June 8, 1954 S. J. BROSKY 2,680,551

METHOD OF ASSEMBLING CANS AND COVERS

Filed April 5, 1951

Fig. 7

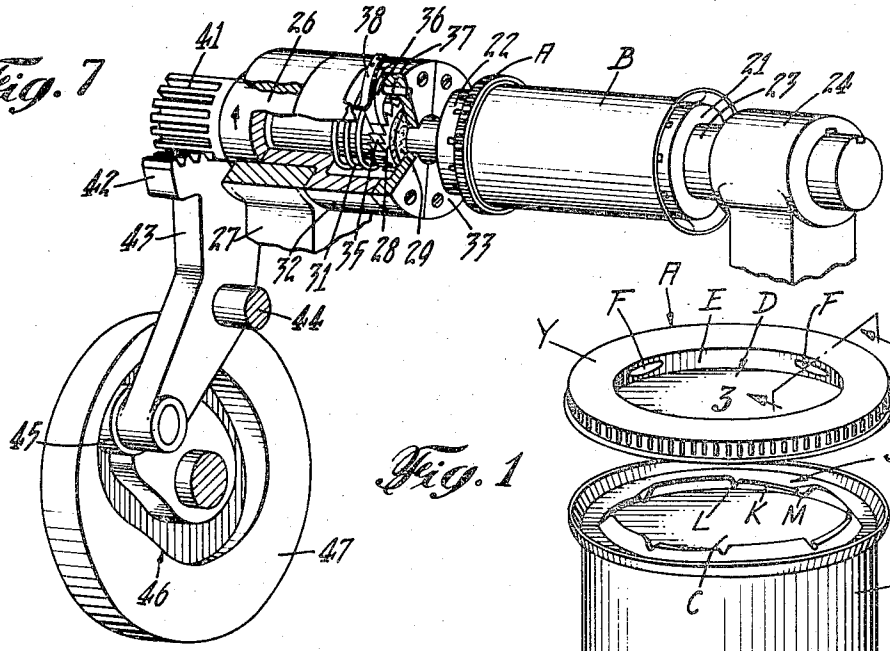



Fig. 1




Fig. 3

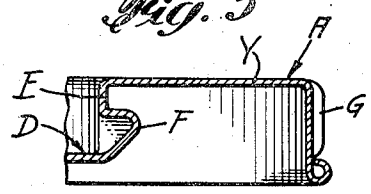



Fig. 4

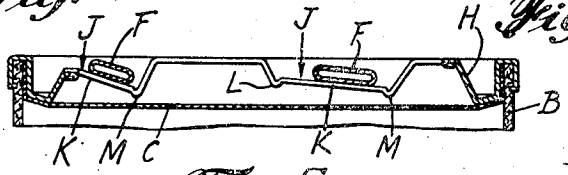



Fig. 2

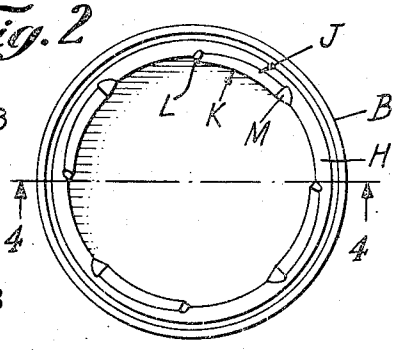



Fig. 5

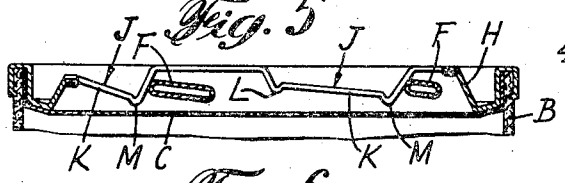
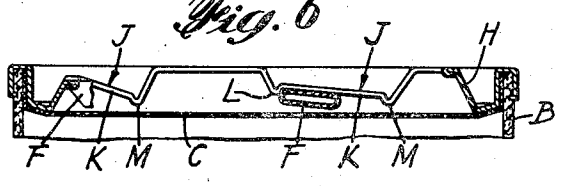



Fig. 6




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## METHOD OF ASSEMBLING CANS AND COVERS

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Application April 5, 1951, Serial No. 219,425

2 Claims. (Cl. 226—88)

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The present invention relates to a method of assembling can covers having locking lugs thereon with cans having locking sections thereon and has particular reference to effecting relative rotative movement between the cover and the can in two successive opposite directions for first locating and inserting the cover on the can and for then removably locking it in place. This is a companion application to co-pending United States application Serial Number 219,404, filed April 15, 1951, by William Pechy on Mechanism for Assembling Cans and Covers.

