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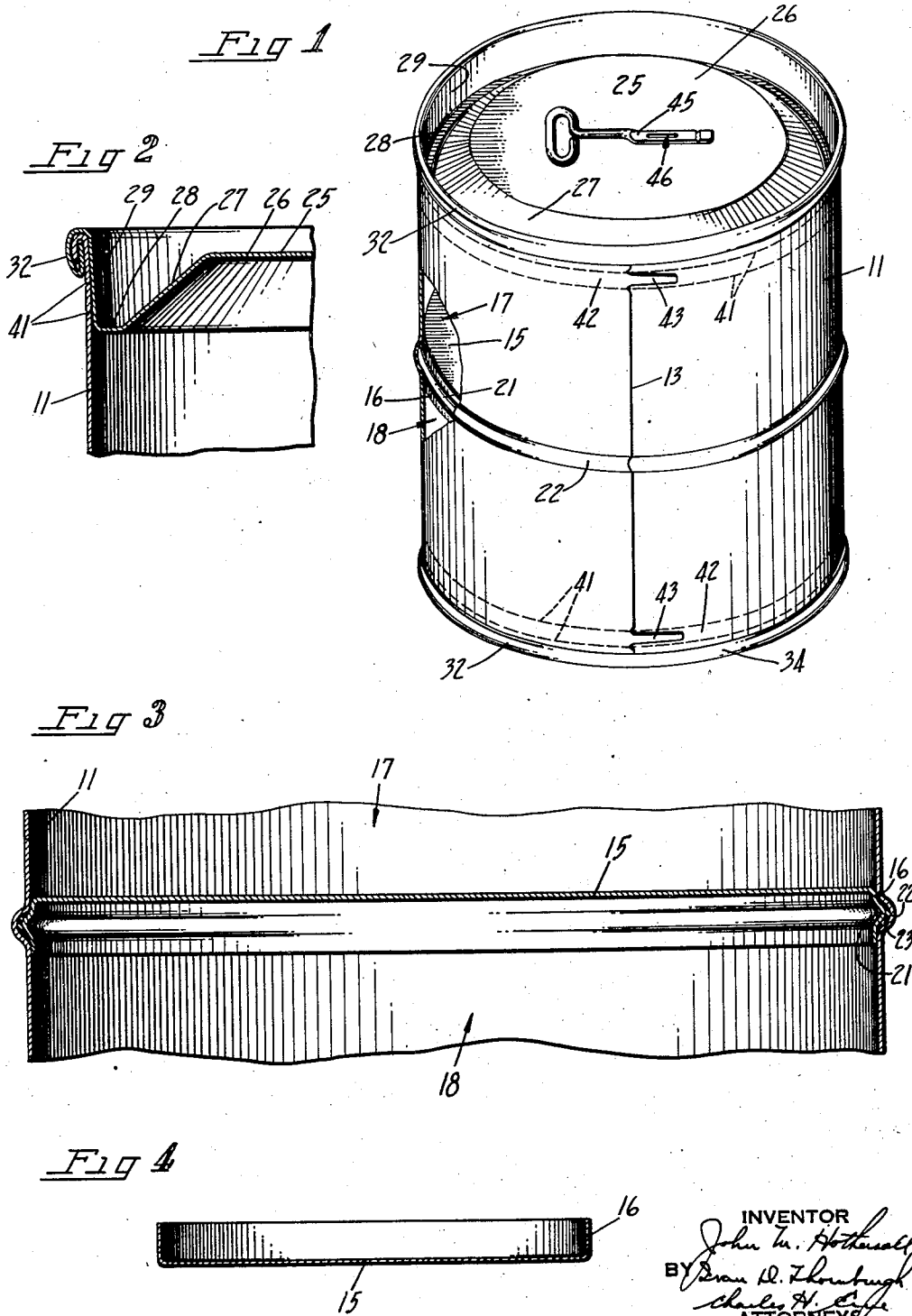
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METHOD OF PRODUCING COMPARTMENT CONTAINERS

