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LIQUID AND LIQUID ADDITIVE DISPENSING MEANS

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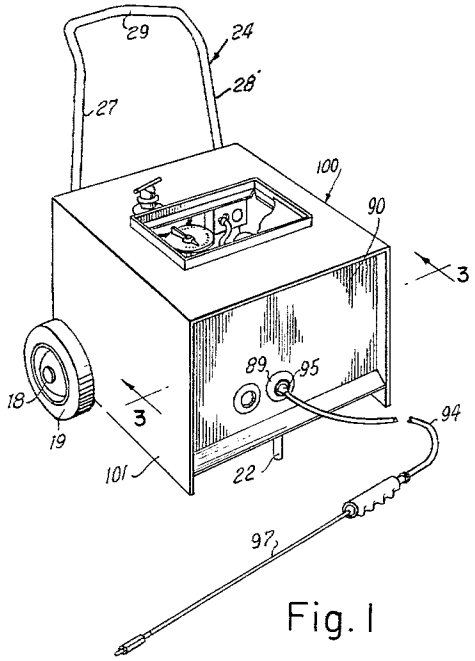


Fig. 1

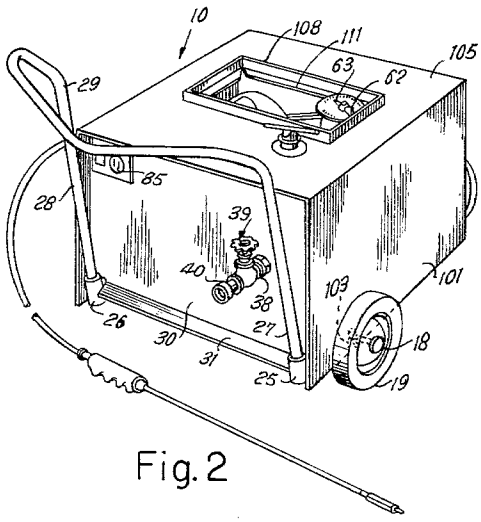


Fig. 2

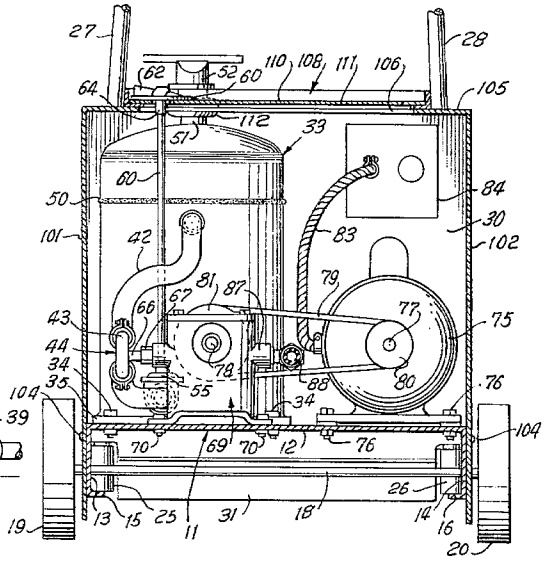


Fig. 3

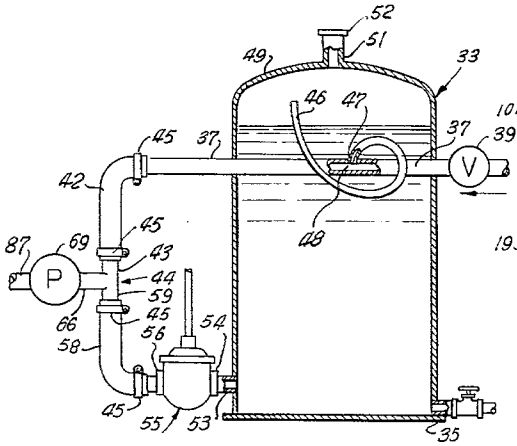


Fig. 4

INVENTOR

James M. McClure

BY Eastman, Ackley and Walter J. Jaeger

ATTORNEYS

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LIQUID AND LIQUID ADDITIVE DISPENSING MEANS

James M. McClure, 4652 Maulden Lane, Dallas, Tex.

