April 22, 1947. C. H. BARR 2,419,475

SEALING MACHINE

Filed June 12, 1942 4 Sheets-Sheet 1

Fig. 1

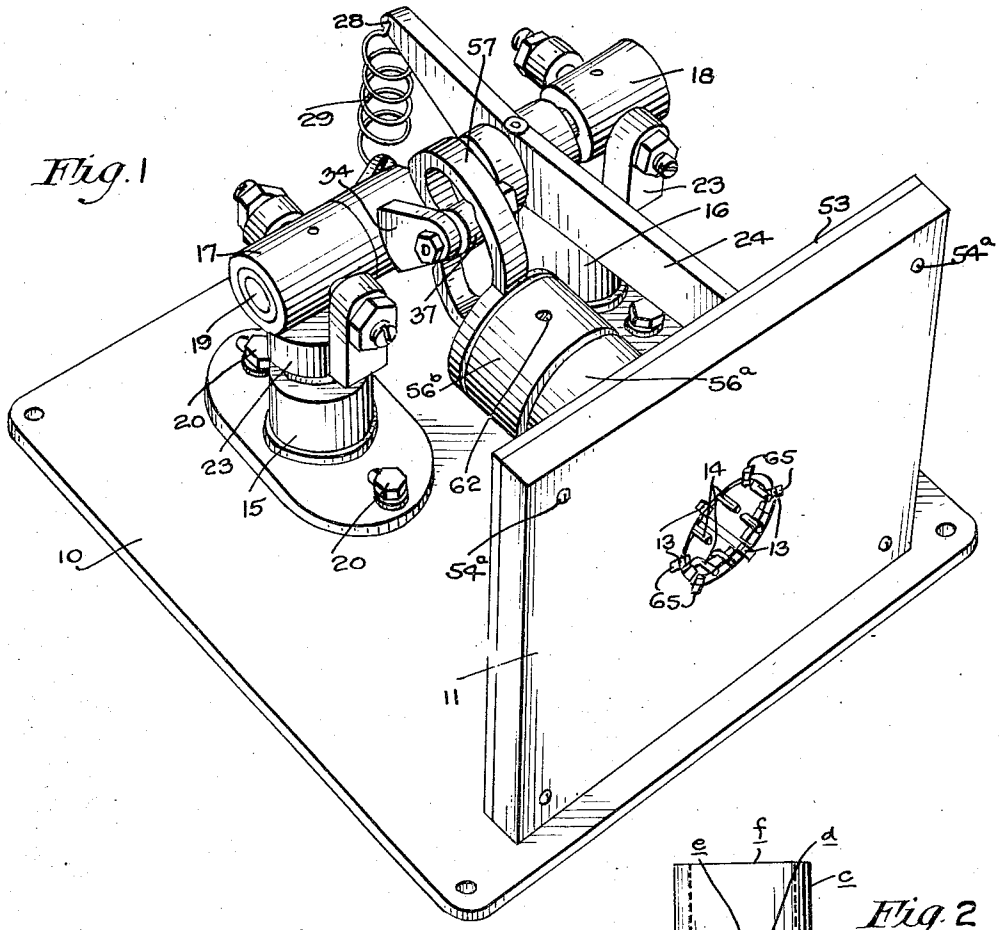


Fig. 2

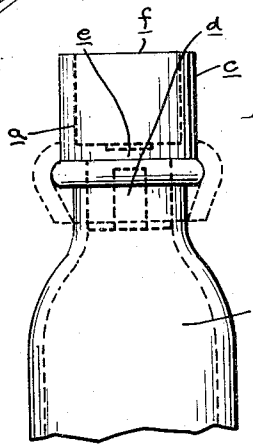


Fig. 3

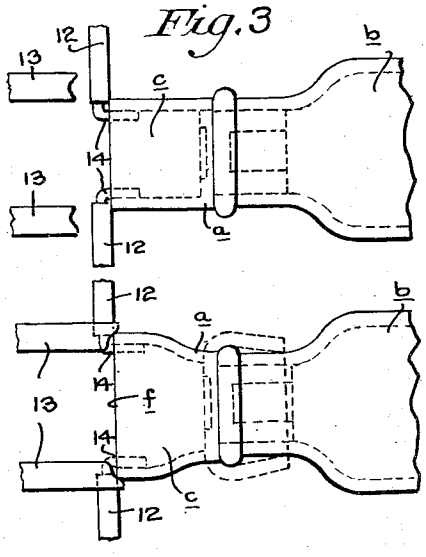


Fig. 4

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SEALING MACHINE

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Fig. 5

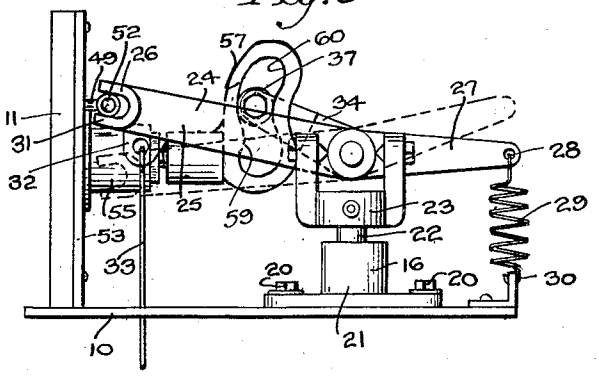


Fig. 6

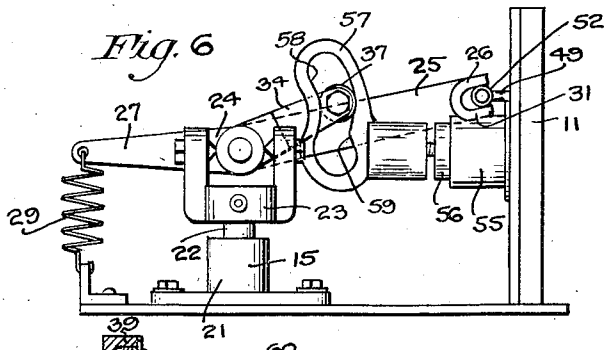


