

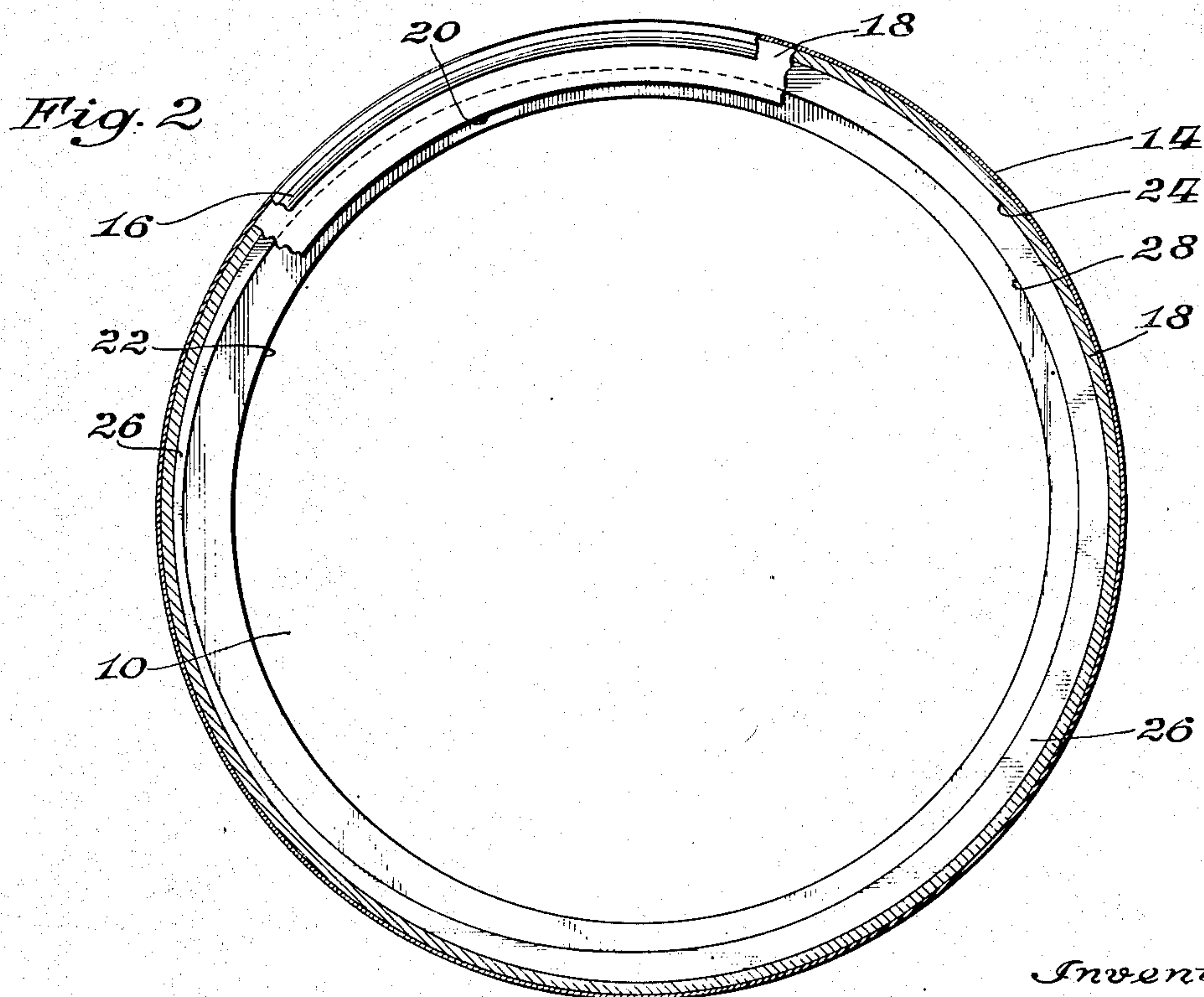
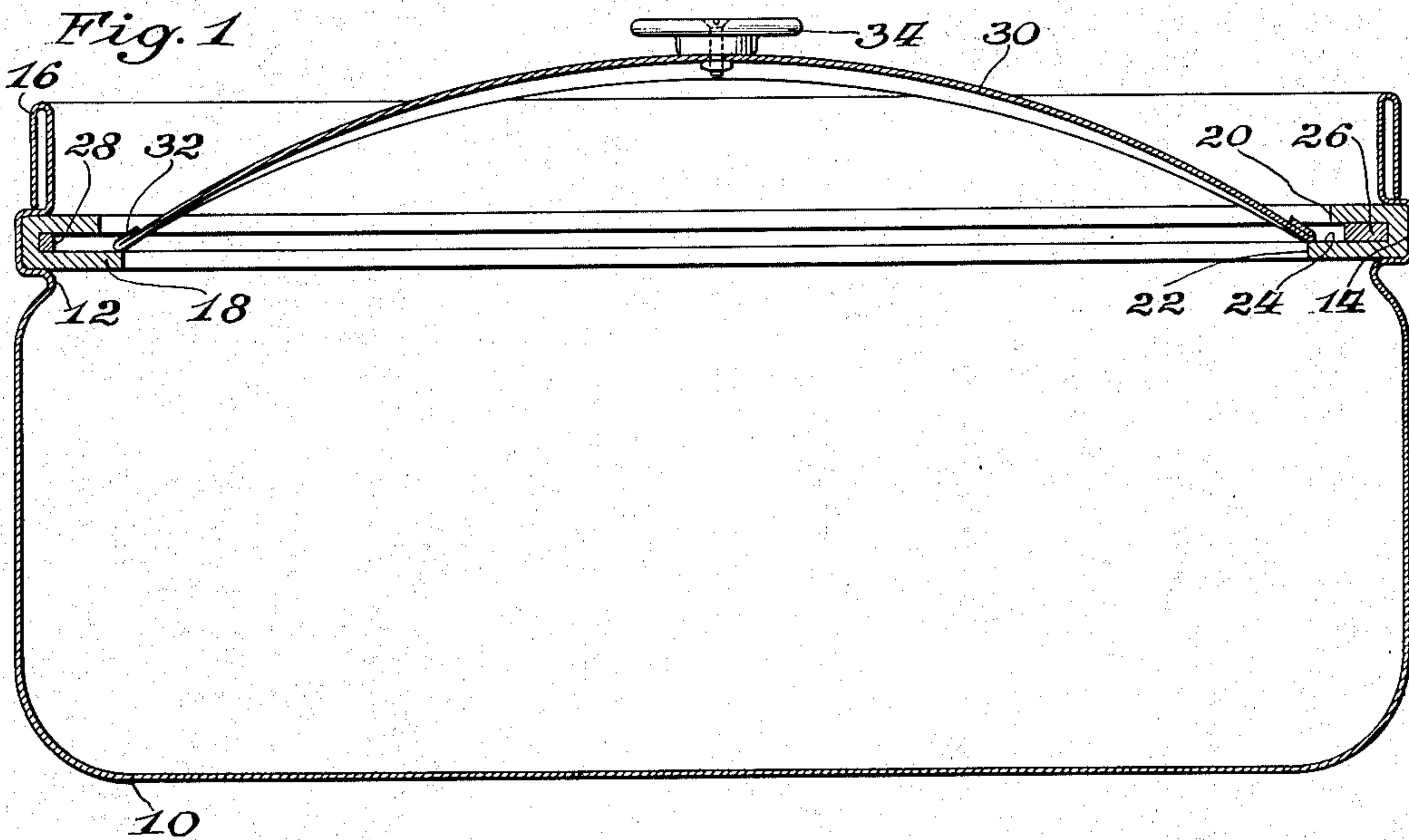
Feb. 17, 1953

A. VISCHER, JR
CONTAINER CLOSURE

2,628,739

Filed June 7, 1946

4 Sheets-Sheet 1



Inventor:
By *Alfred Vischer Jr.*
Hinkle, Horton, Ahlberg, Honemann & Kupper
Attorneys.

