

Jan. 9, 1945.

J. H. MURCH ET AL

2,366,748

CAN CLOSING MACHINE

Filed April 4, 1941

2 Sheets-Sheet 1

Fig 1

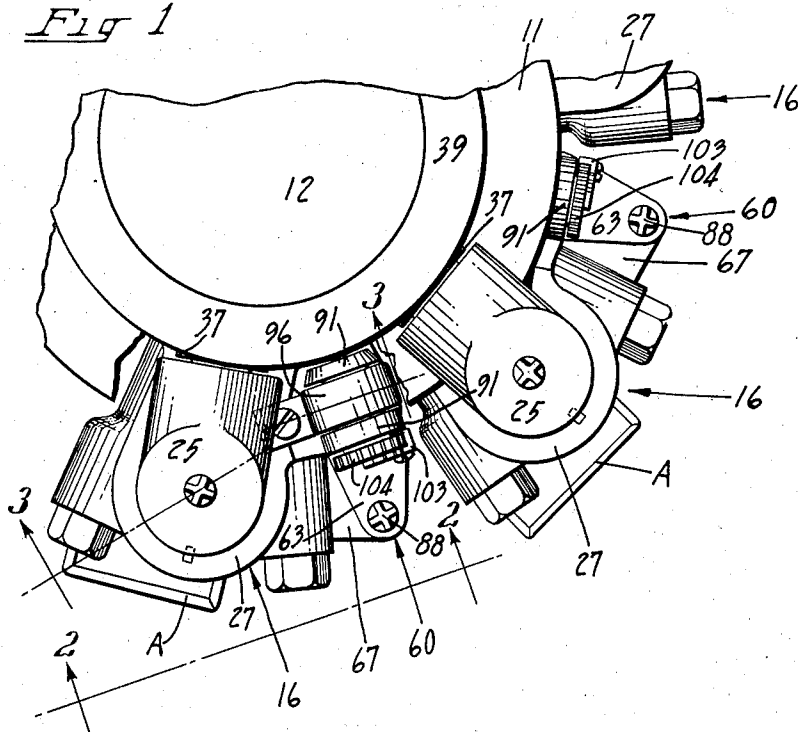
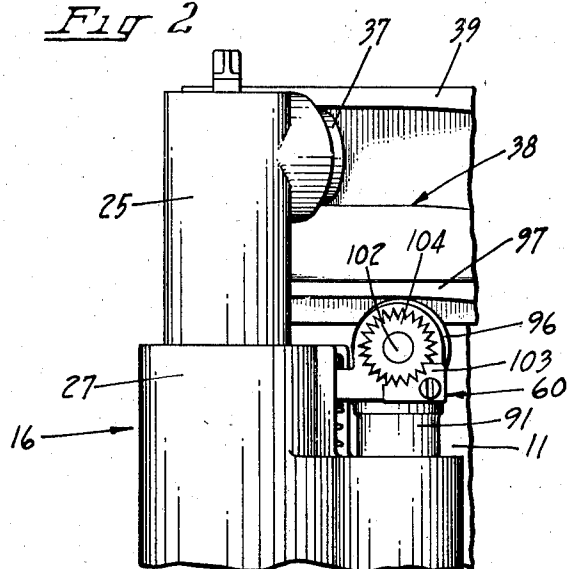


Fig 2



INVENTOR.
John H. Murch
Ronald E. Nordquist
 BY *Ivan D. Thornburgh*
Chas. H. Erbe
 ATTORNEYS

Jan. 9, 1945.

