

[54] CONTAINER SHAPING APPARATUS
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1,966,349 7/1934 Kronquest..... 113/1 G
3,459,028 8/1969 Bijvoet..... 113/120 M

FOREIGN PATENTS OR APPLICATIONS

778,545 7/1957 Great Britain 113/120 M

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113/1 G, 116 R; 72/393, 370

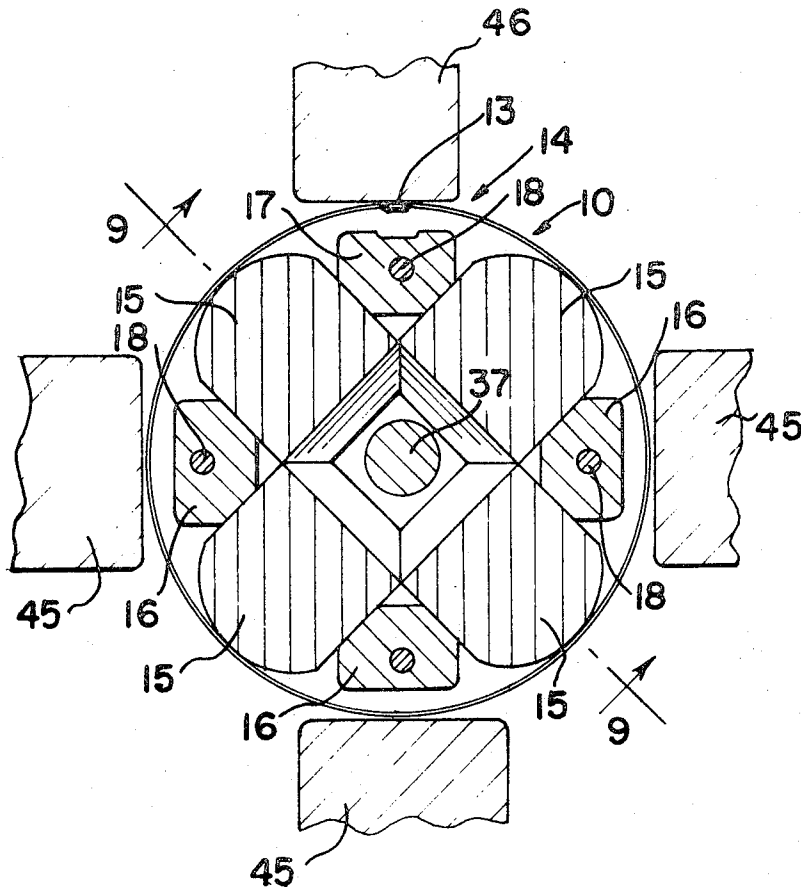
[56] References Cited
UNITED STATES PATENTS

2,462,080 2/1949 Erb..... 113/120 M

[57] ABSTRACT

An apparatus for reforming a cylindrical can body to a generally rectangular body. The apparatus includes means for holding the side seam clamped while the can body is being stretched into rectangular shape.

4 Claims, 13 Drawing Figures



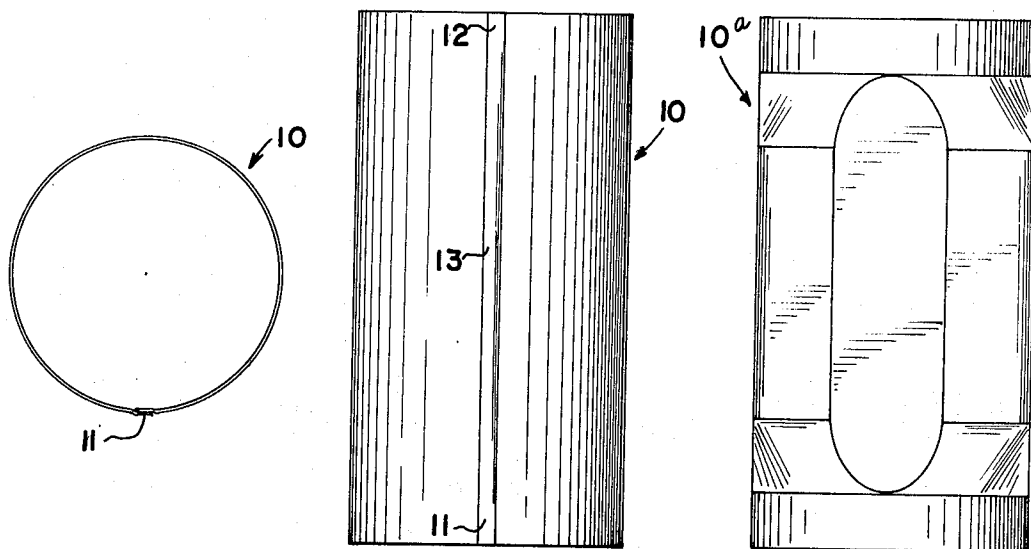


FIG. 1.

