Dec. 30, 1958 F. E. ULLMAN ET AL 2,866,305

METHOD OF SEALING A CONTAINER OPENING AND AN APPARATUS THEREFOR

Filed Jan. 14, 1954 3 Sheets-Sheet 1

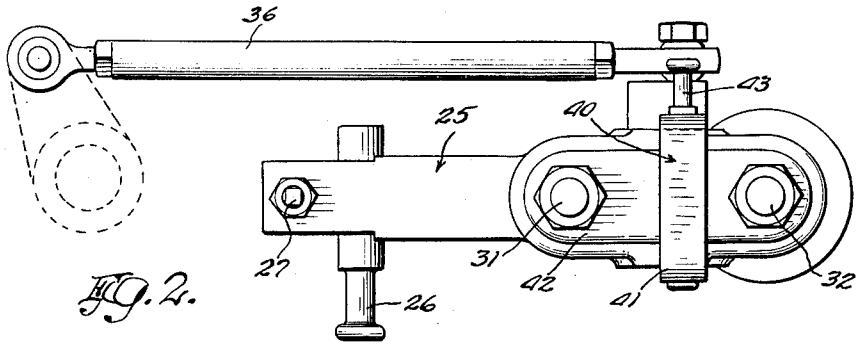


Fig. 2.

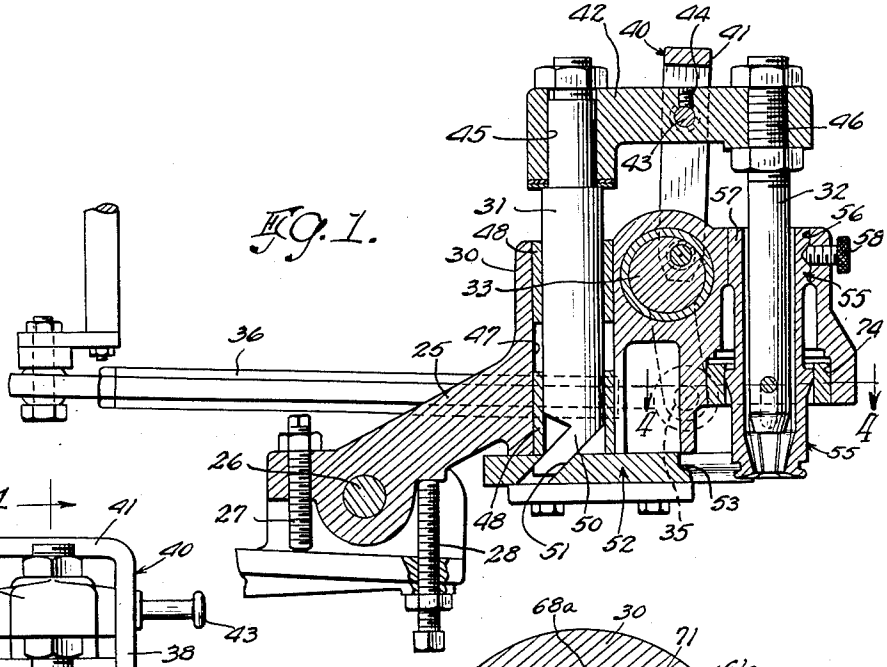


Fig. 1.

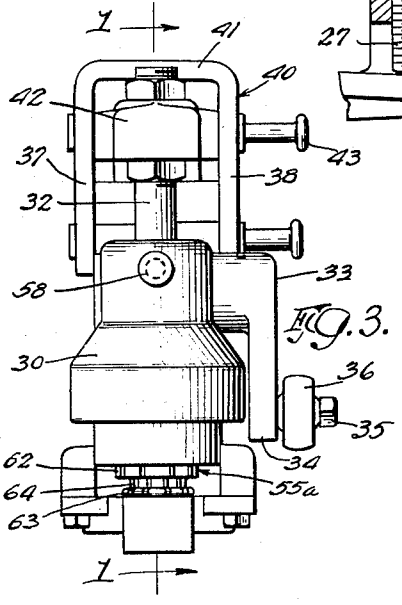


Fig. 3.

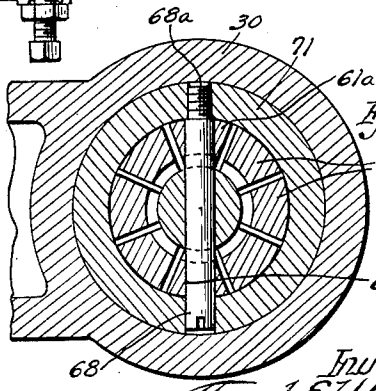


Fig. 4.

