

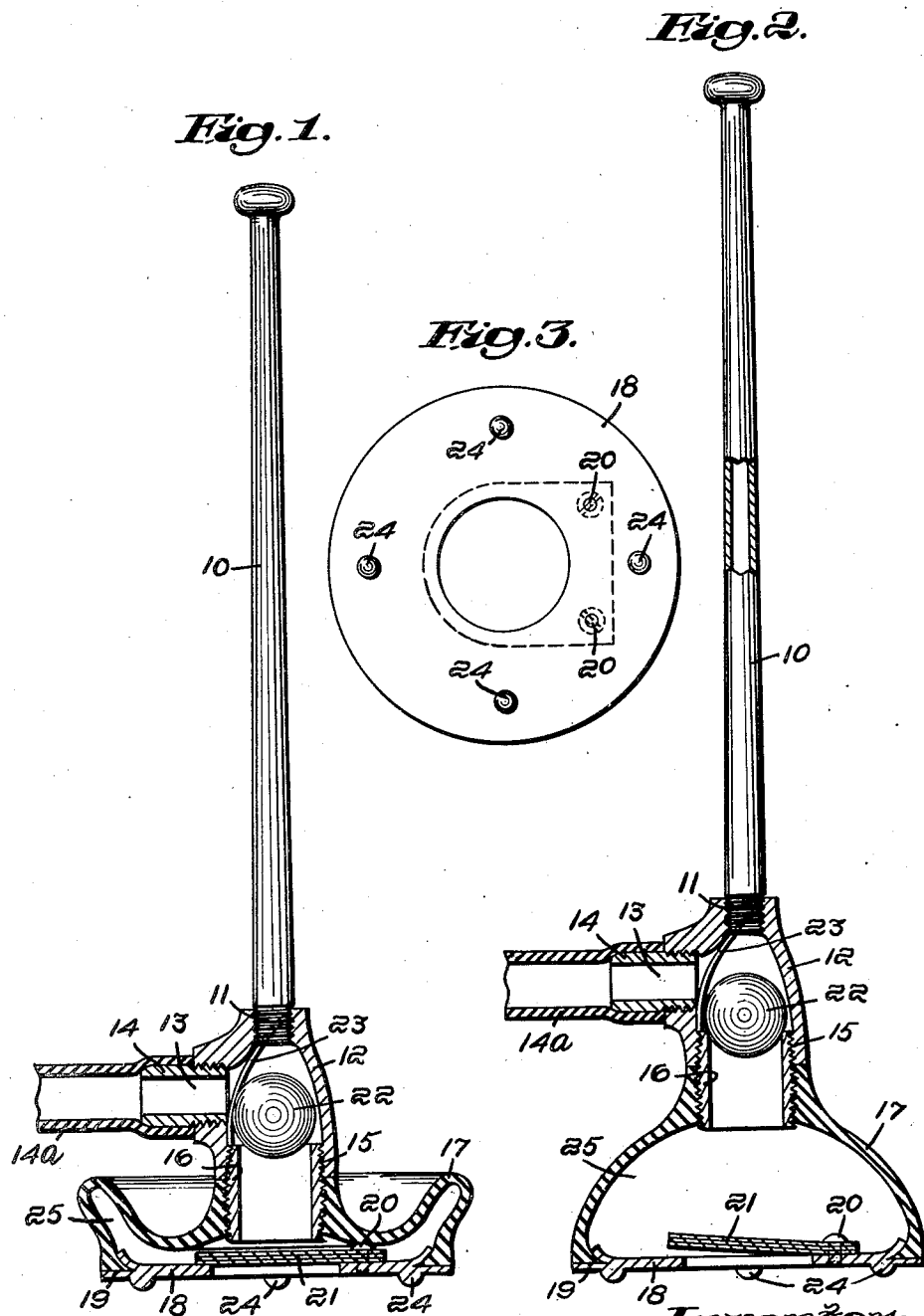
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PUMP

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## UNITED STATES PATENT OFFICE

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## PUMP

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8 Claims. (Cl. 103-148)

My present invention involves improvements in pumps, and particularly the so-called bilge pumps adapted for bailing water and any entrained sand or other materials accumulated in a boat, pontoon, raft or other hollow object.

In such devices low cost of manufacture, simplicity of construction, and reliability of operation are of paramount importance.

Various forms of foot or hand operated bilge pumps have been made, but for the most part they are heavy, cumbersome for small boat use, and relatively expensive. The urgent need is for a small, compact, light-weight, low-cost pump embodying the minimum number of working parts and capable of being stored under a seat or in a locker for direct operation in any water accumulated from leakage, rain or over-rail wave break.

My concept contemplates a low-cost, light-weight, reliably-operating pump having the minimum number of working parts so assembled as to be conveniently accessible for purposes of inspection, repair or replacement.

As illustrative of my invention, and as a specific structure of practical value possessing the above indicated desirable features, I have shown in the accompanying drawing a small hand-operated pump which I have found highly satisfactory in use and well adapted to low-cost manufacture. In the drawing—

Figs. 1 and 2 show such a pump in partial side elevation and section, Fig. 1 illustrating the position of the parts on the exhaust stroke of the pump, and Fig. 2 their position on the intake stroke, and

Fig. 3 is a bottom plan view of the pump.

The preferable construction of my pump is as follows: I provide an operating handle 10 in the form of a rod or stem which is preferably tubular so as to increase the suction effect. If the handle is tubular, it is closed at its upper end by any conventional knob. The lower end of the handle is assembled, as by threading it at 11, in the upper end of a reducing T 12 of rigid material, such as metal or the like. T 12 has an outlet 13 at one side for a hose connection 14<sup>a</sup>. If desired, I may thread an adapter 14 within said outlet to receive the hose connection.

