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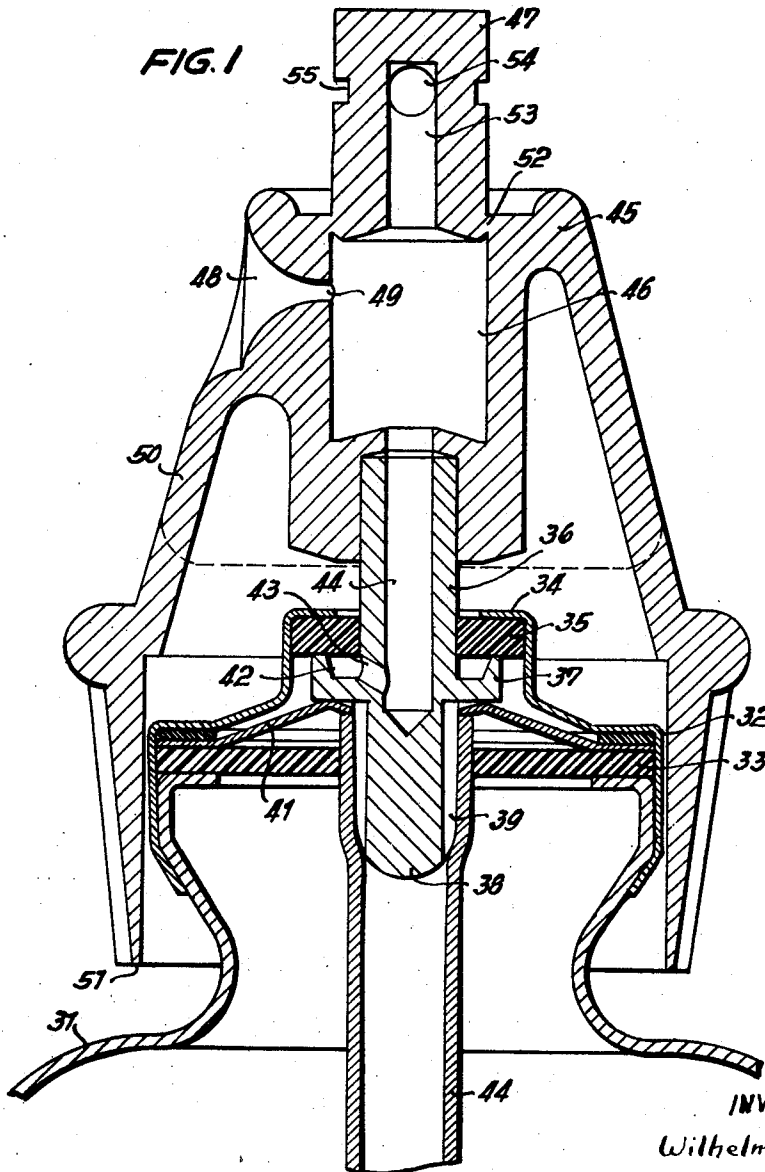
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2,952,278