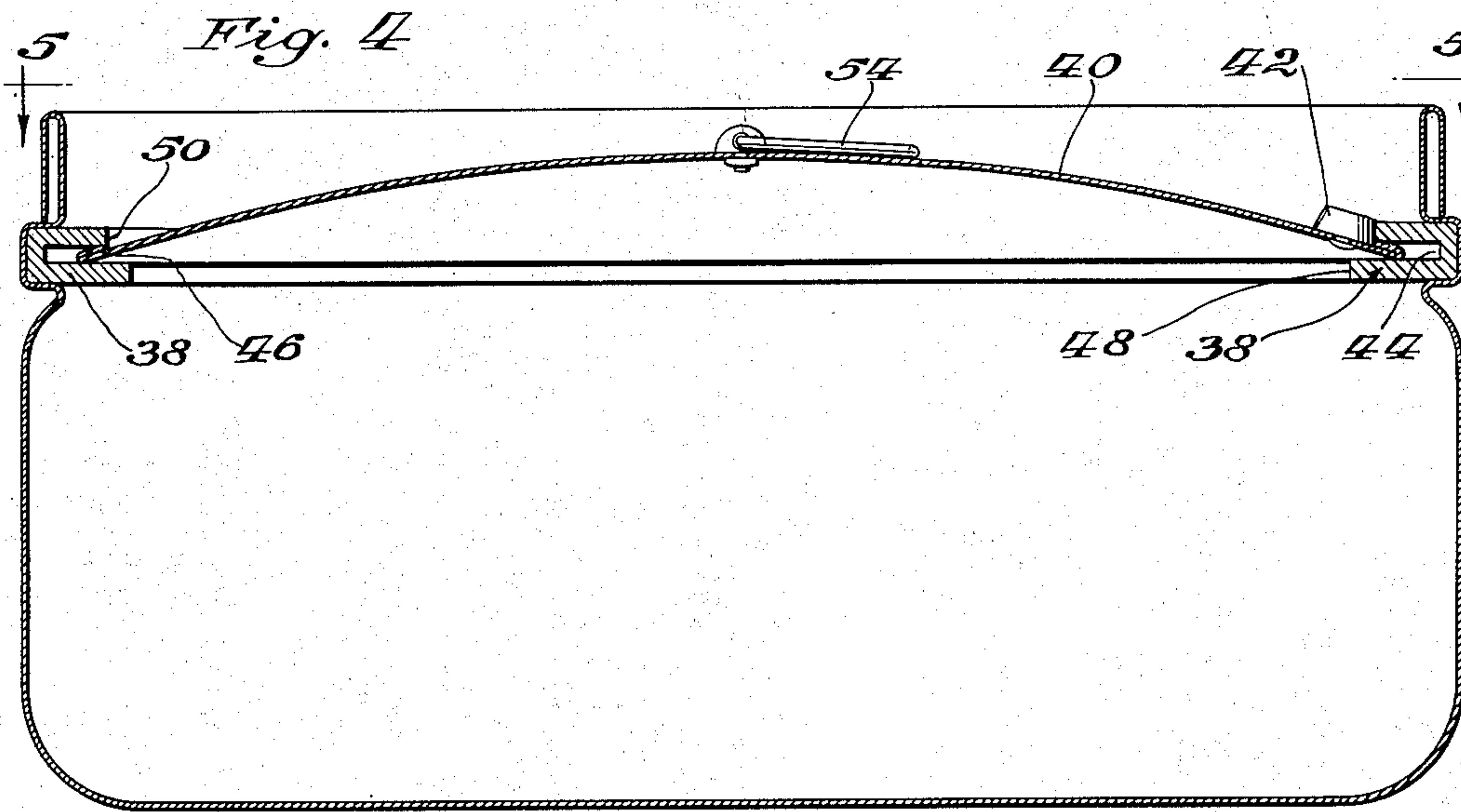
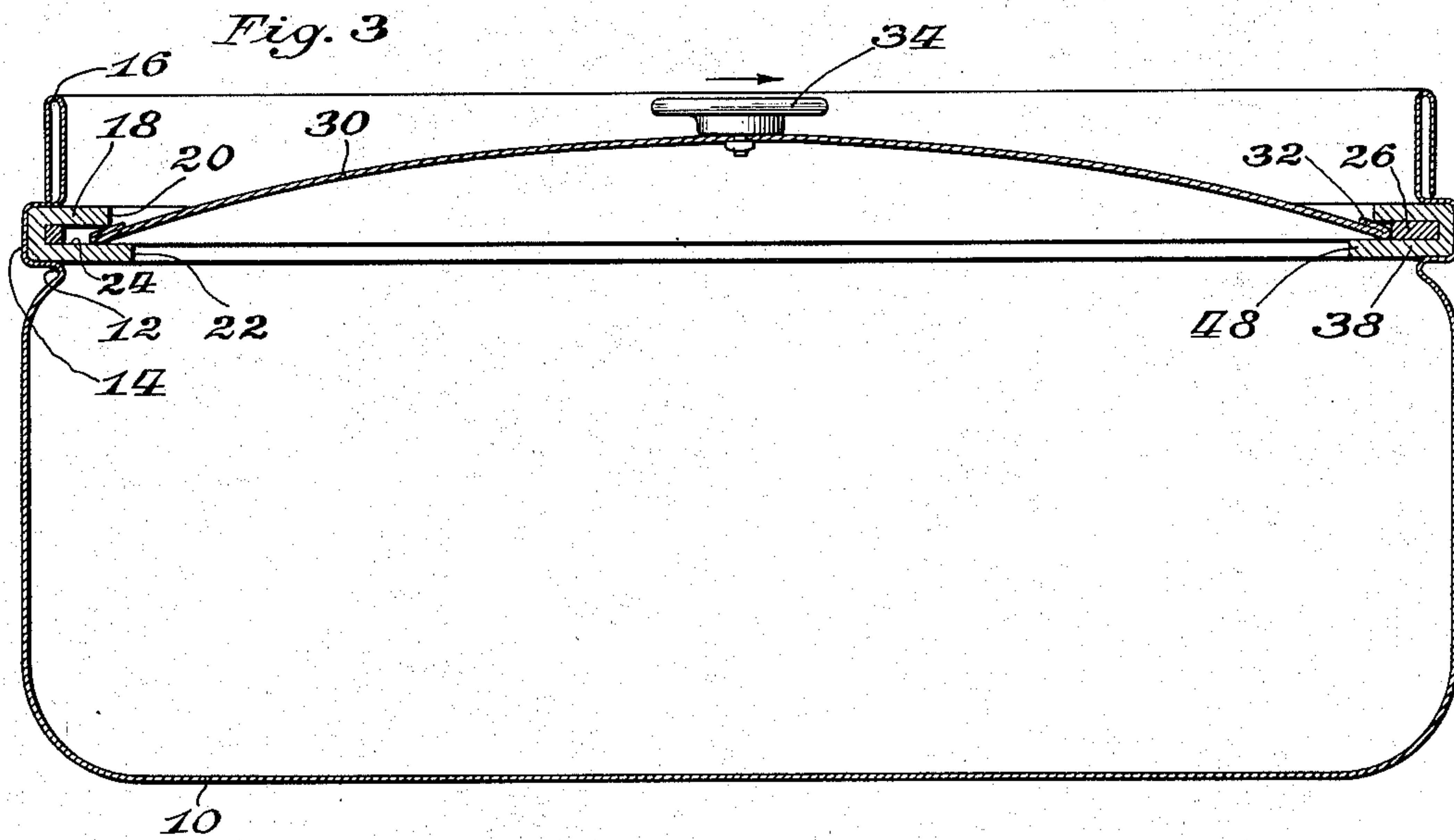
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Inventor:

Alfred Vischer Jr.

