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(54) Apparatus and method for reshaping containers

Vorrichtung und Verfahren zum Wieder-in-Form-bringen von Behältern

Dispositif et procédé de remodelage de récipients

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Description

The present invention relates to an apparatus for, and a method of, reshaping containers.

It is an object of this invention to provide a new or improved apparatus for, and a method of, reshaping a container.

CH-A-388887 describes an apparatus for reshaping a hollow container comprising a body member having first and second ends, at least one of said first and second ends being open, said apparatus comprising mold having an inner surface which defines a chamber for accomodating the container, first holding means for holding the container at said first end thereof with respect to the mold, second holding means for holding the container at said second end thereof with respect to the mold means for sealing the or each open end of the container, and means for supplying a fluid under pressure to the interior of the container so as to expand the container outwardly onto the inner surface of the mold.

According to one aspect of this invention, there is provided an apparatus for reshaping a hollow container comprising a body member having first and second ends; at least one of said first and second ends being open, and at least one end member being joined to the body member by a double seam, said apparatus comprising a mold having an inner surface which defines a chamber for accommodating the container, means for sealing the or each open end of the container, and means for supplying a fluid under pressure to the interior of the container such as to expand the container outwardly onto the inner surface of the mold, characterised by first holding means for holding the container at said first end thereof with respect to the mold, second holding means for holding the container at said second end thereof with respect to the mold; said first and second holding means being separate one from the other, and clamping means for gripping the or each double seam to prevent deformation thereof during expansion of the container; the clamping means comprising a first member for supporting one side of the or each double seam, and a second member for supporting the opposite side of the or each double seam.

According to a second aspect of this invention, there is provided a method of reshaping a hollow container comprising a body member having first and second ends, at least one of said first and second ends being open, said container comprising at least one end member joined to the body member by a double seam, said method comprising the steps of placing the container in a mold having an inner surface which defines a chamber for accommodating the container, holding the container at said first end thereof with respect to the mold, holding the container at said second end thereof with respect to the mold, sealing the or each open end of the container, supplying a fluid under pressure to the interior of the container so as to expand the container outwardly onto the inner surface of the mold, and gripping the or each double seam to prevent deformation during expansion of the container.

This invention will now be described in more detail, by way of example, with reference to the drawings in which:

Figure 1 is a longitudinal sectional view of a first apparatus for reshaping a container embodying this invention, the apparatus being shown with a container before reshaping;

Figure 2 is a longitudinal sectional view of the apparatus of Figure 1 with the container after reshaping;

Figure 3 is a longitudinal sectional view of a second apparatus for reshaping a container embodying the invention, the apparatus being shown with a container before reshaping;

Figure 4 is a longitudinal sectional view of the apparatus of Figure 3 with the container after reshaping;

Figure 5 is a longitudinal sectional view of a third and preferred apparatus for reshaping a container embodying the invention, the apparatus being shown with a container before reshaping;

Figure 6 is a longitudinal sectional view of the apparatus of Figure 5 with the container after reshaping; and

Figure 7 shows an air supply system which may form part of any one of the apparatuses of Figures 1 to 6.

Referring now to Figures 1 and 2, there is shown an apparatus for reshaping a container. The apparatus comprises a mold 10 and this is shown together with a container 12. In Figures 1 and 2 the container 12 is shown, respectively, before and after reshaping.

The container 12 comprises a hollow cylindrical body member 14, a closed dome-shaped member 16 joined to the lower end of the body member 14 by a double seam 17 and an open cone-shaped end member 18 joined to the upper end of body member 14 by a double seam 19. The body member 14 is formed from a rectangular piece of steel sheet which is welded, in well known manner, into a cylindrical shape. The end members 16 and 18 are both formed from steel sheet. The various parts of the container 12 may be coated with stretchable lacquer or paint or polymer coating prior to reshaping. The container 12 is destined to form part of an aerosol dispensing container. In later stages of manufacture of the container, a valve cup is crimped to the upper end of the end member 18, a valve is clinched in place inside the valve cup and the container is filled with a product to be dispensed and a suitable propellant.

The mold 10 is of the split type. The mold 10 comprises an upper sleeve 22, an outer sleeve 24, an inner sleeve 26 and a liner 28. The inner surface 29 of liner 28 defines both a chamber to receive the container 12 and also the eventual desired outer shape of the container 12 after reshaping. As may be seen in Figure 1, there is a cavity 30 between the container 12 before reshaping and the inner surface of the liner 28. As will be explained, during reshaping the container 12 expands

outwardly through the cavity 30 onto the inner surface 29 of liner 28.

The apparatus also includes a mandrel 34 which has a head 36 and a shaft 38 located inside the mold. A passage 40 extends through the mandrel 34 along an axis 42 which is central both to the mandrel 34 and the mold 10. By way of modification, the single passage 40 may be replaced by several, for example three, passages. A deep groove 44 is formed in the head 36 adjacent the upper end of the shaft 38 and this groove 44 is arranged to receive the end member 18.

The apparatus further includes a lower clamping member 48 for clamping the lower end of the container 12 to the mold 10, and a pair of upper clamping members 50,52 for clamping the upper end of container 12 to the mold. The upper sleeve 22 and the upper clamping members 50,52 are arranged so that they can slide axially with respect to the mandrel 34 and the inner sleeve 26. In order to limit their axial movement, there is provided a spacer ring 54. The upper sleeve 22 and the upper clamping members 50,52 may slide freely or, preferably, be caused to slide in a controlled manner by a cam mechanism.

At its lower end, the apparatus includes a support member 58, the upper surface of which is complementary to the outer surface of the dome-shaped member 16 and which is brought into engagement therewith.

As may be observed in Figures 1 and 2, the lower clamping member 48 engages the outer side of the double seam 17 and the support member 58 engages the inner side of the double seam 17. Thus, the double seam 17 is gripped between the lower clamping member 48 and the support member 58. Also, the lower clamping member 48 has an inwardly directed rib 49 which engages the outer part of the root of the double seam 17. Consequently, the root of the double seam 17 is gripped between the lower clamping member 48 and the support member 58. As a result of gripping the double seam 17 in this manner, it is prevented from deforming during reshaping. Furthermore, the support member 58 prevents the dome-shaped end member 16 from deforming during reshaping.

The apparatus also includes a pair of sealing rings 60,62 which together serve to seal the upper end of the container 12.

As may be observed in Figures 1 and 2, the clamping member 50 and the sealing ring 62 engage the container 12 at the double seam 19 between the body member 14 and the end member 18. As will be explained below, as a result of clamping and sealing the container 12 at the double seam 19, the end member 18 and the double seam 19 are prevented from deforming during reshaping.

As mentioned above, the mold 10 is of the split type. Thus, the upper sleeve 22, the outer sleeve 24, the inner sleeve 26 and the liner 28 are each formed in two halves. Likewise, the lower clamping member 48, the upper clamping members 50,52 and the spacer ring 54 are also each formed in two halves. The two halves of the mold 10 together with the associated components are mounted so that they can open to receive the container 12 and then close and lock together.

