

[54] **CLAMPING RING HAVING A CLOSURE MEMBER MADE OF SYNTHETIC PLASTICS MATERIAL**

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[22] Filed: **Aug. 6, 1974**

[21] Appl. No.: **495,289**

[30] **Foreign Application Priority Data**

Aug. 9, 1973 Germany..... 2340360

[52] **U.S. Cl.**..... 24/16 PB

[51] **Int. Cl.²**..... **B65D 63/00**

[58] **Field of Search**..... 24/16 PB, 73 PB, 206 A, 24/17 A, 17 AP, 305 P, 230 B, 230 F; 248/74 PB; 292/322, 320

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[57] **ABSTRACT**

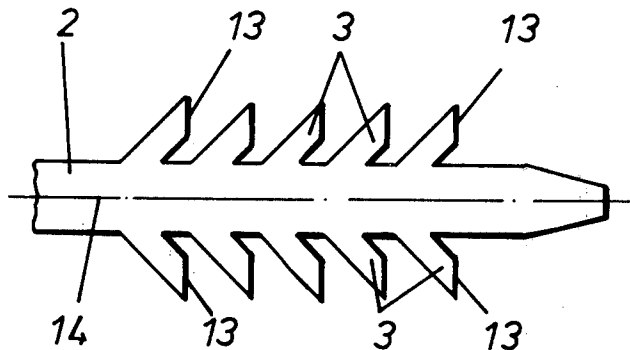
A clamping ring is provided with a closure that is made of synthetic material and wherein the closure has catch elements into which the end of a clamping ring engages. A detachable or non-detachable closure can be used. The closure can be formed by two side members, and wherein over-lappings are avoided.

[56] **References Cited**

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12 Claims, 7 Drawing Figures



