June 19, 1923. 1,458,975

W. CLAUSON

MIXING APPARATUS

Original Filed Oct. 7, 1919 2 Sheets-Sheet 1

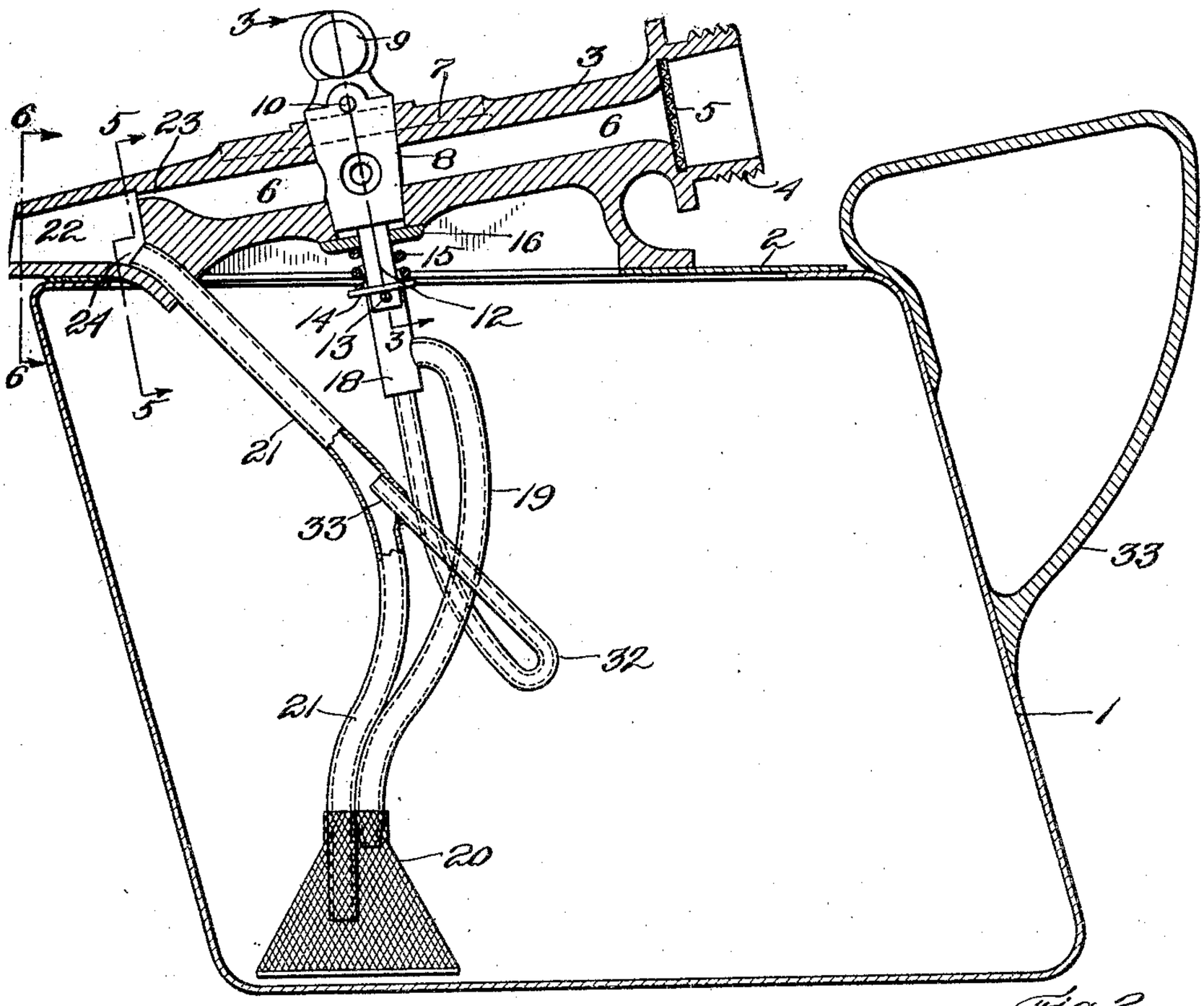

Fig. 2.

