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COMPILATION OF GENERAL DESCRIPTIONS AND DATA
OF PUMPS MANUFACTURED IN UNITED STATES

by

Donald E. Anderson and Robert J. Zaworski



Submitted in Partial Fulfillment of the Requirements for
the Bachelor of Science Degree in Mechanical Engineering
from the
Massachusetts Institute of Technology

1947

Signature redacted

Signature redacted

Acceptance:

Instructor in Charge of Thesis,
✓

Signature redacted

September 12, 1947

September 12, 1947
Cambridge, Massachusetts

Professor Joseph S. Newell
Secretary of the Faculty
Massachusetts Institute of Technology
Cambridge, 39, Massachusetts

Dear Sir:

Herein is presented the thesis Compilation of
General Descriptions and Data of Pumps Manufactured in
the United States, which was carried out under the
direction of Mr. R. B. Cheney of the Department of
Mechanical Engineering.

Respectfully submitted,

Signature redacted

Donald E. Anderson

Signature redacted

Robert J. Zaworski

REMARKS

As far as we know, this is the first time any such thesis has been attempted. We gathered and filed a tremendous amount of information, but there are still large volumes that have only been touched upon. Some of these might be the investigation of the many special-purpose pumps such as chemical pumps and the suitable materials of which to make them, hydraulic system pumps, etc., each of which could be a considerable thesis in its own. Due to the large amount of material to be covered, we have made no attempt to go very deeply into any of these types, satisfying ourselves with only a general description and application.

ACKNOWLEDGEMENTS

We wish to take this opportunity to thank our most capable thesis adviser, Mr. R. B. Cheney, for his help in our work. Also we would like to express our appreciation to the companies which made this thesis possible by their wholehearted co-operation.

The information contained in this thesis was obtained from bulletins and catalogs sent to the writers by the various manufacturers.

The names and addresses of about three hundred pump manufacturers were obtained from the ASME Mechanical Directory. A standard form letter, a copy of which is shown on the following page, was then drawn up, mimeographed, and sent to each of these companies. The replies generally included a letter stating that the firm was pleased to cooperate in such an endeavor and that they were including the bulletins and catalogs that covered their line of pumps. Others, in addition to this material, also included various bits of general information, handbooks, and scattered among the replies, were letters from former M. I. T. graduates who generally mentioned their thesis subject and wished us luck in our efforts. Some companies, however, informed us that they no longer manufactured pumps or else had never done so. Still others did not reply to our first class mail request, which accounts for the fact that several companies are not included in our compilation.

86 Harvard Avenue
Brookline 46, Massachusetts
June 23, 1947

Dear Sirs:

We are conducting a thesis at the Massachusetts Institute of Technology on pumping machinery under the direction of Mr. R. B. Cheney of the Department of Mechanical Engineering.

This thesis will consist of a description and compilation of data on all the important types of pumps manufactured in this country.

Any assistance on data, outstanding characteristics, and general descriptions, in the form of booklets, catalogues, and the like, which you can supply us will be very helpful and greatly appreciated.

Very truly yours,

/s/ _____
Donald E. Anderson

/s/ _____
R. J. Zaworski

PURPOSE

To acquaint ourselves with the general types of pumps manufactured in the United States, by compiling a file of them including their uses.

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1.

Trade Name: The Air-Way Pump

Manufacturer: The Airway Pump and Equipment Company, Chicago, Illinois.

Use and Outstanding Characteristics:

A hand-operated pump which makes use of air pressure to force the liquid out in a continuous stream. Principally used for taking liquids from barrels and drums. There is a seal which prevents dirt from getting into the container during the pumping operation. It can be used in the transfer of the following materials: gasoline, kerosene, crude oils, cutting oils, thinners, printing inks, varnish, stains, linseed oils, shellac, turpentine, alcohol, lubricating oils, and emulsified asphalt. For general use on farms, construction jobs, and factories.

Manufacturer's Data:

Rate of Flow: Approx. 15 g.p.m.

2.

Trade Name: Aldrich High Pressure Pumps

Manufacturer: The Aldrich Pump Company, Allentown, Pennsylvania

Use and Outstanding Characteristics:

These units are vertical, triplex, reciprocating-type pumps with three throw crankshafts to allow stroke overlap and thus provide for continuous flow. It is designed to pump small quantities of liquid at high pressures. It has application in bakelite presses, pipe line service, linoleum presses, hydraulic presses, plastic moulding, pressure die casting, high pressure testing, mill balancing rolls, textile machinery rolls, hydraulic drawbenches, hydraulic extrusion presses, oil field water flooding, and composition board and shingle presses.

Manufacturer's Data (Table in reference):

25 to 150 H.P.

5.6 to 136.6 G.P.M.

Working Pressure: 6985 to 510 p.s.i.

Stroke Length: 6" and 7"

R.P.M. 106 and 120

3.

Trade Name: Aldrich High Speed Pumps

Manufacturer : The Aldrich Pump Company, Allentown, Pennsylvania

Use and Outstanding Characteristics:

The Aldrich High Speed Power Pumps are of vertical triplex and quintuplex types, driven by electric motors. They are used in deep mine unwatering and are for general use in industry where hydraulic power pressure of 2000 to 75000 p.s.i. are required. In general the company can provide this type of unit to deal with specific problems if the data are presented to them.

4.

Trade Name: Aldrich High Pressure Pumps

Manufacturer: The Aldrich Pump Company, Allentown, Pennsylvania

Use and Outstanding Characteristics:

This type of pump is a vertical triplex reciprocating power pump which is used chiefly in pumping small quantities of liquid at high pressure. It is used in such fields as plastic moulding, pressure die casting, repressuring in the oil industry, use in balancing rolls in the steel industry, manufacturing calendar rolls for the paper and textile industries, and general use where high pressure is required.

Manufacturer's Data (Table in reference):

$2\frac{1}{2}$ to 15 H.P.
G.P.M. - .28 - 43
Working Pressures - 14900 - 495 p.s.i.

5.

Trade Name: Aldrich-Groff Controllable Capacity "POWER-SAVR" Pumps

Manufacturer: The Aldrich Pump Company, Allentown, Pennsylvania

Use and Outstanding Characteristics:

This type is a vertical triplex reciprocating plunger pump which is operated at constant speed, the output being governed by regulation of the stroke length. The power required is approximately proportional to the pumping output.

The applications of the pump include boiler feeding, especially at pressures over 250 p.s.i. where control of variable load is needed, pipeline pumping such as high pressure butane, gasoline and oil under automatic control without requiring surge tanks; process charging and proportioning where metering is necessary; hydraulic extrusion presses; oil burner supply; and hydraulic steering gear, hoists, airplane catapults, and bulkhead door systems. Driven by motor or turbine drives.

Type: Reciprocating plunger

Manufacturer's Data:

Pressures - 250 - 15000 p.s.i.

6 .

Trade Name: Aldrich Inverted Vertical Quintuplex Pumps

Manufacturer: The Aldrich Pump Company, Allentown, Pennsylvania

Use and Outstanding Characteristics:

This type has the pump crankshaft located at the bottom and liquid end at the top in contrast to conventional types. The unit comes in three sizes: the 6", 8", and 10" strokes, with strokes overlapping each other so that the discharge is continuous. The units have application in water flooding, salt water disposal, pipe line service, central hydraulic systems, and use where large volumes of liquid are involved.

Manufacturer's Data:

Stroke: 6", 8" or 10"

Plunger Diameter: 2" to 8"

Delivery Range: 60 to 2030 g.p.m .

Pressures: Up to 5000 p.s.i.

special cases up to 15000 p.s.i.

7.

Trade Name: Aldrich Inverted Vertical Triplex High Pressure Pumps Series 3800

Manufacturer: The Aldrich Pump Company, Allentown, Pennsylvania

Use and Outstanding Characteristics:

This type has the pump end on top allowing easy access to valves. The

crankshaft has three throws allowing stroke overlap so that there is continuous flow. The unit may be attached to either motor or engine drive through a speed reducer at the base of the unit. It has application in water flooding, salt water disposal, pipe line service, central hydraulic systems, die casting, plastic, and hydraulic presses.

Manufacturer's Data:

Pressures: Up to 15000 p.s.i.
Capacities: Up to 228 g.p.m.
(7824 barrels per day)

8.

Trade Name: Hydroseal Pump

Manufacturer: Allen-Sherman-Hoff, Inc.

Use and Outstanding Characteristics:

This pump is a centrifugal volute type intended for pumping abrasive-laden liquids and slurries, such as are encountered in sandy water and dredging. the hydroseal principle involves introducing a small amount of water into the volute and suction eye of the impeller, and by this preventing abrasive-laden liquid from leaking back through the annular clearances between the impeller and pump side plates, into the pump suction or to the stuffing box. It is also rubber lined with "Maximax" parts which are replaceable in the field.

Manufacturer's Data:

Capacities from 25 g.p.m. to 12000 g.p.m.
Heads up to 196' T.D.H.

9.

Trade Name: Type S Centrifugal Pumps

Manufacturer: Allis-Chalmers Manufacturing Company

Model: Type S

Use and Outstanding Characteristics:

Allis-Chalmers manufactures these double suction single stage pumps for almost any purpose. Sizes range from small compact units to handle just a few gallons per minute to huge 72-inch pumps such as those for handling sewage in large metropolitan areas. These pumps will handle heads up to 475 feet.

Popular size capacities:

From 30 g.p.m. to 7000 g.p.m.

10.

Trade Name: Electrifugal and SSUnit Pumps

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

These pumps are single stage, single suction units and may be mounted in any position. The electrifugal differs from the SSUnit in that, instead of using a standard motor with an extended shaft and a special pump adapter, the motor yoke and the flange on which the pump is mounted are cast integral. Electrifugals may be obtained up to 20 h.p. at 1750 r.p.m. and 25 h.p. at 3500 r.p.m .

Manufacturer's Data:

Capacities: (U S G P M) 10 to 2500

11.

Trade Name: Type M Multi-stage Centrifugal Pumps

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

The type M centrifugal pump is a double-suction multistage volute type unit designed for pumping liquids against high heads. It has an exceptionally long diffusion nozzle and a long sweep return bend between stages.

Manufacturer's Data:

Sizes: from 3 x 2 to 8 x 6

12.

Trade Name: Type A Self-Priming centrifugal pump

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

This pump is of the recirculation type with an automatic bypass check valve .

13.

Trade Name: Solids Handling Pump

Manufacturer: Allis-Chalmers Manufacturing Company

Model: Types CW01 and CW02

Use and Outstanding Characteristics:

The type CW01 is intended for applications where the solids handled are highly abrasive and must be kept out of the stuffing box, regardless of the dilution of the material being pumped, while the CW02 is for jobs where dilution must be kept to a minimum. They are volute type centrifugals.

Manufacturer's Data:

Sizes: from 4 x 3 to 16 x 14

14.

Trade Name: H-Density Feeder

Manufacturer: Allis Chalmers Manufacturing Co.

Use and Outstanding Characteristics:

This feeder was designed to fill a need of the paper and pulp industry for a means of pumping high-density pulp without air binding. It can handle up to 8% dry consistency. The high-density feeder consists of a shaft and multiple vane assembly, which moves the pulp into the pump suction at the rate the pump is designed to move the rest operation.

15.

Trade Name: Type SSOR Open Impeller Stock Pump

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

This is an open impeller centrifugal stock pump. It is available in sizes from 4 x 2 to 12 x 10.

16.

Trade Name: Type PO Open Impeller Stock Pump

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

This centrifugal pump has an open impeller specially designed to handle paper stock.

17 .

Trade Name: Type "HYC" (Hydracone) Centrifugal Pump

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

The type "HYC" centrifugal pump is a single suction, two stage pump with the impellers placed back to back and is used for domestic water service, sluicing service, etc., where a moderately high head is needed. Between the two stages of the pump is the "Hydracone" special type diffuser for converting velocity head to pressure head before the water enters the second stage minimizing the losses between the stages.

Manufacturer's Data:

Sizes: From 4 x 3 to 14 x 12

18.

Trade Name: Process Pumps

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

This is a volute type centrifugal pump designed to handle corrosive and abrasive liquors. It has a unique stuffing box arrangement in that it is located in the suction side of the pump.

Manufacturer's Data:

Heads: Up to a 280 ft.

Capacities: Up to 1300 g.p.m.

19.

Trade Name: Type SS-B Pedestal Type Centrifugal Pump

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

It is a single stage, volute type, centrifugal pump.

Manufacturer's Data:

Sizes from 1 x 3/4 to 8 x 6

20.

Trade Name: Two-Stage SS-Multi Pumps

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

This pump is a two-stage centrifugal pump designed for uses such as boiler feed, humidifier and air-conditioning service, high-lift pumping for buildings, small mining pumps, and oil field operations including gathering, loading, and pipe line pumping. It may be powered by motor, steam turbine, or gasoline engine.

Manufacturer's Data:

Heads: Up to 550 ft.

Capacities: Up to 300 g.p.m.

21.

Trade Name: Centrifugal Fire Pump

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

These centrifugal volute type pumps are designed for fire protection uses in lumber yards, textile mills, warehouses, office buildings and mercantile establishments.

Manufacturer's Data:

Heads: from 60 p.s.i. to 108 p.s.i.

Capacities: from 500 g.p.m. to 1500 g.p.m.

22.

Trade Name: Engine Driven Centrifugal pumps

Manufacturer: Allis-Chalmers Manufacturing Company

Use and Outstanding Characteristics:

They are powered by gasoline, kerosene, distillate, natural gas and

butane burning engines. They are volute type, single stage, single or double suction centrifugal pumps, designed for handling liquids at normal temperatures.

Manufacturer's Data:

Heads: from 20 ft. to 175 ft.
Capacities: from 200 g.p.m. to 5000 g.p.m.

23.

Trade Name: Alten's Pumping Unit
Type A-50-TC

Manufacturer: Alten's Foundry & Machinery Works, Lancaster, Ohio

Use and Outstanding Characteristics:

Used in petroleum industry for pumping oil wells. Entire unit of weatherproof construction. Pumping speeds and stroke lengths adjustable to maximum efficiency. Unit can be used with any type multicylinder or single cylinder engine or electric motor. Internal expanding brake for stopping and holding load in any position with remote control and lock.

Manufacturer's Data:

Range of Strokes: 18, 21, 27, and 30"
Well Working Center: 42"
Unit Structure Rating API 5100 lb.
Unit Gear Peak Torque Rating: API 24750 in.lb.
Total weight less engine and beam: 2300 lb.

24.

Trade Name: Alten's Pumping Unit
Type A-80-TC

Manufacturer: Alten's Foundry & Machine Works, Lancaster, Ohio

Use and Outstanding Characteristics:

Used in petroleum industry in pumping oil wells. Skid type base which gives maximum strength with minimum weight and eliminates foundation necessity. Weatherproof construction. Hanger may be tipped back for well servicing. Stroke lengths and pumping speeds are adjustable. A second well may be pumped by use of "V" underpull attachment. Powered by any type multi-cylinder engine or electric motor. A brake for stopping and holding load in any position with remote control and lock is part of the unit.

Manufacturer's Data:

Manufacturer's Data: (Complete specifications in reference)

Unit Structure Rating API	7500 lbs.
Unit Gear Peak Torque Rating API	44550 in. lb.
Working Well Center	48"
Range of Strokes	22, 26, 30, 36 in.
Total weight of Unit with crank weights, Engine, side rails, less beam weights and engine -	3530 lb.

25.

Trade Name: Alten's Pumping Unit
Type A-110-TC

Manufacturer: Alten's Foundry & Machine Works, Lancaster, Ohio

Use and Outstanding Characteristics:

Used in petroleum industry for pumping oil wells. Self-contained unit type skid base which eliminates necessity of foundation. Weatherproof construction minimizes housing necessity. Stroke lengths and pumping speeds are adjustable. The unit may be powered by any type multi-cylinder engine or electric motor. Internal expanding brake allows stopping and holding load in any position, remote control and lock.

Manufacturer's Data:

Unit Structure API Rating	11000 lbs.
Range of Polished Rod Strokes	28", 32", 38", 44"
Well End Working Center	64"
Pitman End Working Center	57" and 64½"
Overall Length of Base	12'-3"
Weight of Unit Structure (less reducer and beam wts.)	5350#

26.

Trade Name: Alten's Pumping Unit
Type A-140-TC

Manufacturer: Alten's Foundry & Machine Works, Lancaster, Ohio

Use and Outstanding Characteristics:

Used in petroleum industry for pumping oil wells. Unit made of heavy structural steel welded into integral structure. Unit designed such that minor misalignments are easily corrected.

Manufacturer's Data (Complete specifications in reference):

Nomographic Charts are in the reference for computing the following:
1. Static Polish Rod Load

2. Acceleration Factor
3. Polish Rod Load in Pounds
4. Torque Rating
5. Loss of Stroke Due to Rod and Tubing Stretch
6. Over Travel of plunger Due to acceleration
7. Production in barrels per hour
8. Horse power Required

Unit Structure, API Rating	14000 lbs.
Range of Polished Rod Strokes	32" 38", 45" and 54"
Well End Working Center	74"
Pitman End Working Center	68½" and 60½"
Overall length of base	14' 0"
Weight of Complete Unit Pumper (less beam wts. and prime mover)	8250 lb.

American Hard Rubber Company

The materials which may be safely handled by these pumps are as follows:

Acetic acid
Acetone
Alum solutions
Ammonium hydroxide
Calcium Hypochloride
Chlorine solutions
Copper Chloride
Copper sulfate
Ferric chloride
Ferric sulphate
Formic acid
Hydrobromic acid
Hydrochloric acid
Hydrofluoric acid
Mercuric chloride
Nickel sulfate
Nitric Acid up to 16° Be.
Oxalic acid
Phosphoric acid - up to 75%
Potassium hydroxide
Sodium Borate
Sodium Chloride (Brine)
Sodium Hydroxide
Sodium hypochlorite
Sodium sulphide
Sodium thosulphate
Stannic chloride
Sulphuric Acid - up to 50° Be.
Sulphurous acid
Zinc chloride
Zinc sulphate

Rubber solvents such as ether, benzol, aniline, etc., should be avoided when using hard rubber equipment. Other solvents include some hydrocarbons, organic acids and solutions.

27.

Trade Name: Ace Hard Rubber Centrifugal Pump, Type W.A.M.

Manufacturer: American Hard Rubber Company, New York, New York

Use and Outstanding Characteristics:

This pump is of three types of drive; motor and motor with extended drive. It is especially manufactured for use in handling acids and other chemicals best handled by hard rubber. There is no contact of the solution with metal parts.

Manufacturer's Data: (Capacity charts in reference)

On 60 cycle current and s.g. approx. 1.0:

Heads - Up to 82'

G.P.M. - Up to 85

On 50 and 25 cycle current:

Heads - Up to 55'

G.P.M. - Up to 80

28.

Trade Name: Ace Hard Rubber Centrifugal Pump, Type W.E.F.

Manufacturer: American Hard Rubber Company, New York, New York

Use and Outstanding Characteristics:

This type is hard rubber lined with split casing vertically. All essential parts are protected with or made of acid-resisting rubber. The shaft and impeller are molded together thus eliminating the possibility of acid seeping through.

Manufacturer's Data (Capacity charts in reference):

a. 60 cycle current: S.G. approximately 1.0

Heads - Up to 95'

G.P.M. - Up to 360

b. 25 and 50 Cycle current:

Heads - Up to 64'

G.P.M. - Up to 300

29.

Trade Name: Ace Hard Rubber Rotary Gear Pump, Type G.

Manufacturer: American Hard Rubber Company, New York, New York

Use and Outstanding Characteristics:

This pump was designed for uses in handling corrosive chemicals including

acids, alkalis, and their solutions. The pumps come with either a hard rubber covered shaft or a Hastelloy Covered shaft. Hastelloy covered is not suitable for services with sodium hypochlorite, ferric chloride, and hydrofluoric acids. It has application in removing and distributing acids from carboys and tanks, pumping from tank to tank or tank to process division, pumping on acid tower work, and for direct agitation of plating or other solutions by pumping.

Manufacturer's Data (Table in reference):

Capacity - 7 G.P.M.
Heads - Up to 81'
Pressure - Up to 35 p.s.i.

30.

Trade Name: Ace Hard Rubber Reciprocating Pump, Type J for Acid Handling

Manufacturer: American Hard Rubber Company, New York, New York

Use and Outstanding Characteristics:

These are displacement type with the only parts in contact with the liquid completely protected by acid-resisting hard rubber. The pump discharges only on the down stroke so the flow is intermittent and not suitable for high suction lift or discharge pressure. Either hand or belt driven.

Manufacturer's Data (Table in reference):

G.P.M. - Up to 14
Strokes per minute - Up to 75

31.

Trade Name: Amsco Type "XH" Pumps

Manufacturer: American Manganese Steel Division American Brake Shoe Company,
Chicago, Illinois

Use and Outstanding Characteristics:

A dredge pump of heavy construction with either standard or counterflow water ends. The position of the impeller may be fixed to satisfy requirements of hydraulic efficiency.

Manufacturer's Data:

Sizes - 12" 16" 18" 20"
An example of one of these types is as follows:

1000 H.P. 400 r.p.m. slip ring motor
Dynamic head - 185'
13600 G.P.M. of mixture of solids and water
500 yards per hour material rate
Passes stones 7" diameter

32.

Trade Name: Amsco Type "H" Pumps

Manufacturer: American Manganese Steel Division, Chicago Heights, Illinois

Use and Outstanding Characteristics:

Dredge pumps available with both Standard and Counterflow water ends. They can be used for river and general dredging purposes in addition to use in commercial production of sand and gravel.

Manufacturer's Data:

Example:

600 H.P. 514 R.P.M. slip ring motor
Heads - to 160'
Capacity - 8000 G.P.M.
Material Rate - 225 yards per hour

33.

Trade Name: Amsco Type "M" Pumps

Manufacturer: American Manganese Steel Division, Chicago Heights, Illinois

Use and Outstanding Characteristics:

These units may be fitted with either counterflow or standard water ends. They may be directly coupled to their driver or may be arranged as belt-driven units. In general use as dredge-type pumps.

Manufacturer's Data:

Sizes - 6", 8", 10"
Heads - To 260'
Motor H.P. - 250
Rated Capacity - 3000 G.P.M.
Material Rate - 90 yards per hour

34.

Trade Name: Amsco Type "C" Pumps

Manufacturer: American Manganese Steel Division, Chicago Heights, Illinois

Use and Outstanding Characteristics:

These pumps are of light construction for general use in dredging and sand and gravel production. It may be fitted with either counterflow or standard water ends. It has a combined thrust and radial bearing assembled as unit, but the radial bearing is a singular annular babbitted replaceable sleeve, allowing it to be machined rather than scraped.

Manufacturer's Data:

Sizes: 6", 8", 10"
Example of 8" size:
150 H.P. motor
Head 130'
1700 G.P.M. of solids and water
Material Capacity - 60 yards per hour

35.

Trade Name: Amsco Type "I" Pumps

Manufacturer: American Manganese Steel Division, Chicago Heights, Illinois

Use and Outstanding Characteristics:

Amsco Type "I" pumps are designed to handle abrasive materials. They are smaller in size than the standard dredge pumps and may be used for pumping pulp, ashes, sand, cement slurry, sewerage, slime and tailings in metal mines, mine drainage, coal washing water, and any materials of an abrasive nature. It is made of manganese steel which aids impact and abrasive resistance.

Manufacturer's Data:

Sizes: 3", 4", 5", 6", and 8"
Mixture capacity: 2000 G.P.M.
Material Rate: 60 yards per hour

36.

Trade Name: Boiler Feed Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Simpler type, Piston Packed

Use and Outstanding Characteristics:

They are direct acting, steam operated, piston packed, simpler pumps,

designed for boiler feed and general service and are available in the valve-plate type or side pot type-tie bar yoke form.

Manufacturer's Data:

Capacities in g.p.m. ranging from 1.95 to 558
Heads up to 250 p.s.i.
Steam Pressures up to 250 p.s.i.

37.

Trade Name: Boiler Feed Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Duplex type, Piston Packed

Use and Outstanding Characteristics:

These boiler-feed and general service pumps are of the Duplex, direct acting, steam driven, piston packed type. They are manufactured as valve plate types, turret types, or side pit-twin pattern types.

Manufacturer's Data:

Capacities in g.p.m. ranging from 9 to 960
Heads up to 400 p.s.i.
Steam pressures up to 300 p.s.i.

38.

Trade Name: Boiler Feed Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Simplex Pumps, Outside Packed Plunger type

Use and Outstanding Characteristics:

Designed for boiler feed and general service, these pumps are of the simplex, direct acting, steam operated, outside packed plunger form. The piston packed pump is slightly more efficient but this one is better for handling gritty fluids.

Manufacturer's Data:

Capacities in g.p.m. Ranging from 24 to 558
Heads up to 250 p.s.i.

39.

Trade Name: Boiler Feed Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Duplex, Outside Packed Plunger type

Use and Outstanding Characteristics:

These duplex, direct acting, steam operated, outside packed plunger pumps are designed for boiler feed and general service. They have a slightly lower efficiency than a piston-packed pump but are much better for handling gritty fluids.

Manufacturer's Data:

Capacities in g.p.m.: Ranging from 29 to 530

Heads: Up to 350 p.s.i.

Steam Pressures: Up to 300 p.s.i.

40.

Trade Name: Wet Vacuum Pumps

Manufacturer: American Marsh Pumps, Inc., Battle Creek, Michigan

Model: Steam Driven, Piston packed type

Use and Outstanding Characteristics:

Designed for use on vacuum heating systems and in various manufacturing processes requiring vacuums up to 26 inches (as referred to a 30-inch barometer), these pumps are of the direct-acting, steam-driven, piston-packed type.

Manufacturer's Data:

Capacities: From 13 g.p.m. to 1678 g.p.m.

Heads: Up to 250 p.s.i.

Steam Pressures: Up to 250 p.s.i.

E.D.R. Ratings: From 2600 to 335600

41.

Trade Name: Deep Well Engines

Manufacturer: American Marsh Pumps, Inc., Battle Creek, Michigan

Use and Outstanding Characteristics:

These pumps consist of an engine, which is available in the plain yoke

type, hinge base type, and hinge base type with displacement plunger, located at the surface, directly over the well, which operates a well cylinder by means of a well rod which connects the steam piston of the engine to the water plunger of the well cylinder. These engines can be operated by means of steam, compressed air, or natural gas.

Manufacturer's Data:

Capacities in g.p.m. range from 150 to 4370
Total heads up to 300 ft.

42.

Trade Name: Hydraulic Pressure Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Simplex, outside end packed plunger type

Use and Outstanding Characteristics:

These units are of the simplex, direct acting, steam operated, outside end packed plunger type with double acting fluid cylinder form.

Manufacturer's Data:

Capacities: Up to 18 g.p.m.
Pressures: Up to 5000 p.s.i.

43.

Trade Name: Heavy Liquids Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Filter-Press type

Use and Outstanding Characteristics:

These "Filter-Press" types are single-cylinder, direct acting, steam driven, piston-packed pumps. They are also furnished as power driven models.

Manufacturer's Data:

Capacities range from 18.1 g.p.m. to 157 g.p.m.
Heads: Up to 150 p.s.i.

44.

Trade Name: Heavy Liquids Pump

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Magna Type

Use and Outstanding Characteristics:

American-Marsh Magna pumps, plunger type, steam driven, are designed for handling thick, heavy, or viscous liquids (syrups, molasses, hot lard, etc.). Suction valves are entirely eliminated - the fluid inlet opens directly into the cylinder. They may also be obtained as power-driven models.

Manufacturer's Data:

Basic capacities: ranging from 12.2 g.p.m. to 103 g.p.m.
Pressures: up to 150 p.s.i.
Maximum steam pressure of 150 p.s.i.

45.

Trade Name: Redi-Oiled Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Piston Packed Duplex power pump type

Use and Outstanding Characteristics:

This unit is a piston packed, duplex power pump with a flood lubrication. Flatbelt, V-Belt, chain, gear or direct drive is available. There is a choice between valve-plate type piston packed, side pot piston packed, or outside center packed plunger, or outside end packed plunger pumps.

Manufacturer's Data:

Capacities Ranging from 35 g.p.m. to 216 g.p.m.
Working Pressures up to 400 p.s.i.

46.

Trade Name: End suction Centrifugal Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type R

Use and Outstanding Characteristics:

This is a single stage, single volute type centrifugal pump available with either open or closed impellers.

Manufacturer's Data:

Capacities from 8 g.p.m. to 2500 g.p.m.
Total heads up to 210 ft.

47.

Trade Name: Redi-Drain Sump Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Volute Centrifugal

Use and Outstanding Characteristics:

Designed for sump draining, these pumps are constructed of bronze and stainless steel below the sump cover. They are driven by vertically mounted electric motors with thermal overload protection and an automatic float switch.

Manufacturer's Data:

Capacities from 5 g.p.m. to 225 g.p.m.
Shut-off Heads up to 70 ft.

48.

Trade Name: Single stage, double suction centrifugal pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type HBM

Use and Outstanding Characteristics:

Horizontally split case, centrifugal, volute type single stage pumps with double suction, they are available with either open or closed impellers.

Manufacturer's Data:

Sizes ranging from 3/4 x 1 to 16 x 16

49.

Trade Name: Centrifugal single stage pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Types HLM and HIM

Use and Outstanding Characteristics;

These are single stage, double suction, volute type, centrifugal pumps,

with horizontally split cases. The complete rotating element is removable as one unit. It is available with either open or closed impeller.

Manufacturer's Data:

Capacities from 85 g.p.m. to 4500 g.p.m.
Total Heads up to 115 ft.

50.

Trade Name: Single Stage Centrifugal Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type HCM

Use and Outstanding Characteristics:

These are single stage, double suction, centrifugal pumps with a horizontally-split case, that are adaptable to Electric Motor, steam turbine, gas engine or belt drive. They are available with either open or closed impellers.

Manufacturer's Data:

Sizes from 3/4 x 1 to 8 x 10

51.

Trade Name: Single Stage Centrifugal Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type HSM

Use and Outstanding Characteristics:

Single stage, double suction centrifugal volute type pumps with horizontally split case, types HSM have a stainless steel shaft.

Manufacturer's Data:

Sizes from 1 1/2 x 2 to 5 x 6

52.

Trade Name: Two-stage Centrifugal Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type HJM

Use and Outstanding Characteristics:

This type is a two-stage, single-suction, volute centrifugal pump suitable for electric motor, steam turbine, gas engine, or belt drive.

Manufacturer's Data:

Capacities ranging from 125 g.p.m. to 1250 g.p.m.
Heads up to 380 ft.

53.

Trade Name: Boiler Feed two-stage Centrifugal Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type HHM

Use and Outstanding Characteristics:

This pump is of the two-stage, single suction, volute centrifugal form and was designed for boiler feed service handling hot water as high as 300° F.

Manufacturer's Data:

Capacities up to 700 g.p.m.
Heads up to 350 p.s.i.

54.

Trade Name: Boiler Feed Multi-stage Centrifugal Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type OSMH

Use and Outstanding Characteristics:

This unit is a four-stage, volute type centrifugal pump designed for pressure boiler installations. It is intended to handle water at temperatures up to 500° F.

Manufacturer's Data:

Capacities up to 800 g.p.m.
Pressure up to 500 p.s.i.

55.

Trade Name: Motor-Units

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type RMV

Use and Outstanding Characteristics:

These are self-contained units consisting of a volute, single-stage centrifugal pump and an electric motor, gasoline engine, or steam turbine. Also with special conversion it is very suitable for high-suction pressures and allows external lubrication of the packing. This is important when pumping volatile liquids such as gasoline, etc.

Manufacturer's Data:

Capacities from 5 to 600 g.p.m.
Heads up to 328 ft.

56.

Trade Name: Redi-Prime Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Self-priming pump and gasoline engine units.

Use and Outstanding Characteristics:

This volute type single-stage pump is primed by an exhaust primer (patented) which is automatic in action.

Manufacturer's Data:

Capacities from 25 g.p.m. to 300 g.p.m.
Total heads up to 85 ft.

57.

Trade Name: Portable Centrifugal Fire Pump

Manufacturer: American-Marsh Pumps, Inc.

Model: MXF

Use and Outstanding Characteristics:

This pump was designed to meet a need for a larger capacity portable pump. It has a patented exhaust-type primer and is of centrifugal form.

Manufacturer's Data:

Capacities from 25 to 200 g.p.m.
Heads up to 335 p.s.i.

58.

Trade Name: Portable Centrifugal Fire Pump

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type XF

Use and Outstanding Characteristics:

This pump is intended for use in rural areas as an all-around handy pump. It is a gasoline engine driven centrifugal with a full load fuel consumption of approximately one-half gallon per hour, and has automatic priming on lifts up to 20 ft.

Manufacturer's Data:

Capacities from 3 to 65 g.p.m.
Heads from 20 to 140 p.s.i.

59.

Trade Name: Condensation Units

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Automatic pumps and receivers

Use and Outstanding Characteristics:

They are available in centrifugal, turbine, steam and power types and are suitable for handling water and condensate at temperatures up to 210° F. The Redi-Return type has a horizontal pump built right into the receiver, the turbine type is for smaller capacities against higher boiler pressures, and the centrifugal types are built to order for special specifications. The steam types have a semi-rotation valve and the power types are again for small capacities against high heads.

Manufacturer's Data:

Capacities from 7½ to 450 g.p.m.
Heads up to 400 p.s.i.
Tank sizes from 16 to 500 gallons

60.

Trade Name: Junior Redi-Return condensation Unit

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Use and Outstanding Characteristics:

This is a pump and receiver unit designed for use in hotels, apartment houses, and private homes that require a condensation unit on a smaller scale.

Suitable for handling water at 210° F.

Manufacturer's Data:

Capacities from 7½ g.p.m. to 27 g.p.m.
Discharge pressures up to 20 p.s.i.

61.

Trade Name: Redi-Return Condensation Units

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Use and Outstanding Characteristics:

These units consist of a volute type centrifugal pump, electrically driven and a receiving tank and can be had as twin units or singles. They are suitable for temperatures up to 210° F.

Manufacturer's Data:

Pressures up to 125 p.s.i.
Capacities from 1000 to 300,000 d.c.i.r. and from 7½ to 50 g.p.m.

62.

Trade Name: Condensation Units

Manufacturer: American-Marsh Pumps, Inc.

Model: Types VKR and VMR

Use and Outstanding Characteristics:

With turbine type centrifugal pumps these units are intended for small capacities and high pressures. They are produced as single or twin units.

Manufacturer's Data:

Capacities from 2000 to 50,000 D.R. and from 3 to 75 g.p.m.

63.

Trade Name: Twin Fuel Oil Pumping Outfits

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Use and Outstanding Characteristics:

In the two smallest sizes the units are furnished with two simplex pumps while the larger outfits have two duplex pumps and are intended for pressure fuel oil regulation.

Manufacturer's Data:

Capacities from .25 g.p.m. to 50 g.p.m. per pump
Boiler H.P.: Each pump will supply from 25 to 5000
Working pressure of 150 p.s.i.

64.

Trade Name: Redi-Vac Pumps

Manufacturer: American-Marsh Pumps, Inc.

Model: Types XAV and AV

Use and Outstanding Characteristics:

The Redi-Vac pump automatically removes air and condensation from the return lines, discharging the air to the atmosphere and the water to the heater or boiler. The air and water of condensation are removed from the heating systems by means of a vacuum produced by water under pressure being delivered through nozzles or jets into telescopic draft tubes suspended vertically from the upper section. The air separates from the jet or circulating water as soon as it enters the circulating water chamber and is then released to the atmosphere. High pressure returns may be conducted directly to the boiler feed chamber independent of the vacuum system. It is furnished in either single or duplex units.

Manufacturer's Data:

Capacities from 2500 to 300,000 E.D.R. and from 3.8 to 450 g.p.m. at $5\frac{1}{2}$ " mercury vacuum with water at 160° F.

65.

Trade Name: Turbine Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type V

Use and Outstanding Characteristics:

These pumps are of the turbine type and are designed for handling any non-viscous liquid free from abrasive matter such as water, brine, light oils, gasoline, light syrups, liquid foods, etc. Suitable for suction lifts up to 28 ft.

66.

Trade Name: Self-Priming Centrifugal Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type VS

Use and Outstanding Characteristics:

This is a self-priming turbine type pump designed to operate under suction lifts up to 28 ft.

67.

Trade Name: Process Pump

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type OSO

Use and Outstanding Characteristics:

This pump was designed to meet the needs of the oil and chemical industries for a pump to handle hot oil, Propane, butane, Acids, Dowtherm, gasoline, black liquor, evaporator condensate, ammonia, sulphur dioxide extracts and organic fluids. It is a single stage volute type centrifugal pump.

Manufacturer's Data:

Capacities up to 1200 g.p.m.

Differential heads to 750 ft. with suction pressures up to 400 p.s.i.

Temperatures up to 800° F.

68.

Trade Name: Process Pump

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type OSCV

Use and Outstanding Characteristics:

This is a single stage volute type centrifugal pump intended to pump Propane, butane, crude oil, acids, gasoline, naphtha, black liquor, condensate, ammonia, and organic fluids.

Manufacturer's Data:

Capacities up to 1200 g.p.m.
Differential heads to 750 ft. with suction pressures up to 300 p.s.i.
Temperatures up to 350° F.

69.

Trade Name: Brewery Pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type MVIS

Use and Outstanding Characteristics:

These pumps are sanitary centrifugal, volute type brewery pumps designed for handling hot or cold wort, beer, rorlauf, and carbonating, filtering, and racking

70.

Trade Name: Centrifugal pumps

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Model: Type WHM

Use and Outstanding Characteristics:

These pumps are specifically designed for handling mash in a brewery. They will pump any mash of a consistency sufficiently fluid to pass into the pump suction.

71.

Trade Name: Turbo-lift shallow well water systems

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Use and Outstanding Characteristics:

It is a turbine type pump for water supply systems where the suction lift does not exceed 28 feet.

Manufacturer's Data:

Capacities from 300 g.p.h. to 1000 g.p.h. at about 30 p.s.i.

72.

Trade Name: Jeto-Lift Deep Well Water Systems

Manufacturer: American-Marsh Pumps, Inc., Battle Creek, Michigan

Use and Outstanding Characteristics:

These include centrifugal type injector pumps which are practical for suction lifts of over 28 feet down to 300 feet. It has only one moving part.

73.

Trade Name: Caisson Pump

Manufacturer: American-Marsh Pumps, Inc.

Use and Outstanding Characteristics:

This pump is used for dewatering caissons, mines, quarries, or excavations where it is intended to be lowered to the water level. Units can be furnished to pass as large as 5" diameter solids.

Manufacturer's Data:

Capacities up to 5000 g.p.m.
Pressures up to 150 p.s.i.

74.

Trade Name: American Centrifugal Sewerage with Single Blade Impeller

Manufacturer: The American Well Works, Aurora, Illinois

Use and Outstanding Characteristics:

A single blade impeller sewerage pump designed for non-clogging operation under normal sewerage operation. There is only one discharge, thus eliminating divided flow.

75.

Trade Name: American Deep Well Turbine Pump, Type "FA"

Manufacturer: The American Well Works, Aurora, Illinois

Use and Outstanding Characteristics:

A deep well pump with water lubrication. The column is of steel drop pipe which comes in 10' lengths, and in sizes up to 7". The unit comes also with bearings, bowls, and impellers made from Chrome-nickel alloy iron, which is recommended for liquids which might be abrasive because this alloy has a greater hardness than either bronze or steel.

76.

Trade Name: American Two Stage Centrifugal Pump

Manufacturer: The American Well Works, Aurora, Illinois

Use and Outstanding Characteristics:

Volute design casing made of close-grained grey iron. The water pass from the first to the second stage is within the casing to reduce friction losses. The impellers are back-to-back single suction enclosed type generally furnished of bronze.

Manufacturer's Data: (Complete tables in reference)

1. Heads of 160 - 240' 3500 r.p.m.
Up to 300 g.p.m.
2. Heads of 250 - 330' 350 r.p.m.
Up to 300 g.p.m.
Up to 40 H.P. motors
3. Heads of 340 - 420' 3500 r.p.m.
To 300 g.m. 40 H.P. motors
4. At 1760 r.p.m.
Heads to 410'
Capacity - Up to 1000 g.p.m.
Motor Sizes: 50 to 125 H.P.

77.

Trade Name: American Double Suction Pumps

Manufacturer: The American Well Works, Aurora, Illinois

Use and Outstanding Characteristics:

Of double suction volute design, made of close-grained grey iron, split

horizontally on the center line. Water seal passages are cast integral with the top half casing. The impeller is the double suction enclosed type made of bronze.

Manufacturer's Data: (Complete tables in reference)

Sizes 2 x 1½ to 14 x 14 where the suction and discharge openings are indicated.

1. At 3500 r.p.m.
Heads 60 to 250'
Capacity 55 to 850 g.p.m.
Motor sizes: 3 to 60 H.P.
2. At 1760 r.p.m.
Heads 60 to 270'
Capacity: to 4000 g.p.m.
Motor H.P.: ½ to 400
3. At 1160 r.p.m.
Heads: Up to 280'
Capacity: 2000 - 7000 g.p.m.

78.

Trade Name: American Sewerage Pumps

Manufacturer: The American Well Works, Aurora, Illinois

Use and Outstanding Characteristics:

A horizontal pump-motor drive unit. The suction cover is not cast integral with the volute and it can be provided with a renewable wearing ring for the wearing surface on the impeller side. The impeller is of the single-suction enclosed type with two parts, made of grey iron. Repelling vanes are cast integral on both sides of the impeller to prevent packing of fibrous materials between stationary covers and rotating impeller, and to minimize circulation from discharge side of the impeller to suction side and to packing box side.

Manufacturer's Data (Complete table in reference):

Sizes 3 x 3 to 14 x 14

1. Size 3" x 3"
Dynamic head of water - to 105'
Capacity - to 550 g.p.m.
Motor size - ¾ to 15 H.P.
2. Size 14" x 14"
Dynamic head - to 75'
Capacity - to 7500 g.p.m.
Motor size - 25 to 125 H.P.

79.

Trade Name: American Centrifugal Pumps, Type 3500

Manufacturer: The American Well Works, Aurora, Illinois

Use and Outstanding Characteristics:

Used for clear liquid service, has an enclosed impeller, and has ball bearings. It has a jack shaft for belt drive, hence needs no overhung sheave or pulley. The maximum temperature of water to be handled is 180° F.

Manufacturer's Data: (Table in reference)

Sizes 2 x 1½ to 4 x 3
Total dynamic heads - to 120'
Capacity: 40 - 550 g.p.m.
Motor H.P.: ¾ to 20

80.

Trade Name: American Type U Open Impeller Centrifugal Pumps

Manufacturer: The American Well Works, Aurora, Illinois

Use and Outstanding Characteristics:

Designed to meet demand for plain open impeller type centrifugal pump for general purpose duty. It comes either motor or belt driven.

Manufacturer's Data:

Sizes ¾" - ¾" discharge 1" suction
to 5" - 5" discharge 5" suction
Maximum working pressure - 75 p.s.i.
Maximum suction pressure - 25"
Maximum pumping temp. - 150° F.
Heads - to 125'
G.P.M. - to 750

81.

Trade Name: Deep Well Turbine Pumps

Manufacturer: Aurora Pump Company

Model: Type TH

Use and Outstanding Characteristics:

Intended for use as a water supply pump for municipal, industrial and large estates needs, this unit is a turbine type centrifugal pump and is oil lubricated. It is available for any head desired.

Manufacturer's Data:

Sizes from 6" to 24"
Capacities from 40 g.p.m. to 6500 g.p.m.

82.

Trade Name: Deep Well Turbine Pumps

Manufacturer: Aurora Pump Company

Model: Type TH

Use and Outstanding Characteristics:

This is a turbine type centrifugal pump with water lubrication. Available for any head desired and was intended as a water supply pump.

Manufacturer's Data:

Sizes from 6" to 24"
Capacities from 40 to 6500 g.p.m.

83.

Trade Name: Aurora Sump Pumps

Manufacturer: Aurora Pump Company

Model: Type MSM

Use and Outstanding Characteristics:

These pumps are low head, small capacity centrifugal volute type units intended for sump drainage in building basements, tunnels, pits and for transfer of chemicals and hot liquids in chemical and heat treating plants.

Manufacturer's Data:

Capacities up to 110 g.p.m.
Heads up to 40 ft.

84.

Trade Name: Vertical Sump Pumps

Manufacturer: Aurora Pump Company

Model: Types NSA and KS

Use and Outstanding Characteristics:

These pumps are centrifugal, volute types designed for sump drainage and liquids handling in industry (i.e., sugar mills, food processors, beverage manufacturers, etc.), and for transfer of hot liquids and chemicals. Types KS

are intended to handle larger solids than types NSA, which will take solids up to 1 3/8" diameter. Types KS will take solids up to 3".

85.

Trade Name: Centrifugal Pumps

Manufacturer: Aurora Pump Company

Model: Type OD

Use and Outstanding Characteristics:

These are double suction, single stage, volute type centrifugal pumps.

86.

Trade Name: Close Coupled Centrifugal Pumps

Manufacturer: Aurora Pump Company

Model: Type GMC

Use and Outstanding Characteristics:

In the design of these single stage volute type centrifugal pumps is a single shaft for motor and pump, eliminating the necessity for a coupling. Intended for circulating and liquid transfer, air conditioning, condensers, cooling towers, chemical plants, process plants, water works, food packing, power stations, beverage plants, distilleries, refineries, sewerage plants, bulk stations, dairies and milk plants, coal and metal mines, water softeners, bottle and can washers, metal washers, marine installations, and as an integral part of filters.

Manufacturer's Data:

Capacities from 10 to 800 g.p.m.
Heads up to 250 ft.

87.

Trade Name: Centrifugal Pumps

Manufacturer: Aurora Pump Company

Model: Type AD

Use and Outstanding Characteristics:

These are two-stage, volute type centrifugal pumps intended for water supply, brine circulation, hot water circulation, water booster service for upper floors of buildings, white water and overflow service in paper mills, condensation return, hot well, make up water service and any other duties involving the handling of clear water and other low viscosity liquids not containing solids.

Manufacturer's Data:

Capacities from 50 g.p.m. to 1200 g.p.m.
Heads up to 460 ft.

88.

Trade Name:

Aurora Non-Clog Pumps

Manufacturer: Aurora Pump Company

Model: Types KV and KGG

Use and Outstanding Characteristics:

These pumps are single-stage volute type units intended for duties involving the handling of heavy liquids and liquids containing solids such as sewage and pump sludge. The KV types are vertical units while the KGG types are horizontal.

Manufacturer's Data:

Capacities from 100 g.p.m. to 4000 g.p.m.
Heads up to 100 ft.

89.

Trade Name: Centrifugal Pumps

Manufacturer: Aurora Pump Company

Model: Types GGV

Use and Outstanding Characteristics:

Intended for use in processing plants including handling of corrosive liquids, these units are single stage, single suction, volute type centrifugal pumps.

Manufacturer's Data:

Capacities from 10 g.p.m. to 1400 g.p.m.,
Heads up to 190 ft.

90.

Trade Name: Single Suction Pumps

Manufacturer: Aurora Pump Company

Model: Types SRH and SRV

Use and Outstanding Characteristics:

These low head, large capacity pumps are turbine type centrifugals that are used for moving large quantities of water such as are encountered in caissons, dry docks, mines, excavations, grade separation drainage, tunnels, irrigation, etc.

Manufacturer's Data:

Capacities up to 6500 g.p.m.

91.

Trade Name: APCO turbine type pumps

Manufacturer: Aurora Pump Company

Use and Outstanding Characteristics:

These pumps are single and two-stage turbine type centrifugals for use in water supply, boiler feed, condensation return, hot and cold water circulation, chemical transfer, high temperature liquids, filtering, refinery work, natural gasoline plant service, self priming uses, irrigation, cooling tower, marine service, gasoline and propane circulation, booster work, brewery and distillery service, brine circulation, dairy industry uses, and special metals pumps.

Manufacturer's Data:

Capacities up to 100 g.p.m.
Heads up to 350 ft.

92.

Trade Name: APCO Master-Line Water Supply Systems

Manufacturer: Aurora Pump Company

Use and Outstanding Characteristics:

These are complete shallow well water supply systems with a turbine type centrifugal pump.

Manufacturer's Data:

Capacities up to 3000 g.p.h.
Head of 40 p.s.i.

93.

Trade Name: Condensation Return Units

Manufacturer: Aurora Pump Company

Model: Type APCO

Use and Outstanding Characteristics:

These are turbine type centrifugal pumps and are designed to pump steam and air without vapor lock and are units intended for the automatic return to low and high pressure boilers of the hot water condensation from radiators, coils, etc.

Manufacturer's Data:

E.D.R. up to 100,000
Capacities up to 150 g.p.m.
Heads up to 115 p.s.i.

94.

Trade Name: Keep-Pak Pumps

Manufacturer: Axelson Manufacturing Company

Model: Rod type-Stationary Barrel

Use and Outstanding Characteristics:

These deep well oil pumps are deep well units designed to deliver satisfactory service where production is restricted or does not warrant the use of metal pumps. This type has either an 8 or 4 cup plunger and a stationary barrel.

Manufacturer's Data:

Sizes from 2" x 1 1/10" to 2 1/2" x 2"
Strokes from 36" to 152"

95.

Trade Name: Keep-Pak Pumps

Manufacturer: Axelson Manufacturing Company

Model: Rod type - traveling barrel

Use and Outstanding Characteristics:

Intended for deep wells where production can be adequately handled with pumps equipped with cups or packing, they are rod-type traveling barrel, deep well pumps with an eight-cup plunger. Use of a nipple strainer is advised.

Manufacturer's Data:

Sizes from 2" x 1 $\frac{1}{2}$ " to 2 $\frac{1}{2}$ " x 2"
Strokes from 27" to 155"

96.

Trade Name: Super-Service Pump

Manufacturer: Axelson Manufacturing Company

Model: Type R.S.L.

Use and Outstanding Characteristics:

This is a rod sectional liner, stationary barrel type, deep well pump and is equipped with hardened nickel-molybdenum alloy steel liners and plunger. The lower end of the plunger incorporates the Perry Anti-gas-lock working valve, and the upper end has a Barnwell sand scraper. It also has a patented top lock hold down with renewable seats which is recommended for use anchoring unit.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 4" x 2 3/4"
Strokes from 48" to 192"

97.

Trade Name: R.S.L. Pump

Manufacturer: Axelson Manufacturing Company

Model: Traveling Barrel Type

Use and Outstanding Characteristics:

These pumps are intended for use in oil wells having sandy conditions as the external barrel assembly telescopes over the plunger unit, keeping the fluid in constant circulation, minimizing the chances of sanding up. Connection to the sucker rod string is made directly to the top cage or guide coupling, eliminating the necessity of a pump rod. The working valve is located in the upper end of the barrel assembly and the standing valve is in the upper end of the plunger.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 3" x 2 1/4"
Strokes from 57" to 117"

98.

Trade Name: R.S.L. Pump

Manufacturer: Axelson Manufacturing Company

Model: Stationary Barrel Type

Use and Outstanding Characteristics:

This pump is a deep well pump of Rod Sectional Liner type with bottom anchor, shell and sealing unit. The use of a guide type paraffin sub-coupling at the upper end of the pump rod is recommended. The pump may be removed and installed with the sucker rods without pulling tubing and is based on the metal to metal principle.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 3" by 2 1/4"
Strokes from 56" to 116"

99.

Trade Name: Groove-Seal R.C.O. Pump

Manufacturer: Axelson Manufacturing Company

Model: Stationary barrel type

Use and Outstanding Characteristics:

This stationary type, deep well oil pump with top lock hold down is

intended for oil well production under average conditions and is based on the metal-to-metal principle. It is comprised of a barrel unit which remains stationary in the well tubing and a sectional cast-iron plunger carrying the working valve, which reciprocates with the sucker rods. The plunger sections are externally grooved to allow the use of a comparatively loose fitting plunger, as the turbulence created in each of the grooves produces a sealing effect.

Manufacturer's Data:

Sizes from 2" x 1 1/2" to 3" x 2 1/2"
Strokes from 53" to 106"

100.

Trade Name: R.S.L. Acme Pump

Manufacturer: Axelson Manufacturing Company

Model: Traveling Barrel type

Use and Outstanding Characteristics:

This type of rod sectional liner deep well oil pump differs from conventional traveling barrel styles in that the plunger passes entirely through the liners, which reduces the number of liners and affords an advantageous relationship between pump bore and standing valve capacity. The plunger also serves as a pull tube.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 2 1/2" x 1 3/4"
Strokes from 55" to 103"

101.

Trade Name: Star-B R.C.D. Pump

Manufacturer: Axelson Manufacturing Company

Model: Traveling Barrel type

Use and Outstanding Characteristics:

These deep well oil pumps are offered for use in stripper wells where the production has become too limited to warrant the further use of tubing pumps. These pumps are installed and removed without pulling tubing. This type has a

stationary plunger assembly connected to the standing valve and hold-down unit, while the barrel, carrying the working valve, reciprocates with the rods, telescoping over the plunger assembly. The pump has a cup-type hold down which allows it to be inserted in the top of an old working barrel in the well. The use of a strainer nipple is recommended.

Manufacturer's Data:

Sizes from 2" x 1½" to 2½" x 2"
Strokes from 33" to 69"

102.

Trade Name: T.S.L. Pump

Manufacturer: Axelson Manufacturing Company

Model: Regular type

Use and Outstanding Characteristics:

This is a deep well oil pump of basic design with all parts conforming to A.P.I. standards.

Manufacturer's Data:

Sizes from 2" x 1 3/4" to 4" x 3 3/4"
Strokes from 6" to 66"

103.

Trade Name: Star-B R.C.D. Pump

Manufacturer: Axelson Manufacturing Company

Model: Stationary Barrel type

Use and Outstanding Characteristics:

These deep well oil pumps are adapted for use in stripper wells and are based on the metal-to-metal principle, with a grooved plunger to allow a good seal with large tolerancers. In this type the barrel tube, together with the standing valve and hold-down unit, is stationary, while the plunger assembly, carrying the working valve, reciprocates with the sucker rods. The use of a strainer nipple is recommended.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 2 1/2" x 1 1/2"
Strokes from 32" to 70"

104.

Trade Name: Groove-Seal R.C.D. Pump

Manufacturer: Axelson Manufacturing Company

Model: Traveling Barrel type

Use and Outstanding Characteristics:

This deep well oil pump was designed for service for average well conditions at less cost than a sectional liner pump, and it comprises a traveling barrel unit reciprocating over a stationary plunger. The working valve is mounted at the upper end of the barrel assembly and the plunger is grooved to allow a good seal with loose tolerances.

Manufacturer's Data:

Sizes from 1 1/2" x 1 1/4" to 3" x 2 1/2"
Strokes from 57" to 110"

105.

Trade Name: R.S.L. Pump

Manufacturer: Axelson Manufacturing Company

Model: Stationary Barrel Type

Use and Outstanding Characteristics:

Designed for pumping wells making sand, water and gas, this deep well pump is a rod sectional liner, stationary type with top-lock hold down, guide coupling, Perry-Barnwell plunger, and combined collar and cage. It is composed of a barrel unit which remains stationary in the well tubing and a plunger assembly traveling with the sucker rods.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 4" x 2 3/4"
Strokes from 48" to 132"

106.

Trade Name: T.S.L. Pump

Manufacturer: Axelson Manufacturing Company

Model: Top Collar both ends type

Use and Outstanding Characteristics:

This is a deep well oil pump with an upper plunger valve and has an extension at the lower end which allows a longer stroke than is possible in a pump of the Regular type having the same number of liners. The use of a nipple and extension shoe allows the upper end of the plunger to operate entirely within the liners, which keeps the plunger from becoming directly exposed to sand, grit, and other foreign substances frequently found in crude oil. Garbutt rods are furnished except in the larger sizes.

Manufacturer's Data:

Sizes from 2" x 1 3/4" to 4" x 3 3/4"
Strokes from 11" to 95"

107.

