Sept. 19, 1933. J. H. HUXLEY 1,927,454

MANUFACTURE OF CONTAINERS AND CLOSURES THEREFOR

Filed May 29, 1931 2 Sheets-Sheet 1

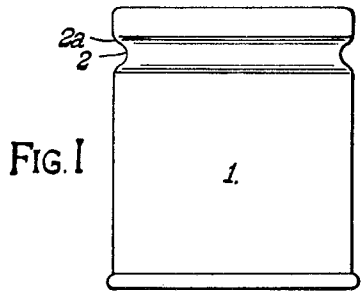


FIG. 1

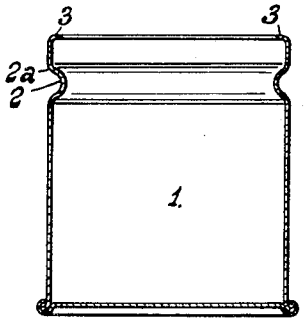


FIG. 2.

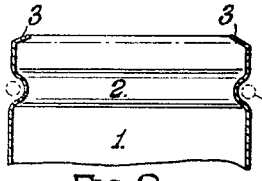


FIG. 3.

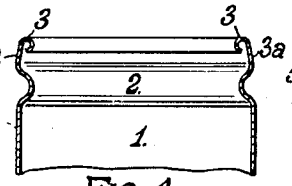


FIG. 4.

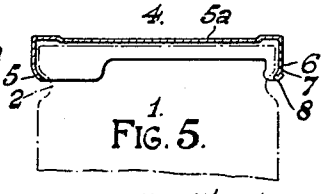


FIG. 5.

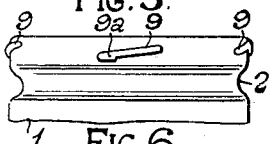


FIG. 6.

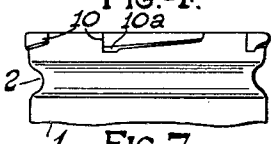


FIG. 7.

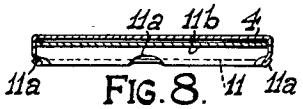


FIG. 8.



FIG. 9.

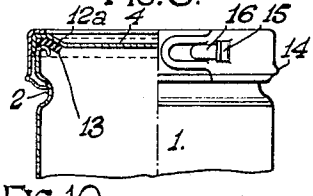


FIG. 10.



FIG. II.

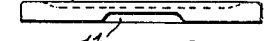


FIG. 9a.

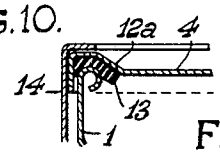


FIG. 10a.

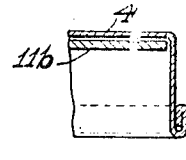


FIG. 8a.

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MANUFACTURE OF CONTAINERS AND CLOSURES THEREFOR

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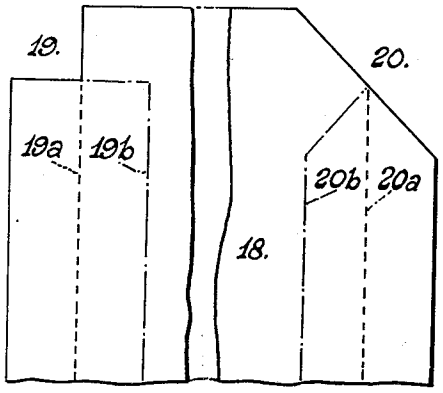


FIG. 12.

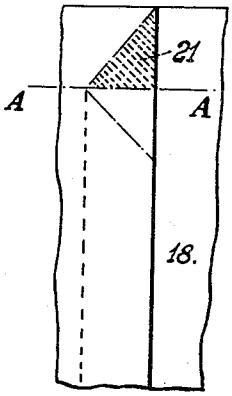


FIG. 13.

