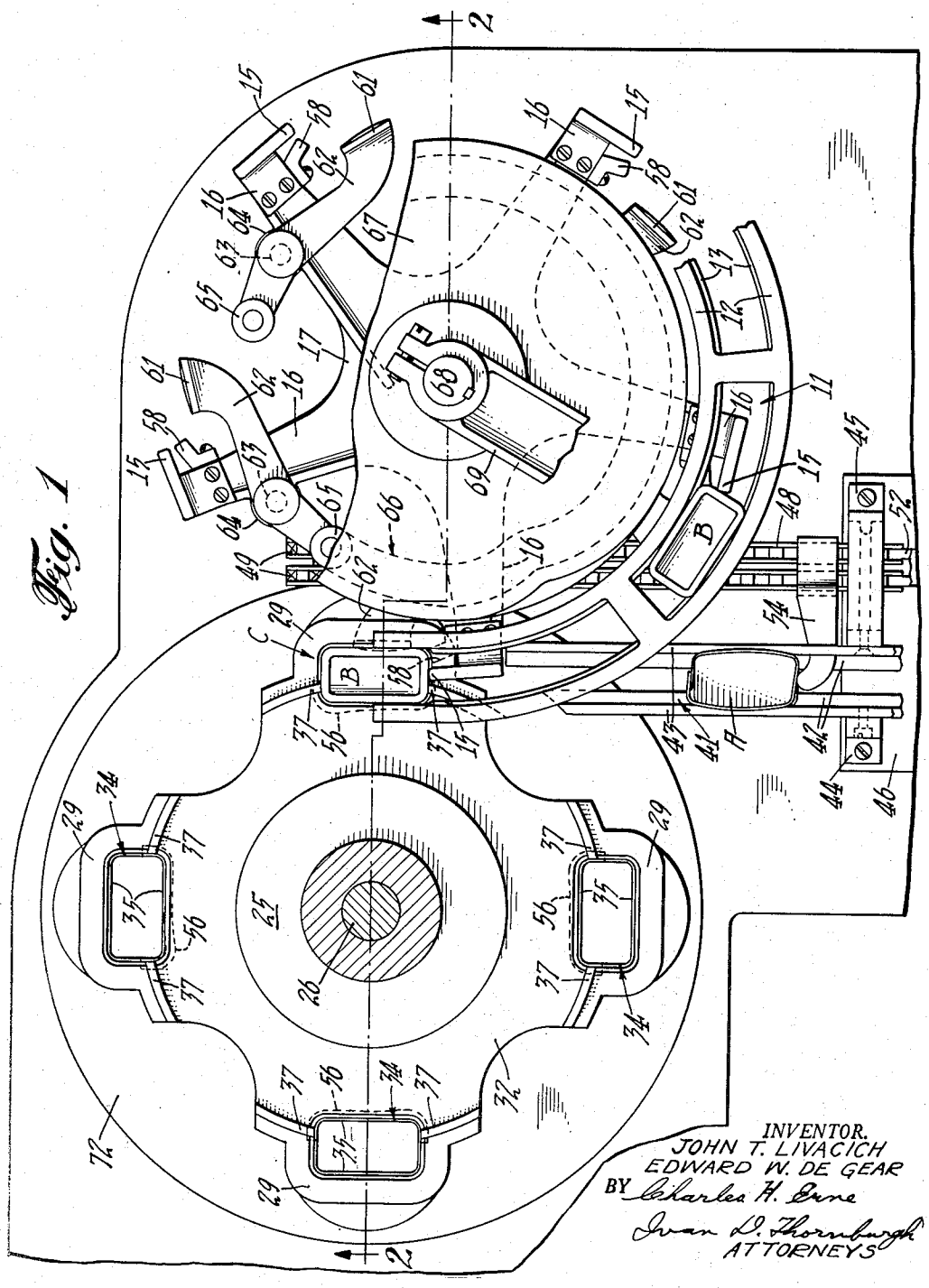
Dec. 1, 1953 J. T. LIVACICH ET AL 2,660,936

