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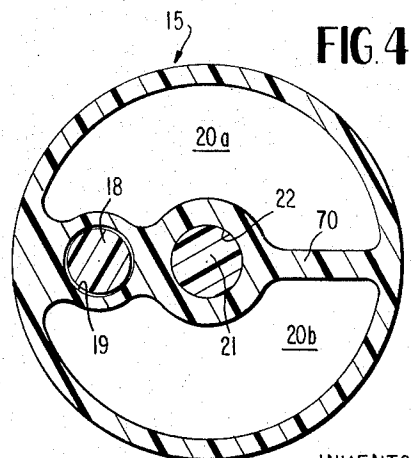
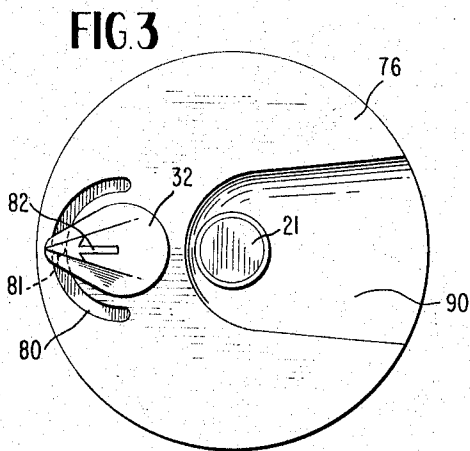
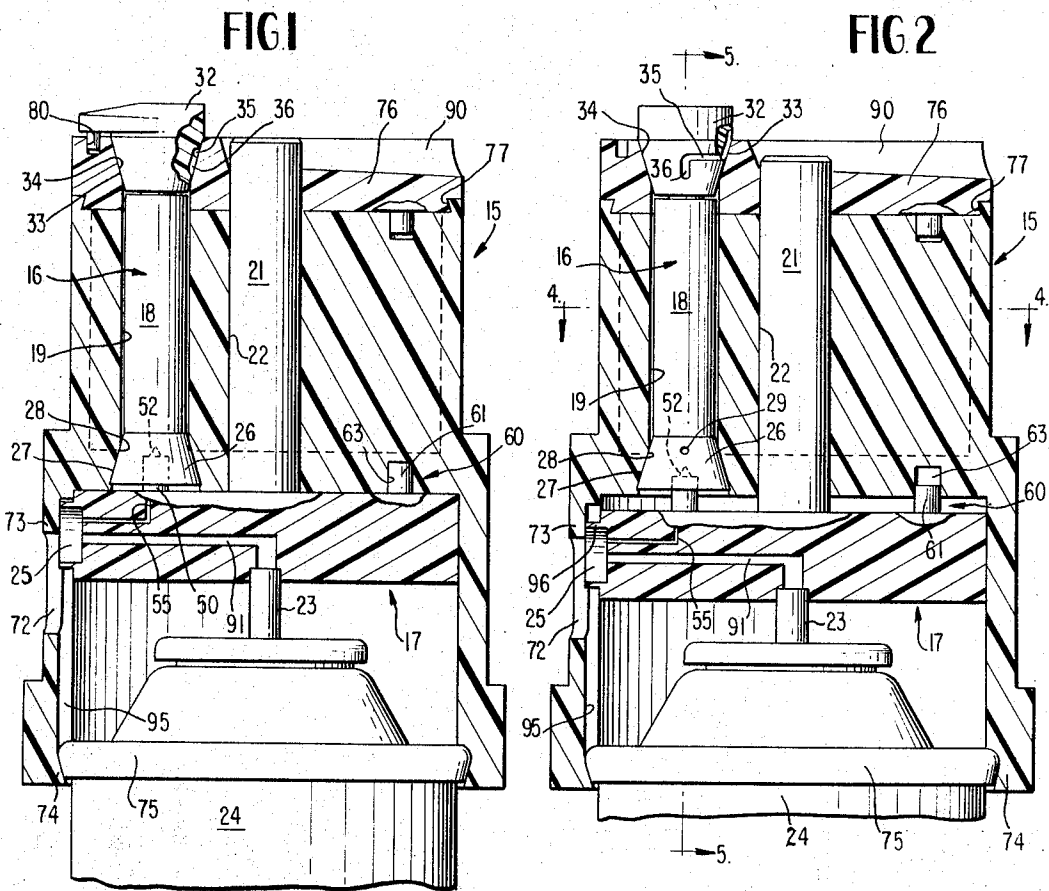
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SPRAY HEAD WITH ROTATABLE SELECTOR

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2 Sheets-Sheet 1



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3,298,611

SPRAY HEAD WITH ROTATABLE SELECTOR

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6 Claims. (Cl. 239-305)

This invention relates to a multi-compartmented spray head for use with an aerosol bomb for accomplishing a mixing of two fluids such as air freshener fluids, hair tinting and/or treating fluids and the like.