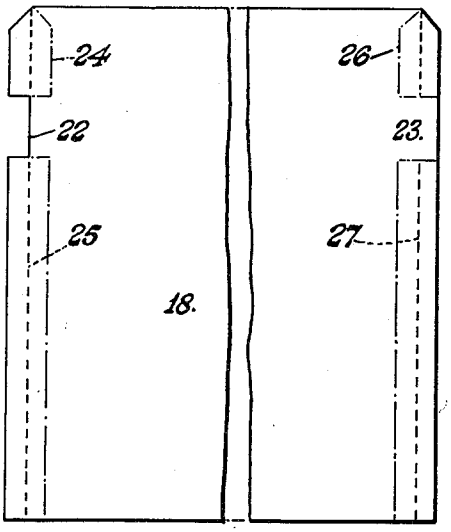


FIG. 14.

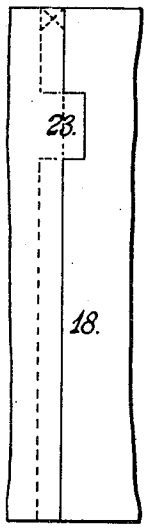


FIG. 15.

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UNITED STATES PATENT OFFICE

1,927,454

MANUFACTURE OF CONTAINERS AND CLOSURES THEREFOR

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Application May 29, 1931, Serial No. 541,041, and in Great Britain June 4, 1930

7 Claims. (Cl. 220—61)

This invention relates to the manufacture of containers made from sheet material especially sheet tin plate, and to the sealing or closuring of such containers with a cap, stopper or the like, secured to the container by a jointed locking ring.

A tin container according to the present invention comprises a groove formed in the vicinity of the mouth for the reception of the lower flange of a jointed locking ring, and is characterized by the body being formed with a lap joint over the area of the groove, whereby a smooth engaging face for the ring obtains.

The lap joint may extend as hereafter explained, from the groove to the mouth of the container, or for the length of the body; conveniently, the container may comprise a body including a lap and a lock joint in combination, the lock joint being between the groove and the bottom of the container, and in some cases also between the groove and the mouth of the container.

The invention further comprises the combination with a tin container including a lap joint within the area of the groove of a closure including means to engage the body of the container so that a packing lodged between the closure and the container is held in compression, characterized by the mouth of the container being flanged or curled to form a bed for the packing.

For the reception of an interlocking closure, the mouth of the container may be formed with a bed for an interposed compressible packing, the bed being constructed so as to resiliently resist the application of the closure.

To this end, the flange at the mouth of the tin container may be set at an angle to the plane containing the mouth, whereby on the initial application of a packed closure member, the compressible material forming the packing is accurately set on the container.

For the purpose of obtaining all the attributes of a glass container in a container made of tin plate according to the present invention, that part of the container between the groove and the mouth may be tapered, as hereafter fully explained, to obtain what is herein termed as a glass finish to the container. Whether or not the glass finish is provided, the mouth of the container may, instead of being folded over, be curled to provide a seating for the packing material in the closure.

For the purpose of receiving a closure which interlocks with the container the body of the container between the groove and the mouth may be formed with ribs or the like or equivalent indentations for interlocking engagement with a closure provided with co-operating means on the flange, and such an arrangement according to the invention is characterized in that the edge of the closure flange is formed as a flat fold, whereby an even seating for a jointed locking ring and a suitable re-sealing closure obtains.

Where the closure interlocks with the container, the closure being formed with a flat fold, the co-operating means on the closure for the interlock may be formed in the flat fold at the edge of the flange.

To enable a closure to hold on to a tin container by engaging in the groove thereof, there may be formed on one side of a diameter of the closure a locking flange which extends about a quarter of the circumference and on the other side of the diameter a locking flange of about half the length of the aforesaid flange, the two flanges being connected by a narrow flange and the small flange engaging in the groove being extended to provide a tab disposed under the jointed locking ring and ready to implement the removal of the closure when the ring is removed.

A combined tin container and closure constructed according to the invention may further be characterized by the closure member being formed with a recess contiguous to its periphery for the reception of a compressible packing member, said recess being wider than the seating formed at the mouth of the container for co-operation therewith.

The recess may be tapered inwardly thereby assuring an internal seal around the flange or curl at the mouth of the container.

Where a container is provided with a glass finish to the mouth a friction fitting closure may be employed, preferably one which is formed with a cut-away flange which enables an instrument to be introduced to prise up the cap from the container.

