HU000035974T2

(19) **HU**

(11) Lajstromszám: **E 035 974** (13) **T2**

MAGYARORSZÁG
Szellemi Tulajdon Nemzeti Hivatala

EURÓPAI SZABADALOM
SZÖVEGÉNEK FORDÍTÁSA

(21) Magyar ügyszám: **E 10 719598**
(22) A bejelentés napja: **2010. 05. 13.**

(51) Int. Cl.: ***B21D 51/38*** *(2006.01)*
B65D 17/28 *(2006.01)*

(96) Az európai bejelentés bejelentési száma:
EP 20100719598
(97) Az európai bejelentés közzétételi adatai:
EP 2429736 A1 **2010. 11. 18.**
(97) Az európai szabadalom megadásának meghirdetési adatai:
EP 2429736 B1 **2017. 05. 10.**

(86) A nemzetközi (PCT) bejelentési szám:
PCT/EP 10/056628
(87) A nemzetközi közzétételi szám:
WO 10130820

(30) Elsőbbségi adatok:
465894 **2009. 05. 14.** **US**

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(54) **Eljárás dobozvég kialakítására, amelynek mozgatható része van**

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 429 736 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
10.05.2017 Bulletin 2017/19

(21) Application number: **10719598.4**

(22) Date of filing: **13.05.2010**

(51) Int Cl.:
B21D 51/38 *(2006.01)* ***B65D 17/28*** *(2006.01)*

(86) International application number:
PCT/EP2010/056628

(87) International publication number:
WO 2010/130820 (18.11.2010 Gazette 2010/46)

(54) METHOD OF FORMING A CAN END HAVING A MOVEABLE PORTION

VERFAHREN ZUR HERSTELLUNG EINES DOSENENDES MIT EINEM BEWEGLICHEN TEIL

PROCÉDÉ DE FORMATION D'UNE EXTRÉMITÉ DE BOÎTE DE CONSERVE COMPORTANT UNE PARTIE MOBILE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **14.05.2009 US 465894**

(43) Date of publication of application:
21.03.2012 Bulletin 2012/12

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EP 2 429 736 B1

Description

Technical Field

[0001] The present invention relates to a method for producing a can end according to the preamble of claim 1. Such a method is for example disclosed in US 2007/0108209. In particular, the present invention relates to a method for forming a can end having enhanced openability.

Background Art

[0002] In the field of metal packaging, "easy open" ends for metal cans are well known. Typically, an easy open can end includes a pull tab and an approximately planar panel having a score line defining an opening area. To open a can having an easy open can end, a user may lift a handle of the pull tab to initiate fracture of the score line, and a user may subsequently pull the tab to partially or fully remove a portion of the panel, thereby creating an opening through which a user may access the contents.

[0003] Typically, the gap between the pull tab handle and the can end panel is very small. This small gap may make it difficult for a user to grasp the pull tab, because there may not be enough clearance under the pull tab for a user to insert a finger. Therefore, typical easy open cans may be difficult for a user to open.

[0004] A can end that has a moveable portion disposed beneath a handle of its tab has been developed by Crown Packaging Technology, Inc. This can end - known commercially as the Easylift™ can end - is disclosed in U.S. application no. 11/613,909 (published as US 2007/0108209. The Easylift™ can end has a moveable portion that is deformable from an upward position to a downward position - these two states are clearly shown in figure 2 of US 2007/0108209. In the upward position, the can end is readily stackable for transportation (i.e. before being attached to a can body), but provides little or no clearance between the can end and the tab. When deformed into the downward position (typically after being attached to a can body), the deformed moveable portion then provides clearance between the tab and can end to enable a user to engage their fingers with the tab and open the can.

[0005] While the moveable portion may be deformed into a downward position using a mechanical force, ideally the downward position is achieved utilising a pressure differential across the can end. For example, before the can end is attached to the can body, the can body is filled with a hot comestible product. After the can end is attached, the hot product cools down gradually and approaches ambient temperature. This lower temperature, as well as resulting steam that is trapped inside the container, may result in a low-pressure period. This reduced pressure inside the container may produce a downward force (i.e. vacuum) acting on the moveable portion to thereby deform the moveable portion into a downward position without the use of a mechanical panel pusher.

[0006] Because it is ideal to deform the moveable portion into a downward position utilising a pressure differential across the can end, there is a need for improved can ends and methods for manufacturing can ends having such capabilities. Note: The terms "can" and "container" are used interchangeably and refer to the same item.

[0007] GB1533959 describes a method of making container end closures and more particularly to a method of forming an opening tab in an end closure. JP2002-160733 also describes a can end that is deformed inwardly when attached to a container body due to negative internal pressure, the end moving outwardly upon opening of the container.

Summary of invention

[0008] Methods for producing a can end having a moveable portion disposed beneath a tab are disclosed. Further, tooling suitable for producing a can end having a moveable portion disposed beneath a tab is also disclosed.

[0009] According to a first aspect of the present invention there is provided a method for producing a can end having a moveable portion disposed beneath a pull tab. The method comprises forming a can end having a centre panel, and forming a moveable portion in the centre panel that is moveable between an upward position and a downward position, the moveable portion initially being in its downward position. The method further comprises restraining a portion of the can end such that a portion of the centre panel that is adjacent to the moveable portion is unrestrained, and moving, while the can end is restrained, the moveable portion into its upward position. The method further comprises attaching the pull tab to the can end, the pull tab having a handle portion that is located above the moveable portion.

[0010] The can end may be restrained with a restraining tool having an upper tool and a lower tool. The upper tool may press against an upper surface of the centre panel and the lower tool may press against a bottom surface of the centre panel. When the restraining tool is restraining the can end, the upper tool may be spaced apart from the portion of the centre panel that is adjacent to the moveable portion.

[0011] Also disclosed is a tool for restraining and reforming a can end having a moveable portion formed in a centre panel of the can end. The tool comprises an upper tool having a first contact surface for contacting a top surface of the centre panel and a lower tool having a protrusion and a second contact surface for contacting a bottom surface of the centre panel, the protrusion being movable upwardly relative to the second contact surface. The first and second contact surfaces are configured to press against the centre panel to thereby restrain the can end whilst leaving portions of the centre panel that are

above and adjacent to the moveable portion of the centre panel spaced apart from the upper tool when the can end is restrained by the upper and lower tools. The protrusion is configured to contact an underside of the moveable portion to thereby move the moveable portion from a downward position to an upward position.

[0012] These and various other advantages and features are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for a better understanding of the invention, its advantages, and the objects obtained by its use, reference should be made to the drawings which form a further part hereof, and to the accompanying descriptive matter, in which there are illustrated and described preferred embodiments of the invention.

Brief description of drawings

[0013]

FIG. 1 is a top view depicting an embodiment of a can end having a moveable portion;

FIG. 2A is a cross sectional view of the can end shown in FIG. 1 with the moveable portion in an upward position;

FIG. 2B is a cross sectional view of the can end shown in FIG. 1 with the moveable portion in a downward position;

FIG. 3A is a top view depicting a can end after the can end has been formed in a first operation;

FIG. 3B is a top view depicting the can end of FIG. 3A after the can end has been formed in a second operation;

FIG. 3C is a top view depicting the can end of FIG. 3B after the can end has been formed in a third operation;

FIG. 3D is a top view depicting the can end of FIG. 3C after the can end has been formed in a fourth operation;

FIG. 3E is a top view depicting the can end of FIG. 3D after a tab has been attached to the can end;

FIG. 4 is a schematic depicting a cross section of a restraining tool having an upper tool and a lower tool that are used during the fourth operation;

FIG. 5 is a schematic depicting a cross section of another restraining tool having an upper tool and a lower tool that are used during the fourth operation;

FIG. 6 is a perspective view depicting an upper tool that may be used with the restraining tool shown in FIG. 5;

FIG. 7A is a perspective view depicting an embodiment of a first die of a lower tool that may be used with the restraining tool shown in FIG. 5; and

FIG. 7B is a perspective view depicting an embodiment of a second die of a lower tool that may be used with the restraining tool shown in FIG. 5.

Description of embodiments

[0014] Preferred structures and methods for can end technology are described herein. An embodiment of a can end and tooling for manufacturing a can end that employ this technology are also described. Further, the present invention encompasses other can end designs not described herein.

[0015] Some can ends may have a moveable portion disposed beneath a tab of the can end. The moveable portion is moveable between an upward position and a downward position. Such can ends are preferably manufactured so that the moveable portions are in the upward position. By having the moveable portions in the upward position, the can ends may be more densely stacked for shipment. When the can ends are seamed onto container bodies to thereby form containers, the moveable portions may be moved to the downward position (either mechanically or by utilising internal negative pressure) so that a gap may be formed underneath their respective tabs. These gaps may allow a user to more easily insert a finger under the pull tabs, to thereby provide enhanced openability of the containers.

[0016] FIG. 1 shows a can end 10 having a moveable portion 14. As shown, can end 10 has a centre panel 18 with a reinforcing bead 22 at its periphery. Reinforcing bead 22 extends upwardly into a wall 26, with the wall 26 extending radially outwards to form a seaming panel 30. A circular score line 34 is formed in the can end 10, defining an openable panel portion 38 inwards of the score line 34. Score line 34 (once severed) defines an aperture through which a product may be dispensed, with the openable panel portion 38 being completely detachable from the can end 10. Beading 42 may be provided on the centre panel 18 for the purpose of strengthening the centre panel 18.

[0017] A tab 46 is attached to the centre panel 18 by a rivet 50. A first end of the tab 46 is provided with a nose portion 54 disposed adjacent to the score line 34. The opposite end of tab 46 is provided with a handle portion 58 in the form of a ring.

[0018] As shown in FIGs. 1, 2A and 2B, the moveable portion 14 may be formed in a recessed portion 62 of the centre panel 18 and may include a downwardly inclined annular step 66 at its periphery. As shown in FIGs. 2A and 2B, the moveable portion 14 can revert between an upward position as shown in FIG. 2A and a downward position as shown in FIG. 2B.