CLOSING MACHINE WITH RECTANGULAR CONTAINER SQUARING AND DEBULGING DEVICES

Filed July 20, 1949 3 Sheets-Sheet 1

Fig. 1



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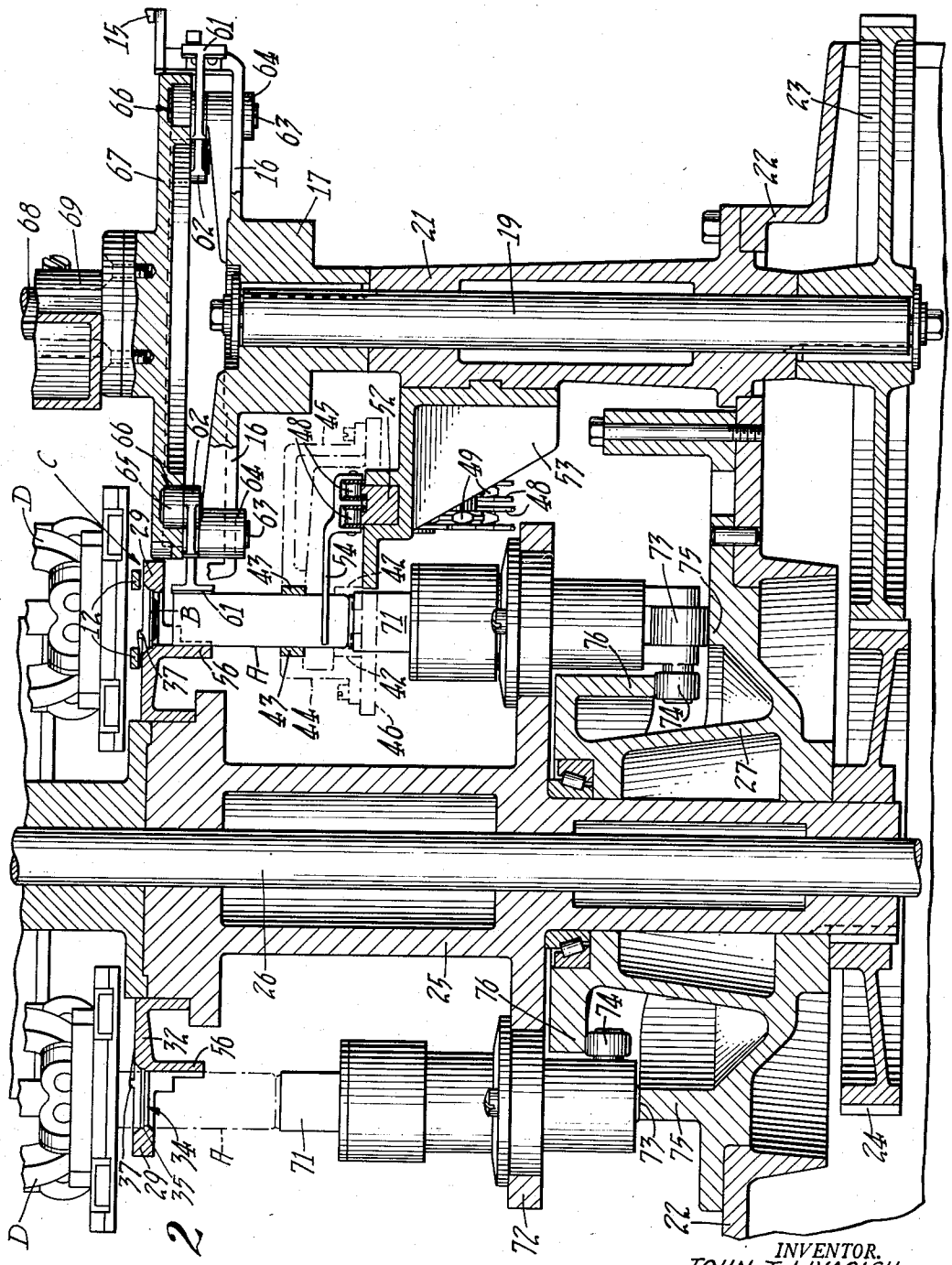

