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CAN END ASSEMBLING MACHINE

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2 Sheets-Sheet 1

Fig. 1

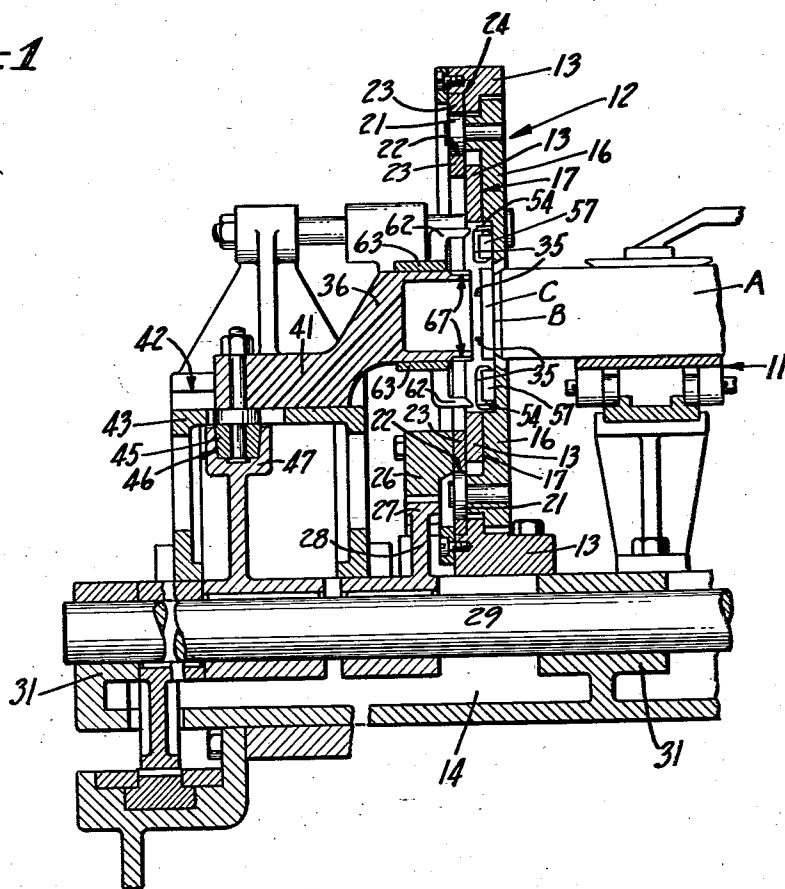
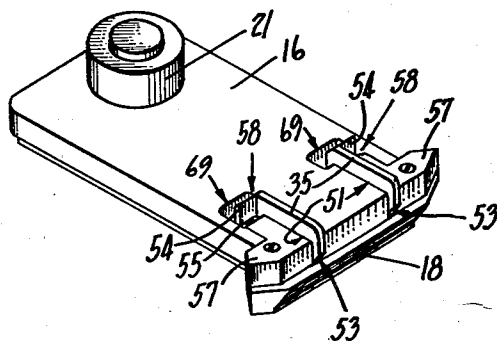


Fig. 2



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CAN END ASSEMBLING MACHINE

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6 Claims. (Cl. 93—55.1)

The present invention relates to can end assembling machines and the like and has particular reference to folding over the flange part of a fibre can body to hold a can end in place within the body. This is an improvement on the can end assembling machine disclosed in United States Patent 2,200,276, issued May 14, 1940, to J. M. Hotherhall et al.

The instant invention contemplates the securing of fibre can ends in place within a rectangular fibre can body having a straight annular flange extending beyond the inserted can end. By way of example such a container is disclosed in United States Patent 2,085,979, issued July 6, 1937, to J. M. Hotherhall. In producing such a can it has been found advantageous to first partially fold the flange over toward the can end so that it is disposed at an angle thereto and then complete the folding operation by bumping or pressing the flange home against the can end. This prevents crushing of the flange parts during the folding operation.

An object therefore of the invention is the provision in a machine for assembling can ends with fibre can bodies, of devices which operate to first partially fold a flange part of a can body into overlapping position relative to a can end inserted within the body, then to hold the flange in such partially folded position while other devices operate to complete the folding operation by forcing the flange inwardly against the can end to hold the latter in position within the body, such devices preventing the flange from being crushed and bent outwardly during the folding operation.

Another object is the provision in such a machine of devices which engage against the side of the body flange at predetermined points and bend and hold the flange inwardly at an angle toward the end of the can so that a straight faced punch readily completes the flange folding operation and presses the flange home against the can end to hold it in place within the can body.

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 sectional view of a can body and end assembling mechanism embodying the instant invention with parts broken away;

Fig. 2 is an enlarged perspective detail of a part of the mechanism;

Fig. 3 is an enlarged composite elevation and sectional view of the assembling head parts of the mechanism showing a can body and can end in place, with parts broken away;

Fig. 4 is a perspective view of one of the head parts drawn at a reduced scale; and

Fig. 5 is a sectional view taken substantially along the broken line 5—5 in Fig. 3.

