Sept. 15, 1953 I. L. WILCOX ET AL 2,651,977

MACHINE FOR SECURING END CLOSURES TO CONTAINER BARRELS

Filed Sept. 28, 1948 6 Sheets-Sheet 1

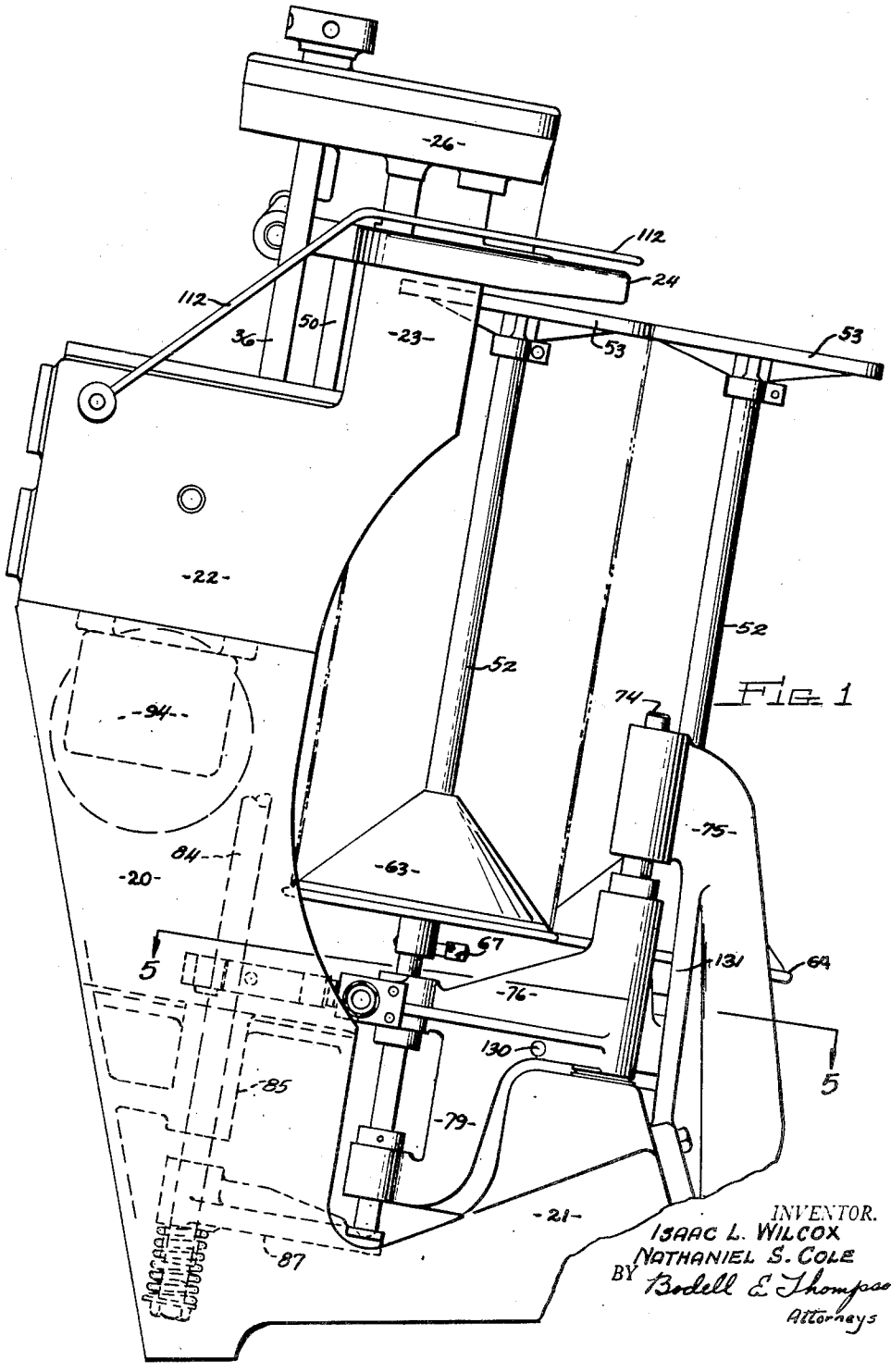


Fig. 1

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MACHINE FOR SECURING END CLOSURES TO CONTAINER BARRELS

Filed Sept. 28, 1948 6 Sheets-Sheet 2

