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AEROSOL CONTAINER

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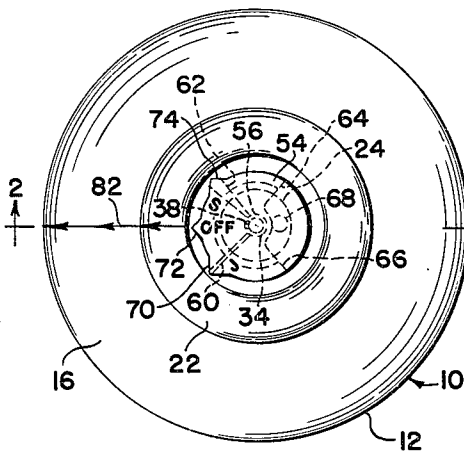


FIG. 1

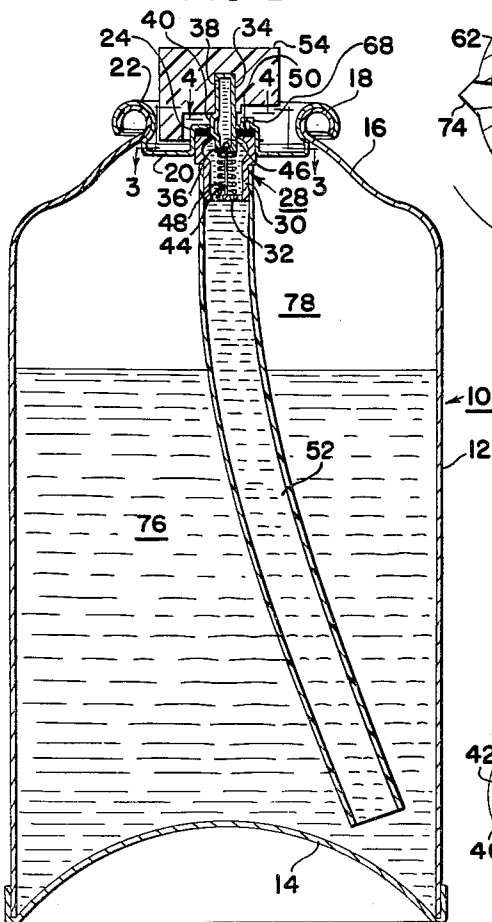


FIG. 2

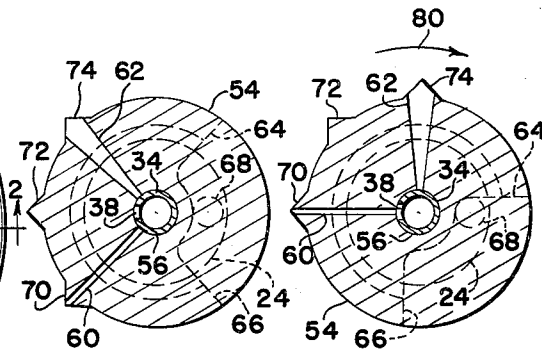


FIG. 5

FIG. 6

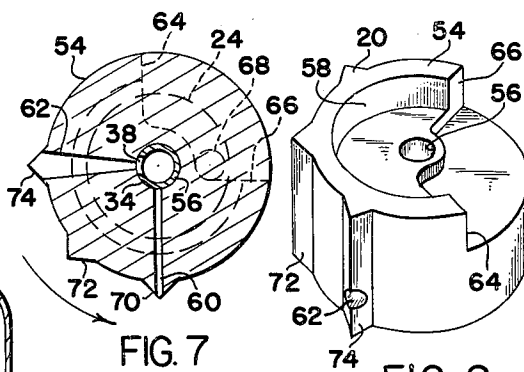


FIG. 7

FIG. 8

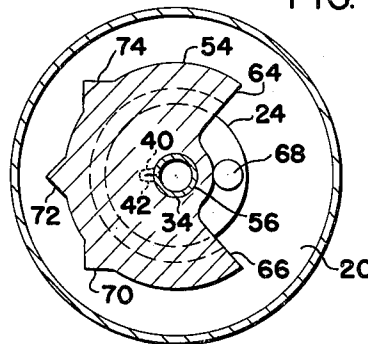


FIG. 3

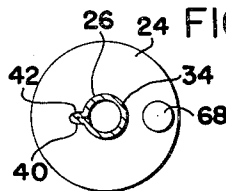


FIG. 4

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AEROSOL CONTAINER

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8 Claims. (Cl. 239—337)

This invention relates to the construction of an aerosol container, and more particularly to an aerosol container which can provide the material contained therein in the form of either a jet or a fine spray or mist.