Trade Name: T.S.L. Pump

Manufacturer: Axelson Manufacturing Company

Model: Top Collar both ends type with Barnwell Plunger

Use and Outstanding Characteristics:

This is a deep well pump designed for production from sandy, gassy wells and incorporates a Barnwell plunger and a standing valve puller. All parts conform with A.P.I. Standards.

Manufacturer's Data:

Sizes from 2" x 1 3/4" to 4" x 3 3/4"
Strokes from 10" to 82"

108.

Trade Name: Deep Well Plunger Pumps

Manufacturer: Axelson Manufacturing Company

Model: Tubing liner type.

Use and Outstanding Characteristics:

This deep well oil pump is of the tubing liner type which gives a maximum pump bore for a tubing liner size. Various combinations of barrels, plungers, working valves and standing valves are obtainable to make a unit suited to individual production requirements. It incorporates a Barnwell plunger, a Ritter Standing valve, and a J-slot automatic standing valve puller. Also it has an extension nipple.

Manufacturer's Data:

Sizes from 2" x 1 3/4" to 4" x 3 3/4"

109.

Trade Name: Deep Well Plunger Pumps

Manufacturer: Axelson Manufacturing Company

Model: Rod liner type

Use and Outstanding Characteristics:

This deep well oil pump was designed for wells where pump diameters must be reduced in order to balance production in relation to loss of stroke due to rod stretch. The pump can be installed and removed without removing the tubing. This type is composed of a liner barrel unit which remains stationary in the well tubing and the plunger assembly reciprocating with the sucker rods.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 3" x 2 1/4"

110.

Trade Name: Deep Well Plunger Pumps

Manufacturer: Axelson Manufacturing Company

Model: Rod liner type, with traveling barrel

Use and Outstanding Characteristics:

These units are designed for use in deep, sandy oil wells, being designed

to minimize sanding up. The barrel assembly telescopes over the plunger unit, keeping the fluid in constant circulation. All parts conform to A.P.I. specifications.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 3" x 2 1/4"

111.

Trade Name: Sure-Seal Pump

Manufacturer: Axelson Manufacturing Company

Model: Rod type, with Stationary Barrel

Use and Outstanding Characteristics:

This is a deep well oil pump with a grooved pin-end plunger with a stationary barrel, and it can be furnished with heavy-duty cages.

Manufacturer's Data:

Sizes from 2" x 1 1/16" to 3" x 2 1/2"

112.

Trade Name: Sure-Seal pumps

Manufacturer: Axelson Manufacturing Company

Model: Traveling Barrel Type

Use and Outstanding Characteristics:

This is a deep well oil pump of the traveling-barrel type, operating on the metal-to-metal principle. Heavy duty cages can be obtained.

Manufacturer's Data:

Sizes from 2" x 1 1/2" to 3" x 2 1/2"

113.

Trade Name: Hazleton Shaft Pumps

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

These pumps are used for dewatering mines. They are of the twin volute type.

Manufacturer's Data:

Example:

200 H.P. Motor @ 1700 r.p.m.
Starting head 70'
Delivers 4500 g.p.m.
Rated capacity at 200' is 3000 g.p.m.

114.

Trade Name: Hazleton Portable Pump

Manufacturer: Barrett, Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

This portable pump is especially designed for mine service. The smaller 3/4 H.P. units are excellent for use in gathering from small dips or pools and sending it to a small sump where a larger pump can handle it. A larger 2 H.P. unit of the same type is not so convenient to handle but can handle larger heads and has a greater capacity. The pump, when placed in a pool of water, doesn't suck up any solids which drift toward the suction, thus lessening wear on the impeller. In addition the pump stops when the water level reaches the lowest row of holes about the suction so that it doesn't pump itself dry.

Manufacturer's Data:

1. 2 H.P.
Capacity: To 120 g.p.m.
Heads: To 70'
2. 3/4 H.P. motor
Capacity: 80 g.p.m.
Heads: To 60'

115.

Trade Name: Hazleton Auto-Pump

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

A self-priming, positive air displacement, automatic control, self-contained unit. The control is push-button for hand operation and by electrode for automatic operation. It can be used to keep a ditch constantly drained by means of holding the electrode over the sump. When it becomes wet, the pump

automatically primes itself and the motor begins operation. The motor stops when the bottom of the suction pipes is uncovered and the air enters the suction pipe. In this way power is saved and the pump doesn't pump a combination of air and water. This is important if the water is acidulous because a mixture of air and acidulous water quickly causes corrosion.

Manufacturer's Data:

Sizes: 1 x 2 to 12 x 15
Capacity: 70 up 650 G.P.M.
Head: To 180'
Motor H.P.: To 5'

116.

Trade Name: Hazleton Single Suction Vertical Pump, Type "VS"

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

Especially designed to handle silt-laden water from a washery. The waste water enters a flume which is separated from the sump by a screen with a mesh somewhat smaller than the pumping strainer. Anything that passes the screen can pass the pump.

117.

Trade Name: Hazleton Open Impeller Pump, Type H-Y

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

They are low-priced pumps recommended for light service. Thrust collars hold the shaft and impeller in position, thus the internal bearing prevents whipping of the shaft.

118.

Trade Name: Hazleton Type CB Pumps

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

These pumps are the closed-impeller type designed for use on abrasive

materials. Since in this type leakage takes place only at the seal rings, they are made renewable so that by this the original capacity can be restored after wear. They have a uniform output especially for the coal-cleaning process. The pump can handle a mixture of water and 25% solids by weight. It has application in the following purposes: hydrolators, hydro-separators, jigs, filter effluent, concentrating table effluent, thickener clarified water, recirculating water, filtrate.

Manufacturer's Data:

Sizes: 3" to 16"
Capacities: 150 g.p.m. @ 60' T.D.H.
to
10000 g.p.m. @ 50' T.D.H.

119.

Trade Name: Hazleton Type CT Pumps

Manufacturer: Barrett, Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

A sludge pump for handling highly abrasive materials. The seal rings are the source of the most wear so they are provided so that they can be replaced.

Manufacturer's Data:

Sizes: 4 to 12
Range (dynamic head): 20' to 100' head
Capacities: 120 to 6000 g.p.m.
Size of solids passed 5/8" and up to 3 1/4"

120.

Trade Name: Hazleton Type F.W. Multi-Stage Pump

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

These pumps are similar to the standard Hazleton multi-stage pumps but are of lighter construction.

121.

Trade Name: Hazleton Standard Multistage Volute Pump

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

These multi-stage pumps are built in separate two-stage units or casings in which the impellers are arranged back to back. For example, the six-stage has three such casings bolted together. The advantage of such construction is a simple casing which is easy to cast. This is important in the case of hard-to-cast metals of which the pumps are made; also the casing makes it possible to place more bolts in the top half which holds it down. This lessens the likelihood of internal leakage.

Since casing wear frequently occurs only in the first stage, especially when the pump works with an excessive suction lift. In such a case, here only the first casing would need to be replaced.

Manufacturer's Data:

Capacities: 200 to 800 g.p.m.
Heads: Up to 1000'

122.

Trade Name: Hazleton Booster Pumps for Mine Service

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

These booster pumps are double suction, slow speed type, capable of working on high-suction lift. They are used to supply water to large multi-stage which, on account of mining conditions, are located so high above the sump that suction lift becomes too great and not economical. The booster pump insures that the multi-stage pump operates at maximum efficiency.

Manufacturer's Data:

Example: An 800 H.P. 4-stage pump with a 40 H.P. booster pump being used with it. Low-water level is 30' below the center-line of the 4-stage pump.

123.

Trade Name: Hazleton Sinking Pumps

Manufacturer: Barrett Haentjens & Company, Hazleton, Pennsylvania

Use and Outstanding Characteristics:

The pumping unit is designed for use in pumping material through a slope or shaft as water from a flooded mine. The unit can be mounted in an inclined or a vertical position with suction and discharge piping connected directly to the pump.

Manufacturer's Data:

Single stage:	2000 - 4000 G.P.M.
	200 - 400' Head
	150 - 400 H.P.
Two stage:	2000 - 4000 G.P.M.
	400' - 800' Head
	300 - 800 H.P.

124.

Trade Name: Beach-Russ Type RP Rotary Piston High Vacuum Pump

Manufacturer: Beach-Russ Company, New York, New York

Use and Outstanding Characteristics:

These pumps operate at a very slow speed, 200 r.p.m., and are noiseless except for the click produced by the exhaust valves under a vacuum. They are used in vacuum processing in the following industries: air conditioning, ceramic-deairing steatite and similar clays for high potential insulators, chemical and drug, electrical products - high vacuum impregnation of coil windings, food products - vacuum processing including drying, distillation and dehydration, instruments, laboratory, metallurgical - vacuum refining of magnesium and rare metals; impregnating castings, wire and cable - vacuum impregnating and dehydrating of cable and transformer oils.

Manufacturer's Data:

Capacities: 15 to 750 c.f.m.
also available in 1100 c.f.m.

125.

Trade Name: Beach-Russ Rotary Type SS Vacuum Pumps

Manufacturer: Beach-Russ Company, New York, New York

Use and Outstanding Characteristics:

This type is made for use where a constant vacuum as high as 5 m.m. on a tight system is required. These uses include chemical distillation, filtration, drying, vacuum filling, sealing and packing, contact printing, film drying, clay deairing, fumigation, vacuum feed, pick-up and chucking machines, hospital and laboratory uses, exhausting refrigerating systems, and moulding.

Manufacturer's Data:

Capacities: 6 to 375 c.f.m.
Pump Speed: 600 - 200 r.p.m.
Motor H.P.: 3/4 - 25

126.

Trade Name: B & G Series 1532 Uni-Built Centrifugal Pumps

Manufacturer: Bell & Gossett Company, Morton Grove, Illinois

Use and Outstanding Characteristics:

This closed-impeller pump is designed to handle clear liquids. It cannot be provided as an all-bronze unit because the stuffing box is built into the motor frame. It can be bronze-fitted, however.

Manufacturer's Data:

Heads: 10' to 100'
Capacities: 10 to 100 g.p.m.
Motor H.P.: 1/4 to 2

127.

Trade Name: B & G Series 1530 Uni-Built Centrifugal Pumps

Manufacturer: Bell & Gossett Company, Morton Grove, Illinois

Use and Outstanding Characteristics:

Series 1530 has an enclosed impeller and is designed for use where space is limited. It operates at peak efficiency when pumping clear liquids.

Manufacturer's Data:

Heads: 10' to 180'
Capacities: 10 to 500 g.p.m.
Motor H.P.: 1 to 10

128.

Trade Name: B & G Type "W" Centrifugal Pumps, Series 1510 - 1515

Manufacturer: Bell & Gossett Company, Morton Grove, Illinois

Use and Outstanding Characteristics:

Series 1510 has a semi-open impeller, while series 1515 has enclosed impeller. Series 1510 is designed to handle viscous liquids and those containing solid matter in suspension; while series 1515 has application in paper mills, beverage plants, packing houses, sugar mills, chemical works, food-processing plants, and drainage works.

Manufacturer's Data:

Series 1515 will pass the following sized solids without clogging:

Pump size 1 $1/4$ - $3/8$ " solid
to
Pump size 6 - 1 $1/2$ " solid

1510

Heads: To 320'
Motor size: To 30 H.P.
Capacity: To 800 g.p.m.

1515

Heads: 10' to 100'
Capacity: 10 to 1200 g.p.m.
Motor size: .5 to 25 H.P.

129.

Trade Name: B & G Series 1522 Uni-Built Centrifugal Pumps

Manufacturer: Bell & Gossett Company, Morton Grove, Illinois

Use and Outstanding Characteristics:

The series 1522 pumps are available as all-iron, bronze-fitted, or all-bronze units. The pump should be located as near as possible to the source of supply, particularly when operating on a suction lift. The maximum suction should not exceed 15'. The pump should not be run dry, but rather primed with water and the air removed before starting.

130.

Trade Name: B & G Booster

Manufacturer: Bell & Gossett Company, Morton Grove, Illinois

Use and Outstanding Characteristics:

This pump has a horizontal design which enables it to be placed in either upright or horizontal pipe lines in either the right or left hand positions. It has use in mechanically circulated hot water heating systems, and for circulating service water systems.

Manufacturer's Data:

Head pressures to 13'

Other similar units such as:

1. The B & G Belt Driven Pump
Head pressures to 25'
2. The B & G Universal Pump
Head pressures to 90'

131.

Trade Name: Besler High Pressure Triplex Pumps

Manufacturer: Besler Corporation

Use and Outstanding Characteristics:

These pumps are triplex shaft-driven high pressure units.

Manufacturer's Data:

Displacement Capacities up to 49.92 g.p.m.
Heads up to 4730 p.s.i.

132.

Trade Name: Rotary Pumps

Manufacturer: Blackmer Pump Company

Use and Outstanding Characteristics:

Blackmer rotary pumps include a bucket (swinging vane) type motor which compensates for wear, and have either single or double reduction units. They are intended for handling the following liquids and semi-solids: Acids, acetates, alcohols, ammonia, beer, bilge water, black liquor, bleaches, brines, catsup, caustics, coal tar, cream corn, creosote, dog food, dyes, enamels, fish oils, fruit juices, fuel oils, gasoline, glucose, glue, glycerine, grape juice, kerosene,

lacquers, lard (hot), mash, mayonaise, milk, mineral oil, molasses, oils (cooking, crude, lube, palm, vegetable), naphtha, paints, paraffin, printing ink, rubber cement, salad dressing, shellac, silicate of soda, sizings, slop brewery, soaps, solvents, soups, starches, syrups, tan liquor, tallow, tar, tomatoes, turpentine, varnishes, vinegar, wine and yeast. They are used as original equipment on the following different types of machinery and equipment: Diesel engines, tank trucks, hydraulic lifts, canning machinery, concrete mixeers, asphalt distributors, as coolant pumps, skid tanks, X-Ray machines, stills, clarifiers, drilling machines, paint striping machines, refrigeration, molasses sprays, filter equipment, quenching oil coolers, laundry machinery, baker's dough machines, butter cutters, dry cleaning equipment, industrial oil burners, centrifuges, portable tube equipment, printing presses, boats, aircraft, bottling machines, elevators, power sprays, and heavy machine tools. They are available as power-driven, belt-driven, and multiple units.

Manufacturer's Data:

Capacities from 5 to 750 g.p.m.
Heads up to 300 p.s.i.

133.

Trade Name: Direct Connected Pumps

Manufacturer: Blackmer Pump Company

Model: Type DC

Use and Outstanding Characteristics:

This pump is a rotary type with sliding buckets and handles the following liquids: acids, acetates, alcohols, bleaches, caustics, creosote, dyes, enamels, gasoline, glycerine, lacquers, lard (hot), mayonaise, paints, paraffin, oils (cooking, coude, lube, vegetable), solvents, starches, syrups, tan liquor, turpentine, varnishes, and yeast. They are used for transfer work, on machine tools for handling coolant, as fuel pumps on oil fired burners, and for marine services.

Manufacturer's Data:

Capacities from 5 to 20 g.p.m.
Heads up to 230 ft.

134.

Trade Name: Rotary Hand Pumps.

Manufacturer: Blackmer Pump Company

Use and Outstanding Characteristics:

These are rotary-type, hand pumps with swinging vane buckets, available in 54 models. They are intended for service as bilge pumps, auxiliary fuel and lube oil pumps, kerosene handling, barrel pumps, and as complete refueling units.

Manufacturer's Data:

Capacities from 7 to 25 g.p.m.

135.

Trade Name: Blakeslee Jet Pump

Manufacturer: Blakeslee Pump Company, Du Quoin, Illinois

Use and Outstanding Characteristics:

These steam jet pumps are for use as bilge pumps, among other uses. They are designed to raise a large amount of water with just a little steam, but do raise it to a very great height, however. They can also be used for filling tanks, transferring liquids from one part of a building to another, substitute for water tank on railroads, unwatering shallow mines, pits, cellars, coffer-dams, quarries, and wells.

Manufacturer's Data:

Steam pressure 25 - 125 p.s.i.

Maximum water temperature 150° F.

Pump will not make 20' suction over successfully with less than 45 to 50 lbs. or more than 75 to 80 lbs.

Example: at 75 lbs. steam pressure when lifting 20' will elevate 40'

136.

Trade Name: No. 00 Rotary Geared Pump

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

This is a rotary-gear pump having helical gears and is intended for supplying oil for lubrication or for coolant where small capacities are devised, and is suitable for use with pressures up to 100 p.s.i. It is also suitable for pumping emulsions and is self-lubricating.

Manufacturer's Data:

Capacities up to .5 g.p.m.
Heads up to 100 p.s.i.

137.

Trade Name: Nos. 1, 2, 3, and 4 Rotary geared pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

These are general purpose rotary gear pumps suitable for supplying coolant and lubricant, for circulating purposes, and for transfer work.

Manufacturer's Data:

Capacities from 1.6 to 27 p.s.i.

138.

Trade Name: Nos. 1S, 2S, and 3S Rotary Geared Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

These rotary gear pumps are equipped with helical gears permitting higher speeds than pumps with spur gears. They are general-purpose pumps suitable for supplying coolant and lubricant, for circulating purposes, and for low-pressure hydraulic service. They should be used with comparatively clean liquids. They have a mechanical seal also.

Manufacturer's Data:

Capacities from 1.6 to 16.4 g.p.m.
Pressures up to 200 p.s.i.

139.

Trade Name: No. 8 Vane Pump

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

This is a two-vane type rotary pump, with sliding vanes. It is used either to circulate coolant to the cutting tools of light metal working machines or as a lubricating pump for mechanical units. It discharges a constant flow of oil in one direction regardless of the direction of rotation of the rotor.

Manufacturer's Data:

Capacities from .23 to 1.37 g.p.m.

140.

Trade Name: Nos. 11, 12, and 13 Rotary Geared Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and outstanding Characteristics:

These are rotary-geared pumps that discharge from the top only and are adapted for use on machines where cutting tools operate in both directions, as on screw machines, since they maintain the same direction of delivery when rotation is reversed.

Manufacturer's Data:

Capacities: 1.6 to 17.2 g.p.m.
Heads up to 100 p.s.i.

141.

Trade Name: Nos. 21 and 23 Bronze Rotary Geared Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

These are brone rotary geared pumps, intended for use where a corrosion-resisting pump is required, as for providing circulation on water-jacketed engines and pumping saline solutions.

Manufacturer's Data:

Capacities from 1.6 to 17.3 g.p.m.
Heads up to 20 p.s.i.

142.

Trade Name: Nos. 53 and 55 Rotary Geared Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

Suitable for supplying oil under pressure on hydraulically operated machines and for pumping oil for lubricating machinery where quietness is essential, these units are rotary-gear pumps with helical gears. These pumps should not be used for pumping a cutting lubricant or coolant.

Manufacturer's Data:

Capacities from 4 to 34.1
Pressures up to 200 p.s.i.

143.

Trade Name: 500 Series Rotary Geared Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

These pumps are rotary-gear pumps with herringbone gears intended for supplying oil under pressure for hydraulic operation of machines. They should not be used for pumping a cutting lubricant or coolant.

Manufacturer's Data:

Capacities from 5.1 to 37.6 g.p.m.
Heads up to 500 p.s.i.

144.

Trade Name: Nos. 101, 102, and 103 Motor Driven Rotary Geared Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

These are motor-rotary gear pump units with helical gears, suitable for supplying coolant, for lubrication, and for general circulation purposes.

Manufacturer's Data:

Capacities from 3 to 18 g.p.m.
Heads up to 200 p.s.i.

145.

Trade Name: No. 172 Motor Driven Cellar Drain Pump

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

This is a unit designed for cellar drainage and installations where a compact, portable, motor driven unit is required for transferring liquids. It is comprised of a rotary geared pump driven by a 1/4 H.P. electric motor.

Manufacturer's Data:

Capacity: From 5 to 5.8 g.p.m.
Pressures: Up to 20 p.s.i.

146.

Trade Name: Nos. 205, 206, 206A, and 207 Motor Driven Centrifugal Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

These are vertical motor-driven centrifugal pumps built for supplying coolant for machine tools and light machinery where dirt or abrasives may be present in the liquid and where a moderate volume of flow is desired at a low head.

Manufacturer's Data:

Capacities: To 20.5 g.p.m.
Heads: Up to 12.3 ft.

147.

Trade Name: No. 212 Motor Driven Centrifugal Pump

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

This is a vertical, volute type, single stage, centrifugal, motor-driven pump designed for supplying coolant for machine tools, light machinery, and for other installations where a large volume is required at a low head and where dirt

and abrasives may be present in the liquid.

Manufacturer's Data:

Capacities: To 78 g.p.m.
Heads: to 24.7 ft.

148.

Trade Name: Nos. 220 and 225 Motor Driven Centrifugal Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

These are single-stage, horizontal, volute type centrifugal pumps suited for supplying coolant for machine tools and light machinery, for use where dirt and abrasives may be present in the liquid, and for light transfer work. The No. 220 supplies a moderate volume and No. 225 a large volume at low head.

Manufacturer's Data:

Capacities: Up to 78 g.p.m.
Heads: Up to 24.7 ft. (0 capacity)

149.

Trade Name: Nos. 240 and 245 Motor Driven Centrifugal Pumps

Manufacturer: Brown & Sharpe Manufacturing Company

Use and Outstanding Characteristics:

These are vertical, single-stage, volute type, motor driven, centrifugal pumps suitable for supplying coolant for machine tools and light machinery, for use where dirt or abrasives may be present in the liquid, and for light transfer work. The No. 240 supplies a moderate volume, and No. 245 a large volume at low head.

Manufacturer's Data:

Capacities: To 78 g.p.m.
Heads: To 24.7 ft. (0 capacity)

150.

Trade Name: Class "RR" Single Suction Multistage Pumps

Manufacturer: Buffalo Pumps, Inc.

Use and Outstanding Characteristics:

These are two and four stage volute type centrifugal pumps intended for use in handling clear water, hot or cold.

Manufacturer's Data:

Capacities: From 20 to 900 g.p.m.
Heads: To 1500 ft.

151.

Trade Name: Double Ball Bearing Single Suction Pumps

Manufacturer: Buffalo Pumps, Inc.

Model: "CL" and "CS"

Use and Outstanding Characteristics:

These are single-stage, single-suction volute type centrifugal pumps with an interchangeable bearing stand and mounting ring on all sizes up to and including No. 3. This allows interchanging of pumps with varying capacities. They are suitable for handling hot water with low submergence or suction or for operating with suction lift as high as 25 on cold water.

Manufacturer's Data:

Capacities: From 5 to 750 g.p.m.
Heads: Up to 260 ft.

152.

Trade Name: Double Suction Single Stage Centrifugal Pumps

Manufacturer: Buffalo Pumps, Inc.

Use and Outstanding Characteristics:

These are double suction, single-stage, volute type centrifugal pumps designed for almost any service where clear water is to be handled. They are available with self-priming units built in.

Manufacturer's Data:

Capacities: From 10 to 20,000 g.p.m.

153.

Trade Name: Single Stage Class "SV" Centrifugal Underwriter Fire Pumps

Manufacturer: Buffalo Pumps, Inc.

Use and Outstanding Characteristics:

These are single-stage, double-suction volute type centrifugals for fire fighting equipment and are approved by the Associated Factory Mutual Fire Insurance Companies and the National Board of Fire Underwriters.

Manufacturer's Data:

Capacities: 750, 1000, and 1500 g.p.m.

Heads: Up to 100 p.s.i.

154.

Trade Name: Bilton Pumps

Manufacturer: Byron Jackson Company

Model: Type TL

Use and Outstanding Characteristics:

The Bilton TL is a single stage, single suction, volute type unit with a common shaft for the motor and pump. The unit may be mounted either vertically or horizontally, or on a hand truck, or suspended from a sling for portable use. It is a general-purpose pump intended for medium or low head service.

Manufacturer's Data:

Capacities: From 10 g.p.m. to 600 g.p.m.

Heads: Up to 340 ft.

155.

Trade Name: Boiler Feed Pumps

Manufacturer: Byron Jackson Company

Model: Double Case Type HDB

Use and Outstanding Characteristics:

This unit is a seven-stage, volute type, centrifugal boiler feed pump having a double case (the inner case contains the volutes and the outer case surrounds the inner with the water being pumped). This, by introducing the dis-

charge pressure on the outside of the inner case, eliminates the need for heavy bolting of the case. Also, since the temperature throughout the pump is more uniform, expansion of the parts has less effect. The volutes are of the double type to balance the pressures.

Manufacturer's Data:

Capacities from 100 to 2000 g.p.m.
Heads: From 1000 to 2800 p.s.i.

156.

Trade Name: Submersible Pumps

Manufacturer: Byron Jackson Company

Model: Types R and B

Use and Outstanding Characteristics:

This is a close-coupled turbine type centrifugal pump and electric motor designed to be lowered into the well and operates submersed in water, thus eliminating the necessity for long drive shaft as needed in conventional turbine type deep well pumps. The seal for the motor is of the mercury type and the entire motor is immersed in an oil of high dielectric strength.

Manufacturer's Data:

Capacities: Standard pumps: To 7,000 g.p.m.
Special pumps: To 20,000 g.p.m.
Heads: To 1,500 ft.

157.

Trade Name: Hydropress Pump

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

These are units designed for high pressure, low volume pumping. They are double case, double volute, multistage centrifugal pumps. The outer case is a cylinder and the inner case has the discharge pressure on it, eliminating the need for heavy bolting. They are used for boiler-feed service, hydraulic press

operation, hot or cold refinery service, oil well flooding, pipe line service, and primary water supply.

Manufacturer's Data:

Capacities: From 20 to 300 g.p.m.
Heads: Up to 5000 p.s.i.

158.

Trade Name: Bulk Station Pump

Manufacturer: Byron Jackson Company

Model: Type TLB

Use and Outstanding Characteristics:

This is a single-stage, single-suction volute type centrifugal pump and electric motor close-coupled unit. It has an oil seal operating on a differential pressure principle. This unit is designed to safely handle gasoline, butane, stove oil, diesel fuel, naptha, kerosene, lube oils, solvents, thinners, and other hydrocarbons.

Manufacturer's Data:

Capacities: To 600 g.p.m.
Heads: To 150 p.s.i.
Temperatures: To 150° F.

159.

Trade Name: Rain Pumps

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

The rain pump is a single-stage, single-suction, horizontal, volute type, centrifugal pump, designed for use in overhead irrigation systems or other portable service requiring rugged construction. It may be belt-driven or direct connected.

Manufacturer's Data:

Capacities: From 200 to 1200 g.p.m.
Heads: From 70 to 160 ft.
Speeds: From 1200 to 2200 r.p.m.

160.

Trade Name: Ditch Pumps

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

These special-purpose, single-stage turbine, centrifugal type, low-lift pumps are designed for use in irrigation, drainage, or any service involving total dynamic heads of 16 feet or less, when pumping from canals, ditches, lakes, or other open sources of supply. There are no stuffing boxes.

Manufacturer's Data:

Capacities: From 740 to 7570 g.p.m.
T.D.H.'s up to 16 ft.

161.

Trade Name: VMT Pumps

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

These pumps are multi-stage, volute type units, mounted in a barrel from which it takes suction. They are designed for handling liquids -- hot or cold -- corrosive or non-corrosive -- where the net positive suction head is limited.

Manufacturer's Data:

Capacities: Up to 1000 g.p.m.; special to 5000 g.p.m.
Heads: Up to 250 p.s.i.
Temperatures: To 250° F.; special to 750° F. or subzero

162.

Trade Name: Deep Well Pumps

Manufacturer: Byron Jackson Company

Model: Types B and K

Use and Outstanding Characteristics:

They are deep-well turbine-type centrifugal pumps intended for agriculture,

municipal, mining, and other primary water supply uses. Types B are intended for wells of larger diameter where relatively high heads and pressures are involved, and Types K are designed for average conditions.

Manufacturer's Data:

Capacities: B - 25 to 1600 g.p.m.
K - 40 to 7000 g.p.m.

163.

Trade Name: Pneumatic Sponge

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

This unit is a single or double stage volute type centrifugal pump intended for use in mine shafts and wings, coffer-drums, caissons, sumps, cisterns, pits, tanks, basements, manholes, and bilges, on construction projects, for salvage work, or other similar applications where the pumped fluid contains a heavy percentage of solids. It is driven by a compressed air motor operating at pressures from 70 to 100 p.s.i. suitable for operation in any position. The motor is equipped with a governor.

Manufacturer's Data:

Capacities: From 25 to 300 g.p.m.
Heads: To 300 ft.

164.

Trade Name: Multiplex Pumps

Manufacturer: Byron Jackson Company

Model: Types SD and SDO

Use and Outstanding Characteristics:

These are volute-type, multi-stage centrifugals without diffusion vanes, intended for use on boiler-feed service, booster service, crude oil charging, mine station pumping, fire protection, loading station service, hydraulic press operation,

pipe lines, water works, and incline and vertical mine unwatering service.

Type SDO is a slower-speed pump than SD.

Manufacturer's Data:

Capacities: From 100 to 400 g.p.m.
Heads: Up to 2000 ft.

165.

Trade Name: Type SM Process Pump

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

A centrifugal, double-volute type, this pump is designed for handling fluids over a wide range of pressures and temperatures. It handles hot oil, evaporator condensate, propane, process liquors, butane, gasoline, dowerm, organic fluids, hot well condensate, acids, sulphur dioxide extracts, and hot water in circulating systems.

Manufacturer's Data:

Capacities: From 10 to 1400 g.p.m.
Heads: From 20 to 650 ft.

166.

Trade Name: Process Pumps

Manufacturer: Byron Jackson Company

Model: Figure 1025 and Figure 1050

Use and Outstanding Characteristics:

Both pumps are horizontal, single-stage, end-suction, volute centrifugal types. Figure 1025 can be obtained with an oil seal if desired. The Figure 1050 includes special features that are available only on special order for the 1025.

Manufacturer's Data:

	Figure 1025	Figure 1050
Capacities:	10 - 600 g.p.m.	100 - 1000 g.p.m.
Heads:	20 - 340 ft.	100 - 600 ft.
Temperature limit (both):	350° F.	

167.

Trade Name: Hydroplex Pumps

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

This unit is a smaller and less expensive version of the hydropress pump. It is a multistage, volute type centrifugal pump intended for low capacity, high pressure pumping. It is vertical and direct connected.

Manufacturer's Data:

Capacities: From 10 to 140 g.p.m.

Heads: From 450 to 1700 ft.

Temperatures: To 300° F.

168.

Trade Name: Type S Pump

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

It is a single-stage, double-suction, volute type centrifugal pump designed for large volume pumping.

Manufacturer's Data:

Capacities: To 40,000 g.p.m.

Heads: To 400 feet

169.

Trade Name: Sand and Gravel Pump

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

It is a horizontal, single-stage, volute type centrifugal pump built to handle rock and sand or gravel-bearing liquids.

Manufacturer's Data:

Capacities: From 100 to 6000 g.p.m.

Heads: From 10 to 150 ft.

170.

Trade Name: Corrosiron Acid Resisting Pump

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

This pump is a single-stage, volute type centrifugal pump intended for handling corrosive liquids carrying abrasive solids. The Corrosiron refers to a high-silicon iron which is employed in their construction.

Manufacturer's Data:

Capacities: From 30 to 425 g.p.m.
Heads: From 20 to 140 ft.

171.

Trade Name: Antimonial lead Acid Pump

Manufacturer: Byron Jackson Company

Use and Outstanding Characteristics:

These are vertical, single-suction, turbine type centrifugal pumps with all the liquid contacting parts made of antimonial lead. They are intended to handle acids.

Manufacturer's Data:

Capacities: To 1900 g.p.m.
Heads: To 17.5 ft.

172.

Trade Name: Carver Side Suction Pumps

Manufacturer: Carver Pump Company

Model: Types EFL and EFH

Use and Outstanding Characteristics:

These are single-stage, volute type centrifugal pumps designed for service in apartment buildings, hotels, laundries, air-conditioning plants, greenhouses, bottle and can washers, dairies, and creameries. Available with open and closed impellers.

Manufacturer's Data:

Capacities: From 30 to 900 g.p.m.
Heads: From 20 to 200 ft.

173.

Trade Name: Carver Electropumps

Manufacturer: Carver Pump Company

Use and Outstanding Characteristics:

An integrated motor-pump unit, these pumps are of the single-stage volute type, centrifugal form with efficiencies in excess of 80%.

Manufacturer's Data:

Capacities: From 10 to 900 g.p.m.
Heads: From 10 to 200 ft.

174.

Trade Name: Carver Self-Priming Centrifugal Pumps

Manufacturer: Carver Pump Company

Model: Model KN line

Use and Outstanding Characteristics:

These are self-priming, single-stage, volute type, centrifugal pumps, either gasoline or diesel engine driven. They are portable and intended, depending on size, for the following: garden and lawn sprinkling, filling tanks, unloading tank cars, dewatering jobs, cleaning swimming pools, removal of storm water from strip mines and stone quarries, irrigation systems, oil field service, large construction jobs, marine salvage, and flood water pumping.

Manufacturer's Data:

Capacities: From 50 g.p.m. to 3390 g.p.m.
Heads: Up to 110 ft.

175.

Trade Name: Rex Farm Utility Pumps

Manufacturer: Chain Belt Company

Model: No. 5 Model

Use and Outstanding Characteristics:

This is a light-weight centrifugal pump intended for farm utility service. It can function in the following jobs: watering stock, water storage, spray rigs, irrigation service, dewatering and fire fighting. It is self-priming and has an open impeller allowing aggregate up to 3/8" diameter to pass through.

Manufacturer's Data:

Capacity: 5000 g.p.h. with 5 ft. suction lift.

176.

Trade Name: Rex Easy Flow Speed Prime Pump

Manufacturer: Chain Belt Company

Model: Model M

Use and Outstanding Characteristics:

This is an air-cooled engine and centrifugal pump unit mounted on two wheels. It has an Armco iron press-formed body and a Z metal impeller. Also it has an "air peeler" (patented) to speed the priming operation.

Manufacturer's Data:

Capacities: From 5 g.p.m. to 325 g.p.m.

Heads: Up to 80 ft.

Suction lifts: Up to 25 ft.

177.

Trade Name: Rex Pumpcrete

Manufacturer: Chain Belt Company

Model: Models 160 and 200

Use and Outstanding Characteristics:

These are hopper-fed reciprocating pumps for moving concrete and are made either as singles or doubles. Punyscrete models are built to pump up to 120 ft. vertically or 1000 ft. horizontally. Where any combination is involved -- vertical and horizontal -- the two distances can be figured on an eight-to-one ratio. They will handle aggregate up to 3" diameter.

Manufacturer's Data:

Capacities up to 65 cubic yards per hour

178.

Trade Name: CP Portable Sludge Pump

Manufacturer: Chicago Pneumatic Tool Company, New York, New York

Model: Model CP No. 7

Use and Outstanding Characteristics:

Portable sludge pump of injector type with low air consumption and high lift. It will handle up to 15% solids.

Manufacturer's Data:

From 65 g.p.m. at 50 ft. to 20 g.p.m. at 200 ft.

179.

Trade Name: CP "Power Vane" Rotary Sump pumps

Manufacturer: Chicago Pneumatic Tool Company, New York, New York

Model: Quimby Model

Use and Outstanding Characteristics:

It is a low-priced rotary force pump with air motor which can be operated on 60 cu. ft. of air a minute. It is self-priming and used for dewatering purposes.

Manufacturer's Data:

Ratings: 130 and 205 g.p.m. at 20 ft. head

180.

Trade Name: CP "Power Vane" Rotary Sump Pumps

Manufacturer: Chicago Pneumatic Tool Company, New York, New York

Model: Byron-Jackson Model

Use and Outstanding Characteristics:

It is designed to meet the need for an air-driven sump pump to operate against heads of 100 to 125 feet.

Manufacturer's Data:

Ratings: 25 g.p.m. at 160 ft. head to 125 g.p.m. at 50 ft. head

181.

Trade Name: Chicago Type "D" Double Suction Single Stage, Horizontally Split Case Centrifugal Pump

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Type "D" centrifugal pumps can be motor, gas engine, steam turbine, or belt-driven. They can be used for house pumps, fire and booster service, circulating water, water supply for buildings and towns, pneumatic water systems, brine circulating, and air washer circulating. It has an enclosed impeller and it consists of a number of curved vanes cast on a center hub and between two circular discs, the whole being cast in one piece.

Manufacturer's Data:

Range in capacities: 25 to 1900 g.p.m.
Heads: Up to 530 ft.

182.

Trade Name: Chicago HS Multi-Stage Horizontally Split Shell Centrifugal Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Type HS multi-stage pumps are particularly useful for water supply for buildings, towns, and cities where a high head is required, and for fire protection, hydraulic elevator service, and boiler feeding. They are either 2, 3, or 4-stage pumps of the horizontal type, having the casing and bearing brackets parted on the horizontal center line of the shaft. The impellers are the enclosed type. The units come with either ball bearings or sleeve bearings.

Manufacturer's Data:

Range in capacities: 50 to 1100 g.p.m.
Discharge heads:
2" 2 stage to 220'
2" 3 stage to 330'
2" 4 stage to 445'
3" 6 stage to 880'
5" 2 stage to 350'
Maximum motor H.P.: 125

Trade Name: Chicago Centrifugal Fire Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These fire pumps are approved by the following agencies for use as fire pumps:

National Board of Fire Underwriters
Associated Factory Mutual Fire Insurance Companies.

The pump casings are made of semi-steel, split horizontally. The impellers are the double suction type made of solid bronze and keyed to the shaft. These fire pumps are also available in multi-stage units to obtain pressure not attainable by single-stage units. Also, for sky-scrappers, tandem or dual fire pumps models are available. These units consist of one high and one low pressure fire pump with an electric motor mounted between, the reason for this arrangement being that in most tall buildings both high and low standpipe systems are installed in such a way the lower floors avoid excessive pressures. There are also gas engine driven pumps for use in smaller communities where the water supply and electric supply are not as reliable. Chicago Booster or low pressure fire pumps which are for the purpose of increasing the pressure of water already available for fire protection come as part of this same series.

Manufacturer's Data:

Varies

Minimum size fire pump allowed by Underwriters is 500 g.p.m. for one or two standpipes. An additional 250 g.p.m. is required for each additional standpipe.
PIPE

Trade Name: Chicago Type M Multistage Vertically Split Case Centrifugal Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These centrifugal units are designed for use with small capacities and high heads. They are an Underwriter's approved sprinkler filling pump and come in

single or multi-stage units to satisfy the need to which they will be put. Other uses for them consist of use in water supply systems, furnishing water for roof tanks, pneumatic tanks, sprays, for circulating hot and cold water, brine, and other liquids, boiler feed work and general industrial plant use. The impeller is made of close grain cast iron.

Manufacturer's Data:

1. Type MA multistage
1720 r.p.m.
Capacity: to 75 g.p.m.
Maximum head: 280'
Motor H.P.: Up to 10
2. Type MB Multi-Stage
1720 r.p.m.
Capacity: to 150 g.p.m.
Maximum head: 440'
Motor H.P.: Up to 40

185.

Trade Name: Chicago Close Coupled Horizontal Centrifugal Type "N" Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Type "N" pumps have screwed suction and discharge connections so that they can fall in any one of 4 positions. The discharge nozzles which have flanged suction and discharge connections can face up or on either side. The units come with either enclosed or open type impellers. The pumps' chief uses are in water supply systems, circulating service, and general industrial use.

Manufacturer's Data:

1. @ 3500 r.p.m.
Maximum capacity: 550 g.p.m.
Maximum discharge head: 210'
Maximum motor H.P.: 25
2. @ 1750 r.p.m.
Maximum capacity: 350 g.p.m.
Maximum discharge head: 47'
Maximum motor H.P.: 3

186.

Trade Name: Chicago Type "W" Turbine Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The capacity of these pumps varies only slightly even if there is considerable variation in head condition. The capacity can be increased or decreased by changing the cover plates and the impeller. The pump can be completely taken apart without disturbing the piping. The impeller is designed so that it will handle a considerable amount of air or vapor with the liquid without vapor locking. Rotation can be changed to right or left hand simply by changing the cover plates. The pump has uses in hot and cold water circulating, condensation return, high temperature liquids, breweries and distilleries, brine circulating, cooling towers, marine service, water supply, boiler feed, transfer, filtering, refineries, irrigation, booster, and in dairies.

Manufacturer's Data:

Capacities: 1 to 150 g.p.m.

Discharge heads: To 400'

Suction lift: 28' at sea level

The capacity reduces as the suction lift increases beyond 20'.
r.p.m.: 1750

187.

Trade Name: Chicago Transformer Vault and Cable Manhole Pump

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The express purpose of these pumps is for use in manholes and transformer vaults where seepage and other sources of moisture flood the vaults, causing corrosion on the bottoms of the transformers and pothead legs. These pumps are made of non-corroding materials so as to facilitate their underground use. These materials are Everdur, Monel, bronze, rubber, balata, and galvanized iron. The pump is always primed and its action is automatic. The motor and switch are completely covered by a diving bell to protect them from drip, splashing or flood water. The air in the diving bell forms an air pocket around the motor, and as water rises the air under the bell compresses and keeps the water from rising to the motor.

Manufacturer's Data:

Maximum capacity: 150 g.p.m.
Maximum head: 60'
Maximum motor H.P.: 2

188.

Trade Name: Little and Big Giant
Automatic Electric Bilge Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The Little and Big Giants are centrifugal volute type with an open bronze cast impeller. A steel strainer surrounds the suction opening. They are supplied in sizes so as to pump basins 3, 4, 5, 6, and 7 feet deep. In all cases a basin cover is supplied since an open basin is dangerous from both the physical and health standpoints. Since some cities require bilge pumps to have gas tight covers, these may be supplied with the units. Gas tight covers are recommended for use in residences where waste laundry is liable to become stagnant in pump basins.

Manufacturer's Data:

Capacity: 10 - 50 g.p.m.
Heads: 5 - 22'
Little Giant: $\frac{3}{4}$ H.P. motor
Big Giant: $\frac{1}{2}$ H.P. Motor
Discharge pipe: $1\frac{1}{4}$ " H.P. motor

189.

Trade Name: Chicago Type LGL Automatic Electric Bilge Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These bilge pumps are centrifugal volute type with bronze cast open type impeller. They are used for draining basements, pits, and sumps. Duplex installation of these units is recommended whenever possible because such arrangement provides for (1) continuous operation if one becomes out of order, (2) provides for alternation of service, and (3) can handle sudden emergencies such as flooded basements better than single units.

Manufacturer's Data:

Capacity: 10 - 100 g.p.m.
Head at 1750 r.p.m.: 6 - 43
Motor sizes: 1/4 to 1 H.P.

190.

Trade Name: Chicago Type LIC and OSC Automatic Electric Bilge Pump

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The Chicago Automatic Electric Bilge Pump is a vertical centrifugal volute type with an open brass impeller. The whole has a pump which is pipe supported from the floor or motor plate which rests on the basin cover. The motor is mounted and bolted in place so that the outfit is all ready to set in place and connect to the discharge pipe. The chief use of the outfit is for pumping water out of basements located below sewer level. The automatic control consists of an enclosed float switch mounted on a pedestal which is actuated by a heavy ball float through a heavy rod which is guided above and below the floor plate. The automatic control is mounted on the floor plate from which the pump is suspended.

Manufacturer's Data:

Speeds: 1750 and 1150 r.p.m.
Capacities: To 200 g.p.m.
Discharge head: To 64'
Motor H.P.: 1/2 - 2

191.

Trade Name: "Flush-Kleen" Sewerage Ejector

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The "Flush-Kleen" is intended for use where non-clogs are generally used, but where there must be absolutely no failure due to clogging. The sewerage inlet is connected to the discharge line of the unit so that the raw sewerage flows into the discharge line but the solids are stopped by a strainer just before the impeller so that only water passes through the impeller, when it is inoperative,

into the pit. In the meantime the solids accumulate in the strainer chamber of the discharge line. Then the water level in the basin reaches a certain level the pump starts, pumping the water from the basin and flushing the solids in the discharge line that have accumulated in the strainer chamber. When the water level in the basin reaches a certain low level, the pump cuts out allowing the cycle to start over. There is a check valve on the inlet side which prevents sewerage from backing into the inlet line.

Type "O" Dry Basin - for use in concrete pits deeper than 8'.

Type "F" Submerged "Flush-Kleen" - recommended where submerged equipment and a round cast iron basin may be used.

Type "U" Dry-Basin "Flush-Kleen" - underground sewerage pumping station is for use where there is an existing manhole and where it is necessary for the entire pumping station to be underground.

Manufacturer's Data:

Capacities: To 1500 g.p.m.
Heads: To 111'
Motor size: To 30 H.P.

192.

Trade Name: Chicago Non-Clogging Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These pumps are heavy duty, screenless enclosed shaft type used for handling sewerage and drainage in buildings, municipal sewerage disposal plants and industries. The "non-clogging" impeller fits on a tapered shaft and is fixed by a large screw; this method affords a smooth surface for the material entering the impeller.

Types:

1. Type "F" Non-Clog Submerged Sewerage Ejectors - equipped with a round cast iron basin and is recommended for any project where submerged equipment may be used.

2. Type "G" Submerged Sewerage Ejectors may be used wherever square or rectangular concrete basins may be used.

Manufacturer's Data:

Each ejector handles from 1 to 10 toilets
Speeds: 575 to 1750 r.p.m.
Discharge heads: To 100'
Motor H.P.: 1/2 to 75

193.

Trade Name: Chicago Vertical Open-Shaft Non-Clog Plumps, Heavy Duty

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These pumps are used to pass industrial by-products, semi-solids, and wastes in such places as sewerage plants, lift stations, and buildings. The enclosed "L" type impellers have gradually increasing size from the suction opening to the blade tips; anything that enters the suction will pass through the impeller without clogging.

Manufacturer's Data:

Speeds: 575 - 1750 r.p.m.
Capacities: To 6500 g.p.m.
Heads: To 127'
Motor size: 1/2 to 100 H.P.

194.

Trade Name: Chicago Non-Clogging Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Type HBB horizontal ball bearing non-clog pumps are best used where a non-clog pump is required and where floor space is not limited. They are useful in sewerage work and especially in sewerage treatment plants. Self primes come with the units. For one pump installation the self prime is mounted on the suction of the pump. It is connected to an air pump mounted on the pump base, which is twin-driven by the belt from the pump motor. The air pump exhausts air from the priming chamber causing water to rise in the suction pipe into the chamber until

a float reaches the proper height necessary for operation to begin; at this point a linkage through the float shuts off the air pump. For two or more pumps the self-priming principle is the same, but a vacuum tank is connected to the suction of each pump instead. This tank is connected to an air pump which is regulated by a float vacuum switch to keep the necessary vacuum in the tank.

Manufacturer's Data:

Speeds: 575 - 1750 r.p.m.
Capacities: To 7500 g.p.m.
Heads: To 128'

195.

Trade Name: Chicago Scru-Peller Sludge Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Scru-Peller sludge pumps are screw-feed, centrifugal type. They are fitted to handle heavy sewerage and such hard material to pass as rags, rope, and the like. There are two types, the horizontal and the vertical. The horizontal is usually installed on the floor level or in a dry pit and connected so that sludge flows into the suction by gravity. Sludge enters the suction and is carried by a screw conveyer to the open-type impeller. The solids or stringy material that extend beyond the conveyer are cut up by the stellited screw edges so that any solids which lodge are cut in two and pass through the pump. The vertical units operate on the same principle, but are installed in a dry well or suspended in the basement and connected by pipe. The motor remains at the floor level.

Manufacturer's Data:

Capacities: To 352 g.p.m.
Dynamic Heads: To 170'

196.

Trade Name: Chicago Plunger Sludge Pumps

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Chicago Plunger Sludge Pumps may be either chain or belt-driven. They

are used commonly in sewerage work. A variable capacity is obtained by an adjustable eccentric which changes the stroke of the plunger. Eleven such adjustments are provided on the eccentric.

Manufacturer's Data:

	Simplex:	Duplex:
Capacity	75 g.p.m.	150 g.p.m.
Dynamic head	50'	50'
Motor	3 H.P.	5 H.P.
Weight	1700 #	2700 #

197.

Trade Name: Chicago Water Seal Pumping Unit and Meter Seal Pumping Unit for Sewerage Treatment Plants

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The water seal unit is a centrifugal pump with an outside water seal so that if city water is used to seal the pump, there are no connections directly to the sewerage pump. The meter seal unit is primarily of use when it is desirable to prevent the meter body and lines from clogging.

Manufacturer's Data:

Speed: 1750 r.p.m.
Capacity: 5 - 25 g.p.m.
Heads: To 80'

198.

Trade Name: Chicago Type "AVC" Vertical Condensation Pump and Receiver

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The pump of these units has a bronze casing and rotor and stainless steel shaft. The receiver has a low inlet suitable for floor or shallow pit mounting with no foundation bolts necessary. The weight holds it in place.

Manufacturer's Data:

Use for 500 to 10,000 sq. ft. of direct radiation @ 10 to 50 lbs. pressure
Capacity: To 15 g.p.m.
Motor size: 1/4 to 1 H.P.

199.

Trade Name: Sure Return Condensation Pump and Receiver

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Sure Returns are designed to handle hot water and have a tendency not to steam bind because the pump suction is always under a head, and the suction opening is larger, therefore causing low velocity which reduces friction and the possibility of a vacuum. An air vent is equipped to allow air to enter while water is being pumped out, and the air to leave while it is being pumped in. It is driven by electric motor and comes ready for connection to the boiler return line in either single or duplex units.

Manufacturer's Data:

Single Units:

1000 to 75000 sq. ft. of direct radiation

Discharge pressure: 10 - 90 p.s.i.

Capacity: To 112.5 g.p.m.

200.

Trade Name: Type "LVC" Vertical Condensation Pump and Receiver

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The pump is centrifugal type with the cast iron casing made in two parts. The upper part has the volute and discharge opening, while the lower has the suction opening. The impeller is bronze, single suction, open type. An air vent is provided to allow air to flow out when water comes in and to allow it to flow in as the water is pumped out. The outfits come as either single or duplex units.

Manufacturer's Data:

Use with 2000 - 20,000 sq. ft. of direct radiation

Discharge pressures: 10 - 40 p.s.i.

Capacities: To 30 g.p.m.

Pump speed: 1750 & 3500 r.p.m.

201.

Trade Name: Chicago Vertical Condensation Pump and Receiver

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These pumps and receiver combinations come as either single or duplex units. It is designed for use with hot return where the return comes back below the floor and eliminates the pitting of a horizontal unit for such a case. The advantage here being that the pits' elimination does away with it as an inconvenience to repair and as a receptacle for dirt and refuse, and as a spot that becomes flooded. The pump is the volute split case type with a bronze impeller and is automatically controlled by means of a float switch.

Manufacturer's Data:

1000 to 40,000 sq. ft. of direct radiation
Discharge Pressures: 10 - 25 lbs.
Capacity: To 60 g.p.m.
Motor H. P.: 1/2 to 2

202.

Trade Name: F.C. Condensation Pump and Receiver

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Single and duplex units are provided in these combinations which find use in boiler and return work for heating systems and in industrial applications. The pumps are split case and controlled by a "Boiler Water Level Controller" which starts the pump when the boiler needs water. If it draws all the water from the receiver and the boiler still needs water, then the float of the "Make-up Water Controller" drops and opens a valve in the line which connects the receiver with a hot water source. When the boiler high water level is reached, the switch is opened and the pump stops.

Manufacturer's Data:

Use with 1000 to 50,000 sq. ft. of direct radiation
Discharge pressures: 30 to 150 lbs.
Capacities: To 75 g.p.m.
Motor size: 1/4 to 15 H. P.

Trade Name: Condo-Vac Return Line Vacuum and Boiler Feed Pump

Manufacturer: Chicago Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The "Condo-Vac" is made to handle both hot air and hot water. The water capacity remains constant up to the boiling point, about 200° F., and the air capacity remains constant to the evaporation point - 10" of vacuum at 180° F. The inlet is low so that pits can be frequently avoided, and low radiation drains to receiver by gravity. The general principle is that the return line material is exhausted and trapped in alternate slugs of condensate and air in the rotor. Centrifugal force throws out the water and continues to pick up alternate slugs of air and water. The air and water are completely separated and the air vented out.

Manufacturer's Data:

2500 to 150,000 sq. ft. of direct radiation
Capacity: To 225 g.p.m.
Discharge Pressure: 20, 30, 40 lbs.

Trade Name: Clark Triplex Slush Pump

Manufacturer: Clark Bros. Co., Inc., Qlean, New York

Use and Outstanding Characteristics:

Power can be applied from either side of the pump through a double extended pinion shaft. The main shaft has eccentric hubs on the crank throws, uniting the advantages of a crank shaft and eccentric shaft. This design permits main and connecting rod bearings to be interchangeable.

The main use of this pump is in oil drilling operations.

Manufacturer's Data:

1. 7 1/4" x 12" Triplex Power Pump.
2. Maximum H.P. Input (Mech.) 380 @ 70 r.p.m.
3. Maximum H.P. Output (Hyd) 323 @ 70 r.p.m.
4. Recommended Max. R.P.M. - 70
5. Length 12' 8 3/16" Width fluid end 75 5/8"
Power end width 82 1/2", height 51 1/16", weight 24000#
6. Using 7 1/4" Liner @ 400# Discharge pressure @ 70 r.p.m.

H.P. - 235	4" Liner @ 70 r.p.m.
G.P.M. - 865	H.P. - 65
	G.P.M. - 137

up to 2000# discharge pressure where only 4" liner may be used - @ 70 r.p.m.

H.P. - 326
G.P.M. - 233

These are the ranges of the pumps as listed in a more complete table in the reference.

205.

Trade Name: Cochran C-B System

Manufacturer: Cochran Corporation, Philadelphia, Pennsylvania

Use and Outstanding Characteristics:

This system is a unit for returning condensate to boiler at a high pressure. It is designed to prevent the escape of steam from condensate when air is vented to the atmosphere. The system is actually two pumps in one, one a centrifugal which energizes an eductor which pumps the condensate to the boiler against the boiler pressure at any temperature. The entrained air is automatically eliminated before the condensate is discharged to the boiler. It is used chiefly in steam process industries such as laundries, food, chemical, and so forth.

Manufacturer's Data:

Boiler H.P.: 50 - 2500
G.P.M. evaporated: 3 - 150
Pressure differential: 10 - 100 lbs.

206.

Trade Name: Cochran Hot Process Water Softener

Manufacturer: Cochran Corporation, Philadelphia, Pennsylvania

Use and Outstanding Characteristics:

The Cochran Chemical Feeding and Proportioning Apparatus is designed to feed suspensions such as milk of lime, as well as clear liquids. Its use can be modified to feed several liquids simultaneously. The outfit consists of a chemical tank, proportioner, and pump set. The pump set consists of two centrifugal pumps connected to the same electric motor. One pump circulates the lime and soda solution through the proportioner, while the second receives the proportioned chemicals and transfers them to the softener. The pumps are low speed variety

with quiet operation. They have open, non-clogging type impellers, split case, and double suction.

207.

Trade Name: Conseco Types P and PH Pedestal Mounted Volute Pumps

Manufacturer: Condenser Service & Engineering Co., Scranton, Pennsylvania

Use and Outstanding Characteristics:

Types P and PH pumps have a wide range of services such as water supply, boosters, circulators, transfer, high vacuum condensate units, brine overboard, evaporation, air conditioning, and general industrial duties. The baseplate is such that an electric motor, turbine, or gas engine can be mounted. The volute casing can be swung into four different positions to suit installation.

Manufacturer's Data:

Type P: Heads to 55 ft. at 1750 r.p.m.
Capacities: 25 to 450 g.p.m.
Type PH: Heads to 235 ft. at 3500 r.p.m.
Capacities: 50 - 1200 g.p.m.

208.

Trade Name: Conseco Types C and CC Close-Coupled Volute Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

This type is recommended for high-vacuum services such as condensate, overboard brine, evaporator plants, and general industrial applications where compactness is desired. Self-contained construction permits mounting in any position from horizontal to vertical. Design is such that there is close-coupling to motors, steam turbines, and small gas engines.