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METHOD OF SEALING A CONTAINER OPENING AND AN APPARATUS THEREFOR

Filed Jan. 14, 1954

3 Sheets-Sheet 2

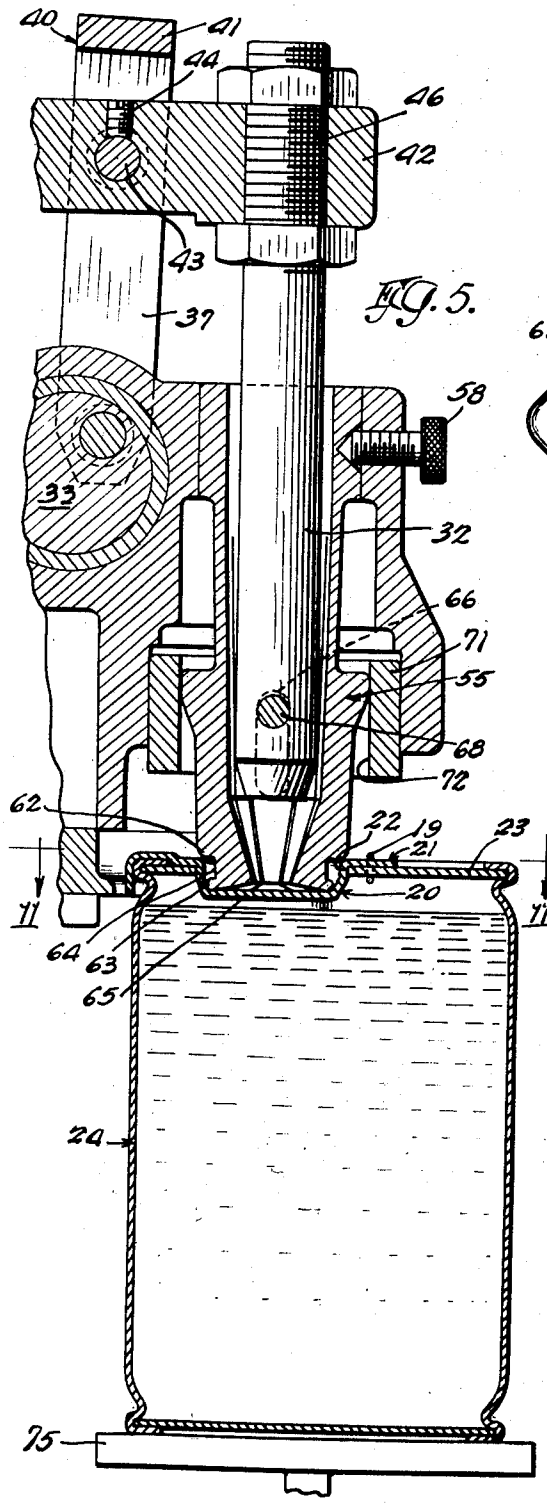


FIG. 5.

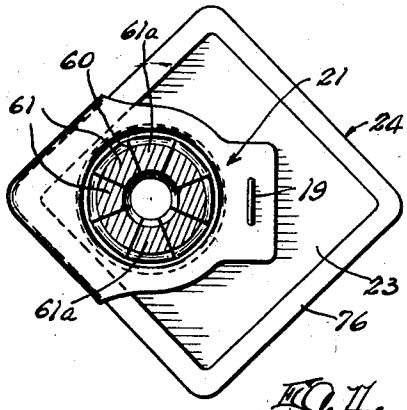


FIG. 11.

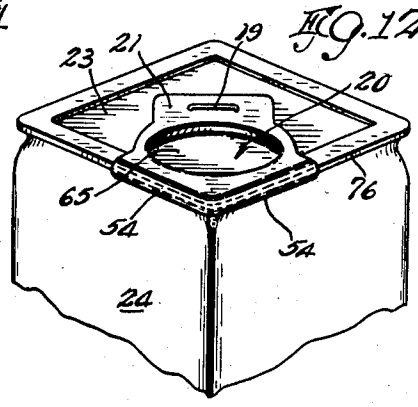


FIG. 12.

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METHOD OF SEALING A CONTAINER OPENING AND AN APPARATUS THEREFOR

Filed Jan. 14, 1954 3 Sheets-Sheet 3

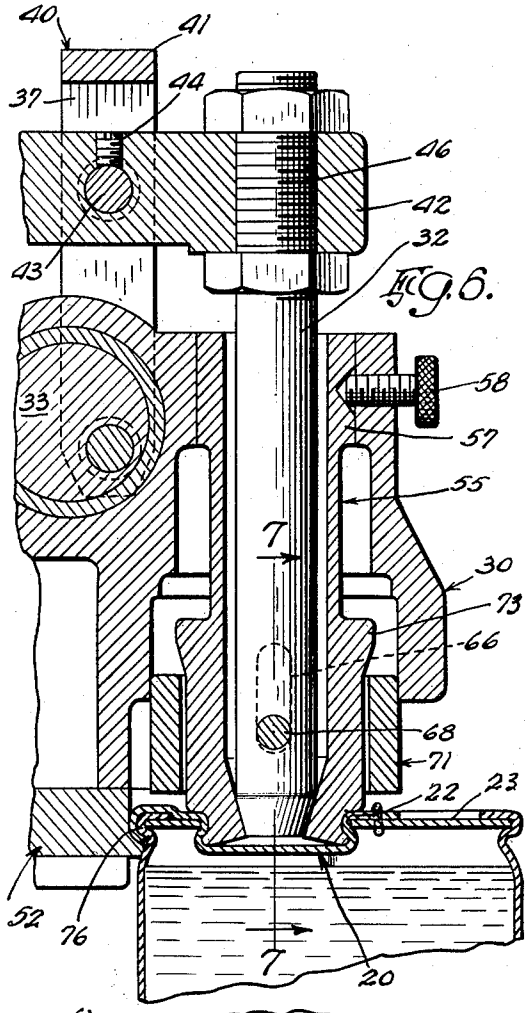


FIG. 6.