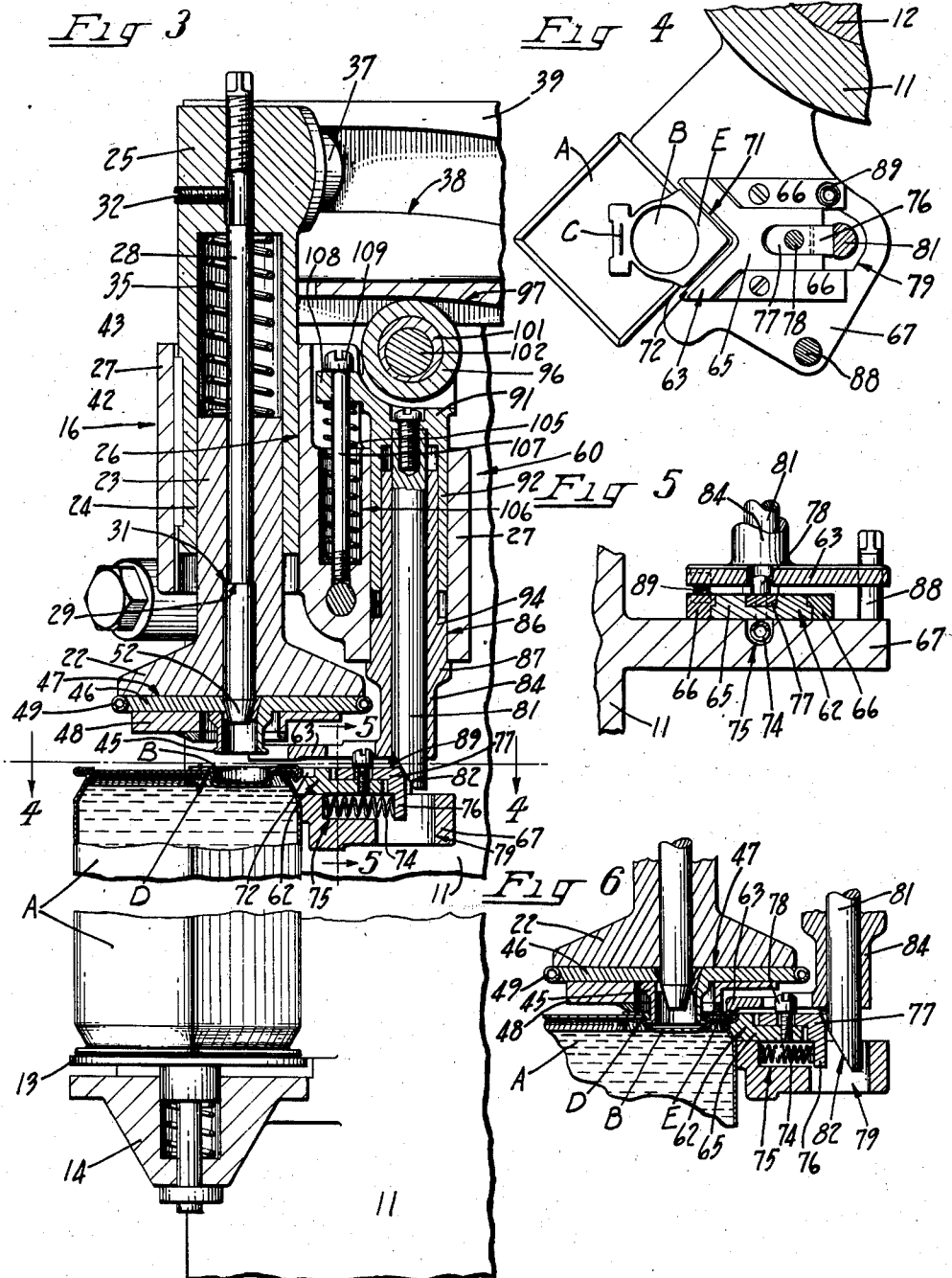
J. H. MURCH ET AL

2,366,748

CAN CLOSING MACHINE

Filed April 4, 1941

2 Sheets-Sheet 2



INVENTOR.
John H. Murch
 BY *Ronald E. J. Nordquist*
Chas. H. Ene
 ATTORNEYS

UNITED STATES PATENT OFFICE

2,366,748

CAN CLOSING MACHINE

John H. Murch, East Orange, and Ronald E. J. Nordquist, Maplewood, N. J., assignors to American Can Company, New York, N. Y., a corporation of New Jersey

Application April 4, 1941, Serial No. 386,919

9 Claims. (Cl. 226—86)

The present invention relates to can closing machines for sealing the flap or attached closure element of a filled fibre milk container, can or bottle and has particular reference to sealing a portion of the flap down over an edge of the container. This is an improvement over United States Patent 2,170,821, issued August 29, 1939, to J. M. Hothersall et al. on Can closing machine.

An object of the invention is the provision of a can closing machine for sealing filled fibre milk containers of the character having closure elements formed with an extended flap wherein the flap is sealed down over the pouring edge of the container to protect this edge against contamination during shipment and storage.

Another object is the provision of such a machine for sealing filled fibre milk containers of the character having hingedly attached extended flap closure elements which are adapted to be inserted in part into and close a filling and dispensing opening in a wall of the container wherein the inserted portion of the closure element is extruded or expanded after it is in place in the filling and dispensing opening to lock the element in place while the extended flap portion of the element is simultaneously sealed down over an adjacent edge of the container to protect the pouring edge against contamination.

