

June 27. 1933.

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1,915,318

METHOD OF PRODUCING FLANGED CAN BODIES

Filed Sept. 17, 1931

2 Sheets-Sheet 1

Fig. 1

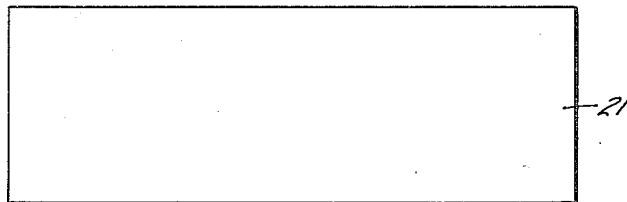


Fig. 3

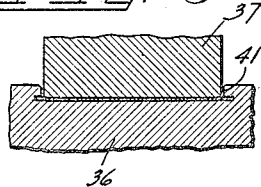


Fig. 2

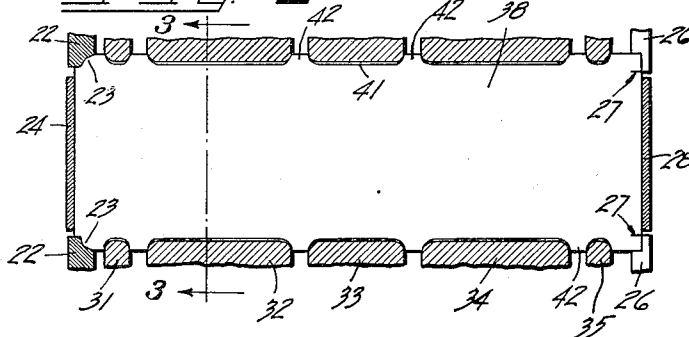


Fig. 4

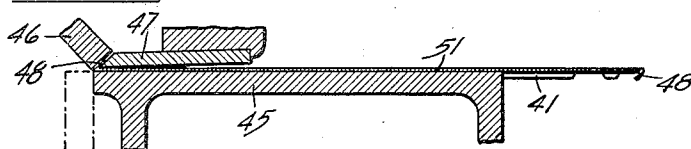
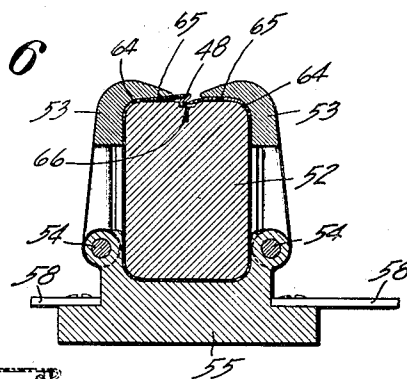
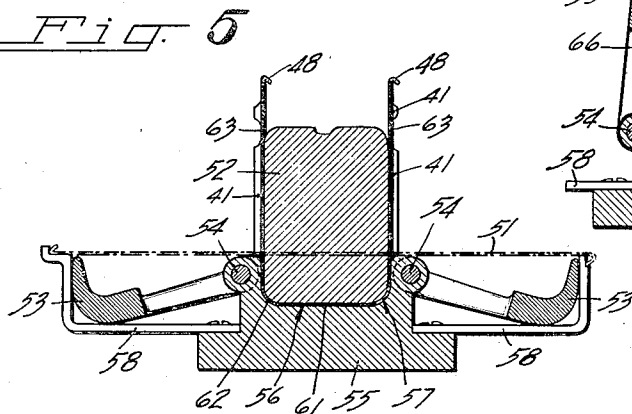


