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(54) Closing device, particularly for containers with guarantee seal.

(57) A closure device, particularly for containers with a seal of guarantee which are formed by a lid (1) and a tray (2) made of plastic materials that can be coupled hermetically together along respective complementarily shaped peripheral edges (3, 4) ; comprises at least one engagement member (8) that protrudes from one of the edges of the tray (4) or of the lid (3) and can be inserted only in one direction in a corresponding opening (14) formed on the other one of the edges of the lid or of the tray. An engagement member (8) formed on the edge (3) of the lid (1) at a corner or at a protrusion thereof is joined to the edge (3) of the lid with tabs (12) that have a minimum resisting cross-section. The engagement member (8) includes a central pin (9) with an expanded end (10) that is shaped like a bulb or an arrow and from which a series of longitudinal stiffening ribs (11) extends radially ; the opening (14) has a flared side wall (15) which is shaped substantially complementarily to the expanded end (10) of the opposite engagement member (8). The closure device has the advantage of high functionality and economy in manufacture.

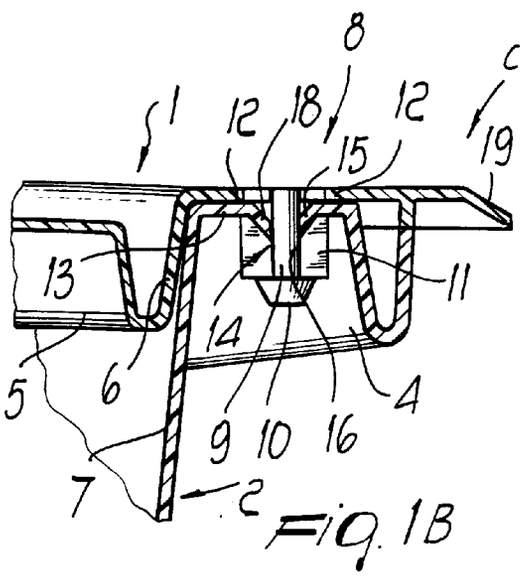


Fig. 1B

EP 0 610 904 A2

The present invention relates to a closure device particularly for containers with a seal of guarantee formed by a lid and by a tray made of plastic materials, obtained by injection-molding or with other forming processes, that can be mutually hermetically coupled along their peripheral edges.

Closure devices of the above described type are commonly used for widely-used food product containers, described and claimed for example in the Italian patent application no. VI92A000079 filed on May 13, 1992 in the name of the same Applicant, the contents of which are included in the present application as reference. However, it is briefly noted that this prior application provides for a removable seal that normally prevents the lid from being raised in order to clearly indicate the integrity of the package. The seal consists of a portion of the edge of the tray, which is joined to the rest of the tray by means of thin tabs or stress raisers. When closed, the edge of the tray adheres perfectly to, and is uniformly blended with, the edge of the lid so that it has no protrusions or gaps with respect to the lid. A particular embodiment of this container provides for a means for the automatic mutual coupling of the detachable portion of the tray and the facing region ofg the lid which can be engaged when the lid is closed onto the tray and cannot be disengaged even after breaking the seal and opening the container. However, in this case, too, the edge of the lid and the edge of the tray have such a shape that they are blended perfectly when closed, so as to make it more difficult to separate them except by breaking the seal of guarantee. This configuration offers the maximum assurances of hygiene and tamper protection, but it can entail some difficulties in opening it, especially for individuals that have limited dexterity or for older people, and is furthermore rather complicated from the point of view of execution.

The aim of the present invention is to provide a closure device, particularly suitable for containers with a seal of guarantee, which is highly functional but at the same time simple and cheap.

A particular object of the present invention is to provide a closure device that shows clear evidence that it has been opened after its first use so as to be itself, in practice, a seal of guarantee.

According to the invention, a closure device as defined in the introduction is characterized in that it includes at least one engagement member that protrudes from one of the edges of the tray or of the lid and can be inserted, in only one direction and without the possibility of disengagement, in a corresponding opening formed on the other edge.