Manufacturer's Data:

Type C: Heads to 225' @ 3500 r.p.m.
Capacities: 75 - 425 g.p.m.
Sizes: To 3" discharge
Type CC: Heads to 150' @ 3500 r.p.m.
Capacities: 50 to 200 g.p.m.
Sizes: To 1½" discharge

209.

Trade Name: Conseco Type C Turbo-Driven Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

This type is suited to condensate, hotwell, and boiler feed services, as well as cold water services, the latter type supplied with non-vented suction heads on the pumps.

Manufacturer's Data:

Heads: To 100' @ 3500 r.p.m.

Capacities: 15 to 150 g.p.m.

210.

Trade Name: Conseco Type SS Single-Suction Single-Stage Volute Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

These units are designed for services where horizontally split casings are preferred. Many sizes can be equipped with suction vents in order to adapt them to condensate and other high vacuum services. They are recommended for use where intermediate head ranges are called for. Such uses include boosters, domestic water supply, boiler feed, and refrigerants. The rotating parts and bearing housings can be lifted from the lower casing without breaking pipe joints or in any way disturbing the pump alignment.

Manufacturer's Data:

Type SS, A, B, or C:

Heads to 100' @ 1750 r.p.m.

Type SSX Series:

Heads to 250' at 3600 r.p.m.

Capacities: 75 to 375 g.p.m.

211.

Trade Name: Conseco Type DS Double-Suction Single-Stage Volute Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

These double-suction units are designed especially for severe, continuous service. Such applications include water works, boiler plants, steel mills, mines, and general industrial use. The low-head units are considered good for condenser circulating and low pressure service. The pump is furnished in a variety of materials to suit the fluid being pumped.

Manufacturer's Data:

Heads: To 325' @ 1750 r.p.m.
Capacities: 75 to 6000 g.p.m.
Peak efficiencies from 80 to 90% depending on the size

212.

Trade Name: Conseco Type DSX Double-Suction High-Speed Volute Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

Type DSX pumps are double-suction units designed for high speed operation with motor, turbine, gasoline or oil engines, or through a gear drive. They are recommended for use in intermediate head ranges such as for boosters, domestic water supply, industrial and boiler feed services, and refrigerants. Foot pedestals are provided near the centerline to absorb expansion on hot liquids. The suction openings are large, and the stuffing boxes are extra deep to assure longer life with hot liquids. Many metals are available to suit construction with the liquid pumped.

Manufacturer's Data:

Heads: To 350' at 3600 r.p.m.
Capacities: 150 to 1800 g.p.m.
Sizes: 2 to 6" discharge

213.

Trade Name: Conseco Types KS and KT Split-Casing Two-Stage Volute Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

Types KS and KT are designed for use as booster, domestic water supply, boiler feed, refrigerant, water works, steel mills, mines, and general industrial use where the head required is higher than that provided by intermediate head range pumps of this general type. They have two single-suction opposed impellers with radially staggered volutes to produce the least possible thrust. Water between the stages is gradually decelerated. Drive may be obtained through a motor, turbine, gasoline or diesel engine, or through a jackshaft and pulley.

Manufacturer's Data:

Type KS Heads to 235'
Type KT Heads to 450'
Speed Ranges (both types): 1500 to 2000 r.p.m.

214.

Trade Name: Conesco Type KB Split-Casing Two-Stage Volute Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

Application for this type is primarily in such severe duties as boiler feed, water supply, gasoline handling, and general industrial use. Single-suction opposed impellers are used to minimize axial thrust, and radially staggered volutes hold radial thrust loads to a minimum. Drive may be obtained through gears, belt, gasoline engine, turbine, or a motor.

Manufacturer's Data:

Heads: To 700' @ 3500 r.p.m.
Capacities: 75 to 1000 g.p.m.

215.

Trade Name: Conesco Type KX Split-Casing Four-Stage Volute Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

Application for this type is such that it is designed to meet high-capacity and high-pressure requirements for heavy-duty services in mines, boiler

plants, slushing units, and similar applications. The overhead interstage passage keeps the pump centerline close to the floor, which is advantageous when all possible suction head is desirable. The pumps are adaptable to all conventional drives.

Manufacturer's Data:

Medium speed series:
Heads to 500' at 1750 r.p.m.
High speed series:
Heads to 1400' at 3500 r.p.m.
For both:
Capacities: To 1500 g.p.m.
Sizes: 2 to 6" discharge

216.

Trade Name: Conesco Duplex Piston Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

This type is best used for pumping heavy columns of water with uniform pressure and continuity of flow without objectionable momentum. These uses include boiler feed, tank, and general service up to 150 p.s.i. The pump consists of two equal-dimension steam pumps placed side-by-side so that the steam piston of each controls the valve of the other. This allows one piston to complete its stroke and gradually come to rest. This permits the water valves to seat quietly and the incoming water to fill the cylinder while piston returns to its original position. 80 p.s.i. of steam pressure are required to secure the best benefits of these compound pumps.

The pumps come in 3 different types of units:

- (a) for boiler feed or light oil service
3 to 10" stroke
- (b) for tank or light service
4 to 18" stroke
- (c) for pressures to 150 p.s.i.
12 and 18" strokes

217.

Trade Name: Conseco Compound Duplex Piston Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

These pumps are recommended for water and oil pumping service at 150 p.s.i. or less whenever fuel saving is important. The saving is accomplished by compounding, which saves steam. The types available are iron-fitted and brass-fitted. In each case the water cylinder liners are removable. The steam cylinders are provided with a simpling device which allows easy starting by having live steam in all the cylinders. Water valves are located in decks above the water pistons, keeping them constantly primed. Valve materials are varied to suit conditions with temperature and the liquid pumped.

Manufacturer's Data (Table in reference):

Capacities: 100 to 1500 g.p.m.
Strokes: 10", 12", 18"
Sizes: 3, 4, 6, 7, 8" discharge

218.

Trade Name: Conseco Triplex Plunger Pumps

Manufacturer: Scranton Pump Division, Scranton, Pennsylvania

Use and Outstanding Characteristics:

Conseco Triplex Plunger Pumps, which are vertical pot chamber, water-end type, are designed for any lift, specifically for mine use, and wherever the advantages of a sectionalized pot chamber pump are desired. The plungers are close-grained cast-iron, chilled iron, or acid-resisting bronze. Chilled iron plungers are extremely hard and resist the erosive action of grit.

Manufacturer's Data (Table in reference):

Plunger diameters: 6, 7, 7½, 8, 9, 10, 11, 12"
Stroke: 9, 10, 12, 16"
Capacities: To 1170 g.p.m.
Speed: Approx. 50 r.p.m.

219.

Trade Name: Cook L S Pumps

Manufacturer: A.D. Cook, Inc., Lawrenceburg, Indiana

Use and Outstanding Characteristics:

This is an electric motor-driven deep well plunger pump with chain drive, scotch yoke reciprocating mechanism, positive lubrication, and an eight-ring stuffing box. The pump can be run in either direction, and the entire mechanism is accessible by removal of four screws. It is intended for domestic water supply.

Manufacturer's Data:

Capacities from 90 g.p.h. to 2400 g.p.h.

220.

Trade Name: Cook SW Pumps

Manufacturer: A. D. Cook, Inc., Lawrenceburg, Indiana

Use and Outstanding Characteristics:

These are electric-motor driven plunger pumps for shallow well water supply. The pump is double acting and has a bronze cylinder. Tanks are available.

Manufacturer's Data:

Capacities from 265 g.p.h. to 600 g.p.h.

221.

Trade Name: Cook Ejector Pumps

Manufacturer: A. D. Cook, Inc., Lawrenceburg, Indiana

Use and Outstanding Characteristics:

This is a vertical volute centrifugal pump which may be used as a part of the two-pipe ejector design; or as a shallow well pump. It is driven by a close-coupled electric motor and has an automatic take up packing gland. The units are furnished as complete with tanks if desired.

Manufacturer's Data:

Capacities: From 200 to 2620 g.p.h.

Heads: Up to 77 p.s.i.

222.

Trade Name: Cook Deep Well Turbine Pump

Manufacturer: A. D. Cook, Inc., Lawrenceburg, Indiana

Use and Outstanding Characteristics:

This is a vertical turbine pump for deep well water supply. It is intended for automatic service. It is either electric motor driven or gear headed (right angled), or belt driven. It may be obtained as oil lubricated or water lubricated, oil being preferred for wells over 40 feet deep.

223.

Trade Name: Davidson Single Cylinder Pumps

Manufacturer: N. T. Davidson Co., Brooklyn, New York

Use and Outstanding Characteristics:

Horizontal single-cylinder, double-acting steam pumps used for boiler feed or general pressure service, tank or light pressure service, and air and vacuum use in heating systems and vacuum pans. The water cylinder is adapted for each particular service. The valve area is large so that the pumps can run at high speed without noise. Pistons have special packings to suit them for the services intended. For example cupped leather packings for cold water, a square fibrous packing set out by a brass spring for hot water and special packings for very hot water, oil, naphtha, etc.

Manufacturer's Data:

- (a) Boiler Feed Service:
 - Stroke 4 - 18"
 - Gallons per stroke: .05 to 6.74
 - Discharge: 1-- 7"
- (b) Light Pressure Service Type
 - Stroke 4 - 14"
 - Gallons per stroke: .054 to 6.85
- (c) Air and Vacuum
 - Heating surface: 1000 - 13,500 sq. ft.
 - Stroke: 3 - 18"

224.

Trade Name: Davidson Centrifugal Pumps, Type A0

Manufacturer: M. T. Davidson Co., Brooklyn, New York

Use and Outstanding Characteristics:

These pumps are single-stage solid volute centrifugal pumps with enclosed type impeller. The volute casings and impellers are designed so as to give the highest efficiency of the pump over a broad range, that is a "flat-curve" characteristic. The impeller is cast bronze, generally enclosed, but open impellers are provided wherever heavy and viscous liquids are to be pumped in such industries as the chemical industries.

Manufacturer's Data:

Speed 1750 r.p.m.
Heads: To 100'
Capacities: To 180 g.p.m.

225.

Trade Name: Davidson Submerged Sump Pumps

Manufacturer: M. T. Davidson Co., Brooklyn, New York

Use and Outstanding Characteristics:

These pumps are self contained of central column discharge type. It may be mounted on a pit cover or suspended and let down through a manhole into the bilge or tank. Special types of these pumps can be used to pump unscreened sewerage, tannery wash, soapy and tarry solutions, trash, and waste food products. They find use in the following applications and industries: bilges, chemical plants, dairies, boiler rooms, incinerators, laundries, packing houses, restaurants, tanneries, tunnels, sewerage, and tarry waters.

Manufacturer's Data:

Capacities: 10 - 2000 g.p.m.
Discharge pressures: 5 - 100 p.s.i.

226.

Trade Name: Davidson Brewery Pumps

Manufacturer: M. T. Davidson Co., Brooklyn, New York

Use and Outstanding Characteristics:

The brewery pumps come in several types:

(a) Wort Pumps for pumping hot or cold wort (s.g. 1.05) operating with flooded suction. All parts coming in contact with acid resisting bronze.

(b) Beer Pumps having all parts coming in contact with the liquid, the pumps being made of bronze. The motor is built in and splash-proof.

(c) Mash Tub Liquor Pumps of either all bronze or bronze fitted.

(d) Anhydrous Ammonia pumps for handling liquid ammonia from the accumulator.

Manufacturer's Data:

- (a) Wort Pumps:
To 350 barrels per minute
Heads to 43'
- (b) Beer Pumps:
Capacity: To 250 b.p.h.
Dis. pressure: To 35 p.s.i.
- (c) Mash Pumps
Capacities: To 100 g.p.m.
Heads: To 20'
- (d) Ammonia: To 15 g.p.m.

227.

Trade Name: Davidson Marine Pumps

Manufacturer: M. T. Davidson Co., Brooklyn, New York

Use and Outstanding Characteristics:

The Davidson Marine Pumps are vertical simplex pot valve type pumps with grey iron cast steam cylinders, cast iron piston on the steam side, and bronze follower type pistons on the liquid side. The liquid cylinders have bronze liners in the iron casting.

Manufacturer's Data:

- General Service:
Capacities: To 580 g.p.m.
- Boiler Feed Service:
Capacities: To 377 g.p.m.
- Fuel Oil Service:
Capacities: To 377 g.p.m.

228.

Trade Name: Davidson Type AYD Marine Pumps

Manufacturer: M. T. Davidson Co., Brooklyn, New York

Use and Outstanding Characteristics:

These pumps are single-stage, double-suction with horizontally split volute casing of gray iron. The impeller is of bronze, double-suction type.

229.

Trade Name: Single-Suction Centrifugal Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: Type R

Use and Outstanding Characteristics:

Single-stage, single-suction, volute type, centrifugal units, these pumps were developed especially for oil refinery service. They are particularly adapted to handle hot liquids such as oil and dowtherm.

Manufacturer's Data:

Capacities: From 10 to 2500 g.p.m.

230.

Trade Name: Oil Bath Power Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Types H and XH

Use and Outstanding Characteristics:

These are side pot, piston packed, duplex, reciprocating power pumps with the power end immersed in an oil bath and using herringbone gears.

Manufacturer's Data:

Stroke of 10"

Capacities from 58.80 to 420 g.p.m.

Heads up to 1000 p.s.i.

Stroke of 6"

Capacities from 27.48 to 120 g.p.m.

Pressures up to 800 p.s.i.

231.

Trade Name: Single-Suction Centrifugal Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: Type C

Use and Outstanding Characteristics:

This is a single-suction, single-stage, volute type, centrifugal pump equipped with either an open or closed impeller. It can be made of special materials to meet unusual conditions.

232.

Trade Name: Close-Coupled Centrifugal Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: Two Stage

Use and Outstanding Characteristics:

This is a two-stage, volute type, centrifugal pump, close coupled with an electric motor.

Manufacturer's Data:

Capacities: Up to 500 g.p.m.

Heads: Up to 700 ft.

233.

Trade Name: Close Coupled Centrifugal pump

Manufacturer: Dean Brothers Pumps, Inc.

Model: Single Stage

Use and Outstanding Characteristics:

These units are single-stage, volute type, centrifugal pumps, close coupled with an electric motor with ball bearings.

Manufacturer's Data:

Capacities: Up to 75 g.p.m.

Heads: Up to 240 ft.

234.

Trade Name: Close Coupled Centrifugal Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: Single-stage flanged

Use and Outstanding Characteristics:

This is a single stage, volute type centrifugal pump with flanged connections and close coupled to an electric motor.

Manufacturer's Data:

Capacities: From 5 to 1000 g.p.m.

Heads: Up to 300 ft.

235.

Trade Name: "Durable" Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: Horizontal Duplex

Use and Outstanding Characteristics:

These horizontal duplex piston pumps are of the reciprocating, side pot type. It features accessible stuffing boxes, stud type glands, independent cradle and monkey wrench, dismountability.

Manufacturer's Data:

Heads; Up to 400 p.s.i.

Capacities: Up to 200 g.p.m.

236.

Trade Name: Truck Pump

Manufacturer: Dean Brothers Pumps, Inc.

Model: 3524

Use and Outstanding Characteristics:

These are reciprocating woven gear operated, power pumps, intended for handling gasoline or other volatile mixtures, the pumps being of the close clearance type.

237.

Trade Name: Station Pump

Manufacturer: Dean Brothers Pumps, Inc.

Model: 3461

Use and Outstanding Characteristics:

These are reciprocating power pumps of the close clearance type intended for handling high-test gasoline or other volatile liquids.

238.

Trade Name: Horizontal Close Clearance Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: 3844

Use and Outstanding Characteristics:

These are horizontal, single-style, double-acting, close clearance, reciprocating pumps, designed for pumping high-test gasoline.

Manufacturer's Data:

Discharge Pressure: 400 p.s.i.
Suction pressure: 300 p.s.i.
Capacities: From 5.95 to 352.5 g.p.m.

239.

Trade Name: "Durable" Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: Duplex

Use and Outstanding Characteristics:

These are direct acting, horizontal, duplex piston pumps intended for tank service, boiler feed, and water supply. There are two types: One for light pressures up to 100 p.s.i. and one for pressures up to 250 p.s.i.

Manufacturer's Data:

100 p.s.i.
Capacities from 24 to 1426 g.p.m.
250 P.S.I.
Capacities from 10.5 to 312 g.p.m.

240.

Trade Name: Pressure Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: Single Style

Use and Outstanding Characteristics:

These are reciprocating, direct acting, single stage, horizontal pumps furnished in two types: light service and general service.

Manufacturer's Data:

General Service:

Pressures up to 200 p.s.i.

Capacities from 5.4 to 340 g.p.m.

Light Service:

Pressures up to 100 p.s.i.

Capacities from 9.4 to 264 g.p.m.

241.

Trade Name: Vacuum Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These are single-style, reciprocating, direct-acting pumps suited for steam heating systems and other systems where a moderate vacuum is required. They are made as valve plate and cover types or as high-duty one-piece cylinder types.

Manufacturer's Data:

E.D.R.'s from 1350 to 225,000

Capacities from 11.24 to 3517 g.p.m.

242.

Trade Name: Boiler Feed and Pressure Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These are horizontal, single-style, outside center packed plunger, boiler feed and pressure pumps. It is of the valve plate and cover pattern.

Manufacturer's Data:

Capacities: From 7 to 238 g.p.m.

Working pressure of 200 p.s.i.

243.

Trade Name: Boiler Feed and Pressure Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These are horizontal, single-style, double-acting, outside end packed, pot valve type boiler feed and pressure pumps.

Manufacturer's Data:

Working Pressure of 300 p.s.i.
Capacities from 26 to 275 g.p.m.

244.

Trade Name: Hydraulic Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These are horizontal, single-style, double-acting, forged steel cylinder hydraulic pumps.

Manufacturer's Data:

Working pressure of 4000 p.s.i.
Capacities from 1.15 to 10.37 g.p.m.

245.

Trade Name: Magma Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These are horizontal, single-style, double-acting Magma pumps.

Manufacturer's Data:

Displacements from 32 to 214 g.p.m.
Working pressure of 100 p.s.i.
Magma pumps deliver 60% of the displacement.

246.

Trade Name: "Durable" Automatic Feed Pumps & Receivers

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These units consist of a reciprocating, duplex, double-acting, steam pump with a receiver tank. They are used for the purpose of returning automatically to the boiler the condensed steam drained from the heating coils, drying cylinders, evaporating systems, etc. The condensed water flows by gravity into the receiver where its level, by a float arrangement, determines the operation of the pump.

Manufacturer's Data:

Capacities: from 5000 to 200,000 E.D.R.

247.

Trade Name: "Durable" Plunger Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These are horizontal, duplex, outside center packed, valve plate and cover type reciprocating pumps intended for boiler feed and general service. There is also a heavy duty type for use in mines, water supply stations, etc.

Manufacturer's Data:

Capacities from 24 to 176 g.p.m.

Working pressure of 200 p.s.i.

Heavy duty:

Capacities from 118 to 616 g.p.m.

248.

Trade Name: Durable Plunger Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These are duplex, horizontal, outside end packed, pot valve, reciprocating plunger pumps, intended for boiler feed.

Manufacturer's Data:

Working pressure of 300 p.s.i.

Capacities from 33 to 705 g.p.m.

from 478 to 10200 B.H.P.

249.

Trade Name: "Durable" Duplex Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Model: Vertical

Use and Outstanding Characteristics:

These pumps are duplex, reciprocating steam pumps developed for marine service. There are two types: the one for 300 p.s.i. working pressure and the other for 50 p.s.i.

Manufacturer's Data:

Capacities:	300 p.s.i. 32 - 208	50 p.s.i. 326 - 1386
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250.

Trade Name: "Durable" Oil Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These are duplex, reciprocating, steam pumps designed for use in refineries, pipe lines service, and for oil or water pumping service when pressures up to 800 p.s.i. are required.

Manufacturer's Data:

Capacities from 21 to 147 g.p.m.

251.

Trade Name: Vertical Triplex Hydraulic Pumps

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

They are triplex power pumps intended for heavy pressure hydraulic service.

Manufacturer's Data:

Working Pressures from 1200 to 5000 p.s.i.
Capacities (displacements) from 2.07 g.p.m. to 49.93 g.p.m.

252.

Trade Name: Air Pumps & Jet Condensers

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

These units are a combination of jet condenser and vacuum pump. Its application is particularly successful in connection with high-speed engines and is adapted however for either high or low speed engines, of the simple compound, or triple expansion type and with steam turbines. It is furnished in either vertical or horizontal form. They are also available in single style.

Manufacturer's Data:

2907 - 100,270 pounds of exhaust steam per hour (26" vacuum, 70° water)

253.

Trade Name: Dean Bros. Combined Air & Circulating Pump

Manufacturer: Dean Brothers Pumps, Inc.

Use and Outstanding Characteristics:

This is a reciprocating pump with a pump cylinder for circulating water through the condenser and air cylinder for removing the air and water of condensation from the condenser, both cylinders being operated by a steam cylinder. They may be used with all styles of Surface Condensers.

Manufacturer's Data:

Capacities: 770 - 14660 pounds of steam/hour (26" vacuum, 76° water)

254.

Trade Name: Vertical Single Suction Pumps

Manufacturer: Dean Hill Pump Co.

Use and Outstanding Characteristics:

These are vertical centrifugal pumps and are subdivided into two classes: the open-shaft type and the closed-shaft type. The former being built in what is usually designated as the "depressed type" suspended from the surface, while the

latter has the pump proper supported on brackets at the bottom of the pit. They can be furnished with either open, closed, or a special form of Francis wheel impeller.

Manufacturer's Data:

Sizes from $\frac{1}{2}$ " to 8"

Maximum depths of setting from 25 feet to 80 feet.

255.

Trade Name: Centrifugal Sump Pumps

Manufacturer: Dean Hill Co.

Use and Outstanding Characteristics:

These are sump pumps of the single-stage, volute type, centrifugal form intended for service requiring the removal of liquids intermittently from basins, tanks, or pits. They have been used in sugar refineries, industrial plants, basements below the sewer level, hot wells, and flywheel pits.

Manufacturer's Data:

Sizes from $1\frac{1}{2}$ " to 4"

256.

Trade Name: Single Suction Centrifugal Pumps

Manufacturer: Dean Hill Pump Co.

Use and Outstanding Characteristics:

This is a single-suction, volute type, single-stage centrifugal pump. It has a closed impeller and is intended for handling water, oil, brine, and other liquids, reasonably free from solids, against medium or low heads. It is available for any type of drive.

Manufacturer's Data:

Sizes from 1" to 5"

Capacities up to 1000 g.p.m.

257.

Trade Name: Back-to-Back Centrifugal Pumps

Manufacturer: Dean Hill Pump Co.

Use and Outstanding Characteristics:

This is a two-stage, volute type, centrifugal pump with centerline support, water-cooled stuffing boxes, and oil lubricated water-cooled, cartridge type, ball bearings.

Manufacturer's Data:

Sizes from 2" to 4"

258.

Trade Name: Multi-Stage Centrifugal Pumps

Manufacturer: Dean Hill Pump Co.

Use and Outstanding Characteristics:

These are centrifugal pumps built in either the volute or diffuser type. The diffuser rings are separate stationary units, mounted in the casing allowing individual design of the diffuser rings for each job. The volute type is recommended for service where high efficiencies are not required or where the liquid to be handled is extremely gritty. The packing is of the labyrinth type. It also has an automatic balancing device using pressure to counteract axial thrust. It is furnished with either motor or turbine drive.

Manufacturer's Data:

Sizes from 2" to 12"
Capacities from 120 to 4800 g.p.m.

259.

Trade Name: Double Suction Ball Bearing Pumps

Manufacturer: Dean Hill Pump Co.

Model: Model SC

Use and Outstanding Characteristics:

These pumps are small size, high speed, single stage, double suction, volute type centrifugal pumps, intended for use in pumping water, oil, and other light liquids.

Manufacturer's Data:

Sizes up to 3"

260.

Trade Name: Double Suction Single Stage Centrifugal Pumps

Manufacturer: Dean Hill Pump Co.

Model: Models SC, MC, and LC

Use and Outstanding Characteristics:

These pumps are of the single-stage, double-action, volute type, centrifugal form, with horizontally split casings and bearings.

Manufacturer's Data:

Sizes from 2" to 30"

261.

Trade Name: Centrifugal Pumps

Manufacturer: De Laval Steam Turbine Company

Use and Outstanding Characteristics:

These are single-stage, single or double suction, volute type, centrifugal pumps used in water supply operations. They have labyrinth wearing rings and horizontally split cases.

262.

Trade Name: Clogless Pumps

Manufacturer: De Laval Steam Turbine Company

Use and Outstanding Characteristics:

This unit is intended for handling sewage, paper stock, rag stock, and other solid-bearing fluids. It is a volute type, single-stage, centrifugal pump with large impeller openings.

263.

Trade Name: Mixed Flow Pump

Manufacturer: De Laval Steam Turbine Company

Use and Outstanding Characteristics:

This is a volute, single-stage, centrifugal pump operating at high specific speed and is suitable for delivering large volumes of water or sewage against moderate heads and the shape of the impeller is such that large objects can be passed without clogging or wedging.

264.

Trade Name: Motor-Mounted Pumps

Manufacturer: De Laval Steam Turbine Company

Use and Outstanding Characteristics:

These are volute, single-stage, end suction centrifugal pumps, close-coupled to an electric motor.

Manufacturer's Data:

Capacities from 5 to 1200 g.p.m.
Heads from 10 to 230 feet

265.

Trade Name: Pedestal Mounted Pumps

Manufacturer: De Laval Steam Turbine Company

Use and Outstanding Characteristics:

This type is a single-stage, end suction, volute type, centrifugal pump built with pedestal mounting for connection by flexible coupling to separately mounted motors or by sheaves for belt drive.

Manufacturer's Data:

Capacities from 5 to 1200 g.p.m.
Heads from 10 to 230 ft.

266.

Trade Name: Vertical Pumps

Manufacturer: De Laval Steam Turbine Company

Use and Outstanding Characteristics:

These are vertical, volute type, centrifugal pumps, either single or two stage, intended for shipboard use or condensate, fire pump or circulating pump services.

267.

Trade Name: Multistage Pumps

Manufacturer: De Laval Steam Turbine Company

Model: Opposed Impeller Type Series

Use and Outstanding Characteristics:

These are multistage, volute type, centrifugal pumps with labyrinth wearing rings and is intended for boiler feed, desealing spray and oil pipe line use.

Manufacturer's Data:

Pressures up to 1200 p.s.i.

268.

Trade Name: Imo Pumps

Manufacturer: De Laval Steam Turbine Company

Use and Outstanding Characteristics:

The Imo pumps are unique in that they consist of three rotors (one power and two idler) with meshing helical bands. It requires no valves or pilot gears, has no reciprocating parts, requires no lubricating system, and is capable of operating at motor or turbine speeds. It is extensively used for handling oil and other liquids of practically any viscosity, in almost any volume and at any pressure.

269.

Trade Name: Blowers & Compressors

Manufacturer: De Laval Steam Turbine Company

Use and Outstanding Characteristics:

These are centrifugal, volute type air pumps of single and multi-stage construction used for blast furnaces, coke plants, gas works, sewage treatment, smelting and refining.

270.

Trade Name: Side-Suction Centrifugal Pumps

Manufacturer: Deming Company

Model: Fig. 3900, 3910

Use and Outstanding Characteristics:

This is a small, low-priced unit of the volute, single-stage, centrifugal form. It has an open impeller and the position of the discharge nozzle may be rotated to several places.

Manufacturer's Data:

Capacities from 2 to 200 g.p.m.
Heads up to 70 ft.

271.

Trade Name: Side Suction Centrifugal Pumps

Manufacturer: Deming Company

Model: Figs. 4010, 4020, 4030, 4040

Use and Outstanding Characteristics:

These are volute, single stage, centrifugal pumps with a semi-enclosed impeller (i.e., closed on one side). For the 25 different pumps manufactured under these models, only four different types of support heads are required, allowing interchangeability. The design features an axially adjustable support head bearing which allows for adjustment of the clearance between the impeller and casing to any desired.

Manufacturer's Data:

Capacities from 10 to 3600 g.p.m.
Sizes from 1" to 10"
Heads up to 240'

272.

Trade Name: Side Suction Centrifugal Pumps

Manufacturer: Deming Company

Model: Fig. 3903

Use and Outstanding Characteristics:

These pumps use the same casings and impellers as the Deming Fig. 3900 but are adapted for heavy duty, being provided with two ball bearings. They are suitable for booster service where the suction pressure does not exceed 25 p.s.i. The position of the discharge nozzle may be rotated.

Manufacturer's Data:

Capacities up to 50 g.p.m.
Heads up to 50 ft.

273.

Trade Name: Side Suction Centrifugal Pumps

Manufacturer: Deming Company

Model: Fig. 4003, 4013, 4023, 4033

Use and Outstanding Characteristics:

These are single-stage, volute, centrifugal pumps of overhung impeller type, constructed for heavy duty, having two ball bearings. It has a semi-enclosed impeller and the position of the discharge nozzle is adjustable. Also the impeller clearance is adjustable while the pump is running.

Manufacturer's Data:

Sizes from 1" to 6"
Capacities from 10 to 1200 g.p.m.
Heads up to 240 ft.

274.

Trade Name: Side Suction Centrifugal Pumps

Manufacturer: Deming Company

Model: Figs. 4012, 4022, 4032, 4042

Use and Outstanding Characteristics:

The outstanding feature of these volute, single-stage, semi-enclosed impeller, centrifugal pumps is the liquid end, which consists of the volute casing, impeller and stuffing-box head, separate and bolted to the rigid support head. Therefore, for pumping corrosive liquids, only the liquid end need be made of special alloy, which represents a considerable saving. The impeller clearance is adjustable. For flexibility, only four different support heads are required to accomodate the thirty-one different pump ends.

Manufacturer's Data:

Sizes from 1" to 10"
Capacities from 10 to 3600 g.p.m.
Heads up to 240 ft.

275.

Trade Name: "Motor-Mount" Centrifugal Pumps

Manufacturer: Deming Company

Model: Fig. 4302, 4312, 4322

Use and Outstanding Characteristics:

These are close coupled units consisting of a splash proof electric motor and a single-stage, volute, centrifugal pump, featuring impeller clearance adjustment and a three-vane, semi-closed impeller.

Manufacturer's Data:

Capacities from 10 to 600 g.p.m.
Heads up to 180 ft.

276.

Trade Name: Portable Centrifugal Pumping Units

Manufacturer: Deming Company

Model: Fig. 4010 - EP

Use and Outstanding Characteristics:

These are all-purpose pumps intended for permanent and auxiliary installations as well as for temporary jobs such as pumping from sewers, trenches,

cellars, and cofferdams. The units consist of the Deming Fig. 4010 volute, centrifugal, single-stage, pump combined with an air-cooled gasoline engine and can be carried by two men. The suction line should be equipped with a foot valve.

Manufacturer's Data:

Capacities to 300 g.p.m.
Heads up to 58 ft.

277.

Trade Name: Double Suction Centrifugal Pumps

Manufacturer: Deming Company

Model: Figs. 5010, 5020, 5030

Use and Outstanding Characteristics:

These are double-suction, volute type, centrifugal pumps with a closed impeller. They are intended for general service.

Manufacturer's Data:

Sizes from $1\frac{1}{2}$ " to 10"
Capacities up to 5000 g.p.m.
Pressures up to 200 p.s.i.

278.

Trade Name: Vertical Sump Pumps

Manufacturer: Deming Company

Model: Figs. 4610, 4620, 4630, 4640

Use and Outstanding Characteristics:

The complete unit consists of a bottom suction, single-stage, volute, centrifugal pump suspended by an intermediate column or suspension pipe from a pit cover or cover plate. On this plate are mounted the motor and the thrust bearing which supports the pump shaft. They are used in packing houses, food processing plants, sugar mills, bottling works, sewage disposal, heat treating processes, and pits.

Manufacturer's Data:

Will pass solids from $5/6$ " to $3\frac{1}{4}$ "
Capacities from 10 to 3200 g.p.m.
Heads up to 120 ft.

279.

Trade Name: Sump Pumps

Manufacturer: Deming Company

Model: Fig. 4608

Use and Outstanding Characteristics:

This pump was designed to fill the need for an inexpensive unit where a regular sump pump is larger than needed and a cellar-drainer is too small. They are offered in two types: pit cover suspension or pit floor support.

Manufacturer's Data:

Capacities from 45 to 160 g.p.m.
Heads up to 60 ft.

280.

Trade Name: Cellar Drainers

Manufacturer: Deming Company

Model: Fig. 4604

Use and Outstanding Characteristics:

While ordinarily designed for use as cellar drainers, these centrifugal pumps may also be used for draining boiler rooms, tunnels, elevator pits, and many emergency uses.

Manufacturer's Data:

Heads from 5 ft. to 24 ft.
Capacities from 300 to 3000 g.p.h.

281.

Trade Name: Deep Well Turbine Pumps

Manufacturer: Deming Company

Model: Fig. 4700

Use and Outstanding Characteristics:

The outstanding features of this turbine type, centrifugal, multi-stage, deep well pump are water lubrication employing cutless rubber bearings and adjust-

able impeller clearance. They are used in the following fields: water supply, mine pumping, irrigation, refrigeration, and air-conditioning applications, petroleum industry, gasoline transfer, steel and metal industries, and chemical industries. They are furnished with unit drive, right angle drive and belt drive.

Manufacturer's Data:

Capacities from 15 to 3000 g.p.m.
Sizes for wells from 4" to 16" or larger

282.

Trade Name: "Turbo-flo" Pumping Units

Manufacturer: Deming Company

Model: Series 9000

Use and Outstanding Characteristics:

These are moderate priced, centrifugal, turbine type pumps intended for uses such as boiler feeding, condensate return, water circulation, brine circulation, chemical transfer, refinery service, cooling towers, and handling high temperature liquids. They should be used for clear liquids only.

Manufacturer's Data:

Capacities from 1 to 25.5 g.p.m.
Heads from 20 to 200 ft.

283.

Trade Name: Power Rotary Force Pumps

Manufacturer: Deming Company

Model: Fig. 1531 and 1532

Use and Outstanding Characteristics:

These are spur gear type rotary pumps used for pumping petroleum products, oil burner service, food products, handling, paint and varnish pumping.

Manufacturer's Data:

Capacities from 12 to 75 g.p.m.
Heads up to 50 p.s.i.

284.

Trade Name: High Speed Rotary Pumps

Manufacturer: Deming Company

Model: Fig. 1580 and 1581

Use and Outstanding Characteristics:

The design of these pumps differs from other Deming rotary gear pumps in the following respects: helical gears, suction and discharge ports on opposite sides of case, and pumps operate in either direction. They are suitable for pumping fuel oil or other light lubricants where small capacity pumps are desired.

Manufacturer's Data:

Capacities from 2.3 to 11.7 g.p.m.
Heads up to 100 p.s.i.

285.

Trade Name: Hand Rotary Pumps

Manufacturer: Deming Company

Model: Figs. 1576 and 1579

Use and Outstanding Characteristics:

These are hand rotary gear pumps, the 1576 differing from the 1579 in that it is rigged for barrel attachment and the 1579 is provided with wall-mounting brackets.

Manufacturer's Data:

Capacities from 5 to 8 g.p.m.

286.

Trade Name: Quadruple-Acting Oscillating Force Pumps

Manufacturer: Deming Company

Model: Fig. 1570

Use and Outstanding Characteristics:

This is a hand-operated oscillating wing force pump used for handling gasoline and oil.

Manufacturer's Data:

Capacities from 6 to 30 g.p.m.
Heads up to 90 ft.

287.

Trade Name: "Oil-Rite" Pumps

Manufacturer: Deming Company

Model: Figs. 992 and 993

Use and Outstanding Characteristics:

The vertical "Oil-Rite" single-acting, piston pump is available in either duplex or triplex form. All working parts are fully enclosed, giving protection against dust, dirt, and water. The unit is intended for general duty high pressure pumping.

Manufacturer's Data:

Maximum working pressures from 350 to 600 p.s.i.
Capacities from 4.65 to 18 g.p.m.

288.

Trade Name: "Oil-Rite" Pumps

Manufacturer: Deming Company

Model: Fig. 2993

Use and Outstanding Characteristics:

The single-acting "Oil-Rite" horizontal triplex pump is of the reciprocating plunger type with a gear drive. All moving parts in the power end are completely enclosed and operate in an oil bath. The pump is intended for use in portable and stationary spray service, industrial work, contractors' requirements, and any high pressure work where an automatically oiled pump is desirable.

Manufacturer's Data:

Maximum working pressure of 800 p.s.i.
Capacities: 20 and 35 g.p.m.

289.

Trade Name: "Oil-Rite" Car Washers

Manufacturer: Deming Company

Model: Fig. 9922

Use and Outstanding Characteristics:

The units consist of an "Oil-Rite" vertical high pressure, reciprocating pump, mounting frame, washer gun, and hose. It is intended to take its water supply from the low pressure city water line, or any other source within suction distance.

Manufacturer's Data:

Capacities from 4 to 18 g.p.m.
Heads up to 300 p.s.i.

290.

Trade Name: Duplex High Pressure Pumping Units

Manufacturer: Deming Company

Model: Fig. 2896

Use and Outstanding Characteristics:

It is a reciprocating plunger type duplex unit, motor driven, and suitable for high pressure service on water supply systems in country clubs, dairies, industrial plants, etc., and may also be used for boiler feed or condensation return service.

Manufacturer's Data:

Capacities from 240 to 900 g.p.h.
Heads up to 250 p.s.i.

291.

Trade Name: "Oil-Rite" High Pressure Pumping Units

Manufacturer: Deming Company

Model: Fig. 1809 H-P

Use and Outstanding Characteristics:

This High Pressure pump is a single-cylinder power pump with all the power parts enclosed and operating in an oil bath. It is intended for general

water supply, boiler feed and condensation service, where a heavy-duty pump is desired.

Manufacturer's Data:

Heads up to 250 p.s.i.
Capacities from 510 to 1140 g.p.h.

292.

Trade Name: Condensation Return Units

Manufacturer: Deming Company

Use and Outstanding Characteristics:

These are complete units for returning condensate to the boiler and consist of

- (1) a vented receiver tank with make up provisions,
- (2) a pump and a motor (pumps are side suction centrifugal, centrifugal jet, "Turbo-Flo", or reciprocating units),
- (3) regulating equipment control by either:
 - (a) amount of water in receiving tank or
 - (b) amount of water required by boiler
- (4) necessary auxiliary fittings and accessories.

Manufacturer's Data:

Temperatures to 190° F.
Boiler pressures up to 100 p.s.i.
Capacities from 3 to 60 g.p.m.
14.5 to 290 B.H.P.
2000 to 4000 E.D.R.

293.

Trade Name: "Oil-Rite" Mine Pumps

Manufacturer: Deming Company

Model: Fig. 1876

Use and Outstanding Characteristics:

The "Oil-Rite" mine pump is a reciprocating, heavy-duty, double-acting,

power pump especially adapted for mine gathering service. The power end is enclosed and runs in an oil bath.

Manufacturer's Data:

Heads from 75 to 275 p.s.i.
Capacities from 17.34 to 100 g.p.m.

294.

Trade Name: Triplex Pumps

Manufacturer: Deming Company

Model: Figs. 50 and 70

Use and Outstanding Characteristics:

Fig. 50 triplex pump is a single-acting plunger type, vertical reciprocating pump driven by belt and is intended for general service. Fig. 70 is the same type but horizontal and motor driven. It is also mounted on a portable truck and main gears are bolted, not keyed to a one-piece shaft and can be removed with a wrench.

295.

Trade Name: "Marvalette" House Water System

Manufacturer: Deming Company

Model: Fig. 1975

Use and Outstanding Characteristics:

This is a low price water supply pressure unit and consists essentially of a tank, reciprocating pump and electric motor. The following are some of its features: quiet operation due to rubber mounting; brass tubing cylinder liner; rubber valves; automatic oiling; crankcase painted on inside with case pore-sealing paint to keep oil free from fire, sand, and iron particles; combination vacuum and air chamber to cushion water flow. This unit can be had with either a horizontal or vertical tank.

Manufacturer's Data:

Maximum pressure of 50 p.s.i.
Capacity of 250 g.p.h.

296.

Trade Name: "Marvel" Electric Pumping Unit and Water System

Manufacturer: Deming Company

Model: Figs. 2090 and 2090 - G and 1890

Use and Outstanding Characteristics:

Fig. 1890 is the pumping unit, consisting of either a gasoline or electric motor driving a reciprocating plunger pump with the following some of its features: replaceable brass cylinder liner; rubber mounted; rubber valves; combination vacuum and air chamber; oil bath lubrication; crankcase painted on inside with pore sealing case paint to keep the oil free of sand and iron particles. Figs. 2090 and 2090 - G include a tank.

Manufacturer's Data:

Capacities of 275 and 375 g.p.h.
Pressures up to 50 p.s.i.

297.

Trade Name: Duplex Water Systems

Manufacturer: Deming Company

Model: Fig. 2895

Use and Outstanding Characteristics:

These units consist of a duplex pumping unit and tank. The pumping unit is driven by electric motor and has rubber valves, replaceable brass cylinder liners, and a combination built-in vacuum and air chamber.

Manufacturer's Data:

Capacities from 500 to 1800 g.p.h.
Pressures from 50 to 125 p.s.i.
Total suction lift of 25 ft. or less

298.

Trade Name: "Oil-Rite" Water Systems

Manufacturer: Deming Company

Model: Fig. 1809

Use and Outstanding Characteristics:

These units consist of an electric motor driven, "Oil-Rite" horizontal piston pump and tank. The pumping unit has helical gearing, vacuum chamber, and oil bath lubrication.

Manufacturer's Data:

Capacities from 550 to 3000 g.p.h.
Pressures from 50 to 125 p.s.i.
Total suction lift of 25 ft. or less

299.

Trade Name: Shallow Well Jet Water System

Manufacturer: Deming Company

Model: Fig. 4950

Use and Outstanding Characteristics:

This is a unit comprised of a shallow well jet pump and a tank. The pumping unit is a centrifugal, vertical, pump with a jet vacuum booster located above the ground.

Manufacturer's Data:

Capacities from 240 to 825 g.p.h.
Heads from 20 to 40 p.s.i.
Total suction lift of 20 feet or less.

300.

Trade Name: Deep Well Jet Pumps and Water Systems

Manufacturer: Deming Company

Model: Fig. 4902, 4901

Use and Outstanding Characteristics:

The units consist of a tank and pump with necessary accessories. The pump is a single-stage centrifugal with either one or two jet vacuum boosters located at the bottom of the well.

Manufacturer's Data:

Capacities from 60 to 4200 g.p.h.
Heads from 15 to 150 ft. (well depth)

301.

Trade Name: "Oil-Rite" Deep Well Water Systems

Manufacturer: Deming Company

Model: Fig. 1062

Use and Outstanding Characteristics:

These units consist of an "Oil-Rite" deep well pumping unit, tank, and accessories. The reciprocating pumping unit is powered by electric motor through helical gears and has splash and force feed lubrication. The force feed is obtained by the meshing gears. It can also be driven by a gasoline engine.

Manufacturer's Data:

Capacities from 190 to 1630 g.p.h.
Heads up to 40 p.s.i.

302.

Trade Name: "Miniturb" Deep Well Turbine water systems

Manufacturer: Deming Company

Model: Fig. 4701

Use and Outstanding Characteristics:

These units are for use in 4" I.D. or larger wells with lifts up to 200 feet. The "Miniturb" is a water lubricated deep well turbine pump and is controlled by an automatic pressure switch. The complete system features a pump, a tank, and all necessary accessories.

Manufacturer's Data:

Capacities from 15 to 75 g.p.m.
Heads from 20 to 200 ft. (well depth)
Discharge pressures between 20 and 40 p.s.i.

303.

Trade Name: House lift Pumps

Manufacturer: Deming Company

Model: Figs. 125 and 120

Use and Outstanding Characteristics:

These are hand pumps for water with a maximum suction lift of 25 feet. The cylinder may be drained by raising handle to extreme height. The handle is adjustable to any angle with the spout.

Manufacturer's Data:

Sizes from 3" to 4"

304.

Trade Name: House Force Pumps

Manufacturer: Deming Company

Model: Figs. 522, 525

Use and Outstanding Characteristics:

These pumps are hand-plunger types differing in that Fig. 525 is fitted with brackets for attaching to plank or wall. The cylinder may be drained by raising lever to its extreme height. The lever may be changed to the opposite side of the pump.

Manufacturer's Data:

Maximum suction lift of 25 feet
Lift and force of 60 feet
Sizes 3"

305.

Trade Name: Pipe Set-Length Lift and Force Pumps

Manufacturer: Deming Company

Model: Figs. 166 and 167

Use and Outstanding Characteristics:

These pumps are for wells 29 feet deep or less. They have a drip hole to prevent freezing.

Manufacturer's Data:

Size 3"

306.

Trade Name: Double-Acting Pipe Set-Length Force Pumps

Manufacturer: Deming Company

Use and Outstanding Characteristics:

This pump has a double-acting plunger operating below the frost line and the plunger rod is outside the pipe. By lengthening the pipe and rod the pump can be adjusted to the well.

Manufacturer's Data:

Size 3"

Maximum suction lift of 25 ft.

307.

Trade Name: Three-Way force Pumps

Manufacturer: Deming Company

Model: Figs. 417 and 417 $\frac{1}{2}$

Use and Outstanding Characteristics:

These pumps are designed for use in territories with sandy soil or low temperatures. They may be operated by windmill, pump jack, or by hand. They have underground and surface discharge.

Manufacturer's Data:

Strokes of 6, 8, and 10"

Drop pipe size 1 $\frac{1}{4}$ "

308.

Trade Name: Lift and Force Pump Standards

Manufacturer: Deming Company

Model: Figs. 403-A and 140 - A

Use and Outstanding Characteristics:

The stocks on all these pumps are tapped inside below the spout for 2" pipe and are fitted with a combination bushing to adapt them for 1 $\frac{1}{2}$ " or 1 $\frac{1}{4}$ " pipe. They have a drip hole below the freezing line (3 ft.) to prevent the pump

from freezing up. Fig. 403 (Lift Pump Standards) are designed to supply water with hand, windmill, or pump jack operation. Fig. 140 -A has a tube extending into the enlarged portion at the top to prevent air from escaping around the plunger rod and forms a built-in air chamber. The base of the standard permits the well casing to extend above the surface of the well platform and thus prevents contamination of the well by surface water. It is approved by the state board of health.

Manufacturer's Data:

Strokes of 6, 8, and 10 inches (adjustable)
Sizes $1\frac{1}{4}$, $1\frac{1}{2}$ or 2"

309.

Trade Name: "Straight Line" Pump Standards

Manufacturer: Deming Company

Model: Fig. 1716

Use and Outstanding Characteristics:

This is a water supply pump (domestic) that may be operated by hand, windmill, or pump jack, and made especially for export use.

Manufacturer's Data:

Strokes of 6, 8, and 10" (Adjustable)
Sizes of 2 and 3"

310.

Trade Name: "Giant" Double-acting Thresher Tank Pump

Manufacturer: Deming Company

Model: Fig. 554

Use and Outstanding Characteristics:

These are double-acting, hand-operated plunger pumps suitable for a combined lift and force of 60 feet.

Manufacturer's Data:

Capacity from one to two barrels per minute, depending on the number of strokes. ($7/8$ gallon/stroke)

311.

Trade Name: "Climax" Double-acting House Force Pumps

Manufacturer: Deming Company

Model: Fig. 608 and 608 $\frac{1}{2}$

Use and Outstanding Characteristics:

These hand pumps are particularly adapted for pumping water into elevated tanks. A large air chamber is included to smooth the flow. Fig. 608 $\frac{1}{2}$ differs from Fig. 608 in that it has an air valve fitted on the cylinder head, by means of which air may be pumped with water.

Manufacturer's Data:

Will lift and force 75 feet

Sizes 1 $\frac{1}{2}$ " and 1 $\frac{3}{4}$ " (suction) and 1 $\frac{1}{2}$ " and 1" (discharge).

312.

Trade Name: "Triumph" Double-Acting Force Pumps

Manufacturer: Deming Company

Model: Figs. 601 and 602

Use and Outstanding Characteristics:

These heavy-duty, double-acting, hand-operated, force pumps are adapted for use in mines, factories, warehouses, etc., and for use on vessels in pumping either hot, cold or soft water. Fig. 602 is identical to Fig. 601 except that it has two levers with a tie-rod in between, allowing two men to operate it.

Manufacturer's Data:

Will lift and force up to 75 ft.

Capacity of .490 gallons/stroke

313.

Trade Name: Hydraulic Pressure Test Pumps

Manufacturer: Deming Company

Model: Figs. 566 and 594

Use and Outstanding Characteristics:

These pumps are very convenient for plumbers to use for removing obstruc-

tions from drain pipes, testing boilers, pipe lines and castings; or for testing pressure gauges in connection with a master gauge. They are also adapted for use as reserve hand boiler feed pumps. They are hand-lever operated. Fig. 566 has brass parts wherever the liquid contacts it.

Manufacturer's Data:

Fig. 566 - pressures up to 800 p.s.i.
Fig. 594 - pressures up to 400 p.s.i.
3" stroke

314.

Trade Name: Hydraulic Rams

Manufacturer: Deming Company

Model: Fig. 690

Use and Outstanding Characteristics:

This ram operates on the velocity head developed in a drop pipe. When the velocity of the water rushing through reaches a certain level a valve is closed and the water hammer resulting forces the water into an air chamber under pressure. The fall must not be less than two feet for satisfactory service and the discharge elevation must not be less than six times (without a throttle valve) nor more than twelve times the fall. The quantity discharged from the ram will be approximately from $1/12$ to $1/24$ of the amount supplied to the ram, depending on the ratio of elevation to fall. Multiply the fall in feet by the number of gallons per minute supplied; divide the product by twice the discharge elevation; the result will be the approximate quantity discharged per minute.

Manufacturer's Data:

Drive (inches)	Pipe sizes	Discharge (inches)
1, $1\frac{1}{2}$, 2		$1/2$, $3/4$, 1

DISTILLATION PRODUCTS, INC.
ROCHESTER, NEW YORK

Uses of High Vacuum Pumping Equipment in Manufacturing:

Electronic Industry

Vacuum tubes of various types as used in radio.
Special vacuum tubes including cathode-ray tubes and x-ray tubes.
Photo-sensitive cells
Infra-red detectors - by use of coating equipment
Selenium Rectifiers - " " " " "
Condensers - " " " " "
Attenuators - " " " " "

Optical Industry - through use of coating equipment.

Low reflection coatings (cameras, binoculars, optical systems).
Semi-transmitting coatings
Graded density coatings
Special gun-sights (Nydar shot-gun sight and military equivalent)
Front Surface Mirrors.

Refrigeration Industry

Dehydration of compressor units.

Pharmaceutical

Dehydration of Penicillin
Preparation of Vitamin concentrates
Dehydration of blood plasma, vaccines and serums.

Novelty Industries

Plastic and glass jewelry, nameplates, etc., with metallic coatings by use
of coating equipment
Spangles

Electrical Industry

Therapeutic lamps, for reflector surface and conditioning
Standard Lamps
Neon type lamps
Sealed beam units, for reflector surface and conditioning

Metals and Alloys

Gas Analysis
Magnesium
Calcium
Tungsten
Gas-free alloys

Miscellaneous Applications

Thermometer Evacuation
Purification of plasticizers
Miscellaneous chemical processes

Special Equipment

Vacuum coating chambers
High Altitude chambers
Electron microscope
cyclotron
synchrotron
Linear accelerator
Molecular stills
Dehydration equipment
Rotary exhaust machines

Research

A tremendous amount of high vacuum equipment is in use in research laboratories. This promises to expand the list of applications of which the above is an indication of present extent.

315.

Trade Name: Glass-Metal Diffusion Pump

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

These glass-metal units are satisfactory for use in the rapid evacuation of cyclotrons, ultracentrifuges, vacuum spectographs, metal evaporation systems, and special electronic tubes. It has a high pumping speed and produces high vacua so it is well adapted for use with large chemical and physical systems. The units are either air or water cooled.

Manufacturer's Data:

Amt. of Oil: 200 g.m.
Recommended Oils: Amoil-S; Octoil
Forepressure: .15 m.m.
Heater Power: 130 - 325 watts
Heater Current: V. 2 - 3.5 A
Heater Voltage: 64 - 36 V
Speed: 220 liters per sec. @ 10^{-4} m.m.

316.

Trade Name: Miniature Glass Two-Stage Fractionating Pump, Type GF-5A

Manufacturer: Distillation Products, Inc.,

Use and Outstanding Characteristics:

Type GF-5A pump was adapted from a larger unit to provide the same ultimate vacuum and operation range as Type GF-20A for application to portable systems or where length or restricted diameter of the pumping line limits the speed to that obtainable with this unit.

Manufacturer's Data:

Amount of oil: 50 g.m.
Rec. oils: Octoil and Octoil S
Forepressure: .10 m.m.
Heater Power: 40 - 80 W
Heater Current: 1.0 - 1.4 A
Heater Voltage: 40 - 60 V
Speed: 3 - 5 liters/sec @ 10^{-4} m.m. of Hg.
Ultimate Vacuum 5×10^{-7} m.m. of Hg. at 25° C.

317.

Trade Name: Glass Two-Stage Booster Pump, Type GB - 3

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

Type GB - 3 booster pumps are intended for use between those of high speed glass pumps and mechanical pumps used for increasing unit efficiencies. An oil manometer provides a method of measuring the differential between fore-pressure and fine pressure when the pump is in operation. Specific applications of use are that to a falling film molecular still where it first acts as an intermediate between a high speed and a mechanical pump; it secondly serves to keep the diffusion unit operating by storing the gases removed from the system in a ballast tank while the mechanical pump is used to produce a primary vacuum in another part of the system.

Manufacturer's Data:

Amt. of oil: 150 c.c.
Recommended oil: Butyl Sebacate
Forepressure: 1.0 m.m.
Heater Power: 65 - 160 W
Heater Current: 1.3 - 2.0 A
Heater Voltage: 50 - 80 V
Speed: 3 liters/sec.
Ultimate Vacuum: 5×10^{-5} m.m. of HG.

318.

Trade Name: Glass Single-Stage Pump, Type G-4

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

Type G-4 pumps provide an economical method of obtaining high vacua in small systems. A series of alembics on the forepressure side of the jet makes the unit a semifractionating model, even though it is not of multistage construction. When the pump is used in an all-glass system, pressures of 1×10^{-5} m.m. are possible by proper adjustment of the heating and cooling systems. It is recommended for any situation where a pump of small capacity and high vacuum

without the aid of a cold trap is required. Examples of this are uses in the manufacture of neon signs, discharge tubes, and fluorescent tubes.

Manufacturer's Data:

Amt. of oil: 65 g.m.
Recommended oil: Amoil-S
Forepressure: .08 m.m.
Heater Power: 25 - 60 W
Heater Current: .8 - 1.2 A
Heater Voltage: 31 - 50 V
Speed: 4 liters/sec.
Ultimate Vacuum: 1×10^{-5} m.m. @ 25° C.

319.

Trade Name: Glass Two-Stage Fractionating Pumps

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

This type can produce a 10^{-7} m.m. vacuum in electrom tubes without use of a cold trap. This is made possible by controlled flow of oil through three boilers. After it has run for a short time, the extreme volatiles have been distilled into the alembics of the vertical tube. Condensed oil from jets returns to the first boiler where highest relative heat is applied. Here the more volatile constituents in the oil are vaporized. The material of lower vapor pressure passes through the connecting tube to the second boiler. The lower volatility of this oil plus the efficiency of the second stage provide better vacuums at high speeds. The small boiler at the end of the pump serves as a still in which dark-colored, non-volatile residue collects while the more active components are distilled and returned to the two other boilers.

Manufacturer's Data:

Heater power: 90 - 260 W
Heater current: 1.3 - 2.2 A
Heater voltage: 70 - 120 V
Amt. of oil: 130 g.m.
Recommended oils: Octoil and Octoil-S
Forepressure: .10 m.m. Hg.
Speed: 20 liters/sec.
Ultimate Vacuum: 7×10^{-7} m.m. Hg. @ 25° C.