Fig. 1.

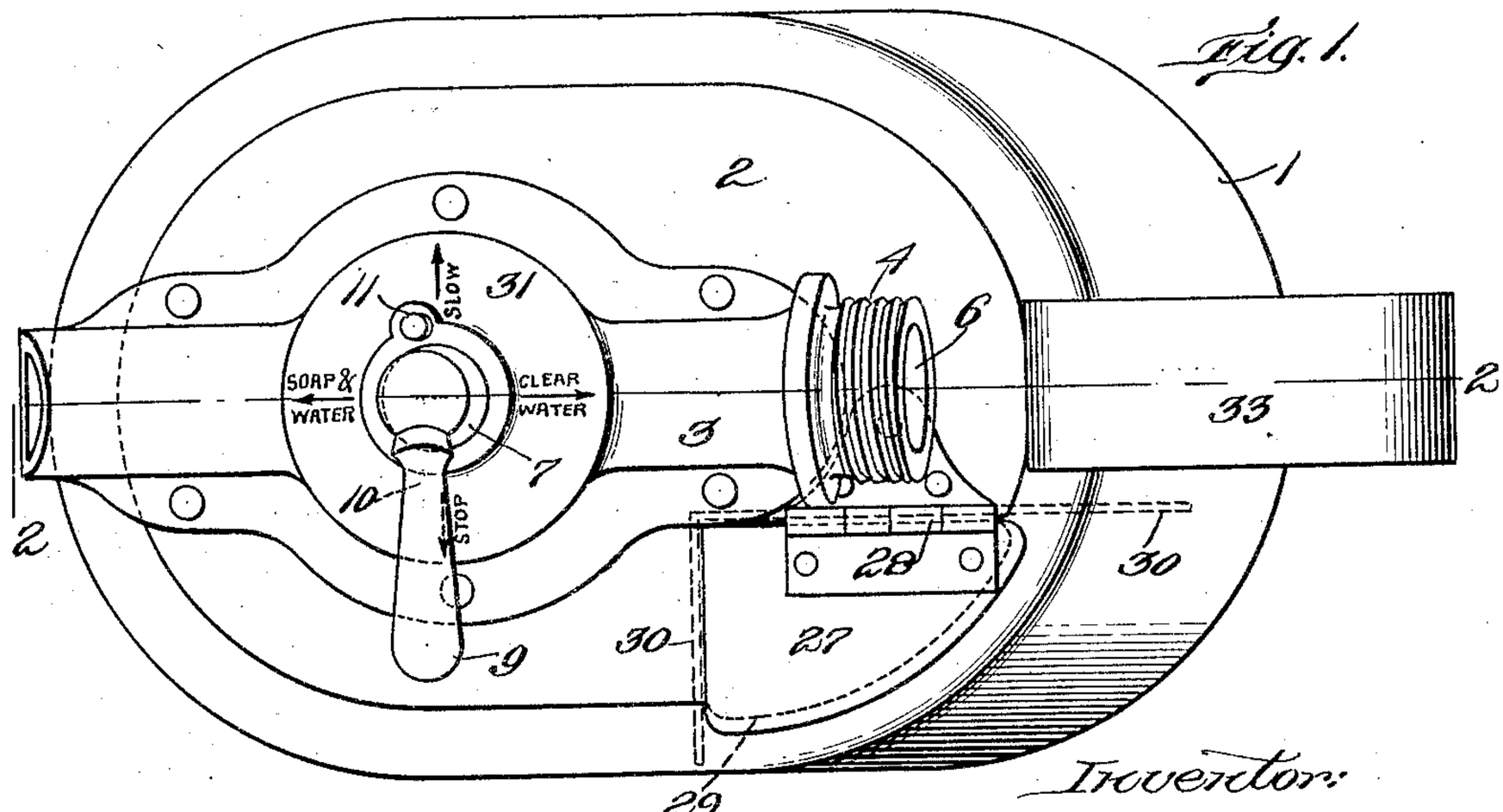

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Fig. 3.

