

Jan. 2, 1923.

P. P. VALBOE.  
DRAINER.  
FILED JAN. 20, 1923.

1,441,187.

2 SHEETS-SHEET 1.

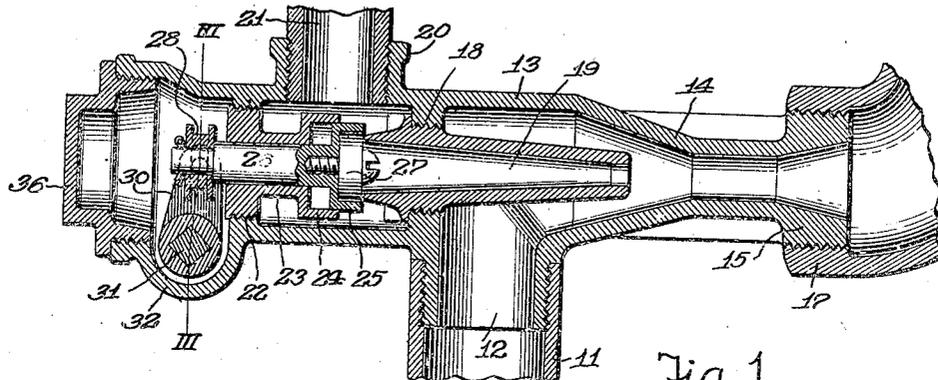


Fig. 1.

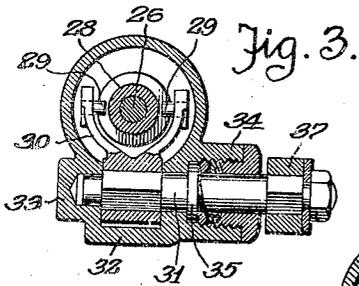


Fig. 3.

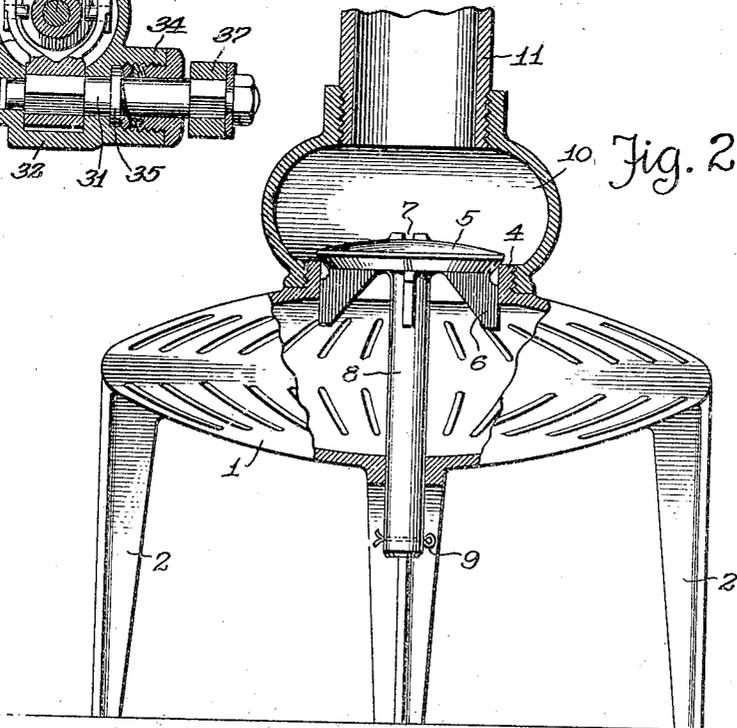


Fig. 2.