FIG. 2.

FIG. 3.

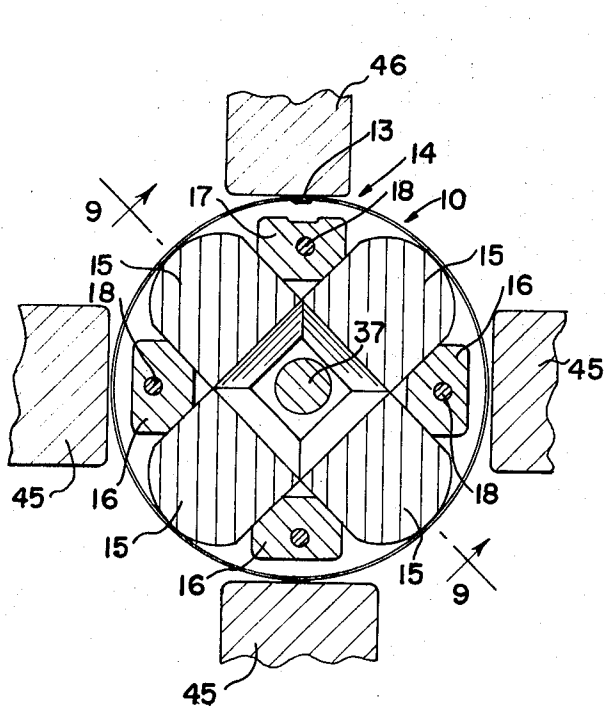


FIG. 4.

