

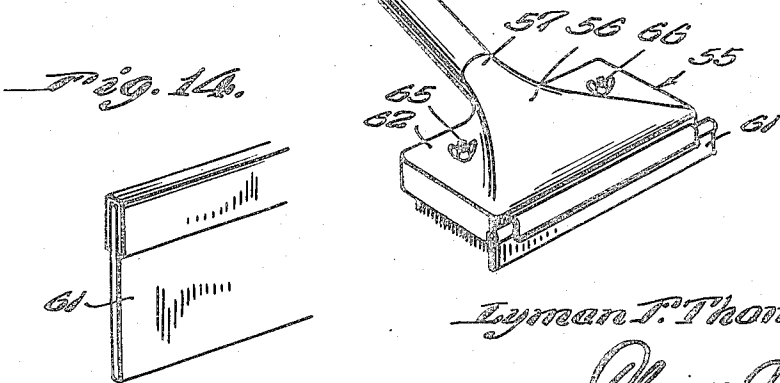
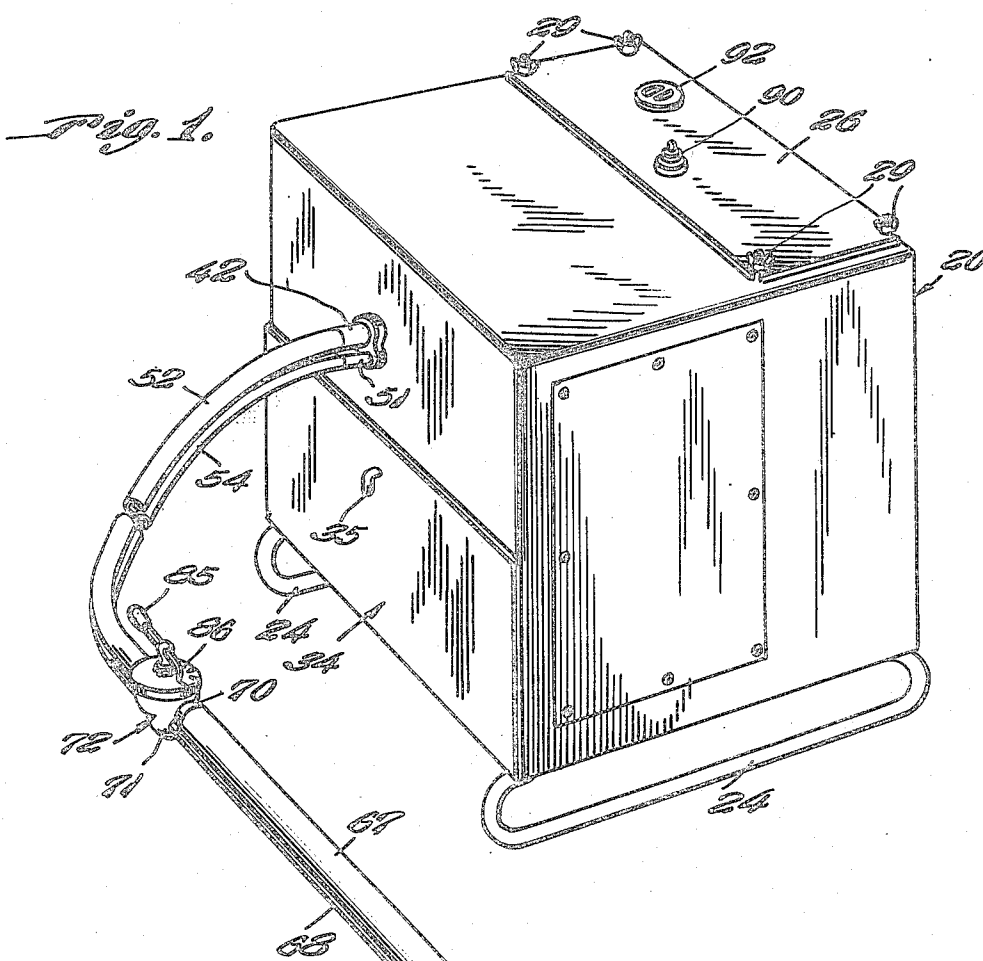
Nov. 21, 1950