The lower end of the T 12 is assembled, as by threading it at 15, to the upper end of a tubular nipple 16 which is inserted within and assembled as by threading to the upper end of a domed or cup-like collapsible member 17 of rubber or other flexible material.

Assembled to the lower end of the cup-like member 17 is a check valve plate 18 of rigid ma-

terial, such as metal or the like. Preferably, plate 18 is detachably assembled to member 17 by providing its periphery with an annular groove 19 to receive the inner edge of member 17. Plate 18 has a liquid intake opening covered by a check valve 21 of leather or other suitable material which is pivoted at 20 to the upper side of said plate.

Loose within T 12 is a ball check valve 22 of a size to seat upon the upper edge of nipple 16. Extending across the outlet opening 13 of said T is a guard preferably in the form of a wire 23, the ends of which are anchored in grooves in nipple 16. The purpose of guard wire 23 is to prevent check valve 22 from becoming wedged in outlet opening 13.

If desired, the under side of check valve plate 18 may be provided with protuberances 24 which serve to space member 17 from the floor boards or planking of the boat so that water or other liquid may enter beneath it.

The operation of my pump is as follows: Assuming that the chamber 25 of member 17 has been filled with water or other liquid in a previous stroke of handle 10, the next down stroke of said handle flexes or collapses member 17 (see Fig. 1) the ball valve 22 is raised from its seat on the upper end of nipple 16, and the water is expelled through outlet opening 13 and hose connection 14<sup>a</sup>. Upon the upstroke of handle 10, member 17 returns to unflexed condition, check valve 21 opens to admit a new charge of water (see Fig. 2) and ball valve 22 drops by gravity onto its seat on the upper end of nipple 16.

My pump is extremely simple in construction and very reliable in operation. It requires no priming and will pump air as well as water or other liquids. The dome-like construction of member 17 stabilizes the pump on any underlying surface and greatly simplifies the pumping operation.

One special advantage of the construction illustrated resides in the manner of assembling check valve plate 18 to the lower edge of member 17. In accomplishing this, the lower portion of member 17 is spread open against the natural springiness of the rubber, check valve 18 is inserted with its annular groove 19 in position to receive the annular edge of member 17 and said member is released and allowed to spring back to its normal position, thereby tightly clamping plate 18 in place. This avoids the necessity for any special clamping screws or the like to assemble plate 18 to member 17.

Although handle 10 is shown as tubular, be-

cause experience has shown that a tubular handle increases the efficiency of the pumping action due to the column of air contained therein, it is obvious that the handle may be solid if desired.

From the foregoing description, taken in connection with the drawing, it will be evident that the T 12 provides a rigid pressure-receiving element for transmitting the pressure of the handle 10 to the flexible member 17 to collapse the same relative to the rigid base plate 18.

It will also be evident that if desired a foot-operated plate with spring return could be substituted for handle 10, and that a hose connection and fitting could be assembled to plate 18 about the inlet opening thereof for pumping liquid from inaccessible places.

Various other modifications in construction and design may obviously be resorted to within the spirit and scope of my invention as defined by the appended claims.

What I therefore claim and desire to secure by Letters Patent is:

1. In a pump, a handle, a T-like connector member fixed to the lower end of said handle and having an inlet and an outlet in communication with each other, a nipple fixed in the inlet of said connector member and having its upper end formed as a valve seat, a check valve confined in the connector member to seat on said valve seat, a flexible hemi-spherical dome fixed to said nipple, a rigid check valve plate having an inlet opening and having a marginal recess to receive the lower edge of said dome, spacing supports on the lower face of said plate, and a check valve carried by said plate to seat thereon to close said inlet opening of the plate.

2. The pump of claim 1, wherein the handle is tubular and is closed at its upper end.

3. The pump of claim 1, wherein a guard is disposed across the outlet of said connector and is anchored at one end adjacent the lower end of said handle and at its opposite end to the connector below the outlet thereof.

4. In a pump, a handle, a connector member fixed to the lower end of said handle and having an inlet and an outlet in communication with each other, a valve seat between said inlet and outlet, a check valve confined in the connector

member to seat on said valve seat, a flexible dome fixed to said connector, a rigid check plate having an inlet opening, said plate being marginally engaged with the lower edge of said dome, and a check valve carried by said plate to seat thereon to close said inlet opening of the plate.

5. In a pump, a rigid base having an inlet opening, a check valve controlling said opening, a flexible dome-like member assembled at its lower edge to said base and having a chamber provided with a valve seat and an outlet in communication with said inlet through the interior of said dome-like member, a rigid pressure-receiving element assembled to said dome-like member above said chamber, means whereby operating pressure may be applied to said pressure-receiving element to collapse said dome-like member and close said check valve, and a second check valve seated on said valve seat to open as said dome-like member is collapsed to close said first-named check valve.

6. The pump of claim 5, wherein the lower portion of the dome-like member is constructed of rubber.

7. The pump of claim 5, wherein said base is inset within the lower portion of said dome-like member and is provided with an outwardly opening groove in its marginal edge to receive the lower edge of said dome-like member.

8. A pump, comprising a dome-like member having a flexible lower portion, said member having a chamber provided with a valve seat and an outlet in communication with said chamber, a rigid plate inset within the lower portion of said dome-like member and assembled to the lower edge thereof and having an inlet opening in communication with said chamber, a valve in control of said inlet opening, a rigid pressure-receiving element assembled to the upper portion of said dome-like member, means whereby operating pressure may be applied to said pressure-receiving element to collapse said dome-like member and close said valve, and a second valve seated on said valve seat to open as said dome-like member is collapsed to close said first-named valve and to close as said dome-like member returns to its uncollapsed position.

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