SPRAY HEAD AND FILLING PLUG

Filed Sept. 18, 1956

4 Sheets-Sheet 1



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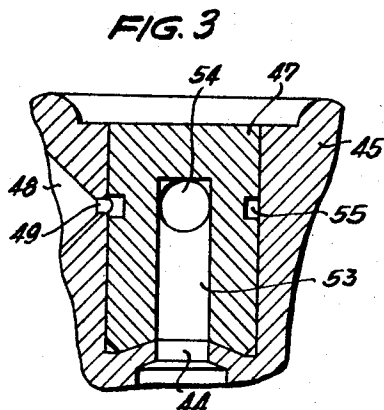
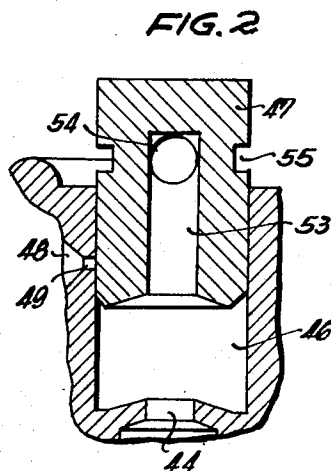
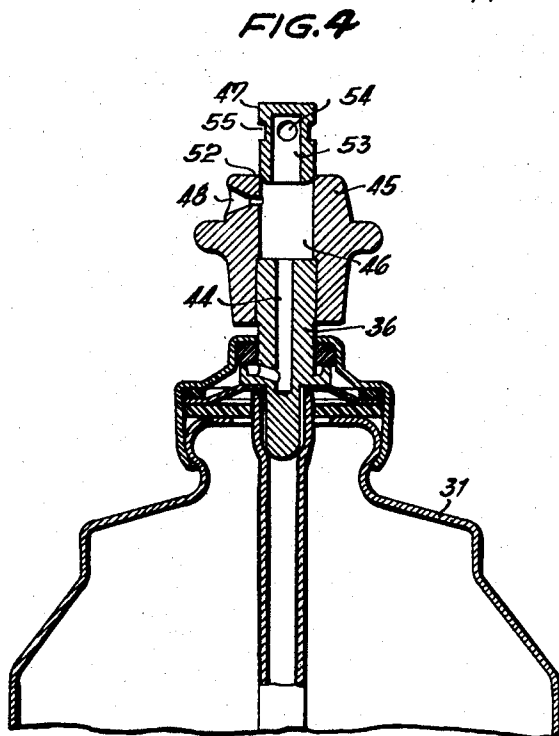
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4 Sheets-Sheet 2



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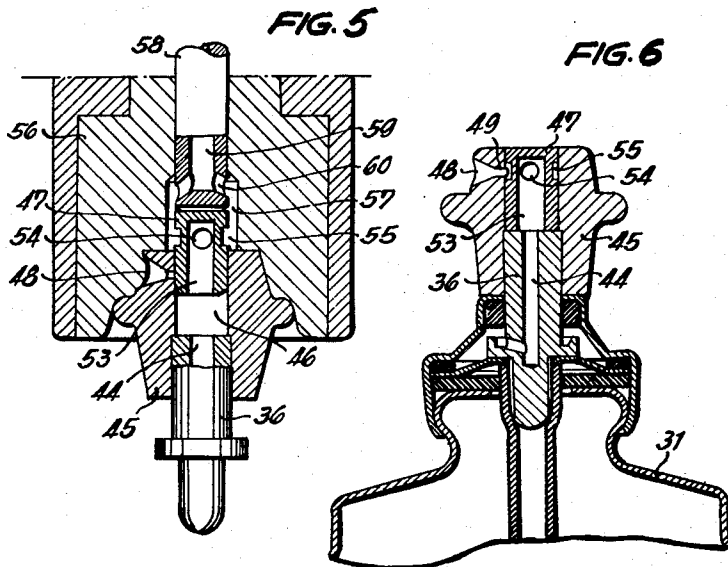
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SPRAY HEAD AND FILLING PLUG