Fig. 5



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Fig. 7

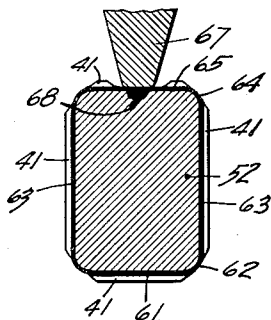


Fig. 8

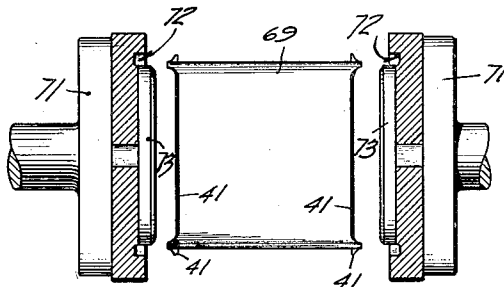


Fig. 9

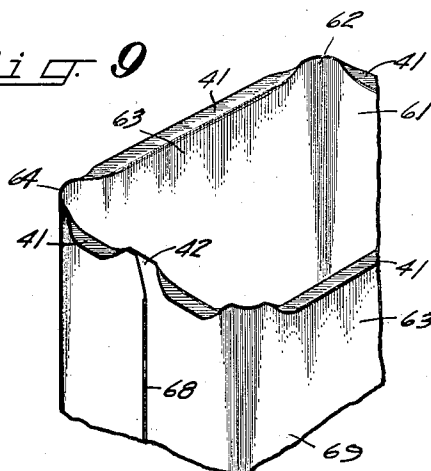


Fig. 10

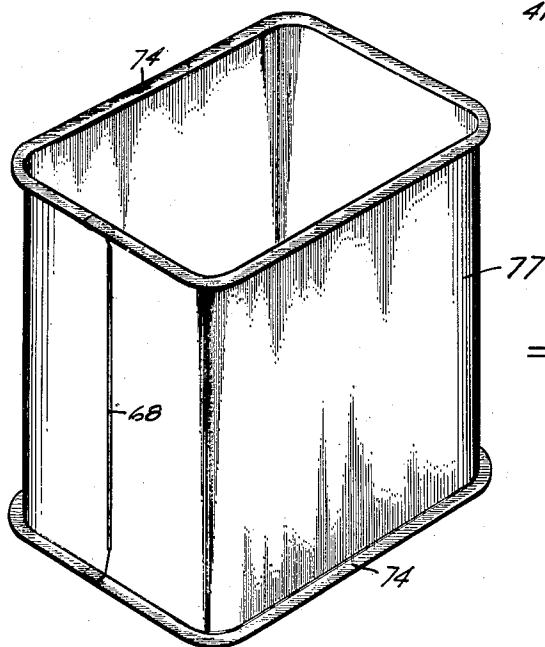
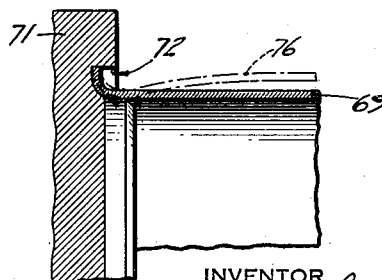


Fig. 11



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METHOD OF PRODUCING FLANGED CAN BODIES

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The present invention relates to an improved method of producing flanged can bodies and has particular reference to the flanging of rectangular bodies having relatively small rounded corners.

The invention contemplates the production of a metallic flanged body of rectangular form by means of a series of associated operations which relieve or greatly reduce the tearing and cracking strains set up in the metal by the usual flanging operations when working with small corners, these improved operation steps producing a more even, regular and perfect flange.

The principal object of the present invention is the provision of a method of producing flanged can bodies which may be practiced without concentrating the stretching of the metal at the corners to a degree likely to produce cracking or fracturing. The invention contemplates the division of the flanging operation into two steps, one of which accomplishes the flanging throughout the relatively straight sides of the container and the other operation or step accomplishes the flanging of the metal at the corners. The first step or operation accomplishes the pre-stretching of the material adjacent the corners so that the final operation of flanging the corners may be performed by pressure substantially equal to that needed per unit of length to flange the sides of the can.

Preferably an initial flanging operation is made only on part of the body blank edges, leaving other parts unflanged, certain of these unflanged parts being subsequently incorporated in the corners of the formed body, then flanging the corners and other unflanged parts on the formed or shaped can body.

A further important object of the invention is the provision of a method of the character described wherein the body blank is prepared in the usual way and in addition spaced sections along a peripheral edge are pre-flanged, then the blank is formed into body

shape and with its end edges united in a side seam, this also being done in the usual manner, after which the peripheral flanged edge is completed and the spaced pre-flanged parts fully incorporated therein.

An important object of the invention is the provision of a method of providing a flange for a rectangular, round cornered tubular body by delaying only the flanging of the corner edges and the body edge adjacent the side seam until after the body has been fully formed.