By

Hinkle, Horton, Ahlberg, Hansmann & Kupper
Attorneys.

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Fig. 5

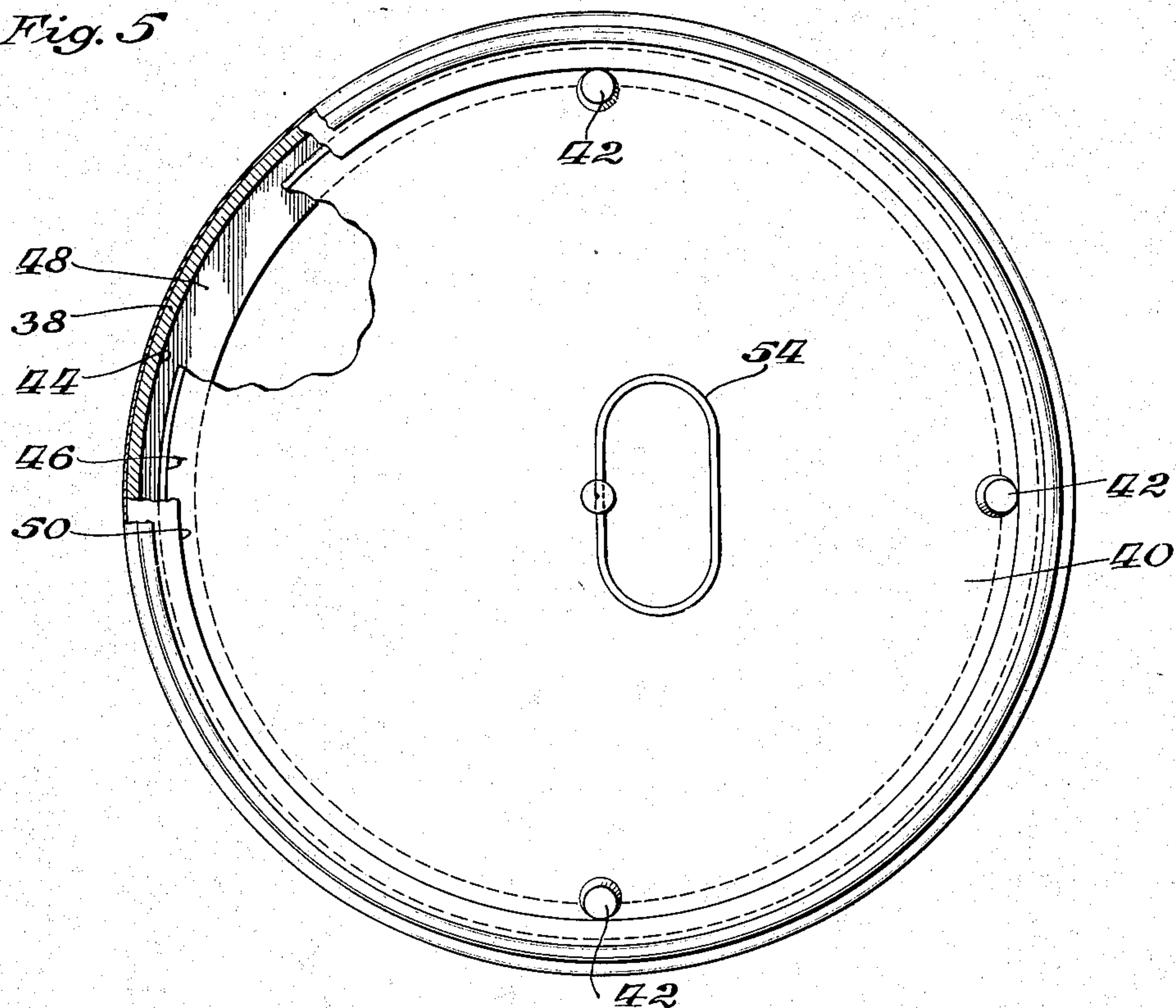
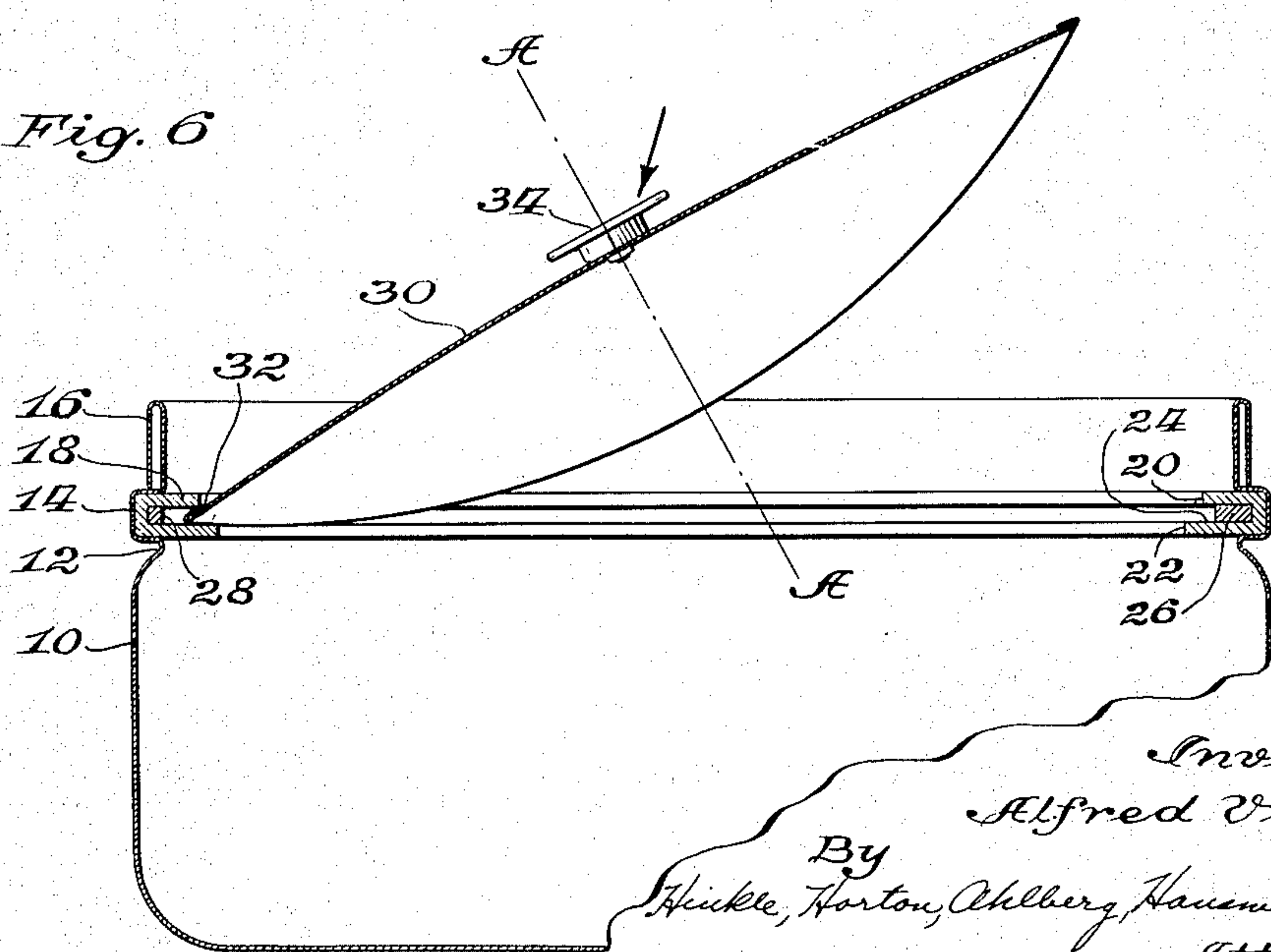