320.

Trade Name: Glass Three-Stage Fractionating Pumps

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

This pump, by careful adjustment of the heater input and cooling of the pump, and after baking out the metal parts of the system, can develop a pressure of 5×10^{-8} m.m. without the aid of a cold trap. With a cold trap, vacua of the order of 10^{-9} m.m. are possible. They have application where extremely high vacua are required such as evacuation of x-ray tubes, high-power electronic tubes, and apparatus for the production of molecular rays.

Manufacturer's Data:

Amt. of oil: 200 g.m.
Recommended Oil: Octoil-S
Forepressure: .10 m.m.
Heater Power: 90 - 250 W
Heater Current: 1.4 - 2.3 A
Heater Voltage: 65 - 108 V
Speed: 25 liters/sec.
Ultimate Vacuum: 5×10^{-8} m.m.

321.

Trade Name: VFM -260

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

A three-stage oil diffusion pump used to supplement two-stage miniature pumps for similar application where higher speed is required. It is well adapted for use in conjunction with a high-vacuum valve on small evaporation units, and for use with the electron microscope.

Manufacturer's Data:

Amt. of oil: 300 g.m.
Recommended Oils: Octoil, Octoil-S
Forepressure: .10 m.m. of Hg.
Heater Power: 310 - 375 W
Heater Current: 2.8 - 3.1 A
Heater Voltage: 110 - 120 V
Speed: 250 liters/sec.
Ultimate Vacuum: 4×10^{-7} m.m.

322.

Trade Name: VMF Booster Pumps

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

A booster pump similar in construction to the other VMF series is available. It is used where the forepressure which can be attained is limited. The forepressure requirements are rated at 500 microns, but can be worked somewhat higher. The booster pump is used between the fractionating and mechanical pump and enables the fractionating pump to do its best job.

323.

Trade Name: Metal Diffusion Pump, Type MC-275

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

This type is designed to meet the demand for an unbreakable high-speed unit on lens coating and metal evaporation outfits. It is also well adapted for many other kinetic vacuum systems such as electron microscopes, cyclotrons, vacuum spectographs, impregnating tanks, chambers for carbonizing filaments, high-vacuum distillation equipment, and vacuum furnaces.

Manufacturer's Data:

Amt. of Oil: 200 g.m.
Recommended oils: Octoil, Amoil-S
Forepressure: .10 m.m.
Heater Power: 250 - 450 W
Heater Current: 2.75 - 3.75 A
Heater Voltage: 90 - 120 V
Speed: 275 liters/sec.
Ultimate Vacuum: 5×10^{-6} m.m.

324.

Trade Name: Metal Diffusion Pump, Type MC - 500

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

The type was primarily designed for the evacuation of kinetic vacuum

systems where large volumes of gas must be handled at pressures of less than a micron. An example of this is commercial preparation of front surface mirrors.

Manufacturer's Data:

Amt. of oil: 600 g.m.
Recommended oils: Octoil, Amoil-S
Forepressure: .10 m.m.
Heater Power: 330 - 1080 W
Heater Current: 5.0 - 9.0 A
Heater Voltage: 65 - 120 V
Speed: 500 liters/sec.
Ultimate Vacuum: 5×10^{-6} m.m.

325.

Trade Name: The KB - 300 Booster Pump

Manufacturer: Distillation Products, Inc., Rochester, New York

Use and Outstanding Characteristics:

This type was designed to have large capacity in the pressure range of 100 to 300 microns. It is used in the vacuum smelting of magnesium and as a backing pump for high speed diffusion pumps.

Manufacturer's Data:

Amt. of Oil: $5\frac{1}{2}$ gal.
Recommended Oil: KB Pump Fluid
Forepressure: 1 - 3.5 m.m. Hg.
Heating Power: 5 - 10 KW
Speed: 350 liters/sec.
Ultimate Vacuum: .010 m.m. HG.

326.

Trade Name: Domestic Diaphragm Pumps

Manufacturer: Domestic Engine & Pump Co.

Model: Model 164

Use and Outstanding Characteristics:

These diaphragm pumps deliver water out of pitcher-type spouts (but can be converted) and are recommended where pumped water can be carried away by gravity. They are used for dewatering sewers, trenches, footings, foundations,

and similar applications where seepage and extremely dirty water is encountered. They are powered by a "Domestic" engine, with back-gear drives.

Manufacturer's Data:

Capacities (g.p.h.): 2000 to 1200
Suction lift: Up to 20'
H.P.: $1\frac{1}{2}$ to 10

327.

Trade Name: "Sextuple" Jetting pump units

Manufacturer: Domestic Engine & Supply Co.

Model: Sextuple Plunger Pump

Use and Outstanding Characteristics:

This six-cylinder portable unit is designed primarily for use as a jetting pump for sinking piling. It has a single drive shaft for both the motor and pump, large clearance between the pump cylinder walls for handling fairly muddy water, and self-grinding valves.

Manufacturer's Data:

Displacements (g.p.m.): 200 to 337
Heads (ft.): 289 to 404
H.P.: $41\frac{1}{2}$ to 44

328.

Trade Name: "Standard" Triplex & Duplex Pumps

Manufacturer: Domestic Engine & Pump Co.

Model: Types; triplex and duplex

Use and Outstanding Characteristics:

These units are used for water supply pumps for roadbuilders, oil drillers, boilers, logging locomotives, steam shovels, and drag lines, jetting pumps, chemical solution spray pumps. They are furnished as triplex or duplex portable plunger pumps. They have self-grinding valves, the design being such that the water passing through the pump rotates them in the seats. They are mounted on all-steel four-wheel trucks.

Manufacturer's Data:

Capacity (g.p.m.): 30 to 178
Head: 230 to 1155
H.P. required (included in unit): 7 to $21\frac{1}{2}$

329.

Trade Name: "Simplex" Medium Pressure Force Pump

Manufacturer: Domestic Engine & Pump Co.

Model: Type BT

Use and Outstanding Characteristics:

It is a single-cylinder, double-acting piston pump used for pumping from shallow wells, springs, and streams into elevated storage tank or through long horizontal pipe lines, boiler supply, concrete mixer water supply, standard or rotary drill, road bed sprinkling, etc., and is mounted on a low-wheel truck. It is not intended to handle water containing a large quantity of sand or grit.

Manufacturer's Data:

Displacement capacity (g.p.m.): 5 to 35
H.P. required (included in unit): $1\frac{1}{2}$ to 4
Maximum work head in ft.: 150 to 200

330.

Trade Name: Vertical Motor Unit Pumps

Manufacturer: Domestic Engine & Pump Co.

Model: Type "LB"

Use and Outstanding Characteristics:

These vertical motor-unit centrifugal pumps are used for water circulation (hot and cold), brine circulation, boiler feeding, sprinkler systems, washing machinery, air conditioning systems and pressure boosting.

Manufacturer's Data:

Capacities (g.p.m.): 10 to 300
Heads: 20 to 200
H.P.: $\frac{1}{2}$ to 15

331.

Trade Name: Domestic Plunger type Sludge Pumps

Manufacturer: Domestic Engine & Pump Co.

Model: Type PS

Use and Outstanding Characteristics:

The plunger motion of these sludge pumps is imparted by a walking beam which is, in turn, driven by means of a pump gear or jack. The units are furnished with either a constant or variable (Reeves or equal Vari-Speed Motor-Drive) speed motor drive, and also as simplex or duplex units.

Manufacturer's Data:

Displacement (g.p.m.): 10 to 120
Total net head in ft.: 35 to 50
H.P. required: 2 - 5

332.

Trade Name: Domestic Plunger Sludge Pumps

Manufacturer: Domestic Engine & Pump Co.

Model: Types EPS and CEPS

Use and Outstanding Characteristics:

These pumps are of plunger type with constant speed motors and adjustable eccentric stroke. The EPS types have herringbone reduction gears, while the CEPS have constant speed gear-head motors. These units are furnished in either simplex or duplex type.

Manufacturer's Data:

Displacement (g.p.m.) 40 to 150
* Total net head in ft.: 30 to 50
H.P. required: 2 to 5

* Total heads are figured to include suction lifts up to 20 feet.

333.

Trade Name: Domestic Self-Priming Centrifugal pumps

Manufacturer: Domestic Engine & Pump Co.

Model: Types ALR, AMR, and AHR

Use and Outstanding Characteristics:

These centrifugal pumps utilize the wet vacuum principle to prime themselves. A small quantity of liquid is pumped to the entrance of the impeller which establishes a maintained liquid seal. Priming is accomplished without the need of a foot valve by using the liquid at the suction inlet entraining all air from the suction line. The entrained air is then discharged with the liquid into an air separator where the air rises to the top of the separator while the liquid returns to the suction inlet to complete the cycle and entrain additional air. This process continues until sufficient air has been removed from the suction line to fully prime the pump. Control of the priming to any degree is included in the design.

Manufacturer's Data:

Capacities (g.p.m.): Ranging from 10 to 1000
Heads (ft.): Ranging from 15 to 120

334.

Trade Name: Ether Pumps

Manufacturer: Domestic Engine & Supply Co.

Model: Ether type (Easy Running)

Use and Outstanding Characteristics:

These are hand piston pumps operating on a rack and segment principle rather than an ordinary lever method which gives it a longer stroke with less force required. These pumps are manufactured with various specifications to operate as shallow and deep well pumps.

335.

Trade Name: Ames Vacuum Heating Pump

Manufacturer: Domestic Engine and Pump Co.

Model: Type LG

Use and Outstanding Characteristics:

These units make use of the multiple-orifice-jet principle to produce a partial vacuum and the pumps are centrifugal.

Manufacturer's Data:

Capacities (at $5\frac{1}{2}$ " vacuum @ 160° F.): 3.8 to 97.5 g.p.m.
Discharge pressure: from 20 to 60 p.s.i.
H.P. required: from $\frac{3}{4}$ to 10

336.

Trade Name: Ames Automatic Make-up Water Units

Manufacturer: Domestic Engine & Pump Co.

Model: Type LCM

Use and Outstanding Characteristics:

These are centrifugal units used to maintain automatically a desired boiler level in conjunction with a condensate pump. Available in single or duplex units.

Manufacturer's Data:

Ratings: 2 to $97\frac{1}{2}$ g.p.m. at 10 to 60 p.s.i.
R.P.M.: 1750 and 3450
H.P. required: $\frac{1}{4}$ to $7\frac{1}{2}$

337.

Trade Name: Ames Condensate Return Pumps

Manufacturer: Domestic Engine & Pump Co.

Model: Type "LC"

Use and Outstanding Characteristics:

Centrifugal condensate return pump of vertical construction which can be obtained in either single or duplex units.

Manufacturer's Data:

Ratings: 2 to $97\frac{1}{2}$ g.p.m. at 10 to 60 p.s.i.
R.P.M.: 1750 and 3450
H.P. required: $\frac{1}{4}$ to $7\frac{1}{2}$

338.

Trade Name: Barnes-Dorrco Sludge Pump

Manufacturer: Door Company

Use and Outstanding Characteristics:

These are electric-motor driven simplex or duplex plunger pumps designed to handle sludges, pulps, or slurries in the field of municipal sewage treatment, water purification, industrial wastes treatment and petroleum refining. It is available with an automatic clock timing device and is intended for service where operating supervision is often limited. The gear head is of herringbone gears and texrope driven. It has an adjustable eccentric permitting a stroke variation of about 5".

Manufacturer's Data:

Capacities:

Simplex: 4500 g.p.h.

Duplex: 9000 g.p.h.

Heads up to 50 p.s.i.

339.

Trade Name: The Dorrco Pump

Manufacturer: Door Company

Model: V. Type

Use and Outstanding Characteristics:

This is a diaphragm pump designed for handling sludges, pulps, or slimes, containing appreciable quantities of small material. It has stroke adjustment while in operation. It is quite compact and may be arranged for acid handling. It is used in handling the thickened underflows from the sedimentation tanks used in chemical, metallurgical, industrial, and sanitary engineering.

Manufacturer's Data:

Capacities from 7.70 to 11.44 in ft. pulp/min; from 334 to 124 tons solid/day.

340.

Trade Name: The Dunham VRD Vacuum Pump

Manufacturer: C. A. Dunham Company, Chicago, Illinois

Use and Outstanding Characteristics:

This is a duplex automatic vacuum pump of compact assembly, mounted on a single bed plate. It is of the centrifugal type with a bronze-fitted, enclosed impeller. Either or both of these pumps can be operated as desired from the selector switch on the control panels. This switch permits pump to run continuously, operate only on float control, or on full automatic control.

Manufacturer's Data:

Sq. ft. of radiation: 2500 - 6500

341.

Trade Name: The Dunham VR Vacuum Pump

Manufacturer: C.A. Dunham Company, Chicago, Illinois

Use and Outstanding Characteristics:

VR pumps are available as either single or duplex units. They are rated according to the amount of equivalent radiation to be handled for a definite discharge pressure. The standard here is 20 lbs. for ordinary low boiler pressures, but for higher pressures 30, 40, and 50 lb. pumps are available. Multi-stage exhauster and a discharge valve are mounted above the centrifugal pumps. The pump can be run as desired from the selector switch on the control panel.

Manufacturer's Data:

Radiation: 2500 - 6500 sq. ft.

Water only: 3.8 - 97.5 g.p.m.

Simultaneous air and water: 1.3 g.p.m. and 1.3 c.f.m. to 32.5 g.p.m.
and 19.8 c.f.m.

342.

Trade Name: Condensation Pump and Receiver, Type CH, Model C

Manufacturer: C. A. Dunham Company, Chicago, Illinois

Use and Outstanding Characteristics:

These models are complete compact assemblies for automatically returning water of condensation to boilers for gravity systems or steam process equipment.

It is a bronze-fitted centrifugal pump with a volute type case. The pump is driven by an electric motor through a flexible coupling. The steel receiver tank is equipped with float switch and push-button starting switch with overload protection. The duplex model has an alternator which rotates the pumps in operation.

Manufacturer's Data:

Capacity: 2000 - 50000 sq. ft. E.R.D.
Pump capacity: 3 - 75 g.p.m.
Receiver capacities: 15 3/4 - 41 1/2 gal.

343.

Trade Name: Duriron and Durichlor Centrifugal Pumps

Manufacturer: The Duriron Company, Inc., Dayton, Ohio

Use and Outstanding Characteristics:

Duriron pumps are made of special alloys to resist corrosion for chemical industries. Among these alloys "Durichlor" has resistance to chlorine and its compounds, durimet, a special stainless steel resistant to caustics as well as sulphuric and other acids. Model 40 Duriron and Durichlor pumps can be converted to stainless steel pumps by substituting stainless steel volute, cover and impeller for the corresponding parts.

Manufacturer's Data:

Capacities: To 300 g.p.m.
Heads: To 123'

344.

Trade Name: Duriron Stainless Steel Centrifugal Pumps

Manufacturer: The Duriron Company, Inc., Dayton, Ohio

Use and Outstanding Characteristics:

Duriron Stainless Steel Pumps are made of high-strength, stainless steel alloys. The most outstanding of these steels is "Durimet", of which there are two analyses. Durimet T is used on hot, weak sulfuric acid, solutions of oxidizing salts, and many weaker acids with sulfuric acid in solution. Durimet 20 is of

higher alloy content and can be used for more severe applications with sulfuric acid.

Manufacturer's Data:

Heads: To 123'
Capacities: To 300 g.p.m.

345.

Trade Name: Edson "MV" Power Force Pumps

Manufacturer: The Edson Corporation, South Boston, Massachusetts

Use and Outstanding Characteristics:

In this type the cylinder head and ring hold a standard diaphragm which seals the pressure chamber forcing the liquid out through the discharge outlet. It is powered by a gasoline engine. The pumps are compact and for heavy-duty uses such as in trenches, manholes, vats, sewerage, cesspools, tanneries, water-works, and similar applications.

Manufacturer's Data:

Capacities: 4000 to 12000 g.p.h.
Engine Sizes: 2 - 3 H.P.
Discharge and Suction Sizes: 3" and 4"

346.

Trade Name: Edson Diaphragm Trench Pumps

Manufacturer: The Edson Corporation, South Boston, Massachusetts

Use and Outstanding Characteristics:

These pumps are very small, and have side suction. Both the valves are made of brass and moulded rubber.

Manufacturer's Data:

Suction: 2, 2½, 3, 4"
Capacities: To 6000 g.p.h.
Heads: To 25'

347.

Trade Name: The Edson Hand Force Pump

Manufacturer: The Edson Corporation, South Boston, Massachusetts

Use and Outstanding Characteristics:

This light diaphragm pump is light and good for use in cesspool pumping, irrigation, soil testing, gas drip, and other such uses where a hose discharge or discharge pressure up to 50 lbs. is required. A side inlet connection is threaded for pipes and hoses. It is also possible to equip this pump with electric motor drive.

Manufacturer's Data:

Capacity: To 1200 g.p.h.
Weight: 50 lbs.

348.

Trade Name: Edson Diaphragm Power Pumps

Manufacturer: The Edson Corporation, South Boston, Massachusetts

Use and Outstanding Characteristics:

These pumps are heavy-duty type, with spur gear, reduction jack and rocker arm. They also come in light-weight units with worm reduction and V-belt drive.

Manufacturer's Data:

Capacities: 4000 - 12000 g.p.h.
Light-weight unit: 4000 g.p.h.
Sizes: 3 - 4" and open discharge

349.

Trade Name: Edson Diaphragm Bilge Pumps

Manufacturer: The Edson Corporation, South Boston, Massachusetts

Use and Outstanding Characteristics:

The Edson Bilge Pump has bottom suction. It is furnished with a three-way cock on the suction if it is desired for washing decks.

Manufacturer's Data:

Capacities: To 6000 g.p.h.
Suction size: 2, 2½, 3, 4"
Discharge: 1½" and open

350.

Trade Name: Ellicott Sand-Gravel-Dredging Pumps

Manufacturer: Ellicott Machine Corporation, Baltimore, Maryland

Use and Outstanding Characteristics:

Ellicott Standard Sand-Gravel-Dredging Pumps come in five sizes from 4 to 12". These pumps are motivated by most any type of drive: belt, chain, gasoline engine, electric motor, steam engines, and diesel engines.

351.

Trade Name: Elmes High Pressure Pump

Manufacturer: Elmes Engineering Works of American Steel Foundries, Chicago, Illinois

Use and Outstanding Characteristics:

This line varies from small hand pumps to large 6-plunger type. The hand pumps are used principally for testing and operating hydraulic jacks and small presses. All pumps of this line are motor driven.

Manufacturer's Data:

1. Model 5935 - 6 plunger horizontal H.P. pump
Capacity: 100 H.P. to 500 H.P.
2. Model 5808 - 3 plunger Vertical H.P. pump
Maximum Capacity: 100 H.P.
3. Model 6293 - 3 plunger Vertical H.P. pumps
- "Furnished in Various Capacities"
4. Model 2292 - Single Plunger H.P. Hand Pump
Up to 6000 lbs. pressure
5. Model 1413 - High and Low Pressure Hand Pumps
Up to 4000 lbs. pressure
6. Model 3465 - Single Plunger Hand Pump
Up to 4000 lbs. pressure
7. Model 1635 - Single Plunger Hand Pump
Max. pressure: 25000 lbs.

352.

Trade Name: Pomona "Little Chief"

Manufacturer: Fairbanks Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

This pump is designed to supply clean water at the "in between levels", that is those which are neither best handled by small water systems nor by deep well turbines. It can provide sufficient pressure for a hydro pneumatic tank and also provide water at the ground surface. It can be used on golf courses, dairies, bottling works, cemeteries, laundries, public buildings, mines, railroads, swimming pools, farms, duck ponds, and factories. Driven by an electric motor.

Manufacturer's Data (Complete table in reference):

Min. Well dia.: 4"
Motor H.P.: $1\frac{1}{2}$ - 3
Column Length: 10 - 250'
Pressure: Surface to 70 lbs.

353.

Trade Name: Pomona Mine Pumps

Manufacturer: Fairbanks Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

These pumps are designed for use in mines, specifically for unwatering flooded mines, vertical or inclined shaft sinking, dewatering from bottom to collar, brine handling, sulphur handling, and mine or mill water supply. It is equipped with semi-open impellers, and is made of various types of metals to fit the use for which the pump is intended.

Manufacturer's Data:

Capacity: Up to 10,000 g.p.m.
Pressures: Up to 800 p.s.i.
Fluid Temps.: Up to 180° F.

354.

Trade Name: Fairbanks-Morse Turbine Pumps

Manufacturer: Fairbanks Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

These pumps are enclosed impeller type, are water or oil lubricated,

and may be driven by electric motor, gasoline, or diesel engine, or steam turbine. It is well adapted for use where sand or fine particles are suspended in the water.

Manufacturer's Data:

No data given, instead the information required such as (1) well diameter (2) well depth (3) capacity, etc., is asked by the company in order for them to select a pump.

355.

Trade Name: Fairbanks-Morse Centrifugal Pumps

Manufacturer: Fairbanks, Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

These large-size pumps have application in municipal water works and industrial plants where large quantities of water are required. They are driven by a Fairbanks-Morse electric motor.

Manufacturer's Data:

Capacity: Up to 50,000 g.p.m.
Sizes: 2" to 36"
Dynamic Head: Up to 300'

356.

Trade Name: Fairbanks-Morse "Builttogether" Centrifugal Pumps

Manufacturer: Fairbanks, Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

The pump and motor have a common shaft; it can be mounted in any position and comes in many sizes.

Manufacturer's Data: Heads: To 525'

Discharge Sizes: 1" - 5"
Capacity: To 900 G.P.M. (water)

357.

Trade Name: Fairbanks-Morse Single Stage Split Case Centrifugal Pumps

Manufacturer: Fairbanks, Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

This type of pump is of the split case centrifugal type and uses a diesel or gasoline engine or electric motor type drive. It can be used for pumping brine as well as water.

Manufacturer's Data (Complete table in reference):

- a. 1750 r.p.m.
Capacity: 50 - 4500 g.p.m.
Size: 2 - 10"
H.P.: $1\frac{1}{2}$ - 300
- b. 1150 r.p.m.
Capacity: 50 - 3500 g.p.m.
Head: To 140'
Size: 3" to 10"
H.P.: 1 - 50
- c. 860 r.p.m.
Capacity: 50 - 5000 g.p.m.
Head: To 70'
Size: 2 - 14"
H.P.: $\frac{1}{2}$ to 50
- d. 1450 r.p.m.
Capacity: 50 - 4000 g.p.m.
Head: To 220'
Size: 2 - 10"
H.P.: $1\frac{1}{2}$ to 250

358.

Trade Name: Fairbanks-Morse Two-Stage Opposed Impeller Centrifugal Pumps

Manufacturer: Fairbanks, Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

These pumps are designed for use at heads higher than obtainable by a single-stage unit. They are suited for all classes of service where the liquid is free from foreign matter and of reasonable viscosity. They may be used for high-pressure water supply, small cities, elevator hydraulic pumps, dewatering service, and are of use in such places as chemical plants, paper mills, breweries, refineries, canneries, packing plants, and steel mills.

Manufacturer's Data (Selection table in reference):

Capacities: 100 to 1400 g.p.m.
Discharge Pressures: To 450 p.s.i.

359.

Trade Name: Westco Flexible Coupling Drive Turbine Type Pump

Manufacturer: Fairbanks, Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

This is a high-pressure, heavy-duty pump intended for application where jacketed construction is required for high pressures and temperatures. The units are in general use in refineries, chemical plants, and processing industries.

Pump jackets may be connected with steam lines for liquids which need pre-heating.

Manufacturer's Data:

Up to 270 g.p.m.
Up to 350' head
Operating speed: 1750 r.p.m.
Motor size: 2 to 20 H.P.

360.

Trade Name: Condensation Return Units

Manufacturer: Fairbanks Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

These units fall into four categories: standard simplex, standard duplex, vertical condensation return units, and heavy-duty simplex and duplex units. The Standard Simplex and Duplex units are used in such systems as small heating systems, coils, and kettles. The vertical condensation units are designed for use with low pressure steam systems where the return lines are near the floor level. The unit must be placed in a pit to secure drainage. The heavy duty simplex and duplex units are designed to return condensate to the boiler from steam heating and process equipment. The units operates at slow speed giving quietness to operation that is desirable in public buildings, hotels, and apartments.

Manufacturer's Data:

Standard Simplex Unit: Handles up to 2000 sq. ft. of radiation
Motor: $\frac{1}{4}$ H.P. 1750 r.p.m.

Standard Duplex Unit: Motor: $2\frac{1}{2}$ H.P. 1750 r.p.m.
Handles up to 4000 sq. ft. of radiation

Vertical Unit: Centrifugal pump
Motor: 1 or 3 phase $\frac{1}{4}$ or $\frac{1}{3}$ H.P.
3450 r.p.m.
Boiler pressure: Up to 25 lbs.
Sq. ft. of radiation: Up to 5000

Heavy Duty Units: Up to 100,000 sq. ft. of radiation
Boiler pressure: Up to 150 lbs.

361.

Trade Name: Niagra Propellor Pumps

Manufacturer: Fairbanks Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

The pump is designed for low head large capacity service. It has application in land drainage, flood control, irrigation service, storm water disposal, primary municipal pumping, unwatering of excavations, coffer dams, and dry docks, and as industrial process circulating pumps. They are suited where a portable unit which can be suspended from a structure or floor is needed. They may be driven by electric motors and diesel or gasoline engine drivers. They need not be primed.

Manufacturer's Data (Complete data in reference):

Capacity: Up to 60,000 g.p.m.
Sizes: 8" to 48"
Heads: Up to 40'

362.

Trade Name: Fairbanks-Morse Sewerage and Trash Pumps

Manufacturer: Fairbanks Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

These vertical, close-coupled pumps are designed for dry pit service and may be used when space limitations are encountered. For construction and drainage use, they may be used where a large amount of rubbish is in the water. They can also be used for pumping industrial wastes, bagasse, sugar beet pulp, sardines, and paper stock. It is powered by an electric motor, and the impeller forward blade ends are rounded to avoid catching trash.

Manufacturer's Data (Complete tables in reference):

- a. 1750 r.p.m.
Heads: Up to 160'
Capacity: 50 - 1400 g.p.m.
Motor: 1 - 30 H.P.

- b. 1150 r.p.m.
Heads: Up to 70'
Capacity: 50 - 1200 g.p.m.
Motor: 1 - 10 H.P.

- c. 860 r.p.m.
Heads: Up to 35'
Capacity: 50 - 900 g.p.m.
Motor: $\frac{1}{2}$ - 5 H.P.

363.

Trade Name: Fairbanks-Morse Paper Stock Pumps

Manufacturer: Fairbanks, Morse & Co., Chicago, Illinois

Use and Outstanding Characteristics:

These pumps are specifically built for pumping paper stock in the paper mill industry. They are of the closed and open impeller type. The open impeller type has been designed to handle clean paper stock devoid of long fibrous material, while the closed type which has a two-vane trash pump impeller is used to pass flexible and stringy material. It is best used when dirty stock containing large amounts of solid is to be handled.

Manufacturer's Data:

Sizes: 4", 5" and 6"
Capacity: Up to 2500 g.p.m.

364.

Trade Name: French Hydraulic Power Pumps

Manufacturer: French Oil Mill Machinery Co., Piqua, Ohio

Use and Outstanding Characteristics:

For use in smaller oil mills, as well as large ones, these power pumps are two-throw, four-plunger type with two low pressure and two high pressure plungers. This gives a uniform flow of oil at all times and meets requirements

of smaller mills in that it enables them to operate their hydraulic system as economically as larger mills. Two cylinder pumps of this type are provided where high pressure is needed for a small amount of oil.

Manufacturer's Data:

2-cylinder Duplex model:
60 r.p.m.
2 to 77 g.p.m.
Discharge pressures: 500 to 7000 p.s.i.

365.

Trade Name: "Friend" Model K

Manufacturer: "Friend" Manufacturing Co., Gasport, New York

Use and Outstanding Characteristics:

"Friend" pumps are positive displacement type used for spraying equipment in orchards. Model K comes with an automatic pressure controller and is generally powered by a single cylinder gasoline engine. Units come in skid type, an engine-driven trailer mounting or a "truck" style.

Manufacturer's Data:

Capacity: To 6 g.p.m.
Pressures: To 400 lbs.
Tank capacity: 100 gal.
Trailer: 150 gal.

366.

Trade Name: "Friend" Model KA

Manufacturer: Friend Manufacturing Co., Gasport, New York

Use and Outstanding Characteristics:

A duplex positive displacement type which has no wear or contact on the cylinder walls, model KA is used to pump spraying material in orchards. Standard styles of the pump-tank units are as skid style, engine-driven trailer style, or as the streamlined cutunder style. It is driven by a gasoline engine.

Manufacturer's Data

Discharge pressure: 400 p.s.i.
Capacities:
with 4 H.P. engine: 10 g.p.m.
with 5 H.P. engine: 12 g.p.m.
Tank capacity: 200 gal.

367.

Trade Name: "Friend" Model NX

Manufacturer: Friend Manufacturing Co., Gasport, New York

Use and Outstanding Characteristics:

Model NX, used to pump spray in orchards, is powered by a single cylinder "Wisconsin" gasoline engine. The pump is of the displacement type and a duplex unit. Combination tank and pump units come in skid, cutunder, and tractor-trailer styles.

Manufacturer's Data:

Engine size: 9 h.p.

Capacities: 15 g.p.m.

Discharge pressures: To 700 lbs. (depending on power used)

Tank capacity: 200 gal.

368.

Trade Name: "Friend" Model FX

Manufacturer: Friend Manufacturing Co., Gasport, New York

Use and Outstanding Characteristics:

Friend Model FX is a quadruplex, displacement type pump which is completely enclosed and is intended to be dustproof. It is used to pump spray in orchards.

Manufacturer's Data:

Capacity: 25 g.p.m.

Discharge pressure: rated 700 p.s.i up to 1000 depending on power used

Engine size: 16 H.P.

Tank capacity: 300 gal.

369.

Trade Name: "Friend" Model AXB

Manufacturer: Friend Manufacturing Co., Gasport, New York

Use and Outstanding Characteristics:

Model AXB pumps are quadruplex positive displacement type used to pump spray in orchards. It is completely enclosed, dustproof, powered by a 4-cylinder Hercules gasoline engine, and comes in skid, open type skid, open type cutunder, tractor-trailer styles.

Manufacturer's Data:

Engine size: 28 H.P.
Capacity: 35 g.p.m.
Discharge pressure: 700 lbs.
Tank capacity: 400 gal.

370.

Trade Name: "Friend" Model Y-X

Manufacturer: Friend Manufacturing Co., Gasport, New York

Use and Outstanding Characteristics:

Model Y-X pumps are quadruplex displacement type, used to pump spray in orchards. They are completely enclosed, dustproof, powered by gasoline engine, and come in skid, open-skid, engine-driven trailer, and tractor trailer styles.

Manufacturer's Data:

Engine size: 43 H.P.
Capacity: 60 g.p.m.
Discharge pressure: 800 lbs. (rated) to 1000 lbs. (depending on power input)
Tank capacity: 500 gal.

371.

Trade Name: Fulflo Centrifugal Coolant Pump, A.G.M. Type

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

Fulflo type A.G.M. pumps are of sturdy construction and can be mounted in either side wall, ceiling, or vertical positions. They are equipped with masterball bearing splashproof construction motors. The centrifugal pumping action insures pumping at all times regardless of grit or chips, and a spring tension packing eliminates any packing adjustments. Since the pump shaft slips over the motor shaft, there is no wear on any pump bearings, all of it is taken by the motor shaft.

Manufacturer's Data:

Motor sizes: $\frac{1}{2}$ to 1 H.P.
Capacities: 25 - 90 g.p.m.
Head: 10'

372.

Trade Name: Fulflo Centrifugal Coolant Pump - Motor Driven Type - Spring Tension Packing Type

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

This type coolant pump is used on all machine tool equipment and is especially designed for grinding machines where the coolant contains abrasive. It is designed for limited space and is to be mounted below the water on the side of the coolant tank or machine. Two types are available, one for vertical, and the other for horizontal mounting. There is no bearing in the pump to wear out, and the motor is of splashproof construction.

Manufacturer's Data:

Speed: 1725 r.p.m.
Motor: $\frac{1}{4}$ H.P.
Capacity: 30 g.p.m.
Head: 5'

373.

Trade Name: Fulflo Centrifugal Coolant Pump - Motor Driven Type - Mechanical Seal Type

Manufacturer: The Fulflo Specialties Co., Inc. Blanchester, Ohio

Use and Outstanding Characteristics:

This type coolant pump is used on all machine tool equipment except grinding equipment. The unit is close-coupled, has a carbon seal packing which requires no adjustment, and is mounted below the water level on the side of the coolant tank or machine. Either horizontal or vertical types are provided. Both have master ball bearing motors which are splashproof and come either totally enclosed or explosion proof.

Manufacturer's Data:

Speed: 1725 r.p.m.
Motor: $\frac{1}{4}$ H.P.
Capacity: 30 g.p.m.
Head: 5'

374.

Trade Name: Fulflo Centrifugal Coolant Pump - Reversing Grinder & Machine Tool Types

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

The grinder types are either belt or motor driven and the pump rotates in either direction. Both types have a spring tension packing which eliminates packing adjustments.

Manufacturer's Data:

(a) Grinder Type:

Speed: 1600 - 2400 r.p.m.
Capacity: 12 - 16 g.p.m.
Suction lift: 12"
Head: 4'

(b) Machine Tool Type:

Speed:
Belt driven: 450 - 600 r.p.m.
Motor driven: 1600 - 2400 r.p.m.
Capacity: 12 - 16 g.p.m.
Suction lift: 12"
Head: 4'

375.

Trade Name: Fulflo Centrifugal Coolant Pump - Grindle Type

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

Pumps of this type are available for either left or right hand rotation. They have spring tension packing which eliminated packing adjustments. In its installation all joints must be tight because any air leaks in the suction line will prevent pumping.

Manufacturer's Data:

Speed: 1600 - 2400 r.p.m.
Capacity: 12 - 16 g.p.m.
Suction lift: 12"
Head: 4'

376.

Trade Name: Fulflo Centrifugal Coolant Pump - Machine Tool Type

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

This pump is used on machine tools where the countershaft runs at a

moderate speed, such as lathes, milling machines, and tapping machines. The intake and discharge is at the top in all cases. The pad is cast solid with the body, and it can be furnished on the right or left side.

Manufacturer's Data:

Speed: 450 - 600 r.p.m.
Capacity: 12 - 16 g.p.m.
Suction lift: 12"
Head: 4'

377.

Trade Name: Fulflo Centrifugal Coolant Pump - Grinder Type

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

These pumps are used on machine tool equipment. They have spring tension packing, which eliminates all packing adjustments, and are available with either right or left hand rotation. The suction pipe must be below the level of the liquid and should be tight, as any air leaks will prevent pumping.

Manufacturer's Data:

Speeds: 1800 - 2600 r.p.m.
Capacities: $3\frac{1}{2}$ - 5 g.p.m.
Suction lift: 12"
Heads: 4 - 5'

378.

Trade Name: Fulflo Centrifugal Coolant Pump - Grinder Type - SYM No. ER

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

This type pump is either belt driven or made with extended shaft for flexible coupling connection to a motor. The pad is cast integral with the pump body on either the right or left side. This type of right hand pump can be converted to a left hand pump by reversing the pump body and using a left hand impeller and conversely. They are available either with or without spring tension type packing and are used on all types of machine tool equipment.

Manufacturer's Data:

Speed: 1600 - 2400 r.p.m.
Capacities: 10 - 30 g.p.m.
Suction lift: 12"
Head: 10'

379.

Trade Name: Fulflo Centrifugal Coolant Pump - Grinder Type Sym. No. FR

Manufacturer: Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

These pumps are used on all types of machine tool equipment and are either belt driven or made with extended shaft for flexible coupling connection to a motor. They are available either with or without spring tension type packing.

Manufacturer's Data:

Speeds: 1600 - 2400 r.p.m.
Capacity: 35 g.p.m.
Head: 20'
Suction lift: 12"

380.

Trade Name: Fulflo Centrifugal Coolant Pump - Grinder Type - Sym. No. YLS and YRS

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

These pumps are used on all types of machine tool equipment, are either belt or motor driven, and have spring tension packing. Models are available with either left or right hand rotation.

Manufacturer's Data:

Speed: 1600 - 2400 r.p.m.
Capacity: 80 g.p.m.
Head: 20'
Motor: 2 H.P.
Suction lift: 12"

381.

Trade Name: Fulflo Coolant Pump - Grinder Type Sym. No. NO

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

These pumps are used on all types of machine tool equipment, are available in either right or left hand rotating models, and are equipped with spring tension type packing. They have extended shafts from flexible coupling drive by a motor or else are rigged for belt driven operation. They have carbon seal type packing.

Manufacturer's Data:

Speeds: 1600 - 2600 r.p.m.
Capacity: 8 g.p.m. @ 1725 r.p.m.
Heads: To 5'

382.

Trade Name: Fulflo Centrifugal Coolant Pumps - Grinder Type Sym. No. AO

Manufacturer: The Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

This type pump is used on all types of machine tool equipment, and is rigged with an extended shaft for flexible coupling connection to a motor. Certain types of this pump are made reversible. In all installations the intake must be below the coolant level in the tank at all times.

Manufacturer's Data:

Speeds: 1600 - 2600 r.p.m.
Delivers:
20 g.p.m. @ 1' head
18 g.p.m. @ 5' head
12 g.p.m. @ 8' head
4½ g.p.m. @ 12' head

383.

Trade Name: Fulflo High Speed Gear Pump, Sym. No. TS

Manufacturer: Fulflo Specialties Co., Inc., Blanchester, Ohio

Use and Outstanding Characteristics:

A motor driven gear pump driven through herringbone reduction gears.

Manufacturer's Data:

3 g.p.m. per pump with 1½ H.P. motor @ 1125 r.p.m.

384.

Trade Name: Gardner-Denver Duplex Steam Pumps (Removable Bolted-In Liner Pattern)

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

The steam cylinders of this type are cast iron with slide type valves which operate by direct lever connection. The liquid cylinders are made of alloy iron with removable bolted-in type bronze liners. The packings are suitable for handling water up to 212° F. only; special metal rings can be provided, however, if conditions require it.

Manufacturer's Data (Complete table in reference):

Maximum steam pressure:
Slide Valve steam ends: 250 lbs.
Piston Valve steam ends: 350 lbs.
Capacities: 24 - 260 g.p.m. (normal)
 48 - 520 g.p.m. (maximum)

385.

Trade Name: Gardner-Denver Duplex Steam Pumps (tube lined)

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These pumps are for medium and general services with models used as boiler feed pumps. The liquid cylinders are made of alloy iron and have force-in type tube brass liners. The fibrous packing is suitable for water only up to 212° F., but cast iron or bronze packing rings can be supplied where conditions require.

Manufacturer's Data:

As a boiler feed pump:
Boiler H.P. pump will feed 48 - 1625
Capacity: 3.3 - 112 g.p.m.
Strokes per min. per piston 72 - 46
General Service: 4.5 - 147 normal g.p.m.
 9 - 294 maximum g.p.m.
Low service or tank pump: 38 - 260 normal g.p.m.
 76 - 520 maximum g.p.m.

386.

Trade Name: Gardner-Denver High Pressure Steam Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These duplex pumps are used for boiler feed oil line, mining, water pipe line, grouting, and high pressure industrial service. When used in mining service for sinking or drainage they are generally operated by compressed air at pressures of from 80 to 100 lbs. Types of these pumps are often used in refineries and chemical process industries to handle crude oil, fuel oil, kerosene, and gasoline. Air or water cooled stuffing boxes are available that allow handling hot oil above 400° F.

Manufacturer's Data (Complete tables in reference):

Maximum steam pressure: 400 p.s.i.
Speeds: To 45 r.p.m.
Capacities: To 225 g.p.m.

387.

Trade Name: Gardner-Denver Duplex Piston Pattern Valve Pot Type Boiler Feed Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These pumps are designed for heavy duty oil country service; they may also be used for gathering and hydraulic blowout preventer service. The fluid cylinder has an inside packed piston and a bronze flanged tube type liner. The fluid pistons are head and follower type with fibrous packing for water service.

Manufacturer's Data (Complete table in reference):

Steam end: 400 p.s.i. working pressure
Fluid end: 1000 p.s.i. working pressure
Fluid end: 2500 ps.i. hydrostatic test pressure
Service:
Boiler feed capacity: 59.8 g.p.m.
Normal feed capacity: 117 g.p.m.
Maximum capacity: 156 g.p.m.

388.

Trade Name: Gardner-Denver Duplex Steam Slush Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These units are for use under severe operating conditions in oil feed rotary drilling service. The fluid end is a divided cylinder valve pot type and is cast of Gar-Durloy alloy which is especially fitted for mud pump service. The pumps are suitable for compounding or staging service.

Manufacturer's Data (Table in reference):

3000 lbs. max. fluid pressure
Normal capacity: 115 - 331 g.p.m.
Max. steam pressure: 400 lbs.

389.

Trade Name: Gardner-Denver Duplex Power Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

This type pump is of the enclosed, self-lubricating type and is a general service pump for boiler feeding, water supply, circulating and general industrial service. It has totally enclosed construction which keeps dirt and foreign matter away from working parts and prevents oil leakage to the outside. The fluid cylinders are of Gar Durloy alloy iron. V-belt drive, chain drive, or tight pulley for flat belt drive can be furnished as accessories.

Manufacturer's Data (Complete table in reference):

Displacement: To 488 g.p.m.
Maximum water pressure: 250 p.s.i.

390.

Trade Name: Gardner-Denver Horizontal Duplex Power Slush Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These pumps are used for geophysical, core drilling, and seismograph rigs in exploratory and proven oil feeds as well as slush and cement service in shallow well drilling. Other uses include water supply, boiler feeding, and general service where moderately high pressures are required. The units have an air chamber to protect them from surge or oscillating pressures.

Manufacturer's Data (Table in reference):

Displacement: To 212 g.p.m.
Discharge pressures: To 1800 lbs.
Speed: 40 - 70 r.p.m.

391.

Trade Name: Gardner-Denver Type "FX" Duplex Power Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These pumps are intended for use in oil lines, mining and industrial service. They are widely used in oil feeds for supplying water to drilling rigs, for boiler feeding, and general water supply service where moderately high pressures are required. The fluid liners are removable and are bronze cast for boiler feed and water service. An air chamber is part of the equipment to prevent damage due to surge and oscillating pressures.

Manufacturer's Data (Tables in reference):

Capacity: To 182.5 g.p.m.
Maximum pressure: 1800 p.s.i.
Fluid cylinders: Tested up to 7000 lbs.

392.

Trade Name: Gardner-Denver "FX" Duplex High Pressure Power Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These pumps are for high pressure service in oil lines, mines, and general industries. The frame of Gar Durloy alloys iron with reinforcing ribs placed where shocks are greatest. Precautions have been taken to keep dust, water, and crude oil out of the power end.

Manufacturer's Data (Table in reference):

Displacements: To 606 g.p.m.
Maximum pressure: 2087 lbs.

393.

Trade Name: Gardner-Denver Types B and C Side Suction Centrifugal Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These side-suction pumps are designed for general service conditions such as air conditioning, agriculture, contracting, and industrial uses. They are motor turbine gasoline engine, or belt driven. With motors, turbines, or gasoline engines for motivation, they are used for general water pumping, for fire protection, for refrigeration, and circulating drinking water. With gasoline engine installation they are a power plant in themselves usable in remote installations such as agriculture or contracting work, or where storms, flood, or fire have made power unavailable. The casing is volute construction and can be placed in any one of eight positions. The impeller is cast iron.

Manufacturer's Data (Table in reference):

Capacities: 20 - 2200 g.p.m.
Heads: To 100'
Input: To 60 H.P.

394.

Trade Name: Gardner-Denver Type CA Circulating Pump - Reversible

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These are centrifugal pumps built for circulating water in air compressors, diesel engines, or other water cooled machines. It can be installed in any position on a machine and rotates in both directions so that it isn't necessary to turn it around when taking it from one side of a machine to another. Any type of drive can be used.

Manufacturer's Data (Plot in reference):

Heads: To 53'
Capacities: To 67 g.p.m.
Speeds: 860 - 2000 r.p.m.

395.

Trade Name: Gardner-Denver Types BE and CE Centrifugal Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These pumps are furnished with either closed or open impellers to fit the particular service and are fitted to any type of drive including flat and vee belts, electric motor, and gasoline or diesel engines. Types are made for use in chemical industries where the fluid pumped requires contact parts to be of cast iron, bronze, steel, stainless steel etc.

Manufacturer's Data (Table in reference):

Heads: To 100'
Capacities: To 2000 g.p.m.
Speeds: To 1720 r.p.m.
Input H.P.: .17 to 55.0

396.

Trade Name: Gardner-Denver Types BA and BC Side Suction Centrifugal Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These pumps are single-stage built for rugged heavy-duty service. Under standard construction it is bronze fitted, but under special conditions can be fitted with other metals and alloys. It may be fitted with open and enclosed type impellers with the open type for handling medium-size solid and stringy materials.

Manufacturer's Data:

2" pump handles 3/8" solids
and 5" pump handles 1 1/8" solids
Motor size: 10 - 30 H.P.

397.

Trade Name: Gardner-Denver Types J and K Centrifugal Sewerage and Waste Disposal Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

Although called sewerage and waste disposal pumps, these pumps are

particularly recommended for all types of applications when fluids containing solids are handled. Such applications are in packing houses, tanneries, paper mills, sugar refineries, canneries, and chemical plants. Specific applications are handling coal in water, handling of mineral ores up to 2" solid, mash and pulp in breweries, and grape-fruit pulp handling. The pumps are regularly furnished of either all iron, bronze, stainless steel, and abrasion resisting steel.

Manufacturer's Data: Speeds: 860 to 1750 r.p.m.

Solids: To 6" diameter
Capacities: To 5000 g.p.m.
Heads: To 160'
Motor sizes: To 100 H.P.

398.

Trade Name: Gardner-Denver Horizontally Split Case Centrifugal Pumps

Manufacturer: Gardner-Denver Co., Quincy, Illinois

Use and Outstanding Characteristics:

These types are recommended for general water supply service in buildings and municipalities. In addition to this they can also be used for irrigation, condenser circulating water, oils in oil fields and refineries, wash water, liquids in paper mills and distilleries, and chemical solutions. They are suitable to all types of drive.

Manufacturer's Data (Table in reference):

Speeds: 1750 and 3460 r.p.m.
Motor: $7\frac{1}{2}$ - 250 H.P.

399.

Trade Name: Gaso Duplex Piston Power Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Series 1800

Use and Outstanding Characteristics:

These pumps are reciprocating duplex power pumps intended for service such as water lines, gathering systems, booster stations, or acidizing service.

The power end has herringbone gears and Timken tapered roller bearings and can be driven by electric motor, gasoline motor, or V-belt or chain drive.

Manufacturer's Data:

Pressures: From 150 to 900 p.s.i.
Capacities: From 32 to 201 g.p.m.

400.

Trade Name: Gaso Duplex Piston Power Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Series 1500

Use and Outstanding Characteristics:

These duplex reciprocating side pot units are designed for service on water lines and crude oil gathering and main lines, and can be arranged for any type of rotating drive. It features herringbone gears, oil bath lubrication, and Timken tapered roller bearings.

Manufacturer's Data:

Pressures: From 150 to 1000 p.s.i.
Capacities: From 41 to 355 g.p.m.

401.

Trade Name: Worn-Driven Duplex Piston Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Series 220

Use and Outstanding Characteristics:

These pumping units, mounted on trailers or skids, are adaptable for any type of emergency, temporary, or semi-permanent service such as water lines, gathering systems, booster stations and pick-up service. They are side pot duplex reciprocating pumps featuring Timken Bearings and oil bath lubrication and are driven by gasoline or electric motors.

Manufacturer's Data:

Pressures from 130 to 750 p.s.i.
Capacities from 32 to 201 g.p.m.

402.

Trade Name: Worm Driven Duplex Piston Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Series 2000

Use and Outstanding Characteristics:

These portable pumping units mounted on trailers or skids are intended for permanent or semi-permanent pipe line stations, water service for drilling operations, pick-up in case of line breaks, mudding or cementing operations and general service. They feature a worm drive from a heavy duty oil field type engine, of medium speed with a combination carburetor for natural gas or gasoline, oil bath lubrication, and Timken Bearings.

Manufacturer's Data:

Pressures from 125 to 1000 p.s.i.
Capacities from 41 to 355 g.p.m.

403.

Trade Name: Gaso Duplex Piston Power Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Series 1700

Use and Outstanding Characteristics:

These pumps are suited for pumping large capacities at high pressures, having fluid ends with interchangeable liners from 2½" to 5". They are power driven reciprocating duplex pumps featuring herringbone gears, oil bath lubrication and Timken Bearings.

Manufacturer's Data:

Pressures from 260 to 1400 p.s.i.
Capacities from 38 to 405 g.p.m.

404.

Trade Name: Gaso Duplex Piston Power Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Series 1900

Use and Outstanding Characteristics:

This duplex reciprocating power pump is adapted for service where a vacuum pump of large-capacity is devised or for discharge where the service calls for a pump of large capacity and low pressure. It has herringbone gears, Timken bearings, and oil bath lubrication.

Manufacturer's Data:

Pressures: From 125 to 225 p.s.i.
Capacities: From 250 to 719 g.p.m.

405.

Trade Name: Gaso Duplex Piston Power Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Series 2600

Use and Outstanding Characteristics:

This is the largest of their reciprocating duplex power pump units and is designed for gathering and main line service involving pumping oil or water through long lines. It features herringbone gears, oil bath lubrication, and Timken Bearings.

Manufacturer's Data:

Capacities: From 123 to 446 g.p.m.
Pressures from 475 to 1500 p.s.i.

406.

Trade Name: Gaso Rodline Pump

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Fig. 201

Use and Outstanding Characteristics:

This is an outside piston packed plunger type pump to be used in connection with the rod or shackle line between the power and well or can be connected to the power direct with a pitman. It is intended for oil or water service and can be had with special alloy and bronze parts for handling salt water.

Manufacturer's Data:

Working pressure of 450 p.s.i.
Capacities from 30.96 to 41.28 BPH

407.

Trade Name: Piston Power Pumps (Jerker Pattern)

Manufacturer: Gaso Pump and Burner Manufacturing Co.

Model: Fig. 301

Use and Outstanding Characteristics:

These reciprocating piston pumps are intended for main pipe line or high pressure work but are equally suitable for lease or other low pressure work where a push and pull or crank power can be utilized. Special parts are available for use in salt water disposal.

Manufacturer's Data:

Pressures from 300 to 750 p.s.i.
Capacities from 31.73 to 118.01 BPH

408.

Trade Name: Gaso Walking Beam Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Fig. 602

Use and Outstanding Characteristics:

These are vertical simplex double acting piston type pumps designed for direct connection, by means of a pitman, to the walking beam of an oil well pumping unit. They are available in two models, one featuring interchangeable liners in sizes from 2½" to 4". Special fittings for handling salt water are available.

Manufacturer's Data:

Pressures from 400 to 800 p.s.i.
Capacities from 8.97 to 40.85 BPH

409.

Trade Name: Gaso Vacuum Pumps

Manufacturer: Gaso Pump & Burner Manufacturing Co.

Model: Figs. 604 and 604 $\frac{1}{2}$

Use and Outstanding Characteristics:

These are simplex reciprocating gas or vacuum pumps used in taking gas from the well or to put vacuum on the well and are connected either to the walking beam by means of a pitman or to surface rods on a pumping well. They are intended to withstand much abuse.

Manufacturer's Data:

Displacements from 3417 to 8736 cfh

410.

Trade Name: Integral (Motor Pump) Rotary Vacuum Pumps

Manufacturer: Gast Manufacturing Corporation

Use and Outstanding Characteristics:

These vacuum pumps are four-vane rotary units featuring integral construction of motor and pump. Oiler, muffler and motor overload units are regularly furnished with each pump.

Manufacturer's Data:

Capacities from .05 to .15 cfm at 25" vacuum

411.

Trade Name: Low Cost (General Purpose ~~light~~ light duty) Rotary Vacuum Pumps

Manufacturer: Gast Manufacturing Corporation

Use and Outstanding Characteristics:

This vacuum pump is a rotary (four-vane) unit designed for light applications not warranting the use of more expensive units. The vane is held against the wall by centrifugal force, not springs. Included are a combination oil trap and muffler, and drive coupling assembly.

Manufacturer's Data:

Capacities from .15 to 0.20 cfm at 25" vacuum

412.

Trade Name: V-Belt Driven Rotary Vacuum Pump

Manufacturer: Gast Manufacturing Corporation

Model: Model 15F50

Use and Outstanding Characteristics:

Intended for medium vacuum service it is a four-vane rotary pump, especially suitable for such applications as paper feeding, milking machines, lithographers' film plate holders, etc. The vane is held against the wall by centrifugal force. Included are a small wick oiler, exhaust muffler, and fan pulley.

Manufacturer's Data:

Capacities from 1.0 to 2.1 cfm at 20" vacuum

413.

Trade Name: Fan Cooled Heavy Duty Rotary Vacuum Pumps

Manufacturer: Gast Manufacturing Corporation

Use and Outstanding Characteristics:

These four-vane rotary pumps are designed for heavy-duty applications requiring large air volume at any degree of vacuum. The vane is actuated by centrifugal force. The units are forced air cooled by means of either one or two built-in fans. Included with the unit are an automatic vacuum lubricator, a visible oil cup, a combination oil trap and muffler assembly and a drive coupling assembly.

Manufacturer's Data:

Capacities from 0.2 to 1.4 cfm at 25" vacuum
Maximum vacuum of 28"

414.

Trade Name: Integral (Motor-Compressor) Rotary Compressors

Manufacturer: Gast Manufacturing Corporation

Use and Outstanding Characteristics:

These four-vane rotary compressors are built as an integral part of the motor-compressor unit and are intended for jobs where space is extremely limited. Included with the unit are an oiler, a pressure relief valve, an outlet trap, and a motor overload trip.

Manufacturer's Data:

Capacities from 1.0 to 1.8 cfm at 25 p.s.i.

415.

Trade Name: Fan Cooled (Heavy Duty) Rotary Compressors

Manufacturer: Gast Manufacturing Corporation

Use and Outstanding Characteristics:

These four-vane rotary compressors are forced air cooled by means of either one or two built in fans. Included are an automatic lubricator, an air intake filter and a non-thrust drive coupling assembly. The vanes are centrifugally actuated.

Manufacturer's Data:

Capacities of 2.1 to 5.8 cfm at 30 p.s.i.

416.

Trade Name: Gould Flexi-Unit Open Impeller Centrifugal Pumps

Manufacturer: Gould Pumps, Inc. Seneca Falls, New York

Use and Outstanding Characteristics:

This type is a volute type single-stage centrifugal pump. It has application in many industrial uses, from pumping the general water supply to handling of factory wastes, liquors, oils, and other thick, viscous, or corrosive liquids. The impeller is open type of special warped vane design with a round nose handling thick or fibrous material.

Manufacturer's Data:

Sizes: 1 - 4"

Capacities: 10 - 1000 G.P.M.

Heads: Up to 525'

417.

Trade Name: Goulds "Close Cupld" Enclosed Impeller Centrifugal Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

These pumps are single or two-stage centrifugal units which are suitable for every kind of general pumping. Their usage includes service in breweries, paper mills, oil refineries, and chemical plants. The pump and motor are combined in a single light-weight unit. It has a flush top suction nozzle, which avoids the formation of an air pocket. The casing can be swivelled to any of four discharge positions.

Manufacturer's Data:

Sizes: 1 - 6"
Capacities: 5 - 1600 g.p.m.
Heads: Up to 525'

418.

Trade Name: Goulds Support Head Enclosed Impeller Centrifugal Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

These pumps are intended for general pumping usage in industrial plants that require a heavy-duty pump. The suction nozzle presents a flush top interior surface from the suction pipe to the impeller inlet. The pump can be swivelled to any of four discharge positions. It is regularly bronze fitted, but the units can be supplied such that parts coming in contact with the liquid are made of cast iron with Monel Metal shaft.

