April 12, 1938. E. N. LOWRY 2,113,699

MACHINE FOR ASSEMBLING KNOCK-DOWN CONTAINERS

Filed March 6, 1936 4 Sheets-Sheet 1

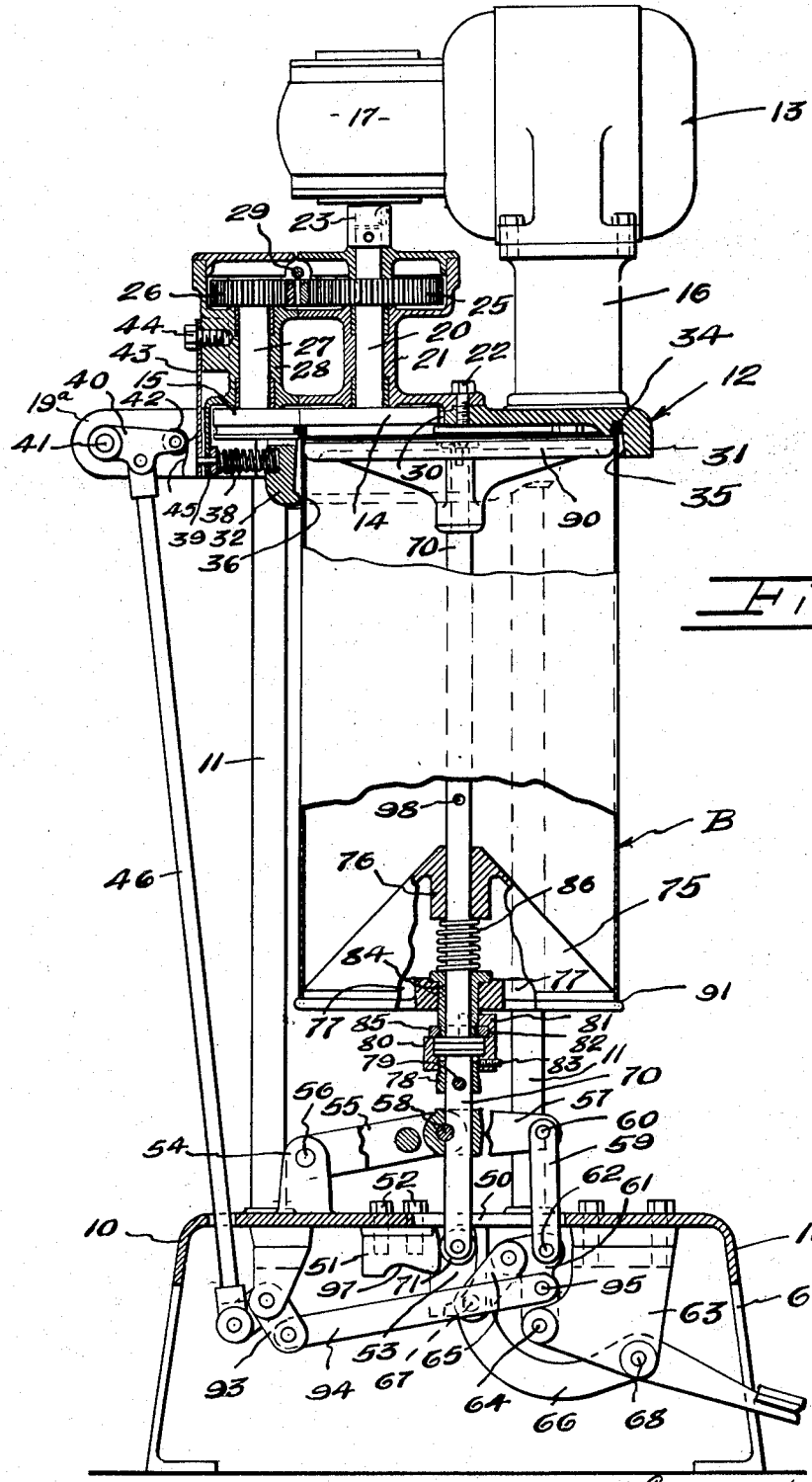


Fig. 1.

INVENTOR.