In operation, the two halves of the mold 10 are opened and the container 12 is placed on the mandrel 34. The two halves of the mold are then closed. After the two halves are closed, they are locked together by a locking mechanism and the locking mechanism provides the clamping force which is necessary to clamp the container 12 in position. Air under pressure is then supplied from an air supply system through the passage 40 to the interior of the container 12. This creates a pressure difference across the wall of the body member 14. Consequently, the container 12 is reshaped because the body member 14 expands outwardly into engagement with the inner surface of liner 28. As the body member 14 expands outwardly, the upper sleeve 22 and the clamping members 50,52 together with the sealing rings 60,62 slide downwardly (freely or in a controlled manner) until the clamping member 52 engages the spacer ring 54. Thus, the height of container 12 is reduced during reshaping. In order to ensure that the height of container 12 is reduced by the desired amount, the liner 28 and clamping member 48 are arranged so as to leave a cavity 66 after reshaping. The presence of the shaft 38 of mandrel 34 inside the container 12 during reshaping reduces the amount of air that has to be supplied.

The reduction in the height of container 12 provides various advantages as will now be explained.

The reduction in the height of the container reduces thinning of the material of the body member 12 in the vicinity of its ends during reshaping. It also ensures that the body member 12 is not drawn out of the clamping members 48,50 and 52. The reduction in height (negative axial strain) together with wall thinning (negative body material thickness strain) enables greater diameter expansion (positive hoop strain). Consequently, there is a saving in material. Containers having a relatively large diameter can be formed by reshaping containers made from relatively thin material and with relatively small diameter ends.

The reduction in material thinning during reshaping also makes it easier to use anisotropic materials as well as materials with grain direction oriented axially along the wall of the body member.

By permitting an end of the container to move axially inwardly during reshaping, the amount of energy required to reshape the container is reduced because the energy is expended only in circumferential stretching of the container body and not on axial stretching.

The apparatus described in Figures 1 and 2 also makes it possible to produce reshaped containers of various sizes and shapes from the same size and shape of container before reshaping. There is also a reduction in the number of parts that have to be changed when modifying the apparatus from producing one type of reshaped container to another type. Furthermore, stock holding of a variety of types of reshaped containers can

be eliminated in favour of stock holding of a limited number of types of containers before reshaping.

Because the container 12 is clamped and sealed at the double seam 19 between the body member 12 and the end member 18, the air pressures on the inside and outside of end member 18 during reshaping are equal and this prevents deformation of the end member 18 and double seam 19.

Referring now to Figures 3 and 4, there is shown another apparatus for reshaping containers which is generally similar to that shown in Figure 1 and like parts are denoted by the same reference numerals preceded by number "1". The apparatus is shown in Figures 3 and 4 with a container 12, respectively, before and after reshaping.

In the apparatus of Figures 3 and 4, the upper sleeve 122 and the outer sleeve 124 are formed integrally. Consequently, the upper end of body member 14 does not move during reshaping.

Also, in the apparatus of Figures 3 and 4, the clamping member 48 of Figure 1 is replaced by clamping members 150 and 152 which are arranged for sliding axial movement inside the lower end of the inner sleeve 126. Their axial movement is limited by a spacer ring 154. The lower end of the outer sleeve 124 is provided with a bearing sleeve 170 and the support member 158 is arranged to move axially inside the bearing sleeve 170 and the inner sleeve 126. The support member 158 and the clamping members 150,152 may slide freely or, preferably, be caused to slide in a controlled manner by a cam mechanism. The double seam 17 is gripped between the support member 158 and the clamping member 150.

Thus, in operation, in the apparatus of Figures 3 and 4, the lower end of the container body 14 moves upwardly, thereby providing a reduction in the height of container 12.

Referring now to Figures 5 and 6, there is shown a further and preferred apparatus for reshaping containers. The apparatus shown in Figures 5 and 6 is generally similar to that shown in Figure 1 and like parts are denoted by the same reference numerals preceded by number "2". The apparatus is shown in Figures 5 and 6 with a container 12, respectively, before and after reshaping.

In the apparatus of Figures 5 and 6, the upper sleeve 222 and the upper clamping members 250,252 slide along the inner surface of the liner 228. The axial movement of the upper sleeve 222 is limited by a spacer ring 270.

In place of the clamping member 48 of Figure 1, there is provided a lower clamping member 272 which is guided for axial sliding movement by the outer sleeve 224 and the inner surface 229 of the liner 228. The support member 258 is arranged to move together with the lower clamping member 258. The double seam 17 is gripped between the lower clamping member 272 and the support member 258. The lower clamping member 272 has an inwardly directed rib 274 and the root of the double seam 17 is gripped between the rib 274 and the support member 258.

In operation, the upper clamping members 250,252 and the lower clamping member 272 move inwardly and towards each other during reshaping of the container 12.

In the apparatus shown in Figure 1, before reshaping of the container 12 there is a gap 70 between the clamping member 52 and the spacer ring 54. There is a risk that the wall of the container body 14 might expand into this gap 70. Careful design is needed to minimize this risk. In the apparatus of Figure 5, the clamping members 250,252,272 slide along the inner surface 229 of the lining member 228 and there is no gap corresponding to the gap 70 of the apparatus of Figure 1. Consequently, the risk just described in relation to the apparatus of Figure 1 does not exist in the apparatus of Figure 5.

The apparatuses of Figures 1 and 2, 3 and 4, and 5 and 6 may be modified for reshaping other types of container.

For example, each apparatus may be used to reshape a container of the type comprising a hollow container body having a rectangular cross-section, a closed end member, and an open end member which is provided with a screwthread for receiving a threaded cap. Each apparatus may be used for reshaping a container of the type in which the closed end member and the body member are formed integrally by a drawing process.

There will now be described a system for supplying air under pressure to the apparatus of Figures 1 and 2 or the apparatus or Figures 3 and 4 or the apparatus of Figures 5 and 6. The system will be described with reference to the apparatus of Figures 1 and 2.

Referring now to Figure 7, the air supply system comprises a three stage compressor 300 which supplies compressed air to an accumulator 302. The output of the accumulator 302 is connected through an adjustable restrictor 304, a solenoid operated valve 306 and a one-way valve 308 to the mandrel 34. The mandrel is also connected through a one-way valve 310 and a solenoid operated valve 312 to the input of compressor 300.

In operation, the valve 306 is opened and the container 12 is subjected to a pressure of, for example 50-60 bar, so that it takes up its shape inside the mold 10. The valve 306 is then closed and the valve 312 is opened so as to return the compressed air to the compressor 300.

Air represents a particularly convenient type of fluid for reshaping containers. However, it is to be appreciated other types of fluid may be used in place of air.

