



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.02.2000 Bulletin 2000/08

(51) Int Cl.7: **B65D 43/06**

(21) Application number: **99306558.0**

(22) Date of filing: **19.08.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
 Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **19.08.1998 GB 9817986**

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(54) **Closure for a container**

(57) A closure for a container, e.g. a paint or varnish tin, has an annular base (10) defining an aperture (14) and a lid (22) which is releasably securable on the base to close the aperture. Either the lid (22) or the base (10) has an annular projection (24) which is sealingly re-

ceived in an annular recess (18') in the other of the lid and base. The profiles of the annular projection (24) and the annular recess (18') differ from one another such that when the lid (22) is secured on the base (10) there is noncontinuous contact between the projection (24) and the recess (18').

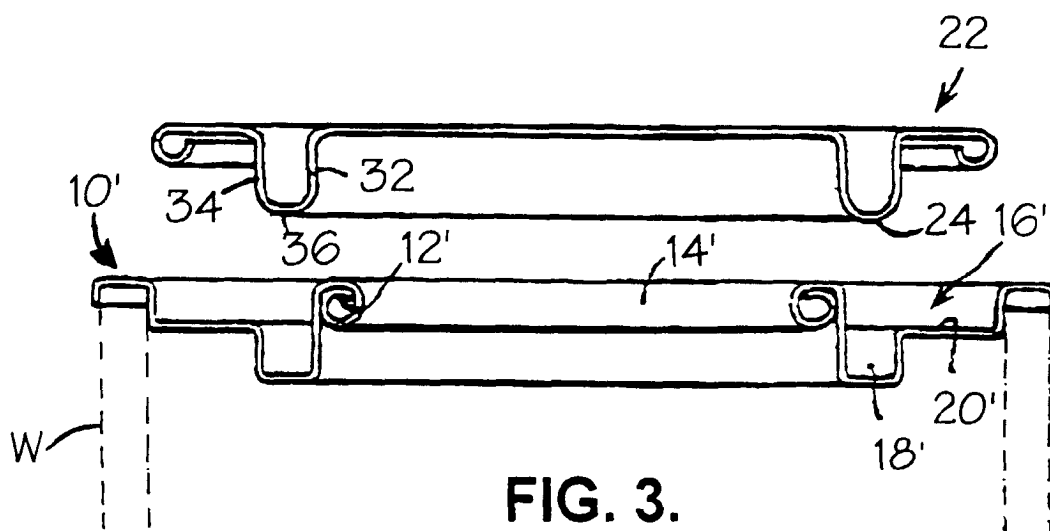


FIG. 3.

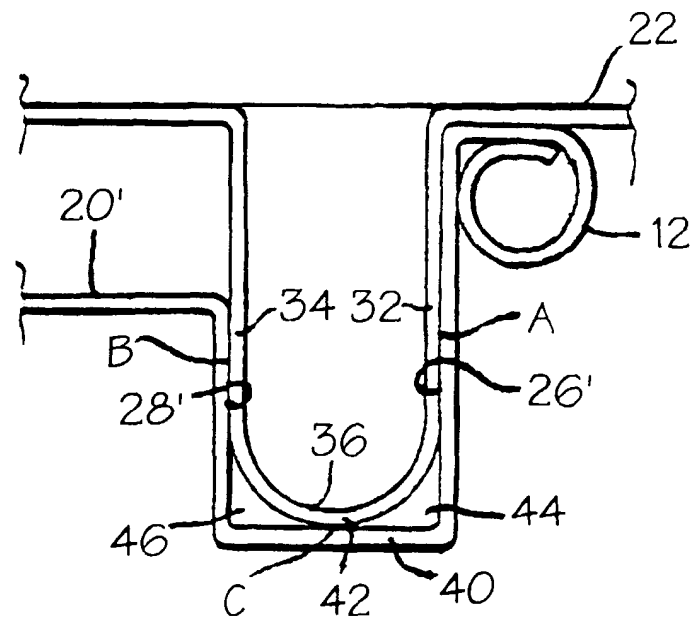


FIG. 4.

Description

[0001] The present invention relates to closures for containers and in particular, but not exclusively, to closures for tins of paint, varnish and the like.

[0002] A known paint tin closure is illustrated in Figs. 1 and 2. Fig. 1 is an exploded view in diametric cross-section of a paint tin closure and Fig. 2 is an enlarged view of the engaging portions of the closure of Fig. 1 when in the closed position.

