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(54) **CLOSURE PLUG AND OVERSEAL**

VERSCHLUSSTOPFEN UND ORIGINALVERSCHLUSS

BOUCHON DE FERMETURE ET CAPSULE DE GARANTIE

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Description

[0001] This invention is directed to a closure combination comprising a closure plug and a tamper evident, closure overseal for shipping containers; such as drums.

BACKGROUND OF THE INVENTION

[0002] In today's global political climate the security of drummed products is coming under ever closer scrutiny. This, coupled with the need for normal tamper vigilance, is driving a trend toward the increased use of effective tamper indicating seals on all types of shipping containers. It has long been the practice to apply overseals of one kind or another with special hand and power tools which were able to crimp a metal portion of the overseal tightly around an upstanding opening neck designed to receive the seal. This type of overseal is rather costly as are tools for their application. Moreover, the application step itself is quite labour intensive and relatively inefficient. Consequently a number of hand applied overseals have come forth which to a certain degree obviate the above-mentioned application tools. These hand-applied overseals are for the most part easily snapped onto the container opening neck and usually almost as easily snapped off. While these plastic snap-on overseals serve to dress up a container such as a 55 gallon drum, giving the closure area a finished appearance and some added degree of cleanliness, there is still much to be desired in terms of drum security. To be effective such drum closure overseals need to meet a number of rather demanding criteria. Obviously the hand application has to be simple and relatively effortless to satisfy normal filling line speeds. Once the drum is shipped, of paramount importance is the ability of the overseal to guard against unauthorized access to the drum contents. This means that the overseal cannot be physically removed without destroying same or making such unauthorized access clearly noticeable and such that the overseal cannot be reapplied in unaltered form to the drum closure. In this regard, plastic, manually-applied overseals currently in general use for both steel and plastic drums are, for the most part, easily pried off in an undetected manner particularly when in a warmed state. In other words "easy-on easy-off".

[0003] Also of importance is the ability of the overseal to resist inadvertent damage during handling and shipment. Commonly employed tamper detection devices such as frangible locking rings, shrink bands and the like found on consumer packages are not at all suited for use on 55 gallon drums. One can easily see that any inadvertent or accidental damage to the tamper resistant overseal immediately raises the question, has the drum security been breached or compromised in some way or is this simply damage to be expected resulting from normal handling? This aspect dictates that any tamper detecting feature be sufficiently robust to remove any question of doubt as to whether unauthorized entry has in fact

occurred.

[0004] A performance criteria also of major importance is the ease with which the overseal can be removed from the underlying drum closure in an authorised manner such that subsequent replacement of the overseal is not possible. Normally this requires destruction of the overseal in some fashion to prevent reuse. In this regard the use of sharp cutting or puncturing implements is undesirable due to the likelihood injury or of accidental damage to the underlying closure. Thus, in addition to the overseal's robust construction, hand removeability is yet another advantageous attribute.

PRIOR ART

[0005] Document DE-A-36 37 644 discloses a closure plug and tamper evident overseal combination for shipping containers (11), the closure plug (2) and the overseal (3) having hidden, complimentary, interlocking, snap-fit features (7, 8, 10) and a frangible portion (9) to permit removal of the overseal from the plug. The interlocking features comprise "On the under side of the seal cap (3), there are integrally formed two half-shells (7), projecting into the stopper cavity between the wrench attachments (5), which half-shells - when the seal cap (3) is snapped on - engage with the help of arresting projections (8) - arranged at their lower end - behind corresponding undercuts (10) in the lateral wall of the stopper cavity, and that above the arresting projections (8), predetermined breaking notches (9) are provided in the outer jacket of the half-shells (7)." [Col. 1 lines 13-22]. The undercut 10 is shown by Figs 1 and 2 to only to extend to either side of wrench attachments (5). Also, the relative angular position of the plug and overseal is critical for fitting the one to the other as the half-shells (7) could foul the wrench attachments (5).

OBJECT OF INVENTION

[0006] It is an object of the present invention to provide a solution to the tamper-detection problems of the closure plug and tamper evident overseal combination as described in respect of document DE-A-36 37 644.