More specifically, this invention relates to an improved combination of compartment selector means and a valving system whereby minute quantities of additive fluid may be effectively combined with a propellant fluid from a propellant container of the aerosol bomb type.

This invention is specifically directed toward the provision of a mixing head which can be sold with an aerosol bomb and disposed of after use. It will therefore be understood that this invention is particularly directed to the provision of an economically designed combination of elements which will meet the above requirement without significantly adding to the cost of the basic aerosol bomb, this being accomplished without sacrificing the required fluid tight and structural integrity of the combination. In handling fluids such as hair tinting fluids and their catalysts, minute streams of the additive fluid must be provided for entrainment and mixing with the propellant fluid. The provision of the minute passageways and seals for these passageways has presented a very difficult problem, particularly when approached with the requirement of producing a one-use throw-away mixing head.

This invention provides a multi-compartmented housing having separate passageways or duct means terminating at orifices in a cell in which is rotatably mounted a selector means having a single inlet port which selectively conducts additive fluid to a valved opening for ultimate flow through a valve means to discharge port means where the additive fluid stream is entrained with and mixed with the propellant fluid. Simple rotative adjustment of the selector means positioned adjacent the outer wall of the housing aligns the desired compartment in discharge position. Vertical movement of the valve means actuates the discharge valve of the propellant container and simultaneously opens a passageway for the additive fluid. The selector means can be positioned to seal all of the compartments and is provided with means for establishing and maintaining the required sound sealing engagement. The venting system is somewhat similarly controlled by the selector means so that when the compartments are in sealed condition their venting system as well as their discharge system are completely sealed.

These and further objects and advantages of the present invention will become more apparent upon reference to the following specification, appended claims and drawings wherein:

FIG. 1 is a side central cross section of the invention in up-seal position with the selector means in neutral position;

FIG. 2 is a view similar to FIG. 1 with the valve means in down-discharge position and the selector means rotated 90 degrees;

FIG. 3 is a top view with the selector means in neutral position;

FIG. 4 is a cross sectional view taken on line 4-4 of FIG. 2;

FIG. 5 is a cross sectional view taken on line 5-5 of FIG. 2 with the selector means and valve means being shown in full lines;

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FIG. 6 is an enlarged view in section of the top of the selector means as positioned in FIG. 5; and

FIG. 7 is an enlarged view in section of the bottom of the selector means and valve means as positioned in FIG. 5.

Referring now to the drawings, it will be seen that in the preferred embodiment the mixing head consists of a cylindrical housing 15, a selector means 16 and a valve means 17.

The selector means 16 has a shaft 18 rotatably mounted in a selector bearing 19 in the housing 15 for selective alignment with one of the compartments 20a or 20b. The valve means 17 has an actuating rod 21 slidably mounted in a valve bearing 22 in the housing 15 to enable movement downwardly against the valve 23 of the propellant container 24 to release propellant fluid, this downward movement also opening the flow path for additive fluid from the selector means 16 to the discharge port means 25 formed in the valve means 17. It will be understood, therefore, that simple rotative adjustment of the selector means 16 followed by downward movement of the valve means 17 will cause gravity flow of additive fluid from a selected compartment into entrainment with the propellant fluid.

The selector means 16 is mounted in a vertical position adjacent the outer wall of the housing, thereby reducing the length of the minute passageways for the additive fluid. Two compartments 20a and 20b are shown in the housing 15 and it will be understood that a larger number of compartments may be provided. The effective sealing accomplished by the selector means is made possible by the plug 26 at its lower end which has an upright frustro-conical face 27 seated in the cell 28, this plug 26 having an inlet port 29 at its face 27 (FIG. 7). The outlet orifices 30 and 31 for the compartments 20a and 20b respectively are aligned with the circle of revolution defined by rotation of the inlet port 29.

