April 28, 1959 L. E. RUSSELL 2,883,939

FLUID PUMP

Filed Sept. 22, 1955

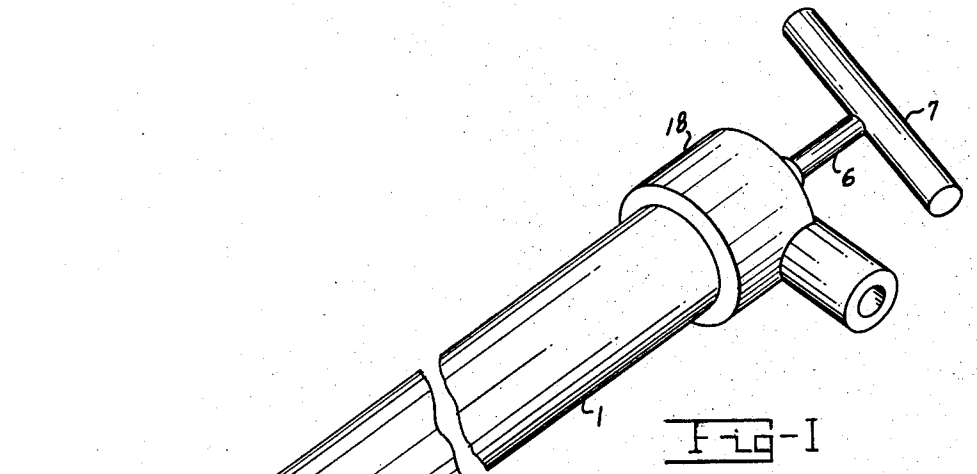


Fig-1

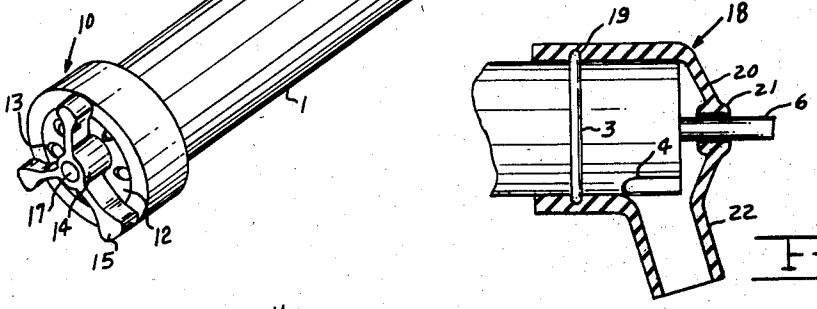


Fig-2

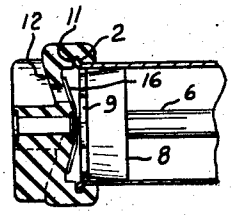


Fig-3

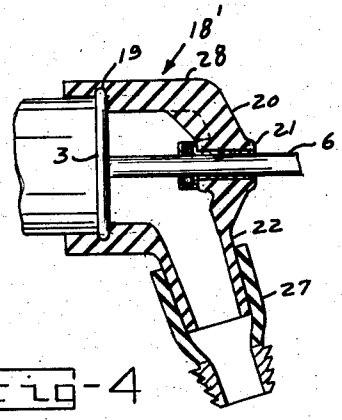


Fig-4

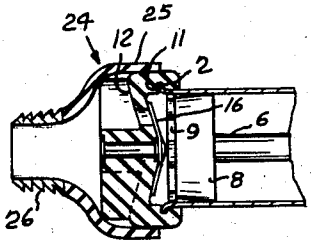


Fig-5

INVENTOR.
LINUS E. RUSSELL
BY Tom Walker
ATTORNEY

United States Patent Office 2,883,939 Patented Apr. 28, 1959

2,883,939

FLUID PUMP

Linus E. Russell, Springfield, Ohio, assignor to Peters & Russell, Inc., Springfield, Ohio, a corporation of Ohio

Application September 22, 1955, Serial No. 535,834

8 Claims. (Cl. 103—178)

This invention relates to a new and improved fluid pump, and more particularly to an improved bilge pump which may be easily and efficiently manually operated.