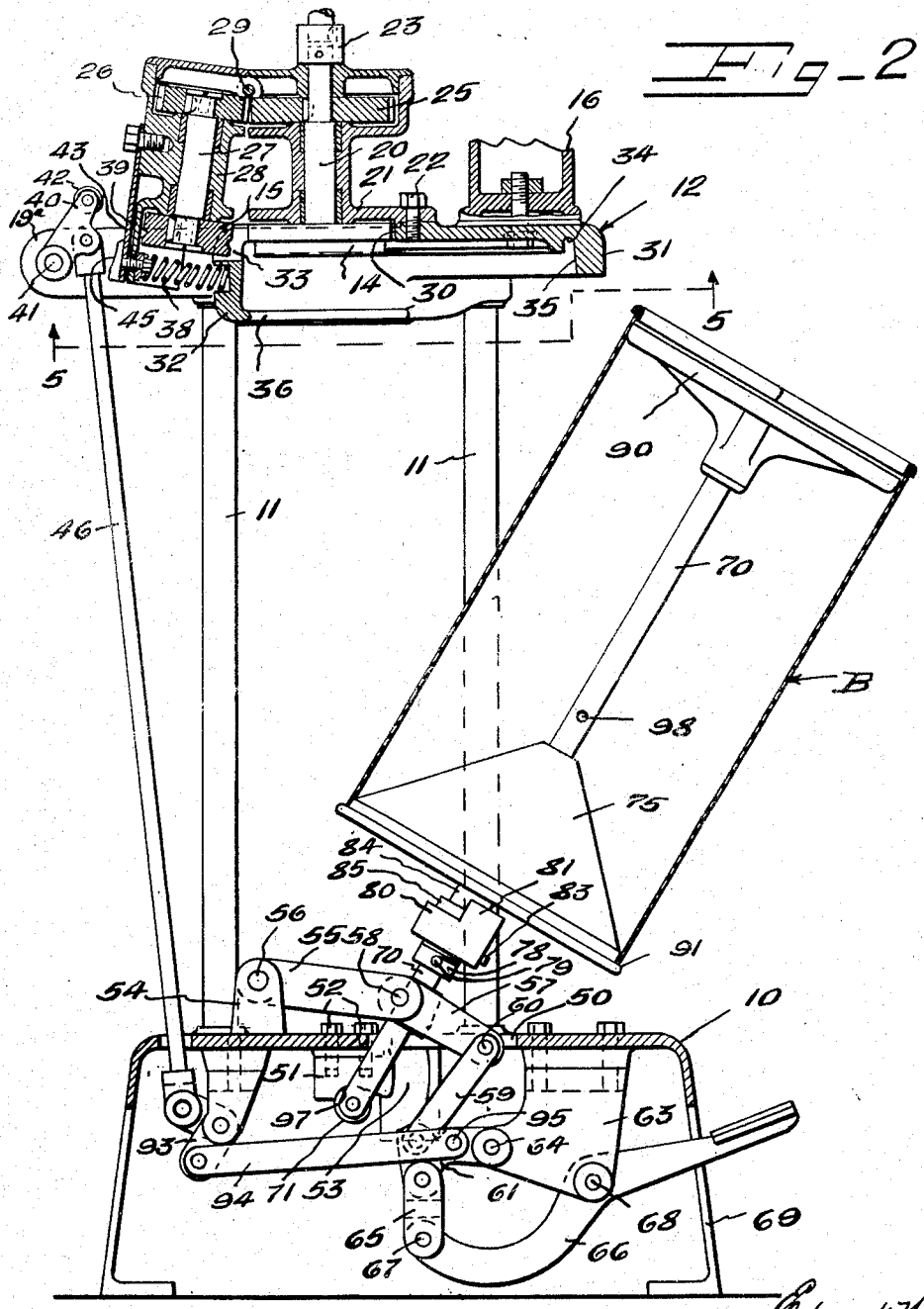
BY Edward N. Lowry
Bodell & Thompson.
ATTORNEYS.

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MACHINE FOR ASSEMBLING KNOCK-DOWN CONTAINERS

Filed March 6, 1936 4 Sheets-Sheet 2

Fig-2-



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MACHINE FOR ASSEMBLING KNOCK-DOWN CONTAINERS

Filed March 6, 1936 4 Sheets-Sheet 3

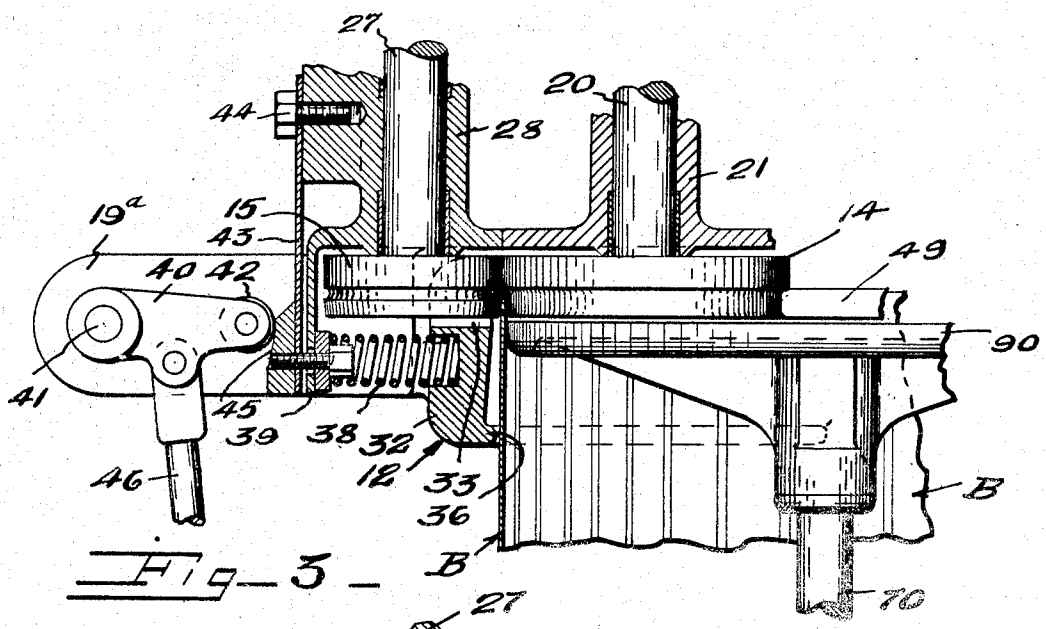


Fig. 3.