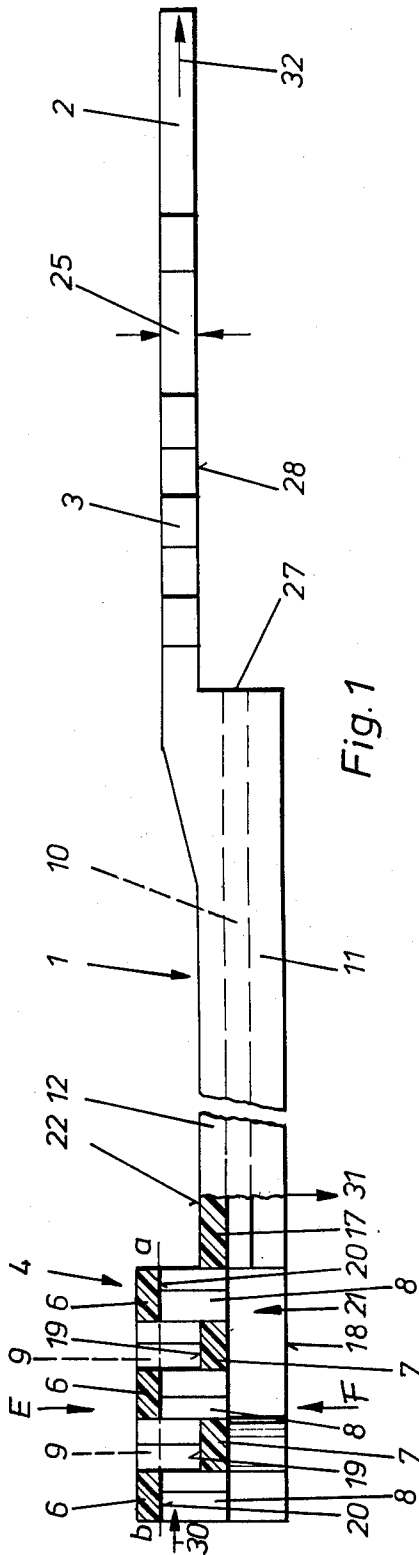


Fig. 1

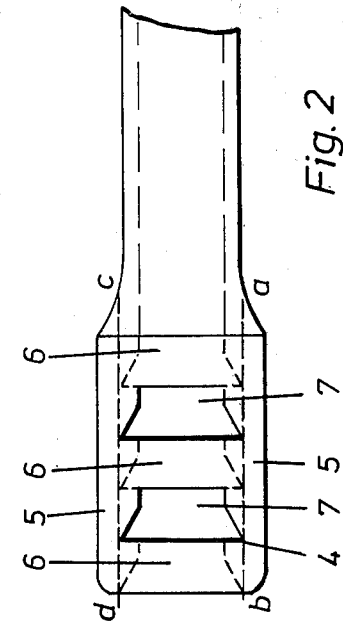


Fig. 2

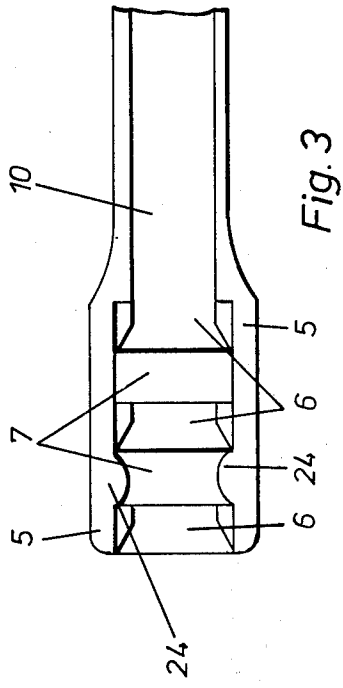


Fig. 3

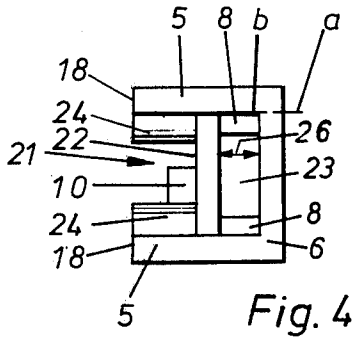


Fig. 4

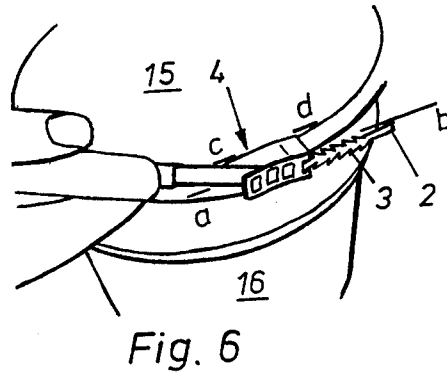


Fig. 6

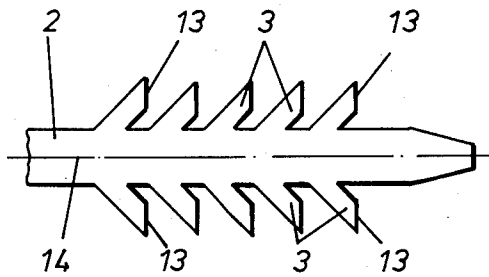


Fig. 5

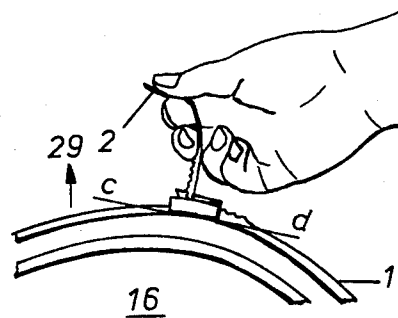


Fig. 7

CLAMPING RING HAVING A CLOSURE MEMBER MADE OF SYNTHETIC PLASTICS MATERIAL

This invention relates to a clamping ring with closure made of synthetic material whereby the closure has catch elements into which the end of the clamping ring in the form of a toothed tongue engages.

The problem of the invention is to simplify the manufacture of a clamping ring with at the same time construction of the ring and catch elements for extremely large loads and to design a detachable or non-detachable closure by simple additional measures.

The solution of the problem is achieved in that the closure is formed by two side members with distance bridge pieces not overlapping on the upper side and level with the base of the clamping ring whereby along the side members saw-tooth like catch elements corresponding to the number of distance bridge pieces are provided and the tongue like end of the clamping ring has catch elements in the form of pawls.

