Aug. 12, 1958 F. M. TOMLINSON 2,846,698

HYDRAULIC FORCE PUMP

Filed Sept. 28, 1956

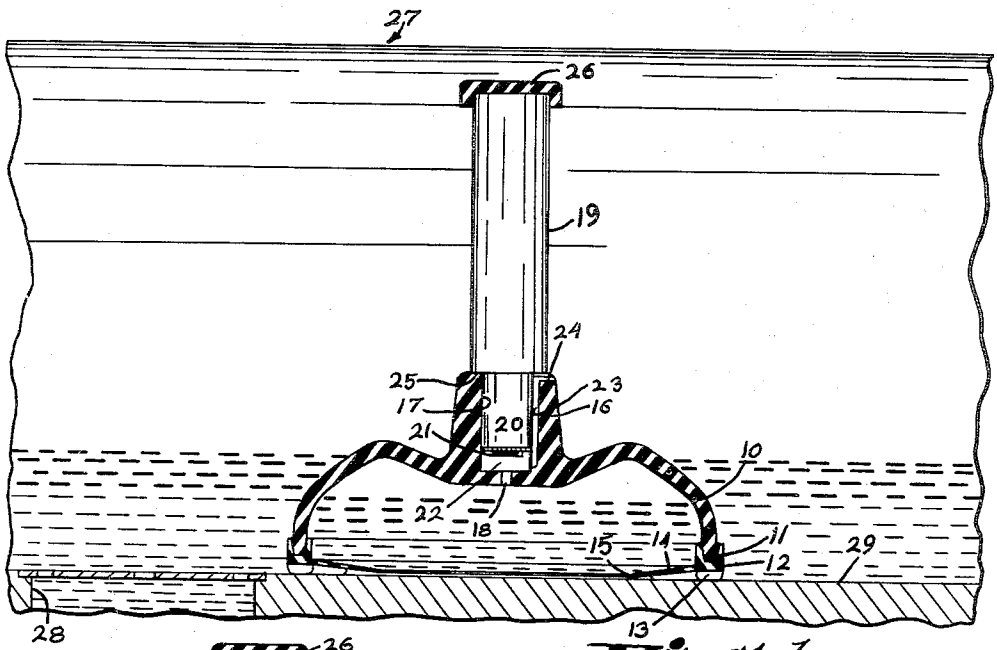


Fig. 1.

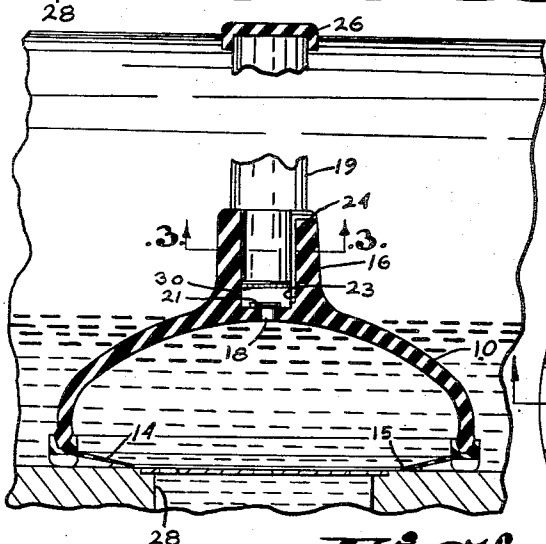


Fig. 2.

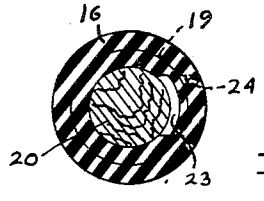


Fig. 3.

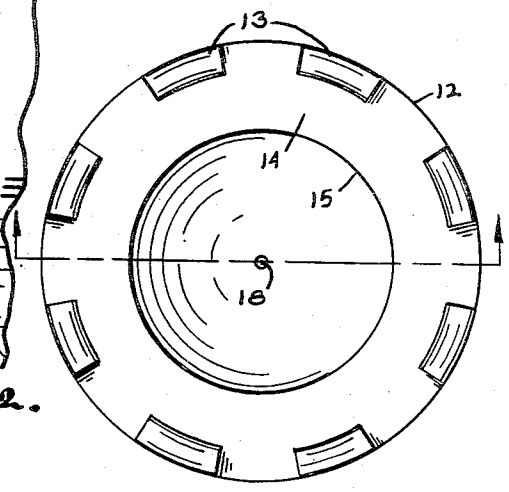


Fig. 4.

