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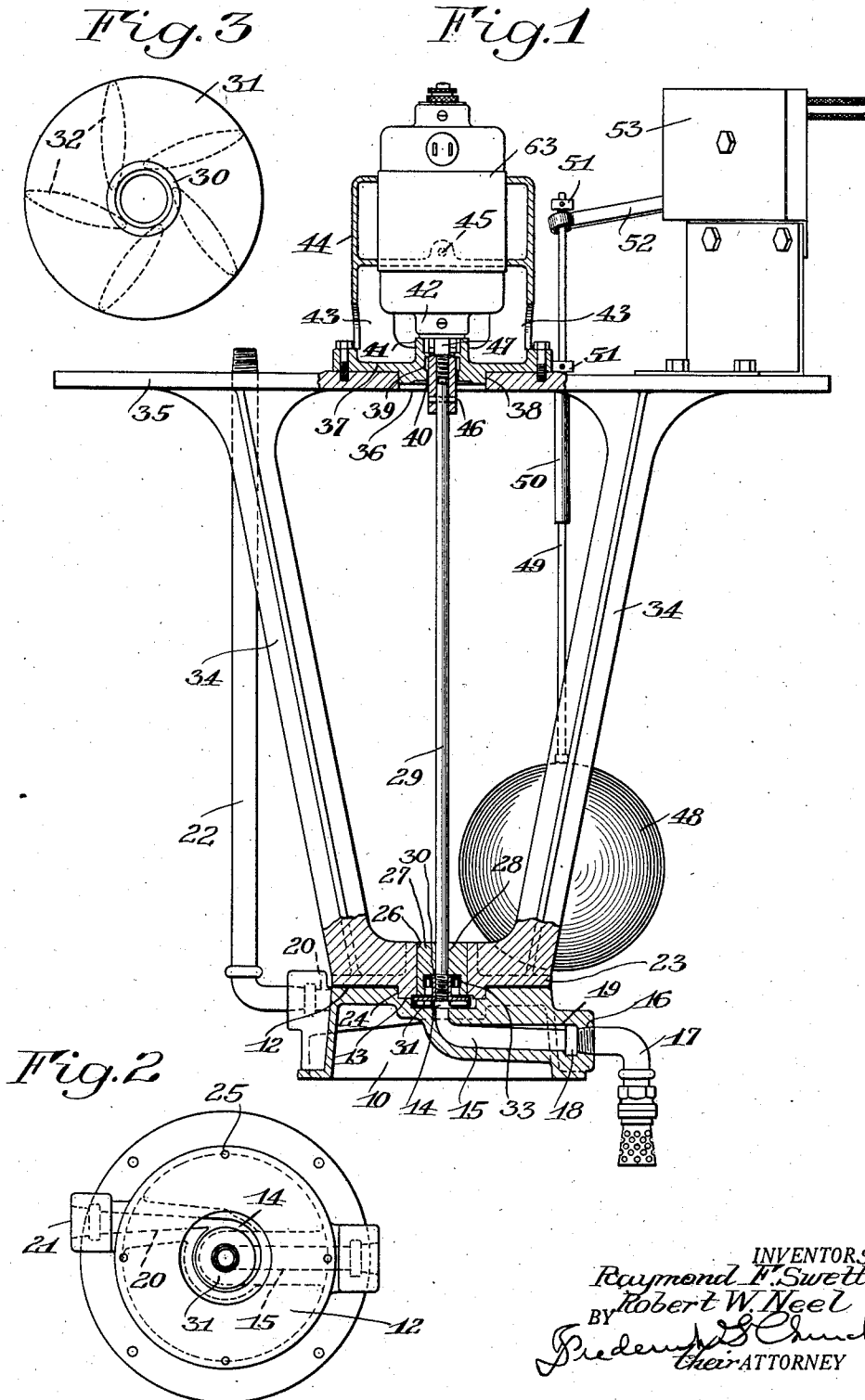
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PUMP

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PUMP.

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This invention relates to pumps and more particularly to the variety adapted for elevating liquid, as, for example, for pumping liquid from a cellar, well or other low area, one object of the invention being to simplify the construction of apparatus of this character and to provide such a machine comprising but few parts of practical construction and mode of operation. A further object is the provision of a simple, centrifugal pump adapted for application to a sump for pumping water therefrom against relatively high heads. Still a further object is the provision of such a pump comprising a minimum number of bearings and with the parts conveniently arranged for access to the pump chamber and impeller without the disconnection of piping. To these and other ends the invention consists in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a side elevation partly in section, of an apparatus embodying the present invention;

Figure 2 is a top plan view of a base portion of the same;

Figure 3 is a plan view of the impeller;

Figure 4 is a central sectional elevation of a construction embodying some modifications, with parts differently arranged; and

Figure 5 is a similar view in a plane at right angles to that of Figure 4.