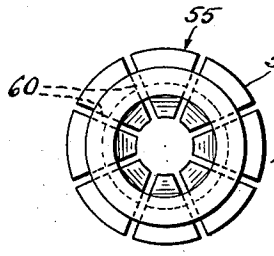


FIG. 9.

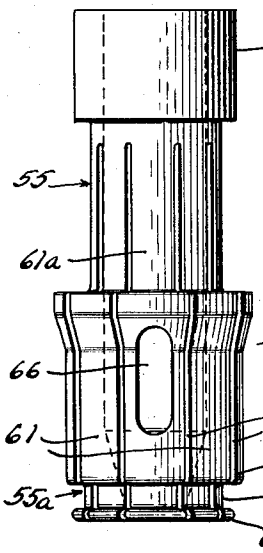


FIG. 8.

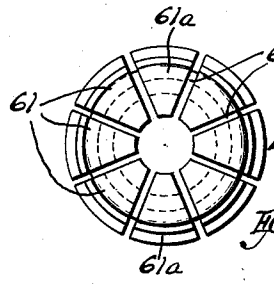


FIG. 10.

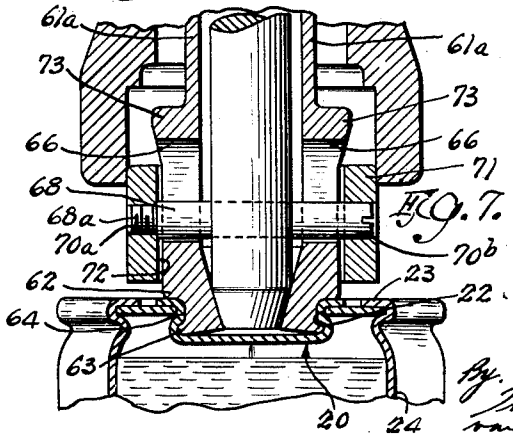


FIG. 7.

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2,866,305

METHOD OF SEALING A CONTAINER OPENING AND AN APPARATUS THEREFOR

Fred E. Ullman, Winnetka, and Norman A. Virta, Mount Prospect, Ill., assignors to Triangle Package Machinery Company, Chicago, Ill., a corporation of Illinois

Application January 14, 1954, Serial No. 403,982

21 Claims. (Cl. 53—42)

This invention relates to a method of sealing a container opening and an apparatus therefor subsequent to an indented portion of a cover being inserted within the container opening.

In disposable containers made from paper or other cellulose material, impregnated with a leakproofing composition, difficulty has heretofore been experienced in effecting a proper seal for the container opening which is capable of withstanding careless and harsh handling of the container without rupturing, prior to the container being opened by the consumer.

In one form of such container, widely used today by the dairy and beverage industries in packing one or more of their liquid products, the top of the container is substanitally flat to facilitate stacking of such containers for storage or shipment. Formed in the flat top adjacent the marginal edge thereof is an opening to permit filling of the container or to pour the liquid therefrom. Hingedly secured to the top adjacent such an opening is a flap or cover having an indented portion for insertion within the opening. The remainder of the cover overlies the exposed circumjacent portion of the container opening and in most instances has a portion of the edge of the cover crimped or bent over a corresponding marginal edge portion of the top. Heretofore in sealing the indented cover portion within the container opening, subsequent to such portion being inserted within the opening, it was the customary practice to position an end of a collet within the indented cover portion so that it protruded into the container interior and then expand the collet end, whereupon the indented cover portion expanded and engage the concealed surface of the circumjacent portion of the container opening. To permit expension of the collet end, the latter was provided with a plurality of elongated longitudinally extending open end slots which formed a plurality of elongated yieldable fingers capable of being radially expanded under force. The normal or natural size and shape of the collet end was such as to permit the collet end to be readily positioned in or disengaged from the indented cover portion. One of the serious difficulties encountered, however, in following this practice was that, when the fingers of the collet end were radially expanded, relatively large gaps or voids were formed between adjacent fingers which resulted in a substantial peripheral portion of the indented cover portion not being forcibly expanded whereupon an ineffectual or weak seal was produced.

Thus, it is the object of this invention to provide a method of sealing a container opening with an indented cover portion and an apparatus for performing such method, which materially overcomes the shortcomings heretofore associated with prior methods.

Further and additional objects will appear from the description, accompanying drawings, and appended claims.

In accordance with one embodiment of this invention, an apparatus is provided comprising an elongated sleeve-like collet having one end thereof contractible and adapted to be positioned within the intended cover portion when the collet end is in a contracted relation. The collet end, when in its normal or natural size and shape, is larger than the size and shape of the container opening. Encompasing the outer periphery of the collet adjacent the contractible end thereof is a collar member which is movable longitudinally of the collet and, when moved in a direction away from the contractible collet end effects contracting of the latter to a size and shape less than that of of the container opening. Disposed within the interior of the collet and movable axially thereof is an elongated plunger, which, when moved in a direction toward the contractible collet end effects return of the latter to its normal size and shape.