INVENTOR.
FAY M. TOMLINSON
BY: Harold B. Hood
ATTORNEY

United States Patent Office

2,846,698

Patented Aug. 12, 1958

2,846,698

HYDRAULIC FORCE PUMP

Fay M. Tomlinson, Daytona Beach, Fla.

Application September 28, 1956, Serial No. 612,840

3 Claims. (Cl. 4—255)

The present invention relates to a hydraulic force pump, and is primarily concerned with the production of a tool for clearing obstructions from waste pipes, or the like.

The primary object of the invention is to provide a device whereby water under high pressure, and accompanied by a destructive hydraulic shock wave, can be forced into a waste or drain line. A further object of the invention is to provide a tool of the character above-described which shall be extremely simple and inexpensive, and which shall be so simple in operation that it can be effectively used by the average housewife.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a sectional view of a force pump constructed in accordance with the present invention, in an intermediate stage in its use;

Fig. 2 is a similar view showing the tool in condition for applying such a shock wave;

Fig. 3 is a section taken substantially on the line 3—3 of Fig. 2; and

Fig. 4 is a bottom plan view of the force pump body.

My force pump comprises primarily an elastic, hollow, bell-shaped body **10** having an open end defined by a deformable lip of such character that, upon partial evacuation of the interior of the body while the lip bears against the bottom of a container having liquid therein, the lip will be deformed to permit the passage of liquid into the interior of the body. In the optimum form of my invention, as illustrated, the rim **11** of the open end of the body **10** carries a channeled ring **12** whose bottom surface is formed with serrations **13**, as clearly shown in the drawings. The ring carries an annular flap **14** of thin, readily-flexible, liquid-impermeable material whose outer edge is fixed to the ring **12** substantially at the level of the roots of the serrations **13**, and whose inner edge **15** is free. In the preferred form of the invention, the ring **12** is made of rubber or rubberoid material, and the flap **14** is integral therewith; but it will be obvious that the ring **12** may be formed of any other suitable material and that the flap **14** may be a separate element suitably secured to the ring with a substantially liquid tight seal.

Thus, in the illustrated embodiment of the invention, the flap **14** primarily constitutes the essential deformable lip.

The body **10** is provided with an upstanding annular wall **16**, substantially at the axis of the body, and defining a socket **17** which opens away from the open mouth of the body **10**. In the illustrated embodiment of the invention, the wall **16** is integral with the body **10**; but it will be clear that, alternatively, the socket **17** may be

formed in a separate element fixedly secured to the body **10**.

A restricted port **18** opens from the interior of the body **10** through the base of the socket **17**.

Preferably a handle member **19**, having a reduced end portion **20**, is provided for facilitating the application of collapsing pressure to the body **10**, in the direction of he open end of the body. As shown, a reduced end portion **20** of the handle **19** is snugly seated in the socket **17**; and a check valve **21** is confined in a chamber **22** defined between the ported wall of the body **10** and the inner end of the handle section **20**.

The check valve **21** is mounted for free floating movement in the chamber **22**; and it will be obvious that said valve will act to prevent fluid flow from the chamber **22** through the port **18** into the interior of the body **10**, but will permit fluid flow through the port **18** from the interior of the body **10** to the chamber **22**.

A restricted passage provides open communication between the chamber **22** and the atmosphere. In the illustrated embodiment of the invention, that passage comprises an axially extending groove **23** molded into a portion of the interior wall of the socket **17**, and a slot **24** molded into the upper end of the socket wall to provide clearance between the shoulder **25** on the handle **19**, and said wall end. It will be obvious that, as an alternative, a similar groove and slot could be formed in the handle.

I have illustrated a sink or the like, indicated generally by the reference numeral **27**, and having a drain outlet **28** formed in its floor **29**. When it is desired to remove an obstruction in the continuation of the drain outlet, the sink will be partially filled with water, and the pump of the present invention will be disposed in the sink, out of registry with the outlet **28**, and with the serrations **13** of the ring **12** in engagement with the sink floor **29**. Now, the handle **19** will be pushed downwardly to collapse the body **10**. Thereby, air entrapped within the body **10** will be forced out through the port **18**, lifting the valve **21**, into the chamber **22**, whence it escapes through the groove **23** and slot **24**. Now, when the handle **19** is released, the inherent resiliency of the body **10** will re-expand the body to its normal, bell-shape. As soon as the body begins to re-expand, the valve **21** will drop into closing association with the port **18**; and therefore, as the body continues to expand, its interior will be somewhat evacuated; and water will be drawn past the free edge **15** of the readily-flexible flap **14**, into the interior of the body. Now, the handle **19** is again pushed downwardly to collapse the body **10**. The free edge **15** of the flap **14** will immediately move into sealing engagement with the sink floor **29** to prevent expression of water therepast, and more air will be forced out of the body through the port **18**. As the body thereafter re-expands, more water will be drawn into the body. Two or three such pumping strokes of the handle **19** will fill the body **10** with water.

