Jan. 24, 1939. J. H. MURCH 2,144,634

CAN CLOSING MACHINE

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Fig. 1

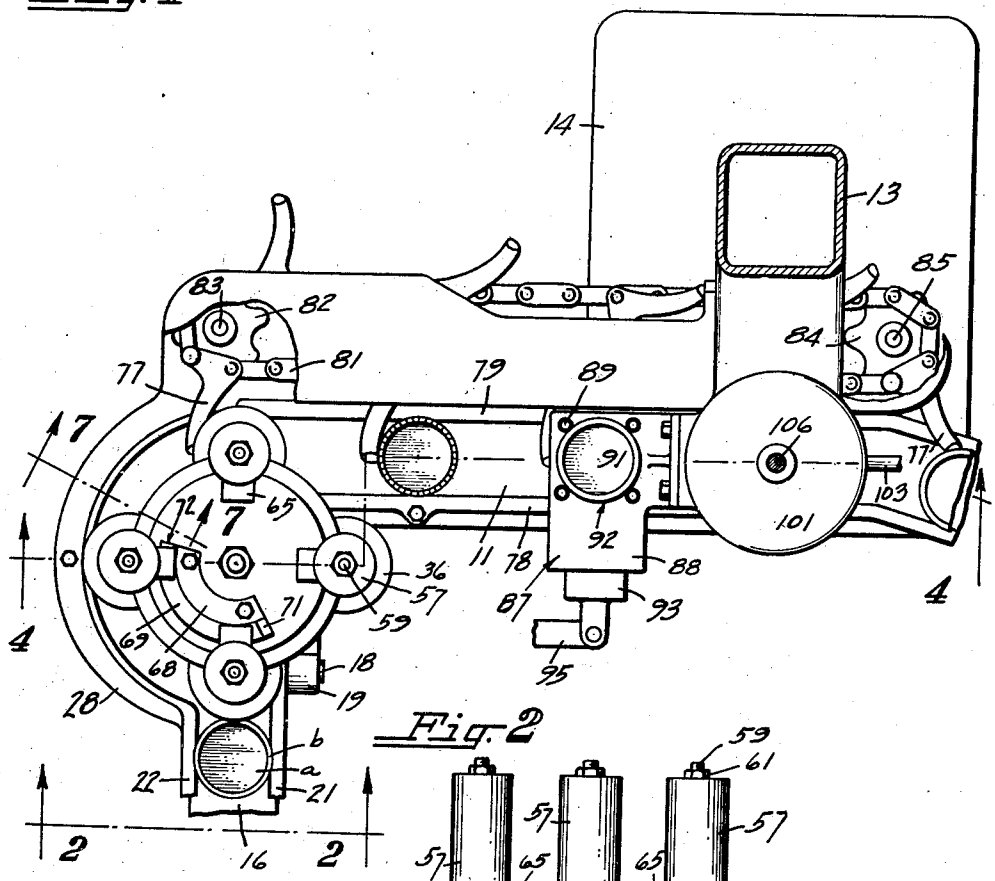



Fig. 2

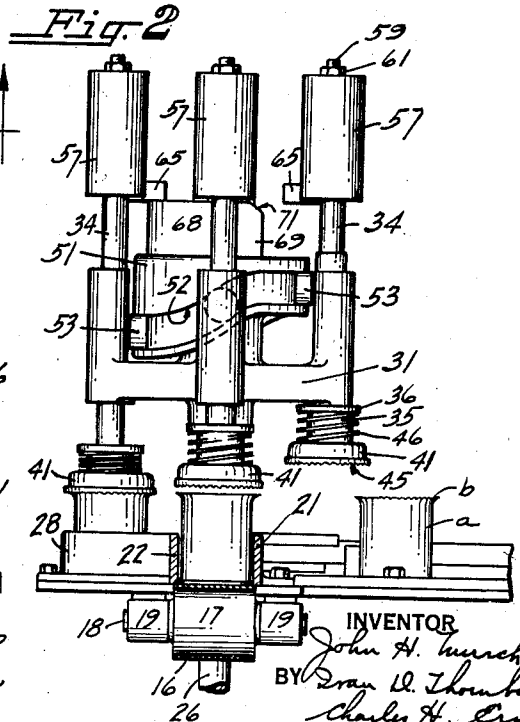
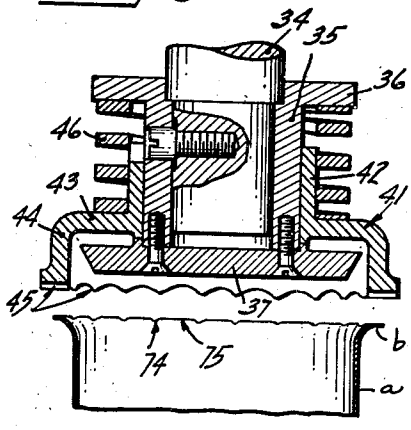



