Jan. 23, 1945. H. K. POWELL 2,367,688

APPARATUS FOR AND METHOD OF ASSEMBLING KNOCK-DOWN CONTAINERS

Filed March 2, 1942 2 Sheets-Sheet 1

Fig. 1.

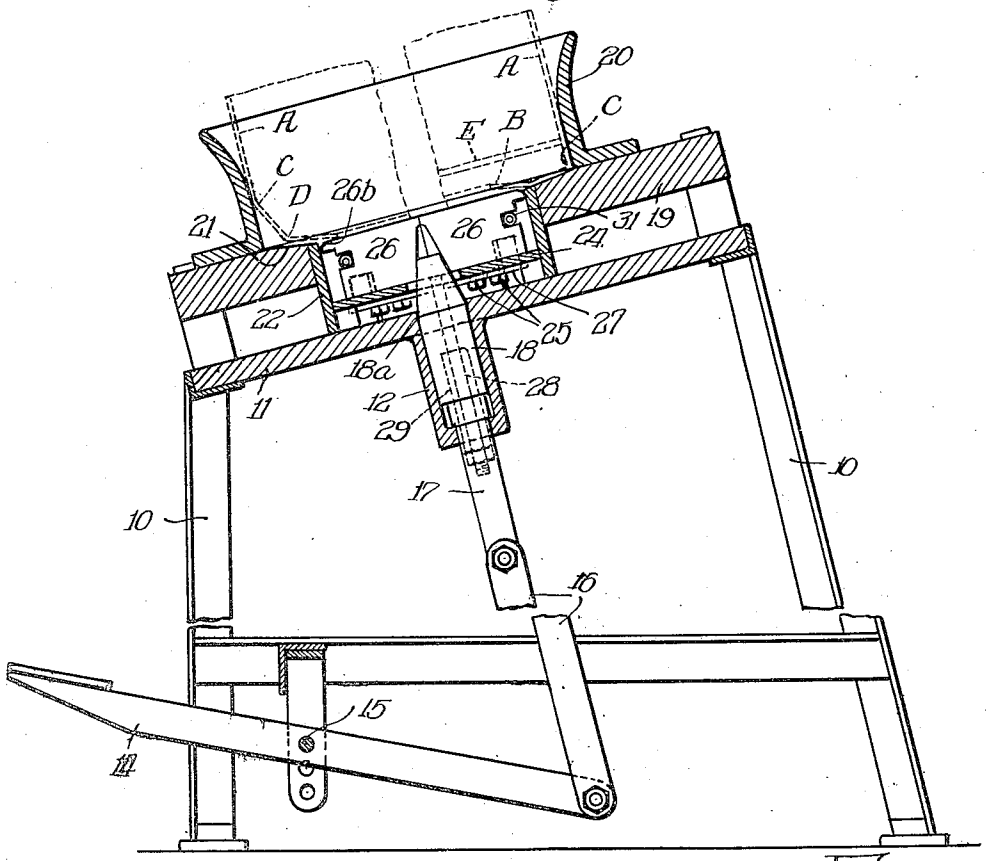


Fig. 2

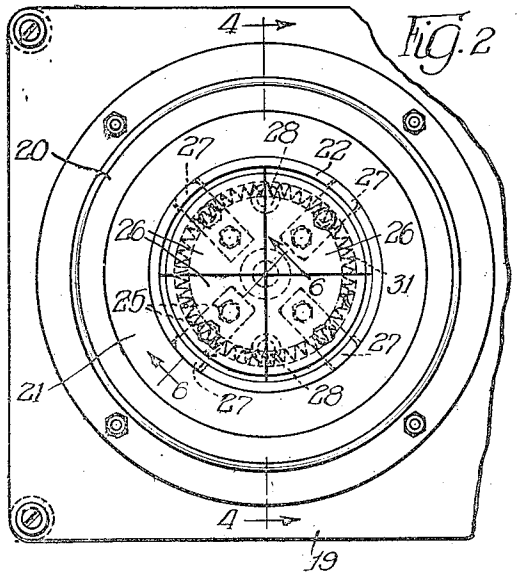
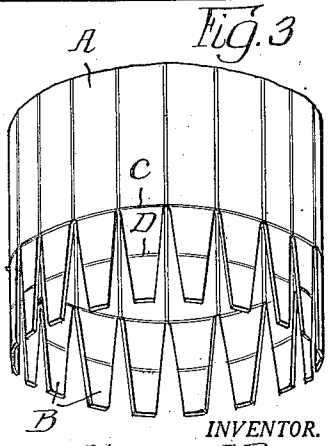