Preferably, each engagement member is formed on the edge of the lid at a corner or protrusion thereof.

Each engagement member is joined to the edge of the lid with tabs that have a minimum resisting cross-section, so that it can be easily separated from the edge of the lid with limited efforts.

The engagement member can include a central body which is shaped like a pin, with an expanded end that is preferably shaped like an arrow or a bulb; a series of longitudinal stiffening ribs extends radially from the pin, and their outer diameter is greater than the maximum transverse dimension of the expanded end of the pin.

Each opening is formed on the edge of the tray in a position that faces a corresponding engagement member which is formed on the edge of the lid and has a side wall whose flared shape is substantially complementary to the shape of the expanded end of a facing pin.

The opening can have a central hole, whose diameter is substantially identical to the diameter of the central body of the engagement member, and a series of notches to allow the passage of the radial ribs of the engagement member and to make the wall give elastically.

Each opening can be formed on a portion of the edge of the tray which is connected to the rest of the edge by means of tabs that can be broken by efforts applied to the portion in an upward direction, in a downward direction and/or transversely in any direction.

With a closure device according to the invention, one obtains the advantage of a simple and effective system for mutually coupling the lid and the tray that can act as a tamper-evident seal of guarantee and can be opened easily even by individuals with limited manual dexterity.

Further characteristics and advantages of the present invention will become apparent from the description of some preferred but not exclusive embodiments of a closure device, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1A is a top view of a portion of a container with a closure device according to a first embodiment of the invention;

Figure 1B is a sectional view of the device of Figure 1A, taken along the vertical plane I-I;

Figure 2A is a top view of a second embodiment of a closure device according to the invention;

Figure 2B is a sectional view of the device of Figure 2A, taken along the vertical plane II-II;

Figure 3A is a top view of a third embodiment of a closure device according to the invention;

Figure 3B is a sectional view of Figure 3A, taken along the vertical plane III-III;

Figure 4 is a slightly enlarged perspective view from below of a detail of the device of the preceding figures.

The figures schematically illustrate a detail of a container, generally designated by the reference letter C and obtained by hot injection of melted plastic material, such as polyethylene, polystyrene, polypropylene. The container C is formed by a lid 1 and by a

tray 2 that can be mutually coupled along complementarily shaped edges respectively designated by the reference numerals 3 and 4. The container can have any shape in plan view, for example a circular or polygonal one. For the sake of simplicity, the figures illustrate a corner portion of a container that has a rectangular or square base without thereby limiting the scope of the invention.

With particular reference to Figures 1A and 1B, the peripheral edge 3 of the lid can have a corrugation 5 with a vertical wall 6 that is elastically in contact with the inner wall 7 of the tray 2 when the lid is closed.

According to the invention, an engagement member, generally designated by the reference numeral 8, extends from the peripheral edge 3 of the lid 1 and is constituted by an elongated central body 9 shaped like a cylindrical pin that has an expanded end 10 shaped like a truncated conical arrow. A series of radial ridges or ribs 11 extends from the central body 9 and has the purpose of stiffening the central body 9 and of increasing its mechanical strength. The engagement member 8 is joined to the upper edge 3 by means of connecting tabs 12 that have a minimal resisting cross-section so that they can be easily separated from the edge 3 by means of manual efforts applied parallel or normal to the longitudinal axis of the member.

As an alternative, the engagement member can have shapes other than the arrow-like one, for example approximately bulb-like with a rounded or tapered end, which are in any case suitable to achieve the functions that will become apparent hereinafter.

The peripheral edge 4 of the tray has a portion 13 which is substantially flat and faces the engagement member 8, with an opening 14 formed by a flared side wall 15 which is shaped complementarily to the expanded end 10 of the member 8, and by a central hole 16 which approximately has the same diameter as the central body 9 of the member 8.

Notches 17 are formed in the flared wall 15 of the opening 14 at the ribs 11 of the engagement member 8 in order to allow its passage when the member 8 is inserted in the opening 14. In this manner, the notches 17 form in the flared wall 15 a series of elastic radial laminas or protrusions 18.

