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(54) **RESEALABLE BEVERAGE CONTAINER AND TOP THEREFOR**

WIEDERVERSCHLIESSBARER GETRÄNKEBEHÄLTER UND DECKEL DAFÜR

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Description

Technical Field

[0001] This invention relates to container ends according to the preamble of claim 1 and a method of manufacturing them according to claim 9.

Background Art

[0002] The current known forms of easy open container end, using a tear-open pour panel operated by an integral or "attached" tab, while universally acceptable in more affluent societies, particularly in the beer/beverage market, is somewhat of a luxury convenience item. These can be recycled insofar as they are constructed primarily of aluminum, but despite many efforts a successful reclosable device or mechanism, particularly one built into the original container, has not been given favor in the marketplace, for a number of reasons. Such containers have thus been relegated to use as one time, throw-away packaging, and they are not capable of keeping fluid contents secure while permitting intermittent partial dispensing of the contents after initial opening.

[0003] Prior to, and during the introduction of, easy-open can ends, a form of container was available having a generally frusto-conical top on a can body and provided with a non-reclosable crown-type cap. Some of those even had a separate reclosable cover threaded to a neck and covering the crown-type cap which was to be discarded once opened, as typified by the disclosure in U.S. Patent 2,337,616. These containers, for various reasons, failed to maintain market acceptance.

[0004] Thus, there is still a need for a reclosable container for fluids which, as part of the original container construction or assemblage, can be reclosed to retain part of the contents under sealed conditions. The mouth construction of such containers is also more acceptable than easy open containers for direct drinking of the container contents.

[0005] Such a reclosable feature has become available in plastic (non-metallic) containers (ordinarily blow-molded) for carbonated beverages, in both two liter and smaller one-half liter (0.59 ml) sizes. Such containers have a frangible sealed and resealable screw-on cap molded of a suitable plastic, but loss of carbonation through the plastic body materials, resulting in lower shelf life of the product and difficulty in recycling same has impaired widespread acceptance of such plastic containers.

[0006] Thus, there is a marketplace need for containers for fluids, and particularly liquids under pressure (e. g. the beer/beverage containers) which have the reclosable feature and which can be constructed of metal, preferably aluminum.

[0007] A further prior art releasable container end is disclosed in US Patent 5,322,177 (on which the preambles of the independent claims are based). The container includes a top with an integrally formed neck portion terminating in an inwardly rolled portion surrounding a container opening. The neck portion has integrally formed slanting camming surfaces extending outwardly therefrom which are engageable by complementarily shaped camming surfaces which project inwardly from a rim part of a cap having a seal member positioned in a groove at a junction between the rim and a top part of the cap. Engagement of the complementary camming surfaces draws the seal member downwardly onto an upper surface of the inwardly rolled portion of the neck portion.

[0008] The principal object of this invention is to provide a resealable end including a removable cap construction (also called a neck and hat herein) which can be added, such as by a conventional seam, to a metal container body to obtain resealing containment of partial contents retained in the container, even under pressure, and to provide an improved mouth construction (or pour opening) for better pouring and for comfortable direct drinking from the container; and to provide an improved method of making such a resealable hat and neck.

[0009] The present invention provides a resealable container end for a liquid holding container as claimed in claim 1 and a method of manufacturing such a container end as defined in claim 9. Preferably the container is provided with a reclosable metal type of cap or hat. Preferably, the end, with an attached sealed hat, is attached to the open end of a filled can by a conventional double rolled seam connection.

[0010] The container end is preferably coupled to a can body by conventional double rolled seam attachment between the bottom of the neck and the rim of the can body.

[0011] Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

Brief Description of the Drawings

[0012]

Fig. 1 is a view showing, in outline, two stacked containers incorporating the invention, the uppermost container shown in phantom lines;

Fig. 2 is an enlarged cross-sectional view of a container end constructed according to the invention, including the rim at the lower edge of the neck section which becomes part of a seamed joint between the end and the upper rim of a can body;

Fig. 2A is an enlarged detail view of one of the lugs formed outwardly in the upper neck section of the end;

Figs. 3A, 3B and 3C are progressive cross-section views illustrating operations in forming of the hat or cap portion of the novel container end;

Figs. 4A--B are progressive cross-section views of

the hat member illustrating its formation;
Figs. 5A--H are partial cross-section views of punch and die tools in a typical press environment, illustrating the formation of the dome or neck structure of the container end;
Figs. 6A--G are enlarged cross-section views of the progressive formation of the neck structure;
Fig. 7 is a schematic illustration of an alternate way of forming lugs on the neck section;
Fig. 8 is a diagram showing the effect of stacking of the containers on the cap and its seal; and
Fig. 9 is a diagram showing the effect of loading on the cap and its seal.

Best Mode for Carrying Out the Invention

The Container

[0013] The container end of the present invention is comprised of two major parts, a dome structure 10 and a cap or hat member 12 which is in the general form of an inverted cup, including an outwardly curled rim 13 depending from the top panel 14 of hat member 12. In Fig. 1, a pair of containers including can type bodies 15 each provided with this end, such bodies having a concave central portion 16 in their bottoms are shown stacked one upon the other to demonstrate the ability of the container to be so stacked while including the novel resealable end. Such bottom configuration of can bodies is per se known.

[0014] Referring to Fig. 2, the dome includes a neck structure 11 with a wing-like lower rim 20 capable of being seamed to the upper end or rim of a can body (see the left edge of Fig. 2), and optionally including a sealing compound 21 on the underside of rim 20. Rim 20 extends outward from the lower edge of a generally frustoconical central neck section 22 which has formed on its upper edge a generally cylindrical upper neck section 25 which terminates at its upper edge in a outward curled seal rim 30 formed upon a ledge 31. About seal rim 30 there is shown an elastomeric preferably circular seal 32, which may take different forms as later explained, but in general is fitted within cap 12.

[0015] Extending outward from upper neck section 25 are a first set of elongated lugs 15, generally triangular in shape (see Fig. 2A), with angled lower cam surfaces 35C extending at a predetermined angle to the generally vertical outer surface of neck section 25. These lugs 35 cooperate with a second set of inwardly extending lug members 36 formed in the curled rim 13 of hat member 12 to hold the cap firmly on the dome structure, as later explained. When the hat member is attached to the upper neck portion, the cooperating first and second lug members 35, 36 draw top panel 14 against the curled seal rim 30, and compress seal 32 against the curled rim 30 and ledge 31, as in Fig. 2.

[0016] Seal 32 can take different forms. In a first form the annular O-ring type seal is molded as a peripheral part of a thin flexible and compliant disk 33 which is attached to the underside of top panel 14. In another form, the O-ring type seal is made as a rim of a circular thin member which is applied to the outer portion of the underside of top panel 14. In any event, the compressible elastomeric seal member is positioned within the hat member 12, as shown in Fig. 2. This arrangement will retain initial pressurization of product (if necessary), and hold residual pressure after reclosing.

Tooling

[0017] The apparatuses and tools disclosed do not form part of the invention. The tooling which is disclosed herein is intended for use in reciprocating high speed presses. In general, with regard to Figs.5A--B, a typical press includes an upper die plate UP, a lower die plate LP, and guide posts GP which maintain the alignment of a punch or punches on upper plate UP and a corresponding die or dies on lower plate LP. The various ones of these figures represent, in somewhat schematic fashion, the tooling at different stations within a press.

Hat Formation

[0018] Figs. 3A--B and 4A--B show the hat or cap and the two steps of forming the completed lugged hat 12. Both steps may be contained in the same press, as this is convenient in a high production environment, however the second operation can be performed in an auxiliary piece of equipment.

[0019] In the first operation (at a first station I-H) see Fig.3A, a blank is cut from either sheet or coiled material on the down stroke of the press by blank punch 45. On the continuation of the down stroke, the blank is drawn into a cup shaped hat part 40-1. At the bottom of the stroke the panel shape is formed into the top of the hat part 40-1 by the punch 45 and cooperating die 46 (Fig. 3A).

[0020] On the up stroke, the lower curl ring 48, which is under spring pressure, raises with the blank punch. The edge 50 of the hat part 40-1 is curled outward into the cavity formed by curl ring 48 and blank punch 45, thus completing a formed hat or cap part 40-1 with an outside curl 55, as shown in Fig. 4A.

[0021] In the second operation (which as mentioned can be another station in the press or in an auxiliary piece of equipment), at a second station II-II, see Fig. 3B, there are a punch 60 and die 62 having a cavity which receives the hat part 40-1 in an inverted orientation, resting in a cavity 63 in die 62. A punch probe, comprising a plurality (e.g. three or four) of radially movable fingers 64 cooperating with a central tapered actuating cam 65, is inserted first into the product side (interior) of the formed hat part 40-1 before the punch closes against the hat part 40-1. The fingers 64 are extended by cam 65 (to the position shown in Fig. 34B) and the finger ends 66 extend into the hat part 40-1 against the

interior of curl 55 to establish the height of the lugs 36 to be formed from material of curl 55. A curling ring 67 on the punch has a set of cavities in its radially inward section, these corresponding to the location and size of the lugs 36. The radially outward region of ring 67 has corresponding inward extending surfaces 68 which move material from the outside curl 55 toward the inside of the hat part 40-1, as the curling ring 67 bottoms out over finger ends 66. This will establish the final form of hat part 40-2, including inwardly directed lugs 36 (preferably three or four) above the outward curled edge 50.

Neck Structure Formation.

[0022] The neck/dome structure 11 is formed in seven operations as described hereafter. However the first station Blank & Draw operation and the second station Redraw operation can if desired, be combined into a single station, reducing the total number of stations to six. The following description will assume that the first and second stations are separate.

[0023] At the first station I-N, a blank is cut from either sheet or coiled material, and is drawn into a cup shaped part 70-1, as shown in Figs. 5A & 6A.

[0024] At the second station II-N (see Figs 5B and 6B), the part 70-1 is redrawn to form the countersink area 72 and the edge 74 is curled to establish the final outside diameter. This allows the resultant part 70-2 to be placed into a belt type transfer system from this operation onward, enabling higher production speeds than can be achieved with other forms of transfer systems. It will be appreciated that the first and second stations can remain separate, however in a production atmosphere that would incorporate an automated transfer system, it may be preferred that stations I-N & II-N be combined to allow immediate placement of the parts into a belt, or other similar transfer system.

[0025] At the third station III-N (see Figs. 5C and 6C), part 70-2 is redrawn to obtain additional height of the central section 75, and in the fourth station IV-N a ledge 76 is formed, upon which the curl (formed in the seventh operation, as later described) will rest, resulting in part 70-3 (Figs. 5D & 6D).

[0026] In the fifth station V-N (see Figs 5E and 6E), a hole or opening 78 is pierced through the part, and in the sixth station VI-N opening 78 is extruded upward to obtain the material necessary for the curl on part 70-4 (see Figs 5F and 6F).

