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(54) CLOSURE

(71) We, LE BOUCHAGE MECANIQUE (L.B.M.), a Body Corporate organised under the laws of the French Republic, of 6, rue Anatole de la Forge, 75017 Paris, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to tamper proof closures for receptacles having screw-threaded necks particularly, though not exclusively, bottles and flasks.

There are known closures of this type which are formed by a cap and a dependant skirt of cylindrical form on the wall of which there is provided at the time or manufacture by means of incisions or the like, separated bridges of material, a circumferential circular line of weakness dividing the skirt into upper and lower parts, the line defining a plane normal to the closure axis.

At the moment of applying the closure to a receptacle the lower part of the skirt is arranged adjacent a cylindrical portion of the neck of the receptacle while there is formed on the upper part of the skirt a screw thread corresponding to that of the neck of the receptacle.

During the first opening of the receptacle the lower part of the skirt rests adjacent said cylindrical portion of the neck of the receptacle while the screw threaded upper part is subjected to helicoidal displacement which causes rupture of all the bridges of material connecting the two parts of the skirt along the line of weakness.

After the first opening, when the upper screw threaded part of the closure has been rescrewed onto the neck to reclose the receptacle in airtight fashion, the two parts of the closure being intact, only a careful examination allows breakage of the bridges to be observed so that the first opening is not very noticeable, even on turning the receptacle around.

Nowadays however a large number of manufacturers of bottles and official inspection services require, in order to improve the guidance against illicit opening offered by such closures, that the first opening should be evident in an obvious manner by destruction or irreversible disappearance of a noticeable part of the skirt.

It has already been suggested to provide such a closure with a double line of weakness defining a strip which is capable of being separated in a single piece or in several fragments during opening to leave, once the closure has been screwed again onto the receptacle, an exposed part of the neck of the receptacle. However these closures which require careful manufacture in order that the strip may be easily detached have the disadvantage of being vulnerable to damage during their application to the receptacle neck because of the increased number of incisions on the skirt which has the effect of diminishing the resistance of the closure to axial pressure which is a disadvantage during application of the closures when the necks of the receptacles to be closed show deviations from very close manufacturing tolerances.

According to the invention, there is provided a closure for a receptacle having a screw-threaded neck, comprising a skirt to fit around the neck of the receptacle, a cap portion at one end to cover the end of the neck, the skirt being divided into an upper and a lower part by a circumferential line of weakness extending around the skirt and interrupted by at least one skirt portion which is attached to the rest of the skirt only by a plurality of spaced bridges, at least one of the bridges connecting said portion to the upper part and at least one of the bridges connecting said portion to the lower part, wherein rotation of the upper part relative to the lower part to open the closure causes detachment of said portion from at least one of said skirt parts.

Preferably, the line of weakness comprises a perforate line and a further perforate line or lines extend along a boundary between the upper and lower parts and the said portion, said bridges being defined by spacings

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between perforations of the further line or lines.

On first opening of the receptacle, because of the rotation and axial displacement of the upper part of the skirt with respect to the lower part not mounted on the screw-threaded neck of the receptacle said portion or "element" connected to the two parts of the skirt is necessarily deformed or displaced until the rupture of the bridge or bridges attaching it to one of the parts of the skirt. This local destruction, which is inevitable, of the skirt in the region of the element makes obvious the first opening and thus constitutes a guarantee against fraud.

However if an element only exists at a single position along the line of weakness its presence or absence during inspection of a batch of receptacles, especially receptacles aligned along shelves, may be concealed because it is on the hidden side of the closure with regard to the observer or inspector. It is thus necessary to take in the hands the receptacle and subject it to rotation about its axis in order to confirm the presence or absence of the element.

In order to avoid this disadvantage it is therefore preferable to provide a plurality of elements distributed along the line of weakness, preferably two or three elements in order to avoid excessive weakening of the skirt, these elements being distributed along the line of weakness of the skirt and separated one from the others by successive portions of the circular line of weakness in order to make it obvious that the receptacle has been opened without the necessity to the receptacle.

