Oct. 9, 1934. H. SEBELL 1,975,979

METHOD OF AND APPARATUS FOR MAKING CAN ENDS

Filed Feb. 2, 1934

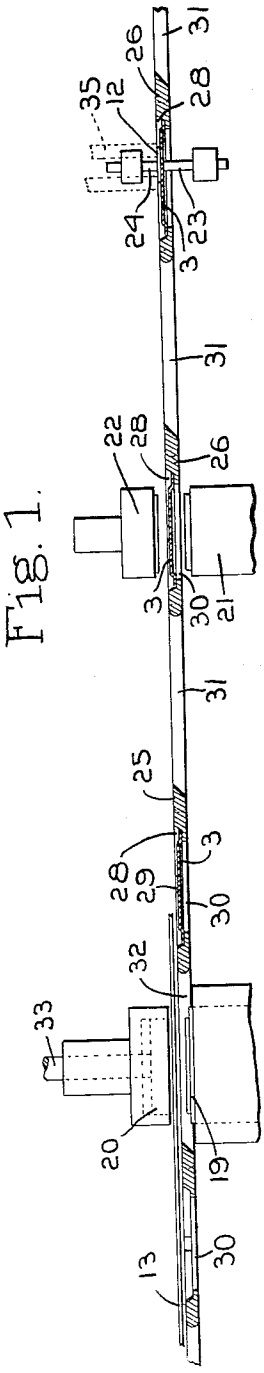


Fig. 1.

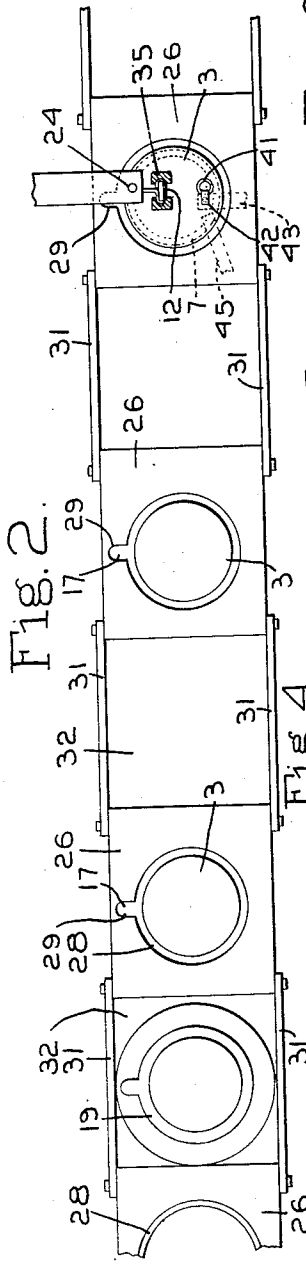


Fig. 2.

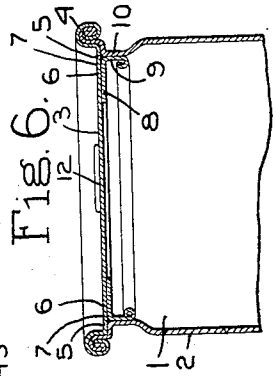


Fig. 6.

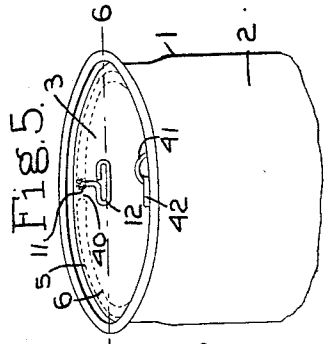


Fig. 5.

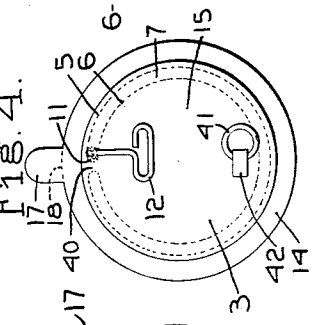


Fig. 4.