[0027] Then, in the seventh station VII-N (see Figs 5G and 6G) the curled seal rim 30 around the drinking opening is formed. The curl is formed through 360 degrees so the raw edge of the material cannot come in contact with the user's mouth when drinking directly from the container. This results in the part 70-5 (shown in Fig. 6G).

[0028] The lugs 35 can be added to the upper neck section 25 in a further press station. It is also possible to form such lugs in separate auxiliary equipment which employs the technique of rolling threads or the like in thin-walled metal cylindrical or cup shaped parts.

[0029] In the additional press station VIII-N (see Fig 5H) the part 70-5 is placed in a die member 80 which includes cavities 81 corresponding to the desired external configuration and location of the lugs 35. In a preferred embodiment there will be three or four such cavities (as before), which will be aligned around the upper neck section at the desired location of the lugs 35. A punch, 82 having radially expandable fingers 84 operated by a tapered cam 85, is inserted into the part 70-5 and the wall of the neck section is pressed into the die cavities by expanding the fingers radially outward. Fingers 84 have embossing parts 86 configured to the size and shape of lugs 35 and are adapted to mate with cavities 81. After lugs 35 are so formed, the fingers 84 are retracted, the punch 82 and die 80 separate, and the completed neck part 70-5 is removed. In this same station, the wing-like lower rim can be reshaped, as by further curling, preparatory for the seaming operation when the end is attached to a filled can body.

[0030] Alternately, using an auxiliary piece of equipment, the wing-like lower rim or seaming curl will be finish shaped, and lugs 35 will be formed at the same time, using rotary techniques. The part 70-5 is grasped in a rotating chuck 90 and rotated about a first axis 92 which coincides with the centerline of the upper neck section 25. Cooperating rotatable rolling (or ironing) tools, namely an outer anvil 94 rotating on an axis 95, and an inner die 96 rotating on an axis 97, are brought into contact with the wall of the neck section. The anvil and it's cooperating die, and their respective rotary drives, are movable toward and away from the chuck/part axis 92 in a radial direction and in a longitudinal direction; thus these parts can be moved into and out of, and toward and away from the surfaces of, the upper neck section 25 of the chucked part 70-5. These rotary anvil 94 and die 96 tools have the male/female configurations of the lugs 35 formed thereon. When the anvil and die are engaged and rotated with the rotating part 70-5, the lug configurations are pressed into the wall of the upper neck section.

Industrial Applicability

[0031] Thus, the present invention provides methods for making the neck and hat member container end. The various punches, dies, and related equipment, associated with the progressive stations disclosed, form a means for performing the various steps described so as to manufacture the neck member and cooperating hat member in presses and related machines in a mass production environment.

[0032] Fig. 8 illustrates geometry of the hat of cap at 6.21 bar (90 PSI), in comparison with approximate undeformed geometry, the deformation being due to application of external vertical axial load on the container due to direct stacking of a second container or can on top of

another can (as in Fig. 1). Testing and computer modeling indicates the hat or cap will tend to lower to minimum position with doming still present in the hat. The seal 32 will tend to push further into the gap between hat member 12 and the external surfaces of the pouring opening, causing a tightening of the seal.

[0033] Fig. 9 shows deformed geometry of hat member 12 at 6.21 bar (90 PSI), compared to approximate undeformed geometry of the hat member. The loading is applied to the center of the hat member and the hat member will tend to flatten due to the moment shown. Such deformation may cause some outward movement in the sides of the hat member (shown exaggerated). This could, potentially, decompress the O-ring seal somewhat, but even in such a lesser pressurized state there is built-in interference between the seal member, the upper neck region at dome, and the cap. Therefore, a container fitted with a seal according to this invention will not lose its sealing, although it may experience some lowering of the hat member as seen in the above-described situation (Fig. in combination with flattening of the hat member.

[0034] While the container end and fabrication method herein described constitute preferred embodiments of this invention, it is to be understood that the invention is not limited to the precise container and method and that changes may be made in either without departing from the scope of the invention, which is defined in the appended claims.

Claims

1. A resealable container end (11, 12) for a liquid holding container, said end comprising:

a neck portion (11) having a generally cylindrical central upper neck part (25) including a pouring opening with a surrounding curl (30, 55),
a first set of lugs (35) having surfaces (35c) facing downwards of said formed outward to a first diameter about said upper neck part (25) for cooperation with a closure hat member (12),
a removable closure hat member (12) covering said pouring opening and including a top panel (14) and a hat member rim shaped to extend downward from said top panel (14) around said upper neck part (25), said hat member rim terminating in a generally circular lower edge (13),
a seal member (32) within said closure hat member (12) extending entirely around said hat member rim, whereby said seal member (32) is compressed against said upper neck part curl (30, 55) when said closure hat member (12) is in place on said neck portion (11),
a second set of lugs (36) formed inwardly within said hat member rim to a second diameter less than said first diameter of said first set of lugs (35) to latch under said first set of lugs (35) to retain said hat member (12) in sealed relationship with said upper neck part curl (30, 55) of said pouring opening, **characterised in that**

(i) said releasable container end (11, 12) is adapted for attachment to said container;
(ii) said neck portion (11) has a lower edge including a peripheral wing part (20) for incorporation with an upper end or rim of a can body (15) of said container;
(iii) said upper neck part (25) has a lesser diameter than said wing part (20); and
(iv) said upper neck part (25) includes a ledge (31) about and immediately below said upper neck part curl (30, 55) whereby said seal member (32) can be compressed against said ledge (31) and said upper neck part curl (30, 55) when said closure hat member (12) is in place on said neck portion (11).

2. The container end according to claim 1, wherein said first set of lugs (35) comprise elongated triangular lugs which have angled lower cam surfaces (35c) which cooperate with said second set of inwardly extending lugs (36) which are formed in a curled rim constituting the hat member lower edge (13) to compress said seal member (32) against said upper neck part curl (30,55) and said ledge (31).

3. The container end according to claim 1 or 2 , wherein said seal member (32) is an elastomeric ring-like member contained within said rim of said closure hat member (12) adjacent a junction of said top panel (14) and said rim.

4. The container end according to claim 1, 2 or 3 wherein an outward curl is formed on said lower edge (13) of said rim of said hat member (12), and said second set of lugs (36) extend inward from said outward curl.

5. The container end according to any preceding claim, further including a seal compound (21) applied to an underside of said wing part (20) of said neck portion (11) to be incorporated in a rolled seam formed with the upper end or rim of said can body (15) of said container and said wing part.

6. The resealable container end according to any preceding claim wherein said first set of lugs (35) are of generally triangular shape and include inclined cam surfaces (35c) facing downward of said upper neck part (25), and said seal member (32) is circular and within said rim of said hat member (12) adjacent

said top panel (14), said seal member (12) having an inner diameter greater than said upper neck part curl (30, 55).

7. The container end according to claim 6, wherein said seal member (32) is an elastomeric ring-like member contained within said rim of said hat member (12) adjacent the junction of said top panel (14) and said rim.

8. The container end according to any preceding claim wherein said circular lower edge (13) of said rim of said hat member (12), has a surrounding outward curl formed thereon and said second set of lugs (36) extend inward from said outward curl.

9. A method of manufacturing a container end including a neck portion (11) for incorporation with a can body (15) and a hat member (12) forming with the neck portion (11) a resealable closure comprising the steps of:

forming a neck portion (11) including a cylindrical upper neck part (25),
forming an outward curl (30, 55) upon the upper neck part (25) defining a pouring opening,
forming a first set of lugs (35) projecting outwardly of the upper neck part (25) to a predetermined first diameter, and forming cam surfaces (35c) on the first set of lugs (35).
forming an inverted generally cup-shaped hat member (12) including a top panel (14) and a rim depending from the top panel and having and edge with an outward curl formed thereon,
forming a second set of lugs extending inwardly from the rim to a predetermined second diameter less than the diameter of the first set of lugs for interaction with the cam surfaces on the first set of lugs on the neck member to urge the top panel against the surrounding curl on the pour opening,
forming a seal member including a ring having an inner diameter sized to fit against the outward curl around the pour opening,
placing the seal member within the hat member such that the ring presses against the outward curl on the pour opening when the lugs on the hat member are fully engaged with the lugs on the upper neck part.

Patentansprüche

1. Ein wiederverschließbares Behälterende (11, 12) zum Anbringen an einen Flüssigkeitsaufnahmebehälter, wobei dieses Ende beinhaltet:

ein Halsstück (11) mit einem im Wesentlichen zylindrischen zentralen oberen Halsteil (25) mit geringerem Durchmesser als ein Flügelteil (20) und beinhaltend eine Auslauföffnung mit einer umgebenden Ringbördelung (30, 55),

eine erste Gruppe von Ansätzen (35) mit von dem Halsstück (11) nach unten gerichteten Oberflächen (35c), wobei die Ansätze (35) nach außen zu einem ersten Durchmesser um den oberen Halsteil (25) herum geformt sind, um mit einem Verschluss-Hutelement (12) zusammen zu wirken,

ein entfernbares Verschluss-Hutelement (12), welches die Auslauföffnung bedeckt und welches eine Deckelplatte (14) beinhaltet und einen Hutelement-Rand, der so geformt ist, dass er sich nach unten von der Dekkelplatte (14) erstreckt, ringsherum um den oberen Halsteil (25), und dieser Hutelement-Rand in eine im Wesentlichen kreisförmige untere Kante (13) mündet,

ein Dichtungselement (32) innerhalb des Verschluss-Hutelementes (12), welches sich vollständig ringsherum um den Hutelement-Rand erstreckt, wobei das Dichtungselement (32) gegen die obere Halsstück-Ringbördelung (30, 55) gepresst wird, wenn das Verschluss-Hutelement (12) an seinem Platz auf dem Halsstück (11) ist,

eine zweite Gruppe von Ansätzen (36), welche nach innen innerhalb des Hutelement-Randes geformt sind, bis zu einem zweiten Durchmesser, der geringer ist, als der erste Durchmesser der ersten Gruppe von Ansätzen (35), um unter die erste Gruppe von Ansätzen (35) einzuschnappen, um das Hutelement (12) abgedichtet in Beziehung zur oberen Halsstück-Ringbördelung (30, 55) der Auslauföffnung zu halten,

dadurch gekennzeichnet, dass

(i) das Halsstück (11) eine untere Kante hat, das einen Flügelteil (20) zur Verbindung mit einem oberen Ende oder Rand eines Dosenkörpers (15) des Behälters beinhaltet;

(ii) der obere Halsteil (25) einen Vorsprung/Sims (31) beinhaltet ringsum und unmittelbar unter der oberen Halsstück-Ringbördelung (30, 55), wobei das Dichtungselement (32) gegen den Vorsprung/Sims (31) und die obere Halsstück-Ringbördelung (30, 55) gepresst werden kann, wenn das Verschluss-Hutelement (12) an seinem Platz auf dem Halsstück (11) ist.