Fig. 19

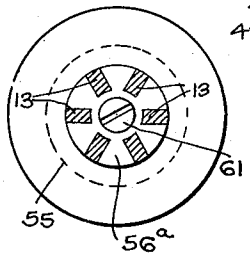


Fig. 7

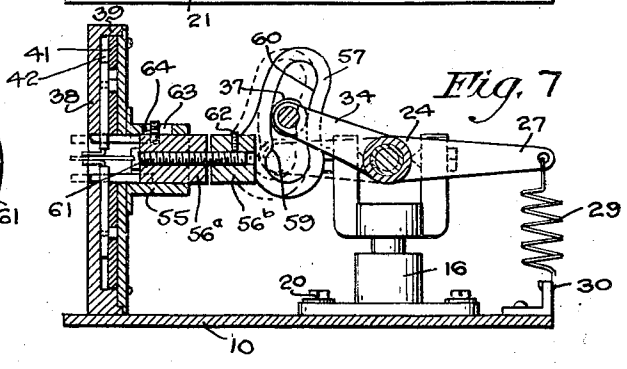
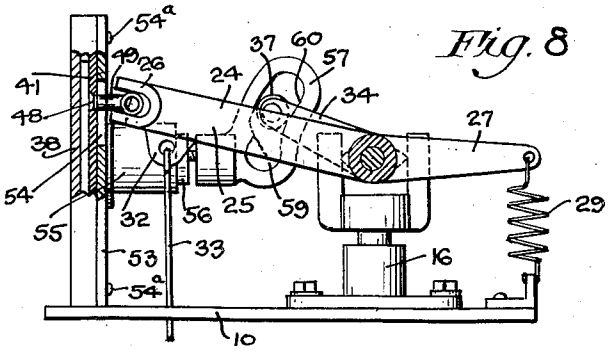


Fig. 8



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Fig. 9

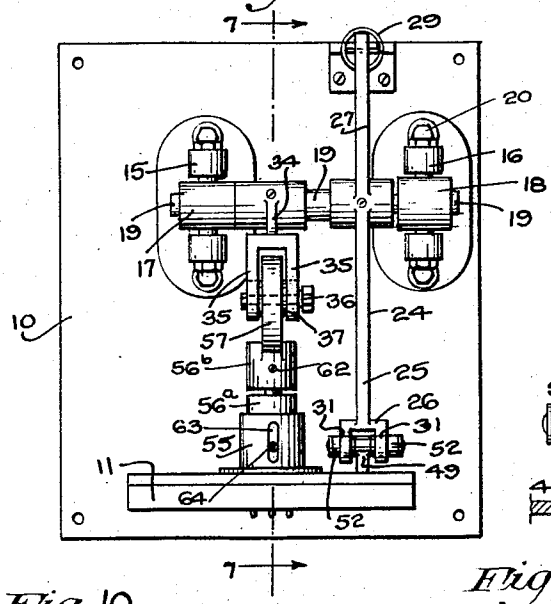


Fig. 13

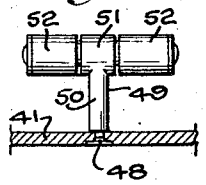


Fig. 10

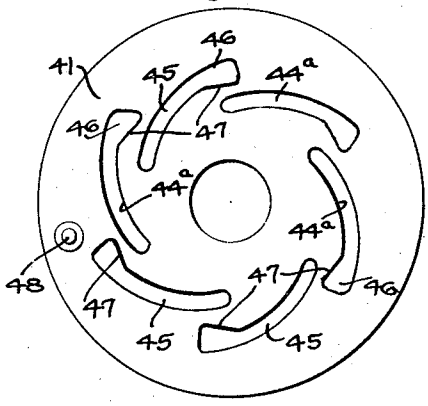


Fig. 11

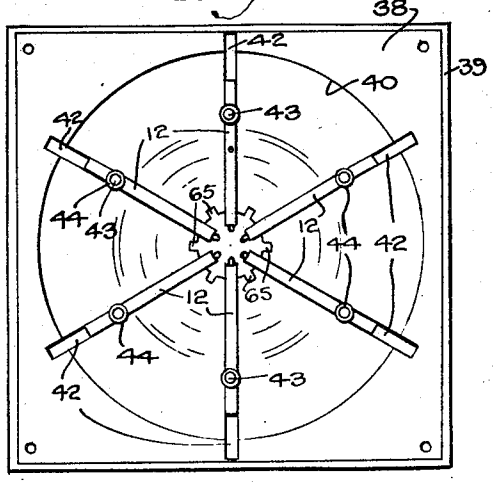
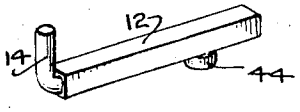