Fig. 2

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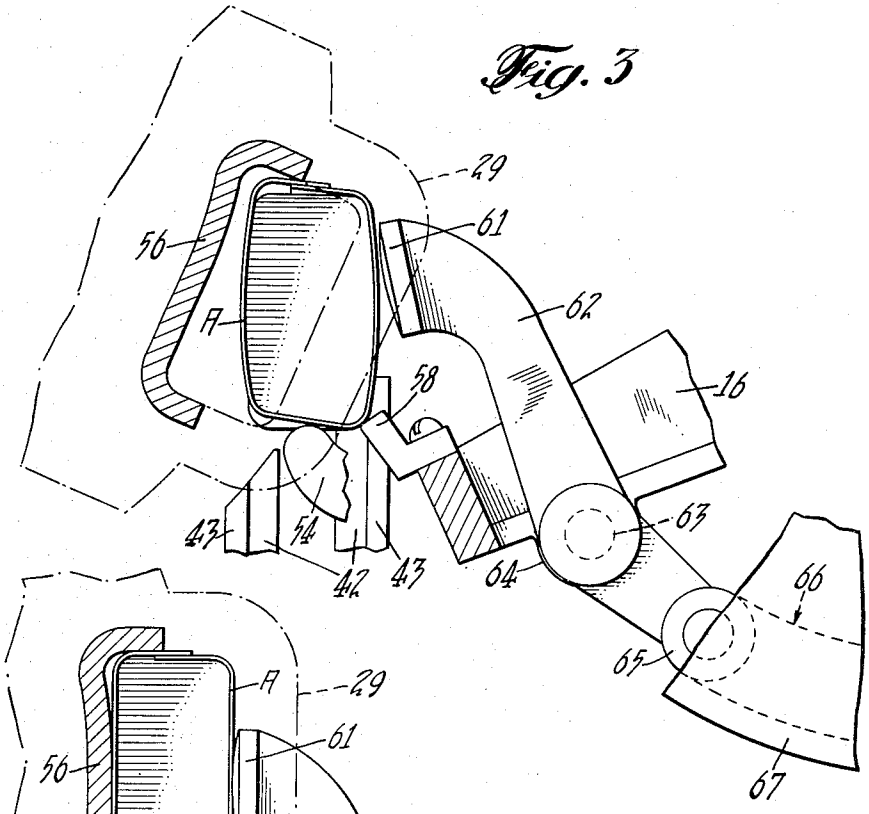
Fig. 3