Fig. 3



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Jan. 23, 1945. H. K. POWELL 2,367,688

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Filed March 2, 1942 2 Sheets-Sheet 2

Fig. 4

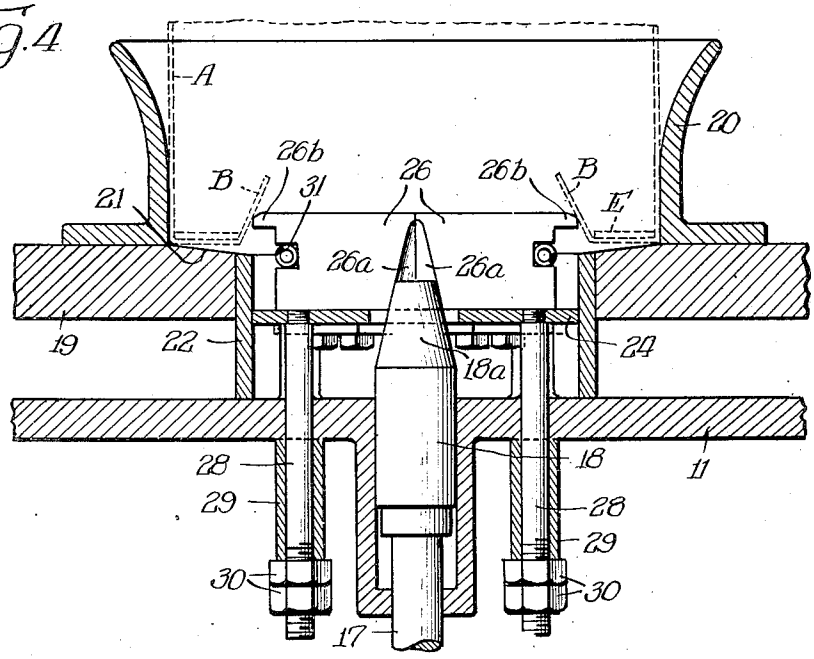


Fig. 5

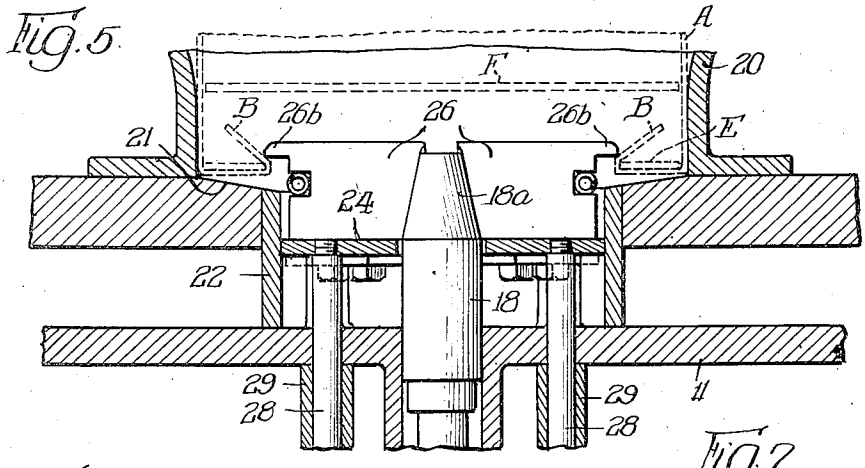


Fig. 7

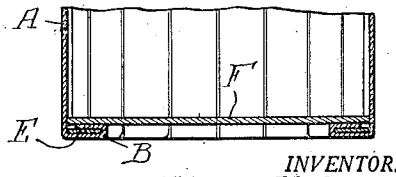
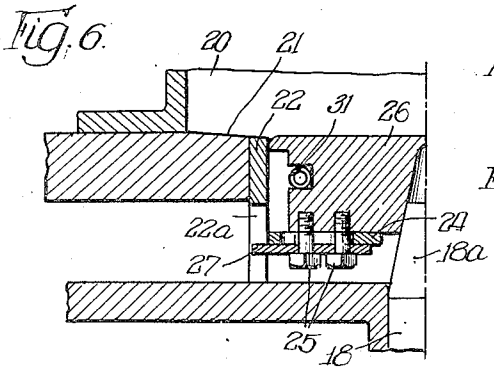


Fig. 6



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UNITED STATES PATENT OFFICE

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APPARATUS FOR AND METHOD OF ASSEMBLING KNOCKDOWN CONTAINERS

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Application March 2, 1942, Serial No. 432,924

10 Claims. (Cl. 93—55.1)

This invention relates to apparatus and method for use in the assembling of knock-down containers of the types which are supplied to the users in collapsed or knocked-down condition and set up or assembled by them when desired for use.

