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AEROSOL PAINT VALVE AND NOZZLE

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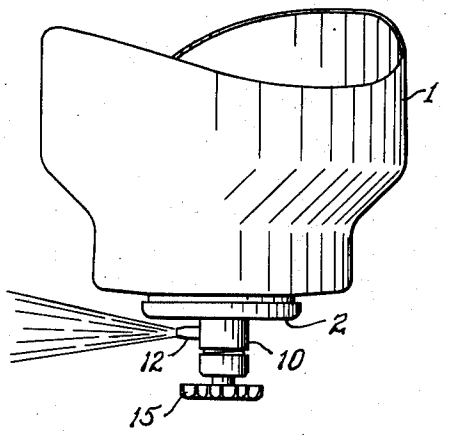

FIG. 1

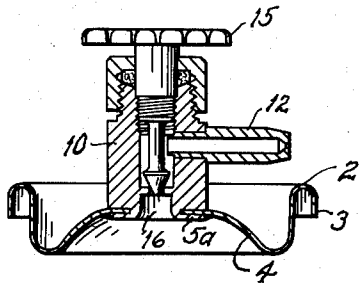

FIG. 2

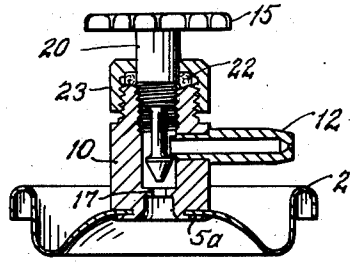

FIG. 3

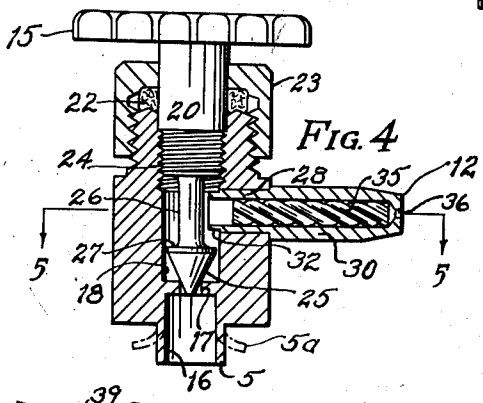

FIG. 4

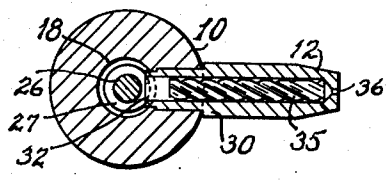

FIG. 5

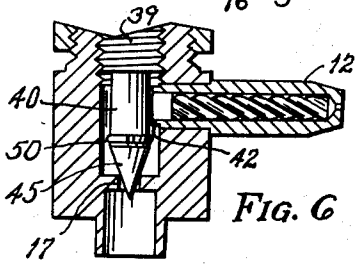

FIG. 6

FIG. 7

INVENTORS
EDMUND ROGERS AND
HAROLD D. NORTH JR.
BY
Justin E. Mashlin
ATTY

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AEROSOL PAINT VALVE AND NOZZLE

Edmund Rogers, South Euclid, and Harold D. North, Jr., Shaker Heights, Ohio, assignors to The Engine Parts Manufacturing Company, Cleveland, Ohio, a corporation of Ohio

Application April 26, 1950, Serial No. 158,216

1 Claim. (Cl. 299—95)

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This invention relates to the valve construction for use with aerosol paint spraying containers and is of the general nature of the valve and nozzle arrangements shown in our prior application, Ser. No. 126,484, filed November 10, 1949, and the application of Edmund Rogers, Ser. No. 125,917, filed November 7, 1949.

The present invention applies particularly to the needle valve type which is opened and closed by a partial turn for ordinary use, the threaded stem of the needle valve being turned by a small handle or knob.

By reason of the construction which is designed to meet the requirements of cheapness and simplicity of manufacture, it sometimes happens the valve is inadvertently opened and unscrewed too far, with the result that the internal pressure forces the valve stem out of the body, discharging the contents of the can with possible damage to surrounding surfaces and objects.

An object of the present invention is to so construct such a valve as to provide a simple and effective means, normally preventing inadvertent unscrewing and removal of the valve stem, while permitting it to open and close in the normal fashion.

A preferred construction by which this object may be accomplished with a minimum of expense is shown in the accompanying drawings, in which:

Fig. 1 is a side elevation of the lower portion of an aerosol can inverted for spraying, and showing the valve and nozzle;

Fig. 2 is a vertical axial section somewhat enlarged through the valve and nozzle and can cover;

Fig. 3 is a similar view showing the valve in its open position illustrating the locking engagement preventing removal;

Fig. 4 is a still further enlarged view of the valve body and valve, showing a device for causing whirling within the nozzle;

Fig. 5 is a horizontal section taken on a plane indicated by the line 5—5 of Fig. 4;

Fig. 6 is a sectional detail showing a modification of the construction of Fig. 4, in which a split ring is used for a locking member, and

Fig. 7 is a view showing such a ring.