[0003] The known paint tin closure comprises an annular, female securing ring 10 which, in use, is fixedly secured to the upper periphery of a tubular paint can wall (not illustrated). The securing ring 10 illustrated is pressed from metal and its radially innermost edge is rolled back on itself as indicated at 12 to provide a smooth periphery for an aperture 14.

[0004] Radially outwardly of the central aperture 14 is a stepped annular recess 16 comprising a radially inner deeper recessed portion 18 and a wider, shallower recessed portion 20 radially outwardly of the deeper recessed portion 18.

[0005] The closure also comprises a generally circular lid 22 for releasably closing the aperture 14 in the ring 10. The lid 22 is also pressed from metal and its periphery is rolled inwardly to hide any sharp edges which might cause injury.

[0006] The lid 22 is provided with a downwardly-depending annular projection 24 of a diameter corresponding to the diameter of the deeper, recessed portion 18 in the ring.

[0007] In use, the lid 22 is fitted to the base 10 by aligning the downwardly depending annular projection 24 with the recessed portion 18 and pressing the lid onto the base. As best seen in Fig. 2, the outer profile of the annular projection 24 on the lid is shaped and dimensioned to be received as a very close interference fit with the recessed portion 18. In particular, it will be observed that the recessed portion 18 comprises parallel inner and outer walls 26, 28 and a base portion 30 which is semi-circular in cross-section. Similarly, when viewed in cross-section the downwardly depending annular recess 24 is provided with two parallel side walls 32, 34 of substantially the same spacing as the parallel side walls 26, 28 of the base and is also provided with a head portion 36 which is semi-circular in cross-section and whose outer diameter corresponds to the inner diameter of the semi-circular portion of the recess 18.

[0008] Thus, when the lid is placed in place on the base 10, there is a substantially continuous U-shaped area of contact between the annular projection 24 on the lid and the annular recess 18 in the base 10 around the whole periphery of the projection 24 and recess 18.

[0009] It has been found that paint and varnish cans having such a closure are prone to the problem of having the lids becoming dislodged from the can, resulting in leakage of the contents. It is an object of the present invention to provide a closure which overcomes or alle-

viates these problems.

[0010] In accordance with the present invention, a closure for a container comprises an annular base defining an aperture and a lid which is releasably securable on the base over the aperture, one of the base and the lid comprising an annular projection and the other of the base and the lid comprising an annular recess for receipt of and engagement with the annular projection when the lid is secured on the base, characterised in that the profiles of the annular projection and the annular recess differ from one another whereby when the lid is secured on the base there is non-continuous contact between the projection and the recess.

[0011] It has been found that by providing the recessed portion and the annular projection with different profiles, the prevalence of the known problem of lids becoming loose is greatly reduced.

[0012] Preferably, the projection comprises a portion having a rounded profile and preferably the rounded portion, e.g. its apex, contacts a wall of the recess.

[0013] Preferably, the projection has two parallel side walls joined by the rounded portion, the side walls contacting the wall of the recess.

[0014] The areas of contact of the side walls with the wall of the recess are preferably spaced from the area of contact of the rounded portion with the wall of the recess. The areas of contact may be separated by air gaps between the projection and the recess.

[0015] Preferably, the recess comprises a flat base wall. The recess preferably further comprises two substantially parallel side walls joined by the base wall, to which they extend perpendicularly.

[0016] The annular projection may be located on a container lid or on the annular base and similarly the annular recess may be located on a container lid or on the annular base.

[0017] The present invention also includes a container comprises a closure in accordance with the present invention.

[0018] By way of example only, a specific embodiment of the present invention will now be described, with reference to the accompanying drawings, in which:-

Fig. 3 is an exploded diametrical cross-sectional view through an embodiment of closure in accordance with the present invention; and

Fig. 4 is an enlarged cross-section through the interengaging portions of the closure of Fig. 3 when in the closed condition.

[0019] The embodiment illustrated in Figs. 3 and 4 is very similar to the prior art closure described above with reference to Figs. 1 and 2 and the same reference numerals are used for the same features.

[0020] As for the prior art closure described previously, the closure shown in Figs. 3 and 4 comprises an annular, female securing ring 10' which, in use, is fixedly secured to, or forms part of, the upper periphery of a

tubular paint can wall W (illustrated schematically in chain dot). The securing ring 10' illustrated is pressed from metal and its radially innermost edge is rolled back on itself as indicated at 12' to provide a smooth periphery for an aperture 14'.

[0021] Radially outwardly of the central aperture 14' is a stepped annular recess 16' comprising a radially inner deeper recessed portion 18' and a wider, shallower recessed portion 20' radially outwardly of the deeper recessed portion 18'.