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4 Sheets-Sheet 3



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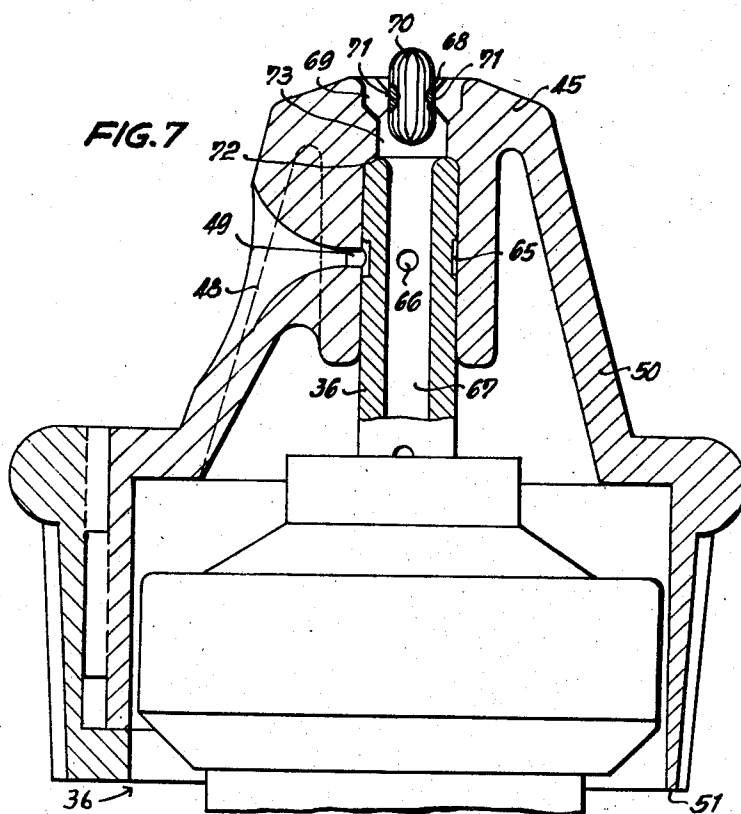
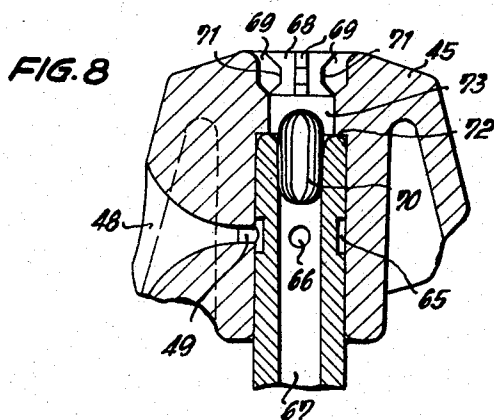
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SPRAY HEAD AND FILLING PLUG

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4 Sheets-Sheet 4



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2,952,278

## SPRAY HEAD AND FILLING PLUG

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The present invention relates to dispensers.

More particularly, the present invention relates to that type of dispenser which is adapted to dispense a spray of any desired fluid.

It is an object of the present invention to provide a dispenser of the above type with a spray head which enables the container for the fluid to be filled while the spray head is in its operating position, so that the spray head need not be placed in its operating position after filling of the container, and in this way loss of fluid is avoided since positioning of the spray head on a dispenser of the above type may entail discharge of fluid from the dispenser.

It is also an object of the present invention to provide a spray head which is capable of producing a relatively short, solid, fine spray.

With the above objects in view the present invention mainly consists of a dispenser for dispensing a spray of fluid, this dispenser including a fluid container having an outlet and a cap means carried by the outlet of the fluid container. A valve means is carried by the cap means for controlling the discharge of fluid from the container, and this valve means has a portion located at the exterior of the container and cap means and carrying a spray head for causing the fluid to issue in the form of a spray, the spray head also having a fluid inlet opening and plug means being provided to close the fluid inlet opening after the container is filled with fluid.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a fragmentary sectional elevational view of a dispensing structure according to the present invention, showing a special spray head together with a filling plug associated therewith;

Figs. 2, 3, and 4 illustrate, in fragmentary sectional elevational views, different stages in the use of the spray head of Fig. 1 during and after filling of the container with a fluid to be dispensed;

Fig. 5 is a fragmentary sectional elevational view of a filling structure which may be used to fill a dispenser according to the present invention;

Fig. 6 is a fragmentary sectional elevational view showing the position of the spray head and valve structure after the container has been filled;

Fig. 7 is a fragmentary sectional elevational view show-

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ing another embodiment of a spray head which is capable of being used in conjunction with the filling of the container; and

Fig. 8 shows the position of the spray head parts of Fig. 8 and the valve structure thereof after the container is filled.

