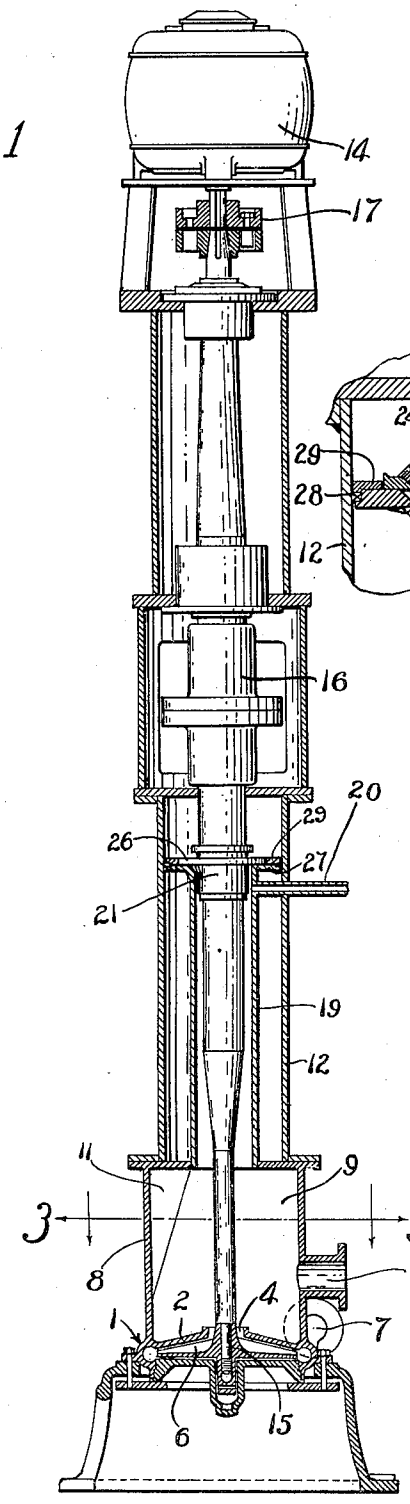
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Fig. 1