The general object of the invention is the provision of such a method which may be practiced with facility and a machine which is conveniently small and simple in construction and operation, which can be constructed at comparatively low cost, and which is accurate, positive and rapid in operation so as to be capable of a large output per day and productive of uniform results in the articles assembled in it.

Other and further objects and advantages of the invention will be pointed out or indicated hereinafter or will be apparent from the following description of it or upon use of it.

In the drawings forming a part of this specification, I show one form in which the invention may be embodied, and serving to demonstrate one fashion in which the method may be performed, but it is to be understood that the particular embodiment shown and hereinafter described is presented merely by way of illustration and is not to be construed in any fashion for limiting the appended claims short of the true and most comprehensive scope of the invention in the art.

In the drawings,

Fig. 1 is a side elevational section of the device, the section being taken on a medial line;

Fig. 2 is a top view;

Fig. 3 is a perspective view of the lower end portion of a collapsible container body of a type which may be assembled in the particular apparatus shown;

Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 2 through the upper part of the device showing parts in the positions which they assume in the course of its operation for the assembly of a container;

Fig. 5 is a similar transverse sectional view showing the parts in positions which they assume in a more advanced stage of the assembling procedure;

Fig. 6 is an elevational section taken through a part of the device on line 6—6 of Fig. 2; and

Fig. 7 is a sectional elevation taken through the lower portion of a container after assembly in the device.

There are various types of packing containers which are made of flexible sheet material and are supplied to the users in collapsed or knocked-down condition and designed to be set up or assembled by the user when the time comes for use of them for packaging the intended products. In Fig. 3 is illustrated the lower portion of a collapsible body member of such a knock-down container which may be made of paper board of suitable weight and stiffness. The particular container body here shown is adapted to be supplied to the user in flat collapsed condition and to be set up in approximately cylindrical form. It has a wall portion A which may be suitably creased to permit its being collapsed and to facilitate its taking a rounded form when properly set up, said wall portion having formed at the lower end thereof a series of tongues or fingers B which are flexible inwardly along fold creases C at their upper ends and foldable upon themselves along transverse fold creases D. For providing a substantial bottom closure for the container body, there is provided a flat ring E (see Fig. 7) of size to fit within the body member when it is in approximately cylindrical form, and a fairly stiff bottom member F which is of a size to fit tightly within the cylindrical body member and form a tight bottom closure.

For setting up such a container and assembling the bottom closure with the body, I have devised a procedure as hereinafter described, and for practicing same I provide an apparatus such as is illustrated in the other figures of the drawings. This apparatus includes a suitable stand having leg members 10 which support a top frame member 11 formed with a central plunger guide 12. A treadle lever 14 fulcrumed on the stand at 15 is adapted to actuate a connecting link 16 which is attached to the shank 17 of an actuating plunger 18 which is guided for upward and downward reciprocation in the plunger guide 12. This actuating plunger has its upper portion 18a of upwardly tapering or frusto-conical form. Supported upon the top frame member 11 is a plate 19 which carries an upwardly flaring annular member 20 disposed concentrically with the guide 12 and actuating plunger 18, and within the annular member 20 the upper surface of the plate 19 has a dished form as indicated at 21, said dished surface portions converging toward a central aperture in the plate 19. Within this central aperture is mounted a hoop or sleeve 22 which forms a guide for certain of the operating parts. The annular member 20, in its lower portion, is of a diameter such as to receive the body member of the container with a close fit when it is in its distended or cylindrical form and the radial width of the dished surface portion 21 is approximately

the same as the length of the body tongue portions between the fold creases C and D.