At the top of the shaft 18, there is telescopically mounted a button 32 which serves two purposes, namely, identifying the compartment in discharge position and providing venting for the selected compartment. For clarity purposes of the drawing the arrow 32 points away from the selected compartment; however, when transparent material is used for the housing, it is preferred that the arrow be reversed to point to the selected compartment. The venting function is accomplished by means of the inverted frustro-conical rim 33 (FIG. 6) which seats in the housing seat 34 and has a tortuous vent passage 35 (FIG. 2) to the atmosphere from its vent inlet 36 whose circle of revolution intercepts the housing vent ducts 37 and 38, each compartment having its own vent duct. The tortuous vent passage 35 in the embodiment shown involves a horizontal groove in the rim for about a 90 degree portion of the rim followed by an upward groove to the atmosphere. This vent passage 35 frictionally impedes additive fluid flow when the spray head is inadvertently tipped.

The means for establishing a tight vent and fluid seal includes the telescoping arrangement of the parts of the selector means 16 and the adjustment means 40 in the form of a screw in the button 32 which threads into a hole 41 in the top of the shaft 18. By adjustment of this screw the plug 26 and rim 33 are drawn into tight engagement with the cell 28 and housing seat 34 respectively. As seen in FIG. 7, the plug 26 is provided with a central vertical cylinder 42 and annular groove 43 between the cylinder 42 and the face 27. This undercut or groove 43 facilitates flexing of the skirt 44 of the plug during assembly as it is moved over the inwardly projecting annular bead 45 at the lower edge of the cell 28, thereby providing a snap fit and dimensional control for precise orientation of the outlet orifice 30 or 31 of the hous-

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ing with the inlet port 29 and the first additive duct 46 of the plug 26, it being noted that this duct 46 extends downwardly to the upper end of the cylinder 42 (FIG. 7).

The valve means 17 has a piston 50 housed within the cylinder 42, the head 51 sealing the first additive duct 46 when in up-seal position by means of the cone 52 which enters the duct 46. If desired, O-ring 53 may be added for engagement by the annular gutter or sump 54 formed in the piston head 51 around the cone 52 for collecting additive fluid flowing over the cone and directing it into the second additive duct 55 formed in the valve means. Preferably, the piston 50 is formed with a flared top annular edge 56 which tightly engages the cylinder 42 for sealing purposes with a minimum of friction. To maintain accurate alignment of the piston in its cylinder and to eliminate any twisting forces thereon, guide means 60 (FIG. 2) are provided in the form of a pin 61 extending upwardly from the valve bar 62 into a guide hole 63 formed in the horizontal wall of the housing 15.

The housing 15 is cylindrical in shape and has wall means 70 which define the additive fluid compartments 20a and 20b, the cell 28 being formed in the bottom wall 71 thereof and a lower spray aperture 72 being formed in the sidewall 73. Suitable means for rigidly attaching the housing to a container is shown in the form of the annular wedge rim 74 which interlocks with the rim 75 of the container 24. The housing 15 includes a cover 76 having a lower rim 77 which interlocks with the sidewall of the housing, this cover carrying the vent ducts 37 and 38 for the compartments and providing the housing seat 34 for the button 32.

As seen in FIG. 3, a substantially semicircular slot 80 is provided adjacent the selector seat 34 in which rides a narrow lug 81 and $\frac{1}{8}$ inch wide depending from the button, this lug traveling between the ends of the slot to align a selected compartment in discharge position.

In use, the selector means 16 is adjusted to the desired compartment and the user places his finger in the hollow 90 in the cover 76 and presses the top of the actuating rod 21 to open the discharge valve 23 of the aerosol bomb and allow propellant fluid to pass through the propellant duct 91 to the discharge port means 25 and through the spray aperture 72. Simultaneously, air is admitted through vent passage 35 to the vent inlet 36 and into the aligned vent duct 38 (FIG. 6) to replace additive fluid passing through the outlet orifice 31, inlet port 29, first additive duct 46, and second additive duct 55 to the discharge port means 25 for entrainment and mixing with the propellant fluid. It will be noted that the discharge port means 25 in the embodiment shown comprises juxtaposed terminal openings of the propellant duct 91 and the second additive duct 55 (FIG. 5).

An internal vertical groove 95 is provided in the housing 15 from the spray aperture 72 to the lower portion thereof to enable assembly of the valve means 17 which is preferably equipped with a discharge port means collar 96. This collar 96 collects any fluid which might drip from the discharge port means after use.