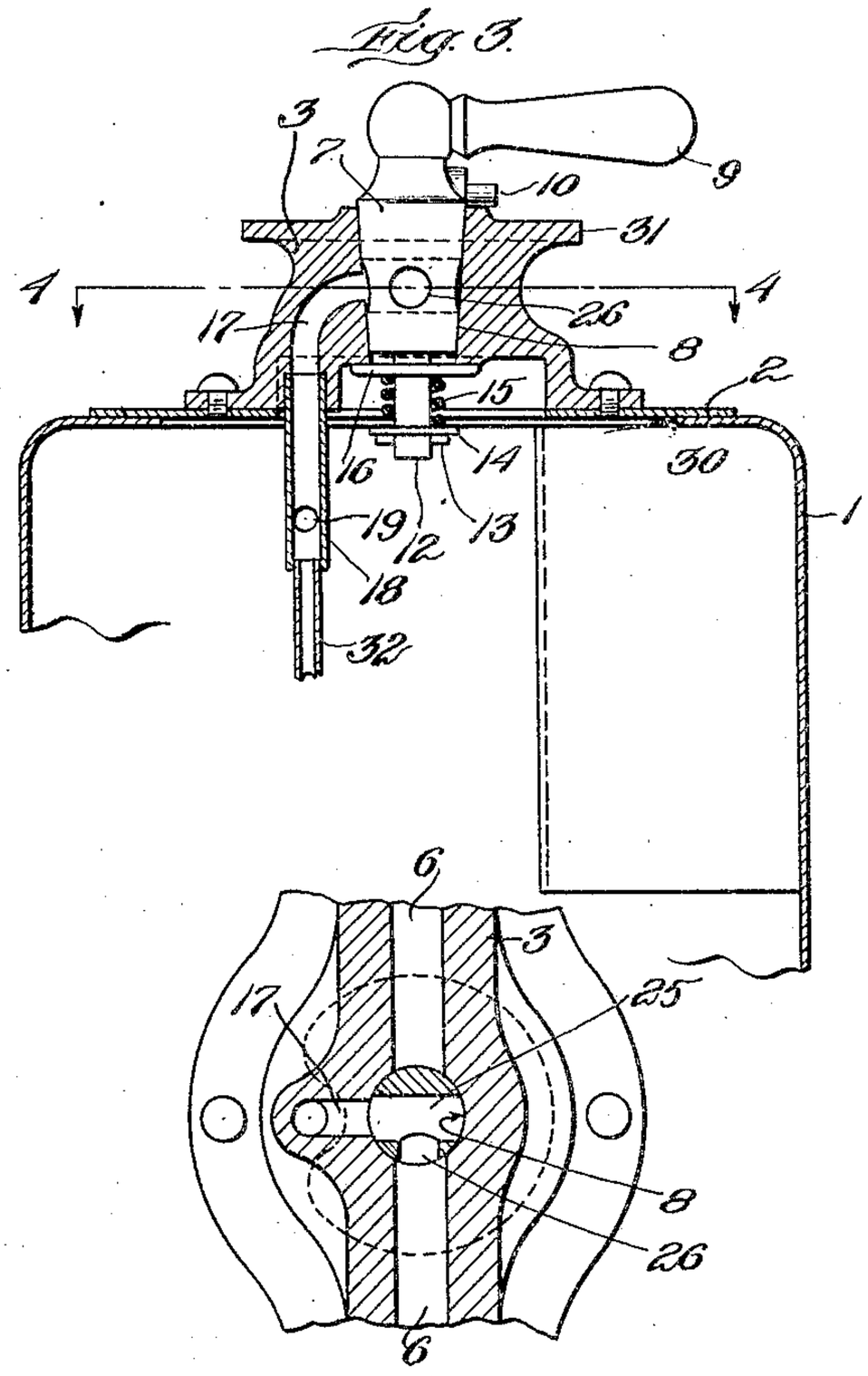

Fig. 4.