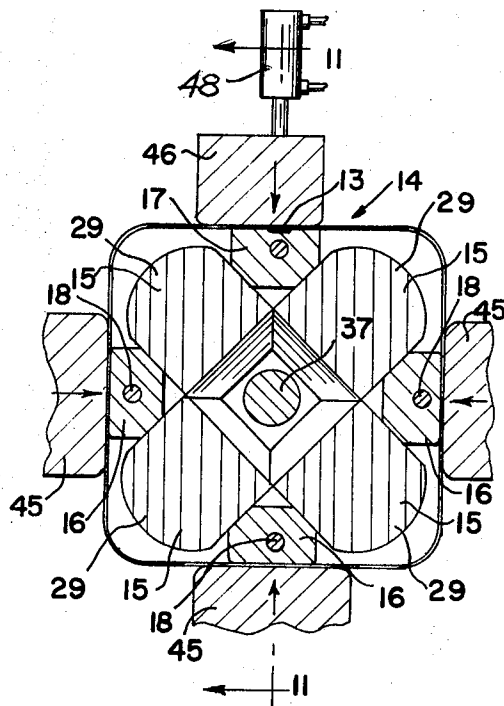


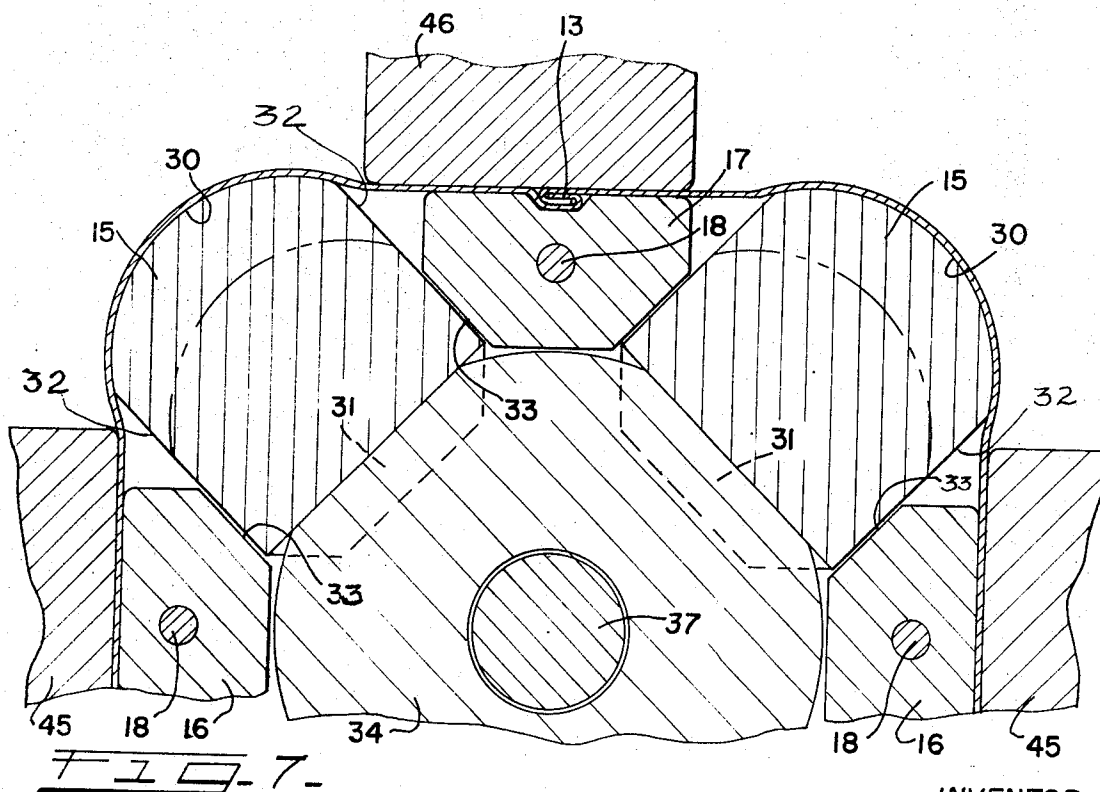
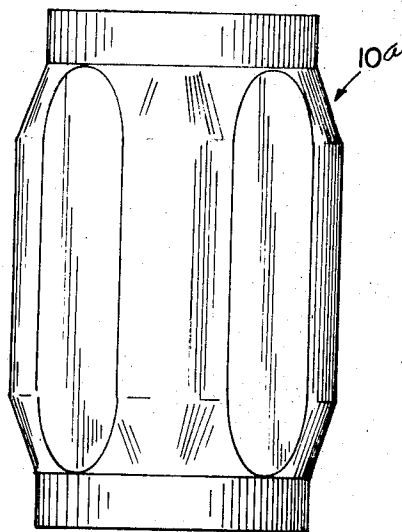
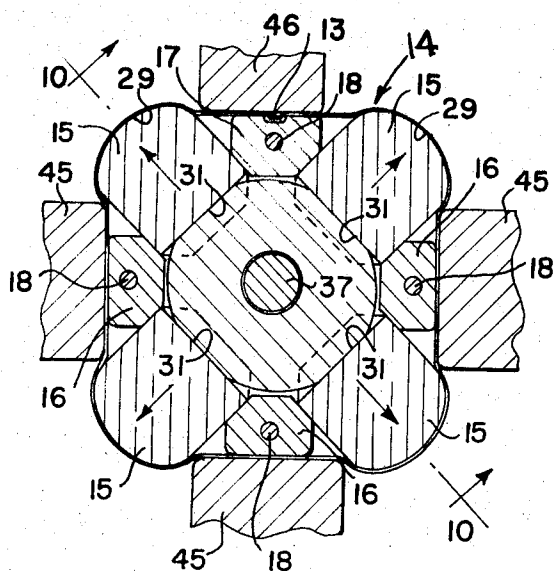
FIG. 6.