For a more complete understanding of this invention, reference should be made to the drawings wherein:

Figure 1 is a fragmentary vertical sectional view of the apparatus taken along line 1—1 of Fig. 3 and showing the collet end in contracted relation;

Fig. 2 is a top plan view of Fig. 1;

Fig. 3 is an end elevational view of the apparatus as viewed from the right-hand side of Fig. 2;

Fig. 4 is an enlarged sectional view taken along line 4—4 of Fig. 1;

Fig. 5 is an enlarged fragmentary vertical sectional view of the apparatus and a container in position with respect to the contractible collet end prior to the indented cover portion being expanded into sealing relation with respect to the container opening;

Fig. 6 is a fragmentary view similar to Fig. 5 but illustrating the collet forcibly returned to its normal size and thereby effecting a sealing operation;

Fig. 7 is a fragmentary sectional view taken along line 7—7 of Fig. 6;

Fig. 8 is an enlarged elevational view of the collet, alone;

Figs. 9 and 10 are top plan and bottom views, respectively, of Fig. 8;

Fig. 11 is a sectional view taken along line 11—11 of Fig. 5; and

Fig. 12 is an enlarged perspective view of the top of a container showing the cover in sealed relation with respect to the container opening.

Referring now to the drawings and more particularly to Fig. 1, an apparatus is shown for use in effecting a seal between an indented portion 20 of a cover 21 and the opening 22 formed, in this instance, in the top surface 23 of a container 24, the latter being constructed preferably of a paper or cellulose material impregnated with a leakproof composition, which will have no adverse effect on the liquid carried within the container. The cover 21, in this instance, is hingedly connected at 19 to the container top 23. The indented portion 20 of the cover 21 is preformed and inserted within the container opening 22, prior to the cover being acted upon by the improved apparatus, to be hereinafter described.

The improved apparatus, in this instance, comprises a frame unit 25 which is adjustable about a shaft 26 to a predetermined fixed position. The unit 25 is held in a desired adjusted position by a pair of positioning screws or bolts 27 and 28, disposed on opposite sides of shaft 26. Unit 25 is provided with a head section 30 in which is carried a pair of reciprocating substantially parallel shafts or plungers 31 and 32. The construction and operation of these plungers will be discussed more fully hereinafter. Also carried within head section 30 is a cam piece 33, adapted to turn about an axis disposed transversely with respect to the longitudinal axes of plungers 31 and 32. Piece 33 is provided with a radially extending arm 34, which is disposed outside of head section 30, see Fig. 3. The free end of arm 34 is pivotally connected at point 35 to an actuating rod 36, the move-

ment of the latter being effected by some external source, not shown, in accordance with a predetermined cycle of operation. Pivotally connected to cam piece 33 and eccentrically disposed with respect to the turning axis thereof are the free ends of leg sections 37 and 38, which form a part of an inverted U-shaped bridge member 40. The member 40, as seen in Figs. 1 and 3, extends above head section 30 and has disposed, between the leg sections 37 and 38 and spaced intermediate the bight section 41 of the member 40 and the top of the head section 30, a transversely extending yoke 42 which is operatively connected to member 40 by a pin 43. The pin is supported at opposite ends by the leg sections 37 and 38 and passes through an opening formed substantially at the center of the yoke. A locking or setting screw 44 is threadably mounted on the yoke 42 for engaging of the periphery of pin 43 and retaining the yoke in a fixed position with respect to the pin. The ends of the yoke 42, disposed on opposite sides of pin 43, are provided with openings 45 and 46 which are adapted to accommodate the upper ends of plungers 31 and 32, respectively.

Plungers 31 has the lower end portion thereof disposed within a suitable bore 47 formed in head section 30 and is adapted to reciprocate therein, upon turning of cam piece 33. A pair of spaced guide bushings 48 are disposed within bore 47. The bottom end 50 of plunger 31 is deformed and is adapted to protrude downwardly from the end of bore 47 and terminate within a suitable slot 51 formed in a plate 52, the latter being slidably secured to the underside of head section 30. The plate 52 slides relative to the head section 30 in a plane disposed transversely with respect to the direction of movement of the plunger 31. The plate 52 has one edge or side 53 thereof shaped to conform to a portion of the marginal edge of the top 23 of container 24 and effects crimping or bending over a portion 54 of the edge of cover 21, subsequent to or simultaneously with the indented portion 20 of the cover being sealed within the container opening 22. The operation and construction of plate 52 is believed well known by those skilled in the art.