In use, after filling the tray, the lid 1, shown in solid lines in Figure 1A, is placed manually or mechanically so as to align each member 8 with a corresponding opening 14 and is then lowered so as to insert the expanded end 10 in the hole 16. The elastic laminas 18, compressed by the expanded end 10, flex outward elastically, allowing both the end 10 and the ridges 11 to pass through the notches 17. Once the expanded end 10 has passed beyond the narrowest section of the hole 16, the elastic laminas 18 close onto the central pin 9 so as to prevent extraction of the member 8 from its seat. In this manner, the elastic laminas 18 allow insertion of the engagement member 8 in one direction but do not allow its extraction in the opposite direction, ensuring the tamper-protection of the package.

When one wishes to open the container for the first time, the lid 1 must be raised by acting on the lateral tongue 19 of the edge of the lid. With a limited effort it is possible to separate the member 8 from the edge 3 so as to release the lid 1. The member 8 may be retained elastically by the tongues 18 so that it does not fall onto the bottom of the tray 2. In any case it forms an opening signal and accordingly can act as a "seal of guarantee".

In Figures 2A and 2B, the members that correspond to those of Figures 1A and 1B are designated by the same reference numerals with the addition of primes. The embodiment illustrated in Figures 2A and 2B differs only due to the presence, at the portion 13′ of the edge of the tray 4′, of a stress raiser 20 and of breakable tabs 21 and 22 which are suitable to allow easy separation of the portion 13' itself from the rest of the tray 4' by means of upward efforts. In this manner, by gripping the tongue 19' that is coupled to the edge of the lid and lifting it upward with a preset force, the engagement member 8' lifts from the opening 14', consequently separating the portion 13' from the edge 4' of the tray and simultaneously separating the engagement member 8' from the edge of the lid 3'.

In a similar manner, in Figures 3A and 3B the corresponding members have been designated by the same reference numerals provided with a double prime. This third embodiment differs from the preceding one of Figures 2A and 2B merely in that instead of the tongue 19' rigidly coupled to the edge 3' of the lid there is a tongue 23 used as a tab of the edge 4" of the tray 2". In this case, too, there is a stress raiser 20" and there are breakable tabs 21" and 22" at the portion 13" of the edge 4" of the tray 2". In this manner, by lowering the tongue 23 with a preset force it is possible to separate the portion 13" from the edge 4" of the tray and the engagement member 8" from the edge 3", so as to release the lid 1" from the tray 2".

The closure device according to the invention achieves the intended aim and objects; in particular, its considerable simplicity and low cost, combined with evident easy use, are noted.

The closure device according to the invention is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept expressed in the accompanying claims and are understood to be equally protected.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each member identified by way of example by such reference signs.

Claims

1. Closure device particularly for containers with a seal of guarantee, formed by a lid (1; 1'; 1") and by a tray (2; 2'; 2") made of plastic materials which can be mutually hermetically coupled along respective complementarily shaped peripheral edges (3; 3'; 3"; 4; 4'; 4"), characterized in that it comprises at least one engagement member (8; 8'; 8") that protrudes from one of the edges of the tray (4; 4'; 4")or of the lid (3; 3'; 3") and can be inserted, in only one direction and without the possibility of disengagement, in a corresponding opening (14; 14'; 14") formed on the other edge of the lid or of the tray.

2. Closure device according to claim 1, characterized in that each engagement member (8; 8'; 8") is formed on the edge of the lid (3; 3'; 3") at a corner or lateral protrusion thereof.

3. Closure device according to claim 2, characterized in that said engagement member (8; 8'; 8") is joined to the edge of the lid by tabs (12; 12'; 12") that have a minimal resisting cross-section so that it can be easily separated from said lid by forces or rotations in an upward direction, in a downward direction and/or transversely in other directions.

4. Closure device according to claim 3, characterized in that said engagement member (8; 8'; 8") comprises a central pin (9; 9'; 9") with an expanded free end (10; 10'; 10").

5. Closure device according to claim 4, characterized in that said expanded free end (10; 10'; 10") is substantially bulb-shaped.