Bilge pumps in the prior art have been many and of a greatly varied nature. There has been a continual search in the art for a bilge pump capable of being manually operated, which would not only be simple and inexpensive, but also efficient. Prior art pumps of a manually operable character have been generally unsatisfactory due to their clumsiness in application and inefficient pumping action. These inadequacies are not only undesirable in a bilge pump, but may have serious consequences.

The subject invention was developed with the above in mind and presents an easily and efficiently operated fluid pump which is capable of being manually operated. The bilge pump provided hereby is of such nature that it is relatively low in primary cost and requires little or no maintenance. While it is particularly applicable as a bilge pump due to the improved pump stabilizing characteristics provided, the improved fluid pump produced by the invention may be employed in many similar applications.

Embodiment of the subject invention results in an exceedingly simple pump housing incorporating an improved intake unit at one end thereof, which unit integrally provides a stabilizing base for the pump when manually operated. The invention further incorporates a discharge element at the other end of the pump housing which provides improved means for stabilizing the pump stroke, effecting maximum pumping efficiency thereby. Other features of the invention will be readily apparent from the embodiment thereof presented herein.

The object of the invention is to simplify the construction as well as the means and mode of operation of fluid pumps, whereby such pumps may not only be economically manufactured, but will be more efficient and satisfactory in use, adaptable to a wide variety of applications, and be unlikely to get out of repair.

A further object of the invention is to provide an improved fluid pump which is capable of being manually operated at maximum efficiency.

Another object of the invention is to provide an improved manually controllable and easily manipulated bilge pump incorporating improved stabilizing means at both the intake and output thereof.

A further object of the invention is to provide in an improved manually operable bilge pump a novel stabilizing base element therefor, incorporating an intake device therein, along with an improved discharge element providing stabilizing means for the pump stroke.

A further object of the invention is to provide a fluid pump possessing the advantageous structural features, the inherent meritorious characteristics and the mode of operation herein mentioned.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent

consists of the features of construction, the parts and combinations thereof, and the mode of operation as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

Referring to the accompanying drawing, wherein is shown one but obviously not necessarily the only form of embodiment of the invention,

Fig. 1 is a perspective view of the novelly improved manually operable bilge pump provided in accordance with the invention;

Fig. 2 is a fragmentary cross-sectional view of the pump shown in Fig. 1 showing the improved discharge detail;

Fig. 3 is a fragmentary cross-sectional view of the intake portion of the pump in Fig. 1;

Fig. 4 shows a fragmentary cross-sectional view of a modified discharge unit; and

Fig. 5 is a fragmentary cross-sectional view of a modified intake for the pump as shown in Fig. 1.

Like parts are indicated by similar characters of reference throughout the several views.

The invention can best be described with reference to the drawings. A pump housing 1 is provided consisting of an elongated cylinder of suitable material such as metal or plastic. The intake end of the cylinder 1 is flared outwardly providing an external flange 2 at the extremity thereof. Adjacent to and spaced from the discharge end of the housing 1 a circular projection 3 is provided on the housing. The discharge end of the housing has a cut back area 4 providing an opening in the wall of the cylinder.

Mounted within the housing 1 for reciprocating movement longitudinally thereof is a pump unit 5 consisting of a piston rod 6 having a T-shaped handle 7 at its outer end and a piston head 8 fixed to its inner end within the housing. The outer diameter of the piston head 8 is such that it maintains a sealing relation with the inner wall of the housing cylinder 1 as it is reciprocated during operation of the pump. A series of apertures 9 are provided in the piston head 8 arranged in circular fashion about the longitudinal axis thereof. It is noted that the piston 8 may be any one of the well known types employed in pumps which incorporate one way valve means. For example, a commonly used piston is illustrated in the U.S. patent of Peters et al., Serial No. 2,678,248.

