

Nov. 26, 1935.

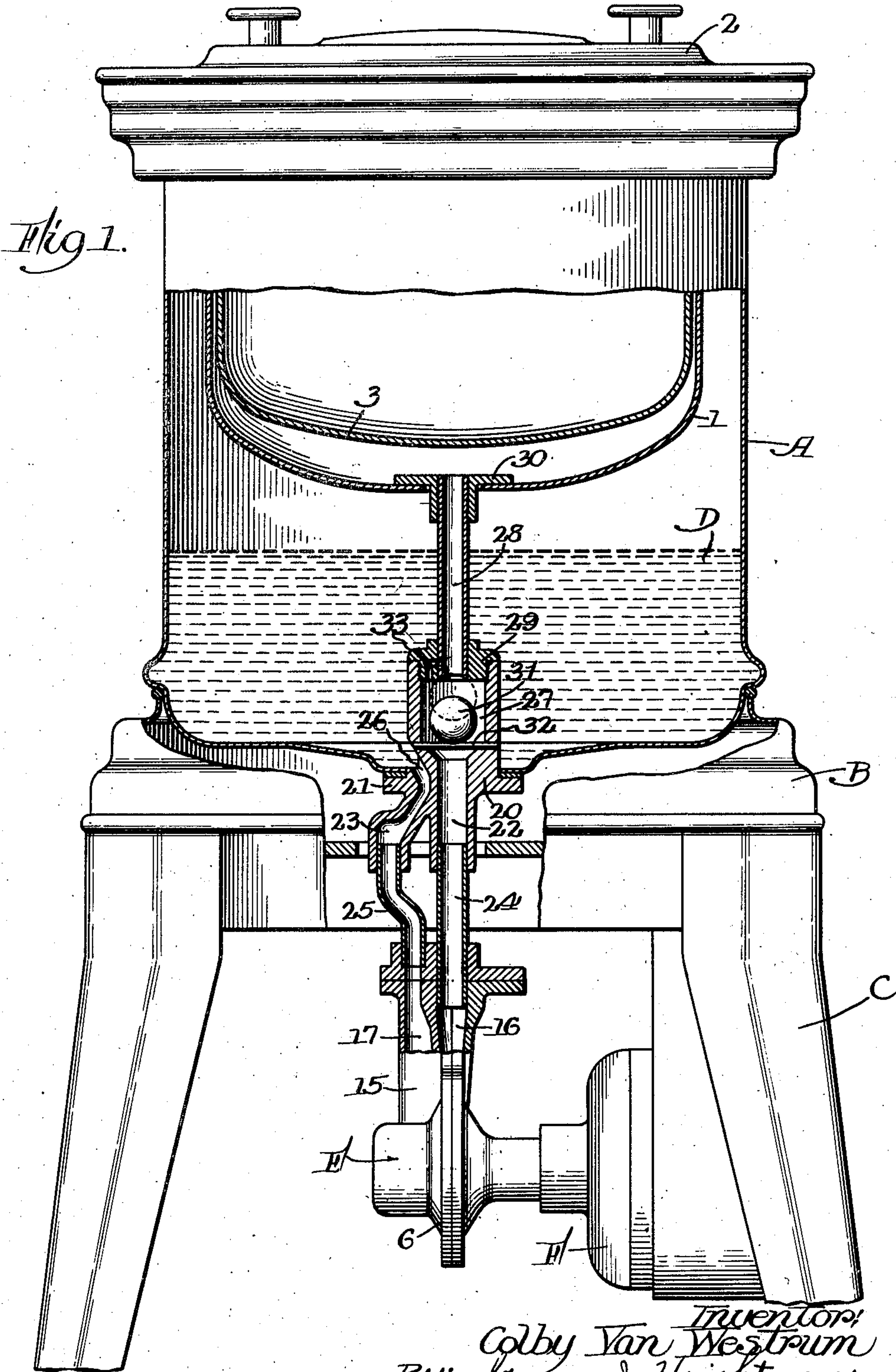
C. VAN WESTRUM

2,022,018

HYDRAULIC SYSTEM FOR CLOTHES DRIERS

Filed Feb. 24, 1934

2 Sheets-Sheet 1



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2 Sheets-Sheet 2.