2. Das wiederverschließbare Behälterende nach Anspruch 1, worin die erste Gruppe von Ansätzen (35) längliche dreieckförmige Ansätze beinhaltet, welche abgewinkelte untere Nockenoberflächen (35c) haben, welche mit der zweiten Gruppe von nach innen sich erstreckenden Ansätzen (36) zusammenwirken, welche in einem gekringelten Rand geformt sind, welcher die untere Hutelement-Kante (13) darstellt, um das Dichtungselement (32) gegen die obere Halsstück-Ringbördelung (30, 55) und den Vorsprung/Sims (31) zu pressen.

3. Das wiederverschließbare Behälterende nach Anspruch 1 oder 2, worin das Dichtungselement (32) ein elastomeres ringartiges Element ist, welches innerhalb des Randes des Verschluss-Hutelementes (12) aufgenommen ist, benachbart zu einer Verbindung der Deckelplatte (14) und dem Rand.

4. Das wiederverschließbare Behälterende nach Anspruch 1, 2 oder 3, worin eine nach außen gerichtete Ringbördelung auf der unteren Kante (13) des Randes des Hutelementes (12) geformt ist, und die zweite Gruppe von Ansätzen (36) sich von der nach außen gerichteten Ringbördelung nach innen erstreckt.

5. Das wiederverschließbare Behälterende nach einem der vorhergehenden Ansprüche, welches weiterhin einen Dichtungsverbund (21) beinhaltet, der auf der Unterseite des Flügelteils (20) des Halsstücks (11) angebracht ist, um in einer gerollten Naht aufgenommen zu werden, die durch das obere Ende oder den oberen Rand des Dosenkörpers (15) des Behälters und dem Flügelteil gebildet ist.

6. Das wiederverschließbare Behälterende nach einem der vorhergehenden Ansprüche, worin die erste Gruppe von Ansätzen (35) im Wesentlichen von dreieckiger Form sind und geneigte Nockenoberflächen (35c) beinhalten, die von dem oberen Halsteil (25) nach unten gerichtet sind, und das Dichtungselement (32) kreisförmig und innerhalb des Randes des Hutelementes (12) benachbart zur Deckelplatte (14) ist, wobei das Dichtungselement (12) einen inneren Durchmesser hat, der größer ist, als die obere Halsstück-Ringbördelung (30, 55).

7. Das wiederverschließbare Behälterende nach Anspruch 6, worin das Dichtungselement (32) ein elastomeres ringartiges Element ist, welches innerhalb des Randes des Hutelementes (12) aufgenommen ist, benachbart zu einer Verbindung der Dekkelplatte (14) und dem Rand.

8. Das wiederverschließbare Behälterende nach den Ansprüchen 6 oder 7, worin die kreisförmige untere Kante (13) des Randes des Hutelementes (12) eine darauf geformte, umgebende, nach außen gerichtete Ringbördelung hat und die zweite Gruppe von Ansätzen (36) sich von der nach außen gerichteten Ringbördelung nach innen erstreckt.

9. Ein Verfahren zur Herstellung eines Behälterendes, beinhaltend ein Halsstück (11) zur Verbindung mit einem Dosenkörper (15) und ein Hutelement (12), welches mit dem Halsstück (11) einen wiederverschließbaren Verschluss bildet, beinhaltend die Schritte:

Formen eines Halsstücks (11), beinhaltend einen zylindrischen oberen Halsteil (25),

Formen einer nach außen gerichteten Ringbördelung (30, 55) auf dem oberen Halsteil (25), um eine Auslauföffnung zu definieren,

Formen einer ersten Gruppe von Ansätzen (35), welche auswärts von dem oberen Halsteil (25) weg ragen, zu einem vorbestimmten ersten Durchmesser, und Formen von Nockenoberflächen (35c) auf der ersten Gruppe von Ansätzen (35),

Formen eines umgekehrten im Wesentlichen tassenförmigen Hutelementes (12), beinhaltend eine Deckelplatte (14) und einen Rand, der von der Dekkelplatte (14) herabhängt und eine Kante mit einer darauf geformten, nach außen gerichteten Ringbördelung hat,

Formen einer zweiten Gruppe von Ansätzen, welche sich einwärts erstrecken von dem Rand zu einem vorbestimmten zweiten Durchmesser, der geringer ist, als der Durchmesser der ersten Gruppe von Ansätzen, zum Zusammenwirken mit den Nokkenoberflächen auf der ersten Gruppe von Ansätzen auf dem Halselement, um die Deckelplatte gegen die umgebende Ringbördelung auf der Auslauföffnung zu drängen,

Formen eines Dichtungselementes, beinhaltend einen Ring, mit einem inneren Durchmesser, der so dimensioniert ist, um gegen die nach außen gerichtete Ringbördelung ringsum die Auslauföffnung herum zu passen,

Plazieren des Dichtungselementes innerhalb des Hutelementes, so dass sich der Ring gegen die nach außen gerichtete Ringbördelung auf der Auslauföffnung presst, wenn die Ansätze auf dem Hutelement in vollem Eingriff mit den Ansätzen auf dem oberen Halsteil sind.

Revendications

1. Extrémité réadaptable de récipient (11, 12) destinée à être fixée à un récipient contenant du liquide, ladite extrémité comprenant :

une zone de col (11) ayant une partie supérieure de col centrale sensiblement cylindrique (25) de diamètre inférieur à celui d'une partie d'aile (20) et comprenant une ouverture de distribution avec une boucle périphérique (30, 55),
un premier ensemble d'oreilles (35) ayant des surfaces (35c) orientées vers le bas de ladite zone de col (11), et les oreilles (35) étant formées vers l'extérieur en un premier diamètre autour de ladite partie supérieure de col (25) pour coopérer avec un élément de chapeau de fermeture (12),
un élément de chapeau de fermeture amovible (12) recouvrant ladite ouverture de distribution et comprenant un panneau supérieur (14) et une bordure d'élément de chapeau formée de manière à s'étendre vers le bas à partir dudit panneau supérieur (14) autour de ladite partie supérieure de col (25), ladite bordure d'élément de chapeau se terminant en un bord inférieur sensiblement circulaire (13),
un élément d'étanchéité (32) à l'intérieur dudit élément de chapeau de fermeture (12) s'étendant entièrement autour de ladite bordure d'élément de chapeau, moyennant quoi ledit élément d'étanchéité (32) est comprimé contre ladite boucle de partie supérieure de col (30, 55) lorsque ledit élément de chapeau de fermeture (12) est en place sur ladite zone de col (11),
un second ensemble d'oreilles (36) formées vers l'intérieur, dans ladite bordure d'élément de chapeau, en un second diamètre, inférieur audit premier diamètre dudit premier ensemble d'oreilles (35), afin de se bloquer sous ledit premier ensemble d'oreilles (35), pour maintenir ledit élément de chapeau (12) dans un rapport d'étanchéité avec ladite boucle de partie supérieure de col (30, 55) de ladite ouverture de distribution, **caractérisée en ce que**

(i) ladite zone de col (11) a un bord inférieur comprenant une partie d'aile périphérique (20) destinée à être incorporée à une extrémité supérieure ou rebord d'un corps de boîte (15) dudit récipient ;
(ii) ladite partie supérieure de col (25) comprend une saillie (31) autour de, et immédiatement en dessous de ladite boucle de partie supérieure de col (30, 55), moyennant quoi ledit élément d'étanchéité (32) peut être comprimé le long de ladite saillie (31) et de ladite boucle de partie supérieure de col (30, 55), lorsque ledit élément de chapeau de fermeture (12) est en place sur ladite zone de col (11).

2. Extrémité de récipient selon la revendication 1, dans laquelle ledit premier ensemble d'oreilles (35) comprend des oreilles allongées triangulaires qui ont des surfaces de came inférieures (35c) qui coopèrent avec ledit second ensemble d'oreilles (36) s'étendant vers l'intérieur, qui ont une forme de bordure en boucle constituant le bord inférieur de l'élément de chapeau (13), pour comprimer ledit élément d'étanchéité (32) contre ladite boucle de partie supérieure de col (30, 55) et ladite saillie (31).

3. Extrémité de récipient selon la revendication 1 ou 2, dans laquelle ledit élément d'étanchéité (32) est un élément élastomère sous forme d'anneau contenu dans ladite bordure dudit élément de chapeau de fermeture (12) de manière adjacente à une jonction dudit panneau supérieur (14) et de ladite bordure.

4. Extrémité de récipient selon la revendication 1, 2 ou 3, dans laquelle une boucle orientée vers l'extérieur est formée sur ledit bord inférieur (13) de ladite bordure dudit élément de chapeau (12), et ledit second ensemble d'oreilles (36) s'étend vers l'intérieur à partir de ladite boucle orientée vers l'extérieur.

5. Extrémité de récipient selon l'une quelconque des revendications précédentes, comprenant en outre un mélange d'étanchéité (21) appliqué à un dessous de ladite partie d'aile (20) de ladite zone de col (11), à incorporer dans une couture roulée formée par l'extrémité supérieure ou bordure dudit corps de boîte (15) dudit récipient et ladite partie d'aile.

6. Extrémité de récipient réadaptable selon l'une quelconque des revendications précédentes, dans laquelle ledit premier ensemble d'oreilles (35) est de forme sensiblement triangulaire et il comprend des surfaces de came inclinées (35c) orientées vers le bas de ladite partie supérieure de col (25), et ledit élément d'étanchéité (32) est circulaire et il est situé à l'intérieur dudit rebord dudit élément de chapeau (12), de manière adjacente audit panneau supérieur (14), ledit élément d'étanchéité (12) ayant un diamètre interne supérieur à ladite boucle de partie supérieure de col (30, 55).

7. Extrémité de récipient selon la revendication 6, dans laquelle ledit élément d'étanchéité (32) est un élément élastomère sous forme d'anneau contenu à l'intérieur de ladite bordure dudit élément de chapeau (12) de manière adjacente à la jonction dudit panneau supérieur (14) et de ladite bordure.

8. Extrémité de récipient selon la revendication 6 ou 7, dans laquelle ledit bord inférieur circulaire (13) de ladite bordure dudit élément de chapeau (12) a une boucle périphérique orientée vers l'extérieur formée sur celle-ci, et ledit second ensemble d'oreilles (36) s'étend vers l'intérieur à partir de ladite boucle orientée vers l'extérieur.

