April 16, 1957 J. A. DEAN 2,789,010

SPRAY HEAD

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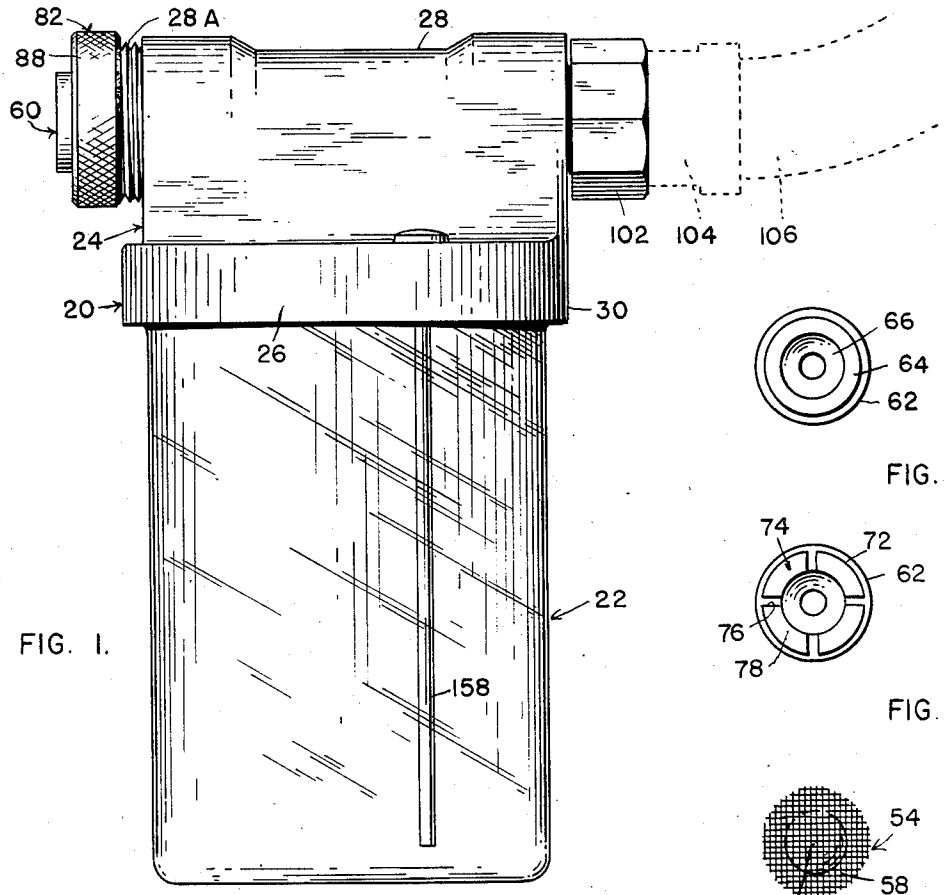


FIG. 1.

FIG. 7.

FIG. 8.

FIG. 9.

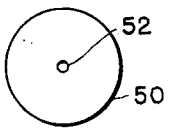


FIG. 10.

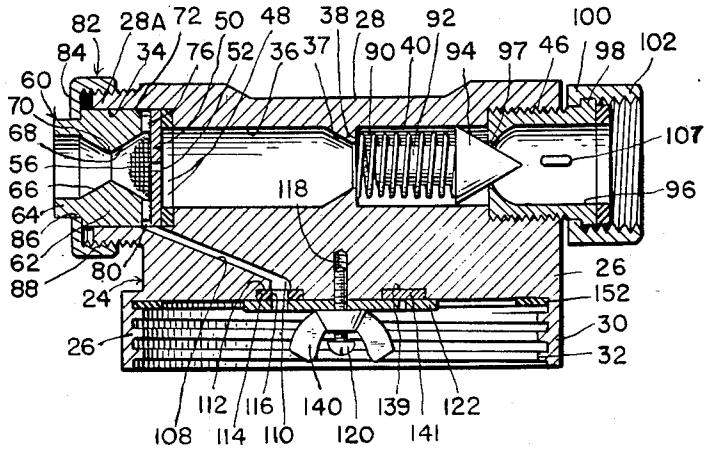


FIG. 5.

