March 31, 1953 D. G. MAGILL ET AL 2,633,095

METHOD OF FORMING END SEAMS IN COMPOSITE CONTAINERS

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Fig. 1

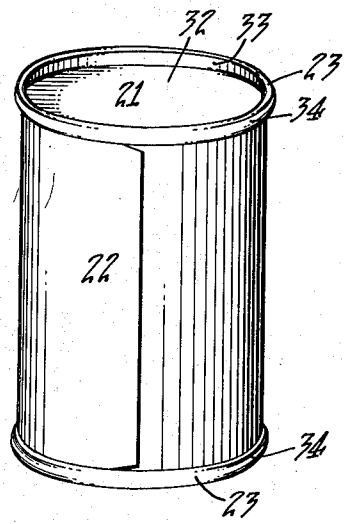

Fig. 3

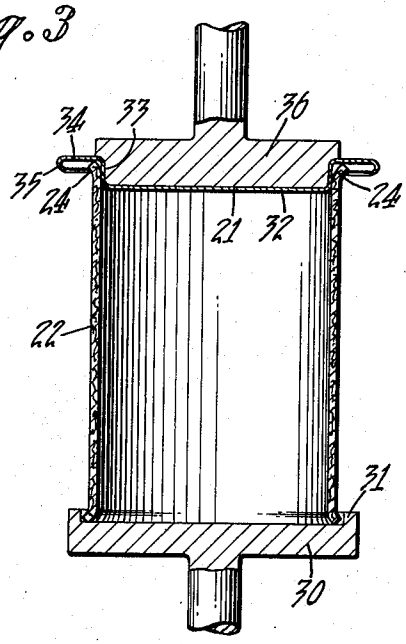

Fig. 2

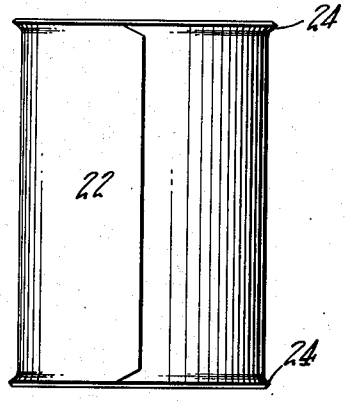

Fig. 4

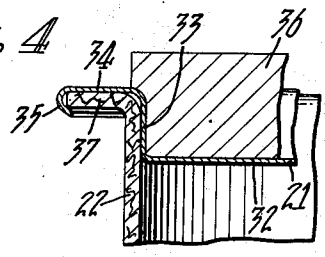

Fig. 5

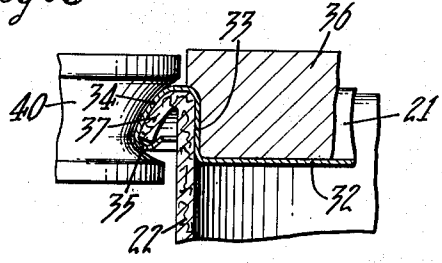

Fig. 6

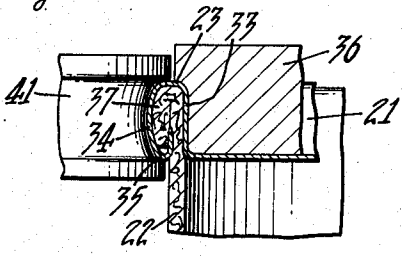

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Fig. 12

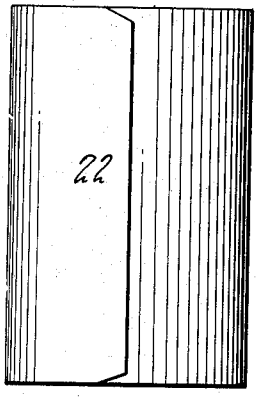


Fig. 9

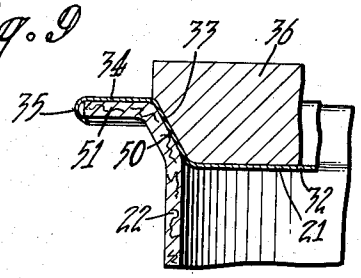


Fig. 7

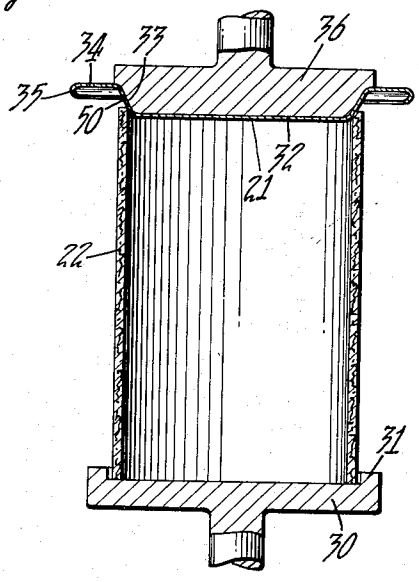


Fig. 8

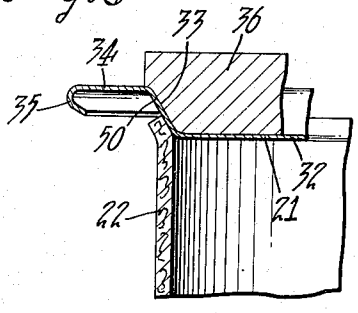


Fig. 10

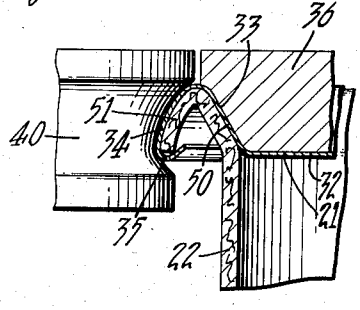
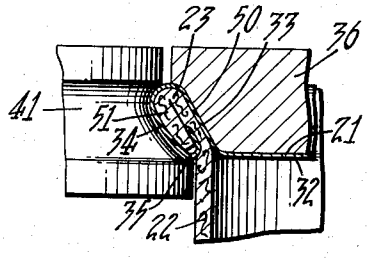


Fig. 11



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2,633,095

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METHOD OF FORMING END SEAMS IN COMPOSITE CONTAINERS

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Application December 28, 1950, Serial No. 203,058

2 Claims. (Cl. 113—120)

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The present invention relates to a method of seaming metal end closures onto nonmetallic container bodies, and has particular reference to a method of double seaming wherein the stiff metal end is used as a flanging die to produce a fiber body flange of exactly predetermined length and shape.

Heretofore it has not been practical on a truly commercial basis to produce a true double seam in a composite container, i. e., a container having a fibre body and metal ends. The main reason for this has been, that it has not been possible to produce uniform flanges on tubular fibre bodies due to the inherent limitations of the fibrous body materials.

In the handling of tubular metal can bodies, the straight walled bodies usually are fed into a flanging machine wherein opposed flanging dies are forced simultaneously into opposite ends of the body. These dies shape the metal adjacent the body ends outwardly into stiff flanges which retain their shape until they are interfolded with the cover flanges into double seams. This flanging operation is performed in the can factory and the bottom end closures are usually seamed onto the bodies in the factory immediately thereafter. The bodies, which now have one end closed and one end flanged, are then shipped to the can packing plant where they are filled and sealed. Considerable time may elapse before the bodies are finally sealed, and the body flanges may be subjected to considerable abuse during this time while in shipment and storage. The metal of the can bodies is strong enough, however, to withstand all normal handling and so this method of handling is practical for metal bodies.

In the case of fibre bodies, however, the situation is somewhat different. The fibrous structure of bodies is such that the material as a rule does not take a permanent set and so the flanges cannot be accurately and uniformly produced. Then too, the characteristics of the material are often affected by moisture and so variations in the humidity in the container factory or packing plant adversely affect the uniformity of the body flanges and so impair the quality of the double seams. Furthermore the flanges have a tendency to straighten out after being formed and cannot be stored for any length of time, and are weak and easily damaged in shipment.