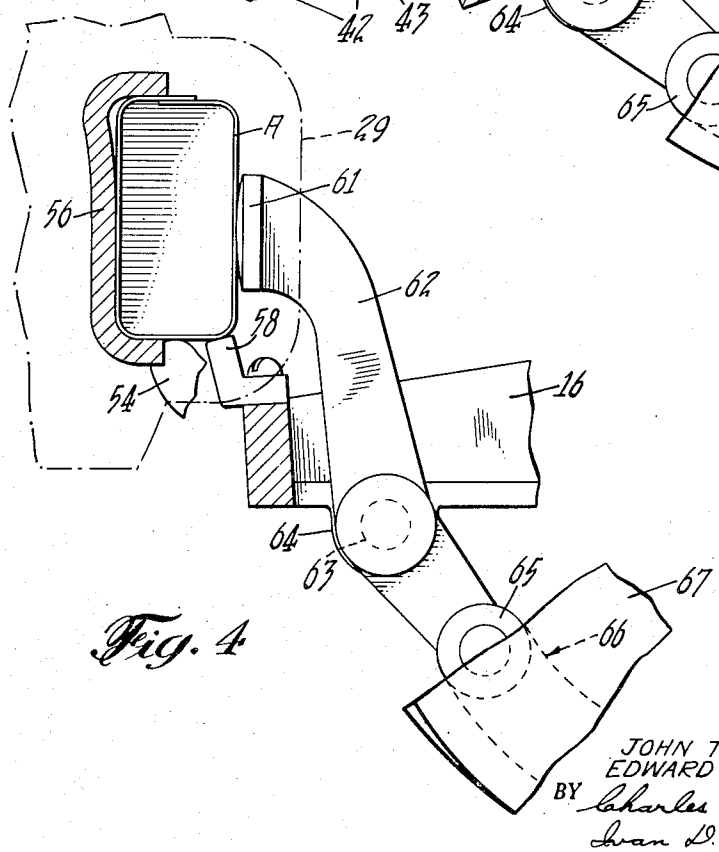


Fig. 4

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UNITED STATES PATENT OFFICE

2,660,936

CLOSING MACHINE WITH RECTANGULAR CONTAINER SQUARING AND DEBULGING DEVICES

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5 Claims. (Cl. 93—55.1)

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The present invention relates to a can or container closing machine and has particular reference to devices for squaring and debulging the bodies of flimsy fibre or similar containers preparatory to attaching covers to the containers.

In the packaging of products such as frozen foods, cottage cheese, and many other commodities, a rectangular shaped container having a fibre body and metal end members is extensively used. The fibre body portion of the container before the end members are attached, and even after one of the end members has been attached, is difficult to handle in automatic closing or sealing machines because of the flexible or flimsy nature of the material from which the body is made. In advancing the bodies through the machine, they often become distorted into a diamond shape instead of retaining a squared or rectangular shape and hence cause considerable difficulty in matching or aligning them with the cover or end member to be attached thereto. Another cause of difficulty is the inherent spring in the fibre material which bulges the sides of the body and prevents unhampered attachment of the covers to the bodies.

An object of the invention is the provision in a container closing machine of devices which operate to square and debulge the sides of a flimsy container or container body so that at least a portion of the container body may be passed through a centering ring to align the body with a cover preparatory to uniting the cover with the body.

Another object is the provision of such devices which are particularly adapted to high speed operation so that squaring of the container and debulging of its side walls may be efficiently effected while the containers and the covers to be attached thereto are advanced into the machine in substantially continuous processions.

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 top plan view of a container closing machine embodying the instant invention, with parts broken away;

Fig. 2 is a sectional view taken substantially along the broken lines 2—2 in Fig. 1, with parts broken away; and

Figs. 3 and 4 are enlarged schematic views showing a container and certain fragmentary parts of the machine in different positions as an incident to properly positioning the container for the reception of a cover.

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As a preferred or exemplary embodiment of the instant invention the drawings illustrate principal parts of a can or container closing machine such as that disclosed in United States Patent 2,447,525 issued August 24, 1948, to R. E. J. Nordquist on Can Closing Machine.

In such a machine filled containers A (Fig. 1) and covers B are fed into the machine along different paths of travel and are brought together into vertical alignment at an assembling station C where the containers are lifted vertically to receive the covers and to position the covers and the upper ends of the containers into closing or seaming heads D (Fig. 2) which permanently unite the covers and containers in suitable end seams by interfolding of flange parts on the covers.

The instant machine is particularly adapted to feed and secure rectangular shaped sheet metal covers to correspondingly shaped fibre containers such as those commonly used for frozen food products, although the invention is equally well adapted to containers and covers of other shapes and materials.

The sheet metal covers B are fed into the assembling station C of the machine in a horizontal position, along a curved runway 11 (Figs. 1 and 2) having a pair of spaced and parallel guide rails 12 formed with cover supporting ledges 13. The guide rails terminate at the assembling station. The covers B are advanced along this runway 11 in spaced and timed order by feed dogs or fingers 15 which are secured to the outer ends of arms 16 of a horizontally disposed rotatable spider wheel 17 located adjacent the curved runway.

The rotatable spider wheel 17 is mounted on the upper end of a vertical shaft 19 which is journaled in a bearing bracket 21 bolted to a frame 22 which constitutes the main frame of the machine. The shaft is rotated continuously by a spur gear 23 which is secured to the lower end of the shaft and which meshes with and is driven by a driving gear 24 mounted on the lower end of a vertical sleeve 25 surrounding a normally stationary shaft 26. The sleeve 25 is supported in and journaled in a bearing bracket 27 bolted to the main frame 22. The sleeve is rotated continuously in any suitable manner such as that shown in United States Patent 1,601,910 issued October 5, 1926, to P. W. Fleischer et al. on Multispindle Double Seamer.