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2 Sheets-Sheet 1



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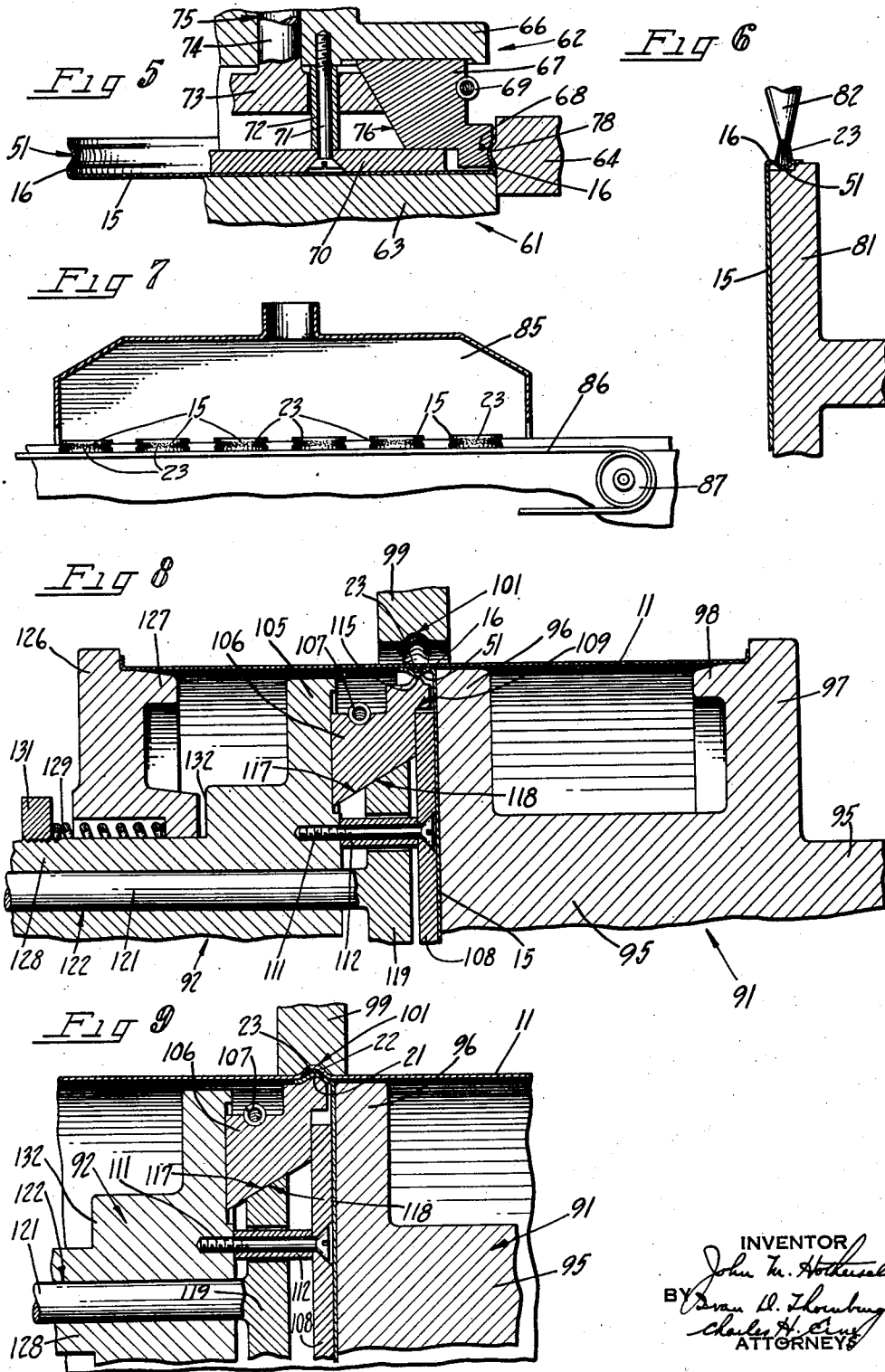
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UNITED STATES PATENT OFFICE

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METHOD OF PRODUCING COMPARTMENT
CONTAINERS

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The present invention relates to a method of producing sheet metal containers and has particular reference to a compartment container having a one piece body which is divided by a partition hermetically joined to the body.