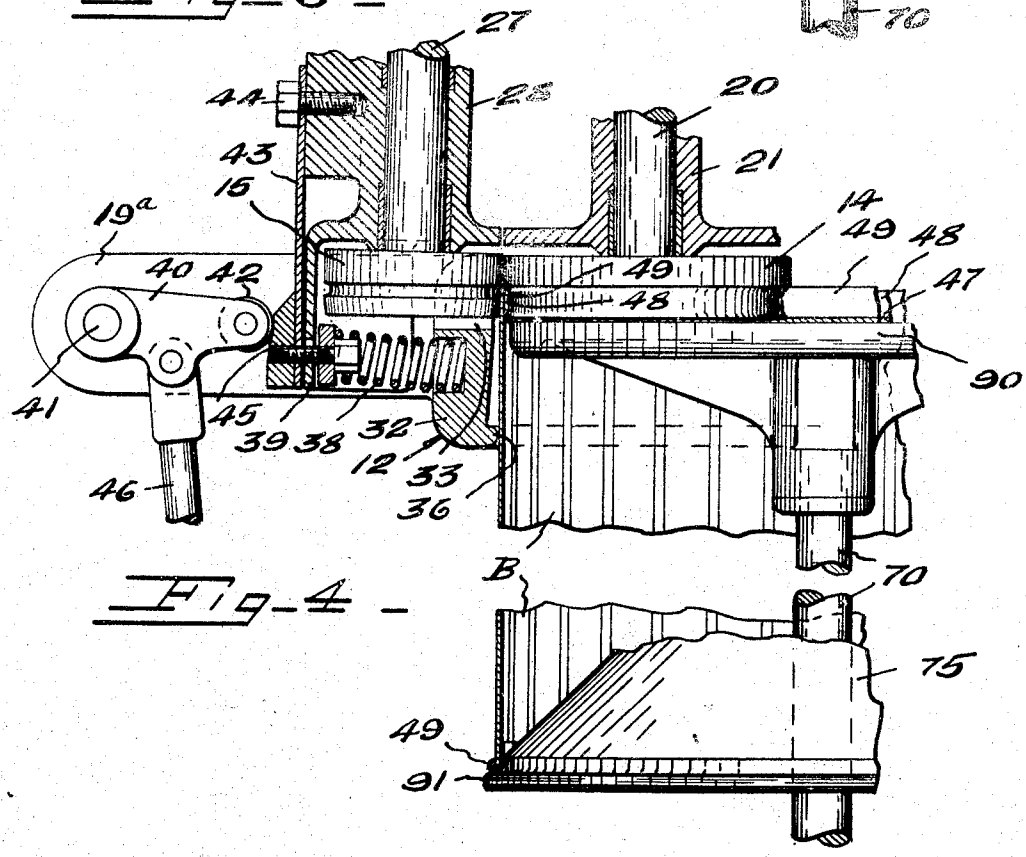


Fig. 4.

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MACHINE FOR ASSEMBLING KNOCK-DOWN CONTAINERS

Filed March 6, 1936 4 Sheets-Sheet 4

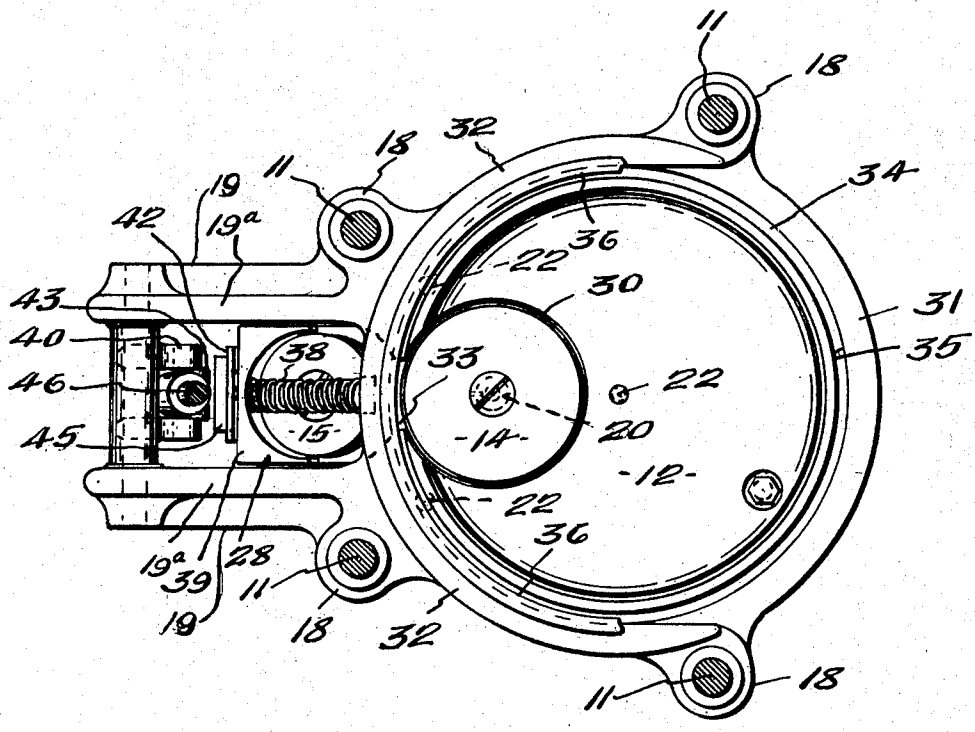


Fig. 5.

