

Dec. 4, 1934.

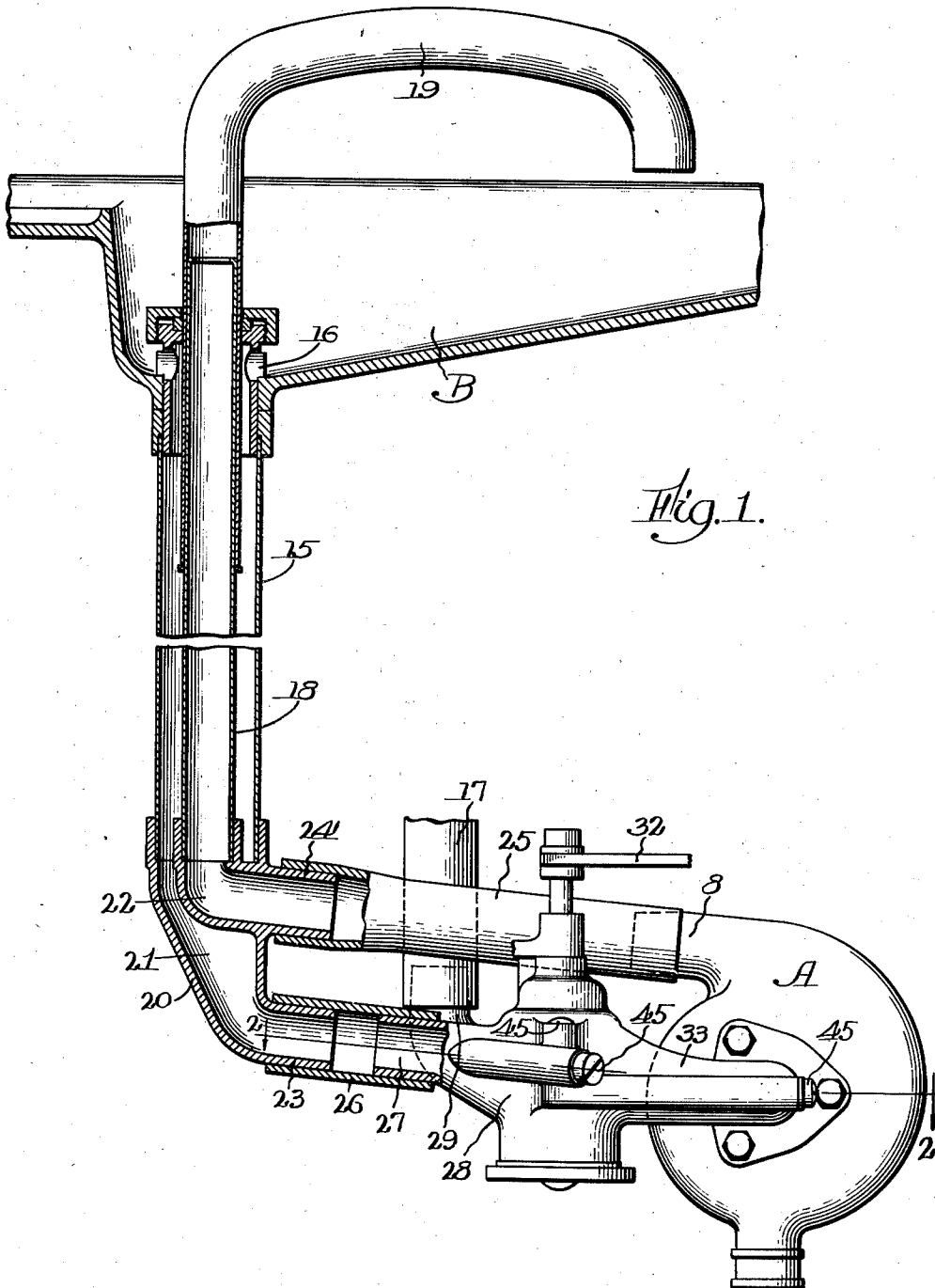
J. T. HUME

1,983,131

FLUID PUMP

Filed March 23, 1933

2 Sheets-Sheet 1



Inventor:
John T. Hume
BY: George I. Haight, Atty.

Dec. 4, 1934.

