

Aug. 26, 1958

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2,849,148

CAN END SEAM

Filed Dec. 29, 1955

2 Sheets-Sheet 1

Fig. 1

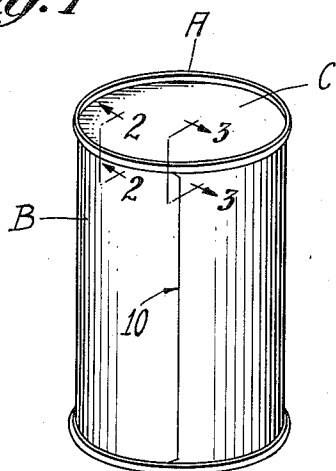


Fig. 2

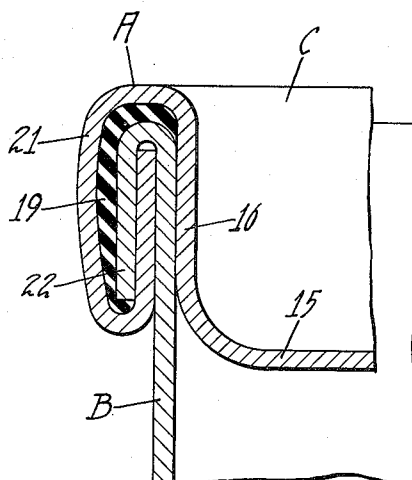
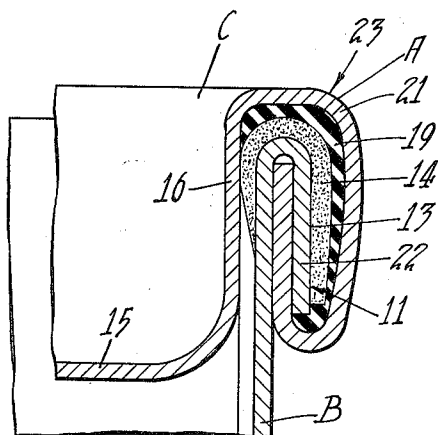


Fig. 3



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Fig. 4

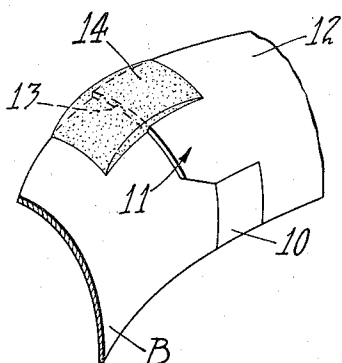


Fig. 6

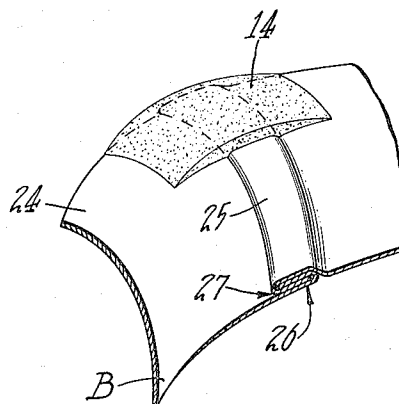
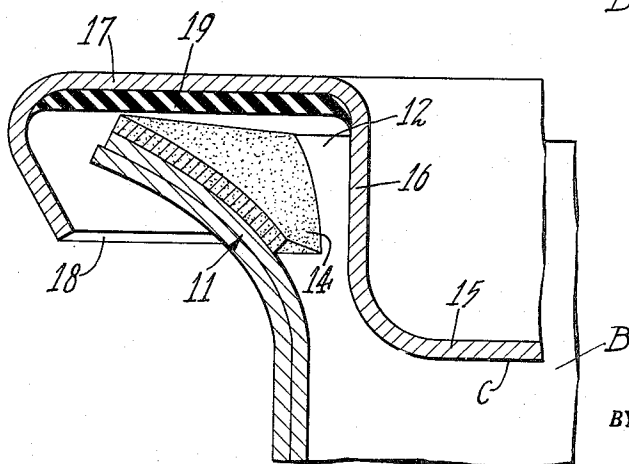


Fig. 5



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2,849,148

CAN END SEAM

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3 Claims. (Cl. 220—67)

The present invention pertains to the end or double seam of a can. More specifically the invention pertains to the end or double seam of a tubular, sheet metal can which has had the side seam portion of the can body flange treated in a particular manner so as to improve the hermetic seal of the seam.

In the formation of the end or double seam of a tubular sheet metal can, it is the general practice to interfold an outwardly extending flange on the can body with a peripheral flange on the end closure member. To fill voids or interstices between the layers of interfolded metal and thereby to seal off potential leak passages, a layer of a rubbery or resilient gasket material—usually carried on the flange of the end closure—is also interfolded into the seam, at least between the two radially outermost metal layers.

In most instances, the presence of this gasket material is sufficient to provide the seam with a hermetic seal. However, occasionally cans are produced in which one or both end seams leak. Further, the incidence of cans having a leaking end seam often increases seriously when the cans are subjected to abuse during various handling operations.