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 portion of a can closing machine embodying the instant invention;

Fig. 2 is a fragmentary side elevation of the machine shown in Fig. 1;

Fig. 3 is an enlarged vertical sectional view taken substantially along the broken line 3—3 in Fig. 1, with parts broken away, and showing a container in place for sealing, the upper portion of the container being shown in section;

Fig. 4 is a horizontal plan section taken substantially along the line 4—4 in Fig. 3, with parts broken away;

Fig. 5 is a vertical section taken substantially along the line 5—5 in Fig. 3, with parts broken away; and

Fig. 6 is a vertical sectional detail view of a portion of the devices and one corner of a posi-

tioned container as shown in Fig. 3, the view showing parts of the devices in a different position from that shown in Fig. 3.

As a preferred embodiment of the invention the drawings illustrate principal parts of the can closing machine disclosed in the above mentioned Hothersall et al. patent. In such a machine a filled fibre milk container A (Figs. 3 and 4) of preferably rectangular cross section is closed and sealed with a friction plug closure element B which is hingedly attached by a wire staple C to the top of the container.

The friction plug portion of the closure element B is inserted into and closes a filling and dispensing opening D formed in one corner of the container top wall. After insertion into the dispensing opening D when the container has been filled, the closure element is extruded or expanded in part to produce an annular bead inside the container. This is to lock and seal the closure element in place on the filled container.

The machine herein shown to exemplify the instant invention is best adapted to seal containers of the character disclosed in United States Patent 2,182,818, issued December 12, 1939, to J. H. Murch. Such a container includes a closure element B formed with an extended flap portion E which projects over the container top wall adjacent the dispensing opening and extends down over and under the adjoining edge of the container to protect these surfaces against contamination during shipment and storage so that they may be used as a pouring lip for the container when the latter is opened. This flap E is crimped in place securely to hold it against displacement.

In the machine shown in the drawings the containers move along a curved path of travel with a rotating sleeve 11 (Figs. 1, 2, 3 and 4) which revolves on a vertically disposed stationary post 12. The post may be a part of or may be supported on the main frame of the machine as disclosed in the Hothersall patent.

The containers A are supported on yieldable pads 13 retained in brackets 14 which are formed on the sleeve 11. There are a plurality of these pads equally spaced around the sleeve and the containers are deposited on them a single container to a pad and are discharged from them in any suitable manner, preferably as shown in the Hothersall machine patent hereinabove mentioned.

Above each support pad 13 there is a closure element sealing unit generally indicated by the numeral 16 (Figs. 1, 2 and 3). Each sealing

unit is located directly over the closure element B of the container A as it rests on its pad 13. The closure element is in inserted or closed position in the dispensing opening D (as shown in Fig. 3) when the container is deposited on its support pad.

Each sealing unit 16 includes a head body 22 (Fig. 3) having an upright hollow stem 23 which fits within a vertically movable sleeve section 24 of a cam slide 25. The cam slide is carried in a bore 26 which extends vertically through a head block 27 formed on the outside of and preferably as an integral part of the rotating sleeve 11. The head body 22 and its stem 23 are supported on a rod 28 which extends down through the middle of the cam slide sleeve section 24 and through the head body stem, the lower end of the rod having a shouldered portion 29 which engages with a shoulder 31 formed on the inside of the head body stem.

The upper end of the rod 28 is threaded into the upper end of the cam slide 25 and is locked in place by a setscrew 32 which is threaded into the cam slide. A compression spring 35 surrounds the rod and is interposed between the cam slide and the top of the head body stem 23 and provides a yieldable connection between these parts.

At its upper end the cam slide 25 carries a cam roller 37 which operates in a cam groove 38 formed in a stationary cam 39. The cam is secured to the upper end of the stationary post 12. A feather 42 carried in the cam slide operates in a featherway 43 cut in the head block 27 and this prevents the cam slide from turning in the head block.

As the sleeve 11 rotates around the post 12 it carries the cam roller 37 of each cam slide 25 around in the cam groove 38 and this results in a movement of each cam slide 25 in its head block 27 first through a downward stroke and thence through an upward stroke. On the downward stroke of the cam slide the head body 22 is brought into engagement with the top of the container A.

While the head body 22 is in engagement with the top of the filled container A the plug section of the closure element is extruded or expanded to seal it in place. This expanding action is brought about by a plurality of arcuate shaped segmental die members 45 which depend from the inner ends of slide bars 46 disposed in radial grooves 47 in the bottom of the head body 22.