The invention contemplates the assembling of cans and covers of the character disclosed in United States Patent 2,488,526 issued November 22, 1949, to R. J. Crawford on Container. Such a container includes a cover, formed with a countersunk panel having peripheral locking lugs, which in one position of the cover fits into a locking ring on the can and which in another position of the cover interlocks its locking lugs with tapered and eccentric locking sections on the locking ring to secure the cover to the can.

For best results the cover should be interlocked with the can with such accuracy as to insure proper tightness to prevent displacement of the cover during shipment and storage and at the same time to insure that the locking elements are not strained or distorted so as to preserve these elements effective when the cover is used repeatedly as a reclosure by the customer.

An object of the invention is the provision of a method of assembling such cans and covers as outlined above wherein relative rotative movement in one direction is effected between the can and its cover, to first locate the locking lugs on the cover in a predetermined or properly oriented location relative to the locking sections on the can, regardless of the initial relative positions of these lugs and sections when the cover and can are initially brought together. Thereafter to effect relative rotative movement in the opposite direction a predetermined fixed distance to effect interlocking of the cover locking lugs with the can locking sections at a predetermined point on the locking sections to insure proper tightness between the can and cover while retaining or preserving a portion of the locking sections for the use of the customer when the can is opened and the cover subsequently used as a reclosure.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a perspective view of a can and a cover to be assembled in accordance with the method steps of the instant invention;

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Fig. 2 is a top plan view of the can;

Fig. 3 is an enlarged sectional detail of the cover as taken substantially along a plane indicated by the lines 3—3 in Fig. 1;

Figs. 4, 5 and 6 are enlarged sectional views of the upper portion of the can and taken substantially along the line 4—4 in Fig. 2, the three views showing schematically the relative positions of locking lugs on the cover during various stages of assembling a cover with a can; and

Fig. 7 is a schematic perspective view of one form of apparatus for carrying out the method steps of the invention.

As a preferred or exemplary embodiment of the invention the drawings illustrate a method of assembling can covers A (Fig. 1) with cans or can bodies B of the type disclosed in the Crawford Patent 2,488,526 hereinbefore mentioned. The body B of such a can may be made of fibre, metal or other suitable material while the cover A preferably is made of metal. Such a can is of the type which preferably carries at its top end, a temporary sealing disc C made of cellophane, paper, metal foil or other suitable frangible material which is adapted to be cut out to gain access to the interior of the can. In such a can, the filling of the product into the can preferably is effected through its bottom. Therefore the bottom is left open and the cover is assembled while the can is in this open end condition.

The cover A is of the type which is formed with a centrally located depressed or countersunk panel D (Figs. 1 and 3) having vertical bounding or edge walls E provided with a plurality of peripherally spaced outwardly projecting imperforate locking lugs F adapted to seat within the open mouth of the can B. The panel D preferably is surrounded by a knurled depending skirt or flange G which extends down outside of the can when the cover is in place, for applying the cover as a reclosure to the can. The wall E and skirt G are connected by a horizontal annular wall Y.

In order to receive the cover A, the top of the can body B preferably is provided with an annular ring H which seats over the temporary sealing disc C and is crimped or otherwise permanently secured to the body or may be an integral part of the body. The ring H also holds the disc C in place on the body. The inner opening in the ring constitutes the mouth of the can. Around this mouth, the inner peripheral edge of the ring is formed with a plurality of peripherally spaced and inwardly projecting locking sections J.

Each locking section J comprises an inclined or declining tapered wall K which begins at its upper or entrance end with a bead, projection, or hurdle element L which depends into the can and terminates at its lower end in a similarly depending bead, projection, or stop element M. Each can locking section J projects eccentrically

inwardly relative to the axis of the can body. Between these locking sections J, the ring H has concentric sections the diametrical dimensions of which are just sufficient to permit the locking lugs F on the cover to enter these concentric sections when the cover is properly oriented and applied to the ring.

In accordance with the method steps of the instant invention, the cover A first is applied to the can B by bringing the cover and the can together in any suitable manner without any regard to the relative positions of the cover locking lugs F and the can locking sections J. Following this a relative rotative movement is effected between the cover and the can in one or a reverse direction to initially locate the cover locking lugs F in a predetermined position relative to the locking sections J on the can. Preferably the can B is held stationary while the cover A is rotated in a reverse direction to shift the cover locking lugs F from whatever relative and random position they are received initially, to a position adjacent the peripherally spaced concentric sections between the locking sections J so that the locking lugs F will fall through these sections and into the mouth of the can during said reverse rotation of the cover.