J. T. HUME

1,983,131

FLUID PUMP

Filed March 23, 1933

2 Sheets-Sheet 2

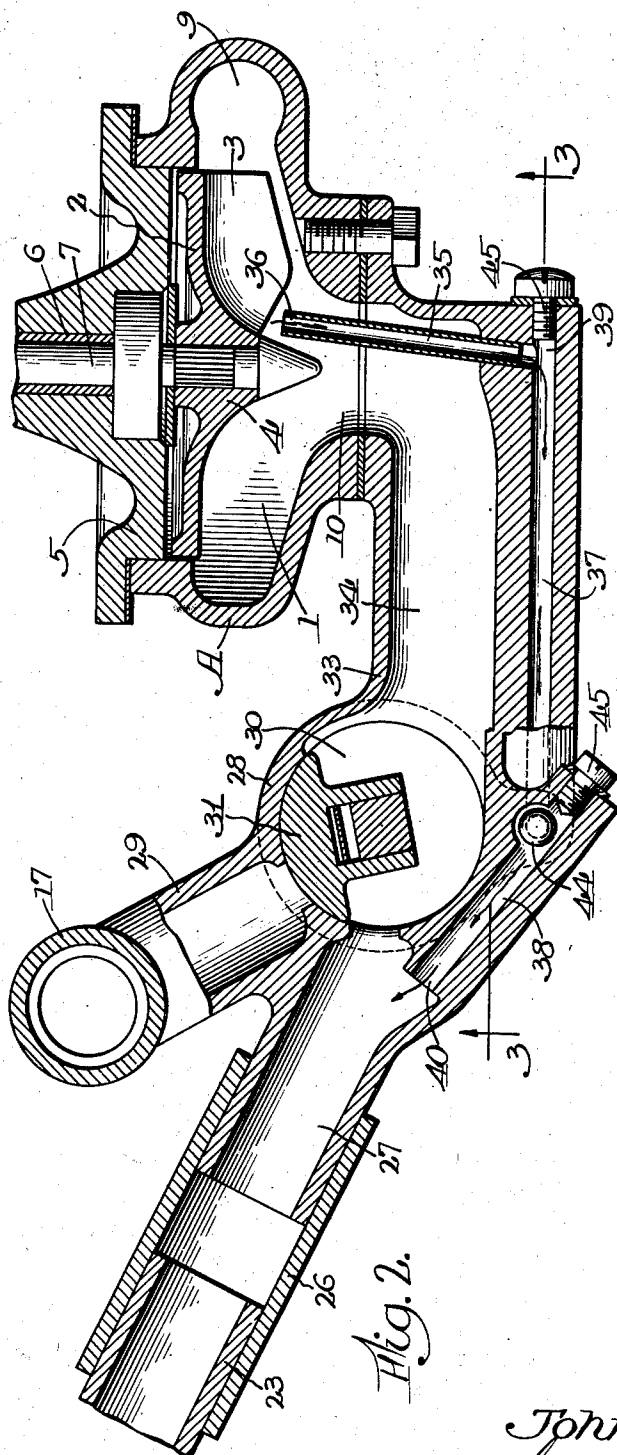


Fig. 2.

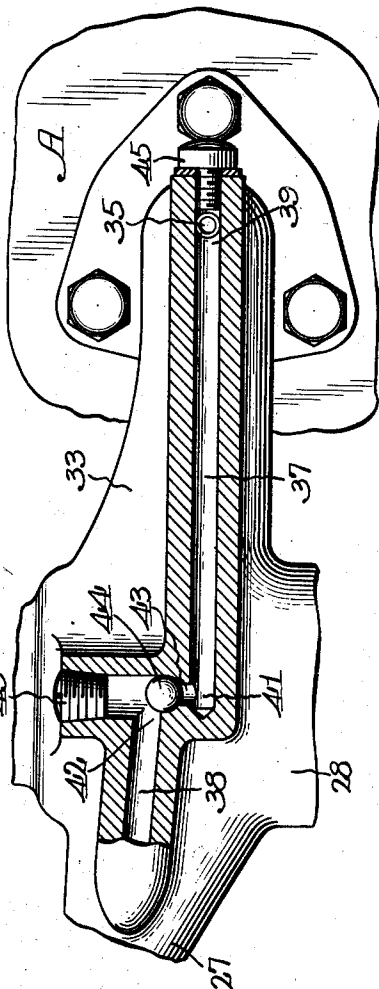


Fig. 3.

BY: John T. Hume Inventor:
George D. Haight Atty.

UNITED STATES PATENT OFFICE

1,983,131

FLUID PUMP

John T. Hume, Chicago, Ill., assignor to Electric Household Utilities Corporation, Cicero, Ill., a corporation of Illinois

Application March 23, 1933, Serial No. 662,207

2 Claims. (Cl. 103—113)

My invention relates to improvements in fluid pumps, particularly in that class of pumps employed in connection with domestic washing machines for discharging water from the tubs or 5 transferring from one tub to another.