Numerous other objects 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 plan view of a can body blank adapted to formation into a flanged body by the steps of the present invention;

Fig. 2 is a schematic plan view of the blank after its subjection to flanging and notching operations, parts of the elements of the flanging and notching apparatus being illustrated in section;

Fig. 3 is a transverse sectional view taken substantially along the line 3—3 in Fig. 2;

Fig. 4 is a schematic view taken through a body blank and showing a further formative step on the blank, the view also illustrating certain elements of an apparatus for producing hooked edges on the blank ends;

Fig. 5 is a schematic sectional view taken through an apparatus for forming the blank into a rectangular, tubular shape;

Fig. 6 is a view similar to Fig. 5 illustrating the interlocking of the hooked edges of the blank;

Fig. 7 is a view similar to Fig. 6 illustrating the closing of the hooked edges and the completion of the can body side seam;

Fig. 8 is a schematic view, partially in section, illustrating elements of a flanging ma-

chine for finally flanging the edges of the can body;

Fig. 9 is a fragmentary perspective view of a partially completed can body shown on an enlarged scale and exemplifying steps of the present invention;

Fig. 10 is a similar perspective view of a completely flanged can body; and

Fig. 11 is an enlarged, sectional detail taken through one edge of a can body and illustrating elements of a final flanging apparatus.

Rectangular can bodies adapted for double seaming with can ends are generally formed and then flanged about the entire open end or ends of the body as a single operation. In the formation of the flanged can body, a stretching of the material at the corners takes place since the outer periphery of the flange is necessarily greater than the inner periphery.

This stretching of the material has presented greater resistance per unit of length to the flanging at the corners than along the intermediate side walls and in the flanging of the corners tendency has been encountered to unduly stretch or fracture the metal.

The present invention contemplates the elimination of these evils by a pre-stretching of the metal adjacent and at the sides of the rounded corners and by the formation of flanges, excepting throughout the straight side walls of the container, before completion of the flanging of the corners themselves. In subsequently laying down the metal of the unflanged open end or edges of the can bodies to form the side flanges the outer edge is stretched at its side points where it joins the intermediate metal left for the contemplated final flanging of the corners. The flanging is completed by bending the side corners outwardly and downwardly into a horizontal flange. The pre-stretching facilitates this action to a large extent equalizing the resistance per unit of length encountered in the flanging operation and prevents concentration of the stretching action at the corners to a degree likely to produce fracture. Preferably this pre-stretching of the metal, i. e., first the flanging operation is accomplished in the flat.

Inasmuch as the corners and the side seam portions of the formed body are equally resistant or substantially equally resistant to the final flanging operation, no unevenness of resistance occurs and therefore the resulting flange is uniform throughout its entire extent.

For the purpose of more fully illustrating the preferred steps in the present method of producing can bodies, schematic illustrations are made in the drawings where essential elements of necessary apparatus are disclosed. A can body blank 21 (Fig. 1) is first provided

the size and shape of the desired can body.

This blank 21 may be subjected to a combination of notching and flanging operations for its first manufacturing step. Notching is necessary where a lock and lap seam is formed in the can body. For this purpose notching die parts 22 (Fig. 2) are provided which operate upon the corners of the blank and along one edge, to produce notched corners 23. A stop plate 24 may be used for engaging this end edge of the blank during this operation. In a similar manner the corners of the opposite edge are acted upon by other notching die parts 26 which produce a special form of notch, being merely a slit 27. A stop plate 28 cooperating with the plate 24 properly registers the blank from this slit end.

One or both side edges of the blank may be subjected to initial flanging before, after or while the notching is taking place, this being preferably performed, for a side, by flanging dies (indicated generally by the numerals 31, 32, 33, 34 and 35). In the event that both ends of the can body are to be flanged, a duplicate set of flanging dies is provided for the opposite side of the blank. These flanging dies may constitute an integral part of a die member 36 (Fig. 3) which cooperates with a backing die 37.

The can body blank, after passing through both flanging and notching operations is altered in shape, assuming a form designated by the numeral 38 (Fig. 2). The opposite side edges of such a body blank are turned up in this flanging operation into a series of right-angled flanges 41 spaced from one another by intermediate unflanged edges 42 in the blank.

Where a locked side seam is used in the can body, the blank 38 is subjected to an edging operation, parts of a suitable apparatus for this purpose being schematically illustrated in Fig. 4. A support or table 45 is used to support the blank 38 during edging, the ends being operated upon by bending or edging elements 46 and 47. These elements bend the two end edges of the blank in opposite directions and produce hooked ends 48. An edged can body blank 51 is thus produced.

The blank 51 is next presented to a suitable body forming apparatus which includes an anvil or forming horn 52 and forming jaws 53 which may be pivoted at 54 on a frame 55. The latter is provided with a cupped recess 56 having rounded corners 57. Supporting bars 58 or an equivalent structure, extend laterally from the sides of the frame 55 and provide an initial support for the blank 51 and also form a housing for the forming jaws 53 when in non-operative position.