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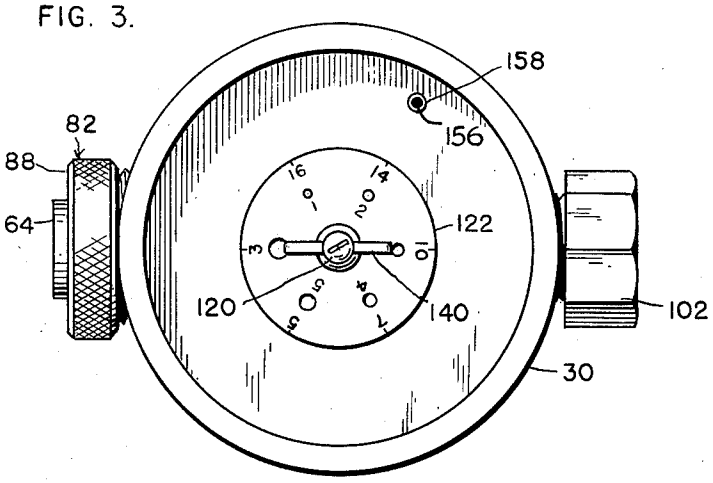
ATTORNEYS

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SPRAY HEAD

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FIG. 3.



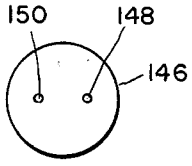


FIG. 11.

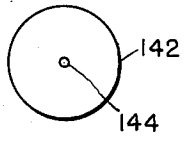
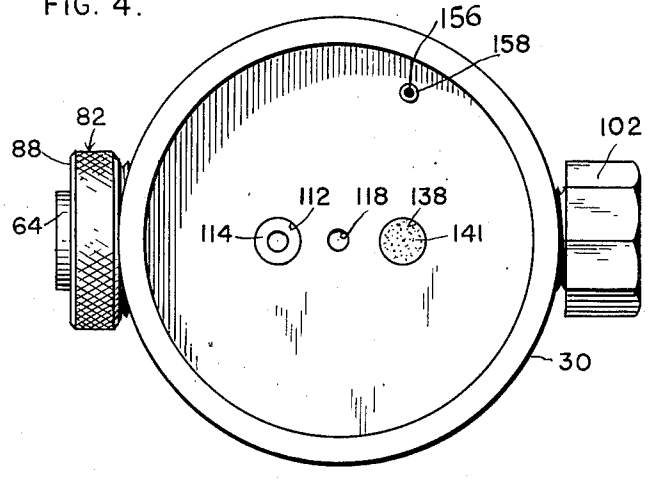


FIG. 12.

FIG. 4.



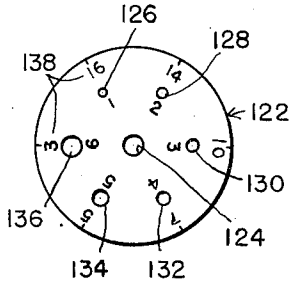


FIG. 6.

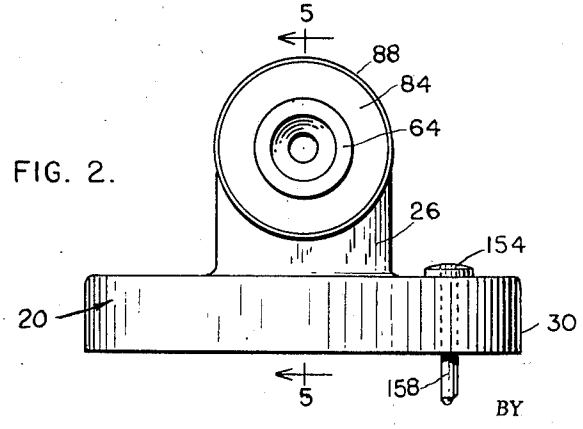


FIG. 2.

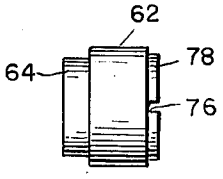


FIG. 13.

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SPRAY HEAD

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Application June 13, 1955, Serial No. 515,195

4 Claims. (Cl. 299—84)

This invention relates to liquid spraying devices, and more specifically, the invention pertains to a spray head.

One of the primary objects of this invention is to provide a liquid compound spray device including a container and spray head therefor adapted for connection with a source of fluid under pressure with means for adjustably controlling the amount of fluid to be mixed with the liquid in the container.

Another object of this invention is to provide in the above mentioned spray head means for providing a uniform symmetrical spray for either close or long distance spraying, and the invention also contemplates means interchangeable with these last mentioned means for use with liquid compounds which may have a tendency to clog the last mentioned means.