Mounted to the intake end of the cylindrical housing 1 is a novel intake unit 10, preferably of rubber or elastic. The mounting end of intake unit 10 is generally cylindrical in shape and has a circular recess 11 in the inner wall thereof slightly spaced from the extremity thereof. This recess 11 provides the means for mounting the intake unit to the housing 1. The mounting end of unit 10 is spread to receive the external flange 2 on the intake end of the housing in the recess 11 and then released. The intake unit thus seats about the flange 2 in positive and stable engaged relation with the cylinder housing element 1. Adjacent the outer or intake end of the unit 10, a conical web element 12 is connected transversely thereof in inverted relation so that the apex of the conical element extends to a point at the opening to the pump housing 1. This conical element is provided with intake apertures 13 equidistantly arranged about the apex thereof which has a central aperture therethrough. Extending axially of the intake unit 10 and integrally connected to the conical element 12 about the central aperture at the apex thereof, is a cylindrical element 14 which extends outwardly of the mounting end of the intake unit. Integral with the conical element 12 and the cylindrical element 14 are three spokes 15 extending radially from the element 14. These spokes provide an extension of the mounting end of the intake unit

and a stabilizing base for the pump when it is manually operated. A conically disposed rubber flap element **16** overlies the apex of the conical element **12** and the apertures **13** thereabout and is fixed to the conical element **12** by a pin **17** extending through the cylindrical element **14** and the apex of the conical element to be engaged to the center of the flap element **16**. Thus, the intake unit is provided with a one way intake valve.

Mounted to the other or discharge end of the housing cylinder **1** is the discharge fitting **18** of rubber or plastic. This fitting **18** is generally cylindrical and open at the end mounting to the housing. Spaced from the open end of the discharge fitting in the inner wall thereof is a circular recess **19**. In mounting the discharge unit **18** to the housing **1**, the projection **3** about the housing is received in recess **19** in the fitting **18** and a sealed and positive engagement of the discharge fitting **18** to the housing cylinder **1** is effected thereby.

The outer end of the fitting **18** is domed at **20**. The domed portion **20** has a central aperture therethrough defined by axial cylindrical extensions **21** therefrom which serve to receive the piston rod **6** of the pump unit therethrough in bearing relation thereto. The projection of the cylinder wall **1** into substantial alignment with the uppermost portion of the discharge fitting **18** provides necessary stabilization for the piston rod bearing area **21**, retaining such area in axial alignment with the cylinder **1**. In this manner a substantial bearing is provided for the pump piston rod at a location axially spaced from the discharge end of the housing **1**. A discharge spout **22** is provided from the discharge fitting **18** to one side thereof and slightly overlapping into the dome portion. In this manner, upon proper mounting of the discharge fitting **18** to the housing **1** as set forth above, the spout **22** will align with the cut back portion at the discharge end of the housing **1**. This will be clear with reference to Fig. 2 of the drawings in particular.

Thus, for ordinary manual operation and use of the pump provided by the invention, the pump assembly is set vertically with the spokes **15** on the intake unit as the base applied to the surface from which fluid is to be pumped. By fabricating the intake unit of rubber, for example, there is a frictional engagement of the base of the pump with the surface to which it is applied which aids in the stability thereof in manual pumping activity. The spoke type extensions on the intake unit provide spaced relation of the intake end of the pump to the surface to which it is applied so as to enable ready entrance of the fluid being pumped.