In recent years the term aerosol has acquired to the public in general the meaning of a method of packaging in which gas under pressure, or a liquified gas which has a pressure greater than atmospheric at ordinary temperatures, is used to spray a liquid. The result of the spraying process is to produce a mist of small liquid droplets in air. Among the many products now being packaged in aerosol containers are insecticides, plant sprays, insect repellents, pet sprays, mothproofers, weed killers, room deodorants, surface coatings, shaving lathers, shampoos, hand creams, air sprays, antiperspirants, suntan products, window cleaners, spot removers, water repellents, anti-foaming agents, mold release agents, lubricants, rust preventatives, drugs, and pharmaceuticals.

Some of these products, such as hair sprays and suntan lotions, are used mainly in the form of fine sprays or mists, whereas some other of these products, such as shaving lathers and toothpastes are used mainly in the form of a jet. There are many of these products, such as insecticides, plant sprays, window cleaners, and lubricants, where it is desirable on some occasions to use them in the form of a fine spray or mist and on other occasions to use them in the form of a jet. For example, if the object to be sprayed is close by and easily accessible a fine spray or mist may be satisfactory, whereas if the object is at a distance, such as the top of a tree or an inaccessible portion of a machine, a strong jet would be required. However, the aerosol containers previously available provide the material contained therein in only one form, i.e. either a fine spray or mist, or a jet, but not in both forms.

Another disadvantage of the aerosol containers previously available is that they can be accidentally discharged either while being carried about or if dropped. This not only causes a waste of material, but can also damage the objects accidentally sprayed if the material in the container is harmful to objects other than that for which they are intended. To overcome this possibility many of the aerosol containers previously available are provided with removable caps over the actuating button. However, this requires the cap to be removed and replaced each time the aerosol container is used, and the caps are often lost or mislaid.

It is therefore the object of the present invention to provide a unique construction of an aerosol container.

It is another object of the present invention to provide an aerosol container which can provide the material contained therein in the form of either a fine spray or mist or the form of a jet.

It is still another object of the present invention to provide an aerosol container in which the actuating button can be turned from a position which provides the material in the form of a fine spray or mist to a position to provide the material in the form of a jet.

It is a further object of the present invention to provide an aerosol container which can be turned off to prevent accidental discharge of the material contained therein.

It is still a further object of this invention to provide an aerosol container in which the actuating button can be turned easily and quickly from an off position to

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either a position which will provide the material in the form of a fine stream or mist or to a position to provide the material in the form of a jet.

Other objects of the invention will appear hereinafter.

For the purpose of illustrating the invention there is shown in the drawings a form which is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

FIGURE 1 is a top elevational view of the aerosol container of the present invention.

FIGURE 2 is a longitudinal sectional view of the aerosol container taken along line 2—2 of FIGURE 1.

FIGURE 3 is a transverse sectional view taken along line 3—3 of FIGURE 2.

FIGURE 4 is a transverse sectional view taken along line 4—4 of FIGURE 2.

FIGURE 5 is a transverse sectional view of the actuating button shown in its off position.

FIGURE 6 is a transverse sectional view of the actuating button shown in its position to provide the material in the form of a jet.

FIGURE 7 is a transverse sectional view of the actuating button shown in its position to provide the material in the form of a spray.

FIGURE 8 is a perspective view of the actuating button showing the bottom side thereof.

Referring to the drawing, the aerosol container of the present invention comprises a container, generally designated by 10, composed of a tubular wall 12, usually of metal, having a bottom plate 14 extending across one end thereof and hermetically sealed thereto. The upper portion 16 of wall 12 is tapered inwardly to form a small top opening for the container 10 and is provided with an outwardly turned bead 18 around the top opening. A top cover plate 20 fits in the top opening of container 10 and has an upwardly extending peripheral flange 22 which is bent over and hermetically sealed to bead 18. Top cover plate 20 is also provided with a central raised portion 24 having a central hole 26 therethrough.

A valve, generally designated by 28, is supported by top cover plate 20. Valve 28 comprises a substantially cup-shaped body member 30 having its open end force-fitted into the raised portion 24 of top cover plate 20. The bottom of body member 30 is provided with a plurality of small holes 32 to permit passage of material into the body member. A tubular valve stem 34 having both ends closed extends through top cover plate hole 26 into the valve body member 30. Valve stem 34 has a hole 36 through its bottom end and a radially extending port 38 in its wall adjacent its upper end. Valve stem 34 also has a longitudinally extending rib 40 projecting from its outer surface which fits into a notch 42 in the raised portion 24 adjacent hole 26 to prevent relative rotational movement between valve stem 34 and top cover plate 20 but permitting relative sliding movement. A rod 44 extends upwardly from the bottom of valve body member 30 into valve stem 34 through the hole 36 in the bottom of the valve stem. Rod 44 is provided with a ball 46 on its end within valve stem 34 which ball is adapted to seat on the bottom of valve stem 34 around hole 36 to seal the hole. Rod 44 is smaller in diameter than hole 36 so that when ball 46 is not seated on the bottom of the valve stem 34 material can pass through hole 36 into the valve stem. A helical spring 48 surrounds rod 44 and is held under compression between the bottom of valve body member 30 and the end of valve stem 34 to normally hold the bottom of valve stem 34 against ball 46 and thereby close the valve. A washer 50 surrounds valve stem 34 between valve body member 30 and the cover plate raised