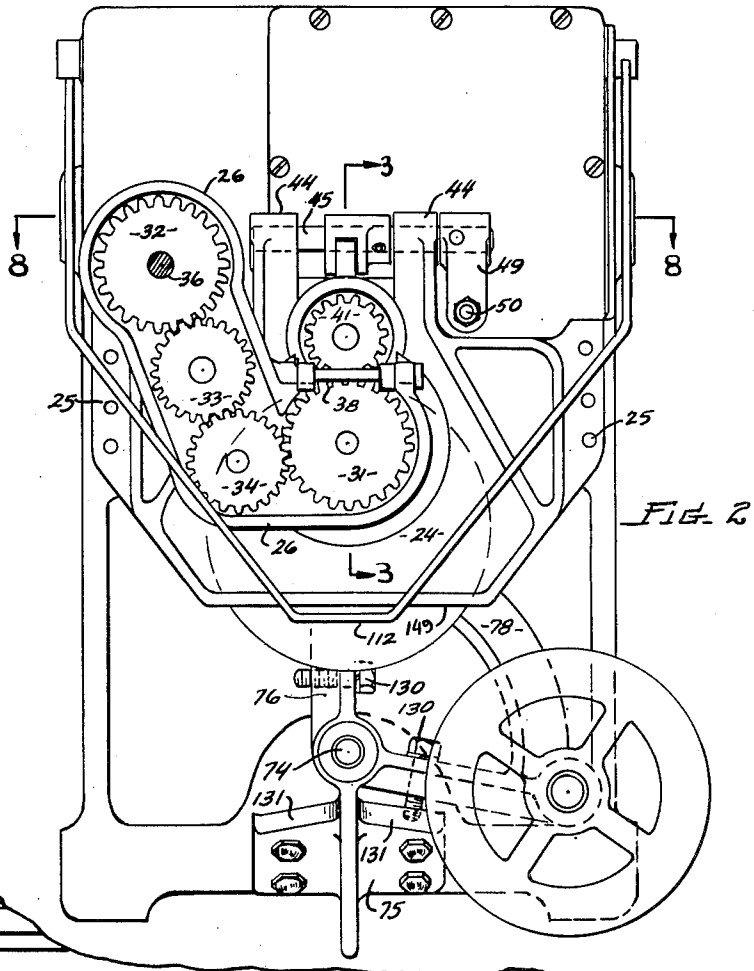


FIG. 2

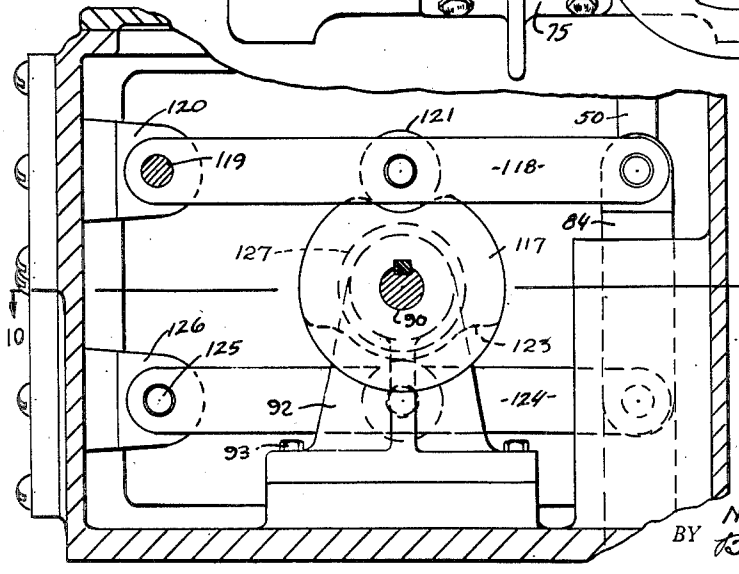


FIG. 9

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MACHINE FOR SECURING END CLOSURES TO CONTAINER BARRELS

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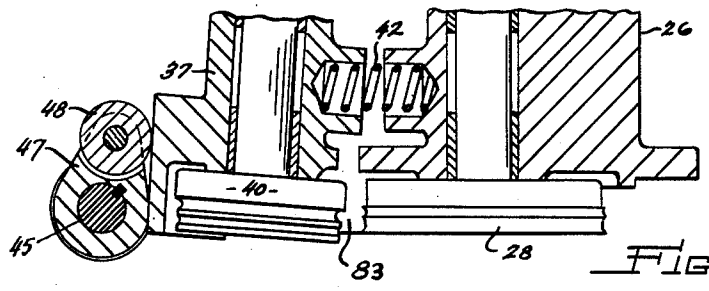