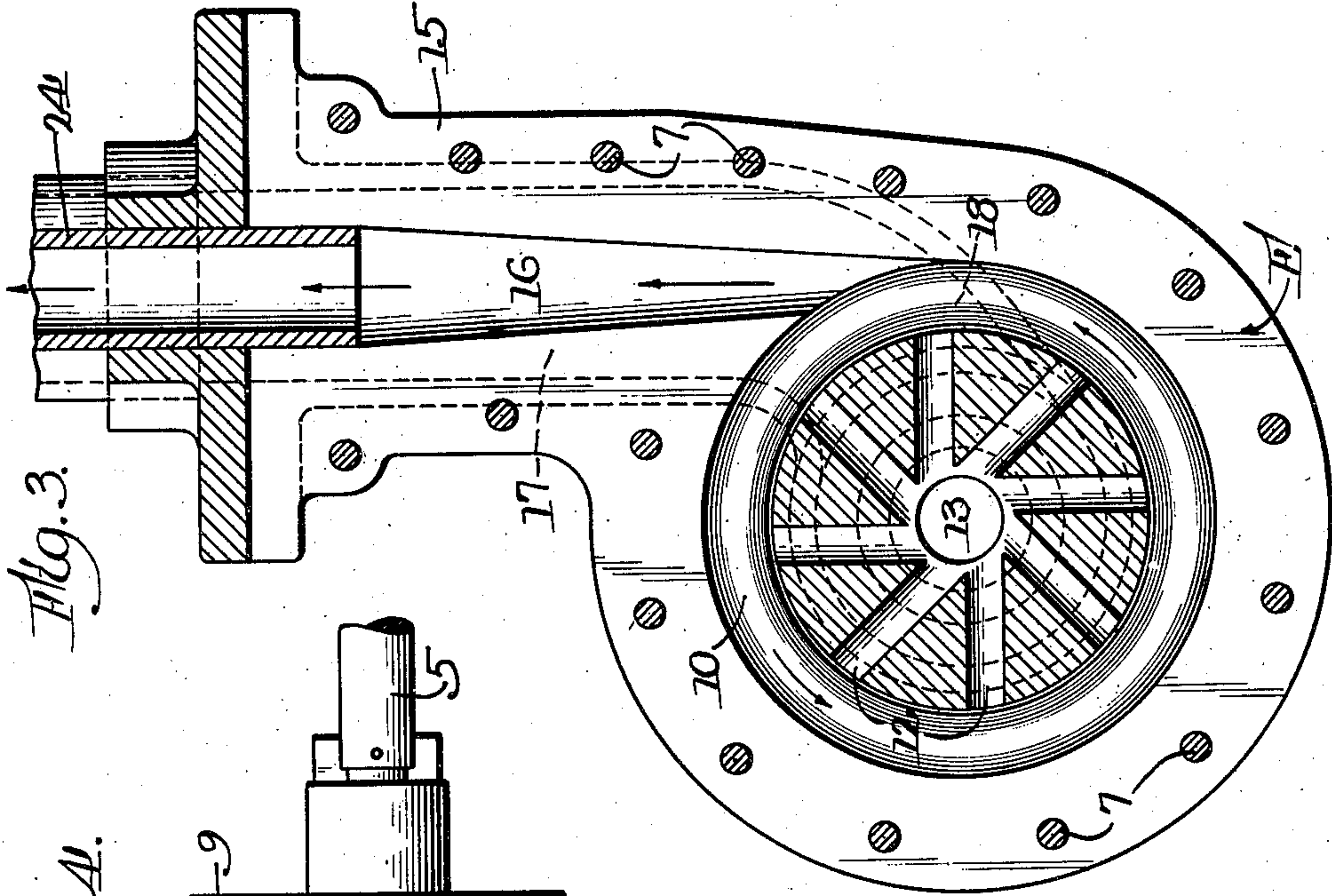


Fig. 3.