In the packaging of certain products under vacuum it is desirable to have a compartment container or can in which one part of the can may be opened without subjecting the entire contents of the can to the atmospheric conditions. By way of example, one such product is coffee. Coffee when exposed to atmospheric conditions loses its aroma. Thus when a can of coffee is opened the entire contents of the can is exposed to these conditions.

The instant invention contemplates overcoming these difficulties by providing a method of making a compartment can having a lined partition so that the compartments may be individually vacuumized after filling and may be independently opened while the unopened compartments remain sealed.

An object, therefore, of the invention is the provision of a method of making a compartment can wherein the can body is divided into hermetic compartments by one or more partitions joined to the can body in a compound lined hermetic seal so that the compartments after filling may be vacuumized and maintained in sealed condition until independently opened regardless of how many of the other compartments of the can have been opened.

Another object is the provision of a method of making such a compartment can wherein the can body is divided into two compartments, the body having a tearing strip at each end thereof and a separate key for each strip so that one compartment may be opened while the other is maintained under vacuum and may be independently opened when desired.

Another object is the provision of a method of producing such a compartment can with a compound lined hermetic partition wherein the compound is applied to the partition, the latter inserted within the can body, and a uniting bead formed in both the partition and the body to produce a compound lined hermetic joint therebetween which will hold a vacuum in each of the independent compartments of the can so produced.

Another object is the provision of such a method of producing a compartment can of this character wherein the partition is formed with an inwardly extending bead to hold a supply of the sealing compound, the compound filled par-

tion inserted in the can body, and the partition bead reversed and bent outwardly while simultaneously producing a holding bead in the body with the compound joining the beads together in a hermetic vacuum tight joint.

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 compartment can embodying the instant invention and made in accordance with the method steps of the invention, a portion of the can being broken away and shown in section;

Fig. 2 is an enlarged detail or fragmentary view in vertical section of the upper edge of the can shown in Fig. 1;

Fig. 3 is an enlarged detail or fragmentary view in vertical section of the intermediate portion of the can, the view showing the compartment partition plate secured in place.

Fig. 4 is a sectional view of the partition plate before being formed for insertion within the can; and

Figs. 5 to 9, inclusive, are sectional views of apparatus for carrying out the method steps of preparing the partition plate and for inserting and joining it with the can, the views showing the partition plate and the can or fragments thereof in position in the various parts of the apparatus.

As a preferred embodiment of the invention the drawings disclose a sheet metal compartment can which includes a tubular cylindrical body 11 (Figs. 1, 2 and 3) having the usual side seam 13. Inside the body there is disposed a circular partition plate 15 having a depending annular flange 16. This partition plate divides the interior of the can into two compartments, an upper compartment 17 and a lower compartment 18. Obviously where more than two compartments are desired two or more partition plates could be inserted within the can body.

The flange 16 of the partition plate 15 fits snugly within the can body 11 and is formed with a preferably outwardly extending annular bead 21 which projects into and interlocks with a similar bead 22 formed in the can body. The partition is thus locked firmly in place. A lining compound 23 of any suitable plastic material is interposed between the beads 21, 22 and this compound renders the partition joint hermetic.

After the upper compartment 17 is filled with

its contents it is preferably vacuumized and sealed with a top closure 25. This closure is preferably of the countersunk panel type having a central raised reenforcing panel. The raised panel includes a flat top wall section 26 which at its outer edge merges into an outwardly and downwardly sloping wall section 27. The outer lower edge of this sloping wall section merges into a flat bottom wall section 28 of the countersunk panel. The bottom wall section 28 of the countersunk panel merges into an upwardly extending vertical wall section 29 which snugly fits within the body 11 of the can and when the parts are thus seamed together, the double seam, marked 32, is beyond or above the flat wall 26 of the closure.