Plunger 32, which has the upper end thereof disposed within yoke opening 46, projects downwardly from the yoke and terminates within the hollow interior of a sleeve-like collet 55, which, in turn, is fixedly positioned within a second bore 56, the latter being formed in head section 30 and disposed on the opposite side of cam piece 33 with respect to bore 47. The upper end 57 of the collet is engaged by a lock screw 58 which is threadably mounted within the head section. The remainder of the collet extends downwardly from bore 56 and is out of contact with head section 30. The collet 55, as seen more clearly in Fig. 8, has approximately three-quarters of the length thereof extending downwardly from bore 56 and is provided with a plurality of symmetrically arranged longitudinally extending open end slots 60. Intermediate adjacent slots are formed yieldable fingers 61 which are of like construction. The lower end portion 55*a* of collet 55 protrudes downwardly from the underside of head section 30 and has the terminus thereof reduced in size to form a shoulder 62 and a radially extending annular flange 63 spaced longitudinally from the shoulder. A neck or annular recess 64 is formed by shoulder 62 and flange 63. The flange 63, when the collet 55 assumes its normal uncontracted relation, has a diameter greater than the diameter of the container opening 22. Thus, in order to locate the flange 63 within the indented cover portion 20, as seen in Fig. 5, it is necessary that the yieldable fingers 61 be urged together so as to contract the flange 63 to a size and shape substantially the same as the inserted base 65 of the indented cover portion, prior to expansion thereof, see Fig. 5. Formed in two diametrically opposed yieldable fingers 61*a*, see Figs. 7 and 8, are elongated longitudinally extending apertures 66. The apertures 66 are aligned with one another and a bore 67, formed adjacent the lower end of plunger 32, so as to permit a transversely extending pin 68 to extend therethrough. The ends of the pin 68 are disposed within aligned openings 70*a* and 70*b* formed in an annular collar 71 which is adapted to encompass the outer periphery of the lower end portion 55*a* of the collet 55. One end 68*a* of pin 68 is reduced in size and threaded into collar opening 70*a*, which is internally threaded. The interior periphery 72 of collar 71 is out of contact with the yieldable fingers 61 and 61*a*, when the collet is in its normal or uncontracted relation, which results when plunger 32 is moved downwardly relative to the collet. The interior of the collet 55, adjacent the lower end thereof is funnel-shaped and is adapted to be engaged by the lower end of plunger 32 and cause the lower end 55*a* of the collet to be forcibly returned substantially to its normal size and shape and expand the indented cover portion. At substantially the center of each of the fingers 61 and 61*a* is an outwardly bulging portion 73 which tapers toward the lower end of the collet. When the plunger 32 is moved upwardly relative to collet 55, the collar 71 is moved in unison therewith, whereupon the interior peripheral surface 72 of the collar will engage the portion 73 formed on each finger and cause the latter to move toward the axis of plunger 32. The movement of the fingers is pivotal about the points of juncture between the upper end portion 57 and the fingers of the collet. The elongated slots 60, which form the fingers 61 and 61*a* must be only of such width as to permit the lower end of the collet to contract a sufficient amount to allow the flange 63 to be located within the indented cover portion 20. The collar 71 is disposed within an enlarged throat 74 formed in the underside of head section 30 and in axial alignment with bore 46 and is adapted to guide the movement of the collar.

The neck or annular recess or groove 64, formed in collet 55, is adapted to accommodate the circumjacent portion of the container opening 22, as seen in Fig. 7, when the cover portion 20 is expanded by the collet flange 63 upon returning of the latter to substantially its normal size and shape. The shoulder 62, formed on the lower end of collet 55 is adapted to engage the exposed surface of the cover, overlying the circumjacent portion of the container opening 22, thereby causing such circumjacent portion to be engaged on opposite sides by the cover.

The method as practiced by the above described apparatus is as follows: (*a*) the downwardly protruding end of the collet 55 is contracted by upward movement of plunger 32 caused by cam piece 33, rotating in a counterclockwise direction to the position shown in Fig. 1; (*b*) the container 24, which is positioned on a raisable platform 75, see Fig. 5, is raised up relative to collet 55 so that the contracted flange 63 of the collet is located within the indented cover portion 20 and contacts the base 65 thereof, whereupon the flange 63 is disposed below the container top surface 23; (*c*) the contracted flange 63 or lower end of the collet is then returned substantially to normal size and shape whereupon the base 65 of the indented cover portion 20 is expanded to a size and shape greater than that of the container opening 22 so that the outer periphery or marginal portion of the base contacts the concealed or interior surface of the container top; (*d*) subsequent to or simultaneously with the expansion of base 65, certain portions of the edge 54 of the cover are bent or crimped over the corresponding marginal edge portions 76 of the top by the deformed edge 53 of plate 52, when the latter is moved to the right from the position, shown in Fig. 1; and (*e*) the lower end of the collet, including flange 63 is once again contracted to the size and shape shown in Fig. 5, and simultaneously therewith plate 52 is moved to the left whereupon the platform 75 is lowered carrying container 24 and effecting disengagement of the collet 55 and the indented cover portion 20. Subsequent to this aforenoted sealing operation, the container 24 is moved

by a conveyor, not shown, to the shipping or storage station. In instances where portions of the edge of the cover do not extend beyond the marginal edge of the container top, step (*d*) of the method may be omitted.

Thus, it will be seen that a method has been provided which produces a more effective seal for a container opening wherein the seal is capable of withstanding harsh or careless handling of the container without being ruptured or broken. Furthermore, an apparatus has been provided for practicing this method, which engages substantially the whole marginal portion of the base of the indented cover portion by reason of the yieldable collet fingers being in closer relation with respect to one another and results in more positive engagement of the underside or cencealed surface of the container top by the expanded base of the indented cover portion.

While a particular embodiment of this invention is shown above, it will be understood, of course, that the invention is not to be limited thereto, since many modifications may be made, and it is contemplated, therefore, by the appended claims, to cover any such modifications as fall within the true spirit and scope of this invention.

We claim:

1. The process of sealing an indented portion of a cover formed of deformable sheet material within an aperture subsequent to the indented cover portion being inserted within such an aperture, which process comprises providing a unitary structure having a slotted contractible end portion of a normal size and shape larger than that of the aperture, contracting the contractible end portion of said structure to a size and shape less than that of the aperture, locating a portion of said contractible end portion, when in contracted relation, within the indented cover portion whereby a part of said end portion is disposed axially on opposite sides of the aperture, expanding said end portion toward normal size and shape whereby said indented cover portion is expanded and portions of said cover snugly engage the opposite sides of the circumjacent portion of the aperture, and disengaging said unitary structure and indented cover portion subsequent to the contractible end portion thereof being contracted to a size and shape smaller than that of the aperture.

