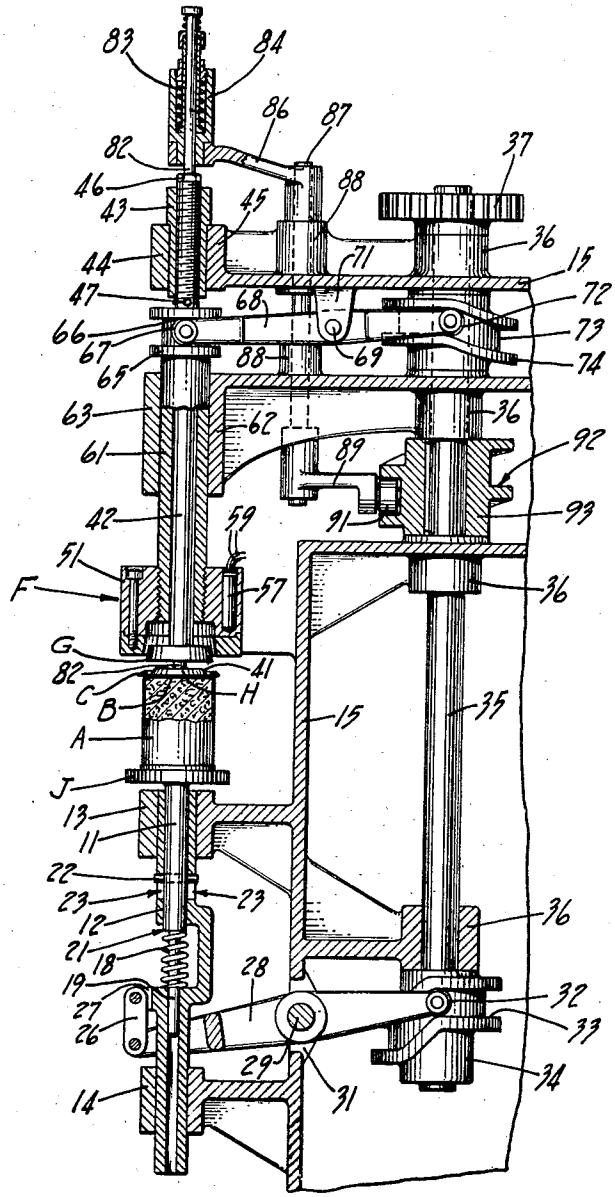
Oct. 16, 1945. N. GEERTSEN 2,386,787

CLOSING MACHINE

Filed March 13, 1943 2 Sheets-Sheet 1

Fig. 1



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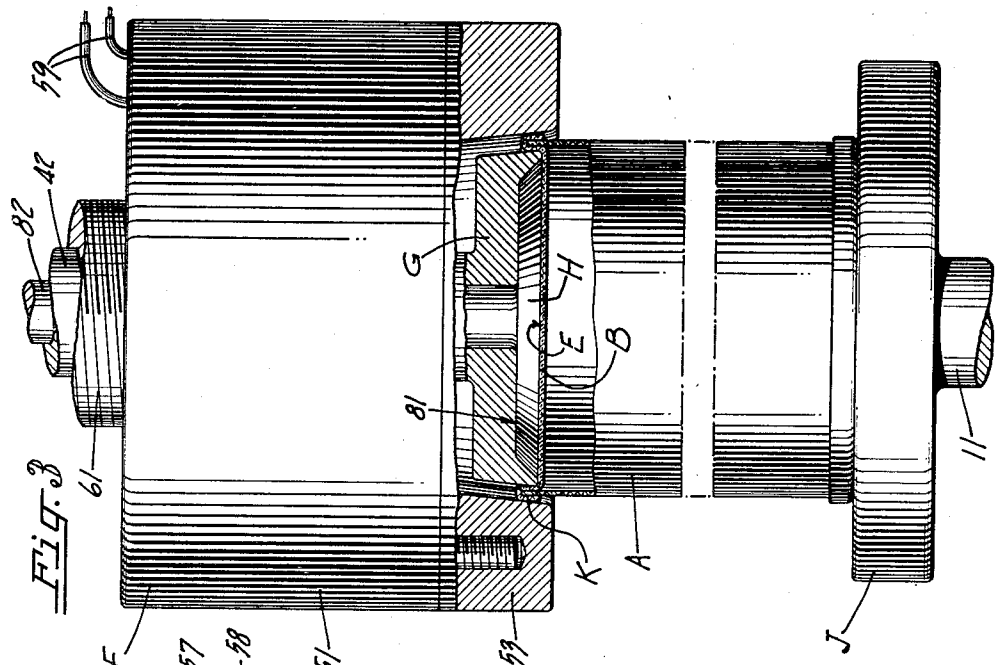