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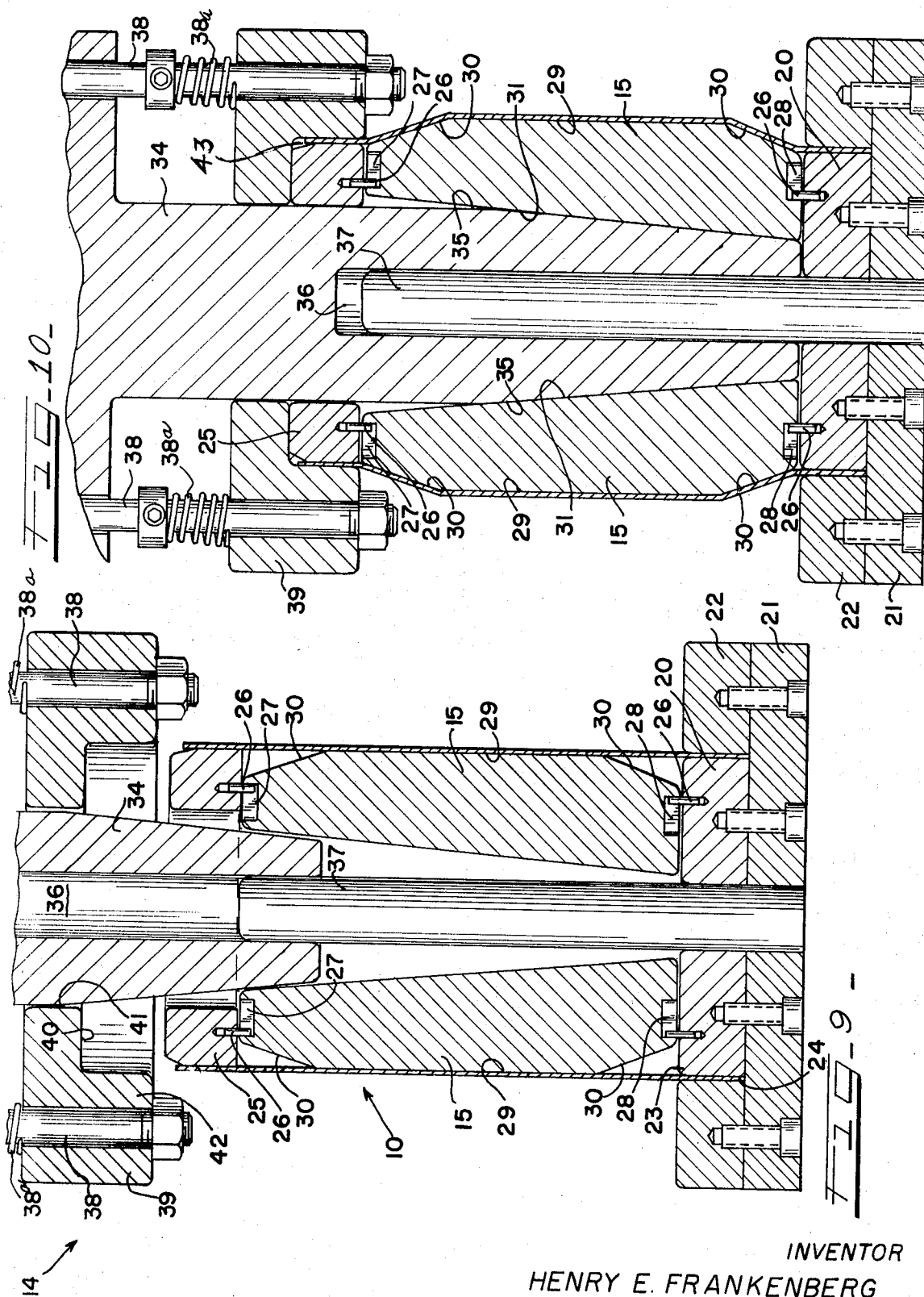