Careful experimental investigation determined that the major source of leaks occurred in that portion of the end seam wherein the plurality of metal layers of the can body side seam are interfolded with the end member. This portion of the end seam is generally known as the cross-over. It was also determined that the cause of these leaks was the damaging of the metal layers, the gasket material and the organic enamel on the metal at the cross-over by virtue of the extremely high pressure exerted on the cross-over during the double seaming operation. This damage sometimes resulted in leak passages that are detectable immediately after double seaming, and more often, potential leak passages that became actual leak passages upon abuse of the can.

I have discovered that when the side seam portion, i. e. the plurality of layers of can body material resulting from the jointure of the marginal edges of the can body blanks, of the can body flange is covered by a patch of a sealing compound, preferably having certain properties, and the end closure member along with the gasket material is then double seamed onto the can body in a manner well known in the art, there results a can end seam having a markedly improved hermetic seal. This hermetic seal persists under the most severe conditions of abuse, sufficient to cause leakage in prior art end seams.

As a completely new and unexpected result of this discovery, I have found that the end seam constructed according to the present invention maintains its improved hermetic seal and resistance to leaking under severe abuse even when the heretofore generally used predetermined amount of gasket material is reduced by up to one half.

Further, I have found that not only can the required amount of gasket material be substantially reduced, but also that the requirements as to quality, properties and types of ingredients of the gasket material can be substantially relaxed without impairing its function as a sealant. The latter advantage makes it possible to select a gasket material most attractive economically and/or best adapted to the mechanism for depositing it on the end closure

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prior to joining the can end and body almost without regard to its ultimate performance in the finished double seam, thereby permitting a great deal more efficient operation of the high speed end lining equipment presently in use.

It is therefore an object of the present invention to provide a novel end seam construction for a sheet metal can having an improved hermetic seal and resistance to leakage upon being abused.

Another object of the invention is to provide a novel end seam of the character described wherein the rigidity of specifications and amount of gasket material necessary to impart a hermetic seal to the end seam may be greatly reduced and consequently its cost considerably lowered.

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 perspective view of a tubular, sheet metal container having end seams constructed according to the present invention;

Figs. 2 and 3 are enlarged sectional views taken substantially along planes indicated by the lines 2—2 and 3—3 respectively in Fig. 1;

Figure 4 is an enlarged fragmentary view in perspective of a portion of the flange of the can body in the side seam area showing a patch of sealing compound over the side seam portion of the flange;

Figure 5 is an enlarged fragmentary sectional view of a can end member applied to the can body flange as an incident to sealing the container, the end member carrying a gasket material and the can body flange at the side seam having a sealing compound thereon; and

Fig. 6 is an enlarged fragmentary perspective view similar to Fig. 4 but illustrating a modified form of the invention.

As a preferred or exemplary embodiment of the instant invention, the drawings illustrate an end or double seam A joining a can body B with an end member C. Although the drawings are directed to top end seams, the invention is equally well suited to bottom seams.

The can body B is formed from a flat blank bent into tubular shape with the longitudinal edges thereof joined together in the usual lock and lap side seam generally designated 10 (Fig. 1). The lap section 11 is located at the longitudinal extremities of the side seam 10 and is composed of two layers of body material, one overlying the other. The upper and lower peripheral edge portions of the body B are flared outwardly to produce the can body flanges, the upper one of which is designated in the drawings at 12 (Figs. 4 and 5). Due to the double thickness of body material in lap section 11, there is present in the otherwise smooth surface of flange 12, an irregularity in the form of a step or break 13 (Fig. 4) which extends substantially from the peripheral edge of the can body flange down the can body wall to the lock section of the side seam 10.

According to the present invention, a patch or daub 14 of a sealing compound is deposited on the top or outer surface of flange 12 and only on that portion of flange 12 sufficient to cover completely the lap section 11 and the break 13. In this manner, the smooth contour of flange 12 is preserved, there being merely a gradually sloping change from one level to the other over step 13.

The sealing compound used to form patch 13 may be of any suitable composition that during the double seaming operation will be tacky or sticky and also will have a high degree of resiliency. The property of stickiness enables the sealing compound to adhere tenaciously to

the metal of lap section 11 and to resist displacement or squeezing out therefrom under the pressure exerted during double seaming. The resiliency of the compound enables it to expand again after being compressed during double seaming whereby any gaps or voids in the lap section 11 are effectively filled and sealed off.

The sealing compounds preferred for use in the present invention are compositions containing an appreciable amount, i. e. in the range of 5% to 75% by weight, of a high Mooney viscosity rubber. By a high Mooney viscosity rubber is meant any elastomeric substance, e. g. natural or synthetic rubber, having a Mooney viscosity of about from 75 to 100. Example of such sealing compounds are compositions comprising: wax and rubber; rubber, filler and a resin; and the like.