A bottom plate 48 which is secured to the bottom of the head body retains the bars in place while an endless coiled spring 49 which surrounds the head bottom and engages the outer ends of the slide bars, maintains them under pressure tending to collapse the die elements. The inner ends of the slide bars are beveled from the top where they are engaged by a lower tapered end 52 of the rod 28.

Hence when the head body 22 moves down onto the container top the depending die members 45 project down into the inserted plug section of the closure element B, as best shown in Fig. 6. This engagement of the head body with the container arrests its further downward movement and thereafter as the cam slide continues to move down it forces the tapered lower end of rod 28 against the inner beveled ends of the slide bars 46 and this shifts the bars outwardly against the resistance of the encircling spring 49 thus bringing the parts into expanded position.

The shifting of the slide bars 46 expands the die members 45 against the inside vertical wall of the closure element plug section and thus extrudes or expands the wall to produce the holding or sealing bead hereinbefore mentioned. It is this expanding or bead forming action that seals the closure element in place.

Simultaneously with this closure element sealing operation, the flap E which projects over the edge of the container is sealed in place. This sealing of the flap E is brought about by a crimping device 60 (Figs. 1, 2, and 3) which is located adjacent the sealing head unit and which moves around with the unit. There is one of these crimping devices for each sealing unit.

Each crimping device 60 includes a horizontally movable crimping tool 62 (Figs. 3, 4, 5 and 6) and a vertically movable pressure foot 63 which cooperate in performing the flap sealing operation. The crimping tool 62 is formed as a part of a slide 65 which operates in a pair of spaced and parallel gibs or guides 66 secured to a flat lug extension 67 which extends out from and is preferably an integral part of the rotating sleeve 11.

The inner end of the crimping slide 65 is formed with a right angle V-shaped notch 71 which permits the slide to fit snugly around one corner of the container A while its closure element is being sealed, this corner being the one where the closure element is located. The inner edge of the slide adjacent the notch is provided with an inwardly extending shoulder or stepped crimping edge 72.

The slide 65 is normally held in a retracted position away from the container by a compression spring 74 which is disposed in a pocket 75 formed in the lug extension 67. The spring presses against a depending leg 76 of an angle member 77 adjustably secured to the slide by a screw 78. Adjustment of this angle member may be obtained to position the slide correctly relative to the container. The leg 76 of the angle member extends down into a clearance hole 79 formed in the lug extension 67.

Hence when the slide 65 is pushed inwardly toward the container the notch 71 fits around the corner of the container and the stepped crimping edge 72 of the tool extends under the top edge of the container. The outer edge of the flap E of the closure element preferably extends down over the outer edge of the container when the latter is placed in position for sealing. Hence when the crimping slide moves in toward the container, the stepped crimping edge of the slide engages against such overhanging marginal portion of the flap E and thereby folds it under the top seam edge of the container, as shown in Fig. 6.

Shifting of the crimping slide 65 into flap crimping position against the container is effected by a vertically movable slide actuating rod 81 having a beveled lower end 82 which rides against the leg 76 of the slide angle member 77. The rod extends up through a sleeve 84 which is formed on the pressure foot 63. The sleeve is disposed in a vertical bore 86 in the sealing head block 27 and is formed with an outer stop shoulder 87 which normally engages against the bottom of the head block.

The sleeve is prevented from turning in its bore 86 by a pilot pin 88 (Fig. 5). The pin extends down through a guide hole in the foot 63 and is threaded into the lug extension 67.

The sleeve 84 is retained normally in this engaged position by a compression spring 89 which is interposed between the bottom of the sleeve and the top of one of the crimping slide gibs 66. The ends of the spring are seated in pockets formed in the sleeve and in the gib.

The upper end of the slide actuating rod 81 is secured to a cam slide member 91. The slide member is formed with a depending skirt section 92 which extends down into the bore 86 and surrounds the upper end of the sleeve 84. For this latter purpose the upper end of the sleeve is reduced in diameter. This reduction in diameter produces a step or shoulder 94 in the sleeve and this step is normally spaced away from the lower end of the skirt section 92 of the cam slide member 91, as in Fig. 3.

The cam slide member 91 carries a cam roller 96 which operates against a cam track 97 formed on the stationary cam 39. The roller is rotatably mounted on a bushing 101 which in turn is eccentrically mounted on and secured to a pin 102 carried in the slide member. Hence by turning the pin 102 the roller may be slightly raised or lowered and thus change the position of the cam slide relative to the cam. This change in position also affects the relation between the tapered lower end of the actuating rod 81 and the crimping slide 65.