Fig. 3




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Fig. 4

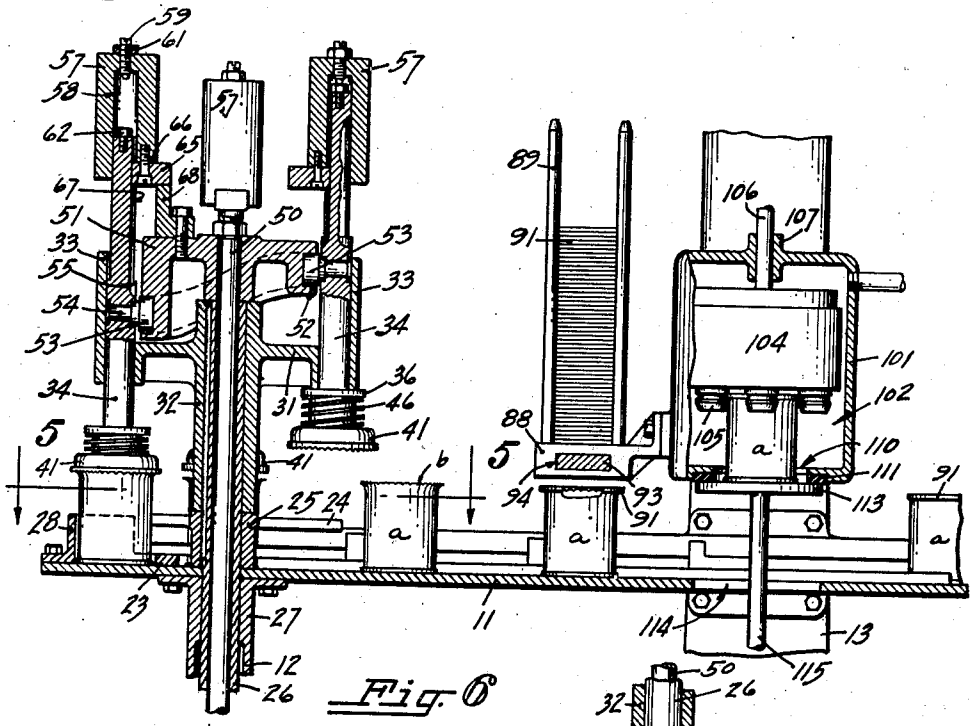



Fig. 5

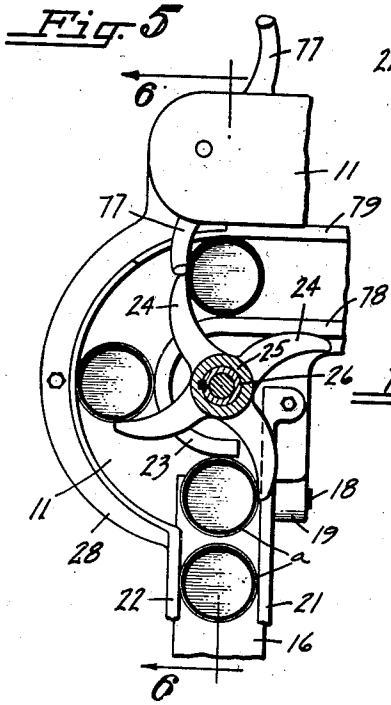



Fig. 6

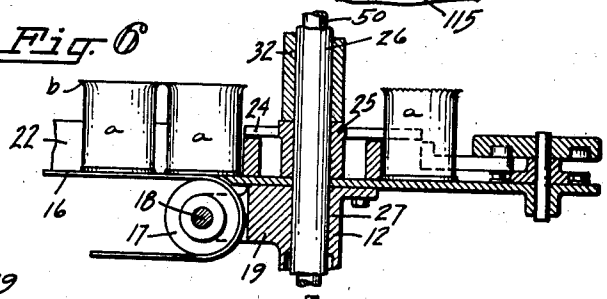
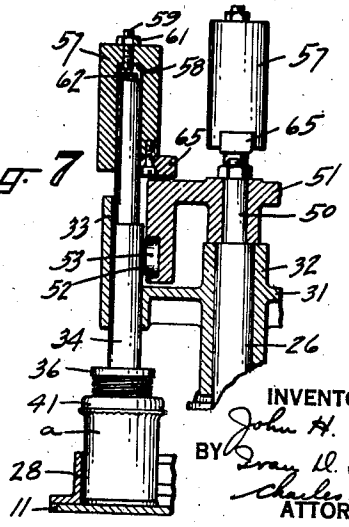