The usual type of aerosol can having a reduced upper portion (here shown inverted) is designated 1. A cap member therefor 2 carries the valve body 10 with its nozzle 12 and valve operating knob or disk 15. The cap 2 is shown as having a flanged portion 3 within which the cap extends downwardly and then upwardly

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forming a dome 4 having a central opening receiving the tubular extension 5 (Fig. 4) which may be spread outwardly to engage beneath the cap as at 5a holding the valve body firmly in position thereon.

The valve body, of course, may be secured to the cap in any suitable fashion. However, the advantage of a flat flange within a dome avoids interfering with flow, and provides smooth surfaces leading to the inner bore 16 of the valve body, and which leads to an orifice 17 in a valve seat which is preferably in the nature of a wall between the lower bore 16 and the upper bore 18. The valve seat and orifice is formed to present a sharp angle edge at its upper side for engaging the needle valve tip.

Internal threads 19 may receive threads formed on the valve stem 20 which is preferably of a diameter slightly larger than the bore 18, the upper portion of which is smooth and is engaged by packing 22 held by a gland nut or threaded cap 23 secured by external threads 24 to the valve body 10. The needle valve stem, as shown in Figs. 2 to 5, has a reduced portion 26 carrying the cone-shaped needle valve head 25 and forming a shoulder 27 at the upper side thereof.

A transverse bore in the valve body receives a reduced portion 28, of a nozzle 12, which is tightly fitted in position and which is provided with an inward extension 32, so projecting into the bore as to stand in the path of the shoulder 27. The outer enlarged portion 30 forms a stop engaging the valve body, and positions this tubular projection 32 so that it will engage the shoulder 27 as shown in Fig. 3 when the valve stem is opened beyond its usual requirement and thus prevent its removal from the valve body. Likewise, the inner end of the nozzle is spaced from the portion 26 of the valve stem allowing free flow into the nozzle.

In assembling this structure, the valve stem with its packing gland is placed in position, after which the tightly fitting reduced portion 28 of the nozzle member 30 is forced into position.

The nozzle is, as indicated, similar to that described in the Rogers' application above mentioned, and we may use a means for causing a whirling spray, if desired, such as twisted wires indicated at 35 fitted into the nozzle and held by the conical inner surface of the end wall, which is provided with the small exit or spray orifice 36, as shown.

A modified form of the locking arrangement

may be used which avoids the possible weakness resulting from unduly reducing the normally very small diameter of the valve stem above the needle valve head member in order to form the shoulder 27. It should be noted that this reduction is such as to provide the shoulder engagement while its diameter and the distance of the projection 32 are such as to assure freedom of flow into and through the nozzle. The maximum diameter of the conical head provides a clearance between it and the bore 18.

The diameter of the reduced portion 26 may in practice be substantially less than one-sixteenth of an inch, which, however, is sufficient for most purposes, particularly where the diameter of the handle member is not large. However, when it is desired to use a relatively large disk-like knob as at 15 this slender portion 26 may not be strong enough.

In the form shown in Fig. 6, however, the valve stem portion 40 is reduced only slightly below the diameter of the threads 39, and the conical valve 45 is formed at the lower end, above which may be provided a groove to receive a split ring 50 which may be sprung into the groove. When in position, the outside diameter of the ring 50 projects sufficiently to engage the tubular projection 42 at the inner end of the nozzle member, which tubular projection, in this case, is somewhat shorter than in the form shown in Fig. 4.

As before, the valve may be assembled with the split ring 50 on the stem and the nozzle may be forced into position locking it against inadvertent removal as the last step in assembly.

In both these forms it should be noted that the conical valve head projects through or substantially through the orifice 17 in the valve seat wall effecting a self-cleaning, which feature was described and claimed in our aforementioned application.

Having thus described our invention, what we claim is:

A valve device for an aerosol container comprising a hollow valve body having an axial bore with a restricted orifice forming a valve seat and having a discharge bore extending laterally from the axial bore, a valve stem having a conical head at the inner end adapted to project into and close said restricted orifice, said stem being threaded into the valve body and having a handle at the outer end for turning the same, a tubular discharge spray nozzle member having a reduced portion tightly fitted into said lateral bore and having its inner end extending into the axial bore to a point adjacent the valve stem and said nozzle having an annular shoulder engaging outer face of the valve body to so position the nozzle, and the valve stem having an annular shoulder adapted to engage the projecting inner end of the tubular nozzle member to prevent inadvertent removal of the valve stem, the tubular discharge nozzle member having a still further reduced diameter at its inner end within the axial bore of the valve body to facilitate flow of liquid around the stem and into the discharge nozzle.

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