Manufacturer's Data:

Sizes: 1 - 6"
Capacities: 1600 g.p.m.
Heads: Up to 525'

419.

Trade Name: Goulds Horizontally Split Case, Single Stage Centrifugal Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

This type has use in services for general water supply, municipal water works, circulating and booster service, and low pressure boiler feeding. The glands are horizontally split and bolted to provide easy access for repacking. The pump is standard bronze fitted but is also available as all-bronze or all-iron.

Manufacturer's Data:

Sizes: 2" - 16"
Capacities: Up to 15,000 g.p.m.
Heads: Up to 500'

420.

Trade Name: Goulds Multi-Stage Centrifugal Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

These pumps are used for general water supply, boiler feed, pressure service, circulating systems, unwatering and other services. They come in two to six stage units. The casing is horizontally split with double volute passages between the stages. The lower half of the casing contains the suction and discharge nozzles. The pumps come regularly furnished in bronze-fitted construction and also in all-iron, and all-bronze construction.

Manufacturer's Data:

Sizes: 3 - 8"
Stages: 2 - 6
Capacities: 40 - 2000 g.p.m.
Heads: Up to 850'

421.

Trade Name: Goulds High Pressure Multi-Stage Centrifugal Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

Application for this type of pump is in use with high temperatures,

high pressure feed service where economy of initial cost and low maintenance are important. Two types are available with different hydraulic arrangements to produce the best possible operation for the service condition. The type Fig. 3360 is built with single suction impellers in pairs placed back to back to give hydraulic balance. Type Fig. 3365 has one double suction impeller and a pair of opposed single suction impellers. Both have stuffing box relief chambers and are cast iron or bronze fitted.

Manufacturer's Data:

Sizes: 3" - 8"
Capacities: Up to 2250 g.p.m.
Stages: 2 - 8
Heads: Up to 3050'

422.

Trade Name: Goulds Open Impeller Pumps For Paper Stock, Pulp, Mashers and Other Thick Liquids

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

This type has application in handling paper stock on deckers, washers, thickeners, or for other services in paper mills; also for fruit pulps, mashers, and similar thick liquids. The rotating element is easily removed. The casing is designed to prevent air binding. There are ample wash out connections. Standard fitting is cast iron with a steel shaft, but units also come in all-iron, bronze fitted, and all bronze.

Manufacturer's Data:

Sizes: 4 - 8"
Capacities: 250 - 4500 g.p.m.
Heads: Up to 220'

423.

Trade Name: Goulds Centrifugal Pumps, Small Horizontal Belt and Motor Driven Single Stage Types for General Service

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

This is a low-cost general service pump of simple construction. When operated on belt drive it permits a wide range of heads and capacities by allowing the pump to operate at the proper speed for any given conditions. Small units of this type with $\frac{1}{2}$ " discharge are used to circulate in drinking water, display fountains, and for use in small aquariums. The casing is cast iron with a vent cock and priming connections. The impeller is cast iron, open type, and the shaft is steel.

Manufacturer's Data (Tables in reference):

Capacities: 5 - 100 g.p.m.
Heads: To 70'

424.

Trade Name: Goulds Special Stainless Alloy Centrifugal Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

This type is of special stainless steel construction to handle acids and other corrosive liquids. All of the parts exposed to the liquid are of stainless steel construction. Heavy through bolts prevent leakage at the parting flange. The deep stuffing box has either a fresh water flush or grease seal. The casing can be swivelled to any one of four discharge positions.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ "
Capacities: Up to 200 g.p.m.
Heads: Up to 140'

425.

Trade Name: Goulds Centrifugal Pumps for Chemical and Special Applications

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

These pumps are designed for handling caustics, acids, abrasives, and hot liquids. Examples of such use are green, black, and white liquors in soda

and Kraft paper mills; slurries, milk of lime and for handling hot oil in refineries. The impellers are fully enclosed or semi-enclosed, depending on the service requirement. There is a water cooled stuffing box with connections for fresh water flush. The pump is available in a number of metals which are best suited to resist the abrasive and corrosive conditions of the liquid pumped.

Manufacturer's Data:

Sizes: 2" - 6"
Capacities: 50 - 1500 g.p.m.
Heads: Up to 130'

426.

Trade Name: Goulds General Purpose Single-Stage Centrifugal Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

This type of pump is used in the air conditioning and plumbing fields, in irrigation, general contracting and building work. Either belt or direct connected drives are available.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ " - 6"
Capacities: 5 - 1800 g.p.m.
Heads: Up to 110'

427.

Trade Name: Goulds Vertical Centrifugal Pumps for Sump and Drainage Service

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

This type of drainage pumps are used for general transfer of liquids. Such uses include removing water from boiler room pits, pipe tunnel, elevator pits, cellars, or any part of a building where water connects below the sewerage line. They are not classed as sewerage pumps although with suitable straining they could handle the discharge from a few toilets. The pump is in a pit below the water level connected by a vertical shaft to the motor. The discharge pipe is welded to the pit cover. The outfit is complete with a float and automatic switch. The units are available as either single or duplex outfits.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ to 4"
Capacities: 10 - 650 g.p.m.
Heads: Up to 65'
Pit depth: 3 - 20'

428.

Trade Name: Goulds Rotary Pumps (Fig. 1942)

Manufacturer: Goulds Pump, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

This type is the herringbone gear type for handling fluids which possess lubricating qualities. It has only two moving parts, hence simplicity in construction. It has a split bolted type of gland and is quiet in operation. It is either direct connected or belt driven.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ - $2\frac{1}{2}$ "
Capacities: 1 - 75 g.p.m.
Pressures: Up to 75 lbs.

429.

Trade Name: Goulds Rotary Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

This type is a hand and belt driven cam type rotary pump used to handle lubricating fluids. The cams are located one above the other. The suction connections are on the side while the discharge may take place from either the top or side.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ and 2"
Capacities: Up to 42 g.p.m.
Pressures: Up to 43 lbs.

430.

Trade Name: Goulds Reciprocating Pumps

Manufacturer: Goulds Pumps, Inc., Seneca Falls, New York

Use and Outstanding Characteristics:

These pumps are used for general hot and cold water service, pneumatic pressure systems, feeding small boilers, condensate, circulating, unwatering, gasoline and oil pumping. They are of the horizontal double-acting piston type.

Manufacturer's Data:

Sizes: $1\frac{1}{4}$ - $2\frac{1}{2}$ "
Capacities: 6 - 58 g.p.m.
Pressures: Up to 250 lbs.

431.

Trade Name: Goyne Mine Pumps

Manufacturer: Goyne Steam Pump Company

Model: Single Stage Double Suction series

Use and Outstanding Characteristics:

These units are double suction closed impeller volute types, single stage, and with roller thrust bearings eliminating the need for cooling water necessary for babbited thrust bearings.

Manufacturer's Data:

Capacities from 200 to 12000 g.p.m.

432.

Trade Name: Goyne Mine Pumps

Manufacturer: Goyne Steam Pump Company

Model: Single Stage, single suction series

Use and Outstanding Characteristics:

These are single-stage, single suction, volute type centrifugal pumps made to care for the smaller capacities encountered in single stage service. It has a Timken Roller thrust bearing.

433.

Trade Name: Goyne Mine Pumps

Manufacturer: Goyne Steam Pump Company

Model: Two Stage Volute Pattern

Use and Outstanding Characteristics:

This is a two stage volute centrifugal pump featuring a Timken Roller thrust bearing in place of a babbitted thrust bearing, thus eliminating the need for cooling water as in the conventional types.

434.

Trade Name: Goyne Mine Pumps

Manufacturer: Goyne Steam Pump Company

Model: Three-stage volute pattern

Use and Outstanding Characteristics:

This is a hydraulically balanced three-stage volute centrifugal pump with removable diffusion vanes. A babbitted or a roller thrust bearing is available as desired.

435.

Trade Name: Goyne Mine Pumps

Manufacturer: Goyne Steam Pump Company

Model: Four-Stage Volute Patterns

Use and Outstanding Characteristics:

These four-stage volute centrifugal pumps are made up of two 2-stage units and have a thrust bearing also. Suction size pipe is carried all the way through up to the discharge outlet reducing water velocities and therefore friction losses proportionate to the larger size piping.

436.

Trade Name: Goyne Mine Pumps

Manufacturer: Goyne Steam Pump Company

Model: Six-stage three-unit special pattern

Use and Outstanding Characteristics:

This is a special unit for special conditions and consists of a combined

four and two-stage volute centrifugal pump so designed that two stages can be eliminated if desired. It has two roller thrust bearings making both the four and six stage arrangements completely independent of each other.

437.

Trade Name: Portable "Controlled-Flow" Coolant Systems

Manufacturer: Gray-Mills Corporation

Model: Model "G" Series

Use and Outstanding Characteristics:

These are portable rotary gear pump units featuring flexible drive couplings, Oilite bearings, flow control petcock, and a built-in automatic pressure relief valve. The pressure is ample to keep cutting operation free of chips or abrasive. They are used on spindle drill presses, tapping machines, lathes, hand screw machines, cut off machines (not abrasive) and large screw machines. They have a five gallon tank.

Manufacturer's Data:

Pressures from 10 to 20 p.s.i.
Capacities from 60 to 130 g.p.h.

438.

Trade Name: Portable "Controlled-Flow" Coolant Systems

Manufacturer: Gray-Mills Corporation

Model: Standard Model "A" Series

Use and Outstanding Characteristics:

These are heavy-duty rotary gear pump units used for circulating coolant for drill presses, tapping machines, screw machines, etc. They feature flexible drive couplings, Oilite bearings, flow control petcock and a built-in automatic pressure relief valve.

Manufacturer's Data:

Pressure of 12 p.s.i.
Capacities from 60 to 180 g.p.h.

439.

Trade Name: Portable "Controlled-Flow" Coolant Systems

Manufacturer: Gray-Mills Corporation

Model: Hi-Volume Centrifugal Models

Use and Outstanding Characteristics:

These are centrifugal pump driven systems for use on any coolant operation where good volume is required at low head. Especially recommended for grinders, mills, abrasive cut-off machines, homes, and wherever abrasive particles are carried in the fluid.

Manufacturer's Data:

Head of 4 ft.
Capacities from 540 to 2640 g.p.h.

440.

Trade Name: Gray-Mills Agitator Pumping Units

Manufacturer: Gray-Mills Corporation

Model: Model H-5-1125

Use and Outstanding Characteristics:

This centrifugal pump diverts part of its discharge to agitate the fluid in the container serving to keep the solids in suspension. Especially applicable to pumping and circulating liquids used in lens grinding, for paints, inks, and other fluids of moderate viscosity which tend to settle out.

Manufacturer's Data:

Capacity (water) 9 g.p.m. at 4 ft. head
Total head of $9\frac{1}{2}$ ft.

441.

Trade Name: Gray-Mills Handi-Pump

Manufacturer: Gray-Mills Corporation

Use and Outstanding Characteristics:

This is a direct coupled, motor driven, gear pump used for transferring

liquids, emptying drums, circulating, draining, flushing, spraying, and coolant. It requires no priming.

Manufacturer's Data:

Maximum pressure of 25 p.s.i.
Capacity up to 6 g.p.m.
Minimum suction lift of four feet.

442.

Trade Name: Standard Fly-Wheel Duplex Vacuum Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These are steam driven, flywheel, duplex reciprocating vacuum pumps for use in connection with vacuum pans and multiple effect evaporators. Two different patterns are built: one for the dry system of working in connection with an elevated condenser and leg pipe, and the other for the wet system where all the condensing water, in addition to the air and gases, are removed by the pump. In the dry pattern a small quantity of water is drawn into the vacuum cylinders at each stroke for lubrication and sealing the valves; brass charging water pipes are furnished for that purpose.

Manufacturer's Data:

Displacements from 52.35 to 471.30 cfm

443.

Trade Name: Standard Fly-Wheel Single Vacuum Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These single reciprocating steam driven pumps are of the center crank type with two heavy fly-wheels and are recommended for vacuum pans and evaporating apparatus of moderate capacity. They are made in two different patterns, one for the dry and one for the wet system of working.

Manufacturer's Data:

Displacements from 10.20 to 235.65 cfm

444.

Trade Name: Slide Air Valve Dry Vacuum Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These are steam driven reciprocating pumps used for the rapid exhaustion and maintaining of a high degree of vacuum in connection with vacuum pans operated on the dry system, vacuum drying apparatus, receivers, etc. The air cylinder is run with ordinary oil lubrication and the slide air valve is mechanically moved. The pump on test shows an efficiency of approximately 98%. It can be used for both vacuum and compression.

Manufacturer's Data:

Displacements from 27.48 to 3665.40 cfm

445.

Trade Name: Direct Acting Steam Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These are simplex, direct acting steam pumps (reciprocating) intended for boiler feed and general service.

Manufacturer's Data:

Capacities from 80 to 3000 B.H.P.

446.

Trade Name: Light Service & Tank Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These are simplex, direct acting, reciprocating steam driven pumps intended for light service and tank use, and are equipped with hard or soft rubber valves to suit the temperature of the liquid handled.

Manufacturer's Data:

Capacities from 25.52 to 587 g.p.m.

447.

Trade Name: Thick Liquor Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These are simplex, direct acting, steam driven reciprocating pumps recommended for handling heavy liquids such as molasses, syrups, tar and other viscous material.

Manufacturer's Data:

Capacities from .22 to 11.75 g.p.m. stroke

448.

Trade Name: Direct Acting Wet Vacuum Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These are simplex, direct acting, reciprocating, steam driven, vacuum pumps used for draining coils and radiators in steam heating and drying systems, drawing condensed water from drums of evaporating vessels and other duties where it is desired to produce and maintain a vacuum.

Manufacturer's Data:

Capacities from 2500 to 115,000 E.D.R.

449.

Trade Name: Direct-Acting Duplex Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These pumps are intended for boiler feed or pressure service and are duplex, direct acting, reciprocating, steam driven pumps. Valves are rubber or bronze to suit the temperature of the material handled.

Manufacturer's Data:

Capacities from 13.2 to 469.6 g.p.m. and from 150 to 5000 BHP

450.

Trade Name: Direct-Acting and Power Driven Magma Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

This is a single, reciprocating piston pump designed for masse-cuite and other heavy liquids. It is either belt or direct-acting steam driven.

Manufacturer's Data:

Capacities from 15.26 to 282.96 g.p.m. and from 2.04 to 37.83 cfm

451.

Trade Name: Direct-Acting and Motor Driven Piston Blowers

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

This single, direct-acting, reciprocating piston blower is used for agitating liquid supplying air to sulphur burners, pumping carbonic acid gas, clearing filters of their residual liquors, and creating and maintaining currents of air. It can also be employed as an exhauster and also for beer racking.

Manufacturer's Data:

Capacities from 11.45 to 176 cfm

452.

Trade Name: Power Pumps

Manufacturer: Guild & Garrison, Incorporated

Use and Outstanding Characteristics:

These are either simplex or duplex, reciprocating pumps adapted for large capacities and high and low pressures and can be arranged for belt drive, chain drive, or direct connected to double reduction gears.

453.

Trade Name: Chemical Proportioning Pumps

Manufacturer: Hills-McCanna Company, Chicago, Illinois

Model: Type SA

Use and Outstanding Characteristics:

These plunger pumps have capacities ranging from a single drop per stroke to an intermittent stream. Non pulsating flow can be obtained through the use of multiple feed units mounted on a common base. Volume control over full range while pump is operating is provided for. Used for accurate feeds.

Manufacturer's Data:

Ratings: From 1.46 GPH at 1000 p.s.i. to 7.4 G.P.H. at 200 p.s.i.
Strokes per min.: 69
H.P. required: $\frac{1}{4}$ at 1725 RPM

454.

Trade Name: Chemical Proportioning pump

Manufacturer: Hills-McCanna Company, Chicago, Illinois

Model: Type R

Use and Outstanding Characteristics:

This plunger pump was designed for small capacity, medium pressure, proportioning needs in the low-price field. Used for inhibitor and dye injections, boiler treatment applications, laboratory experimental installation, and caustic and acid proportioning. It is a variable stroke, constant speed type and can be obtained in multiple assemblies.

Manufacturer's Data:

Ratings: 1.02 g.p.h. at 1200 p.s.i. to 190 g.p.m. at 64 p.s.i.
Strokes/min: 48 and 64
H.P. required: $\frac{1}{4}$ and $\frac{1}{3}$ at 1725 RPM

455.

Trade Name: Chemical Proportioning Pumps

Manufacturer: Hills-McCanna Company, Chicago, Illinois

Model: Type V

Use and Outstanding Characteristics:

Plunger pumps used for high pressure, small capacity proportioning in experimental laboratories, liquid catalyst feeding, pilot plant work, and acid and caustic injection. Various types of alloy liners for the liquid end can be obtained on short notice and check valves also.

Manufacturer's Data:

Ratings: 31.2 GPH against 190 p.s.i. to 1.22 GPH against 4800 p.s.i.
Strokes/min: 48, 58, 64
H.P. required: $\frac{1}{4}$ and $\frac{1}{2}$ at 1725 RPM

456.

Trade Name: Chemical Proportioning Pumps

Manufacturer: Hills-McCanna Company, Chicago, Illinois

Model: Type L

Use and Outstanding Characteristics:

Plunger pumps used for pilot plant work, water conditioning, injection treatment for process industries, acid control and synchronized injection with steam pumps. Accurately meters acids, alkalis, lime and oil slurry, boiler water compounds, dyes, fluids with solids in suspension and molten materials (i.e. sulphur). Volume control from full capacity down to 10% of maximum. Multiple hookups are available.

Manufacturer's Data:

Ratings: 195 g.p.h. against 65 p.s.i. to 4.7 g.p.h. against 1200 p.s.i.
Strokes/min.: 36
H.P. required: $\frac{1}{2}$ to 1 H.P. at 1725 RPM

457.

Trade Name: Chemical Proportioning pumps

Manufacturer: Hills-McCanna Company, Chicago, Illinois

Model: Type M

Use and Outstanding Characteristics:

Plunger pumps used for handling acids, caustics, inhibitors, phosphates, solvents, emulsions, slurries, molten materials, dyes, and bleaching liquors. It has a Micro-screw volume adjustment with means for locking it. It may be obtained in multiple units.

Manufacturer's Data:

Ratings: 2.12 g.p.h. at 2900 p.s.i. to 756 g.p.h. at 90 p.s.i.
Strokes/min.: 41, 43, 48, 58, 64
H.P. required: $\frac{1}{4}$ at 1725 to 5 at 1150

458.

Trade Name: Chemical Proportioning Pumps

Manufacturer: Hills-McCanna Company, Chicago, Illinois

Model: Type H

Use and Outstanding Characteristics:

Plunger pumps used for petroleum research work involving pilot plant installations where the lighter hydro-carbons such as butane, propane, pentane, etc., are handled under increasingly higher pressures. Also satisfactory for handling all types of corrosive solutions. It is available in two sizes.

Manufacturer's Data:

Ratings: 6.30 g.p.h. at 5500 p.s.i. to 223.8 g.p.h. at 200 p.s.i.
Strokes/min: 39, 43, 73
H.P. required: $1\frac{1}{2}$ at 1725 to 3 at 1155

459.

Trade Name: Chemical Proportioning Pumps

Manufacturer: Hills-McCanna Company, Chicago, Illinois

Model: Type HJ

Use and Outstanding Characteristics:

Plunger pumps equipped with a jacketed liquid end, these units are used for pumping liquids or gases which must be heated or chilled to maintain them in a liquid pumping state. In this way material such as paraffin, phenol, residurem, tar, asphalt, molten rosin, stiff emulsions, etc., can be properly handled. Multiple hookups available.

Manufacturer's Data:

Ratings: 6.30 g.p.h. at 5500 p.s.i. to 63 g.p.h. at 350 p.s.i.
Strokes/min.: 39, 43, 73
H.P. required: $1\frac{1}{2}$ at 1725 RPM to 3 at 1155 RPM

460.

Trade Name: Chemical Proportioning Company

Manufacturer: Hills-McCanna Company, Chicago, Illinois

Model: Type GC

Use and Outstanding Characteristics:

These are plunger pumps to be used for high pressure proportioning requirements within the larger capacity range. This pump can be adapted to a pressure rating of 22,500 p.s.i. with special construction. Its abilities are applied to refinery processing, crude oil treating, water treatment, dye and chemical application, and inhibitor and chemical processing in the heavy chemical industry. Multiple units may be obtained.

Manufacturer's Data:

Rating: 5.52 g.p.h. at 10,500 p.s.i. to 181.2 g.p.h. at 190 p.s.i.
Strokes/min.: 29 and 32
H.P. required: 3 to 5 at 1155 RPM

461.

Trade Name: Hydro-Power Radial Pumps

Manufacturer: Hydro-Power, Inc., Springfield, Ohio

Use and Outstanding Characteristics:

Hydro-Power oil-hydraulic radial pumps have been developed for heavy duty pressure generating service. The pump is a variable stroke radial plunger type. It can be equipped with a number of different pump controls for volume and pressure regulation. They are as follows:

1. Type "H" Control. This type is ideal for maintaining a selected pressure at a constant valve. With this control the radial pump delivers in only one direction and the machine movement is controlled by an operating valve.

2. Type "VH" Control. This type offers the same advantages as type "H" control with the added feature of a handwheel for volume adjustment. It is ideal for use where the machine speed must be changed frequently. The radial pump delivers in one direction only and the machine movement is controlled with a piston-type operating valve.

3. Type "HD" Control. This type provides two-speed operation during the working cycle. The pump stroke is automatically and instantly reduced at any

desired point, decreasing the pump delivery to produce the desired slower working speed or rate of pressure build-up. Adjustment of degree of pump stroke reduction is by a wrench adjustment.

4. Type "CS" Control. This type is commonly referred to as the servomotor or servoreversing control. It is designed to achieve reversal of the machine movement without shock. It utilizes the reversible discharge feature of the pump to control the machine movement. No operating valve is required and reversal is accomplished without reversing the pump rotation.

Manufacturer's Data:

- (a) Non-Reversing Type
RPM: 1200 and 1800
Capacity: To 30 g.p.m.
- (b) Reversing Type
RPM: 720 and 900
Capacity: To 185 g.p.m.

462.

Trade Name: Hydro-Power Gear Pumps

Manufacturer: Hydro-Power, Inc., Springfield, Ohio

Use and Outstanding Characteristics:

Hydro-Power gear type pressure generators are constant delivery pumps. They have the Hydro-Power tapered bearing mounting of the gear shafts so that wear is reduced. They can be furnished in both single and double end shaft design and can be either flange or foot mounted.

Manufacturer's Data:

RPM: 900 and 1200
Capacity: 4.8 to 59 g.p.m.

463.

Trade Name: Hydro-Power Booster Pumps

Manufacturer: Hydro-Power, Inc., Springfield, Ohio

Use and Outstanding Characteristics:

This type is a compact multi-plunger intensifier designed to convert

low pressure to high pressure in an oil-hydraulic circuit. No additional pumps are required. The flow is uninterrupted due to the multi-plunger arrangement. The boosters come in two sizes so that two pressure ranges may be had: 2 to 1 and 3 to 1.

Manufacturer's Data:

Maximum discharge pressure: 7500 p.s.i.
Input g.p.m.: 35 to 100

464.

Trade Name: Horizontal High Pressure Three Plunger Pumps

Manufacturer: Hydropress, Inc.

Use and Outstanding Characteristics:

These are high pressure, reciprocating plunger pumps of the horizontal three-throw type specially designed for use in connection with hydraulic presses in the metal forming industry.

Manufacturer's Data:

Pressures from 1500 to 4500 p.s.i.
Smallest unit capacity from 35 to 105 g.p.m.

465.

Trade Name: Ingersoll-Rand Process Pumps, Single-Stage Types HFL, MFL, SFL, BHFL, BMFL and BSFL

Manufacturer: Ingersoll-Rand Co., Phillipburg, New Jersey

Use and Outstanding Characteristics:

These process pumps are built for general service in refinery and process industries. They will handle liquids at temperatures from below freezing to 800° F. A wide range of material combinations are available to suit the liquid being pumped. The stuffing boxes are arranged for water cooling, but may be replaced by a shaft-seal. For many process services this seal saves liquid and reduces stuffing-box maintenance.

Manufacturer's Data:

Capacities: To 3200 g.p.m.
Maximum working pressures: To 300 p.s.i.

466.

Trade Name: Ingersoll-Rand Chemical Pumps, Types MC, MCS, HC, HCH

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These four types are built for general chemical service and handle liquids at temperatures up to 275° F. All of the casing and impeller parts that come in contact with the liquid are made of "Ircamet", a high nickel-chromium-molybdenum alloy steel. This material successfully resists the corrosive action of many acid and alkaline materials. The pumps are available in iron for handling alkaline or neutral liquids and bronze where it is desirable. The pump is self-venting due to the vertical discharge nozzle. The casing is of volute design. The entire pumping unit is sprayed with a chlorinated rubber base paint which renders the unit more resistive to chemical action.

Manufacturer's Data: (Table in reference)

Heads to 200'
Capacities to 1500 g.p.m.
(1500 g.p.m. at 275 F)

467.

Trade Name: Ingersoll-Rand Large Capacity Chemical Pumps, Class CSFL

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

This type of pump is intended for general chemical use, handling either hot or cold liquids. It will handle liquids up to a temperature of 800F. The impeller is of closed design with renewable stationary and rotating impeller rings. Back vanes on the impeller reduce the stuffing box pressure. The standard material for this type is "Ircamet", which successfully handles most acids and alkalis.

Manufacturer's Data (Table in reference):

Capacities: To 4000 g.p.m.
Max. liquid temperature: 800° F.
Heads: To 200'

468.

Trade Name: Ingersoll-Rand Two-Stage Centrifugal Pump, Class GT

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

Class GT pumps are two-stage ball-bearing units which operate at modern motor turbine and engine speeds. They are suitable for general service at pressures beyond the range of single-stage pump. Such uses are boiler-feed pumps at pressures of from 100 - 300 lbs. Other uses include service for a number of uses in chemical plants, paper mills, breweries, refineries, canneries, packing plants, and steel mills. Uses in these places include dewatering service, station pumps in mines, power plant condensate service, jetting pumps on pile driving operations, hydraulic pumps on elevator service, and as reflex pumps in refineries. The casings are of volute design and the impellers are either double suction on the larger units or back-to-back single suction on the smaller units.

Manufacturer's Data: (Table in reference)

Sizes: 2 - 6"

Heads: To 800'

Capacities: To 2100 g.p.m.

469.

Trade Name: Cameron Single-Stage General Service Pumps

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These general service pumps are suitable for almost every liquid pumped. They are used for such services as cooling-tower systems, air-conditioning equipment, transfer service in sugar refineries, chemical plants, oil-tank farms, beverage plants, general service in food packing plants, oil refineries, and general manufacturing plants. Among the liquids safely handled by it are water, gasoline, brine, ammonia, fruit juices, starch, white water, alcohol, soap liquid, dyes, sugar liquors, tanning extracts, beverages and mine water. They have double suction impellers, a horizontally split casing with the suction and discharge nozzles on the lower half. Side suction and discharge is standard.

Manufacturer's Data (Tables in reference):

Heads: To 250'
Capacities: To 5000 g.p.m.

470.

Trade Name: Ingersoll-Rand Heavy-Duty Motorpump, Single-Stage, Class RV

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

This type has application in petroleum, chemical, building, mining, contracting, paper, dairy, food, and beverage industries, in air conditioning and as an integral part of such units as washing, cleaning, water conditioning, bakery, food, and dairy machinery. Open impellers are available to handle paper stock, hot wort, distillery mash and suspensions. The units have a built-in electric motor, and the suction and discharge connections are of the standard flange type.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ - 5" discharge
H.P.: 1 - 40
Capacities: 10 - 1800 g.p.m.
Heads: To 240'

471.

Trade Name: Ingersoll-Rand Heavy-Duty Motorpump Two-Stage Class MRV

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

The two-stage heavy-duty units are adapted to mine shaft pumping, feeding 150 and 200 lb. boilers, air conditioning, and house pump service. The motor is built-in and mounted between the stages. The impellers are placed back-to-back to secure hydraulic balance. The suction and discharge connections are of the standard flange type.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ and 2" discharge
Motors: 10 - 50 H.P.
Capacities: 20 - 275 g.p.m.
Heads: To 500'

472.

Trade Name: Ingersoll-Rand Standard Motor Pump, Single-Stage, Class KRVS

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These units have a fractional horsepower electric motor built-in. They do not require any special foundation and may be mounted in any position. They find application in chemical and food producing industries, refineries, paper mills, beverage plants, and buildings and are well suited for use on air conditioning equipment, coolers, evaporative condensers, dairy machinery, pastuerizers and washes. They are intended for use where clear non-corrosive liquids are handled. The shaft seal is an integral part of the impeller. It consists of a stationary sealing face mounted in the connecting piece and a spring-loaded rotating face mounted on and rotating with the shaft.

Manufacturer's Data:

Capacities: 5 - 125 g.p.m.
Heads: To 150'
Motors: $\frac{1}{4}$ to 1 H.P.
Sizes: $3/4$, 1, $1\frac{1}{2}$ " discharge

473.

Trade Name: Ingersoll-Rand Standard Motor Pump Single Stage Class RVN

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

This type has a built-in integral horsepower electric motor and finds application in the same uses as type KRVS.

Manufacturer's Data:

Capacities: 5 - 250 g.p.m.
Heads: To 175'
Motor sizes: $1\frac{1}{2}$ to 10 H.P.
Sizes: 1, $1\frac{1}{2}$, 2"

474.

Trade Name: Ingersoll-Rand Standard Motorpupe Two-Stage Class MTVN

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These pumps are of the same construction as the single-stage standard Motorpumps. The two impellers are placed back-to-back so the unit is balanced hydraulically.

Manufacturer's Data:

Capacities: 5 - 55 g.p.m.
Heads: To 300'
Motor sizes: $1\frac{1}{2}$ to 5 H.P.
Sizes: 1" discharge

475.

Trade Name: Ingersoll-Rand Standard Motorpump Four-Stage Class MRVH

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

This type is of vertical construction so is very compact. It does not require a special foundation and can be mounted in a space 14" square by 3' high. It is well suited to boiler feed service and for use in refineries, mines, chemical plants, buildings, and manufacturing plants. The suction and discharge nozzles are threaded to receive standard pipe.

Manufacturer's Data:

Capacities: 5 - 50 g.p.m.
Heads: 300 - 600'
Sizes: 1" discharge
Motors: 5 to 15 H.P.

476.

Trade Name: Ingersoll-Rand Heavy Duty Cradle-Mounted Pumps, Single-Stage Class CRV

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

Class CRV pumps are cradle-mounted units which may be connected to any type of driver. They have application in such industries as petroleum, chemical, building, mining, contracting, paper, beverage, and manufacturing. Open impellers are available for handling paper stock, hot wort, distilling mash, and other sus-

pensions. The units are mounted on a baseplate with the driver. For standard NEMA frame motors the base plate is cast iron, but for other drivers it is welded steel. A flexible coupling absorbs the end play in the driver shaft and compensates for temperature change.

Manufacturer's Data:

Heads: To 240'
Capacities: 10 to 1800 g.p.m.
Sizes: 1½, 2, 3, 4, 5" discharge

477.

Trade Name: Ingersoll-Rand Heavy-Duty Cradle-Mounted Pumps. Two-Stage Class CMRV

Manufacturer: Ingersoll Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These pumps have the same features as the single-stage class CRV pumps. The two impellers are single-suction type mounted back-to-back. The suction and discharge connections are of the standard flange type.

Manufacturer's Data:

Capacity: 20 to 275 g.p.m.
Heads: To 500'
Sizes: 1½ and 2" discharge

478.

Trade Name: Ingersoll-Rand Standard Cradle-Mounted Pumps. Single-Stage Class CRVN

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These units are standard type cradle-mounted units of which the heavy duty type has been previously taken up. Their suction and discharge pipes are threaded to receive standard pipe.

Manufacturer's Data:

Heads: To 175'
Capacities: 5 to 250 g.p.m.
Sizes: 1, 1½, and 2" discharge

479.

Trade Name: Ingersoll-Rand Standard Cradle-Mounted Pumps, Two-Stage Class GMRW

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Manufacturer's Data:

Size: 1" discharge
Capacities: 20 to 55 g.p.m.
Heads: To 300'

480.

Trade Name: Ingersoll-Rand Turbine Driven Pumps. Single Stage-Class TRVNL and TRV

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These two types are designed for general service wherever steam-turbine drive is indicated. They are particularly useful in refinery, process, and gas plant service. They have a built-in steam-turbine driver. Suction and discharge connections are on most models of the standard flanged type. The turbine has a turbine wheel of the two-row, velocity-stage impulse type. The turbine governor is of the constant speed, centrifugal flyweight type designed for close regulation.

Manufacturer's Data:

Capacities: 5 to 1500 g.p.m.
Heads: To 240'
Sizes: 1 - 5" discharge

481.

Trade Name: Ingersoll-Rand Turbine-Driven Pumps. Two and Four Stage Classes TMRVN, TMRV, and TMRVH

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These types of the same style as the single-stage turbine driven pumps are designed for heads beyond their range. They are well suited for boiler feed service.

Manufacturer's Data:

(a) Two-Stage:
Capacities: 5 to 275 g.p.m.
Heads: To 500'

(b) Four-Stage
Capacities: 5 - 50 g.p.m.
Heads: 300 to 600'

482.

Trade Name: Ingersoll-Rand Coolant and Circulating Pumps, Single-Stage
Class KRV and KORVN

Manufacturer: Ingersoll-Rand Co., Phillipsburg, New Jersey

Use and Outstanding Characteristics:

These pumps are compact units designed for installation on machinery requiring a circulating pump. Examples of this use are evaporative condensers, machine tools, air conditioning units, and washers. Three types are available: (1) the immersion type, (2) the external type with a sidewall mounting bracket, and (3) the horizontal type.

Manufacturer's Data:

Capacities: 5 to 150 g.p.m.
Heads: To 125'
Motor sizes: $\frac{1}{4}$ to 5 H.P.

483.

Trade Name: Johnston Deep Well Turbine Pumps

Manufacturer: Johnston Pump Company

Use and Outstanding Characteristics:

These deep-well turbine type centrifugal pumps are available with either a motor head, a belt drive head, combination belt and motor head, or flexible coupling head, and with either water (cutless bearings), or oil shaft lubrication. The shaft has reinforced rubber spider guides at suitable intervals also. A unique feature is their use of "Vitriform" procelain lined pump bowls.

484.

Trade Name: Johnston "Junior" Pump

Manufacturer: Johnston Pump Company

Use and Outstanding Characteristics:

This is a small capacity, deep-well turbine pump intended for use in

water supply for private estates, dairies, laundries, breweries, hotels, canneries, and nurseries, etc. It features slow-speed operation, water lubrication, stainless steel at bearing points, and shafts of turned and ground carbon steel.

485.

Trade Name: Aquamatics

Manufacturer: Johnston Pump Company

Model: Double Pipe Deep Well

Use and Outstanding Characteristics:

The double pipe aquamatic consists of a volute centrifugal pump above ground and a hydraulic jet below the water level in the well.

Manufacturer's Data:

Heads: Up to 150 ft. (well depth)
Capacities: From 180 to 3300 g.p.h.

486.

Trade Name: Aquamatics

Manufacturer: Johnston Pump Company

Model: Single Pipe Deep Well

Use and Outstanding Characteristics:

This unit consists of a vertical volute centrifugal pump located above ground and a jet utilizing the area between the well casing and the single pipe as a drive pipe. It is intended for water supply for farms, ranches, dairies, laundries, ponds, etc.

Manufacturer's Data:

Capacities from 180 to 3300 g.p.h.
Well depths to 150 ft.

487.

Trade Name: Aquamatics

Manufacturer: Johnston Pump Company

Model: Shallow Well

Use and Outstanding Characteristics:

The shallow well Aquamatic is a vertical volute centrifugal pump intended for water supply for farms, dairies, country clubs, laundries, etc.

Manufacturer's Data:

Capacities from 70 to 7500 g.p.h.
Pressures up to 50 p.s.i.

488.

Trade Name: Kingsford Double Flow Pumps

Manufacturer: Kingsford Foundry & Machine Works

Model: Type N

Use and Outstanding Characteristics:

This is essentially a double-suction volute type centrifugal employing an impeller of back-to-back construction. It features a single casting casing and a Kingsford flexible coupling.

Manufacturer's Data:

Pressures up to 100 p.s.i.

489.

Trade Name: Paper Stock Pump

Manufacturer: Kingsford Foundry & Machine Works

Model: Type T

Use and Outstanding Characteristics:

This is a single-stage, single-suction volute centrifugal pump suitable for pumping groundwood stock, sulphite and soda stock, kraft stock, bleached stocks, and used on beater, Jordan, machine, screen service, etc. It has an open impeller.

Manufacturer's Data:

Sizes from 4" to 10"

490.

Trade Name: Single Stage Double Suction Pumps

Manufacturer: Kingsford Foundry & Machine Works

Model: Types SN and SNM

Use and Outstanding Characteristics:

These are single-stage, double-suction, volute type, centrifugal pumps used for water supply, general service, showers, grinder pressure pump, hot water, white water, and stock. It can be had with either open or closed impeller.

Manufacturer's Data:

Capacities from 100 g.p.m. to 10,000 g.p.m.
Heads up to 300 ft.

491.

Trade Name: High Pressure Multi-Stage Side Suction Pumps

Manufacturer: Kingsford Foundry & Machine Works

Model: Type SL

Use and Outstanding Characteristics:

This high-pressure multi-stage unit is a volute type centrifugal pump intended for boiler feed, grinder pressure, fire service, hydraulic pressure, etc.

Manufacturer's Data:

Capacities from 50 g.p.m. to 3000 g.p.m.
Heads up to 400 p.s.i.

492.

Trade Name: Heavy Duty Chemical Pumps

Manufacturer: Kingsford Foundry & Machine Works

Model: Types SXL, SXW, SPC

Use and Outstanding Characteristics:

These are side-suction, open or enclosed impeller, volute centrifugal pumps intended to handle acids, caustic, liquors, milk of lime, sizing and colors. They have water-cooled bearings and stuffing boxes.

Manufacturer's Data:

Sizes from $1\frac{1}{2}$ " to 8"

493.

Trade Name: Evaporator Service Pump

Manufacturer: Kingsford Foundry & Machine Works

Model: Type E.S.P.C.

Use and Outstanding Characteristics:

These are side-suction, volute centrifugal pumps developed primarily for circulating caustic soda in evaporators. All parts coming in contact with the caustic are made of pure nickel.

Manufacturer's Data:

Sizes from 10" to 18"

494.

Trade Name: Heavy-Duty Side-Suction Chemical Pumps

Manufacturer: Kingsford Foundry & Machine Works

Model: Type SSCP

Use and Outstanding Characteristics:

These are single-stage, side-suction, volute centrifugal pumps intended for chemical service. All parts in contact with the pumped fluid are made of pure nickel.

Manufacturer's Data:

Sizes from 2 to 5"

495.

Trade Name: Heavy-Duty, Side-Suction Chemical Pumps

Manufacturer: Kingsford Foundry & Machine Works

Model: Type SKCP

Use and Outstanding Characteristics:

This is a heavy-duty chemical service, volute, single-stage, side-suction, centrifugal pump. Pump parts in contact with the liquid may be furnished in cast iron, nickel iron, bronze, monel metal, nickel, cast steel and stainless steel.

Manufacturer's Data:

Sizes from 1" to 2"

496.

Trade Name: Kinney Heliquad Pumps

Manufacturer: Kinney Manufacturing Company

Use and Outstanding Characteristics:

Heliquad Pumps consist of two helically meshing rotors driven by timing gears and are obtainable in seven models to suit the following purposes: General service, marine service, marine cargo service, lubricating liquids, general service (with thrust bearings), and large marine cargo service. They have labyrinth rings and can be furnished to produce a 29" vacuum or better against a 30" reference. They can handle acetic acid, alcohol, ammonia liquor, asphalt (350 - 650° F), asphalt (under 350°), benzol, bilge, caustic, chocolate, cleaning solvent, coconut oil, cottonseed oil, crude oil (light and heavy), diesel oil, distillate, emulsion (asphalt), enamel, ethyl chloride, fuel oil, furnace oil, gas oil, gasoline, grease (hot and semi-solid), hot oil (still bottoms and heating systems), ink (printers), kerosene, lube oils, molasses, paraffin (hot), pine tar, pitch tar, Quebracho extract, road oil, rosin (hot), sea water (ballast), solvents, sulphuric acid, stran oil, syrup, water (evaporater feed, fresh service, hot water heating, and engine cooling).

Manufacturer's Data:

Pressures up to 400 p.s.i.
Capacities up to 2730 g.p.m.

497.

Trade Name: Kinney Rotary Gear Pumps

Manufacturer: Kinney Manufacturing Company

Model: Model LC

Use and Outstanding Characteristics:

This rotary pump consists of two surface hardened spur gear rotors driven by timing gears and is especially designed to pump liquids containing materials of an abrasive nature such as asphalt filled coating - "loaded coating" - containing up to 35% ground slate.

Manufacturer's Data:

Capacities from 27.4 to 141 g.p.m.
Pressures up to 75 p.s.i.

498.

Trade Name: Kinney Rotary Plunger Pumps

Manufacturer: Kinney Manufacturing Company.

Use and Outstanding Characteristics:

These pumps consist of a plunger with a side port in it, a closed bottom and an open top, an eccentric which drives it, and a cylinder in conjunction with which the eccentric operates to force the liquid being pumped. It has no valves and will produce a vacuum of 29" out of 30". It is available as a standard model with either plain cylinders or steam jacketed cylinders. It can be used for pumping ammonia liquor, asphalt (under 350°), chocolate, creosote, coconut oil, cottonseed oil, crude oil (heavy), diesel oil, emulsion (asphalt), enamel, fish oil, fig newton paste, fuel oil, furnace oil, glucose, glue, glutrin, grease (hot and semi-solid), hot oil (still bottoms and heating systems), impregnating, gum, jam or jelly, kerosene, lard, linseed oil, lube oil, molasses, naptha (mixed with oil), paint, paste, petrolatum, pitch tar, shellac, silicate of soda, soap (liquid), soda, starch, sulphite liquor, sulphuric acid, syrup, tanning extract, turpentine, varnish, vaseline, wax, and white lead.

Manufacturer's Data:

Pressures up to 200 p.s.i.
Capacities up to 3360 g.p.m.

499.

Trade Name: Kraissl Rotary Air Pumps

Manufacturer: Kraissl Company, Inc.

Model: Class 21

Use and Outstanding Characteristics:

This is a rotary pump employing rollers as the contacting vanes which is rather a unique pattern, giving the advantage of a rolling contact. This pro-

duces a "one line" seal as compared to a surface seal however limiting this unit to relatively low vacuum requirements (26" Hg). It is intended for general service where corrosive gases or vapors carrying adhesive particles in suspension are encountered.

Manufacturer's Data:

Capacities up to 2 cfm

500.

Kraissl Rotary Air Pumps

Manufacturer: Kraissl Company, Inc.

Model: Class 25

Use and Outstanding Characteristics:

This is a multi-vane type rotary air pump with centrifugal force being utilized to keep the vanes out. It has force feed lubrication and may be purchased in a complete assembly including motor and air filter.

Manufacturer's Data:

Capacities up to 75 cfm

501.

Trade Name: Kraissl Fuel Oil Pumps

Manufacturer: Kraissl Company, Inc.

Model: Class 60

Use and Outstanding Characteristics:

These are internal gear rotary pumps for heavy fuel oil burner service. The drive is connected to the pump by means of a loose coupling which eliminates all side pull on the pump shaft giving long life to the pump.

Manufacturer's Data:

Capacities from 75 to 2127 g.p.h.
Pressures up to 100 p.s.i.

502.

Trade Name: Kraissl Roller Pumps

Manufacturer: Kraissl Company, Inc.

Model: Class 50

Use and Outstanding Characteristics:

This is a rotary pump, utilizing rollers for vanes, for pumping lube oils, fuel oils, and coolant. The rollers make it easier to handle liquids containing extraneous matter.

Manufacturer's Data:

Capacities from 1 to 10 g.p.m.
Pressures up to 100 p.s.i.

503.

Trade Name: Kraissl Centrifugal Pumps

Manufacturer: Kraissl Company, Inc.

Model: Class 32

Use and Outstanding Characteristics:

These are volute type, single-stage, end-suction, centrifugal pumps intended for the circulation or handling of liquids that are non-lubricating or contain materials that are harmful to close clearances.

Manufacturer's Data:

Capacities from 1 to 200 g.p.m.

504.

Trade Name: Kraissl Motorized Pumps

Manufacturer: Kraissl Company, Inc.

Model: Class 60M

Use and Outstanding Characteristics:

It is an internal gear rotary pump mounted on an electric motor for compactness. It is intended for handling oils, gasolines, and solvents.

Manufacturer's Data:

Capacities from 0.4 to 212 g.p.m.
Pressures up to 100 p.s.i.

505.

Trade Name: "Hydrobalance" Self-Priming Pumps

Manufacturer: LaBour Company, Inc.

Use and Outstanding Characteristics:

These single-stage, volute type centrifugal pumps are self-priming through recirculating discharge water principles. They have an open type impeller and with it can attain efficiencies of better than 80%. They are available in various combinations for use in general service, hydraulic service, fire fighting (portable) service, mine service, and service involving hazardous atmospheres. Also in sump or drainage service, mine dewatering, irrigation, tower service, removal of liquid under vacuum, marine service, chemical transfer, ammonium Sulphate saturators, pressure filters, paper mill service, bed filters, and volatile liquids. They can be used to pump liquids or air or both.

506.

Trade Name: LaBour Non-Priming Pumps

Manufacturer: LaBour Company, Inc.

Use and Outstanding Characteristics:

These are single-stage, open impeller, volute centrifugal pumps with efficiencies possible of over 80%. The pump is of simple construction and will not air bind. They are intended for chemical and hydraulic service.

507.

Trade Name: "Hydrobalance" Self-Priming Pumps

Manufacturer: LaBour Company, Inc.

Model: Type G

Use and Outstanding Characteristics:

Type G is a vertical, volute centrifugal pump, self priming, and without a mechanical seal. The shaft being on the suction side eliminates the need for a seal. The self-prime is accomplished by recirculating discharge water principles. It is suitable for use in sump or drainage work, bilge, mine dewatering, irrigation,

tank car unloading, tower service, transfer, and handling liquids under vacuum, volatile liquids, and liquids containing crystals.

508.

Trade Name: Lawrence Centrifugal Pumps, Double-Suction Horizontally Split Type

Manufacturer: Lawrence Machine and Pump Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

For a general description this type of pump should be categorized "general purpose". It will handle water which does not carry too high a content of gritty or fibrous matter. Employment of special metal parts renders the pump suitable for use with acids and such corrosive liquids. General usage finds the type in general pumping service in power plants, water works, industrial plants, paper and pulp mills, chemical and processing plants, and in textile mills. Two of the pumps can be mounted on a common bed plate with a common driver. The casing is horizontally split, volute type with the impeller regularly of bronze. The sealing rings, which form a running joint between the impeller and the casing are made of bronze also.

Manufacturer's Data:

Heads: Up to 300'
Sizes: 2 - 14"
Capacities: 30 - 10,000 g.p.m.

509.

Trade Name: Lawrence Centrifugal Pumps - Standard Size Suction Pumps

Manufacturer: Lawrence Machine & Pump Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

This type is especially adapted for purposes where the fluid to be pumped carries a large amount of solid matter in suspension, for example, grit, sand, ash, pulps, trash, etc. For this reason it is recommended for service in paper and pulp mills, textile plants, tanneries, sugar mills, coal washing plants, mining and construction work for unwatering coffer dams and excavations. The

clearances are large to avoid clogging. For ordinary service the pump is made of iron with a steel shaft, but if conditions require such, the pumps can be furnished with bronze impeller and shaft, or other alloy. Usually an open type impeller is used, but the enclosed type with renewable rings is also provided.

Manufacturer's Data:

Sizes: 1 - 14"
Capacities: To 8000 g.p.m.
Heads: To 150'

510.

Trade Name: Lawrence Centrifugal Pumps, acid and Chemical Pumps

Manufacturer: Lawrence Machine and Pump Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

The types of materials which may be handled by this type of pumps are various types of acid, caustic soda, black liquor, blue vitriol, dye solutions, sulphite solutions, various oils, syrups, pulps and liquids carrying a high percentage of abrasive or solid matter. Such uses find application in chemical plants, paper mills, textile mills, bleacheries, tanneries, explosives plants, sugar mills, and food-processing plants. The pumps are furnished for vertical or horizontal pumping, with the vertical unit mounted inside the sump or tank itself. The casing is volute type, and all parts that come in contact with the liquid are made of a suitable metal to resist corrosive and abrasive action.

Manufacturer's Data:

Sizes: 1 - 12"

511.

Trade Name: Lawrence Centrifugal Pumps, High-Duty Multi-Stage Pumps

Manufacturer: Lawrence Machine & Pump Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

In this type the pump casing is horizontally split permitting inspection without disturbing the bearings or piping. The impellers are made of bronze, the shaft is alloy steel, and the sealing rings are of bronze. The method of lubri-

ation is such that the bearings are water lubricated. They are best used for high pressure service, such as in water works, boiler feed, and fire protection.

Manufacturer's Data:

Sizes: $2\frac{1}{2}$ to 5"
Capacities: 150 - 1000 g.p.m.
Pressures: To 250 lbs.

512.

Trade Name: Lawrence Centrifugal Pumps, High-Density Paper Stock Pumps

Manufacturer: Lawrence Machine and Pump Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

Heavy paper stock has the appearance of homogeneous viscous liquids lacking colloidal properties, therefore the stock when subjected to sudden changes in pressure and velocity separates into water and fibrous matter. This heavy stock contains entrained air which is liberated when the stock is subjected to a vacuum thus causing air binding. Since any interruption in flow due to these conditions might clog the pump, these pumps are designed to eliminate this. The suction intake is extra large and carried all the way into the impeller. Due to this the stock is gradually set in rotation and picked up by the impeller without excessive shock. The impeller is of the non-clogging type with large clearances. The casing is volute, made of cast iron, with center-line-split casing. Generally the pump is motor-driven.

Manufacturer's Data:

Sizes: 4, 6, 8"
Capacities: 200 - 3200 g.p.m.

513.

Trade Name: Lawrence Centrifugal Pumps, Non-Clogging Sewerage and Sludge Pumps

Manufacturer: Lawrence Machine & Pump Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

These pumps are designed to handle sludge and sewerage containing rags, trash, fibrous material, grit, and large solids. The volute casing is made of cast iron and designed so that the discharge pipe shock is as small as possible.

The impeller is the enclosed type with rounded edge so as not to afford a place for material to catch to. It is made of either high grade cast-iron or bronze, depending on the service conditions.

Manufacturer's Data:

Sizes: 2 - 10" discharge
Capacities: 70 - 5300 g.p.m.
Max. solid diameter that will pass: $1\frac{1}{2}$ - $5\frac{1}{2}$ "

514.

Trade Name: Lawrence Centrifugal Pumps - Slurry and Sludge Pumps

Manufacturer: Lawrence Machine and Pump Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

This type has been developed especially for pumping liquids containing abrasive solids in suspension such as cement, slurry, tailings in ore reduction plants, milk of lime, soda ash, and residue from filters. The construction is simple with only three parts, the impeller, shell, and suction disc, coming in contact with the liquid. These parts are made of a special alloy over 500 Brinell Hardness for ordinary abrasive use. The suction is large and carried all the way back into the impeller; this eliminates fluctuations in flow. The stuffing box, due to its depth which permits so much packing that it allows no sealing water to leak through, provides tightness with only moderate pressure on the gland.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ - 6"
Capacities: 40 - 1800 g.p.m.
Max. solid diameters: $\frac{1}{2}$ to $2\frac{1}{4}$ "

515.

Trade Name: Lawrence Centrifugal Pumps, Standard Dredging Pumps

Manufacturer: Lawrence Machine & Pump Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

This type is a general dredging pump for handling abrasive particles. For this reason the parts which come in contact with the liquid are made of abrasive resistant material. For pumping coarse gravel, manganese steel is found best for this use, while for fine sharp abrasive material, alloy steel gives best results.

The only three parts in actual contact are the shell, impeller, and suction disc. The shell is volute extra-heavy type, and the impeller is the enclosed, non-clogging type. Drive may be obtained through electric motor, belt, or gasoline engine.

Manufacturer's Data:

Sizes: 4 - 12"
Capacity: 4 - 125 cubic yards per hour of material
Max. solid diameter: 2 3/8 - 9 1/4"
Heads: To 100'

516.

Trade Name: Lawrence Propellor Pump

Manufacturer: Lawrence Pump & Machine Corporation, Lawrence, Massachusetts

Use and Outstanding Characteristics:

This type propellor screw pump is specially designed to meet the need for large-capacity, low-head pumping services requiring a minimum of upkeep and attendance. Such services include irrigation, drainage, and circulating usage where large volumes of water are handled at low heads. The unit is usually furnished for vertical installation, the lower shaft bearings submerged all the time for water lubrication. Drive can be obtained from motor, belt, or engine. The propellor is of such design that solid particles can be handled.

Manufacturer's Data:

Heads: To 14'
Capacities: To 16,000 g.p.m.
H.P.: To 67
Speeds: To 970 r.p.m.

517.

Trade Name: Layne Vertical Turbine Pumps

Manufacturer: Layne & Bowler, Inc.

Use and Outstanding Characteristics:

These are deep-well turbine pumps, oil or water lubricated, with varied pump heads for any type drive. These pumps are intended for deep well water work. They also have enamelled turbine bowls.

Manufacturer's Data:

Capacities from 50 to 16,000 g.p.m.

518.

Trade Name: McGowan Duplex High Pressure Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

These are side pot, reciprocating, duplex, rotary power driven pumps featuring centrifugally cast liners, Timken roller-bearings, interchangeable liners for different capacities and pressures, and herringbone gears (pinion integral with shaft). It is oil-bath lubricated and is designed for oil feed service.

Manufacturer's Data:

Pressures up to 1500 p.s.i.
Capacities from 34 to 410 g.p.m.

519.

Trade Name: McGowan Valve Plate Packed Piston Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

These are direct acting, steam driven, reciprocating, valve plate packed piston pumps for service in handling boiler feed, condensate, caustic, acids, bean oils, absorber oil, seal oil, bottoms, asphalt, crude, gasoil, kerosene, naphtha, gasoline and water.

Manufacturer's Data:

Capacities: from 10 to 570 g.p.m.

520.

Trade Name: McGowan Close Clearance Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

These direct-acting steam driven single-cylinder, side-pot close clearance pumps are designed for refining service in handling highly volatile liquids

(large valve areas, large suction chambers), white distillates and oils such as the following: ethane, propane, buta diene, pentane, charging and refluxing, still reflux, stabilizers, reactor feed, quenching, loading, bean oil charging, stripping and bottoms.

Manufacturer's Data:

Capacities from 5 to 170 g.p.m.
Discharge pressures up to 600 p.s.i.
Suction pressures up to 400 ps.i.

521.

Trade Name: McGowan Single-Cylinder Steam Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

These reciprocating, steam or power driven, single-cylinder, packed piston valve plate pumps are intended for boiler feed, vacuum and general and light service. They are used to maintain a high vacuum on steam heating installations and surface condensers.

Manufacturer's Data:

Capacities from 100 to 1300 BHP and from 26 to 253 g.p.m.
Pressures up to 184 p.s.i.

522.

Trade Name: McGowan Boiler Feeding and Heavier Pressure Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

These direct-acting steam-driven outside end packed pumps are designed for high pressure work as encountered in boiler feed and hydraulic service. Each valve on the water end can be reached individually.

Manufacturer's Data:

Capacities from 385 to 3000 BHP and from 5 to 348 g.p.m.

523.

Trade Name: McGowan Duplex Turret Type Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

These duplex, turret type, direct acting, steam driven, reciprocating pumps are of the submerged cylinder design best suited for high suction lifts.

Manufacturer's Data:

Capacities from 258 to 700 g.p.m.
Pressures from 41 to 240 p.s.i.