Containers of spray are filled with a liquid and gas or with a mixture of liquid and gas. The gas may be refrigerated so as to be in liquid form so as to be easily introduced into the container with the liquid. Conventionally, the spray head is removed during charging of the container, and then the spray head is pressed onto the upper part of the dispenser valve. Such pressing of the spray head onto the upper part of the valve requires depression of the valve member to move the latter to its open position, and thus it is unavoidable that with such an arrangement fluid will be undesirably discharged from the interior of the container.

According to the present invention, the spray head is placed in its operating position before the container is charged, and a structure is provided which permits the container to be charged even though the spray head is in position. Referring to Fig. 1 it will be seen that the container 31 carries a cap means 32 which clamps to the container a membrane 33 surrounding in a fluid-tight manner a tubular member 44 which extends downwardly from the portion 38 of the valve member 36 and which surrounds the grooves 39 formed in the portion 38. A sealing ring 35 is fixed to the underside of the upper apertured wall 34 of the cap means 32, and the valve member 36 is formed with an axial bore 44, with a transverse bore 43 communicating with the axial bore 44 and with an annular channel 42 formed by the upwardly extending lip 37 of an annular flange on the valve member 36. A resilient plate 41 urges the valve member to its closed position where the lip 37 engages the sealing ring 35. The resilient plate is clamped at its outer periphery between the upper face of the membrane 33 and an elastic sealing ring which engages the underside of a part of the upper wall of the cap means 32, as is indicated in Fig. 1.

A spray head 45 is mounted on the upper end of the valve member 36 before the container 31 is charged with fluid. This spray head 45 is formed with an axial bore 46 which communicates with the bore 44 of the valve member 36, and a filling plug whose structure is described below is located at the top open end of the bore 46. Furthermore, the spray head 45 is provided with a lateral outlet 48 which flares outwardly and which has its inner end 49 of the smallest cross sectional area located at the bore 46.

Furthermore, the spray head 45 includes a downwardly extending skirt portion 50 which terminates in a lower annular edge 51 located at a predetermined distance above the container 31 when the valve is closed, as shown in Fig. 1. Thus, with this arrangement when the spray head is depressed to open the valve the fluid will flow upwardly through the tube 44 and grooves 39 and between gaps formed in the inner periphery of the resilient member 41 to provide a passage extending from the upper end of the grooves 39 to the space surrounding the annular flange of the valve member 36, and from this space the fluid will flow into the upwardly directed channel 42, through the bore 43 and axial bore 44 up to the axial bore 46 of the spray head 45 and

out through the outlet 48 thereof. It will be noted that the engagement of the lower edge 51 of the spray head 45 and the container will limit downward movement of the valve member, so that in this way it is not possible for the operator to push the valve member too far into the container.

The filling plug 47 is joined to the spray head 45 before the container 31 is charged with fluid. At the joint between the spray head 45 and the filling plug 47, notches 52 are provided to render the plug 47 easily detachable from the spray head 45 by a downwardly directed pressure applied to the top face of the filling plug 47. If desired, the filling plug 47 may simply rest on the upper open end of the bore 46 to be pressed downwardly into the latter in the manner described below.

As is indicated in Fig. 1, the filling plug 47 is formed with an axial bore 53 extending upwardly from the bottom end thereof, and this axial bore 53 communicates with the lateral bore 54 which in turn communicates with an annular groove 55 located at the outer surface of the filling plug 47. The distance of the groove 55 from the bottom end of the filling plug 47 is equal to the distance of the inner end 49 of outlet 48 from the shoulder formed between the axial bore portions of the spray head 45 which are of different diameter, as indicated in Fig. 8. In order to charge the container, pressure is applied downwardly against the plug 47 to detach the latter at the weakened places 52 from the spray head 45 and to press the filling plug 47 into the bore 46 until the filling plug 47 has the position indicated in Fig. 2, and in this position it will be noted that the outlet 48, 49 of the spray head is closed by the filling plug 47. At this time, a liquid and gas or a mixture of liquid and gas may be introduced into the container through the annular groove 55, the bore 54, the bore 53, and then downwardly along bore 46 and passage 44 through the valve means into the container. After the container is filled, the filling plug 47 is moved downwardly in the bore 46 to the position shown in Fig. 3, and this is the final position of the filling plug 47. It will be noted that in this position the annular groove 55 is located in the same plane as the inner end 49 of the lateral element 48 of the spray head 45, so that the fluid rising upwardly through the axial bore 44 of the valve member 36, when the latter is in its open position, can move upwardly through the bore 53 and out through the lateral bore 54, the groove 55, and the outlet 48.