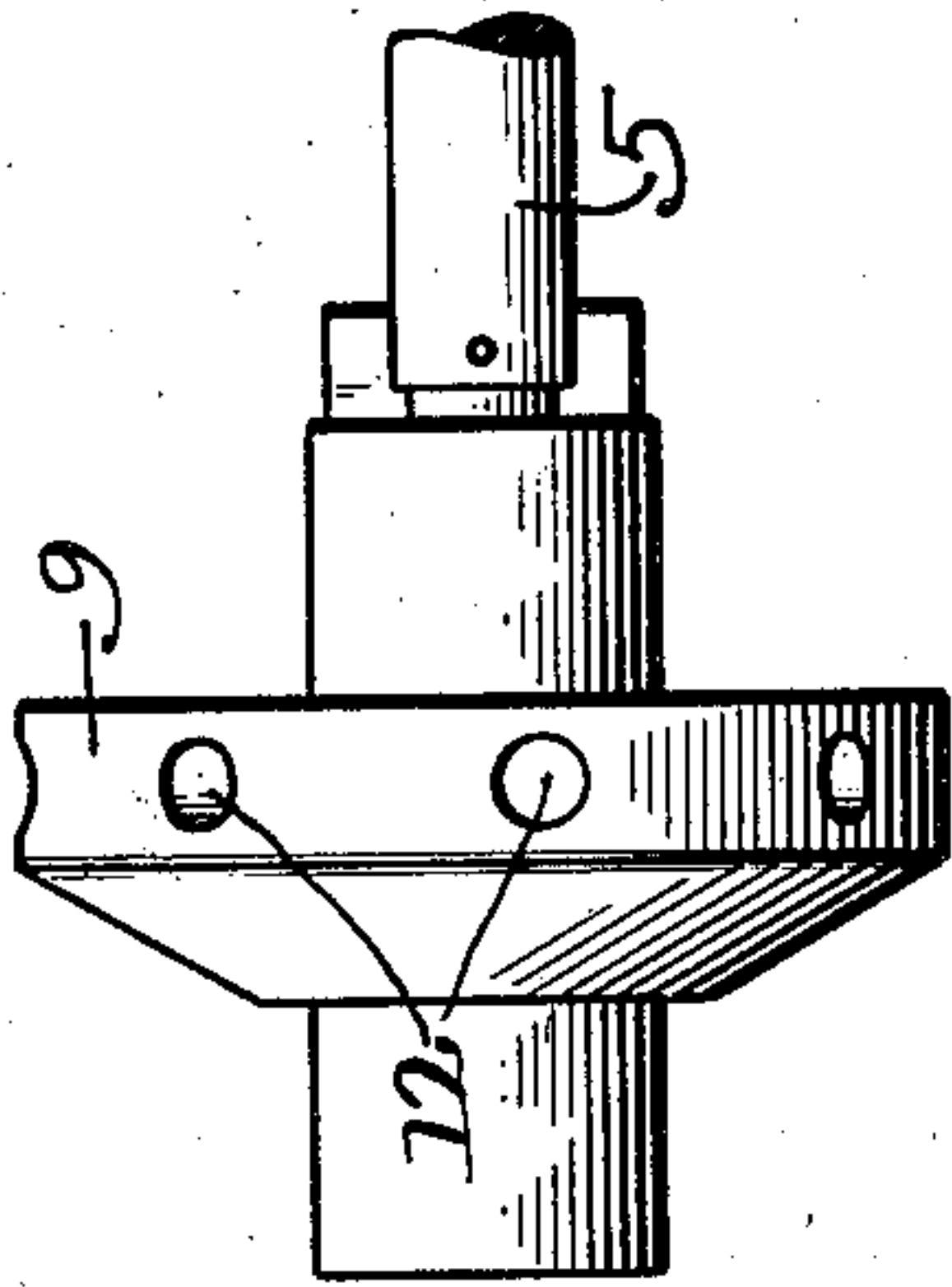


Fig. 4.