One of the objects of my invention is to relieve the pump of air pockets or accumulations which interfere with the action of the pump on the flow of water therethrough, a further object being to provide a simple, inexpensive means for automatically removing from the pump casing any accumulation of air which may enter the pump with the water and destroy the suction of the pump by building up air pressure which prevents 15 water from entering the pump.

Other objects of my invention will appear hereinafter.

Referring to the accompanying drawings,

Fig. 1 is a view, partly in section and partly in 20 elevation, of a pump system for domestic washing machines, a portion of a drainboard of the washing machine and the associated drain and discharge pipes connected with the pump being shown;

Fig. 2 is an enlarged horizontal sectional view substantially on the line 2—2 of Fig. 1; and

Fig. 3 is a detail section substantially on the line 3—3 of Fig. 2.

My invention is illustrated in connection with 30 a centrifugal pump of a type employed for discharging water from the tubs of domestic washing machines and their associated wringers or clothes squeezer mechanism. The pump comprises a housing A having a chamber 1 therein, 35 within which rotates a pump element 2 comprising a disc-like member having one or more radially disposed vanes 3. The central portion 4 of the disc-like member is cone-shaped and partly defines the shape of the pump chamber. One 40 side of the pump housing is formed by a removable cover or plate member 5 having a centrally disposed bearing 6 for the shaft 7 which supports and drives the pump element. The shaft 7 is connected to any suitable driving mechanism. 45 Usually in washing machines the pump is driven through a belt from the main motor of the machine (not shown) and the pump element is designed to be rotated at a relatively high rate of speed.

50 The pump has a discharge outlet 8 which contains a passage communicating tangentially with the peripheral portion 9 of the pump chamber 1, and this discharge outlet is connected with a suitable nozzle for directing the pumped fluid wherever 55 ever desired, as will be hereinafter explained.

The intake or inlet 10 of the pump is centrally disposed with relation to the housing and communicates directly with the pump chamber 1.

These pumps are generally disposed beneath the tub of the washing machine as shown in 60 the drawings, and, although the washing and wringer or squeezer tubs are not shown, a portion B of the machine is shown which is intended to represent the trough or drainboard which collects the water from the wringer mechanism. 65 The drainboard is shown above the pump and is generally arranged to drain the water from the wringer or squeezer adjacent the top thereof.

A vertically disposed standpipe 15 conveys the water from the drainboard B to the pump, the 70 upper end of the standpipe being connected by means of a suitable joint with the drainboard B and communicating with the drainboard through a number of drain openings 16. It is also customary to provide a drain communicating with 75 the bottom of the washing tub so that the tub can be emptied as desired. This bottom drain is represented by the tubular hose or pipe 17.

The discharge outlet of the pump is connected to another vertical pipe 18, the upper end of 80 which is provided with a swinging nozzle or faucet 19 which may be swung around to direct the discharged water as desired. In the structure shown, it is desirable to dispose the discharge pipe 18 within the standpipe 15 and to extend it above 85 the drainboard sufficient for mounting the swing faucet. The lower ends of the standpipe 15 and discharge pipe 18 are connected with an elbow comprising a casting 20 having formed therein the two passages 21 and 22. The upper ends of 90 these passages are concentric while the lower ends terminate in separated bosses 23 and 24. The boss 24 is connected to the discharge outlet 8 of the pump by means of a suitable flexible hose member 25, and the lower boss 23 of the 95 elbow is connected by a suitable hose member 26 with an inlet 27 of a valve housing 28.

The valve housing 28 also has another inlet 29 which is connected with the bottom drain 17 100 of the tub. The passages of both inlets 27 and 29 of the valve housing communicate adjacent each other with a valve chamber 30 in which a vertically disposed valve member 31 is provided. This valve member is operated by a handle 32 and can be rotated to close off either or both inlet 105 members 27 and 29 from the pump as desired. The valve housing has an extension 33 forming a passage 34 extending from the valve chamber 30 and communicating with the inlet opening 10 of the pump, this extension being flanged and 110