Fig. 6



Inventor:

Alfred Vischer Jr.

By

Hinkle, Horton, Ahlberg, Hausmann & Hopper
Attorneys.

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Fig. 8

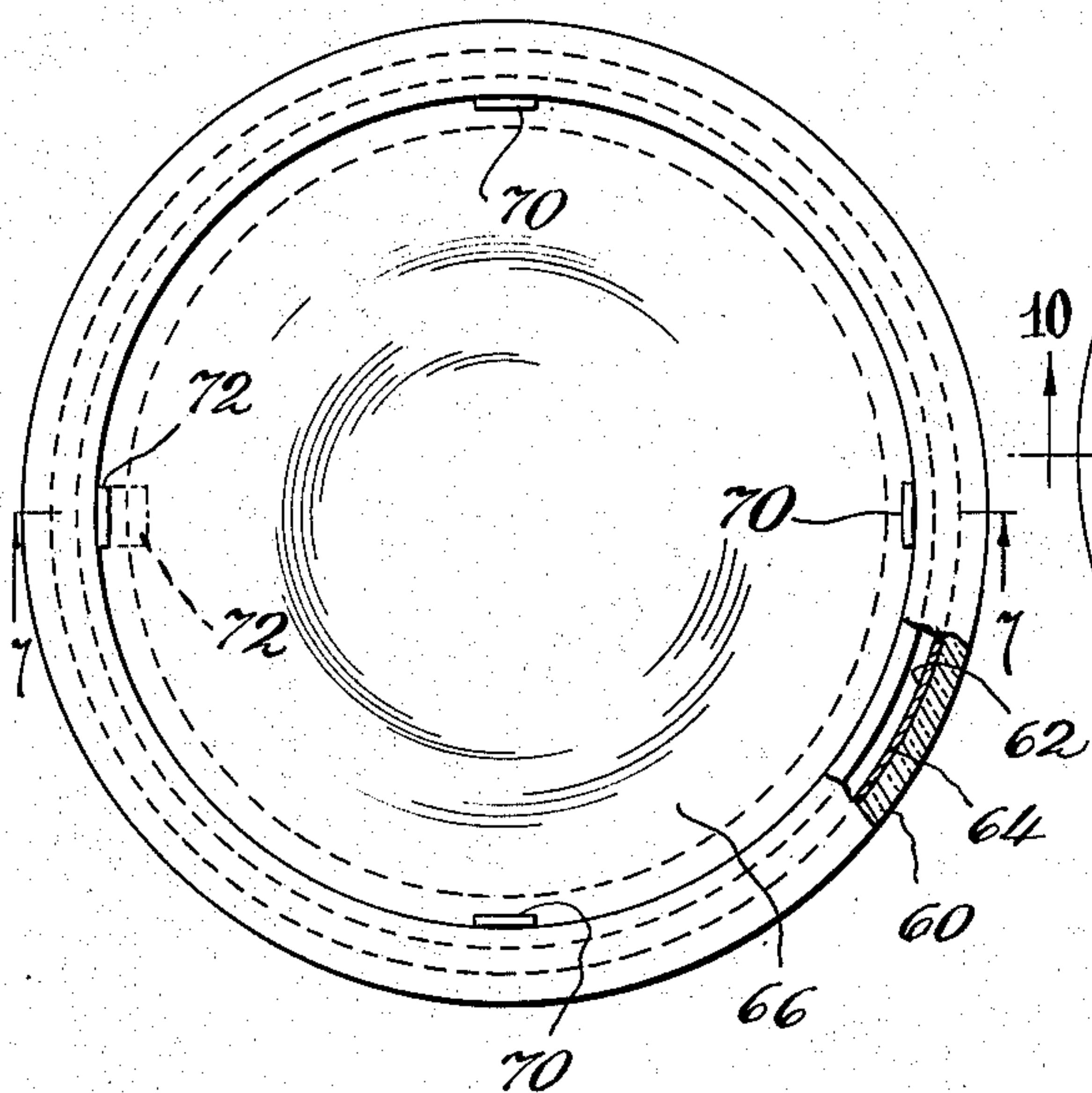


Fig. 9.