Preferred embodiments of the invention will be described with reference to the accompanying drawings, in which:

Figures 1 to 4 show a closure having a single element in four successive states, that is:

Fig. 1 — before capping (application of the closure to a bottle),

Fig. 2 — after capping,

Fig. 3 — during first opening of the receptacle,

Fig. 4 — after opening;

Figures 5 to 8 show another closure in the same states as in Figures 1 to 4, respectively;

Figures 9 and 10 on the one hand, and 11 and 12 on the other hand, are partial views of closures of two different embodiments in two successive states namely closed and open;

Figures 13 and 14 show two states of a closure having two elements, and

Figure 15 is an enlarged, circumferential view, before opening, at the level of the line of weakness of the closure of Figures 13 and 14.

Referring to Figure 1 it will be seen that

a skirt of the closure before capping comprises a circumferential line of weakness 34 formed by incisions 1 separated by bridges of material 2, this line dividing the skirt into an upper part 3 and a lower part 4. Two additional incisions 5 and 6, here in the form of arcs of circles, define on the line of weakness a portion of the skirt hereinafter referred to as an element 7 connected to the upper part of the skirt by a bridge 8 and to the lower part by a bridge 9.

Figure 2 shows the same closure mounted in place on a screw threaded neck of a bottle. In this state the closure has an annular portion of part 4 mounted in a groove 10 below the screw threaded neck, that is to say, below the line of weakness 34 formed by incisions 1 whereas above this line there is formed on the wall of the skirt screw threading 11 corresponding to threading of the neck of the bottle.

Figure 3 shows how during first opening after rupture of the bridges 2 the element 7 pivots with respect to the surrounding upper and lower parts of the skirt under the influence of the couple which is transmitted to it by bridges 8 and 9 which are not already broken. Finally Figure 4 shows the state of the closure after complete opening of the bottle. In the drawing the bridge 8 is broken and the element 7 is only attached to the lower part of the skirt by the bridge 9, which is on the point of being sheared away from the closure.

It is evident that it would be almost impossible to return the upper part of the skirt and to return to its original place element 7 without breaking the bridge 9. Disappearance of the element 7 would thus readily indicate the first opening of the bottle.

As the detachable element is of smaller circumferential length than that of the line 34, it may be sufficient to attach it to the skirt by only two bridges but it may be preferred in view of the operations required in applying the closure originally to make it less fragile by connecting the parts of the skirt to it by one or two supplementary bridges as is shown in the embodiment of Figures 5 to 8.

It will be seen from these Figures that the element is connected to the parts of the skirt on the one hand by bridges 8 and 9 and on the other hand by supplementary bridges 8a and 9a. Bridge 8a is between incisions 6a, bridge 9a is between incisions 5a and bridges 8, 9 are each between a respective pair of incisions 5a, 6a.

It is desirable to provide that bridges 8 and 9 should be wider than the supplementary bridges 8a and 9a in order to ensure progressive pivotal movement in the same sense of the element 7 during the first opening (see Figure 7) until rupture of all the

bridges except one. In the case of Figure 8, it is assumed that this last bridge was bridge 8.

5 In the preceding embodiments the detachable element is circular and extends symmetrically on both sides of the line of weakness.

10 In Figure 9 on the other hand the detachable element 15 is situated entirely above the line of weakness 40 and it is connected to the upper part of the skirt by a bridge 16 and to the lower part by a bridge 17, an auxiliary bridge 18 formed between incisions 41 being provided for reducing the fragility of the element in order to increase its strength during application of the closure. The bridges 16, 17 and 18 are formed between incisions 41.

20 Figure 10 shows progressive deformation of the closure of Figure 9 during the first opening. In the state of the closure shown in this figure, the bridge 18 is already broken but bridges 16 and 17 are being sheared.

25 Figures 11 and 12 show a similar embodiment to that of Figures 9 and 10, with the difference that the element 20 in the form of a semicircle is situated below the line of weakness 40 formed by incisions 1. In this case, bridges 42 are formed between incisions 43.

30 In the closures described above circular or semicircular elements have been chosen but it is evident that any other shape (oval, square, rectangular etc.) may be used.

