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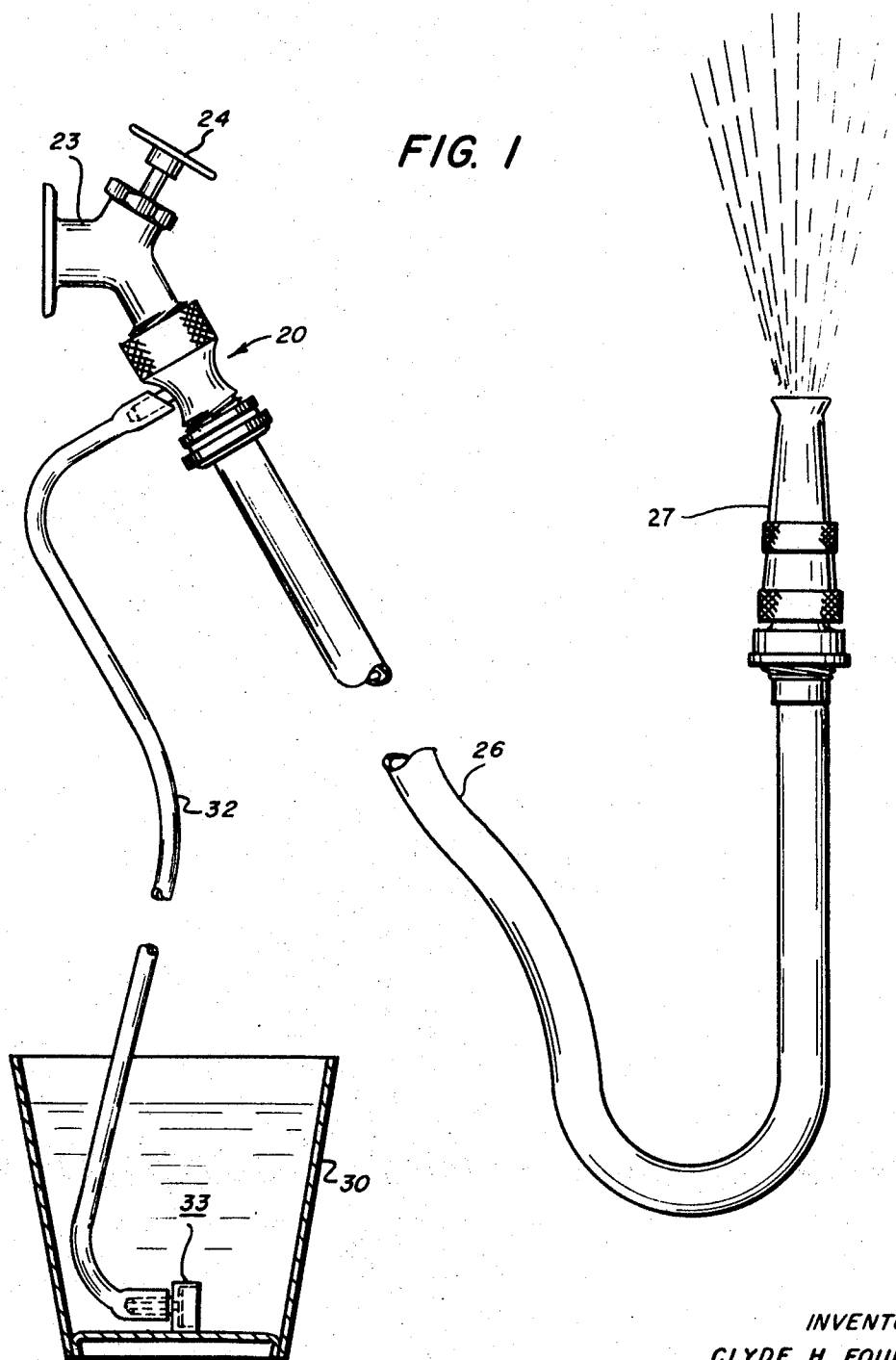
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3,470,826