After the upper half of the can is thus closed it may be inverted and the lower compartment 18 filled with its contents. After such a filling operation the bottom compartment with its contents is vacuumized and the can is closed with a bottom closure 34 and sealed. The closure 34 may be identical in construction to the top closure 25 just described and may be secured in place in the same manner. The can with its two independent contents may now be ready for labeling or other operation incident to putting it into regular channels of trade.

The compartments 17, 18 are adapted to be opened independently, as desired, and for this purpose the can wall at each end adjacent its double seam 32 is provided with a pair of spaced and parallel score lines 41 which extend entirely around the body. These score lines set off a narrow tearing strip 42 at each end of the can, each of which terminates adjacent the body side seam 13 in a starting tongue 43 which projects beyond the seam on the outside of the body.

Removal of these tearing strips in the usual manner when it is desired to open the can may be effected by a key 45. Preferably there are two of these keys, one secured to the top closure and one secured to the bottom closure of the can by soldering or welding as desired. Each key is formed with a slot 46 of usual construction in which one of the tongues 43 is inserted when removing the corresponding strip.

With this construction of compartment can, opening of one compartment does not disturb the vacuum or other condition in the other. Thus for such products as coffee only one half of the can need be opened at one time while the coffee in the unopened compartment will be maintained in a fresh condition until opened. Maintenance of the sealed condition in the unopened compartment is made possible by the hermetic partition plate which is tightly joined to the can body in the compound lined joint.

In the improved method of assembling the partition plate 15 with the can body 11, an inwardly extending bead or groove 51 (Fig. 5) is first formed in the flange 16 of the plate. Its outer peripheral hollow is then filled with the compound material 23. The compound is then preferably dried. After drying the compound lined plate is inserted in place within the can body and the bead 51 is reversed or pressed outwardly against the body thereby forming the outwardly extending bead 21 in the plate and also the cooperating bead 22 in the body which locks the partition and the body together. The compound material is thus interposed between the partition flange bead 21 and the body bead 22 and this renders the joint hermetic.

One form of apparatus for effecting the steps of such a preferred method is illustrated in Figs. 5, 6, 7, 8 and 9 of the drawings. The inwardly extending bead 51 is first formed in the flange 16 of the partition plate 15 by die action. For this purpose the partition plate as shown in Fig. 4 is placed in a die mechanism which includes a lower stationary die 61 (Fig. 5) and an upper movable punch 62.

The die 61 includes an anvil block 63 on which the partition plate rests and also includes a plurality of normally open expanding jaws 64 which surround the anvil. The upper punch 62 includes a punch head 66 which carries a plurality of inside expanding jaws 67 having aligning circumferential grooves 68. These jaws are arranged on the face of the head and are held in place by a surrounding contractile coiled spring 69 and by a flat plate 70.

The plate 70 is secured to the punch head by screws 71 and is retained in spaced relation to the head by spacer sleeves 72 which surround the screws to prevent binding on the jaws. The spring 69 holds the jaws inwardly against a tapered expanding block 73 which is formed on a stem 74 carried in a bore 75 of the punch head. The tapered surface of the block bears against a similar tapered surface 76 formed on each of the expanding jaws 67.

Hence when the punch 62 moves down into the partition plate 15 located in the die 61, the stem 74 of the expanding block 73 moves up and this raises the expanding block causing its tapered surface to slide along the tapered surfaces of the jaws 67. This action forces the jaws outwardly against the resistance of the spring 69 and thus brings them into expanded position in engagement with the inner surface of the partition flange 16.

At the same time the outside expanding jaws 64 are moved inwardly against the outer surface of the flange 16. This movement may be effected in any suitable manner operating in time with the other moving parts of the die mechanism. The flange engaging surfaces of the die jaws 64 are formed with an annular forming bead 78 and as the jaws move in toward the partition flange this forming bead presses the flange 16 into the groove 68 in the inside or punch jaws 67. It is this action that forms the groove 51 in the partition flange 16. After such a forming operation and after the die parts have been separated and have been returned to their original open positions, the beaded plate 15 is removed from the die and it is ready for the next step.