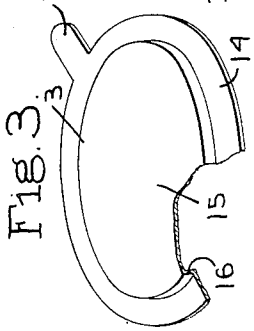


Fig. 3.

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METHOD OF AND APPARATUS FOR MAKING CAN ENDS

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Application February 2, 1934, Serial No. 709,490

5 Claims. (Cl. 113—1)

In my co-pending application Serial No. 667,788, filed April 25, 1933 I have illustrated and described a can in which the can end is sealed to the can body by a double lock seam and in which the can end is provided with two lines of weakness which define between them a tear strip and which meet at the end of the tear strip, said tear strip portion having permanently secured thereto at the end a tab or key member through which pulling force may be applied to the tear strip to tear it loose from the can for the purpose of opening the can.

In order to start the operation of tearing the tear strip from the can it is important that the tab or key member should be secured to the tear strip at the end thereof.

It is one of the objects of the present invention to provide a novel method of making a can end of the type above referred to by which method said can end may be provided with the lines of weakness and the tab or key member may be accurately and properly permanently attached to the end of the tear strip.

In the can shown in said co-pending application Serial No. 667,788 the tear strip extends nearly but not quite around the end of the can and the portion of the can end between the ends of the tear strip constitute a hinge portion about which the can end may be swung to open the can after the tear strip has been removed. The central portion of the can end is also provided at its periphery with a depending flange which fits within the neck of the can body so that a replaceable cover is provided. This cover has secured thereto opposite the hinge portion a ring by which the cover may be opened or closed.

Another object of my invention is to provide a novel method of making a can end by which not only the key member but also this ring may be accurately attached to the can end.

Still another object of the invention is to provide a novel apparatus for accomplishing these purposes.

In carrying out my invention the can end is first blanked out of a sheet of metal, and in doing so it is formed with a positioning portion, preferably in the form of a radially-extending tab or indexing projection. After the can end has thus been blanked out, the lines of weakness, preferably in the form of score lines, are formed in the can end and subsequently the tab member or key member is spot welded to the tear strip defined by the lines of weakness adjacent the point where said lines of weakness meet, that is at the end of the tear strip.

During these operations the can end is held properly positioned by the indexing projection with the result that when the key member is delivered to the can end for the spot-welding operation said key member will invariably be positioned at the end of the tear strip to which it will be welded.

This same indexing tab is also made use of for maintaining the proper position of the can end while the ring is secured thereto. By the use of this indexing tab it is possible to attach both the key member and the pull ring to the can end accurately and in the correct positions.

In order to give an understanding of the invention I have illustrated in the drawing more or less diagrammatically the various steps of the improved process and also an apparatus by means of which these steps can be carried out.

In the drawing:

Fig. 1 is a diagrammatic view partly in section illustrating diagrammatically various steps in the complete process;

Fig. 2 is a plan view of Fig. 1;

Fig. 3 shows the can end after it has been blanked out of a sheet of material;

Fig. 4 shows the can end after the lines of weakness or score lines have been formed therein and the key member has been spot welded thereto;

Fig. 5 is a fragmentary perspective view of a can which has been sealed with a can end made in accordance with my invention;

Fig. 6 is a section on the line 6—6, Fig. 5.

Referring first to Figs. 5 and 6, 1 indicates a can having a can end which has been made in accordance with my invention. The can herein illustrated is similar to that shown in my co-pending application Serial No. 667,788, and it comprises a can body 2 and a can end 3 which has been sealed to the upper end of the body through the medium of a double lock seam 4. The can end 3 is formed with two score lines or lines of weakness 5, 6 which define between them a tear strip 7 which is to be torn from the can end for the purpose of opening the can. These score lines are shown as extending nearly but not entirely around the can end adjacent its outer edge.