Fig. 4

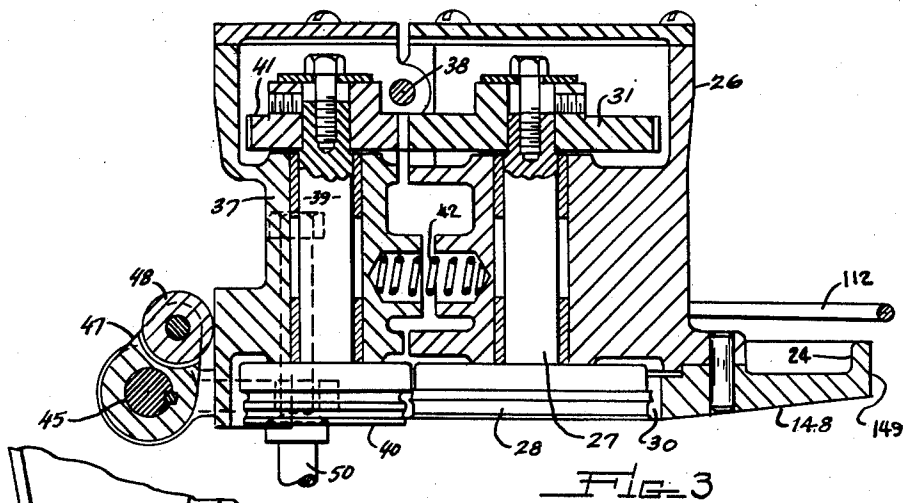


Fig. 3

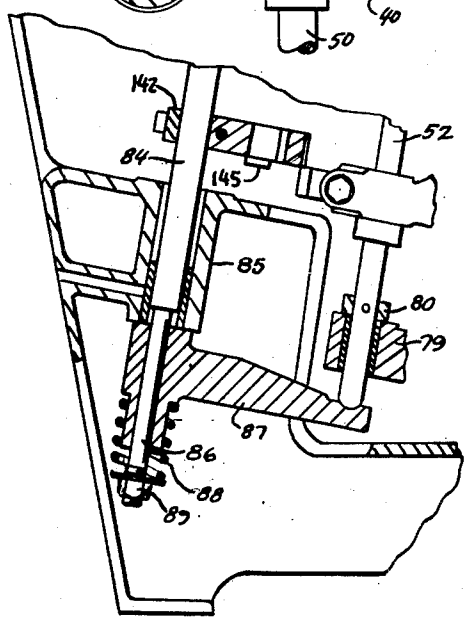


Fig. 1

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MACHINE FOR SECURING END CLOSURES TO CONTAINER BARRELS

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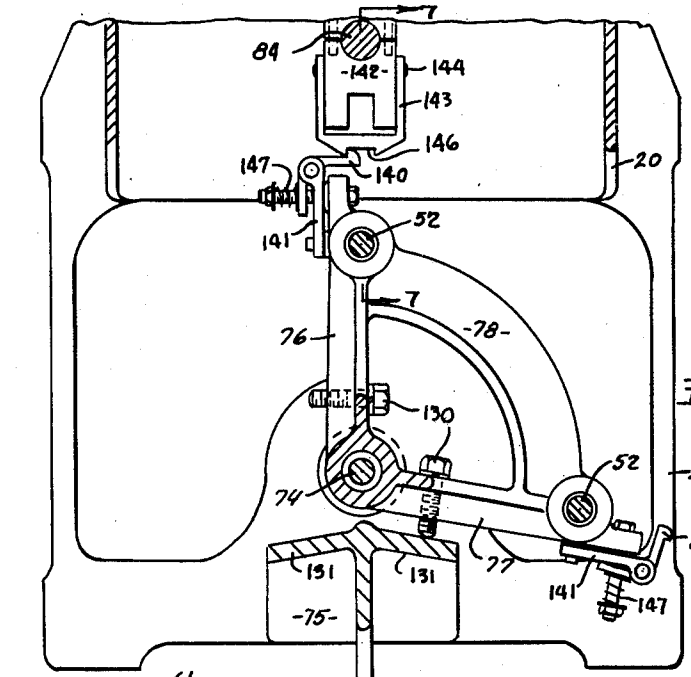