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This invention relates to dispensing devices and more particularly to a liquid dispensing device having means for selectively admixing a substance, such as a detergent, into the liquid being dispensed thereby.

An object of this invention is to provide a new and improved dispensing device having a pump for forcibly expelling a liquid through a nozzle and a means for admixing a substance, such as a detergent into the liquid upstream of the pump whereby the detergent is thoroughly mixed with the liquid as they move through the pump.

Still another object is to provide a dispensing device having a storage tank for the detergent and conduit means connecting the storage tank to the inlet of the pump through which the detergent from the storage tank can be withdrawn and mixed with the water.

Still another object is to provide a dispensing device having means for introducing liquid into the storage tank to help displace the detergent from the tank.

A further object is to provide a dispensing device for admixing a substance, such as detergent, into a liquid flowing through the passage of the conduit which includes a closed storage tank for the detergent, duct means communicating the upper end of the tank with the conduit passage for admitting liquid into the upper end of the tank from the conduit, and outlet means on the tank for permitting flow of the detergent from the lower end of the tank.

A still further object is to provide a dispensing means wherein the outlet means of the tank is connected to the conduit downstream of the location of the communication of the duct means with the conduit passage.

Still a further object is to provide a dispensing device wherein the conduit and the outlet means of the tank are connected to the inlet of a pump whereby the detergent is thoroughly mixed with the liquid in moving therewith through the pump.

A still further object is to provide a dispensing device wherein the tank outlet means is provided with valve means for selectively controlling and regulating flow of the detergent from the tank.

Another object is to provide a new and improved mobile dispensing device wherein the storage tank, the pump and the motor for driving the pump are mounted on a horizontal base provided with wheel means by which the device may be moved from one location to another.

Additional objects and advantages of the invention will be readily apparent from the reading of the following description of a device constructed in accordance with the invention and reference to the accompanying drawings thereof, wherein:

FIGURE 1 is a perspective view of the dispensing device showing the front side thereof;

FIGURE 2 is another perspective view of the dispensing device showing the rear side thereof;

FIGURE 3 is a vertical sectional view taken on line 3—3 of FIGURE 1; and,

FIGURE 4 is a schematic illustration of the flow circuit of the dispensing device.

Referring now to the drawings, the dispensing device **10** includes a base **11** having a horizontal deck **12**, from whose opposite sides depend longitudinal vertical flanges **13** and **14** provided at their bottom edges with inwardly extending horizontal flanges **15** and **16**, respectively. The flanges rigidify and strengthen the deck.

A wheel shaft **18** extends through suitable aligned apertures in the vertical flanges **13** and **14** and is secured to the vertical flanges in any suitable manner. A pair of wheels **19** and **20** are rotatably mounted on opposite ends of the shaft which extend outwardly of the vertical flanges. The shaft and wheels are located adjacent the rear end of the base. One or more feet **22**, depend from the deck at its front end to support the front end of the base. The feet are rigidly secured to the deck in any suitable way, as by welding.

A substantially U-shaped handle **24** is secured to the rear end of the base by means of upwardly opening sockets **25** and **26**, welded to the base, into which are telescopable the lower end portions of the upwardly and rearwardly convergent legs **27** and **28**, respectively, of the handle. The upper ends of the legs are connected by a transverse connecting or handle portion **29**.

It will be apparent that the base may be pivoted about the axis of rotation of the wheels by a downward force exerted on the handle to raise its front end and disengage the front foot **22** from engagement with the ground so that the base will then be supported only on the wheels and can be easily rolled from one location to another.

A rear wall **30** extends vertically upwardly from the base **11** and is rigidly secured thereto as by welding. The lower end or skirt portion **31** of the rear wall extends at an angle rearwardly and downwardly between the sockets to conceal the shaft.

A storage tank **33** is mounted on the deck **12** adjacent the rear wall by means of bolts **34** which extend through suitable adjacent apertures in the deck and the outwardly extending annular bottom flange **35** of the storage tank.