STATEMENT OF INVENTION

[0007] According to the present invention, a closure plug and a tamper evident, closure overseal combination for shipping containers, comprises a closure plug having a cylindrical, cup-shaped body with axially-extending, wrench engaging lugs about the inner periphery of the plug sidewall and a segmented, radially and circumferentially extending groove formed in the sidewall and an overseal having axially extending, resilient legs, each having a radially-extending foot for hidden, complimentary, interlocking, snap-fit engagement with the radial groove undercuts and a visible frangible portion to permit removal of the overseal from the plug; wherein the inner,

segmented locking groove is formed by a radial undercut at the base of each lug, as defined in claim 1.

[0008] When it comes to removal in an authorized manner, manually tearing the visible frangible portion of the overseal results in the interengagement of the interlocking features being released and the overseal is easily removed. However, unlike the overseal of document DE-A-36 37 644, the overseal of the present invention is quite obviously destroyed and rendered completely unusable for resealing.

[0009] The present invention also extends to closure plugs in accordance with the combination of the present invention.

[0010] According to another, further embodiment of the present invention, the closure plug has axially extending wrench engaging lugs equi-spaced about the inner periphery of the plug sidewall and the space between lugs may be at least as great as the width of the lugs.

[0011] The above and further features of the present invention are illustrated, by way of example, the following description and drawings.

DRAWINGS

[0012]

Fig. 1 is a vertical cross sectional view of a closure combination in accordance with a first embodiment of the present invention;

Fig. 2 is an enlarged fragmentary sectional view of the plug wrench engaging lug of the closure plug of Fig. 1;

Fig. 3 is a top plan view of the closure plug of Fig. 1;

Fig. 4 is a vertical cross sectional view of the closure overseal of Fig. 1;

Fig. 5 is a bottom plan view of the overseal shown in Fig. 4;

SPECIFIC DESCRIPTION

[0013] In the embodiment shown by Figs 1 to 5, a wall 1 of a container, such as an industrial size plastic drum, has an upstanding neck 2 defining an internally threaded opening in the container wall. The neck 2 terminates at its upper end in an annular gasket seat 3a surrounded by an upstanding collar 4. Immediately beneath the collar 4 is a peripheral annular bead 5.

[0014] A cup shaped closure plug 6, having a bottom wall 7 and an externally threaded sidewall 8, is screwed into the neck 2. The plug has a circumferentially enlarged head 9 with a gasket retaining groove 10 and resilient sealing gasket 11 on the undersurface thereof. Looking at the top surface of the plug in Fig. 3, there are a series of four equally spaced wrench engaging lugs 12 which are hollowed out as indicated at 13. Also, it can be seen that the width of the lugs 12 is slightly less than the width of the gaps 14 therebetween. Each lug has two radially extending wrench engaging surfaces 15 and a radially

inwardly facing guide surface 16. The base of each lug 12, where it joins the plug bottom wall 7, is radially undercut to form a locking groove 17 designed to interlockingly engage the closure overseal in a manner described hereinafter.

[0015] The closure overseal 20 consists of an imperforate cap moulded of synthetic plastic resin having a disc-like top wall 21 surrounded by a peripheral depending skirt 22. A segmented collet depends from the central portion of the cap made up of a series of axially elongated leg segments 23 clearly shown in Fig. 4. Each segment terminates at its distal end in a radially outwardly projecting foot 24 having a bottom cam surface 25. A tear strip 26 is formed in the cap and is defined by a pair of score lines 27 extending diametrically across the top wall 21 so as to intersect the segmented collet shown, for purposes of illustration, with three of the segments 23 on one side of the tear strip 26 and three segments on the other side of the tear strip. As the score lines 27 approach the cap skirt 22 they diverge outwardly at 28 and continue across the skirt including the circumferentially enlarged portion 22a down to the skirt edge. A tearing ear 29 extends outwardly from either end of the tear strip and is provided with a raised outer edge bead 30 to facilitate gripping.