While the invention has been described with reference to a certain embodiment, the embodiment is to be considered illustrative rather than limiting, and it is intended to cover all further embodiments that fall within the spirit and scope of the appended claims.

We claim:

1. A multi-compartmented spray head for use with an aerosol bomb containing a propellant comprising a housing having compartments for additive fluid and duct means from each compartment to separate outlet orifices in a cell in the bottom portion of said housing, a selector means rotatably mounted in said cell and having an inlet port in its outer surface, the orifices in said cell being aligned with the circle of revolution defined by rotation of said inlet port, said inlet port being connected by a first additive duct to the bottom of said selector means, valve means mounted in said housing for vertical move-

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ment only between an up-seal position with the first additive duct at the bottom of the selector means and a down-discharge position and having means for opening the aerosol bomb when in the down-discharge position and a propellant duct from said bomb to a discharge port means, said valve means having a second additive duct connecting said first additive duct to said discharge port means when in down-discharge position.

2. A spray head for containing a plurality of additive fluids and adapted for use with a container of propellant fluid of the aerosol bomb type having a discharge valve biased to a closed position, said spray head including a housing having wall means defining a plurality of discrete additive fluid compartments and having attaching means for rigid attachment to said container, said wall means including a bottom wall having a cell with an upright frusto-conical surface and duct means extending from the lower portion of each compartment, each duct means terminating at an outlet orifice at said surface, selector means having a plug with an upright frusto-conical face rotatably seated in said cell and having an inlet port at said face, the outlet orifices of said compartments being aligned with the circle of revolution defined by rotation of said inlet port, said plug having a vertical central cylinder in its lower end with a first additive duct extending from the upper end of the cylinder to said inlet port, valve means mounted for vertical movement only in said housing between an up-seal position and a down-discharge position and including a piston housed within said cylinder, said piston having a head which seals said first additive duct when in up-seal position, said valve means including a bottom socket for snugly receiving the container discharge valve and having a discharge port means with a second additive duct connecting the piston head therewith and a propellant duct connecting said socket therewith, and vent means providing a venting flow path to the selected compartment when in said discharge position.

3. A spray head for containing a plurality of additive fluids and adapted for use with a container of propellant fluid of the aerosol bomb type having a discharge valve biased to a closed position, said spray head including a cylindrical housing having wall means defining a plurality of discrete additive fluid compartments, a lower spray aperture, and a bottom attaching means for rigid attachment to said container, said wall means including a substantially horizontal wall having a cell with an upright frusto-conical surface and duct means extending from the lower portion of each compartment, each duct means terminating at an outlet orifice at said surface, said wall means having a vertical central valve bearing and a vertical selector bearing, the top end of said selector bearing being in the form of an inverted frusto-conical selector seat and having vent ducts extending from said seat to each compartment, selector means having a shaft rotatably mounted in said selector bearing and having a plug with an upright frusto-conical face seated in said cell and having an inlet port at said face, the outlet orifices of said compartments being aligned with the circle of revolution defined by rotation of said inlet port, said plug having a vertical cylinder in its lower end with a first additive duct extending from the upper end of the cylinder to said inlet port, a button having an inverted frusto-conical rim seated in the housing seat and having a tortuous vent passage to the atmosphere from a vent inlet whose circle of revolution intercepts the housing vent ducts for the compartments, and means for establishing sound sealing engagements by said plug and said rim, valve means mounted in said housing for vertical movement only between an up-seal position and a down-discharge position including an actuating rod slidably positioned in said valve bearing and a piston housed within said cylinder, said piston having a head which seals said first additive duct when in up-seal position, said valve means including a bottom socket for snugly receiving the container discharge valve and having a discharge port means aligned

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with the housing spray aperture with a second additive duct connecting the piston head therewith and a propellant duct connecting said socket therewith.

4. A spray head as defined in claim 3 and wherein the button of the selector means is telescopically connected to said shaft to enable adjustment of the sealing engagements of said plug and rim.

5. A spray head as defined in claim 3 and wherein an annular groove is provided between the cylinder and the face of the plug to facilitate flexing of said plug and where-

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in the lower edge of said cell has a bead for distorting said plug on assembly to provide a snap fit.

6. A spray head as defined in claim 3 and wherein said housing includes a top having a substantially semicircular slot adjacent the selector seat and said button has a lug slidable between the ends of said slot selectively to align a selected compartment for discharge of additive fluid.

No references cited.

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