bolted to the pump housing to serve as a convenient means of mounting the valve housing. Thus it will be seen that water can be conducted to the pump either from the drainboard B or the tub or both, as desired. The water flows through the valve chamber and passage 34 and into the pump. Ordinarily, the passages conveying water to the pump are all directed downwardly or inclined sufficiently to cause the water to flow into the pump by gravity, and in addition the rotation of the pump element creates sufficient suction to draw water into the pump and discharge the water from the pump in the well-known manner. If the flow of water to the pump is not sufficient, however, to fill the passages, air will also be drawn through these passages and into the pump. This condition is likely to occur more particularly in connection with the water drained from the drainboard B of the wringer due to the fact that water is not as a rule squeezed out of the clothes fast enough to completely fill the standpipe and passages to the pump; instead, the water trickles down through these passages and only partly fills them, with the result that air is also drawn into the pump. The accompanying air frequently becomes trapped or pocketed in the pump chamber and is sufficient not only to destroy the vacuum or suction tendencies of the pump, but also to create a slight back pressure which tends to hold back or retard the water entering the pump with the result that the water is not properly circulated through the pump and discharged from the outlet thereof.

In order to overcome this difficulty, means are provided for relieving the pump of this accumulated air and the back pressure created thereby, and this means comprises a separate passage or by-pass communicating directly with the interior of the pump chamber, preferably adjacent the central portion of the pump element where a vortex action is likely to occur. The by-pass passage in the present structure is formed by a small tube or pipe 35, as shown more clearly in Figs. 2 and 3, mounted in the extension of the valve housing and extending into the pump chamber through the inlet 10 thereof, to a point closely adjacent the central cone-shaped portion 4 of the pump element and the path of the vane 3. The end of this tube is open so that any air pressure carried into the pump with the water and tending to accumulate within the pump chamber will enter the inner end 36 of the tubular passage 35 and by virtue of slight pressure established in the pump chamber will discharge through this passage 35. In practice this tubular member may have its outer end open to the atmosphere so that the air from the pump chamber will be discharged therefrom. Occasionally drops or small quantities of water, however, might also enter the relief passage 35 and discharge therefrom into the atmosphere, and this may not be desirable under some conditions. For this reason, I prefer to connect the tubular member 35 with the passages leading from the drainboard at a point beyond the valve chamber so that any water which enters the relief passage 35 will be directed back into the passage communicating with the standpipe 15.

As shown more clearly in Figs. 2 and 3, this is accomplished in the present structure by forming the separate passageways 37 and 38 in the valve housing extension 33 and the valve housing 28

respectively. The end 39 of passage 37 communicates with the discharge end of the tubular member 35, and the end 40 of the passage 38 discharges into the passage of the inlet member 27. The inner ends 41 and 42 of the passages are connected by means of a short communicating passage 43 in which a seat for a ball check valve member 44 is provided. The ball check valve acts to permit the flow of water or air from the tubular relief passage 35 into the inlet 27, but checks or prevents the flow of water or air in the reverse direction towards the relief passage 35. This check valve provision is made so that in the event that the water flowing toward the pump completely fills the passages and no air enters the pump, the water will be prevented from flowing through the by-pass and relief passage into the pump. However, when the water is trickling through the passages to the pump and these passages are at the same time partly filled with air, then the air pressure within the pump chamber will be relieved by the flow of air through the relief passage into the inlet 27 to discharge this air into said passage, the pressure in this direction being sufficient to move the check valve ball from its seat. In practice the several passageways forming the by-pass are formed in the metal of the housing by drilling from the outside, but the drilling ends of these passages are closed by the screw plugs 45.

It is obvious that changes may be made in the construction, operation and arrangement of the parts without departing from the spirit of the invention, and it is understood that I contemplate such changes as fall fairly within the scope of the appended claims.

I claim:

1. The combination of a pump including a housing having a pump chamber therein and a discharge outlet, a casting forming an elongated passage in communication with the pump chamber for conducting fluid to the pump chamber, a pump element in said pump chamber acting to circulate fluid therethrough, means forming in a separate passage in said casting having a tubular member communicating at one end with the interior of the pump and extending into the pump chamber to a point adjacent said pump element, said separate passage at its other end communicating with the inlet passage at an appreciable distance from the pump chamber, and a check valve in said separate passage permitting the flow of air from the pump chamber through said passage to the inlet passage.

2. The combination of a pump housing having a chamber therein and an outlet therefrom, and a rotary pump element therein, a housing forming an elongated inlet passage for the pump communicating with the interior thereof and having a valve chamber, said housing having means forming connections for a plurality of sources of fluid to said valve chamber, a valve in said valve chamber controlling the flow of fluid from said sources to the pump inlet passage, means in said housing forming an independent passage extending into communication at one end with the pump chamber and at its other end with one of said fluid connections at a point beyond said valve chamber, and a check valve in said independent passage permitting the flow of air in said independent passage from the pump chamber only.

JOHN T. HUME.