2. The process of sealing an indented portion of a cover formed of deformable sheet material within an aperture subsequent to the indented cover portion being inserted within such an aperture, which process comprises providing a unitary structure having a slotted contractible end portion of a normal size and shape larger than that of the aperture, contracting the contractible end portion of said structure to a size and shape less than that of the aperture, locating a portion of said contractible end portion, when in contracted relation, within the indented cover portion whereby a part of said end portion is disposed axially on opposite sides of the aperture, expanding said end portion toward normal size and shape whereby said indented cover portion is expanded transversely with respect to the axis of the aperture and portions of said cover snugly engage the opposite sides of the circumjacent portion of the aperture and the perimeter of the aperture as well, and disengaging said unitary structure and indented cover portion subsequent to the contractible end portion thereof being contracted to a size and shape smaller than that of the aperture.

3. The process of sealing an indented portion of a cover formed of deformable sheet material within an aperture subsequent to the indented cover portion being inserted within such an aperture, which process comprises providing a unitary structure collet having a contractible collet-like flanged end portion, the normal size and shape of the latter being larger than that of the aperture, locating the flanged collet-like end portion within the indented cover portion, subsequent to contracting said flanged end portion to a size and shape smaller than that of the aperture whereby the flanged end portion is extended axially through the aperture to the opposite side thereof, expanding said collet-like flanged end portion to substantially normal size and shape whereby said indented cover portion is deformed and portions of the cover snugly engage the opposite sides of the circumjacent portion of the aperture, and disengaging said collet-like flanged end portion and indented cover portion subsequent to said contractible flanged end portion being contracted to a size and shape smaller than that of the aperture.

4. The process of sealing an indented portion of a cover formed of deformable sheet material within a container opening subsequent to the indented cover portion being inserted within such container opening, which method comprises providing a unitary structure collet having a contractible slotted end portion with the normal size and shape thereof greater than that of the container opening, contracting said slotted end portion to a size and shape smaller than that of the container opening, locating said slotted end portion, when in contracted relation, within the indented cover portion whereby said slotted end portion contacting the indented cover portion projects axially into the interior of the container, expanding said contracted slotted end portion toward normal size and shape whereby the portion of the indented cover portion projecting into the interior of the container is expanded transversely to a size and shape larger than that of the opening for the container so that the concealed side of the circumjacent portion of the container opening is snugly engaged by the expanded indented cover portion.

5. An apparatus for sealing an indented portion of a cover formed of deformable sheet material within a container opening subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising first unitary means having a contractible slotted end portion for disposition within the indented cover portion, said contractible slotted end portion, when in normal relation having a size and shape larger than that of the container opening, second means operatively connected to said first means and movable relative thereto for effecting contraction of said contractible portion from said normal relation and returning said first means to normal relation from a contracted relation, and third means operatively connected to said second means for effecting actuation of the latter.

6. An apparatus for sealing an indented portion of a cover formed of deformable sheet material within a container opening subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising an elongated unitary structure having a contractible slotted end thereof for disposition within the indented cover portion, said contractible slotted end, when in normal relation, having a size and shape larger than that of the container opening and being provided with a peripheral end-encompassing groove spaced from the tip of said contractible end for accommodating the segment of said indented cover portion bounded by the container opening, and means movably mounted on said unitary structure for effecting contraction of said contractible end from normal size and shape when moving in one direction relative to said end, and effecting return of said contractible end to normal relation upon relative movement of said means in a second direction.

7. An apparatus for sealing an indented portion of a cover formed of deformable sheet material within a container opening of a given size and shape subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising an elongated hollow collet having a contractible end portion for insertion within and withdrawing from the indented cover portion only when said collet end portion is contracted from its normal size and shape which is larger than the given size and shape of the container opening, and means

movably mounted on said collet for effecting contraction of said end from and return of the latter to its normal size and shape; said means having a first portion disposed within said collet and movable axially thereof, a second portion encompassing the outer periphery of said contractible collet end and movable longitudinally thereof, and a third portion interconnecting said first and second portions for effecting unitary movement thereof.

8. An apparatus for sealing an indented portion of a cover formed of deformable sheet material within a container opening of a given size and shape subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising an elongated hollow collet having a contractible end portion for insertion within and withdrawing from the indented cover portion only when said collet end portion is contracted from its normal size and shape which is larger than the given size and shape of the container opening, a collar member encompassing the outer periphery of said contractible end and relatively movable in a direction longitudinally thereof, said collar member, when moving in one relative direction effecting contraction of said collet end, an elongated element disposed within the interior of said collet and movable axially thereof, said element, when moving in one direction relative to said collet effecting return of said contractible end portion to its normal size and shape from the contracted relation of the latter, and means interconnecting said elongated element and collar member for effecting unitary movement thereof.

9. An apparatus for sealing an indented portion of a cover formed of deformable sheet material within a container opening of a given size and shape subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising an elongated hollow collet having a contractible end portion for locating the terminus thereof within the indented cover portion only when the terminus is contracted from its normal size and shape which is larger than that of the container opening, said contractible end portion being provided with a plurality of longitudinally extending open end slots having the blind ends thereof terminating at a predetermined distance from the terminus of said end portion, the outer periphery of said contractible end portion having a segment thereof tapered in a direction toward said terminus, the interior of said collet having a funnel-shaped segment adjacent the terminus of said collet, a collar member encompassing the periphery of said contractible collet end and movable longitudinally thereof, said collar member when moving in a direction away from said terminus contacting said tapered peripheral segment and effecting contraction of said contractible end portion, an elongated element disposed within the interior of said collet and movable longitudinally thereof, said elongated element when moved in a direction toward the terminus of said collet contacting said interior tapered segment and effecting return of the contractible end portion to its normal size and shape, and means interconnecting said collar member and elongated element for effecting unitary movement thereof relative to said contractible end portion.