Fig. 12



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Fig. 17

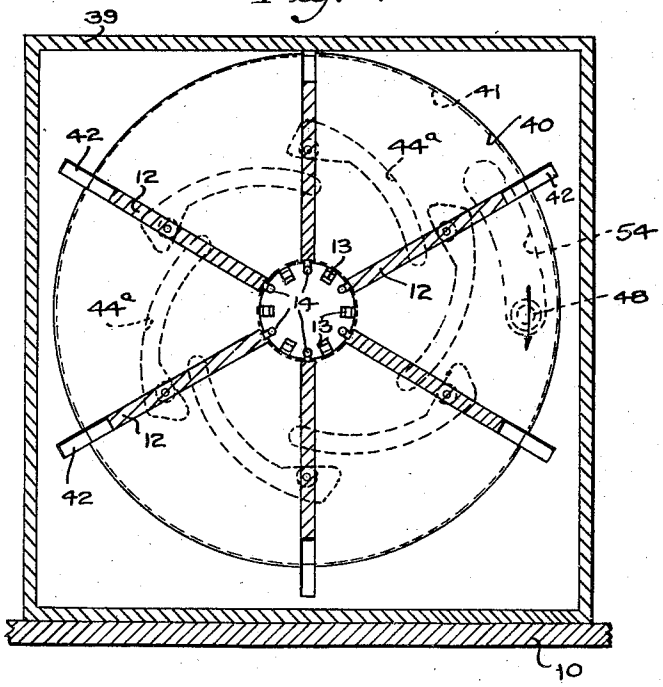


Fig. 15

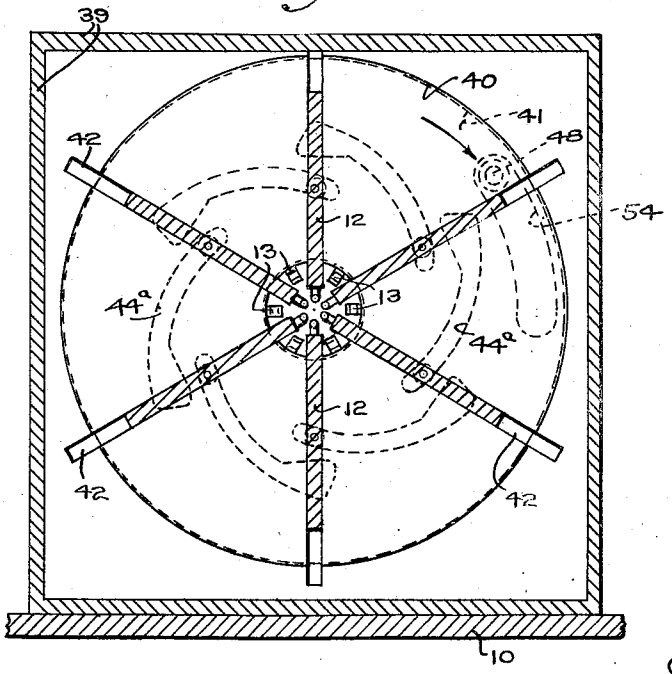


Fig. 16

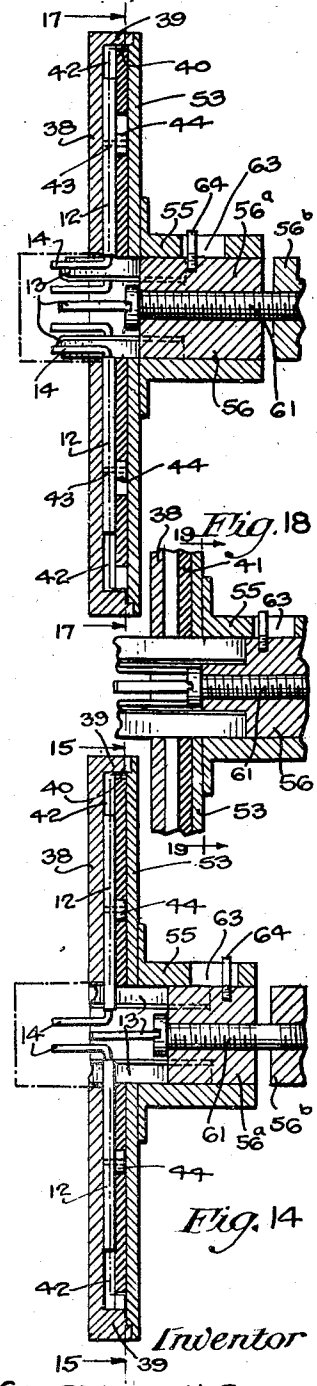


Fig. 18

Fig. 14

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UNITED STATES PATENT OFFICE

2,419,475

SEALING MACHINE

Courtland H. Barr, Glenolden, Pa., assignor, by mesne assignments, to Essdee Patents, Inc., a corporation of Maryland

Application June 12, 1942, Serial No. 446,793

7 Claims. (Cl. 226—89)

1

This invention relates generally to apparatus for sealing containers and more particularly to an improved apparatus for facilitating the application of the so-called double seal type stopper to the open end of the container whereby to effectually seal the same, this type stopper being generally of the form having a main body member which is adapted to fit snugly in the neck of the container and an annular flange or skirt, formed integrally with the body member, which is adapted to snugly embrace the external surface of the neck. Such a stopper is shown in the prior patent to H. K. Mulford, No. 1,616,274, February 1, 1927, to which reference is herein made.