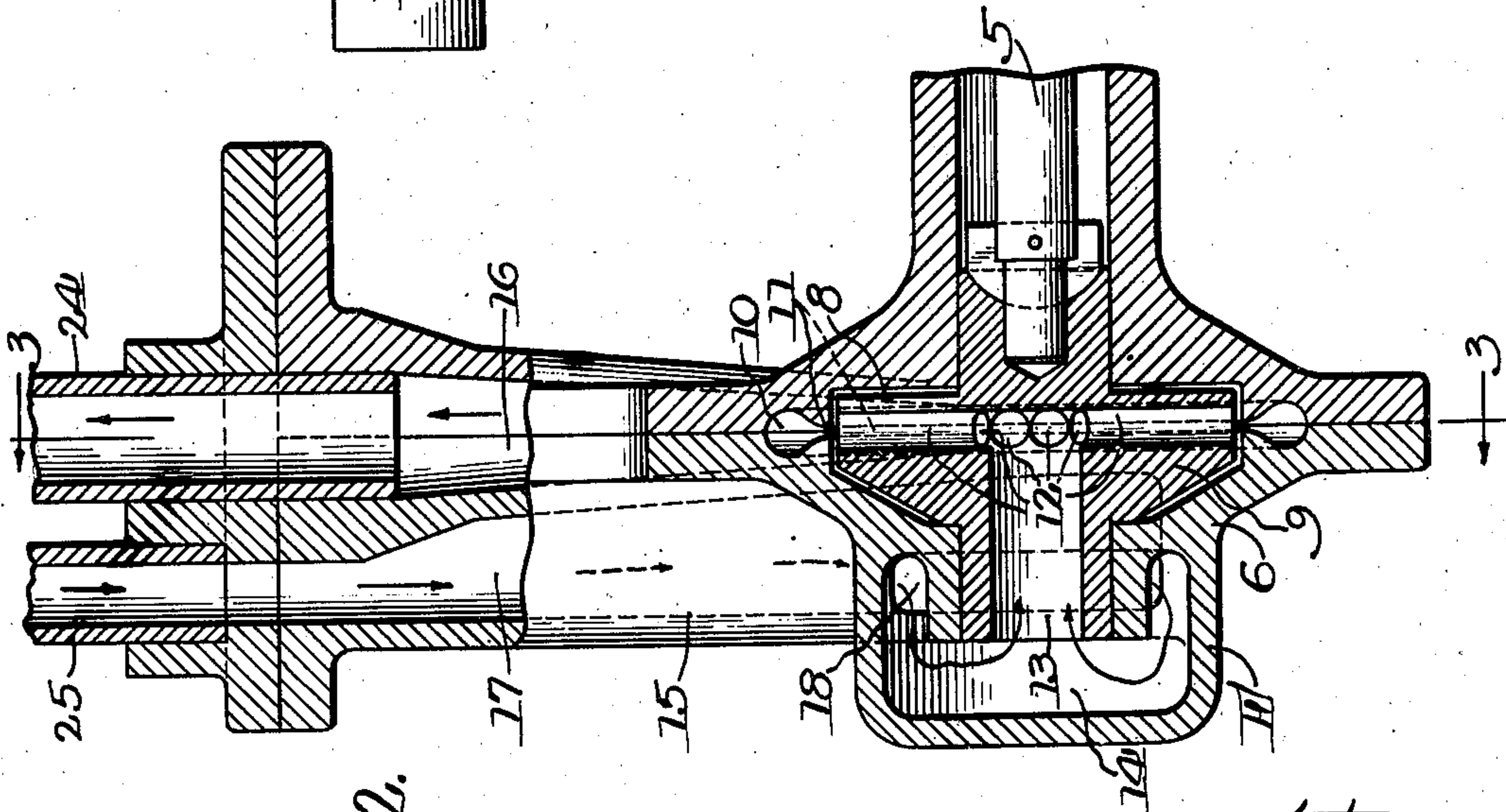


Fig. 2.

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UNITED STATES PATENT OFFICE

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HYDRAULIC SYSTEM FOR CLOTHES DRIERS

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3 Claims. (Cl. 100—50)

My invention relates to improvements in clothes driers of the squeezer type in which the clothes are compressed in a container to squeeze the water therefrom, and more particularly to the hydraulic system for said machines.