Figure 4 shows a structure identical with that of Fig. 1 except that a skirt portion is not provided on the spray head 45. In the position of the parts shown in Fig. 4, the filling plug 47 is located at the top end of the bore 46 and is ready to be broken away at the weakened portion 52 of its joint with the spray head 45 when the plug 47 is moved downwardly into the bore 46. The filling structure includes an elastic element 56 which is shown in Fig. 5. This elastic element 56 is placed about and pressed against the spray head 45 so that the elastic member 56 is deformed and conforms to the outer configuration of the spray head and closes the outlet 48 thereof. It will be noted that the elastic element 56 provides in its interior a chamber 57 which surrounds the filling plug 47 and which does not communicate with the outer atmosphere due to the pressure of the elastic member 56 against the top face of the spray head 45. The filling structure furthermore includes a ram 58 which is formed with an axial bore 59 and with lateral bores 60 communicating with bore 59 and located adjacent the bottom end of the filling ram 58. This filling ram 58 is movable downwardly through the elastic member 56 and is aligned with the filling plug 47, so that when the ram 58 is moved downwardly into engagement with the plug 47, the latter can be detached from the spray head 45 and shifted downwardly to the position shown in Fig. 5, this position corresponding to that shown in Fig. 2. In this position of the parts a liquid and gas

or a mixture of liquid and gas may be introduced through the bore 59 to flow out through the opening 60 into the chamber 57 and from the latter through the annular groove 55 and bore 54 down through the bore 53 and bore 56 into the passage 44 of the valve 36 and so on into the container. After the filling operation is completed, the ram 58 is moved downwardly so as to shift the plug 47 to its final position indicated in Fig. 6 as well as in Fig. 3, and then the dispenser and filling structure are separated from each other and the device is ready for use. It will be noted from Fig. 6 that during the filling of the container 31, the downward pressure applied to the spray head by the elastic member 56 causes the valve to be in the open position indicated in Fig. 6.

Figs. 7 and 9 show another embodiment of a valve structure and spray head arrangement according to the present invention. As may be seen from Fig. 7, the spray head 45 therein includes a skirt portion connected to the remainder of the spray head by a frustoconical hollow portion 50, and the bottom edge 51 of the skirt portion engages the container to limit the downward movement of the valve member 36. This valve member 36 of Fig. 7 extends above the inner end 49 of the lateral outlet 48 of the spray head 45. In this case the axial bore 67 of the valve member 36, which is otherwise identical with the above described valve member 36, communicates with a lateral bore 66 which in turn communicates with an outer annular groove 65 of the valve member 36, and this groove 65 is located at the plane of the inner end 49 of the lateral outlet 48, so that in this way the latter communicates through groove 65 and lateral bore 66 with the axial bore 67 of the valve member 36.