Fig. 3

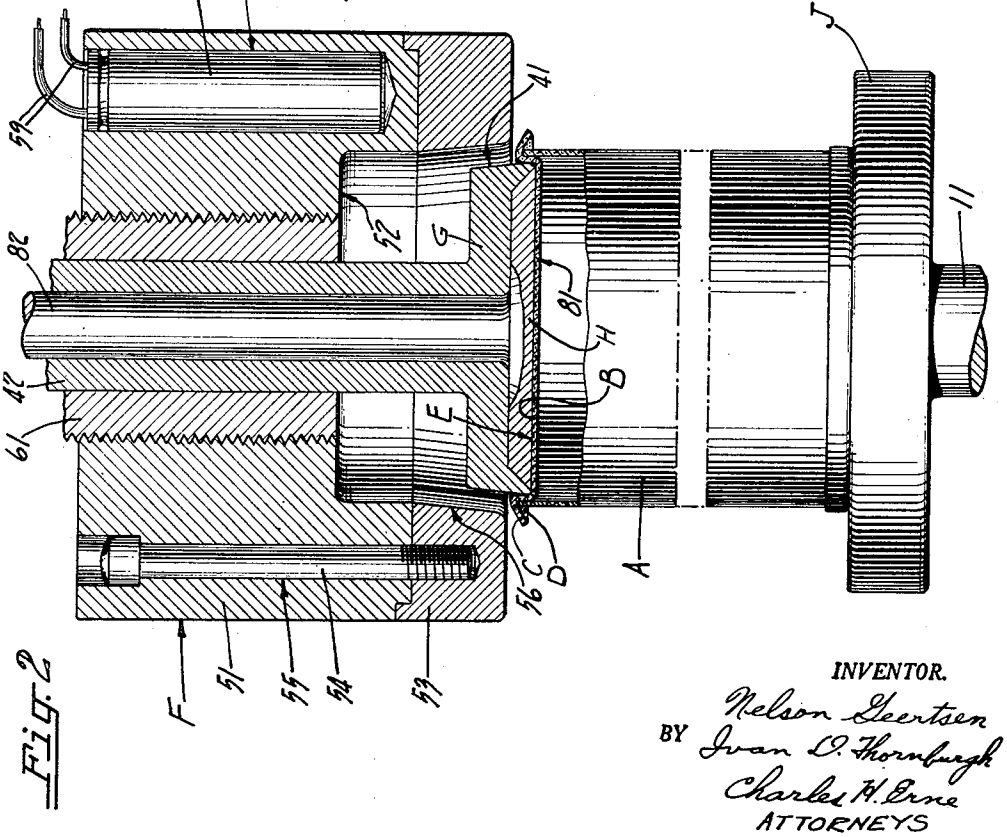


Fig. 2

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CLOSING MACHINE

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7 Claims. (Cl. 93—55.1)

The present invention relates to a closing machine for sealing covers to cans or containers and has particular reference to a crimping head having oppositely disposed continuous and tapered surfaces which cooperate in wiping the flange of a cover, superimposed upon a can, into sealed position against the body side wall of the can.

An object of the invention is the provision of a closing machine for sealing covers to cans wherein a tapered chuck and a tapered ring are utilized for wiping the flange of a cover superimposed upon a can, into position against the can body side wall and for applying a predetermined amount of pressure thereto for sealing the wiped down flange to the body wall.

Another object is the provision of such a closing machine wherein the head is maintained in a heated condition for performing the sealing operation upon fibre can parts which are united by a thermoplastic adhesive.

Another object is the provision of a closing machine of this character wherein the amount of pressure applied to the can parts during the sealing operation may be varied to effect full control over the tightness of the resulting end seam.

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 vertical sectional view of a closing machine embodying the instant invention with a can and cover in position ready to be operated upon, parts being broken away;

Fig. 2 is an enlarged vertical sectional view through the closing head of the machine in Fig. 1, and showing a can with a cover in place in the head, with parts of the head and the can broken away; and

Fig. 3 is a view similar to Fig. 2 and illustrating the movable parts of the head and the can in a different position as during the operation of sealing the cover to the can.