6. Closure device according to claim 4, characterized in that said expanded free end (10; 10'; 10") is substantially arrow-shaped and is connected to the median portion of said pin (9; 9'; 9") by means of a series of longitudinal radial stiffening ribs (11; 11'; 11").

7. Closure device according to claim 6, characterized in that said expanded end (10; 10'; 10") has a maximum transverse dimension that is less than the outer diameter of the stiffening ribs (11; 11'; 11").

8. Closure device according to claims 1 to 7, characterized in that each opening (14; 14'; 14") is formed on the edge of the tray (4; 4'; 4") in a position that faces a corresponding pin (8; 8'; 8") formed on the edge (3; 3'; 3") of the lid (1; 1'; 1").

9. Closure device according to claim 8, characterized in that said opening (14; 14'; 14") has a flared side wall (15; 15'; 15").

10. Closure device according to claim 8, characterized in that said opening (14; 14'; 14") has a central hole (16; 16'; 16") that has substantially the same diameter as the median portion of said pin (9; 9'; 9").

11. Closure device according to claim 9, characterized in that the flared lateral wall (15; 15'; 15") of said opening (14; 14'; 14") has one or more radial protrusions (18; 18'; 18") which are directed inward and are suitable to engage the expanded end (10; 10'; 10") of said pin (9; 9'; 9").

12. Closure device according to claim 11, characterized in that said radial protrusions (18; 18'; 18") consist of a series of radial notches (17; 17'; 17") formed in the flared side wall (15; 15'; 15") of said opening for the passage of said stiffening ribs (11; 11'; 11") of the engagement member (8; 8'; 8").

13. Closure device according to claim 10, characterized in that each opening (14; 14'; 14") is formed on a portion (13; 13'; 13") of the edge of the tray (4; 4'; 4") which is connected to the rest of the edge by means of tabs (20', 21'; 20", 21") that can be broken by applying an effort to said portion (13; 13'; 13") in upward direction, in a downward direction and/or transversely in any direction.