FIG. 5

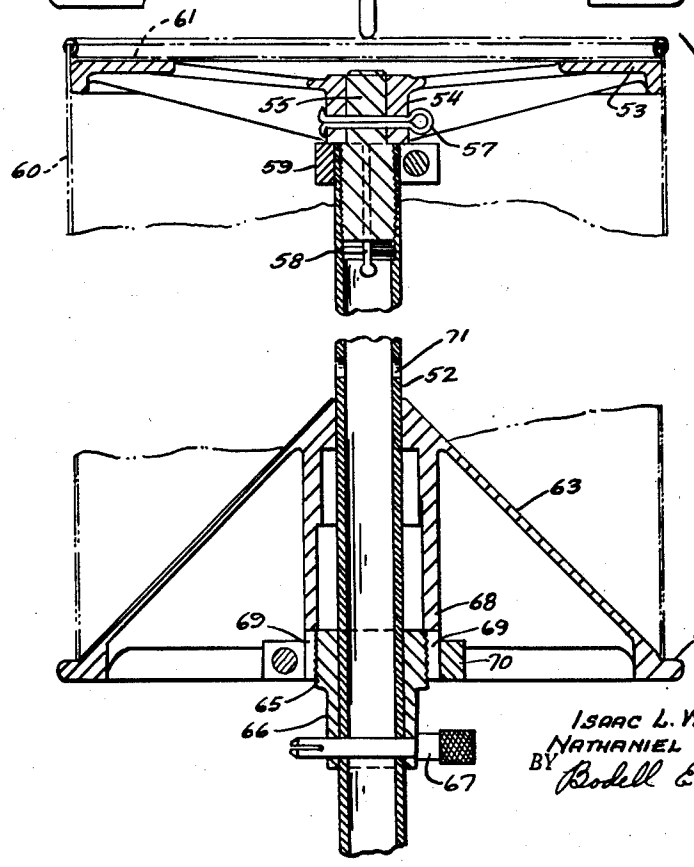


FIG. 6

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MACHINE FOR SECURING END CLOSURES TO CONTAINER BARRELS

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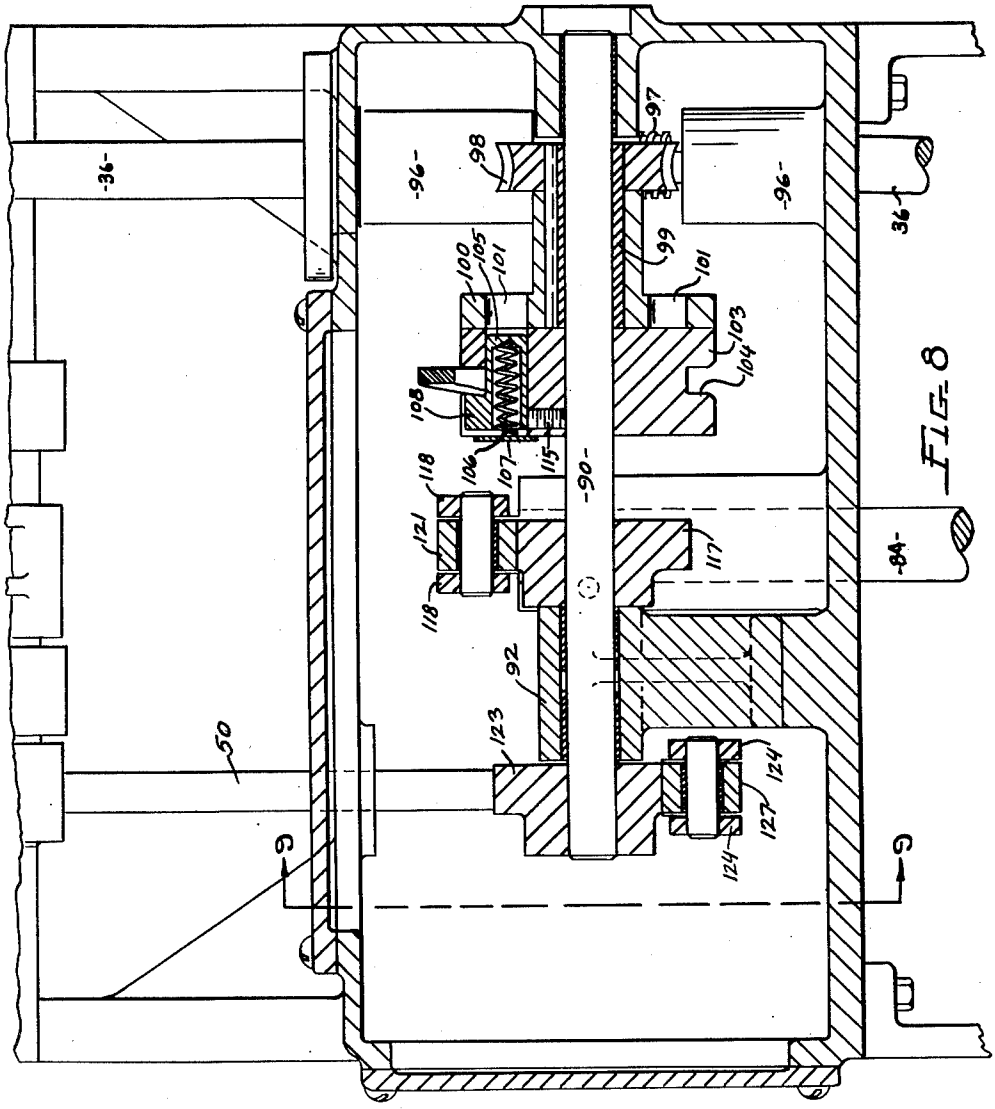