[0016] In practice the plug 6 is screwed into the upstanding neck 2 of a shipping container, such as a blow moulded plastic drum, and tightened by a suitable plug wrench designed to exert a force against the wrench engaging surfaces 15 of the lugs 12. Tightening torque applied in this matter causes the gasket 11 to become compressed against the neck gasket seat 3 providing a leak proof liquid seal. The overseal 20 is then placed over the plug with the segmented collet generally axially aligned with the central portion of the plug defined by the wrench engaging lugs. Simply pressing the overseal by hand onto the plug causes the camming surfaces 25 on the segment feet 24 to deflect the segments 23 radially inwardly upon forceful contact with the top of the wrench engaging lugs 12. As the segment feet move axially along the lug guide surfaces 16, the skirt free edge contacts the neck bead 5 causing the skirt enlargement 22a to expand thereover. In fully seated position the segment feet 25 snap into the wrench engaging lug grooves 17 expanding back out to their moulded position. This snap-fit interlocking engagement permanently secures the overseal to the plug and, of course, the plug to the container opening since the wrench engaging lugs are rendered inaccessible. In fact, as seen in Fig. 1, the segmented collet itself is inaccessible to any kind of pry off tool making unauthorized removal of the overseal extremely difficult, if not impossible, without destroying the overseal or certainly leaving very clear evidence of tampering. To assure the necessary security the arcuate grooves 17 extend laterally and are disposed completely below the plug head top surface and open in an axial plane. The design of the closure plug and overseal is such that the overseal will snap-fit with the plug irrespective of their relative angular

position. The overseal 20 is an interference fit on the container neck bead 5.

[0017] To gain authorized access to the container contents one tearing ear 29 is grasped aided by the raised bead 30 and pulled outwardly separating the tear strip 26 along the score lines 28 and 27 from the rest of the cap. Removal of this top wall section allows the segmented collet to collapse; releasing the segment feet 25 from the grooves 17. This release condition occurs when the tearing action reaches the far side 4 of the top wall 21. At this point, the destroyed and released overseal simply lifts off of the neck 2 still in one piece so that loose cap fragments do not become a problem. Once the overseal is torn off, not only is there assurance against prior opening of the container but in addition the plug and surrounding gasket seat remain dirt free and uncontaminated.

[0018] Various other changes in or modifications of the closure combination of the present are possible; for example the number and spacing of the collet segments could vary.

Claims

1. A closure plug and tamper evident, closure overseal combination for shipping containers comprising:-

a cup-shaped closure plug (6) having:-

a plug sidewall (8),
axially-extending, wrench-engaging lugs
(12) about the inner periphery of the plug
sidewall (8),
and
an inner, segmented locking groove (17),
wherein the closure plug (6) has a bottom
wall (7);
and

an overseal (20) having:-

axially extending, resilient legs (23), each
with a radially-extending foot (24) for hid-
den, complementary, snap-fit, interlocking
engagement with locking groove segments
(17), and
a visible frangible portion (26) to permit re-
moval of the overseal from the plug;

characterised in that:-

the base of each lug (12), where it joins the plug
bottom wall (7), is radially undercut to form the
locking groove segments (17).

2. A closure plug for the closure plug and tamper evident, closure overseal combination of claim 1.

3. A closure plug as claimed in claim 2, wherein the

lugs (12) extend axially and are equi-spaced about the inner periphery of the plug sidewall (8) with the space between lugs at least as great as the width of the lugs.

4. A closure plug as claimed in claim 2 or claim 3 and having four lugs (12).

Patentansprüche

1. Kombination aus Verschlussstopfen und (manipulationssicherem) Originalitätsverschluss für Versandbehälter, umfassend:

einen topfförmigen Verschlussstopfen (6) mit:

einer Stopfenseitenwand (8),
axial verlaufende Schlüsseleingriffsansätze
(12) um den inneren Umfang der Stopfenseitenwand (8) herum,
und
eine innere segmentierte Verschlußausnehmung (17),
wobei der Verschlussstopfen (6) eine Bodenwand (7) aufweist;
und

eine Überdichtung (20) mit:

axial verlaufenden, elastischen Schenkeln
(23), jeweils mit
einem radial verlaufenden Fuß (24) zum
verdeckten, komplementären, ineinandergreifenden Rasteingriff mit Verschlußausnehmungssegmenten (17),
und
ein sichtbarer zerbrechlicher Abschnitt (26),
der eine Entfernung der Überdichtung von dem Stopfen erlaubt;

dadurch gekennzeichnet, dass

das Unterteil jedes Ansatzes (12) dort, wo er an der Stopfenbodenwand (7) ansetzt, radial unter-schnitten ist, um die Verschlußausnehmungs-segmente (17) zu bilden.