With the locking lugs F disposed in the mouth of the can, this relative reverse rotative movement of the cover is continued until the locking lugs F engage and stop against the exterior face of the stop elements M to serve as a predetermined starting point for a following locking step. This rotative movement is variable since there is no control over the initial relative positions of the cover locking lugs F and the stop elements M. This reverse rotative movement preferably is a continuous movement from start-to finish, the engagement of the locking lugs F with the stop elements M terminating the rotative movement between the cover A and the can B, thus bringing the cover to rest on the can in a predetermined position.

With the cover A in this predetermined position on the can B, with the cover locking lugs F engaging the stop elements M of the can locking sections J, a relative rotative movement between the cover and the can is effected in the opposite or forward direction to interlock the cover locking lugs with the can locking sections. This movement is a predetermined fixed amount substantially equal to the arcual distance between the stop elements M on the can and the hurdle elements L as measured in the direction of this rotation. This predetermined degree of rotation shifts the locking lugs F away from the stop elements M and snaps them under and past the hurdle elements L, arresting the movement of the locking lugs just beyond the hurdle elements. This interlocking of the cover lugs F with the hurdle elements L is sufficient to securely hold the cover in place on the can and also reserves the remaining portion of the tapered wall K of the locking sections J unstrained or undistorted for use by the customer when utilizing the cover as a reclosure after opening the can.

The above method steps of assembling a cover A with a can B may be effected by several different mechanisms. One form of mcehanism for carrying out these steps is shown in Fig. 7 of the drawings and includes a suitable non-rotatable chuck 21 for entrance into the open end of a can B for holding the can stationary and further includes an oppositely axially disposed rotatable chuck 22 for gripping a cover A by entrance into the countersunk panel D of the cover or by engagement over the outer periphery of the cover. The can chuck 21 preferably is carried on a stem 23 mounted in a bearing 24 for reciprocation relative to the can for entrance and removal therefrom



The cover chuck 22 preferably is carried on a spindle 26 journaled in a bearing 27 for reciprocation toward and away from the can for gripping a cover and for placing it on the can. The cover chuck 22 preferably is part of a slip clutch which includes a clutch flange 28 having a friction disc 29 on one side and a compression spring 31 on the other. These parts are housed within an enlarged portion 32 of the spindle 26 and are held in place by a two piece end plate 33.

The peripheral edge of the clutch flange 28 is provided with ratchet teeth 35 which are engageable with one or more ratchet pawls 36 carried on pivot pins 37 secured in the spindle 26 and its end plate 33. Leaf springs 38 secured to the spindle portion 32 tend to urge the pawls in engagement with the ratchet teeth. The ratchet teeth 35 and the pawls 36 are arranged to permit free rotation of the spindle 26 relative to the slip clutch flange 28 in a clockwise direction as viewed in Fig. 7 and to lock the clutch flange against rotation relative to the spindle when the spindle 26 rotates in a counterclockwise direction.

The spindle is also rotatable in its bearing 27 for rotating the cover relative to the can. Rotation of the spindle 26 preferably is effected through a spur gear or pinion 41 which is carried on the outer end of the spindle. This gear 41 meshes with and is rotated by a segment gear 42 formed on a lever 43 mounted intermediate its ends on a pivot pin 44 secured in a suitable stationary bearing or fixed portion of the machine frame. The lower end of the lever 43 carries a cam roller 45 which operates in a spindle oscillating cam groove 46 formed in a cam 47. The cam may be rotated in any suitable manner.

Hence as the cam 47 rotates, it rocks the lever 43 in a counterclockwise direction (as viewed in Fig. 7) and thus oscillates or partially rotates the gear 42 and the spindle 26 connected thereto to turn the cover A in a clockwise direction to locate the cover locking lugs F in engagement with the can stop elements M as described above. The travel of the lever 43 is substantially equal to the greatest arcual travel of the cover locking lugs F relative to the can stop elements M since this travel is variable and dependent upon the initial relation of the lugs and the stop elements when the cover and the can are first brought together at random. However, the slip clutch or yieldable connection between the cover chuck 22 and the spindle 26 compensates for any overthrow of the cam groove 46 and thus allows the cover chuck 22 to stop rotating when the cover lugs F engage against the stop elements M on the can, and to permit of the continued rocking of the lever 43 to complete its cycle of operation in the counterclockwise direction.

