Feb. 8, 1966 N. W. SEAQUIST 3,233,793

AEROSOL VALVE

Filed Sept. 3, 1963

Fig. 1

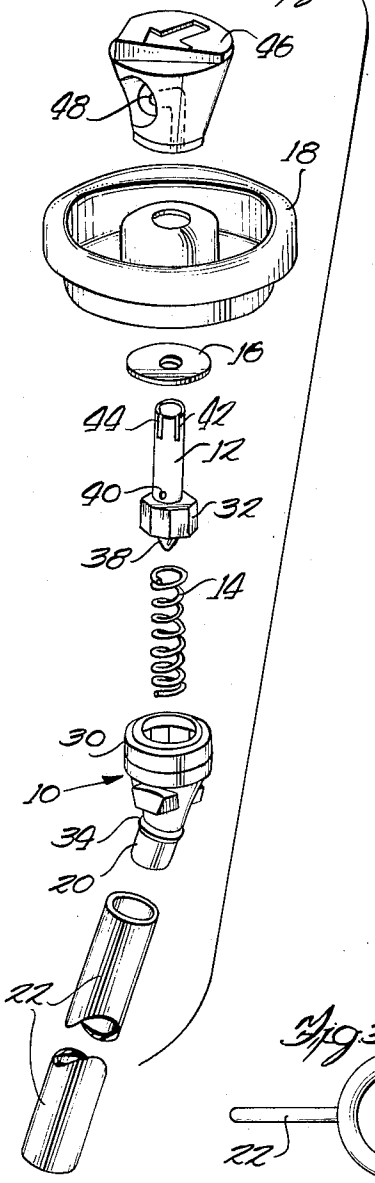


Fig. 2

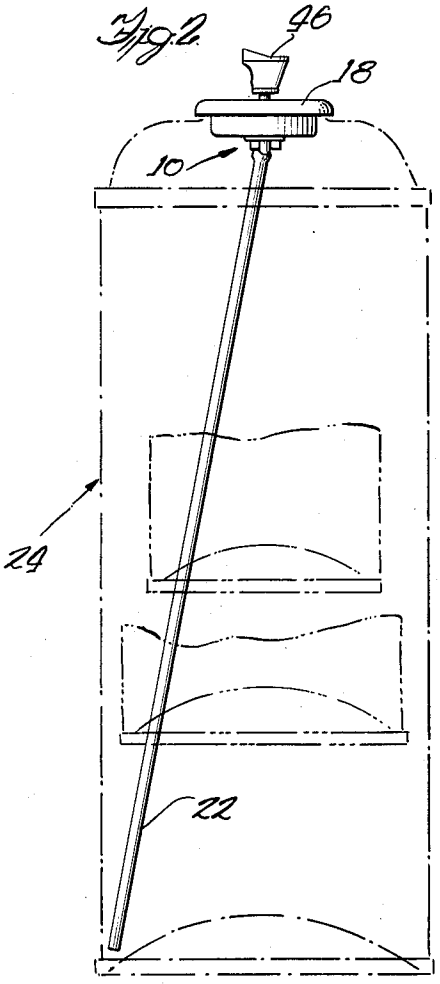
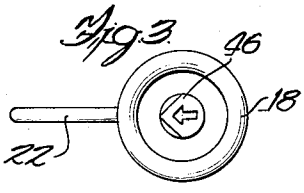


Fig. 3



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AEROSOL VALVE

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1 Claim. (Cl. 222—394)

This invention relates to an aerosol valve and more particularly to the valve body of an aerosol valve in which a novel configuration is used for the dip tube attachment tail to direct the dip tube to the corner of the can so that the entire contents of the aerosol can may be emptied.

Aerosol containers usually have a convex bottom for structural strength against the internal pressure of the propellant. This bottom also serves a second function; namely, channeling of the contents to the periphery of the can bottom where the bottom open-end of the dip tube is usually located. It should be evident that this provides for better emptying of the can as the contents are depleted.

In the usual practice, the valve body has a vertically disposed dip tube attachment tail with an extra length dip tube which is bowed between the tail and the outer peripheral bottom corner of the can. Such extra length is wasteful of dip tube material. The bowing of the tube and the placement of the bottom end of the tube into the corner of the can is frequently difficult because of the usual high-speed operation of canning apparatus. In addition, fatigue occasionally causes shrinkage of the bow with consequent raising of the bottom of the dip tube from the corner of the can. This causes some waste of contents of the can.

Accordingly, an object of this invention is to provide a novel aerosol valve.

Another object is to provide a novel valve body for the valve of this invention wherein its unique dip tube attachment tail insures automatic proper angling of the dip tube thereby facilitating substantially complete discharge of the contents of the can to which the valve is attached.

Still another object is to provide a valve body of the above character having a dip tube attachment tail which does not require special assembly apparatus or technique or special canning apparatus during application to an aerosol can.

Still another object is to provide a valve body of the above character which can be easily molded using simple injection mold techniques.

A still further object is to provide a valve body of the above character which avoids waste of excess dip tube material.

Another object is to provide a valve body of the above character which does not bow the dip tube so that there is no movement of the bottom end of the dip tube from the bottom corner of the aerosol can.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claim.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a side perspective view of an aerosol valve in disassembled form showing the unique dip tube attachment tail.

FIG. 2 is a side elevational view of the valve shown

mounted upon an aerosol can, which is illustrated in outline form, to indicate the positioning of the dip tube when the valve is used upon cans of different sizes.

