(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 073 664**
A1

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **82304533.1**

(22) Date of filing: **27.08.82**

(51) Int. Cl.³: **B 65 D 83/14**

(30) Priority: **01.09.81 GB 8126437**

(43) Date of publication of application: **09.03.83 Bulletin 83/10**

(84) Designated Contracting States: **AT BE CH DE FR IT LI NL SE**

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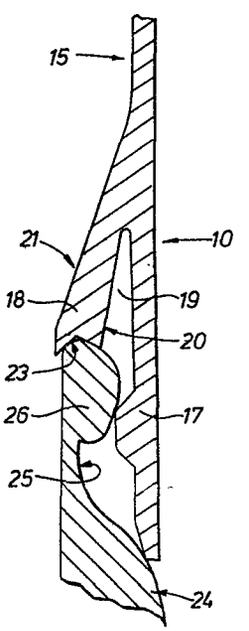
(54) Aerosol can cap.

(57) The cap has a cylindrical outer surface (12), which is substantially flush with the can (14) exterior. The cap is formed internally with projections (17) which resiliently engage with a lip (26) on the can to hold the cap in position. The cap is prevented from being forced down over the can body by means of an internal flange (18) angled towards the axis of the cap and towards the rim (16) thereof, so that the end of the flange engages with the top of the bead on the can. Risk of the aerosol release valve being operated is, thereby, minimised.



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AEROSOL CAN CAP

The present invention relates to a cap of the type used on aerosol cans. Such a cap has a skirt which is adapted to engage with the can, so as to enclose a valve mechanism on top of the can.

Aerosol cans have a cylindrical main body part closed at the top by a domed part which centrally carries the valve mechanism. Steel cans have been made with an upstanding peripheral flange where the cylindrical part joins the domed part so as to define an annular recess around the can. The skirt of the cap seats in the recess and usually snap engages into position.

A can and cap of this type are disclosed in U.S. Patent No. 3565295. The overall shape of the assembled can and cap is basically cylindrical, but the cap is slightly inset radially relative to the can body and the flange separates the can body from the cap.

It is more aesthetically pleasing for the flange to be omitted to permit the cap skirt to be flush with the can body. Flush cans have been produced, but there have been problems with the flush-fitting caps.

Such a can bas a peripheral lip radially inset from the can body and surrounding the domed part. A cap for such a can is injection moulded from plastics material and the skirt has internal projections near the rim. These projections snap-engage with the lip on the can and the circular end wall of the skirt seats on a curved annular shoulder of the can so that the peripheral wall of the can is substantially flush with the cylindrical wall of the body of the can.

It has been found that a cap of this simple construction is unsatisfactory, because stacking of the can and cap assemblies causes problems. The skirt tends, under a top load on the can, to ride off the shoulder and down the outside of the can, so that the valve mechanism is operated and contents of the can are lost.

In an attempt to alleviate this problem, it is usual to provide, on the internal cylindrical wall of the skirt, thin elongate ribs which project radially inwardly and extend longitudinally axially of the cap. These ribs seat on top of the lip. Although this construction is an improvement, the problem still arises and the ribs also tend to ride off the shoulder and down the can body under top load on the cap during stacking and handling. A cap with ribs intended for fitting on the conventional type aerosol can is shown in U.S. Patent Specification 2973881.

Another proposal has been to provide an annular internal projection (or projections) in the skirt defining a shoulder which lies in a diametral plane across the skirt. Seating of this shoulder on the lip of the can would resist movement of the cap down the can. Such a projection would be under shear forces when the top of the can is under load and the projection has to be massive relative to the usual thickness of the wall of the cap to withstand a top load. This creates two further problems. The cap is difficult to injection mould, because the projection renders it difficult to remove the cap from the mould and the massive nature of the projection causes unsightly sink marks around the external periphery of the skirt of the cap. A projection of this type is shown in French Patent Specification No. 1584153 provided on a cap capable of seating on a conventional type aerosol can.

The present invention provides a flush fitting type cap which can withstand high top loads, is easy to mould and does not have unsightly sink marks.