Guided concentrically in the hoop 22 and slidable upwardly and downwardly therein is a rigid disk 24 having a central aperture of sufficient diameter to accommodate the actuating plunger 18, and mounted on the plate 24 by means of bolts 25 is a plurality of complementary segmental jaw members 26 (see Fig. 6), the mounting being such that they may slide in radial directions inwardly and outwardly upon the plate 24. Radially extending guide blocks 27 are supported on the bolts 25 and project outwardly beyond the margin of the plate 24 into guide slots 22a provided in the hoop 22. The plate 24 and the parts carried thereby are mounted on the frame by means of parallel posts 28 which are affixed to the plate 24 at their upper ends and extend through openings in the top frame member 11. These posts carry stop collars 29 which are retained on the posts and adjustable longitudinally thereon by means of nuts 30. When the plate 24 is in its lowermost position, which is illustrated in Fig. 1, the upper ends of the stop collars 29 are spaced a distance below the top frame 11.

The segmental jaw members 26 are normally held in their innermost positions and in contact with one another by a helical spring 31 which embraces them and is retained in a circumferential groove formed in them, and at their inner sides the jaw members 26 are formed with bearing surfaces 26a disposed in position for engagement by tapering surface portions 18a of the actuating plunger. At their upper and outer portions the jaw members 26 are provided with outwardly extending flanges 26b which, in the normal or retracted positions of the jaw members (illustrated in Fig. 1), are received within the upper portion of the hoop 22 so that their upper surfaces are in or slightly below the plane of the upper end of the hoop.

The arrangement is such that when the treadle 14 is depressed, the connecting link 16 will be thrust upwardly and the actuating plunger moved upwardly in the guide 12. Such movement of the actuating plunger, by virtue of the engagement of its upper end with the bearing surfaces 26a of the jaws, will move the jaws and the plate 24 upwardly in the hoop 22 until the upper ends of the stop collars 29 are brought into engagement with the top frame member 11. This arresting of the upward movement of the stop collars 29 will occur at a time when the jaw flanges 26b have been elevated a suitable distance above the upper end of the hoop 22, and the stopping of the stop collars 29 against the frame member 11 will arrest further upward movement of the plate 24 and jaw members 26 because of the fact that further upward movement of the posts 28, to which the plate 24 is attached, will be arrested by nuts 30. This position of the parts is illustrated in Fig. 4. With jaw members 26 thus held against further upward movement, continued upward movement of actuating plunger 18 will be effective to move the jaw members outwardly on plate 24, such outward movement being induced by the wedging of the tapering upper end of the actuating plunger between the bearing surfaces 26a of the jaw members, and said outward movement of the jaw members being thus effected against the constraining pressure of the encompassing spring 31. In this fashion the jaw members are moved to the position illustrated in Fig. 5, wherein their top flanges 26b are projected outwardly over the upper end of the hoop 22 at a distance above it and the dished surface portion 21, as illustrated in Fig. 5. The limit of movement in this direction is reached when the treadle 14 reaches its lowermost limit of movement. When pressure upon the treadle is released, the parts return to their normal positions by gravity and under the pressure of the constraining spring 31.

For setting up a container of the sort above described in accordance with my method and by use of this apparatus, the collapsed body member is first more or less drawn out into rounded form by hand, and its lower end is inserted downwardly within the annular member 20, which receives the tongues readily because of its upwardly flaring form. The body member is thrust downwardly into the annular member 20, and the tongues, which are thus slid downwardly in engagement with the inner surface of the member 20, are guided into engagement with the dished surface portion 21 and the lower portion of the body member is shaped into cylindrical form. With further downward movement of the body member, the tongues, by virtue of the guiding action of the dished surface portion 21, are flexed inwardly along their bend creases C and D, as illustrated in dotted lines at the left hand side of Fig. 1, so that when the unslotted lower end portion of the body member reaches the upper surface of the plate 19, the tongues will have been flexed inwardly to position such as illustrated in dotted lines in the right hand side of Fig. 1, in which position the end portions of the tongues beyond the fold creases D will extend over the upper surface of the jaw flanges 26b. The body member is retained in this position by the annular member 20 and while so retained the flat ring E is inserted within the body member and pressed downwardly therein until it comes into contact with the underlying tongues. While the body member is held in the device by hand, the treadle is depressed to raise the jaw members to the position illustrated in Fig. 4, whereby the end portions of the tongues are fixed upwardly and outwardly, as to the positions illustrated at B in Fig. 4. Then, as the treadle is further depressed and the jaw members moved outwardly, the flanges 26b swing the end portions of the tongues outwardly, as to the positions illustrated at B in Fig. 5. With the tongues held in this position by the flanges 26b, the tight fitting bottom disk F is pressed downwardly in the body member and against the outwardly bent portions of the tongues, and thereupon, while the disk F is pressed farther downwardly, depression on the treadle is released to permit retraction and downward movement of the jaw members while the downward movement of the disk flexes the tongues outwardly and downwardly into engagement with the upper surface of the ring E, as to the relationship shown in Fig. 7. The tight fit of the disk F in the body member holds it securely in this position, in which it holds the tongues closely folded about the ring member E, so that the entire assembly provides a strong and tight bottom closure for the body member. After being thus assembled, the container is withdrawn upwardly from the annular member 20 and is in condition to receive its contents and its cover.