[0019] Typically can ends 10 are transported between different sites for later fixing to a can body (i.e. where a filler attaches the can end to the can body). Preferably, the moveable portion 14 is in the upward position as shown in FIG. 2A during transport. When in the upward position, the moveable portion 14 may have a convex profile that defines a recess 70 on the bottom side of the centre panel 18. Thus, can ends 10 may be most efficiently stacked when the moveable portion 14 is in the upward position, because the recess 70 provides space

for the tab of an underlying can end.

[0020] Once a can body is filled with a product, can end 10 is seamed onto the can body. After seaming, the moveable portion 14 may revert back to the downward position. In order to move the moveable portion 14 into the downward position, a force may be applied, generally in a downward direction, to the moveable portion 14. The force preferably arises from a pressure differential across the can end 10, where the pressure on the upper side of the can end 10 (outside the container) is higher than the pressure on the lower side of the can end 10 (inside the container). In other embodiments, the force may arise from a mechanical force applied to the upper side of the moveable portion 14.

[0021] When in the downward position as shown in FIG. 2B, the moveable portion 14 may have a concave profile that results in a gap Δh between the handle portion 58 and the moveable portion 14. It is intended that a consumer should receive the container with the moveable portion 14 in the downward position, because this maximizes tab access and consequently, ease of opening. The presence of the annular step 66 may increase the force required for the moveable portion 14 to pop-up back to the upward position. That is, the annular step 66 may provide assurance against undesired popping-up of the moveable portion 14, even when the container is subjected to impacts with adjacent containers or other objects, or transported at high altitudes. In this way, the annular step 66 helps to maintain adequate finger access under the tab 46 for a container incorporating such a can end 10.

[0022] In use, a consumer would engage their fingers with the handle portion 58 to first lever the tab 46 upwardly about the rivet 50 to cause the nose portion 54 to initiate rupture of the score line 34. Thereafter, the consumer may pull back on the tab 46 to propagate tearing of the remainder of the score line 34 and cause removal of the openable panel portion 38 from the can end 10.

[0023] Can end 10 may be formed of any material such as aluminum or steel. For example, the can end 10 may be formed of 0.21 mm gauge DR550N material. FIGs. 3A - 3E show the can end 10 after each of its forming operations.

[0024] As shown in FIG. 3A, after a first forming operation, the can end 10 includes the centre panel 18 with reinforcing bead 22 at its periphery. As shown, the reinforcing bead 22 extends upwardly into wall 26, with the wall 26 extending radially outwards to form seaming panel 30. At this stage, the centre panel 18 may be generally planar.

[0025] As shown in FIG. 3B, after a second forming operation, score line 34 is formed in the centre panel 18 proximate to the reinforcing bead 22.

[0026] As shown in FIG. 3C, after a third forming operation, moveable portion 14 and beading 42 are formed in the centre panel 18. Typically, the moveable portion 14 is formed in the downward position as shown in FIG. 2B.

[0027] However, because the can end 10 is typically transported with the moveable portion 14 in the upward position, a fourth operation may be utilised to move the moveable portion 14 into the upward position. In that regard, as shown in FIG. 3D, the moveable portion 14 is moved into the upward position during the fourth operation. Furthermore, additional beading 76 may be formed in the centre panel 18 during this operation. As shown, the beading 76 may be formed proximate to the score line 34 and the rivet 50.

[0028] As shown in FIG. 3E, after a fifth operation, tab 46 is attached to the centre panel 18. As shown, the tab 46 may be attached with rivet 50 such that handle portion 58 is located above the moveable portion 14. During a sixth operation, burs formed on the tab 46 may be removed.

[0029] During the fourth operation shown in FIG. 3D, in which the moveable portion 14 is moved into the upward position, the can end 10 is restrained by a restraining tool. Depending on the restraining tool that is used and the manner in which it restrains the centre panel 18 of the can end 10, the can end may have different operating parameters. That is, the metal may be stretched differently during the fourth operation to thereby create an end that operates differently under similar conditions. FIGs. 4 and 5 depict two different restraining tools that may be used during the fourth forming operation of the can end 10.

[0030] As shown in FIG. 4, a restraining tool 80 includes an upper tool 84 and a lower tool 88. As shown, the can end 10 may be restrained between the upper tool 84 and the lower tool 88. As the can end 10 is restrained, the moveable portion 14 formed in the centre panel 18 is moved to its upward position.

[0031] The upper tool 84 includes a first contact surface 94, a second contact surface 98 and a recess 102. The first contact surface 94 and second contact surface 98 press against an upper surface of the centre panel 18 of the can end 10. As shown, the second contact surface 98 extends further down than the first contact surface 94 and contacts the recessed portion 62 of the centre panel 18, including the portion of the centre panel 18 directly adjacent to the moveable portion 14. Accordingly, when the moveable portion 14 is being moved into its upward position, a hinge 106 is created at a point directly adjacent to the moveable portion 14.

[0032] Lower tool 88 includes a first die 108 and a second die 110. The first die 108 includes a first contact surface 114, a second contact surface 118 and a recess 120. The first contact surface 114 and the second contact surface 118 press against a bottom surface of the centre panel 18 of the can end 10. As shown, the second contact surface 118 is lower than the first contact surface 114 and contacts a portion of the recessed portion 62 of the centre panel 18.

[0033] The second die 110 is positioned in the recess 120 of the first die 108. As shown, the second die 110 includes a protrusion 122. While the can end 10 is being

restrained by the respective contact surfaces 94, 98, 114, 118 of the upper tool 84 and lower tool 88, the protrusion 122 contacts an underside of the moveable portion 14 to thereby move the moveable portion 14 into an upward position. Recess 102 defined by the upper tool 84 provides clearance for the moveable portion 14 when it is in its upward position.

[0034] The can end 10 illustrated is 73 mm in diameter. The can end 10 produced using restraining tool 80 contains certain operating parameters. For example, once this can end 10 is seamed onto a can body, a pressure of approximately 600 mbar may be required to move the moveable portion 14 into its downward position. Furthermore, once in the downward position a pressure of approximately 600 mbar may be required to move the moveable portion 14 back into its upward position.

[0035] FIG. 5 depicts another restraining tool that may be used during the fourth operation. The restraining tool of FIG. 5 differs in its mode of operation to that of FIG. 4 in restraining the centre panel 18 at a location which is further laterally outward from the moveable portion 14 to that of FIG. 4. As shown, a restraining tool 180 includes an upper tool 184 and a lower tool 188. As shown, the can end 10 may be restrained between the upper tool 184 and the lower tool 188. As the can end 10 is restrained, the moveable portion 14 formed in the centre panel 18 is moved to its upward position.

[0036] The upper tool 184 includes a first contact surface 194 and a recess 202. The first contact surface 194 presses against an upper surface of the centre panel 18 of the can end 10. Compared to the restraining tool 80 of FIG. 4, the upper tool 184 of the restraining tool 180 in FIG. 5 restrains the centre panel 18 wholly laterally outward of the recessed portion 62 of the centre panel. In effect, when using the restraining tool 180 during the fourth operation to move the moveable portion 14 into its upward position, the centre panel 18 is less restrained than when using the restraining tool 80. When the moveable portion 14 is being moved into its upward position using the restraining tool 180, a hinge 206 is created at a point radially outward from the moveable portion 14. This hinge 206 is further radially outward than the hinge 106 created when using the restraining tool 80 of FIG. 4.

[0037] The lower tool 188 includes a first die 208 and a second die 210. The first die 208 includes a first contact surface 214, a second contact surface 218 and a recess 220. The first contact surface 214 and second contact surface 218 press against a bottom surface of the centre panel 18 of the can end 10. As shown, the second contact surface 218 is lower than the first contact surface 214 and contacts a portion of the recessed portion 62 of the centre panel 18.

[0038] The second die 210 is positioned in the recess 220 of the first die 208. As shown, the second die 210 includes a protrusion 222. While the can end 10 is being restrained, the protrusion 222 contacts an underside of the moveable portion 14 to thereby move the moveable portion 14 into an upward position. The recess 202 defined by the upper tool 184 provides clearance for the moveable portion 14 when it is in its upward position.

[0039] The can end 10 produced using the restraining tool 180 contains certain operating parameters that may differ from the operating parameters of the can end produced using the restraining tool 80. For example, once this can end 10 is seamed onto a can body, a pressure of approximately 300 mbar may be required to move moveable portion 14 into its downward position to thereby provide finger access under the tab. Furthermore, once in the downward position, a pressure of approximately 600 mbar may be required to move the moveable portion 14 back into its upward position. By producing a can end that only requires approximately 300 mbar to move its moveable portion into a downward position, the potential for sufficient vacuum to cause pop-down without the need for a mechanical panel pusher is increased. Accordingly, the internal negative pressure created by the hot contents of the container may be more efficiently utilised to move the moveable portion into its downward position. This therefore demonstrates a benefit of the reduced restraint provided by using the restraining tool 180, as it has the increased potential to avoid the use of a mechanical pusher to move the moveable portion into the downward position to provide finger access under the tab. Examples of methods for using internal negative pressure of a container to move a moveable portion of a can end into its downward position are disclosed in U.S. provisional application no. 61/113,490 titled "Method of Assembling An Easy Open Can End".

[0040] It should be understood that different pressures for moving the moveable portion into its downward position and for moving the moveable portion into its upward position may be required, depending on many factors such as the contents of the can, the manufacturer, and materials used. Regardless, can ends produced using the restraining tool 180 may increase the possibility of moving the moveable portion into the downward position without a mechanical pusher. Furthermore, can ends produced using the restraining tool 180 are capable of being seamed onto can bodies in high speed seaming operations.