The blank 51 is placed upon the parts 55, 58, this position being indicated by the broken lines in Fig. 5. Cooperative movement between the parts 52, 55 now takes place, the

former engaging the central part of the blank and forcing it downwardly into the recess 56. This action bends it into U-shape, as illustrated in Fig. 5. A narrow end wall 61 is thus formed in the body, this wall having rounded corners 62 connecting with the parallel straight legs of the U in side walls 63 terminated by the hooked edges 48.

The complete shaping of the can body is effected by closing of the jaws 53 around the horn 52 (Fig. 6), the upper ends of the upwardly extending side walls 63 being bent over the top of the horn into rounded corners 64 and flat, short end wall sections 65. At the same time the hooks 48 are interengaged.

The formed and interhooked can body, still upon the horn 52, is then subjected to the usual seam bumping operation, the horn 52 being recessed at 66 for reception of the side seam when formed. Such an apparatus may include a bumping hammer 67 (Fig. 7) which cooperates with the horn 52 and completely closes the hooks 48, forming a side seam 68 partially in the recess 66 of the horn. A fully formed and partially flanged can body 69 (Fig. 9) results.

It will be observed that the unflanged sections 42 of the peripheral edges of the blank come within the corners 62, 64 of the formed can body while two other unflanged sections are located at the ends of the side seam 68. Practically abnormal or variable resistance is set up in this body forming operation by reason of previous flanging since all of the bending takes place at the corners 62, 64 which are unflanged.

The formed body 69 is now subjected to the usual flanging operation, elements of the necessary apparatus for this purpose being schematically illustrated in Fig. 8. These elements may comprise flanging heads 71, each having the usual flanging groove 72 formed in a face thereof, a central projecting support member 73 being disposed inside of the groove. Upon movement of the heads 71 toward each other with the can body 69 therebetween, the unflanged peripheral edge parts 42 are engaged by and moved along the outer side walls of the support members 73, and along the walls of the flange forming grooves 72, this causing a bending or flowing (Fig. 11) of the peripheral edges into completed flanged position. These unflanged sections 42 of the body edges are thus brought into the same planes as the initially flanged edge sections 41 and a continuous outwardly extending flange 74 (Fig. 10) results.

Inasmuch as the resistance in the body metal against bending, which is set up in the final flanging operation, is substantially uniform throughout the spaced intermediate sections 42, these sections move into proper flanged shape without any resulting strains upon the walls of the can body and the body

wall remains in place without springing outwardly as indicated by the broken line 76 in Fig. 11. In other words, any tendency for distortion of body or flange is avoided and an improved and superior flanged can body 77 (Fig. 10) results.

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. The method of producing rectangular, flanged can bodies, which comprises subjecting a body part to an initial flanging operation by bending and flanging a portion only of a peripheral edge thereof, and then bending and flanging the remaining unflanged portions of the partially flanged peripheral edge to produce a fully flanged can body, and then hooking together opposite edges of said body part.

2. The method of producing rectangular, flanged can bodies, which comprises subjecting a body blank to an initial flanging operation by bending and flanging at spaced intervals a part only of a peripheral edge thereof, forming the said blank into a can body, and finally bending and flanging the remaining intermediate unflanged parts of the said body peripheral edge to produce a fully flanged can body.

3. The method of producing rectangular, flanged can bodies, which comprises subjecting a body blank to an initial flanging operation by bending and flanging a part only of a peripheral edge thereof, by leaving spaced intermediate unflanged parts, forming the said blank into a rectangular can body with rounded corners by locating the said unflanged parts in the said corners, and finally bending and flanging the corners of the peripheral can body to produce a continuous flange on the said body.

4. The method of producing rectangular, flanged can bodies, which comprises subjecting a body blank to an initial flanging operation by bending and flanging at spaced intervals parts of opposed peripheral edges of the blank leaving intermediate unflanged parts, forming said blank into a rectangular can body by bending it transversely at proper positions to produce rounded corners embodying said opposed unflanged parts, and thence bending and flanging said unflanged corner parts to correspond to the said opposed initially flanged peripheral edges and to produce continuous and uniform flanges on the two ends of said can body.

5. The method of producing rectangular,

flanged can bodies, which comprises provid-
ing a body blank of predetermined shape,
notching opposite end edges thereof for a
side seam, initially flanging side edges of the
5 blank by bending parts thereof in spaced in-
tervals leaving intermediate unflanged
edges, forming hooks on said end edges adja-
cent said notches, forming said hooked body
blank into rectangular shape, interengaging
10 and uniting said hooked edges in a side seam,
and thence completing the flanging of the
can body edges to provide a fully flanged can
body.

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