In accordance with this invention, there is provided a flush-fitting type aerosol can cap of hollow cylindrical form having a top and a skirt of substantially constant cross-section defining a substantially smooth external cylindrical surface of the cap, the skirt being provided near its rim with integral internal projecting means for resiliently engaging beneath a lip on an aerosol can and being provided with an integral internal projecting seat spaced inwardly of the cap away from the projecting means for seating on the lip,

wherein the seat is defined by an annular end wall of a flange extending from the internal wall of the skirt inwardly towards the rim of the cap at an acute angle as viewed in section to define an annular space between the flange and the internal wall of the skirt.

The flange may be continuous or discontinuous, i.e. defined by discrete portions.

The previously mentioned U.S. Patent Specification No. 3565295 has an additional internal skirt depending from the top of the cap within the main skirt. This internal skirt has an internal annular flange which engages with a lip on an aerosol can adjacent to the valve mechanism. This flange is sufficiently thin and flexible to be deformed by the lip when the cap is engaged with the can, so as to form a seal with the lip. The face of the flange which faces the internal skirt engages with the lip to facilitate such deformation. the flange is not intended to support the cap under top load and is so constructed that it could not do so. The additional skirt itself would increase the resistance of the cap to top load, but the provision of the extra skirt greatly increases the cost of the cap. This publication tends to lead a reader away from the concept of supporting a cap against top load by means of an internal flange, since the flange depicted clearly could not serve this function.

Reference is now made to the accompanying drawings, wherein:-

Figure 1 is a perspective view of an aerosol can fitted with a cap according to the invention;

Figure 2 is an elevation of the can with the cap removed;

Figure 3 is a sectional view through the cap;

Figure 4 is an enlarged sections view of a detail of the cap; and

Figure 5 is an underneath plan view of the cap.

The cap 11 shown has a skirt with a smooth cylindrical outer surface 12 and a flat top 13. The cap is fitted to an aerosol can so that its surface 12 is substantially flush with the cylindrical outer surface of the can 14 (Figure 1). The

cap is a one-piece plastics injection moulding.

As shown in Figure 2, the aerosol can 14 has a cylindrical body 24 with a substantially smooth external surface. The top of the body is closed by a doomed port 10 which carries at the top a valve assembly 9. The domed part has a lip 26 where the domed part joins the body part. The lip is radially inset from the exterior surface of the cylindrical body. this part of the can is shown greatly enlarged in Figure 4.

As shown in Figure 3, the cap also has a cylindrical internal surface 15 and, near the rim 16 of the cap, this internal surface is provided with a multiplicity of small projections or pips 17 arranged in circumferential alignment. Spaced inwardly of the cap away from the pips 17 is an internal annular flange 18. This flange extends towards the rim 16 and towards the axis of the cap at an acute angle, as viewed in cross-section, to the internal cylindrical wall 15. An annular space 19 is thereby defined between the flange and the internal cylindrical wall.

The flange 18 has its surface 20 adjacent the internal wall 15 angled at about 10^{o} to the wall 15, as viewed in cross-section, whereas the opposite wall 21 of the flange is angled at about 15^{o} to the wall 15, the thickness of the flange increasing away from the internal wall 15. The maximum angle between the surface 20 and the wall 15 is 30^{o}.

As shown in Figure 4, the end face of the flange 18 is formed with a V-section groove 23. A part of the aerosol can 14 is shown in this Figure, the can having the main wall 24 formed near the rim with an annular recess 25 and at the rim with the lip 26. The cap is fitted on the can by resilient engagement of the pips 17 on the underside of the lip 26. The maximum extent to which the cap can be forced down onto the can is limited by engagement of the grooved end face 23 of the flange 18 with the top of the lip 26. The grooved formation permits the lip to extend into the groove to reduce the risk of the flange being forcibly deflected so as to become ineffective. The arrangement is such that the reaction to the force exerted by a top load is transferred along the flange to

the skirt so that a top load of at least 60kg can be supported by the flange.

This arrangement has been tested under 110kg. loading without the cap riding down the can. Under such high forces, some deformation of the cap occurs, but the cap was found to recover its shape after removal of the load and to continue to function normally. This is considerably stronger than the known vertically ribbed cap, which tends to ride down the can at 30 to 40kg. loading.