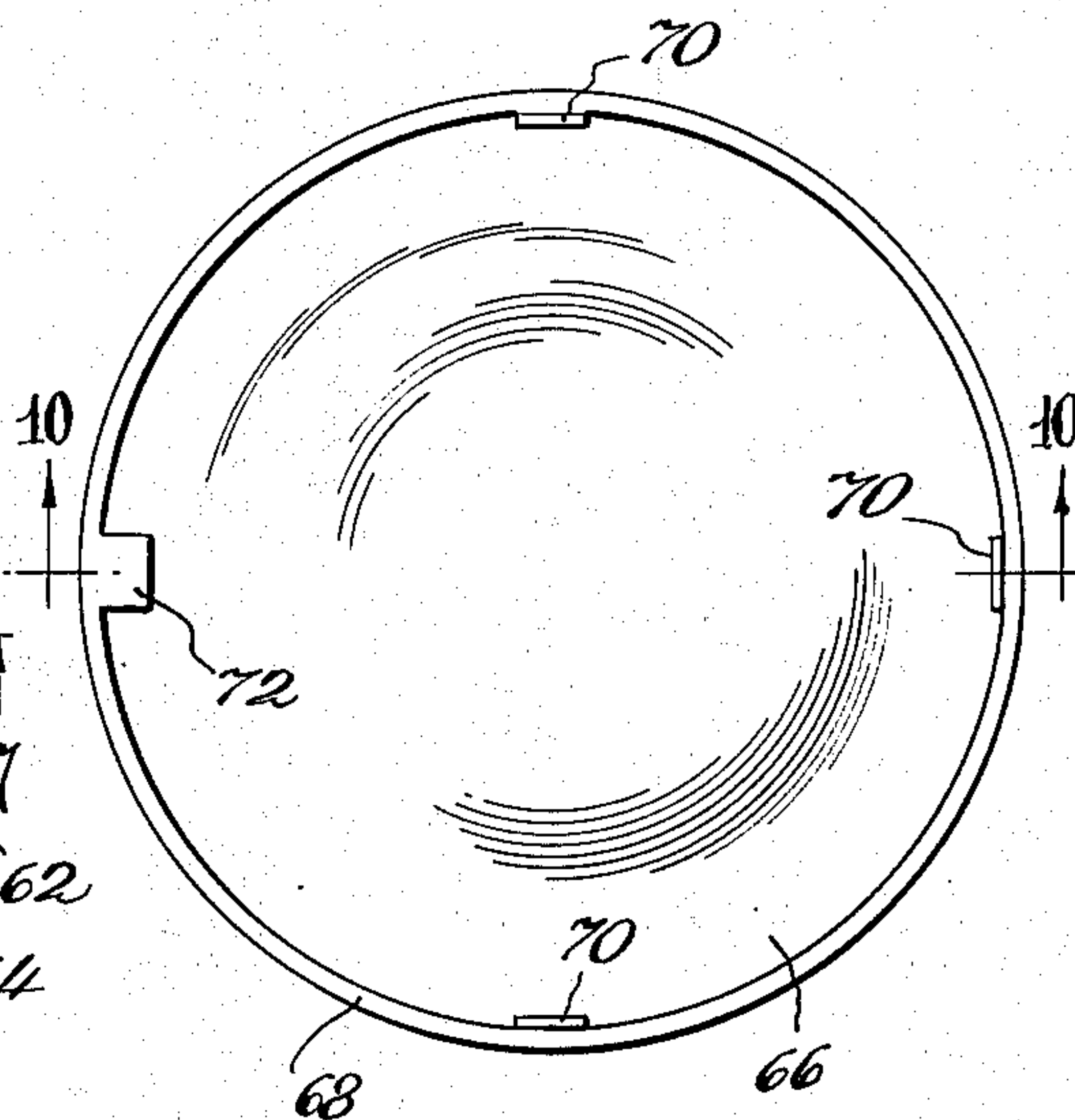


Fig. 10.