JET PUMP AND VALVE COMBINATION

Filed Nov. 3, 1967

3 Sheets-Sheet 1



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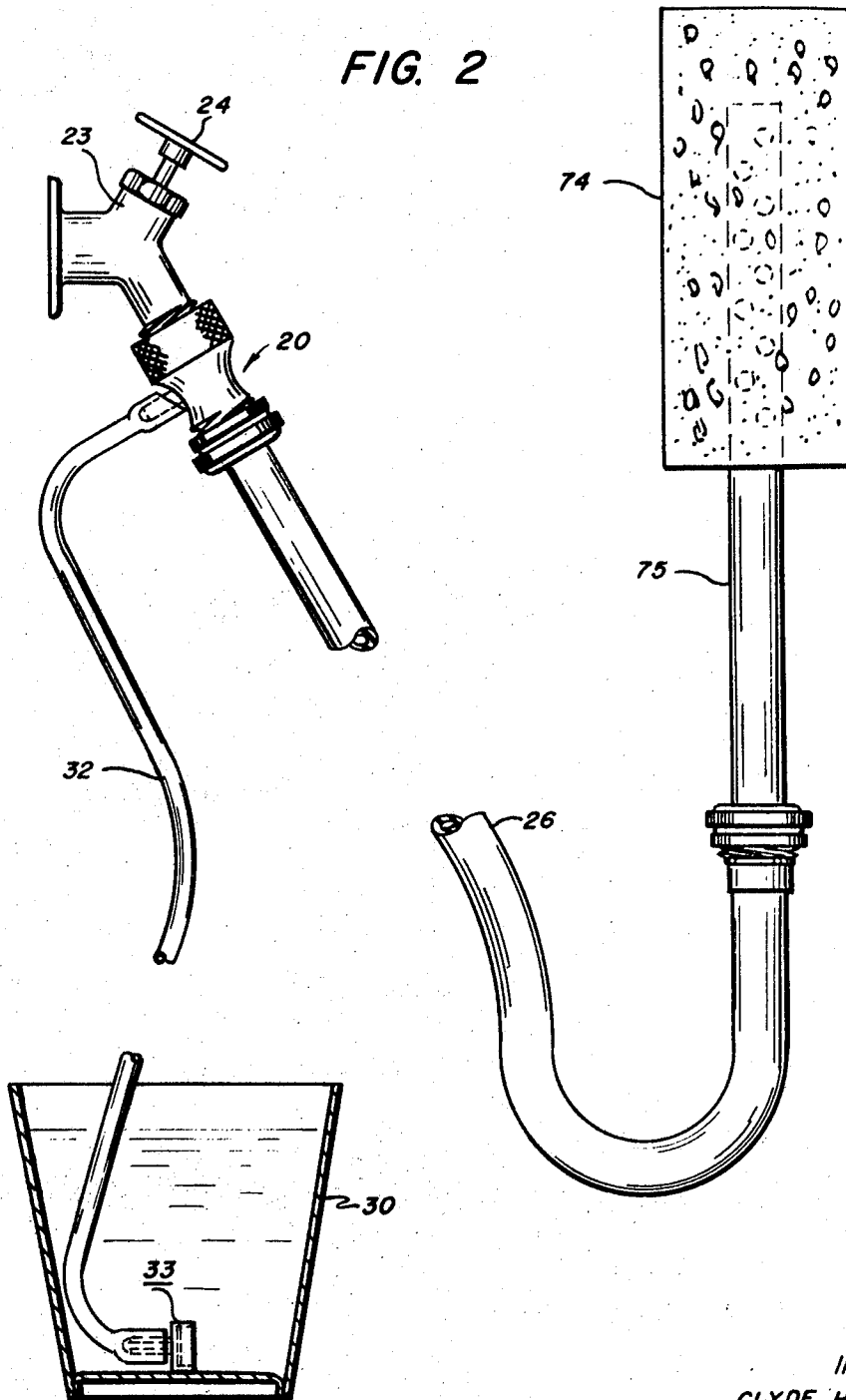
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3 Sheets-Sheet 2