After an adjustment of the roller pin, it may be locked in place by a locking block 103 (Fig. 2) having locking teeth which engage in co-operating teeth formed on the periphery of a locking wheel 104 carried on the outer end of the pin 102. The locking block is held in place by a screw which is threaded into the cam slide member 91.

The cam roller 96 is maintained in operating engagement with the cam track 97 by a compression spring 105. The spring is disposed in a vertical pocket 106 in the head block 27 and surrounds a long screw 107 which extends down through the middle of the pocket and is threaded into the head stock at the bottom of the pocket. The upper end of the screw projects through a lug 108 formed on the cam slide member 91 and the spring presses upwardly against this lug. A head 109 on the upper end of the screw provides a stop which prevents too great an upward movement of the slide member.

Hence as the cam roller 96 traverses the stationary cam track 97 with the turning of the main sleeve 11, the track depresses the cam slide member 91 at the proper time and this forces the slide actuating rod 81 down against the rear end of the angle member 77 of the crimping slide 65. It is this movement of the actuating rod that forces the crimping slide inwardly against the container and thereby folds the flap E under the outer edge of the container.

As the cam slide member 91 continues to move down its skirt section 92 engages against the shoulder 94 on the pressure foot sleeve 84 and this depresses the sleeve. This downward movement of the sleeve shifts the pressure foot 63 down against the top of the container and thus squeezes the unfolded portion of the flap E down against the top of the container edge and the folded under portion of the flap is pressed up against the under side of the container edge. The stepped inner edge 72 of the crimping slide 65 backs up the container during this crimping action. The foot 63 is also of angular shape to conform to the configuration of the notched out

crimping tool 62 so that the pressure is applied equally along the edge only of the container.

The container A is usually coated on its exterior surface with a film of wax and this wax serves as an adhesive to retain the crimped-over flap E in position during shipment and storage of the container. Where a coating of wax is not used on the container a suitable adhesive may be used on the flap E if desired.

This crimping of the flap E in place and the simultaneous expanding of the friction plug section of closure element B completes the sealing of the container. The pressure on the crimping slide 65 is thereupon released by an upward movement of the actuating rod 81 and the compression spring 74 thus moves the slide into a retracted position. This upward movement of the rod also releases the pressure on the pressure foot 63 and the foot is thereupon lifted away from the container by the compression spring 89.

Simultaneously with this release of the crimping tools, the plug expanding die members 45 are contracted by the spring 49 which is allowed to act as the tapered wedge surface 52 slides out of holding position upon the upward movement of the operating rod 28. This releases the die members from the plug section of the closure element and the entire head body 22 and its associated parts are lifted free of the container. This is brought about by the cam 39 and roller 37. The sealed container is thus free to be discharged from the machine in any suitable manner, for example as disclosed in the Hothersall patent hereinbefore mentioned.

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 closing and sealing a fibre container having a closure element hingedly mounted on a wall thereof adjacent a corner of the container with an extension of the closure element projecting over a protruding edge of the container, the combination of a crimping tool yieldably mounted adjacent and slidable toward the container and engageable at a corner of the container for crimping the projecting extension of the closure element around the container edge to protect the edge against contamination, a yieldable pressure foot movable in a direction normal to the movement of said crimping tool for pressing the crimped closure element extension into tight engagement with the container edge to hold it in edge protecting position, a sleeve on said pressure foot, a reciprocable member slidable within said sleeve and engageable with said crimping tool for actuating said tool and also engageable with said sleeve for actuating it and the pressure foot thereon in timed relation with the actuation of said tool, and cam devices for shifting said reciprocable member.

2. In a machine for closing and sealing a fibre container having a closure element mounted on a wall thereof with an extension of the closure element projecting over an edge of the container, the combination of means engageable with the projecting extension of the closure element for crimping it around the edge of the container, a

pressure element engageable with said container for pressing the crimped extension of the closure element tightly against the container edge, and means slidably movable within and relative to said pressure element for moving said crimping means into crimping engagement with said closure element extension.

3. In a machine for closing and sealing a fibre container having a closure element hingedly mounted on a wall thereof adjacent a corner of the container with an extension of the closure element projecting over a protruding edge of the container, the combination of a crimping tool movable toward the container and engageable at a corner of the container for crimping the projecting extension of the closure element around the container edge to protect the edge against contamination, a pressure foot movable in a direction normal to the movement of said crimping tool for pressing the crimped closure element extension into tight engagement with the container edge to hold it in edge protecting position, and means slidably movable within and relative to said pressure foot for moving said crimping tool into crimping engagement with said closure element extension for the purpose specified.

