FOUR PART, TWO FLUID DISPENSER

Inventor: Leonard L. Marraffino, 1824 R.W. 36 Court, Oakland Park, Fla. 33308

Filed: Oct. 12, 1970

Appl. No.: 79,805

U.S. Cl. 222/94, 222/402.1, 223/37, 222/402.24

Int. Cl. B65d 35/22

Field of Search 229/337, 22/94, 136, 193, 222/402.1, 402.24, 518

References Cited

UNITED STATES PATENTS

3,469,744 9/1969 Corsette 222/402.24 X

ABSTRACT

A four part non-metallic fluid mixing and dispensing device is provided for an aerosol can which dispenses two fluids, one of the fluids being destructive of metal. Fine ducts are provided in unique positions whereby manufacturing costs are reduced, and reliability in use and long shelf life are ensured. The location of the ducts in the combination of the four parts accomplishes these desired results.

5 Claims, 4 Drawing Figures
FOUR PART, TWO FLUID DISPENSER

The two fluid aerosol can is provided with a fluid mixing and dispensing device having four basic parts which can be easily manufactured and assembled without sacrifice of structural integrity or long shelf life. It is known that fluids, such as hair dye solutions and the like, are preferably mixed at the time of use. Metal cannot be exposed to certain of such fluids due to the corrosive effects. It is further known that such fluids can be contained within a collapsible bag or cylinder or the like within an aerosol can, such internal container being of a material unaffected by such fluids. The dispensing and mixing of such fluids must take place just prior to use and without contacting metal.

Four basic parts of a material unaffected by metal are provided to accomplish this end, these being a base which is fixed to and sealed to the metal can cap, a nozzle slidably mounted in the cap, a washer, and a valve which is actuated by the nozzle to open fluid outlets in the base. The fluids pass through the base, past the opened valve, and into the nozzle where they are mixed and ultimately dispensed. The four parts coact to allow fluid flow and to prevent such fluid from contacting the metal cap.

The nozzle is removable from the metal cap to enable cleaning thereof as well as cleaning of the valve and base. This eliminates the accumulation of dried or crystallized residue after extended use.

The valve can be viewed as having a form of a pulley; it has a central tubular portion and end flanges. The problem of moulding or drilling the very fine diameter ducts for the two fluids is recognized as one of the major drawbacks in the desired reduction of the number of parts, since these ducts must be accurately and precisely located and formed.

This invention provides a structure whereby two ducts are produced in a single part, the base, through a single manufacturing step, such as drilling and the like. A duct is formed for a primary fluid in the can and an aligned duct is produced for a secondary fluid in a non-metallic compartment in the can.

Other features and advantages of the invention will appear during the course of the following description.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a central vertical section through a pressurized dispenser;
FIG. 2 is an enlarged view of the fluid and mixing device of FIG. 1 in dispensing condition;
FIG. 3 is a view taken on line 3, 3 of FIG. 1, and
FIG. 4 is a view taken on line 4, 4 of FIG. 1 showing the nozzle prong and the valve.

DESCRIPTION OF THE PREFERRED EMBODIMENT

For brevity, a vertical position of the aerosol can will be used in the description; other positions and terms are hereby identified as equivalents.

FIGS. 1 and 2 show the aerosol can 14 and its annular cup like metal cap 15 which houses the valve mechanism 16. The top cap 15 has a longitudinally extending conduit 17 which is rolled inwardly at 18 into fixed holding and sealing engagement with an annular outer groove 19 of the base 20. The annular portion 21 extending upwardly from this rolled portion 18 is in sealing face-to-face engagement with the outer vertical upper annular wall 22 of the base 20. Following this, a transversely inwardly extending annular ledge 23 is provided for coacting with the top annular wall 24 of the base 20 to peripherally and sealingly sandwich the washer 11 therebetween. The conduit 17 then extends upwardly a predetermined distance coordinated with the desired reciprocating movement of the nozzle 26. The conduit 17 then is reduced in diameter again to provide means in the form of an annular lip 27 for engagement with an annular stop 28 on the nozzle 26 to limit upward movement of the nozzle.

The four basic parts are viewed as an important concept in that practical prior designs have involved more parts. These four basic parts are the base 20, the nozzle 26, the valve 25 and the washer 11. The base 20 includes a bottom portion 29 (FIG. 2) having a threaded opening 30 for receiving the non-metallic collapsible bottle 31 or the like and a hole 12 in its side wall for receiving a dip tube 60. A fine diameter outer duct 61 extends substantially transversely inwardly through the depending annular wall of the bottom portion 29. The aligned extension duct 63 of this outer duct 61 is formed during the same drilling operation in the depending longitudinal central pillar 62 and terminates near the top transverse wall of the annular socket 40 in the bottom portion 29. As shown, this duct has been formed at about a 30° angle, as this facilitates the utilization of dip tube 60. Other angles and a horizontal location of this duct will satisfy. Further, the extension inner duct 63 in the pillar 62 need not extend through the pillar. Manufacturing procedures, however, indicate the shown location of this duct system to facilitate quality control. The fine diameter center pillar duct 64 extends upwardly through the central pillar 62 and terminates at the substantially transverse inner duct 63.