The general object of my invention is to provide an effective hydraulic system for said driers, in which a pump supplies fluid under pressure to a squeezer bowl from a reservoir or container, to which the fluid is quickly returned upon release of pressure.

A further object is to eliminate all noise caused by the fluid flowing under high velocity through the system and to provide a valve means which permits the regulated flow of fluid to the squeezer bowl and which permits a rapid reverse or return flow of fluid from the bowl to the reservoir.

A further object is to provide a simple unitary structure including a motor driven pressure pump and direct valve controlled passages between the pump and squeezer bowl for the flow of fluid to and from said bowl.

Other objects of the invention will appear from the following description and drawings which illustrate one embodiment of the invention.

In the drawings,

Fig. 1 is a general view of a clothes drier structure, with the tub and squeezer bowl and the passages shown in section;

Fig. 2 is an enlarged detail section of the pump and associated ducts or passages for the fluid;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2; and

Fig. 4 is a view of the pump rotor.

The structure as a whole includes a cylindrical tub or container A supported at proper height upon a frame B which includes supporting legs C, this structure being generally representative of clothes driers of this type. The tub A contains a body of water D and serves as a reservoir or supply from which water is drawn by the pump and supplied to the squeezer bowl, and to which water is returned from the squeezer bowl when the pressure is released.

In the upper portion of the tub—above the water level—there is provided a cylindrical squeezer bowl 1 having a rounded bottom wall and a removable cover 2 which is fastened in place to seal the upper open end of the bowl when fluid pressure is supplied to the bowl. The squeezer bowl contains a flexible collapsible bag 3 within which the clothes to be dried are placed. The bag is generally cylindrical with a rounded bottom somewhat conforming to the squeezer bowl and is spaced from the wall of the squeezer bowl

which provides a pressure chamber for the water between the bowl wall and the bag. When the clothes are in place in the bag 3 and water under pressure of the pump is supplied to the squeezer bowl, the pressure collapses the flexible bag and compresses the clothes within the bag. The squeezer bowl also has an air vent (not shown) which permits the escape of air when displaced by water, and if the water is supplied too fast the escaping air makes a whistling noise through the vent.

The pressure pump E is positioned below the tub or container A and is directly connected to the shaft 5 of the motor F which drives the pump and which is also mounted in the frame below the tub A. The pump is of the rotary type and includes a centrally divided housing 6, the parts of which are secured together by a series of fastening bolts 7. A chamber 8 is formed within the housing for the rotor 9 which is supported in suitable bearings formed in the housing. An annular chamber 10 is also formed within the housing and surrounds the rotor chamber 8 and has communication with the rotor chamber through a reduced circumferential slot or opening 11. This annular chamber 10 with the narrow circumferential slot forms a water cushion effect to silence the rattling noise which would otherwise be caused by the water striking the casing wall as it leaves the periphery of the rotor. The rotor is a disc-like member having a plurality of tangentially disposed ports 12 opening through the periphery of the disc and communicating at their inner ends with an inlet port 13 formed in the center of the disc and its hub. This inlet port opens into an inlet chamber 14 formed in the housing 6. The housing 6 has an upwardly directed extension 15 in which two ducts or passages 16 and 17 are formed. The passage 16 communicates with the annular chamber 10 and forms an outlet for the pump. The passage 17 communicates at its lower end 18 with the inlet chamber 14 and forms the inlet passage for the pump.

A casting 20 is secured to the center of the bottom wall of the tub A by means of the flanges 21 and is suitably sealed in position to prevent leakage. This member has two passages 22 and 23 formed therein, which are connected at their lower ends by means of the pipes 24 and 25 with the pump casing extension to form continuations of the passages 16 and 17, respectively. The passage 23 communicates directly at its upper end 26 with the interior of the tub A, and the passage 22 communicates with an enlarged valve chamber 27 formed in a portion

of the casting 20 which extends upwardly into the tub. The upper end of the valve chamber is connected by means of a passage 28 with the interior of the squeezer bowl 1, this passage being
 5 formed by a pipe which is mounted at its lower end in a cap member 29 of the valve chamber and at its upper end with a flanged bushing 30 sealed in the bottom wall of the squeezer bowl 1. A ball check valve member 31 is positioned
 10 in the chamber 27 and has a seat at the lower end of the passage 28 to close off said passage against the flow of water under pressure from the pump. In its lower position, the ball valve, however, rests upon a cross-pin 32 which pre-
 15 vents the ball from closing the upper end of the passage 22.