By the solution according to the invention with the clamping ring closure, overlappings are avoided. The closure may be inject moulded in a two part mould which does without sides slides. Thereby the manufacturing process is uncomplicated and cheap. It is now possible to provide a plurality of saw-tooth like catch elements along the side parts and side walls. This has however again the advantage that the clamping force is caught by several catch teeth in the closure as well as also at the tongue like end. The catch teeth in the closure part thus lie respectively below or above the distance bridge pieces. With the injection procedure in the two-part injection mould a portion of the catch teeth and the distance bridge pieces are made in the lower half of the mould while the upper half of the mould supplies the other catch teeth and distance bridge pieces. The individual halves of the mould are interconnected with one another during the injection procedure. Likewise however no overlappings occur as with the other parts of the clamping ring so that lateral injection can be dispensed with. In the same injection process the side parts of the closure and the clamping ring are also produced.

On the closure there are provided suitably under the distance bridge pieces level with the base of the clamping member reinforcing bridge pieces running along the side parts towards the underside closure. These reinforcing bridge pieces serve for the stiffening of the closure and at the same time as a point of engagement for the pushers for the enjection of the injection moulding part from the injection mould.

With the construction of the tongue like end of the clamping ring it is important that the pawls of the tongue like end are arranged spread out at an acute angle in respect of the longitudinal axis of the clamping ring and the tips of the pawls terminate at approximately right angles in respect to the longitudinal axis of the clamping ring and the tips of the pawls terminate in an approximate right angle with respect to the longitudinal axis of the clamping ring due to the spreading out a secure resilient attachment inside the catch teeth is possible. With the action of the force due to the shape of the pawl like catch elements these are loaded only to a small extent with tangential forces to prevent the shearing off of the pawls. On the contrary pressure forces which occur over the faces of the pawls perpendicular to the longitudinal axis are supported laterally

in the closure which act in the longitudinal direction of the pawls to the center point of the clamping ring member. A shearing off of the pawls is in this manner avoided in the same way as by means of the plurality of catch elements in engagement with one another rupture occurs only with extremely great forces.

A further essential feature of the invention consists in that the closure part is connected via a U-shaped projection to the tongue-like end the open side of the U-profile directed towards the part to be closed merges into the receiving space of the closure member and the upper side of the connecting piece of the U-shape profile is flush with the distance bridge pieces of the ratchet space.

According to this construction, there is present a projection inside the closure member, the inside opening of which, is likewise U-shaped and divides into a receiving space and a ratchet space. This division is essential. In the receiving space means are arranged, namely supporting elements which are a construction of the catch elements of the ratchet space. These support elements prevent the profile of the receiving space open downwards from being capable of being substantially spread out if in the receiving space the edge of the lid and the edge of the container is inserted.

The same purpose is served if in the U-profile of the projection a reinforcing bridge piece is disposed.

This separation between the receiving space and the ratchet space is especially important if it is desired to design the non detachable closure detachable.

For this it is necessary for the underside of the distance bridge pieces of one side to be detachable connected to one of the side members, for example, after cutting has been effected and the other side connected to the side member forms a flexible edge so that a lid is capable of being bent for the ratchet space to the applied.

The tongue-like end with the pawls is upon closing of the closure thereby placed on the distance bridge pieces and catches thereon. Due to the fact that the distance bridge pieces which separate the ratchet space and the receiving space from one another are taken care of so that the tongue like end always receives a pull on the containers and the lid, the locking pressure is always maintained even if the lid after an incision is bent up. If it is desired to release the closure then the tongue is simply torn out of this incision which is opened correspondingly when the lid is bent upwards.

For this construction it is essential for the closure to consist of a thermoplastic, injection mouldable plastics material so that it may be suitably deformed.

Essential for a satisfactory handling is also the fact that the height of the tongue-like end corresponds to the height of the ratchet space, which provides good locking action.

The same purpose is also served in that the projection has a stop which associates with the underside of the tongue-like end the same distance from the supporting face as the underside of the distance bridge pieces.