Fig. 7




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# UNITED STATES PATENT OFFICE

2,144,634

## CAN CLOSING MACHINE

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Application July 17, 1935, Serial No. 31,913

9 Claims. (Cl. 113—7)

This invention relates in general to container closing machines and has particular reference to mechanism for altering a sealing flange or edge of a container for cooperation with a subsequently positioned cover to permit quick vacuumization or gassing of the container prior to or simultaneous with the hermetic sealing of the container.

An object of the invention is the provision of a mechanism which reforms, indents or corrugates a flange or edge of a container to be closed to provide clearance, spaces or fluid passages between the container flange or edge and a subsequently positioned cover, the clearance being utilized in subsequent operations performed on the container, such as vacuumizing or gassing operations.

Another object is the provision of such a mechanism which is readily adapted for association with a feeding mechanism and which prepares a flange of a filled container to be vacuumized or gassed so as to permit rapid and uniform vacuumizing or gassing of the container interior while the cover loosely engages the container flange and prevents escape of the container contents.

Another object is the provision in a filled container closing machine of such a flange indenting mechanism which readily lends itself for association with a topper device and comes into flange reforming action with the latter.

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 topping and vacuum closing machine embodying the instant invention, parts being broken away and other parts shown graphically;

Fig. 2 is a front elevational view of the left hand part of the machine as viewed in Fig. 1, the view being taken substantially along the line 2—2 in that figure, parts being shown in section;

Fig. 3 is an enlarged fragmentary sectional view showing one of the topper and flange reforming heads in detail;

Fig. 4 is a sectional view taken substantially along the broken line 4—4 in Fig. 1;

Fig. 5 is a sectional plan view taken substantially along the line 5—5 in Fig. 4;

Fig. 6 is a transverse sectional view taken substantially along the line 6—6 in Fig. 5; and

Fig. 7 is a sectional view taken substantially along the line 7—7 in Fig. 1.

In the machine disclosed in the drawings as exemplifying the instant invention, filled containers or cans *a*, having open top ends and the usual outwardly turned flanges *b*, are introduced into the machine in a continuous procession by a conveyor communicating with any suitable source of container supply. The conveyor delivers the containers or cans individually and successively into a continuously rotating star wheel which transfers them to a table and propels them in an upright position along a curved guideway under a topping and can flange reforming mechanism.

While under this mechanism and while being propelled along the curved guideway a topper head is moved down into the open mouth of a can and compacts its contents, so that the mouth of the can will be free for subsequent operations. Simultaneously with this topping operation the upper surface of the flange surrounding the mouth of the can is forcibly engaged by a serrated plunger ring which is associated with the topper head. This action bends or reforms the can flange into an undulated or corrugated form having alternate depressions and high spots. Near the end of the curved guideway, the topper head and serrated ring are raised out of engagement with the can.

The can is now engaged by a feeding device which carries it under a cover feed mechanism which as the can passes superimposes a cover on its open top and over its flange. The cover flange lightly rests on top of the high spots of the undulated can flange and sets off the depressions forming uniformly distributed spaces or fluid passages, around the can mouth, providing unobstructed communication with the can interior.

After passing the cover feed mechanism, the feeding device carries the covered can to a closing mechanism where it is momentarily halted on top of a lifter pad. The pad immediately lifts the can into a vacuum chamber containing a suitable seaming head for closing the can at the proper time. Before closing, however, the chamber is vacuumized and the air within the can is exhausted quickly and uniformly through the passages formed by the undulated can body flange in cooperation with the cover flange. The can is then closed by the usual seaming head which irons out the undulated flange and locks it in the can seam. This completes the operation and the lifter pad is then lowered to its original position where the can is again engaged by the feeding device and is carried out of the machine to any suitable place of deposit.

A preferred form of machine embodying the invention disclosed in the drawings, comprises in part a can supporting table 11 (Figs. 1 and 4) which is horizontally curved at the feed in end, which is mounted on a pedestal 12. The other end of the table is substantially straight and is supported on a column 13 having a base 14 (Fig. 1).