L. F. THOMPSON
LIQUID DISCHARGING AND COLLECTING
APPARATUS FOR CLEANING

2,531,370

Filed Sept. 13, 1945

4 Sheets-Sheet 1.



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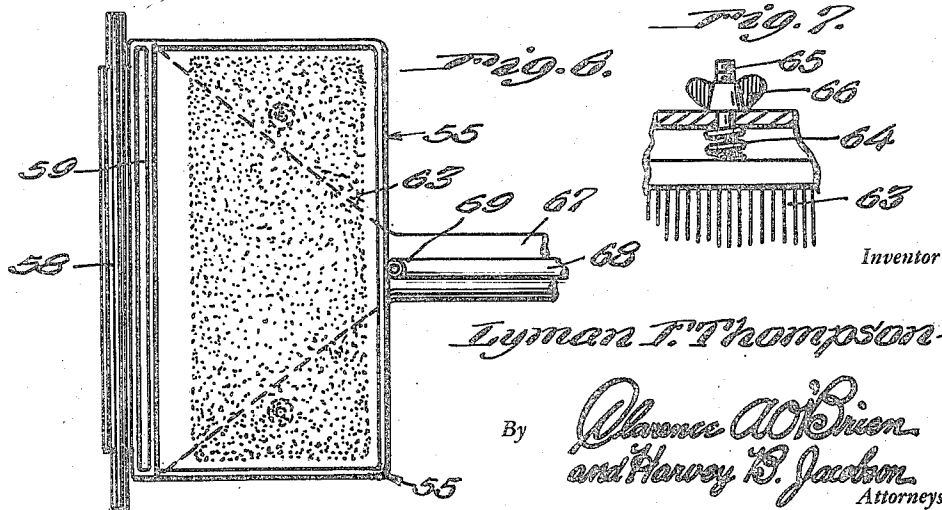
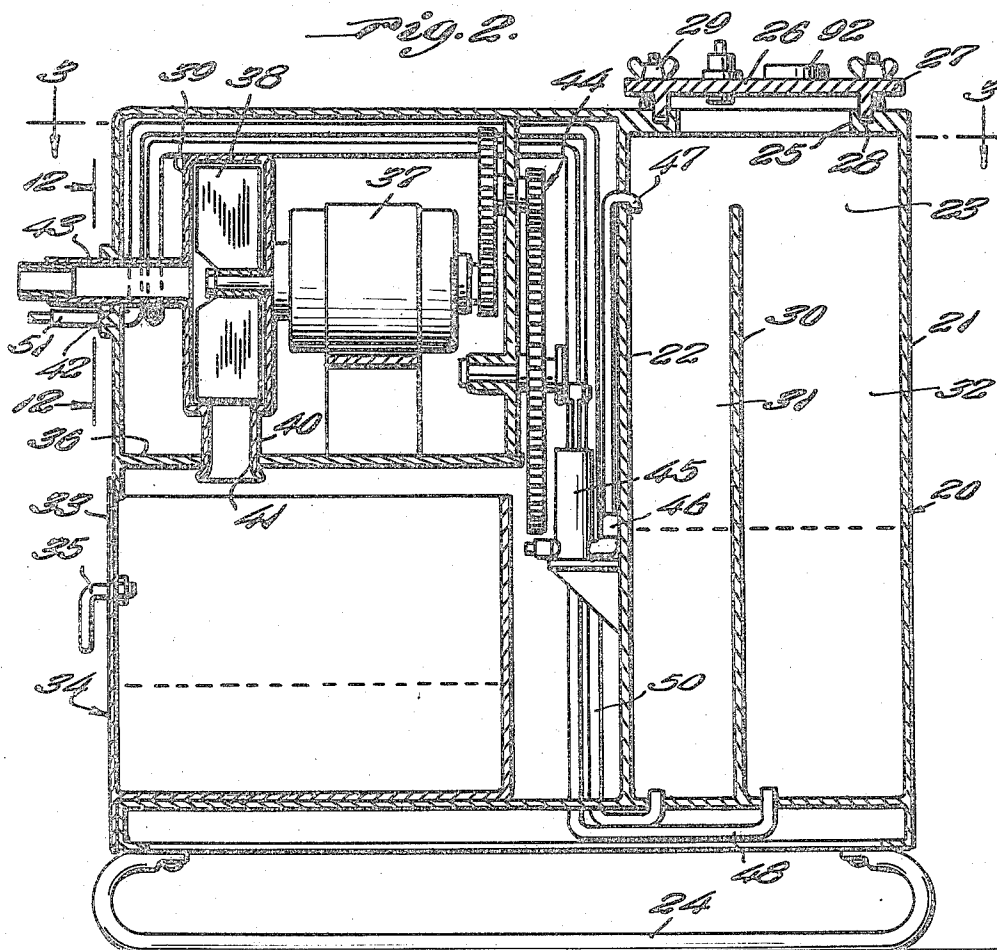