9. Procédé de fabrication d'une extrémité de récipient comprenant une zone de col (11) destinée à une incorporation dans un corps de boîte (15), et un élément de chapeau (12) formant avec la zone de col (11) une fermeture réadaptable, comprenant les étapes consistant à :

former une zone de col (11) comprenant une partie supérieure de col cylindrique (25),
former une boucle orientée vers l'extérieur (30, 55) sur la partie supérieure de col (25) définissant une ouverture de distribution,
former un premier ensemble d'oreilles (35) faisant saillie vers l'extérieur de la partie supérieure de col (25), en un premier diamètre prédéterminé, et former des surfaces de came (35c) sur le premier ensemble d'oreilles (35),
former un élément de chapeau renversé sensiblement sous forme de gobelet (12), comprenant un panneau supérieur (14) et une bordure dépendant du panneau supérieur et ayant un bord avec une boucle tournée vers l'extérieur formée sur celui-ci,
former un second ensemble d'oreilles s'étendant vers l'intérieur à partir de la bordure sur un second diamètre prédéterminé, qui est inférieur au diamètre du premier ensemble d'oreilles, pour une intersection des surfaces de came sur le premier ensemble d'oreilles sur l'élément de col, afin de pousser le panneau supérieur contre la boucle périphérique sur l'ouverture de distribution,
former un élément d'étanchéité comprenant un anneau ayant un diamètre interne dimensionné de manière à s'ajuster contre la boucle orientée vers l'extérieur autour de l'ouverture de distribution,
placer l'élément d'étanchéité à l'intérieur de l'élément de chapeau de sorte à ce que l'anneau appuie contre la boucle orientée vers l'extérieur sur l'ouverture de distribution, lorsque les oreilles sur l'élément de chapeau sont complètement mises en prise avec les oreilles sur la partie supérieure de col.