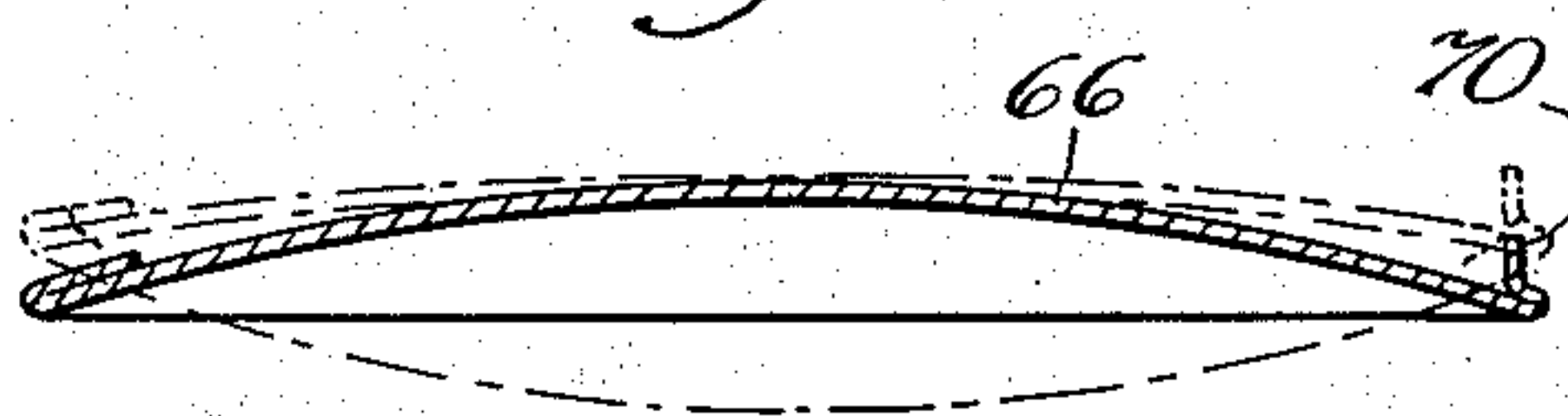


Fig. 7

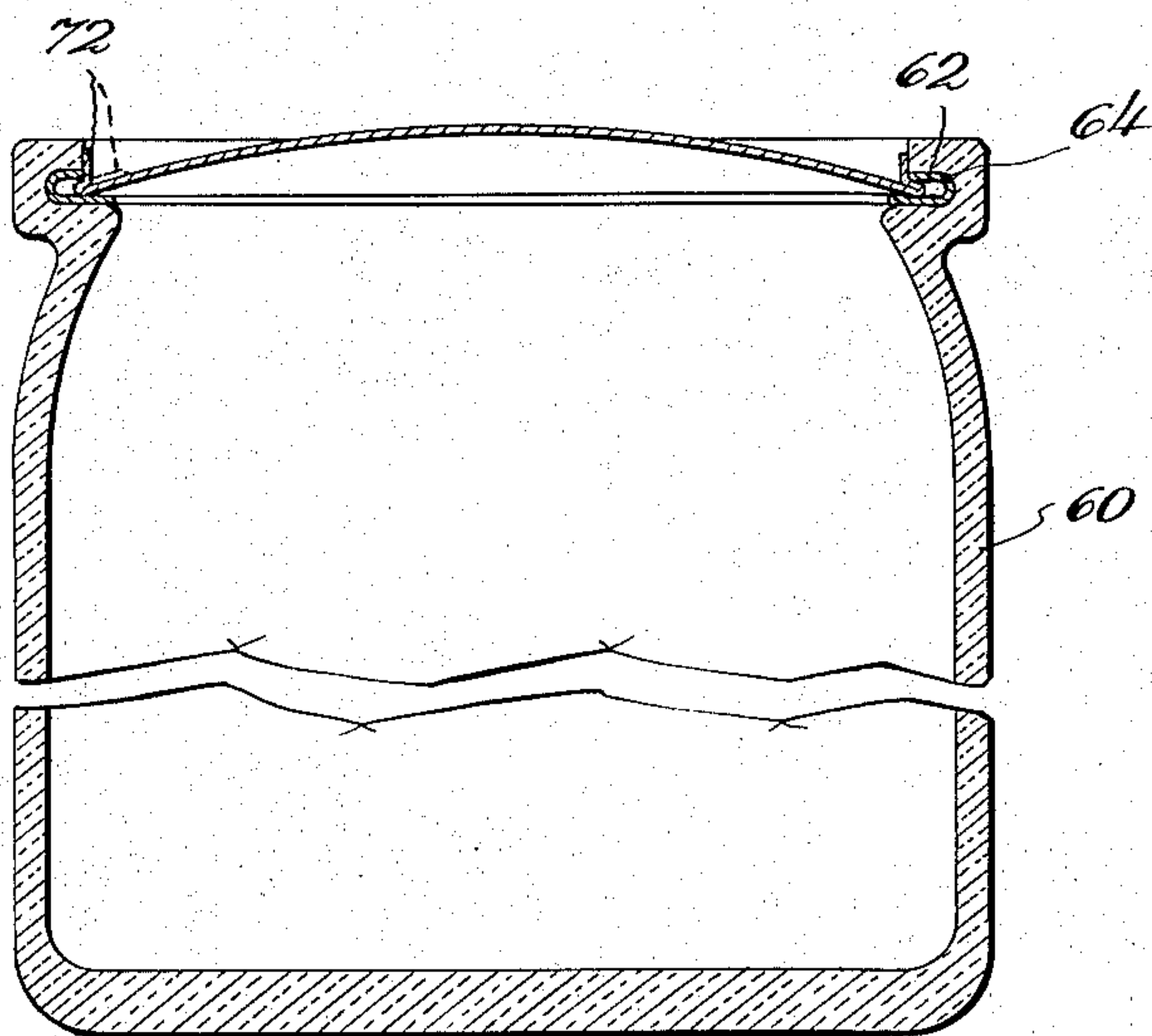
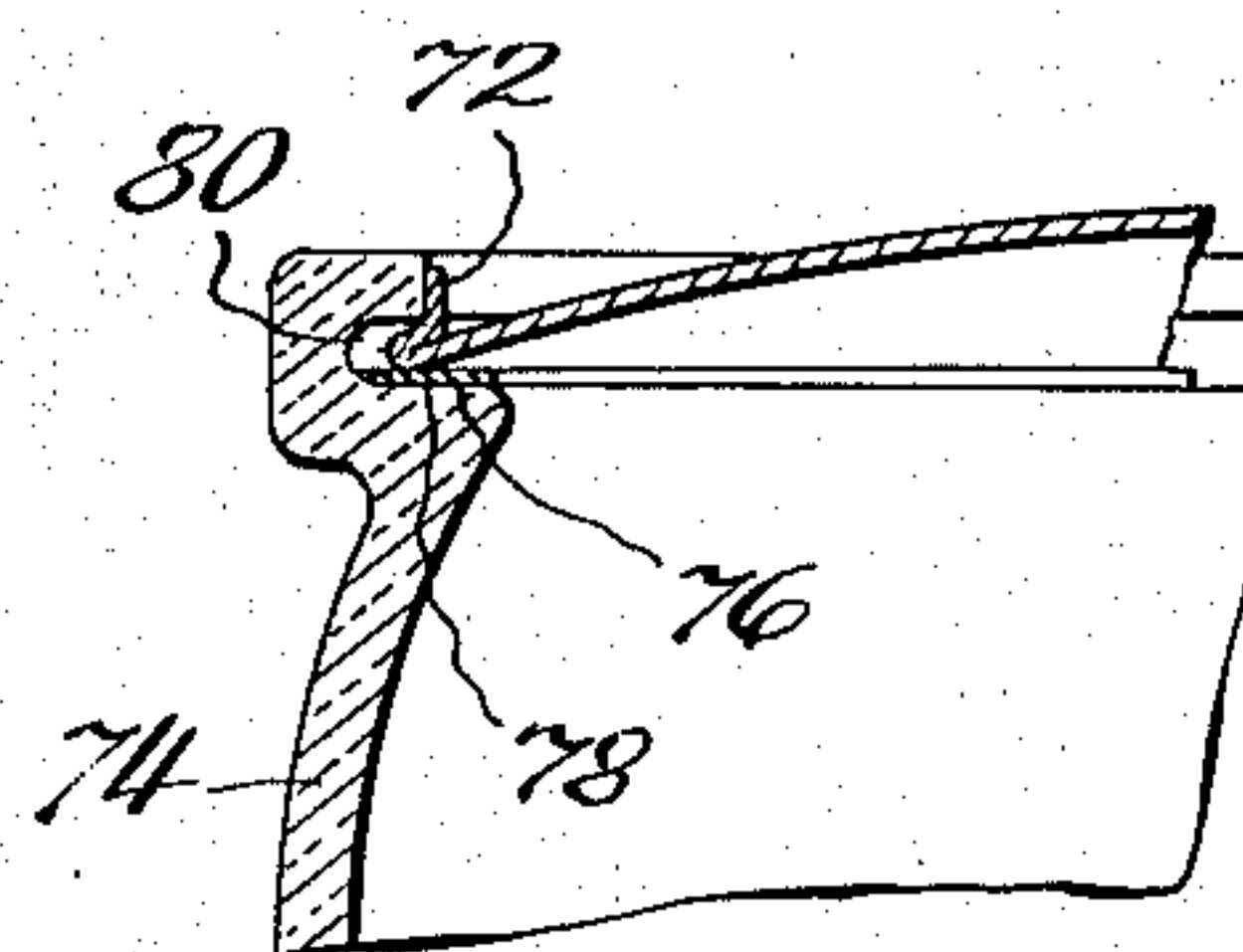


Fig. 11.



Inventor:
Alfred Vischer Jr.

By
Hinkle, Horton, Ahlberg, Hansmann & Kupper
Attorneys.

UNITED STATES PATENT OFFICE

2,628,739

CONTAINER CLOSURE

Alfred Vischer, Jr., Park Ridge, Ill., assignor, by mesne assignments, of twelve-thirtieths to Alfred Vischer, Jr., two-thirtieths to William Vischer, two-thirtieths to Alfred Vischer, III, two-thirtieths to Alfred Vischer, Jr., as trustee, four-thirtieths to Walter W. Zitzewitz, four-thirtieths to Elmer K. Zitzewitz, one-thirtieth to Gertrude J. Zitzewitz, one-thirtieth to Barbara O. Zitzewitz, and two-thirtieths to Gertrude V. Bouton

Application June 7, 1946, Serial No. 675,234

12 Claims. (Cl. 220—24)

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My invention relates generally to containers and container closures, and more particularly to an improved container and closure in which the closure may be quickly and easily applied to the container without the use of clamps, catches, latches, or similar fastening means.

It is an object of my invention to provide an improved container closure particularly for use in protecting food, in which the closure may be very simply and rapidly applied to and removed from the container, and in which the closure is free from substantial protuberances, fastening means, and the like.

In the handling of prepared food, it is frequently desirable, as in serving meals upon aircraft, trains, and the like, to prepare the food in advance and place it in vacuum insulated containers until it is to be served. Particularly in serving meals on aircraft, this presents a problem since the containers should be compact and capable of being stacked one upon another, and the closures therefor should be quickly and easily removable, readily cleanable, and maintain the food in a sanitary condition.

A further object is to provide an improved closure for glass and similar jars, which may be either vacuum tight or pressure tight, or both, and which may be quickly and easily applied to the container.

Other objects will appear from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a diametral vertical sectional view of the improved container with the closure in position to be secured thereto;

Fig. 2 is a plan view of the container of Fig. 1, with portions thereof shown in section;

Fig. 3 is a diametral vertical sectional view of the container and closure of Fig. 1, showing the closure in effective position;

Fig. 4 is a diametral vertical sectional view of a modified form of container and closure;

Fig. 5 is a plan view of the container and closure shown in Fig. 4, with portions of the container and closure shown in fragmentary section;

Fig. 6 is a diametral vertical sectional view of the container and closure, with the closure illustrated in the position it initially assumes when applying it to the container;

Fig. 7 is a central vertical sectional view of a modified form of the invention, in which the closure is applied to a glass or similar jar;

Fig. 8 is a plan view thereof;

Fig. 9 is a plan view of the closure;

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Fig. 10 is a diametral sectional view, taken on the line 10—10 of Fig. 9; and

Fig. 11 is a fragmentary sectional view showing a further modified form of jar and closure.