524.

Trade Name: McGowan Valve Box Duplex Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

This reciprocating, direct acting, steam driven pump has independent suction and discharge valve decks separated by box-type casting. These decks, or valve plates, with their large valve areas, can be cast of metals best suited to the corrosive nature of the liquid, thereby making replacements relatively inexpensive.

Manufacturer's Data:

Capacities from 74 to 359 g.p.m.
Pressures from 39 to 211 p.s.i.

525.

Trade Name: McGowan Single-Cylinder Magma Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

These direct-acting, single-cylinder, steam-driven magma pumps are intended for handling heavy viscous liquids such as massecuite, sludge, and heavy oils. The pump cylinder is enlarged at the center, enabling the cylinder to fill easily. The discharge parts lead directly from the pump cylinder into the discharge pipe without any obstruction which would affect the structure of the material, such as sugar crystals.

Manufacturer's Data:

Capacities from 14 to 57 g.p.m.

526.

Trade Name: McGowan Mash Pumps

Manufacturer: Leyman Manufacturing Corp.

Model: Fig. 753

Use and Outstanding Characteristics:

These submerged cylinder packed piston, side-plate pattern, reciprocating pumps are equipped with reinforced hinged valves of large area, operating on angle seats designed to avoid depositing of solid matter tending to impede perfect seating of the valves. It has a side plate for cleansing.

Manufacturer's Data:

Capacities from 19.2 to 195.52 g.p.m.

527.

Trade Name: McGowan Whiskey Pumps

Manufacturer: Leyman Manufacturing Corp.

Model: Fig. 755

Use and Outstanding Characteristics:

These submerged cylinder pumps of the direct acting, steam driven, reciprocating, single cylinder pattern with flat grid type valve seats and are intended for pumping whiskey. It has a side plate for cleansing.

Manufacturer's Data:

Capacities from 7.32 to 39.96 g.p.m.

528.

Trade Name: McGowan Duplex Power Pumps

Manufacturer: Leyman Manufacturing Corp.

Use and Outstanding Characteristics:

These duplex, reciprocating, rotary power driven pumps are intended for general service such as circulating, booster, boiler feed, filter press, and oil gathering service. It has oil bath lubrication.

Manufacturer's Data:

Capacities from 30 to 485 g.p.m.

529.

Trade Name: Lobee Gear Pumps

Manufacturer: Lobee Pumps & Machinery Company, Inc.

Model: Model "L"

Use and Outstanding Characteristics:

These bronze gear rotary circulating pumps have tobin bronze shafts and are used for circulating water on marine engines, forced feed oil lubrication, pumping bilge, and for pumping liquid under pressure. They can be run in either direction and are available with either herringbone or spur gears.

Manufacturer's Data:

Capacities from .121 to 3.6 gallons/100 rev.

530.

Trade Name: Lobee Bronze Gear Circulating Pumps

Manufacturer: Lobee Pump & Machinery Company, Inc.

Model: Model "OS"

Use and Outstanding Characteristics:

These are all-bronze, rotary gear pumps with spur or herringbone gears used for circulating water on marine engines, forced feed oil lubrication, pumping bilge, and for pumping liquids under pressure.

Manufacturer's Data:

Capacities from .310 to 5.75 gal./100 rev.

531.

Trade Name: Lobee Rotary Gear Pumps

Manufacturer: Lobee Pumps & Machinery Company, Inc.

Model: Types A and B

Use and Outstanding Characteristics:

These are herringbone rotary-gear pumps for pumping water and oils at

100 - 300 RPM.

Manufacturer's Data:

Capacities from 2 to 6 gal./100 rev.

532.

Trade Name: Lobee Bronze Centrifugal Pumps

Manufacturer: Lobee Pump & Machinery Company, Inc.

Model: Model "C"

Use and Outstanding Characteristics:

These are single-stage, volute centrifugal pumps, all bronze, and intended for pumping water (cold or hot), brine, gasoline, flushing decks, and pumping bilge.

Manufacturer's Data:

Capacities from $1\frac{1}{4}$ to 35 g.p.m.

GENERAL INFORMATION CONCERNING LOGAN SURE-FLOW PUMPS

Logan Sure-Flow Centrifugal Pumps are low-head pumps designed for pumping coolants and cutting oils on machine tools. They can also be used for circulating cooling liquids, for pumping or circulating water or quenching oil, and for general liquid transfer service. The open impeller has clearance to allow some abrasives and filings to pass without damaging the pumps. The motor drive is integral with the pump unit. The pumps are self-priming without submerging.

533.

Trade Name: Logan Sure-Flow Centrifugal Pumps, Series 1500

Manufacturer: Logansport Machine Co., Inc., Logansport, Indiana

Use and Outstanding Characteristics:

Series 1500 are foot mounted for mounting on a horizontal surface. They are self priming without submerging so that they can be installed below, above, or remote from the liquid level.

Manufacturer's Data (Curves in reference):

Oil: Heads to 36'
Capacities to 40 g.p.m.

534.

Trade Name: Logan Sure-Flow Centrifugal Pumps, 1600 Series

Manufacturer: Logansport Machine Co., Inc., Logansport, Indiana

Use and Outstanding Characteristics:

Series 1600 are bracket mounted pumps which can be mounted on any reasonably smooth surface (general information precedes).

Manufacturer's Data:

Use with oil:

Capacities: To 40 g.p.m.

Heads: To 36'

535.

Trade Name: Logan Sure-Flow Centrifugal Pumps, 1700 Series

Manufacturer: Logansport Machine Company, Inc., Logansport, Indiana

Use and Outstanding Characteristics:

The 1700 Series has a flange mounting for mounting on a vertical surface at the side of the liquid reservoir. A machined surface and gasket are required. The mounted position is such that the top of the intake opening is 1" below the liquid in the reservoir.

Manufacturer's Data:

Use with oil:

Heads to 36'

Capacities to 43 g.p.m.

536.

Trade Name: Logan Sure-Flow Centrifugal Pumps, 1800 Series

Manufacturer: Logansport Machine Co., Inc., Logansport, Indiana

Use and Outstanding Characteristics:

These are submerged type models and can handle liquids containing suspended abrasive material since they have no shaft seal. An overflow hole in the top of the bearings prevents the liquids from reaching the motor bearings.

Manufacturer's Data:

Heads: To 18' (oil)

Capacities: To 42 g.p.m.

537.

Trade Name: Logan Sure-Flow Centrifugal Pumps, 1900 Series

Manufacturer: Logansport Machine Co., Inc., Logansport, Indiana

Use and Outstanding Characteristics:

Series 1900 is of the grinder type. It has no shaft seal so it can handle liquids with suspended abrasive material. An overflow hole at the top prevents liquid from getting into the motor bearings. Mounting is intended to be on a vertical surface at the side of a liquid reservoir. The inlet is through the mounting flange where a machined surface and a gasket are required.

Manufacturer's Data:

Handling water:

Heads: To 20'

Capacities: To 33 g.p.m.

538.

Trade Name: Luitwieler Triplex Pressure Pumps, Reciprocating Cam Types

Manufacturer: The Luitwieler Corporation, Rochester, New York

Use and Outstanding Characteristics:

In this type of pump the valves are located in an upper and lower deck, the upper for discharge and the lower for suction. Valve decks may be opened for inspection by removing the plates. Air chambers are provided to assist starting and to prevent bursting of the pump when the water is suddenly stopped. The power to drive is applied by direct gear connection, chain, V-belt, or pulley. There are self-contained motor and engine driven units.

Manufacturer's Data:

Example:

6 x 12 Double acting pump.
1000 g.p.m.

539.

Trade Name: Luitwieler Multipellor Turbine

Manufacturer: The Luitwieler Corporation, Rochester, New York

Use and Outstanding Characteristics:

This type is used as a deep-well pump to obtain a sanitary water supply. It has no oil or grease lubrication below the ground lever, which enhances the cleanliness of the water supply.

Manufacturer's Data:

Minimum well diameters: 6" - 13"
Capacities: 25 - 1500 g.p.m.
Max. operating speeds: 1760 - 3500 r.p.m.

540.

Trade Name: The Luitwieler Multipellor - Screw Type

Manufacturer: The Luitwieler Corporation, Rochester, New York

Use and Outstanding Characteristics:

In this pump no oil or grease is used as a lubricant for rotating parts submerged below the water in the well. The reason for this is to protect the water from contamination when it is intended for domestic use. The impellers are located at intervals along the shaft with the impeller skirt rotating in an annular compartment located below the level of the water. The pump shaft is carried by two annular ball thrust bearings which are built into a vertical motor. The skirt forms an external bearing for steadying the suspended pumps shaft and therefore has water lubrication. The electric motor is located above the ground and is the only part requiring oil lubrication. Quietness of operation is enhanced by the operation of the pump being in a submerged portion.

Manufacturer's Data:

Minimum well diameters: 4" - 10"
Capacities: 20 - 2200 g.p.m.

541.

Trade Name: Luitwieler Non-pulsating Deep Well Pumping Engines - For Extra Heavy Duty Service

Manufacturer: The Luitwieler Corporation, Rochester, New York

Use and Outstanding Characteristics:

These pumps are for deep well pumping; they are double-gearred and double-

braced. The two pistons in a single working barrel are operated by balanced pump rods of equal weight. One is solid and the other is hollow. Each is attached to a yoke having an upper and lower roller. Cams rotating against these rollers move the yokes and pump rods up and down uniformly. The cams are such that before one stops lifting, the other takes up the load, thus causing more continuous movement. No check valve is required at the bottom of the pump cylinder to keep the water from dropping back because it is kept moving continuously instead of in spurts.

Manufacturer's Data:

Barrel dia.: 10 - 14"
Length: 80"
Displacements: 11.89 - 23.85 gal.per.rev.
Max. lift.: 200 - 400'

542.

Trade Name: Luitwieler Non-Pulsating Pumping Engine for Deep-Well Pumping
- Heavy Duty Service

Manufacturer: The Luitwieler Corporation, Rochester, New York

Use and Outstanding Characteristics:

This type is a deep-well pump which can be driven by motor, gasoline, oil, or steam engine. It requires no check valve at the bottom of the pump cylinder to prevent water from dropping back due to the fact that the flow of water is continuous due to the fact that there are two piston rods, one of which takes up the load before the other is relieved of it.

Manufacturer's Data:

Inside dia. of pumping barrels: 8 - 12"
Length: 80"
Displacement: 7.22 - 16.48 gal.per rev.
Max. lift: 175 - 400'

543.

Trade Name: Luitwieler Silent Chain Drive Deep Well Pump

Manufacturer: The Luitwieler Corporation, Rochester, New York

Use and Outstanding Characteristics:

This type of deep-well pump has a cast iron frame and an alloy steel shaft. The cast iron base is provided with a cast iron cut reduction gear, the whole unit being self-contained. Types are available for chain drive. The cylinder is made of cold drawn brass any specified number of inches in diameter. The pistons are made of manganese bronze and of two types: single-seated or non-slip type in which hollow rods are open for surge and the double seated type in which the rods are not open.

Manufacturer's Data:

Inside diameters: 2.75 - 6"
Stroke: 10"
Max. speeds: 35 - 45 strokes per min.
Capacities: 22 - 95 g.p.m.
Max. H.P.: 4

544.

Trade Name: Luitwieler Non-Pulsating Automatic Deep Well Pump

Manufacturer: The Luitwieler Corporation, Rochester, New York

Use and Outstanding Characteristics:

This type has a cast iron base for a cut reduction gear, the whole unit being self-contained. For chain drives a motor base with stretcher rods for adjustment is provided. The cylinder is of drawn brass and the pistons are made of manganese bronze. They come in the single-seated and double-seated type.

Manufacturer's Data:

Inside cylinder dia.: 3.75 - 9"
Stroke: 15"
Max. r.p.m.: 39 - 32
Displacement: 52.65 - 258.24 g.p.m.
Max. H.P.: 10

545.

Trade Name: Luzerne Hard Rubber Centrifugal Pumps

Manufacturer: Luzerne Rubber Co., Trenton, New Jersey

Model: Type A

Use and Outstanding Characteristics:

This is an open impeller, single stage, volute type centrifugal pump made of hard rubber with a porcelain faced steel shaft and stuffingbox. It is intended for handling chemicals.

Manufacturer's Data:

Capacities up to 162 g.p.m.
Heads up to 40 p.s.i.

546.

Trade Name: Luzerne Hard Rubber Centrifugal Pumps

Manufacturer: Luzerne Rubber Co., Trenton, New Jersey

Model: Type B

Use and Outstanding Characteristics:

This is a closed impeller, single stage, volute centrifugal pump made of hard rubber and with porcelain lined stuffingbox and shaft. It is intended for use in chemical plants.

Manufacturer's Data:

Capacities up to 148 g.p.m.
Heads up to 28 p.s.i.

547.

Trade Name: Marlow Sludge Pumps

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This general type may be used in disposal plants to remove sludge from settling tank hoppers and also to transfer material from digestion tanks to sludge beds. They are useful industrially in handling such wastes as lime putty, packing plant refuse, and tannery fleshings. The pumps come with either 1, 2, or 3 plungers. They operate by electric motors with vari-drive motors recommended because the capacity can be quickly changed by this means.

Manufacturer's Data: (Complete in reference)

	Simplex	Duplex	Triplex	Quadruplex
Standard g.p.m.	3150	6300	9450	12,600
Max. g.p.m.	4200	8400	12600	16,800
Max. suction lift	20'	20'	20'	20'
Max. discharge head	40'	40'	40'	special
Motor H.P.	3	5	7 $\frac{1}{4}$	10

This general make of pump is classified according to several series each of which will be listed here. In general these pumps are self-priming and use a method of doing this known as "diffuser priming". If operation is interrupted, no further priming is necessary to resume pumping.

548.

Trade Name: Marlow Self-Priming Centrifugal Pump

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Model: 12 Series

Use and Outstanding Characteristics:

Light, compact, and portable; primes itself automatically on lifts up to 25', therefore carries no auxiliary priming device. This series comes in either three or six van impellers. The 3-van impeller type is recommended for general service where the liquid pumped may contain trash or pebbles and the 6-impeller variety develops best efficiency in use with clear liquids. Specific uses include pier holes and general drainage, drying excavations, construction water supply, irrigation, stock water supply, bilge, marine washing down, and fire protection. Runs on gasoline engine.

Manufacturer's Data:

Rated capacity: 50 g.p.m.

Engine H.P.: 1 $\frac{1}{2}$ @ 3000 r.p.m.

549.

Trade Name: Marlow Self-Priming Centrifugal Pump

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Model: 22 Series

Use and Outstanding Characteristics:

Can be carried by two persons. For general use with contractors, utility crews, emergency squad, and farmers. Uses gasoline engine.

Manufacturer's Data:

2" suction and discharge
7000 g.p.h.
Engine H.P.: 3

550.

Trade Name: Marlow Self-Priming Centrifugal Pump

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Model: 25 Series

Use and Outstanding Characteristics:

Has an open type impeller in order to handle trash-laden muddy water without clogging. Best used for moderate size pumping jobs on bridge piers, foundations, excavations, well points and general contracting use. This unit is mounted on a push-cart style wheel mounting and may be had on a skid type mounting.

Manufacturer's Data:

Rated capacity: AGC - 10,000 g.p.h.
Max. solid handled: $\frac{1}{2}$ "
Engine H.P.: 6

551.

Trade Name: Marlow Self-Priming Centrifugal Pump, 23 Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This type is a base mounted model that can be carried by two men. It is useful for stand-by or emergency use. It can be used by public utility crews, general contractors, strip mine operators, barge crews, and general field men. It is self-priming for suction lifts to 25'. Pumps in this series are made of either cast iron or aluminum construction with a skid type base or a push cart wheel mounting. The pump is powered by a model AKS Wisconsin gasoline engine which has an adjustable governor.

Manufacturer's Data:

Heads: To 60' (including friction)
Max. solid handled: 3/8"

552.

Trade Name: Marlow Self-Priming Centrifugal Pumps, 34 Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This type is not too large to perform a dewatering job, but yet is adequate to handle all but heavy-duty tasks. It is self priming on suction lifts to 25'. Since it is light, compact, and mobile, it is recommended for many types of construction, utility, marine, and industrial use. It is self-cleaning and not subject to clogging or jamming and does not require any clean out holes. It comes in four standard models, of which the tank, impeller, and fittings are the same on each, but the skid base or cart mountings differ.

Manufacturer's Data:

Capacity: To 250 g.p.m.
Head: To 70'

553.

Trade Name: Marlow Self-Priming Centrifugal Pumps, 38 Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

The types of this series are best used by contractors who want a rugged medium size pump. It has a long-life seal, high suction inlet, a suction check valve to prevent the loss of priming water during shut-down periods, and a trash type open impeller. It does not waste power by recirculation because it is primed automatically by the diffuser method. It is self-cleaning and of the non-clogging and non-jamming type. It requires no clean-out hole.

Manufacturer's Data:

Capacity: 20,000 g.p.h.
3" suction and discharge
Heads: To 80'

554.

Trade Name: Marlow Self-Priming Centrifugal Pumps, Model 30-M

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This type provides an easily portable pump with large pumping capacity for use in emergencies. It has air-cooled power and has a strainer as standard equipment. The features of the unit are the hand-hole cleanout in the suction passage, a trash type impeller, and a self-cleaning casing. It is powered by a 4-cylinder air-cooled model VF-4 Wisconsin Engine.

Manufacturer's Data:

4" suction and discharge
Capacity: 30,000 g.p.h.
Heads: 110' (total)

555.

Trade Name: Marlow Self-Priming Centrifugal Pumps, 421 Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

These models are designed for high capacity and stamina. The pump tank is made of welded steel. The automatic self-priming is accomplished by the diffuser method which involves no auxiliary priming mechanisms which can weaken or require adjustment. Standard models are wheel-mounted and driven by 4-cycle gasoline engines. The services for which they may be successfully used include general construction dewatering, municipal maintenance and building work, emergency bypassing of raw sewerage around clogged sections, water supply, irrigation, and ship salvage.

Manufacturer's Data:

4" suction and discharge
Capacity: 40,000 g.p.h. (AGC rating)
Total head: To 110'

556.

Trade Name: Marlow Self-Priming Centrifugal Pumps

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

These pumps are best used for dewatering caissons, diverting streams, back-filling, puddling, by-passing plugged sewer lines, supplying water for condensers and transformers, irrigation work, and ship salvage. They are self-priming on suction lifts up to 25'. The shaft is sealed with a packing gland over a wear-resistant stainless steel sleeve. No auxiliary priming mechanisms are necessary because automatic priming is obtained by the diffuser method. Drive is obtained by gasoline engine and it is mounted on a four-wheel chassis or a skid type frame.

Manufacturer's Data:

6" suction and discharge
Capacity: 90,000 g.p.h. (AGC rating)
Heads: To 100'

557.

Trade Name: Marlow Self-Priming Centrifugal Pumps, 861 Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This type is designed for continuous heavy-duty pumping with no attention other than refueling and lubrication. No auxiliary priming mechanism is necessary because automatic priming is taken care of by the diffuser method. The power is supplied by either gasoline or diesel engines. Recommendations for the pumps' service include heavy-duty construction service, irrigation, pumping, rapid transfer and dewatering operations. They are also available with a special trash-type impeller for salvage work where cargo such as coal can be removed by pumping from a sunken barge.

Manufacturer's Data:

8" suction and discharge
Capacity: 125,000 g.p.h. (AGC rating)
Total head: To 110'

558.

Trade Name: Marlow Self-Priming Centrifugal Pumps, 1000 Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This type will pass large amounts of trash including solids to 2 $\frac{1}{2}$ " dia. They find best use in big construction jobs, irrigation, salvage work, and marine dewatering. Other work handled properly by the series varies from handling the condensing water to power plants to pumping raw sewerage from barges. Automatic diffuser type self-priming is assured on suction lifts up to 25'. Drive is obtained through gasoline or diesel engines. Units are mounted on four-wheel chassis or in lifting frames.

Manufacturer's Data:

10" suction and discharge
Capacities: To 240,000 g.p.h.
Heads: To 80'

559.

Trade Name: Marlow High-Pressure Self-Priming Centrifugal Pumps, 22H Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This type can be carried by two men or pushed on its two-wheel carriage by one man. It will push 50 g.p.m. through irrigation pipe sprinklers, supply water barns, furnish a concentrated stream to wash down dirt-clogged equipment, clean boilers, and provide quick fire protection for a house or other buildings. The unit is also favored for transfer of vaporous liquids because no gas can collect inside to bind it and because it is mobile enough to be moved. Automatic diffuser priming eliminates other mechanical priming means. Power is taken from a Wisconsin AKS 5 H.P. engine.

Manufacturer's Data:

50 g.p.m. @ 60 lbs.
2" suction and discharge
Suction lift: 25' at sea level
Heads: To 78'

560.

Trade Name: Marlow High Pressure Self-Priming Centrifugal Pumps, 27H Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

These units are used for fire-fighting, for small farm and grove sprinkler systems, for sinking wellpoints or fishnet holes, for general water supply to camps and construction sights, for cleaning mud-caked equipment, and for transferring volatile liquids. Self-priming by diffuser method is automatic on suction lifts to 25'. Due to this method of priming there is no recirculation in the pump. Power is by a 4-cycle Briggs and Stratton **ZZP** engine.

Manufacturer's Data:

2 and 3" suction and discharge
Capacity: To 170 g.p.m.
Heads: To 220'

561.

Trade Name: Marlow High-Pressure Self-Priming Centrifugal Pumps, 322H Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This type is made to handle large volumes of liquid at high pressures. It is well adapted to pipeline service, commercial farm sprinklers, high-speed transfer work, stand-by fire protection, jetting, and pumping volatile liquids. Since it is diffuser self-primed, it contains no ports, valves, by-passes, or auxiliary priming mechanisms and therefore is free from recirculation and the troubles which go with it. It is powered by a 4-cycle Wisconsin VF₄ engine and is mounted on either a skid or wheel type chassis.

Manufacturer's Data:

3" suction and discharge
Capacities: To 270 g.p.m.
Heads: To 360'
Suction lift: 25' at sea level

GENERAL INFORMATION CONCERNING MARLOW TYPE "E" INDUSTRIAL PUMPS
Electric and Belt-Powered Centrifugals

Marlow Type "E" pumps handle a vast range of liquids: clear water, coolants, lubricating oils, non-corrosive chemical materials, vaporous fluids, and refuse-laden liquids. Volatile materials can be passed without the suction vapor locking.

There are no operating parts other than the regular centrifugal. Self-priming is obtained through a very simple action which is due to the pump design itself. When first put in operation the tank is filled with liquid through a filler plug at the top of the pump. Thereafter the tank retains the liquid even when the pumping stops.

Surrounding the impeller within the tank is a stationary diffuser. When the impeller starts to revolve, this diffuser literally transfers air from the suction line and diffuses it through the liquid in the tank. The suction line is thus emptied of air and the pumping begins. This type of priming takes less than a minute.

No solids can settle and accumulate in the tank so that the units are self-cleaning. The pump and motor are mounted on a steel frame to provide rigid alignment and support. They are fitted for either motor or belt drive.

562.

Trade Name: Marlow Type "E" Industrial Pumps, 12EL Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

(General type information precedes). Pumps in this series are used to pump cleaning fluids, dirty water, and mild chemical solutions. They are useful for cleaning sumps, draining vats, drawing off from filter presses, and dewatering cellars and draining small excavations. The impeller is the open "dirty-water" type. The motor is of such small H.P. that it can be plugged into any lighting circuit.

Manufacturer's Data:

Heads: To 27'

Capacities: To 45 g.p.m.
Motor H.P.: $\frac{1}{2}$
 $1\frac{1}{2}$ " discharge
Max. solid handles: $\frac{1}{4}$ "

563.

Trade Name: Marlow Type "E" Industrial Pumps, 25EL Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

(General Type Information Precedes.) Type 25EL are utility pumps equipped with trash-type impellers which handle large quantities of sand, dirt, chips, and other solids. Priming is automatic on suction lifts up to 25'. Uses for which these models are well adapted include general utility pumping, transfer pumping of volatile liquids, pumping from underground tanks, unloading tank cars, drying sumps, dewatering, construction jobs, and farm irrigation and water supply.

Manufacturer's Data:

Heads: To 60'
Capacities: To 185 g.p.m. at 10' suction
Motor H.P.: 2 - 3
Max. solid handled: $\frac{3}{8}$ "

564.

Trade Name: Marlow Type "E" Industrial Pumps, 27EL Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

(General type information precedes.) This type has best use where motor-driven self-priming pumps are best used. The impeller is side suction closed type. Automatic self-priming is available on suction lifts up to 25'. These models are well suited for pumping from underground tanks, unloading tank cars, transfer pumping of volatile liquids, drawing off from filter presses, emergency water supply, and agricultural water supply supplied by streams and shallow wells.

Manufacturer's Data:

Head: To 180'
Capacity: To 95 g.p.m.
Motor H.P.: $7\frac{1}{2}$
Max. solid handled: $\frac{5}{16}$ "

565.

Trade Name: Marlow Type "E" Industrial Pumps, 37EL Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

(General type information precedes.) This type is adapted to use with pulpy, lumpy, or high viscosity liquids as well as large volumes of clear liquids due to the large inlet and discharge openings. Pulp and paper mills and canning and chemical industries use them satisfactorily. Self-priming is on guaranteed on suction lifts to 25'.

Manufacturer's Data:

Heads: To 55'
Capacity: To 220 g.p.m.
Motor H.P.: 2, 3
Max. solid handled: 3/8"
3" discharge

566.

Trade Name: Marlow Type "E" Industrial Pumps, 37EL Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

(General type information precedes.) These pumps are guaranteed to self-prime on suction lifts to 25'. They have side suction closed impellers. Uses include pumping from underground tanks, unloading tank cars, transfer pumping of volatile liquids, drawing off from filter presses, emergency water supply, and agricultural water systems supplied by streams and shallow wells.

Manufacturer's Data:

3" discharge
Heads: To 185'
Capacity: To 168 g.p.m.
Motor H.P.: 10
Max. solid handled: 5/16"

567.

Trade Name: Marlow Type "E" Industrial Pumps, Models 38EL and 417EL

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

(General type information precedes.) This type is used in factories, municipal installations, construction jobs, sand and gravel pits, paper mills, and sewerage treatment plants. It will handle screened sewerage as easily as clean water. The impeller is open type.

Manufacturer's Data:

3 and 4" discharge
Heads: To 70'
Capacities: To 275' and 475'
Motor H.P.: 5 and 7½
Max. solid handled: 1"

568.

Trade Name: Marlow Type "E" Industrial Pumps, 322 HEL Series

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

(General type information precedes.) This type has automatic self-priming on suction lifts to 25'. It was specifically designed to develop high pressures without a high speed motor. Best use for the units include fire protection where municipal water supply is too distant or inadequate, high-speed transfer pumping, irrigation, and pipe line service.

Manufacturer's Data:

3" discharge
Heads: To 110'
Capacities: To 270 g.p.m.
Motor H.P.: 10
Max. solid handled: ¼"

569.

Trade Name: Marlow Type "E" Industrial Pumps, Models 421EL, 641EL, 861EL, and 1080EL

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

(General type information precedes.) The larger sizes of this type are used for dry dock pumping, ship salvage, and irrigation work. All sizes have

large air handling capacities and high vacuums. They are designed to pass trash and solids in liquids as readily as clear water. The 4, 6, and 8" sizes have 4-vane high head impellers, while the 10" sizes have either 3 or 6-vane impellers. The 3-vane impeller permits handling of larger solids with some loss in head capacity.

Manufacturer's Data:

4, 6, 8, 10" discharges
Heads: To 140'
Capacities: To 3640 g.p.m.
Motor H.P.: 10 - 60

570.

Trade Name: "Marlow Mud Hog" Diaphragm Pumps, 3 - 4" Single Sizes

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

Use of these single units includes handling heavy, messy wastes, and liquids which are filled with sticks, stones, and other trash. They are generally used in factories, on construction jobs, and for sewerage disposal work. Operation is by means of a steel walking beam. The units are furnished either mounted on wheels or with a skid base. Power is by means of a gasoline engine.

Manufacturer's Data:

3 - 4" discharges
Capacities: 3000 and 6000 g.p.h.

571.

Trade Name: "Marlow Mud Hog" Diaphragm Pumps, 4" Double

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

This type is intended for heavy pumping of heavy waste-laden liquids. It sucks and discharges simultaneously with each stroke tending to give smoother operation. It pumps either sewerage or full capacity with no adjustment or change of speed. Power is by a gasoline engine and mounting is either wheel or skid base type.

Manufacturer's Data:

Capacity: 9000 g.p.h.
4" discharge
Heads: 40' above pump or 100' along horizontal
Suction: To 25'

572.

Trade Name: "Marlow Mud Hog" Diaphragm Pumps, Electric Models

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

These diaphragm pumps, since they handle heavy wastes, are used in industries for transferring viscous and clotted compounds and for removing trash laden liquids and thick residues. Factories that put them to use include packing houses, canneries, tanneries, and chemical plants. Since most plants prefer electric drive, the units are supplied for these purposes with such drive.

Manufacturer's data:

3" single: 3000 g.p.h.
4" single: 6000 g.p.h.
4" double: 9000 g.p.h.
Heads: To 40'
Suction: To 25'

573.

Trade Name: Marlow Walking Beam Plunger Pumps

Manufacturer: Marlow Pumps, Ridgewood, New Jersey

Use and Outstanding Characteristics:

These pumps were developed to handle heavy wastes and debris-filled liquids. They will handle viscous and clotted compounds, thick residues, sludge, slime, and solutions which contain fleshlings, skin, and hair. Use such as this is in packing plants and tanneries. Power is supplied by either an electric motor or gasoline engine.

Manufacturer's Data:

Heads: To 40'
Capacities: To 90 g.p.m.
Motor H.P.: 5 - 55
Suction: 20'

574.

Trade Name: Manistee Single-Stage Double-Suction Pumps

Manufacturer: Manistee Iron Works Company

Model: Type V

Use and Outstanding Characteristics:

These centrifugal pumps are single-stage, double-suction, volute types used for general service or water supply.

Manufacturer's Data:

Capacities: From 75 to 3100 g.p.m.
Heads: Up to 250 ft.

575.

Trade Name: Manistee Four-Stage Centrifugal Pumps

Manufacturer: Manistee Iron Works Company

Model: Type H

Use and Outstanding Characteristics:

These are four-stage centrifugal pumps of the volute form for general service.

Manufacturer's Data:

Capacities: From 50 to 3500 g.p.m.
Heads: Up to 1200 ft.

576.

Trade Name: Shallow Well Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Series 420

Use and Outstanding Characteristics:

These shallow well pumps are single cylinder plunger pumps, motor driven, and intended for water supply. By reversing suction and discharge valves in the water box, suction may be reversed. It is of quite simple construction.

Manufacturer's Data:

Capacities: From 250 to 650 g.p.h.
Pressures of 20 - 40 p.s.i.

577.

Trade Name: Shallow Well Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Series 480

Use and Outstanding Characteristics:

These are gearless (V-belt drive) duplex, double-acting piston pattern pumps designed for general water service for industrial plants, creameries, summer resorts, large country estates, cheese factories, etc. It can be furnished with either electric motor or gasoline engine.

Manufacturer's Data:

Capacities: Up to 3000 g.p.h.
Heads: Up to 140 p.s.i.

578.

Trade Name: Deep Well Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Series 400 and 600

Use and Outstanding Characteristics:

These are pumping heads for reciprocating deep-well pumps. The complete power mechanism is removable from the main housing without disturbing motor, wiring or piping. It has a V-belt drive.

Manufacturer's Data:

Capacities from 160 to 550 g.p.h.

579.

Trade Name: Deep Well Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Series 416 - 12

Use and Outstanding Characteristics:

This is a large, heavy-duty, automatically oiled, deep well pumping head with straight line motion. It has an adjustable stroke of 8", 10" or 12".

Manufacturer's Data:

Capacities up to 30 g.p.m.

580.

Trade Name: Hydro-Jet Deep Well Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Use and Outstanding Characteristics:

These units consist of a vertical single-stage volute centrifugal pump above ground in connection with a booster jet at the water level. It is available as a single or two-pipe installation. As a single, the well cylinder acts as a second pipe.

Manufacturer's Data:

Well depths to 120 ft.
Capacities to 1500 g.p.h.

581.

Trade Name: Pitcher Spout Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 2

Use and Outstanding Characteristics:

These are open-spout hand pumps for shallow wells, made of iron with leather check valves.

Manufacturer's Data:

Sizes: $1\frac{1}{4}$ to 2" (suction)

582.

Trade Name: "Tru-San" Pitcher Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 2 - T

Use and Outstanding Characteristics:

These hand-operated pitcher pumps have a closed spout and a layout type priming plug which locks into position making the pumps sanitary.

Manufacturer's Data:

Suction: $1\frac{1}{2}$ "

583.

Trade Name: Revolving Top Cistern Pump

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 1

Use and Outstanding Characteristics:

This is a revolving top, hand-operated cistern pump of close-grained cast iron and a leather check valve.

Manufacturer's Data:

Suction: $1\frac{1}{4}$ " and $1\frac{1}{2}$ "

584.

Trade Name: House Force Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Figs. 3, 52, and 53

Use and Outstanding Characteristics:

These are hand-operated house force pumps. Fig. 3 has a closed spout cast integral with the head; Fig. 52 has an iron spout standard; and Fig. 53 has a brass ground key faucet spout standard. It has a trip valve for draining.

Manufacturer's Data:

Suction: $1\frac{1}{4}$ "

585.

Trade Name: Brass House Force Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 73

Use and Outstanding Characteristics:

These are hand-operated, heavy duty force pumps for shallow well service. They have seamless brass tubing cylinders and brass piston rods.

Manufacturer's Data:

Suction: $1\frac{1}{4}$ "

586.

Trade Name: Brass Gally Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 74

Use and Outstanding Characteristics:

These are compact, heavy-duty, hand-operated pumps for aboard ship installation arranged for wall or bulkhead mounting. They have seamless brass tubing cylinders and brass piston rods.

587.

Trade Name: Tank Force Pump

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 87-D

Use and Outstanding Characteristics:

These are hand-operated, double-acting, force pumps suitable for pump jack operation if desired.

Manufacturer's Data:

Suction: 2"

588.

Trade Name: Double-Acting Force Pump

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Figs. 46 and 46S

Use and Outstanding Characteristics:

These are hand-operated, brass lined, double-acting, force pumps equipped with red brass valves and valve seats ground to fit. Because cylinder and plunger are below suction and discharge valves, they are always primed ready for service.

Manufacturer's Data:

Suction: $1\frac{1}{4}$ "

589.

Trade Name: Lift Pump Standards

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Figs. 705 and 706

Use and Outstanding Characteristics:

These are hand-operated lift pumps suitable for wells to 50 ft.

Fig. 706 has a sanitary (closed) top.

Manufacturer's Data:

Suction: $1\frac{1}{4}$ "

590.

Trade Name: Windmill Lift Pump Standard

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Figs. 710 and 712

Use and Outstanding Characteristics:

These are hand, windmill, or pump jack operated lift pumps. Fig. 712 is extra heavy with a globe type reservoir and is suitable for almost any depth. Fig. 710 is suitable for depths to 150 ft.

Manufacturer's Data:

Suction: 2"
Strok of 6 or 10"

591.

Trade Name: Shallow Well Set Length Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 705SL and 706SL

Use and Outstanding Characteristics:

These are four-foot set length shallow well, hand-operated pumps for medium duty. Fig. 706SL has a sanitary top and Fig. 705SL may be operated by windmill or pump jack as well as by hand.

Manufacturer's Data:

Suction: $1\frac{1}{4}$ "

592.

Trade Name: Adjustable Set Length Lift Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Figs. 704SL and 796SL

Use and Outstanding Characteristics:

They are 4-foot adjustable fixed length, hand-operated pumps with sanitary tops for shallow wells. Fig. 796SL is a heavy-duty unit.

Manufacturer's Data:

Suction: $1\frac{1}{4}$ " and 2"

593.

Trade Name: "Jiffy Fix" Underground Valve Force Pump

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 768

Use and Outstanding Characteristics:

These are underground valve force pumps operated by hand, windmill, or pump jack. They are not affected by freezing weather and complete valve unit may be withdrawn with removal of two stud bolts.

594.

Trade Name: Underground Valve Windmill Force Pumps

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Figs. 70SV and 71SV

Use and Outstanding Characteristics:

This is an adjustable standard force pump, suitable for use with dug, drilled, or tubular wells. It may be operated by hand, windmill, or pump jack and has a 6" or 10" adjustable stroke. They have the McDonald speedy control valve and Fig. 71SV has the "Jiffy-Fix" feature allowing easy withdrawal of the valves.

595.

Trade Name: Windmill Force Pump Standards

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 716

Use and Outstanding Characteristics:

These are force pump standards with varying types of spouts and may be operated by hand, windmill, or pump jack. One model has a rack and pinion drive.

Manufacturer's Data:

Suction: 2"

596.

Trade Name: Marine Hand Bilge Pump

Manufacturer: A. Y. McDonald Mfg. Co.

Model: Fig. 76

Use and Outstanding Characteristics:

This light-weight, marine hand bilge pump is of brass construction suitable for use in fresh or sea water in small craft.

597.

Trade Name: Milton Roy Pumps

Manufacturer: Milton Roy Company

Use and Outstanding Characteristics:

These are unique plunger pumps, in simplex or duplex form, because of their valve design and their volume control. The valves are double-ball type arranged in series, are non-clogging, self-cleaning, and give capacities practically that of the plunger displacement. They meter the volume vary accurately and practically eliminate wire drawing of the valve seats. Each valve is engineered for a specific job as desired. Stroke adjustment is possible by one of three means: Standard adjustment consists of moving the trunnion bolt while the pump is inoperative; Screw adjustment consists of a screw adjustment of the trunnion position while the pump is inoperative; Micro adjustment affords very precise control of stroke by means of a hand wheel, while the pump is operating -- a vernier dial permits setting to within 1/750 of the stroke (full length). These

units are also available with an automatic electronic speed control for volume regulation. A liquid seal to provide a complete seal for the plunger is available if it is desired to prevent poisonous vapors in the the surrounding atmosphere. The automatic control principle can be applied to any variables that can be measured to set a potentiometer for pump speed control (i.e., temperature, pressure, conductivity, pH, liquid level.) These pumps are employed in industries like chemical, petroleum, water, sewage, textiles, foods, paper, paints, pharmaceuticals, and high-pressure testing. They will handle the following liquids: acetaldehyde, acetic acid (pure), acetic anhydride, acetone, alcohols, aluminum chloride, aluminum hydroxide, aluminum sulfate, ammonia (anhydrous liquid), ammonium bicarbonate, ammonium carbonate, ammonium chloride, ammonium hydroxide, ammonium phosphate (Di and Tri), ammonium sulfate, amyl acetate, aniline-aniline oil, aniline dyes, barium chloride, barium hydroxide, benzene or benzol, benzoic acid, boric acid, bromine, buttermilk, butyric acid, calcium chloride, calcium hydroxide, calcium hypochlorite, calcium sulphate, calgon, carbon disulphide, carbonic acid, carbon tetrachloride (anhydrous), castor oil, chinawood oil, chlorine (water solutions), chloroacetic acid, chloroform, chromic acid, citric acid, copper chloride, copper sulphate, cottonseed oils, cresols, cresylic acid, dichloroethane, diethylene glycol, doctor solutions, ethers, ethyl chloride, ethylene glycol, fatty acids, ferric chloride, ferric sulphate, ferrous chloride, ferrous sulphate, formaldehyde, formic acid, fruit juices, furfural, gelatin, glucose, glue, glycerine, hydrobromic acid, hydrochloric acid, hydrocyanic acid, hydrofluoric acid, hydrofluosilicic acid, hydrogen peroxide, hydrogen sulphide solutions, ink, iodoform, ketchup, lacquers, lactic acid, linseed oil, magnesium chloride, magnesium sulfate, maleic acid, malic acid, mayonnaise, melamine resins, mercuric chloride, mercury, methyl alcohol, methyl chloride, milk, molasses, mustard, naphthalene, nickel chloride, nickel sulfate, nitric acid, nitrobenzene, oleum, oils (vegetable), oxalic acid, parez (607), petroleum (crude and refined), phenol, phosphoric acid, picric acid, potassium bromide, potassium carbonate, potassium chloride, potassium cyanide, potassium hydroxide, potassium permanganate, potassium phosphate, potassium

sulphate, propylene dichloride, pyrogalllic acid, soap solutions, soda ash, sodium chloride, sodium cyanide, sodium hydroxide, sodium hypochlorite, sodium metaphosphate, sodium nitrate, sodium perborate, sodium peroxide, sodium phosphate (mona, di, and tri), sodium polyphosphate, sodium silicate, sodium sulfate, sodium sulfide, sodium sulphite, sodium tetroborate (borax), sodium thiosulphate, starch, sugar solutions, sulphur (molten), sulphur chloride, sulphur dioxide (anhydrous liquid), sulphuric acid, sulphurous acid, tannic acid, tartaric acid, toluene (toluol), trichloroethylene, turpentine, varnish, vegetable juices, vinegars, water (distilled or deionized), water, whiskey and wines, zinc chloride, and zinc sulphate. These pumps handle slurries as well as any other liquids.

Manufacturer's Data:

Capacities from 1 pint/hr. to 2600 gal./hr.
Pressures up to 20,000 p.s.i.

Morris pumps will handle clear or white water, thick stock, thin stock, brine, calcium acid sulphate, carbonate of soda, caustic carbonate of soda, caustic potash, caustic soda, caustic sulphide, cellulose, lime water, milk of lime, salt brine, soda ash, sulphate of alumina, sulphide of sodium, sulphurous acid, and sulphurous acid gaseous.

598.

Trade Name: Morris Heavy-Duty Lined Dredge Pump

Manufacturer: Morris Machine Works

Use and Outstanding Characteristics:

These dredge pumps are single-stage, volute centrifugal pumps designed to handle heavy sand and gravel and for operation against high heads. The shell liner is replaceable and is a steel alloy casting.

Manufacturer's Data:

Heads: Up to 150 ft.
Sizes: From 6" to 15"

599.

Trade Name: Morris Heavy-Duty Dredging Pump

Manufacturer: Morris Machine Works

Model: Type F

Use and Outstanding Characteristics:

This is a single-stage volute centrifugal pump for handling highly abrasive mixtures against high heads. Suitable for handling sand or gravel or for general dredging service against high head.

Manufacturer's Data:

Heads: Up to 150 ft.

Size: From 4" to 15"

600.

Trade Name: Morris High Speed Non-Clogging Centrifugal Pumps

Manufacturer: Morris Machine Works

Use and Outstanding Characteristics:

The outstanding characteristic of this single-stage volute type centrifugal pump is its ability to handle pumps of high consistency at high speeds without loss of efficiency. It is intended for sewage and industrial services.

Manufacturer's Data:

Heads: Up to 100 ft.

Sizes: 3 to 12"

601.

Trade Name: Morris Double-Suction High-Speed Pumps

Manufacturer: Morris Machine Works

Use and Outstanding Characteristics:

These single-stage, double-suction volute centrifugal pumps are adapted for municipal water supply, factory service, chemical process work, and general pumping duty. They are direct connected to high-speed motors.

Manufacturer's Data:

Capacities: From 50 to 800 g.p.m.

Heads: From 100 to 250 ft.

602.

Trade Name: Morris Side-Suction Pumps

Manufacturer: Morris Machine Works

Use and Outstanding Characteristics:

Morris single-stage side-suction volute pumps are designed for general service where a sturdy, inexpensive pump is required to operate at slow speeds and to handle clear water, abrasives, or pulpy mixtures. Used for dewatering, white water and light stock handling, and chemical plants.

Manufacturer's Data:

Capacities from 20 to 11,800 g.p.m.
Heads up to 120 ft.

603.

Trade Name: Morris Straightflo Pumps

Manufacturer: Marris Machine Works

Use and Outstanding Characteristics:

Morris Straightflo pumps are axial flow propellor pumps for handling clear liquids containing rags, sticks, or stones or other refuse. Efficiencies over 90% are obtainable.

Manufacturer's Data:

Capacities from 1500 to 25000 g.p.m.
Heads up to 40 ft.

604.

Trade Name: Morris Multi-Stage Pumps

Manufacturer: Morris Machine Works

Use and Outstanding Characteristics:

Morris Machine Works builds multi-stage volute pumps for any pressure service desired.

605.

Trade Name: Morris Type K Sand Pump

Manufacturer: Morris Machine Works

Use and Outstanding Characteristics:

This is a simple, high efficiency, single-stage, volute sand pump. Its construction permits the use of any alloy for contacting parts.

Manufacturer's Data:

Capacities from 14 to 56 cu. yds./hr.
Heads up to 100 ft.

606.

Trade Name: Medium Duty Dredging Pumps

Manufacturer: Morris Machine Works

Model: Type M

Use and Outstanding Characteristics:

This is a single-stage volute centrifugal pump intended for dredging service. It has a closed impeller.

Manufacturer's Data:

Heads to 100 ft.
Capacities from 14 to 195 cu. yds./hr.

607.

Trade Name: Morris Stock Pump

Manufacturer: Morris Machine Works

Model: Type ST-P

Use and Outstanding Characteristics:

These single-stage volute pumps are used for handling heavy paper machine feed stock and raw waste paper stock.

Manufacturer's Data:

Capacities from 15 to 200 tons of paper per day

608.

Trade Name: Slurry Pumps

Manufacturer: Morris Machine Works

Model: Type R

Use and Outstanding Characteristics:

This is a single-stage centrifugal pump for handling acid slurries and sludges, caustic liquors, milk of lime; also slurries containing soda ash, ore concentrates, tailings, slag, residue from filters and clarifiers, coal, silt and washery solids. Also for handling cement and glass sand slurries. The stuffing box is subject only to suction pressure; all internal study and bolts are eliminated; nozzles can be swivelled; shells can be made of any material; and it operates equally well under positive or vacuum head. When used as a booster pump it can be connected directly into the line, eliminating the need for a suction hopper.

Manufacturer's Data:

Heads up to 225 ft.
Capacities up to 1800 g.p.m.

609.

Trade Name: Nash Vacuum Pumps

Manufacturer: Nash Engineering Co.

Model: Types MD and AL

Use and Outstanding Characteristics:

Nash vacuum pumps are rotary units with one moving part, the rotor.

A non-pulsating vacuum is secured with it without equalizing tanks; a high vacuum is available (27" Hg. for a single stage); liquid, even in slugs, does not harm the pump; hot gases and saturated vapors may be handled to unusual advantage because of the condensing effect produced by the liquid seal; they are used in connection with condensers on vacuum pans and deodorizers in dairies and condensed milk plants, on candy and sugar evaporation, on stills and on solvent evaporators; solvent recovery may be benefitted by the pump by circulating a suitable liquid as the seal, from which the solvent, normally lost, is recovered; no internal lubrication is required. The pump consists of a round, multi-vane rotor revolving

freely in an elliptical casing partially filled with liquid. The liquid is alternately speeded up and slowed by the elliptical casing and since it is practically incompressible, creates air pockets at the enlarged sections. By placing the ports at the narrow sections, air is drawn in and carried around and forced out with the liquid maintaining an efficient seal. They can be had in one or two stages.

610.

Trade Name: Jennings Manifold Type Vacuum Heating Pump

Manufacturer: Nash Engineering Co.

Use and Outstanding Characteristics:

The Jennings pump separates the air from the condensate before pumping and the full rated capacities of both air and water are available all the time. The two are completely independent of each other. It has automatic control.

Manufacturer's Data:

Capacities from 2500 to 300,000 E.D.R.

611.

Trade Name: Jennings Vapor Turbine Vacuum Heating Pump

Manufacturer: Nash Engineering Co.

Use and Outstanding Characteristics:

These units consist of a standard Jennings vacuum heating pump which is driven by the steam from the heating system. This gives continuous operation, rather than intermittent, resulting in economy due to uniform circulation.

Manufacturer's Data:

Capacities from 4000 to 140,000 E.D.R.

612.

Trade Name: Nash Glass Pump

Manufacturer: Nash Engineering Co.

Use and Outstanding Characteristics:

The Nash pump of glass is a volute centrifugal made of pyrex for use in

chemical plants. It has an acid-proof mechanical seal and a pressure relief valve.

Manufacturer's Data:

Capacities up to 6000 g.p.h. of acid or other liquid
Heads up to 50 p.s.i.

613.

Trade Name: Jennings Centrifugal Pump

Manufacturer: Nash Engineering Co.

Use and Outstanding Characteristics:

These pumps are of single-stage, volute type centrifugal form either single or double suction, built on the close-coupled construction.

Manufacturer's Data:

Heads up to 300 ft.
Capacities up to 1900 g.p.m.

614.

Trade Name: Nathan Valveless Mechanical Locomotive Lubricator

Manufacturer: Nathan Manufacturing Company

Model: Type DV

Use and Outstanding Characteristics:

This unit consists essentially of a plunger pump operating in an oil reservoir with a plunger rotating movement opening and closing the ports.

615.

Trade Name: Mechanical Lubricator

Manufacturer: Nathan Manufacturing Company

Model: Type S

Use and Outstanding Characteristics:

This is a compact, single-feed, ratchet driven lubricator made in two sizes, especially suited for chassis application, stoker engines, and diesel power.

616.

Trade Name: "Motoair"

Manufacturer: New Jersey Machine Corporation

Use and Outstanding Characteristics:

This is a rotary vane pump mounted on the housing of the motor and operating on the same shaft as the motor. An air filter to take out the sealing oil is included. It is used for packaging machines, paper handling, liquid handling, webb guiding, laboratory vacuum or pressure, milking machines, glass tube heating, vacuum frames, stereo equipment, vacuum relays, vacuum chucking, gas furnaces, furnace blower, cleaner blower, air pistons or vises, removing dangerous dust or gases, operating air guages, simulating high altitude conditions, booster for super-chargers, conveying light sheet metal for stamping.

617.

Trade Name: Novo Pressure Pumps

Manufacturer: Novo Engine Company, Lansing, Michigan

Model: Model AV

Use and Outstanding Characteristics:

For general water supply, they may also be equipped for pumping oil s and gasoline. It is furnished with either electric drive or pulley. Moderately priced.

Manufacturer's Data:

Disp.g.p.m.: 15.7 - 51
Strokes per M: 120
pressure: 125 - 40
Head ft.: 289 - 92

618.

Trade Name: Novo Pressure Pumps

Manufacturer: Novo Engine Company, Lansing, Michigan

Model: Model DU

Use and Outstanding Characteristics:

Water supply, yetting, pipe line testing, core drills, blowing out and testing steam lines, boiler washing, gasoline and oil. Driven by gasoline engine, electric motor, pulley. Single cylinder, double acting, and "unit built". Re-

placeable brass cylinder liner and cup piston packing.

Manufacturer's Data:

Disp. g.p.m.: 25 - 46
Stroke per M: 105
pressure: 75 - 200
Head ft.: 173 - 462

619.

Trade Name: Novo Pressure Pumps

Manufacturer: Novo Engine Company, Lansing, Michigan

Model: Model DW

Use and Outstanding Characteristics:

Rugged construction and high capacity to be suitable for water supply on construction jobs, jetting piles, water for mixers and pavers, cove drills, water supply for parks, estates, golf courses, fire fighting, light oil and gasoline, testing and blowing out steam and gas lines. They are two-cylinder, double acting pumps driven by gasoline engines or electric motors.

Manufacturer's Data:

Disp. g.p.m.: 53 - 94
Strokes per M: 110
pressure: 40 - 200
Head ft.: 100 - 462

620.

Trade Name: Pronto-Prime

Manufacturer: Novo Engine Company, Lansing, Michigan

General Characteristics

Self-priming centrifugal pumps, they have a self-aligning, self-adjusting, rotating neoprene seal encased in brass. Has sight feed oiler, two tapered roller thrust bearings and impeller, pump case, and wear plate made of novite alloy metal. Have universal bases, independent pump units and easy servicing.

Model: Model L3M - 1 $\frac{1}{2}$ L

Use and Outstanding Characteristics:

Used for dewatering manholes, small excavations, barges, boats, stock

tanks, basements. Also for filling and spraying tanks, picking up pools of oil or water, sprinkling, and fire protection. Powered with 1 to $1\frac{1}{2}$ h.p. air-cooled engine.

Manufacturer's Data:

* Capacity g.p.h. (AGC rating at total head of 15' and pump 10' above water): 3000 G.P.M.
RPM: 2 and 50

* See "Pronto prime" bulletin PC-1

Model: L7M - 2G

Use and Outstanding Characteristics:

It is mounted on a wheelbarrow (pneumatic tire) base which makes it very portable for emergency jobs in supplying and removing water.

Manufacturer's Data:

* Capacity g.p.h. (AGC rating at total head of 25 ft. with pump 10' above water): 7000
RPM: 3100

* See "Pronto prime" bulletin # PC-2

Model: L10M - 2N

Use and Outstanding Characteristics:

Easily handled, used for supplying water to mixers or pavers; dewatering excavations, piers, boats, small footings and sewers; irrigation, etc. Powered with 3 to 4 h.p. air-cooled engine.

Manufacturer's Data:

* Capacity g.p.h. (AGC rating at total head of 25 ft. and pump 10 ft. above water): 10,000
RPM: 2250

* See bulletin # PC - 3

Model: L15M - 3N

Use and Outstanding Characteristics:

Since it has large clearances this pump is more suitable for handling water containing too much sediment for smaller pumps. Easily handled. It is

used for sewer, bridge, general building and pipe line work and also in jetting jobs; also as transfer and loading pump in oil fields. Powered by 4 to 5 h.p. A-C engine.

Manufacturer's Data:

* Capacity g.p.h. (AGC rating at head of 20 ft. with pump 10 ft. above water): 15000
RPM: 2200

* See bulletin # PC - 4A

Model: Model L20M - 3N

Use and Outstanding Characteristics:

Used for dewatering excavations of all kinds including manholes and conduit passages and for fire fighting, refrigeration plant, swimming pool, sewer cleaning and septic tank work. It is powered by a 5 to 6 h.p. water-cooled engine.

Manufacturer's Data:

* Capacity g.p.h. (AGC rating): 20,000
RPM: 1750

* See bulletin # PC - 5

Model: L30M - YN

Use and Outstanding Characteristics:

Used for road building work, for washing of coal, sand and gravel, for oil field jobs and for many special applications where removing, supplying, or circulating water is a problem. It is powered by a 10 to 12 h.p. water-cooled engine.

Manufacturer's Data:

* Capacity g.p.h. (AGC rating): 30,000
RPM: 1900

* See bulletin # PC - 6

Model: L40M - 4N

Use and Outstanding Characteristics:

Used for heavy dewatering jobs such as bridge footings, excavations, caissons, coffer dams, sea walls, mines, bulkheads, pier footings, manhole and

conduit passages. Also used for road building and oil field work, fire fighting, well pointing, jetting, sheet piling, swimming pools, sewer cleaning, and septic tanks. It is powered by a 20 to 25 h.p. water-cooled engine.

Manufacturer's Data:

* Capacity g.p.h. (AGC rating): 40,000
RPM: 2000

* See Bulletin # PC - 7

Model: Model L90M - 6C

Use and Outstanding Characteristics:

This is the biggest of the bunch of "pronto-primers". As are all the others this one is mounted on wheels. It is used for large excavating work, sand and gravel washing, well-point jobs, sealwalls, and strip mining. It is powered by a 30 to 35 h.p. water-cooled engine.

Manufacturer's Data:

* Capacity g.p.h. (AGC rating): 90,000
RPM: 1750

* See bulletin # PC - 8

Trade Name: Novo Diaphragm Pumps

Manufacturer: Novo Engine Company, Lansing, Michigan

Model: Models AD - 3W and AD - 4D

Use and Outstanding Characteristics:

Used for very muddy or sand and debris laden water and where the pumping is intermittent with a large amount of air. For jobs that require giving the pump considerable abuse. Approximately 200 hours life against a fifty-foot head before the diaphragm must be replaced.

