Mar. 3, 1925. 1,528,083

H. F. SCHMIDT

MOTOR DRIVEN PROPELLER SET

Filed Sept. 3, 1921 2 Sheets-Sheet 1

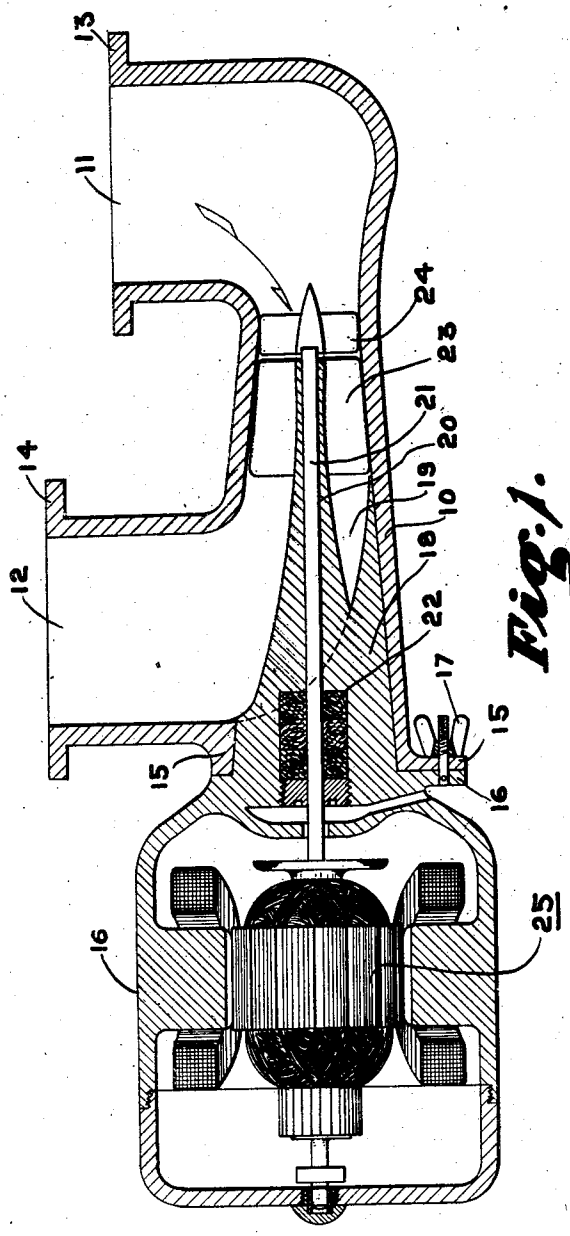


Fig. 1.

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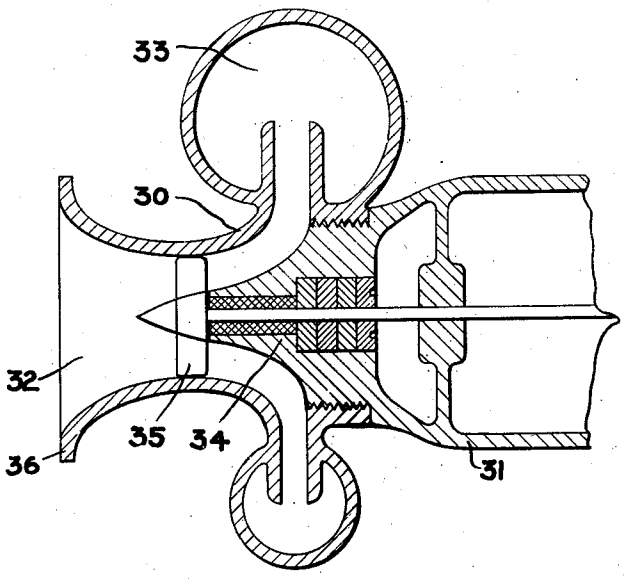


Fig. 2.

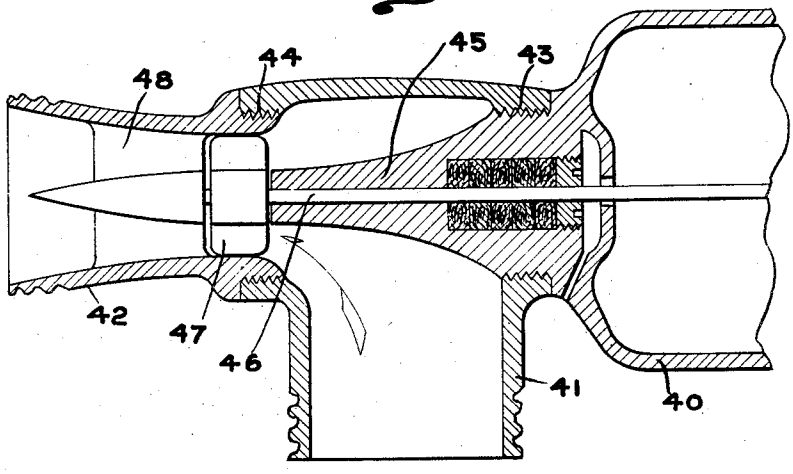


Fig. 3.