FIG. 8

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MACHINE FOR SECURING END CLOSURES TO CONTAINER BARRELS

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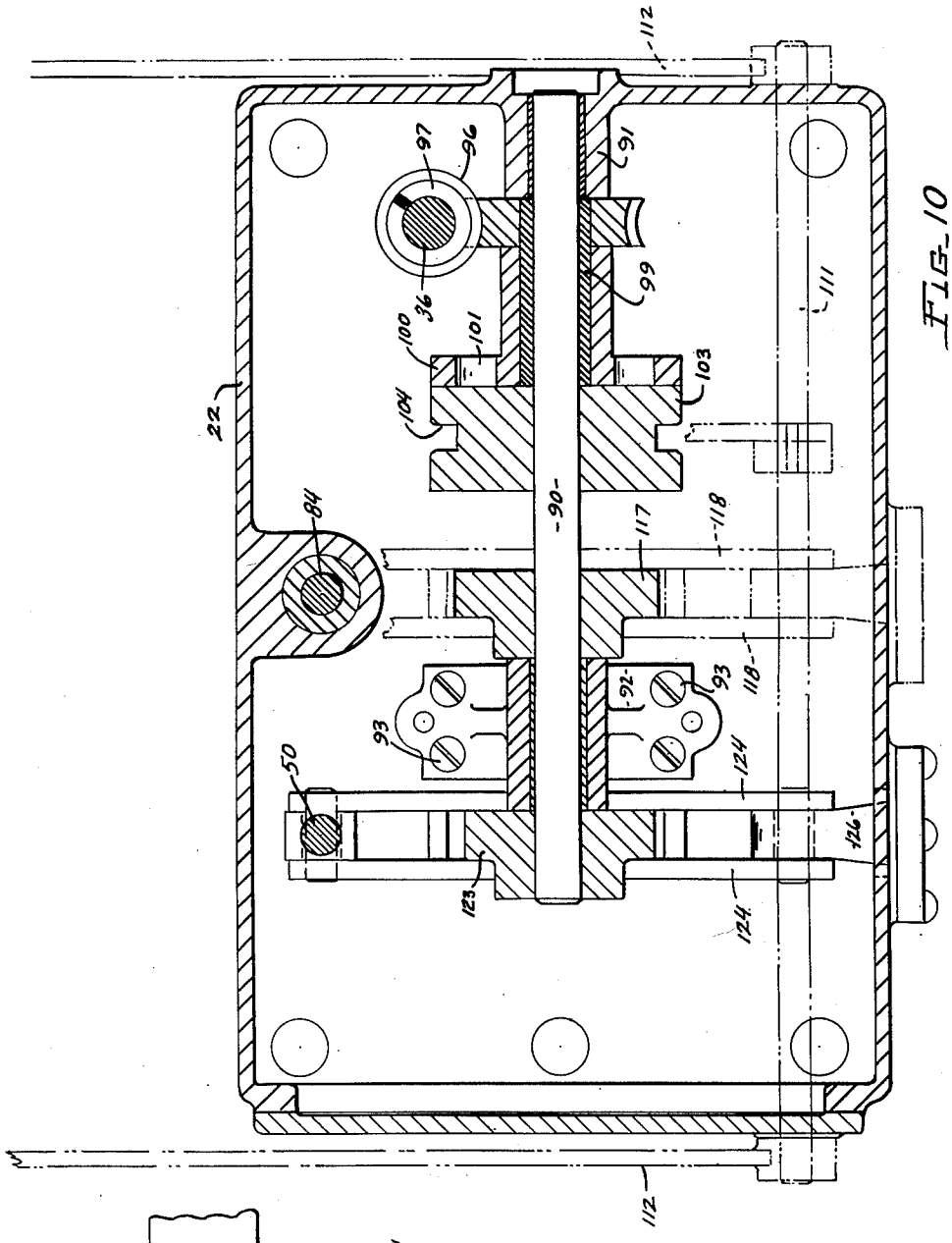


FIG. 10

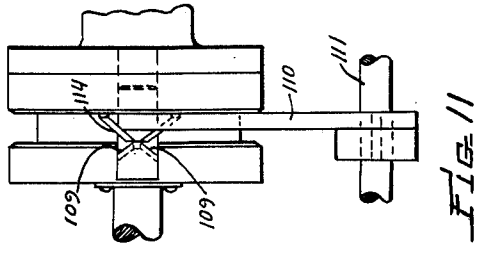


FIG. 11

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Patented Sept. 15, 1953

2,651,977

UNITED STATES PATENT OFFICE

2,651,977

MACHINE FOR SECURING END CLOSURES TO CONTAINER BARRELS

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Application September 28, 1948, Serial No. 51,624

3 Claims. (Cl. 93—55.1)

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This invention relates to a machine for securing end closures to containers, and more particularly for securing end closures formed of paperboard to the ends of tubular container bodies formed of the same material by crimping the end closure, or a retaining ring, into engagement with the end of the container barrel. Machines of this type are disclosed in Patent No. 2,113,699, issued to E. N. Lowry, April 12, 1938, and Patent No. 2,238,372, issued to J. F. Price, April 15, 1941.

The containers referred to are shipped to the packer with the container barrels or bodies in flat collapsed condition. These barrels are expanded to tubular form, placed upon a container support, an end closure seated on the upper end of the tubular barrel, and thereafter the barrel is elevated into a head member on which there is journalled a pair of crimping rolls. The arrangement is such that the peripheral portion of the end closure and container barrel are positioned intermediate the crimping rolls and while rotated, the rolls are moved into crimping engagement with the end closure to effect the crimping operation.

In the machines of the patents above referred to, the container support is moved about a horizontal axis from an outwardly inclining position to a vertical position in axial alinement with the head member. These machines function entirely satisfactory insofar as the formation of the crimp is concerned. They are, however, not capable of rapid operation due to the fact that the operator has lost time while the machine is performing the crimping operation on the container.

This invention has as an object a machine of the type referred to embodying a structural arrangement whereby the container supports are more readily available for the operator to sleeve the expanded barrel or body thereon and to seat the end closure on the end of the barrel, the assembly being more conveniently and more accurately moved into axial alinement with the head structure of the machine.

The invention has as a further object a crimping machine embodying a plurality of container supports, whereby one support is always available at the loading and unloading station while another support is supporting a container during the crimping operation, whereby the operator is able to double the productive output without any increase in effort.

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

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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 elevation of a crimping machine embodying my invention with a portion of the base structure broken away.

Figure 2 is a top plan view of the machine shown in Figure 1, with the top closure of the crimping roll gear case removed.

Figure 3 is a partial sectional view taken on line 3—3, Figure 2.

Figure 4 is a fragmentary sectional view, corresponding to the lower portion of Figure 3, showing the crimping rolls in spaced relation.

Figure 5 is a view taken on line 5—5, Figure 1.