Claims

1. An apparatus for reshaping a hollow container (12) comprising a body member (14) having first and second ends (16,18); at least one (18) of said first

and second ends being open, and at least one end member (16,18) being joined to the body member (14) by a double seam (17,19), said apparatus comprising a mold (10) having an inner surface (29) which defines a chamber for accommodating the container (12), means (60,62) for sealing the or each open end of the container, and means (34) for supplying a fluid under pressure to the interior of the container such as to expand the container outwardly onto the inner surface (29) of the mold, characterised by first holding means (50,52) for holding the container (12) at said first end thereof with respect to the mold, second holding means (48) for holding the container at said second end thereof with respect to the mold; said first and second holding means being separate one from the other, and clamping means (50,62; 48,58) for gripping the or each double seam (17,19) to prevent deformation thereof during expansion of the container (12); the clamping means comprising a first member (22,48) for supporting one side of the or each double seam, and a second member (36,58) for supporting the opposite side of the or each double seam.

2. An apparatus as claimed in Claim 1, including means (58) for supporting the external surface of a closed end member (16) joined to the container so as to prevent deformation of said closed end member as the container (12) expands outwardly onto the inner surface of the mold (10).

3. An apparatus as claimed in Claim 1 or Claim 2, in which at least one of said first and second holding means is arranged to move inwardly towards the other holding means as the container expands.

4. An apparatus as claimed in Claim 3, in which both holding means are arranged to move inwardly towards each other as the container (12) expands outwardly.

5. An apparatus as claimed in any one of Claims 1 to 4, in which at least one of said first and second holding means is arranged to slide inwardly along the inner surface of the mold (29) towards the other holding means as the container expands outwardly.

6. An apparatus as claimed in Claim 4, in which both holding means are arranged to slide inwardly along the inner surface of the mold (29) towards each other as the container (12) expands outwardly.

7. An apparatus as claimed in any one of the preceding claims, including a mandrel (34) located in the chamber and having a passage (40) formed therein to supply fluid to the interior of the container.

8. A method of reshaping a hollow container (12) comprising a body member (14) having first and second ends (16,18), at least one (18) of said first and second ends being open, said container (12) comprising at least one end member joined to the body member (14) by a double seam (17,19), said method comprising the steps of placing the container in a mold (10) having an inner surface which defines a chamber for accommodating the container (12), holding the container (12) at said first end thereof with respect to the mold (10), holding the container (12) at said second end thereof with respect to the mold (10), sealing the or each open end of the container (12), supplying a fluid under pressure to the interior of the container (12) such as to expand the container (12) outwardly onto the inner surface of the mold (10), and gripping the or each double seam to prevent deformation during expansion of the container.

9. A method of reshaping a hollow container as claimed in Claim 8, in which said at least one end member of the container (12) includes an open end member (18) joined to the body member (14) by a double seam (17,19) at said first end of the container, and, in said steps of holding and sealing said first end of the container (12), the container (12) is clamped and sealed in the vicinity of the double seam (17,19) between said open end member (18) and the container body (14) so as to perform thereby said step of gripping the double seam (17,19) between said open end member (18) and the container body (14) to prevent deformation during expansion of the container.

10. A method of reshaping a hollow container as claimed in Claim 8 or Claim 9, in which said at least one end member of the container includes a closed end member (16) joined to the body member (14) by a double seam (49) at said second end of the container, and, in said step of holding said second end of the container, the walls of the double seam (49) between said closed end member (16) and the container body (14) are gripped together so as to perform thereby said step of gripping the double seam (49) between said closed end member (16) and the container body (14) to prevent deformation during expansion of the container (12).

11. A method as claimed in Claim 10, including the step of supporting the external end surface of said closed end member (16) of the container so as to prevent deformation of said closed end member (16) as the container expands outwardly onto the inner surface of the mold (10).

12. A method as claimed in any one of Claims 8 to 11, including the step of permitting at least one end of the mold (10) to move inwardly towards the other end as the container (12) expands onto the inner surface of the mold (10).

Patentansprüche

1. Vorrichtung zum Rückformen eines hohlen Behälters (12) mit einem erste und zweite Enden (16, 18) aufweisenden Rumpfteil (14), wobei wenigstens eines (18) der ersten und zweiten Enden offen und wenigstens ein Endteil (16, 18) über einen zweifachen Falz (17, 19) an das Rumpfteil (14) angefügt ist, wobei die Vorrichtung eine Form (10) mit einer inneren Oberfläche (29), die eine Kammer zum Anpassen des Behälters (12) bildet, Mittel (60, 62) zum Abdichten des oder jedes offenen Endes des Behälters und Mittel (34) zum Zuführen eines Fluides unter Druck in das Innere des Behälters zum Ausdehnen des Behälters nach außen an die innere Oberfläche (29) der Form aufweist, **gekennzeichnet durch** erste Haltemittel (50, 52) zum Halten des Behälters (12) an seinem ersten Ende bezüglich der Form, zweite Haltemittel (48) zum Halten des Behälters an seinem zweiten Ende bezüglich der Form, wobei die ersten und zweiten Haltemittel voneinander beabstandet sind, und Befestigungsmittel (50, 62; 48, 52) zum Halten des oder jedes zweifachen Falzes (17, 19) zum Verhindern seiner Verformung während des Ausdehnens des Behälters (12), wobei die Befestigungsmittel ein erstes Teil (22, 48) zum Stützen einer Seite des oder jedes zweifachen Falzes und ein zweites Teil (36, 58) zum Stützen der gegenüberliegenden Seite des oder jedes zweifachen Falzes aufweisen.

2. Vorrichtung nach Anspruch 1, die Mittel (58) zum Stützen der äußeren Oberfläche des geschlossenen Endteiles (16) des Behälters einschließt, um eine Verformung des geschlossenen Endteiles zu verhindern, wenn der Behälter (12) sich nach außen an die innere Oberfläche der Form (10) ausdehnt.

3. Vorrichtung nach Anspruch 1 oder 2, bei der wenigstens eines der ersten und zweiten Haltemittel zum Bewegen nach innen in Richtung der anderen Haltemittel bei Ausdehnen des Behälters angeordnet ist.

4. Vorrichtung nach Anspruch 3, bei der beide Haltemittel bei Ausdehnen des Behälters (12) nach außen sich aufeinander zu bewegend angeordnet sind.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, bei der wenigstens eines der ersten und zweiten Haltemittel zum Verschieben nach innen entlang der inneren Oberfläche der Form (29) in Richtung des anderen Haltemittels bei Ausdehnen des Behälters nach außen angeordnet ist.

6. Vorrichtung nach Anspruch 4, bei der beide Haltemittel zum Verschieben nach innen entlang der inneren Oberfläche der Form (29) bei Ausdehnen des Behälters (12) nach außen sich aufeinander zu bewegend angeordnet sind.

7. Vorrichtung nach einem der vorstehenden Ansprüche, die einen Dorn (34) aufweist, der in der Kammer angeordnet ist und einen darin eingebrachten Durchlaß (40) zum Zuführen eines Fluides in das Innere des Behälters einschließt.