A further object of this invention is to provide a liquid compound spray device with aspirating means operable only when the device is inverted.

A still further object of this invention is to provide a device of the type referred to supra which is non-complex in construction and assembly, inexpensive to manufacture and maintain, and durable in use.

Other and further objects and advantages of the present invention will become more evident from a consideration of the following specification when read in conjunction with the annexed drawings, in which:

Figure 1 is a side elevational view of a liquid compound spray device constructed in accordance with this invention.

Figure 2 is an end elevational view of the spray head shown in Figure 1.

Figure 3 is a bottom plan view of the spray head of the device shown in Figure 1.

Figure 4 is a bottom plan view of the spray head, parts thereof being removed to illustrate details of its construction.

Figure 5 is a longitudinal medial cross-sectional view taken on the vertical plane of line 5—5 of Figure 2, looking in the direction of the arrows.

Figure 6 is a front elevational view of the liquid flow control valve.

Figure 7 is a front elevational view of the spray nozzle.

Figure 8 is a rear elevational view of the spray nozzle.

Figure 9 is a front elevational view of the spray screen.

Figure 10 is a front elevational view of a fluid volume control disc.

Figure 11 is a front elevational view of a second fluid control disc.

Figure 12 is a front elevational view of a third fluid volume control disc.

Figure 13 is a side elevational view of the nozzle.

Referring now more specifically to the drawings, reference numeral 20 designates, in general, a liquid spray device constructed in accordance with this invention. The device 20 is seen to comprise, in main, an elongated hollow transparent cylindrical container 22 having opposed open and closed ends, and the open end thereof is externally threaded for connection with a spray head 24.

The spray head 24 comprises a substantially solid cylindrical main body portion 26 from which arises an integrally formed substantially hollow tubular boss 28 which extends diametrically thereacross, and from which depends a substantially hollow cylindrical flange 30 internally threaded at 32 for connection with the open end of the container 22.

The boss 28 is bored inwardly at 34, and at its inner end the bore 34 is in open communication with the outer end of a bore 36 of reduced diameter. The inner end 37 of the bore 36 is also reduced in diameter to form an internal annular shoulder 38. The inner end of the bore 36 is in open communication with the inner end of a bore 40, and the bore 40 communicates with the inner end of the internally threaded bore 46.

The inner end of the bore 36 receives an annular gasket 48 against which is juxtaposed in side-by-side relation a fluid volume control disc 50 having a centrally positioned transversely extending orifice 52. A circular screen 54 having a centrally positioned convex-concave portion 56 and a radial flange 58 is placed in juxtaposition with respect to the other side of the disc 50 and is held thereagainst by a nozzle designated, in general, by the reference numeral 60.

The nozzle 60 comprises an elongated tubular body portion 62 having an annular boss 64 projecting from an end thereof and a pair of longitudinally extending passages 66, 68 extending therethrough. As seen in Figure 5 of the drawings, the passages 66, 68 have an inverted frusto-conical configuration with respect to each other and having the smaller diameter ends thereof communicating with each other. The end of the passage 66 having the largest diameter communicates with the inner end of the bore 70 of the boss 64.

Referring to Figures 5 and 7, it is seen that the inner end of the nozzle 60 is reduced in diameter to form a shoulder 72 and an axially extending boss generally indicated at 74. The boss 74 is provided with a plurality of radially extending grooves 76 spaced at 90° intervals which divide it into a plurality of segmental sections 78. The shoulder 72, the segmental sections 78 and the adjacent portions of the boss 28 and disc 50 define an annular passage 80 to which further reference will be made, and it should be noted at this point that the segmental sections 78 bear against the flange 58.

The nozzle 60 is retained in its position by means of a cap 82 comprising a disc 84 centrally apertured at 86 which receives the boss 64 therethrough and engages the outer end of the tubular body portion 62. The disc 84 is integrally formed with a laterally extending internally threaded cylindrical flange 88 and is threaded on the externally threaded end projection 28A of the boss 28.

A helicoidal spring 90 is disposed in the bore 40 and has an end thereof abutting against the annular shoulder 38. The other end of the spring encircles a keeper pin 92 and engages against the base of a conical valve 94 normally seated in the valve seat 97. As is illustrated in Figure 5, one end of the pin 92 is rigidly secured to the base of the valve 94 and the other end projects laterally therefrom.