The spray head 45 is formed with an axial bore which receives the upper end of the valve member 36 and which extends upwardly beyond the same to provide the chamber 73, this chamber 73 having at its bottom end a downwardly directed surface which engages the top end of the valve member 36 at 72, as shown in Figs. 7 and 8. The upper end of the axial bore of the spray head 45 is enlarged and a plurality of fins 69 are located in the upper portion of the bore of the spray head 45, these fins 69 being formed integrally with the spray head and extending radially toward the axis thereof, the fins 69 being distributed about this axis and defining between themselves passages 68 which communicate with the chamber 73 and through the latter with the axial bore 67 of the valve member 36. The inner ends 71 of the fins 69 are joined to a plug 70 which may have any desired configuration, the plug 70 being elliptical in the example shown. However, this plug may, for example, be spherical. At the joint 71 between the plug 70 and the fins 69, the material of the spray head 45 is weakened as by being formed with suitable notches, grooves, or the like, so that the plug 70 is easily detachable from the spray head 45. With this structure the container is filled in the manner described above while the parts have the position shown in Fig. 7. In other words with this arrangement, the elastic member 56 shown in Fig. 5 will surround the upper part of the spray head so as to close the outlet 48, but the ram 58 whose interior communicates with the passages 68 is not lowered to an extent sufficient to break the plug 70 from the fins 69 during the filling of the container. After the container is filled, the ram 58 is lowered so as to detach the plug 70 from the fins 69, and the ram 58 is actuated to lower the plug 70 until it has the position shown in Fig. 8. The outer diameter of the plug 70 is great enough to cause it to be inserted with a press fit into the upper end of the bore 67 so that the upper end of this bore is closed in a fluid-tight manner by the plug 70, and in this way, after the container is filled, the fluid can escape therefrom only through the outlet 48 after the valve 36 is opened. Thus, the spray head has the structure shown in Fig. 8 after the container is filled.

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While the invention has been illustrated and described as embodied in fluid dispensers, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

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

1. For use with a fluid dispenser comprising a fluid container and a dispenser valve: a spray head mounted on the valve, said spray head having an axial bore communicating with the valve and a lateral spray outlet communicating with the axial bore, and a two position filling plug for a fluid inlet communicating with the valve and detachably connected to and extending above the spray head at the end of the axial bore in a first position to permit fluid flow into the end of the axial bore, and displaceable in said axial bore upon detachment from the spray head to be contained in a second position within the spray head for preventing fluid flow into the upper end of the axial bore of the valve.

2. For use with a fluid dispenser comprising a fluid container and a dispenser valve: a spray head mounted on the valve, said spray head having an axial bore communicating with the valve and a lateral spray outlet communicating with the axial bore, and a two-position hollow plug having substantially the same outer diameter as the diameter of the axial bore, said hollow plug being detachably connected to and extending above the spray head at the upper end of the axial bore and having a lateral fluid inlet opening and an annular groove in communication therewith, whereby the container may be filled with fluid in a first position of the plug through said inlet opening, axial bore and valve, and the hollow plug being displaceable in a second position upon detachment from the spray head so as to be contained within the upper end of the spray head and the annular groove in the plug communicates with the lateral spray outlet.

3. For use in a dispenser for dispensing a spray of fluid, a spray head formed with an axial bore which is open at the top and with a lateral outlet communicating with said axial bore; and a filling plug detachably carried by said spray head at an upper portion of the bore thereof for filling a container carrying said spray head, said filling plug being formed with passages extending from the exterior of said filling plug into said bore of said spray head and said filling plug being slidable, after detachment from said spray head, downwardly along the interior of said bore thereof to a position where said passages of said filling plug communicate with said lateral outlet of said spray head and with said bore thereof, so that fluid can flow through said spray head along a path which is partly formed by the passages of said filling plug.

4. For use in a dispenser for dispensing a spray of fluid, in combination, a spray head formed with an axial bore having an upper portion open at the top and of a larger diameter than a lower portion of said bore to provide an upwardly directed annular shoulder in said axial bore directed upwardly toward the open top thereof, and said spray head being formed with a lateral outlet communicating with said upper bore portion adjacent the top thereof; and a filling plug located, when a container carrying the spray head is to be filled, at said open top of said spray head bore, said filling plug being formed with an axial bore extending upwardly from the bottom end thereof, with an outer annular groove located intermedi-

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ate the ends of said filling plug, and with a lateral bore providing communication between said groove and said bore extending axially from the bottom of said filling plug, the latter being slidable in said axial bore of said spray head up to the shoulder of said latter bore, and said annular groove and lateral bore of said filling plug being spaced from the lower end thereof by the same distance that said lateral outlet of said spray head is spaced from said shoulder, so that when said filling plug engages said shoulder said lateral outlet of said spray head communicates with said annular groove and with the bore of said filling plug, said latter bore communicating with the lower bore portion of said spray head.