Now, without lifting the pump, it is moved into registry with the drain outlet **28**, as shown in Fig. 2. Of course, it will be understood that the drain outlet is filled with a column of water supported upon the obstruction which it is desired to remove; and, when the pump is moved into the position of Fig. 2, the mass of water within the body **10** constitutes a cap upon that column.

Now, a sharp hammer blow is struck against the upper end of the handle **19**, which is preferably protected by a cap **26** of shock resistant material such as, for instance, rubber. The body **10**, of course, tends to collapse under the effect of such a blow, whereby the force of the blow is transmitted, through the mass of water within the body **10** and the column of water in the drain outlet **28**, to the obstruction in the waste pipe. Of course, a few drops of water will be forced through the port **18**, lifting the valve

21; but that port is so restricted that almost all of the force of the hammer blow will nevertheless be transmitted to the obstruction in the waste pipe, and a substantial volume of water will be driven, under high pressure, from the interior of the body **10** into the waste pipe which, of course, has many times the effective diameter of the port **18**. At the same time, a hydraulic shock wave will be generated in the column of water in the waste pipe; and the combination of that shock wave and the moving mass of water is capable of dislodging any obstruction in the waste pipe except a solid object firmly locked therein. If necessary, of course, several hammer blows may be successively struck upon the handle cap in order to dislodge the obstruction.

Preferably, a spider **30** is firmly seated in the chamber **22** to retain the valve **21** against loss in case the handle **19** is removed from the body **10**.

I claim as my invention:

1. A hydraulic force pump comprising an elastic, hollow, bell-shaped body having an open end, and having a restricted port opposite its open end, valve means dominating said port to prevent fluid flow through said port to the interior of said body but to permit restricted fluid flow through said port from the interior of said body, a ring secured to the boundary of said open body end and carrying an inwardly-extending, readily-flexible, continuous annular flap, and manually-manipulable means for exerting collapsing pressure upon said body toward the open end thereof, said annular flap leaving a substantial area of said body end open for free fluid movement therethrough, and said ring being serrated on its surface remote from said opposite end of said body, and said flap being fixed at its outer edge to said ring substantially at the level of the serration roots and free at its inner edge.

2. A hydraulic force pump comprising an elastic, hollow, bell-shaped body having an open end provided with a spaced series of serrations and dominated by a deformable, readily flexible, inwardly-extending, annular lip and

providing, substantially at the axis of said body, a socket opening away from said open end, said body having a restricted port providing communication between the interior of said body and said socket, and valve means in said socket preventing fluid flow through said port from said socket into the interior of said body but permitting relatively free gaseous flow but highly restricting liquid flow through said port from the interior of said body into said socket, said flap acting as a valve to permit free fluid flow past said serrations to the interior of said body and to prevent fluid flow from the interior of said body past said serrations, but leaving a clear central opening for fluid movement past the radially-inner edge of said flap.

3. A hydraulic force pump comprising an elastic, hollow, bell-shaped body having an open end and providing, substantially at the axis of said body, a socket opening away from said open end, said body having a restricted port providing communication between the interior of said body and said socket, a substantially inflexible ring, serrated on its surface remote from said socket, secured to the boundary of said open body end and carrying a radially-inwardly extending, continuously-annular, highly flexible flap, a handle member having an end seated in said socket but spaced from the ported wall of said body, a check valve confined in said socket between said handle end and said body wall, and a restricted passage opening from the interior of said socket to the atmosphere.

References Cited in the file of this patent

UNITED STATES PATENTS

2,368,091	Andersen	Jan. 30, 1945
2,498,359	Coleman	Feb. 21, 1950

FOREIGN PATENTS

324,984	Italy	Feb. 23, 1935
471,149	Italy	Mar. 6, 1952