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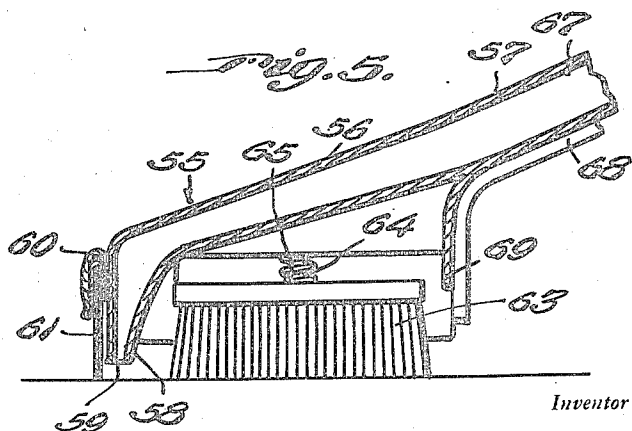
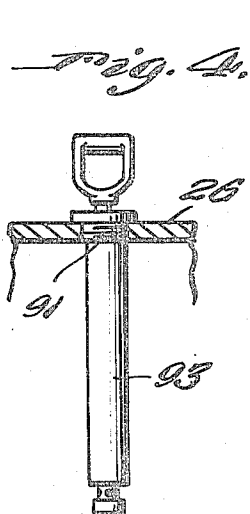
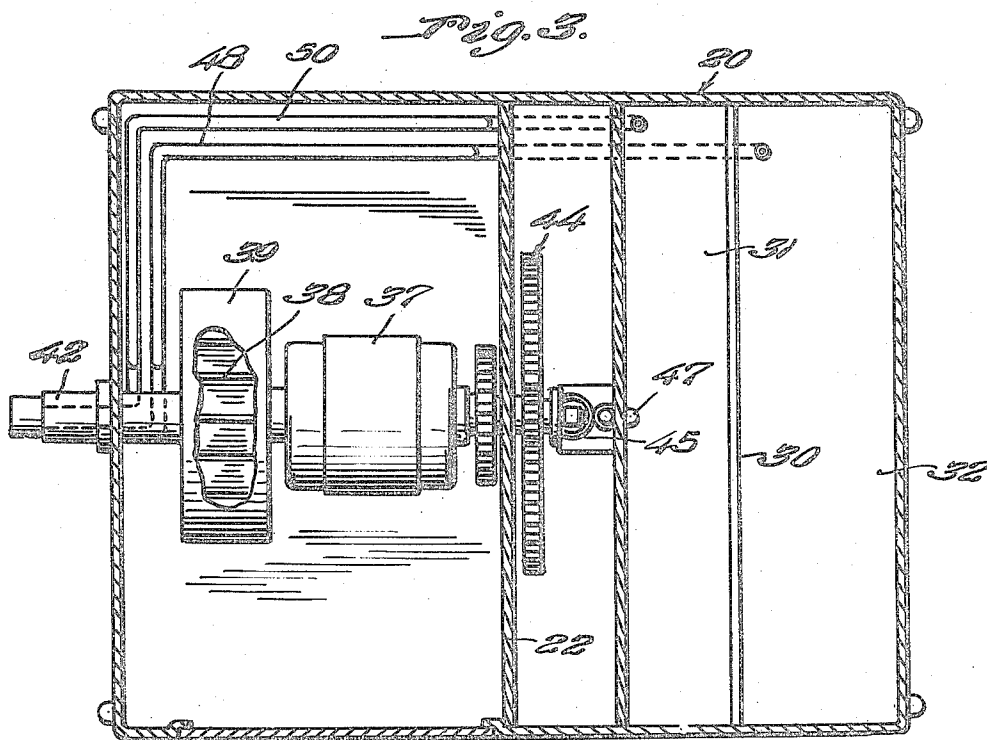
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4 Sheets-Sheet 3