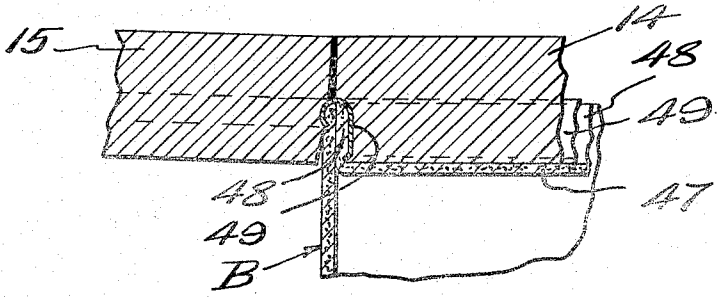


Fig. 6.

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Patented Apr. 12, 1938 2,113,699

UNITED STATES PATENT OFFICE

2,113,699

MACHINE FOR ASSEMBLING KNOCK-DOWN CONTAINER

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Application March 6, 1936, Serial No. 67,514

12 Claims. (Cl. 153—1)

This invention relates to a machine for securing a closure into the end of a container, and more particularly the invention relates to a machine for securing an end closure to a container formed with a fibrous tubular barrel.

An object of the invention is a machine of the type above referred to which is automatically operable to seal the closure in the barrel of the container with a single movement on the part of the operator, whereby the machine may be operated by unskilled labor, and the closure sealed in the end of the barrel of the container with a minimum expenditure of time, and so sealed as to form a liquid tight container.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevational view, partly in section, of the container assembling machine with the container support shifted to bring the end of the container in operative relationship to the crimping mechanism.

Figure 2 is a view, similar to Figure 1, showing the container support shifted in position to receive a container, or permit the removal of the container.

Figure 3 is an enlarged, fragmentary view showing the crimping rolls and the contiguous portion of the container barrel, with a reinforcing ring being applied to one end of the barrel.

Figure 4 is a view, similar to Figure 3, illustrating the operation of the machine in scoring a bottom closure in one end of the barrel, a reinforcing ring having been previously applied to the opposite end of the barrel.

Figure 5 is a view taken on lines 5—5, Figure 2.

Figure 6 is an enlarged, fragmentary, sectional view of the crimping rolls and contiguous portion of the container barrel and end bottom closure.

The general object of this invention is to provide a machine of simplified construction and of economical operation, to seal an end closure to the body or barrel of a paper container of the knock-down or collapsible type.

At the present time, paper containers are being used extensively for products heretofore merchandised in metallic containers, such for example as ice-cream. It is a matter of common knowledge that for many years the ice-cream manufacturer has shipped the bulk ice-cream in heavy metallic containers which are placed in the refrigerating cabinets of soda fountains and the like, and after they have been emptied they are collected by the manufacturer, returned to the plant, washed, sterilized, and again refilled. These heavy metallic cans are costly in the first instance, and are costly to handle because of their weight. Also, the cost of gathering up the empty cans, returning them to the plant, washing them, sterilizing etc., all add to the cost of merchandising the product. The paper containers are extremely cheap in initial cost, are of negligible weight, and when empty can be readily and immediately discarded by the retailer by burning, or otherwise, which materially reduces the handling cost of the product, and also avoids the objection of the accumulation of empty, metallic containers which, in warm weather, become rancid and emit an offensive odor. This is particularly a problem for the corner drug-stores and the like in large cities where they do not have available space to store a number of empty containers.

In order that the paper container may be entirely satisfactory for this purpose, it must be of the knock-down or collapsible type. That is, the body of the container is shipped in a flat folded condition and the end closures shipped separately. It then becomes necessary for the manufacturer to expand the collapsed barrel, secure one end closure as a bottom to the barrel, fill the container and subsequently attach the other end closure in the nature of a cover. Due to the fact that the ice-cream, or other, manufacturer is not familiar with the business of fabricating containers, it is most important that means be provided whereby these end closures may be securely and efficiently sealed to the container without the aid of large or expensive machinery, and of machines requiring the services of a skilled operator.

The machine herein described operates to secure and seal the bottom closure to the container, and as mentioned above, the general object is a machine of low initial cost and one which may be operated by anyone, and whereby the bottom closure may be sealed effectively to the expanded tubular paper barrel with the minimum consumption of time.