portion 24 to seal the hole 26 in the raised portion. A tubular standpipe 50 fits tightly around the bottom portion of valve body member 30 and is of a length sufficient to extend almost to the bottom of container 10.

An actuating button 54, of plastic or the like material, has a central blind hole 56 extending from the bottom surface thereof into which the top end of valve stem 34 fits. The fit between valve stem 34 and hole 56 should be such as to permit actuating button 54 to be rotated with respect to valve stem 34, but still tight enough to prevent actuating button 54 from falling off of valve stem 34 if the container 10 is turned upside down. The bottom surface of actuating button 54 is provided with a counterbore 58 of a diameter sufficient to permit actuating button 54 to extend around the central raised portion 24 of cover plate 20. Actuating button 54 is provided with two circumferentially spaced, radially extending passages 60 and 62 extending from its outer surface to central hole 56. Passages 60 and 62 are positioned in the same plane as valve port 38. As shown, passages 60 and 62 are preferably spaced apart approximately ninety degrees, although they can be slightly closer together or slightly further apart. Passage 60 is cylindrical and relatively small in diameter to provide a strong jet stream, whereas passage 62 tapers radially outwardly so that it has a larger diameter at the outer surface of actuating button 54 than it has at central hole 56, so as to provide a fine spray or mist. Diametrically opposite to passages 60 and 62, the bottom of actuating button 54 is cut away to provide stop shoulders 64 and 66. Stop shoulders 64 and 66 are spaced apart a distance slightly greater than the spacing between passages 60 and 62 so that shoulder 64 is slightly out of alignment with passage 60 and shoulder 66 is slightly out of alignment with passage 62 for reasons which will be described later. The central raised portion 24 of cover plate 20 is provided with an upwardly extending stop projection 68 which extends into the cut away portion of actuating button 54 between shoulders 64 and 66. The outer surface of actuating button 54 has three circumferentially spaced, longitudinally extending ribs 70, 72, and 74. Rib 70 is located at the end of passage 60; rib 74 is located at the end of passage 62, and rib 72 is located halfway between ribs 70 and 74. As shown in FIGURE 1, the top of actuating button 54 is marked with the letter J over or next to rib 70, with the S over or next to rib 74, and with OFF over or next to rib 72.

The container 10 is partially filled with the desired ingredient 76, which may be in the form of an emulsion or even a two-phase liquid system. The space 78 above the ingredient 76 is filled with a gaseous propellant under pressure, which, except for food products, is usually composed of low boiling fluorochlorohydrocarbons, Freons, Genetrons, or Isotrons. The propellant is under a pressure sufficient to operate the aerosol container at a pressure between thirty and forty pounds per square inch at 70° F. The particular composition of the various ingredients used in aerosol containers, and the composition of the necessary propellant for such ingredients are well known in the trade and form no part of the present invention.

The operation of a filled aerosol container of the present invention is as follows:

To obtain a jet stream of the ingredients, the user turns actuating button 54 clockwise as indicated by arrow 80 in FIGURE 6, until stop projection 68 hits against stop shoulder 64. This brings jet passage 60 into alignment with valve stem port 38, which is visually indicated by rib 70 being in alignment with indicating arrow 82 on the outer surface of container 10 (FIGURE 1). The user then presses down on actuating button 54 which in turn moves valve stem 34 downwardly. This moves the bottom of valve stem 34 away from ball 46 to open

valve 28. The propellant then forces the ingredients 76 up through standpipe 52, holes 32 in the bottom of valve body 30, hole 36 in the bottom of valve stem 34, valve stem 34, valve port 38, and jet passage 60, to provide the desired jet stream of the ingredients. To stop the flow of the ingredients, the user releases actuating button 54, which permits spring 48 to push the bottom of valve stem 34 against ball 46 and thus close the valve 28.

To obtain a fine spray or mist of the ingredients, the user merely rotates actuating button 54 counterclockwise until stop projection 68 abuts against stop shoulder 66. This brings spray passage 62 into alignment with valve port 38, which is visually indicated by rib 74 being in alignment with indicating arrow 82. The user then presses down on actuating button 54 to open valve 28 and allow the ingredients to flow through spray passage 62 to obtain the desired spray of the ingredients.

