United States Patent [19]

Davenport

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[45] **Dec. 4, 1973**

[54] **SPRAY MIX APPLICATOR**

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[21] Appl. No.: **239,877**

[52] **U.S. Cl.** **239/310,** 239/354

[51] **Int. Cl.** **B05b 7/24**

[58] **Field of Search** 239/310, 318, 340, 239/346, 354, 434

[56] **References Cited**

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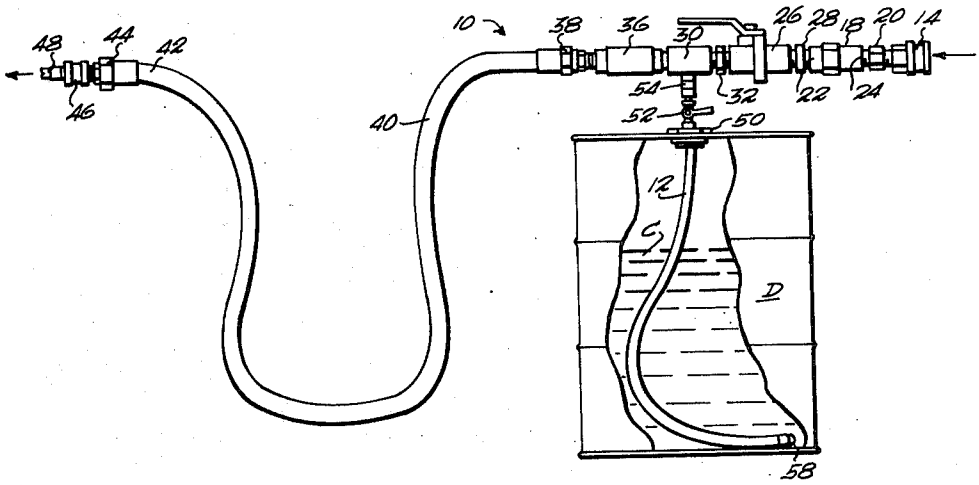
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Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—Andres Kashnikow
Attorney—Meyer A. Baskin

[57] **ABSTRACT**

The spray mix applicator of the present invention is a device for mixing and spraying a mixture of two liquids at a prescribed flow rate in a prescribed proportion to each other, one liquid being under atmospheric pressure while the pressure of the other liquid may vary, for instance, from 15 pounds per square inch to 125 pounds per square inch without affecting the output of the device.

5 Claims, 2 Drawing Figures



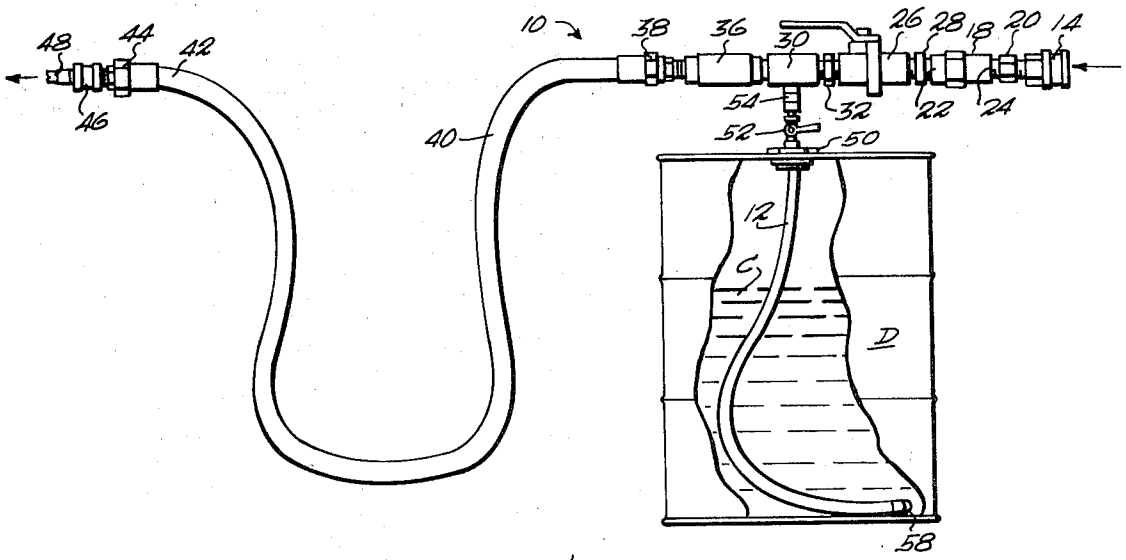
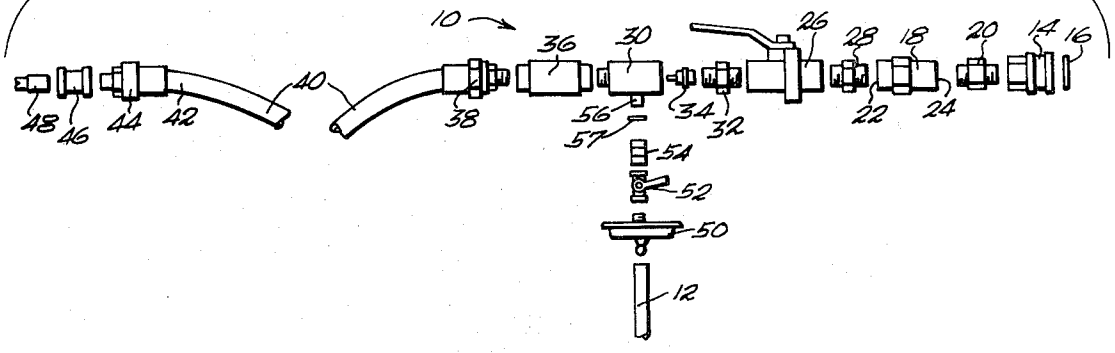