As here shown, the machine comprises a base 10 which is preferably of cast metal, and is of inverted cup-shape in cross section, a plurality of supporting posts 11 extend upwardly from the base and support at their upper ends a head 12 on which is suitably mounted a motor 13 suitably

connected to the seaming rolls 14, 15, to impart a rotary motion thereto.

Referring to Figure 1, the motor 13 is mounted upon a stool 16 and is provided with an integral gear reduction and angular drive 17. However, the motor may be of any suitable construction and mounted upon the head 12 in any desired manner.

The head 12 is substantially circular in form and provided with four spaced apart radially extending bosses 18 to receive the upper ends of two of the supporting rods 11. The head 12 is also provided with a pair of spaced apart rearwardly extending projections 19 which are also provided with bosses 19a to receive the upper ends of the rear supporting posts 11.

The seaming roller 14 is secured to the lower end of a vertically arranged shaft 20 journalled in a housing 21 detachably secured to the upper surface of the head 12 as by means of cap screws 22. The upper end of the shaft 20 is connected to the driven shaft of the motor drive 17, as at 23. A gear 25 is secured to the shaft 20 in the upper portion of the housing 21 and meshes with a gear 26 secured to the upper end of shaft 27 which is journalled in a housing 28 which is pivoted at its upper end to the housing 21, as at 29. The gears 25, 26 are of such width and are so arranged that the teeth of the gears remain in mesh during a limited pivotal movement of the housing 28 about the pivot 29, as indicated in Figure 2. The seaming roller 15 is secured to the lower end of the shaft 27 and rotatable therewith.

From the description thus far, it will be apparent that the seaming rollers 14, 15, are rotatably mounted in the head 12 in such manner that the roller 15 may be moved toward and from the roller 14 in an arcuate movement about the pivot 29, and constant rotation is imparted to the seaming rolls 14, 15, by the motor 13.

The upper surface of the head 12 is formed with a circular aperture 30 to receive the seaming roll 14. The head is also provided with an annular depending flange 31. The rear portion 32 of the flange 31, extending rearwardly from the bosses 18, is of greater depth than the front portion of the flange, and the head and flange portion 32, adjacent the aperture 30, is cut away to provide an opening 33 to permit the seaming roll 15 to be moved radially inwardly toward the seaming roll 14. The under side of the head is provided with an annular groove 34 substantially semi-circular in cross section, and arranged with the outer side of the groove merging with the inner face 35 of the flange 31. The inner face 35 of the flange 31 is preferably tapered outwardly and downwardly. The rear portion 32 of the flange 31 is provided with an inwardly extending rib 36 the inner surface of the rib 36 being formed on an arc having a radius substantially equal to that of the center of the groove 34. The rib 36 extends through an arc of substantially 180°.

The housing 28 is normally maintained in its outer position, that is, with the seaming roll 15 spaced apart from the seaming roll 14 by a helical compression spring 38 inserted between the rear portion 32 of the flange 31 and the depending rear wall 39 of housing 28. The housing 28 is moved about the pivot 29 toward the seaming roll 14 by arcuate movement of the lever 40 which is pivoted at 41 between the rearwardly extending portions 19a of the head 12. The free end of the lever 40 is provided with a roller 42 which coacts with the rear wall of the housing 28. Preferably, a flat spring member 43 is secured to the rear wall of the housing 28 as at 44, and is provided at its lower end with a cam surface 45. The lever 40 is operated about the pivot 41 by a link 46. Downward movement of the link 46 effects clockwise movement of the lever 40, and the roller 42 contacting the cam surface 45 causes the lower end of the housing 28 to swing inwardly moving the outer seaming roll 15 radially inwardly toward the seaming roll 14.

It is to be understood that the paper barrel B is initially formed with lengthwise extending corrugations and is shipped in folded or collapsed condition. At the packer's plant, the collapsed barrel is removed from the shipping carton and expanded into tubular form. A metallic reinforcing ring 49 is attached to one end of the container barrel and subsequently the bottom closure is secured in the opposite end of the barrel. The metallic ring 49 is U-shaped in general cross section having an outwardly flaring flange to overlap the end or edge of the barrel and which is subsequently crimped into engagement with the outer surface of the barrel presenting a neat bead around the end of the barrel. The inside of the ring is considerably longer, and the lower edge is tapered inwardly against the inner surface of the barrel.

The closure unit consists, in this instance, of a fibrous or paper disk 47 formed with an annular flange 48 extending substantially at right angles to the discoidal portion 47. The bottom closure is secured to the barrel by a ring identical with the ring 49. The ring 49 and the closure disk 47 are preliminarily attached together with the sides of the ring being spaced apart sufficiently to receive the end of the barrel. This closure unit is placed upon the end of the barrel, and the barrel and closure are elevated into the head 12, whereupon the closure is pressed into the end of the barrel with the flange of the ring overlapping the edge of the barrel, and this ring is subsequently crimped or seamed into tight contact with the end of the barrel by action of the seaming rollers 14, 15. The closure may be of any suitable structure provided with an outwardly flaring flange to overlap the end of the barrel, and which flange is subsequently seamed or crimped into engagement with the end of the barrel.