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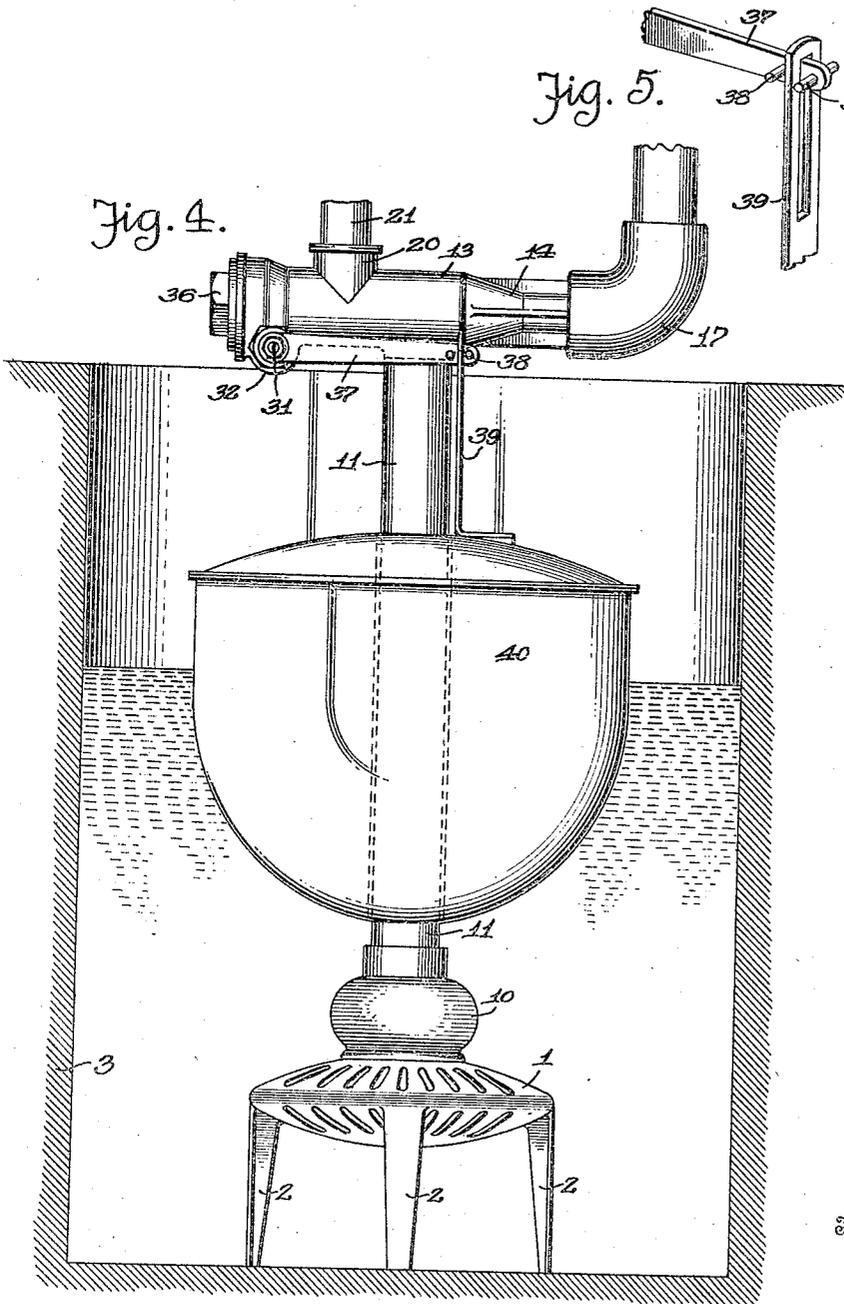
Attorneys

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Inventor

By

Peter P. Valboe,  
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Attorney

# UNITED STATES PATENT OFFICE.

PETER P. VALBOE, OF DETROIT, MICHIGAN, ASSIGNOR TO PENBERTHY INJECTOR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

## DRAINER.

Application filed January 20, 1921. Serial No. 438,663.

*To all whom it may concern:*

Be it known that I, PETER P. VALBOE, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Drainers, of which the following is a specification, reference being had therein to the accompanying drawings.

In the Pribil Patent No. 1,063,468, granted June 3, 1913, there is disclosed an automatic cellar drainer that may be used in pits, sumps, cellars, tanks, settling basins, sewers and excavations for removing waste water, and the draining device disclosed in this patent includes a novel float operated ejector mechanism compactly arranged above the level of waste water to be removed by the device.

In a later Pribil Patent No. 1,116,481, granted Nov. 10, 1914, there is disclosed another automatic cellar drainer of the float actuated ejector type, and in this and the prior patent the ejector valves are vertically disposed with reciprocable valve stems or rods extending through stuffing boxes. Such cellar drainers have been extensively used and have proven satisfactory, but it has been found that other improvements, to be hereinafter referred to, materially contribute to the efficiency of the cellar drainer, besides reducing the expense of manufacture and maintenance of the cellar drainer.

Considering one of the improvements it has been found that any stuffing box containing a reciprocable member requires more attention than a stuffing box containing a rocking or rotary member; therefore, the present invention includes an ejector which is actuated through the medium of a rocking or oscillatory member arranged in a laterally disposed stuffing box.

Other improvements are certain refinements in the manufacture of the drainer parts, and all of the improvements will be described in detail by aid of the drawings, wherein—

Figure 1 is a longitudinal sectional view of the ejector;

Fig. 2 is a side elevation of a strainer or foot piece of the draining device, partly broken away and partly in section;

Fig. 3 is a cross sectional view taken on the line III—III of Fig. 1;

Fig. 4 is a side elevation of the draining device relative to a pit or well, and

Fig. 5 is a perspective view of the lever and link connection.