A rigid conduit or pipe **37** extends through the tank adjacent its upper end. The rear end portion of the conduit **37** extends rearwardly through a suitable aperture of the rear wall and has connected thereto, by a suitable fitting **38**, an inlet valve **39**. The inlet end of the valve has a suitable fitting **40** by means of which one end of a flexible conduit, such as a hose, may be connected. The other end of such hose is connected to any suitable source of water, such as the usual water supply system of a city.

The other or outlet end of the rigid conduit **37** is connected by a flexible conduit or hose **42** to one inlet end portion **43** of a T-coupling **44**. The opposite end portions of the hose are telescoped over the conduit **37** and the inlet end portion **43** and are secured thereto by suitable clamps **45**.

The rigid conduit has a branch conduit **46** whose flow passage **47** opens to the longitudinal flow passage **48** of the rigid conduit and to the interior of the storage tank adjacent the top **49**. The branch conduit passage **47** is of substantially smaller orifice than the rigid conduit passage **48**. The branch conduit curves upwardly, then downwardly, and then again upwardly to make its flow passage **47** relatively long.

The top portion of the tank is welded as at **50** on the lower end portion. The top portion has a tubular inlet **51** which is closable by a closure or cap **52** threaded thereon. The storage tank adjacent its bottom has an outlet **53** connected to the inlet **54** of a valve **55**. The outlet **56** of the valve **55** is connected by a flexible hose **58** to the inlet end portion **59** of the coupling **44**. The hose **58** is secured to the valve and the coupling by suitable clamps **45**.

The valve **55** is movable between its open and closed positions by an operator rod **60** which extends rotatably through a gauge plate **61** and is provided at its upper end with a handle **62** whose pointed end **63** cooperates with indicia of the gauge plate to indicate the position of the valve. The gauge plate has a downward tubular guide extension **64** for the rod. The lower end portion of the operator rod is rectangular in cross-section and extends

into a recess of similar configuration in the upper end of the usual rotatable member (not shown) of the valve.

The storage tank may also be provided with a drain outlet 65 at its bottom.

The outlet end portion 66 of the coupling 44 is connected by a suitable fitting 67 to the inlet of a pump 69 rigidly mounted on the deck 12 by bolts 70 which extend through suitable apertures in the deck and the pump base 72. The pump is driven by an electric motor 75, mounted on the deck by means of bolts 76, whose drive shaft 77 is connected to the shaft 78 of the pump by a belt and pulley transmission consisting of the belt 79 and the pulleys 80 and 81 rigidly secured to the motor and pump shafts 77 and 78, respectively.

A flexible conduit or hose 94 is connected to the forward extension 88 by a suitable fitting 95 and its other end is connected to a nozzle 97 through which the liquid pumped by the pump 69 is expelled. A cover 100 includes a pair of side walls 101 and 102 and extends over the front and rear walls and on opposite sides of the vertical flanges of the base. The side walls are provided with suitable slots 103 to receive the outer end portions of the wheel shaft 18. The side walls are secured to the vertical flanges as by screws 104. The cover also includes a top wall 105, integral with the side walls, which has a rectangular opening 106 about which extends a rectangular frame 108 rigidly secured, as by welding, to the top wall. A closure plate 110 is positionable in the frame and on the horizontal flange 111 thereof of the frame to close the rectangular opening 106. The closure plate, of course, has a suitable aperture through which the tubular extension 69 of the gauge plate extends, the gauge plate being rigidly secured as by welding to the upper surface of the closure plate.

The filler duct 51 of the storage tank 33 extends upwardly through a suitable aperture in the top wall and through a suitable grommet or gasket 112.

In use, the storage tank is filled with a liquid detergent to a level below the upper free end of the branch conduit 46 and the cap 51 is then screwed on the tank inlet 51. The inlet end of the water valve 39 is then connected by suitable flexible hose to a source of water such as the usual water system of a city which provides water under pressure. The dispensing device may then be moved to any desired location of use, for example, to wash an automobile. The valve 39 is opened, the motor 75 is connected to a source of electric current and a stream of water of high velocity is expelled through the nozzle 97. The jet or stream of water from the nozzle can be easily directed to various parts of the automobile since the nozzle is connected to the outlet of the pump through the flexible hose 94. The detergent from the storage tank is not now being added to the water since the valve 55 is closed.