As a result, the trade has never been able to produce a commercially acceptable double seamed composite container. This invention contemplates remedying this situation by making it possible to produce uniform, accurate flanges at the time the double seam is formed.

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An object is to provide a method of forming a double seam between a metal end closure or fitting and a nonmetallic body wherein the metal closure is utilized as a flanging die to form an accurate flange of predetermined length in the body at the time the closure and body are assembled.

A further object is to provide a method of double seaming a metal closure to a fibre or nonmetallic body wherein the closure curl is utilized to act as a stop to definitely and accurately determine the length of the body flange.

Another object is the provision of a method which makes it possible to double seam metal end closures onto container bodies which are made from various types of flexible nonmetallic materials, such as fibre and paper board, plastics, plastic impregnated cloths, etc.

Still another object is to provide a simple method of uniting metal ends to nonmetallic bodies in double seams which are hermetic and greatly resistant to internal pressure.

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 sealed composite container produced by the method of the instant invention,

Fig. 2 is a side elevation of a fibre container body used in the formation of the composite container of Fig. 1,

Figs. 3 through 6 are sectional views illustrating successive steps in the formation of a double seam by the method of the present invention, parts being broken away,

Figs. 7 through 11, are sectional views similar to Figs. 3 through 6 but illustrate a slightly modified method of producing a composite double seam, and

Fig. 12 is a side elevation of the fibre container body used in the method illustrated in Figs. 7 through 11.

As a preferred or exemplary embodiment of the instant invention, the drawings illustrate method steps of producing a composite container having metal ends 21 secured to a fibre body 22 in double seams 23 (see Fig. 1).

For purposes of simplicity, this specification and the appended claims frequently refer to the body as being made of fibre. It should be understood, however, that while the invention is ideally suited for use with fibre or paper board bodies, it is not limited thereto and is adaptable for use with

many other types of flexible, nonmetallic materials such as plastics, plastic-impregnated cloth, plastic-impregnated glass fibres, etc.

In accordance with the method steps of the invention, the fibre body **22** is first bent or preflanged outwardly to form a slightly flared portion **24** (see Figs. 2 and 3). This flaring operation may be performed in any suitable manner, and the length and angle of the flared portion **24** is not critical, since its function is merely to bias or condition the ends of the body for subsequent outward movement and not to determine the ultimate length of the final flange. After the body has been flared outwardly, it is positioned on a support **30**, which, in practice, may be the lifter pad of a double seaming machine. The support **30** is formed with an annular step **31** in order to confine the lower end of the body **22** and prevent any movement thereof while the closure is being seamed on.

The metal end closure **21** is now positioned on the upper end of the body **22** in any suitable manner (see Fig. 3). The end closure **21** is substantially dish-shaped and is formed with a countersunk central panel section **32**, adapted to fit within the open mouth of the can body **22**. The panel section **32** merges into an upright annular countersink wall **33** having an outside diameter substantially equal to the inside diameter of the body. At its top edge the countersink wall **33** merges into an outwardly extending annular flange **34** which terminates in an open curl **35**.

The end closure **21** is held in place by a backing-up chuck **36** which extends downwardly into the countersink of the end closure and engages against the panel section **32** and countersink wall **33**. The chuck also extends outwardly a short distance over and against a portion of the annular flange **34** contiguous to the countersink wall. The chuck thus provides lateral support to both countersink wall and flange.

When the body **22** and the closure member **21** have been thus positioned a longitudinal endwise pressure is exerted against the body **22** to move it relative to the closure member **21**. This can be conveniently accomplished by moving the lifter pad **30** upwardly relative to the chuck **36** to compress the body in an endwise direction and force the outwardly turned body end **24** against the closure **21**. Since the backed-up metallic closure **21** is much stiffer and stronger than the fibre body **22**, it in effect functions as a nonyielding flanging die. The marginal edge portion of the body is thus forced outwardly and moves along the lower surface of the closure flange **34** and is progressively reshaped into a body flange **37** (Fig. 4). The body is guided outwardly and prevented from jamming or buckling when it is initially forced against the flange **34** by the outward bias imparted to it by the slight flare **24**.