CLAIMS

1. A flush-fitting type aerosol cap (11) of hollow cylindrical form having a top and a skirt (12) of substantially constant cross-section defining a substantially smooth cylindrical external surface of the cap, the skirt being provided near its rim (16) with integral internal projecting means (17) for resiliently engaging beneath a lip (22) on an aerosol can (14) and being provided with an integral internal projecting seat (18) spaced inwardly of the cap away from the projecting means for seating on the lip, characterised in that the seat is defined by an annular end wall (23) of a flange (18) extending from the internal wall (15) of the skirt inwardly towards the rim of the cap at an acute angle as viewed in section to define an annular space (19) between the flange and the internal wall of the skirt.

2. A cap according to Claim 1, wherein the annular end wall of the flange has a formation (23) for engaging over the lip of the can.

3. A cap according to Claim 2, wherein the formation is an annular groove (23).

4. A cap according to Claim 1, 2 or 3, wherein the angle between the internal wall (15) of the skirt and the adjacent surface (20) of the flange (18) is no more than 30^{o}.

5. A cap according to Claim 4, wherein said angle is about 10^{o}.

6. A cap according to any preceding claim, wherein the projecting means (17) comprises a multiplicity of discrete projections.

7. A cap according to any preceding claim wherein the flange

(18) increases in thickness in the direction away from the skirt.

8. An assembly of an aerosol can and a cap, wherein the can has a main body having a cylindrical external surface, a domed portion provided with a valve mechanism, and an annular lip (22) around the domed portion and inset radially inwardly relative to the cylindrical external surface and wherein the cap (11) is of the flush-fitting type of hollow cylindrical form having a top and a skirt (12) of substantially constant cross-section defining a substantially smooth external surface of the cap, the skirt being provided with integral internal projecting means (17) resiliently engaging beneath the lip (22) so that the external surface is substantially flush with the external surface of the can body, the skirt having an integral internal projecting sear (18) spaced inwardly of the cap away from the projecting means and seating on the lip, characterised in that the seat is defined by an annular end wall (23) of a flange (18) extending from the internal wall (15) of the skirt inwardly towards the rim of the cap at an acute angle as viewed in section to define an annular space (19) between the flange and the internal wall of the skirt.