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Patented Mar. 3, 1925. 1,528,083

UNITED STATES PATENT OFFICE.

HENRY F. SCHMIDT, OF SWARTHMORE, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

MOTOR-DRIVEN PROPELLER SET.

Application filed September 3, 1921. Serial No. 498,501.

To all whom it may concern:

Be it known that I, HENRY F. SCHMIDT, a citizen of the United States, and a resident of Swarthmore, in the county of Delaware and State of Pennsylvania, have invented a new and useful Improvement in Motor-Driven Propeller Sets, of which the following is a specification.

This invention relates to pumps and more particularly to motor driven propeller pumps and it has for its object to provide apparatus of the character designated in which a motor for driving the pump and the driven pump elements may be assembled within a single compact and accessible housing from which the propeller elements may be readily removed for the purposes of cleaning and repair.

With the above and other objects in view, the invention consists of novel features of construction and combinations of parts, as will be hereinafter more clearly set forth in the specification.

In the drawing, Fig. 1 is a longitudinal view, in section, showing a motor-pump set assembled in accordance with my invention; Fig. 2 is a similar view showing a motor-pump set employing a vortex pump; and Fig. 3 is a modification of the construction illustrated in Fig. 1, in which the pump casing is divided into several parts.

The present invention contemplates a motor-pump set comprising a pump casing and a motor casing arranged to form a compact unit housing. The motor casing carries both the driving and the driven pump elements, all of which are supported from the pump casing in such manner as to be readily removable therefrom for the operations of cleaning and repair.

Referring to the drawing for a more detailed understanding of my invention, I show in Fig. 1 a motor-pump set in which 10 indicates a pump casing having an inlet means 11 and discharge means 12. The pump inlet and discharge means 11 and 12 are provided with suitably constructed flanges 13 and 14 adapted to secure the pump set to the apparatus with which the pump is to be employed, as, for example, a dish washing machine. The pump casing is preferably in the form of a converging-diverging U-shaped passage, the throat of which is situated at the bottom of the U adjacent the inlet side. The pump casing 10 is provided with a milled flange portion 15 adapted to be secured to a cooperating flange of a motor casing 16 in any suitable manner. As shown, the two casings are secured together by a thumb screw 17.

The motor casing 16 is provided with a tapered portion 18 which extends into the interior of the pump casing 10. The tapered portion 18 has a recess 19 provided therein which defines a smooth passage from the bottom of the casing to the outlet 12. The free end of the tapered portion forms a protruding hollow conical stem 20 which accommodates a shaft 21. Suitable packing means 22 surround the shaft within the stem 20 and serve to prevent any fluid leakage along the shaft into the motor casing. Secured at the extremity of the stem 20 and located at the diverging portion of the bottom of the U-shaped passage adjacent the throat are suitably arranged guide vanes 23 which are adapted to fit within a pump chamber. A propeller 24 carried by the shaft 21 is positioned adjacent to the fluid directing vanes 23. The assemblage of the pump elements is such that the propeller operates at the throat of the pump and discharges the fluid into the portion of the casing in which the guide vanes 23 are disposed. The guide vanes 23 and propeller 24 are designed to conform to the diverging portion of the pump casing 10 so that they may be readily removed from the pump casing when the two casings 10 and 16 are separated.

The motor casing 16 houses a suitable motive power device directly connected to the propeller 24 by the shaft 21. As shown, an electric motor 25 located within the casing drives the propeller 24, this arrangement providing a compact apparatus.

In Fig. 2 I indicate a rotary pump set composed of a volute pump casing 30 and a motor casing 31 secured thereto. The pump casing 30 is provided with inlet means 32 and discharge means 33. In a similar manner to that described above in relation to Fig. 1, the motor casing 31 carries integrally therewith a reduced portion 34 which extends into the pump casing 30. Likewise, the reduced portion 34 carries a propeller 35 which is arranged at the throat of the inlet

portion of the pump casing. Provision is made for supporting the vortex-pump set by a suitable flange means 36 provided at the inlet portion of the pump casing 30.