2. Verschlussstopfen für die Kombination aus Verschlussstopfen und Originalitätsverschluss von Anspruch 1.

3. Verschlussstopfen nach Anspruch 2, wobei die Ansätze (12) axial verlaufen und in gleichen Abständen um den inneren Umfang der Stopfenseitenwand (8) herum angeordnet sind, wobei der Abstand zwischen Ansätzen zumindest so groß wie die Breite der Ansätze ist.

4. Verschlussstopfen nach Anspruch 2 oder 3 und vier Ansätze (12) aufweisend.

Revendications

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1. Combinaison de bouchon de fermeture et capsule de garantie de fermeture, inviolable, pour conte-neurs d'expédition, comprenant :

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un bouchon de fermeture (6) en forme de coupelle, comportant :

une paroi latérale de bouchon (8),
des pattes d'engagement de clé (12) s'étendant axialement, autour de la périphérie interne de la paroi latérale de bouchon (8),
et
une rainure de verrouillage segmentée interne (17) ;
le bouchon de fermeture (6) comportant une paroi inférieure (7) ;
et

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une capsule de garantie (20) comportant :

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des jambages élastiques (23) s'étendant axialement, chacun pourvu d'un pied (24) s'étendant radialement pour un engagement par verrouillage réciproque, par encliquetage, complémentaire, dissimulé, avec des segments de rainure de verrouillage (17),
et
une partie susceptible de rupture (26), visible, pour permettre d'enlever la capsule de garantie du bouchon ;

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caractérisée en ce que :

la base de chaque patte (12), à l'emplacement de sa jonction avec la paroi inférieure de bouchon (7), est radialement découpée par en dessous pour former les segments de rainure de verrouillage (17).

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2. Bouchon de fermeture pour la combinaison de bouchon de fermeture et capsule de garantie de fermeture, inviolable, selon la revendication 1.

3. Bouchon de fermeture selon la revendication 2, dans lequel les pattes (12) s'étendent axialement et sont équidistantes autour de la périphérie interne de la paroi latérale de bouchon (8), l'espace entre les pattes étant au moins aussi grand que la largeur des pattes.

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4. Bouchon de fermeture selon la revendication 2 ou la revendication 3 et comportant quatre pattes (12).

Fig.1.

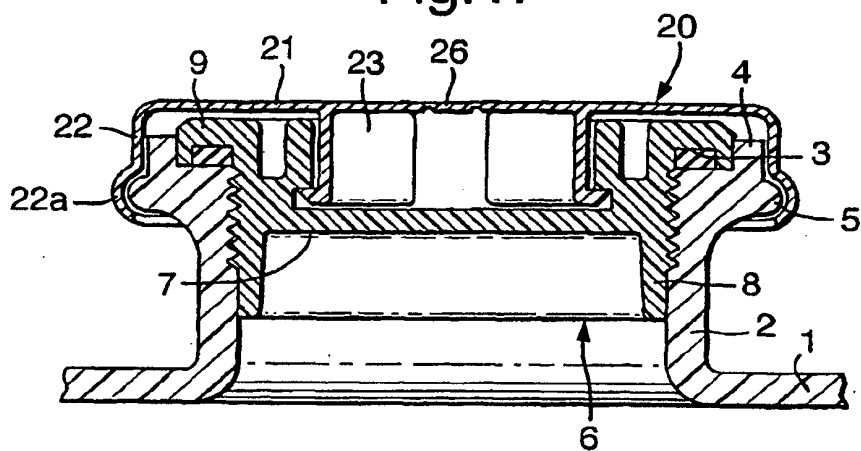


Fig.2.