FIG. 3 is a top view of the valve of FIG. 2 showing the relationship of the arrow on the head of the valve cap and the slant of the dip tube.

Similar reference characters refer to similar parts throughout the several views of the drawings.

As best seen in FIG. 1, the aerosol valve herein comprises a valve body **10**, a valve stem **12**, valve stem biasing means **14**, sealing means **16**, and a valve housing **18**. The body has an angular dip tube attachment tail **20** upon which dip tube **22** is affixed when the valve is assembled and ready for insertion into and crimping into the open crown top of an aerosol can **24**. It will be noted from FIG. 2 that the angle utilized for the tail **20** is preferably about 10 to 20° with respect to the centerline of the valve to provide for optimum positioning of the lower end of the dip tube so that there will be substantially complete emptying of the can contents.

In a more specific embodiment, the aerosol valve of this invention comprises a tubular valve body **10** with a lower dip tube attachment tail **20** having an off-center angular configuration so that when a straight length of dip tube **22** is force fitted or otherwise affixed onto the tail, it inherently assumes an angular position, as illustrated in FIG. 2, which is optimum for use with various size aerosol cans. Such variety in size is illustrated, in outline form, in FIG. 2.

In one preferred form of valve, the valve body **10** has an enlarged upper portion **30**, of cup-shape, for receiving the valve stem biasing means **14**, which is preferably a helical spring of appropriate size, and the lower closed end **32** of the tubular valve stem **12**. A gasket **16** which encircles the valve stem to act as the sealing means, and a valve housing **18**, which is crimped upon the upper portion **30** of the valve body **10**, completes the actual valve assembly. Other parts which are added when the valve is used and the unique features of the valve will be evident from the detailed description which follows.

In the embodiment illustrated in FIG. 1, the valve consists of a valve body **10** of tubular shape with a lower dip tube attachment tail **20** angled at about 10 to 20° from the centerline of the assembled valve and an upper enlarged cup-shaped portion **30** into which the valve stem biasing means **14**, preferably a helical spring, and the lower closed end **32** of the valve stem **12** is fitted. The tail **20** of the valve body has an annular gripping ring **34** for retaining the dip tube **22** when the latter is force fitted over the tail. The inside surface **36** of the valve body **10** may assume any configuration, but as noted in FIG. 1, in the preferred form, it has an octagonal configuration to receive the matching octagonal outer surface of the lower closed end **32** of the valve stem **12**. The result of these coacting surfaces is to guide the valve stem during reciprocable movement within the valve body.

In addition, to the closed lower end **32**, the valve stem also has a hollow tubular configuration in its upper portion which acts as a passageway for the material being dispensed from the can. The under surface of the closed end has a boss **38** with a diameter slightly less than the diameter of the valve stem spring **14**, whereby control over lateral movement of the spring within the valve body is effected.

The valve stem has a discharge orifice **40** on one side which, when free of the sealing means **16**, provides for discharge of the contents from the aerosol can.

In an even more preferred form, the upper end of the valve stem has one or more key slots **42** and **44** (two shown) for receiving an appropriately placed key contained on the inner surface of the valve cap **46**. As illustrated by reference to FIG. 3, such a key arrangement

provides for proper disposition of the nozzle 48 of the cap with the dip tube 42 so that the latter dips into the lowermost portion of the can to provide for substantially complete emptying of the contents of the can. In the usual fashion, the can during use is held with a slightly forward tilt. By providing a nozzle direction which points in the same direction as the tilt of the dip tube, the latter will extend into the lowermost portion of the can. It is obvious that other key arrangements are possible where the can is held in a fashion other than a forward tilting one.

It will also be noted that when the valve is assembled and crimped upon an aerosol can, the dip tube automatically extends to the lower corner of the can. No special provision need be made for bowing the dip tube in a certain direction nor is there a need for an extra length dip tube. The tube automatically angles in a particualr direction and this can be detected by reference to the key slots 42 and 44.

It should be evident that the invention herein provides for a saving of dip tube material. The particular angle of the tail provides, with the key slots 44, for a slant in the dip tube which facilitates better emptying of the aerosol can. And such provision does not require complicated individual parts for the valve which require expensive molding or forming operations. All of the parts can be manufactured using simplified and economical injection molding techniques.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claim.

It is also to be understood that the following claim is intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Now that the invention has been described, what I claim as new and desire to secure by Letters Patent is:

A valve for use upon an aerosol container to provide for substantially complete emptying of said container, comprising a valve housing capable of being affixed to said containar, a tubular valve body within said housing and having a dip tube attachment tail, a dip tube affixed to said tail, a tubular valve stem having passage means for dispensing material from said can, said stem having a closed end which reciprocates within said tubular valve body, and key means on its other end, said end protruding through said valve housing, valve sealing means for said passage means, valve stem biasing means whereby said passage means of said valve stem is biased against said sealing means to maintain said valve in a normally closed condition, and a valve cap with a discharge orifice on one side thereof and matching key means for affixation to said key means end of said valve stem, said dip tube attachment tail being angled with respect to the centerline of said valve whereby the dip tube is directed toward the bottom corner of said can during use said corner being on the same side of the centerline as said discharge orifice and whereby no excess dip tube is required to provide for bowing of said tube, and said key means of said cap and stem being so positioned as to provide proper positioning of the discharge orifice with respect to the angular direction of said dip tube.

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