As a preferred embodiment of the instant invention the drawings illustrate principal parts of a can body and can end assembling station of a can end assembling machine of the character disclosed in the above mentioned Hotherhall Patent 2,200,276.

In such a machine the work to be done is performed on rectangular shaped fibre can bodies A (Fig. 1) having inwardly bent annular beads or shoulders B which terminate in a straight longitudinally extending annular flange C. These bodies as they enter the assembling station carry flat fibre can ends D which have been previously inserted within the can body and which rest in engagement with the shoulder B, as shown in Fig. 3.

A can body A with its inserted end member D is carried through the machine in a horizontal position in an intermittent or step-by-step manner on a conveyor 11 (Fig. 1) which is actuated in any suitable manner in time with the other moving parts of the machine. When the conveyor comes to rest between movements, it brings a can body A into position adjacent the assembling station with the end of the body in line with a can holding head 12. Gripper fingers disposed at the opposite end of the body engage it and push it transversely of the conveyor into the holding head.

The can holding head 12 includes a stationary cylindrically shaped bracket 13 which is bolted to the machine frame, indicated by the numeral 14. This bracket 13 carries a plurality of radially movable slides 16 which operate in slideways 17 (see also Figs. 2 and 3) formed in the bracket. There are preferably four of these slides located one adjacent each flat side of the rectangular can body. At their inner ends the slides are formed with shaped jaws 18 which are adapted to engage within the bead shoulders B of the can body A.

Adjacent the outer ends, the slides 16 carry cam rollers 21 which operate in inclined cam slots 22 formed in a rotatable cam disc 23 disposed in an annular recess 24 in the bracket

13. The disc is fitted with a rack 26 which meshes with a segment gear 27 formed on a crank arm 28 keyed to a rock shaft 29 carried in bearings 31 of the machine main frame 14. The rock shaft is oscillated in any suitable manner in time with the other moving parts of the machine.

Hence when the rock shaft 31 moves in one direction it rocks the segment gear 27 and through the rack 26 rotates the cam disc 23 in its recess 24. This shifts the cam slots 22 relative to the cam rollers 21 and thus the slides 16 are shifted inwardly toward the can body, the jaws 18 engaging in the shoulder head B and thereby gripping the can on all sides and holding it firmly against displacement.

While the can is thus held against movement its flange C is folded over against the inserted can end member D and this holds the latter in place. This folding operation is preferably effected in two steps. The straight longitudinally extending flange is first engaged at points around its periphery by a plurality of bending fingers 35 which are carried in the slides 16 and which bend the flange inwardly to an inclined position shown in Fig. 3. This temporarily holds it in this position preparatory to further bending by a straight faced hollow, movable punch 36. The punch presses the flange down home against the can end and thus completes this part of the folding operation while creasing the folded edge of the flange.

It should be understood that it is not intended in this particular assembling operation to seal the flange tight against the can end, although if it is desired such a sealing operation could be done by the punch. In the instant machine the flange is permitted to spring back into an inclined position so that the thermoplastic adhesive which is carried by the flange may be heated at another station in the machine and the flange then permanently sealed in place.

The folding of the body flange C is effected by movement of the punch 36, the punch actuating the bending fingers 35 so that on one stroke of the punch both folding steps are effected in proper time and order. For this purpose the punch is formed on a slide 41 retained in a slide-way 42 disposed in a bracket 43 bolted to the top of the main frame 14. The slide carries a cam roller 45 which operates in a cam groove 46 of a rocker cam 47 keyed to the rocker shaft 29.

Hence when the rocker shaft 29 moves the can holding jaws 18 into place against the can to hold it in position, it also rocks the cam 47 and thereby moves the punch 36 forward toward the end of the held can. The timing is such that the jaws 18 are fully in place before the punch starts forward so that the jaws will back up the can bead shoulders B during the bumping action.

The bending fingers 35 are preferably narrow L-shaped blades set on edge in slide grooves 51 formed in the slides 16 adjacent the jaws 18. There are preferably two of these fingers 35 in each jaw 18 so that the flange on each side of the can will be engaged at two points. On one side, i. e., where the side seam of the body is disposed, there is preferably a third finger 35 located so that this finger will engage the side seam section of the flange.

The inner edge of each finger 35 is formed with an under-cut inclined surface 53 which is adapted to engage against the can body flange C. The opposite or outer edge of each finger is formed with a right angle ledge 54 which is en-

gaged by a spring barrel 55. The spring barrel is disposed in a bore 56 of a block 57 secured to the slide 16 in a recess 58 formed in the slide. A compression spring 59 housed inside the barrel presses the latter in engagement with the finger ledge 54 and thereby normally maintains the finger in a retracted position relative to the slide 16, as best shown in Figs. 1 and 2.

Actuation of the bending fingers 35 is brought about by cam prongs 62 (Figs. 1, 3, 4 and 5) which are formed on cam blocks 63 secured to the sides of the punch 36. The cam prongs extend parallel with the sides of the punch and are located in line with the fingers 35 in the slides 16. The forward edge of each cam prong is beveled as at 64 for engagement with similarly beveled surfaces 65 on the bending fingers 35.