When the lever 43 completes its travel in the counterclockwise direction, the cam 47 swings the lever through the opposite or clockwise direction (as viewed in Fig. 7). At the beginning of this reverse travel of the lever 43, the pawl 36 on the spindle 26 immediately engages the ratchet teeth 35 on the clutch flange 28 and hence the spindle 26 and the chuck 22 rotate as a unitary structure regardless of the position of the spindle when it

stopped through the engagement of the cover locking lugs F against the stop elements M on the can. This opposite rotational movement of the interlocked spindle and chuck is a precise distance substantially equal to the arcual distance between the outer face of the stop elements M and the inner faces of the hurdle elements L so that this rotational movment rotates the cover on the can the precise amount or predetermined constant distance sufficient to snap the cover lugs under the hurdle elements L, and to stop said lugs just beyond such hurdle elements. This precise rotation of the cover is sufficient to secure the cover in place on the can and still reserve the remaining portion of the tapered wall K of the locking sections J on the can for the use of the customer after the can is opened, the sealing disc fractured or destroyed, and the cover utilized as a reclosure.

After removal of the assembled can and cover from the holding chucks 21, 22 the cam 47 completes the rocking of the lever 43 in its clockwise direction to return the segment gear 42 to its initial starting position for a subsequent assembling operation.

In this manner the cover is rotated in two oppositely disposed directions to first properly orient and locate the cover locking lugs F relative to or in abutting relation against the stop elements M on the can to use the latter as a precise starting point for a cover locking operation. Thereafter to move the locking lugs F from this starting point a precise amount or uniform distance to interlock them with the tapered wall K adjacent and inwardly of the hurdle elements L on the can in a precise relation so as to reserve a portion of the tapered wall K on the locking sections J for the subsequent use of the cover by the customer as a reclosure element, as mentioned above.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the steps of the method described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the method hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of assembling covers on containers wherein a said cover is provided with a countersunk panel surrounded by spaced outwardly projecting locking lugs and a said container includes a dispensing mouth surrounded by spaced cover lug receiving sections and alternately spaced radially inwardly extending cover locking sections, said locking sections each being defined by a forward depending hurdle element and a rearward depending stop element connected by a downwardly inclined tapered locking wall surface, said method comprising the successive steps of separately holding a said container and cover in axially spaced aligned relation and relatively pressing the container and cover together at random to yieldably position the cover against the container mouth, relatively rotating the engaged cover and container in one direction to insert the cover locking lugs respectively into the lug receiving sections of the container and between the spaced locking sections thereof, yieldably continuing said relative rotative movement in said one direction to abut said inserted cover locking lugs respectively against the stop elements at the rear ends of the locking sections on the container to arrest further rotative movement of the container and cover while compensating for further relative rotative movement of the holding instrumentalities therefor, and thereafter positively relatively rotating the engaged cover and container in the opposite direction a predetermined constant distance just sufficient to snap said cover locking lugs respectively over said hurdle elements at the forward ends of the locking sections on the container so as to arrest the relative rotative movement of said cover lugs at the commencement of said downwardly inclined tapered locking walls, thereby securing said cover against displacement from the container while preventing distortion of said tapered locking walls by said cover lugs and thus preserve the contour of said walls for subsequent use as a cover clamping and sealing medium when the cover is utilized as a reclosure for the container.

2. The method of assembling covers on containers wherein a said cover is provided with a countersunk panel surrounded by spaced outwardly projecting locking lugs and a said container includes a dispensing mouth surrounded by spaced cover lug receiving sections and alternately spaced radially inwardly extending cover locking sections, said locking sections each being defined by a forward depending hurdle element and a rearward depending stop element connected by a downwardly inclined tapered locking wall surface, said method comprising the successive steps of separately holding a said container and cover in axially spaced aligned relation and relatively pressing the container and cover together at random to yieldably position the cover against the container mouth, rotating the engaged cover in a reverse direction to insert the cover locking lugs respectively into the lug receiving sections of the container and between the spaced locking sections thereof, yieldably continuing said reverse rotative movement of the cover to abut said inserted cover locking lugs respectively against the stop elements at the rear ends of the locking sections on the held container to arrest further rotative movement of the cover while compensating for further rotative movement of the holding instrumentality therefor, and thereafter positively rotating the engaged cover in the opposite forward direction a predetermined constant distance just sufficient to snap said cover locking lugs respectively over said hurdle elements at the forward ends of the locking sections on the container so as to arrest the rotative movement of said cover lugs at the commencement of said downwardly inclined tapered locking walls, thereby securing said cover against displacement from the container while preventing distortion of said tapered locking walls by said cover lugs and thus preserve the contour of said walls for subsequent use as a cover clamping and sealing medium when the cover is utilized as a reclosure for the container.

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