35 In Figure 13 there is shown a closure 21 having two elements in which the skirt 22 has a circular line of weakness 33 formed by incisions 23 separated by breakable bridges such as 24. A first series of supplementary incisions arranged in this embodiment in the form of a rectangle defines a rectangular detachable element 25 which extends symmetrically on both sides of the line of weakness. This element is defined, with reference to Figure 13, by two vertical incisions 26a and 26b and by a double series of incisions arranged horizontally 27a and 27b separated by breakable bridges respectively 28a and 28b reinforcing the attachment of the detachable element to the upper and the lower parts of the skirt. These attachments are further assured by bridges 29 and 30 respectively connecting the detachable element to the upper and lower part of the skirt. In the same way, on a region of the rear of the skirt, as viewed in Figure 13, which is approximately diametrically opposed to element 25, a second series of incisions 31 defines a second detachable rectangular element 32 at the level of the circular line of weakness 33.

60 In Figure 14 it is seen that as in Figure 7 the bridges 24 and the bridges 28a and 28b of a detachable element 25 are already broken whereas one of the two bridges 29

and 30 is about to be broken. There is shown in dotted lines the detachable element 32 of which the bridges, upper and lower, corresponding to bridges 28a and 28b of the detachable element 25 are broken whereas the diagonally opposite bridges of the element 32 and homologous to bridges 29 and 30 are about to be broken.

70 In Figure 15 which shows an enlarged, circumferential view of the skirt at the level of the circular line of weakness 33 there are shown rectangular detachable elements 25 and 32. At the level of the line of weakness and the elements there is inscribed a schematic text in the form of letters of the alphabet. It will be seen that the part of this text disappearing at opening of the bottle after detaching of the two detachable elements is greater than with a single such element which makes the opening of the bottle more evident.

75 When the skirt has two detachable elements, it is advantageous to arrange them on positions of the skirt which are approximately diametrically opposed. This makes the presence or absence of the elements and consequently the opening or non opening of the bottle obvious without having to pivotably move the latter about its axis. When the skirt has more than two detachable elements they may be arranged, preferably regularly, around the skirt along the circular line of weakness. There should remain between any two elements a space which preferably does not exceed a third of the circumferential length of the line of weakness.

80 It is possible if desired to print on the detachable element all or part of a design or inscription which disappears at the same time as the element and thus improves the guarantee. In particular, in the case of bottling of alcoholic beverages the detachable element may bear all or part of a fiscal stamp or seal which is irredeemably destroyed during first opening of the receptacle.

85 Because of the relatively small number of incisions required in the skirt compared with prior art constructions, the closure according to the invention retains a resistance to crushing. This resistance is practically equal to that of tamper proof closures of the conventional type which only have a single horizontal line of weakness.

90 Further the relatively small number of incisions and the relatively small size of the detachable element has the advantage of safeguarding to a greater extent the aesthetic appearance of the closure and allows to be imposed on the closure designs, trademarks or publicity slogans printed outside the detachable element which are conserved when the detachable element is removed.

95 It will be appreciated that, in each em-

bodiment, there is a single, i.e. only one, circumferential line of weakness extending around the skirt. However, the boundary between the element and the upper and/or lower skirt part forms an additional line or lines of weakness. In the embodiments of Figures 1 to 8, the line 34 extends around the circumference and elements 7 are formed symmetrically on both sides of the line of weakness. In the embodiments of Figures 1 to 4, incision 6 and bridge 8, and incision 5 and bridge 9 form further lines along the boundary lines between element 7 and the upper skirt part 3 and the lower skirt part 4 respectively. In the embodiments of Figures 5 to 8 the incisions 6a and bridges 8 and 8a, and incisions 5a and bridges 9 and 9a form further lines along the boundary lines between element 7 and the upper skirt part 3 and the lower skirt part 4 respectively.

In the embodiments of Figures 9 to 12, the line of weakness 40 extends around the circumference and element 15 (Figures 9 and 10) lies above the line of weakness while element 20 (Figures 11 and 12) lies below the line of weakness. In the embodiment of Figures 9 and 10, the bridges 16 and 18 and the incisions 41 between them form a boundary between element 15 and the upper skirt part. In the embodiment of Figures 11 and 12, the bridges 42 and the incisions 43 between them form a further line along the boundary between element 20 and the lower skirt part.