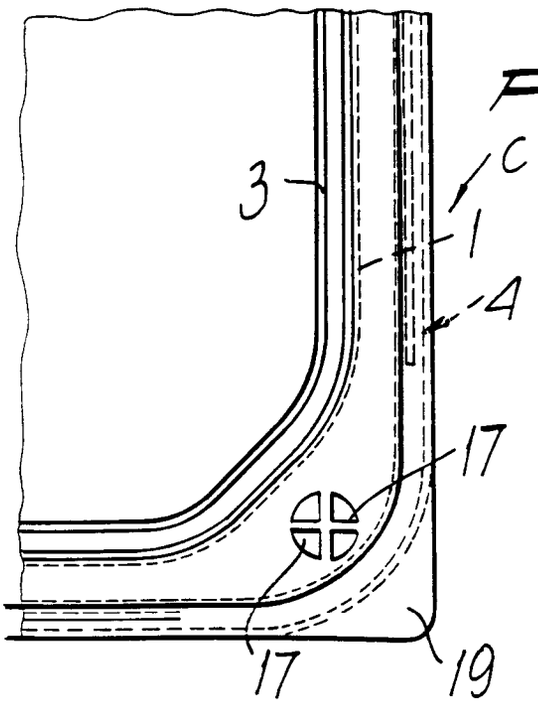


FIG. 1A

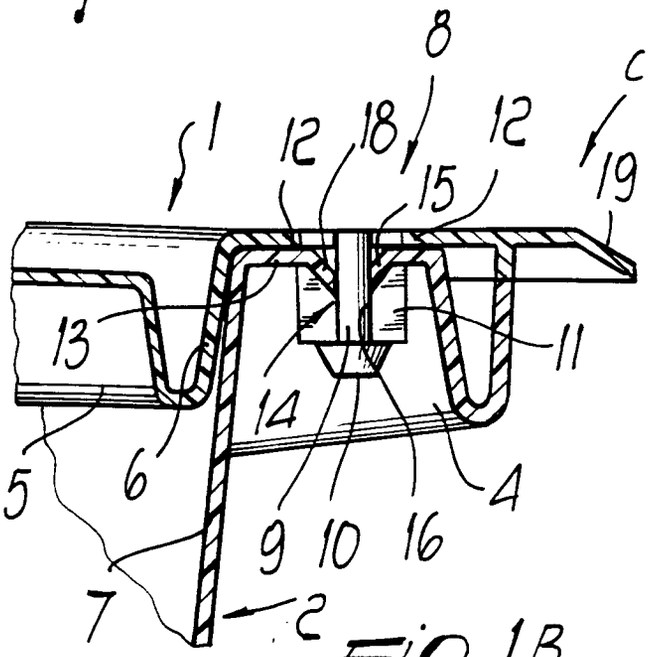


FIG. 1B

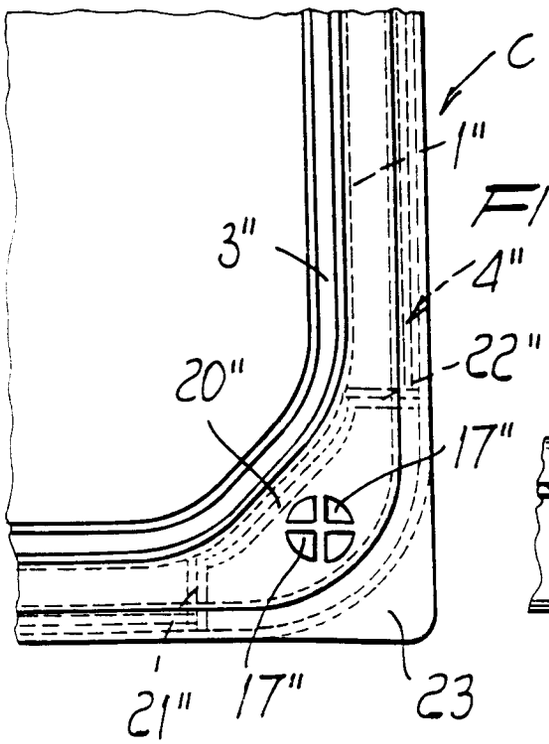


FIG. 2A

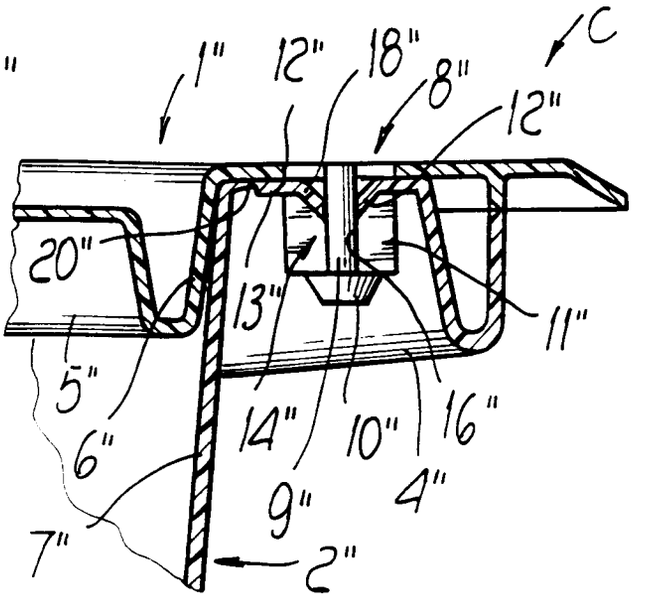
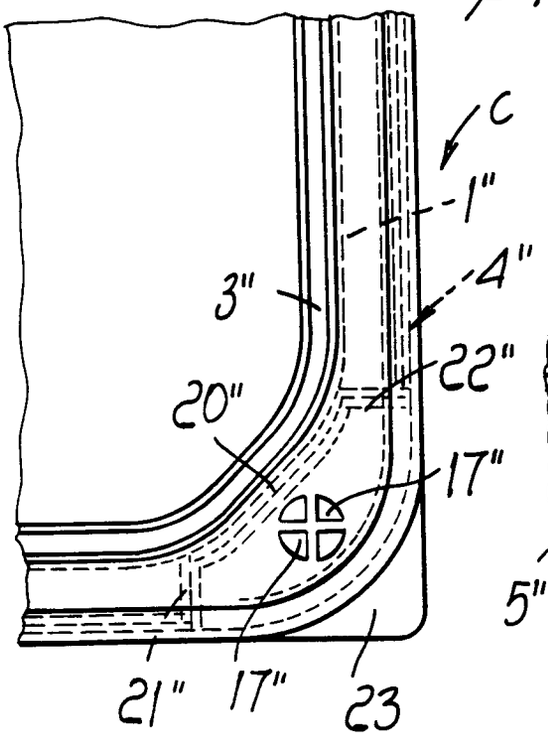