By operation of the handle **7** of the pump unit, on the upward or intake stroke fluid is drawn in through the apertures **13** in the conical element **12** past the flap valve **16** and into the housing cylinder **1**. On the down stroke of the piston rod the fluid moves through apertures **9** in the piston head **8**. On the next succeeding upstroke of the piston the fluid is lifted in the cylinder to exit through the cut back section **4** in the wall of the housing cylinder and out through the spout **22** of the discharge fitting **18**. The cylindrical bearing provided by extensions **21** for the piston rod **6**, together with the cylinder extension into the upper part of the fitting **18**, insures a stabilized stroke for the pump of a greatly improved nature with respect to that of ordinary hand operable pumps. This insures that maximum energy applied to the pump is actually reflected in the pumping action, enabling a high pump efficiency. Thus, a simple hand operated pump assembly is provided with an improved base device giving free flow intake and actually incorporating the intake valve means. Also, a firm skid proof pump base is effected thereby. In addition, the novel discharge fitting effects an extremely stable pump stroke and affords maximum pump efficiency.

Figs. 4 and 5 of the drawings show modifications of the discharge and intake fittings which may be employed when the pump unit is to be fixed in a predetermined position for operation and tubes are to be provided respectively at the intake and discharge ends thereof for placement in necessary locations in accordance with the location of the fluid to be removed. As shown in the drawings, an adapter **24** is provided for the intake fitting which consists of a rubber tube portion **25** which frictionally engages about the intake fitting and has an externally threaded metal adapter **26** integrally connected thereto and extending axially therefrom so that an intake tube section may be connected thereto. An adapter **27** is provided for the discharge fitting consisting of a rubber or plastic tube which frictionally engages the spout on the discharge fitting **18** in sealing relation thereto and has an externally threaded extremity for fixing a length of tubing thereto for discharge of the fluid pumped through the housing **1** to a selected point. Thus, the pump assembly is versatile in application and its efficiency is at a maximum in any instance due to the improved discharge fitting which stabilizes the pump stroke.

There is also shown in Fig. 4 a remodified form of discharge unit **18**. As shown therein, the discharge unit **18'** is reinforced by the use of a diagonal web **28** in the interior of the cap extending from the elongated bearing **21** to the shoulder of the recess **19**. In this form of the invention the cylinder **1** is shortened by elimination of the portion thereof which extends upwardly past the flange or projection **3**. The strengthening or reinforcing of the upper end of the pump is in this instance provided by the diagonal web **28** which is provided as an integral part of the discharge unit **18'**. In either Fig. 2 or Fig. 4 the discharge unit is reinforced by cooperation of the housing **1** with the discharge unit, such reinforcement being intermediate the connection of the housing to the discharge unit and the bearing area for the piston rod.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in lauguage more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect.

Having thus described my invention, I claim:

1. A fluid pump comprising a substantially cylindrical housing, a piston pump element mounted in said housing for reciprocating movement relative thereto, operating rod means connected to said piston and extending from said housing at one end thereof, the other end of said housing being flared, resilient adapter means sealingly arranged on said housing formed to seat about said flared end, said adapter means having one way valve means integrally connected therewith transversely thereof so as to afford a free flow intake to said housing, said one end of said housing having a peripheral projection spaced inwardly of the extremity thereof, a resilient cylindrical discharge fitting having one end thereof sealingly connected to said housing formed to frictionally engage about said projection at said one end, said discharge fitting having means providing a reinforced extended bearing for said operating rod at said one end of said housing, and tubular discharge means in said discharge fitting whereby a highly efficient manually operable fluid bilge pump obtains.

2. A fluid pump comprising a cylindrical housing, a flange at one end of said housing and an external projection thereabout adjacent the other end thereof, a piston mounted in said housing for reciprocating movement relative thereto, an operating rod connected to said

piston and extending from said housing at the discharge end thereof, a resilient cylindrical intake fitting sealingly connected to said housing at the flange at said one end thereof, a one way intake valve in said fitting, radially arranged spokes integral with said intake fitting forming a skid proof base for the pump in manual operation thereof, a resilient cylindrical discharge fitting having the inner open end thereof sealingly connected to said housing at said projection, the outer end of said discharge fitting being domed and providing an elongated cylindrical bearing for said operating rod, an integral reinforcement formed in said discharge fitting and bearing to maintain alignment of said bearing and housing, and a spout integral with said discharge fitting aligned with a discharge opening in said housing inwardly of said other end thereof whereby said housing may be vertically arranged for manual operation with the said base applied to the surface from which water is to be pumped and a free intake flow and a stabilized pump stroke will obtain providing maximum pump efficiency.