I will now proceed to describe the mechanism for supporting the barrel and closure, pressing the closure into the end of the barrel, effecting the crimping of the metallic ring and the removal of the barrel from the machine. The base 10 is provided with an elongated aperture 50. A cam block 51 is secured to the under side of the base as by cap screws 52. This cam block 51 is provided with a cam track 53. The upper surface of the base 10 is provided with a pair of suitable upstanding bosses 54 which are located to the rear of the base. A link 55 is pivoted at one end between the bosses 54, as at 56, and at its other end it is pivoted to one end of the link 57, as at 58. The other end of the link 57 is pivoted to link 59, as at 60. The link 59 at its opposite end is pivoted to the T-shaped link 61 as at 62. The link 61 is pivoted to a bracket 63 depending from the under surface of the base 10, as at 64, and the link 61 is also pivotally connected through links 65 to the inner end of the foot pedal 66, as at 67, and the foot pedal 66 is pivoted between its ends to the bracket 63, as at 68. It will be observed that the links 59, 61, operate in the nature of a toggle. The front side of the base is provided

with a vertical slot 69 to permit operation of the lever 66 about the pivot 68.

The end of the link 57, adjacent to the pivot 58, is provided with a bore extending substantially at right angles to the lengthwise axis of the link 57. A rod 70 is mounted in this bore of the link 57, and is provided at one side with a notch to receive the pivot pin 58, whereby the rod 70 is held from axial movement relative to the bore in the link 57. The lower end of the rod 70 is provided with a roller 71 which is arranged to travel in the track 53 of cam block 51. The rod 70 carries means for supporting the tubular barrel while the end closure is being pushed into the end of the barrel, and while the closure is being secured to the barrel.

75 designates a hollow conical member formed with a hub 76 at its small end, and with a plurality of radially extending spokes 77 at the base, the joinder of the spokes constituting a hub. The hub 76 is bored to slidably receive the rod 70. A collar 78 is secured to the rod 70 by a pin 79 and a sleeve 80 is threaded thereon, see Figure 1. The sleeve 80 is formed with an upwardly extending semi-circular portion 81 in the inner surface of which is formed a rectangular recess 82. The sleeve 80 is adjustable axially of the rod 70 by means of a thread connection with the collar 78. The sleeve 80, when adjusted, is held in position by a set screw 83. The hub of the spoke 77 is bored concentrically with the bore of the boss 76 to receive a bushing 84. A ring 85 is located in the recess 82, the bushing 84 inserted through the hub of the spoke 77, and the lower or protruding end of the bushing 84 is then pressed into the ring 85. The upper semi-circular portion 81 of the bushing 82 may be then placed about the sleeve 84 with the attached ring 85 seating in the recess 82, and these parts together with the collar 78 may be then slid over the upper end of the rod 70. The upper end of the bushing 84 is provided with a collar overlapping the hub of the support member, and a helical compression spring 86 is interposed between the upper hub 76 and the bushing 84. When the collar 78 is secured to the rod 70 by means of pins 79, the support 75 is carried by the compression spring 86. That is, the compression spring 86 moves the support 75 upwardly until the hub in the base portion contacts the shoulder on top of the bushing 84.

It will be observed, referring to Figure 1, that there is a slight clearance between the bottom of the support 75 and the top of the upper portion 81 of the sleeve 80. The support 75 is thus resiliently mounted upon the rod 70 to have a slight axial movement downward relatively thereto. A disk 90 is fixed to the upper end of the rod 70 and is substantially the same diameter as the inner diameter of the tubular barrel B. The conical surface of the support 75 terminates at the bottom in a short vertical surface which joins a narrow shoulder 91. The outside diameter of the shoulder 91 is slightly greater than the outside diameter of the tubular barrel B, and forms a ledge to hold the barrel while the closure is being secured thereon.

It will be observed that the T-shaped link 61 is also connected to the rod 46 which actuates the rear movable roller housing 28 toward and from the seaming roll 14. The lower end of the rod 46 is pivotally connected to one arm of an angle lever 93, the other arm of which is pivotally connected to the link 94, the opposite end of which is connected to the T-shaped link 61, as at 95.

Referring to Figure 2, it will be observed that when the pedal end of the lever 66 is in up position, the rod 70 is swung outwardly to the front and the rod 46 is elevated. In this position, the barrel B is expanded into tubular form and passed over the disk 90 and downwardly until the lower edge of the barrel seats upon the shoulder 91 of the support 75. The support 75 is preferably of conical formation to aid in directing the lower edge of the barrel to a position concentric with the rod 70 and the disk 90. After the barrel B has been thus placed on the support 75 with the upper edge projecting slightly above the top surface of the disk 90, a closure unit is placed upon the top edge of the barrel. The operator then steps upon the pedal end of the lever 66 pushing it downwardly and this movement through links 65, 61, 59, imparts an arcuate movement of the link 57 about the pivot 58, and also an arcuate movement of the pivot 58 about the pivot 56. When the device is in the position shown in Figure 2, the roller 71, at the lower end of the support rod 70, is seated against an arcuate cam surface 97 formed on a portion of the cam block 51. Inasmuch as the rod 70 is fixed or secured to the link 57, the roller 71 travels in an arcuate movement about the pivot 58, this movement being to the right, Figures 1 and 2, during which movement the roller 71 passes from beneath the cam surface 97 and into the cam track 53. The lower portion of the cam track 53 is formed on an arc substantially about the pivot 58, while the upper portion of the cam track 53 is struck on a different arc to effect a vertical movement of the rod 70.