As a preferred embodiment of the invention the drawings illustrate the principal parts of a can closing machine in which a fibre can A is closed with a fibre cover B secured to the can by a crimping over of a flange C formed on the can end or cover, the flange carrying on its inside surface a coating of dried thermoplastic adhesive D (see Fig. 2). The can cover preferably is formed with a countersunk panel E so that a backing may be provided for the cover when the flange is turned or bent down against the upper outer edge of the can to form the finished end seam.

The machine includes a vertically movable crimping head F having a centrally disposed stationary chuck member G and a knock-out pad H. The chuck and the knock-out pad cooperate with a vertically movable lifter plate J in holding the can and its superimposed cover in place while the head moves down over the can and cover to perform the sealing operation.

The lifter pad J on which the can is supported is mounted on a depending vertical rod or stem 11 (Fig. 1) which is carried in a vertical slide bracket 12 that slides in a pair of spaced upper and lower bearings 13, 14 formed on a frame 15 which constitutes the main frame of the machine. The rod is yieldably mounted in the slide bracket on a compression spring 18 which surrounds a reduced diameter section 19 of the rod. The spring is interposed between the slide bracket and a shoulder 21 on the rod. The rod is held in place in the slide bracket against the resistance of the spring by a pin 22 which is secured in the rod and which operates in slots 23 formed in the bracket.

The slide bracket 12 and its lifter plate J are raised vertically to lift the can A and its superimposed cover B into engagement with the chuck G, by a link 26 the upper end of which is pivotally connected to a pair of lugs 27 formed on the slide bracket 12. The lower end of the link is pivotally connected to the outer end of a cam lever 28 mounted on a pivot pin 29 carried in bosses 31 formed on the main frame 15. The inner end of the lever carries a cam roller 32 that operates in a cam groove 33 of a cam 34 mounted on a vertical cam shaft 35 journaled in a plurality of spaced bearings 36 formed in the main frame. The cam shaft is rotated in any suitable manner such as for example, by a gear 37 mounted on the upper end of the shaft.

The chuck G when engaged by the raised can cover B on the can A fits snugly within the countersunk cover panel E. The outer peripheral edge of the chuck is formed with an outwardly tapered surface 41 (see Fig. 2) which engages and backs up the inner circumferential panel wall of the cover B. The chuck is formed on the lower end of a vertical tubular stem 42 which extends up through the crimping head F.

Above the head F, the stem 42 is threadedly secured in a chuck holding or support block 43 which is clamped tightly by a half-cap 44 in a bearing 45 formed on the main frame 15. A nut 46 formed on the upper end of the chuck stem is provided for turning the stem in its holding block 43 to change the vertical position of the chuck G relative to the head F. Spanner holes 47 in the stem are also provided for this purpose.

The crimping head F which wipes down the flange C of the cover B against the body of the can A while the can and cover are held against the chuck, includes a cylindrical head body 51 which is concentric with the chuck and surrounds it and which is formed with a centrally disposed recess 52 in which the chuck is located. The bottom of

the head body carries an annular crimping ring member 53 which is secured in place by long bolts 54 that extend down through bores 55 formed in the head body. The crimping ring is formed with an outwardly tapered inner crimping surface 56 which is disposed substantially parallel with the tapered backing-up surface 41 on the chuck G.

The head body 51 and the ring 53 are heated by a plurality of electric heating elements 57 located in vertical bores 58 formed in the head body. Electric energy is supplied to these heating elements by wires 59 that lead from any suitable source of such energy.

The crimping head F normally is held suspended in spaced relation to the chuck G, on the lower threaded end of a head sleeve 61 which surrounds the chuck stem 42. This normal position of the head permits of the bringing of the cover into engagement with the chuck G. The sleeve is supported and slides in a half bearing 62 formed on the main frame 15. A half cap 63 confines the sleeve to its bearing.

The head F is moved vertically by cam action through a downward or working stroke and thence through an upward or return stroke. For this purpose the upper end of the head sleeve 61 is formed with a collar 65 having an annular groove 66 in which rollers 67, on the outer end of a bifurcated cam lever 68, operate. The lever is mounted on a pivot pin 69 carried in bearing lugs 71 formed on the main frame 15. The inner end of the lever also is bifurcated and carries a pair of cam rollers 72 that operate in a cam groove 73 of a barrel cam 74 mounted on the vertical cam shaft 35. In this manner the head F is moved vertically in time with the movement of the lifter pad J and the other moving parts of the machine.

