Jan. 16, 1940. J. L. MacMILLAN 2,187,043

TRAP CLEANER AND FORCE PUMP

Filed July 20, 1938

Fig. 1

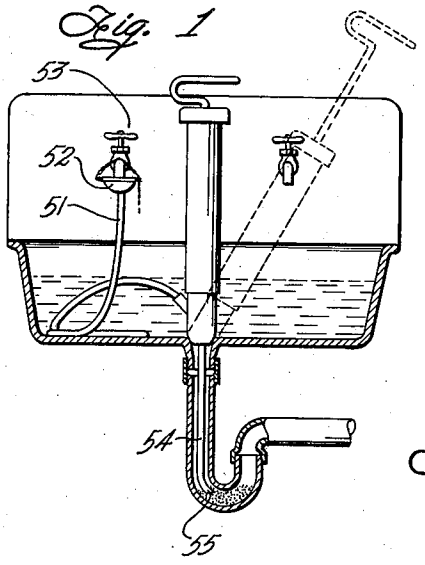


Fig. 2

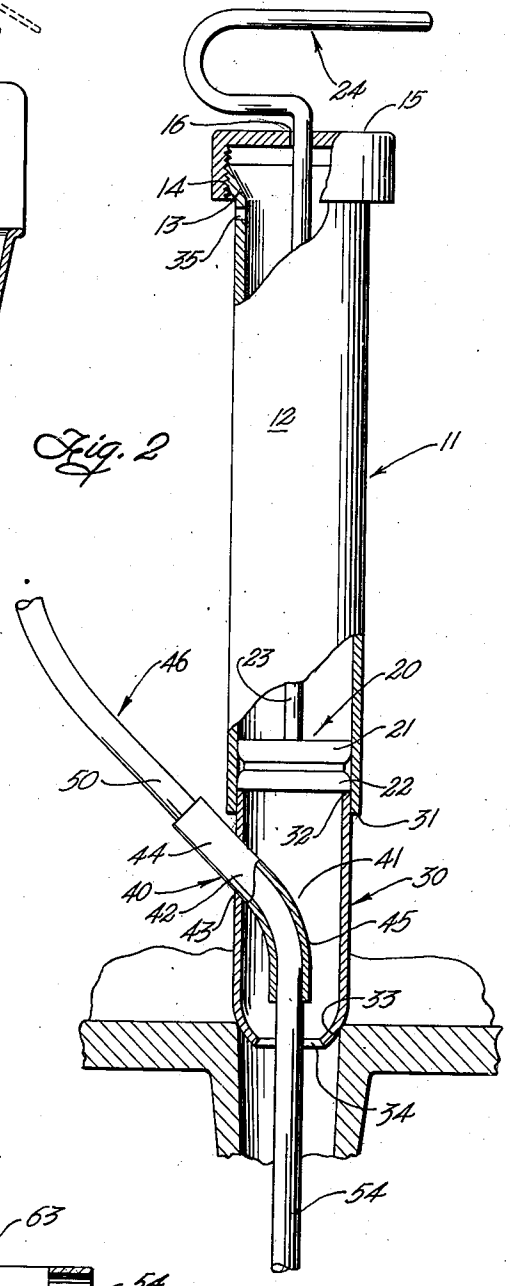
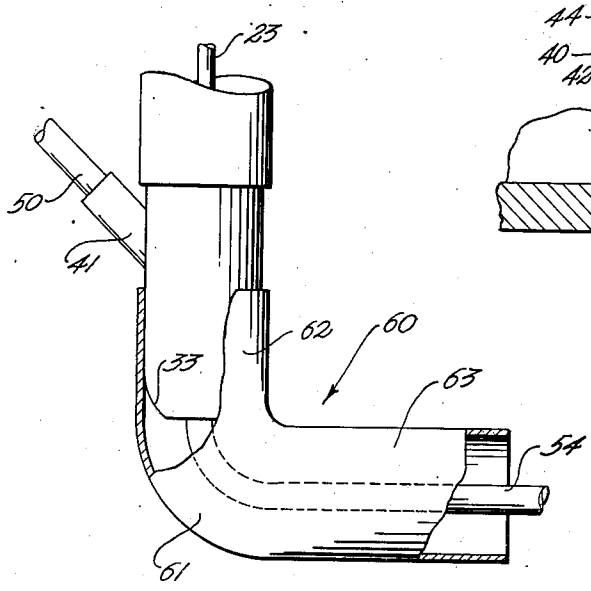