3. A fluid pump comprising a substantially cylindrical housing flared at one end thereof and having a cut back section providing an opening in the wall thereof at its other extremity, a piston mounted in said housing for reciprocating movement relative thereto, an operating rod connected to said piston and extending from said housing at said other end thereof, a resilient cylindrical intake fitting sealingly interengaging with the flared end of said housing, said fitting having a conical web with apertures therethrough arranged transversely of said fitting, flap means overlying said web providing a one way intake valve thereby, an axial extension from said intake fitting providing radial spokes forming a skid proof base for the pump on manual operation thereof, a resilient discharge fitting engaging said housing at said other end thereof providing a bearing for said operating rod, and a spout formed on said resilient discharge fitting aligned with the cut back section in said housing, whereby said housing may be vertically arranged for manual operation with said base applied to the surface from which fluid is to be pumped and on operating said rod manually free flow and maximum pump efficiency will obtain.

4. A fluid pump as set forth in claim 3, characterized by a tubular connector frictionally engaged about the exterior of the discharge spout.

5. A fluid pump comprising a cylindrical housing having external projections adjacent the opposite ends thereof, a piston mounted within said housing for reciprocating movement relative thereto, an operating rod connected to said piston and extending from said housing at the discharge end thereof, a substantially cylindrical resilient intake fitting sealingly connected to said projection on said housing, said fitting having a conical web transversely thereof, said web having apertures therethrough, a flap overlying said web providing an intake valve thereby, an integral axial extension from said intake fitting integral with said web and providing radial spokes forming a skid proof base for manual operation of said pump, a substantially cylindrical resilient discharge fitting having the inner open end thereof sealingly connected to said housing about the projection therefrom, the outer end of said discharge fitting being domed and providing a substantial cylindrical elongated bearing for said operating rod spaced from the discharge end of said housing, reinforcing means interposed between said projection and bearing, and a spout from the discharge fitting whereby said housing may be vertically arranged for manual operation of the pump with the spoke base applied to the surface from which fluid is to be pumped and free intake flow and a stabilized pump stroke will obtain providing maximum pump efficiency thereby.

6. A fluid pump as set forth in claim 5, characterized by a tubular connector frictionally engaged about the exterior of said intake fitting.

7. A fluid pump as set forth in claim 5, characterized by resilient tubular connectors frictionally engaging about the exterior resilient fittings of the intake and discharge fittings.

8. A fluid pump comprising a housing having a bore therethrough, a pump element within said bore for reciprocating movement therein and having operating means connected thereto and extending from one end of said bore, resilient closure members for said bore, annular flanges on said members engageable about the exterior of said housing, an annular recess in the interior of the annular flanges, radial projections adjacent the ends of said housing engageable within the annular recesses and seated therein under influence of the resiliency of said closure members, one of said closure members providing an apertured web transversely arranged relative to the bore, means normally overlying said web and providing an intake valve to the bore, the other of said closure members including an extended bearing for said pump operating means and a discharge element communicating with said bore.

References Cited in the file of this patent

UNITED STATES PATENTS

237,193	Mallory	Feb. 1, 1881
880,560	Milroy	Mar. 3, 1908
923,201	Petigor	June 1, 1909
978,538	Barker	Dec. 13, 1910
1,338,739	Lane	May 4, 1920
1,471,085	Wood	Oct. 16, 1923
1,777,052	Shepherd	Sept. 30, 1930
2,044,594	Scholfield	June 16, 1936
2,377,916	Anderson	June 12, 1945
2,388,661	Woodford	Nov. 6, 1945
2,577,417	Halpin	Dec. 4, 1951
2,622,539	Martin	Dec. 23, 1952