Among the principal objects of the present invention is to provide an apparatus which is operative automatically to turn the annular flange or skirt from its initial position extending axially outwardly of the stopper body into a position wherein it is concentric with said body and sungly embraces the outer periphery of the neck portion of the container.

A further object is to provide an apparatus of the character and for the purpose described which is so operative that it eliminates the need for the operator to touch or otherwise handle the neck portion of the container, in consequence of which the mouth of the container and the immediately adjacent surfaces of the container are effectively sealed by the annular flange or skirt part of the stopper against contaminating agencies.

Still other objects of the invention are to provide an apparatus of the character described which is readily and efficiently operable to apply the sealing flange of the stopper in embracing relation with respect to the neck of the container, which is of simple and yet rugged design and construction, and which greatly reduces the time and labor involved in sealing containers with the double seal type of stopper.

Other objects of the invention and economies and advantages resulting therefrom will be apparent more fully hereinafter, it being understood that the present invention consists substantially in the combination, construction, location and relative arrangement of parts, all as described more fully hereinafter, as shown in the accompanying drawings and as finally pointed out in the appended claims. In the accompanying drawings, which are illustrative of a preferred construction of an apparatus embodying the general principles of the present invention—

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Figure 1 is a perspective view of the apparatus constructed in accordance with and embodying the principles of the present invention;

Figure 2 is a partial view in elevation of a container with the double seal type stopper in position preliminarily to turning the annular flange or skirt part thereof over and about the outer surface of the neck portion of the container;

Figure 3 is a view illustrating the application of the stoppered container of Figure 2 to the apparatus preliminarily to operation of the apparatus;

Figure 4 is a view similar to Figure 3, but showing the annular flange or skirt of the stopper distended preliminarily to turning it inside out and into the dotted line positions shown in Figures 2 and 4;

Figure 5 is a side elevational view of the apparatus;

Figure 6 is an opposite side elevational view thereof;

Figure 7 is a longitudinal sectional view taken on the line 7—7 of Figure 9;

Figure 8 is a view similar to Figure 5 with certain parts thereof shown in section;

Figure 9 is a top plan view of the apparatus;

Figure 10 is an elevational view of the oscillatable camming plate;

Figure 11 is a rear elevational view of the front mounting plate for the camming plate of Figure 10;

Figure 12 is a perspective view of one of the radially movable arms;

Figure 13 is a view of the connector between the operating lever of the apparatus and the oscillatable camming plate;

Figure 14 is a view of the forward part of the apparatus showing the stopper-engaging elements thereof in normal inoperative position;

Figure 15 is a view taken on the line 15—15 of Figure 14;

Figure 16 is a view similar to Figure 14, but showing the stopper-engaging elements moved into full, operative position;

Figure 17 is a view taken on the line 17—17 of Figure 16;

Figure 18 is a sectional view showing the axially movable pusher elements in fully extended forward position; and

Figure 19 is a sectional view taken on the line 19—19 of Figure 18.

Referring now to the drawings and more particularly to Figure 1 which shows most comprehensively the apparatus of the present invention,

it will be observed that this apparatus generally consists of a base 10 having at its forward end a vertically disposed plate assembly 11 which operatively supports those elements of the apparatus which are employed to engage, distend and turn over the external sealing skirt of the double seal type stopper *a* for the container *b*. These elements, to which detailed reference will be made hereinafter, comprise two separate and distinct groups respectively composed of a plurality of circumferentially spaced, radially movable members 12 and a plurality of similarly spaced, axially movable members 13. Preferably, the several members 12 are arranged in alternating relation with respect to the several members 13 about a common central axis, all of the members of each group being operative in unison and in such manner that one group of members is operative in advance of the second group.

Thus, by reference to Figures 3 and 4, it will be observed that the first group of radially movable arms 12, each of which latter is provided at its inner end with a finger 14 extending frontally of the plate assembly 11, is adapted initially to grasp the outer extremity of the axially extending skirt *c* of the container stopper *a* by way of said circumferentially spaced fingers 14 and then, upon radial outward movement of said arms 12, is adapted to distend the skirt of the stopper into the stretched condition shown in Figure 4. When the skirt *a* of the stopper has been distended to the desired extent and while held so distended by the fingers 14 of the radially shifted arms 12, the second group of axially movable members 13 then become operative to engage the free edge of the distended skirt *c* (see Figure 4) and by pushing against the same cause it to turn over and snap into the dotted line position shown in Figure 4, in which latter position the skirt *c* of the stopper snugly embraces the neck of the container *b*. Inasmuch as the double seal type of stopper is now more or less well known in the art, it is not thought necessary to describe herein its construction or function in detail, although it may be well to point out that for certain uses it is provided with a central recess *d* extending upwardly from its lower end to provide a self-sealing perforable web *e* which may be readily pierced by means of a hypodermic syringe or needle for withdrawing the solution sealed in the container. The stopper is, of course, formed of a suitable elastic material, such as rubber. The initial insertion of the stopper *c* into the neck of the container, as shown in Figure 2, may be effected in a suitable manner, the apparatus of the present invention being designed to turn the axially extending skirt *a* of the stopper into the dotted line position shown in Figure 2 merely upon application of the preliminarily stoppered container to the apparatus and operation of the latter in the manner and by the means now to be described in more or less detail.