8. Verfahren zum Rückformen eines hohlen Behälters (12) mit einem erste und zweite Enden (16, 18) aufweisenden Rumpfteil (14), wobei wenigstens eines (18) der ersten und zweiten Enden offen ist, bei dem der Behälter (12) wenigstens ein Endteil aufweist, das an das Rumpfteil (14) über einen zweifachen Falz (17, 19) angefügt ist, wobei das Verfahren die Schritte des Anordnens des Behälters in einer Form (10), die eine innere Oberfläche hat, welche eine Kammer zum Anpassen des Behälters (12) bildet, des Haltens des Behälters (12) an seinem ersten Ende bezüglich der Form (10), des Haltens des Behälters (12) an seinem zweiten Ende bezüglich der Form (10), des Abdichtens des oder jedes offenen Endes des Behälters (12), des Zuführens eines Fluides unter Druck in das Innere des Behälters (12) zum Ausdehnen des Behälters (12) nach außen an die innere Oberfläche der Form (10) und des Haltens des oder jedes zweifachen Falzes zum Verhindern einer Verformung während der Ausdehnung des Behälters aufweist.

9. Verfahren zum Rückformen eines hohlen Behälters nach Anspruch 8, bei dem wenigstens ein Endteil des Behälters (12) ein offenes Endteil (18) einschließt, das über einen zweifachen Falz (17, 19) an das erste Ende des Behälters an das Rumpfteil (14) angefügt ist, und bei dem bei den Schritten des Haltens und Abdichtens des ersten Ende des Behälters (12) der Behälter (12) in der Nähe des zweifachen Falzes (17, 19) zwischen dem offenen Endteil (18) und dem Behälterrumpf (14) befestigt ist, so daß dabei der Schritt des Haltens des zweifachen Falzes (17, 19) zwischen dem offenen Endteil (18) und dem Behälterrumpf (14) ausgeführt wird, um eine Verformung während des Ausdehnens des Behälters zu verhindern.

10. Verfahren zum Rückformen eines hohlen Behälters nach Anspruch 8 oder Anspruch 9, bei dem wenigstens ein Endteil des Behälters ein geschlossenes Endteil (16) aufweist, das über einen zweifachen Falz (49) an das zweite Ende des Behälters an das Rumpfteil (14) angefügt ist, und bei dem bei dem Schritt des Haltens des zweiten Ende des Behälters die Wandungen des zweifachen Falzes (49) zwischen dem geschlossenen Endteil (16) und dem Behälterrumpf (14) zusammengehalten werden, so

daß dabei der Schritt des Haltens des zweifachen Falzes (49) zwischen dem geschlossenen Endteil (16) und dem Behälterrumpf (14) ausgeführt wird, um eine Verformung während des Ausdehnens des Behälters (12) zu verhindern.

11. Verfahren nach Anspruch 10, das den Schritt des Stützens der äußeren Endoberfläche des geschlossenen Endteiles (16) des Behälters einschließt, so daß ein Verformen des geschlossenen Endteiles (16) bei Ausdehnen des Behälters nach außen an die innere Oberfläche der Form (10) verhindert ist.

12. Verfahren nach einem der Ansprüche 8 bis 11, das den Schritt des Gestattens eines Bewegens wenigstens eines Endes der Form (10) nach innen in Richtung des anderen Ende bei Ausdehnen des Behälters (12) an die innere Oberfläche der Form (10) einschließt.

Revendications

1. Dispositif pour remodeler un récipient creux (12) comprenant un corps (14) présentant une première et une seconde extrémités (16, 18) ; au moins l'une (18) desdites première et seconde extrémités étant ouverte, et au moins un élément d'extrémité (16, 18) étant joint au corps (14) par un double pli (17, 19), ledit dispositif comprenant un moule (10) présentant une surface interne (29) qui définit une chambre permettant de recevoir le récipient (12), un moyen (60, 62) permettant de fermer hermétiquement la ou chaque extrémité ouverte du récipient, et un moyen (34) permettant d'alimenter l'intérieur du récipient en fluide sous pression de telle façon que ce fluide dilate le récipient vers l'extérieur jusqu'à la surface interne (29) du moule, caractérisé par un premier moyen de maintien (50, 52) permettant de maintenir le récipient (12) sur ladite première extrémité de celui-ci par rapport au moule, un second moyen de maintien (48) permettant de maintenir le récipient au niveau de la seconde extrémité de celui-ci par rapport au moule ; lesdits premier et second moyens de maintien étant séparés l'un de l'autre, et un moyen de serrage (50, 62 ; 48, 58) permettant de saisir le ou chaque double pli (17, 19) afin d'empêcher la déformation de celui-ci lors de la dilatation du récipient (12) ; le moyen de serrage comprenant un premier élément (22, 48) permettant de supporter un côté du ou de chaque double pli, et un second élément (36, 58) permettant de supporter l'autre côté du ou de chaque double pli.

2. Dispositif selon la revendication 1, comportant un moyen (58) permettant de supporter la surface externe d'un élément d'extrémité fermé (16) joint au récipient de façon à empêcher la déformation dudit élément d'extrémité fermé lorsque le récipient (12) se dilate vers l'extérieur jusqu'à la surface interne du moule (10).

3. Dispositif selon la revendication 1 ou la revendication 2, dans lequel au moins l'un desdits premier et second moyens de maintien est agencé de façon à se déplacer vers l'intérieur, en direction de l'autre moyen de maintien, lorsque le récipient se dilate.

4. Dispositif selon la revendication 3, dans lequel les deux moyens de maintien sont agencés de façon à se déplacer vers l'intérieur, en direction l'un de l'autre, lorsque le récipient (12) se dilate vers l'extérieur.

5. Dispositif selon l'une quelconque des revendications 1 à 4, dans lequel au moins l'un desdits premier et second moyens de maintien est agencé de façon à coulisser vers l'intérieur le long de la surface interne du moule (29) en direction de l'autre moyen de maintien lorsque le récipient se dilate vers l'extérieur.

6. Dispositif selon la revendication 4, dans lequel les deux moyens de maintien sont agencés de façon à coulisser vers l'intérieur le long de la surface interne du moule (29) en direction l'un de l'autre, lorsque le récipient (12) se dilate vers l'extérieur.

7. Dispositif selon l'une quelconque des revendications précédentes, comportant un mandrin (34) situé dans la chambre et présentant un passage (40) formé dans celui-ci afin d'alimenter en fluide l'intérieur du récipient.