A preferred method of manufacturing the containers according to the invention will hereafter be referred to.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings which show by way of example preferred embodiments in which:

Fig. 1 shows an elevation of a tin container,

Fig. 2 shows a sectional elevation thereof,

Fig. 3 is a part sectional elevation showing a modified form obtaining a resilient seating at the mouth of the container,

Fig. 4 is a similar view showing the mouth of the container bounded by a curled wall,

Fig. 5 is a sectional elevation showing one form of closure member which may be employed in the container according to the invention, and

Figs. 6 and 7 are part elevations of containers according to the invention showing interrupted threads and lugs respectively for inter-engagement with closures having nibs, ribs, or the like;

Fig. 8 shows in sectional elevation and Fig. 8*a* in sectional elevation (to an enlarged scale) a form of closure provided with indentations on the lower edge of the flange for use with containers constructed according to Figs. 6 and 7,

Fig. 9 is a sectional elevation through a cap or closure showing a preferred form of recess in the closure to ensure an internal seal on the mouth of the container as hereafter explained,

Fig. 9*a* shows a particular form of cap which may be used with a container having a glass finish in accordance with the invention,

Fig. 10 is a part sectional elevation and part elevation showing a container according to the invention with a closure of the kind illustrated in Fig. 9, and showing the said internal seal.

Fig. 10*a* is a detail view of the construction shown in Fig. 10 drawn to a larger scale to show more clearly the nature of the seal obtained.

Fig. 11 is a fragmentary view of a preferred form of locking ring,

Fig. 12 is a diagrammatic view showing one form of blank which may be employed in constructing a lap joint within the area of the groove in accordance with the invention, and Fig. 13 is a fragmentary view showing the blank folded.

Figs. 14 and 15 are similar views respectively showing the employment of another form of blank;

In the accompanying drawings like reference numerals designate the same or similar parts.

Referring to the drawings:

The tin container comprises a body 1 which is grooved as indicated at 2, the side wall 2*a* of the groove being formed in such a manner that the lower flange of a jointed locking ring can be evenly forced thereagainst when the top flange is engaging a closure member covering the mouth of the container.

In accordance with the invention, there is a lap seam in the area including the groove 2 and the shoulder 2*a*; in other words, the groove is formed in a part of the container where a lap seam is formed. This lap seam may extend to the mouth of the container or from top to bottom of the container. Alternatively, the body between the groove and the bottom of the container may be formed by a lock seam and so also may be formed the part of the body between the groove and the mouth.

By joining the edges of the sheet material with a lap joint at the area of the groove, a practically continuously smooth surface is obtained within the area engaged by a jointed locking ring, so that it attains intimate contact with the body throughout its periphery. If the lap is extended to the top end of the body there does not attain at any point or area a thickness of metal which would obstruct the folding, curling or grooving operation, or, while permitting the operation, would cause the result to be a distorted top flange to the container.

The mouth of the container is preferably formed to provide a sealing flange for a compressible packing in order that an air-tight seal may be ensured between the closure and the cap; e. g. instead of leaving the top of the container as a raw edge which would have a tendency to cut into and destroy packing material forced thereon, the edge may be turned over, folded, or curled.

In order that the lower edge of a jointed locking ring may be fixed in the groove 2 by a constricting force applied simultaneously around the whole periphery of the ring, the groove is preferably made so as to receive the tool by which the force is applied.

By such an arrangement a closure cap and a jointed locking ring can be applied, whilst end pressure is maintained thereon, by constricting e. g. a loop of spiral wire indicated at *x* in Fig. 3 engaged over the locking ring at its lower edge so as to obtain simultaneous radial pressure, said loop pressing the lower edge of the locking ring against the shoulder 2*a*, which it is enabled to do by the dimensions of the groove formed on the container e. g. as hereafter explained, and because of the angular setting of the shoulder with regard to the axis of the container.