As appears in Figures 1 and 5 to 9, inclusive, the mechanism for actuating the two groups of members 12 and 13 in accordance with a predetermined sequence of operations primarily is mounted upon the base 10 of the apparatus and includes a pair of laterally spaced journal boxes or supports 15 and 16 respectively provided with fixed bearing members 17 and 18 between which is journaled a transversely extending shaft 19. The supports 15 and 16 are each securely fixed to the base 10 by suitable bolts 20 and are preferably of such construction that they may be individually adjusted vertically and angularly

with respect to their vertical axes. To this end, the supports each include a lower fixed part 21 having a vertically extending bore in which is fitted the circular shank 22 of a yoke member 23 constituting the upper part of the support. Suitably carried by the yoke members 23—23 are the fixed bearing members 17 and 18 already referred to.

Non-rotatably secured to the transversely extending shaft 19 is a main actuating lever 24, this lever having a forwardly extending arm 25 terminating in a clevis 26 and a rearwardly extending arm 27, the rear end of which is secured, as at 28, to the upper end of an extension spring 29. The lower end of this spring 29 is suitably secured, as at 30, to a fixed part or element of the base 10. The clevis 26 is shaped in horizontal plan in the form of a yoke having the laterally spaced parallel elements 31—31, each of which, in side view, is of generally C shape, as appear most clearly in Figures 5, 6 and 8. Formed as an integral part of the forward arm 25 of the lever is a perforated lug 32 to which is connected the upper end of an operating rod 33, the lower end of this rod being in turn connected to a suitably operated foot-pedal (not shown). It will be understood that the arrangement is such that as the operating rod is drawn downwardly, the lever 24 will rotate about its shaft against the restraining action of the spring 29 from the full line position shown in Figure 5 to the dotted line position shown therein, and that upon release of the downward pull on the operating rod 33, the lever will be retracted by the spring 29 to its original full line position.

Also non-rotatably secured to the transversely extending shaft 19 in laterally spaced relation to the main actuating lever 24 is a second lever 34, the free outer extremity of which is in the form of a yoke having spaced parallel arms 35—35. These arms 35—35 of the yoke lever 34 are respectively provided with alined openings through which is projected the shaft 36 for a cam roller 37. This cam roller 37 is thus free to rotate about its supporting shaft 36 at the same time that it is restrained against axial movement by the arms 35—35 of the yoke lever. It will be noted that the levers 24 and 34 are angularly displaced relatively to each other and with respect to the axis of the shaft 19 upon which they are non-rotatably secured for a reason which will be apparent hereinafter, it being further observed that the said shafts 24 and 34 operate in unison to respectively actuate the radially movable members 12 and the axially movable members 13 hereinbefore referred to.

The means employed for effecting actuation of these members 12 and 13 upon operation of their respective operating shafts 24 and 34 will now be described, it being observed in this connection that said means is generally supported by and is operatively associated with the vertically disposed front plate assembly 11 of the apparatus. As most clearly appears in Figures 10, 11 and 14 to 17, this plate assembly 11 includes a front plate 38 which is provided about its perimetral edge with a rearwardly extending flange 39. The rear face of this plate 38 is provided with a circular recess 40 (see Figure 11) and fitted in this recess 40 is a circular cam plate 41 (see Figure 10). The recess 40 is of a depth substantially equal to the thickness of the cam plate 41 so that when the parts 38 and 41 are assembled, their rear surfaces are flush with one another. Also provided in the rear face of the front plate 38 are a plu-

rality of uniformly spaced radially extending grooves or slots 42, these slots being cut into the rear face of the plate 38 to a depth beyond the flat surface of the circular recess 40. Preferably, as shown in Figure 11, the slots 42 extend radially outward beyond the circumference of the recess 40. Fitted into each of the said slots 42 for sliding movement therein in a direction radially from the center of the circular recess 40 is one of the members 12 hereinbefore referred to. When the several members 12 are respectively disposed in their receiving grooves or slots 42, their outer surfaces are flush with the flat surface of the circular recess 40.

Each of the radially movable members 12 is provided with an outwardly extending stub shaft 43 upon which a roller 44 is rotatably journaled. As most clearly appears in Figure 11, these rollers 44 are equidistantly spaced from the inner extremities of the members 12 and are adapted to be respectively received in the cam slots 44a formed in the cam plate 41. These cam slots are of the shape and relative arrangement most clearly shown in Figure 10, wherein it will be observed that each of said slots is provided with a relatively long arcuate part 45 of substantially uniform width and with a shorter part 46 of gradually increasing width. The longer parts 45 of the cam slots are eccentrically disposed with reference to the center of the cam plate 41, while the inner edges 47 of the shorter portions 46 of said slots are substantially concentric with reference to said center. Thus, it will be apparent that when the cam plate 41 is properly fitted upon and to the assembly shown in Figure 11 with the rollers 44 of the radially movable members 12 respectively fitted in the cam slots 44a, upon rotation of the cam plate 41 relatively to the fixed plate 38, the cam slots 45 acting upon the rollers 44 will cause the latter, and consequently the members 12, to shift in a radial direction. The direction of shifting will depend, of course, upon the direction of rotation of the cam plate 41.