By this measure it is achieved that the catch teeth have an optimum locking action because the tongue-like end is guided parallel to the upper face of the distance bridge pieces. The catch faces of the teeth are then flush with the corresponding catch elements in the closure part.

One embodiment of the invention is illustrated in the accompanying drawings by way of example.

FIG. 1 shows a longitudinal clamping ring partly in section according to the invention with the arrangement of the reinforcing bridge pieces and the catch teeth in the closure member;

FIG. 2 shows a plan view of the closure member;

FIG. 3 shows an underneath plan view of the closure member;

FIG. 4 shows a front view of the locking member;

FIG. 5 shows the arrangement of the pawls on the tongue-like end of the clamping ring;

FIG. 6 shows the adjustment of a non-detachable closure spaced apart;

FIG. 7 shows the releasing of the closure in spartial representation.

In FIG. 1 the clamping ring member 1 is illustrated on the tongue-like end 2 of which are disposed pawls 3 in double rows. The other end of the clamping ring forms the closure member 4 which is also referred to as a block. This closure member 4 has two side parts 5 in FIG. 2 and FIG. 3 which are connected to one another by distance bridge pieces 6. Displaced relatively these distance bridge pieces 6 are then provided further distance bridge pieces 7 flush with the base 12 of the clamping ring member. The distance bridge pieces 6,7 are so arranged that no obstruction occurs in the direction of injection in manufacture. Under the distance bridge pieces 6 and above the distance bridge pieces 7 are disposed saw tooth-like catch elements 8 and 9 along the side faces 5. The two part injection mould for the manufacture is closed in the direction of the arrow E-F. Because of the lack of obstruction the manufacture is less expensive.

In FIG. 3 is shown the side member 5 and the catch elements 9. They continue towards the supporting face 18 as supporting elements 24. They serve at the same time for the engaging of the ejectors from the injection mould as can be seen in FIG. 3.

FIG. 4. shows a front view of the closure members with the side faces 5 and the catch elements 8 underneath the first distance bridge piece 6. Furthermore there can be seen a longitudinal side reinforcing bar 10 which runs inside the longitudinal axis of the clamping ring. The clamping ring member is thereby formed from two side parts 11 with the base 12. Inside this U-shaped arrangement the reinforcing bar 10 runs in the longitudinal axis of the clamping ring 1.

The tongue-like end 2 is according to FIG. 5 provided with a double row of pawls 3 which are arranged symmetrically with the center line 14. Upon placing together the clamping ring end with the closure part the pawls 3 catch into the catch elements 8,9 of the closure part 4.

Locking faces 13 running perpendicularly to the center line 14 transmit the load over a large surface on the pawls 3.

FIGS. 6 and 7 show the connection of a lid 15 of a container 16 by means of the clamping ring member 1 with closure part 4. By slitting the closure member 4 along the separating line *a-b* there is provided a non-detachable closure. If FIGS. 1 and 2 are compared this lid can be bent up around the bending edge *c-d* from the center line *a-b* in the direction of the arrow E (FIG. 1). If the tongue like end 2 is bent and drawn upwards in the direction of the arrow 29 (FIG. 7) then the closure is released.

The special construction of the closure member ensures that same locking action and closing force is pres-

ent even if the distance bridge pieces 6 are released on one side in its connection with the side member 5.

Essential for this invariable locking action with non-detachable closure is the fact that a projection 17 is present which has a U-shaped profile and side member 17 is present which has a U-shaped profile and side member 11 on the base 12. The upper side 22 of the base 12 is thus flush with the upper side 10 of the distance bridge pieces 7. If now the tongue-like end 2 is guided around the closing member and introduced in the direction of the arrow 30 then it can be seen due to the stop 27 of the projection 17 that the underside 28 of the tongue-like end 2 lies flat on the upper side 19 of the distance bridge pieces 7. Thus the locking teeth 3 lie exactly parallel to the catch elements 8,9. An optimum locking action is thereby ensured. The height 26 of the locking space is substantially the same as the height 25 of the tongue-like end. Due to the presence of the stop 27, with the fixing pressure there is always exercised a force in the direction of the arrow 31, that is, on the support 18. The pressure does not vary even when by flapping up the lid formed by the distance bridge pieces 6 the underside 20 of the bridge piece 6 is removed from the tongue 2. By means of the distance bridge pieces 7 the receiving space 21 is separated from the locking space 23. Even if the edges of the parts to be closed are not level the closing action is thereby not adversely affected because the underside 28 of the tongue-like end 2 lies on the upper side 19 of the distance bridge pieces 7.