10. An apparatus for sealing an indented portion of a cover formed of deformable sheet material within a container opening of a given size and shape subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising an elongated sleeve-like collet having one end portion thereof provided with a restrictive opening, said collet end portion being contractible and being positionable within or withdrawable from the indented cover portion only when said end portion is contracted from its normal size and shape which is larger than the size and shape of the container opening, the terminus of said contractible end portion being provided with a peripheral flange for disposition within the indented cover portion adjacent the concealed surface of the circumjacent portion of the container opening, said collet terminus being provided with a plurality of narrow open end slots extending longitudinally therefrom to a predetermined distance from said terminus, a collar member encompassing the outer periphery of said contractible end portion and being movable longitudinally thereof, said collar member when moving longitudinally of said contractible end portion in a direction away from said terminus contacting the outer periphery of said collet and effecting contraction of said terminus, and an elongated core element disposed within the interior of said collet and movable axially thereof in unison with said collar member, said core element, when moved in a direction toward said restricted collet opening contacting the interior surface of said collet and effecting return of the contractible end portion to its normal size and shape.

11. The process of sealing an indented portion of a cover formed of deformable sheet material within an aperture subsequent to the indented cover portion being inserted within such an aperture, which process consists in providing an elongated structure having a contractible end portion comprising a plurality of longitudinally disposed finger members, separated by slots which open through one end of the structure, said finger members terminating in outwardly extending flange portions which, together with said slots, initially define a complete annulus, substantially similar in outline to that of the aperture, but of larger size, moving the fingers inwardly to reduce the size of said flanged annulus to one which is smaller than that of the aperture, thereby reducing the width of the slots, locating said flanged annulus within the indented cover portion while in reduced size, moving the fingers outwardly to increase the size of the said flanged annulus toward initial size whereby said indented cover portion is expanded and portions thereof are caused snugly to engage the peripheral edge portion of the sheet material defining the aperture, restricting the size of the said flanged annulus to one permitting withdrawal thereof from the indented cover, and withdrawing the flanged annulus from the sealed indented cover.

12. The process set forth in claim 11 in which the aperture and the cover indentation are both of circular form and in which the flanged portions of the finger members are of such arcuate shape that as initially formed and positioned they define an interrupted circle, the radius of which is of the order of the radius of the circle which the flanged parts are to occupy when expanded within the cover indentation to effect the sealing operation.

13. The process of sealing apertures in a plurality of sheets of material, in which an indented cover formed of deformable sheet material is disposed within each aperture prior to the sealing operation, which process consists in providing an elongated structure having a contractible end portion comprising a plurality of longitudinally disposed finger members, separated by slots which open through one end of the structure, said finger members terminating in outwardly extending flange portions which together with said slots defining a complete annulus, similar in outline to that of the aperture, but of larger size, initially moving the fingers inwardly to reduce the size of said flanged annulus to one which is smaller than that of the aperture, locating said flanged annulus within the indented cover portion in the first sheet to be treated while in said reduced size, moving the fingers outwardly to increase the size of the said flanged annulus toward initial size whereby said indented cover portion is expanded and portions thereof are caused snugly to engage the peripheral edge portion of the material defining the aperture, restricting the size of the said flanged annulus to one permitting withdrawal of the flanged annulus from the indented cover, causing withdrawal of the annulus from the indented cover, and sealing additional covers

by moving the flanged end portion into and out of position with respect to the indentations in the covers whilst in contracted condition, and wherein the steps of both contracting and expanding the flanged fingered end portion obtain only whilst such end portion is positioned within the confines of the cover indentation.

14. The process set forth in claim 13, in which the aperture and cover indentation are both of circular form and in which the flanged portions of the finger members are of such arcuate shape that as initially formed and positioned they define an interrupted circle, the radius of which is of the order of the radius of the circle which the flanged parts are to occupy when expanded within the cover indentation to effect the sealing operation.

15. An apparatus for sealingly uniting an indented cover formed of deformable sheet material within a container opening of a given size and shape subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising in combination, means for supporting a container with the end having the positioned cover portion exposed, an elongated tubular unitary structure having a slotted contractible end portion of a normal size and shape larger than the size of the indentation in the cover, means for contracting the contractible end portion of said tubular unitary structure to such reduced size as will permit disposition of the lower end thereof within the indentation in said cover, means for causing relative movement between the container supporting means and said unitary structure to dispose the lowermost end portion of the contractible end portion within said cover indentation, means for expanding said contractible end portion to effect displacement of portions of said cover member radially outward to effect sealing engagement of the cover portion and contiguous container material, the means for contracting said end portion being again actuated after effecting such sealing engagement of the cover with the container, and means for causing relative movement of said container supporting means and said unitary structure to effect relative separation of the end of the unitary structure from the indentation in said cover.