This latter action is illustrated most clearly in Figures 14 to 17 wherein it will be observed that when the cam plate 41 is at one limit of its permitted movement relatively to the fixed plate 38, as shown in Figure 15, the cam rollers 44 are respectively in those ends of the cam slots 45 which are closest to the center of the cam plate. Consequently, the radially shiftable members 12 are then retracted into their innermost positions. However, when the cam plate 41 is rotated in the direction indicated by the arrow from the position shown in Figure 15 to the position shown in Figure 17, the cam slots 45 acting upon the cam rollers 44 will cause the latter to be radially shifted outwardly and away from the center of the cam plate to their outermost position indicated in Figure 17. In this latter position, the members 12 will have been shifted radially outwardly to their outermost limits of movement.

This rotation of the cam plate 41 in the one direction or the other is effected by means of the main actuating lever 24, the forward free end of which is connected, in the manner and in the means now to be described, to the said cam plate 41. Secured to the latter by means of a swivel connection, as at 48, is a T-shaped connector member 49 (see Figure 13). By reason of the swivel connection 48, the stem 50 of the connector member 49 is free to oscillate about its axis with respect to the cam plate 41, in consequence of which the transversely extending head 51 of

the connector member may at all times assume a horizontally extending position regardless of the position assumed by the cam plate 41 at any point during its rotation in one direction or the other. The said transversely extending head 51 of the connector member 49 is provided upon its oppositely extending branches with freely rotatable rollers 52—52, these latter being respectively received within the C shaped elements 31—31 of the yoke clevis 26 of the lever 24. As quite clearly appears in Figures 5, 6, 8 and 9, the rollers 52—52 of the connector member 49 are each of such length that they project beyond the opposite sides of the C shaped element 31 in which it is more or less loosely received, and it will also be observed that these C shaped elements 31 are each of such depth as compared with the diameters of the rollers 52—52 as to permit the clevis end of the lever 24 to move forwardly and rearwardly relatively to said rollers. The connector member 49 thus constitutes in effect a form of universal joint or coupling between the main actuating lever 24 and the cam plate 41 to facilitate rotation of the latter in one direction or the other depending upon the direction in which said lever is shifted about its axis. It will be apparent, therefore, that when the clevis end of the lever 24 is depressed, as by exerting a downward pull on the operating rod 33, the cam plate 41 will be oscillated in the direction of the arrow shown in Figure 15 from the initial position shown in said Figure 15 to the final position shown in Figure 17, and it will be returned from said final position to said initial position when the lever 24 is retracted into its original position under the influence of the spring 29 acting thereon.

In order to maintain the cam plate 41 in its operative position within the recessed frontal plate 38, a back plate 53 is employed, this back plate being closely fitted into the marginal flange 39 of the front plate 38 and being secured to the latter by means of the securing bolts 54a. The cam plate 41 and the radially shiftable members 12 are thus compactly housed between the front and back plates 38 and 53. In order to provide for the necessary free movement of the rearwardly extending swivel stem 50 of the connector member 49, the back plate 53 is provided with an arcuate slot 54 (see Figures 8, 15 and 17) in the region of the movement of said swivel stem 50. Preferably, this slot is of sufficient size to permit the back plate 53, when disconnected from the front plate 38, to be freely slipped over the transversely extending head 51 of the coupling member.

As most clearly appears in Figures 14, 16 and 18, the plates 38, 41 and 53 are each centrally apertured to provide a common bore extending through the front assembly from front to rear thereof. Secured to the back plate 53, in axial alinement with the central bore extending through the assembled plates 38, 41 and 53, is a guide sleeve 55 within which is slidably fitted the supporting block 56 for the axially shiftable pusher members 13. These members 13 may be secured in any suitable manner to the block 56 so that they extend forwardly thereof and are uniformly spaced circumferentially about the central axis of the axially shiftable supporting block 56. This axis is, of course, coincident with the central axis of the cam plate 41. Preferably, the pusher members 13 are secured to their supporting block 56 by setting the inner ends thereof respectively in circumferentially spaced slots or

grooves suitably formed in the forward portion of the block 56, as shown most clearly in Figures 14, 16 and 18.

The supporting block 56 is provided at its rear end with a cam member 57 in the form of a closed loop of the general shape shown most clearly in Figures 5 to 8, this cam member being operatively associated with the cam roller 37 previously referred to and described as being journaled upon the free end of the yoke lever 34. It will be understood, of course, that the internal edge 58 of the looped shaped cam member 57 constitutes the camming track which is engaged by the cam roller 37, and it will be observed in this connection that this camming track is provided with a high spot 59 on the forward side of the cam member. The general configuration of the cam track 58 is such that when the yoke lever 34 is in its raised, full line position shown in Figures 5 to 8, the cam roller 37 thereof presses against the rear portion 60 of the cam track to draw the cam member 57 and the block 56 operatively associated therewith to the rearmost position shown. In this rearmost position of the block 56, the pusher members 13 will be in their fully retracted position shown in Figure 14.