8. Procédé de remodelage d'un récipient creux (12) comprenant un corps (14) ayant une première et une seconde extrémités (16,18), dont l'une (18) au moins desdites première et seconde extrémités est ouverte, ledit récipient (12) comprenant au moins un élément d'extrémité relié au corps (14) par un double pli (17,19), ledit procédé comprenant les étapes consistant à placer le récipient dans un moule dont la surface interne définit une chambre pour recevoir le récipient (12), à maintenir le récipient (12) par rapport au moule (10) au niveau de ladite première extrémité, à maintenir le récipient (12) par rapport au moule (10) au niveau de ladite seconde extrémité, à fermer hermétiquement la ou chaque extrémité ouverte du récipient (12), à injecter un fluide sous pression à l'intérieur du récipient (12) de façon à dilater le récipient vers l'extérieur jusqu'à la surface interne du moule (10), et à serrer le ou chaque double pli pour éviter la déformation pendant la dilatation du récipient.

9. Procédé de remodelage d'un récipient creux selon la revendication 8, dans lequel l'extrémité du récipient (12) contient un élément d'extrémité ouvert

(18) relié au corps (14) par un double pli (17,19) au niveau de ladite première extrémité du récipient (12), dans lequel le récipient (12) est serré et fermé hermétiquement au voisinage du double pli (17,19) entre ledit élément d'extrémité ouvert (18) et le corps (14) du récipient, de façon à pouvoir ainsi mettre en oeuvre ladite étape consistant à serrer le double pli (17,19) entre ledit élément d'extrémité ouvert (18) et le corps (14) du récipient pour éviter la déformation pendant la dilatation du récipient.

10. Procédé de remodelage d'un récipient creux selon la revendication 8 ou la revendication 9, dans lequel l'extrémité du récipient comporte un élément d'extrémité fermé (16) relié au corps (14) par un double pli (49) au niveau de ladite seconde extrémité du récipient, et où, dans ladite étape consistant à maintenir ladite seconde extrémité du récipient, les parois du double pli (49) entre ledit élément d'extrémité fermé (16) et le corps (14) du récipient sont serrées ensemble, de façon à mettre en oeuvre ladite étape consistant à serrer le double pli (49) entre ledit élément extrémité fermé (16) et le corps (14) du récipient pour éviter la déformation pendant la dilatation du récipient (12).

11. Procédé selon la revendication 10, comprenant l'étape consistant à supporter la surface d'extrémité externe dudit élément d'extrémité fermé (16) du récipient, de façon à éviter la déformation dudit élément d'extrémité fermé (16) lorsque le récipient se dilate vers l'extérieur jusqu'à la surface interne du moule (10).

12. Procédé selon l'une quelconque des revendications 8 à 11, comprenant l'étape consistant à autoriser au moins une extrémité du moule (10) à se déplacer à l'intérieur vers l'autre extrémité pendant que le récipient (12) se dilate vers l'extérieur jusqu'à la surface interne du moule (10).

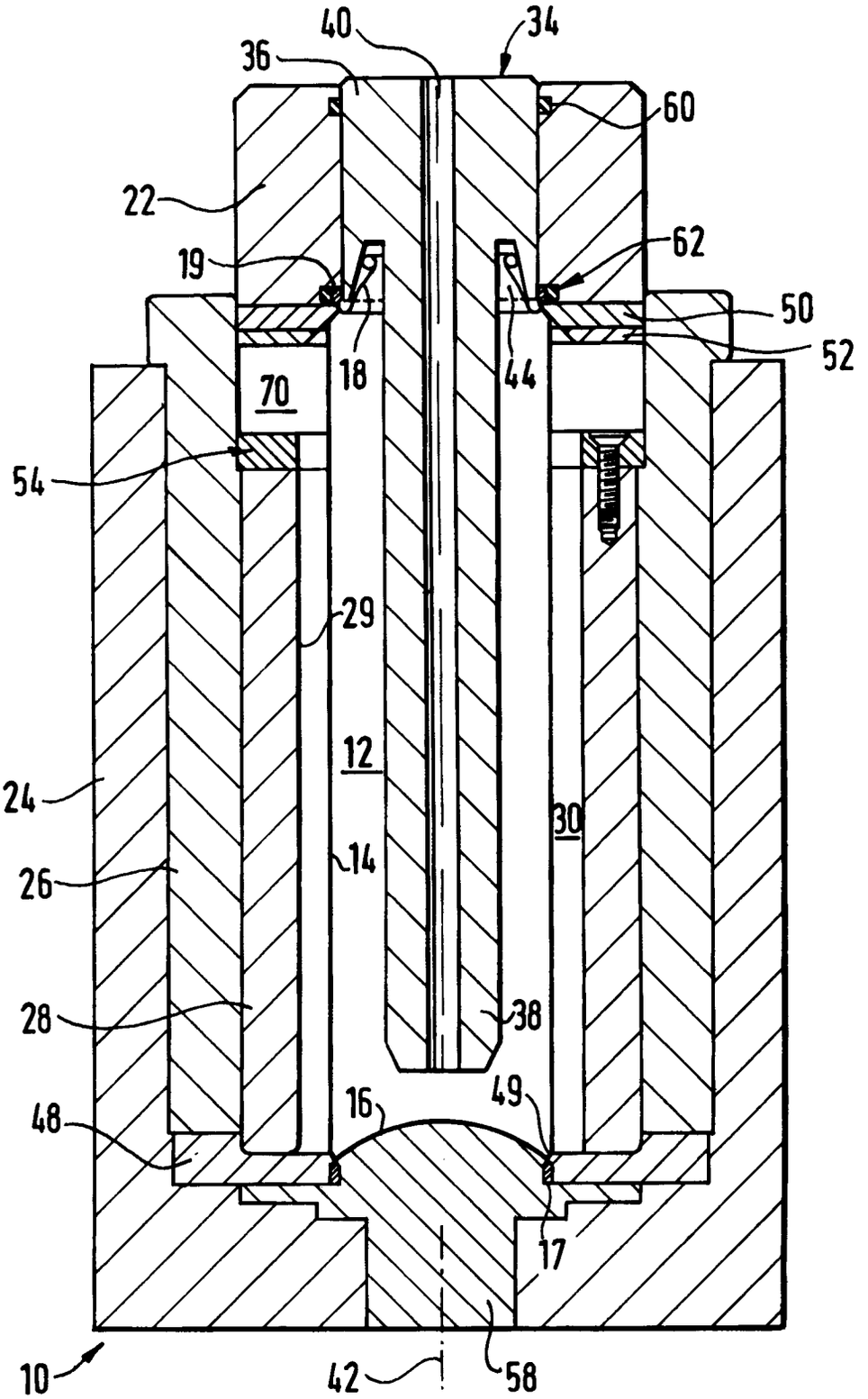
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FIG.1.