FIG.1

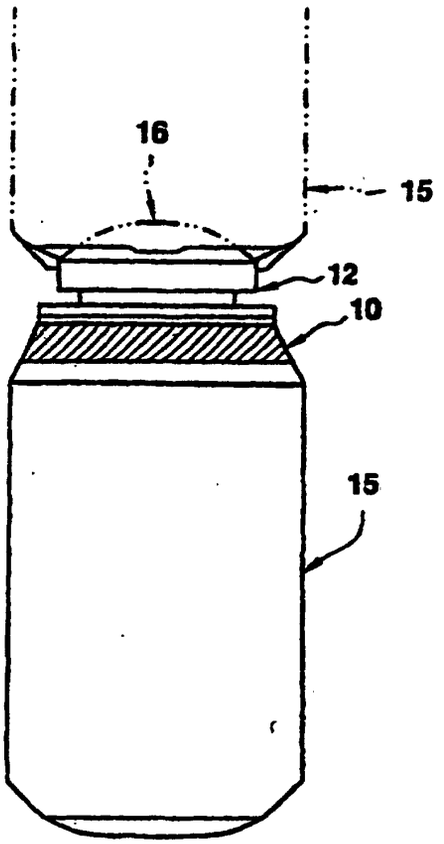


FIG.2A

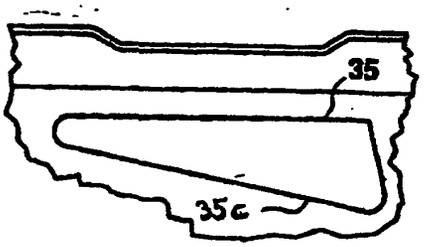


FIG.2

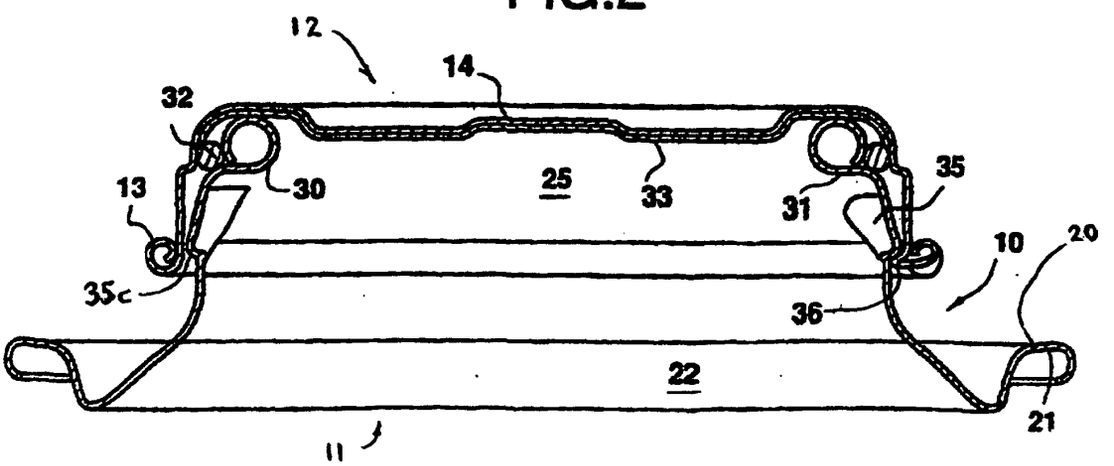


FIG.3A

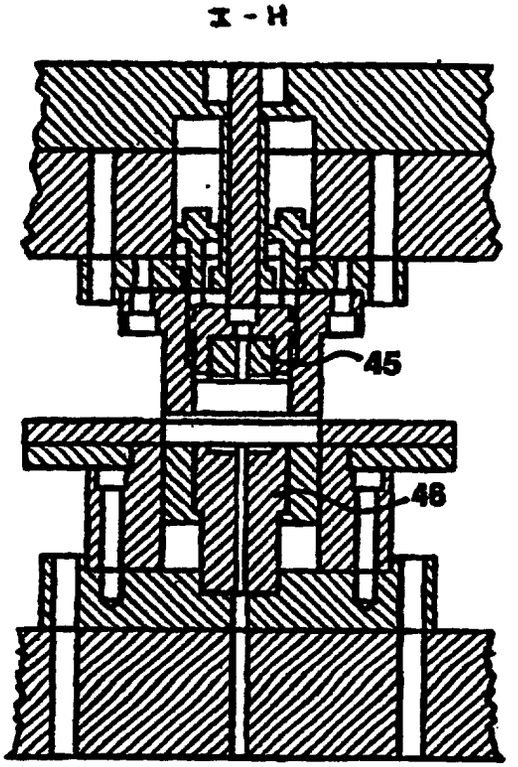


FIG.3C

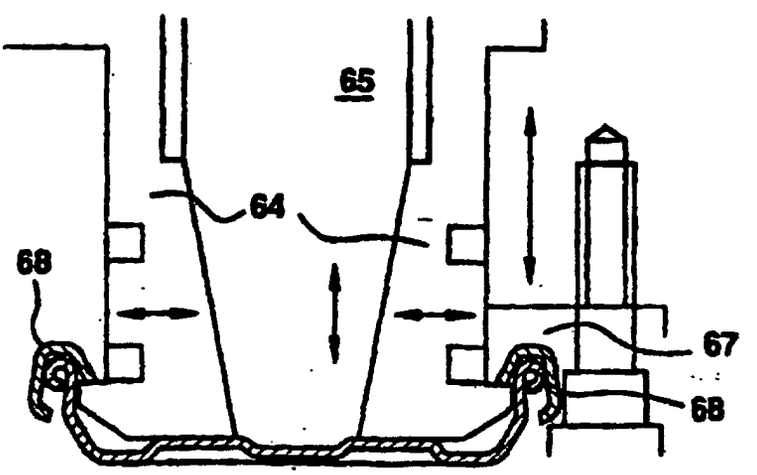


FIG.3B

II - II

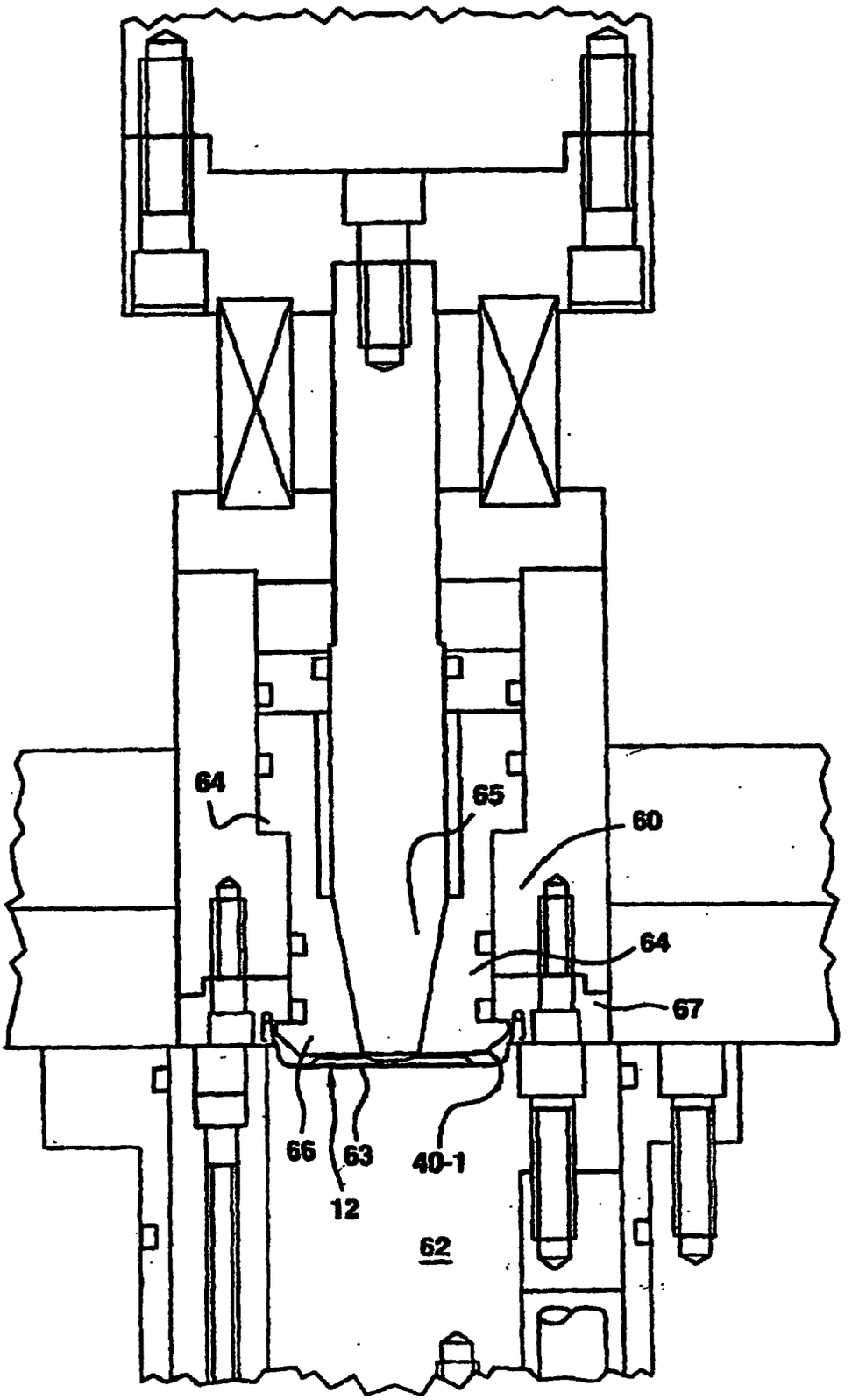


FIG.4A

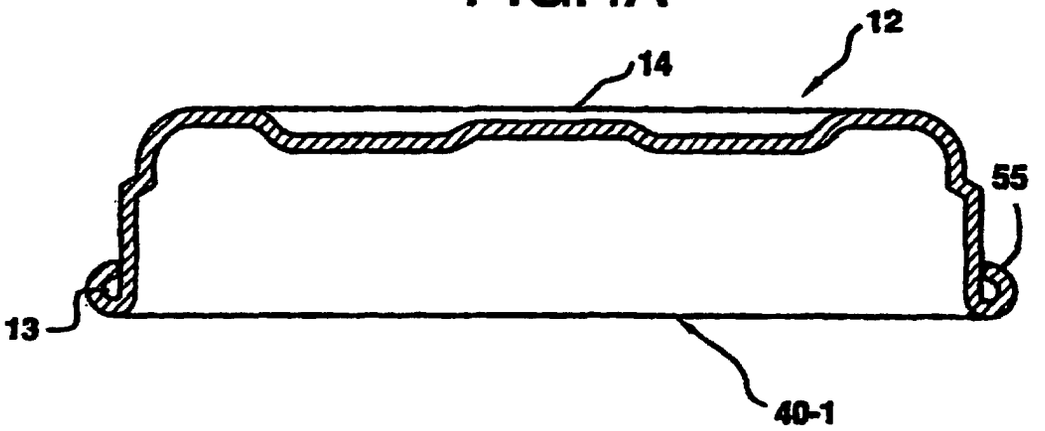


FIG.4B

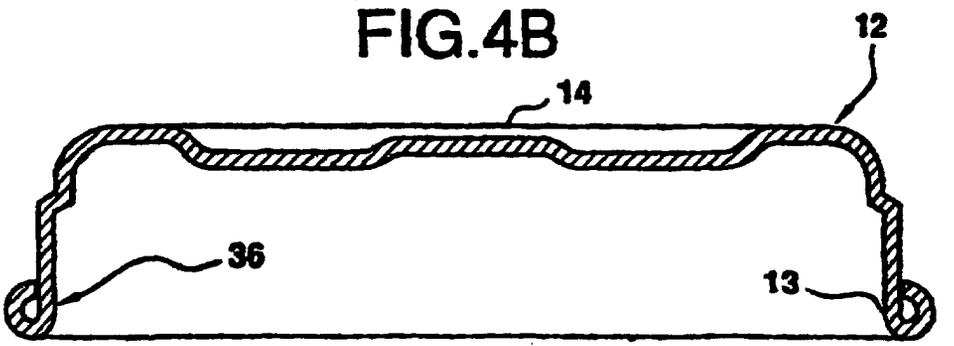


FIG.5A

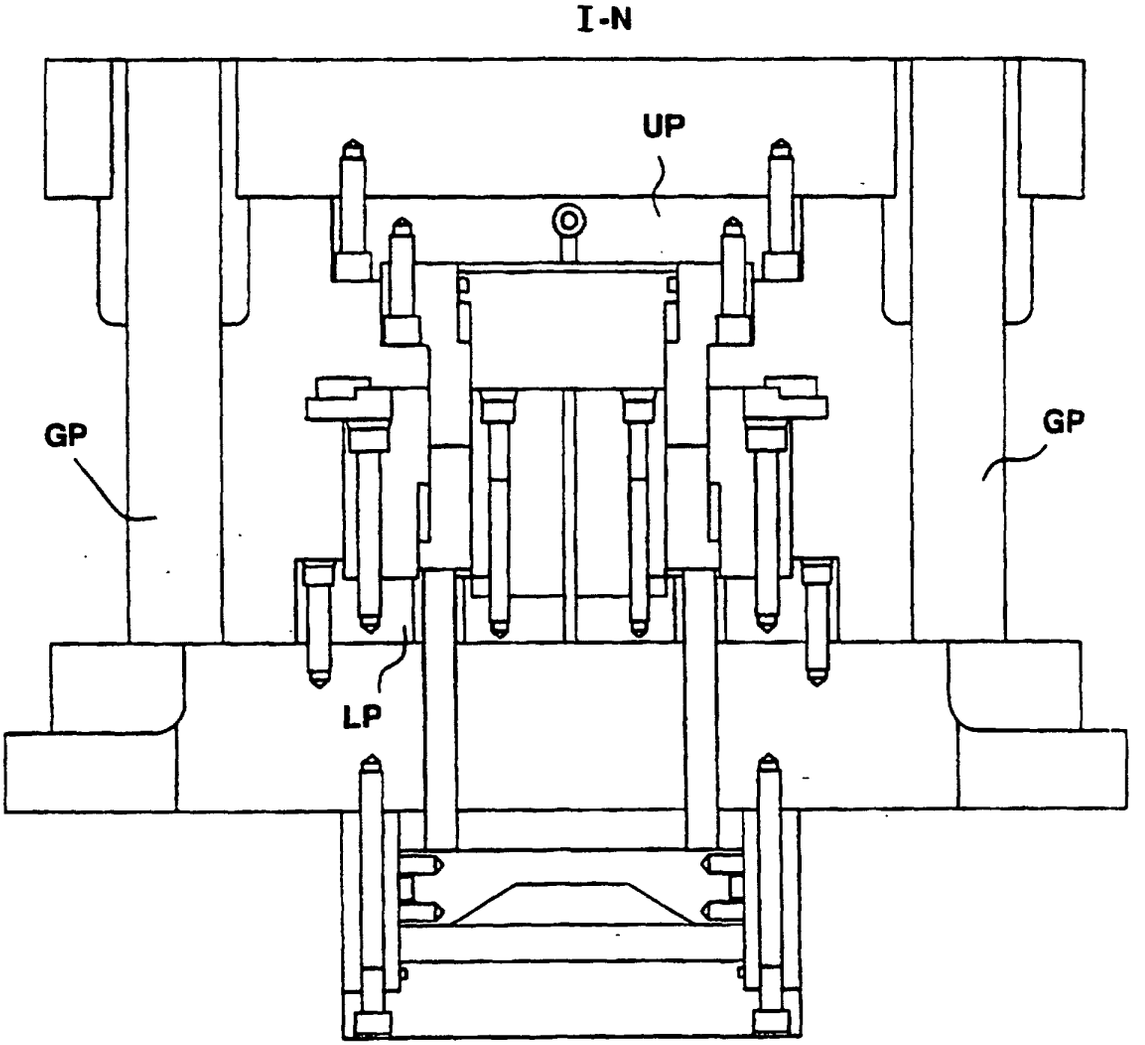


FIG.6A