When, however, the yoke lever 34 is depressed, which action takes place concurrently with depression of the main actuating lever 24, the cam roller 37 rides over the high spot 59 of the cam track 58 and causes the cam member 57 and its associated block 56 to be shifted axially forward within the supporting sleeve 55 for the said block. In this latter position of the block 56, the pusher members 13, of course, will have been shifted into their most forward position shown in Figure 16.

In order to provide for positional adjustment of the members 13 in relation to the vertical plane of the front plate 38, the supporting block 56 for the members 13 may be formed of two parts which are axially adjustable with respect to each other. Thus, as shown in the drawings, the said supporting block for the members 13 may be made of the two parts 56^a and 56^b which are secured together for relative axial adjustment by means of a screw 61, the part 56^b being locked in axially adjusted position by means of a suitable set screw 62. In order to preclude angular displacement of the axially shiftable block 56 within its supporting sleeve 55, the latter may be provided with an elongated slot 63 therein into which projects a guide pin 64 fixed in the block 56. This guide pin 64 and its cooperating slot 63 are so related that they permit the block 56 to shift axially within its sleeve 55 within the limits determined by the coacting cam roller 37 and the cam member 57, while preventing the block 56 from rotating about its axis. Thus, the parts described are all maintained in their proper operating alinement. In order to further guide the pusher members 13 in their shifting movement axially with respect to the vertical plate assembly 11, the front plate 38 of said assembly is provided with a series of notches 65 extending radially outwardly of the central aperture in said plate. These notches 65 are uniformly spaced about the circumference of said central opening and are respectively so located with respect to the radially shiftable members 12 that each notch is located between an adjoining pair of said radially shiftable members. Inasmuch as each notch 65 slidably receives and guides one of the axially shiftable pusher members 13, it will be apparent that the latter are at all times maintained in proper alternating relation with respect to the radially shiftable members 12, thereby insuring against any interference in operation between the two groups of members 12 and 13.

As has been previously mentioned, the levers 24 and 34 are commonly keyed to the shaft 19, in consequence of which actuation of the lever 24 effects a corresponding, concurrent actuation of the lever 34. However, by angularly displacing these levers 24 and 34 with reference to their common axis of rotation and by properly relating the free ends thereof respectively to the cam plate 41 and the cam member 57, it will be apparent that these said levers may be caused to actuate the two groups of members 12 and 13 in a predetermined time relation. In the apparatus of the present invention, the parts are relatively so adjusted and arranged that although both levers 24 and 34 operate in unison, operation of the lever 24 immediately causes the radially shiftable arms to move from their innermost to their outermost positions, while corresponding operation of the lever 34 results in axial forward shifting of the members 13 only after the radially shiftable members 12 have closely approached or are at their outermost limits of movement. This proper timing in operation of the members 12 and 13 is quite essential to successful operation of the present apparatus because the axially shiftable pusher members 13 should not come into operation until after full operation of the radially shiftable members 12. In order to permit some continued axial movement of the pusher members 13 forwardly of the front plate assembly 11 after the radially shiftable members 12 have assumed their final outermost positions, the cam slots 45 in the cam plate 41 are respectively provided in their outer portions with the enlarged parts 46 having the concentric inner edges 47 hereinbefore referred to. By reason of this form of the cam slots 45, it will be apparent that when the cam plate 41 is rotated to present the said concentric edge portions 47 in engagement with the cam rollers 44 of the radially shiftable members 12, continued rotation of the cam plate 41 may be permitted to the extent afforded by the lengths of said concentric edge portions 47 without changing the final outward positions of the members 12. In other words, the outer portions 46 of the cam slots 45 in the cam plate 41 provide a dwell period for the radially shiftable members 12 during which the main actuating lever 24 may move somewhat beyond the position necessary to cause said members 12 to reach their final outermost limits. During this same dwell period, the lever 34 may continue to exert a forward pressure on the cam member 57 to insure continued movement of the pusher members 13 to the maximum permissible degree.

In the operation of the apparatus of the present invention, it will be understood, of course, that the apparatus will be set initially in the condition shown in Figures 5 to 8 and 15. In this condition of the apparatus, the radially shiftable members 12 will be in their innermost positions with the axially extending fingers 14 thereof in the closely associated relation shown most clearly in Figure 15. At the same time, the axially shiftable pusher members 13 will be in their fully retracted position shown most clearly in Figure 14 and in which position the forward ends of these members are disposed substantially flush with the front surface of the vertically extending plate assembly 11. In this condition of the apparatus, a stoppered container such as shown in Figure 2, is so applied against the front plate assembly 11

that the annular wall of the skirt *c* of the stopper *a* surrounds the fingers 14 while the peripheral edge *f* of the stopper is in registry with the pusher members 13. This initial position of the stoppered container in relation to the members 12 and 13 of the apparatus is shown most clearly in Figure 3.