Hence as the heated crimping head F moves down through a working stroke as shown in Fig. 2, the tapered inner crimping surface 56 of the crimping ring 53 engages the outwardly projecting flange C of the can cover B and wipes or turns the flange down against the body of the can and presses the flange and the can body inwardly against the outer tapered backing-up surface 41 of the chuck G, as best shown in Fig. 3. In this manner the two tapered surfaces, on the chuck and on the ring, cooperate in crimping over the flange C into sealing position against the can body while the heat of the head softens or melts the thermoplastic adhesive interposed between the cover flange and the can body and thus unites the cover and the can in a sealed end seam or joint K (Fig. 3).

In some cases a tight end seam may be required while in others a looser joint will suffice. The tightness requirements of the joint depend considerably upon the nature of the products to be sealed in the can and also may be governed by the type of fibre stock used in the can parts. A hard finished fibre stock may require considerably more pressure in forming the end seam than a soft spongy and thicker stock which would be unduly crushed by too much pressure.

The tightness of the resulting joint for any type of can is controlled by the ultimate space between the tapered surfaces of the chuck and the crimping ring when the crimping head is in its lowermost position which obtains at the end of its downward or working stroke. This space may be changed at will to bring about the desired results by moving the chuck vertically relative to the head. It is for this purpose that the chuck stem 42 is threadedly secured in its holding block 43 as hereinbefore described.

After completing the end seam K, the crimping head F moves up through its return stroke, free of the sealed can so that the latter may be stripped off the chuck and returned by the lifter plate J to its original position. Stripping of the can from the chuck is effected by the knock-out pad H. This pad is located in a recess 81 (Fig. 2) formed in the bottom of the chuck. The pad is formed on the lower end of a knock-out rod 82 that extends up through the tubular chuck stem 42. The rod projects above the stem and carries a yieldable compression spring unit 83 located within a housing 84 that surrounds the rod.

The knockout pad H is depressed at the proper time to strip the sealed can off the chuck by an arm 86, the outer end of which connects with the housing 84. The inner end of the arm is mounted on the upper end of a vertically slidable shaft 87 carried in slide bearings 88 formed in the main frame 15. The lower end of the shaft carries a cam arm 89 having a cam roller 91 that operates in a cam groove 92 formed in a barrel cam 93 mounted on the cam shaft 35. In this manner the knock-out pad H is actuated in time with the lifter pad J, the crimping head F and the other moving parts of the machine.

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 for crimping can covers into sealed position onto can bodies, the combination of a crimping ring member having an inner tapered surface, a crimping chuck member disposed within said crimping ring member in spaced relation thereto and having an outer correspondingly tapered surface disposed in substantial and permanent parallelism with the inner tapered surface of said ring member, said chuck member being arranged to back up and support a flange part of a can cover superimposed upon a can body and interposed between the tapered surfaces of said crimping members, and actuating devices for moving one of said members relative to the other in a straight line direction to reduce the space between the opposed parallel surfaces of said ring and chuck member and to engage the can cover and the can body between the said tapered surfaces so as to apply pressure thereto for wiping the flange of the cover inwardly into sealing engagement against the adjacent wall of the can body.

2. In a can closing machine for crimping can covers into sealed position onto can bodies, the combination of a one piece crimping ring member having an inner tapered surface, a one piece crimping chuck member disposed within said crimping ring member in spaced relation thereto and having an outer correspondingly tapered surface disposed in permanent parallelism with the inner tapered surface of said ring member, said chuck member being arranged to back-up and support a flange part of a can cover superimposed upon a can body and interposed between the tapered surfaces of said crimping members, actuating devices for moving one of said members relative to the other in a straight line direction to reduce the space between the opposed

parallel surfaces of said ring and chuck member and to engage the can cover and the can body between the said tapered surfaces so as to apply pressure thereto for wiping the flange of the cover inwardly into sealing engagement against the adjacent wall of the can body, and means for varying the spaced parallel relation of said members to regulate the space between said tapered surfaces for controlling the tightness of the end seam resulting from the sealing of the cover to the can body.