Similar reference numerals throughout the several views indicate the same parts.

The present embodiment of the invention comprises a centrifugal pump and a motor forming a pumping unit in which the motor shaft is arranged vertically for the purpose of obtaining certain advantages hereinafter explained, the motor being preferably of the high speed variety and the pump correspondingly designed for pumping efficiently against relatively high heads. Referring more particularly to the drawings, there is shown at 10, Figures 1, 4 and 5, a base supported by a flange 11 and having an upper surface 12 formed with a bearing 13 preferably in the form of an annular seat recessed in the top of the base. Within this seat or bearing, the base is further recessed to provide a horizontally arranged pump

chamber 14 opening through the top of the base and preferably having the well known volute form employed in pumps of this character. The base has cored therethrough a suction conduit 15 communicating centrally with the pump chamber from below and also exteriorly at the side of the base at which end the conduit walls are threaded as at 16 for the attachment of a suction pipe 17. This conduit has the usual enlargement 18 formed therein adjacent its threaded end and to prevent the undesirable collection of air in this enlargement or pocket, the inclined top of the conduit is grooved horizontally as at 19 for the escape of such air through the pump.

At 20 is a cored passageway communicating tangentially with the volute, as well understood in the art, and forming a discharge conduit extending through the base and having at the side of the latter an external opening 21 for the attachment of a discharge pipe, as shown at 22.

For the purpose of spacing the motor from the pump, if desired, and at the same time locating the impeller at the bottom of a pump to avoid the necessity of priming, there is preferably provided an intermediate frame portion comprising a plate 23 formed with a downwardly projecting central boss 24 fitting within the recess in the base and on the bearing 13 of the latter. This plate is detachably bolted to the top of the base, as indicated by the bolt holes 25, Figure 2. The pump chamber is thus formed between the frame plate and base and the plate is preferably provided with a flanged opening 26 therethrough receiving a block 27 through which is formed a shaft receiving opening 28. This latter opening is enlarged at its bottom as shown to provide a recess for packing serving to prevent leakage of the water upwardly. At 29 is a vertically arranged motor shaft extending downwardly through the shaft opening of the plate to the pump chamber. The end of this shaft is preferably threaded for the reception of a threaded sleeve 30 on the lower end of which is a flange or disc 31 provided with a series of impeller blades 32 as shown in Figure 3. The packing means is in this instance in the form of a ring 33 of leather or the like bent upon itself in U shape, with the edges arranged down-

wardly so that pressure generated by the pump tends to expand the packing ring and seal the joint.

Rising from the peripheral portions of the frame plate 23 are supports 34 carrying at their upper ends a bed or platform 35 having a central opening 36. Bolted on this platform is an upper frame portion comprising a plate member 37 having a downwardly extending boss 38 similar to the boss 24 of the lower plate 23 and similarly formed with a packing recess 39 about the central shaft receiving opening 40. Extending upwardly above the latter opening are abutment means or lugs 41 adapted for engagement with the end portion 42 of a motor housing to support and locate the same vertically. Rising from the peripheral portions of plate member 37 are supports 43 carrying bearing means 44 for supporting and centering the motor by engagement with the sides of the housing as shown. A set screw 45 is provided for locking the motor against movement in the bearing means. The motor shaft 29 extends through the bearing opening 40, and is at this portion preferably provided with a coupling sleeve 46 threadedly engaged with the armature section 47 of the shaft.

At 48 adjacent the base is a float on a rod 49 extending upwardly through a guide sleeve 50 fixed on platform 35 and carrying above the latter space stops 51 operating an arm 52 of an electric switch 53 suitably connected for automatically starting and stopping the motor as the water to be pumped rises and falls.

As apparent from the above description and the drawings the pump chamber and the impeller located between the base and the frame detachably secured thereon, so that by disconnecting the frame and base these portions may be reached whenever necessary. The suction and discharge connections extend wholly through the base so that they do not have to be disturbed for removing the frame. The vertical arrangement of the driving shaft permits the latter to be supported merely by the motor bearings which also take up the thrust of the shaft, the bearing block 27 being provided merely for guiding the lower end of the shaft. The apparatus thus comprises an exceedingly small number of parts. The vertical arrangement furthermore prevents spread of the water along the shaft from the pump to the motor and in the arrangement described above the latter is located at a safe elevation while the pump is disposed at the lower liquid level so that it does not have to be primed.