Fig. 3



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Patented Jan. 16, 1940

2,187,043

UNITED STATES PATENT OFFICE

2,187,043

TRAP CLEANER AND FORCE PUMP

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Application July 20, 1938, Serial No. 220,279

4 Claims. (Cl. 15—104.05)

In most types of trap cleaners in which a force pump or the like is utilized, the pressure developed by the pump is relied upon as being sufficient to clean out the trap or other obstruction in a pipe. Frequently however the action of such a force pump merely compacts the obstructing material making it more difficult to remove. Moreover it sometimes occurs with a force pump that a small opening will be broken through an obstruction sufficient to allow passage of the fluid under the action of the pump but such passage does not enlarge and thus does not remove the entire obstruction so that when the trap is again used in its normal manner it clogs or the remaining portion of the obstruction again clogs the water or drain pipe.

An object and feature of my invention is the combinational construction and action of a hydraulic force pump in connection with a pressure jet of water in which the water jet may act substantially directly on the obstruction, that is, work or discharge in a trap or against the obstructing material in a drain and the force pump is operative to increase the pressure. Therefore as soon as any of the obstructing material whether in a trap or the straight pipe, is loosened, the pressure water jet carries away the loosened material, allows loosening more by the pressure of the force pump and as the material is loosened, it is carried away by the water jet.

Another more detailed object and characteristic of my invention is providing a water jet in which its discharge end may be varied as to its distance from the end of the force pump, this being accomplished by a flexible hose which may be fed beyond the end of the pump and led into a trap or a drain pipe to an obstruction. Thus when the other end of a hose is connected to a pressure water faucet, the direct water pressure and flow carried through the flexible hose operates directly on the obstructing matter and the force pump may be used to give a repeated pressure stroke. Such force pump is preferably of the cylinder and reciprocating piston type in which the water is drawn in through the lower or discharge end and forced out under pressure through such discharge end, the hose for the jet also leading through the discharge end of the force pump. In this connection a detail feature of my invention utilizes a rigid curved guide passage through which the flexible hose is led, such passage however interfering but little with the force pump. Another detail feature consists of accessory end pieces of various curved or other shapes which may fit in toilet bowls or the like, giving a lead for the discharge from the force pump towards the obstruction.

My invention is illustrated in connection with the accompanying drawing, in which:

Fig. 1 is an elevation of my invention shown in connection with a sink and a trap of a sink, the sink and trap being shown in vertical section.

Fig. 2 is an elevation of the invention similar to Fig. 1 on an enlarged scale but broken away to show internal details.

Fig. 3 is an elevation of the lower end of the force pump with a detachable extension piece for directing the flow from the pump.

In my invention the force pump proper is indicated by the numeral 11. This is provided with a cylinder 12 in which the piston operates, such cylinder preferably having an outward flare 13 at the top, this flare having a threaded rim 14 to which the cap 15 is screw threaded. The cap has a perforation 16. Operating in this cylinder is a piston 20. This may be of a standard type but preferably has the piston leathers or cups 21 and 22 facing in opposite directions. A piston rod or plunger stem 23 leads upwardly from the piston through the guide opening 18 and is provided with a handle 24 at the top for manual manipulation.

The lower part of the force pump has a cylindrical end piece 30, the upper end being fitted in the lower end of the force pump cylinder 12, there being the lap joint indicated at 31, the two cylinders are soldered or welded at this overlap. Such construction provides an internal shoulder 32 limiting the downward movement of the piston. The end piece has a somewhat dome-shaped end 33 and a discharge opening 34, such opening being considerably smaller in diameter than the diameter of the end piece 30. As the water or liquid only enters through the opening 34, it is necessary to have an air vent 35 in the cylinder 12 to allow free in and out flow of air above the piston or if desired, this air vent may be in the cap 15.

The water jet assembly 40 includes a guide tube 41 which has a central portion 42 passing through a diagonal opening 43 in the end piece 30. There is an outer extension 44 and an inward curved extension 45, this latter extension having its opening downwardly and preferably in alignment with the center of the opening 34. A flexible rubber hose 50 is threaded through the guide tube 40. This has an upper portion 51 with any suitable type of connector 52 for attachment to a water faucet 53. The attachment illustrated is a cup with chains or the like for fastening the

cup on the water faucet. The lower portion 54 of the hose is led down through the opening 34 of the end piece 30 and may be thrust downwardly or remote from this opening 34. The hose preferably has a beveled end 55 at its discharge jet.