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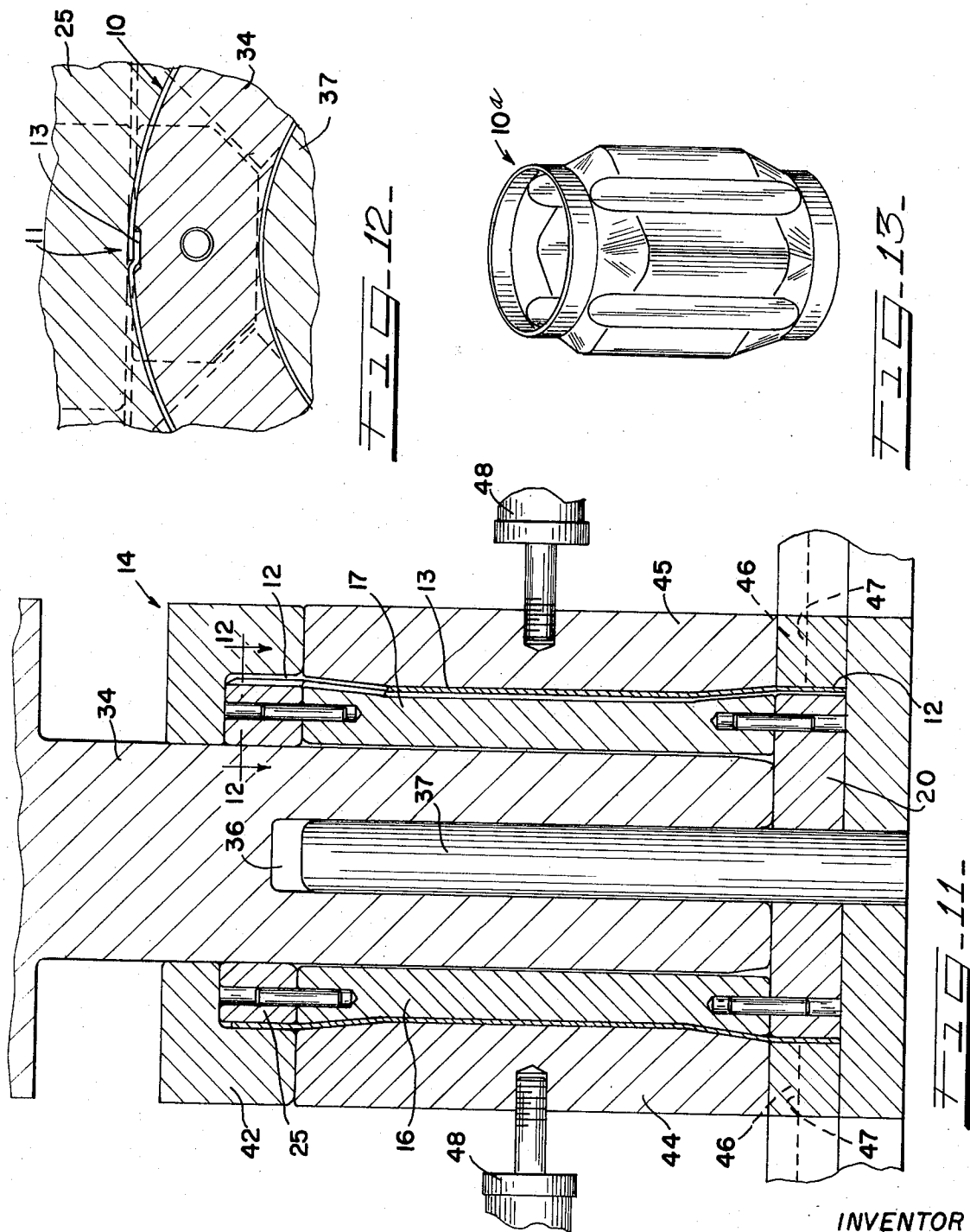