Hence when the punch 36 moves forward toward the end of the can body A, the cam prongs 62 first come into engagement with the bending fingers 35 and slide them inwardly toward the can body. The inner under-cut surfaces 53 of the fingers engage the straight can flange C and bend it inwardly into the inclined position shown in Fig. 3. When the fingers have been pushed in as far as they will go, the cam prongs slide along the outer edges of the fingers and thus hold the fingers and the bent flange C in such position.

Clearance grooves 67 formed in the sides of the punch 36 provide clearance for the bending fingers 35 and permit the punch to continue its movement toward the end of the can. Openings 68 in the can holding head bracket 13 and recesses 69 in the slides 16 provide clearance for the cam prongs 62.

The punch 36 continues to move toward the can body during this flange positioning operation and finally comes into endwise engagement with the flange. The face of the punch is preferably formed with a straight and flat surface 71 and this face presses the inclined flange C from the position shown in Fig. 3 to a position where it is flat against the can end member D. The jaws 18 back up the can body shoulder bead during this bumping operation so that the outer edge of the flange will be creased sufficiently to hold the flange in an inclined position when it springs out after the punch 36 and fingers 35 withdraw or are retracted from their flange holding positions.

This completes the flange bending operations and the punch 36 is withdrawn to its original position in readiness for a subsequent can body. Withdrawing of the punch shifts the cam prongs 62 away from the bending fingers 35 and this permits the springs 59 to return the fingers to their original normal position so that they will be ready for the next incoming can body A. The can holding slides 16 withdraw from the can body during this retraction of the punch and of the bending fingers and this releases the can body so that it may be removed from the head 12 and shifted with the conveyor 11 to the next station in the machine for further treatment.

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 an apparatus for securing can ends in inserted position against a shoulder provided by an inwardly extending bead formed in the projecting annular flange of a fibre can body, the combination of means for bending and holding the projecting flange inwardly toward the inserted can end, and a bumping device adjacent the can end for actuating said bending means and for bumping the folded flange against and overlapping the outer surface of the can end to hold the end in place.

2. In an apparatus for securing can ends in inserted position against a shoulder provided by an inwardly extending bead formed in the projecting annular flange of a fibre can body, the combination of means for partially folding and holding the projecting flange inwardly toward the inserted can end and in overlapping relation thereto, and devices for actuating said folding means and also for completing the folding operation by further bending the projecting flange inwardly against the outer surface of the can end to hold the end in place.

3. In an apparatus for securing can ends in inserted position against a shoulder provided by an inwardly extending bead formed in the projecting annular flange of a fibre can body, the combination of instrumentalities for holding a can body in position and for backing up the shoulder in the body, means for bending and holding the projecting flange inwardly toward the inserted can end, and a bumping device adjacent the can end for actuating said bending means and for bumping the folded flange against and overlapping the outer surface of the can end to hold the end in place.

4. In an apparatus for securing can ends in inserted position against a shoulder provided by an inwardly extending bead formed in the projecting annular flange of a fibre can body, the combination of a plurality of movable fingers disposed adjacent the outer surface of the projecting body flange and arranged at spaced intervals therearound, means for forcing said fingers against the flange to partially bend it inwardly toward the inserted can end and in overlapping relation thereto, and a punch movable toward the end of the can body for actuating said movable fingers and for engaging the partially folded

flange for further bending it to complete the folding operation and to press the flange against the can end so that the latter will be held in place within the can body.

5. In an apparatus for securing can ends in inserted position against a shoulder provided by an inwardly extending bead formed in the projecting annular flange of a fibre can body, the combination of a plurality of movable fingers disposed adjacent the outer surface of the projecting body flange and arranged at spaced intervals therearound, a punch movable toward the end of the can body, actuating means for said punch, and cam members on said punch, said cam members engaging against said fingers and shifting them inwardly against said flange to partially bend the latter inwardly toward the inserted can end and in overlapping relation thereto when the punch moves toward the can end, said punch continuing along its path of travel to engage the partially folded flange to further bend it and to complete the folding operation to press the flange against the can end so that the latter will be held in place within the can body.

6. In an apparatus for securing can ends in inserted position against a shoulder provided by an inwardly extending bead formed in the projecting annular flange of a fibre can body, the combination of a plurality of jaws surrounding the can body and movable into engagement therewith adjacent the shoulder to support the body and to back up the shoulder, a plurality of yieldable fingers carried on said jaws and movable relative thereto, a punch movable toward the end of the can body and having a plurality of recesses formed in its outer walls to receive said fingers, actuating means for said punch, and cam members on said punch, said cam members engaging against said fingers and shifting them inwardly against said flange to partially bend the latter inwardly toward the inserted can end and in overlapping relation thereto when the punch moves toward the can end, said punch continuing along its path of travel to engage the partially folded over flange and to further bend it and to complete the folding operation to press the flange against the can end so that the latter will be held in place within the can body.

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