Fig. 5.

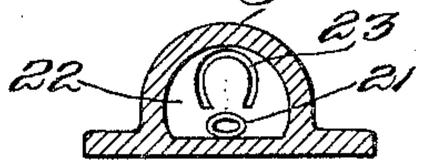

Fig. 6.

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Patented June 19, 1923. 1,458,975

UNITED STATES PATENT OFFICE.

WILLIAM CLAUSON, OF EVERETT, MASSACHUSETTS, ASSIGNOR TO THE FRIENDLY SERVICE CO., OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

MIXING APPARATUS.

Continuation of application Serial No. 329,148, filed October 7, 1919. This application filed September 24, 1920. Serial No. 412,497.

To all whom it may concern:

Be it known that I, WILLIAM CLAUSON, a subject of the King of Sweden, residing at Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Mixing Apparatus, of which the following is a specification.

My invention relates to a mixing or spraying apparatus for use in spraying or washing objects with a liquid or a liquid solution. The object of my invention is to provide an improved device or apparatus of this kind adapted for use in washing automobiles and other vehicles, in washing floors and walls, spraying trees and other work involving the application of a liquid or a liquid solution.

I am aware that mixing and spraying devices of various kinds have been heretofore invented which are devised to operate by diverting from a main stream of liquid under pressure a branch stream which flows into a container or chamber containing a chemical or soap, the diverted liquid with the chemical or soap which it entrains then reuniting with the main stream. None of these devices, however, have the combination of elements of my new apparatus upon which I rely for its successful operation.

The utility of my device is well demonstrated by its use in the washing of automobiles and other vehicles.

Heretofore in washing automobiles and other vehicles it has been the usual practice to apply a mixture of soap and water by means of a sponge, the soap commonly used being furnished to garages by the barrel and in the form of a paste. The workman engaged in washing a vehicle usually scoops up a handful of the soap paste from the barrel and deposits it in a pail containing water in which latter the soap is dissolved by stirring. No measurement is made of the soap used for each pail of water other than the amount selected by the workman in scooping a handful from the barrel, and no great care is used in dissolving the soap in the water with the result that the workman in most instances uses more soap than necessary and almost invariably an undissolved quantity of the soap remains unused in the bucket and is thrown away when the latter is emptied. As a result a great amount of soap is wasted. In my invention is embodied a simple and inexpensive apparatus adapted to be connected with a supply of water under pressure or head and which acts automatically to mix soap with the water as the latter passes through said apparatus, and to throw onto the automobile a spray of soap suds. In its preferred form the apparatus is supplied with a control valve which controls the flow of water and the flow of soap suds whereby the apparatus may deliver clear water directly from the source of supply, or soap suds from the container, or any desired mixture of the two.

With this and other objects in view my invention consists in the combination of parts set forth in the following specification, and particularly pointed out in the claims thereof.

In the accompanying drawings:

Figure 1 is a plan view of a mixing apparatus constructed in accordance with my invention;

Figure 2 is a section on line 2—2 of Figure 1;

Figure 3 is a section on line 3—3 of Figure 2;

Figure 4 is a section on line 4—4 of Figure 3;

Figure 5 is a section on line 5—5 of Figure 2; and

Figure 6 is a section on line 6—6 of Figure 2.