In the particular can shown the central portion of the can end 3 inside of the inner score line 6 has a ring member 8 rigidly secured thereto, which member extends underneath the tear strip 7 and is provided with a depending flange 9 adapted to fit within the neck 10 of the can body. The two score lines 6 and 7 meet at a

point 11 which defines the end of the tear strip 7.

12 indicates a key member which is spot welded or otherwise permanently secured to the end of the tear strip adjacent the point 11 where the score lines 5 and 6 meet. The opening of the can involves applying pulling strain on the key 12 sufficient to tear the tear strip loose from the can end along the score lines 5, 6, the tearing operation beginning at the point 11 and proceeding along the length of the score lines.

The tearing out of the tear strip along the score lines 5, 6 may be accomplished by turning the key 12 and rolling the tear strip up on the key as it is torn from the can. The tearing out of the tear strip 7 separates the central portion of the can end from the peripheral portion which is seamed to the can body and if the central portion of the can end is provided with the ring 8 with its skirt 9 then said central portion constitutes a replaceable cover which can be put back on the can to close the latter after the contents have been partially or entirely discharged as described in the above-mentioned application.

In the construction shown in the drawing wherein the tear strip 7 extends nearly but not entirely around the can end 7, the portion 40 of the can end between the ends of the tear strip, constitutes a hinge portion about which the central portion of the can end may be swung when the can is opened or closed.

The can herein shown has a pull ring 41 secured to the can end opposite the unscored portion 40, said pull ring constituting a finger hold by which the can end may be swung into its open or closed position. This pull ring is shown as secured to the can through the medium of an anchoring piece of sheet metal 42 which has its ends spot welded or otherwise secured to the can end and which passes through the ring.

In order to be able to start tearing the tear strip from the can end it is important that the key member 12 should be secured to the tear strip at the extremity thereof where the two score lines 5 and 6 meet, and as stated above one object of the present invention is to provide an improved method of making the can end by means of which this end may be accomplished.

In carrying out my invention the first step is to blank out a can end 3 from a sheet 13 of material and in doing this the can end blank is given the shape shown in Fig. 3, that is, it is formed with the central portion 15 and the peripheral flange portion 14 which constitutes the seaming flange, and a positioning portion by which the can end may be prevented from turning about its axis and which is herein shown as an index tab 17 extending radially from the periphery of the flange 14. Said central portion 15 and flange portion 14 are shown as being in different planes and as being connected by the vertical portion 16.

The next step in the operation is to provide the portion 15 of the can end with the lines of weakness or score lines 5, 6. This is done by subjecting the can end to the action of proper dies which cut partially but not entirely through the can end, thereby leaving an imperforate can end but one which has the score lines 5, 6 therein. These score lines are shown as extending nearly but not quite around the can end so that the can end will have a portion 40 thereof between the ends of the tear strip which are unscored.

During the operation of forming the score lines the can end 3 is held in proper position and is prevented from turning into different angular positions by means of the indexing tab 17 which co-operates with suitable guides or positioning means.

After the score lines have been formed then a key member 12 is delivered to the can end in position to be spot welded to the end of the tear strip 7 adjacent the point 11 where the two score lines 5 and 6 meet, and when the key member has been thus delivered it is spot welded to the tear strip. During the operation of delivering the key and of spot welding it the can end is held properly positioned and is prevented from turning movement by the co-action of the indexing tab 17 with suitable positioning means. If the can end is provided with the pull ring 41 above referred to, it will also be necessary to secure said pull ring to the can end before the latter is attached to the can body. The securing of the pull ring to the can end may be secured by delivering to the can end in proper position the assembled pull ring 41 and anchor plate 42 and then spot welding or otherwise permanently attaching the anchor plate to the can end. During this operation as well as during the operation of delivering and spot welding the key member to the can end, the can end is held in proper position by means of the indexing tab. After the key member and the pull ring have been thus secured to the can end the latter is ready to be sealed to the can body but before this is done the indexing tab 17 is severed from the can end along the dotted line 18 in Fig. 4.