Hence through the rotation of the spider wheel

17 a feed dog 15 engages behind a cover B from any suitable source of supply such as a stack or the like and propels the cover along the runway 11 toward the assembling station C. At the assembling station C, the cover supporting ledges 13 are cut away to permit the cover to drop down from the runway 11 into a container and cover centering ring 29 which locates the cover in proper angular and horizontal position for reception by the container.

There are a plurality of the centering rings 29 equally spaced around the periphery of a turret 32 which is mounted on and rotated with the sleeve 25. The sleeve 25 and the spider wheel 17 rotate in timed relation so as to bring a centering ring 29 into proper position at the assembling station C each time a feed dog 15 on the spider wheel 17 advances a cover B into position at the assembling station.

Each centering ring 29 includes an inwardly tapered throat or opening 34 which corresponds in shape and substantially in size to the cover B to be received therein. Within this throat the centering ring is formed with a horizontal inwardly projecting support ledge 35 which is of just sufficient width to engage the usual curled edge on the flange of the cover so as to leave the major portion of the flange free for engagement by the container as will be fully explained hereinafter. The top of the centering ring 29 is provided with a pair of upwardly extending cover locating lugs 37 which are located one at each end of the ring and adjacent the tapered edge of the throat.

Hence as a centering ring 29 and a cover B simultaneously approach the assembling station C, the centering ring passes under the guide rails 12 of the runway 11 and moves into a position directly under the approaching cover to receive the cover. The outer guide rail 12 is cut away away to permit clearance for the locating lugs 37 on the ring. During this approach of the cover and the centering ring, the cover moves into place between the locating lugs 37 and when the cover drops from the runway 11 it falls into the centering ring and is properly located therein by the tapered walls of the ring throat and is supported on the ring ledge 35 in readiness for application to the container.

To facilitate this proper centering of the covers B in the centering rings 29, the covers move along a straight line path of travel for a short distance during the approach of the covers to the assembling station C. This is effected by the assembling station C being located on the center line of the ring turret 32 and slightly in advance of a parallel center line of the spider wheel 17 as best shown in Fig. 1.

The fibre containers A to be assembled with the covers B are fed into the machine toward the assembling station C from any suitable source of supply in a substantially endless straight line procession, arranged in spaced and timed order and in a vertical or upright position. The bottoms may be secured to the container bodies and the containers filled with a product although the invention is equally well adapted to the seaming of covers onto empty container bodies.

The entering containers A move along a straight line runway 41 (Fig. 1) having a pair of spaced and parallel lower L-shaped supporting and guiding rails 42 (see also Fig. 2) and a pair of spaced and parallel upper guide bars 43. These guide rails and bars extend toward and terminate at the assembling station C. They are held in place by brackets 44, 45 which are bolted to a horizontal table 46 which is part of the main frame 22.

Advancement of the containers A along the runway 41 in spaced and timed order is effected in time with the advancement of the covers B and the centering rings 29. This is brought about by an endless chain conveyor 48 which is disposed adjacent the container runway 41 in spaced and parallel relation thereto and which operates continuously over suitable vertically disposed sprockets 49. The upper or feeding run of the conveyor is supported and guided on a horizontal support rail 52 which is carrier in the table 46 and in a bracket 53 (Fig. 2) secured to the spider wheel bearing bracket 21. Feed dogs 54 secured to the conveyor at spaced intervals therealong engage behind the flimsy fibre containers A and feed them toward the assembling station C. These feed dogs are disposed in a horizontal position and extend laterally from the conveyor into the container runway 41.

With such an arrangement of feeding mechanism, a container A, a cover B, and a centering ring 29, all approach the assembling station in timed order. As a container approaches the assembling station, the corresponding centering ring moves into position above the container as best shown in dot and dash lines in Fig. 3. Simultaneously with this action, a half mold 55 (Figs. 2 and 3) which is formed integrally with the centering ring and which depends therefrom, moves into position to receive and hold the container. The container feed dogs 54 advance the container into the mold as best shown in Fig. 3.