In the drawings, the reference numeral 1 denotes a cage or apertured foot piece provided with suitable legs or supports 2 for supporting the cage in an elevated position relative to the bottom of a pit 3 or the like. The cage 1 may be of any suitable shape or design and serve as a strainer to prevent large particles of matter within the pit or well 3 from entering the draining device.

The top of the cage 1 is provided with an axial exteriorly screwthreaded integral connection 4 serving as a valve seat member for a gravity closing valve 5 provided with wings 6 engaging the walls of the connection 4 to guide the valve 5 relative to the cage. The top of the valve 5 has a tool seat 7 to facilitate rotating the valve on the connection 4 to clean the valve seat, and the bottom of the valve 5 has a depending stem 8 extending through the bottom of the cage 1 and provided with a cotter pin 9 or like stop member. This cotter pin or stop member limits the opening movement of the valve 5 relative to the connection 4 and the bottom of the cage 1 cooperates with the wings 6 and the valve stem 8 in constantly maintaining the gravity closing valve axially of the cage 1, said valve preventing flooding or overflowing during the use of the draining device.

Screwed on the connection 4 is a dome or chamber 10, and connected to said dome and communicating therewith is a suction or stand pipe 11 which is adapted to extend above the level of waste water that may accumulate within the pit or well 3.

Suitably connected to the upper end of the suction pipe 11 is a depending nipple 12 of an ejector casing 13, this casing having its longitudinal axis at a right angle to the axis of the suction pipe 11. One end of the ejector casing 13 is reduced and suitably reinforced to afford a restricted portion 14 and the outer end of the restricted portion is enlarged to afford a coupling connection 15 for an elbow or waste pipe 17. The waste pipe

16 is adapted to extend out of the pit or well 3, and is placed as close to the axis of the suction pipe 11 as possible.

The ejector casing 13, adjacent the nipple 12, has a partition 18 supporting a detachable ejector nozzle 19, said nozzle being of a conventional form tapering inwardly from its inner end to its outer end with its inner end serving as a valve seat and its outer end extending across the axis of the nipple 12 into the restricted portion 14 of the ejector casing.

Adjacent the partition 18 is a connection 20 for a high pressure service pipe 21 adapted to extend out of the pit or well 3 and receive water or other fluid under pressure.

Contiguous to the connection 20 is another partition 22 for a detachable combined guide and bearing 23 disposed in the longitudinal axis of the ejector casing 13. The outer end of the bearing 23 affords a cup shaped guide 24 for a valve 25, said valve having a stem or rod 26 slidable in the bearing 23. The valve 25 confronts the inner end of the ejector nozzle 19 and detachably mounted in said valve is a wear member 27 which seats on the inner end of the ejector nozzle 19. This wear member may be made of fiber or any suitable material possessing tight seating qualities, and it might be mentioned that all parts of the draining device are of such materials not subject to corrosion or slime, and consequent inoperativeness.

The inner end of the valve rod 26 is reduced and provided with a detachable flanged collar or spool 28 engaged by the opposed pins 29 of a yoke 30 mounted on a transverse rock shaft 31, journaled in a transverse housing 32 forming part of the ejector casing. One end of the transverse housing 32 affords a bearing 33 for the inner end of the rock shaft 31, and the opposite end of the housing 32 has a conventional form of stuffing box 34 through which the rock shaft extends. On the rock shaft 31, within the stuffing box 34, is a collar 35 against which the packing of the stuffing box is placed and retained by the gland of the stuffing box. The rock shaft 31 also has a squared or facet portion for the yoke 30, so that said yoke may be actuated by the rock shaft 31 to reciprocate the slidable valve rod 26.

The yoke 30 may be placed within the transverse housing 32 through the end of the ejector casing 13, and this end of the ejector casing is normally closed by an end plug or cap 36.

Suitably mounted on the outer end of the rock shaft 31 is a lever or crank 37 having its outer end provided with transverse pins 38 and loose on the outer end of said lever, between the pins 38 is a longitudinally slotted upper end of a link or arm 39, car-

ried by the top of a float 40 slidable longitudinally of the suction or stand pipe 11. The float 40 is of a conventional form having a central passage providing clearance for the suction pipe 11 so that said suction pipe will serve functionally as a guide for said float.