As shown in Figs. 2 and 3, the turned over portion or seating flange to the mouth of the container indicated at 3 may be set at right angles to the wall of the container to form a bed for the compressible packing in the closure, or, alternatively, as shown in Fig. 3, the flange 3 may be set at an angle—say 30° to 45° to a plane containing the mouth of the container so that when the closure is applied by end pressure in known manner just prior to turning in the lower flange of the jointed locking ring, the up-turned flange is first further turned so that it is disposed at 90° to the wall or substantially in the plane containing the mouth of the container, and this setting of the flange during the closuring operation ensures an accurate sealing of the compressible material between the closure and container and a tight seal.

Alternatively, the container may have a curled top 3 (see Fig. 4) in place of the turned-in flange, thus obtaining a smooth seating internally without raw edges which might have a tendency to cut or otherwise destroy the continuity of an internal sealing formed as hereafter explained.

It may further be mentioned that in some constructions it may be preferred that the width of the flange 3 or curl 3 is such that its inner edge is equal to the diameter of the inner face of the groove 2 formed on the container; thereby in packing such articles as cigarettes, the groove acts as a stop for locating filling material, such as paper, or the like, and further, the tops of the cigarettes are prevented from lodging themselves under the flange 3 or curl.

Particularly for packing cigarettes it may be preferred to employ the alternative construction of rolling or curling the top edge.

In any of the constructions referred to with reference to Figs. 1–3, that portion of the body above the groove may be inclined towards the axis of the container, i. e. tapered as clearly indicated at 3*a* in Fig. 4 thereby providing a finish to the mouth of the container equivalent to that of a glass bottle.

A tin container including the groove formed in a lap seam is preferably provided with a reseal closure; for example, the closure may be of "snap on" form including on opposite sides of a diameter a depending flange which engages under the shoulder 2*a*, the depending portion in the one half being relatively smaller as regards ex-

tent along the circumference than the other. Such a construction is shown in Fig. 5, the closure 4 as shown being provided at one side of the diameter with a skirt having a depending locking flange 5 which may extend symmetrically for about one-quarter of the circumference and a depending locking flange 6 on the other side of the diameter which may be about half the length of the flange or skirt 5, there being a relatively narrow flange 5*a* connecting the flanges 5 and 6.

This flange 6 is extended by the portion 7 which terminates in a curl 8 which, in use, will lie under the jointed locking ring. When the latter is taken off the container, the curl 8 is engaged and by an upward force the closure is lifted from the container.

The flanges 5 and 6 may be substituted by a plurality of tongues as will be well understood in the art.

Instead of having a cap or closure which is sprung on and off the container, the closure may be one in which engagement is effected by relative rotation thereon. To this end, as indicated in Fig. 6, the body of the container above the groove 2 may be formed with interrupted threads 9, and with such form of container the closure may be one with nibs or ribs, or formed with interrupted threads as indicated at 4*a* in Fig. 9.

Instead of threads 9, the container may be provided at the mouth as shown in Fig. 7, with lugs 10 under which a closure with indented nibs or ribs may be employed; further the threads or bayonet lugs 9 or 10 may be extended to form stops 9*a* or 10*a* as shown in Figs. 6 and 7 to prevent the nibs or ribs over-running.

To facilitate moving the closure on and off the container, the closure as constructed in Figs. 8, 8*a* or 9 may be milled.

A novel form of closure particularly suitable for employment with a tin container constructed in accordance with the invention, is illustrated in Figs. 8 and 8*a*. In this construction, the raw edge of the closure is curled and squashed as indicated at 11, thereby attaining a flat fold.

The nibs indicated at 11*a*, Fig. 8, formed in the flat folded edge of the flange are preferably, though not necessarily, formed by a radial pressure as distinct from so-called indenting by applying pressure directly on the edge in a line containing the flange. In the latter case, a very rigid abutment obtains, whereas by the formation of the indents 11*a* by radial pressure, the ribs so produced are relatively resilient, and accordingly not likely to damage the threads or the like formed on a tin container.

The flat fold of the present invention presents the advantage of reinforcement of the edge of the flange of the closure without the objection of a protuberance in the nature of a rib (constituted by a curl) under the securing jointed locking ring.