The apparatus herein shown comprises a vessel 1 of sheet metal closed at its top by a cover 2 which may be soldered to said vessel. To the cover 2 is secured, as by rivets, a nozzle 3 having an exteriorly threaded end 4 adapted to be coupled to the end of a flexible hose pipe by means of which the nozzle is connected with a faucet or other supply of water under pressure or head. Within this inlet end of the nozzle 3 may be provided a screen disc 5 made from wire cloth. Nozzle 3 is made with a main port 6 therethrough of relatively large size which is controlled by a tapered valve 7 rotatably mounted within a transverse valve chamber 8. At its outer larger end the valve 7 is made with a handle 9 by means of which it is manually rotated, said larger end being also provided with a laterally projecting pin 10 co-operating with a lug 11 on the body of the nozzle for the purpose hereinafter set forth. At its smaller end the valve 7 is formed with a stem 12 that

is transversely perforated to receive a cotter pin 13 which holds a washer 14 in place on said stem. On this stem 12 is also mounted a spring 15 one end of which bears against the washer 14 and the other end against another washer 16 keyed in the usual fashion to the stem. The spring 15 serves to hold the valve seated within its chamber.

The nozzle 3 is made with another port 17 opening into valve chamber 8 at right angles to the port 6, said port 17 communicating with a pipe 18 of relatively large capacity which in turn has connected with it the upper end of a pipe 19 of relatively smaller capacity whose lower end is near the bottom of vessel 1 and inclosed by a porous hood 80 preferably made from wire cloth. This lower end of the pipe 19 is constricted as shown, permitting a comparatively small outlet from the pipe 19 into the vessel.

Within the porous hood 20 is arranged the lower end of another pipe 21 which extends upwardly to the nozzle 3 where its upper end opens into a chamber 22 provided at the discharge end of the nozzle. This chamber 22 communicates with the port 6 through a horse-shoe shaped slit 23, Figures 2 and 5, which is in close proximity to the discharge end of pipe 21.

One end of a by-pass 32, of relatively small capacity, is connected to the lower end of pipe 18 and the opposite end of pipe 32 opens into pipe 21 so as to discharge toward the outlet end thereof. The pipe 32 is of smaller capacity than pipe 21. The constriction at the lower end of pipe 19 and the relatively small size of the by-pass pipe 32 make the capacity of pipe 18 greater than the other two with the result that a portion of the stream diverted into pipe 18 is forced under pressure through pipe 32 into pipe 21, producing the action or effect of an injector at 33 which establishes and maintains a flow of soap suds from the container up through pipe 21. The capacity of the pipe 21 and the flow produced therein by the ejector 32 is sufficient to discharge the liquid which flows into the container force pipe 19 as the apparatus operates, so that the container never fills up and overflows.

The valve 7 is a three-way valve. That is, it is formed with a transverse port 25, Figure 4, extending from side to side thereof, and with a radial port 26 extending from the port 25 to the periphery of the valve. The port 25 co-operates with the port 6 and the port 26 with the port 17, all of the ports being so arranged that when the valve is rotated from the position shown in the drawings in a right hand direction ninety degrees the port 26 registers with the port 17, with the port 25 in alinement with the port 6. The constriction at 23 occasions a back pressure in port 6 when the valve 7 is thus opened, which causes water to flow from port 6 through ports 25, 26 and 17, and from the latter through pipes 18 and 19 into vessel 1 and through by-pass 32 with the injector effect above described.

The top of the vessel 1 is made with a door 27 connected with the cover plate 2 by hinges 28. This door 27 normally closes an opening 29 through which a quantity of soap paste is passed into vessel 1. It will thus be seen that the water discharged into the vessel through the pipe 19 is brought into contact with this body of soap, some of which it entrains so that the water leaving the vessel through pipe 21 is soapy.

The soap suds discharge from the pipe 21 in the direction of the top of the chamber 22 where they are struck by the spray of water which rushes under pressure from the slit 23 and which carries the soap suds with it onto the automobile or other object to be sprayed or washed. The arrangement is such that a steady, strong stream of soap suds or soapy water is thrown from the end of the nozzle 3 directly onto the object that is being cleaned.