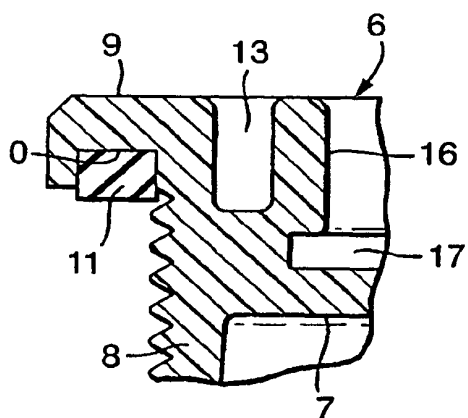


Fig.3.

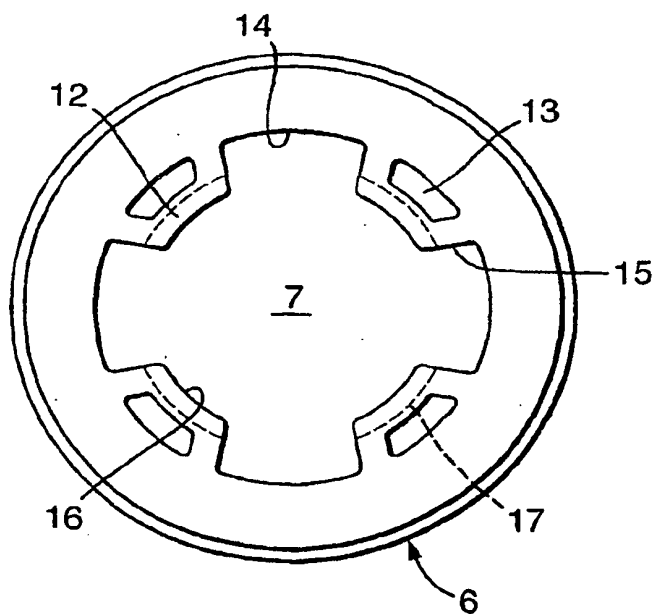


Fig.4.

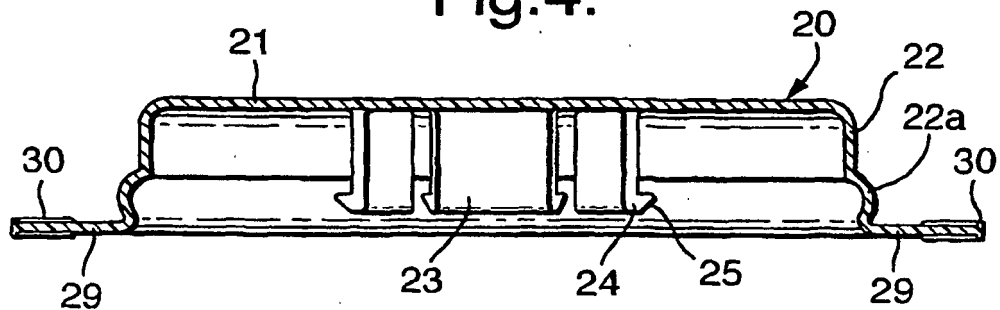


Fig.5.