In operation, the water or fluid under pressure in the ejector casing 13, between the partitions 18 and 22, does not interfere with the opening of the valve 25, since said valve is reciprocable in the guide 24, and any adjustment of the valve relative to the ejector nozzle 19, is practically noiseless. With the ejector mechanism and the greater part of the draining device above the level of the waste water within the pit or well 3, the waste water cannot interfere with the operation of the draining device nor cause the deterioration thereof. As waste water accumulates in the pit or well the float 40 will be raised, and due to the elongated slot in the upper end of the link or arm 39, the float 40 will have a predetermined movement before actuating the lever 37. Assuming that a sufficient quantity of waste water has accumulated within the pit or well 3 to raise the float 40 and actuate the lever 37, said lever rocks the shaft 31 and swings the yoke 30 to retract the valve rod 26, thereby opening the valve and establishing communication between the high pressure service pipe 21 and the ejector nozzle 19. The high pressure of water passing from the ejector nozzle 19 through the restricted portion 14 of the ejector casing 13 produces a partial vacuum or reduction of atmospheric pressure within the ejector casing 13 and the suction or stand pipe 11, resulting in the valve 25 being raised and the waste water drawn upwardly from the cage 1 through the suction or stand pipe 11 into the ejector casing 13 and out through the waste pipe 16 connected to said ejector casing. The ejection of the waste water continues until the level of waste water within the pit or well 3 is materially lowered and when the float 40 assumes normal position the link or arm 39 thereof actuates the lever 37 which in turn rocks the shaft 31 and causes the yoke 30 to shift the valve rod 26 and seat the valve 25 relative to the ejector nozzle 19 thereby closing the ejector nozzle and by shutting off the motive fluid thereto the draining device becomes inactive for draining purposes and so remains until sufficient waste water has accumulated within the pit or well 3 to again actively operate the float 40 and the ejector mechanism.

From the foregoing, it will be observed that the rod 26 is horizontally disposed and completely inclosed by the ejector casing, consequently it is unnecessary to use any packing in connection with the combined

guide and bearing 23. With the valve rod horizontally disposed and the valve partly housed by the guide 24 less force is required to shift the valve rod, as the friction or resistance is reduced to a minimum. The same is true in connection with the rock shaft 31, which is horizontally disposed in the stuffing box 34, and this arrangement possesses distinct advantages over a vertically disposed stuffing box having a reciprocable valve rod therein, as shown in the prior Pribil patents previously referred to. With the valve rod reciprocable in the stuffing box, there is a long frictional resistance against the movement of the rod by the packing in the stuffing box and if the packing is too dense or tight more force is required to shift the valve rod, and if the packing is loose to reduce the frictional resistance there is leakage between the packing and the valve rod. It is therefore evident that the stuffing box of the reciprocable valve rod requires repeated packing and greater attention than that of a rock shaft in a stuffing box, for the reason that a rock shaft has a smaller degree of movement in the packing and the packing is maintained more uniform during the operation of the rock shaft. In my constructive arrangement of parts the stuffing box 34 cooperates with the combined guide and bearing in preventing leakage. It is practically impossible for the motive fluid or liquid, as steam or water, to enter the guide 24 and pass between the valve rod 26 and the bearing 23, but should any motive fluid enter the transverse housing 32, then there is the stuffing box 34 to prevent leakage. Comparing my improvement with the construction disclosed by the prior Pribil patents, it will be noted that my structure is more compact the operating mechanism enclosed to a greater degree, besides the structure is more durable and rigid throughout.

What I claim is:—

1. In a draining device which is operated by a motive fluid, through an ejector having a float controlled valve:—an ejector casing enclosing the ejector valve, and a combined bearing and guide for the ejector valve maintaining said valve shiftable in the lon-

gitudinal axis of the ejector casing, and serving as a partition intermediate the ends of said ejector casing.

2. In a draining device having an ejector casing and a nozzle wherein a motive fluid constitutes a force for producing a partial vacuum for draining purposes:—a valve controlling the operation of the injector and movable to and from the injector nozzle in the axis thereof, and a combined bearing and guide for said valve, said nozzle and combined bearing and guide being removable from one end of said ejector casing.

3. In a draining device having an ejector casing and a nozzle in said casing cooperating with a motive fluid in producing a partial vacuum for draining purposes; a valve movable to and from an end of said nozzle, a float actuated yoke adapted to move said valve, and means between said nozzle and said yoke serving as a partition and as a guide for said valve.

4. In a draining device having an ejector casing and a nozzle in said casing cooperating with a motive fluid in producing a partial vacuum for draining purposes, a stuffing box at the side of said casing, a float actuated rock shaft extending through said stuffing box into said casing, a bearing in said casing serving as a partition between said nozzle and the rock shaft in said casing, and reciprocable valvular means operatable through said bearing and movable to and from said ejector nozzle and actuated from said rock shaft.

5. In a draining device having an ejector casing and a nozzle in said casing cooperating with a motive fluid in producing a partial vacuum for draining purposes, a valve movable to and from said nozzle, means adapted to operate said valve, and a valve bearing in said casing and having a guide at one end thereof for said valve.

In testimony whereof I affix my signature in presence of two witnesses.

PETER P. VALBOE.

Witnesses:

ANNA M. DORR,  
CHAS. W. STAUFFIGER.