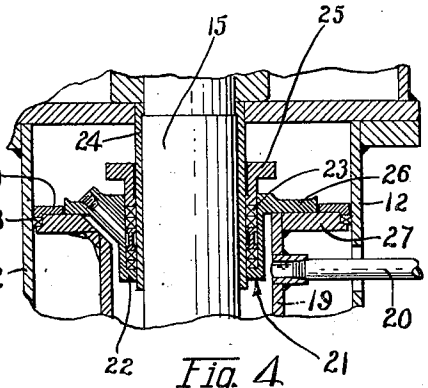


Fig. 4

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Fig. 2

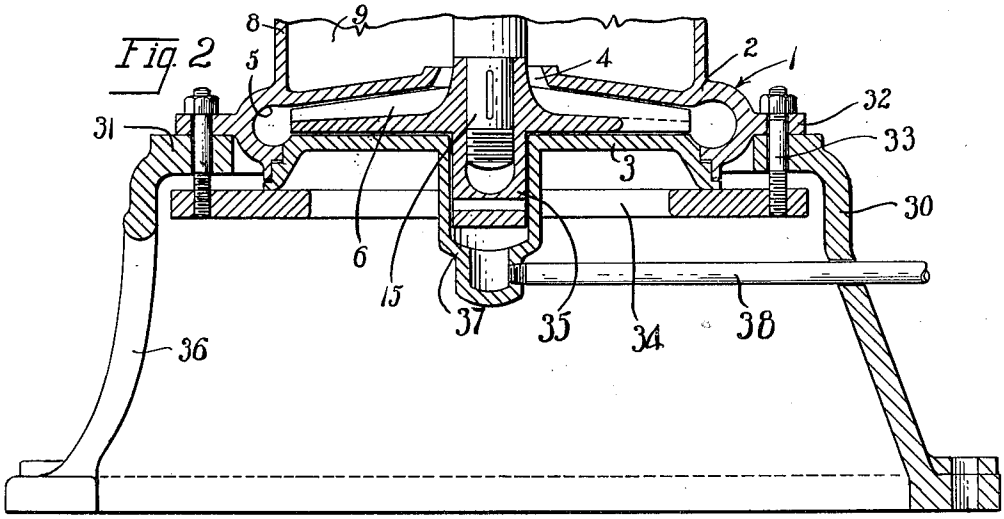
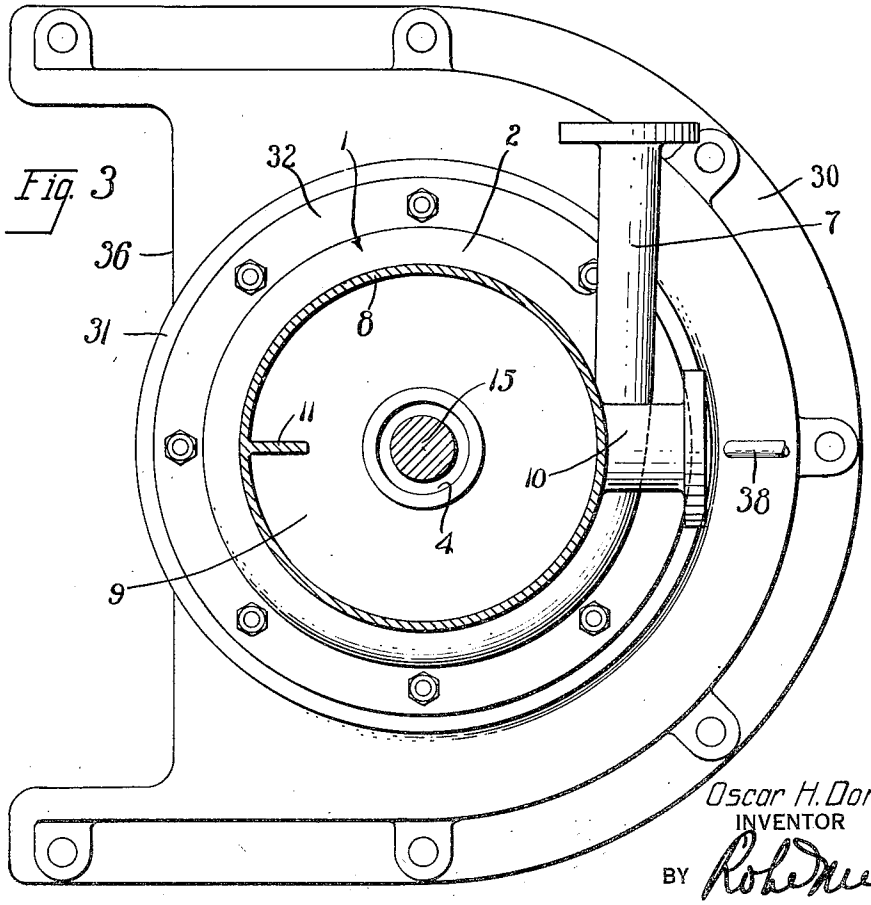


Fig. 3



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Patented Apr. 1, 1941 2,237,027

UNITED STATES PATENT OFFICE

2,237,027

PUMP

Oscar H. Dorer, East Orange, N. J., assignor to Worthington Pump and Machinery Corporation, Harrison, N. J., a corporation of Delaware

Application November 4, 1938, Serial No. 238,765

1 Claim. (Cl. 103—103)

This invention relates to centrifugal pumps, and more particularly to pumps employed in pumping corrosive liquids such as acids.

An object of the present invention is to provide a pump structure for pumping corrosive liquids which embodies a relatively large suction chamber at the suction side of the pump serving the dual purpose of allowing the liquid to flow freely to the impeller without eddies, and as a priming feature to keep the pump primed at all times, and a pump structure in which there are no stuffing boxes under pressure of liquid pumped.

Another object of the invention is to provide a novel construction of pump whereby the impeller may be easily removed from the pump casing for replacement or repair without disturbing the suction and discharge connections of the pump.

With these and other objects in view, as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing a pump embodying the invention, and the features forming the invention will be specifically pointed out in the claim.

In the drawings:

Figure 1 is a vertical section through the improved pump structure.

Figure 2 is an enlarged vertical section through the pump.

Figure 3 is a horizontal section taken on the line 3—3 of Fig. 1.

Figure 4 is an enlarged detailed section of a packing structure employed in the pump.

Referring more particularly to the drawings, the pump casing 1 is a sectional casing comprising the suction section 2 and the back section 3. The suction section 2 embodies the suction inlet 4 and the discharge volute 5, into which the impeller 6 discharges. The discharge volute 5, which is formed on the suction section 2 of the pump casing, has the discharge outlet connection 7 formed thereon.