Figure 6 is a vertical sectional view of one of the container supports.

Figure 7 is a fragmentary sectional view taken on a line corresponding to line 7—7, Figure 5.

Figure 8 is a vertical sectional view of the transmission box taken on line 8—8, Figure 2.

Figure 9 is a sectional view taken on line 9—9, Figure 8.

Figure 10 is a transverse sectional view of the gear casing taken on a line corresponding to line 10—10, Figure 9.

Figure 11 is a plan view of the clutch mechanism.

The machine consists generally of a frame having a base portion and a gear box mounted thereon. A head member is secured on the gear box section. A pair of crimping rolls is journalled in or on the head member. The head member is formed on its under side with a circular groove which functions to position the upper end of the container barrel, and the end closure seated thereon, so that the periphery of these members is arranged intermediate the crimping rolls, whereby the rolls may properly effect crimping action to permanently secure the end closure to the container barrel. The container barrels are supported during the crimping action by a container support which, in the present machine, is movable about an axis extending parallel to the axis of the head, the support being movable from an outward loading and unloading position to an inward position in axial alinement with the head. The machine is operated by an electric motor and by mechanism arranged in the gear box. The container supports are elevated to move the upper end portion of the container and the closure in the groove in the head member during the crimping operation and thereafter, to effect downward movement of the container support.

The base member is formed with a rear portion 20 extending upwardly, and a portion 21 extending forwardly. The rear portion 20 is of U formation, and a gear box or casing 22 is mounted on the upper end of the portion 20 and is formed with a pair of upwardly extending projections 23 on which the head member 24 is mounted, as by screws 25. The head 24 extends forwardly and is inclined downwardly, see Figure 1.

A housing 26 is mounted on the head member 24 in which there is journalled a shaft 27 having a seaming or crimping roll 28 secured to the lower end thereof and positioned in a circular aperture 30 formed in the head. The upper end of the shaft 27 has affixed thereto a gear 31 connected to a driving gear 32 through a pair of idle gears 33, 34, also journalled in the housing 26. The gear 32 is affixed to a shaft 36 extending downwardly from the housing 26 into the gear box 22.

A crimping roll support 37 is pivotally mounted at its upper end to the rear of the housing 26 on a pin 38. A shaft 39 is journalled in this support and has secured to its lower end a crimping roll 40 and at its upper end a gear 41 meshing with the gear 31. The support 37 is urged rearwardly, or from the roll 28, by a compression spring 42 interposed between the housing 26 and the support member 37, see Figures 3 and 4. Normally, the support 37 is maintained in rearward position by the spring 42, as shown in Figure 4, to provide a space between the rolls 28, 40, to permit the end closure and container barrel to be entered between the rolls.

The support 37 is moved toward the housing 26 to bring the roll 40 into crimping position, as shown in Figure 3, by power actuated mechanism. The head member 24 is formed with a pair of rearwardly extending projections 44 apertured to receive a shaft 45 to which there is affixed, intermediate the projections 44, an arm 47 carrying a roller 48 engaging the lower portion of the support 37 adjacent the lower end thereof. The shaft 45 has affixed at one end an arm 49 to which a rod 50 is operatively connected and which extends downwardly into the gear box 22. The arrangement is such that upon downward movement of the rod 50, the support member 37 will be moved in a counter-clockwise direction from the position shown in Figure 4 to the position shown in Figure 3, and thus move the roll 40 into crimping relation to roll 28.

The containers are supported during the crimping operation by a container support consisting of a staff in the form of a tubular member 52 on the upper end of which is mounted a circular member 53 having a hub portion 54 secured to a stem 55 threaded into the upper end of the staff which is formed with a slot 58. The threaded stem 55 provides for accurate axial adjustment of the member 53 relative to the staff. The stem 55 is fixed in adjusted position by a clamp collar 59 encircling the upper end of the staff. The upper member 53 serves to maintain the upper end of the container body 60 in expanded circular form, and also serves to correctly position the end closure 61. The container barrel 60 is supported by a conical member 63 having a radial flange 64 engaging the end of the container barrel. This supporting member is threaded upon the upper end portion 65 of a collar nut 66 mounted upon the staff 52 and secured thereto by a pin 67. The lower portion of the hub 68 is slotted, as at 69, and is clamped

fixedly to the nut 66 by a clamp collar 70. The staff is provided with one or more spaced apart apertures 71 to provide for positioning the lower support 63 at different distances from the upper support 53 to accommodate container bodies of different lengths.

There are a plurality of these container supports. In the machine illustrated, two are provided and are mounted on a carrier journalled on a pin 74 mounted in the forward portion 21 of the base and a bracket 75 secured thereto. The carrier is formed with arms 76, 77, extending from the pivot pin 74 in angular relation and being connected by an arcuate shaped portion 78. Each of the arms 76, 77, are apertured to slidably receive the staffs 52, each arm having a depending portion 79 to provide a lower bearing for the staff. The staffs are slidably mounted in the arms, and each is provided with a collar 80 pinned to the staff and which abuts against the bearing of the lower arm portion 79 and determines the downward position of the staff.