[0041] FIGs. 6, 7A and 7B disclose example upper and lower tools that may be used for the restraining tool 180. Therefore, the upper tool shown in FIG. 6 and the lower tool shown in FIGs. 7A and 7B will be capable of moving the moveable portion of a can end into an upward position while not restraining the portion of the centre panel that is adjacent to the moveable portion.

[0042] As shown in FIG. 6, an upper tool 250 includes a first contact surface 254 and a recess 258. As shown, recess 258 may be cylindrical and may be surrounded by the first contact surface 254. In other words, first contact surface 254 may extend from a peripheral edge of the upper tool 250 to the recess 258.

[0043] FIG. 7A shows a first die 270 of a lower tool and FIG. 7B shows a second die 272 of a lower tool. As shown in FIG. 7A, the first die 270 includes a first contact surface

274, a second contact surface 278 and a recess 282. The first contact surface 274 may be defined by the upper most surface of first die 270 and second contact surface may be defined by a surface of a second recess 288 formed in the first die 270. The second recess 288 may be shaped to receive a recessed portion of a can end 10 so that the can end 10 is not damaged during the fourth forming operation. The recess 282 may be formed in the second recess 288 and may be shaped to receive or otherwise hold the second die 272.

[0044] As shown in FIG. 7B, the second die 272 may be shaped to fit in the recess 282 of the first die 270 and includes a protrusion 296. When the second die 272 is received by the recess 282 of the first die 270, the protrusion 296 is adapted to contact a bottom surface of a moveable portion of a can end.

[0045] The foregoing description is provided for the purpose of explanation and is not to be construed as limiting the invention. While the invention has been described with reference to preferred embodiments or preferred methods, it is understood that the words which have been used herein are words of description and illustration, rather than words of limitation. Furthermore, although the invention has been described herein with reference to particular structure, methods, and embodiments, the invention is not intended to be limited to the particulars disclosed herein, as the invention extends to all structures, methods and uses that are within the scope of the appended claims. Those skilled in the relevant art, having the benefit of the teachings of this specification, may effect numerous modifications to the invention as described herein, and changes can be made without departing from the scope as defined by the appended claims. Furthermore, any features of one described embodiment can be applicable to the other embodiments described herein.

Claims

1. A method for producing a can end (10) having a moveable portion (14) disposed beneath a pull tab (46), the method comprising:

   forming a can end (10) having a centre panel (18);
   forming a moveable portion (14) in the centre panel (18) that is moveable between an upward position and a downward position, **characterized by** the moveable portion (14) initially being in its downward position;
   restraining a portion of the can end (10) such that a portion of the centre panel (18) that is adjacent to the moveable portion (14) is unrestrained; and
   moving, while the can end (10) is restrained, the moveable portion (14) into its upward position;
   the method further comprising attaching the pull tab (46) to the can end (10), the pull tab (46) having a handle portion (58) that is located above the moveable portion (14).

2. The method of claim 1, wherein the moving step includes moving a tool into contact with the moveable portion (14) such that the moveable portion (14) moves from the downward position to the upward position.

3. The method of claim 1 or 2, wherein during the restraining step, the can end (10) is restrained between an upper tool (84) and a lower tool (88), the lower tool (88) having a protrusion (122) for contacting an underside of the moveable portion (14).

4. The method of claim 3, wherein the upper tool (84) is spaced apart from the portion of the centre panel (18) that is adjacent to the moveable portion (14) as the moveable portion (14) is reformed into the upward position.

5. The method of any one of claims 1 to 4, further comprising restraining the can end (10) with a restraining tool (80), the restraining tool (80) comprising an upper tool (84) that presses against an upper surface of the centre panel (18) and a lower tool (88) that presses against a bottom surface of the centre panel (18), wherein the upper tool (84) is spaced apart from a portion of the centre panel (18) that is adjacent to the moveable portion (14) when the can end (10) is restrained between the upper and lower tools (84, 88); and
   moving, while the can end (10) is restrained, the moveable portion (14) into its upward position.

6. The method of any one of claims 1 to 5, wherein (i) the centre panel (18) further includes a recessed portion (62), (ii) the moveable portion (14) is formed in the recessed portion (62) and (iii) the upper tool (84) is spaced apart from the recessed portion (62) as the upper tool (84) and the lower tool (88) restrain the can end (10).

7. The method of claim 6, wherein the upper and lower tools (84, 88) restrain the can end (10) by pressing against a portion of the centre panel (18) that is radially outward from the recessed portion (62).

8. The method of any preceding claim, wherein a score (34) is formed in the can end (10) proximate to the periphery of the centre panel (18) during the forming of the moveable portion (14), the score (34) defining an openable panel portion (38).

9. The method of any preceding claim, wherein the can end (10) is formed to have a wall portion (26), an annular reinforcing bead (22) extending radially in-

ward from the wall portion (26) and the centre panel (18) extends radially inward from the annular reinforcing bead (22).

10. The method of any preceding claim, further comprising:

filling a can body with a comestible product;
seaming the can end (10) onto the can body; and
moving the moveable portion (14) back to the downward position, the moving being in response to internal negative pressure caused by cooling of the product within the can body.

Patentansprüche

1. Verfahren zum Herstellen eines Dosenendes (10) mit einem beweglichen Abschnitt (14), welcher unter einer Ziehlasche (46) angeordnet ist, wobei das Verfahren umfasst:

Bilden eines Dosenendes (10) mit einem Mittelfeld (18);
Bilden eines beweglichen Abschnitts (14) im Mittelfeld (18), der zwischen einer aufgerichteten und einer abgesenkten Position beweglich ist, **dadurch gekennzeichnet, dass** der bewegliche Abschnitt (14) anfänglich in seiner abgesenkten Position ist;
Einzwängen eines Abschnitts des Dosenendes (10), sodass ein Abschnitt des Mittelfeldes (18), welcher dem beweglichen Abschnitt (14) benachbart ist, nicht eingezwängt ist; und
Bewegen des beweglichen Abschnitts (14) in seine aufgerichtete Position, während das Dosenende (10) eingezwängt ist;
wobei das Verfahren außerdem den Schritt des Befestigens der Ziehlasche (46) am Dosenende umfasst (10), wobei die Ziehlasche (46) einen Griffabschnitt (58) besitzt, der oberhalb des beweglichen Teils (14) angeordnet ist.

2. Verfahren nach Anspruch 1, wobei der Schritt des Bewegens das Bewegen eines Werkzeugs in Kontakt mit dem beweglichen Abschnitt (14) so umfasst, dass sich der bewegliche Abschnitt (14) von der abgesenkten in die aufgerichtete Position bewegt.

3. Verfahren nach Anspruch 1 oder 2, wobei während des Schrittes des Einzwängens das Dosenende (10) zwischen einem oberen Werkzeug (84) und einem unteren Werkzeug (88) eingezwängt wird, wobei das untere Werkzeug (88) einen Vorsprung (122) besitzt, um mit einer Unterseite des beweglichen Abschnitts (14) in Kontakt zu kommen.

4. Verfahren nach Anspruch 3, wobei das obere Werkzeug (84) vom Abschnitt des Mittelfeldes (18), welcher dem beweglichen Abschnitt (14) benachbart ist, entfernt angeordnet ist, wenn der bewegliche Abschnitt (14) in die aufgerichtete Position zurückgeformt wird.

5. Verfahren nach einem der Ansprüche 1 bis 4, außerdem umfassend das Einzwängen des Dosenendes (10) mit einem Einzwängwerkzeug (80), wobei das Einzwängwerkzeug (80) ein oberes Werkzeug (84) umfasst, welches gegen eine obere Fläche des Mittelfeldes (18) drückt und ein unteres Werkzeug (88) umfasst, das gegen eine untere Fläche des Mittelfeldes (18) drückt, wobei das obere Werkzeug (84) von einem Abschnitt des Mittelfeldes (18), welcher dem beweglichen Abschnitt (14) benachbart ist, entfernt angeordnet ist, wenn das Dosenende (10) zwischen dem oberen und dem unteren Werkzeug (84, 88) eingezwängt ist; und
Bewegen des beweglichen Abschnitts (14) in seine aufgerichtete Position, während das Dosenende (10) eingezwängt ist.

6. Verfahren nach einem der Ansprüche 1 bis 5, wobei (i) das Mittelfeld (18) außerdem einen vertieften Abschnitt (62) umfasst, (ii) der bewegliche Abschnitt (14) im vertieften Abschnitt (62) gebildet ist und (iii) das obere Werkzeug (84) vom vertieften Abschnitt (62) entfernt angeordnet ist, wenn das obere Werkzeug (84) und das untere Werkzeug (88) das Dosenende (10) einzwängen.

7. Verfahren nach Anspruch 6, wobei das obere und untere Werkzeug (84, 88) das Dosenende (10) einzwängen, indem sie gegen einen Teil des Mittelfelds (18) drücken, der sich in Radialrichtung außerhalb des vertieften Abschnitts (62) befindet.

8. Verfahren nach einem der vorherigen Ansprüche, wobei eine Kerbe (34) im Dosenende (10) in der Nähe des Umfangs des Mittelfeldes (18) beim Bilden des beweglichen Abschnitts (14) gebildet wird, wobei die Kerbe (34) einen offenbaren Feldabschnitt (38) definiert.

9. Verfahren nach einem der vorherigen Ansprüche, wobei das Dosenende (10) derart gebildet ist, dass es einen Wandabschnitt (26) umfasst, wobei ein ringförmiger Verstärkungswulst (22) sich vom Wandteil (26) in Radialrichtung nach innen erstreckt, und das Mittelfeld (18) sich vom ringförmigen Verstärkungswulst (22) in Radialrichtung nach innen erstreckt.

10. Verfahren nach einem der vorherigen Ansprüche, außerdem folgende Schritte umfassend:

Füllen eines Dosenkörpers mit einem verzehr-

baren Produkt;
Fügen des Dosenendes (10) an den Dosenkörper; und
Bewegen des beweglichen Teils (14) zurück in die abgesenkte Position, wobei das Bewegen als Reaktion auf einen negativen Innendruck erfolgt, der durch Abkühlen des Produkts im Dosenkörper entsteht.