Manufacturer's Data:

Outfit No.	AD - 3W	AD - 4D
Capacities		
at 10' suction lift	3000 g.p.h.	6000 g.p.h.
at 20' suction lift	1500 g.p.h.	3000 g.p.h.
Power unit - single cylinder		
air cooled	2½ h.p.	3½ h.p.

621.

Trade Name: Oberdorfer Standard Series "50" Bronze Gear Pumps

Manufacturer: Oberdorfer Foundries, Inc.

Use and Outstanding Characteristics:

The Oberdorfer bronze gear pump "50" is used extensively on marine engines and marine conversions. It is available in four different models: with upper drive shaft, with lower drive shaft, and with built-in relief valve in either of the above. It is also very widely used in industrial applications.

Manufacturer's Data:

Capacities from 102 to 1728 g.p.h. at 1800 rev.

622.

Trade Name: Oberdorfer Special Gear Pumps

Manufacturer: Oberdorfer Foundries, Inc.

Model: Models B, K, and M

Use and Outstanding Characteristics:

The B, K, and M are bronze herringbone gear pumps with different installation dimensions from the standard "50" series. A special bronze alloy is used in the pump body and cover.

Manufacturer's Data:

Capacities up to 16.5 g.p.m.

623. ~~rod~~

Trade Name: Oberdorfer Bronze Centrifugal Pumps

Manufacturer: Oberdorfer Foundries, Inc.

Use and Outstanding Characteristics:

These are single-stage volute pumps with end suction and are made of bronze. They are used for pumping fuel oil, gasoline, water, coolants, brines, and many other liquids.

Manufacturer's Data:

Capacities up to 2100 g.p.h.
Heads up to 24 ft.

624.

Trade Name: The Oberdorfer Bronze Hand Pump

Manufacturer: Oberdorfer Foundries, Inc.

Model: "Type E" and "Type E Oil"

Use and Outstanding Characteristics:

This hand-operated bronze gear pump was designed for the U. S. Navy for limited volume transfer purposes aboard ships of all sizes. It is very effective in operation for pumping oil or water and many other liquids from drums, (gasoline also). The pump is self-priming to a fifteen-foot draft. Special Navy bronze is used. "Type E oil" is for pumping heavy oil.

Manufacturer's Data:

Capacity of 240 g.p.h. at 60 r.p.m.

625.

Trade Name: Oilgear Pumps

Manufacturer: Oilgear Company

Use and Outstanding Characteristics:

The Oilgear Units are unique in their design for a piston pump. It consists of seven or more pistons mounted radially about the centerline of a cylinder block, an offset rotor containing a reaction ring against which the pistons make contact, and a fixed pintle in the cylinder barrel. The rotor and cylinder barrel both rotate. The rotor being offset acts as a cam forcing the pistons in and centrifugal force forces them out against the reaction ring. Thus as the unit rotates, reciprocating motion is imparted to the pistons. The pintle contains ports and is fixed, with the rotation of the cylinder barrel opening and closing them for suction and discharge. These units are available with either constant displacement or variable displacement. Variable displacement is obtained by mounting the rotor on a slide block which controls the offset of the reaction ring and therefore the stroker. The units can be used as either pumps or motors. Built into the front housing of the pump is an internal gear pump for partially

supercharging the main system and for operating hydraulic controls. Suction and return valves are built into the pump and also relief valves. Reservoirs are available and an overall efficiency of 90% is possible. The units are available with any type of control (including electric remote) desired. They are used for all types of hydraulically operated machinery such as presses, etc.

Manufacturer's Data:

Pressures of 1100, 1700, and 2500 p.s.i.
Capacities from 1.7 to 108 g.p.m.

626.

Trade Name: Olivite Acid Handling Pump

Manufacturer: Oliver United Filters, Inc.

Use and Outstanding Characteristics:

This is a centrifugal pump (volute) designed specifically for chemical work. Olivite, from which the pump gets its name, is a special rubber base composition normally used for lining the casing and cover and frequently used for covering the impeller. It has all the corrosion resistant qualities of hard rubber plus higher tensile strength. The bond lasts as long as the pump itself, being unaffected by temperature, speed, pumping pressures, or abrasive particles. A special soft Olivite is recommended where abrasive particles are being carried in the liquor being pumped. Neoprene can be furnished for handling oily liquids and other solutions for which Olivite is not suitable. Olivex is a strong, tough, resin plastic highly resistant to most chemicals hot or cold. It is used for stuffingbox fittings and in many cases for the impeller. It has a carbon seal for pumps handling clear solutions and consists of three parts: (1) rubber sleeve (2) rotating carbon ring seal (3) and stationary carbon ring seal. It can be used for practically all acid slurry mixtures, hot and cold. This pump will handle all the following solutions and slurries: acetic, citric, hydrochloric, hydrofluoric, phosphoric, sulphurous and sulfuric acids; strong caustics; the chlorides of ammonia, magnesium, zinc, copper, iron and nicotine; alum; litho red; rayon rinsing solutions; chlorinated brine.

Manufacturer's Data:

Capacities from 5 to 1400 g.p.m.
Heads up to 150 ft.

627.

Trade Name: Oliver Diaphragm Slurry Pumps

Manufacturer: Oliver United Filters, Inc.

Model: Type ODS

Use and Outstanding Characteristics:

This is essentially an air-driven diaphragm pump with check valves and solenoid timing. The timer is explosion proof and there is no mechanical linkage to the diaphragm. It is used for handling metallurgical slurries containing beryllium, copper, manganese, titanium, uranium, graphite, gold, zinc and bauxite; chemical liquors including aluminum hydrate, magnesium chloride, sodium tungstate, and sodium sulphate; crystalline products such as sugar, salt, sodium sulphate, organic and inorganic products; acids such as hydrochloric, sulphuric, hydrofluoric and phosphoric; food products such as cubed vegetable soup; also ammonia, brine, paints, pigments, spray chemicals, paper filler, pharmaceuticals, rubber latex, explosives, cane, sugar mud, catalysts, spent carbide sludge, clay slip, sink-float concentrates, and gypsum. The O.D.S. pump is particularly suitable for handling food products where sanitary conditions must be observed, and the synthetic rubber parts make it practical to handle petroleum products. It can be used for proportioning service, for feed to pressure filters and for handling filtrate from filter receivers.

Manufacturer's Data:

Capacities up to 60 g.p.m.

628.

Trade Name: Peerless Water King Pumping System

Manufacturer: Peerless Pump Division

Use and Outstanding Characteristics:

These water systems are shallow well outfits with a Peerless "Hi Lift"

pump. The pump consists of a revolving cable driven rotor with a rounded spiral vane on its exterior surface. It revolves inside a stationary housing (stator) which has two similarly rounded spiral depressions on its interior surface. Water is continuously squeezed along the rotor by its revolving, upward line of contact with the stator. The stator is made of rubber and has two threads for each thread on the rotor. Thus with each revolution of the rotor, one thread of the stator is closed off, causing a continuous spiral of water to rise through the pumping element. Suction head has little effect on capacity.

Manufacturer's Data:

Capacities to 430 g.p.h.
Heads up to 40 p.s.i.

629.

Trade Name: Fluidyne

Manufacturer: Peerless Pump Division

Model: Types PE and PB

Use and Outstanding Characteristics:

The Peerless Fluidyne is an end suction, single-stage, volute centrifugal pump and is manufactured either close-coupled with a motor or as an independent unit. It is for general service.

Manufacturer's Data:

Capacities up to 1000 g.p.m.
Heads up to 270 ft.

630.

Trade Name: Peerless Vertical Centrifugal Pumps

Manufacturer: Peerless Pump Division

Model: Type VST, VSB, and V

Use and Outstanding Characteristics:

Type VST is a top-suction submerged type centrifugal volute pump intended for sump service in wet pit installations only. The top suction makes it practically impossible to vapor lock even when pumping boiling water. Also

the pump directly above the impeller has only the static sump head on it. Type VSB has a bottom suction and is for sump service in wet or dry pits. Type V is close-coupled and intended for general service.

Manufacturer's Data:

Capacities from 200 to 5000 g.p.m.
Heads from 20 to 100 ft.

631.

Trade Name: Peerless Hydro-Foil Pumps

Manufacturer: Peerless Pump Division

Model: Propellor type

Use and Outstanding Characteristics:

Peerless Hydro-Foil propellor type pumps are propellor pumps with streamlined propellor blades and are used for lifting tremendous volumes of water.

Manufacturer's Data:

Capacities from 600 to 200,000 g.p.m.
Heads from 2 to 60 ft.

632.

Trade Name: Peerless Hydro-Foil Pumps

Manufacturer: Peerless Pump Division

Model: Mixed Flow type

Use and Outstanding Characteristics:

The Mixed Flow pumps are multi-stage or single units with an advantage in their ability to move water against maximum head with less submergence, permitting the use of shallower sumps and higher speed motors for medium heads. The mixed flow design is a combination of propellor and centrifugal flow. It is intended for moving enormous volumes of water.

Manufacturer's Data:

Capacities from 600 to 220,000 g.p.m.
Heads from 2 to 60 ft.

633.

Trade Name: Peerless Deep Well Turbine Pumps

Manufacturer: Peerless Pump Division

Use and Outstanding Characteristics:

These deep-well turbine pumps are available as either oil or water-lubricated. The water-lubricated unit uses Goodrich cutless rubber bearings.

Manufacturer's Data:

Capacities from 15 to 30,000 g.p.m.
Heads from 5 to 1000 ft.

634.

Trade Name: Peerless Jet Water System

Manufacturer: Peerless Pump Division

Use and Outstanding Characteristics:

These units consist of a centrifugal pump located above ground and a booster jet operating on the entertainment principle. The unit is available in double or single pipe (well cylinder acting as second pipe) for deep and shallow wells and with over-well or off-set construction.

Manufacturer's Data:

Capacities from 300 to 4800 g.p.m.

635.

Trade Name: Dry Vacuum Pumps

Manufacturer: Pennsylvania Pump and Compressor Co.

Model: Class 7-AT and 8-AT

Use and Outstanding Characteristics:

These Pennsylvania dry vacuum pumps are of the straight-line, single cylinder, roller bearing type. These pumps are furnished for both power and steam drive and are available in either the single-stage or two-stage design. The single stage pumps are designed for handling air or gases in ordinary service, while the two-stage pumps are used for higher volumetric efficiency and higher vacuum.

636.

Trade Name: Pennsylvania Centrifugal Pumps

Manufacturer: Pennsylvania Pump and Compressor Co.

Model: Class BHD, BMD, and BLD

Use and Outstanding Characteristics:

These are double-suction, single-stage, ball bearing, volute centrifugal pumps. A balancing port (patented) connecting the two suction chambers prevents end thrust due to unequal pressures.

637.

Trade Name: Pennsylvania Centrifugal Pumps

Manufacturer: Pennsylvania Pump and Compressor Co.

Model: Class SHD, SMD, and SLD

Use and Outstanding Characteristics:

These are double-suction, single-stage, sleeve bearing, volute centrifugal pumps, with bearing brackets cast integral with the pump casing. A balancing port (patented) equalizes the pressure in the two-suction chambers.

638.

Trade Name: Pennsylvania Centrifugal Pumps

Manufacturer: Pennsylvania Pump and Compressor Co.

Model: Class MD and HD

Use and Outstanding Characteristics:

These are double-suction, single-stage, sleeve bearing, volute centrifugal pumps. A balancing port (patented) equalizes the two suction chamber pressures.

639.

Trade Name: Thrustfire Centrifugal Pumps

Manufacturer: Pennsylvania Pump and Compressor Co.

Use and Outstanding Characteristics:

These multi-stage volute type centrifugal pumps incorporate a patented

design feature for dynamic balance. The balance is obtained by an accurate proportioning of the diameter of the shaft covering between two directly opposed impellers. It is available in 2, 3, 4, 5, 6, and 7 stages. Used for boiler feed and general service.

Manufacturer's Data:

Capacities up to 1700 g.p.m.
Heads up to 1200 p.s.i.

640.

Trade Name: Pioneer Seal-type Pumps

Manufacturer: Pioneer Pump and Mfg. Co.

Use and Outstanding Characteristics:

These seal-type coolant pumps are of the single-stage volute form. They employ a rotating neoprene washer against a fixed carbon disc. for a seal eliminating the need for a packing gland. They are used for circulating coolant and are adaptable for almost any installation.

Manufacturer's Data:

Capacities up to 174 g.p.m.
Heads up to 54 p.s.i.

641.

Trade Name: Pioneer Seal-less type Pumps

Manufacturer: Pioneer Pump and Mfg. Co.

Use and Outstanding Characteristics:

The "Seal-less" pump is a vertical top suction, volute centrifugal pump for circulating coolant. It has surge baffles to prevent the coolant from surging up the motor shaft. The top suction eliminates the need for a seal. These units are larger than Pioneer "Seal-types".

Manufacturer's Data:

Capacities up to 174 g.p.m.
Heads up to 54 p.s.i.

642.

Trade Name: Smith-Vaile Pumps

Manufacturer: Platt Iron Works

Model: Duplex, piston packed, turret type

Use and Outstanding Characteristics:

These reciprocating, direct-acting, steam-driven, piston-packed, turret type, duplex pumps are intended for boiler feed, general service, and light pressure service. All pipe connections are flanged.

Manufacturer's Data:

Pressures from 50 to 150 p.s.i.

Capacities from 0.16 to 16.2 gals./rev. and from 80 to 4100 BHP

643.

Trade Name: Smith-Vaile Pumps

Manufacturer: Platt Iron Works

Model: Duplex, piston-packed, yoke type

Use and Outstanding Characteristics:

These duplex, direct-acting, steam-driven, piston-packed, yoke type reciprocating pumps are intended for boiler feed and general service.

Manufacturer's Data:

Pressures up to 150 p.s.i.

Capacities from 0.49 to 5.87 gals./rev.

644.

Trade Name: Smith-Vaile Pumps

Manufacturer: Platt Iron Works

Model: Duplex-Outside End Packed

Use and Outstanding Characteristics:

These duplex, outside end packed, direct-acting, steam-driven, plunger pumps are designed for boiler feed and general service.

Manufacturer's Data:

Pressures up to 175 p.s.i.

Capacities from 0.41 to 10.40 gals./rev.

645.

Trade Name: Smith-Vaile Pumps

Manufacturer: Platt Iron Works

Model: Duplex-Outside center packed

Use and Outstanding Characteristics:

These duplex, outside center packed, direct acting, steam-driven plunger pumps are designed for boiler feed and general service.

Manufacturer's Data:

Capacities from 1.30 to 35.20 gals./rev.
Pressures up to 250 p.s.i.

646.

Trade Name: Smith-Vaile Pumps

Manufacturer: Platt Iron Works

Model: Duplex-outside end packed, pot valve type

Use and Outstanding Characteristics:

These duplex, outside end packed, pot valve, direct-acting, steam-driven plunger pumps are intended for boiler feed and general service.

Manufacturer's Data:

Capacities from 1.30 to 7.99 gals./rev.
Pressures up to 300 p.s.i.

647.

Trade Name: Smith-Vaile Pumps

Manufacturer: Platt Iron Works

Model: Duplex-piston packed, pot valve type

Use and Outstanding Characteristics:

These duplex, piston-packed, pot valve, direct-acting, steam driven, piston pumps are designed for boiler feed and general service.

Manufacturer's Data:

Pressures up to 300 p.s.i.
Capacities from .734 to 7.99 gals./rev. and from 270 to 2200 BHP

648.

Trade Name: Smith-Vaile Pumps

Manufacturer: Platt Iron Works

Model: Duplex-Direct Port Pattern

Use and Outstanding Characteristics:

These duplex, direct-port pattern, direct-acting, steam-driven, piston pumps are intended for general service.

Manufacturer's Data:

Pressures of 50, 100, and 150 p.s.i.
Capacities from 4.89 to 62.6 gals./rev.

649.

Trade Name: Pump and Receiver Combination

Manufacturer: Platt Iron Works

Use and Outstanding Characteristics:

These pump and receiving tank combinations are specially designed for collecting the condensation from steam mains, heating systems and steam cooking and conditioning apparatus. They are automatic in operation and gravity fed. Either yoke-type or turret-type pumps are available as desired.

Manufacturer's Data:

Capacities from 5000 to 80,000 EDR and from 12 to 100 g.p.m.

650.

Trade Name: Triplex Power Pumps

Manufacturer: Platt Iron Works

Model: Class K

Use and Outstanding Characteristics:

These pumps are vertical, single-acting, triplex gear driven plunger pumps for boiler feed and general service.

Manufacturer's Data:

Pressures up to 200 p.s.i.
Capacities from 12.4 to 676 g.p.m.

651.

Trade Name: Triplex Power Pumps

Manufacturer: Platt Iron Works

Model: Class "K" - pot valve type

Use and Outstanding Characteristics:

These triplex, plunger pumps, shaft driven, are designed for the high pressures required to feed modern high pressure boilers. They are arranged to be driven by belt, chain, or double reduction gearing.

Manufacturer's Data:

Capacities from 71 to 246 g.p.m.
Heads up to 450 p.s.i.

652.

Trade Name: Triplex Power Pumps

Manufacturer: Platt Iron Works

Model: Class "KH"

Use and Outstanding Characteristics:

These triplex, shaft driven plunger pumps are designed for the heavy pressures required for hydraulic pressures. They are arranged for belt, chain, or double reduction drive.

Manufacturer's Data:

Pressures up to 5000 p.s.i.
Capacities from 3.5 to 102 g.p.m.

653.

Trade Name: Smith-Vaile Centrifugal Pumps

Manufacturer: Platt Iron Works

Model: Single Stage

Use and Outstanding Characteristics:

These pumps are of the double-suction, split case, volute type, single-stage form and are intended for general service.

Manufacturer's Data:

Capacities from 60 to 10,000 g.p.m.
Heads up to 260 ft.

654.

Trade Name: Smith-Vaile Centrifugal Pumps

Manufacturer: Platt Iron Works

Model: Multi-Stage

Use and Outstanding Characteristics:

These multi-stage, volute centrifugal pumps are so designed that each stage combines the double suction and volute features eliminating variable thrust troubles. They are intended for boiler feed and general service.

655.

Trade Name: Adjust-O-Feeders

Manufacturer: % Proportioneers, Inc. %

Use and Outstanding Characteristics:

Adjust-O-Feeders are single-acting, plunger pumps with outside end packed stuffing boxes and interchangeable check valves. They are used in injecting measured quantities of fluid or treating chemical against variable discharge pressures. Some of their applications are in water treating, sewage, chemical process, and petroleum. They have a "Fluid Seal" yoke permitting use of an enclosing fluid around plunger and stuffing gland. They will handle the following chemicals: acetaldehyde, acetic acid or anhydride, acetone, acid brines (non-oxidizing), acid brines (oxidizing), alcohols (industrial), alkaline brines, aluminum chloride, aluminum sulfate - alum, ammonia, liq., ammonium chloride, ammonium hydroxide, ammonium nitrate, amyl acetate, alcohol, anti-oxidants, aniline oil, asphalt, barium chloride, barium hydroxide, benzene-benzol, benzaldehyde, benzoic acid, brines (neutral), bromine, buromin, butadiene and butane, butylene and butanol, butyl acetate, calcium chloride, calcium hydroxide, calcium hypochlorite, calgon, carbolic acid - phenol, carbon disulfide, carbon suspensions, carbonic

acid solutions, carbon tetrachloride, castor oil, caustic-alkalis, cellulose acetate, chlorine (anh. liq), chlorine solutions, chloroform, chlorobenzene, chromic acid, citric acid, copper acetate, copper sulfate, creosote oil, cresylic acid-cresols, drying oils, esters or ethers, ethyl acetate, ethylene dichloride, ethylene glycol, fatty acids, ferric chloride, ferric sulfate, ferrous chloride, ferrous sulfate, fish oils, formaldehyde, formic acid, freon, fruit juices, fuel oils, furfural, gasoline (refined), gasoline (sour), gum inhibitor, glue, glycerine, hydrochloric acid (conc.), hydrochloric acid (dilute), hydrogen chloride (anh. liq.), hydrofluoric acid, hydrogen fluoride (anh. liq.), hydrogen peroxide, hydroquinone, kerosene, ketones, lacquers - lacquer solvents, lactic acid, latex, lube oils (refined), lube oils (sour), magnesium chloride, magnesium hydroxide, maleic acid and anhydride, mercuric chloride, mercury, methyl alcohol, methyl chloride, milk, mineral oil, mixed acid (nitrations), molasses, naphtha or naphthalene, nickel chloride or sulfate, nitric acid, nitrobenzene, oleum, oxalic acid, phosphates (alkaline), phosphates (neutral), phosphates (acid), phosphoric acid, picric acid, pitch, plasticizers and plastics, potassium chloride, potassium cyanide, potassium nitrate, potassium permanganate, potassium persulfate, propane, pthalic acid, resins, soap solutions, soda ash, sodium bicarbonate, sodium bisulfate, sodium bisulfite, sodium hydroxide, sodium hypochlorite, sodium peroxide, sodium silicate, sodium sulfate, sodium sulfide, sodium sulfite, sodium thiosulfate, starch, styrene, sugar solutions, sulfate liquors, sulfonates, sulfonic acid (crude), sulfuric acid (conc.), sulfuric acid (dil.), sulfuric acid (int.), sulfurous acid, tannic acid, tars, tartaric acid, toluene - toluol, trichorethylene, turpentine or varnish, vegetable oils, and zinc chloride. They have a micrometer screw for displacement adjustment.

Manufacturer's Data:

Pressures up to 6000 p.s.i.

Capacities from 3.5 to 2600 g.p.h.

656.

Trade Name: Model "Q" Quimby close coupled Centrifugal Pump

Manufacturer: Quimby Pump Division, H. K. Porter Co., Inc., Pittsburgh, Pennsylvania

Use and Outstanding Characteristics:

Used for brine and cold water.

Manufacturer's Data: (Complete data in reference)

Head: 10 - 220'
g.p.m.: 10 - 2000
20% more H.P. necessary in motor to pump brine than cold water

657.

Trade Name: Quimby Type CF and DF Centrifugal Pumps

Manufacturer: Quimby Pump Division, H. K. Porter Co., Inc., Pittsburgh, Pennsylvania

Use and Outstanding Characteristics:

Used for pumping water, condensate, solvents, brine, caustics, acids, organic liquids, hydrocarbons, gasolines and oils. Francis type for handling low boiling point liquids up to 300° F.

Manufacturer's Data (Complete data table in reference):

Head: 25 - 300'
g.p.m.: 40 - 1200
r.p.m.: 1200 - 3600 (varies with head and g.p.m.)

658.

Trade Name: Quimby Chemical Pump, Type DB

Manufacturer: Quimby Pump Division, H. K. Porter Co., Inc., Pittsburgh, Pennsylvania

Use and Outstanding Characteristics:

Used to handle hydrochloric and other strong acids and corrosive salts. Also satisfactory for liquids easily contaminated by metal.

Manufacturer's Data:

Up to 2000 g.p.m.
Heads up to 125'
Speeds up to 3500 r.p.m. in smaller sizes; up to 1750 r.p.m. for larger units

659.

Trade Name: Quimby Chemical Pumps, Type G

Manufacturer: Quimby Pump Division, H. K. Porter Co., Inc., Pittsburgh, Pennsylvania

Use and Outstanding Characteristics:

Used for process and medium duty chemical service such as circulating and transfer service for various process and chemical liquids; filter press service; condensation return and low pressure boiler feed service, handling slurries and other liquids containing moderate quantities of small liquids in suspension.

Manufacturer's Data:

Discharge sizes: 1, 1 $\frac{1}{4}$, 1 $\frac{1}{2}$, 2, 3"
Up to 400 g.p.m.
Heads up to 210'

660.

Trade Name: Quimby Streamflow Rotex Pumps

Manufacturer: Quimby Pump Division, H. K. Porter Co., Inc., Pittsburgh, Pennsylvania

Use and Outstanding Characteristics:

Used for pumping lubricating, non-lubricating, and viscous liquids such as acids, alcohol, alkalis, asphalts, cellulose, coolants, diesel oil, dyes, fuel oil, gasoline, inks, lubricating oils, molasses, paints, paraffins, rayon dope, shellac, solvents, syrups, tar, varnishes.

There are two types available:

1. Gear in Head - for clear liquids which have sufficient lubricating properties to protect the gears and bearings.
2. External Gear and Bearing - which is recommended for pumping non-lubricating liquids so that independent bearing and gear lubrication is required.

Manufacturer's Data:

Discharge pressures: Up to 250 p.s.i.
Capacity: Up to 1500 g.p.m. (depending on liquid handled)

661.

Trade Name: Quimby Chemical Pumps, Type "DC"

Manufacturer: Quimby Pump Division, H. K. Porter Co., Inc., Pittsburgh, Pennsylvania

Use and Outstanding Characteristics:

This type of pump may be made of many metals such as aluminum, copper, steel, and any metal which best fits the use of the pump to pumping a certain fluid. The pump is suitable for use in the following types of plants: acid, bleacheries, breweries, cellophane plants, chemical plants, commercial solvent plants, dyeworks, explosive factories, fertilizer plants, metal plating shops, packing houses, paper mills, petroleum refineries, rayon mills, silk mills, soap factories, sugar refineries, tanneries, textile mills, and vinegar works. Special type "DB" rubber lined pumps are available to handle certain liquids which no metal has yet been used. Some of these liquids are muriatic acid, ferric chloride, and chlorine bleaches.

Manufacturer's Data (Complete table in reference):

g.p.m.: 25 - 500
Head: 20 - 240'
r.p.m.: 1150 - 1750

662.

Trade Name: Quimby Screw Pump

Manufacturer: Quimby Screw Pump Division, H. K. Porter, Inc., Pittsburgh, Pennsylvania

Use and Outstanding Characteristics:

The pump has application in handling light hydraulic oils at high pressure. It can also be used to handle low viscosity fluids at pressures up to 500 lbs. where it is not possible to obtain a sufficient number of screw turns within the body bore to effectively seal the fluid handled. It can be used on acetates, dopes, tar, soap, sludge, chewing gum, tooth paste, chicle, and food products.

Manufacturer's Data:

Sizes: $1\frac{1}{2}$ " to 16"
g.p.m.: 5 - 6000
r.p.m.: 1150 - 430
H.P.: 1 - 1000

663.

Trade Name: Racine Hydraulic Pressure Boosters

Manufacturer: Racine Tool and Machine Company

Use and Outstanding Characteristics:

This is essentially a differential cylinder, double acting, in which a low-pressure, large area piston drives a high-pressure, small area piston. They are installed in a hydraulic line and are automatic. The high pressure volume output is inversely proportional to the low-pressure volume input by the pressure ratio.

Manufacturer's Data:

Ratios from 3:1 to 7:1

Output capacities from 3.4 to 5 g.p.m.

664.

Trade Name: Racine Variable Volume Hydraulic Pumps

Manufacturer: Racine Tool and Machine Company

Use and Outstanding Characteristics:

These pumps are rotary vane types with the volume being varied by changing the eccentricity of the pressure chamber ring to the rotor. It is available with automatic control. They are used as sources of hydraulic power for oil hydraulic systems.

Manufacturer's Data:

Pressures up to 1000 p.s.i.

Capacities up to 30 g.p.m.

665.

Trade Name: Resisto Centrifugal Acid Pumps

Manufacturer: Resisto Pipe and Valve Co.

Use and Outstanding Characteristics:

These are single-stage, volute, end suction pumps for acid handling service. They are made of hard lead, rubber lined, stainless steel, nickel, monel, aluminum, bronze, and silver lined construction.

Manufacturer's Data:

Capacities from 1 to 1000 g.p.m.

666.

Trade Name: Resisto "Midget" Pump Series

Manufacturer: Resisto Pipe and Valve Co.

Model: Model "M"

Use and Outstanding Characteristics:

These are small, centrifugal, single-stage volute pumps for laboratory and small-duty plant work. They are made of hard lead, rubber lined, stainless steel, nickel, aluminum, monel, bronze, and silver lined construction. A few of their applications are: agitation, transfer of corrosives, circulating liquids in condensers and absorption apparatus, acid treatment of oil, feed water treatment, filtration and aeration, H-ion apparatus, general laboratory use, and pilot units.

Manufacturer's Data:

Capacities from 1 to 10 g.p.m.
Heads up to 10 ft.

667.

Trade Name: Resisto "Giant" hard Lead Centrifugal Acid Pump

Manufacturer: Resisto Pipe and Valve Co.

Model: Model GAH-17B30

Use and Outstanding Characteristics:

These are volute, single-stage, end suction, centrifugal pumps made of hard lead for acid handling.

Manufacturer's Data:

Capacities up to 900 g.p.m.
Heads up to 105 ft.

668.

Trade Name: Victor-Acme Positive Displacements Gas Pumps

Manufacturer: Roots-Connersville Blower Corp.

Use and Outstanding Characteristics:

These are meshing double lobe rotary pumps used for the exhausting and boosting of gases and vapors. They are positive displacement pumps with no internal seal, no internal lubricant and no internal contact.

Manufacturer's Data:

Capacities to 690 cu. ft./min.

669.

Trade Name: Cycloidal Rotary Pumps

Manufacturer: Roots-Connersville Blower Corp.

Model: Types RF and S0

Use and Outstanding Characteristics:

These pumps are positive displacement rotary pumps with two meshing, three lobe, cycloidal impellers. There is no internal contact and no internal lubrication. Type S0 is for larger capacities. The impellers are gear driven.

Manufacturer's Data:

Capacities from 25 to 4350 g.p.m.
Heads up to 150 ft.

670.

Trade Name: Robertson High Pressure Hydraulic Pump

Manufacturer: John Robertson Company, Inc.

Model: Series 20, 30, 40, 50, 60, 70, 80, 90

Use and Outstanding Characteristics:

These high-pressure hydraulic pumps are of the motor-driven, triplex type with herringbone gears.

Manufacturer's Data:

Pressures up to 6000 p.s.i.
Capacities from 1 to 220 g.p.m.

Roper Rotary Pumps will handle the following: acetic acid, acetone, acid mine water, alcohol, alkaline brines, alkaline liquids, alum, aluminum chloride, aluminum sulphate, ammonia, ammonium bicarbonate, ammonium chloride, ammonium nitrate, ammonium sulphate, aniline water, asphaltum, barium chloride, barium nitrate, beer, beer wort, beet juice, benzine, bichloride of mercury, bitterwasser, bleachery liquids, blood, body deadener, brine, butane, cachaza, calcium acid sulphate, calcium brine plus sod. chl., calcium chlorate, calcium chloride, calcium magn. so. shl., cane juice, carbolic acid, carbonate of soda, carb. acid gas in water, carbon tetrachloride, carbon bisulphide, caustic cl. of magn., caustic cl. of sodm. caustic cyanogen, caustic manganese, caustic potash, caustic soda, caustic strontia, caustic sulphide, caustic zinc chloride, cellulose, cellulose acetate, chloride of zinc, cider, citric acid, coal tar oil, copperas, copper sulphate, creosote, creosote oils, cyanic acids, cyanic liquors, cyanide, cyanide potassium, cyanogen, diffusion water, dish water, distillery wort, dog food, duco, dye wood liquors, ethyl acetate, ethyl chloride, ethylene chloride, ethyl iodide, ethyl pthalate, ethyl sulphate, fatty acids, ferrous chloride, ferric hydroxide, ferrous sulphate, fuel oil, gasoline, glue, glycerine, grape juice, gun cotton brine, heptant, hops, hydrocyanic acid, hydroflusilic acid, iron pyritic acid, kerosene, lard, lime water, linseed oil, lye, magn. acid sulphate, magnesium sulphate, magma, marsh gas, mash, mayonnaise, methanol, milk, milk of lime, milk of magnesia, molasses, monoethanolamine, mustard, naphtha, nickel chloride, nickel sulphate, nitric acid, paraffin, peroxide of hydrogen, petroleum oil, petroleum ether, potash, potash sulphide, potassium carbonate, potassium chloride, potassium cyanide, potassium nitrate, potassium sulphate, propane, rapeseed oil, rhigolene, sal ammoniac, salt brine, sea water, soap water, soda, soda ash, sodium bicarbonate, sodium brine, sodium carbonate, sodium chloride, sodium hydroxide, sodium hypsulphite, sodium nitrate, sodium sulphide, sodium sulphate, starch, strontium nitrate, sugar, sulphate of lime, sulphide of hydrogen, sulphide of sodium, sulpholiginic salts, sulphur dioxide, sulphur in water, sulphuric acid, sulphurous acid, sweet water, syrup, tan liquor, tar, tar and ammonia in water, tartaric

acid, tomato pulp, trisodium phosphate, turpentine oil, urine, vegetable oil, vinegar, vitriol (blue), vitriol (green), water, whiskey, wine, wood pulp, wort, yeast, zinc chloride, zinc nitrate, zinc sulphate.

671.

Trade Name: Roper Rotary Pumps

Manufacturer: Geo. D. Roper Corporation, Rockford, Illinois

Model: Series 3600

Use and Outstanding Characteristics:

These rotary gear pumps are designed to handle thin or viscous liquids at slow speeds. They are axially hydraulically balanced, self-lubricating and cooling. They have spiral gears. They operate with equal efficiency in either direction.

Manufacturer's Data:

Capacities from 36 to 176 g.p.m.
Heads up to 54 p.s.i.

672.

Trade Name: Roper Rotary Pumps

Manufacturer: Geo. D. Roper Corporation, Rockford, Illinois

Model: Series K

Use and Outstanding Characteristics:

These pumps are rotary gear units with spiral gears and venturi suction and discharge ports to reduce turbulence. They are used for pressure lubrication, hydraulic service, fuel supply, or transfer work pumping clean liquids.

Manufacturer's Data:

Pressures up to 150 p.s.i.
Capacities from .65 to 56 g.p.m.

673.

Trade Name: Roper Rotary Pumps

Manufacturer: Geo. D. Roper Corporation, Rockford, Illinois

Model: Series F

Use and Outstanding Characteristics:

These are rotary gear pumps with spiral gears intended for pumping clean liquids of all kinds.

Manufacturer's Data:

Pressures up to 300 p.s.i.
Capacities up to 300 g.p.m.

674.

Trade Name: Roper Rotary Pumps

Manufacturer: Geo. D. Roper Corporation, Rockford, Illinois

Model: Series H

Use and Outstanding Characteristics:

These are rotary gear pumps with spur gears used for all types of hydraulic mechanisms, steel mill equipment and in oil field gathering line service where high pressures are required.

Manufacturer's Data:

Pressures up to 1000 p.s.i.
Capacities up to 75.3 g.p.m.

675.

Trade Name: Ross Steam Jet Ejectors

Manufacturer: Ross Heater & Mfg. Co., Inc.

Use and Outstanding Characteristics:

These are steam jet, single-stage, ejectors operating on the entrainment principle. They are used in connection with condensers, vacuum dryers, crystallization equipment, evaporators, filtration systems, vacuum stills, receivers, creosoting systems, tire molds, vacuum packing machines, deoderizers, cooking kettles, fractionating towers and priming of centrifugal pumps and syphon systems. They have no moving parts.

Manufacturer's Data:

Vacuum (practical) of 26"

676.

Trade Name: Sawyer Portable Submersible Pump

Manufacturer: Sawyer Electrical Mfg. Co.

Model: Model 777A

Use and Outstanding Characteristics:

The pump unit is simple in design, consisting of a squirrel cage induction motor mounted within a water-jacketed case and having a pump runner mounted on the motor shaft within the pump casing at the suction end of the pump. The suction and discharge are at opposite ends of the pump, all water passing through the water jacket, thus cooling the motor. The pump is designed to operate either submerged or not submerged and in any position, horizontal, vertical or any midway position. The pump will handle either fresh or salt water.

Manufacturer's Data:

140 g.p.m. at 70 ft. head and 180 g.p.m. at 50 ft. head

677.

Trade Name: Ceco Centrifugal Acid Pumps

Manufacturer: E. C. Scheyer Pump Co.

Use and Outstanding Characteristics:

Ceco centrifugal pumps are designed expressly for handling acids. They have no sharp edged vanes or sealing rings. The pumps are constructed of lead, aluminum, aluminum bronze, monel, hastelloy, stainless steel, ceco 100 metal, rubber or any metal or combination of metals as desired. They are used for: unloading tank cars and storage tanks, transferring acid and corrosive liquids to distant buildings, circulating acid over towers in lead chamber plants, agitation by pumping over and over, mine drainage and gathering, removing solutions from evaporators under high vacuum, vacuum and pressure filter press work, delivering acids against high heads to top stories of tall buildings, handling hot liquids and those of high vapor pressure at room temperature, and handling mixtures of liquid and gas.

Manufacturer's Data:

Capacities from 5 to 1500 g.p.m.

678.

Trade Name: "Wearproof" Sludge Pumps

Manufacturer: Claude B. Schneible Co.

Model: Type "V"

Use and Outstanding Characteristics:

These pumps are centrifugal units with a two-bladed vane type impeller and were designed primarily for pumping slurry from multi-wash dust collectors. The housing has a renewable, abrasion resistant, multi-segment lining of patented "V"-blocks. These "V"-blocks dovetail into corresponding "V"-grooves in the inside periphery of the housing and are easy to replace. They are manufactured for either horizontal or vertical use. The discharge is venturi shaped for minimum turbulence.

Manufacturer's Data:

Capacities from $1\frac{1}{2}$ to 500 g.p.m.

679.

Trade Name: Miami Pumps

Manufacturer: Shartle Bros.

Model: Class A

Use and Outstanding Characteristics:

These pumps are single-stage, double-suction, volute centrifugal pumps designed to pump water, thin paper stock, or similar fluids. They have an open impeller.

680.

Trade Name: Miami Pumps

Manufacturer: Shartle Bros.

Model: Class H.M.

Use and Outstanding Characteristics:

This is a single-stage, end suction, volute centrifugal pump intended for paper mill work handling consistencies up to 4%. It has an over-hung open impeller and is split at a 45 degree angle to permit installation under a low ceiling and still be accessible for cleaning. The side plates can be replaced without removing the shaft.

681.

Trade Name: Miami Agi-Flow Pumps

Manufacturer: Shartle Bros.

Use and Outstanding Characteristics:

The "Agi-Flow" pumps are rotary agitators and centrifugal pumps combined in one unit for use on all kinds of stock handling with consistencies up to 8%. The pump has uniform suction pressure regardless of the stock height in the chest and therefore delivers uniform volumes.

682.

Trade Name: Miami Pumps

Manufacturer: Shartle Bros.

Model: Class "D"

Use and Outstanding Characteristics:

These are low initial cost volute centrifugal pumps for handling lube oil, white water, white water showers, acids, alkalies, milk of lime, or thin paper stock (consistencies up to 3%) and clear liquids. It has an overhung, open type impeller and Timken Bearings, and a built-in diffuser is provided in the suction inlet to prevent vapor-binding.

683.

Trade Name: Miami Pumps

Manufacturer: Shartle Bros.

Model: Class "DS"

Use and Outstanding Characteristics:

This is a flexible volute single-stage centrifugal pump, with the ability to rotate the suction and discharge casings to 24 positions. Special spiral side plates keep rags and strings from plugging between impeller and side plate. It is intended for handling paper stocks.

684.

Trade Name: Miami Pumps

Manufacturer: Shartle Bros.

Model: Class JU

Use and Outstanding Characteristics:

This is vertical top suction, single-stage volute centrifugal pump designed expressly for completely emptying paper mill sumps and chests up to 15 ft. in depth. The use of top suction eliminates the need for a stuffing box and in combination with a water lubricated bearing results in a decrease in impeller overhang. It will handle consistencies up to 8%.

685.

Trade Name: Miami Pumps

Manufacturer: Shartle Bros.

Model: Class "DV"

Use and Outstanding Characteristics:

This is a vertical volute centrifugal stock pump used in emptying chests in the paper mill industry. It has a top suction allowing consistencies up to 6%. It has a spiral ribbed side plate to keep rags and strings from plugging between the impeller and the sideplate.

686.

Trade Name: Shriver Diaphragm Pumps

Manufacturer: T. Shriver & Co., Inc.

Use and Outstanding Characteristics:

The Shriver Diaphragm pump is specifically designed to handle such materials as cannot be satisfactorily and economically handled by ordinary pumping equipment. This applies particularly to abrasive or thick materials or fluids that clog or build up on pump parts. It is a double-acting piston pump of the positive displacement type, delivering large volumes at high pressures efficiently. The pistons consist of a series of concentric rings, each mechanically actuated to produce a different length of stroke. Heavy rubber (or synthetic) diaphragms separate the working mechanism from the two liquid ends resulting in the elimination of contamination of either the working mechanism or the fluid handled. By means of a drawback disc the diaphragm is completely supported by the pistons at every stage of both suction and pressure strokes. They are easy to clean and will handle the following materials: acids, acid sludges, activated carbon, alkalis, aluminum hydrate, aluminum pheno-sulphonate, aluminum sulfo-carbonate, ammonium sulfate, asphalt emulsions, barium sulfate, battery solutions, beeswax, benzine, beverage syrups, brines, bright zinc solutions, caffeine, cane sugar, carborundum grit, chromium hydroxide, cider, clays, clay size coating, cocktails, cola extract, colors, copper cyanide, copper sulfate and silver, cosmetic pastes, dicalcium phosphate, dimethyl glyoxine, drugs, dyes, egg white, emery sludge, enamel frit, enzymes, essential oils, ferrous chloride, filter acids, flue gas slimes, fluospar, food sauces, formalin, frits, fruit juices, fruit pomace, fullers earth, gasoline and sulfur, gelatin, glazes, glue, gold cyanide, grape juice, graphite, hormone extracts, hypo solution, insulating compound, kieselguhr, lacquers, lactic acid, latex - synthetic rubber, lead fluo-borate, lime sludge in caustic, lime sulphur, linoleum coatings, linseed oil and solvent, lube oil, magnesium hydroxide, malt extracts, manganese dioxide, manganese sulfate, maple sugar, mash or wort, metallic oxides and salts, mercury, methyl chloride, milk by-products, molasses, mucilage, nickel salts, oil well mud, orange juice, organic salts, paints, pectin, pharmaceuticals, pigments, plating solutions,

pottery slip, preserves, prussian blue in aluminum, radium salts, resin solutions, rubber chemicals, salammoniac, sand, shellac, silica flour, silica slurry, silver sulfide, sizes, slimes, sludges, slurries, sodium bromide, sodium fluoride, sodium tungstate, solvents, soya bean oil in meal, sulfite liquor, syrups, tars, tinctures, titanium oxide, tungstic acid, tungsten salts, vanadium salts, vegetable oils, vinegar, waxes, whey, wine, wine lees, wool scouring waste, yeast, and zurconium slurry.

687.

Trade Name: Skidmore Pumps Type "VC" Condensation Pump and Receiver

Manufacturer: Skidmore Pumps, St. Joseph, Michigan

Use and Outstanding Characteristics:

This pump is used to return condensate to a boiler or other points from all types of steam heating systems and process equipment. Pump and motor assembly may be removed and inspected without disturbing the piping. Bronze centrifugal impeller especially designed for handling hot water. Powered by electric motor. Single unit or duplex unit.

Manufacturer's Data (Complete tabulation in reference):

All pump sizes for discharge pressure up to 30 lbs. @ 1750 r.p.m.;
40 lbs. and above 3450 r.p.m.
g.p.m.: $1\frac{1}{2}$ - $97\frac{1}{2}$ (1000 to 65,000 sq. ft. e.d.r.)
Cap. of receiver (gal.): 10 - 65
Return pipe line: 2" - 4"
Discharge pipe size: 1" - 2"
Motor H.P.: ($\frac{1}{4}$ - 5) to ($1\frac{1}{2}$ - $7\frac{1}{2}$)

688.

Trade Name: Skidmore Pumps Type "HS" Condensation Pump and Receiver

Manufacturer: Skidmore Pumps, St. Joseph, Michigan

Use and Outstanding Characteristics:

Used to return condensate to boiler or other points from all types of steam heating systems and process equipment. The unit can be furnished with automatic pump controller for boiler when used for supplying make-up water. It

can be disassembled without disturbing piping connections. Powered by electric motor. Single and duplex units.

Manufacturer's Data (Complete tabulation in reference):

r.p.m. all models up to and incl. 30 lbs. discharge press.: 1750 r.p.m.
40 lbs. and over: 3450 r.p.m.
Types: HS11 to HS 6010 (117 types)
Discharge pressures 10 to 100
g.p.m.: $1\frac{1}{2}$ to $97\frac{1}{2}$
Receiver capacity (gallons): 10 - 117
Motor H.P.: $\frac{1}{4}$ to 10
Wt.: 430 - 720 lb. (50% more for duplex units)

689.

Trade Name: Skidmore Pumps, Type "CM" Condensate and Make-up Water Pump

Manufacturer: Skidmore Pumps, St. Joseph, Michigan

Use and Outstanding Characteristics:

Unit used for automatically supplying water to the boiler when boiler water is lost through use of steam in processing plants such as laundries, packing plants, and so forth. An electric boiler water level controller may be mounted on boiler. Bronze impeller keyed and locked on stainless steel shaft, designed for use with hot water. Powered by electric motor.

Manufacturer's Data (Reference gives complete tabulation):

1750 r.p.m. all types up to 30 lbs. discharge pressure
3450 r.p.m. all types over 40 lbs. discharge pressure
Discharge pressure: 30 - 100 (according to type)
Equivalent boiler H.P.: 7.15 - 286
Gallons per minute: $1\frac{1}{2}$ - 60
Receiver capacity (gal.): 21 - 117
Motor H.P.: $\frac{3}{4}$ to $7\frac{1}{2}$
Wt.: 335 to 680 lb.

690.

Trade Name: Skidmore Pumps, Type "TM" Condensate and Make-up Water Pump

Manufacturer: Skidmore Pumps, St. Joseph, Michigan

Use and Outstanding Characteristics:

Used to supply water to boiler when boiler water lost through use of steam processing plants. Turbine type, multi-vane impeller, designed for high pressure service. Available in single and duplex units. Powered by electric motor.

Manufacturer's Data (Complete table in reference):

r.p.m. all types @ 1750 except TM-107 and TM-1010 op. at 3450
Boiler H.P.: $7\frac{1}{2}$ - 250
Discharge pressure: 30 - 150
g.p.m.: $1\frac{1}{2}$ - 51
Motor H.P.: $\frac{1}{4}$ - 15
Return pipe size: 2" - 3"
Discharge pipe size: $1\frac{1}{4}$ - $2\frac{1}{2}$ "

691.

Trade Name: Skidmore Pumps, Type "TH" Condensation Pump and Receiver

Manufacturer: Skidmore Pumps, St. Joseph, Michigan

Use and Outstanding Characteristics:

Unit used to return condensate to boiler from all types of steam heating systems and process equipment such as laundries, etc. Self-cleaning strainer between pump and receiver. Multi-vaned impeller, shaft is mounted on outboard ball bearings, one bearing on each side of impeller. Powered by electric motor. available in single and duplex units.

Manufacturer's Data:

r.p.m.: 1750 (motorspeed)
Boiler H.P.: $7\frac{1}{2}$ - 250
Discharge pressure: 30 - 150
g.p.m.: $1\frac{1}{2}$ - 51
Motor H.P.: $\frac{1}{4}$ - 15
Tank capacity (gal.): 10 - 71
Return pipe size: 2"
Discharge pipe size: $1\frac{1}{4}$ - $2\frac{1}{2}$ "
Wt.: 225 - 1000 lb. (50% extra for duplex units)

692.

Trade Name: Carter Self-Priming Centrifugal Pumps

Manufacturer: Ralph B. Carter Co. (Smith-Meeker Eng. Co.)

Model: Type S

Use and Outstanding Characteristics:

These pumps are single-stage, volute type, centrifugal pumps designed for general service. They are self-priming, this being accomplished by recirculation with an automatic priming control to eliminate the recirculation after prime

is obtained. The priming control is essentially a hinged valve operated by an arm and a paddle over the discharge from the volute. A check valve is built into the suction of the pump. The pump is available in either close or long coupled construction.

Manufacturer's Data:

Capacities up to 2000 g.p.m.
Heads up to 210 ft.

693.

Trade Name: Carter Self-Priming Centrifugal Pumps

Manufacturer: Ralph B. Carter Co. (Smith-Meeker Eng. Co.)

Model: Type HC

Use and Outstanding Characteristics:

These centrifugal pumps are self-priming and designed with a helio-centric volute construction.

Manufacturer's Data:

Capacities up to 2000 g.p.m.
Heads up to 210 ft.

694.

Trade Name: Waterous Heavy-Duty Rotary Pumps

Manufacturer: Waterous Company (Smith-Meeker Eng. Co.)

Use and Outstanding Characteristics:

These are pilot geared, three-tooth, rotary gear pumps used for handling water, fuel oil, lube oil, gasoline, diesel oil, molasses, glue and other viscous liquids, either acid or alkaline in the following applications: main cargo, stripping, oil transfer, fire, bilge, shore installations, refineries, etc. They have an integral gear reduction.

Manufacturer's Data:

Capacities from 100 to 2500 g.p.m.
Heads up to 100 p.s.i.

695.

Trade Name: Smith Axial Flow Pump

Manufacturer: S. Morgan Smith Co.

Use and Outstanding Characteristics:

These pumps are propellor type axial flow pumps with either adjustable pitch (automatic) or fixed pitch propellers. They are designed for moving enormous volumes of water against low and medium heads in the following services: dewatering dry docks, controlling flash floods, pumping large quantities of process water in chemical and other industries, providing white water at a constant head to the wet end of paper making machinery and many other uses. The pitch control is hydraulically operated, and is used while the pump is running. The power required at any given head is directly proportional to its discharge (50% discharge takes 50% power).

Manufacturer's Data:

Capacities from 3,000 to 900,000 g.p.m.
Heads from 5 to 55 ft.

696.

Trade Name: "Nofome" Sanitary Pumps

Manufacturer: Specialty Brass Company

Use and Outstanding Characteristics:

Nofome sanitary pumps are of centrifugal, open impeller design especially designed to eliminate foaming or churning and to handle viscous and semi-liquid products. The heads are smoothly finished, all pockets and crevices where bacteria may collect and grow have been eliminated. By removing the one-piece clamp, the heads, impeller, and rotary seal may be readily removed for thorough cleaning. Pump heads are extended from the bearing housing, which removes any possibility of grease working into the pump heads. A retaining pin is used to hold the impeller in position, thus eliminating internal threads within the pump which would come in contact with the product and at the same time eliminating the necessity for an impeller nut wrench. The pump has a rotary seal, a head gasket which

cannot blow out or leak due to greater sealing effect as the pressure increases, and roller bearings. All Nofome pumps have stainless steel shafts and the heads and impeller may be furnished of nickel alloy, stainless steel or special alloys. Special Nofome sanitary pumps are available for pumping large volumes against unusually high heads and are adaptable for either motor or turbine drive. The Nofome units are used for milk, cream, food products, and chemicals.

Manufacturer's Data:

Capacities from 4,800 to 270,000 pounds/hr.
Heads up to 110 ft.

697.

Trade Name: Nofome Streamflo Pumps

Manufacturer: Specialty Brass Company

Use and Outstanding Characteristics:

These are sanitary, centrifugal pumps with open-type impeller and unified streamline design. The heads are smoothly finished and all pockets and crevices where bacteria may collect and grow have been eliminated. By removing the one-piece clamp, the heads, impeller and rotary seal may be removed readily for thorough cleaning. The three-bladed open-type impeller is designed to eliminate foaming and churning and is especially adaptable for handling viscous and semi-liquid products. Internal threads within the pump that would come in contact with the product have been eliminated by use of an impeller retaining pin which at the same time eliminates the need for an impeller nut wrench. They have a rotary seal and a head gasket which cannot blow out or leak as the design provides greater sealing effect as the pressure increases. The motor is assembled as an integral part of the pump, eliminating alignment troubles and at the same time doing away with the necessity for pump bearings. They have stainless steel shafts and the heads and impeller may be furnished of nickel alloy, stainless steel or special alloys. The pumps are used for pumping milk, cream, food products, and chemicals. Special Nofome Streamflo pumps are available for pumping large volumes against unusually high heads.

Manufacturer's Data:

Capacities from 4,800 to 50,000 lbs./hr.
Heads to 80 ft.

698.

Trade Name: Nofome Water and Brine Pumps

Manufacturer: Specialty Brass Company

Use and Outstanding Characteristics:

These units are centrifugal pumps for water and brine service. All the pump shafts are made of stainless steel and supported by ball or roller bearings.

699.

Trade Name: Sterling Vacuum Pumps

Manufacturer: Sterling, Inc.

Model: Type S

Use and Outstanding Characteristics:

The Sterling Type S vacuum pump is of the venturi vacuum producer type. A centrifugal pump drives de-aerated water from a separator tank to the boiler and also through a venturi jet which by entrainment produces a vacuum on an accumulator tank. The water from the accumulator tank and the jet water then return to the separator tank to be de-aerated. It is all combined into one attractive simplex or duplex unit. It is completely automatic in operation.

Manufacturer's Data:

Capacities from 5 to 20 g.p.m. and from 10,000 to 40,000 E.D.R.
Pressures up to 40 p.s.i.

700.

Trade Name: Sterling Vacuum Pumps

Manufacturer: Sterling, Inc.

Model: Type V

Use and Outstanding Characteristics:

This Type V vacuum pump operates on the venturi principle in the same

manner as the Type S but by rearrangement of the tanks and parts is made more compact. They, also, are available in simplex or duplex units and are completely automatic.

Manufacturer's Data:

Capacities from 5 to 20 g.p.m. and from 10,000 to 40,000 E.D.R.
Heads up to 40 p.s.i.

701.

Trade Name: Sterling Condensate Pump

Manufacturer: Sterling, Inc.

Model: 3500 Series

Use and Outstanding Characteristics:

The Series 3500 pump is a compact, self-contained unit built to meet a wide range of capacity and installation requirements. Designed for "heavy-duty" service, it is equipped with a heavy, steel receiver, solid cast iron base and a centrifugal pump, with a bronze impeller, mounted integrally with an electric motor. It is self-priming.

Manufacturer's Data:

Capacities up to 65,000 E.D.R.
Pressures up to 150 p.s.i.

702.

Trade Name: Sterling Condensate Pumps

Manufacturer: Sterling, Inc.

Model: Series 3700

Use and Outstanding Characteristics:

The 3700 series pump is especially designed for underground or below floor level installation. It differs from conventional underground condensation pumps in that all bearings are in a horizontal position instead of vertical. The centrifugal pump and motor, close-coupled, are mounted on top of the receiver away from moisture and easily accessible for routine maintenance. The receiver is made of cast iron and has a removeable cover. The pump is self-priming, auto-

matic and equipped with a bronze impeller.

Manufacturer's Data:

Capacities from 3 to 30 g.p.m. and from 2000 to 20,000 E.D.R.
Pressures up to 30 p.s.i.

703.

Trade Name: Sterling Condensate Pumps

Manufacturer: Sterling, Inc.

Model: 3800 Series

Use and Outstanding Characteristics:

This is a low-cost unit, compact in design, and consisting of a heavy, large-size receiver, centrifugal pump with bronze impeller and a ball-bearing motor mounted integrally with the pump. The unit is automatic and available in either simplex or duplex form.

Manufacturer's Data:

Capacities up to 10,000 E.D.R. and 15 g.p.m.
Pressures up to 30 p.s.i.

704.

Trade Name: Sterling Condensate Pumps

Manufacturer: Sterling, Inc.

Model: 3900 Series

Use and Outstanding Characteristics:

The 3900 series pump is designed especially for applications requiring the handling of large quantities of condensate under discharge pressures up to 40 p.s.i. The ball-bearing, unibuilt centrifugal pump and motor unit has a bronze impeller and bronze wearing rings and the entire unit can be removed without disturbing pipe connections. Motor windings are protected by extra insulation for moisture resistance and the bearings are grease-packed at the factory for a year's service. The unit is automatic and supplied in either simplex or duplex form.

Manufacturer's Data:

Capacities up to 40,000 E.D.R.

705.

Trade Name: Sundstrand Hydraulic Pumping Units

Manufacturer: Sundstrand Machine Tool Co.