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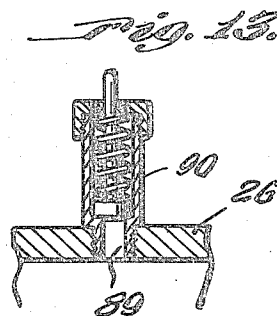
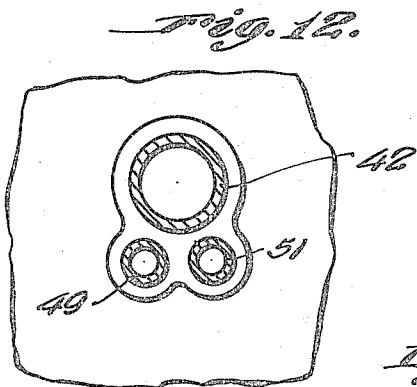
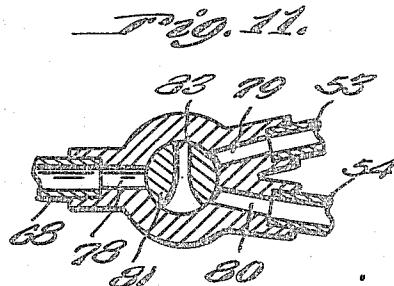
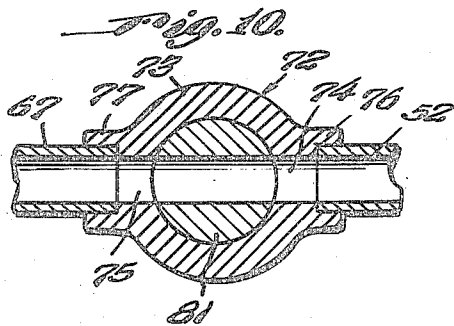
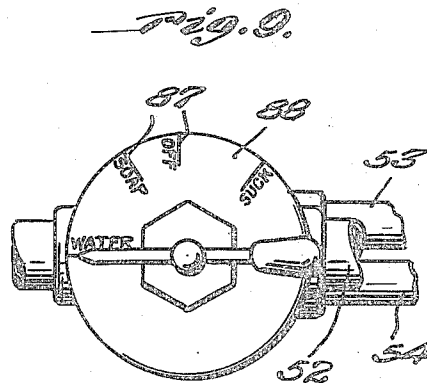
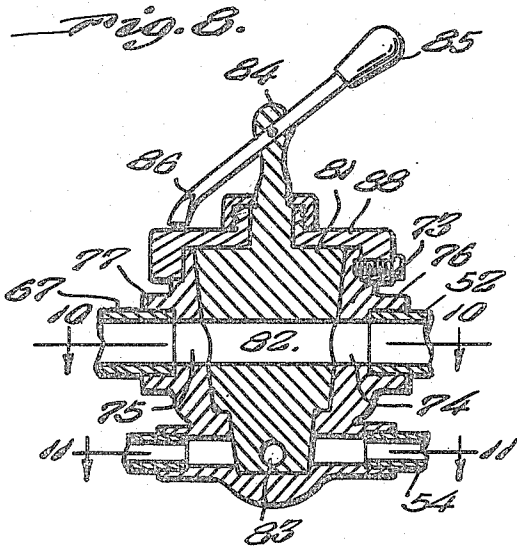
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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LIQUID DISCHARGING AND COLLECTING
APPARATUS FOR CLEANING

Lyman F. Thompson, Fayetteville, Ark.