In order to insure proper positioning of a container A into a mold 56 and to square the sides of the container with each other, a pressure is exerted against the outer trailing corner of the container as best shown in Fig. 3. For this purpose each arm 16 of the spider wheel 17 carries a squaring finger 58 which moves with the spider wheel. The finger moves into position with the feeding of the cover B and engages the corner of the container A as shown in Fig. 3 just as the container is entering the mold 56. The squaring finger 58 after engagement with the corner of the container, forces the corner ahead while the opposite corner of the container is backed up by the mold and thus twists the body of the container into proper position in the mold. In this manner a container body which is out of square, even though it has a bottom on it, is forced back into shape so that its sides are square with each other and its corners are square as shown in Fig. 4.

At times the inherent spring in a fibre container body bulges its sides outwardly in a bow shape as shown in Fig. 3. Such bulging is also caused sometimes by the contents of the container. To overcome this bulging action so as condition and align the container for the reception of a cover, the sides of the container are pressed inwardly to straighten them. This is effected after the container is fully seated in the mold 56.

This debulging action is effected by a presser pad 61 (Figs. 1, 3 and 4) which is formed on the outer end of a lever 62 which is carried on and rotates with the spider wheel 17. There is one of these presser pads and levers for each squaring finger 58. Each lever 62 is mounted adjacent its squaring finger 58, on a pivot pin 63 carried in a

boss 64 (Figs. 1 and 2) formed on each of the arms 16 of the spider wheel. The inner end of each lever 62 carries a cam roller 65 which operates in a cam track 66 of a stationary face cam 67 located above the rotating spider wheel 17. The cam is secured to a vertical post 68 which aligns vertically with the spider wheel shaft 19 and which is supported in a bracket 69 projecting out from a superstructure of the main frame 22.

Hence as the spider wheel 17 rotates to feed a cover B and to square up an out-of-square container A, the debulging or presser pad lever 62 moves with the wheel and at the assembling station C, the cam track 66 rocks the lever 62 and swings its presser pad 61 outwardly against the outer side of the container, engaging the container near its top edge and, in cooperation with the mold 56, forcing its opposing sides inwardly into a straight line or flat relation. In this manner the squaring finger 58 and the presser pad 61 cooperate with the mold 56 to force a distorted container A into a squared position directly under a centering ring 29 so that the container may be readily lifted up into and through the centering ring to pick up the waiting cover B.

Lifting of the properly squared containers A is effected by conventional pusher or lifter pads 71 (Fig. 2), which are located, one under each centering ring 29 and which are supported in a flange 72 on the sleeve 25. The lifter pads are raised and lowered at the proper time by cam rollers 73, 74 which operate against stationary cam tracks 75, 76 formed on the sleeve bearing bracket 27. The containers transfer from the container runway 41 to a lifter pad 71 in the conventional manner as the pads individually approach the assembling station C. At the assembling station the squared container while held in shape by the mold 56, the squaring finger 58 and the presser pad 61, is raised by a lifter pad 71 into the centering ring 29 and engages the positioned cover B in its peripheral flange part. This pad continues to lift the container to push the superimposed cover and the upper end of the container through the centering ring and into a closing head D. There is one closing head D for each centering ring 29 and they are disposed just above the rings and rotate in this relation, with the turret 32. The closing head seals the cover onto the lifted container and the lifter pad thereupon lowers the sealed container for discharge from the machine in the conventional manner.

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 form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

We claim:

1. In a machine for attaching covers to rectangular can bodies, the combination of feeding devices for advancing a can body along a predetermined substantially straight path of travel, a movable centering ring disposed adjacent one side of said path of travel for holding a cover in spaced relation to an advanced can body for application thereto, a movable mold disposed between said centering ring and said feeding devices and located in axial alignment with said centering ring, actuating means for continuously moving said ring and said mold in unison along said path of travel for receiving said advanced can body in said mold, squaring means disposed on the opposite side of said path of travel and movable toward said mold, means operating in time with said actuating means for moving said squaring means into engagement with said body for shifting its sides relative to each other in said mold for squaring-up said body relative to said centering ring, and pusher means movable toward said mold for pushing said squared-up body through said centering ring for receiving the cover held in said ring.