3. In a can closing machine for crimping can covers into sealed position onto can bodies, the combination of a one piece crimping ring member having an inner tapered surface, a crimping chuck member disposed within said crimping ring member in spaced relation thereto and having an outer correspondingly tapered surface disposed in permanent parallelism with the tapered inner surface of said ring member, said chuck member being arranged to back-up and support a flange part of a can cover superimposed upon a can body and interposed between the tapered surfaces of said crimping members, actuating devices for shifting said ring member relative to said chuck member in a straight line direction to reduce the space between the opposed parallel surfaces of said ring and chuck member and to engage the can cover and the can body between the said parallel tapered surfaces so as to apply pressure thereto for wiping the flange of the cover inwardly into sealing engagement against the adjacent wall of the can body, and a chuck support block for holding said chuck member stationary to effect said wiping action, said chuck member being movable relative to its support block to vary the spaced parallel relation of the tapered surfaces of said ring and chuck members for controlling the tightness of the end seam resulting from the sealing of the cover to the can body.

4. In a can closing machine for crimping can covers into sealed position onto can bodies, the combination of a one piece crimping ring member having an inner tapered surface, a one piece crimping chuck member disposed within said crimping ring member in spaced relation thereto and having an outer correspondingly tapered surface disposed in permanent parallelism with the tapered inner surface of said ring member, said chuck member being arranged to back-up and support a flange part of a can cover superimposed upon a can body and interposed between the tapered surfaces of said crimping members, actuating devices for shifting said ring member relative to said chuck member in a straight line direction to reduce the space between the opposed parallel surfaces of said ring and chuck member and to engage the can cover and the can body between the said tapered surfaces so as to apply pressure thereto for wiping the flange of the cover into sealing engagement against the adjacent wall of the can body, and mechanism for bringing the can body with its superimposed cover into position against said chuck member and for holding it in such position during the sealing operation.

5. In a can closing machine for crimping can covers into sealed position onto can bodies, the combination of a crimping head, a one piece ring member secured to said head and having an inner tapered crimping surface, a stationary one piece chuck member located within said head concentric with and in spaced relation to said ring member and having an outer tapered surface disposed in permanent parallelism with the tapered inner surface of said ring member, said chuck member being arranged to back up and support a flange part of a can cover superimposed upon a can body and interposed between the tapered surfaces of said members, and actuating devices for moving said crimping head toward said chuck member in a straight line direction to reduce the space between the opposed parallel surfaces of said ring and chuck member and to engage the can cover and the can body between the said tapered surfaces, so as to apply pressure to the engaged can parts for wiping the flange of the cover inwardly into sealing engagement against the adjacent wall of the can body.

6. In a can closing machine for crimping can covers into sealed position onto can bodies, the combination of a crimping head, a one piece ring member secured to said head and having an inner tapered crimping surface, a stationary one piece chuck member located within said head concentric with and in spaced relation to said ring member and having an outer tapered surface disposed in permanent parallelism with the tapered inner surface of said ring member, said chuck member being arranged to back-up and support a thermoplastic adhesive coated flange part of a fibre can cover superimposed upon a fibre can body and interposed between the tapered surfaces of said members, actuating devices for moving said crimping head toward said chuck member in a straight line direction to reduce the space between the opposed parallel surfaces of said ring and chuck member and to engage the can cover and the can body between the said tapered ring and chuck surfaces so as to apply pressure to the engaged can parts for wiping the flange of the cover inwardly into sealing engagement against the adjacent wall of the can body with the adhesive therebetween, and heating elements carried by said crimping head for heating the adhesive on said cover flange to seal the wiped down cover flange to the can body.

7. In a can closing machine for crimping can covers into sealed position onto can bodies, the combination of a one piece crimping ring member having an inner tapered surface, a one piece crimping chuck member disposed within said crimping ring member in spaced relation thereto and having an outer tapered surface disposed in permanent parallelism with the tapered surface of said ring member, said chuck member being arranged to back-up and support a flange part of a can cover superimposed upon a can body and interposed between the tapered surfaces of said crimping members, actuating devices for moving one of said members relative to the other in a straight line direction to reduce the space between the opposed parallel surfaces of said ring and chuck member and to engage the can cover and the can body between the said tapered surfaces and so as to apply pressure thereto for wiping the flange of the cover into sealing engagement against the adjacent wall of the can body, and knock-out means disposed within said chuck member for stripping the sealed can body from said member.

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