9. An assembly according to Claim 8 wherein the cap is constructed according to any one of Claims 2 to 7.

10. An assembly according to Claim 8 or 9, wherein the flange supports a top load on the cap of at least 60kg.

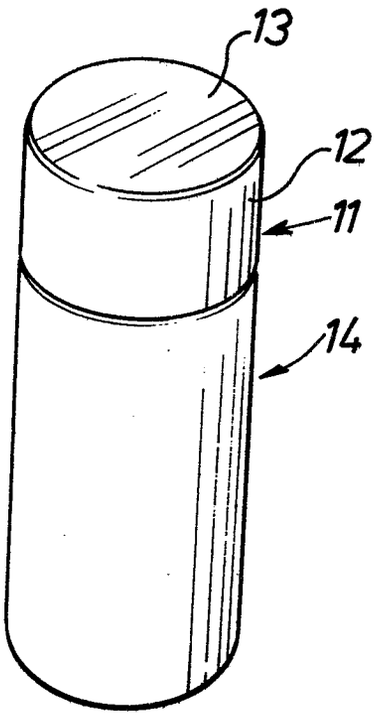

FIG. 1

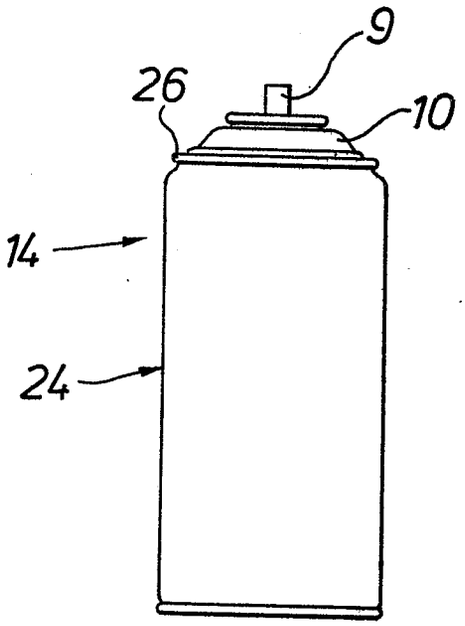

FIG. 2

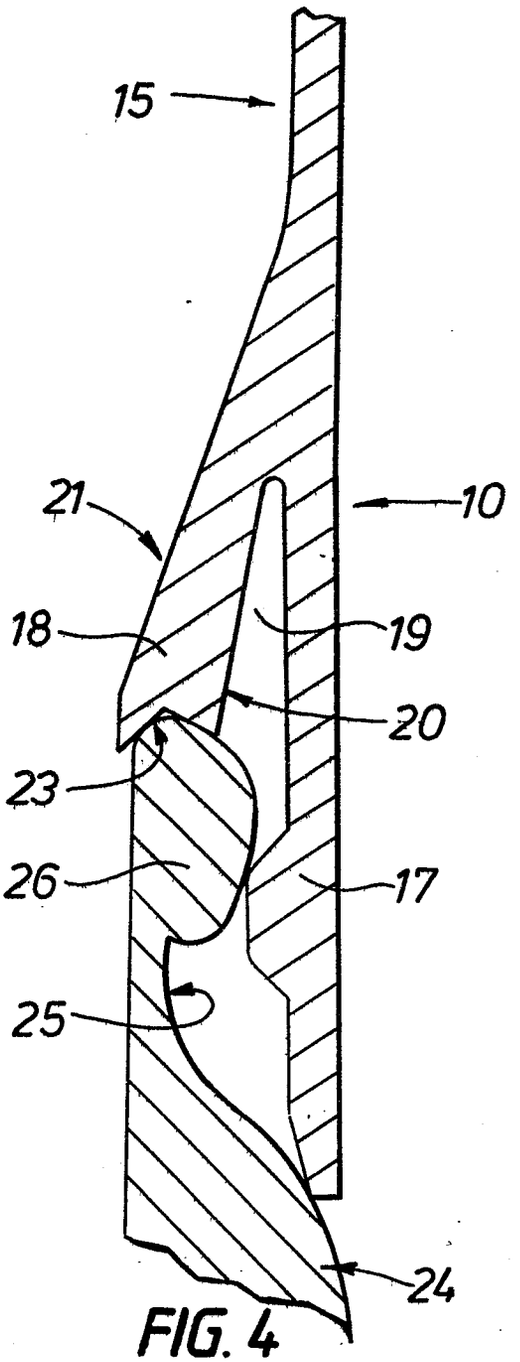

FIG. 4

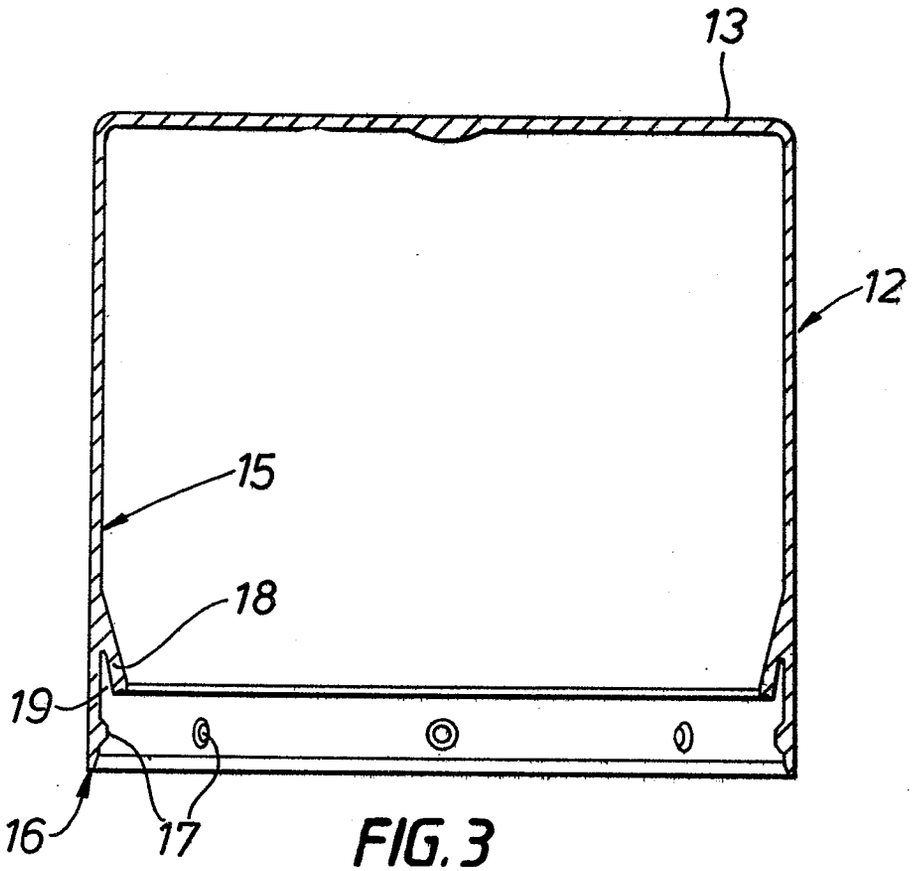

FIG. 3

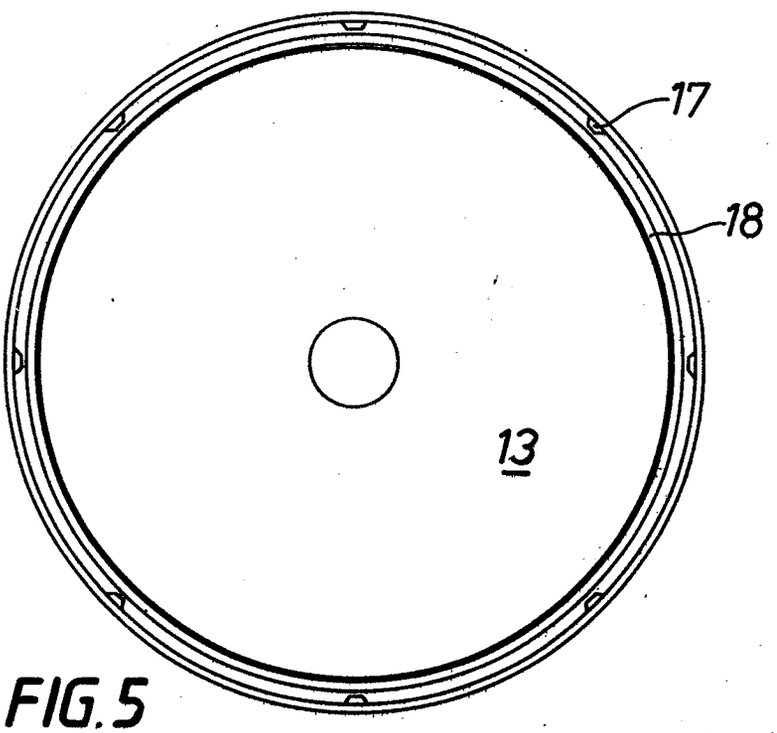

FIG. 5

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EUROPEAN SEARCH REPORT

0073664
Application number

EP 82 30 4533

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
D,A	US-A-3 565 295 (DOYLE) *Column 2, lines 10-33; figures 1-3*	1,8,9	B 65 D 83/14
A	US-A-2 775 372 (JORDAN) *Column 2, lines 26-44; figures 1-5*	1,6,8, 9	
A	US-A-3 360 156 (BOHLMAN) *Column 2, lines 37-50; column 3, lines 3-17; figures 1-3*	1,8,9	
A	US-A-2 973 881 (OSTROWITZ) *Column 1, lines 48-56; column 2, lines 15-20; figures 1-3*	1,6,8, 9	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	FR-A-1 428 577 (MEMASSANCH) *Page 1, right-hand column, last paragraph; page 2, left-hand column, lines 1-3 and line 54 to right-hand column, lines 1-3; figures 1,2*	1,7,8	B 65 D
A	FR-A-2 013 085 (HAYASHIDA) *Page 1, lines 32-38; figures 1-5*	1,2,8, 9	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	01-12-1982	VANTOMME M.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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