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Fig. 1

Fig. 2


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SPRAY MIX APPLICATOR

STATE OF THE PRIOR ART

Various devices have been provided for mixing two liquids and for discharging same in a stream or spray form.

For instance, the Pressurized Washing and Rinsing Apparatus disclosed in U.S. Pat. No. 3,297,257 to G. H. Roser provides a storage tank which is charged with a supply of a chemical, such as a wash detergent or the like; the tank is then pressurized by introducing a pressurized fluid such as water into the tank; and valve means are manipulated to provide a discharge, from the tank, through a spray gun. A separate line is connected to the gun to provide a stream of high pressure air to the water and detergent solution as it is being discharged from the gun. No attempt is made to insure a constant flow rate in definite prescribed proportions.

The Portable Garden Sprinkling and Fertilizing Apparatus disclosed in U.S. Pat. No. 2,293,796 to C. E. Bestor also discloses a device which includes a storage tank in which a supply of chemical is mixed with pressurized water to cause a discharge through an appropriate nozzle. Again, no effective means are provided to control the flow rate of chemical and water proportions.

U. S. Pat. No. 2,199,110, entitled Dilution of Liquid Chemical Compounds, issued to P. P. Mets, discloses a means to control the chemical and water ratios. A storage tank is provided with a tendinous sack-forming partition, the chemical being introduced to one side of the partition and pressurized water for compression purposes being supplied to the opposite side of the sack.

U.S. Pat. No. 3,049,304, entitled Portable Hose Spraying Apparatus, and issued to V. R. Sears, discloses an extremely complicated series of alternative structures for separately delivering a chemical to the nozzle of a hose for mixture with the pressurized water, being delivered through the hose, in an exit opening of the nozzle. This device generally utilizes a hose within a hose and provides no particular flow rate or proportion controls.

BACKGROUND OF THE PRESENT INVENTION

The spray mix applicator of the present invention was designed particularly for commercial cleaning purposes; however, it is equally applicable to home use and may also be used for other purposes in which it is desirable to mix two liquids at a prescribed flow rate in a prescribed proportion to each other, such as the mixing of fertilizers with water or the like.

A principal object of the present invention is to provide a spray mix applicator which is attachable to a standard water hose and will spray a mixture of two liquids at a prescribed flow rate in a prescribed proportion to each other.

A further object of this invention is to provide a spray mix applicator as above described, wherein one liquid is under normal atmospheric pressure and the other liquid is under a pressure which, for example, may vary from 15 pounds per square inch to 125 pounds per square inch without affecting the output of the device.

Yet another object of the invention is to provide an injector in the incoming water line to receive the liquid under pressure through a sized nozzle and to convert it to a jet stream which, in turn, creates a prescribed flow of liquid chemical from a container, through a suction tube attached to the injector, creating a desired mixture of the liquids at a prescribed flow rate.

Another object of the present invention is to provide a check valve in the device, downstream of the point of mixture of the two liquids, to hold the chemical in the suction tube when the spray mixture applicator is shut off to prevent any of the mixture remaining in the applicator hose from draining into the container of chemical via the suction tube.

A still further object of this invention is to provide a shut-off valve in the upper portion of the suction tube to enable the operator to shut off the flow of chemical, which permits a flow of plain water to flow through the nozzle for rinse purposes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an elevational view of the spray mix applicator of the present invention, connected to a drum containing a chemical; and

FIG. **2** is an exploded view of the spray mix applicator as illustrated in FIG. **1.**

DETAILED DESCRIPTION OF THE DRAWINGS

With reference to the drawings, in which like reference numerals indicate like or similar parts throughout both views, the spray mix applicator of the present invention is indicated generally at **10,** including a suction tube **12,** extending downwardly into a drum D containing a chemical C.

The spray mix assembly includes a conventional type of hose adaptor **14,** including a hose washer **16,** for screw threaded engagement with a suitable water source (not shown), providing a water pressure, for instance, within a range of 15 to 125 pounds per square inch.