The progressive outward movement of the body edge portion continues until the flange **37** strikes against the inside surface of the open cover curl **35** and is held against further outward movement (see Fig. 4). The curl **35** thus acts as a stop to terminate the flanging operation and predetermines the width of the body flange **37**. The upward movement of the pad **30** is stopped when the body flange **37** hits the cover curl **35**, but the body **22** and the end closure **21** are held clamped together.

While the body and closure are thus held, the interengaged parts of the body and the closure are pressed together to form an interfolded double seam **23**. This is preferably done in two steps in order to correctly shape the parts. The first step is accomplished by a first operation seaming roll **40** which is pressed against the periphery of the cover to bend the cover flange **34**, the cover curl **35**, and the body flange **37** downwardly and inwardly toward the body **22** (see Fig. 5). A second operation seaming roll **41**, which differs in profile from the first operation roll **40**, completes the flattening operation and partially embeds the cover curl **35** into the body wall **22** to form a compact, hermetic seam **23** (see Fig. 6). During this operation, the countersink wall **33** is backed-up and supported by the chuck **36**.

After the so-called factory end closure has been seamed on in the manner just described, the container is shipped to the packing plant, filled, and then sealed by seaming on the second end closure in the same manner. Thus a composite double seam container is produced which is hermetic, highly resistant to internal pressure, and neat in appearance.

Figures 6 through 11 illustrate a slightly modified embodiment of the invention. Here a straight walled fibre body **22** (see Fig. 12) is used, the preflaring operation being omitted. The countersink wall **33** of the end closure **21**, instead of being vertical as in Figs. 2 through 6, is flared or inclined outwardly to form a conical surface **50** (see Figs. 7 to 9).

The cover **21**, backed-up by the chuck **36**, is positioned in the open mouth of the body **22** (see Fig. 7) and endwise pressure is exerted on the body **22** through the lifter pad **30**. This forces the edge of the body **22** against the conical cover surface **50** and imparts an initial outward conditioning flare to it (see Fig. 8). Continued pressure causes the body edge to move or slide along the conical surface **50** and thence horizontally outward along the lower surface of the cover flange **34** until it is stopped by the cover curl **35**. Thus a body flange **51** of predetermined length is formed.

The formation of the double seam **23** is completed by the first operation seaming roll **40** (see Fig. 10) and the second operation roll **41** (see Fig. 11) in the manner previously described. The double seam **23** thus formed extends outwardly at an angle from the straight body wall **22** (see Fig. 11) but this flaring does not affect its strength or tightness.

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 steps of the process described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the process hereinbefore described being merely a preferred embodiment thereof.

We claim:

1. A method of forming a seam between a nonmetallic container body and a metallic end closure having a countersink wall surrounded by an outwardly extending annular flange terminating in an open stop curl, which comprises effecting relative movement between the body and the end closure in an endwise longitudinal direction while laterally supporting said countersink wall and a contiguous portion of said flange to progressively force a marginal edge portion of the body along the countersink wall of the end closure and to progressively force said marginal edge portion

of the body radially outwardly along the closure flange to reshape said edge portion into an outwardly extending body flange, continuing said endwise body movement until the edge of the body flange is stopped by said curl to accurately determine the length of said body flange, and folding said body flange and said closure flange downwardly and inwardly to form a double seam.

2. A method of forming a seam between a fibre container body and a metallic end closure having a countersink wall surrounded by an outwardly extending annular flange terminating in a downwardly extending stop curl, which method comprises flaring slightly one end of the body to bias said body end for radially outward movement, moving the body in a longitudinal endwise direction relative to the end closure while laterally supporting said countersink wall and a contiguous portion of said flange to force said flared end of the body along said countersink wall and to progressively force said end of the body radially outwardly along said closure flange to reshape said edge portion into a body flange, continuing said endwise movement until the leading edge of said body flange is stopped by said downwardly extending curl to accurately determine the length of said body flange, and folding said body flange and said closure flange downwardly and inwardly to form a seam.

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