[0022] The closure also comprises a generally circular, planar lid 22 for releasably closing the aperture 14 in the ring 10. The lid 22 is also pressed from metal and its periphery is rolled inwardly to hide any sharp edges which might cause injury. The lid 22 is provided with a downwardly-depending annular projection 24 of a diameter corresponding to the diameter of the deeper, recessed portion 18' in the ring. The annular projection 24 comprises two parallel side walls 32, 34 extending substantially perpendicularly to the plane of the lid 22 and a head portion 36 which is semi-circular in cross-section and joins the side walls 32, 34. The spacing of the side walls 32, 34 corresponds to the width of the inner deeper recessed portion 18' in the base 10.

[0023] In use, as for the prior art, the lid 22 is fitted to the base 10' by aligning the downwardly depending annular projection 24 with the recessed portion 18' and pressing the lid onto the base, thereby engaging the annular projection 24 sealingly with the recess 18' with an interference fit.

[0024] The lid 22 is identical to the prior art lid described previously and the ring 10' is virtually identical to the prior art lid described previously with only one significant difference. The significant difference is that, as best seen in Fig. 4, the profile of the recessed portion 18' does not correspond to the external profile of annular projection 24 on the lid. It will be noted that the profile of the recessed portion 18 of the first embodiment is replaced with a recessed portion 18' comprising two opposed parallel side walls 26', 28' which are joined by a flat, planar base wall 40 which extends substantially perpendicularly to each of the side walls 26', 28' and parallel to the shallower recessed portion 20'. The base 10' is otherwise identical to the prior art base 10 described previously.

[0025] Thus, as illustrated in Fig. 4 when the lid 22 is located on the base 10 such that the downwardly-depending annular projection 24 is received and is engaged in the recessed portion 18' with the inner face of the lid 22 in sealing contact with the material forming the aperture 14', there is a non-continuous contact between the exterior of the annular projection 24 of the lid and the internal face or wall of the recessed portion 18' of the base. In particular, it will be observed that the respective parallel side walls 26', 28' and 32, 34 of the base 10' and the lid 22 sealingly engage each other and that the apex 42 of the rounded head of the annular projection 24 contacts the central part of the flat base wall

40 of the recessed portion 18'. Thus, it will be apparent that there are essentially three areas of sealing contact, identified as A, B and C in Fig. 4, and that areas A and C and areas B and C are separated by air gaps 44, 46 respectively. It has been found that by providing the recessed portion 18' with a different profile to that of the annular projection 24, whereby there is a non-continuous contact between the two, the prevalence of the known problem of lids becoming loose from the tin and thereby allowing the contents to escape is greatly reduced.

[0026] The invention is not restricted to the details of the foregoing embodiment. For example, it would be possible for the annular projection 24 to be located on the base 10 and for the receiving recess 18 to be located on the lid 22. Moreover, although the closure has been described as being formed from pressed metal, it is possible for the base and/or lid of the closure to be constructed from other materials such as moulded plastics. In the latter case, the closure may form part of, rather than being secured to, the upper annular rim of the container itself.

Claims

1. A closure for a container, comprising an annular base (10) defining an aperture (14) and a lid (22) which is releasably securable on the base over the aperture, one of the base and lid comprising an annular projection (24) and the other of the base and lid comprising an annular recess (18') for receipt of and engagement with the annular projection when the lid is secured on the base, characterised in that the profiles of the annular projection (24) and the annular recess (18') differ from one another whereby when the lid (22) is secured on the base (10) there is non-continuous contact between the projection (24) and the recess (18').
2. A closure as claimed in claim 1, wherein the projection (24) comprises a portion having a rounded profile.
3. A closure as claimed in claim 2, wherein the rounded portion contacts a wall of the recess (18').
4. A closure as claimed in claim 3, wherein the apex of the rounded portion contacts the wall of the recess (18').
5. A closure as claimed in claim 3 or claim 4, wherein the rounded portion contacts the wall of the recess (18') sealingly.
6. A closure as claimed in any of claims 3 to 5, wherein the portion of the projection having a rounded profile joins two opposed side walls (32, 34) of the projec-

tion.

in the base (10) and/or lid (22) comprise plastics.