An externally threaded substantially hollow tubular coupler 96 having a radially and inwardly extending valve seat 97 is threaded into the internally threaded bore 46, and the other end thereof terminates in an outwardly extending radial flange 98 which is overlapped by an inwardly extending radial flange 100 of a female hose connector 102 which is adapted to receive the male connector element 104 at one end of a flexible hose or conduit 106 having its other end connected with a source of fluid, such as water, under pressure. The coupler 96 is provided with a plurality of radially inwardly ex-

tending lugs 107 adapted for tool engagement when inserting or removing the same from the bore 46.

The main body portion 26 is provided with an inclined passage 108 having one of its ends in open communication with the annular passage 80. The outer end of the passage 108 connects with a bore 110 which is counter-bored at 112 to receive an annular gasket 114 having a central aperture 116 aligned with the bore 110. The main body portion is also formed with an internally threaded opening 118 which receives an elongated bolt 120 on which is mounted a valve disc 122 centrally apertured at 124.

The valve disc 122 is also provided with a plurality of transversely extending radially spaced apertures 126, 128, 130, 132, 134 and 136 of progressively greater diameters, respectively, to serve a function to be described. Each of the apertures are assigned a reference numeral, one to six inclusive, and other data 138 is impressed adjacent each of the apertures to serve a function also to be described below. A wing nut 140 is mounted on the bolt 120 and is adapted to be tightened against the valve disc 122 to adjustably secure the disc 122 against the main body portion 26 with a selected one of the apertures 126, 128, 130, 132, 134 or 136 coaxially aligned with the central aperture 116 and the bore 110. The underside of the main body portion 26 is provided with a circular recess 139 in which is inserted a friction disc 141 adapted for engagement with the valve disc 122 to effect means for maintaining the apertures 126, 128, 130, 132, 134 or 136 aligned with the aperture 116 while the wing nut is loose.

Figures 11 and 12 pertain to modifications of the fluid control disc illustrated in Figure 10. The disc 142 shown in Figure 12 is identical in all respects with respect to the disc 50 illustrated in Figure 10 with the exception that the orifice 144 extending centrally therethrough is of a smaller diameter than the diameter of the orifice 52 of the disc 50. The disc 146 having a pair of diametrically opposed and spaced apertures 148, 150 is similar in all other respects to the disc 50. The fluid control discs 142 and 146 serve a function to be described below.

The main body portion has formed thereon an upstanding hollow boss 154 which has inserted therein one end of an elongated tubular conduit 158 which depends therefrom into the container 22. A bore 156 in the tube 158 communicates the interior of the container 22 with the atmosphere thus venting the container 22.

In operation, the spray head 24 is adapted to be connected to the threaded upper end of any standard glass quart canning jar containing a liquid compound which is adapted to be mixed with water and sprayed, for example, on cars, buildings, or the liquid may be sprayed as a fish oil fertilizer, liquid weed killer for gardens and lawns, or the sprayed liquid may comprise a disinfectant for farm outbuildings, and may be utilized in many other ways not herein itemized. Leakage between the spray head 24 and the threaded end of the container 22 is prevented by means of the interposed gasket 152.

After the container 22 has been filled with the desired liquid compound and the spray head connected thereto, the spray head is then connected with the hose 106 as described above. The valve 94 is normally seated in the valve seat 97 and is forced to its open position by the force of the fluid under pressure received from the hose 106. The fluid passes from the hose 106 through the connector element 104, the coupler 96, valve seat 97, the bores 40 and 36, the gasket 48 and passes through the orifice 52 formed in the fluid volume control disc 50. As the fluid leaves the orifice 52 it impinges against the wire dome 56 and is broken up into substantially molecular particles, the particles being discharged therefrom through the inverted frusto-conical bores 68, 66, for discharge through the bore 70 of the boss 64 into the atmosphere.

It should be noted at this point that the valve 94 is maintained in its open position only as long as fluid pressure is being exerted thereon. To mix the liquid compound disposed in the cylindrical container 22 with the water under pressure, the cylindrical container 22 is inverted so that the liquid compound will then pass through a selected aperture from one of the apertures 126, 128, 130, 132, 134 and 136 and will pass through the bore 110, the passage 108 to the annular passage 80 from which it is conducted by the radially extending grooves 76 to the frusto-conical bore 68. At this point the liquid compound becomes intermixed with the water discharged from the wire dome 56 and is discharged from the nozzle 60 in the manner described above.