It will be observed that the annulus 20 together with the dished surface portion 21 constitute a body shaping member for guiding the body portion of the container to the intended form and the tongues or connecting flaps B to in-turned positions, and that the jaws 26 constitute flap

bending means whereby the flaps are bent upwardly and outwardly within the area of the body member. It is to be understood, moreover, that by suitable modification of the forms of these members the device may be adapted for assembling containers of various other cross-sectional forms, such as triangular, rectangular, hexagonal, elliptical, etc., all of which is within the contemplated purpose of the invention.

What I claim is:

1. A device for use in applying closures to container bodies having flaps extending from their ends, comprising a body shaping member having a portion for embracing a container body inserted endwise within it and a portion for guiding the end flaps to positions where they extend inwardly from the body walls, flap bending members movable axially and outwardly relative to the shaping member within the area thereof, and means for moving said bending members axially relative to the body shaping member and outwardly and inwardly relative thereto.

2. A device for use in applying closures to container bodies having flaps extending from their ends, comprising a body shaping member having a portion for embracing a container body and a portion for guiding the end flaps to positions where they extend inwardly in angular relationship to the body walls, flap bending means associated with the shaping member in position for cooperation with portions of a container body therein, and means for moving the bending means axially within a container body seated in the shaping member and thence outwardly toward the encompassing walls of the body.

3. A device for assembling closures with container bodies having flaps extending from their ends, comprising a body shaping member having a downwardly converging wall portion for embracing the container body and a flap guiding portion extending inwardly from said wall portion in position to deflect the body flaps inwardly from the body wall, flap bending members movable axially and outwardly within a container body seated within the shaping member, means for moving the flap bending members axially in the container body and thence outwardly to bend portions of the body flaps upwardly and outwardly relative to said flap guiding portion, and means for returning the flap bending members inwardly from their outer positions.

4. A device for assembling end closures with container bodies having flaps extending from their ends, comprising a body shaping member having a wall portion delineating the desired peripheral form of the container body and affording an upwardly flaring and upwardly opening passage into which the container body may be inserted endwise and a flap guiding surface converging downwardly and inwardly relative to said wall, said surface being of a width less than the length of the container body flaps, and flap bending members movable axially to an elevation above the lower terminus of said wall and thence outwardly to positions overhanging portions of said surface, and means for moving said flap bending members axially relative to the flap guiding surface and outwardly and inwardly relative thereto.

5. In a device for assembling end closures with container bodies having flexible flaps extending from their ends, a body shaping member for retaining a container body in the desired peripheral form and having inwardly extending flap supporting portions, a plurality of complementary flap bending jaws disposed centrally of the body shaping member, and means for moving said jaws in the axial direction into the body shaping member and in radial directions outwardly therein.

6. A device as specified in claim 5 and wherein said flap bending jaws have peripheral portions movable to positions over said flap supporting portions.

7. A device as specified in claim 5 and including means yieldably constraining said jaws toward a central axis.

8. A device as specified in claim 5 and wherein said jaws have convergent bearing surfaces and the actuating means comprises a reciprocable plunger cooperating with said bearing surfaces to transmit upward and outward movements to said jaws.

9. A device as specified in claim 5 and wherein said jaws have convergent bearing surfaces and the actuating means comprises a reciprocable plunger cooperating with said bearing surfaces to transmit upward and outward movements to said jaws, and means for limiting the extent of upward movement of said jaws.

10. A method of assembling an end closure with a collapsible container body having flexible flaps extending from its end, which comprises shaping the body to its desired peripheral contour and bending its end flaps inwardly, placing a flat ring upon portions of the flaps which are adjacent the body wall, bending inwardly projecting portions of the flaps upwardly and outwardly around the inner edge of the ring, inserting an end closure plate within the container body and into engagement with the outwardly bent portions of the flaps and moving it in the axial direction and thereby pressing the outwardly bent tongue portions into contact with the ring and the periphery of the plate into tight fitting engagement with the body wall.

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