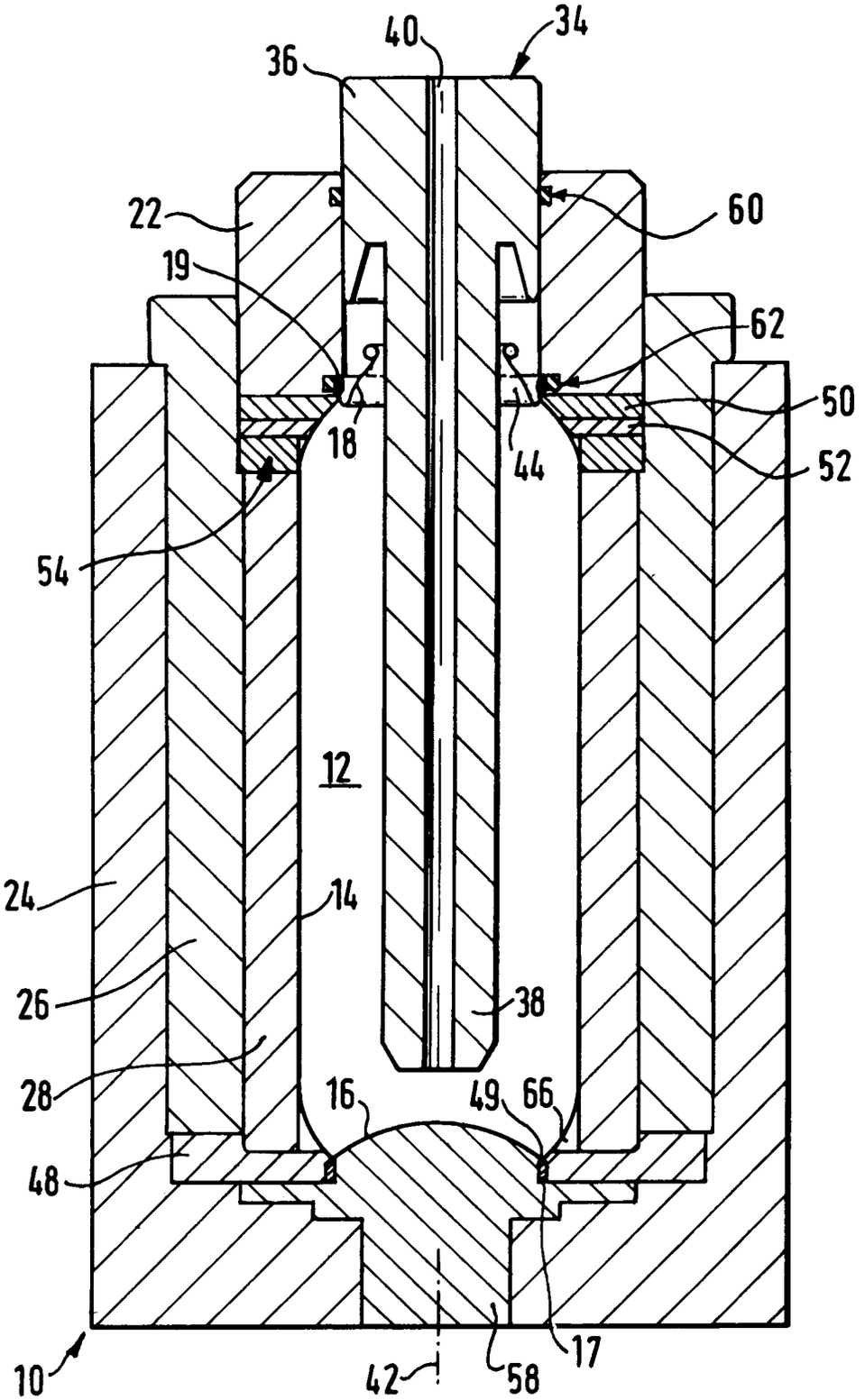
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FIG. 2.

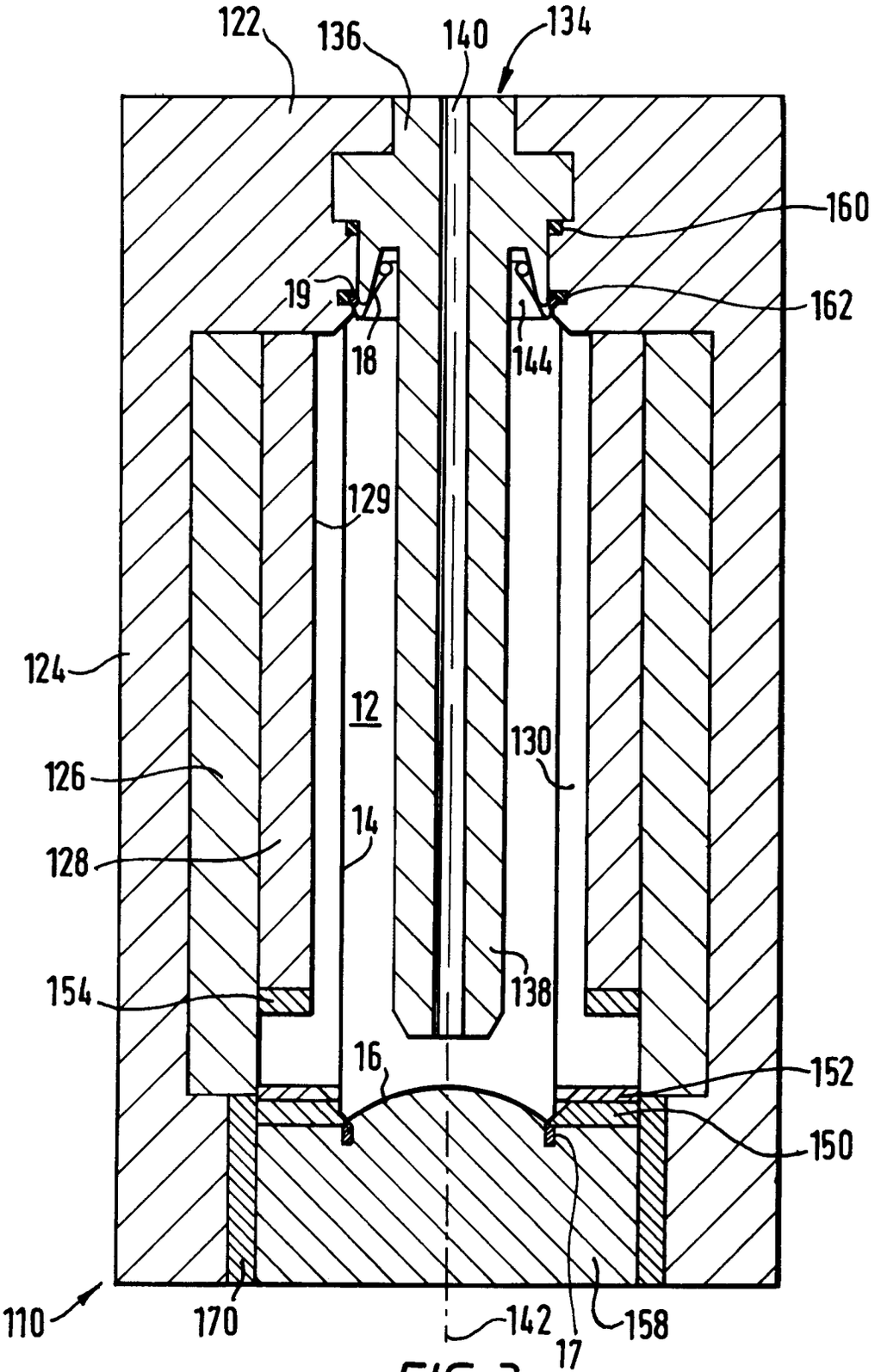
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FIG.3.