The next step of the method is the application of the compound lining material to the partition plate 15. In this operation the plate is placed on a vertical wheel 81 (Fig. 6) which rotates under a compound lining nozzle 82. The nozzle aligns with the groove 51 in the partition plate and hence as the latter revolves with the wheel the compound issuing from the nozzle in liquid or semi-liquid form is deposited in the groove. The compound may be fed into the nozzle in any suitable manner and from a suitable source of supply. The compound material is preferably of a plastic nature, and may even have thermoplastic characteristics if desired, so that it will readily remain in place in the groove after it is deposited therein and until it is dried.

Drying of the compound material is preferably done in a conventional type of drying oven 85 (Fig. 7) which is heated in any known or pre-

ferred manner. The compound lined partition plates 15 are preferably carried through the oven on an endless conveyor belt 86 which takes over pulleys 87, only one of which is shown in the drawing. The driving pulley will be rotated in time with the other moving parts of the oven.

After this drying operation the compound lined partition plate 15 is inserted within the can body 11 and is thereupon secured in place. This is preferably done in an inserting and beading mechanism illustrated in Figs. 8 and 9. The mechanism includes a stationary can body holding head 91 and a movable plate inserting and beading head 92 which is movable toward and away from the holding head.

The holding head 91 comprises a stationary shaft 95 on which there is formed an inner disc 96 adapted to fit within and support the body 11 of a container intermediate its length and an outer disc 97 of larger diameter which is spaced from the inner disc, as shown in Fig. 8. The outer disc is provided with an annular shoulder 98 which is adapted to fit within and support the body 11 adjacent one open end.

Adjacent the inner disc 96 and surrounding the outside of the body positioned on the head is a plurality of outer beading jaws 99 having beading grooves 101 formed in the faces thereof. These jaws may be supported in any suitable manner and may be moved in and out in time with the other moving parts of the apparatus.

The beading head 92 includes an inner disc 105 which is adapted to fit within and pass into the can body 11 from the opposite end. This disc carries a plurality of inner beading jaws 106 arranged on the face of the disc. The jaws are held in place by a coiled or contractile tension spring 107 which extends entirely around the grouped jaws. They are further held in place by a holding plate 108 which overlaps the jaws being seated in recesses 109 formed in the jaws. The plate is secured in place by screws 111 which extend through spacer blocks or sleeves 112 and are threaded into the disc 105.

The peripheral faces of the jaws 106 are formed with raised bead sections 115. The opposite or inner faces are formed with an inclined cam surface 117 which bears against a similar tapered surface 118 formed on a movable cam block 119. The cam block is formed on the inner end of a stem 121 disposed in a bore 122 which extends through the head 92.

The beading head 92 also includes a yieldable outer disc 126 which is larger in diameter than the can body 11 and which is formed with an annular shoulder 127. The flanged end of the body fits against this shoulder and is supported when the beading head is in place. The outer disc is carried on a reduced diameter shaft portion 128 of the head and is backed-up by a compression spring 129 held in place on the shaft portion by a threaded collar 131. When the head is not in operating position the spring keeps the outer disc 126 in engagement with a shoulder 132 formed on the head adjacent the shaft portion.

In preparation for the assembling of the partition plate 15 with the can body 11, the beading head 92 is drawn away from the holding head 91 and the can body is pushed onto the holding head. The partition plate 15 is then placed over the inner end of the beading head 92 with the flange 16 of the plate engaged over the beading jaws 106 of the head.

The beading head 92 is then pushed toward the

holding head and into the open end of the held can body. This action inserts the partition plate into the body. Inward movement of the beading head continues until the partition plate 15 engages the inner disc 96 of the holding head against which it is firmly pressed. The disc 96 thus serves as a stop for locating the plate 15 in proper position relative to the length of the can body. This is the assembled position of the parts as shown in Fig. 8.