Application September 13, 1945, Serial No. 615,937

2 Claims. (Cl. 15—321)

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This invention relates to a suction mop for use in scrubbing floors, and the like.

The principal object of the invention is to facilitate the cleaning of floors by the discharge of a soap solution and water onto the floor in the vicinity of a suitable floor brush, and the collecting of the scrubbing fluid into a suitable waste receptacle.

Among its features, the invention embodies a mophead, a tube to convey liquid to the mophead, a suction tube to convey liquid away from the mophead, and means to direct a soap solution or clear water through the tube which conveys the liquid to the mophead, and means to convey the waste liquid through the suction tube to a suitable waste receptacle.

Other features include a suction pump for conveying the waste liquid to the waste receptacle and a pressure pump operated in unison with the suction pump for creating a head of pressure on the water and soap solution so as to force them to the mophead under certain conditions.

Still other features include a single valve provided with a group of ports so that when the valve is turned to various different positions, soap solution may be directed to the mophead, clear water may be directed to the mophead, or the waste liquid may be extracted from beneath the mophead and deposited in a waste receptacle.

In the drawings—

Figure 1 is a perspective view of a suction mop embodying the features of this invention,

Figure 2 is a longitudinal sectional view through the mop housing containing the various tanks and pump and waste receptacle,

Figure 3 is a horizontal sectional view taken substantially on the line 3—3 of Figure 2,

Figure 4 is an enlarged fragmentary view of a substitute pressure pump which may be employed in connection with this invention,

Figure 5 is a fragmentary longitudinal sectional view through the mophead,

Figure 6 is a bottom plan view of the mophead,

Figure 7 is a fragmentary enlarged detail view illustrating the manner in which the brush is supported in the mophead,

Figure 8 is a longitudinal sectional view on an enlarged scale through the valve which is employed in connection with this mop,

Figure 9 is a top plan view of the valve illustrated in Figure 8,

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Figure 10 is a transverse sectional view taken substantially on the line 10—10 of Figure 8,

Figure 11 is a transverse sectional view taken substantially on the line 11—11 of Figure 8,

Figure 12 is a sectional view taken substantially on the line 12—12 of Figure 2,

Figure 13 is a fragmentary sectional view through the cover on an enlarged scale illustrating in detail the pressure relief valve, and Figure 14 is an enlarged fragmentary perspective view of one end of the squeegee employed on the mophead.

Referring to the drawings in detail, a cabinet, designated generally 20 comprising a substantially rectangular casing 21 formed intermediate its ends with a partition wall 22 which provides a closed chamber 23, is supported on suitable feet 24 which are in the form of runners, as will be readily appreciated upon reference to Figures 1 and 2. The casing 21 is provided with a top opening 25 through which communication of the chamber 23 is had with the atmosphere. A cover 26 having a depending flange 27 which is adapted to seat in a groove extending around the periphery of the opening 25 to close the opening, and suitable sealing means, such as a gasket 28, is arranged in the bottom of the groove to form an airtight seal between the cover and the chamber 23 when the clamp screws 29 are turned down to clamp the cover in place. A vertical partition wall 30 separates the sealed chamber 23 into a compartment 31 for the reception of soap solutions, and a second compartment of somewhat larger capacity 32 in which clear water is adapted to be contained. Formed in the end wall of the housing 21 opposite that enclosing the chamber 23 is an opening 33 for the reception of a waste receptacle, designated generally 34. This waste receptacle is open at its top, as illustrated in Figure 2, and carries on its outer or front panel a handle 35 by means of which the receptacle may be introduced into or withdrawn from the interior of the casing. Extending horizontally above the upper, open side of the waste receptacle 34 is a shelf or platform 36 on which the pump mechanism to be more fully hereinafter described is supported.