It will be apparent, from Figures 2 and 5, that the staff carried by the arm 77 is positioned outwardly where the operator can conveniently remove a crimped container and place a container barrel and end closure on the support. At the same time, the support carried by the arm 76 is positioned in axial alinement with the head 24 for the crimping operation. The axis of the pin 74 and the staff 52 extend parallel, and are also parallel to the axis of the head 24. When the operator has loaded the support carried by the arm 77 and the crimping operation has been completed on the container support by the support carried by the arm 76, the carrier is swung about the pivot 74 positioning the support carried by arm 77 in crimping position, and the support carried by the arm 76 is positioned outwardly to the left of the pivot pin 74, Figures 2 and 5, for unloading and loading.

When the staffs 52 are in the down position, as shown in Figure 1, the top of the container barrel readily clears the under side of the head 24. After the carrier has been moved about the pivot 74 to position one of the container supports in alinement with the head, that support is elevated to position the container top and end closure in a circular groove formed in the under side of the head 24 extending between the rolls 28, 40 and simultaneously, the crimping roll 40 is moved into engagement with the closure and cooperates with the roll 28 to form the crimp.

The staffs 52 are elevated by a pull rod 84 depending from the gear box 22 and being slidably mounted in the bracket 85 formed in the rear section 20 of the base. The lower end 86 of this rod is of reduced diameter and there is slidably mounted thereon an arm 87, the outer end of which is arranged to engage the lower end of the staff 52. The arm 87 is yieldingly urged against the shoulder formed by the reduced portion 86 by a compression spring 88 interposed between the arm 87 and a nut 89 threaded on the lower end of the rod.

A shaft 90 is journalled in the gear box 22, one end of the shaft being journalled in a hub portion 91 formed in one end wall of the box, and the opposite end being journalled in a bracket 92 mounted on the bottom wall of the box, as by screws 93. A motor 94 is mounted on the under side of the gear box, and the output shaft 36 thereof extends upwardly through the box into the upper gear case 26 and has secured on its upper end the gear 32, Figure 2. The bottom

and top walls of the box are formed with bosses 96 to form bearing members for the shaft, and a worm 97 is fixed to the shaft intermediate these bosses and arranged to engage a worm gear 98 keyed to a sleeve 99 to which is also keyed a disk 100 provided with a plurality of apertures 101 and which forms the driving member of a one revolution clutch of any suitable construction.

In the structure shown in Figures 8, 10 and 11, the driven member 103 is formed with a circumferential groove 104, and is apertured to slidably receive a driving pin 105 urged toward the driving disk 100 by a compression spring 106 arranged in the bore of the pin and acting against a cover plate 107 secured to the end of the member 103. This pin is formed with a radially extending portion 108, the end portion of which, confronting the groove 104, is formed with inclined surfaces 109. A trip bar 110 is secured on a shaft 111 journalled in the housing and having attached to its ends a yoke 112 extending upwardly and forwardly over the head 24, see Figures 1 and 2. The opposite end of the trip bar is positioned in registration with the groove 104 and is formed with an inclined surface 114. Normally, the end portion of the trip bar rides on the bottom of the groove 104 and upon rotation of the driven member 103, the inclined surface 109 formed on the projection on the pin 105 is engaged by the angular surface 114 on the end of the trip bar and thus the pin is cammed outwardly to the position shown in Figures 8 and 12. When the operator depresses the yoke 112, the trip bar is raised upwardly out of engagement with the pin and the same is moved toward the disk 100 by the spring 106 and enters the first aperture 101 that becomes alined with the pin. The driven member 103 is fixed to the shaft 90 as by a set screw 115. With this arrangement, one revolution is imparted to the shaft 90 each time the operator raises the yoke 12.

The rod 84 is moved upwardly by a cam 117 fixed to the shaft 90. The upper end of this rod is pivotally connected to a pair of links 118, the opposite ends of which are pivotally mounted on a pin 119 carried by a bracket 120 secured to the side wall of the box. Intermediate their ends, the links are provided with a roller 121 riding on the cam 117.

The rod 50 is moved downwardly by a cam 123, the lower end of which rod is pivotally connected to a similar pair of links 124, the opposite ends of which are pivoted on a pin 125 carried by a bracket 126 extending inwardly from the side wall of the box. Intermediate their ends, the links 124 are provided with a roller 127 riding upon the surface of cam 123. The construction and arrangement of the cams 117, 123, is such that when the staff 52 has been elevated to properly position the closure in the head 24, the rod 50 is moved downwardly to swing the roll 40 into crimping position. At the end of the crimping operation, the roll 40 is permitted to move outwardly and the staff 52 is permitted to descend.

The outer end of the arm 87 is formed with a depression to receive the lower end of the stem 52 when the stem is moved in alinement with the head 24. The stems 52 are correctly positioned in alinement with the head by adjustable stop screws 130 mounted in the arms 76, 77, and engaging flanges 131 formed on bracket 75.

In order to avoid any possibility of the carrier rebounding after one of the stop screws engages the associated flange 131, latch means is provided to latch the carrier in shifted position until the support is elevated. Upon elevation of the support, the latch means is automatically disconnected to permit the carrier to be shifted upon downward movement of the support.