When it is desired to wash the object with clear water the valve 7 is moved in a left hand direction into a position ninety degrees from that shown in the drawings which brings the port 25 into alignment with port 6 and closes port 17. As will be clear the purpose of the hood 20 is to keep the soap paste within vessel 1 away from the lower ends of the pipes 19 and 21 so that the latter cannot become clogged, and at the same time the porous character of this hood permits the water to pass back and forth therethrough as is necessary.

The soap paste commonly used is more or less stiff and may sometimes be forced into the vessel 1 by a rigid poker that would be likely to injure the small pipes 19 and 21 as well as the hood 20 is permitted to engage the same. For this reason I provide within the vessel 1 a guard 30 in the shape of a wall depending from cover 2 and extending downwardly far enough to shield said parts.

The body of the nozzle 3 is made with a disc-like enlargement 31 bearing four index marks in the form of arrows as shown in Figure 1, said marks being angularly positioned with relation to the handle 9 so as to co-operate with the latter as an index for use in positioning the valve 7, inscriptions "Stop", "Soap and water", "Slow", and "Clear water" or the like informing the user as to the action of the apparatus for each position of the handle indicated by the arrows. When the handle 9 is positioned at the arrow, "Soap and water," the maximum amount of soapy water is mixed with the steam discharging from the nozzle, and by moving the handle 9 from this position in

a right-hand direction toward the stop lug 11 the amount of soapy water supplied to the discharging stream may be decreased to the minimum which latter is secured when the pin 10 engages the lug 11. This position is useful when it is desired to simply soap the sponge. With the handle 9 registering with the "Clear water" position the size and speed of the stream may be varied by adjustment of the handle and valve in either direction from that position, the engagement of the pin 10 with the lug 11 stopping the valve in position to deliver from the nozzle a slow small stream of clear water such as would be desired in wetting a sponge, or for washing off the soap suds.

The apparatus herein shown is constructed as an attachment adapted to be coupled to the end of a flexible hose pipe which in turn may be connected with the faucet of a water system, the apparatus being grasped by one hand and manipulated to direct the stream upon the object being cleaned. For this reason the vessel 1 is preferably made upon its exterior with a handle 33 across the top of which the hose pipe will extend when the latter is coupled to the nozzle, so that both the handle 33 and the end of the hose pipe are grasped by the hand of the workman when the apparatus is in service. This prevents abrupt or sharp bending of the hose pipe near its junction with the nozzle.

The improved mixing apparatus above described is of simple, efficient and inexpensive construction. Its use not only results in great economy in the consumption of soap and water but makes it possible to perform the operation of washing a vehicle quickly and effectively. Moreover this device does not depend upon pressure within the container to discharge the contents of the container from the apparatus, so that the container need not be air tight and the entire operation can be controlled by one valve.

What I claim is:

1. A device of the character described comprising a container; a main conduit affording a direct delivery from a source of supply; a second conduit connecting with said source of supply and delivering into said container; a mixture delivering conduit leading from said container; valvular means for controlling the flow through the main and second conduits, and a by-pass conduit having its inlet end connected with said second conduit between the discharge end of the latter and said valvular controlling means and its outlet end connected with said mixture delivering conduit so as to constitute an injector for causing a current in said mixture delivering conduit toward the discharge end of the latter.

2. A device of the character described comprising a container, a main pipe, a branch pipe tapping the main pipe and leading to the interior of the container, a discharge pipe leading from the container and communicating with the main pipe at a point between junction of the branch pipe with the main pipe and the delivery end of the latter, and a by-pass pipe connected at one end with said branch pipe and communicating at its opposite end with said discharge pipe so as to constitute an injector for causing a current in said discharge pipe into said main pipe.

3. A device of the character described comprising a container, a main pipe attached thereto adapted to be connected at one end with a source of supply of liquid under pressure, a branch pipe tapping the main pipe and communicating with the interior of the container, a discharge pipe leading from the container and opening into the main pipe near the outlet end thereof, a by-pass pipe connected at one end with said branch pipe and communicating at its opposite end with said discharge pipe so as to constitute an injector whereby liquid which enters the container through the branch pipe is caused to flow through the discharge pipe to the main pipe, and valve means in the main pipe for controlling and adjusting the flow of liquid in the main and branch pipes.