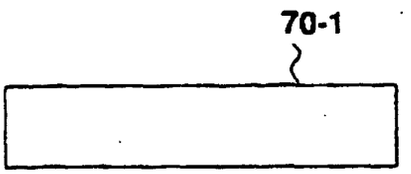


FIG.5B

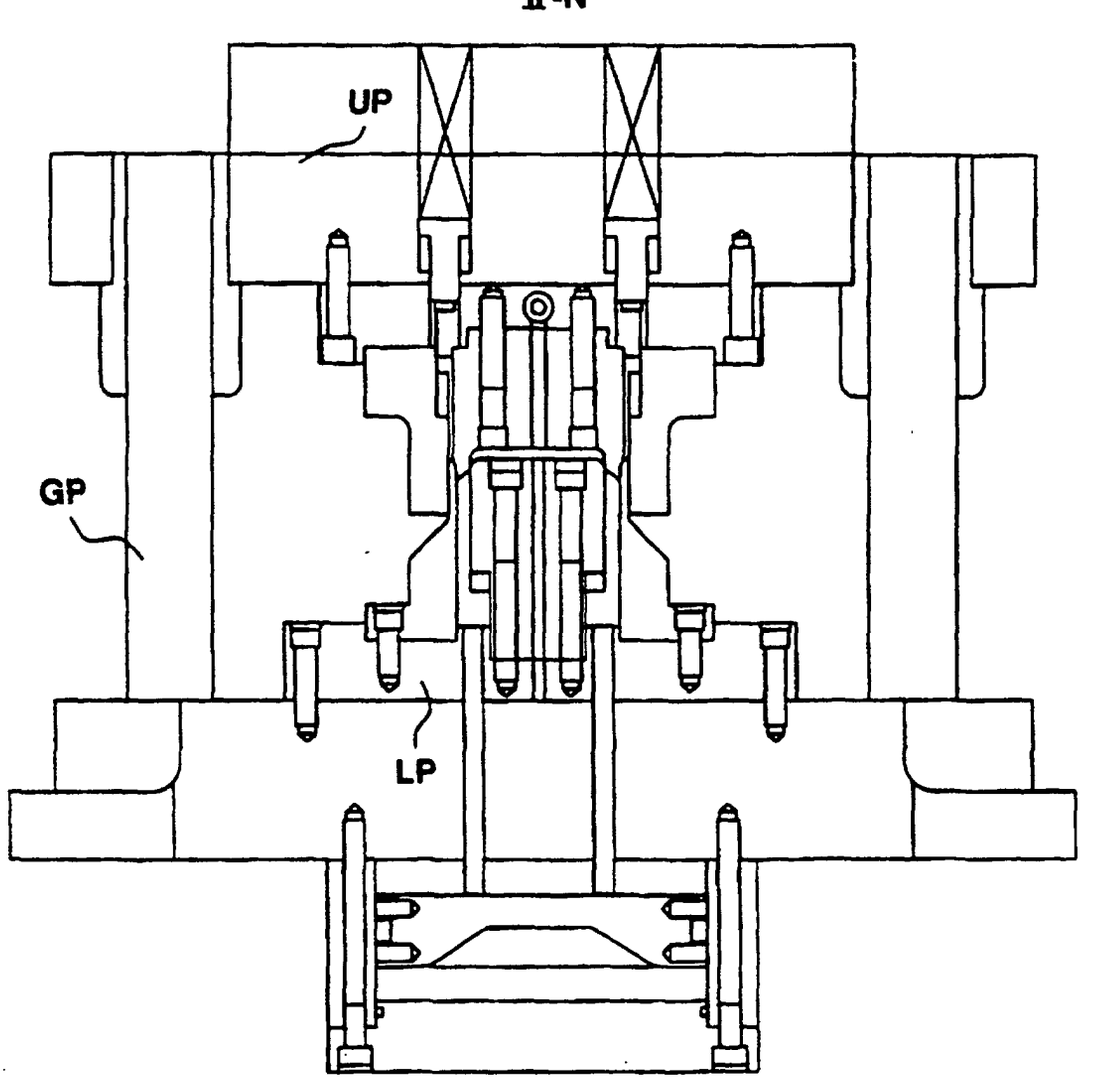


FIG.6B

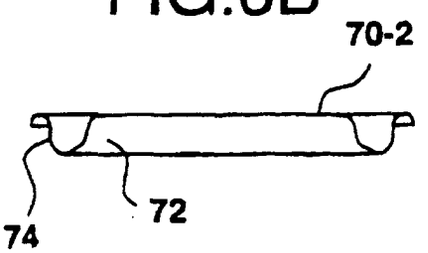


FIG.5C

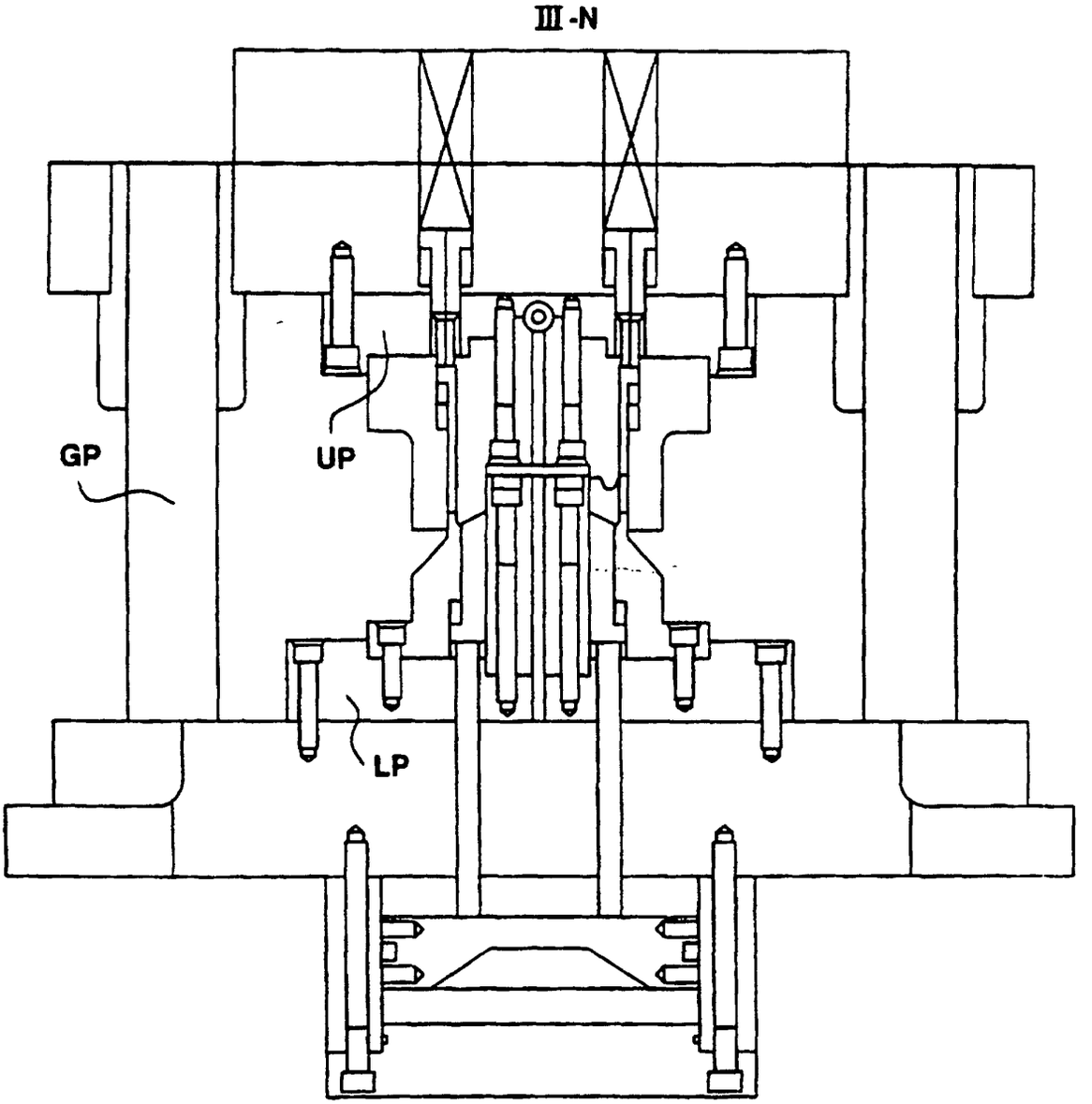


FIG.6C

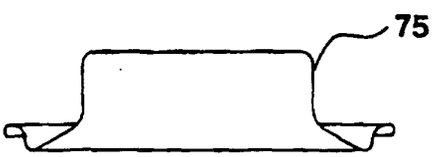


FIG.5D

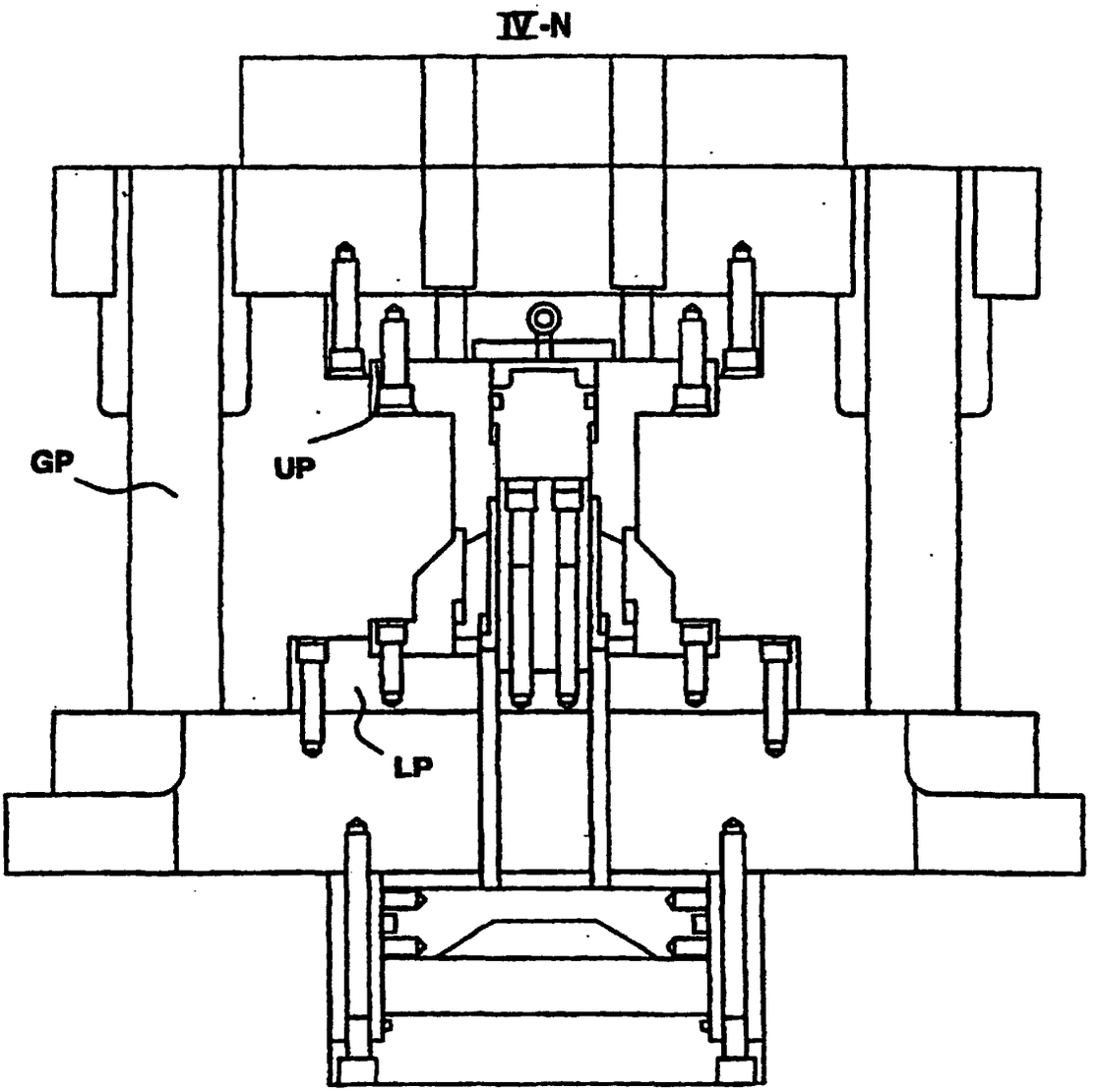


FIG.6D

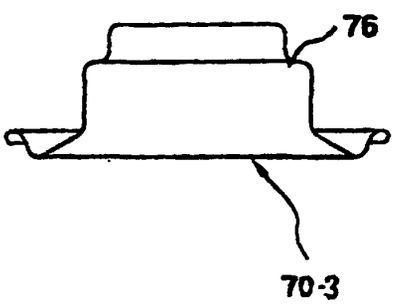


FIG.5E

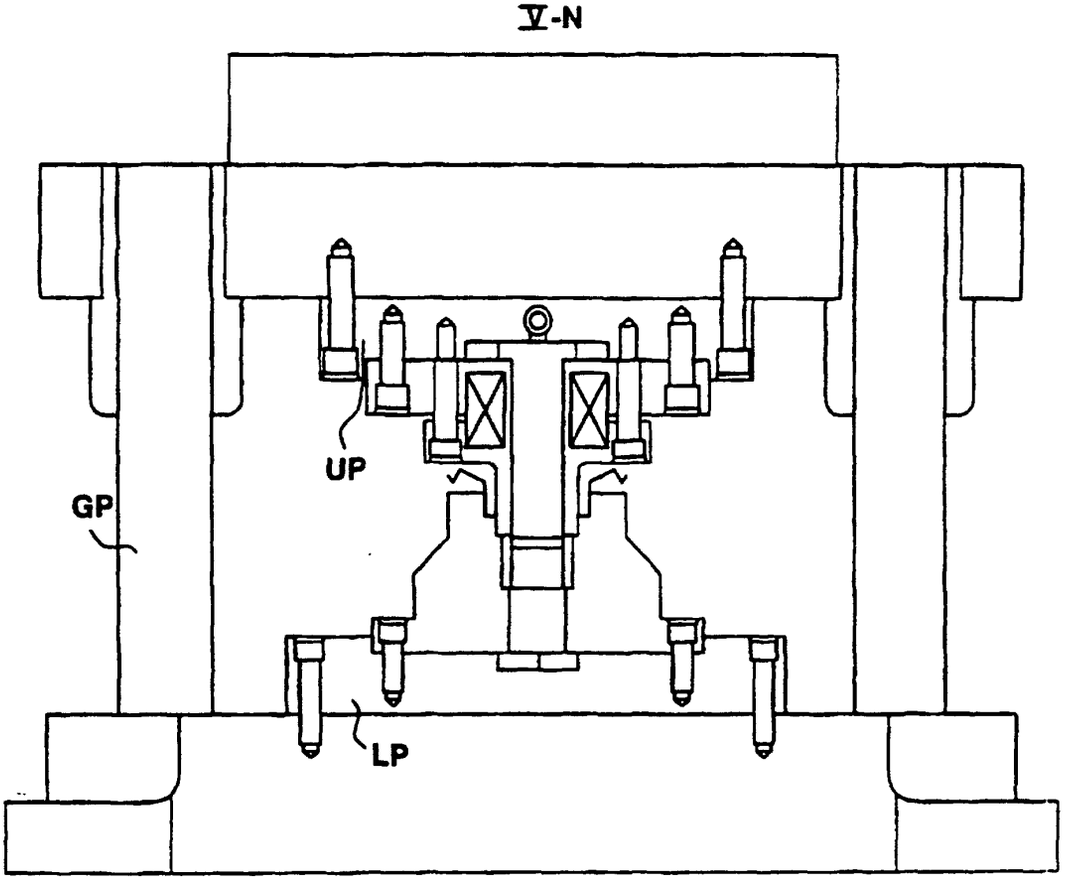


FIG.6E

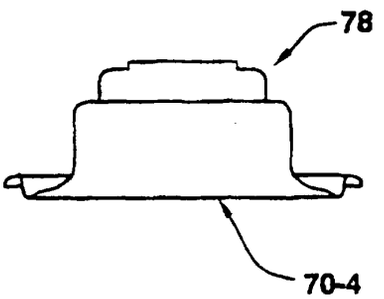


FIG.5F

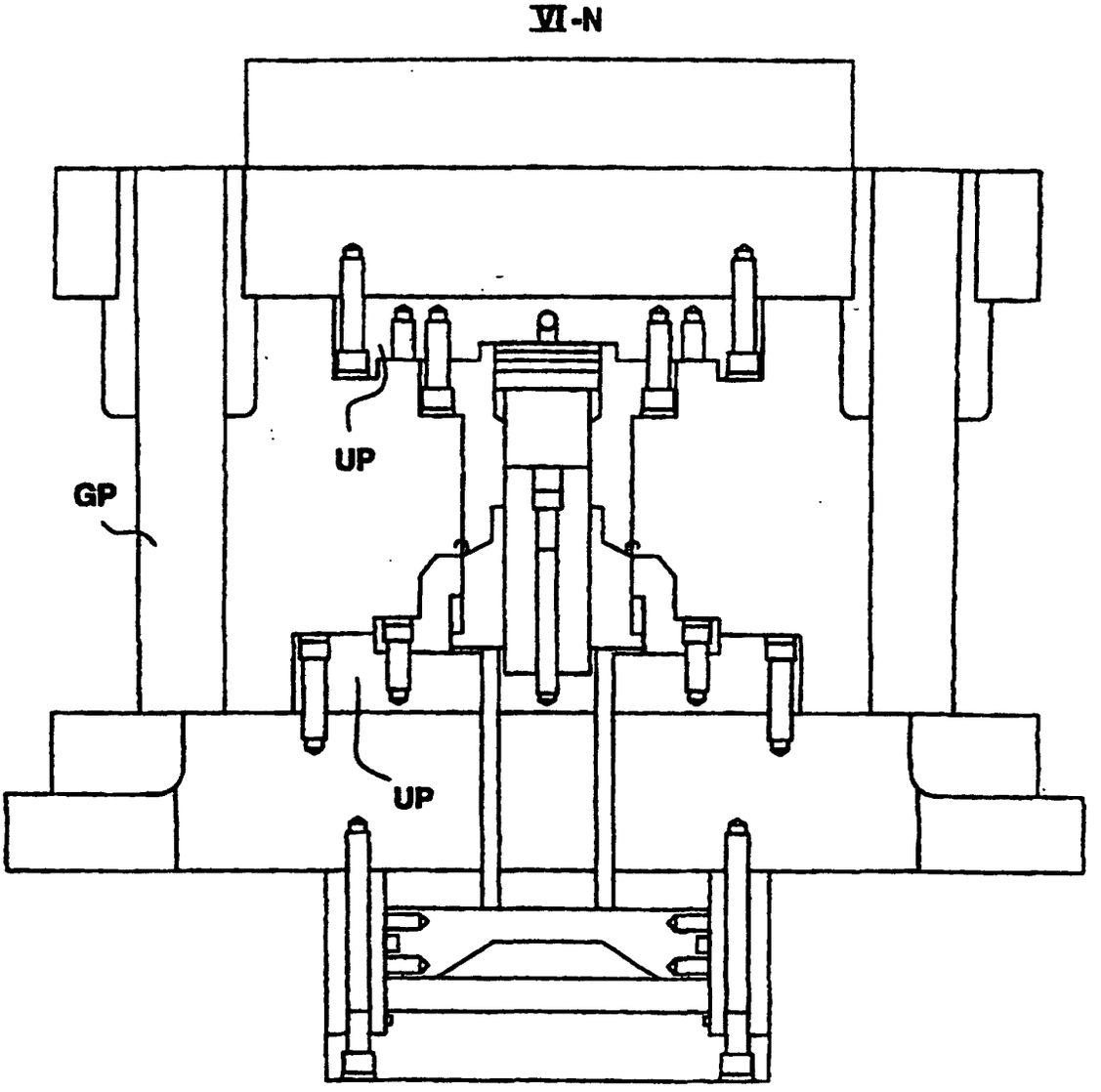