It should be noted that the above described flow of the fluid is accomplished through the force of gravity and by aspirating action.

The valve disc 122 together with its apertures 126, 128, 130, 132, 134 and 136 permits the operator to predetermine the exact ratio of fluid under pressure to the liquid compound. In the drawings, the indicia 138 refers to the number of gallons of water which will be mixed in ratio to one quart of the chemical compound, the setting of the valve disc 122 in Figure 3 indicating that three gallons of water are being mixed with one quart of the liquid compound.

The fluid control disc 142 having a smaller diameter aperture than the aperture 52 in the disc 50 is substituted for the disc 50 when the operator desires to reduce the volume of water dispensed per quart of liquid compound.

In the event that the liquid compound disposed within the cylindrical container 22 may have a tendency to bog the dome 56, the fluid control disc 146 is utilized in place of either of the fluid control discs 50 or 142, the disc being employed without the wire screen.

For long distance spraying, the discs 50 and 142 are used with a substantially flat screen (not shown).

The metal parts of which the spray head is constructed are made from non-corrosive metals which will not deteriorate if normal care is used in its maintenance. For example, if the liquid compound employed is a weed killer or an insecticide, the sprayer should be placed in a container of soda water in order to counteract the poisonous action of the chemicals.

A spray head constructed in accordance with the present invention possesses the still further attribute in that when the fluid pressure is cut off the valve 94 automatically closes thereby preventing any of the liquid compound which may be harmful, from returning into the hose.

Having described and illustrated one embodiment of this invention, it will be understood that the same is offered merely by way of example, and that the invention is to be limited only by the scope of the appended claims.

What is claimed is:

1. A spray head comprising a main body portion having means projecting from a side thereof for connection with a container for a liquid compound, an enlarged boss projecting laterally from the other side of said main body portion, said boss having a continuous passage formed therethrough, automatically operated valve means disposed in said passage in normally closed relation, means for connecting said passage with a source of fluid under pressure, a fluid volume control disc having a centrally positioned orifice disposed in the path of flow of said fluid under pressure through said passage, a screen element positioned on the discharge side of said orifice, nozzle means releasably secured on said boss, a passageway formed in said main body portion and communicating with said nozzle and said container whereby said liquid may be aspirated from said container, and means for controlling the flow of the fluid through said last named communicating means.

2. A spray head comprising a main body portion substantially cylindrical in configuration, a substantially cylindrical internally threaded flange projecting laterally from a side thereof, an enlarged substantially hollow tubular boss projecting laterally from the other side of said main body portion, said boss having a continuous passage extending therethrough, a hose coupler device threaded into said boss at one end thereof, said coupler being in communication with one end of said passage, hose connector means rotatably mounted on said coupler, said coupler having a valve seat at the inner end thereof, a valve normally seated in said seat, spring means disposed within said passage and constantly tending to urge said valve against its said seat, a gasket for the other end of said boss, a fluid volume control disc mounted in said boss against said gasket, a convex-concave intersticed element positioned against said disc, said disc having an orifice disposed within said passage, a nozzle having a pair of inverted frusto-conical passages formed therethrough, said nozzle being positioned in said boss with one of said frusto-conical passages in juxtaposition relative to said intersticed conical passages communicating with a discharge bore formed in the outer end of said nozzle, said nozzle having a reduced inner end cooperating with the adjacent portions of said disc and said boss to form an annular passage, a plurality of grooves extending diametrically across said inner end of said nozzle, a passage formed in said main body portion, said passage communicating at one of its ends with said annular passage, the other end thereof communicating with a bore extending inwardly from said one side of said main body portion, and means for controlling

the flow of said liquid compound through said last named bore.

3. A spray head as defined in claim 2, said control means for said bore comprising a disc having a plurality of openings extending transversely therethrough, said openings each having diameters of various lengths, and means for securing a selected one of said openings in alignment with said last named bore.

4. A spray head as defined in claim 2, said last named means comprising a disc having a plurality of radially spaced transversely extending apertures adapted for alignment with said last named bore, said apertures each having a diameter varying in length with respect to one another, said disc having a central aperture extending transversely therethrough, an internally threaded passageway extending inwardly from said one side of said main body portion, said last named aperture and said internally threaded passageway being coaxially aligned, a bolt extending through said last named aperture and threaded into said internally threaded passageway, and a winged nut mounted on said bolt for engagement against said disc to hold a selected one of its said apertures in alignment with said last named bore.

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