The container shown in Figs. 1, 2, 3, and 6, is illustrated as comprising a cylindrical shell 10 formed with a circumferential indented groove 12, an internally directed channel portion 14, and a folded lip or bead portion 16.

An internally channeled ring 18 is secured in the channel portion 14 of the shell. This is accomplished prior to formation of the bead portion 16 of the container, so that the ring 18 is permanently clamped between the portion of the shell forming the groove 12 and that forming the bead 16. The ring 18 is provided with a top opening 20 and a smaller diameter bottom opening 22, as well as an internal groove or channel 24. Within the groove or channel 24 there is located a filler 26 having a circular external edge and a circular hole 28 located eccentrically with respect to the outer edge thereof. If desired, the filler 26 may be made integral with the ring 18.

The closure or cover 30 is circular, of greater diameter than the opening 20, and is preferably made of thin flexible sheet metal of high tensile strength, such as 18-8 stainless steel, is conformed as more fully disclosed in my prior Patent No. 2,282,011, and is made in a manner such that it tends normally to warp to the shape indicated in Figs. 1 and 6. When in this shape (Fig. 1), the projection of the peripheral edge of the cover upon a horizontal plane is substantially an ellipse. The cover is provided with a peripheral bead 32 and a suitable button-like handle 34 is secured at its center.

To apply the cover 30 to the container, a portion of its peripheral edge, at the end of the diameter along which the cover is warped, is inserted in the groove or channel 24 in the manner shown in Fig. 6, and a force applied to the handle 34 in the general direction of the arrow shown in Fig. 6. As a result of the application of a force in this manner, the peripheral edge portion 32 of the cover is caused progressively to slide into the groove or channel 24 as the force applied to the cover flexes the latter, causing it to decrease its radius of curvature in the plane represented by the line A—A in Fig. 6, until the entire peripheral edge of the cover is in contact with the surface of the ring 18 at the bottom of the groove 24. Due to the fact that the opening 28 in the filler 26 is eccentric, the cover may be slid to the left (Figs. 1, 2, and 3) to permit the right-hand por-

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tion of the peripheral edge to pass through the opening 20. When the full peripheral edge of the cover is thus seated against the ring 18, the cover is moved to the right to the position in which it is shown in Fig. 3, in which position the full peripheral edge of the cover underlies the upper flange of the channel ring 18. When in this position, the cover substantially seals the opening formed in the ring 18 and the container and contents may be lifted by grasping the handle 34. In some instances a pivoted bail-like ring or loop handle may be substituted for the button type handle 34, in order to reduce the overall height of the container with the closure applied, and to facilitate handling the container with the cover attached.

The cover 30 may readily be removed from the container by sliding it to the left from the position in which it is shown in Fig. 3, to permit clearance of the right-hand peripheral edge portion from beneath the upper flange of the ring 18. It is then tilted toward the position shown in Fig. 6. As it moves to this position, progressively greater portions of the peripheral edge become free from the upper flange of the ring 18 and the cover returns to its fully flexed position substantially to the shape in which it is shown in Fig. 6. Thereafter, the left-hand portion of the peripheral edge may readily be removed from beneath the upper flange of the ring 18 completely to free the cover from the container.

In the form of the invention shown in Figs. 1 to 3, and 6, it is necessary that the cover be applied to the container in a certain direction, that is, the cover must be oriented with respect to the container in the position in which it is shown (Fig. 6) so that the portion of the peripheral edge portion 32 thereof which is in line with the diameter of maximum curvature of the cover enters the groove 24 at the point at which the free portion of this groove is deepest, that is, the left-hand portion of the container as shown in Figs. 1, 2, 3, and 6.

To avoid the necessity of utilizing the filler 26 and to make it possible to insert the closure in the container in any orientation with respect to the container, a construction such as shown in Figs. 4 and 5 may be employed. In this construction the channeled ring 38 is circular and the groove 44 therein is likewise circular and coaxial with the container. In this construction the cover 40 is provided with three stops 42, which may conveniently be secured to the cover by riveting, these stops preferably being located on the cover as shown in Fig. 5, at 90° intervals. In this form of the invention, the left-hand peripheral edge 46 of the cover may be inserted in the groove 44 in a manner similar to that illustrated in Fig. 6, the cover being progressively flexed toward a less warped position until its peripheral edge is in engagement with the top surface of the lower flange 48 of the ring 38. When in this shape and position, the cover may be moved to the right to the position in which it is shown in Figs. 4 and 5, in which position it will be stopped and properly centered with respect to the upper opening 50 in the ring 38 by the stops 42, thus completely closing the opening in the ring. When in this position, the container and its contents may be handled by grasping the pivoted bail type handle 54, since the entire peripheral edge of the cover will be located beneath the upper flange of the ring 38.

Due to the fact that the top of the closure and its handle are substantially flush with the upper

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edge of the container, the containers, when filled, and with the closures in place, may be stacked one upon another, and thus occupy a minimum of space, and make it convenient to handle them in multiple groups.

It will be noted that when the closure is applied to the container in closing position, the peripheral edge of the closure frictionally engages both the upper and lower walls of the annular groove, and due to its tendency to resume its warped shape, this frictional engagement is sufficient to hold the closure in place.

The metal to metal contact of the peripheral edge of the closures 30 and 40 with respect to the horizontal surfaces of the rings 18 and 38, provides a sufficiently tight seal to prevent splashing of liquid foods, such as soups and broth, from the container when they are used to carry such foods in airplanes and other means of transportation. When the food is to be maintained under pressure or vacuum, or both, structures of the types shown in Figs. 7 to 11 may be employed.

Referring to Figs. 7 to 10, the closure is illustrated as applied to a jar 60 which preferably is made of glass, porcelain, or other suitable vitreous or ceramic material, but may be made of metal. The jar 60 is provided with an internally directed annular groove 62 near its upper edge. Within the groove there is an annular gasket 64 of J-shaped cross section, which fits snugly in the groove and may be bonded to the jar. This gasket is preferably made of a suitable synthetic rubber.

The closure comprises a thin flexible dished sheet metal cover 66 having a reinforcing annular bead 68. Three lugs 70 spaced at 90° intervals are bent upwardly, while a fourth lug 72 initially lies flat against the surface of the cover. The cover 66 is normally warped, as indicated in dotted lines in Fig. 10, and is applied to the container by inserting the edge adjacent the lug 72 into the groove provided by the gasket 64, and at the same time pressing down on the center of the cover, in the manner described with respect to the other embodiments, until the whole peripheral edge of the cover rests against the upwardly facing surface of the lower flange of the gasket 64. Then the cover is moved to the right, to the position in which it is shown in Fig. 7, the three lugs 70 accurately centering the cover with respect to the jar. When the cover has thus been properly located, the lug 72 is bent upwardly from the dotted line position of Fig. 7 to the full line position, thereby holding the cover in central position. Due to the inherent resiliency of the cover 66, it will engage both the upper and lower flanges of the gasket 64 and effectively seal the jar. The jar may be used to maintain the contents under partial vacuum, or under moderate superatmospheric pressure, since air or gas pressure on either side of the cover will cause it to be pressed more firmly against one of the flanges of the gasket 64.