FIG. 2



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3 Sheets-Sheet 3

FIG. 3

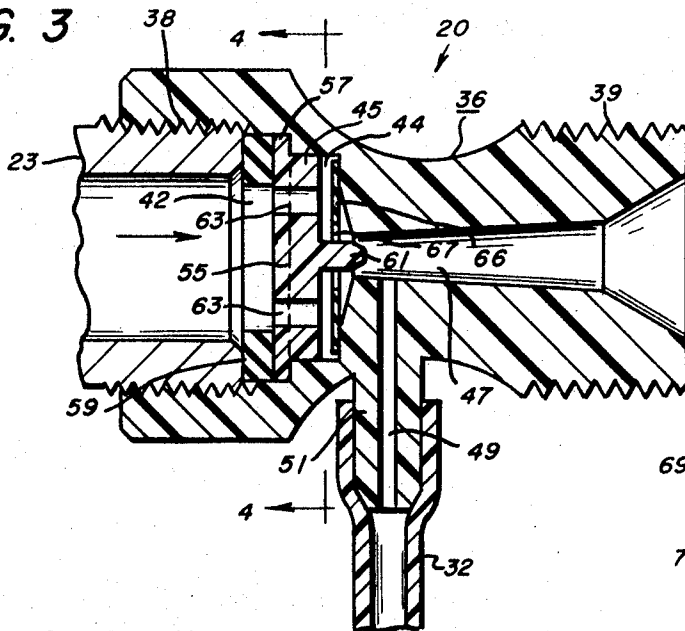


FIG. 7

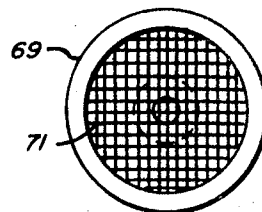


FIG. 6

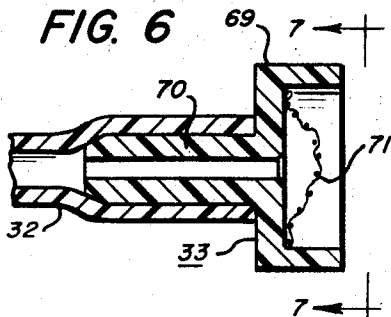


FIG. 4

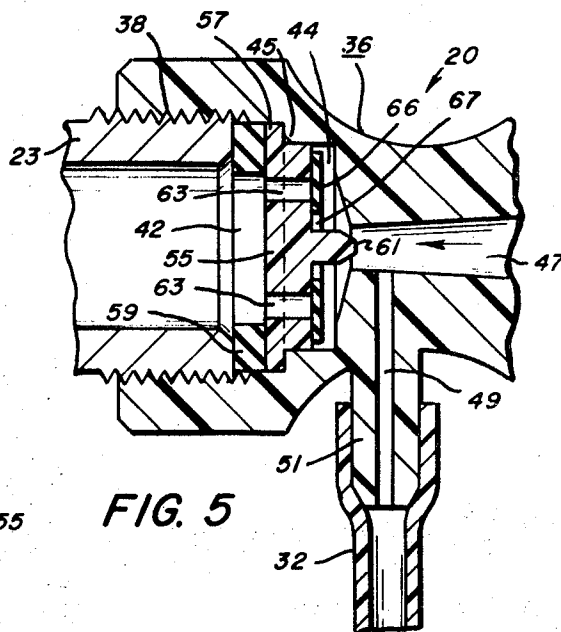
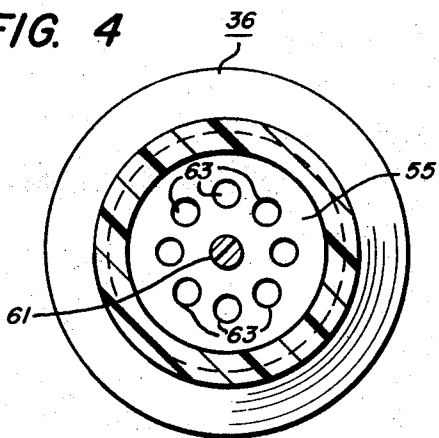


FIG. 5

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3 Claims

ABSTRACT OF THE DISCLOSURE

A water jet pump fitting for attachment to a water outlet and having a venturi passage therein for creating a low pressure which is communicated to a liquid supply to be intermixed with the water and an outlet passage for exiting the intermixed water and liquid. A valve construction is provided in the fitting for preventing accidental backing up of the liquid supply into the water outlet.