7. A closure as claimed in claim 6, wherein the two opposed side walls (32, 34) of the projection are substantially parallel to each other. 5
8. A closure as claimed in claim 6 or claim 7, wherein the side walls (32, 34) of the projection (24) contact the wall of the recess (18'). 10
9. A closure as claimed in claim 8, wherein the side walls (32, 34) of the projection (24) contact the wall of the recess (18') sealingly.
10. A closure as claimed in claim 8 or claim 9, wherein the areas of contact (A, B) of the side walls (32, 34) with the wall of the recess (18') are spaced from the area of contact (C) of the rounded portion with the wall of the recess. 15
11. A closure as claimed in claim 10, wherein the areas of contact (A, B) of the side walls (32, 34) with the wall of the recess (18') are separated from the area of contact (C) of the apex with the recess (18') by air gaps (44, 46) between the projection (24) and the recess (18'). 20
12. A closure as claimed in any of the preceding claims, wherein the recess (18') comprises a substantially flat base wall (40). 25
13. A closure as claimed in claim 12, wherein the substantially flat base wall (40) joins two opposed side walls (26', 28') of the recess (18'). 30
14. A closure as claimed in claim 13, wherein the two opposed side walls (26', 28') are substantially parallel to each other. 35
15. A closure as claimed in claim 14, wherein the two opposed side walls (26', 28') are substantially perpendicular to the base wall (40). 40
16. A closure as claimed in any of the preceding claims, wherein the annular projection (24) is located on a container lid (22) and the annular recess (18') is located in the annular base (10). 45
17. A closure as claimed in any of claims 1 to 15, wherein the annular projection (24) is located on the annular base (10) and the annular recess (18') is located in a container lid (22). 50
18. A closure as claimed in any of the preceding claims, wherein the base (10) and/or lid (22) comprise metal. 55
19. A closure as claimed in any of claims 1 to 17, where-
20. A container comprising a closure as claimed in any of the preceding claims.
21. A container as claimed in claim 20, wherein the base (10) is secured to, or forms part of, an annular upper rim of the container.