To sum up it can be seen that with a minimum manufacturing expenditure, that is, with simple injection moulds with closure part 4 made of a thermoplastic synthetic material it is succeeded in manufacturing cheaply a closure which permits great closing forces, in a detachable as well as also a non-detachable construction and furthermore is suitable to compensate also tolerances in the parts to be connected. In particular the supporting elements 24 permit a satisfactory introduction of the parts to be closed, they also reduce the friction between the parts to be closed in the receiving space 21 upon tightening up the closure. Thus we have succeeded in achieving the greatest locking forces in the locking space 23 because upon drawing the tongue-like end 2 when closing the direction of the arrow 30 then this whole traction force is effective in the locking space.

What we claim is:

1. A clamping ring fastener made of plastic with a one piece fastener head molded to one end of the clamping ring, said one end having a passage, the other end of the clamping ring having a tongue-shape, said passage permitting the tongue-shaped end to be pushed therein, saw teeth respectively disposed on the lateral edges of the tongue-shaped end and on the lateral walls of the passage for interengaging with each other; characterized in that the fastener head (4) has lateral walls (5) that are interconnected on the upper side and at the level of the base of the clamping ring (1) by spacing bars (6,7) that do not overlap, so that the saw teeth (8,9) are disposed on two lateral walls always opposite each other on the places of departure of the spacing bars, and wherein stop latches (3) are disposed on the tongue-shaped end (2) so that they are positioned at an acute angle in relation to the longitudinal axis of the clamping ring and so that they are disposed approximately at a right angle to said longitudinal axis.

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2. The clamping ring as defined in claim 1 wherein under the spacing bar (7) flush with the base (12) of the clamping member (1) saw teeth (9) are provided running along the side members (5) towards the underside of the closure.

3. A clamping ring according to claim 1 characterized in that the stop latches (3) of the tongue-like end (2) are arranged spread out in an acute angle in respect to the center line (14) of the clamping ring and the tips (3) of the stop latch in the locking direction have locking faces (13) running perpendicularly to the center line of the clamping ring.

4. A clamping ring according to claim 1 characterized in that the closure member (4) is connected to the tongue-like end (2) via a U-shaped member (17).

5. A clamping ring according to claim 1 characterized in that the saw teeth (9) enter the locking space (23) and are reinforced as supporting elements (24) in the receiving space (21).

6. A clamping ring according to claim 5 characterized in that a stiffening bridge piece (10) is disposed in the member (17).

7. A clamping ring according to claim 6 characterized in that the saw teeth (9) extend as far as the supporting face (18).

8. A clamping ring according to claim 7 characterized in that the height (25) of the tongue-like end (2) corresponds to the height of the locking space (23).

9. A clamping ring according to claim 5 characterized in the fastener head (4) consisting of a thermoplastic injection moldable synthetic material.

10. A clamping ring as defined in claim 1 characterized in that the under side (20) of the spacing bar (6) of one side is detachably connected, after an incision has been effected in one of the side members (5), the other side of the spacing bar (6) being connected to the side member (5) forming a bending edge (c-d) so that a lid capable of being bent up for locking space (23) is provided.

11. A clamping ring according to claim 1 characterized in that the member (17) has a stop (27) associated with the under side (23) of the tongue-like end (2) at the same distance from the supporting face (18) as the upper side (19) of the spacing bar (7).

12. A clamping ring as defined in claim 1 characterized in that the distance of the walls (5) in the closure member (4) is greater than the distance (11) of the side member of the member (17).

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