The cans are introduced into the machine adjacent the curved end of the table 11 on a continuously moving endless belt conveyor 16 (Figs. 1, 2, 5 and 6). This end of the conveyor is carried on a pulley 17 which is mounted on a shaft 18 held in bearings 19 formed in the pedestal 12. The opposite end of the conveyor communicates with any suitable supply of filled cans such as a filling machine or the like and is actuated from that end by any suitable means. Parallel guide bars 21, 22 confine the cans on the conveyor as they are carried toward the table.

At the table end of the conveyor (Fig. 5) a can *a* encounters an end of a curved guide rail 23 which is mounted on top of the table. The guide rail arrests are movement of the can in a straight direction and holds it in the path of an arm 24 of a continuously rotating star wheel 25. The star wheel rests on top of the curved end of the table at its hub center and is keyed to a vertical sleeve 26 which passes through the table and is journaled in a bearing 27 formed in the top of the pedestal 12. The sleeve extends down into the pedestal and at its lower end is continuously rotated by any suitable means.

The rotating arm 24 engages the can and sweeps it from the conveyor onto the table 11 and propels it over the curved end of the table under a topping and can flange reforming mechanism and between the inner guide rail 23 and a cooperating concentric outer guide rail 28. The latter is a curved extension of the rail 22 and is also secured to the top of the table 11.

The topping and can flange reforming mechanism comprises a spider member 31 (Figs. 2, 3 and 4) which is formed with a central elongated hub 32 which is keyed to the sleeve 26. The lower end of the hub rests on top of the starwheel 25 and so spaces the spider above the tops of the cans. The spider is provided with a plurality of vertical bearings 33 corresponding in number to the arms of the star wheel and placed in vertical alignment with the axis of the cans traveling under them. Each bearing carries a vertically sliding plunger rod 34 having a shouldered lower end on which is mounted a bushing 35 (Fig. 3). The upper end of the bushing is flanged as at 36 and the lower end carries a topping disc 37 (Fig. 3) which is slightly smaller in diameter than the open mouth of the can and which is normally disposed just above it.

Can flange reforming heads 41 are carried on each of the bushings 35 and each of these heads comprise a hub 42 which is slidably mounted on the bushing between the flange 36 and the topping disc. The lower end of the head is formed with an inverted cup shaped member having a horizontal flange wall 43 extending out from the hub and which at its outer edge merges into a depending cylindrical wall 44. This wall surrounds and projects below the topping disc 37 in circumferential alignment with the can flange. The lower end of the wall 44 is enlarged and its bottom face is serrated with a plurality of spaced tooth-like elements or projections 45. A heavy coiled spring 46 encircles the hub 42 and is interposed between the flange 36 and flange wall 43 and yieldingly holds the head 41 in engagement with the disc 37 when not in can flange reforming position.

The topping discs 37 and reforming heads 41 are periodically lowered and raised into and out of engagement with the cans traveling under them by cam action. This is effected by a stationary barrel cam 51 (Fig. 4) which rests on top of the spider member 31 and which is keyed and bolted to the upper end of a stationary shaft 50. The shaft extends down inside of the sleeve 26 and is held at its lower end by any suitable means. Cam 51 is provided with a suitable cam groove 52 which is cut in its periphery adjacent the bearings 33 and which is engaged by cam rollers 53. The rollers are mounted on projecting ends of studs 54 which are secured in each of the plunger rods 34 and which extend through slots 55 cut in the sides of the bearings 33.

The upper end of each plunger rod 34 (Fig. 4) extends above its bearing 33 and carries a weight 57 which cooperates with its associated head 41 in performing the can flange reformnig operation. The weight is formed with a central bore 58 which is closed at its top end. A set srcew 59 is threadedly secured in this end of the weight and is locked in position by a lock nut 61. The lower end of the screw projects into the upper end of the bore for cooperative action with a cap screw 62 threadedly secured in the top of each plunger rod 34. This action will be fully explained hereinafter.

The weight slides on the end of the rod 34 in the bore 58 and is prevented from turning on the rod by a key 65 which is secured in a slot 66 formed in the bottom of each weight. One end of the key engages within a keyway 67 cut in the rod while the other end of the key extends beyond the slot and into the path of a stationary lift cam 68. The cam is formed with an arcuated edge 69 which is beveled at one end as at 71 and has a sharp drop edge 72 at its opposite end. The cam 68 is mounted on top of the stationary cam 51, as illustrated in Fig. 1, so that it cooperates with the groove 52 in effecting proper timing between the can topping operation and the can flange reforming operation.