A small port 33 around the valve is formed in the cap 29 and communicates with the valve chamber 27 and with the passage 28 above the valve. This port serves as a by-pass around the
 20 ball valve and is considerably smaller in size than the other passages, the size being intended to regulate the flow of water under pressure to the squeezer bowl, so that the application of water pressure to the flexible bag and to the clothes therein will be gradual.

When the driving motor F is started, the pump operates to force water under pressure through the passages 16, 22, valve chamber 27,
 30 and passage 28, to the squeezer bowl 1, and apply pressure therein to collapse the bag and squeeze water from the clothes. The flow of water under pressure instantly carries the ball valve 31 upwardly and lodges it against its seat,
 35 thereby closing the lower end of the passage 28; however, the water flows through the smaller by-pass 33 around the valve and into the squeezer bowl 1. On account of the restricted passage of the by-pass 33, the pressure will be maintained
 40 in chamber 27 to hold the valve against its upper seat, and noise incident to a chattering valve or the flow of water through the passage will be eliminated.

When the pressure is released by stopping the motor and pump, the valve member 31 will drop
 45 against the pin 32 and open the passage for the free flow of fluid by gravity downwardly through the passages 28, 27, 22 and 16, through the pump chambers and rotor ports, and thence
 50 upwardly through the passages 17, 23 and 26, to the sump or reservoir in the tub A. These passages are all relatively large and permit the water to flow rapidly from the squeezer bowl, whereby the bowl will be quickly emptied and the bag distended, permitting the removal of the
 55 clothes.

I claim:

1. In a clothes drier of the class described, the combination of a tub forming a reservoir for wa-
 60 ter, a container in the tub above the level of the water therein to cause the flow of water from

the container to the reservoir by gravity, a pressure pump arranged to force water therethrough in one direction when operating and to permit water to flow in reverse direction therethrough when idle, means forming a passage connecting
 5 the reservoir with the container, said passage including the pump, a valve in said passage for closing the passage in the direction of flow of water under pressure to the container but per-
 10 mitting the free flow of water by gravity in the reverse direction of said passage from the container, and means forming a partially restricted by-pass around said valve, permitting the flow of water under pressure to the container inde-
 15 pendently of the valve.

2. In a clothes drier of the class described, the combination of a tub forming a reservoir for a body of water, a container within the tub above the water level therein so that water will flow by gravity from the container to the res-
 20 ervoir, a rotary pump positioned below the tub, and arranged to permit the flow of water therethrough when idle, means forming a passage connecting the reservoir with the inlet of the pump, means forming an outlet passage for the pump
 25 leading to the container, a housing forming a chamber connected in said outlet passage, a ball valve member in the chamber adapted to be lifted by water under pressure flowing toward the container to close said outlet passage, said hous-
 30 ing having a by-pass connecting said chamber with the passage beyond the ball valve member, said by-pass being adapted to permit the flow of water under pressure to the container independently of the valve member, and means
 35 in the chamber preventing the valve from obstructing the flow of water from the container to the reservoir through said passages and pump.

3. In a clothes drier of the class described, the combination of a container forming a reservoir
 40 for a body of water, a pressure actuated squeezer mechanism within the container and above the water level therein so that water will flow from the squeezer mechanism to the reservoir by grav-
 45 ity, means forming a passage from the reservoir to the squeezer mechanism, a pressure responsive valve in said passage for closing the pas-
 50 sage when the flow of water under pressure is from the reservoir to the squeezer mechanism but permitting the flow of water by gravity from the squeezer mechanism to the reservoir, means forming a partially restricted by-pass around the valve to permit the flow of water under pressure to the squeezer mechanism, and a pump included in said passage and forming a part thereof for
 55 the flow of water in either direction in said passage, said pump having a rotor adapted when operating to force water under pressure in the passage toward the squeezer mechanism.

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