During the first movement of the foot lever 66, the rod 70 is simply swung about the pivot 58 bringing the top end of the barrel B into contact with the rib 36 formed on the under side of the head. This rib acts as a guide for the upper end of the barrel, and at this time the roller 71 is in the cam track 53, and also at this time the rod 46 has been moved downwardly so that the roller 42 assumes a position near the cam surface 45 on the rear of the housing 28. Further downward movement of the foot lever 66 effects vertical elevation of the rod 70, and of course the support 75, disk 90 and the barrel B. This movement brings the upper edge of the ring 49 into the recess 34 formed on the under side of the head, and continued upward movement results in pressing the closure into the end of the barrel B, at which time it rests against the upper surface of the disk 90. By this time, when the closure has been pressed home, the roller 42 has engaged the cam surface 45 and caused the lower end of rear housing 28 to swing inwardly about the pivot 29. The inner seaming roll 14 is located eccentric to and tangent with the recess 34, that is the rear side of the roller 14 is in alinement with the recess 34, as clearly shown in Figure 5. Or, in other words, when the closure has been pushed home with the ring 29 in the recess 34, the rear side of the inner seaming roll 14 is in engagement with the inner surface or flange of the ring 49.

As previously stated, the housing 28 has been moved radially inwardly toward the axis of the roller 14 which results in pressing the edge of the roller 15 into contact with the outer side of the U-shaped ring 49, and inasmuch as these rollers are revolving, rotary motion is imparted to the barrel B, support 75 and disk 90, and the

outer side of the ring 49 is seamed, or rolled over the upper end of the barrel in a manner well known to those skilled in the art. It only takes one second for the seaming operation to be completed, at which time the operator removes his foot from the pedal 66, the container shaft 70, support 75, and disk 90 descend vertically, and at the same time the rear housing 28 is instantly released, permitting the outer seaming roll 15 to move away from the upper end of the container. Upon further downward movement, the roller 71 passes out of the cam track 53 and engages the cam surface 97, whereupon these parts assume the position shown in Figure 2, and in which position the container, with the closure firmly secured in the end thereof, may be readily removed by lifting it upwardly over the disk 90.

The container barrels are cut to a uniform length, depending upon the capacity of the container. However, inasmuch as they are generally formed of paper stock, they expand or contract more or less in length, due to atmospheric conditions, temperature, etc. To provide for this situation, the barrel support 75 is carried upon the compression spring 86, and the parts are so arranged with a slight clearance between the bottom of the support 75 and the upper end of the sleeve 80. Accordingly, if the container barrel has become moist and increased slightly in length, it will not be buckled or otherwise damaged when the operator forces the closure up into the groove 34. To accommodate a smaller size container, the rod 70 is provided with a hole 98 to which the collar 78, sleeve 80 and support 75 may be moved by removing the pin 79 and again inserting it into the hole 98. Also, to accommodate any slight variation in the diameter of the closure, because of variation in thickness of material, or otherwise, the cam block 45 is mounted upon the flat spring member 43, the lower end of which is connected directly to the outer end of the compression spring 38. With this arrangement, a substantially uniform pressure is obtained between the seaming rolls 14, 15, regardless of slight variations in the diameter of the closure.

I desire to point out the particularly economical operation of this container assembling machine, it being kept in mind that this machine is located in the plant of the producer, such as the ice-cream manufacturer, who is not familiar with the fabrication of containers. With this machine, it is only necessary to sleeve the expanded barrel over the disk 90 and set it upon the support 75, place the closure unit on the top of the barrel, and simply press the outer end of the pedal 66 downwardly. By this one operation, the barrel is moved into proper place, the closure is pressed into the end of the barrel, and the metallic ring crimped firmly uniting the closure with the barrel.

What I claim is:

1. A machine for securing an end closure to the end of a container barrel comprising a suitable frame, a stationary head supported by the frame, a pair of crimping rolls rotatably journalled in the head, means for effecting rotation of said rolls, means operable to move the container barrel in juxtaposition to said head with the closure engaging the head, and to bring the crimping rolls into engagement with the peripheral margin of the closure to crimp the same about the end of the barrel.

2. A machine for securing an end closure to the end of a container barrel comprising a suitable frame, a stationary head supported by the frame, a pair of crimping rolls rotatably journalled in the head, means for effecting rotation of said rolls, a support for the container barrel carried by the frame and being movable toward and from the head, means operable to move said support toward the head, with the end closure in engagement with the head, and to bring the crimping rolls into engagement with the peripheral margin of the closure to crimp the same about the end of the barrel.