A substantially cylindrical shell 8 rises from the suction section 2 and may be cast thereon as shown in the drawings, or suitably connected to the suction section 2 by a fluid-tight connection. The cylindrical shell 8 forms a large suction chamber 9 above the pump casing 1, and opens into the pump casing through the suction inlet 4. The capacity of the suction chamber 9 is such that it will permit the fluid to be pumped to pass freely through the suction inlet 4 into the impeller 6 of the pump without eddies and also will provide a sufficient head of fluid to be pumped to always maintain the impeller 6 primed. The suction chamber 9 has an inlet 10 associated therewith, and a web 11 extends into the suction chamber 9 to facilitate the prevention of the formation of eddies therein.

A motor supporting frame or member 12 is supported by and rises from the top of the shell 8 and supports the driving motor or prime mover 14 on the top thereof. The motor or prime mover 14 is connected to the impeller 6 by means of a vertical shaft 15 and suitable couplings 16 and 17. The riser 19 rises from the suction chamber 9 and has its lower end in communication with the top of the suction chamber 9. This riser 19 surrounds the shaft 15 and receives evaporation and/or released gases from the suction chamber 9 which escape through a vent 20 near the top of the riser 19.

A novel form of stuffing box shown at 21 and more clearly in section in Figure 4 of the drawings is provided about the shaft 15 at the top of the riser 19 to provide a seal about the shaft 15, and a second seal to prevent any evaporation or released gasses from escaping about the exterior of the riser 19.

The improved packing comprises a packing containing sleeve 22 which has suitable packing 23 contained therein, and held firmly in packing engagement with the sleeve 24 surrounding the shaft 15 by a packing gland 25. The sleeve 22 has an annular flange 26 thereon which rests against the annular flange 27 formed on the upper end of the riser 19 and extends outwardly to the support 12. Packing 28 is provided between the perimeter of the flange 27 and the inner surface of the frame 12. The packing 28 is held in place by a ring 29, which surrounds the perimeter of the annular flange 26. The packing or stuffing box structure 21 prevents leakage of corrosive liquids into the lower section of the cylindrical motor support 12, while the dual ring assembly formed by the flange 26 and ring 29 will serve as a buffer or shock absorber, preventing vibration and eliminating the necessity of stay bolts or supports for the riser 19.

The pump casing 1 is supported by a base 30, which has an inturned flange 31 engaging and attached to an annular flange 32 formed on the suction section 2 of the casing 1. The bolts 33, which serve to connect the suction section 2 of the casing to the base 30, also engage a clamping ring 34, which engages the outer under-surface of the back section 3 of casing 1, and securely clamps it in fluid-tight engagement with corre-

sponding surfaces formed on the suction casing 2, so that by removal of the clamping ring 34 the back section 3 may be removed to permit ready access to the impeller 6, or to permit easy removal of the impeller from the shaft 15 and from within the casing 1 for purposes of replacement or repair.

The impeller 6 has a hub projection 35 formed thereon which threadably receives the lower end of the shaft 15 so that when the back section 3 is removed the impeller may be easily disconnected from the shaft 15 and, together with the clamping ring 34, lowered into the supporting base 30.

The supporting base 30 is substantially horseshoe shaped. That is, it has its side 36 open so that the clamping ring 34 and the impeller may be moved out of the base and thus the impeller may be removed for replacement or repair without in any way disturbing the suction and discharge line connections with the pump. The back section 3 of the casing 1 has a cup-like extension 37 formed thereon which houses the hub extension 35 of the impeller 6 and receives any leakage which passes about the impeller and the hub section 35. A suitable drain pipe 38 is connected to the lower-most portion of the cup-like extension 37 for carrying off the leakage.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be widely modified within the invention defined by the claim.

What is claimed is:

In a vertical centrifugal pump, an impeller, a casing comprising a relatively large substantially cylindrical suction chamber forming section having a fluid inlet therein, a portion of said suction chamber forming section shaped to form the discharge volute of the pump, an annular disc formed in said casing section and forming the suction side of the impeller enclosing chamber of the casing, a removable back section forming the back of the impeller enclosing chamber of the casing, a supporting base beneath said suction chamber forming section, a clamping ring within said base for holding said back section in place, said base provided with an opening in its side to permit removal of said back section, clamping ring and impeller therethrough.

OSCAR H. DORER.