As the topping discs 37 are carried by their plunger rods 34 over the tops of cans being propelled across the table by the star wheel 25, the shape of the cam groove 52 causes the plunger rods to successively descend and lower the topping discs into the open mouths of the moving cans. This action presses the can contents below the open can tops. Simultaneously with this action the reforming head 41 associated with each topping device is lowered into position on top of the can flange where it remains under tension of the yielding spring 46 as the topping disc moves further down into the can. When the topping disc is in the can as far as it will go the upper end of the hub 42 engages the under side of the flange 36 providing a solid backing for the reforming head. By this time the can has been advanced to a position approximately one half way around the curved end of the table.

Just prior to the full insertion of the topping disc into the can the key 65 associated with the weight 57 engages the beveled end of the cam 68 and it rides up on the cam edge 69, raising the weight to a position illustrated in Fig. 4. It remains in this position and is carried along over the top of the can until the topping disc 37 is fully inserted into the can. At this time, when the can is about half way around the curve of the

table as explained above, the key 65 reaches the end 72 of the cam 68 and suddenly rides off, permitting the weight to fall in a sort of guillotine or trip hammer action.

In falling the weight carries the set screw 59 down into striking contact with the cap screw 62 (Fig. 7) and the impact imparts a sudden concussion to the reforming head 41. This concussion drives the projections 45 into the can flange, reforming it into an undulated surface having alternate depressions 74 and high spots or sections 75 (Fig. 3).

This completes the topping and flange reforming operation and while the can is propelled around the remaining curved part of the table the cam groove 52 raises the plunger 34, which in turn lifts the topping disc 37 and reforming head 41 out of and away from the top of the can. This action also raises the weight to a position where the key 65 is again in line with the beveled edge of the cam 68 in readiness for the next reforming operation.

As the can reaches the end of the curved section of the table 11 a moving finger 77 engages behind it and pushes it away from the starwheel 25 and along the remaining straight section of the table between parallel and spaced guide bars 78, 79 (Figs. 1 and 5). Bar 78 is an integral extension of the bar 23 while bar 79 is a separated cooperating extension of the bar 28. Both of these bars are secured to the top of the table 11.

There are a plurality of the fingers 77 mounted at intervals on an endless chain 81, and engaging behind successive cans as they leave the topping and can flange mechanism. The conveyor is disposed horizontally adjacent the table 11 and at one end is carried on an idler sprocket 82 which is mounted on a vertical shaft 83. At its opposite end it is carried on a drive sprocket 84 which is mounted on a vertical shaft 85 which is continuously rotated by any suitable means.

The cans moving along the table are passed under a can cover feeding device 87, which automatically drops a cover on top of each can as it passes. The cover lightly rests on top of the can flange *b* confining the contents, yet permitting access to the can interior above the contents through the flange depressions 74.

The cover feeding device 87 may be one of any number of suitable and well known devices, the device shown in Figs. 1 and 4 of the drawings being merely any exemplary type. This device comprises a bracket 88 which carries a plurality of vertical rods 89 which define a magazine for a stack of can covers 91. The bracket is provided with an opening 92 directly under the magazine and through which individual covers are periodically released by a slide gage 93, disposed in a slideway 94 formed in the bracket 88. The outer end of the gate is secured to the end of an actuating lever 95. This lever is moved by any suitable means in time with the other moving parts of the machine and periodically withdraws the gate in time with the passage of the cans under it to release the lowermost cover from the magazine and deposit it on top of a passing can.

The bracket 88 is secured to the side of a housing 101 which is formed as a part of the column 13 and which overhangs the table 11 as shown in Figs. 1 and 4. This housing encloses a vacuum chamber 102 which communicates with a suitable source of vacuum, through a pipe 103 threadedly secured in its side wall, and which houses a suitable can closing head 104. The closing head may be of any suitable type such as a double seaming device or the like having seam forming rollers 105. This head is mounted on the end of a shaft 106 which is journaled in a bearing 107 formed in the top of the housing 101, the shaft being continuously rotated by any suitable means.

The bottom of the housing is provided with an opening 110 having a sealing gasket 111 surrounding the edges defining the opening. It is under this opening that the can is positioned after leaving the cover feeding device, the can propelling finger 77 at this time being drawn back and halted in its forward conveying movement by cam action which is usual in this type of machine and well known in the art.