Model: WX

Use and Outstanding Characteristics:

A pumping unit for hydraulic clamping, indexing and similar operations has two separate and distinct functions. It must provide a large volume of oil for rapid traverse of the ram or other moving member and a smaller volume at high pressure for the actual work. Both functions are obtained in a single compact Sundstrand WX pumping unit. A large capacity pump rapidly brings this moving member to position and then automatically dumps its oil under slight pressure. A smaller pump provides and maintains the high pressure required for the work. Both pumps and all valves are assembled in a single unit. The pumps are basically internal gear types with square rotor teeth. A relief valve maintains constant pressure output in the small pump.

Manufacturer's Data:

Capacities from .8 to 18 g.p.m.
Pressures up to 1000 p.s.i.

706.

Trade Name: Sundstrand Rota-Roll Pumps

Manufacturer: Sundstrand Machine Tool Co.

Model: Constant Delivery Type

Use and Outstanding Characteristics:

Rota-Roll pumps are rotary type of the internal gear form with special tooth design, the rotor teeth being practically square. They are designed for pumping oil only.

Manufacturer's Data:

Pressures up to 1000 p.s.i.
Capacities up to 15.2 g.p.m.

707.

Trade Name: Sundstrand Hydraulic "Circuit-Control" Pump

Manufacturer: Sundstrand Machine Tool Co.

Model: PWX

Use and Outstanding Characteristics:

The PWX consists of a variable displacement multi-piston pump for feeding, a constant displacement pump for rapid traverse and the main control valves all in one housing. Thus complete "Circuit-Control" is obtained from one compact unit and the piping required between the main control valve, the feed pump and the rapid pump is eliminated. The main control valves in the unit may be actuated by either a remote hydraulic pilot valve or a remote electric solenoid valve. They in turn are actuated by the machine slide as it progresses through its cycle. It provides automatic and semi-automatic cycles -- one, two, or three feed rates, complicated operating cycles involving skip feed and feed in both directions. In the variable displacement pump, reciprocating motion is procured through the use of a non-rotating wobbler plate. The constant displacement pump is of the "Rota-Roll" type.

Manufacturer's Data:

Capacities from .75 to 18 g.p.m.
Pressures up to 1000 p.s.i.

708.

Trade Name: Taber "CLVS" Series

Manufacturer: Taber Pump Co., Buffalo, New York

Use and Outstanding Characteristics:

This is a series of single-suction, open-impeller centrifugal pumps which can be changed over from service to service by simply changing the case and impeller. In this sense they are true general-purpose pumps. The standard models of this series are built of iron and equipped with bronze impeller, although they can be supplied made of any castable-machinable alloy. They are special pumps and are built to the specifications set forth by the prospective users.

Manufacturer's Data:

Capacities: To 600 g.p.m.
Total head: To 105'
Necessary H.P.: 1 - 18

709.

Trade Name: Taber Sump Pump No. 1 and No. 2

Manufacturer: Taber Pump Co., Buffalo, New York

Use and Outstanding Characteristics:

This type has use as automatic drainage pump for protective use wherever water damage may occur. For example, seepage or floodwater may get into basements, pipe tunnels or other below-sewer-level locations and cause difficulty. Each of these types provides automatic means for removal of the annoyance. They are placed over a standard 18" terra cotta tile collecting basin. This sump is sunk into the floor so that water may flow into and collect in it and be pumped out. The automatic feature of the system is a float switch located in basin which starts the pump when water accumulates and stops it when it recedes. Power is supplied by a small electric motor which drives through a flexible coupling. The impeller is bronze mounted on a steel shaft enclosed in a cast iron casing.

Manufacturer's Data:

No. 1: $\frac{1}{4}$ H.P. motor
To 25 g.p.m.
Max. head 22'

No. 2: $\frac{1}{2}$ H.P. motor
To 40 g.p.m.
Max. head 26'

710.

Trade Name: Taber Sump Pumps, No. 3 and No. 4

Manufacturer: Taber Pump Co., Buffalo, New York

Use and Outstanding Characteristics:

This type is used as a drainage pump for ridding submerged spaces of undesirable seepage or flood water. It is of larger capacity than the types 1 and 2 mentioned previously. The centrifugal pump is mounted above a terra cotta

tile sump which is located in the floor of the space to be pumped. This basin acts as a spot into which the water may run, accumulate, and consequently be pumped out. Automatic operation is obtained by means of a float switch which starts the pump when there is an accumulation in the basin, and shuts it off when the water level recedes. The standard impeller of this type is made of bronze.

Manufacturer's Data:

No. 3: H.P. motor: 1
To 100 g.p.m.
Max. head 31'

No. 4: H.P. motor: $1\frac{1}{2}$
To 120 g.p.m.
Max. head 34'

711.

Trade Name: Taber Automatic Sump Pump, Single and Duplex

Manufacturer: Taber Pump Co., Buffalo, New York

Use and Outstanding Characteristics:

These various pumps are especially made for drainage work. They are supplied in several styles for adaptation to specific uses. For example, the flood water mounting has the motor and pump elevated so that they escape damage by the flood water. Use in such applications as quarry-pits requires that the pump be lowered to the desired level because the lift would be too great otherwise. In all cases, all of these types are mounted over some form of accumulator into which extends an automatic float switch which operates the pump when there is a water accumulation.

712.

Trade Name: Transit Horizontal Duplex Steam Pumps

Manufacturer: National Transit Pump and Machine Co.

Model: General Service and Low Service Types

Use and Outstanding Characteristics:

These are duplex, direct-acting, steam-driven, reciprocating pumps with

renewable tube liners. They are available in bronze and iron constructions and are used in general service, boiler feed, and tank farm, mine, and chemical industry service.

Manufacturer's Data:

Pressures of 125 p.s.i. and 250 ps.i.
Capacities from 11 to 477 g.p.m.

713.

Trade Name: Transit Horizontal Duplex Steam Pumps

Manufacturer: National Transit Pump and Machine Co.

Model: Valve Plate type

Use and Outstanding Characteristics:

These are duplex, valve-plate type, direct-acting, steam-driven, reciprocating pumps with renewable liners intended for general service and oil refinery service.

Manufacturer's Data:

Pressures of 125 and 250 p.s.i.
Capacities from 26 to 477 g.p.m.

714.

Trade Name: Transit Horizontal Duplex Steam Pumps

Manufacturer: National Transit Pump and Machine Co.

Model: Side Pot Enbloc type

Use and Outstanding Characteristics:

These direct-acting, steam-driven pumps have each suction and each discharge valve and seat located in an individual chamber or pot. This construction provides for easy accessibility, liberal valve area, small trapped gaskets, and independent access to each valve and seat without disturbing any other part. These pumps will handle liquid temperatures up to 800° F. They are general service pumps.

Manufacturer's Data:

Pressures up to 500 p.s.i.
Capacities up to 767 g.p.m.

715.

Trade Name: Horizontal Duplex Steam Pumps

Manufacturer: National Transit Pump and Machinery Co.

Model: Jacketed Enbloc type

Use and Outstanding Characteristics:

These duplex, direct-acting, steam-driven pumps are made in two types: valve plate and side pot. They will handle liquid temperatures up to 800° F.

Manufacturer's Data:

Pressures up to 400 p.s.i.
Capacities up to 766 g.p.m.

716.

Trade Name: Transit Side Pot Pumps

Manufacturer: National Transit Pump and Machine Co.

Model: Type SPS

Use and Outstanding Characteristics:

These single, horizontal, side-pot pumps have removable liners and will handle liquid temperatures up to 800° F. They are widely used in the oil refinery industry.

Manufacturer's Data:

Pressures up to 600 p.s.i.
Capacities up to 802 g.p.m.

717.

Trade Name: Horizontal Single Steam Pumps

Manufacturer: National Transit Pump and Machine Co.

Model: Jacketed Type (JS)

Use and Outstanding Characteristics:

Type JS single, direct-acting, steam pumps feature steam jacketed liquid ends for handling liquids of high viscosity and are of the side-pot design. They will handle liquid temperatures up to 800° F. It is for general service.

Manufacturer's Data:

Pressures up to 400 p.s.i.
Capacities up to 828 g.p.m.

718.

Trade Name: Transit ACE Pumps

Manufacturer: National Transit Pump and Machine Co.

Use and Outstanding Characteristics:

This transit ACE pump has a patented construction involving minimum clearances and streamlined passages designed specifically for pumping casing-head gasoline, butane, propane, and other highly volatile liquids. They will handle liquid temperatures up to 800° F.

Manufacturer's Data:

Pressures up to 600 p.s.i.
Capacities up to 345 g.p.m.

719.

Trade Name: Transit Magma Pumps

Manufacturer: National Transit Pump and Machine Co.

Use and Outstanding Characteristics:

These magma pumps are direct-acting, steam-driven pumps for handling semi-solid materials such as acid sludge or settlings from lube oils or other very heavy residuums. There are no suction valves; the residuum to be pumped gravitates into a hopper or funnel section, entering cylinder at top of mid-stroke. The piston which is of the solid plug type shears off a slug of this residuum and forces it through large block valves at each end of the cylinder.

720.

Trade Name: Horizontal Duplex Power Pumps

Manufacturer: National Transit Pump and Machinery Co.

Model: Side Pot Enbloc Type

Use and Outstanding Characteristics:

These horizontal duplex reciprocating power pumps feature separate pots for each suction and discharge valve, suction and discharge valve service interchangeable, rain and dust sealed out-lubrication sealed in, herringbone gears, and anti-friction bearings. They are used for oilfield and pipeline service.

Manufacturer's Data:

Pressures up to 500 p.s.i.
Capacities up to 653 g.p.m.

721.

Trade Name: Transit Vertical Triplex Type Power Pumps

Manufacturer: National Transit Pump and Machine Co.

Use and Outstanding Characteristics:

These vertical triplex, reciprocating, power pumps feature helical gears and a forged steel liquid end. These pumps are particularly adapted for service such as supplying water for flooding purposes in recovering oil, for hydraulic presses, cotton gins, pipe line service, and refinery work.

Manufacturer's Data:

Pressures up to 3250 p.s.i.
Capacities to 132.1 g.p.m.

722.

Trade Name: Transit Hot Oil Power Pumps

Manufacturer: National Transit Pump and Machine Co.

Use and Outstanding Characteristics:

These are single and duplex plunger power pumps suitable for any type drive and are intended for pumping hot oil. They will handle oil up to 900° F. They have forged steel liquid ends and herringbone gears.

Manufacturer's Data:

Pressures up to 1500 p.s.i.
Capacities up to 885 g.p.m.

723.

Trade Name: Transit Rotary Pumps

Manufacturer: National Transit Pump and Machine Co.

Use and Outstanding Characteristics:

The transit rotary pump is of the sliding vane, positive displacement, rotary type made for heavy duty. It has a replaceable liner and can be furnished

of iron, bronze, and special combinations. They are tested to 27" vacuum. They are used for marine and general service.

Manufacturer's Data:

Pressures up to 300 p.s.i.
Capacities up to 2000 g.p.m.

724.

Trade Name: New Design Process Pumps

Manufacturer: National Transit Pump and Machinery Co.

Use and Outstanding Characteristics:

This is a carefully designed single-stage, volute pump with streamlined passages and a broad capacity range. They will handle hot oil, hot oil slurries, propane, butane, refluxes, condensates, boiler feed water, dow therm, ammonia, sulphur dioxide, all refrigerants, acids, caustics, benzol, mek, furfural, and all solvents. They are made in 12 sizes with 22 impeller designs.

Manufacturer's Data:

Capacities from 40 to 1500 g.p.m.
Heads up to 1000 ft.
Temperatures up to 800° F.

725.

Trade Name: Tuthill Small Industrial Pumps, Model L

Manufacturer: Tuthill Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The principle of operation of this type is known as the "internal gear" principle. Power is applied to a rotor and transmitted to an idler gear with which it meshes. The space between the outside diameter of the idler and the inside diameter of the rotor is sealed by a crescent-shaped projection. An increased volume causes a partial vacuum as the teeth come out of mesh so that the liquid is forced into the space and then forced from these spaces out of the pump. Industrial applications include oil lifting from tanks, oil line booster, and use on air brakes. Drive may be obtained through either an electric motor or a gasoline engine.

Manufacturer's Data:

Speed range: 900 - 1800 r.p.m.
Discharge pressures: To 400 p.s.i.
Capacities: To 179 g.p.h.

726.

Trade Name: Tuthill General Purpose Pumps -- Model C

Manufacturer: Tuthill Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These general-purpose pumps, which are built to do service as industrial liquid handlers, operate on the internal gear principle which was described in the sketch on Tuthill Model "L". Models are available to obtain drive from either belts or electric motors.

Manufacturer's Data:

Capacities: To 200 g.p.m.
Discharge pressure: 100 p.s.i.

727.

Trade Name: Tuthill High-Pressure Pumps -- CK Series

Manufacturer: Tuthill Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These are internal gear type pumps that have either reduction gear or direct motor drive. They are designed to produce high discharge pressures. For hydraulic applications they should be attached to lines which are large enough to avoid excessive vacuum at the pump suction. Special units for pumping viscous liquids are available; their chief characteristics are slower speed and auxiliary steam heads to aid in causing a workable viscosity.

Manufacturer's Data:

Capacities: 1 to 200 g.p.m.
Discharge pressures: To 40 p.s.i.

728.

Trade Name: Tuthill Viscous Liquid Pump

Manufacturer: Tuthill Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

This is a slow-speed pumping unit for handling heavy liquids. It is especially recommended for use as a heavy fuel oil pump in connection with oil burners. It is motor driven with necessary speed reductions through belts to insure greater quietness of operation which is so essential to residences and office buildings.

Manufacturer's Data:

Handles viscosities to 800 s.s.u.
Capacities: To 28.1 g.p.m.

729.

Trade Name: Tuthill Coolant Pump -- Model M

Manufacturer: Tuthill Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

The pumping principle of Model-M is that of the internal-gear operation which was described in connection with Model L. A pair of balanced shoes, which are held against the rotor by light springs, separate the suction and discharge zone. These shoes lift off when excess pressure is built or when chips obstruct flow. Compensation for rotor wear is taken care of by these shoes. They are intended as coolant circulating pumps.

Manufacturer's Data:

Capacities: To 50 g.p.m.

730.

Trade Name: Tuthill Automatic Reversing Pumps -- Model RC and Model RM

Manufacturer: Tuthill Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

These are positive displacement rotary pumps with unidirectional flow, regardless of direction of shaft rotation. They are recommended for use on reversing machinery and machinery of which the ultimate rotation is not known. The pumping principle is that of the internal gear, previously described. To

accomplish the reversal of flow the crescent swings through 180°, keeping the flow in the same direction. The crescent is mounted on a separate casting called the idler carrier which rotates in the cover casting. Stops prevent rotation beyond 180°. The crescent always moves through the suction zone.

Manufacturer's Data:

Capacities: To 50 g.p.m.

731.

Trade Name: Tuthill Stripped Pumps, Series Sand SA

Manufacturer: Tuthill Pump Company, Chicago, Illinois

Use and Outstanding Characteristics:

Operation principle is that of the internal gear, described with Model "L". The types include those of most categories manufactured by this company and are made especially for machinery makers to include in their designs to become part of the machine unit.

Manufacturer's Data:

Capacities: To 200 g.p.m.

732.

Trade Name: Universal Acid Pumps

Manufacturer: United States Stoneware Company

Model: Series 697

Use and Outstanding Characteristics:

These centrifugal pumps with all parts coming in contact with liquids made of "Ceratherm", a new stoneware (high alumina body) of remarkable heat-shock resistance as well as unusual strength and toughness will handle all liquid corrosives except fluorides and hot alkalies.

Manufacturer's Data:

Capacities up to 475 g.p.m.
Pressures up to 76 ft.

733.

Trade Name: Viking Rotary Pumps

Manufacturer: Viking Pump Co.

Use and Outstanding Characteristics:

These rotary pumps are of the internal-gear type and are manufactured for a number of uses: general service, belt drive, motor drive, sanitary (with one head clamp screw for easy disassembly), "Straitline," "Vertical," "Pullabout" (dolly mounted), hazardous liquids handling, hydraulic, twin units, hand drive, fuel oil burner pumps, gasoline and truck pumps.

Manufacturer's Data:

Capacities from 2/3 to 1050 g.p.m.
Pressures from 50 p.s.i. to 500 p.s.i.

734.

Trade Name: Viking Idler Drive Gear Pumps

Manufacturer: Viking Pump Co.

Use and Outstanding Characteristics:

These are rotary pumps of the internal gear type with the power being supplied through the idler gear instead of the rotor as in conventional types. They are suitable for handling practically all liquids.

Manufacturer's Data:

Capacities up to 600 g.p.m.
Heads up to 100 p.s.i.

735.

Trade Name: Vogt Brothers Duplex Pumps

Manufacturer: Vogt Brothers Manufacturing Co., Louisville, Kentucky

Use and Outstanding Characteristics:

These duplex units are steam pumps with seamless brass liners in the pump cylinders, Tobin bronze rods, iron pump pistons, vulcanized pump valves and brass valve seats. Different intended uses varies the outfitting of the various types within the category. Special types are available for oil line use, boiler feed, circulating, and receiver pumping.

Manufacturer's Data:

Discharge pressures: To 200 lbs.

736.

Trade Name: Warren "Compactunit"

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

The "Compactunit" is a centrifugal pump with a standard drip-proof motor used as drive, but there are special units with close-coupled turbine drive. They are fitted as standard, all-iron, or all-bronze. An anti-swirl baffle in the casing tends to prevent air binding in the pump.

Manufacturer's Data:

Capacities: To 450 g.p.m.

Heads: To 500'

737.

Trade Name: Warren Machine and Jordan Chest Pumps

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

This type of pump is manufactured for use in handling paper stock. It is the centrifugal type with an open-type impeller that has vanes on the reverse side that cause it to be self-cleaning. There is a combination propeller-impeller that is designed to maintain practically constant level in the regulating or stuff box.

Manufacturer's Data:

Handles up to 150 tons per day at the usual densities

738.

Trade Name: Warren Two-Stage Volute Centrifugal Pumps, Type 2HB

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

Type 2HB has a volute type hydraulically balanced pump casing that is

divided horizontally. The impellers are single-suction enclosed type. The two stages are joined by an inter-stage loop which is designed such to provide smooth flow. Standard fitting is bronze, but all-iron, and all-bronze units are also available.

Manufacturer's Data:

Total Heads: To 800'
Capacities: To 825 g.p.m.

739.

Trade Name: Warren Steam Heat Vacuum Pumps

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

This is a reciprocating type pump with cast-iron steam and liquid cylinders with the liquid cylinder having a bronze liner. The liquid valves are Durabla valves which achieve adjustment to variations in load instantly. They open only enough to allow passage of the flow and close instantly. This reduces slip, turbulence, and friction losses and permits full load operation at slower speeds.

Manufacturer's Data:

Drains up 215,000 sq. ft. of radiation surface
Displacements: To 1600 g.p.m.

740.

Trade Name: Warren Single-Stage-Double Suction Centrifugal Pumps, Type DM and DL

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

These types have a cast-iron double-suction volute type casing. The suction and discharge nozzles are on the lower half of the horizontally split case. Priming and discharge openings are provided along with air cocks.

Manufacturer's Data:

Capacities: 800 - 5000 g.p.m.
Total heads: To 300'
Motor H.P.: 7.5 to 450

741.

Trade Name: Warren Hydraulic Pressure Pumps

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

This is a duplex forged-barrel type hydraulic pressure pump. It has flat face, slide type steam valves that have outside stroke adjustment. The plunger barrel is of forged steel with stuffing boxes, valve holes, and ports bored in.

Manufacturer's Data:

Steam pressures: To 250 lbs.
Liquid pressures: To 10,000 p.s.i.
Capacities: To 127 g.p.m.

742.

Trade Name: Warren Horizontal Duplex Piston Pumps, "Realwear" Type

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

These types are used for boiler feed, fuel oil pressure, oil transfer, and general water service. They are cast iron, bronze-fitted for pH values from 6.5 to 8.5, and all-iron for pH values from 8.5 up. Applications include draining steam lines, coils, radiators, heaters, steam jackets, boilers, and feeding condensate to boilers.

Manufacturer's Data:

Steam and liquid pressures: To 250 lbs.
Capacities: To 294 g.p.m.

743.

Trade Name: Warren Horizontal Duplex Plunger Pumps for Boiler Feed and Pressure Service

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

This type can be dismantled completely without disturbing the piping. They are pot valve type with outside end packed plungers.

Manufacturer's Data:

Capacities:

Cold water pressure service: To 654 g.p.m.
Boiler feed service: To 490 g.p.m.
Boiler H.P.: To 7100

744.

Trade Name: Warren Single Stage Double Suction Centrifugal Pumps, Type DB and DBM

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

These types have a volute type horizontally split casing with the suction and discharge nozzles cast integrally with the lower half. They have double-suction inclosed type impellers.

Manufacturer's Data:

Total heads: To 170'
Capacities: To 1200 g.p.m.

745.

Trade Name: Warren 4 and 6 Stage, Type TM

Manufacturer: Warren Steam Pump Company, Warren, Massachusetts

Use and Outstanding Characteristics:

These types are adaptable to any type driver. The standard bases are designed for NEMA frame motors and modern turbines, but other types of bases for other drives can be provided. The first stage inlet is oversize and has no sharp bends to eliminate the possibility of cavitation and reduce suction losses. Bronze-fitted is standard for the type, but all-iron and all-bronze units are available where such calls for them.

Manufacturer's Data:

Capacities: 40 - 750 g.p.m.
Total head: 700 - 1600'

746.

Trade Name: Weinman Unipumps

Manufacturer: The Weinman Pump Manufacturing Company, Columbus, Ohio

Use and Outstanding Characteristics:

Unipumps may be installed in most any position. They have a volute casing regularly furnished with cast iron but also furnished with other metals if use should require. The impeller is normally enclosed type with closed back design to eliminate the need of a second stuffing box. Application is best described as general service. This includes cold water and brine service.

Manufacturer's Data:

Heads: To 500'
Capacities: To 1000 g.p.m.

747.

Trade Name: Weinman Type "L" Split Case Centrifugal Pumps

Manufacturer: Weinman Pump Manufacturing Company, Columbus, Ohio

Use and Outstanding Characteristics:

These types have use in water works, as utility pumps, with air conditioning equipment, and in general purpose industrial uses. Drives are obtained through motor or turbine as power units. The impeller is double suction enclosed type made of bronze, cast iron, or any alloy necessary to adapt it to a particular usage.

Manufacturer's Data:

Capacities:
Minimum: To 2400 g.p.m.
Heads: To 240'

Maximum: To 3500 g.p.m.
Heads: To 185'

748.

Trade Name: Weinman Centrifugal Pumps for Belt or Motor Drive, Types GB and KB

Manufacturer: Weinman Pump Manufacturing Company, Columbus, Ohio

Use and Outstanding Characteristics:

Types GB and KB are side-suction volute centrifugal pumps that are fitted for service in creameries, dairies, ice plants, air conditioning systems, laundries, greenhouses, irrigation systems, hotels, apartment buildings, and

in bottle and can washers. The side suction may be placed in any of four positions, which is an advantage when space must be conserved. Either open or enclosed type impellers are standard, the two being interchangeable on the pumps.

Manufacturer's Data:

Capacities: To 1100 g.p.m.
Heads: To 200'
Motor sizes: $\frac{1}{2}$ to 40 H.P.

749.

Trade Name: Weinman Sump Pumps

Manufacturer: Weinman Pump Manufacturing Company, Columbus, Ohio

Use and Outstanding Characteristics:

Sump pumps with their automatic control are generally installed in basements or such remote locations. To protect materials against damage by flood, seepage or other types of encroaching water, Weinman's are furnished in two general classes: the GAV for carrying small, non-fibrous liquids and UVS for handling sewerage, fibrous and solid material. The motor is located above the pump unit to protect it from the flood waters and it is activated by a float operated switch. With three-phase motors, however, the float serves merely as a pilot switch and a magnetic switch is the actual motivator. Single and duplex units of the outfit are available.

Manufacturer's Data:

Speeds: 1750 and 11500 r.p.m.
Capacities: To 500 g.p.m.
Heads: To 60'

750.

Trade Name: Weinman Type "U" Non-Clogging Pumps

Manufacturer: Weinman Pump Manufacturing Company, Columbus, Ohio

Use and Outstanding Characteristics:

Type "V" Non-Clogging Pumps are designed specifically for handling liquids carrying large solids and foreign material. They have use in the pumping of sewerage and sludge for municipalities and have industrial use in rubber

reclaiming plants, canneries, wineries, beet sugar refineries, packing houses, and tanneries, paper mills, and dairy barns. Vertical or horizontal types for either submerged or non-submerged pumping are available. The impeller is a two-vane abrasion-resistant type with rounded ends to lessen clogging possibilities.

Manufacturer's Data:

Minimum: To 800 g.p.m.
Heads: To 150'

Maximum: To 2300 g.p.m.
Heads: To 105'

751.

Trade Name: Weinman Type "P" Self-Oiling Geared Mine Pumps

Manufacturer: Weinman Pump Manufacturing Company, Columbus, Ohio

Use and Outstanding Characteristics:

These are power pumps that require no oil or grease cups. Oil in the gear case lubricates all bearings and moving parts except the motor bearings. The oil level need only be inspected weekly. The liquid cylinders are made of cast iron, but are of acid-resisting bronze for use where acidous mine water is encountered.

Manufacturer's Data:

Maximum head: 300'
Capacity: To 100 g.p.m.

752.

Trade Name: Weinman Multi-Stage Pumps

Manufacturer: Weinman Pump Manufacturing Company, Columbus, Ohio

Use and Outstanding Characteristics:

The multi-stage units are cast-iron casing centrifugal pumps with bronze back-to-back single-suction impellers. This latter feature hydraulically balances the rotating element and, under normal conditions, avoids thrust.

Manufacturer's Data:

Speeds: 1750 and 3450 r.p.m.
Capacities: To 650 g.p.m.
Heads: To 400'

GENERAL INFORMATION CONCERNING WELCH DUO-SEAL PUMPS

The Welch duo-seal consists essentially of a tight metal case in which is mounted the pump unit. There is a stationary "stator" in which a rotor is eccentrically mounted. The contact point of the two is a seal, thus leaving a crescent-shaped air space. As the rotor goes around, it sweeps the air spaces clean. As this progresses a higher and higher vacuum is produced.

753.

Trade Name: Welch Two Stage Duo-Seal Vacuum Pump 1405

Manufacturer: W. M. Welch Manufacturing Co., Chicago, Illinois

Use and Outstanding Characteristics:

This is the best pump made by the Welch Company. It has a double seal which prevents the diffusion of the exhaust gases back into the intake side and insures a higher vacuum. It has quiet operation, which is an asset for laboratory operation.

Manufacturer's Data:

Vacuum: .00005 m.m.H.g.

Free air capacity: 33.4 liters/min.

754.

Trade Name: Welch 1405 H Motor-Driven Duo-Seal Pump

Manufacturer: W. M. Welch Manufacturing Co., Chicago, Illinois

Use and Outstanding Characteristics:

This type is mounted on a cast-iron base with a V-belt drive.

Manufacturer's Data:

Motor H.P.: 1/3

755.

Trade Name: Welch 1400 Two-Stage Duo-Seal Vacuum Pump

Manufacturer: W. M. Welch Manufacturing Co., Chicago, Illinois

Use and Outstanding Characteristics:

This type is especially adapted for use in physics laboratories and

other high-vacuum applications where the ultimate in capacity is not required. It is quiet in operation.

Manufacturer's Data:

Vacuum: .0001 m.m.H.G.
Free air capacity: 21 liters/min.
Oil required to charge: 550 ml.

756.

Trade Name: Welch 1406 H Single Stage Duo-Seal Pump

Manufacturer: W. M. Welch Manufacturing Co., Chicago, Illinois

Use and Outstanding Characteristics:

This type uses only one rotor unit so is exceptionally quick-acting in the early stages of exhaustion and this makes it ideal as a backing unit for diffusion or condensation pumps.

Manufacturer's Data:

Vacuum: 5 microns
Capacity: 33.4 liters

757.

Trade Name: Welch Single-Stage Large Capacity Pump 1403B

Manufacturer: W. M. Welch Manufacturing Co., Chicago, Illinois

Use and Outstanding Characteristics:

This is a single-stage rotary type with large free air capacity. It has large capacity which makes it ideal as a force pump for diffusion and molecular drag pumps and is also suited for distillation work.

Manufacturer's Data:

Vacuum: To .005 m.m.H.g.
Capacity: 100 liters/min.

758.

Trade Name: Welch 1404 H Vacuum Distillation Pump

Manufacturer: W. M. Welch Manufacturing Co., Chicago, Illinois

Use and Outstanding Characteristics:

This pump is expressly designed for vacuum distillation in an organic

laboratory. It can be cleaned and the oil changed without taking the pump apart. It handles a large volume of oil which dilutes the vapors which are products of distillation and protects the mechanism from corrosion and clogging.

Manufacturer's Data:

Vacuum: .02 m.m.
Free air capacity: 33.4 liters/min.

759.

Trade Name: Welch Vacuum Pressure Pump, 1410N

Manufacturer: W. M. Welch Co., Chicago, Illinois

Use and Outstanding Characteristics:

This is a general utility vacuum and pressure pump. It is used for demonstration and utility work since it furnishes both vacuum and pressure.

Manufacturer's Data:

Vacuum: .02 m.m.
Air capacity: 21 liters/min.
Pressure: 15 p.s.i.

760.

Trade Name: Duplex Steam Slush Pump, Model H-15000-CF

Manufacturer: The Wheland Company, Chattanooga, Tennessee

Use and Outstanding Characteristics:

This type is size 15" x 7 3/4" x 18" and is recommended for any drilling condition where the size is suitable. The steam cylinders with the steam chest are cast in one piece. There are no screws or threads in the mud stream.

Manufacturer's Data:

Capacities (at 100% efficiency): To 788 g.p.m.
Speeds: To 56 r.p.m.

761.

Trade Name: Wheland Duplex Steam Slush Pumps, Model H-20000-AA

Manufacturer: The Wheland Company, Chattanooga, Tennessee

Use and Outstanding Characteristics:

In this type the combined steam and exhaust valves are located below the steam cylinders. The exhaust steam must blow out the condensate before leaving the cylinder so that there is automatic self-draining of the steam end. The base is a skid type "H" beam with boiler plate welded to the beams to protect the under side of the pump.

Manufacturer's Data: (at 100% efficiency)

Speeds: To 68 r.p.m.
Capacities: To 1125 g.p.m.
Size: 15½ x 8 x 20"

762.

Trade Name: Wheland Duplex Steam Slush Pump, Model H-20000-BA

Manufacturer: The Wheland Company, Chattanooga, Tennessee

Use and Outstanding Characteristics:

This type has skid-type base with plating welded on as protection for the underside of the pump. It, too, has the feature of the exhaust steam having to blow out the condensate before leaving the cylinder thus giving automatic self-draining of the steam end.

Manufacturer's Data:

Size: 16½ x 8 x 20"
Maximum recommended speed: 56 r.p.m.
Capacity at this speed: 927 g.p.m.

763.

Trade Name: Wheland Duplex Slush Pump, Model HP-8000

Manufacturer: The Wheland Company, Chattanooga, Tennessee

Use and Outstanding Characteristics:

Features of this type are Timken bearings, fully enclosed oil bath power end, and a special water cylinder head and liner packing assembly. In addition to this it has a reversible pinion shaft assembly.

Manufacturer's Data:

Size: 7" x 12"
Capacities: To 460 g.p.m.
Pressures: To 1141 lbs.

764.

Trade Name: Wheland Heavy Duty Power Slush Pump, Model HP-11000-AB

Manufacturer: The Wheland Company, Chattanooga, Tennessee

Use and Outstanding Characteristics:

This is a slush pump mounted on a heavy "I" beam sled-type base.

Manufacturer's Data:

Capacities: To 571 g.p.m.

Pressures: To 1673 lbs.

Size: $7\frac{1}{2}$ x 14"

765.

Trade Name: Wheland Heavy Duty Power Slush Pump, Model HP-15000-CF

Manufacturer: The Wheland Company, Chattanooga, Tennessee

Use and Outstanding Characteristics:

These types are fully enclosed with oil tight power ends. They are mounted on a sled type steel base.

Manufacturer's Data:

Capacities: To 760 g.p.m.

Pressures: To 1404 lbs.

766.

Trade Name: Yeoman's Type HSD Single-Stage Double-Suction Pumps

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

Service for this type includes handling clear water or other clear liquids of low viscosity at moderate heads. Ordinary applications include general water supply, city water booster service, hot, condensate, or make-up water service, white water or overflow service in paper mills. Construction features include a horizontally split case, enclosed type bronze impellers, and bed plates equipped with drip pans having a tapped drain.

Manufacturer's Data:

Capacities: To 10000 g.p.m.

Heads: To 125'

Peak efficiency: 84%

767.

Trade Name: Yeoman's Type YB Two-Stage Pumps

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

Type YB's are centrifugal pumps with ball-bearing construction. This has advantages when the service is automatic and constant attendance is not desired because lubrication is only occasionally necessary. It has an opposed impeller which permits the use of a short, stubby, rigid shaft. The shaft rigidity results in increased life of packings, which offers the further advantage of large capacity in a small floor space. This has advantage where multi-level water supply systems. Applications include clear water services where pressures of 100 - 170 lbs. are required. Such services include water supply for high buildings, small municipalities, and industrial plants, boiler feeding, golf course sprinkling, hydraulic elevators, and quick feed to low pressure stage of hydraulic pressures.

Manufacturer's Data:

Capacities: 75 - 700 g.p.m.

Heads: 175 - 400'

768.

Trade Name: Yeoman's Turbine Type Pumps

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

These are manufactured for use with small capacities and high heads. It is a double-suction, ball bearing type horizontal unit. Its only moving part is the impeller, which is of many-bladed construction. Each blade acts as a pump itself. The number of blades acting on the liquid determines the pressure applied to the liquid. Larger and smaller impellers may be readily replaced thus varying the pump capacity without disturbing connections. The impeller design is such that amounts of air and vapor may be handled without vapor locking. Applications include water supply, boiler feed, condensation return, hot and cold

water circulating, chemical transfer, filter, air conditioning, refinery, self-priming pumps, cooling tower, marine service, gasoline and propane circulating, booster, brewery and distillery service, and brine circulating service.

Manufacturer's Data:

Heads: To 550'
Capacities: To 19 g.p.m.

769.

Trade Name: Yeoman's Close-Coupled Centrifugal Motopump

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

Yeoman's Motopumps are designed for general service. They are portable, self-contained, and can be mounted in horizontal or vertical positions. Their general service usage includes pumping of abrasive laden liquids, fluids at high temperatures, hot and cold water, brine, drainage, sewerage, slurry, various chemicals, distilled and alkaline liquids. The impellers are made of many types of materials to fit them for use with specific types of fluids. They can be fitted to most any place in a pipe line. The motor is protected from water by a brass water slinger. The volute shifts to fit various pipe layouts.

Manufacturer's Data:

10 to 1000 g.p.m.
Heads: To 250'
Suction lift: 15'

770.

Trade Name: Yeoman's Close-Coupled Centrifugal Motopump

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

This type is used for circulating hot water, cold water, or brine, for booster service in small buildings.

Manufacturer's Data:

Capacities: To 35 g.p.m.
Heads: To 60'
Speed: 3500 r.p.m.

771.

Trade Name: Yeoman's Automatic Electric Heavy Duty Bilge or Sump Pumps,
Series 3000

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

Practical use of these pumps are in locations where street sewers are shallow and narrow and basements are deep to remove waste water and seepage to sewers. To remove this drainage the bilge pump is located over a sump or catch basin and the pump is automatically activated when the liquid rises. The pump casing is the submerged type equipped with a cast iron enclosed type impeller. It is hung by a wrought iron suspension pipe from an iron plate. In the duplex units the pumps are hung from individual plates. The automatic control is obtained from electrodes in contact with the liquid. This method, however, is only usable with alternating current.

Manufacturer's Data:

Heads: To 75'
Capacities (each pump); To 1200 g.p.m.

772.

Trade Name: Drain-Dri

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

"Drain-Dri" is a rust-proof "cellar drainer". There is a screen at the foot to exclude larger trash, but still pass smaller solids to the non-clog impeller. The control is enclosed butt contact, heavy-duty type float switch with positive overload protection. The impeller is non-clogging type that passes matches, laundry waste, and cellar trash.

Manufacturer's Data:

Heads: To 28'
Capacities: To 5200 g.p.h.

773.

Trade Name: Yeoman's Hi-Lo

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

This is a condensation return pump entirely hot dipped galvanized for rust-proofing. They work automatically by means of an electric control with positive float rod operation.

Manufacturer's Data:

Sq. ft. of radiation handled: 15000
Capacities: To 45 g.p.m.
Discharge pressures: To 30 lbs.

774.

Trade Name:

Yeoman's Condensation Return Pump, Turbine Type

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

An electrically driven pump to handle a gravity type condensation system. The units are either single or duplex with float switches rigged for overload protection. The pump itself is a double suction turbine type with a flexible coupling.

775.

Trade Name: Yeoman's Centrifugal Sewerage and Trash Pumps

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

There are several mountings for these types. They are designed for sewerage lift stations, for low-level and isolated areas, delivering sewerage to treatment and disposal plants, pumping sewerage from one stage to the next in disposal plants, and for pumping sludge.

Manufacturer's Data:

Capacities: To 3500 g.p.m.
Total heads: To 75'

776.

Trade Name: Yeoman's Dry Vacuum Pumps

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

The assembly consists of a cylinder having an elliptical inlet and discharge ports on opposite sides and a drum-shaped rotor, which has a shaft carried in roller or ball bearings. The rotor is quite a bit smaller than the diameter of the cylinder and is mounted off-center in it so that the surface of the rotor runs close to the bottom wall of the cylinder. The rotor has a number of radial slots milled through its length in each of which is a blade. Centrifugal force makes the blade follow the inside contour of the cylinder, and since this is not concentric with the rotor, the blades are continuously forced in and out. Thus the cells between them are constantly contracting and compressing the air trapped in them. The blade action depends solely on centrifugal force and there is automatic compensation for wear.

Manufacturer's Data:

Capacity: To 600 CFM

777.

Trade Name: Yeoman's Screenless Ejectors, Heavy Duty Submerged Type Automatic Electric

Manufacturer: Yeoman Brothers Company, Chicago, Illinois

Use and Outstanding Characteristics:

This is a submerged centrifugal screenless ejector used wherever heavy liquids, or liquids containing solids are to be elevated to greater heights. They have also been used as booster pumps for raising sewerage and storm water from low-lying areas. In industrial plants they are used to handle heavy viscous liquids, to transfer effluents, and certain acids in process work. The unit has an alarm bell which rings whenever there is power failure or the inflow is too great for the pump to handle.

Manufacturer's Data:

Capacities: To 1200 g.p.m.

Heads: To 75'

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270.	Deming Company, Salem, Ohio	- Catalog	G-47
271.	"	"	"
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305.	Deming Company, Salem, Ohio	-	Catalog	G-47
306.	" " " "		"	"
307.	" " " "		"	"
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313.	" " " "		"	"
314.	" " " "		"	"
315.	Distillation Products, Inc., Rochester, N.Y.		Gen'l Catalog	
316.	" " " "	"	"	"
317.	" " " "	"	"	"
318.	" " " "	"	"	"
319.	" " " "	"	"	"
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325.	" " " "	"	"	"
326.	Domestic Engine & Pump Co., Shippensburg, Pa.			
			Bulletin	44T
327.	" " " "	"	"	44F
328.	" " " "	"	"	"
329.	" " " "	"	"	"
330.	" " " "	"	"	409
331.	" " " "	"	"	SP41
332.	" " " "	"	"	"
333.	" " " "	"	"	37ISP
334.	" " " "	"	"	37EP
335.	" " " "	"	"	905
336.	" " " "	"	"	908
337.	" " " "	"	"	N908
338.	Dorr Company, N.Y., N.Y.	-	Bulletin	5181
339.	" " " "		"	5001
340.	G. A. Dunham Company, Chicago, Ill.			
341.	" " " "	"	"	"
342.	" " " "	"	"	"
343.	Duriron Company, Dayton, Ohio	-	Bulletin	810-2
344.	" " " "		"	11-2
345.	Edson Corporation, South Boston, Mass.		Bulletin	393247
346.	" " " "	"	"	"
347.	" " " "	"	"	"
348.	" " " "	"	"	393147
349.	" " " "	"	"	393347
350.	Ellicott Machine Corp., Baltimore, Md.		Bulletin	F499
351.	Elmes Engineering Works Of American Steel Foundries, Chicago, Ill	-	Bulletin	1020
352.	Fairbanks Morse & Co., Chicago, Ill.		Bulletin	6980
353.	" " " "	"	"	27
354.	" " " "	"	"	690M2
355.	" " " "	"	"	5810A
356.	" " " "	"	"	55508
357.	" " " "	"	"	5810-8
358.	" " " "	"	"	5972

359.	Fairbanks Morse & Co., Chicago, Ill.,	Bulletin	6855
360.	"	"	6860
361.	"	"	6310
362.	"	"	5430-2
363.	"	"	5460-1
364.	French Oil Mill Machinery Co., Pequa, Ohio,	Bulletin	05-10A
365.	Friend Manufacturing Co., Gasport, N. Y. -	Sprayer's Booklet	
366.	"	"	"
367.	"	"	"
368.	"	"	"
369.	"	"	"
370.	"	"	"
371.	Fulflo Specialties Co, Blanchester, Ohio	- Data Sheet	200
372.	"	"	"
373.	"	"	600
374.	"	"	800
375.	"	"	900
376.	"	"	1000
377.	"	"	1100
378.	"	"	1200
379.	"	"	1300
380.	"	"	1400
381.	"	"	1500
382.	"	"	1600
383.	"	"	3000
384.	Gardner - Denver Company, Quincy, Ill.	Bulletin	P46
385.	"	"	P45
386.	"	"	P36
387.	"	"	P40
388.	"	"	P234
389.	"	"	P47
390.	"	"	P38
391.	"	"	P370
392.	"	"	P37
393.	"	"	6-A -5
394.	"	"	"
395.	"	"	AB-1
396.	"	"	A-8
397.	"	"	A304
398.	"	"	A105
399.	Gas Pump & Burner Mfg. Co., Tulsa, Okla.		
400.	"	"	"
401.	"	"	"
402.	"	"	"
403.	"	"	"
404.	"	"	"
405.	"	"	"
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410.	Gast Mfg., Corp., Benton Harbor, Mich.		
411.	" " " " " "		
412.	" " " " " "		
413.	" " " " " "		
414.	" " " " " "		
415.	" " " " " "		
416.	Goulds Pumps, Inc., Seneca Falls, N. Y.	Bulletin	720.1
417.	" " " " " "	"	720.2
418.	" " " " " "	"	720.3
419.	" " " " " "	"	721.1
420.	" " " " " "	"	722.1
421.	" " " " " "	"	722.5
422.	" " " " " "	"	723.1
423.	" " " " " "	"	621A1
424.	" " " " " "	"	725.2
425.	" " " " " "	"	725.1
426.	" " " " " "	"	623A1
427.	" " " " " "	"	726.1
428.	" " " " " "	"	643A1
429.	" " " " " "	"	641A2
430.	" " " " " "	"	601A
431.	Coyne Steam Pump Co., Ashland, Pa.,		
432.	" " " " " "		
433.	" " " " " "		
434.	" " " " " "		
435.	" " " " " "		
436.	" " " " " "		
437.	Gray - Mills Corp., Evanston, Ill.		
438.	" " " " " "		
439.	" " " " " "		
440.	" " " " " "		
441.	" " " " " "		
442.	GUILD & GARRISON INC., Brooklyn, N. Y.	Bulletin	110
443.	" " " " " "	"	"
444.	" " " " " "	"	"
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451.	" " " " " "	"	"
452.	" " " " " "	"	"
453.	Hills - McCanna, Chicago, Ill.,	Catalog	P44
454.	" " " " " "	"	"
455.	" " " " " "	"	"
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457.	" " " " " "	"	"
458.	" " " " " "	"	"
459.	" " " " " "	"	"
460.	" " " " " "	"	"
461.	Hydro - Power Inc., Springfield, Ill.	Bulletin	460
462.	" " " " " "	"	"
463.	" " " " " "	"	"

464.	Hydro - Press Inc., N. Y., N. Y.					
465.	Ingersoll - Rand, Philipsburg, N. J.				Booklet	465
466.	"	"	"	"	Form	7095
467.	"	"	"	"	"	"
468.	"	"	"	"	"	7062
469.	"	"	"	"	"	7057
470.	"	"	"	"	"	7093A
471.	"	"	"	"	"	"
472.	"	"	"	"	"	"
473.	"	"	"	"	"	"
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480.	"	"	"	"	"	"
481.	"	"	"	"	"	"
482.	"	"	"	"	"	"
483.	Johnston Pump Co., Los Angeles, Calif.					
484.	"	"	"	"		
485.	"	"	"	"		
486.	"	"	"	"		
487.	"	"	"	"		
488.	Kingsford Foundry & Machine Works, Oswego, N. Y.				Catalog	16
489.	"	"	"	"	Bulletin	59
490.	"	"	"	"	"	"
491.	"	"	"	"	"	"
492.	"	"	"	"	"	"
493.	"	"	"	"	"	52
494.	"	"	"	"	"	51
495.	"	"	"	"	"	50
496.	Kinney Mfg. Co., Boston, Mass.				Bulletin	13A
497.	"	"	"	"	"	"
498.	"	"	"	"	"	"
499.	Kraissl Company, Inc., Hackensack, N.J.				Bulletin	1289
500.	"	"	"	"	"	"
501.	"	"	"	"	"	1193
502.	"	"	"	"	"	1330
503.	"	"	"	"	"	1344
504.	"	"	"	"	"	1267
505.	LaBour Company, Inc., Elkhart, Ind.,				Bulletin	50
506.	"	"	"	"	"	"
507.	"	"	"	"	"	51
508.	Lawrence Machine & Pump Corp., Lawrence, Mass.				Bulletin	201-2
509.	"	"	"	"	"	202-2
510.	"	"	"	"	"	303-3
511.	"	"	"	"	"	204-2
512.	"	"	"	"	"	205-2
513.	"	"	"	"	"	206-2
514.	"	"	"	"	"	207-2
515.	"	"	"	"	"	208-2
516.	"	"	"	"	"	209-2

517.	Layne & Bowler Inc.,	Memphis,	Tenn.			
518.	Leyman Mfg. Corp.,	McGowan Pump Division,	Cincinnati,			
				Ohio	Bulletin	518
519.	"	"	"	"	"	4030D
520.	"	"	"	"	"	"
521.	"	"	"	"	"	4043A
522.	"	"	"	"	"	405A
523.	"	"	"	"	"	405A
524.	"	"	"	"	"	406A
525.	"	"	"	"	"	"
526.	"	"	"	"	"	"
527.	"	"	"	"	"	"
528.	"	"	"	"	"	4030A
529.	Lobee Pump And Machinery Co.,	Gasport,	N. Y.			
530.	"	"	"	"	"	"
531.	"	"	"	"	"	"
532.	"	"	"	"	"	"
533.	Logansport Machine Co.,	Logansport,	Ind.,		Catalog	62
534.	"	"	"	"	"	"
535.	"	"	"	"	"	"
536.	"	"	"	"	"	"
537.	"	"	"	"	"	"
538.	Luitweiler Corp.,	Rochester,	N. Y.		Phamphlet	
539.	"	"	"	"	"	
540.	"	"	"	"	"	
541.	"	"	"	"	"	
542.	"	"	"	"	Bulletin	1840
543.	"	"	"	"	"	1004
544.	"	"	"	"	"	1510
545.	Luzerne Rubber Co.,	Trenton,	N. J.			
546.	"	"	"	"	"	
547.	Marlowe Pumps,	Ridgewood,	N. J.		Bulletin	S46
548.	"	"	"	"	General Catalog	
549.	"	"	"	"	"	"
550.	"	"	"	"	"	"
551.	"	"	"	"	"	"
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568.	"	"	"	"	"	"
569.	"	"	"	"	"	"
570.	"	"	"	"	"	"
571.	"	"	"	"	"	"

572.	Marlowe Pumps, Ridgewood, N. J.	General Catalog	
573.	" " " " " "	" "	
574.	Manistee, Iron Works Co., Maristee, Mich.	Bullentin 4-33	
575.	" " " " " "	" "	
576.	A.Y. McDonald Mfg. Co. Dubuque Ia.	Catalog 46	
577.	" " " " " "	" "	
578.	" " " " " "	" "	
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596.	" " " " " "	" "	
597.	Milton Roy Co. Philadelphia, Pa.	Catalog 146	
598.	Morse Machine Works Balwensville, N.Y.	Bullentin 143	
599.	" " " " " "	" "	158
600.	" " " " " "	" "	160
601.	" " " " " "	" "	163
602.	" " " " " "	" "	165
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605.	" " " " " "	" "	174
606.	" " " " " "	" "	175
607.	" " " " " "	" "	176
608.	" " " " " "	" "	
609.	Nash Eng. Co., South Norwalk Conn.	Bullentin	349
610.	" " " " " "	" "	345
611.	" " " " " "	" "	350
612.	" " " " " "	" "	339
613.	" " " " " "	" "	362
614.	Nathan Mfg. Co., N.Y.	Bullentin	31
615.	" " " " " "	" "	L-6
616.	N.J. Machine Corp. Hoboken N.Y.		
617.	Novo Engine Co. Lansing Michigan,	Bullentin	167-D
618.	" " " " " "	" "	
619.	" " " " " "	" "	"
620.	" " " " " "	" "	"
621.	Obeidorfer Foundries Inc. Syracuse N.Y.		
622.	" " " " " "	" "	
623.	" " " " " "	" "	
624.	" " " " " "	" "	
625.	Oil-Gear Co., Milwaukee, Wis.	Bullentin	47000

626.	Oliver United Filters N.Y.,N.Y.	Bullentin	308R
627.	" " " " "	"	309
628.	Peerless Pump Div. Los Angeles, Calif.		
629.	" " " " "	"	
630.	" " " " "	"	
631.	" " " " "	"	
632.	" " " " "	"	
633.	" " " " "	"	
634.	" " " " "	"	
635.	Pennsylvania Pump and Compressor Co. Easton, Penn.	Bullentin	91
6361	" " " " "	" " " "	233
637.	" " " " "	" " " "	234
638.	" " " " "	" " " "	"
639.	" " " " "	" " " "	"
640.	Pioneer Pump and Mfg. Co., Detroit Michigan		
641.	" " " " "	" " " "	
6421	Platt Iron Works, Dayton Ohio	Bullentin	797
643.	" " " " "	" " " "	798
644.	" " " " "	" " " "	799
645.	" " " " "	" " " "	600
646.	" " " " "	" " " "	801
647.	" " " " "	" " " "	815
648.	" " " " "	" " " "	802
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651.	" " " " "	" " " "	813
652.	" " " " "	" " " "	808
653.	" " " " "	" " " "	810
654.	" " " " "	" " " "	812
655.	% Proportioneers % Providence, R.I.	Bullentin	1100
656.	Quimby Pump Div. H.K. Porter Co.	Bullentin	300A
657.	" " " " "	Catalog	Q45A
658.	" " " " "	Bullentin	C212A
659.	" " " " "	"	C213B
660.	" " " " "	"	QR46A
661.	" " " " "	"	C211A
662.	" " " " "	"	S-204
663.	Racine Tool and Machine Co. Racine, Wis.	Catalog	P.100
664.	" " " " "	" " " "	"
665.	Resist Pipe and Valve Co. Cambridge, Mass.		
666.	" " " " "	" " " "	
667.	" " " " "	" " " "	
668.	Root-Connersville Blower Corp. Co., Connersville Ind.	Bull.	31B15
669.	" " " " "	" " " "	61B-11
670.	John Roberston Co. Brooklyn, N.Y.		
671.	George D. Roper, Rockford, Ill	Catalog	947
672.	" " " " "	" " " "	
673.	" " " " "	" " " "	
674.	" " " " "	" " " "	
675.	Ross Heater and Mfg. Co. Buffalo, N.Y.	Bullentin	6509
676.	Sawyer Electrical Mfg., Co. L.A. Calif.		
677.	E.C. Schleyer Pump Co. Anderson Ind.		
678.	Claude B. Schreible, Detroit, Mich.		1249

679.	Shartle Bros., Middletown O.	Bullentin	485	
680.	"	"	605	
681.	"	"	685	
682.	"	"	755	
683.	"	"	765	
684.	"	"	765	
685.	"	"	775	
686.	"	"	785	
686.	T. Shriver and Co. Harrison, N.Y.			
687.	Skidmore Pumps St. Joseph, Mich.	Bullentin	104	
688.	"	"	14	
689.	"	"	16	
690.	"	"	17	
691.	"	"	18	
692.	Smith - Meeker Eng. Co.	Bullentin	4260	
	(R.B. Carter Co.) Hackenock, N.Y.		4260	
693.	Waterous Co. St Paul Minn.		4260	
694.	"	"	"	
695.	Morgan Smith Co., York Penn.			
696.	Speciality Brass Co., Kenosha Wis.	Bullentin	913	
697.	"	"	"	"
698.	"	"	"	"
699.	Sterling Inc., Milwaukee, Wis.	Bullentin	445B	
700.	"	"	"	"
701.	"	"	453	
702.	"	"	"	"
703.	"	"	"	"
704.	"	"	"	"
705.	Sundstand Machine Tool Co., Rockford Ill.			
706.	"	"	"	"
707.	"	"	"	"
708.	Taber Pump Co., Buffalo, N.Y.	Bullentin	CL339	
709.	"	"	SL35	
710.	"	"	SL35	
711.	"	"	R929	
712.	National Transit Pump and Machine Co., Tulsa, Ok.	Bull.	1000	
713.	"	"	"	1010
714.	"	"	"	1020
715.	"	"	"	1100
716.	"	"	"	2011A
717.	"	"	"	2200
718.	"	"	"	2301
719.	"	"	"	2500
720.	"	"	"	3070
721.	"	"	"	3014
722.	"	"	"	3401
723.	"	"	"	7041
724.	"	"	"	6000
725.	Tuttle Pump Co., Chicago, Ill. General Catalog			
726.	"	"	"	"
727.	"	"	"	"
728.	"	"	"	"
729.	"	"	"	"
730.	"	"	"	"
731.	"	"	"	"

732.	U.S. Storeware Co., N.Y.	Bullentin	702
733.	Viking Pump Co., Cedar Falls, Iowa	Catalog	42-6
734.	"	"	"
735.	Vogt Bros. Mfg. Co., Louisville, Ky.	Bullentin	D-245
736.	Warren Steam Pump Co., Warren, Mass.	Bullentin	242
737.	"	"	243
738.	"	"	229
738.	"	"	226
739.	"	"	227
740.	"	"	238
741.	"	"	230
742.	"	"	239
743.	"	"	225
744.	"	"	241
745.	"	"	241
746.	Weinman Pump Mfg. Co., Columbus, Ohio,	Bullentin	26-C
747.	"	"	627
748.	"	"	727B
749.	"	"	728A
750.	"	"	730B
751.	"	"	70
752.	"	"	800
753.	W.M. Welch Mfg. Co., Chicago, Ill	- Duo. Seal Booklet	
754.	"	"	"
755.	"	"	"
756.	"	"	"
757.	"	"	"
758.	"	"	"
759.	"	"	"
760.	"	"	"
760.	Wheland Co. Chattanooga, Tenn.	Bullentin	171
761.	"	"	153AA
762.	"	"	153BA
763.	"	"	170
764.	"	"	168
765.	"	"	151B
766.	Yeoman Bros. Co., Chicago, Ill.	Bullentin	1500
767.	"	"	1700
768.	"	"	1401
769.	"	"	1102
770.	"	"	Leaflet 1170
771.	"	"	Bullentin 3003
772.	"	"	" 3207
773.	"	"	" 102
774.	"	"	" 5301
775.	"	"	" 6202
776.	"	"	" 7204
777.	"	"	" 8003