End member C preferably is formed with a countersunk panel 15 (Fig. 5) which merges into a substantially vertical or upstanding surrounding wall section 16. At its outer edge, wall section 16 merges into an annular substantially horizontal flange 17, which flange terminates in an inwardly curved or curled edge 18. Carried on the underside of the end member flange 17 and disposed between the wall section 16 and the curled edge 18 is the gasket 19, present in a predetermined size or amount. The gasket 19 may be a solid, annular ring, or as shown in the drawings, may be a rubber or other suitable composition deposited in a fluid condition and dried to a substantially solid state in the conventional manner well known in the can making art.

After the patch 14 has been deposited on the body flange 12 in the area of the lap section 11 and allowed to set, the end closure C is applied to the flanged open end of can body B as shown in Fig. 5 with the gasket 19 and sealing compound 14 interposed between the can body flange 12 and the end closure flange 17. In this position, the countersunk panel 15 fits into the open end of can body B and its upright wall 16 is aligned with the inner surface of the wall of can body B. With the end closure C in this position, it is permanently united to the can body B by interfolding the respective flanges of each member in a manner well known in the art, for example as disclosed in U. S. Patent 1,574,764. This interfolding operation produces the tightly interlocked finished end seam A shown in Figs. 2 and 3.

Gasket 19 is disposed and fills any voids or interstices between the two radially outermost layers 21 and 22 in the greatest portion of the finished end seam A (Fig. 2). However, as shown in Fig. 3, at the cross-over 23 in addition to the gasket 19 between layers 21 and 22, there is present the sealing compound 14 which extends into and fills the step or break 13 and forms a continuous sealing layer between metal layers 21 and 22. As stated previously, this construction so improves the hermetic seal in the end seam that the amount of gasket material present in the seam can be substantially reduced from that heretofore used, i. e. up to 50% less, while still providing an end seam hermetic seal which is superior to the seal in prior art seams.

The modification illustrated in Fig. 6 shows the can body B flared outwardly at its upper periphery to form a can body flange 24. Extending longitudinally of the can body and up to the peripheral edge of the flange 24 is a full lock seam 25. The lock seam 25 is composed of four interlocked layers of can body material shown at 26. Due to these four thicknesses of body material, there is present in the surface of the flange 24 an irregularity in the form of a V-shaped channel or groove 27 which forms a break in the otherwise smooth surface of the flange 24.

As with the preferred embodiment shown in Fig. 4, the patch 14 of sealing compound is deposited over all of that portion of seam 25 extending into the flange 24, including the groove 27 to impart a substantially smooth surface to flange 24. Thereafter, the can body B and end closure C are united in a double seam in the same manner

as shown in Fig. 5 and described above. The side seam portion or cross-over of the finished double or end seam resulting from the union of end member C and can body B is similar to that shown in Fig. 3, except that eight layers of can body material are interfolded therein rather than four. The patch 14 of sealing compound improves markedly the hermetic seal in an end seam having these eight layers enclosed therein as it does with the lock and lap seam described hereinbefore.

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 tubular sheet metal can comprising a body member having a side seam which extends the entire length of said body member and an end member secured to the body member in an interfolded end seam, said end seam having a peripherally extending gasket material enclosed therein for sealing said end seam against the passage of fluids therethrough, the improvement which comprises a patch of a resilient sealing compound in addition to said gasket material only in that portion of said end seam in which the body member side seam is enclosed within said end seam, said resilient compound being in direct contact with said side seam and bridging the same within said end seam to effect a substantially improved hermetic seal in said end seam.

2. In an end seam of a sheet metal can comprising a can body flange having a surface irregularity therein caused by the plurality of layers of material in the can body side seam which side seam extends the entire length of said can body, an end closure flange interfolded with said can body flange, and a peripherally extending gasket material disposed between said flanges for filling voids therebetween, the improvement comprising a patch of a resilient sealing compound in addition to said gasket material disposed only between the surface irregularity of said can body flange and the end closure flange, said resilient compound being in direct contact with said irregularity and bridging the same within said end seam for filling in and smoothing out said irregularity in said can body flange whereby a substantially improved hermetic seal in said end seam is produced.

3. A double seam structure for joining an end closure to a can body having a side seam extending from end to end thereof comprising an outwardly and downwardly bent can body flange, said can body flange having a greater number of layers of can body material in the area of the side seam than in the remainder of said flange thereby producing an irregularity in the surface of said flange in said side seam area, an end closure flange bent outwardly, downwardly and upwardly around said can body flange, a peripherally extending gasket material disposed between said can body flange and said end closure flange for filling voids therebetween, and a resilient sealing compound in addition to said gasket material disposed between said flanges only in said area of said side seam, said resilient compound being in direct contact with said irregularity and bridging the same within said end seam for filling in and smoothing out said irregularity in said can body flange whereby a substantially improved hermetic seal in said double seam is produced.

References Cited in the file of this patent

UNITED STATES PATENTS

1,977,090 Schibsted _____ Oct. 16, 1934

FOREIGN PATENTS

870,732 France _____ Dec. 22, 1941

870,731 France _____ Dec. 22, 1941