FIG. 2B

FIG. 3A



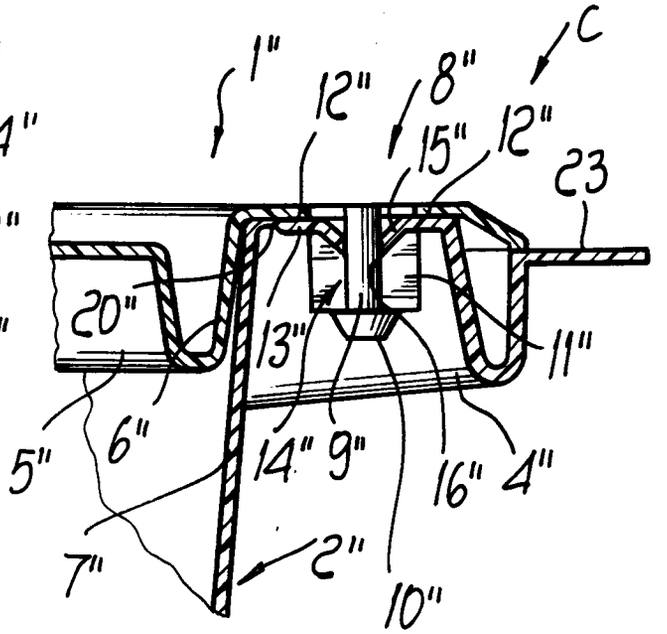


FIG. 3B

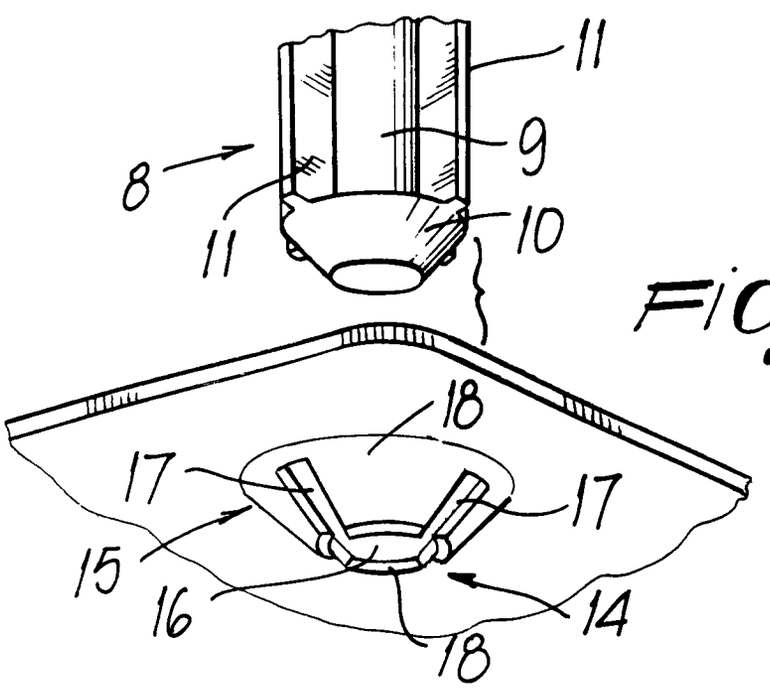


FIG. 4