If a raw edge is left on the closure and nibs are formed on the edge, they may become somewhat flattened after repeated use. However, if the edge is curled and thereby reinforced, then the edge may be indented with the ribs and these will be of such strength as to avoid being flattened when the closure is rotated into position.

Such form of closure may be provided with a packing disc as shown at 11*b*. This disc may be made from comminuted cork, agglomerated and pressed, and one surface of the disc may be waxed or otherwise rendered impervious to the contents of the container, and the other surface may be gummed or otherwise treated to obtain a truly plane surface for intimate contact with the inside face of the closure.

A closure member employed with tins according to the invention is preferably recessed contiguously to its periphery as indicated at 12 in Fig. 9 for the reception of a compressible packing which is wider than the flange 3 or curled top, as the case may be, of the container, and the recess shaped so that when the closure is applied the folded over or curled top attains an internal seal, as clearly indicated at 13, Fig. 10, by reason of the inner edge thereof seating itself against or embedding itself in the warped compressible material of the lid, as well as forming the normal seal between the seating formed by the flange 3 (or curl) and the compressible member in the lid.

This formation of the seal on the inner edge of the folded-over portion is intensified if the groove in the lid tapers inwardly thereof on the inner side of the groove, as indicated at 12*a* Fig. 9, this formation forcing the packing into and even below the plane containing the edge of the flange or curl.

On a container according to the invention formed with a glass finish, friction caps e. g. formed with recesses 12 as indicated in Fig. 9 may be employed as in glass containers. If a friction fit cap is employed the latter is preferably formed with a flange which is cut away, as indicated at 4*b* Fig. 9*a*, from the skirt upwards to enable a tool, such as a knife blade, to be inserted to lift the cap from the container when the jointed locking ring has been unfastened. The cap will be secured with the jointed locking ring which is seated in the groove formed on the container, as already described; thereby the closuring and seal on the metal container correspond exactly to the seal and closuring of the similar shaped glass vessel, and the difficulties arising out of irregularities of shape always resulting in the manufacture of glass containers is entirely eliminated.

A closure employed on a container according to this invention may also be of the kind including a perforation filled or covered with plastic material removable when the contents of the container are required to admit atmospheric air and destroy the vacuum thereby facilitating removal of the closure.

A closure for a container according to the invention may, however, be in any known form of cap with a fraction fit or cap formed to engage with interrupted threads on the container, or a cap which is formed to include a component part of a joint, of which the other part is carried by the container. Alternatively, the lid may be an ordinary screw-on lid or snap-on lid, that is to say, a lid with spring nibs or tongues adapted to engage on the container. The formations on the body for cooperation with the closures aforesaid may be made at the same time as the groove is made or during a subsequent operation.

Instead of a cap a ring may be employed for securing a disc, and the latter may be of metal or paper, papier mache, wood pulp, or the like.

If, however, closures are employed which are formed to interlock with a container a re-sealable metal container is obtained, and by reason of the formation of the cap an effectual re-seal is always obtained.

In the tins as already described with reference to Figs. 1–4 of the accompanying drawings, the body between the groove and mouth runs smoothly into the groove.

Accordingly, a locking ring over a friction fitting cap is supported by the cap and groove evenly over the whole of its surface; this attribute may be attained on a re-seal container by indenting the container to form paths or grooves instead of interrupted threads or lugs and then a closure as illustrated in Fig. 8 may be employed, the ribs 11*a* engaging in said paths or grooves. In this way a re-seal tin with an even cylindrical bedding for the locking ring obtains, i. e. not only for the body of the band but also for the lower edge thereof which is inturned into the groove 2 when closure is made.

In securing the closure to a container any known form of jointed locking ring may be employed, but where the closure includes a flange with a curled edge it may be convenient to employ a jointed locking ring which is beaded to accommodate the curl. Alternatively, the bead may be disposed and formed adjacent the lower edge of the ring so as to act as a hinge line about which the lower flange of the ring is moved when it is compressed on to the body of the container in the act of securing the closure.