Prior devices which dispensed liquids in the above manner have had the inherent disadvantage of not having means to prevent possible pollution of the water supply which provides the motive power for the jet pump. Such pollution may result in cases such as when the apparatus is being used to dispense a weed killer or fertilizer to a yard or when the device is dispensing a detergent or strong cleaner to a vehicle being washed.

An object of the present invention is therefore to provide a means in such an apparatus for preventing the pollution of a water supply used in conjunction therewith.

Another object of the present invention is to provide a unique, reliable, and economical valve construction for use in combination with a water jet pump which prevents liquid being dispensed thereby from traveling in the wrong direction.

Other objects and fuller understanding of this invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is an elevational view showing the general environment of the present invention in conjunction with feeding a liquid fertilizer or weed killer through a conventional water hose;

FIGURE 2 is a similar view showing the present invention in conjunction with feeding a car wash solution through a conventional water hose which is connected to a sponge assembly attached to the end of the hose;

FIGURE 3 is a side elevational view in section of the jet pump and valve apparatus of the present invention;

FIGURE 4 is a view taken generally along the line 4—4 of FIGURE 3;

FIGURE 5 is a view similar to FIGURE 3 but showing the valve in closed rather than in the open position of FIGURE 3;

FIGURE 6 is an elevational view in section of the strainer shown in FIGURES 1 and 2; and

FIGURE 7 is a view taken generally along the line 7—7 of FIGURE 6.

Referring specifically to FIGURE 1, there is shown the jet pump and valve apparatus of the present invention which is indicated generally by the reference numeral 20 and this apparatus is interposed between a source of water supply 22 which in this particular instance is the conventional water valve found in homes and many commercial establishments. The valve is conveniently turned on and off by simple rotation of the valve handle 24. The end of the apparatus 20 opposite the water supply 23 is attached to a conventional garden hose 26 which has attached to its opposite end a conventional nozzle 27 for spraying water as desired. A liquid supply 30 is used in conjunction with the apparatus and is adapted to be fed

2

to the apparatus by means of transparent plastic tubing 32 which has a strainer 33 attached to the end thereof.

The jet pump and valve apparatus 20 includes in combination a housing 36 (FIGURE 3) which is preferably constructed of a satisfactory plastic material such as "Delrin" and this housing is adapted to be attached to the water supply 23 by threads 38 and to the conventional garden hose 26 by threads 39. These threads are integrally provided on the housing at what will be called the first and second end portions of the housing, respectively.

The first end portion of the housing has a bore 42 extending theretinto and at the end of the bore there is provided a counter bore 44. The bore and counterbore are separated by a shoulder 45. A venturi passage 47 extends from the counterbore through the second end portion of the housing and exits the same and is located in communication with the garden hose 26 when attached thereto by means of threads 39.

A liquid supply passage 49 is located in the housing and extends generally transverse to the extent of the venturi passage and communicates at one end therewith. The passage 49 is provided in a protruding portion 51 of the housing and the opposite end of the passage 49 is adapted to be connected to the transparent plastic tubing 32 by simply the friction fit of the tubing over the outside of the protruding portion.

An annular valve body member 55 is snugly received in the counterbore 44 and is provided with a shoulder 57 which engages the shoulder 45 and the shoulder portion 57 in effect resides in the bore 42. Immediately adjacent the annular valve body member 45 is provided a sealing ring 59 of a rubber-like construction and it will be seen in FIGURES 3 and 5 that the threaded fitting portion of the valve 23 holds the sealing ring 59 and consequently the valve body member 55 firmly in position. The valve body member 55 is provided with an integral axial extension 61 which extends toward the venturi passage 47 and is for a purpose which will be subsequently discussed. A plurality of circumferentially spaced valve passages 63 are provided which extend axially through the valve body member and are for the purpose of providing for fluid communication from the bore to the venturi passage. A flat valve member 66 is provided which has a central opening 67 which central opening fits over and is larger in diameter than the axial extension 61. The member 66 is preferably of neoprene and may be a neoprene covered fabric. Then central opening 67 and the outer peripheral edge of the flat valve member 66 define an annular portion therebetween which is of a size to cover all of the circumferentially spaced valve passages 63, when the same is moved axially into engagement with the valve body member as shown in FIGURE 5. In other words, the valve member in the open position of FIGURE 3 permits fluid communication through the passages 63 and prevents fluid communication therethrough in the closed position of FIGURE 5.