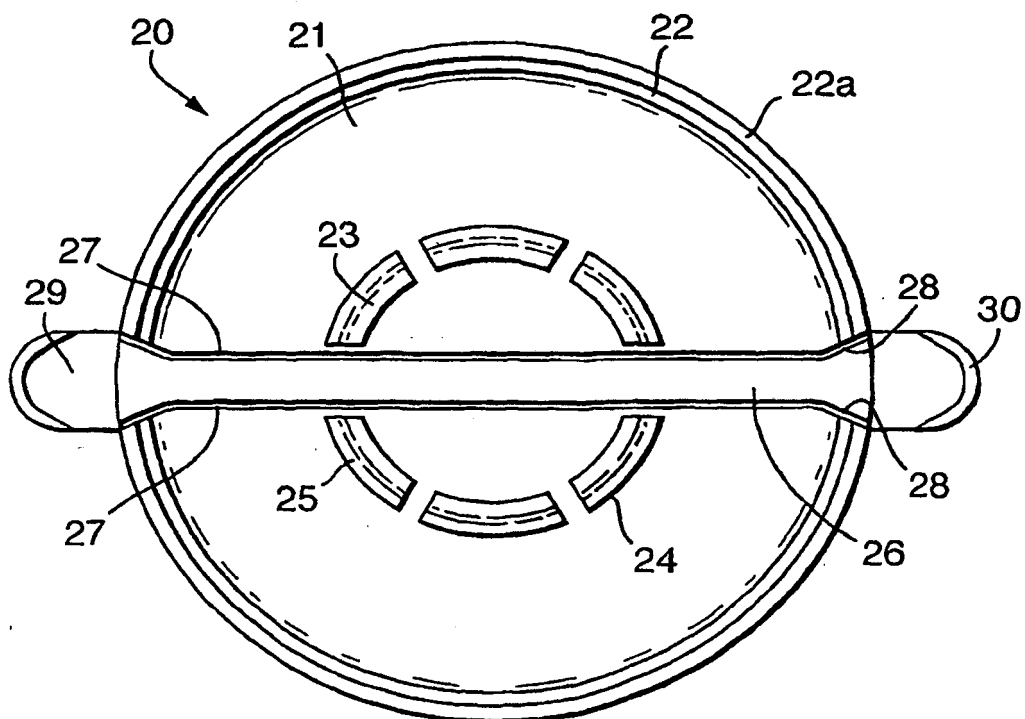


Fig.6.

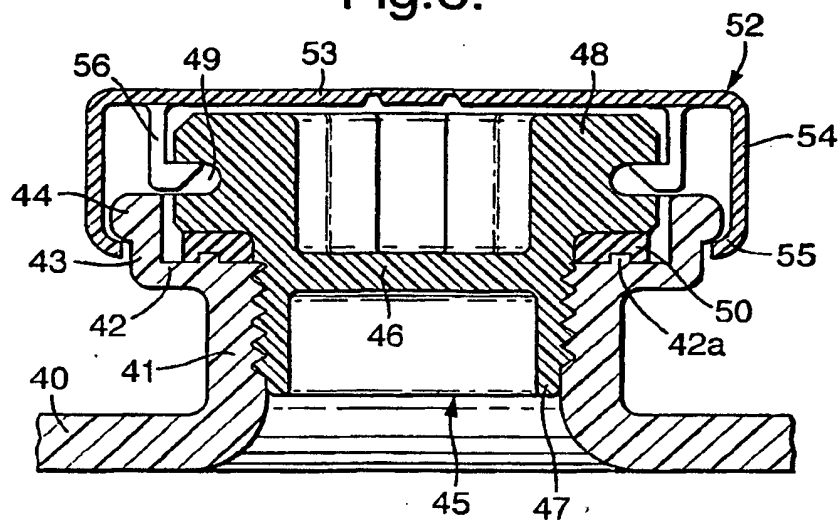


Fig.7.

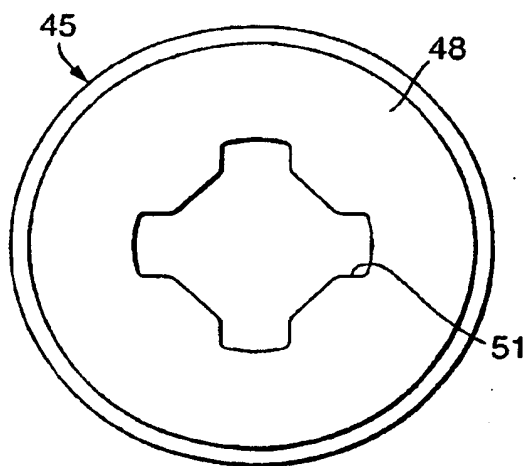
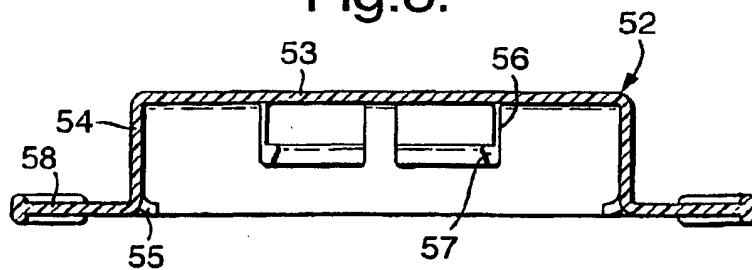


Fig.8.



REFERENCES CITED IN THE DESCRIPTION

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