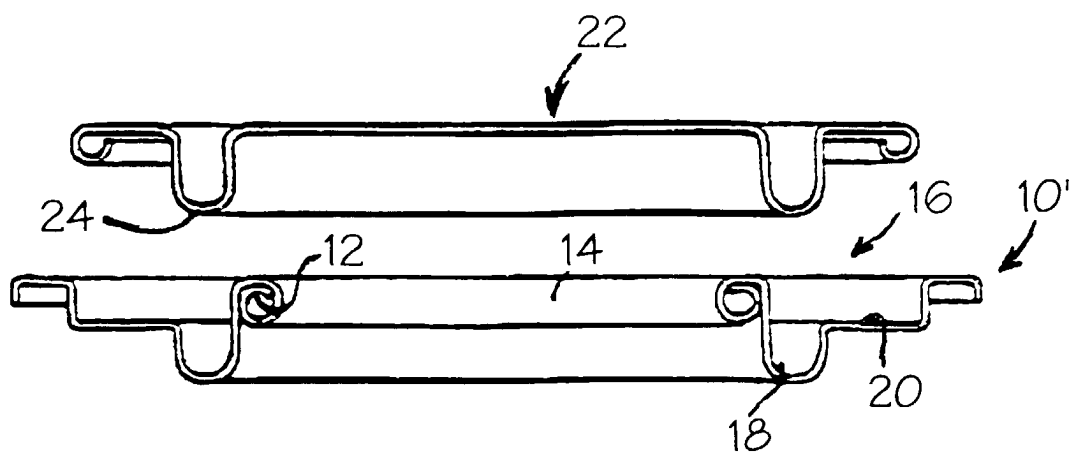
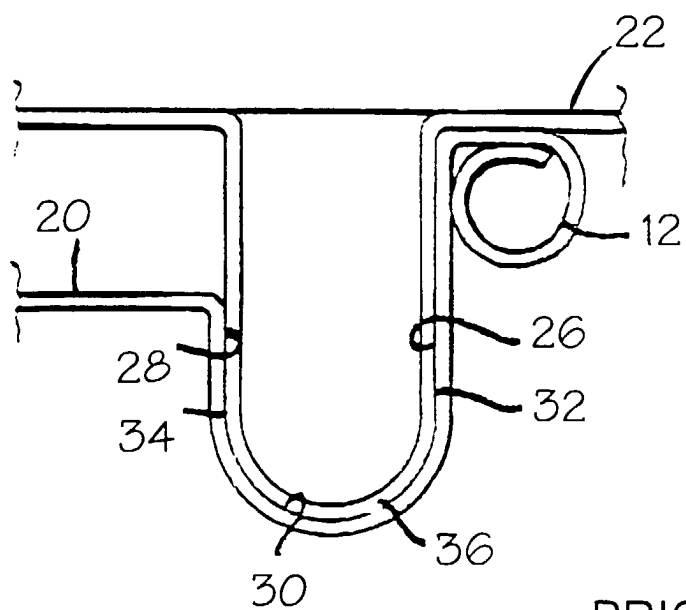
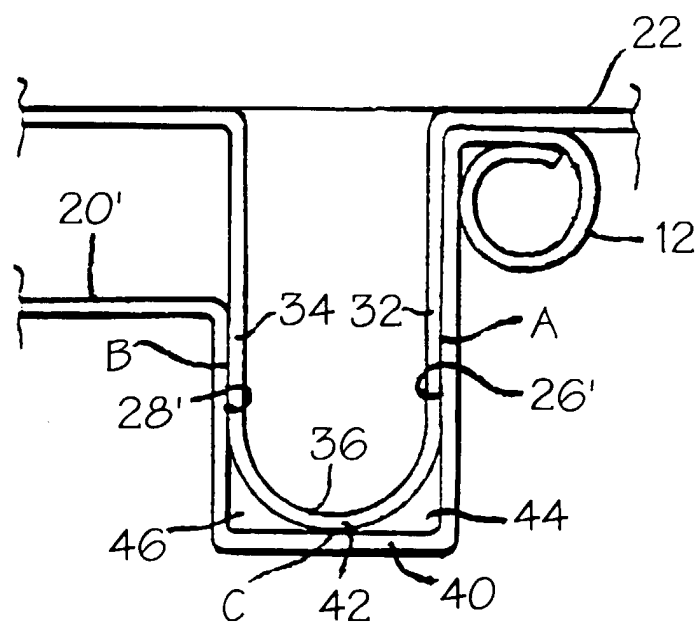
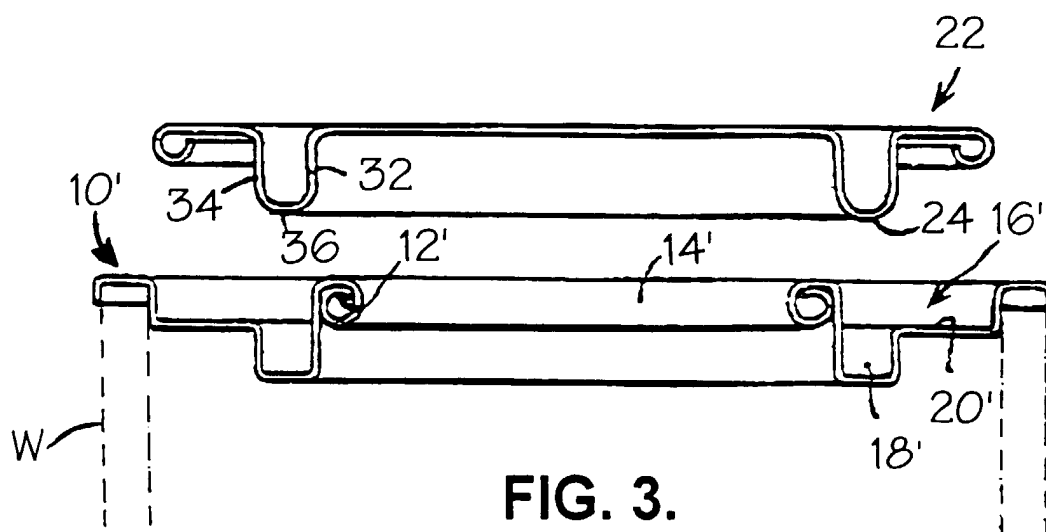


FIG. 1. PRIOR ART



PRIOR ART

FIG. 2.





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 6558

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.7)
X	EP 0 736 460 A (THOMASSEN & DRIJVER) 9 October 1996 (1996-10-09)	1-16, 18-21	B65D43/06
Y	* the whole document *	17	
Y	US 3 944 115 A (MOONAN WILLIAM ET AL) 16 March 1976 (1976-03-16) * column 1, line 60 - column 2, line 8; figures *	17	
X	EP 0 672 591 A (THOMASSEN & DRIJVER) 20 September 1995 (1995-09-20) * column 5, line 31 - column 6, line 22; figures 8-12 *	1-16, 18-21	
X	US 1 568 625 A (ROBINSON) 5 January 1926 (1926-01-05) * the whole document *	1-6	
A	US 4 667 843 A (GALER HERBERT W) 26 May 1987 (1987-05-26) * column 2, line 25 - column 3, line 17; figures *	1-21	
A	US 4 530 442 A (VOGEL JR WILLIAM M ET AL) 23 July 1985 (1985-07-23) * column 2, line 48 - column 3, line 50; figures *	1-21	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
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The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 10 November 1999	Examiner Olsson, B
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 30 6558

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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