2. In a machine for attaching covers to rectangular can bodies, the combination of feeding devices for advancing a can body along a predetermined substantially straight path of travel, a movable centering ring disposed on one side of and adjacent said path of travel and arranged to hold a cover for application to said can body, a movable mold disposed between said centering ring and said feeding devices and locate in axial alignment with said centering ring, actuating means for continuously moving said ring and said mold in unison along said path of travel for receiving said advanced can body in said mold, a movable squaring finger disposed adjacent the opposite side of said path of travel for engaging said body adjacent a corner thereof as the body enters said mold for squaring-up the sides of said body relative to each other, a presser pad also disposed adjacent said opposite side of the path of travel of said body for engaging a side of said body for compressing the body in the mold to straighten the sides of the body in case they are bulged, actuating means for moving said squaring finger and said presser pad toward said mold in time with each other and in time with said mold for effecting the squaring and the debulging operations, and pusher means for pushing said squared-up and debulged body through said centering ring for receiving the cover held in said ring.

3. In a machine for attaching covers to rectangular can bodies, the combination of a rotatable centering ring, a mold disposed in axial alignment with said centering ring, means for continuously rotating said ring and said mold in an arcuate path and in unison, body feeding devices for advancing a can body along a path substantially tangent to said arcuate path and into said mold adjacent said centering ring, cover feeding devices disposed on the side of said path of the bodies opposite said centering ring and movable toward said ring for feeding a cover into said centering ring in a position axially spaced relative to said body, actuating means for operating said cover feeding devices in time with the rotation of said ring and mold, a squaring element carried on said cover feeding devices and movable toward said mold for engaging said body adjacent a corner thereof for squaring-up said body in said mold to align the sides of the body with the contour of said fed cover received in said centering ring, and pusher means movable in time with the rotation of said mold for pushing said squared-up body through said centering ring for the application of the cover thereto.

4. In a machine for attaching covers to rectangular can bodies, the combination of a rotatable centering ring, a mold disposed in axial alignment with said centering ring, means for continuously rotating said ring and said mold in an arcuate path and in unison, body feeding devices for advancing a can body along a path substantially tangent to said arcuate path and

into said mold adjacent said centering ring, cover feeding devices disposed on the side of said path of the bodies opposite said centering ring and movable toward said ring for feeding a cover into said centering ring in a position axially spaced relative to said body, actuating means for operating said cover feeding devices in time with the rotation of said ring and mold, a squaring element carried on said cover feeding devices and movable toward said mold for engaging said body adjacent a corner thereof for squaring-up said body in said mold to align the corners of the body with the corners of said fed cover received in said centering ring, a pivotally mounted presser pad carried on said cover feeding devices in advance of said squaring element, means for rocking said presser pad on its pivotal mounting and toward said mold for compressing the body against said mold to straighten the sides of the body if bulged so that they will align with said cover, and pusher means movable toward said mold in time with the rotation of said mold for pushing said squared-up and debulged body through said centering ring for the application of the cover thereto.

5. In a machine for attaching covers to rectangular can bodies, the combination of a rotatable turret, a centering ring carried on and movable with said turret, a mold disposed in axial alignment with said centering ring, actuating means for continuously rotating said turret and said mold in unison, body feeding devices for advancing a can body along a straight line path of travel into said mold adjacent said centering ring, a rotatable spider wheel disposed opposite said turret, means for continuously rotating said

wheel in time with said turret, a cover feed track disposed adjacent said wheel and leading to said turret for guiding a cover to said centering ring, a feed dog mounted on said wheel for feeding said cover along said track and into said centering ring in axially spaced relation to an end of said can body, a squaring finger mounted on said wheel adjacent said feed dog for engaging said body adjacent a corner thereof for shifting the sides of said body relative to each other in said mold to align the end of the body with the contour of the cover in said centering ring, pusher means rotating with said turret in axial alignment with said centering ring, and means operable in time with said turret to actuate said pusher means for pushing the squared-up body through said centering ring for the application of the cover thereto.

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