FIG.6F

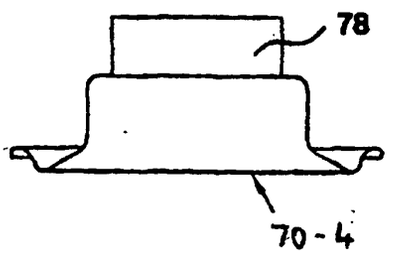


FIG.5G

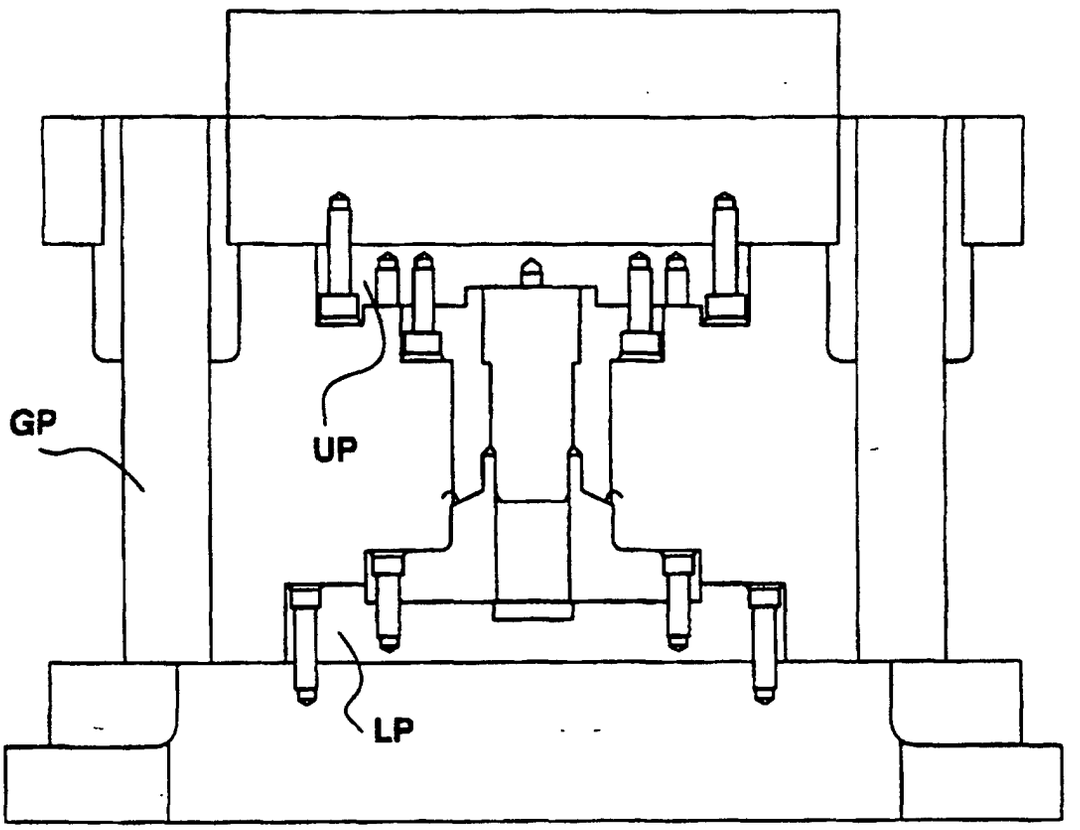


FIG.6G

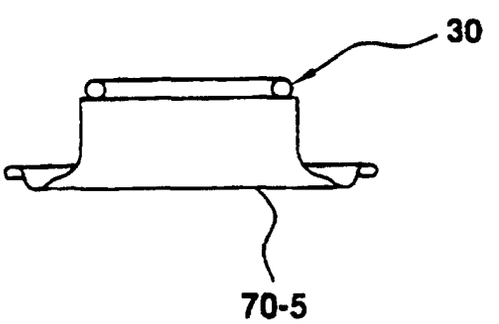


FIG.5H

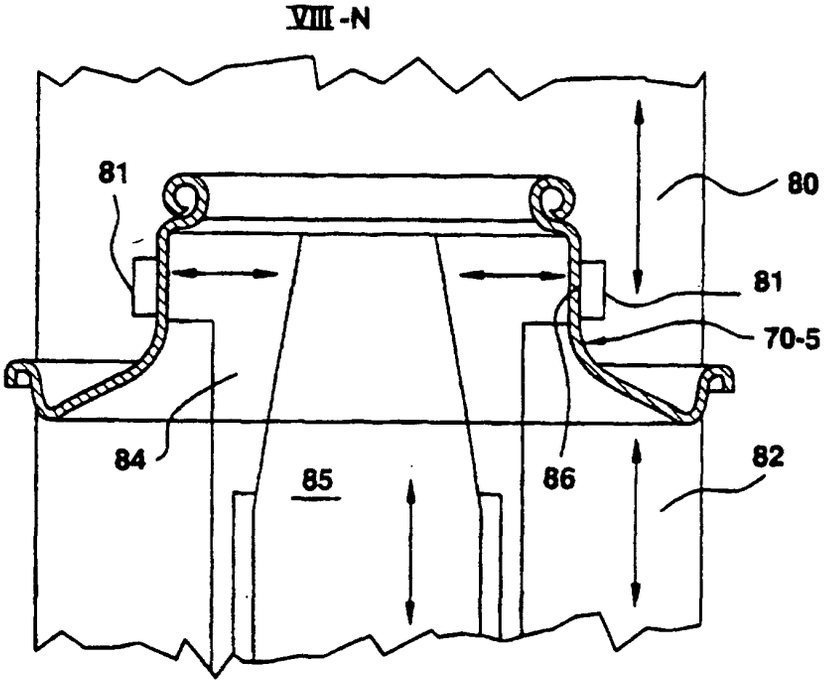


FIG.7

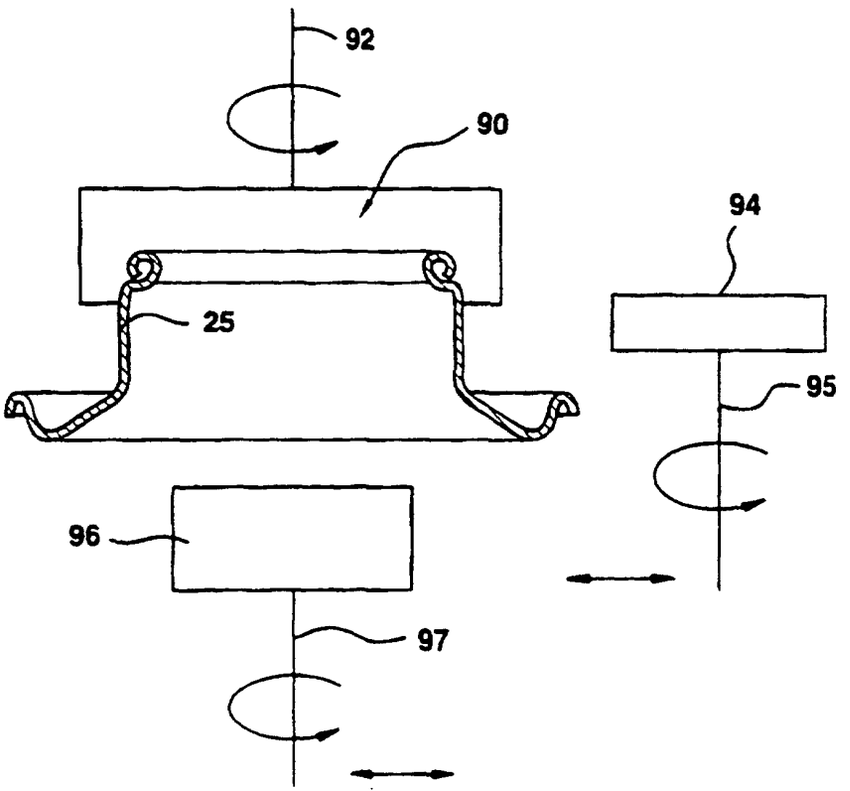


FIG.8

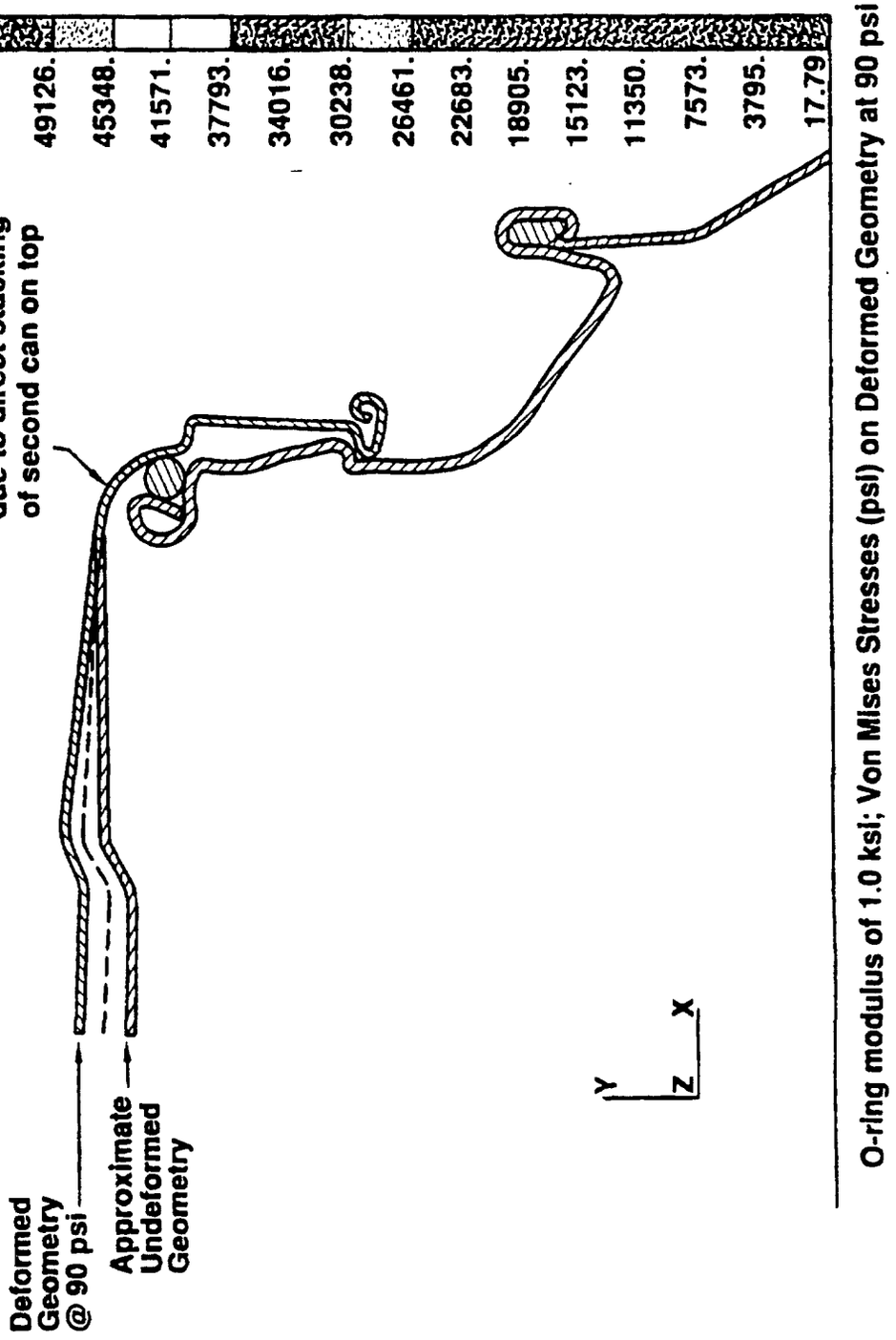
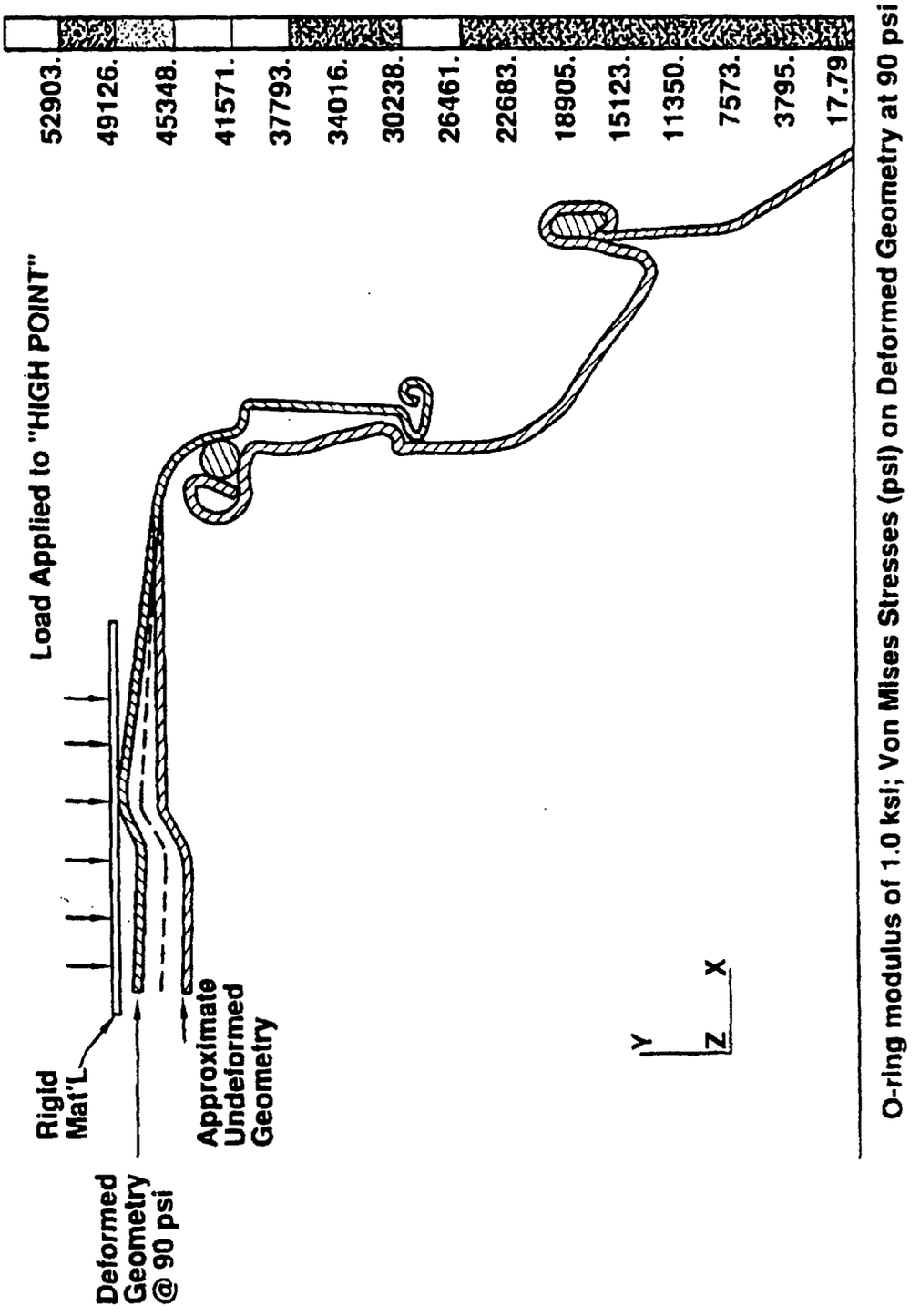

52903.
49126.
45348.
41571.
37793.
34016.
30238.
26461.
22683.
18905.
15123.
11350.
7573.
3795.
17.79
Application of axial load due to direct stacking of second can on top
Deformed Geometry @ 90 psi
Approximate Undeformed Geometry
Y
Z
X
O-ring modulus of 1.0 ksi; Von Mises Stresses (psi) on Deformed Geometry at 90 psi

FIG.9


Load Applied to "HIGH POINT"
52903.
49126.
45348.
41571.
37793.
34016.
30238.
26461.
22683.
18905.
15123.
11350.
7573.
3795.
17.79
Rigid Mat'L
Deformed Geometry @ 90 psi
Approximate Undeformed Geometry
Y
Z
X
O-ring modulus of 1.0 ksi; Von Mises Stresses (psi) on Deformed Geometry at 90 psi