Mounted on the shelf or platform 36 is a prime mover 37 such as an electric motor, to the drive shaft of which is connected the impeller 38 of a suction pump 39, the discharge 40 of which is directed downwardly through an opening 41 in the platform 36 so that the waste drawn through the suction pump will be discharged into the

waste receptacle 34. The intake port of the suction pump is connected to a pipe 42 which leads outwardly through an opening 43 in the wall of the casing above the opening 33 previously referred to. Connected through a gear train 44 to the drive shaft of the motor or prime mover 37 is the piston of a pressure pump 45, the discharge 46 of which is connected through a pipe 47 with the upper end of the chamber 23 so that, as the motor 37 operates, fluid pressure will be generated in the chamber over the top of the liquids contained in the compartments 31 and 32. A pipe 48 leads from the bottom of the compartment 32 and through the interior of the casing 21 to a point near the pipe 42 where it is connected to a discharge coupling 49 (Fig. 12) and a similar pipe 50 leads from the bottom of the compartment 31 through the casing to a coupling 51.

Connected to the pipe 42 is a suction hose 52 and connected to the couplings 49 and 51 are liquid conveying flexible hoses 53 and 54, respectively, (Fig. 9).

A mophead, designated generally 55, comprises a substantially funnel shaped nozzle 56 which terminates at one end in a socket 57 and at its opposite end in a downwardly extending nose 58 having a downwardly directed slot 59, which, when the device is in use, lies in close proximity to the surface or floor being cleansed. Carried by the nose 58 is an inverted U-shaped channel 60 in which a squeegee blade 61 is removably supported. Secured to a horizontally extending rectangular plate 62 and extending downwardly from the underside thereof is a brush 63 which is held in yielding engagement with the surface being cleansed by means of compression coil springs 64 which surround bolts 65 which extend upwardly through the plate 62 and are adjustably secured therein by means of wing nuts 66 (Fig. 1). It will be understood, of course, that the bolts 65 extend through openings formed in the brush head in alignment with the openings in the plate 62. Leading upwardly from the socket 57 is a suction tube 67 and attached to the underside of the suction tube is a liquid conveying tube 68, the lower end of which terminates in a downwardly directed discharge nozzle 69 located on the side of the brush opposite the nose 58 of the nozzle 56. The tubes 67 and 68 are coextensive and are connected to coupling nipples 70 and 71, respectively, of a valve designated generally 72, to be more fully hereinafter described.

The valve 72 above referred to is best illustrated in Figures 8 through 11, inclusive, and comprises a valve body 73 formed substantially midway of its length with aligning ports 74 and 75 carrying coupling sockets 76 and 77 to which the ends of the hose 52 and the tube 67 are respectively coupled. Formed in the valve body 73 in parallel relation with the port 75 and directly beneath said port is a port 78, while similar ports 79 and 80 which diverge toward the outside of the valve body are arranged on the same level with the port 78. Connected to the port 78 is the liquid conveying tube 68, while liquid conveying hoses 53 and 54 are respectively connected to the ports 79 and 80. Rotatably mounted in the valve body 73 is a turning plug 81 which is provided substantially midway of its length with a transversely extending port 82 adapted, when the plug is in one position, to establish communication between the ports 74 and 75. A port 83 extends transversely of the

turning plug 81 on a level with the ports 78, 79 and 80, but the axis of the port 83 is perpendicular to the axis of the port 82 so that when communication between the ports 74 and 75 is established, communication between the ports 78, 79, and 80 will be interrupted. The turning plug 81 is provided with an extension 84 carrying a handle 85 and an index pointer 86 which is adapted to cooperate with indices 87 formed on the outer side of a cap 88 carried by the valve body 73 in indicating the position of the turning plug 81 within the body.