In Fig. 1 there is shown more or less diagrammatically an apparatus by which the above process can be carried out. In said figure the blanking out dies are shown at 19 and 20 and as will be understood these dies when actuated will blank out from the sheet 13 the can end blank and at the same time will deform the blank as shown in Fig. 3. The scoring dies that make the score lines are indicated at 21 and 22.

23 and 24 indicate electrodes of an electric welding machine by which the key member 12 is spot welded to the tear strip 7, and 43, 44 indicate electrodes designed to spot weld the anchoring plate 42 to the can end.

The machines or presses having the blanking-out dies 19, 20 and the scoring dies 21, 22 and also the welding machine carrying the electrodes 23, 24 will preferably be arranged relative to each other so that after the can end has been blanked out of the sheet 13 by the blanking-out dies 19, 20 said can end may be conveyed first to the scoring dies and then to the welding machine. These machines are, therefore, located at different stations along the line of travel of the can end as different operations are performed thereon. The operation of welding the anchor plate 42 to the can end may be accomplished at the same station as that at which the key member is spot welded to the can end or at a different station as desired.

For thus conveying the can end from station to station there is provided in Figs. 1 and 2 a conveyer indicated generally at 25, which receives each can end after it has been cut out from the sheet 13 by the dies 19, 20, and which conveys said can end from the station at which it is blanked out to the station at which the scoring dies 21, 22 are located, and which subsequently conveys the can end to the station at which the spot-welding machine is located.

This conveyor has positioning means which cooperate with the indexing tab 17 of the can end for holding each can end in proper position while it is being conveyed from the blanking-out dies to the scoring dies and from the latter to the spot-welding machine so that each can end will be properly positioned during the scoring operation and also during the spot-welding operation. This conveyer is formed with a series of plates 26, each having at its upper side a recess 28 of a size and shape to receive the blanked-out can end, said recess being provided with the lateral extension 29 adapted to receive the indexing projection 17 of the can end. Each plate is also provided with a central opening 30 of a size to receive the scoring die 21. These plates are connected by links 31 and thus an endless chain conveyer is provided having alternate plates 26 and open spaces 32.

The conveyer will be moved forwardly with a step by step motion and when it is at rest between any alternate successive forward steps one of the open spaces 32 will be in line with the blanking-out dies 19, 20. The die 19 operates through this space 32 and the two dies 19, 20 operate on the sheet 13 to cut out the can end blank. As stated above the deforming of the blank into the shape shown in Fig. 3 occurs simultaneously with the cutting of the blank out of the sheet 13 and when this combined operation of cutting the blank and deforming it is completed and the dies separate, the blank will remain attached to the upper die 20. The conveyer then moves forward one step to bring the recess 28 in a plate 26 underneath die 20. The blank is then ejected from the die 20 through the operation of the ejecting plunger 33 as usual in presses of this type.

The conveyer is then advanced another step to bring the next opening 32 in line with the dies 19, 20 and the latter are again operated to blank out another can end blank, and at the next forward step of the conveyer said blank is deposited in the recess 28 of another plate 26.

These blanked-out can ends are carried by this step by step movement of the conveyer into position between the scoring dies 21, 22 as shown in Fig. 1. The step by step movement of the conveyer is such that at the end of every alternate forward step of said conveyer a can end blank will be positioned between the scoring dies 21, 22. Said dies operate to provide the score lines 5, 6 in said can end during the period of rest between forward steps.

The indexing projection 17 co-operating with the recess extension 29 serves to hold a can end from turning movement while being conveyed from the blanking-out dies to the scoring dies.

The forward movement of the conveyer carries each blank from the scoring dies to the spot-welding apparatus and preferably the construction is such that it will take two forward steps of the conveyer to convey any can end from the scoring die to the spot-welding apparatus. The step-by-step movement of the conveyer is such that when any can end arrives at a position between the electrodes 23, 24 said electrodes will be positioned to act on the can end at the end of the tear strip 7 adjacent the point 11. As each can end arrives at the spot-welding station a key member 12 is delivered thereto automatically from a suitable magazine 35, this magazine being positioned to deliver the key to the can in a position to be acted on by the electrodes 23, 24 of the spot-welding apparatus.