When halted under the opening 110 the can is in position on a lift pad 113 which is normally disposed in an opening 114 formed in the table 11. The pad is connected with a vertical rod 115 carried in suitable bearings formed on the front of the column 13. This rod is actuated when a can is in position on the pad to raise the can up into the chamber 102 into engagement with the closing head. The pad in raised position contacts the sealing ring 111 and thereby hermetically seals the chamber enclosing the can and its cover in a rarefied atmosphere. The sealed chamber is rapidly vacuumized through the pipe connection 103 and likewise the air in the can is quickly and uniformly exhausted through the passages or flange depressions 74. The closing head 104 then hermetically seals the cover onto the can, the undulated can flange being ironed out smooth during this operation and incorporated in the can seam.

After this closing operation the lifter pad and closed can are lowered to the level of the table 11 and the finger 77 again moves into engagement with the can and pushes it along the table toward the discharge end where it is discharged to any suitable place of deposit.

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.

I claim:

1. In a can closing machine, in combination, means for conveying an open top flanged can through the machine, means for deforming the flange of said can by providing alternate high and low sections therein, means for superimposing a cover over the open can and in engagement with said deformed flange to provide spaced passages communicating with the interior of said can, means for vacuumizing said can through said low sections of said deformed flange, and means for uniting said cover with said can flange while the can is in a vacuumized condition.

2. In a can closing machine, in combination, conveyor means for open top filled cans, a topping device arranged over the path of the cans and movable towards and away from the open ends of the latter, means associated with said topping device for reforming the closing edges of said cans to provide fluid passages therein, means for positioning covers over the open ends of said cans in engagement with said reformed edges, means for vacuumizing said cans through said passages, and means for uniting said covers with said reformed edges while the cans are in a vacuumized condition.

3. A can flange reforming device, comprising in combination, a movable head, serrated bending elements formed on said head, means for moving said head into and out of yielding engagement with the flange of a positioned can, weighted means for forcibly moving said bending elements into engagement with said can flange while said head is in position on said can and for forming spaced undulations in said flange around a desired portion thereof, and means for actuating said weighted means in time with the movement of said head.

4. A can topping and flange reforming mechanism, comprising in combination, a movable topping disc insertable into a filled open end can having a projecting flange, a movable head associated with said disc, bending elements on said head, and means for moving said disc into the open end of said can for compressing its contents and also for moving said head and its associated bending elements into engagement with said can flange for bending said flange so as to provide a plurality of depressions therein.

5. A can topping and flange reforming mechanism, comprising in combination a movable topping disc insertable into a filled open end can having a projecting flange, a movable head yieldingly associated with said disc, bending elements on said head, means for moving said disc into the open end of said can for compressing its contents and for simultaneously moving said head into yielding engagement with said can flange, and means for further moving said head and for forcibly pressing said bending elements into said flange for effecting a plurality of high and low sections in the same.

6. A can topping and flange reforming mechanism, comprising in combination, a conveyor for moving open end filled cans provided with sealing flanges, a movable topping disc arranged over the path of travel of said cans, a movable head associated with said disc, bending elements on said head, means for carrying said disc and said head over the top of a said moving can in time with said conveyor, and means for moving said disc and said head into engagement with the open end of said can for compressing the contents of said can and for bending the can flange so as to provide a plurality of depressions therein.

7. A can end flange reforming device, comprising in combination, a reciprocating head rotatably mounted for bodily movement in a circular path, means for rotating said head, a crimping die having peripheral serrations carried by said head, and means for moving said head and said die into crimping engagement with the end flange of a positioned open can during bodily movement of the latter in a path coinciding with the path of said head, for effecting a plurality of depressions in said flange disposed outwardly relative to the can body wall.

8. A can end flange reforming device, comprising in combination, a movable head rotatably mounted for bodily movement in a circular path of travel, means for rotating said head, a crimping die having peripheral serrations carried by said head, means for positioning said head and said die in superimposed engagement with the end flange of a positioned open can carried in a circular path of travel, and means for forcing said die into said can end flange while so engaged for effecting a plurality of depressions therein disposed outwardly relative to the can body wall.

9. A can end flange reforming device, comprising in combination, a head mounted for bodily movement in said device, a crimping die having peripheral serrations associated with said head, means for bodily moving said head in a predetermined path of travel over the top of and corresponding to the path of a bodily moving open can, means for moving said head into and out of engagement with the top of said moving can, and means for actuating said die while said head is in can engaging position for deforming the can end flange into an undulated shape having high and low sections disposed outwardly relative to the can body wall, said low sections providing passageways to the interior of said can when a cover is subsequently placed thereon.

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