Preferably also, the jointed locking ring is one in which there is a tongue in the tail of the strip from which the ring is formed to engage the root of the tongue in the head of the strip used in conjunction with the container so that a tamper proof ring according to United States specification No. 456,612 is obtained. Such a strip is illustrated in Fig. 11 a bead or groove being formed adjacent to the lower edge as indicated at 14 and the tongue in the tail as indicated at 15, the ring including the normal tongue 16 in the head of the strip. The head may also be perforated at 17 to enable the ring to be curled automatically and its end jointed together on a mandril, for example, forming part of a machine as described and claimed in United States specification No. 456,612.

Instead of the bead being formed near the lower edge of the locking ring, the latter may be otherwise weakened, e. g. by perforating the band adjacent the edge, or by having portions removed therefrom by perforating so that a serrated edge is obtained.

By such constructions, the seal may readily be applied by radial pressure applied simultaneously around the whole periphery of the jointed ring when completing the closure of the tin as the lower edge of the strip being weakened allows this to be in-turned without distortion and with considerably less effort than is required to turn in a solid or plane jointed locking ring.

In a preferred method of manufacturing a container according to the invention, the edges of a sheet metal blank are joined by a lock seam for a length corresponding to the distance from the bottom of the tin to the groove to be formed thereon for the reception of the locking ring, this limitation of the lock seam being effected by cutting away metal from the longitudinal edges at the top end in such manner that for that portion of the metal destined to form the top of the container from the groove upwards the edges are merely overlapping to a greater or lesser extent according to the method of cutting away the metal from one or both sides of the blank.

The cut-away portions may be of rectangular or triangular form, both portions being rectangular or triangular or one side being cut away by removing a rectangular piece of metal and the other side being cut away by removing a triangular piece of metal.

In one method of manufacturing a tin container with a lap joint within the area of the groove 2 and extending to the top, a blank of the form shown in Fig. 12 may be employed. In this construction, a lap joint is obtained from the groove to the mouth of the container and a lock seam below the groove. The limitation of the lock seam is obtained by cutting away metal from the longitudinal edges at the top end of the blank as indicated at 19 and 20.

In such arrangement the lap occurs over a triangular area as indicated by the shaded area 21 in the diagram constituting Fig. 13. In the folding operation the blank is folded along the dotted line 19*a*, Fig. 12 and also along the dotted line 20*a*, thereby forming on each side of the blank a flange disposed according to the chain lines 19*b* and 20*b* respectively, and as both folds are made in the same direction, one flange is above the blank and the other below. In forming the lock seam the flanges hook into one another as will be understood in the art. In Fig. 13 the lock seam extends from the chain line A—A downwards and the lap seam extends from the line A—A to the top.

The blank may be pressed into cylindrical form by means of dies arranged to close around a mandril, the meeting edges of the said blank being connected by the lock seam thereby formed. By employing a lock seam the production of the container according to the invention may be produced along fully automatic lines.

In Fig. 14 is shown another form of blank which may be used. In employing this form the lap seam is only obtained actually within the area occupied by the groove. Above and below the groove a lock seam is formed. To this end the blank is notched as indicated at 22 on one side and along the other side a tongue 23 is formed by slitting the edge of the blank.

One edge of the blank is then folded along the dotted line 24 achieving the position shown in chain lines 25, and the other edge of the blank is folded over along the dotted line 26, except for that part constituting the tongue 23, achieving the position shown in chain line 27, the turned-over ends both being turned in the same direction as described with reference to treatment of the blank as described in Fig. 12, then hooked one into the other. The position of the flanges and the tongue 23 is shown in the diagrammatic elevation constituting Fig. 15.

According to another method of manufacture, the body may be formed from tin plate of which the edges are connected by lapping and soldering from end to end. This method eliminates the necessity of forming special notches except, perhaps, at the top and/or bottom to facilitate curling the top and a flange in the bottom of the container. This notching of the top and bottom may be in addition to any other notching or slitting formed to manufacture a lap in the area of the groove and a lock seam above or above and below the groove.

By manufacturing a container according to the present invention, for instance from sheet metal, the metal is of even thickness throughout, has a continuously smooth surface and there are no perforations in the metal caused by attenuation, and a cap can be perfectly seated on the folded-over portion of the tin, whilst the locking ring can be perfectly engaged in the groove thereof causing a perfect seal.