16. The process of sealing an indented portion of a cover formed of deformable sheet material within an aperture in a sheet of material subsequent to the indented cover portion being inserted within such an aperture, which process comprises providing a unitary structure having a slotted contractible end portion of a normal size and shape which is at least larger than the size of the inndentation in the cover portion, initially contracting the contractible end portion of said structure to such smaller size as will permit same to be accommodated within the indentation of the cover member to be sealed and after the structure has once been initially contracted to said smaller size thereafter for the sealing of each cover in a sheet of material locating part of said contractible end portion within said indentation so that a part is disposed axially on opposite sides of said aperture, expanding the contractible member toward normal size and shape, thereby enlarging the indentation at least in part so that portions of said cover snugly engage the opposite sides of the circumjacent marginal portion of the sheet material defining the aperture, contracting said contractible end portion to a size sufficiently small to permit withdrawal thereof from the indentation, and causing sufficient relative movement between the indented cover portion and said contractible end portion, while the latter is in contracted condition, to relocate the same outwardly of the indentation.

17. The process of sealing an indented portion of a cover formed of deformable sheet material within aperture in a sheet of material subsequent to the indented cover portion being inserted within such an aperture, which process comprises providing a unitary structure having a slotted contractible end portion of a normal size and shape which is larger than the size of the aperture in the sheet material, initially contracting the contractible end portion of said structure to such smaller size as will permit same to be accommodated within the indentation of the cover member to be sealed and after the structure has once been initially contracted to said smaller size thereafter for the sealing of each cover in a sheet of material locating part of said contractible end portion within said indentation so that a part is disposed axially on opposite sides of said aperture, expanding the contractible member toward normal size and shape, thereby enlarging the indentation at least in part so that portions of said cover snugly engage the opposite sides of the circumjacent marginal portion of the sheet material defining the aperture, contracting said contractible end portion to a size sufficiently small to permit withdrawal thereof from the indentation, and causing sufficient relative movement between the indented cover portion and said contractible end portion, while the latter is in contracted condition, to relocate the same outwardly of the indentation.

18. The process of sealing an indented portion of a cover formed of deformable sheet material within an aperture in a sheet of material subsequent to the indented cover portion being inserted within such an aperture, which process comprises providing a unitary structure having a slotted contractible end portion of a normal size and shape which is at least larger than the size of the indentation in the cover portion, said end portion being also provided with a peripheral groove, initially contracting the contractible end portion of said structure to such smaller size as will permit same to be accommodated within the indentation of the cover member to be sealed and after the structure has once been initially contracted to such smaller size thereafter for the sealing of each cover in a sheet of material locating part of said contractible end portion within said indentation so that said peripheral groove is disposed axially on opposite sides of said aperture and with a portion of the material defining the groove contacting the outer surface of the cover, expanding the contractible member toward normal size and shape, thereby causing peripheral portions of said indentation to be conformed to said groove and to be crimped peripherally over the opposite sides of the circumjacent marginal portion of the sheet material defining the aperture, contracting said contractible end portion to a size sufficiently small to permit withdrawal thereof from the indentation, and causing sufficient relative movement between the indented cover portion and said contractible end portion, while the latter is in contracted condition, to relocate the same outwardly of the indentation.

19. An apparatus for sealing an indented portion of a cover formed of deformable sheet material within a container opening subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising first unitary means having a contractible slotted end portion for disposition within the indentation of the indented cover portion, said contractible slotted end portion when in normal relation having a size larger than the size of the indentation with which it is to be used, second means for effecting contraction of said contractible end portion from said normal relation to such smaller one as will permit said end portion to be accommodated in said indentation and means for expanding the contracted end portion toward normal relation to effect sealing of the indented portion of the cover in a container opening.

20. The combination set forth in claim 19 in which said contractible end portion of said first unitary means is provided with a peripheral groove spaced from the tip of the contractible end portion for accommodating that peripheral portion of the indented cover wall bounded by the container opening.

21. An apparatus for sealing an indented portion of a cover formed of deformable sheet material within a

container opening subsequent to the indented cover portion being inserted within such container opening, said apparatus comprising first unitary means having a contractible slotted end portion for disposition within the indentation of the indented cover portion, said contractible slotted end portion, when in normal relation having a size larger than the size of the indentation with which it is to be used, second means for effecting contraction of said contractible end portion from said normal relation to such smaller size as will permit said end portion to be accommodated in said indentation, means for causing sufficient relative movement between a container with the indented cover portion inserted in the aperture therein and the contractible slotted end portion whilst in contracted relation to locate the said end portion operatively within the indentation for sealing purposes and to locate the end portion externally of the indentation subsequent to the sealing operation and means for expanding the contracted slotted end portion whilst operatively located within the indentation for sealing purposes.

References Cited in the file of this patent

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,866,305

December 30, 1958

Fred E. Ullman et al.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 27, for "packing" read -- packaging --; line 46, for "engage" read -- engaged --; lines 47 and 48, for "expension" read -- expansion --; column 2, line 1, for "intended" read -- indented --; line 5, for "Encompasing" read -- Encompassing --; column 3, line 10, before "head" strike out "the"; line 17, strike out "of", first occurrence; line 22, for "Plungers" read --Plunger --; column 5, line 15, for "cencealed" read -- concealed --; column 8, line 61, for "defining" read -- define --; column 9, line 49, for "inndentation" read -- indentation --; line 70, after "within" insert -- an --.

Signed and sealed this 21st day of April 1959.

(SEAL)

Attest:

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