The adaptor **14** is connected to a flow-control valve **18** by means of a hex nipple **20.** The flow control valve is of a type which provides a constant flow rate from the downstream end **22** regardless of the input flow rate entering the upstream end **24.**

The downstream end **22** is connected to a main on-off valve **26** by means of a hex nipple **28** which is, in turn, connected at its downstream end to a mixing chamber fitting **30** by a hex nipple **32.** An injector **34,** FIG. **2,** is interposed within the upstream end of the mixing chamber fitting and is held in place by the hex nipple **32.** The injector **34** is provided with a small orifice at its downstream end which receives the liquid under a predetermined pressure from the flow control valve **18** through a sized nozzle, and converts it into a jet stream which creates a prescribed flow of liquid chemical C from the container drum D through the suction tube **12,** creating a desired mixture of the liquids at the prescribed flow rate, as determined by the flow-control valve **18.**

The downstream end of the mixing chamber fitting **30** is connected to a check valve **36** which permits the fluid to flow only in the downstream direction. A conventional hose fitting **38,** fixed to the first end of a hose **40,** receives the downstream end of the check valve **36** in a fixed relation. The second or discharge end **42** of the hose **40** is provided with a similar hose fitting **44** for theaded engagement with a coupling **46,** connecting with a spray tip **48.**

As illustrated, the suction tube **12** is press fitted onto a bung adaptor **50** which is connected to an on-off

valve **52**, which is, in turn, connected to a chemical metering control **54**, fixed to a downwardly projecting nipple **56** from the mixing chamber fitting **30** with an O-ring **57** interposed therebetween.

In use, the bung of a drum of a suitable chemical is replaced with the bung adaptor **50** with the suction tube extending downwardly into the chemical, a suitable foot strainer **58** being provided on the lower end thereof. The hose adaptor **14** is screw threaded onto a suitable water source, such as a hose attached to a water faucet. When it is desirable to use the spray mix applicator of the present invention for washing purposes, the respective on-off valves **26** and **52** for the water and chemical supplies are turned to their on positions, initiating a flow from the spray nozzle **48** at a prescribed flow rate with a prescribed proportion of water and chemical.

The flow-control valve **18** determines the flow rate of the water, which, in turn, determines the suction rate of the chemical C into the mixing chamber of the fitting **30**. The water and chemical may be provided at predetermined fixed ratios, or the metering knob **54** may be provided to adjust the proportion of the chemical relative to the water.

For rinsing purposes, the on-off valve **52** in the chemical suction line is turned to its off position, permitting a flow of plain water through the spray nozzle. The prescribed flow-control valve **18**, as previously stated, accepts variable water pressures, 15 to 125 pounds per square inch, for instance, and delivers a constant flow rate to the spray nozzle **48** for either washing or rinsing purposes.

Due to erratic water pressure, the flow rate, the mix ratio and spray pattern are ordinarily never consistent. However, with the device of the present invention, the flow rate is controlled by a prescribed flow-control valve **18**, the mix ratio by a prescribed orificed injector **34**, and the spray pattern by a prescribed sized spray jet or nozzle **48**.

What is claimed is:

1. A spray mix applicator comprising:

A. A hose adaptor for connection to a source of pressurized fluid which may have a relatively wide pressure range from approximately 15 P.S.I. to 125 P.S.I.,

B. A flow-control valve connected in fluid communication with said hose adaptor, said flow-cotrol valve being adapted to maintain a constant prescribed downstream flow rate of the incoming fluid;

C. A first on-off valve connected in fluid communication with said flow-control valve;

D. A fitting connected in fluid communication with said on-off valve providing:

1. a mixing chamber, and

2. a fluid injector having a sized nozzle to receive the fluid having the prescribed pressurized flow rate and a reduced diameter orifice to convert the prescribed flow into a jet stream in said mixing chamber, which creates a prescribed suction flow of a liquid chemical into said mixing chamber from a chemical container through a suction tube;

E. A check valve downstream of said mixing chamber to prevent a backflow of the liquid mixture into the chemical container when said first on-off valve is moved to an off position;

F. A first hose fitting connecting the downstream end of said check valve with the intake end of a length of flexible hose;

G. A second hose fitting connecting the discharge end of said flexible hose to a coupling; and

H. A spray nozzle, having a prescribed spray pattern, to discharge the fluid mixture at said prescribed flow rate.

2. A spray mix applicator as defined in claim **1** including a second on-off valve in said suction tube, exteriorly of the chemical container.

3. A spray mix applicator as defined in claim **1** including an adjustable metering valve in said suction tube, exteriorly of the chemical container.

4. A spray mix applicator as defined in claim **1** wherein said suction tube is connected to a nipple extending outwardly at right angles to said mixing chamber and communicating between said suction tube and mixing chamber.

5. A spray mix applicator as defined in claim **1** including a bung adaptor for attachment in the bung hole of the container and providing fluid communication between said suction tube and mixing chamber.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,776,468 Dated December 4, 1973

Inventor(s) William K. Davenport

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet in the heading insert --[73] Assignee: B and B Chemical Company, Inc., Miami, Fla., a Corporation of Florida --.

Signed and sealed this 7th day of May 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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