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CONTAINER SHAPING APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to reshaping can bodies and more particularly to an apparatus and method for reshaping soldered side seam cans.

Can bodies are generally made from blanks of sheet metal which are formed into cylindrical or other forms with the overlapping edges arranged as a lock and/or lap seam which are soldered. The cylindrical can body is normally made on a standard body making machine. Although efforts have been made to form a container on a body maker into shapes other than cylindrical such as for example, rectangular, or a combination of linear and curved lines, these efforts have not been generally adapted because of operational and economic considerations.

For these reasons, cylindrical can bodies have been reshaped or stylized in devices separate from the standard body maker. The mechanical devices include shaped expandable tooling which is inserted in the cylindrical bodies and expanded so that the can body conforms to the shape of the tooling.

These mechanical expandable tooling devices have the drawback of applying considerable stress at the soldered side seam such that the seam frequently separates and thereby causes failure of the container.

SUMMARY OF THE INVENTION

By the present invention, it is proposed to provide an arrangement for reshaping a cylindrical can body which overcomes the difficulties encountered heretofore.

This is accomplished generally by the provision of an expandable tool arrangement that is insertable into a cylindrical body. The expandable tool arrangement includes a plurality of angularly spaced stationary members which coact with members located exterior of the container to assist in the reshaping of the container. At least one pair of complementary exterior and interior members are adjusted relative to each other to clamp the container at the side seam. The remainder of the stationary interior and exterior members are disposed to permit the body to slip therebetween. In this manner the cylindrical body is reshaped by stretching of the metal while the side seam is held clamped.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plane view of a cylindrical can body prior to being reshaped;

FIG. 2 is an elevational view of the can body before reshaping;

FIG. 3 is an elevational view of the can body after reshaping;

FIG. 4 is a cross sectional view through the apparatus for reshaping the can body showing the reshaping tools in the retracted position;

FIG. 5 is a cross sectional view of the reshaping apparatus similar to FIG. 4 but showing the reshaping tools in the reshaping position;

FIG. 6 is a cross sectional view similar to FIGS. 4 and 5 but showing the reshaping tools retracted after performing the reshaping operation;

FIG. 7 is a greatly enlarged fragmentary view of FIG. 5;

FIG. 8 is a view of the reshaped can body similar to FIG. 3 but showing the can body rotated 90°;

FIG. 9 is a cross sectional view taken generally along the lines 9—9 of FIG. 4 and showing the die segments in the retracted position;

FIG. 10 is a cross sectional view taken generally along the lines 10—10 of FIG. 5 and showing the die segments in the expanded or reshaping position;

FIG. 11 is a cross sectional view taken generally along the lines 11—11 of FIG. 6;

FIG. 12 is a fragmentary cross sectional view taken generally along the lines 12—12 of FIG. 11; and

FIG. 13 is a perspective view of the reshaped container.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1 and 2 of the drawings, there is shown a circular cross section can body 10 which is to be reshaped to the generally rectangular container 10a shown in FIGS. 3, 9, and 13. The can body 10 is made from sheet metal and formed with a side seam 11 including lap seams 12 at each end and a lock seam 13 intermediate the ends. The lock seam 13 and lap seams 12 are joined by soldering. The can body 10 is formed in the standard manner on a conventional body maker.

The cylindrical can body 10 is reshaped to the body 10a of generally rectilinear cross section by means of a reshaping apparatus 12 embodying the structure of the present invention. The reshaping apparatus 14 as shown in FIGS. 4—8 and FIGS. 9—12 comprises generally a plurality of radially movable die or reshaping segments 15 disposed between fixed locating and shaping posts 16 and a fixed clamping post 17. The radially movable die segments 15 and fixed posts 16 and 17 are supported on a disk 20 fixed as by bolts to a die plate 21 which may be suitably mounted on the bed (not shown) of a reciprocating press. Disposed about the disk 20 is a ring plate 22 having an opening 23 of somewhat larger diameter than the disk thereby to provide an annular groove 24 for accommodating the lower end of the metal body including the lap seam 12 therein.

An upper annular disk or ring 25 is fixed as by means of pins 18 to the upright posts 16 and 17 and is coaxially aligned with the disk 20. Fixed to and projecting from the underside of the annular disk 25 are slide or guide pins 26 which extend into elongate radial grooves 27 formed on the upper end of the die segments 15. Similar projecting pins 26 are fixed to the base disk 20 and extend into elongate radial grooves 28 formed in the lower ends of the die segments 15. In this manner, the forming segments 15 are guided for radial movement into and out of contact with the can body 10 as more fully to be explained hereinafter.

The die segments 15 are of identical structure including an arcuate outer face 29 including inwardly tapering portions 30 at the upper and lower ends thereof respectively. The inner sides 31 of the die segments 15 are each tapered with the wider end located adjacent the base disk 20. As shown, the lateral sides 32 of the die segments 15 are guided between opposing faces 33 formed on the posts 16 and 17.

Mounted on a movable head (not shown) of the press (not shown) in which the reshaping apparatus 14 is supported, is an actuating plunger 34. As shown, the actuating plunger 34 is shaped as a cylinder having four flat faces 35 tapered complementary to the die segment

inner sides 31. The four flat faces 35 are located to engage the tapered inner sides 31 of the reshaping or die segments 15 to move the latter radially outwardly. The actuating plunger 34 is formed with an axial bore 36 which receives a guide pin 37 extending upwardly from the base plate 20. The guide pin 37 serves to maintain the plunger 34 axially aligned so that the latter exerts a uniform outward force on the die segments 15.

Slidable supported on downwardly extending posts 38 is a retaining ring 39 having an inwardly projecting shoulder 40 which is adapted to overlie the ring 25. The retaining plate 39 is formed with an axial opening 41 through which the actuating plunger 34 passes for engagement with the die segments 15.