In the embodiment of Figures 13 to 15, the line of weakness 33 extends around the circumference. The bridges 28b, 30, 28a and 29 and the incisions between them form further lines along the boundary between element 25 and the upper and lower skirt parts.

It will be appreciated that, in each embodiment, the line of weakness is interrupted by at least one skirt portion which is attached to the rest of the skirt only by a plurality of spaced bridges.

WHAT WE CLAIM IS:—

1. A closure for a receptacle having a screw-threaded neck, comprising a skirt to fit around the neck of the receptacle, a cap portion at one end to cover the end of the neck, the skirt being divided into an upper and a lower part by a circumferential line of weakness extending around the skirt and interrupted by at least one skirt portion which is attached to the rest of the skirt

only by a plurality of spaced bridges, at least one of the bridges connecting said portion to the upper part and at least one of the bridges connecting said portion to the lower part, wherein rotation of the upper part relative to the lower part to open the closure causes detachment of said portion from at least one of said skirt parts.

2. A closure according to Claim 1, wherein the line of weakness comprises a perforate line and wherein a further perforate line or lines extend along a boundary between the upper and lower parts and the said portion, said bridges being defined by spacings between perforations of the further line or lines.

3. A closure according to Claim 1 or Claim 2, having a plurality of said portions along the line of weakness.

4. A closure according to Claim 3, in which said portions are distributed symmetrically around the skirt along the line of weakness.

5. A closure according to Claim 4, provided with two of said portions diametrically opposed with respect to the skirt.

6. A closure according to any one of the preceding claims, in which said portion is positioned entirely on the side of the line of weakness of the lower part of the skirt.

7. A closure according to any one of Claims 1 to 5, in which said portion is circular and extends symmetrically on both sides of the line of weakness.

8. A closure according to any one of Claims 1 to 5, in which said portion is rectangular and extends symmetrically on both sides of the line of weakness.

9. A closure according to any one of the preceding claims in which said portion bears a design or inscription.

10. A closure according to Claim 9, in which said portion bears at least part of a fiscal stamp or seal.

11. A closure for a receptacle, substantially as hereinbefore described with reference to the accompanying drawings.

12. A receptacle, provided with a closure as claimed in any preceding claim.

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In the embodiments of Figures 9 to 12, the line of weakness 40 extends around the circumference and element 15 (Figures 9 and 10) lies above the line of weakness while element 20 (Figures 11 and 12) lies below the line of weakness. In the embodiment of Figures 9 and 10, the bridges 16 and 18 and the incisions 41 between them form a boundary between element 15 and the upper skirt part. In the embodiment of Figures 11 and 12, the bridges 42 and the incisions 43 between them form a further line along the boundary between element 20 and the lower skirt part.

In the embodiment of Figures 13 to 15, the line of weakness 33 extends around the circumference. The bridges 28b, 30, 28a and 29 and the incisions between them form further lines along the boundary between element 25 and the upper and lower skirt parts.

It will be appreciated that, in each embodiment, the line of weakness is interrupted by at least one skirt portion which is attached to the rest of the skirt only by a plurality of spaced bridges.

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only by a plurality of spaced bridges, at least one of the bridges connecting said portion to the upper part and at least one of the bridges connecting said portion to the lower part, wherein rotation of the upper part relative to the lower part to open the closure causes detachment of said portion from at least one of said skirt parts.

2. A closure according to Claim 1, wherein the line of weakness comprises a perforate line and wherein a further perforate line or lines extend along a boundary between the upper and lower parts and the said portion, said bridges being defined by spacings between perforations of the further line or lines.

3. A closure according to Claim 1 or Claim 2, having a plurality of said portions along the line of weakness.

4. A closure according to Claim 3, in which said portions are distributed symmetrically around the skirt along the line of weakness.

5. A closure according to Claim 4, provided with two of said portions diametrically opposed with respect to the skirt.

6. A closure according to any one of the preceding claims, in which said portion is positioned entirely on the side of the line of weakness of the lower part of the skirt.

7. A closure according to any one of Claims 1 to 5, in which said portion is circular and extends symmetrically on both sides of the line of weakness.

8. A closure according to any one of Claims 1 to 5, in which said portion is rectangular and extends symmetrically on both sides of the line of weakness.

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