FIGURE 6 is a cross sectional view of the strainer 33 and it will be noted that in cross section the strainer is composed of a cup shaped portion 69 with an extension 70 over which is friction-fitted the opposite end of the transparent tubing 32. A piece of screening 71 of appropriate size is friction fitted into the cup-shaped portion 69 and prevents the introduction of foreign material into the apparatus.

As shown in FIGURE 1, the apparatus is adapted to feed a predetermined amount of liquid fertilizer or weed killer in liquid form to a conventional home lawn. In order to accomplish this result the appropriate mixture is placed in the liquid supply container 30 and the strainer 33 with the tubing 32 attached is immersed therein. The first end portion of the jet pump and valve apparatus 20

is threadably attached to the water supply 23 and the second end portion is threadably attached to the hose 26. The nozzle is utilized to provide the desired spray coverage of the lawn. The water supply is then turned on with the resultant passage of the water from the bore 42 through the venturi passage 47, through the hose and subsequently to the nozzle 27. The passage of water through the venturi passage causes a drop in pressure at the point where the passage 49 is connected thereto with resultant drawing of liquid through the tubing 32 and introduction of the same into the main water stream. The device which is shown in the drawings is drawn approximately double scale and with the conventional water pressure in most homes the liquid in the liquid supply 30 will be diluted approximately twelve to sixteen times in utilizing the present apparatus.

It will be noted that under these conditions the water from water supply 23 acts upon the left face of valve member 66 (as seen in FIGURE 3) causing the valve member to move to the right and causing passage of water through passages 63 and out through the central opening 67. Assuming that the water might be shut off at the nozzle 27 with possible lowering of pressure at the water supply valve or even further back in the system, the material in the liquid supply 30 is prevented from backing up into the main water system by the provision of the valve member 66. It will be seen that any attempt by the water in hose 26 or in liquid supply 30 to back up, causes a force to be exerted against the right face (as seen in FIGURE 5) of the valve member, causing the same to firmly close over passages 63 and thus preventing contamination of the main water supply.

FIGURE 2 is substantially identical to FIGURE 1 and wherein the parts are similar the same reference numerals have been applied thereto. This device shown in FIGURE 2 is shown for the purpose of feeding a detergent to the water supply used to wash a car or other vehicle and the nozzle 27 has been replaced by a sponge assembly 74 which is fixedly attached to the end of a conduit 75 which in turn is screwed into the end of the garden hose. The end of the conduit 75 which is attached to the sponge has suitable openings therein whereby water is transmitted to the sponge.

It will therefore be readily apparent that the invention described hereinabove carries out the unique advantages expressed in the objects.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A jet pump and valve apparatus combination for interposition between a source of water supply, a water dispenser such as a hose, and a liquid supply to be intermixed with the water; including in combination a housing having first and second end portions, said first end portion having a bore extending thereinto and having a counterbore at the end thereof, a venturi passage extending from said counterbore through said second end portion, a liquid supply passage in said housing extending generally transverse to the extent of said venturi passage and communicating therewith, an annular valve body member residing in said counterbore and having a shoulder engaging the intersection of said bore and counterbore to position the same, said valve body member having an axial extension which extends toward said venturi passage, a plurality of circumferentially spaced valve passages extending axially through said valve body member for providing communication between said bore and said venturi passage, a flat valve member having a central opening fitting over and being larger than said axial extension, said central opening and the outer peripheral edge of said flat valve member defining an annular portion therebetween which is of a size to cover all of said circumferentially spaced valve passages when moved axially into engagement with said valve body member, means for attaching said apparatus to a source of water supply, means for attaching said apparatus to a water dispenser such as a hose, a tube connected at one end to said liquid supply passage, another end of said tube adapted to be immersed in a liquid supply.

2. A jet pump and valve apparatus as claimed in claim 1 wherein said attaching means are threads.

3. A jet pump and valve apparatus as claimed in claim 1 wherein said another end of said tube is connected to a strainer member.

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103—272; 137—218, 604