Revendications

1. Procédé de fabrication d'une extrémité (10) de cannette comportant une partie mobile (14) disposée en dessous d'une languette de préhension (46), le procédé comprenant les étapes ci-dessous :

   formation d'une extrémité (10) de cannette comprenant un panneau central (18),
   formation d'une partie mobile (14) dans le panneau central (18) qui est mobile entre une position haute et une position basse, le procédé étant **caractérisé en ce que** la partie mobile (14) est initialement dans sa position basse,
   retenue d'une partie de l'extrémité de cannette (10) de façon à ce qu'une partie du panneau central (18) qui est adjacente à la partie mobile (14) n'est pas retenue, et
   déplacement, lorsque l'extrémité (10) de la cannette est retenue, de la partie mobile (14) dans sa position haute,
   le procédé comprenant en outre une étape de fixation de la languette de préhension (46) à l'extrémité (10) de la cannette, la languette de préhension (46) comportant une partie d'anse (58) qui est située au-dessus de la partie mobile (14).

2. Procédé selon la revendication 1, dans lequel l'étape de déplacement comprend le déplacement d'un outil en contact avec la partie mobile (14) de sorte que la partie mobile (14) se déplace de la position basse jusqu'à la position haute.

3. Procédé selon la revendication 1 ou 2, dans lequel, durant l'étape de retenue, l'extrémité (10) de la cannette est retenue entre un outil supérieur (84) et un outil inférieur (88), l'outil inférieur (88) comportant une saillie (122) destinée à entrer en contact avec une face inférieure de la partie mobile (14).

4. Procédé selon la revendication 3, dans lequel l'outil supérieur (84) est espacé de la partie du panneau central (18) qui est adjacente à la partie mobile (14) lorsque la partie mobile (14) est reformée dans la position haute.

5. Procédé selon l'une quelconque des revendications 1 à 4, comprenant en outre la retenue de l'extrémité de la cannette (10) à l'aide d'un outil de retenue (80), l'outil de retenue (80) comprenant un outil supérieur (84) qui exerce une pression contre une surface supérieure du panneau central (18) et un outil inférieur (88) qui exerce une pression contre une surface inférieure du panneau central (18), l'outil supérieur (84) étant espacé d'une partie du panneau central (18) qui est adjacente à la partie mobile (14) lorsque l'extrémité de la cannette (10) est retenue entre les outils supérieur et inférieur (84, 88), et
   le déplacement, lorsque l'extrémité de la cannette (10) est retenue, de la partie mobile (14) jusqu'à sa position haute.

6. Procédé selon l'une quelconque des revendications 1 à 5, dans lequel (i) le panneau central (18) comprend en outre une partie en retrait (62), (ii) la partie mobile (14) est formée dans la partie en retrait (62) et (iii) l'outil supérieur (84) est espacé de la partie en retrait (62) lorsque l'outil supérieur (84) et l'outil inférieur (88) retiennent l'extrémité de la cannette (10).

7. Procédé selon la revendication 6, dans lequel les outils supérieur et inférieur (84, 88) retiennent l'extrémité de la cannette (10) en exerçant une pression contre une partie du panneau central (18) qui est radialement à l'extérieur de la partie en retrait (62).

8. Procédé selon l'une quelconque des revendications précédentes, dans lequel une entaille (34) est formée dans l'extrémité de la cannette (10) à proximité du pourtour du panneau central (18) pendant la formation de la partie mobile (14), l'entaille (34) définissant une partie de panneau ouvrable (38).

9. Procédé selon l'une quelconque des revendications précédentes, dans lequel l'extrémité de la cannette (10) est formée de façon à comporter une partie de paroi (26), un bourrelet de renfort annulaire (22) s'étendant radialement à l'intérieur à partir de la partie de paroi (26) et le panneau central (18) s'étend radialement vers l'intérieur à partir du bourrelet de renfort annulaire (22).

10. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre les étapes ci-dessous :

    le remplissage d'un corps de cannette avec un produit comestible,
    le sertissage de l'extrémité de cannette (10) sur le corps de cannette, et
    le déplacement de la partie mobile (14) en retour jusqu'à la position basse, le déplacement étant effectué en réaction à une pression négative interne provoquée par le refroidissement du produit à l'intérieur du corps de la cannette.