If it is now desired to wash the automobile with a solution of water and detergent, the handle 62 is rotated to cause the operator rod 60 to open the valve to any desired degree. The water in the conduit passage 48 is at a higher than atmospheric pressure since the conduit 37 is connected to a source of water under pressure, and as the pressure at the outlet 53 of the tank is now decreased due to the action of the pump 69, water will flow into the upper end of the tank through the branch duct as detergent flows from the lower end of the tank through the valve 55 to the coupling 44 and thence to the inlet of the pump. As the water flowing from the conduit 37 and the detergent from the tank are moved through the pump, they are thoroughly mixed and the solution of water and detergent is expelled through the nozzle 97.

If it is thereafter desired to rinse the automobile with plain water, the valve 55 is again closed and only water will be moved by the pump through the nozzle 97 because the branch duct opens above the top surface of the detergent in the tank. In addition, since the tank is closed no air will flow from the tank into the conduit. The long passage 47 tends to prevent any accidental or reverse flow of detergent from the tank into the passage 48 of the tank through the passage 47 of the branch conduit even during any surges or accidental displacement of the detergent in the tank since the branch duct is filled with water.

In addition, the relatively long passage 47 of small orifice prevents surges in the flow of water into the tank and thus permits gradual changes in the rate of flow of detergent from the tank as the degree of closure of the valve 55 is raised.

It will now be seen that a new and improved dispensing apparatus has been illustrated and described for forcibly dispensing a liquid, such as water or a solution of water and detergent, through a nozzle whereby the device may be used to wash an object such as a vehicle with a solution of water and detergent and then be used to rinse the device with water only.

It will further be seen that the water and detergent are thoroughly mixed prior to the injection of the solution through the nozzle 97 since the detergent and the water flow are moved through the pump 69.

It will further be seen that a new and improved dispensing device which is of simple economical construction and which is easily moved from one location to another.

It will further be seen that the provision of the rigid conduit 37 extending through the storage tank permits the branch conduit to be located in the tank where it is protected against damage and also permits a very compact strong design of the tank and the means for dispensing detergent from the tank.

It will also be seen that the ratio of detergent to water may be easily regulated by varying the degree of closure of the valve 55 and that the detergent is forced from the tank due to both the force of the pressure of the water in the passage 48 of the conduit 37 communicated to the top of the tank through the passage 47 of the branch duct 46 and the pump action of the pump 69, and that water from the passage 48 flows into the tank to replace the detergent flowing from the tank to prevent decrease of pressure in the tank.

It will be apparent that, while the dispensing device has been described as used to wash vehicles, it may also be used to wash other objects such as windows, floors, driveways, and the like, to spray vegetation with insecticides, and in general to spray a mixture or solution of any type on any surface or object.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed and desired to be secured by Letters Patent is:

1. A dispensing device including: a base; a pump having inlet and outlet means mounted on said base; a motor for driving said pump mounted on said base; a storage tank mounted on said base; conduit means extending through said tank and connected at one end thereof to said inlet means of said pump, the other end of said conduit means being connectable to a source of liquid, said conduit means having a longitudinal passage; a branch duct in said tank having a flow passage communicating at one end with said flow passage of said conduit means and at its other end with said tank adjacent the upper end of said tank, said flow passage being of smaller orifice than said longitudinal passage; and duct means connecting the lower end of said storage tank with said inlet means of said pump, said last mentioned duct means having valve means for controlling flow of fluid from said storage tank to said pump inlet means, said inlet means of said pump being spaced below the level of liquid in said tank.

2. The dispensing device of claim 1 wherein said branch duct has one end rigidly secured to said conduit means and is arcuate whereby its other end is positioned adjacent the upper end of the tank and said branch duct is of substantial length.

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M. HENSON WOOD, JR., *Primary Examiner.*

EVERETT W. KIRBY, *Examiner.*