The shoulder 40 seats on the upper face of the ring 25 and is biased into engagement therewith by compression springs 38a prior to the time that the plunger 34 engages the die segments 15. A circular skirt portion 42 depending below the shoulder 40 is concentrically disposed about the ring 25 and is of somewhat larger diameter to define an annular space 43 therewith. The annular space 43 accommodates the upper end of the cylindrical can body 10.

Laterally movable and disposed about the base are movable guide posts 44 and a movable clamping post 45. The movable posts 44 and 45 of which the lower ends may be formed with dove tails that are slidably disposed in dove tail slots formed in the base. If desired the upper ends may be guided in slots formed in the depending skirt 42 of the ring 39. The guide posts 44 and clamping post 45 may be moved by two way fluid operated piston units 48 that are actuated by switch means (not shown) engageable with the ring 39 as the latter moves downwardly. The posts 44 and 45 are movable to bend the circular can in the vicinity thereof into engagement with the front faces of the fixed posts 16 and 17. The associated mating faces of the movable posts 44 and 45 and the fixed posts 16 and 17 are bowed out of the vertical plane such that the metal will spring to a substantially flat plane when the apparatus returns to the contracted position. The inward stroke of each of the posts 44 is limited so that sheet metal is free to slip in the space between the latter and the posts 17. In this manner the sheet metal is free to stretch during the reformation of the cylindrical body 10 by the reforming die segments 15.

The post 45 serves as a clamping post and to this end the stroke of the post associated therewith is arranged so that the post 45 is firmly engaged with the fixed post 17. It is to be noted that the post 17 is formed with a groove 50 which accommodates the lock seamed portion 13 of the side seam 11. Thus, the marginal edge portions adjacent the groove 50 and on the opposite sides of the lock seam 13 are firmly gripped between the posts 17 and 45.

The posts 44 and the clamping post 45 are moved into engagement with the complementary fixed posts 16 and 17 by an energizing circuit (not shown) con-

nected to a source of fluid for operating the fluid piston units 48.

In operation, the ring 39 and actuator rod 34 are spaced above the ring 25. A cylindrical container body 10 is placed about the posts 16 and 17 and the reshaping die segments 15 as shown in FIGS. 9 and 11. In this connection, it is to be noted that the lower lap seamed end 12 is disposed in the annular groove 24 and the locked seamed portion 13 is disposed in the vertical recess 50 of the clamping post 45. The retaining ring 39 is then lowered so that the shoulder 40 abuts the annular ring 25 and the skirt 42 forms an annular groove 43 therewith which receives the lap seamed upper end of the container body 10.

The posts 16 and 17 move inwardly upon actuation of the piston units as explained heretofore. The clamping post 17 firmly seats against the lock seamed portion 30 of the can body to hold the latter clamped against the post 45. The remaining posts 16 merely bow the cylindrical can in sliding engagement with the fixed posts 44.

At the same time, the actuating plunger 34 descends so that the tapered faces 35 engage the inner sides 31 of the reshaping segments 15. This causes the reshaping segments 15 to move radially outwardly between the posts 16 and clamping post 17 to form the rounded corners. During such outward movement, the sheet metal is stretched into shape as shown in FIGS. 3, 9, and 13. Such stretching takes place from the clamped lock seam portion 13 while the remaining portion of the can body slides between the posts 16 and 44.

What is claimed is:

1. A reshaping apparatus for reshaping a cylindrical container body having a soldered side seam, said reshaping apparatus comprising a plurality of angularly spaced pairs of vertical posts between which the cylindrical body is adapted to be disposed, said pairs of posts including a pair of posts movable relatively to each for clamping said cylindrical body along the length of said side seam, said remaining ones of said pairs of vertical posts being movable relative to each other to displace said cylindrical container body into a generally rectangular cross-section prior to stretching said container body when said can is held clamped at said side seam thereby to reshape said cylindrical container body.

2. The invention as defined in claim 1 wherein said remaining ones of said vertical posts grip said container body so that said can body is free to slip therebetween as said reshaping means stretch said body.

3. The invention as defined in claim 2 wherein said reshaping means are radially movable outwardly relative to said pairs of posts so that said container body is stretched.

4. The invention as defined in claim 1 wherein said one pair of posts for clamping said can body side seam includes notch means for accommodating said side seam therein.

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