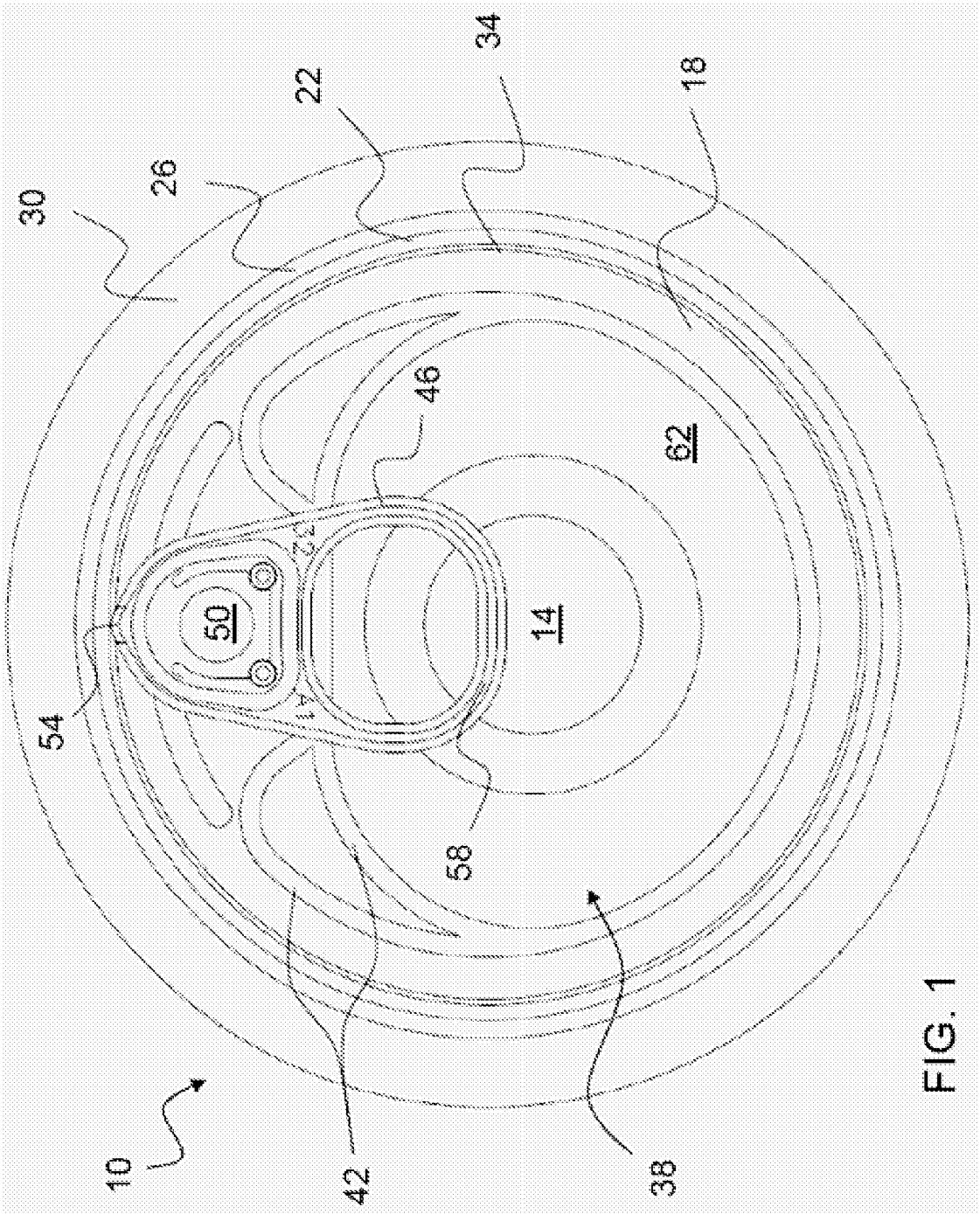

FIG. 1

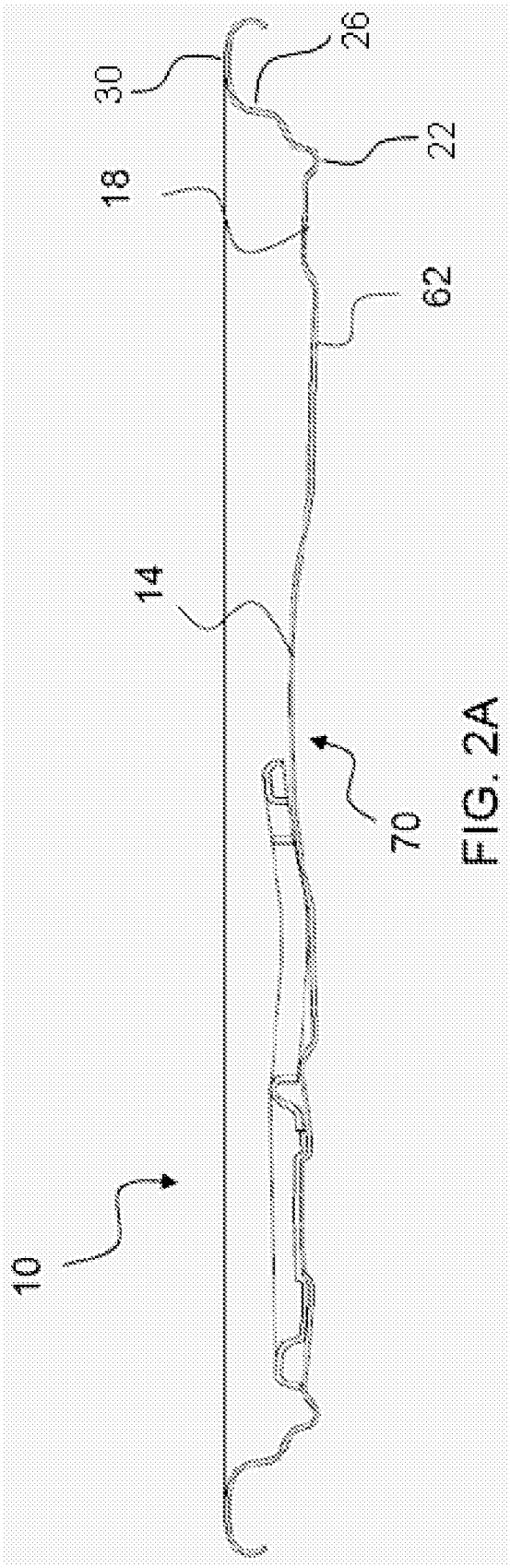

FIG. 2A

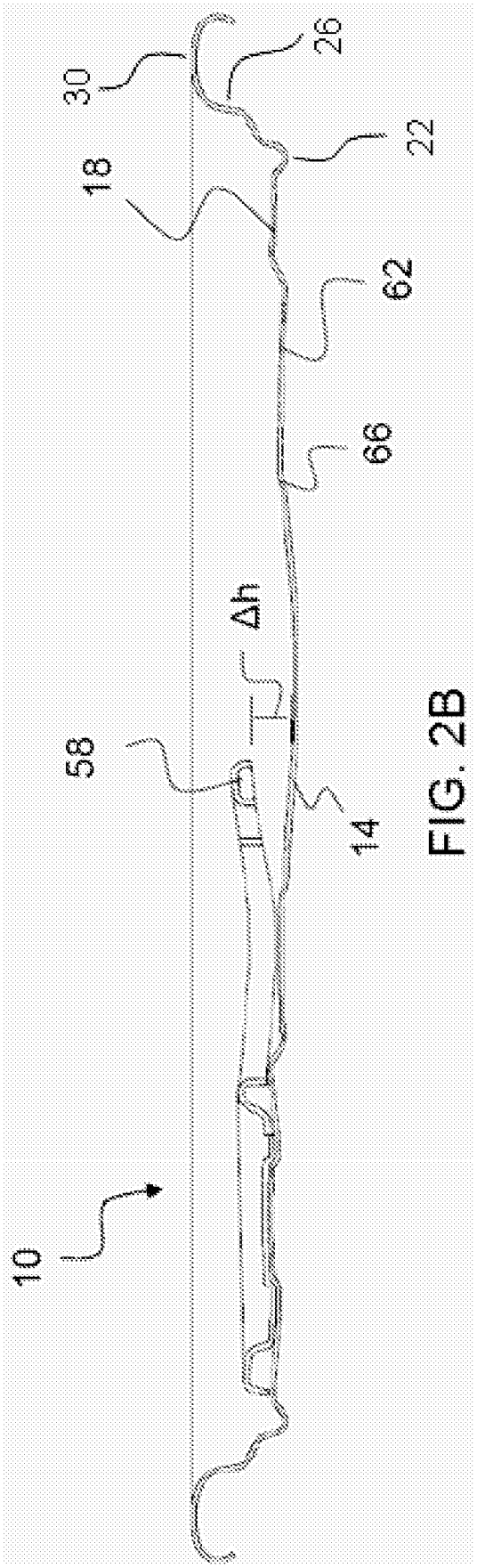

FIG. 2B

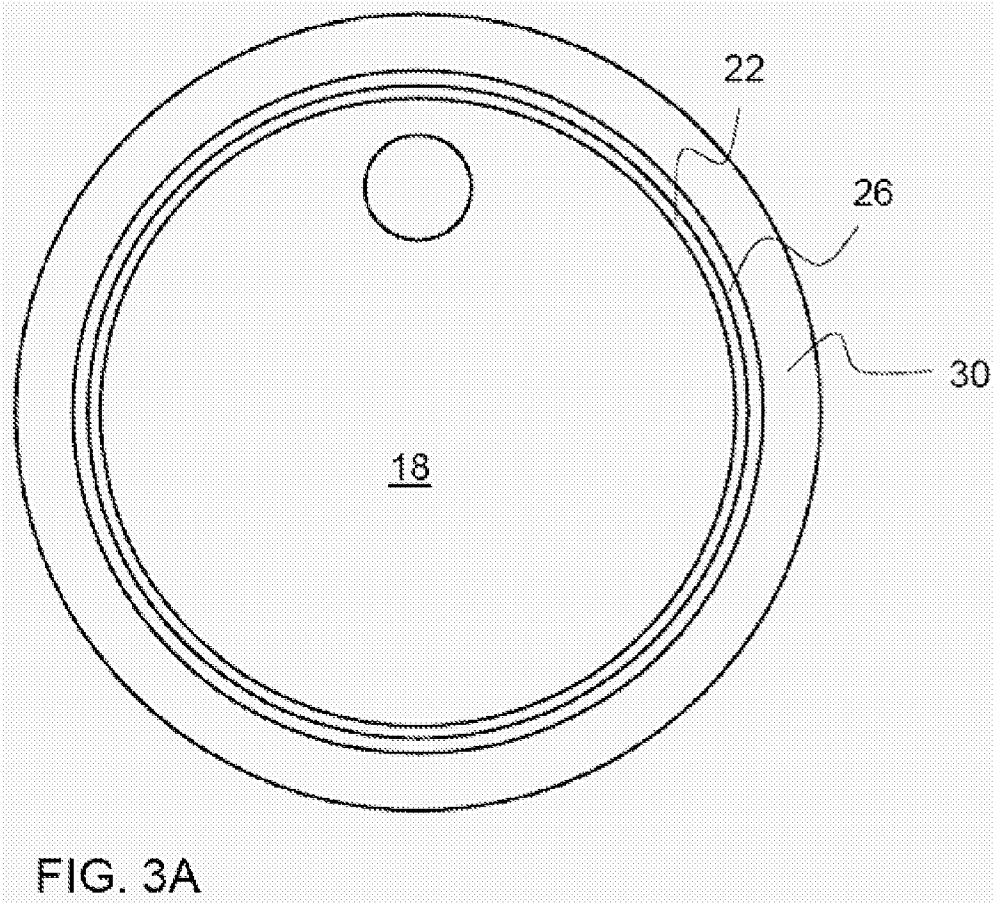