When desired, however, the intermediate frame portions may be removed and the plate member 37 attached directly to the top of the base in place of the intermediate

plate 23. In this arrangement the parts occupy the relation shown in Figures 4 and 5, in which the base 10 has the same construction already described. The motor carrying frame may also have the same construction as the upper frame portion described above but in this view several modifications are shown. Thus the plate 54 has the same lower surface construction as plate member 37 for cooperation with the base and forming the upper side of the pump chamber. In this embodiment however, the packing means is varied comprising a gland recess 55 and a gland sleeve 56 carried by a bar 57 arranged for operation by studs 58 and nuts carried thereby to force the gland sleeve into the recess and compress the packing as well understood in the art. At 59 is a lubricating cup and at 60 is a pressure relieving cock. The plate 54 has rising therefrom the peripheral supports 61 carrying bearing means 62 supporting and centering the motor 63, the lower end of which is supported and located vertically by abutment means 64. This arrangement of the parts affords the advantages described above, and it is to be noted in this instance that the pump impeller is carried directly by the motor shaft so that the motor bearings are the only ones required, thereby eliminating the necessity for many parts.

As already stated a high speed motor is preferably employed so that the size of the pump chamber and impeller are materially reduced thereby reducing the friction of the liquid and also affording a pressure adapted to work against relative high heads.

We claim as our invention:

1. In a pump, the combination of a base having an impeller chamber provided with suction and discharge passages, an impeller within said chamber, a frame unit having an annular portion forming a closure for said chamber and provided with an opening therethrough and also having an upright bearing portion and a vertically disposed motor including a housing having its lower end resting upon said annular portion whereby the motor is supported independently of its shaft, the latter projecting into said opening and connected with said impeller, said upright bearing portion being adapted to engage said motor above said annular portion to holding it thereon.

2. In a pump, the combination of a base, a frame having a bearing on and detachably secured to said base, a volute chamber formed horizontally between said base and frame, suction and discharge conduits connecting with said chamber through said base, a motor including a shaft, abutment means on the frame for supporting and locating the motor vertically and independently of its shaft, bearing means on the frame engaging the motor between its ends

to hold it on said abutment means with its shaft extending vertically and concentric with said chamber and an impeller in said chamber adapted to be supported on and driven by the lower end of said shaft.

3. In a centrifugal pump, the combination of a base, a frame comprising a plate having a bearing on and detachably secured to said base and having a shaft receiving opening therethrough, a horizontal pump chamber closed by said plate, suction and discharge means communicating with said chamber through said base, a driving motor, abutment means on said plate for engagement with the end of the motor housing to support and locate the motor vertically independently of its shaft, bearing means on said frame for engagement with the sides of said motor housing intermediate its ends to center the motor with its shaft extending vertically through said plate opening, and an impeller in said chamber supported and driven by the lower end of said motor shaft.

4. In a centrifugal pump, the combination of a base having a bearing, an intermediate frame portion carried by the bearing of said base and detachably secured to said base, a pump chamber formed between said intermediate portion and base, suction and discharge conduits communicating with said chamber through said base, an upper frame portion carried by said intermediate portion and adapted also to be carried on the bearing of said base and detachably secured to the latter, a vertically disposed motor on said upper frame portion supported thereon independently of its shaft, the lat-

ter extending vertically downward, and an impeller carried on the lower end of said shaft in said chamber.

5. In a centrifugal pump, the combination of a base having a bearing formed on its upper surface, an intermediate spacing frame portion comprising a plate carried on the bearing of said base and detachably secured to the latter, said plate having a shaft opening therethrough and said base having the upper surface thereof within said bearing recessed to form a pump chamber, an upper frame portion comprising a plate member carried on said intermediate frame portion and adapted also to be carried on said bearing of the base and secured to the latter, said member having a shaft opening therethrough, supporting means on said member for a motor, a motor supported by said means independently of the motor shaft, the latter extending vertically downward through said openings, and an impeller carried on the lower end of said shaft in said chamber.

6. In a pump, the combination of a base having an impeller chamber provided with suction and discharge passages, an impeller within said chamber, a closure for the chamber, a vertically disposed motor resting upon and supported by the closure independently of the motor shaft, the latter projecting through the closure and connected with the impeller, and upstanding means carried by the base adapted to engage the motor to hold it in upright position upon the closure.

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