5. For use in a dispenser for dispensing a spray of fluid, in combination, a spray head formed with an axial bore having an upper portion open at the top and of a larger diameter than a lower portion of said bore to provide an upwardly directed annular shoulder in said axial bore directed upwardly toward the open top thereof, and said spray head being formed with a lateral outlet communicating with said upper bore portion adjacent the top thereof; and a filling plug located, when a container carrying the spray head is to be filled, at said open top of said spray head bore, said filling plug being formed with an axial bore extending upwardly from the bottom end thereof, with an outer annular groove located intermediate the ends of said filling plug, and with a lateral bore providing communication between said groove and said bore extending axially from the bottom of said filling plug, the latter being slidable in said axial bore of said spray head up to the shoulder of said latter bore, and said annular groove and lateral bore of said filling plug being spaced from the lower end thereof by the same distance that said lateral outlet of said spray head is spaced from said shoulder so that when said filling plug engages said shoulder said lateral outlet of said spray head communicates with said annular groove and with the bore of said filling plug, said latter bore communicating with the lower bore portion of said spray head, said spray head having an outer annular skirt portion extending downwardly from the remainder of the spray head and having a bottom periphery located at the lowest part of the spray head, so that when the spray head is connected to a device for admitting fluid to the spray head during downward movement of the latter, the lower periphery of said skirt portion can engage a fluid container to limit movement of the spray head and structure connected thereto for movement therewith.

6. For use in a dispenser for dispensing a spray of fluid, in combination, a spray head formed with an axial bore and with a lateral outlet communicating with said axial bore, the latter having an upper open end and said spray head having a plurality of fins directed radially toward the axis of said spray head at the upper portion of said axial bore thereof; and a plug detachably carried by the inner extremities of said fins, so that a fluid may be filled into a container carrying said spray head through the spaces of said fins and then said plug may be detached from said fins and moved downwardly into said axial bore for closing the latter at an elevation higher than said lateral outlet thereof.

7. For use with a fluid dispenser comprising a fluid container and a dispenser valve: a spray head mounted on the valve, said spray head having an axial bore communicating with the valve, a lateral spray outlet communicating with the axial bore and an annular fluid inlet opening at the outer end of the axial bore in communication with the valve, a plurality of radial fins in the fluid inlet opening and a two-position plug detachably held at the inner ends of the fins in a first position to permit fluid flow through said fluid inlet into the outer end of the axial bore, said plug being displaceable in said axial bore end upon detachment from the fin ends in a second position of the plug to be contained within

the spray head for preventing fluid flow through the fluid inlet.

**References Cited in the file of this patent**

**UNITED STATES PATENTS**

|           |        |                |    |
|-----------|--------|----------------|----|
| 2,612,293 | Michel | Sept. 30, 1952 |    |
| 2,613,023 | Reich  | Oct. 7, 1952   |    |
| 2,625,303 | Mays   | Jan. 13, 1953  |    |
| 2,641,399 | McBean | June 9, 1953   | 10 |

5

|           |
|-----------|
| 2,671,590 |
| 2,686,652 |
| 2,708,347 |
| 2,715,481 |
| 2,744,665 |
| 2,753,214 |
| 2,761,593 |
| 2,773,722 |
| 2,802,490 |
| 2,828,892 |

|                |               |
|----------------|---------------|
| McBean         | Mar. 9, 1954  |
| Carlson et al. | Aug. 17, 1954 |
| Cameron        | May 17, 1955  |
| McGhie         | Aug. 16, 1955 |
| Carlson        | May 8, 1956   |
| Abplanalp      | July 3, 1956  |
| Spiess et al.  | Sept. 4, 1956 |
| Abplanalp      | Dec. 11, 1956 |
| Ward           | Aug. 13, 1957 |
| Ward           | Apr. 1, 1958  |