The base portion bottom 29 is in effect a ring which seats up against the bottom of the cap 15 in face-to-face sealing engagement therewith. The central pillar 62 and the depending annular wall of bottom portion 29 define annular socket 40.

The socket 40 has a transverse wall 70 with a slot 71 for receipt of the depending prong 72 of the nozzle 26.

The nozzle 26 also includes a top spout 47, a venturi neck 46 and a mixing chamber 73. The transverse outwardly extending annular stop 28 on the nozzle 26 engages the conduit annular lip 27 to limit upward movement caused by the biasing force delivered by the valve 25.

Preferably valve 25 is of predetermined compliance and construction such that on assembly it has residual upward bias to maintain the nozzle 26 in the upper closed position of FIG. 1.

Valve 26 is held in the socket 40 by the ball 31 which is screwed into the base 20, the bottom annular sealing ring 80 of the valve 26 being clamped between the bottle 31 and the base 20.

The valve 26 includes a longitudinal tubular portion 81 mounted on and sealingly surrounding the pillar 62. Annular flexing flange 82 extends transversely at the upper end of the tubular portion 81 and is seated at the transverse wall 70 where it seals the slot 71 and inner duct 63.

The nozzle prong 72 upon downward movement distorts the flexing flange 82, as shown in FIG. 2, allowing primary fluid in can 14 to pass through outer duct 61, into socket 40, through slot 71, and into nozzle 26. The primary pressurized fluid in the can 14 compresses bottle or bag 31 causing the secondary fluid therein to flow through center pillar duct 64, inner duct 63, slot 71, and into nozzle 26 for mixing and dispensing with the primary fluid.

Preferably, the slot 71 is semi-circular as shown in FIG. 4 and the prong 72 is in the form of two spaced fingers, one in each quadrant of slot 71, to form a central passage 90.

Washer 11 seals the mixing chamber for the two fluids from the can and also serves as a bearing for the nozzle 26. The upper annular wall 22 of the base 20 also may serve as a bearing for nozzle 26.

The nozzle 26 is snapped into place past lip 27. It can be easily removed by the user to enable washing. The mixing chamber can then be easily washed to clean the washer, base and valve. This feature is particularly important in the elimination of residues which can produce clogging and reduction in usability of the product.

I claim:
1. An aerosol can for dispensing two fluids comprising:
   a metal container having a pressurized outer chamber and a collapsible non-metallic inner compartment and a top metallic cap having a longitudinally extending conduit;
   and
   a fluid mixing and dispensing device having four basic parts of a material which is unaffected by a fluid or fluids dispersed including:
   a base fixedly and sealingly mounted at the bottom of the conduit and,
a nozzle slidably mounted for longitudinal reciprocation at
the top of the conduit and having a top spout, a bottom
mixing chamber, and a depending prong,
a valve, and
a washer;
said base having a bottom portion with a depending annular
wall and a depending longitudinal central pillar which
define an annular socket, a longitudinal pillar duct ex-
tending from the bottom and through the pillar to a sub-
stantially transverse inner duct near the top transverse
wall of the annular socket, and depending annular wall
having a substantially transverse outer duct extending therethrough for providing open fluid communication
between the outer chamber and the socket, said inner
duct and said outer duct being aligned, an upper annular
wall fixedly and sealingly mounted in the lower portion of
said conduit and providing a bearing for the lower portion
of said nozzle, said transverse wall of the socket having a
slot through which said prong depends, said base having
an annular top wall;
said valve including a longitudinal tubular portion mounted
on and sealingly surrounding said pillar and seated in said
socket, an annular flexing flange extending transversely at
the upper end of the tubular portion and seated at said
transverse wall and sealing said slot and said inner duct,
an annular sealing rim at the lower end of the tubular por-
tion in sealing engagement with the collapsible non-
metallic inner compartment;
said prong upon downward movement distorting said valve
and its flexing flange to move said valve away from said
slot and said inner duct to release the two fluids for flow
through the nozzle mixing chamber to the spout; and,
said washer being sandwiched in fixed sealing position
between said ledge and said annular top wall of the base.

2. An aerosol can as defined in claim 1 and wherein the
aligned outer duct and inner duct are at about a 30° angle with
a horizontal plane and the inner duct passes entirely through
the central pillar with its upper end being opened by said
prong moving said flexing flange away therefrom.

3. An aerosol can as defined in claim 1 and wherein said slot
in said transverse wall of said base is semi-circular and said
prong includes spaced fingers, one in each quadrant, to form a
passage for fluid flow from the outer chamber and the inner
chamber into the nozzle mixing chamber.

4. An aerosol can as defined in claim 1 and wherein said an-
nular sealing rim of the valve is sandwiched between said an-
nular sealing rim of the base and the top of said inner compart-
ment.

5. An aerosol can as defined in claim 1 and wherein the top
of said inner compartment is threadedly received in the base
tubular portion.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,653,547 Dated April 4, 1972
Inventor(1) Leonard L. Marraffino

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

Column 1, Line 27: before the word form, "a" should be --the--

Claim 1, Column 3, Line 11: before the word depending, "and" should be --said--

Signed and sealed this 25th day of July 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. ROBERT GOTTSCALK
Attesting Officer Commissioner of Patents