3. A machine for securing an end closure having an outwardly flaring circumferential marginal flange to the end of a container barrel comprising a suitable frame, a head carried by the frame, a pair of crimping rolls rotatably journalled in said head, means for effecting rotation of said rolls, a container barrel support pivotally mounted on the frame and movable about said pivot to bring the container barrel into axial alinement with said head, and means operable to move said support and container barrel in axial alinement with said head, and to move said support and container barrel toward the head with the end closure engaging the head, and to bring the crimping rolls into engagement with the peripheral margin of the closure to crimp the same about the end of the barrel.

4. A machine for securing an end closure having an outwardly flaring circumferential flange to the end of a container barrel comprising a suitable frame, a head carried by the frame, and a pair of crimping rolls rotatably journalled in said head, means for effecting rotation of said rolls, a container barrel support pivotally mounted on the frame, said support being normally positioned to permit the container barrel and the end closure to be placed thereon, and being movable into axial alinement with said head and toward said head to press the end closure into the barrel, means for moving said support about its pivot and axially of said head to bring the closure into engagement with the head, and to bring the crimping rolls into engagement with the marginal flange of the closure to crimp the same about the end of the barrel.

5. A machine for securing an end closure to the end of a container barrel comprising a suitable frame, a stationary head supported by the frame, a pair of crimping rolls rotatably journalled in said head, means for effecting rotation of said rolls, a container support movably mounted on said frame, and when in inoperative position adapted to receive the container barrel and closure, and when in operative position pressing the closure against the head, means operable to shift the container support from inoperative to operative position, and to bring the crimping rolls into engagement with the peripheral margin of the closure to crimp the same about the end of the barrel.

6. A machine for securing an end closure to the end of a container barrel comprising a suitable frame, a stationary head carried by the frame, a pair of crimping rolls rotatably journalled in the head, means for effecting rotation of said rolls, one of said rolls being movable toward and from the other, a support for the container barrel, and closure means operable to move said support into juxtaposition to said head, with the closure engaging the head and the peripheral margin of the head arranged between the crimping rolls, and means for moving the movable crimping roll into engagement with the

peripheral margin of the closure to crimp the same about the end of the barrel.

7. A machine for securing an end closure to the end of a container barrel comprising a frame, a stationary head carried by the frame, a container barrel support shiftable to bring the end closure into engagement with the head, a pair of crimping rolls rotatably journalled in said head and arranged to engage the inner and outer sides of the closure margin, means for effecting rotation of said crimping rolls, means for shifting said support and for effecting relative movement between the seaming rolls to crimp the margin of the closure about the end of the barrel.

8. A machine for securing an end closure to the end of a barrel comprising a frame, a stationary head carried by the frame, a container barrel support shiftable to bring the end closure into engagement with the head, a seaming roll rotatably journalled in the head and arranged to engage the inner surface of the margin of the closure when the same is in engagement with the head, and a complemental seaming roll rotatably mounted in the head and being movable toward and from said first roll to engage the outer surface of the margin of the closure to crimp the same over the end of the barrel, means for effecting rotation of said rolls, and means operable to shift the container barrel support and to move the outer seaming roll into engagement with the end closure.

9. A machine for securing an end closure to a container barrel comprising a frame, a head carried by the frame, a seaming roll rotatably journalled in the head, a housing carried by the head and being movable toward and from said roll, a complemental seaming roll rotatably journalled in said housing, means for effecting rotation of said rolls, a container barrel support being shiftable to bring the container barrel and the closure into engagement with the head, with the peripheral margin of the closure arranged between said crimping rolls, means operable to shift said support and to move said housing toward the said first crimping roll to effect crimping of the margin of the closure about the end of the barrel.

10. A machine for securing an end closure to the end of a container barrel comprising a base, a head supported by said base in spaced apart relation thereto, a container support pivotally mounted on the base and operable to bring the container barrel and closure in axial alignment with said head, and being movable toward said head to bring the end closure into engagement with said head, means for effecting rotation of said rolls, a pair of crimping rolls carried by the head, a pedal carried by the base, and motion transmitting means between said pedal and the container support to shift said support into axial alinement with the head, and to move said support toward the head, and motion transmitting connections between said pedal and the crimping rolls to bring said rolls into engagement with the peripheral margin of the closure when the same is in engagement with the head to crimp said margin about the end of the barrel.

11. A machine for securing an end closure to the end of a container barrel comprising a suitable frame, a stationary head supported by the frame and being formed with a circular recess to receive the peripheral edge of the end closure, a pair of crimping rollers rotatably journalled in said head, means for effecting rotation of said rollers, one of said rollers being arranged within said recess and the other roller outside of said recess, a support for the container barrel carried by the frame and being movable toward and from the head, means operable to move said support toward the head with the end closure arranged in said recess and to bring the crimping rolls into engagement with the peripheral margin of the end closure to crimp the same about the end of the barrel.

12. A machine for securing an end closure to the end of a container barrel comprising a suitable frame, a stationary head carried by the frame, a pair of crimping rollers rotatably journalled in the head, means for effecting rotation of said rollers, means operable to move the container barrel with the closure thereon into juxtaposition to said head with the closure engaging the head, said head being provided with means for guiding the periphery of the closure between said rollers, and means operable to bring the crimping rollers into engagement with the periphery of said closure and crimp the same about the end of the barrel.

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