Having so initially applied the stoppered container to the apparatus, the operator holds it in the position just described and at the same time actuates the lever 24 to effect rotation of the camming plate 41 and corresponding outward shifting of the radially shiftable members 12. As these latter members are shifted radially outwardly, the fingers 14 thereof engage the annular wall of the stopper skirt *c* and stretch it into the distended condition shown in Figure 4. When the said skirt *c* of the stopper has been fully extended in the manner just described, the axially shiftable pusher members 13 then come into operation to engage the peripheral edge *f* of the stopper skirt whereby to reversely turn the skirt into the dotted line position shown in Figures 2 and 4. The whole operation just described is substantially automatic and is rapidly effected upon the operator firmly pressing the preliminarily stoppered container in position against the front plate assembly 11 of the apparatus simultaneously as he actuates the lever 24 in the manner described.

It will be understood, of course, that the apparatus of the present invention is susceptible of various changes and modifications which may be made from time to time without departing from the general principles or real spirit of the invention, and it is accordingly intended to claim the same broadly, as well as specifically, as indicated in the appended claims.

What is claimed as new and useful is:

1. An apparatus for turning the skirt of a double seal type stopper about the neck of a container into which the body of said stopper is preliminarily inserted with its skirt extending axially outwardly from the neck of the container, comprising a centrally apertured plate assembly against which the stoppered container is adapted to be firmly held, radially shiftable elements projecting axially forward of the central aperture in said plate assembly for disposition interiorly of the open end of said skirt, means for shifting said elements only radially outward from the axis of said stopper skirt to internally engage the latter and expand it to a predetermined limit, and means projectable through said central aperture of the plate assembly and shiftable relatively to said radially shiftable elements to engage the peripheral edge of the expanded skirt at circumferentially spaced points thereof to reversely turn the same into embracing relation with the outer surface of the neck of the container.

2. An apparatus for turning the skirt of a double seal type stopper about the neck of a container into which the body of said stopper is preliminarily inserted with its skirt extending axially outwardly from the neck of the container, comprising a plurality of relatively shiftable means operable sequentially to first engage a freely extending end of said skirt and stretch the same to a diameter exceeding the diameter of the container neck, and to second engage the free circumferential edge of the distended skirt and exert an axial pressure thereagainst whereby to reversely turn the skirt into embracing relation with respect to the neck of the container, said first-mentioned means including a rotatable cam plate having a plurality of cam slots formed therein, a plurality of radially shiftable arms having rollers respectively fitted in said slots and means for confining each of said arms to rectilinear movement, whereby upon rotation of said cam plate in one direction or the other, said arms are shifted in unison inwardly or outwardly with respect to the longitudinal axis of the stopper skirt.

3. In an apparatus of the character defined in claim 2, in combination therewith, a main actuating lever universally coupled to said cam plate for effecting oscillation thereof.

4. In an apparatus of the character described, in combination, a fixed plate member having a central opening therein and a circular recess formed in the inner surface thereof concentrically with said opening and a plurality of uniformly spaced radially extending grooves formed in the base of said recess, a circular cam plate fitted in said recess for rotation therewithin, said cam plate being provided with a plurality of arcuate cam slots, each of which is disposed eccentrically with respect to the axis of rotation of said cam plate, a plurality of radially shiftable members respectively fitted in said grooves for sliding movement therein, said members being respectively provided with elements for projection into said cam slots, and having fingers projecting axially through said central opening in said fixed plate and beyond the frontal or exposed face of said fixed plate and to the exterior of the apparatus and means connected to said cam plate for effecting rotation thereof in one direction or the other whereby to effect shifting of said members in unison radially toward or away from the axis of rotation of the cam plate.

5. In an apparatus of the character described, in combination, a fixed plate member having a central opening therein and a circular recess formed in the inner surface thereof concentrically with said opening and a plurality of uniformly spaced radially extending grooves formed in the base of said recess, a circular cam plate fitted in said recess for rotation therewithin, said cam plate being provided with a plurality of arcuate cam slots, each of which is disposed eccentrically with respect to the axis of rotation of said cam plate, a plurality of radially shiftable members respectively fitted in said grooves for sliding movement therein, said members being respectively provided with elements for projection into said cam slots, and having fingers projecting axially through said central opening in said fixed plate and beyond the frontal or exposed face of said fixed plate and to the exterior of the apparatus and means connected to said cam plate for effecting rotation thereof in one direction or the other whereby to effect shifting of said members in unison radially toward or away from the axis of rotation of the cam plate, said fixed plate and said rotatable cam plate being each centrally apertured to provide a common opening extending therethrough, and said radially shiftable members being provided at their inner ends with axially projecting fingers extending frontally through the central aperture of said fixed plate, said fingers being adapted to internally engage the skirt of a double seal type stopper and expand the same upon shifting of said members radially away from the axis of rotation of said cam plate.

6. An apparatus of the character defined in claim 5 wherein said cam slots of the cam plate are each provided at their outer ends with camming sections disposed concentrically with re-

spect to the axis of rotation of the cam plate whereby to provide a dwell period during which the radially shiftable members are held relatively stationary while permitting the cam plate to rotate through an arc somewhat greater than that necessary to insure shifting of said members to their outermost limits.

7. An apparatus of the character defined in claim 5 wherein is included an axially shiftable block having supported thereon a plurality of circumferentially spaced axially extending members adapted to be axially projected through the alined central apertures of said fixed plate and said rotating cam plate, and cam means for axially shifting said supporting block to project said spaced members thereof frontally of the fixed plate automatically as said radially shiftable fingers expand the stopper skirt to its maximum permissible expansion.

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

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