In the construction illustrated in Fig. 3, a detachable angle end 60 may be utilized. This is a right angularly bent tube 61 and preferably has a short arm 62 and a long arm 63. Both of these are of the same internal diameter so that they may have a close and tight sliding fit on the outside of the end piece 30. In the illustration the short end 62 is connected on the end piece and the long end extends laterally at right angles to the axis of the force pump. The flexible hose manifestly follows the elbow curve or other curve of the angular end piece. It is manifest that this may be made in angles varying from 90 degrees.

In the use of my invention, presuming a trap connected to a sink has an obstruction which is to be removed, the flexible hose is coupled to the faucet. If the sink has a grating this is removed. The sink may be partly filled with water. The force pump is then fitted over the waste opening and the hose pushed through the guide pipe 40 until it is judged that the end with the jet nozzle 55 is adjacent the obstruction to be removed. Manifestly as the lower and intake end 34 of the force pump is below the water level, pulling up on the handle raises the piston and sucks water into the force pump, filling the cylinder 12 below the piston and the end piece 30. Then by turning the water on gradually at the faucet and operating the force pump preferably with somewhat rapid strokes, a pressure is built up against the obstruction as the dome end 33 forms somewhat of a seal or closure at the waste outlet of the sink. This pumping action may be continued until it is apparent that there is a discharge opening through the obstruction. The force of water from the faucet may then be increased by opening the faucet to secure increased blow-in pressure and during this procedure it is not necessary to pump so vigorously on the force pump as a passage has already been created through the obstruction and it is only necessary to continue the washing aided by the force pump until all the obstructing material is removed. It is obvious that as the material is washed out, the hose may be forced or fed downwardly so that the discharge nozzle follows the material as it is washed away until the obstruction is completely removed.

In the construction of Fig. 3 using the angular end piece 60, there may be a series of these end pieces and of different angles which have a sufficiently tight fit on the end piece 30 to resist leakage. This may be used in large openings such as water closets where the dome end 30 cannot contact an outlet. The force pump is manipulated by angular tilting to direct the discharge end of the angle 60 in approximately the desired direction. The force pump may then be operated in conjunction with the flow of water through the flexible hose. The flexible hose should have a somewhat tight fit in the curved pipe 40 so that there will not be any flow back between the pipe 40 and the rubber hose, especially during the force or pressure stroke of the force pump. However, even if the hose has a somewhat loose fit when it is not under internal pressure, there is usually sufficient expansion under pressure of the water through the hose from the faucet to form a substantially liquid tight seal through the tube 40.

Various changes may be made in the details of the construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. In a device as described the combination of a force pump for pumping liquid under pressure, means to flow a washing liquid independent and separate from the pump whereby the washing liquid may carry away an obstruction loosened by the liquid pumped by the force pump, the means to flow a washing liquid comprising a flexible conduit, and means adjustably supporting said conduit for axial movement with respect to said pump in order to allow fluid to discharge from said conduit adjacent an obstruction in a pipe.

2. In a device as described the combination of a force pump for pumping liquid under pressure, means to flow a washing liquid independent and separate from the pump whereby the washing liquid may carry away an obstruction loosened by the liquid pumped by the force pump, the means to flow a washing liquid comprising a guide structure connected to part of the force pump, a flexible conduit slidable through said guide whereby the discharge end of the conduit may be positioned adjacent an obstruction to be removed, the conduit having means for connecting to a source of liquid under pressure.

3. In a device as described the combination of a reciprocating type of force pump having a cylinder and a piston, a flexible conduit, a guide structure connected to part of the force pump whereby the flexible conduit may have its discharge end positioned adjacent an obstruction to be removed from a pipe, and means connectable to a source of liquid under pressure to develop a flow of liquid through the flexible conduit independent of the forced flow of liquid by the force pump, the guide comprising a guide tube, the force pump having a discharge opening, the flexible conduit comprising a rubber hose extending through the guide tube and through the discharge opening of the force pump.

4. In a device as described, the combination of a force pump having a cylinder with a reciprocating piston therein, an operating plunger connected to the piston and having a handle at one end of the force pump, the opposite end of said pump having a discharge opening, a guide tube connected to part of the force pump and having an outer end positioned outside of the cylinder and an inner end located inside of the cylinder facing the discharge opening, a flexible hose slidably mounted in the guide tube and having a discharge end portion extending through the discharge opening of the force pump, the opposite end having means for connection to a source of pressure liquid whereby a flow of pressure liquid may be directed through the hose to the obstruction to be removed and the force pump operated to develop a pressure of liquid on such obstruction.

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