FIG. 3A

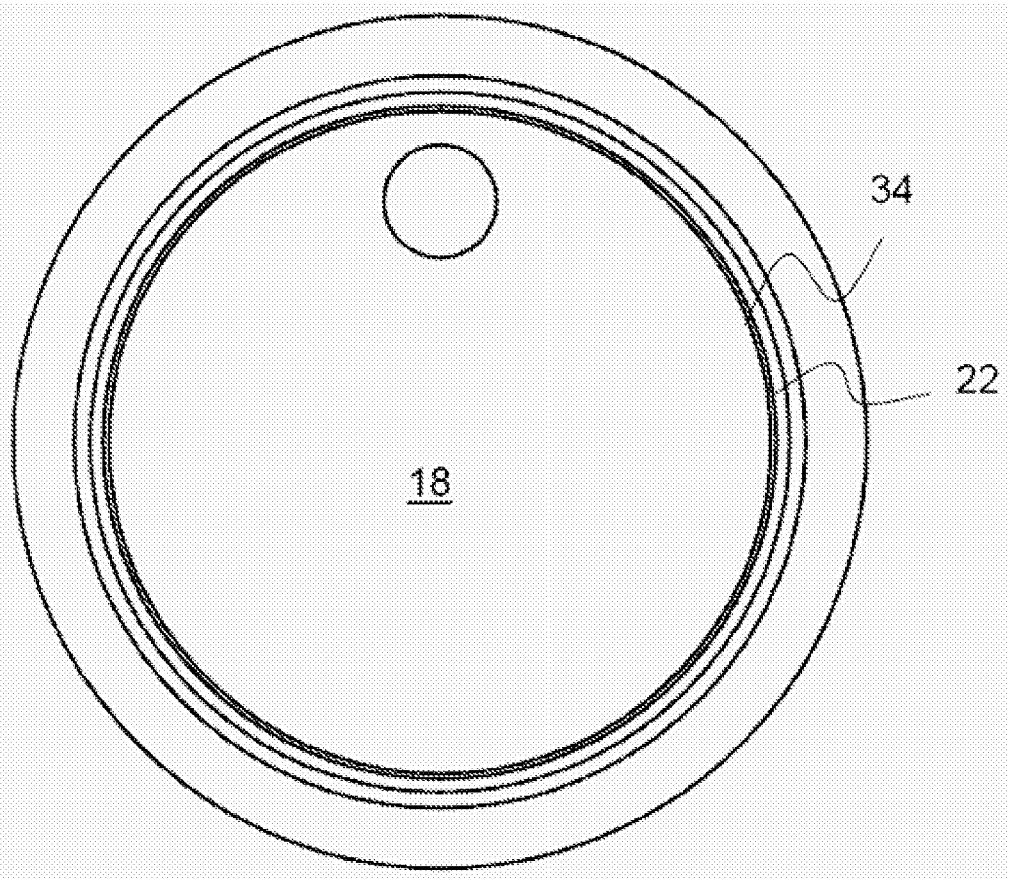

FIG. 3B

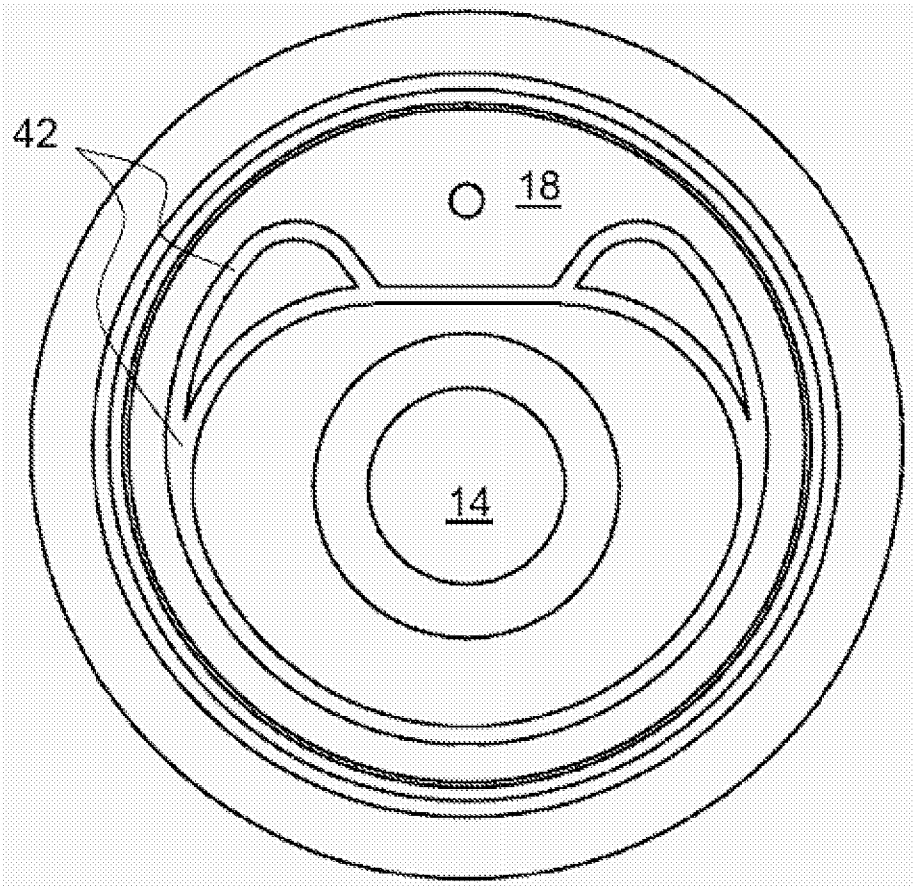

FIG. 3C

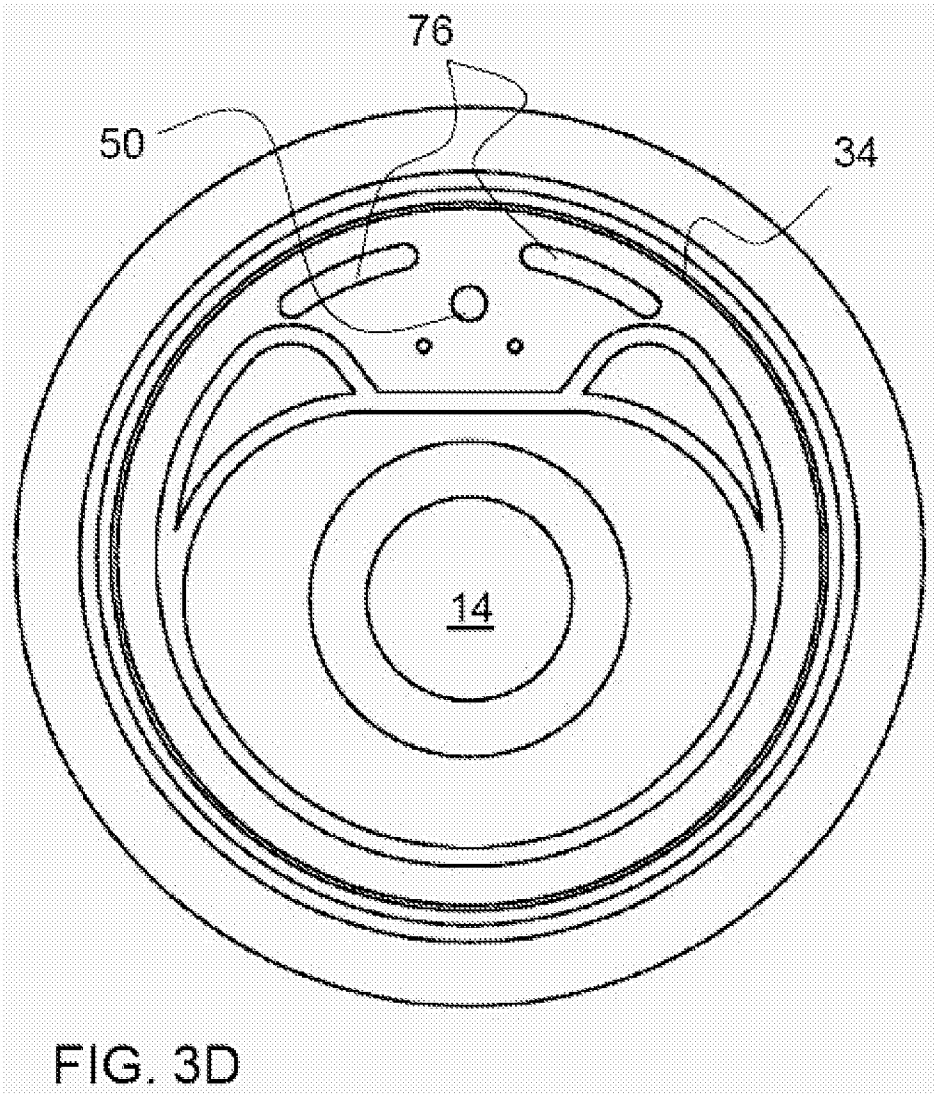

FIG. 3D