4. A device of the character described comprising a container for holding one of the ingredients of a desired mixture, a main pipe attached thereto having an outlet end, an inlet end adapted to be connected with a source of supply of liquid under pressure, and a restricted orifice at a point near said outlet end, a branch pipe tapping said main pipe and terminating in a restricted oulet orifice inside the container, a discharge pipe leading from the container and opening into the main pipe at a point between the restriction therein and the outlet end, a by-pass of relatively small capacity connected at one end with said branch pipe and with its outlet end opening into said discharge pipe in the direction of the main pipe so as to constitute an injector, and a valve in the main pipe adjacent the inlet end of the branch pipe by which the flow of liquid in the main and branch pipes may be regulated and controlled, as and for the purposes described.

5. A device of the character described comprising a container, a main pipe attached thereto having a restricted orifice near its outlet end, a branch pipe tapping said main pipe at a point between its inlet end and said restricted orifice and terminating in a restricted outlet orifice inside the container, a discharge pipe with its inlet end near the bottom of the container and enclosed by a porous hood and its outlet end opening into the main pipe adjacent the restricted orifice therein, a by-pass pipe of

relatively small capacity connected at its inlet end with said branch pipe and with its outlet end opening into said discharge pipe so as to serve as an injector to create a current in said discharge pipe, whereby a portion of the liquid in the main pipe may be diverted into the container through the branch pipe and is then carried by the discharge pipe into the main pipe and carried through the outlet end thereof by the liquid of the main stream after it passes the restricted orifice in the main pipe.

6. A device of the character described comprising a container, a main pipe attached thereto having a restricted orifice near its outlet end, a discharge pipe with its inlet end inside the container and its outlet end opening into the main pipe at a point between the restricted orifice and the discharge end thereof, a branch pipe tapping said main pipe and terminating in two pipes of relatively small capacity, one an inlet pipe opening into the container, whereby a part of the liquid in the main pipe may be diverted into the container, and the other a by-pass pipe with its outlet end opening into said discharge pipe, whereby a part of the stream in the branch pipe may be utilized as an injector to cause a current in said discharge pipe, and valve means in said main pipe for controlling and adjusting the flow of liquid in the main and branch pipes.

7. A device of the character described comprising a container, a main pipe attached thereto adapted to be connected with a supply of liquid under pressure and having a restricted orifice therein, a discharge pipe with its inlet end near the bottom of said container and its outlet end opening into said main pipe adjacent the said restricted orifice therein, a branch pipe tapping said main pipe at a point between the inlet end thereof and the said restricted orifice, said branch pipe terminating in two pipes of relatively small capacity, one an inlet pipe terminating within the container, and the other a by-pass pipe opening into said discharge pipe in the direction of said main pipe, and a valve in the main pipe adjacent the inlet end of the branch pipe for controlling and adjusting the flow of liquid in the main and branch pipes.

8. A device of the character described comprising a container for holding a supply of soft soap or the like, with an opening for filling the same, a main pipe attached thereto adapted to be connected with a supply of liquid under pressure and having a restricted orifice therein, a discharge pipe with its inlet end inside the container and its outlet end opening into said main pipe at a point adjacent said restricted orifice and between said restricted orifice and the outlet end of said main pipe, a branch pipe tapping said main pipe at a point between said restricted orifice and the inlet end of said main pipe, said branch pipe terminating in two pipes of relatively small capacity, one an inlet pipe terminating in a restricted opening inside the container and the other a by-pass pipe opening into the discharge pipe in the direction of the main pipe, and a valve in said main pipe adjacent the inlet end of the branch pipe by which the flow of liquid in the main and branch pipes may be controlled and adjusted.

Signed at Boston, Massachusetts, this 30th day of March, 1920.

WILLIAM CLAUSON.