As a result of practice, it is found that the act of forming the seam causes the inner wall of the body to be indented slightly where the overlap obtains, hence, the outer surface of the overlapping portion is substantially countersunk.

This effect may in fact, be procured by preliminary treating the edge of the blank destined to be within the lap joint and within the wall thereof, so as to depress a portion ready to receive the overlapping part.

Apart from the container formed from metal as herein described, the invention comprises also the association with a container of any form of cap, lid, disc, or the like, which is formed with a groove for the reception of plastic material which is wider than the seating on the container, so that the internal seal as well as the top seal, as hereinbefore explained, is obtained. Preferably, also, the invention covers the recessing of the closure member when this tapers towards the inner side, which is the preferred construction for the reception of rubber latex as the compressible material, thereby a minimum amount of rubber material is employed whether or not the cap is used with a tin container formed with a seating by folding over as herein described, or whether the seating is formed by folding, rolling or curling the top edge.

In referring to a re-seal closure or a re-seal container herein, is meant a closure and a container which co-operate with one another so as to form an air-tight closure each time the closure is put upon the container, which result is not obtained by merely applying a lid again to the container in the form of a friction fitting lid; such a construction may produce an air-tight tin when first applied, but when once a tin is opened, these conditions are not obtained by the re-use of the lid, which condition requires a mechanical co-operation of the two to compress a packing between the closure and the container as described herein.

What I claim is:—

1. A reseal container of the character described in combination with a closure member therefor, said container comprising a body portion, an annular sealing groove in the body portion in the vicinity of the mouth of said container and adapted to be engaged by said closure member, a lock seam extending longitudinally of the container, a lap joint in said seam in the area of said groove, and a lock seam between said groove and the mouth of said container.

2. A reseal container formed from sheet material and including a body portion, a lock seam extending longitudinally of said container and terminating in the vicinity of the mouth thereof, an annular sealing groove in the vicinity of the mouth of said container, said seam having a lap joint in the area of the groove, and a lock joint between said groove and the mouth of said container.

3. A reseal container formed from sheet material and including a body portion, an annular sealing groove in the body portion in the vicinity of the mouth of said container, a lock seam extending longitudinally of the container, a lap joint in said seam in the area of said groove, and a lock joint in said seam between said groove and the mouth of said container.

4. A reseal container formed from sheet material and including a body portion, an annular sealing groove in the body portion in the vicinity of the mouth of said container, a lock seam extending longitudinally of the container, a lap joint in said seam in the area of said groove, a lock seam between said groove and the mouth of the container, and a flange folded inwardly from the body portion about the mouth of said container.

5. A reseal container of the character described, in combination with a closure member therefor having a jointed locking ring, said container comprising a body portion formed from sheet material, an annular sealing groove in the body portion in the vicinity of the mouth of said container, an inwardly folded flange about the mouth of said container, a lock seam extending from the bottom of the container to the groove, a lock seam extending from said groove to the mouth of the container, and a lap joint in the seam in the area of the groove forming an even surface in the groove with which the jointed locking ring is adapted to engage to retain said closure member on the container.

6. A reseal container of the character described in combination with a snap type closure member including a skirt having inwardly turned flanges, said container comprising a body portion formed from sheet material, an annular sealing groove in the body portion in the vicinity of the mouth of said container and adapted to receive the flanges of said closure member, a lock seam extending longitudinally of the container, a lap joint in said seam in the area of said groove, and a lock seam between said groove and the mouth of the container.

7. In a reseal container of the character described in combination with an interlocking closure member having a recess about the rim thereof including a ribbed skirt, said container comprising a body portion formed from sheet material, an annular sealing groove in the body portion in the vicinity of the mouth of said container, a lock seam extending longitudinally of the container, a lap joint in said seam in the area of the groove, a lock seam between said groove and the mouth of the container, a flange folded inwardly from the body portion about the mouth of said container, bayonet lugs between the groove and the mouth of said body member adapted to cooperate with means on the closure member, and a locking ring having flanges engaging the cover and the groove.

JOSEPH HAROLD HUXLEY.