The indexing or positioning projection 17 co-operating with the walls of the recess 29 hold the can end from turning in the recess 28 and maintains the can end in the proper angular position so that the key member 12 will be delivered and spot welded to the end of the tear strip.

If the pull ring 41 with its anchoring plate 42 is to be attached to the can end at the same station as that at which the member 12 is spot-welded to the can end then there will be provided at said station a second magazine 45 from which assembled pull rings and anchoring plates 42 are delivered automatically to the can end at a point directly opposite the unscored portion 40 thereof. The spot-welding machine at this station may be provided with suitable electrodes 43 for spot welding the anchoring plate 42 to the can end and this spot-welding operation may take place simultaneously with that of spot welding the key member.

Or, if desired, the attaching of the pull ring 41 and anchoring plate 42 to the can end may take place at a station separate from that at which the key member is spot welded to the can end, in which case the conveyer 25 will operate to convey the can end from the first spot-welding station at which the key member 12 is spot welded to the can end, to another station at which the plate 42 is spot welded to the can end. In either case, the co-operation of the index tab 17 and the recess 29 serve to hold the can end in proper position to have these parts spot welded correctly thereto.

After the spot-welding operation has been completed the tab 17 may be cut off along the dotted line 18 and the can end is then ready to be seamed to the can body with the double lock seam 4 as illustrated in said co-pending application Serial No. 667,788.

I claim.

1. The method of making a can end which consists in cutting out from sheet material a can end blank having a radially-extending positioning projection, conveying said can end blank from station to station, forming in said blank at one station two lines of weakness which define a tear strip and which meet at the end of the tear strip, delivering a key member to said can end and spot welding it to the tear strip at a subsequent station, and through the medium of the positioning projection maintaining the can end in the correct position to have the key delivered and spot welded to the end of the tear strip.

2. A device for forming a can end comprising means for cutting from sheet material a can end having a radially-extending positioning tab, means for forming in the can end two lines of weakness defining a tear strip and which meet at the end of the tear strip, means for delivering to the can end a key member and spot welding it thereto, and means for conveying the can end from the blanking-out dies to the scoring dies and then to the spot-welding device, said means including a device co-operating with said positioning tab to prevent the can end blank from turning about its axis during its travel from the scoring dies to the spot-welding machine.

3. The method of making a can end which consists in cutting out from sheet metal a can end blank having a positioning portion by which

it may be held from turning movement about its axis, conveying said can blank to a plurality of stations successively, forming in said blank at one station two lines of weakness which define a tear strip and which meet at the end of the tear strip, delivering a key member to said can end and spot welding it to the tear strip at a subsequent station, and through the medium of said positioning portion maintaining the can end in the correct position about its axis to have the key delivered and spot welded to the end of the tear strip.

4. The method of making a can end which consists in cutting out from sheet material a can end blank having a positioning portion by which it may be held from turning movement about its axis, conveying said blank to a plurality of stations successively, forming in said blank at one station two lines of weakness which define a tear strip and which meet at the end of the tear strip, delivering a key member to said can end and spot welding it to the tear strip at a subsequent station, and through the medium of such positioning portion maintaining the can end in a fixed angular position with reference to its axis from the time it is cut from the sheet metal until the key has been spot welded thereto.

5. The method of making a can end which consists in cutting out from sheet metal a can end blank having a positioning portion by which it may be held from turning movement about its axis, conveying said blank to a plurality of stations successively, forming in said blank at one station two lines of weakness which define a tear strip and which meet at the end of the tear strip, delivering a key member to said can end and spot welding it to the end of the tear strip at a subsequent station, delivering a finger hold member to the can end at a point opposite the key member and permanently securing said finger hold member to the can end, and through the medium of such positioning portion maintaining the can end in a fixed angular position with reference to its axis from the time it is cut from the sheet metal until the key and the pull member have been permanently secured thereto.

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