During this inward movement of the beading head 92 the outer disc shoulder 127 engages within the open end of the can body and when the beading head is all the way in as in Fig. 8, its outer disc 126 and spring 129 force the can body against the disc 97 of the holding head 91. The body is thus securely held between its flanges.

While the can body and its partition plate are thus held, the outer beading jaws 99 of head 91 move in against the outside of the body. After this movement the cam block 119 of head 92 is shifted outwardly along the inclined surfaces of the inside beading jaws 106. This action expands the inside beading jaws and thus forces their bead sections 115 against the inwardly extending bead 51 in the partition plate flange 16.

As the jaws continue to expand they press the bead outwardly, practically reversing the bead 51 from an inner to an outer form during which action the confined compound material 23 shifts in position and shape. The can body wall is thus reshaped as the groove 101 is formed within the outside beading jaws. It is this beading or expanding action that also reshapes the bead in the partition flange into the outwardly extending bead 21. The partition plate 15 is thus firmly locked in place within the can body bead 22 with the compound material 23 interposed in the joint thus providing the hermetic seal.

This completes the final assembly of the partition plate with the can body. The expanded jaws 99, 106 then return to their original positions, the latter under the tension of the coil spring 107, and the beading head is removed from the can body leaving the partition in place therein. After stripping the partitioned can body from the holding head 91 its compartments may be filled with contents, first the one and then the other, and each end closed with its closure member 25 or 34 as hereinbefore explained.

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 and that 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 form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The method of manufacturing a compartment container capable of being vacuumized, comprising applying a compound lining material to an annular groove disposed in the exterior surface of an angularly extending circumferential flange wall of a container partition plate member, inserting said plate member within a tubular container body member while limiting the depth of such insertion to an intermediate position of said plate member therein, and then pressing said partition plate flange wall radially outwardly against the inner wall surface of said tubular body wall

while exteriorly confining and limiting radial outward movement of the latter to transform said annular partition plate groove into an outwardly projecting annular bead, thereby forming outwardly extending interlocking bead channels in said body and partition plate flange respectively with said lining material interposed and compressed therebetween to constitute a vacuum tight joint, whereby to provide separate independent spaced compartments in said body, each capable of being independently filled, vacuumized, sealed and opened to atmosphere.

2. The method of manufacturing a compartment container capable of being vacuumized, comprising pressing an inwardly extending annular bead in an angularly extending circumferential flange wall of a container partition plate member to form a continuous exterior groove in said flange wall, applying a compound lining material to said groove, inserting said plate member within an open ended tubular container body member while limiting the depth of such insertion to an intermediate position of said plate member therein, said body member being capable of subsequent hermetic sealing by the application of end closure members to the opposite open ends thereof, and then reversing the position of said inwardly extending annular partition plate groove by pressing the same radially outwardly against the smooth inner wall surface of said tubular body wall while exteriorly confining and limiting radial outward movement of the latter, the outward pressing of said partition plate groove transforming the same into an outwardly projecting annu-

lar bead so as to form outwardly extending interlocking bead channels in said body and partition plate flange respectively with said lining material interposed and compressed therebetween to constitute a vacuum tight joint, thereby providing separate independent spaced compartments in said body, each capable of being independently filled, vacuumized, sealed and opened to atmosphere.

10 3. The method of manufacturing a compartment container capable of being vacuumized in each of its compartments and consisting of a body, a partition plate member and end closure members, comprising pressing inwardly a part of
15 an annular flange wall of said partition plate member to form a continuous exterior channel, applying a liquid compound lining material to said channel, heat drying said compound to provide a lined plate member, inserting said lined
20 plate member within an open end of said body to an intermediate position with the exterior of said plate flange wall in close engagement with the interior of the body wall, and beading said
25 flange and body walls outwardly by reversing said inwardly extending plate flange bead and pressing said lining out of the exterior plate flange channel into the newly formed interior channel of said body wall, thus forming a vacuum-tight joint
30 between the container body and said partition plate, thereby providing separate independent spaced compartments in said body each capable of being independently filled and vacuumized and respectively sealed by said end closure members.

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