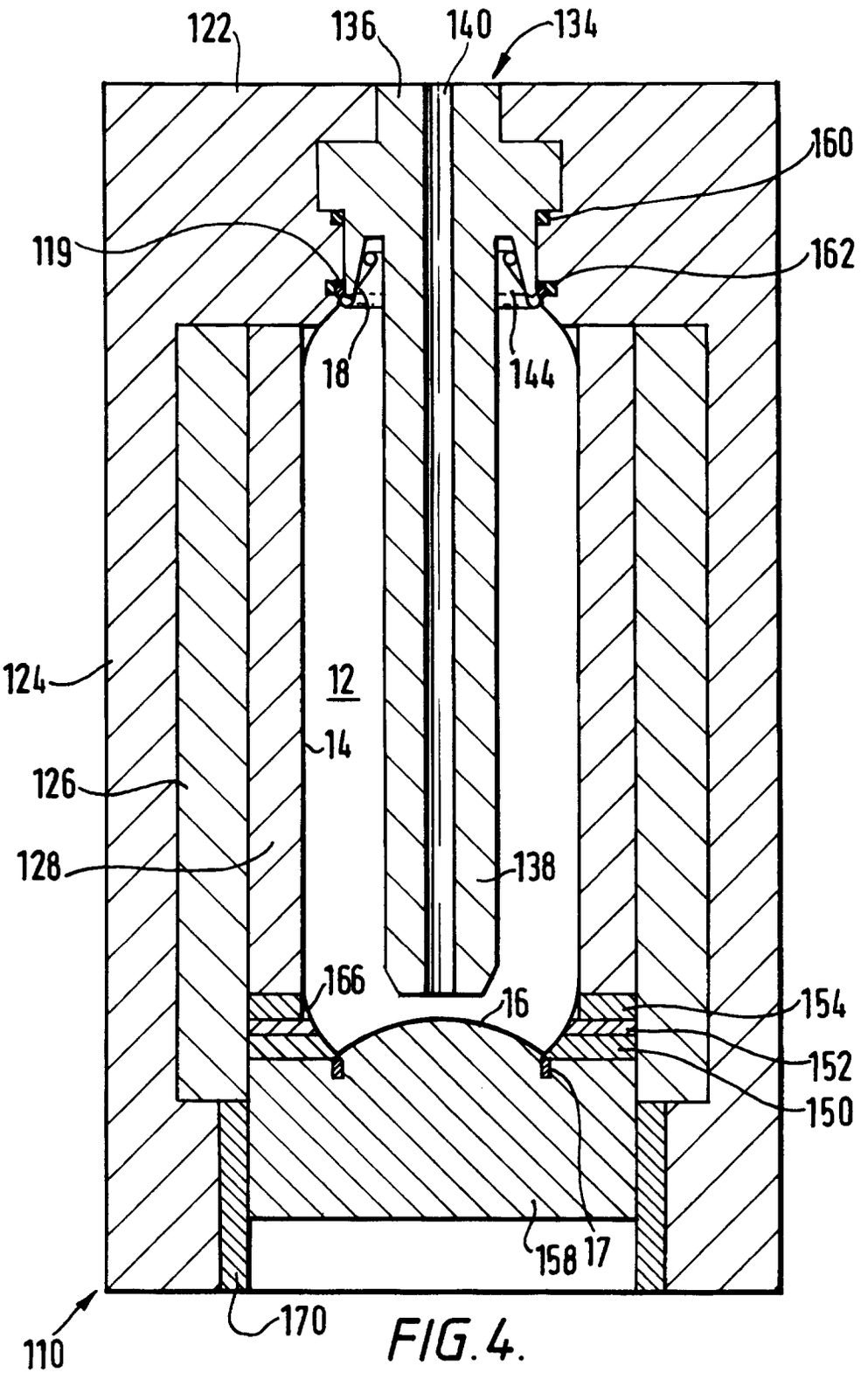
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FIG. 4.

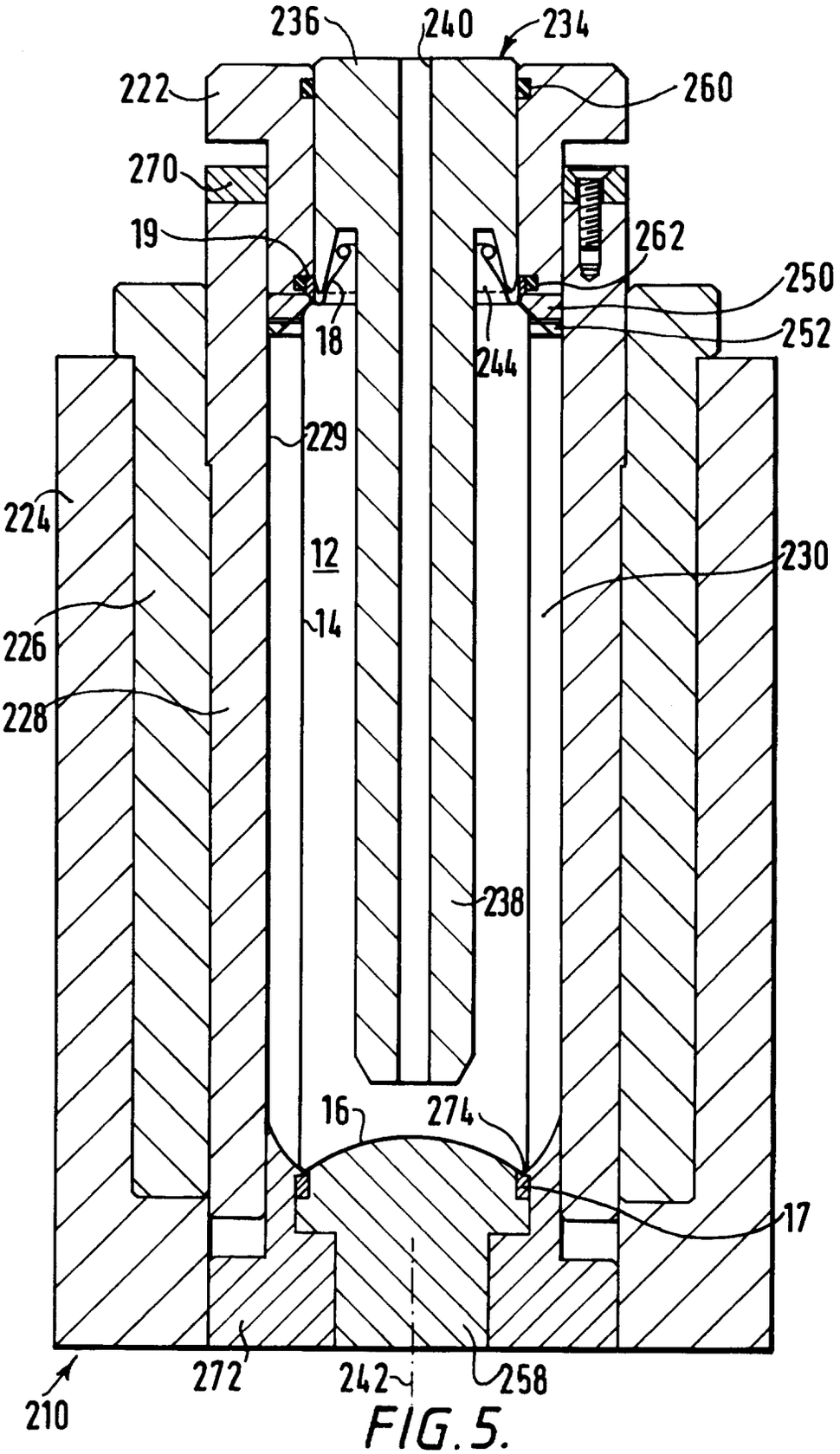
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FIG. 5.