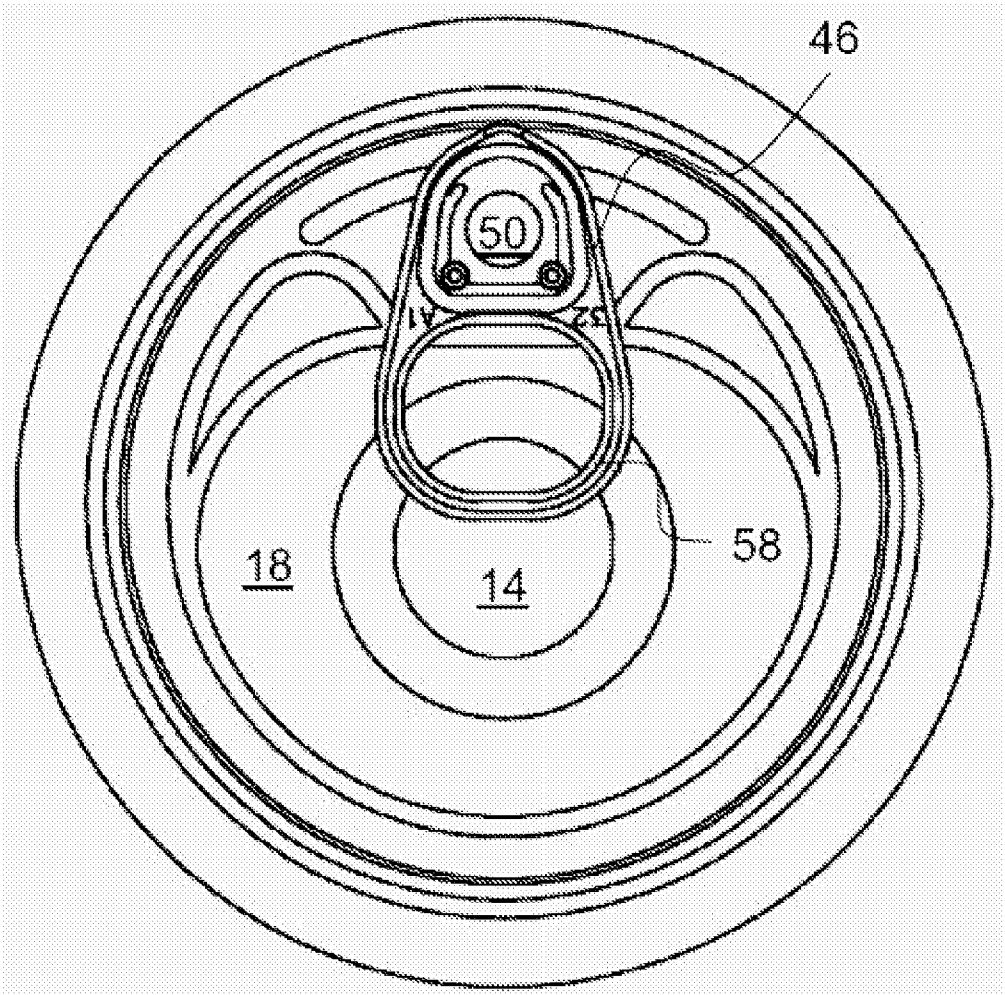

FIG. 3E

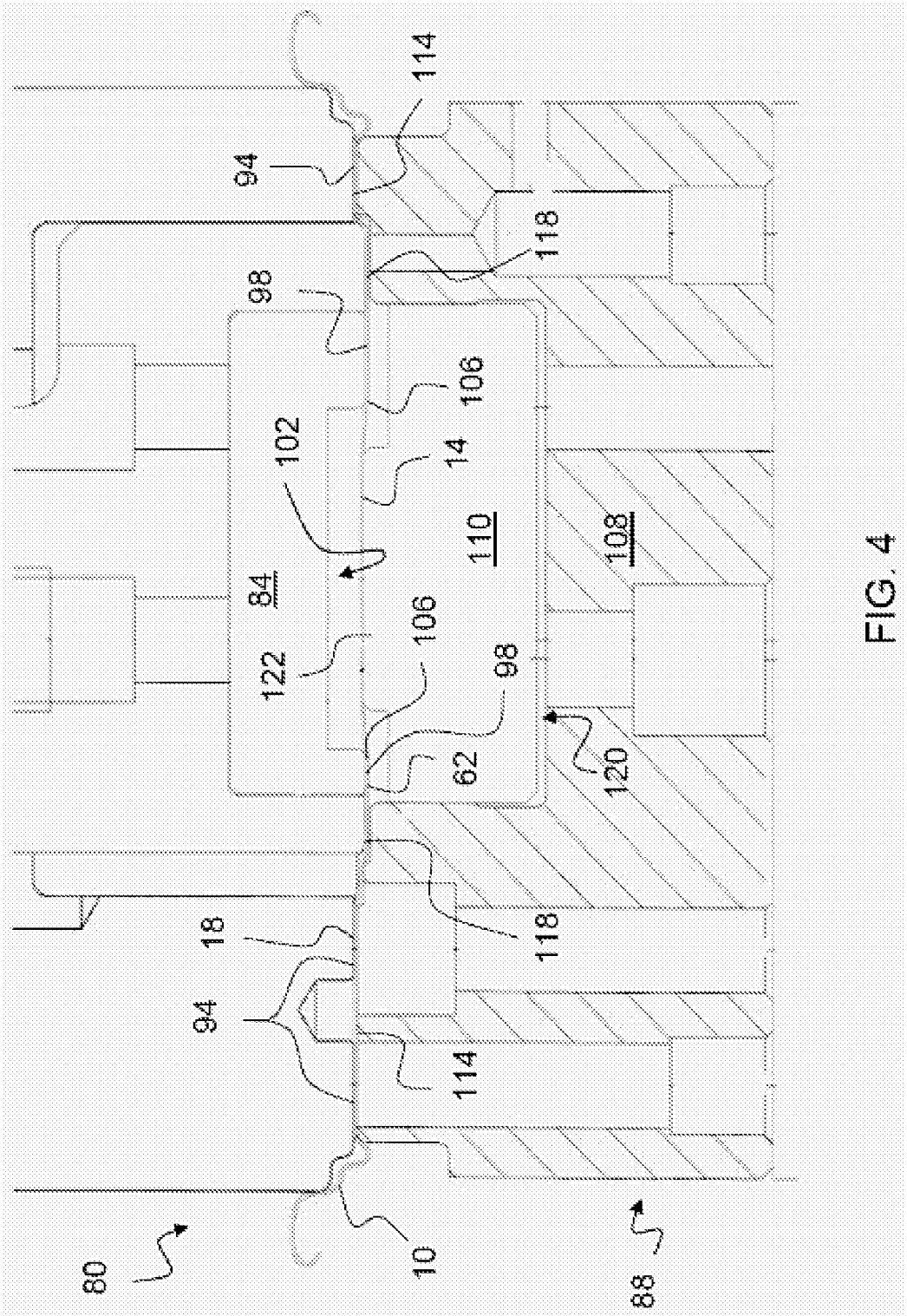

FIG. 4

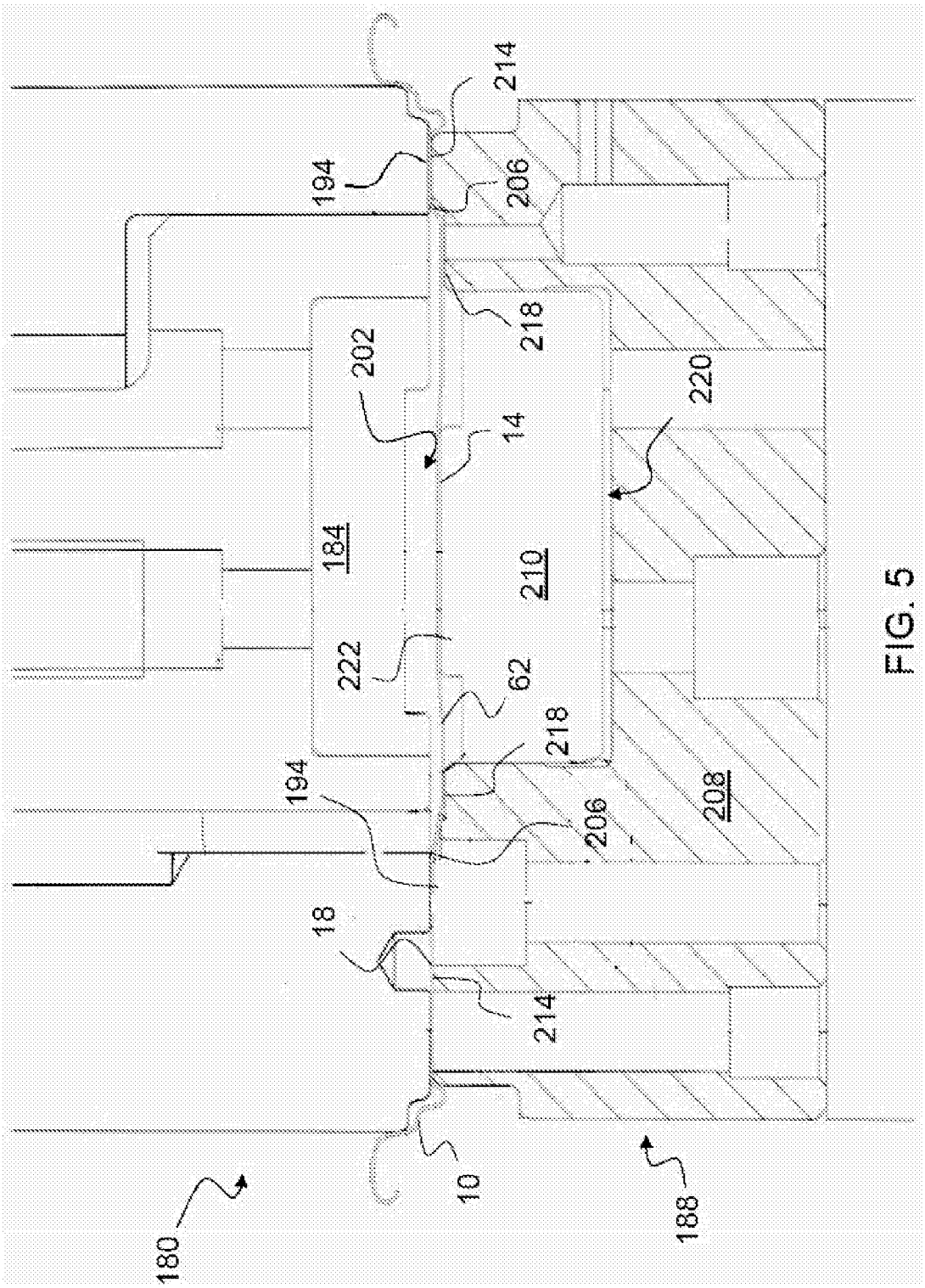
214
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FIG. 5