When the aerosol container is not being used, the user should rotate actuating button 54 until rib 72, which is marked Off, is in alignment with indicating arrow 82. In this position of actuating button 54 valve port 38 is located between passages 60 and 62, so that if actuating button 54 is pressed down, the ingredients cannot pass out of valve stem 34. Thus, with the actuating button being in the Off position, accidental pressing of the actuating button will not discharge any of the ingredients.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

I claim:

1. An aerosol container comprising a hermetically closed container, a valve mounted on the wall of the container and having a tubular valve stem projecting beyond the wall of the container and slidable between a valve closed position and a valve open position, said valve stem having a valve member disposed therein controlling the inlet thereto, a radially extending port in the wall of said valve stem adjacent its outer end, and an actuating button having a blind hole therein extending from its bottom surface and a pair of circumferentially spaced passages extending radially therethrough from its outer surface to said blind hole, the valve stem fitting into said blind hole and abutting the bottom thereof, the button being rotatable relative to said valve stem to selectively bring each of said passages into alignment with said port.

2. The aerosol container as set forth in claim 1 in which one of said spaced passages is a jet passage and the other is a spray passage, the actuating button having three ribs on its outer surface, one rib being located at the end of the jet passage, another rib located at the end of the spray passage, and the third rib located substantially midway between the other two ribs.

3. An aerosol container comprising a container having a closed bottom and an opening in its top, a cover plate extending across the opening in said container and hermetically sealed to said container, a valve mounted on said cover plate within said container and having a tubular valve stem projecting upwardly through a hole in said cover plate, means preventing rotation of said valve stem relative to said cover plate, said stem being slidable with relation to said cover plate between a valve closed position and a valve open position, a radially extending port in the wall of said valve stem adjacent the upper end thereof, and an actuating button having a blind hole therein extending from its bottom surface and a pair of circumferentially spaced passages extending radially therethrough from its outer surface to said blind hole, the valve stem fitting into said blind hole and abutting the bottom thereof with the port being in the same plane as the passages, the button being rotatable relative to said

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valve stem to selectively bring each of said passages into alignment with said port.

4. The aerosol container as set forth in claim 3 in which the actuating button has a pair of circumferentially spaced stop shoulders, and the cover plate is provided with a stop projection extending upwardly between said stop shoulders, said stop shoulders being positioned such that when the button is rotated until the stop projection engages the stop shoulders a respective passage is in alignment with said valve stem port.

5. The aerosol container as set forth in claim 4 in which one of said passages is cylindrical and of a relatively small diameter to provide a jet stream, and the other passage tapers outwardly from the blind hole so that it has a larger diameter at the outer surface of the button than its diameter at the hole to provide a fine spray or mist.

6. The aerosol container as set forth in claim 3 wherein said rotation preventing means includes a rib on the outer surface of said stem projecting into a notch on said cover plate.

7. An aerosol container comprising a container having a closed bottom and an opening in its top, a cover plate extending across the opening in said container and hermetically sealed to said container, a valve mounted on said cover plate within said container and having a tubular valve stem projecting upwardly through a hole in said cover plate, a valve member in said tubular stem controlling an inlet thereto, a rod on said valve member extending through said inlet, means preventing rotation of said stem relative to said cover plate, said stem being slidable with relation to said cover plate between a valve closed and a valve open position, a radially extending port in the wall of said valve stem adjacent the upper end thereof, and an actuating button having a blind hole therein extending from its bottom surface and a pair of circumferentially spaced passages extending radially there-through from its outer surface to said blind hole, said valve stem fitting into said blind hole and abutting the

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bottom thereof with the port being in the same plane as the passages, the button being rotatable relative to said valve stem to selectively bring each of said passages into alignment with said port.

8. An aerosol container comprising a container having a closed bottom and an opening in its top, a cover plate extending across the opening in said container and hermetically sealed to said container, a valve mounted on said cover plate within said container and having a tubular valve stem projecting upwardly through a hole in said cover plate, interengaging means on said stem and cover plate for preventing said stem from rotating relative to said cover plate, said stem being slidable in a direction coincident with its longitudinal axis between a valve opening position and a valve closing position, a radially extending port in a portion of said valve stem which projects beyond the hole in said cover plate, and an actuating button having a blind hole therein extending from its bottom surface and a pair of circumferentially spaced passages extending radially therethrough from its outer surface to said blind hole, said valve stem fitting into said blind hole and abutting the bottom thereof with the port in said stem being in the same plane as the passages, said button being rotatable relative to said stem for selectively bringing each of said passages into alignment with said port, whereby dispensing of fluid from said container is initiated by rotating said button until one of said passages is aligned with said port and then depressing said button so that said valve stem moves to a valve opening position.

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