This latch means consists of a latch member and a detent member associated with the container support carrier and the elevating rod 84. As shown in Figures 5 and 7, a latch 140 is pivotally mounted on a bracket 141 secured to the outer end of each of the arms 76, 77, on the container support carrier. A block 142 is clamped to the elevating rod 84. A U-shaped member 143 is pivotally mounted, as at 144, to the block and is normally positioned on a stop piece 145 carried on the under side of the block 142. The yoke 143 is recessed, as at 146, to receive the latches 140, the latches being urged into the recess by compression springs 147. With this arrangement, when the carrier is rotated in a clockwise direction, Figure 5, to position the staff 52 carried by the arm 76 in alinement with the head 24, the stop screw 130 carried by the arm 77 engages the flange 131 on bracket 75 and simultaneously, the latch 140 carried by the arm 76 enters the recess 146 in the detent 143, thus preventing any retrograde movement of the container support carrier. When this staff is elevated upon upward movement of the rod 84, the detent 143 is elevated upon upward movement of the rod 84, the detent 143 is moved out of engagement with the latch 140, whereupon the latch is rotated in a counter-clockwise direction by its spring 147. When the rod 84 moves downwardly to effect lowering of the staff 52, the detent is positioned on the top of the latch and thus the carrier may be rotated in a counterclockwise direction about the pivot 74 to position the staff 52 carried by the arm 77 in alinement with the head.

The under surface of the forward portion of the head 24 is inclined upwardly, as at 148, and the forward edge of the head 149 is positioned inwardly from the edge of the container and closure. This arrangement permits the operator to slide an end closure with the retaining ring thereon over the top of the container when the same has been moved in registration with the head if the operator prefers to so position the end closure rather than position the same on the end of the container when the same is located in one of the loading and unloading positions.

With our machine, the operator removes the container with the end closure crimped thereon and places a new container on the container support while the crimping operation is being performed on another container. This materially increases the output of the machine without any additional effort on the part of the operator.

What we claim is:

1. A machine for securing an end closure to the end of a container barrel comprising a frame, a head member mounted on the frame, a pair of crimping rolls journalled in the head, said head being cooperable upon engagement with a container to position the end portion of the container and an end closure seated thereon into crimping relation with said rolls, a carrier having a plurality of container supports, said carrier being movable about an axis extending parallel to and arranged at one side of the axis of the head to alternately move said supports from a loading position to a position in axial alinement with the

head, said supports being mounted in the carrier for axial movement toward and from the head, a power operated support actuating means operable to effect elevation of the support positioned in axial alinement with the head and move the container on said support into engagement with the head, a latch member mounted on the carrier in juxtaposition to each of said supports, a detent carried by said support actuating means and being normally positioned to be engaged by said latch members when each support is moved into axial alinement with said head and being movable with said actuating means upon elevation of the support out of engagement with said latch, and means operable to close the crimping rolls on the peripheral portion of the end closure of the container during elevation thereof.

2. A machine for securing an end closure to the end of a container barrel comprising a frame, a head member mounted on the frame, a pair of crimping rolls journalled in the head, said head being cooperable upon engagement with a container to position the end portion of the container and an end closure seated thereon into crimping relation with said rolls, a carrier having a plurality of container supports, said carrier being movable about an axis extending parallel to and arranged at one side of the axis of the head to alternately move said supports from a loading position to a position in axial alinement with the head, said supports being mounted in the carrier for axial movement toward and from the head, a power operated support actuating means movable upwardly toward the head and operable to effect elevation of the support positioned in axial alinement with the head and move the container on said support into engagement with the head, a latch member mounted on the carrier in juxtaposition to each of said supports, a detent carried by said support actuating means and being normally positioned to be engaged by said latch members when each support is moved into axial alinement with said head and being movable with said actuating means upon elevation of the support out of engagement with said latch, means operable to close the crimping rolls on the peripheral portion of the end closure of the container during elevation thereof, and said detent being maintained out of latch engaging position upon return downward movement of said support actuating means.

3. A machine for securing an end closure to the end of a container barrel comprising a frame, a head member mounted on the frame, a pair of crimping rolls journalled in the head, said head being cooperable upon engagement with a container to position the end portion of the container and an end closure seated thereon into crimping relation with said rolls, a carrier mounted in the frame below the head and having a plurality of container supports, said carrier being movable about an axis extending parallel to and arranged at one side of the axis of the head to alternately move said supports from a loading position to a position in axial alinement with the head, said supports being mounted in the carrier for vertical axial movement toward and from the head, a power operated rod slidably mounted in the frame for vertical movement parallel with the axis of said head, an arm mounted on said rod for yieldable axial movement relative thereto and arranged to engage a support positioned in axial alinement with the head, power means operable to effect upward movement of said rod and arm and elevation of said support to move a container thereon into engagement with the head, a latch member mounted on the carrier in juxtaposition to each of said supports, a detent movably mounted on said rod and being normally positioned to be engaged by said latch members when each support is moved into axial alinement with the head and being movable with said rod upon elevation of the rod and support out of engagement with said latch, said detent being movable relative to said rod upon downward return movement thereof out of latch engaging position, and means operable to close the crimping rolls on the peripheral portion of the end closure of the container during the elevation thereof.

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