4. In a machine for closing and sealing a fibre container having a closure element hingedly mounted on a wall thereof adjacent a corner of the container with an extension of the closure element projecting over a protruding edge of the container, the combination of a crimping tool movable toward and away from the container and engageable at a corner of the container for crimping the projecting extension of the closure element around the container edge to protect the edge against contamination, a pressure foot movable in a direction normal to the movement of said crimping tool for pressing the crimped closure element extension into tight engagement with the container edge to hold it in edge protecting position, and reciprocable actuating means for operating said crimping tool and said pressure foot in the proper direction and in timed order during movement through a single stroke, the actuating means for said crimping tool being slidably movable within and relative to said pressure foot.

5. In a machine for closing and sealing a fibre container having a closure element hingedly mounted on the top wall thereof with a part inserted into an opening in said wall and further having a flap extension projecting over an adjacent edge of the container for protecting the edge against contamination, the combination of a sealing head, means carried by and movable relative to said sealing head for expanding the inserted portion of said closure element within the container opening and beneath the edges of the same for sealing the container, instrumentalities also carried by and movable relative to said sealing head and operable upon the closure element flap extension for crimping it over the container edge for sealing the extension against the top of the container edge, said crimping instrumentalities including independent devices movable in directions at right angles to one another for the purpose specified, and means for simultaneously actuating said expanding means and crimping instrumentalities in timed relation for the expanding and crimping operations.

6. In a machine for closing and sealing a fibre container having a closure element hingedly mounted on the top wall thereof with a part inserted into an opening in said wall and further

having a flap extension projecting over an adjacent edge of the container for protecting the edge against contamination, the combination of mechanism for advancing a container along a predetermined path of travel through the machine, a sealing head, sealing means carried by and movable relative to said sealing head and disposed in the path of the advancing container above its said closure element for expanding the inserted part of said closure element within the container opening to seal the container, and co-operating independent instrumentalities carried by said sealing head and operable in a direction at right angles to one another in timed relation to the actuation of said sealing means for crimping the flap extension over and beneath the container edge and for sealing said extension tight against the top of the container.

7. In a machine for closing and sealing a fibre container having a friction plug closure element hingedly mounted on the top wall thereof with a part inserted into an opening in said wall and further having a flap extension projecting over an adjacent edge of the container for protecting the edge against contamination, the combination of mechanism for advancing a container along a predetermined path of travel through the machine, vertically movable sealing means disposed above the container closure element for expanding the inserted part of said closure element within the container opening to seal the container, a crimping tool cooperatively mounted relative to said sealing means and slidable toward the container and engageable with a corner of the container for crimping the projecting extension of the closure element around the container edge to protect the edge against contamination, a pressure foot movable in a direction normal to the movement of said crimping tool for pressing the crimped closure element extension into tight engagement with the container edge to hold it in edge protecting position, and means slidably mounted within and movable relative to said pressure foot for actuating said tool for the crimping operation.

8. In a machine for closing and sealing a fibre container having a closure element mounted on a wall thereof with an extension of the closure element projecting over a protruding edge of the container, the combination of a crimping tool slidable toward and engageable with the projecting extension of the container closure element for folding the said extension under the outer edge of the container, a pressure foot movable in a direction normal to the sliding movement of said crimping tool for squeezing the folded portion of said closure element extension against the outer edge of the container with the said extension backed up by said crimping tool, resilient means for normally holding said pressure foot out of engagement with said closure element extension, and means for moving said crimping tool and said pressure foot against the action of said resilient means to crimp said closure element in container edge protecting position.

9. In a machine for closing and sealing a fibre container having a closure element mounted on a wall thereof with an extension of the closure element projecting over a protruding edge of the container, the combination of a crimping tool slidable toward and engageable with the projecting extension of the container closure element, a pressure foot spaced above said crimping tool and having a movement in a direction normal to the sliding movement of said crimping tool, actu-

ating means for sliding said crimping tool against said closure element extension to fold parts thereof under the outer edge of the container and to back up the folded parts, said actuating means also lowering said pressure foot to press it on the folded closure element and to crimp it on said protruding container edge, and a sliding connec-

tion between said pressure foot and said crimping tool for delaying the downward movement of said pressure foot by said actuating means until said crimping tool has moved into its backing-up position.

JOHN H. MURCH.

RONALD E. J. NORDQUIST.