In Fig. 3 I show a motor-pump set composed of three casing members forming a unit housing. I indicate at 40 a motor casing member to which a pump casing inlet member 41 and a discharge member 42 are attached, these being separate castings and the several parts being joined by screw joints 43 and 44. As described in connection with the motor sets shown in Figs. 1 and 2, the motor casing 40 is provided with a curved reduced portion 45, which extends into the pump casing 41 and, as further described, the reduced portion carries a shaft 46 and a propeller 47 attached thereto. The casing member 42 is provided with guide vanes 48 designed to direct the flow of the fluid discharged from the propeller 47, which operates adjacent thereto. The construction permits access to the pump parts because of the detachability of the casings 41 and 42 at joint 44.

In the several modifications of the invention a compact motor-pump is provided in which the operating parts are made readily accessible for cleaning and repair. As illustrated in Fig. 1, the motor set is composed of the pump casing 10 and a motor casing 16. The arrangement is such that the pump casing 10 may rigidly support the motor-pump set and for the purpose of cleaning and repair, the motor casing 16 may be detached from the pump casing 10 by loosening the thumb screws 17. It will be observed, as heretofore pointed out, that by removing the motor casing 16 the pump parts are readily made accessible.

The arrangement shown in Fig. 2 illustrates a compact motor vortex pump set. The motor set is preferably supported by a flange 36 formed at the inlet of the pump casing. This construction permits the building up of a pump which occupies a small space and which has a relatively large capacity. An advantage obtained in this type of pump is that the efficiency is the same at all discharge angles from the propeller. That is, the efficiency of the vortex chamber is constant for all loads.

The arrangement shown in Fig. 3 is particularly adaptable for circulating cooling water, as for example, in an automobile cooling system. It will be observed that the arrangement of this motor-pump set is such that it may be readily supported by the hose connections owing to the fact that the motor-pump set weighs approximately only four pounds. Should the pump need cleaning or repairing for any reason, the pump elements may be removed by unscrewing the motor casing 40 from the inlet casing 41, at 44. With such an assemblage the parts or connections between the fluid delivery passages need not be broken. If it is desired that the pump be more rigidly supported, the assemblage shown in Fig. 1 may be used with facility.

While I have shown my invention in three forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. In a propeller pump unit, the combination of a motor casing and a pump casing, the latter having an inlet and outlet port, a convergent fluid passage leading from the inlet port to a throat portion within the pump casing, a divergent fluid passage leading from said throat portion to the outlet port, a reduced portion of the motor casing being adapted to fit within the pump casing and a recess being cut into the reduced portion to provide a smooth passage from the inlet port to the outlet port.

2. A propeller pump comprising a motor casing, a pump casing detachably fitted thereto, the latter having a convergent inlet and a divergent outlet at the ends thereof, a tapered portion of the motor casing extending into a co-operating portion of the pump casing, a recess being provided in the tapered portion, and means associated therewith for directing fluid through the recess to the outlet port.

3. A propeller pump unit comprising a motor casing and a pump casing, the latter having inlet and outlet ports, a reduced portion of the motor casing extending into the pump casing, a recess being provided in the reduced portion, said recess forming a fluid passage to the outlet port, and guide vanes at the entrance thereof to direct the fluid to the outlet port.

4. In a propeller pump, the combination of a pump casing and a motor casing, said casings having a ground joint connection, a propeller in the pump casing and carried by the motor casing, a reduced portion of the motor casing extending within the pump casing, a recess being formed in the reduced portion, guide vanes carried on the reduced portion and means to impart velocity to the fluid.

5. In a propeller pump unit, the combination of a motor casing and a pump casing, inlet and outlet ports in the pump casing, a reduced portion of the motor casing extending into the pump casing, guide vanes carried thereby, and a recess in said reduced portion arranged to co-operate with the

pump casing to form a smooth fluid passage to the outlet ports.

6. A pump set comprising a converging and diverging pump chamber terminating in an inlet and outlet means, said pump chamber having an axial opening at one end providing a seat, a motor driven propeller unit comprising a propeller designed to operate within the throat of the chamber, a motor casing provided with a reduced portion fitting into the pump chamber and designed to define a continuation of the interior curved surface of the chamber, guide vanes carried by the reduced portion, and means for detachably securing the pump chamber and propeller unit together without disassembling the pump parts.

7. In a propeller-pump set, the combination of a casing having fluid inlet and discharge passages therein, a U-shaped pump, a motor casing detachably secured to the pump casing, a throat formed in the bottom portion of the U-shaped casing and means in the throat for forcing a fluid through the passages.

In testimony whereof, I have hereunto subscribed my name this 28th day of July, 1921.

HENRY F. SCHMIDT.