Formed in the cover 26 is an internally screw threaded opening 89 for the reception of a spring actuated pressure release valve 90 and formed in the cover 26 is an internally screw threaded opening 91 which normally is closed by a plug 92. This plug, however, may be removed and should it be desirable, a hand pump 93 may be threaded into the opening 91 in place of the plug so that if, for any reason, the pump 45 should fail to operate, fluid pressure may be created within the chamber 23. This pump may also be used in case it is found desirable to omit the pump 45 should a cheaper or less complicated device be preferred.

In operation, it will be understood that when the prime mover or motor 37 is driven, the suction pump 39 will be set into motion and also the pressure pump 45 will be driven, thus creating fluid pressure over the liquid contained in the compartments 31 and 32. Upon turning the turning plug 81 of the valve 72, the port 83 may be moved into registration with one or the other of the ports 79 or 80, thus establishing communication between one or the other of the compartments 31 or 32 and the nozzle 69 carried by the mophead 55. Liquid will thus be discharged behind the brush 63 so that the scrubbing of the surface to be cleansed may proceed. When a sufficient supply of liquid has been applied to the surface to be cleansed, the turning plug 81 of the valve 72 is moved into the position illustrated in Figure 11 and the turning plug 81 is turned to a position to block the passages 79 and 80, thus to cut off the supply of liquid to the tube 68 and nozzle 69. The scrubbing of the floor may then proceed, and when such scrubbing has been completed, the water and liquid which has been discharged onto the floor may be removed by turning the turning plug 81 into a position so that the port 82 therein registers with the ports 74 and 75, whereupon the waste liquid will be extracted by suction through the slot 59 and nozzle 56 into the suction tube 67 from which it passes through the valve and the hose 52 to the pump 39 through which it is discharged into the waste receptacle 34. The squeegee 61 tends to accumulate the liquid beneath the nose 58 of the nozzle 56 and to leave the surface over which it is being moved in a comparatively dry state.

It will thus be seen that a simple and efficient mop is provided which may readily accomplish the purpose for which it is intended.

While in the foregoing, there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction and combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

Having thus described the invention, what I claim is:

1. In a suction mop a base, a sealed chamber

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at one end of the base, a second chamber at the opposite end of the base adjoining the sealed chamber, the wall of the second chamber remote from the sealed chamber having an opening therethrough, a waste receptacle removably entering the second chamber through the opening, a suction pump in the second chamber above the waste receptacle having its discharge directed toward the waste receptacle, a mophead having a liquid discharge nozzle adjacent its rear end, a suction nozzle carried by the mophead adjacent its forward end, a tubular conduit coupling the liquid discharge nozzle with the sealed chamber, a second tubular conduit coupling the suction nozzle with the intake of the pump, a valve coupled to the conduits between the sealed chamber and the mophead and the pump and the mophead selectively to establish communication through said conduits between the liquid discharge nozzle and the sealed chamber, and the suction nozzle and the receptacle, and a pressure pump and a suction pump having means operatively associated therewith for simultaneous operation to create fluid pressure on the surface of liquid contained in the sealed chamber.

2. In a suction mop, a source of liquid, a source of liquid soap, a waste receptacle, a mophead, a mixing and control valve carried by the mophead, a tube carried by the mophead and connected to the mixing side of the valve, said tube having a discharge adjacent the rear of the mophead, a tube connected to the mixing side of the valve and to the source of liquid, a second tube connected to the source of soap and to the mixing side of the valve, a suction nozzle carried by the mophead opposite the discharge of the tube, a suction tube connected to the suction

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nozzle and the control side of the valve, a suction pump near the waste receptacle, said suction pump having its discharge directed toward the waste receptacle, a suction conduit connected to the control side of said valve and to the suction pump and means operatively associated with the suction pump and simultaneously operative therewith to maintain the liquid and the liquid soap under pressure.

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