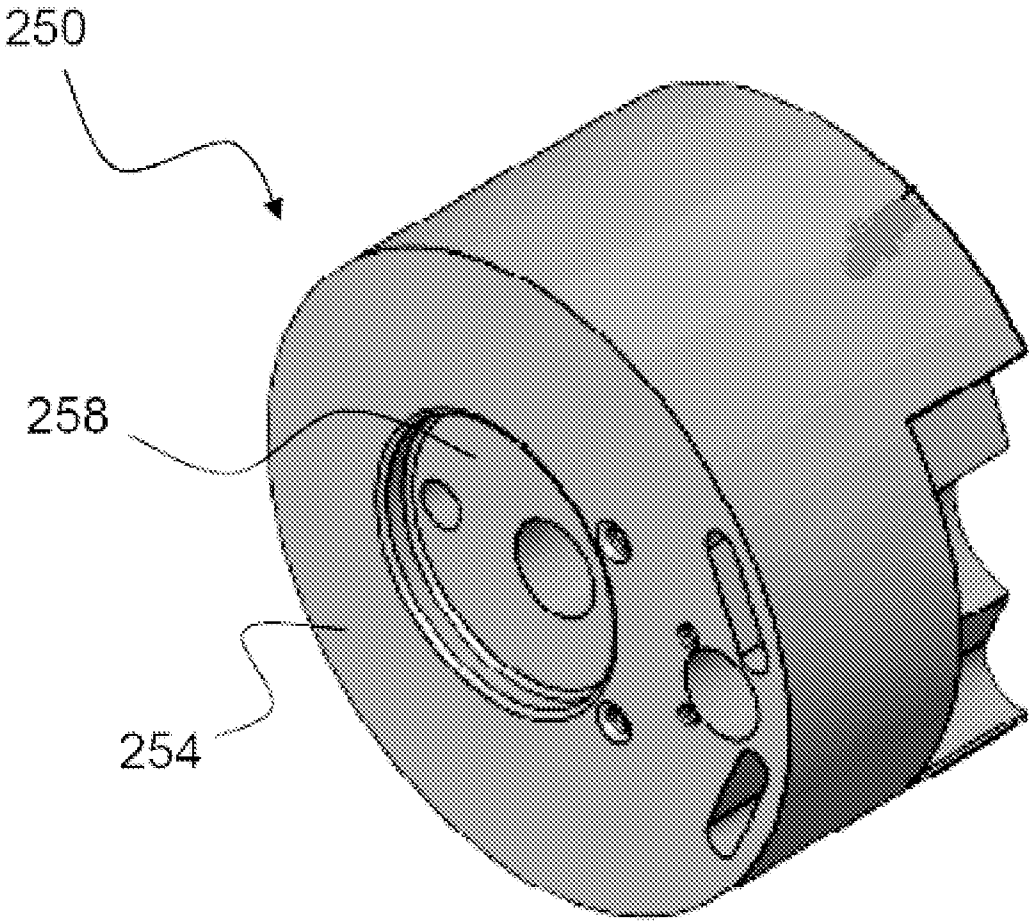

FIG. 6

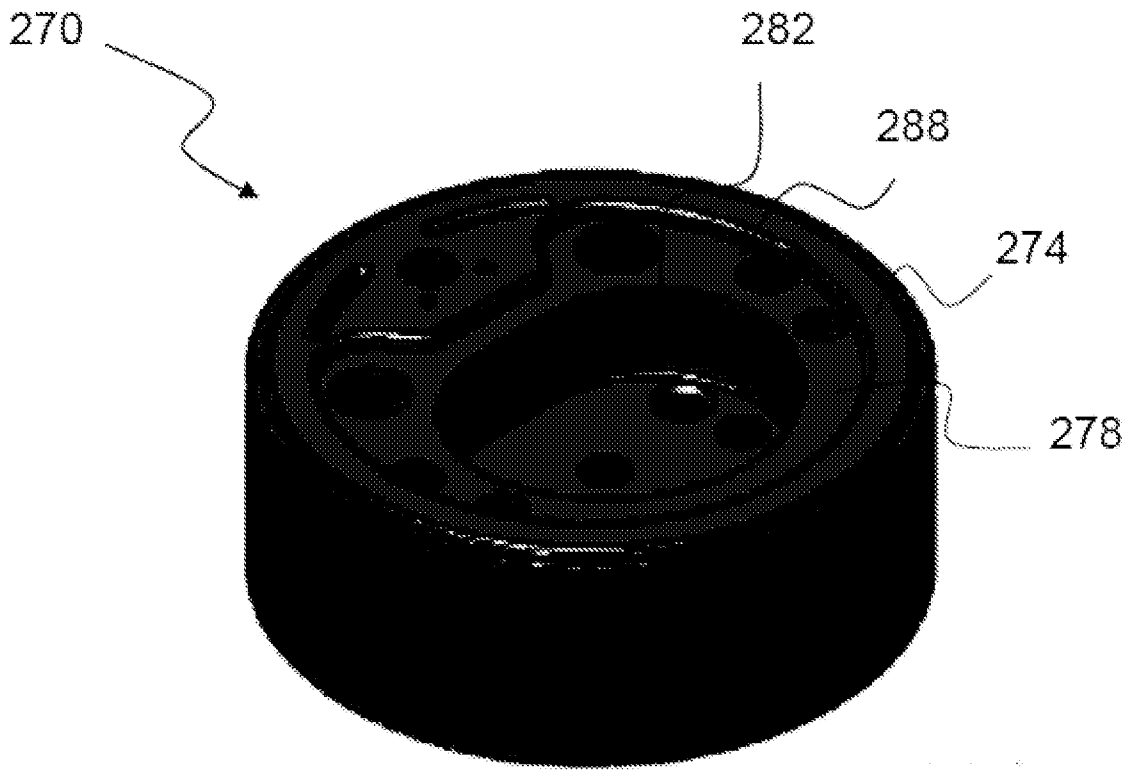

FIG. 7A

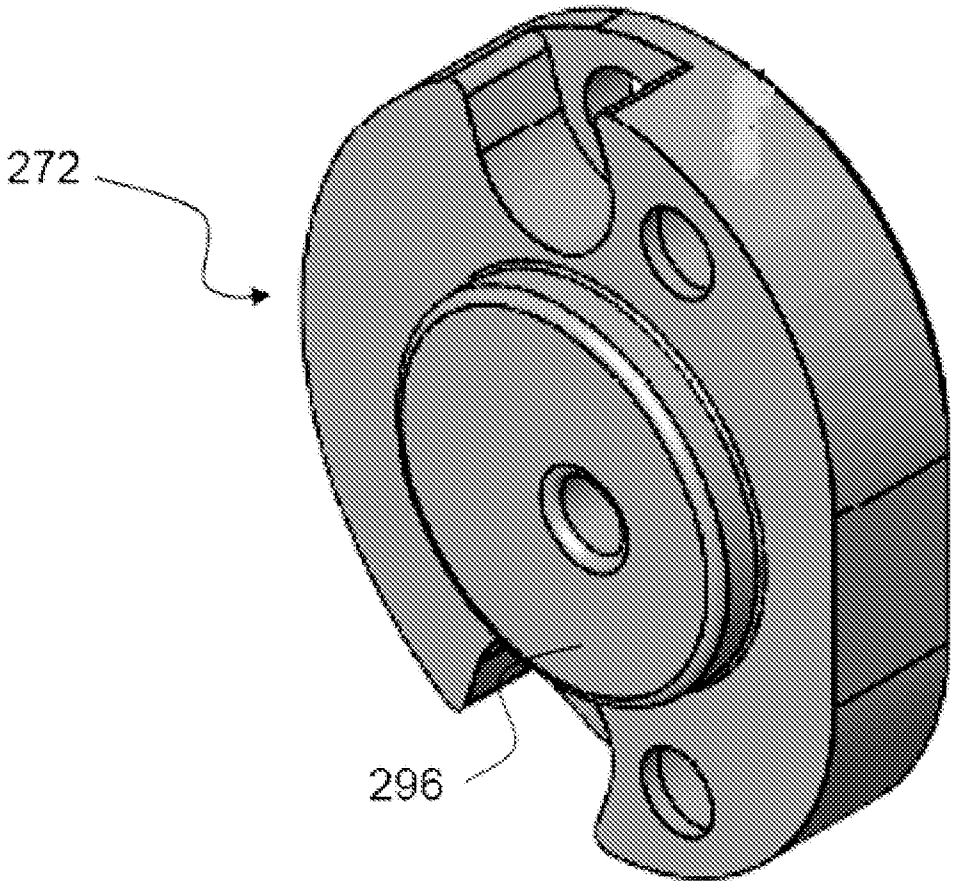

FIG. 7B

REFERENCES CITED IN THE DESCRIPTION

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- US 613909 A **[0004]**
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- US 61113490 A **[0039]**

Szabadalmi igénypontok

1. Eljárás dobozvég (10) előállítására, amelynek van mozgatható része (14), amely húzónyelv (46) alatt elhelyezve, az eljárás tartalmazza:

dobozvég (10) kialakítását, amelynek van központi lemeze (18);

mozgatható rész (14) kialakítását a központi lemezben (18), amely mozgatható felfelé pozíció és lefelé pozíció között, azzal jellemezve, hogy a mozgatható rész (14) kezdetben annak efelé pozíciójában van;

dobozvég (10) befogását, úgy hogy a központi lemez (18) része, amely szomszédos a mozgatható résszel (14), nincs befogva; és

a mozgatható rész (14) mozgatását felfelé pozíciójába, míg a dobozvég (10) be van fogva;

az eljárás továbbá tartalmazza a húzónyelv (46) rögzítését a dobozvéghez (10), a húzónyelvnek (46) van fogantyú része (58), amely a mozgatható rész (14) felett van elhelyezve.

2. Az 1. igénypont szerinti eljárás, ahol a mozgatási lépés tartalmazza szerszám érintkezésbe mozgatását a mozgatható résszel (14), úgy hogy a mozgatható rész (14) a lefelé pozícióból a felfelé pozícióba mozog.

3. Az 1. vagy 2. igénypont szerinti eljárás, ahol a befogási lépés alatt, a dobozvég (10) be van fogva felső szerszám (84) és alsó szerszám (88) között, az alsó szerszámnak (88) van előreugrása (122) a mozgatható rész (14) alsó részének kontaktálására.

4. A 3. igénypont szerinti eljárás, ahol a felső szerszám (84) távolságban van a központi lemez (18) részétől, amely szomszédos a mozgatható résszel (14), ahogy a mozgatható rész (14) vissza van alakítva a felfelé pozícióba.

5. Az 1-4. igénypontok bármelyike szerinti eljárás, amely továbbá tartalmazza a dobozvég (10) befogását befogószerszámmal (80), a befogószerszám (80) tartalmaz felső szerszámot (84), amely nekinyomódik a központi lemez (18) felső felületének és alsó szerszámot (88), amely nekinyomódik a központi lemez (18) alsó felületének, ahol a felső szerszám (84) távolságban van a központi lemez (18) részétől, amely szomszédos a mozgatható résszel (14), ha a dobozvég (10) be van fogva az alsó és felső szerszámok (84, 88) között; és

a mozgatható rész (14) mozgatását felfelé pozíciójába, míg a dobozvég (10) be van fogva.

6. Az 1-5. igénypontok bármelyike szerinti eljárás, ahol (i) a központi lemez (18) továbbá tartalmaz bemélyített részt (62), (ii) a mozgatható rész (14) a bemélyített részben (62) van kialakítva és (iii) a felső szerszám (84) távolságban van a bemélyített résztől (62), ahogy a felső szerszám (84) és az alsó szerszám (88) befogják a dobozvéget (10).

7. A 6. igénypont szerinti eljárás, ahol az alsó és felső szerszámok (84, 88) befogják a dobozvéget (10) a központi lemez (18) részéhez nyomódás által, amely sugárirányban kifelé van a bemélyített résztől (62).

8. Bármelyik előző igénypont szerinti eljárás, ahol rovátka (34) van kialakítva a dobozvéghez (10) a központi lemez (18) kerületéhez közel, a mozgatható rész (14) kialakítása alatt, a rovátka (34) meghatároz nyitható panel részt (38).

9. Bármelyik előző igénypont szerinti eljárás, ahol a dobozvég (10) úgy van kialakítva, hogy van fal része (26), gyűrűs erősítő pereme (22), amely kiterjed sugárirányban befelé a fal résztől (26) és a központi lemez (18) kiterjed sugárirányban befelé a gyűrűs erősítő peremtől (22).

10. Bármelyik előző igénypont szerinti eljárás, továbbá tartalmazza:

doboztest megtöltését ehető termékkel;

a dobozvég (10) rászegését a doboztestre; és

a mozgatható rész (14) mozgatását vissza a lefelé pozícióhoz, a mozgás belső negatív nyomásra válaszként, amelyet a termék hűlése okoz a doboztestben.