When it is desired to use the jar solely for maintaining the contents under partial vacuum, it may be constructed in the manner of the jar 74 shown in Fig. 11, and provided with a simple flat annular gasket 76 resting upon a shoulder 78 beneath the groove 80. The cover and the manner in which it is applied to the jar are the same as those previously described.

When it is desired to remove the cover, any one of the lugs or tabs 70, 72 may be bent downwardly to the position in which the lug 72 is shown in dotted lines in Fig. 7, whereupon the cover may

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be slid toward the lug which has been bent down to free the diametrically opposite edge and permit the cover, due to its inherent tendency to resume its warped shape, to be readily removed from the jar.

Instead of having the gaskets 64 and 76 assembled in the jars 60 and 74, respectively, the closure 66 may have a coating of suitable gasket material, such as a synthetic rubber, vulcanized or otherwise applied to the edge of the cover, along the surfaces which are to contact the jar.

The modification shown in Fig. 11 may be used advantageously for the preservation of food using canning processes, since water vapor may escape from the jar during the cooking of the food, while the cover seals the closure against the admission of air.

Whenever closures of the type shown in Figs. 7 and 11 are utilized when the contents of the jar are under pressure or under vacuum, it will usually be necessary to pierce the closure with a can opener or the like to facilitate its removal.

While I have shown and described preferred embodiments of my invention, it will be apparent that numerous variations and modifications thereof may be made without departing from the underlying principles of the invention. I therefore desire, by the following claims, to include within the scope of the invention, all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. A container and closure comprising a container shell having an annular internally channeled ring secured therein adjacent the top edge thereof, said ring having an opening in its upper flange and a smaller opening in its lower flange, said openings being circular and concentric, and a flexible sheet metal closure internally stressed so as normally to assume a warped shape in which the projection of its peripheral edge upon a plane perpendicular to its polar axis is substantially an ellipse having its minor axis shorter than the diameter of the opening in the upper flange of the ring, said closure when a force directed downwardly near the center thereof is opposed by upwardly directed forces along the peripheral edge thereof, assuming a dome-like shape with its peripheral edge circular, said closure when in closing position in said container having its peripheral edge positioned within the groove of the ring and held in place by the flanges of the ring forming the groove.

2. The combination set forth in claim 1, in which the axis of the groove in the ring is parallel to, but displaced a small distance from, the axis of the openings in the ring.

3. The combination set forth in claim 1, in which the closure is provided with a plurality of projections to limit the extent that a portion of the closure may be inserted in the groove in the ring, and thereby facilitate locating the closure centrally with respect to the openings in the ring.

4. The combination set forth in claim 1, in which the closure is provided with stops projecting from the top of the cover and engageable with the ring to limit the extent that a portion of the closure may be inserted in the groove in the ring.

5. In an apparatus of the class described, the combination of a container having a circular opening therein and having means providing two

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spaced parallel plane annular surfaces forming an internal groove therebetween, the lower of said surfaces having an internal diameter substantially less than that of the upper surface to provide an inwardly directed shoulder, said means being adjacent the opening in the container and rigid with the container, and a removable thin flexible warpable sheet metal closure engaging the lower surface and having its entire peripheral edge portion bent back on itself and located at least partially within the groove.

6. In combination, a container having a circular opening in the top thereof and provided with an internal annular groove adjacent the opening, the internal diameter of the container immediately beneath said groove being less than that of the opening to provide an annular flat shoulder surface substantially continuous with the lower surface of the groove, a flat gasket resting on said flat surface and extending into the groove, and a thin resilient circular sheet metal closure of diameter greater than that of the opening and having its peripheral edge positioned within the annular groove and engaging the gasket, said closure being internally stressed so as to assume an appreciably warped shape, when not subjected to externally applied forces, to facilitate its insertion into and removal from the groove.

7. In combination, a container having a circular opening in the top thereof and provided with an internal annular groove adjacent the opening, the internal diameter of the container immediately beneath said groove being less than that of the opening to provide an annular flat surface substantially continuous with the lower surface of the groove, an internally grooved annular gasket resting on said flat surface and extending into the groove, and a thin resilient circular sheet metal closure of diameter greater than that of the opening and having its peripheral edge positioned within the annular groove and engaging the gasket, said closure being internally stressed so as to assume an appreciably warped shape when not subjected to externally applied forces to facilitate its removal from the groove.

8. In combination, a container having a circular opening in the top thereof provided with an internal annular groove adjacent the opening, said container having an internally projecting shoulder forming an annular flat surface substantially continuous with the upwardly facing surface which in part defines the groove, an outwardly convex circular sheet metal closure of greater diameter than that of the opening in the container and having its entire peripheral edge retained within the groove, and means on the closure and engageable with the container to facilitate centering the closure with respect to the opening in the container, said closure being internally stressed to cause it to assume a warped shape, when it is not subjected to applied forces, so as to facilitate its application to and removal from the container.

9. In combination, a container comprising a shell having a relatively large opening in the top thereof, having an internal annular groove near the opening and having an annular internally projecting shoulder providing a substantially flat surface continuous with the lower surface of the groove, and a circular dished thin flexible resilient sheet metal closure having its peripheral edge located in the groove, said closure having internal stresses therein to cause it to tend to warp appre-

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ciably when unrestrained and thus to frictionally engage the walls of the groove.

10. In combination, a container comprising a shell having a relatively large opening in the top thereof, having an internal annular groove near the opening and having an annular internally projecting shoulder providing a substantially flat surface continuous with the lower surface of the groove, a circular dished thin flexible resilient sheet metal closure having its peripheral edge located in the groove, said closure having internal stresses therein to cause it to tend to warp appreciably when unrestrained and thus to frictionally engage the walls of the groove, and means on the closure and engaging the shell to maintain it centered with respect to the opening in the latter.

11. In an apparatus of the class described, the combination of a container having means adjacent an opening in the top thereof providing two spaced parallel plane annular surfaces forming an internal groove therebetween, the lower of said plane surfaces extending farther inwardly than the upper surface to provide a seat, and a removable thin flexible warpable sheet metal closure of greater diameter than the opening in the upper annular surface and having its entire peripheral edge bent back on itself to form a bead, the major portion of which is located within the groove and engaging the seat.

12. In combination, a container comprising a shell having a relatively large opening in the top thereof, having means providing an internal annular groove near the opening, and having an

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inwardly projecting shoulder with an upwardly facing surface forming a continuation of the lower surface of the groove; and a circular dished thin flexible sheet metal closure having a peripheral bead located in the groove in the container and being of slightly lesser width than that of the groove, said closure having internal stresses therein to cause it to tend to warp appreciably when unrestrained and being sufficiently dished that it frictionally engages both the upper and lower surfaces of the means providing the groove.

ALFRED VISCHER, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
663,392	Piper	Dec. 4, 1900
1,454,699	Chaffin	May 8, 1923
1,561,141	Coughlin	Nov. 10, 1925
1,983,139	Lovell	Dec. 4, 1934
2,011,406	Hiltner	Aug. 13, 1935
2,282,011	Vischer	May 5, 1942
2,407,627	Chandler	Sept. 17, 1946

FOREIGN PATENTS

Number	Country	Date
256,734	Germany	Feb. 18, 1913
280,658	Great Britain	Nov. 24, 1927
281,312	Germany	Feb. 13, 1913
820,843	France	Aug. 9, 1937