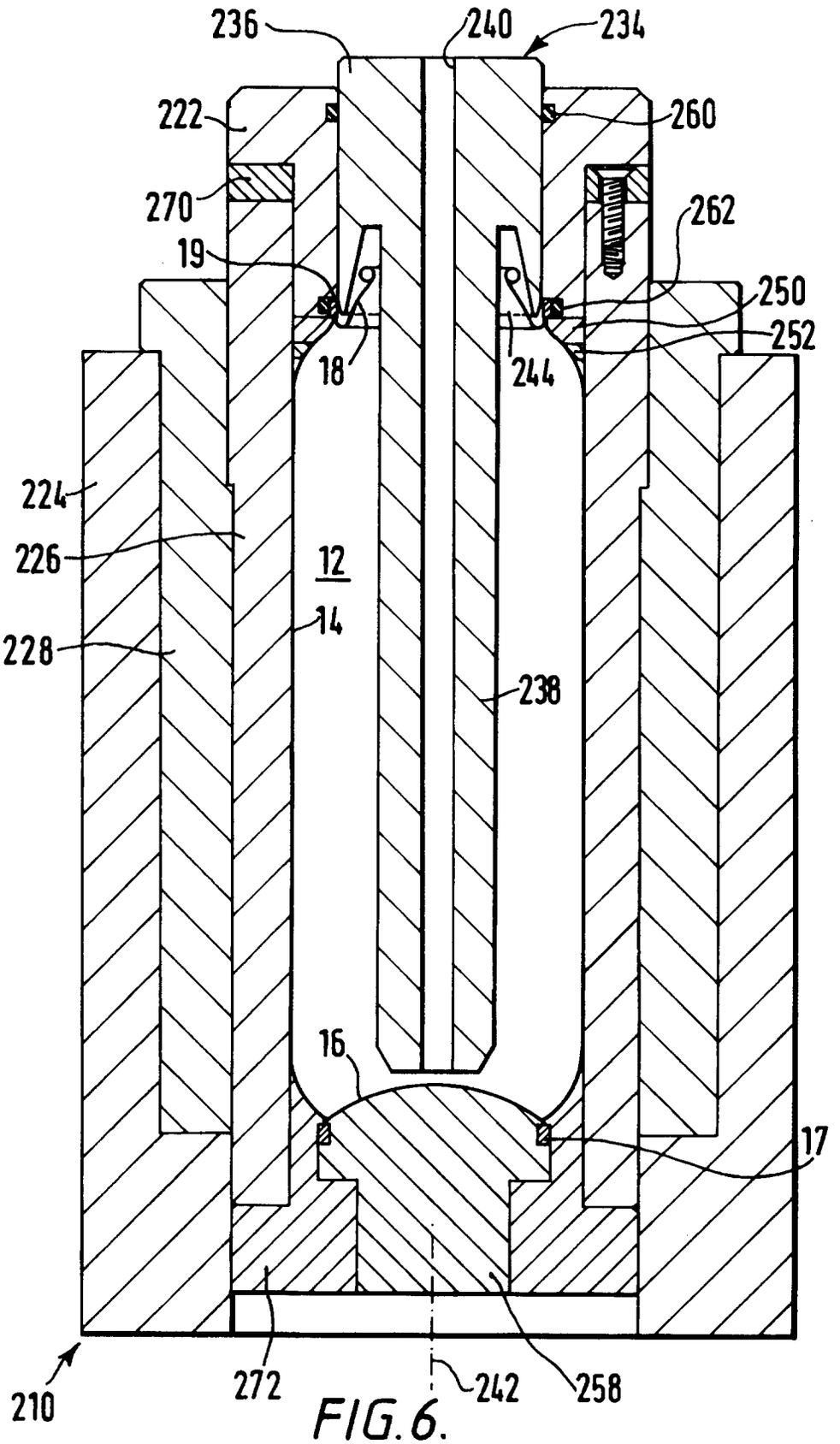
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FIG. 6.

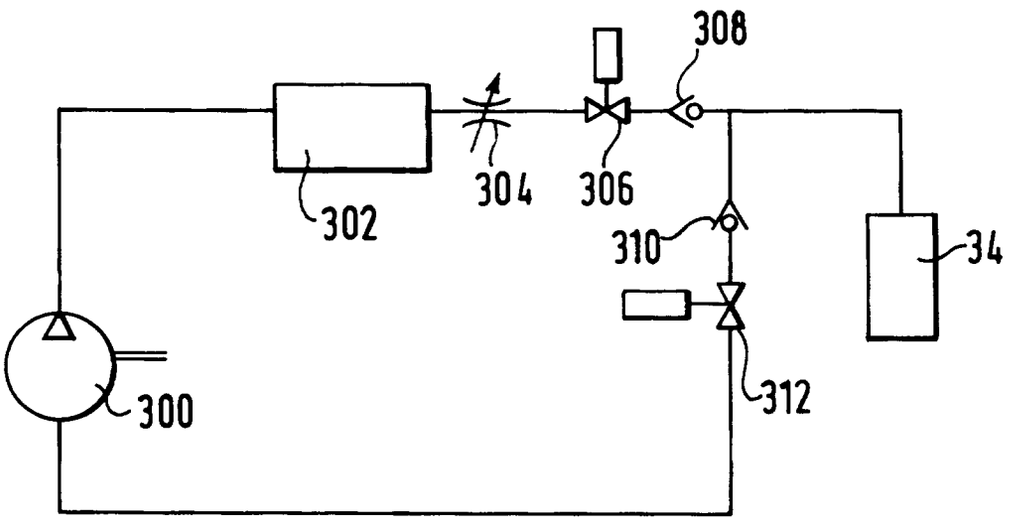

FIG. 7.