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R. G. CLYNE

CONTAINER AND PROCESS OF PRODUCING THE SAME

Filed May 24, 1926

Fig. 1.

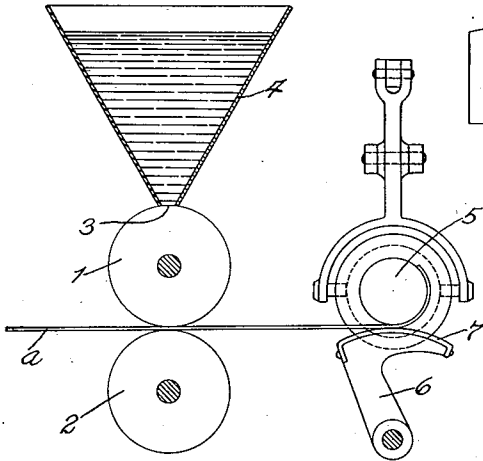


Fig. 5.

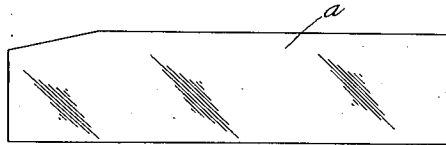


Fig. 6.

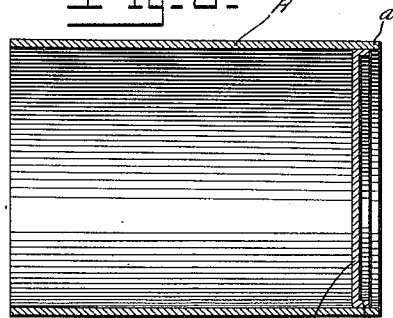


Fig. 2.

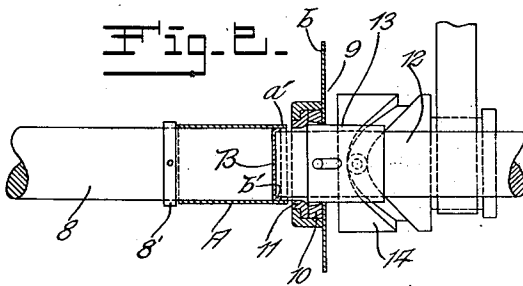


Fig. 7.

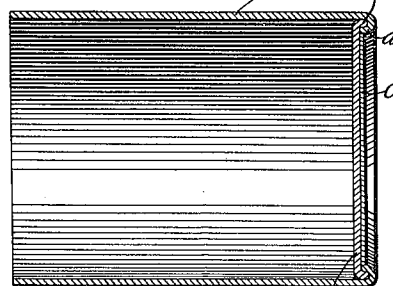


Fig. 3.

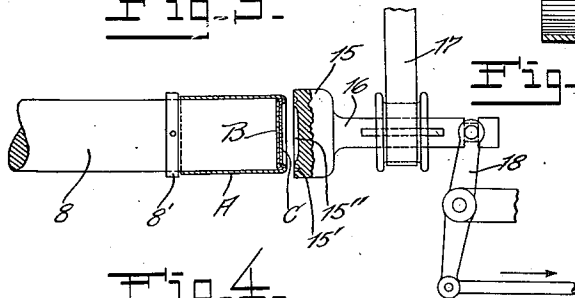


Fig. 8.

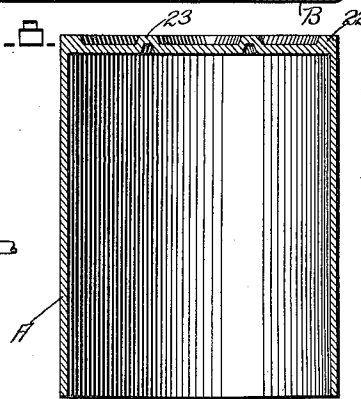
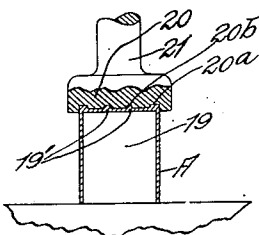


Fig. 4.



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CONTAINER AND PROCESS OF PRODUCING THE SAME.

Application filed May 24, 1926. Serial No. 111,303.

This invention relates generally to containers. More particularly, my invention relates to a certain new and useful end-closed container of cylindrical tubular type and to the method or process of producing the same.

Tin and glass tubes, paper and tin boxes, and various other such types of containers are today in enormous quantities employed in many industries for the packaging of different kinds of commodities and merchandise of small bulk, and my present invention has for its chief object the provision of an inexpensive container, efficiently usable especially for the packaging of commodities and merchandise of the kind stated, which may be economically manufactured, and which is durable, light in weight, air-tight, seamless, and substantially unbreakable.

And with the above and other objects in view, my present invention resides both in the novel form and construction of the container as an article of manufacture and in the method or process of producing the same, all as hereinafter described and pointed out in the claims.

In the accompanying drawing, certain figures of which are more or less schematic and merely show, in a conventional manner, fragments of an apparatus for carrying out and performing the several successive steps of the process of manufacture of the container.

Figure 1 is a view illustrating paper-treating, feeding, and tube-forming means and the co-operative relation therebetween;

Figure 2 is a view, illustrating, in a general way, means for blanking, shaping, and inserting into the tube-body the end-closure member or disk;

Figure 3 is a view, illustrating the operation of inturning and interlocking or crimping the contiguous or marginal end and edge-portions of the tube and end-closure disk;

Figure 4 is a view, illustrating the final compressing and swagging operation of the closed end of the container;

Figure 5 is a plan view of a blank sheet or section of paper or other material from which the body of the tube may be initially formed;

Figure 6 is a longitudinal section through the container-tube with the initially formed end-closure in place;

Figure 7 is a similar view, showing the marginal or end-portions of the tube inturned in interlocking engagement with the marginal flange of the end-closure disk and with the key-disk in place; and

Figure 8 is a similar view of the finally completed or finished container.

Referring now more in detail and by reference characters to the drawing, A designates the body of the container, which, as best seen in Figures 6, 7, and 8, is of cylindrical, tubular form and preferably constructed of paper or other suitable material. The body A may be pre-formed, as might be said, and is originally open at both ends. However, my present invention also comprehends the special immediate formation of the tubular body A in any desirable manner; economically the body A may be formed by the simple process of winding a strip of paper *a* or the like upon a mandrel, as illustrated in Figure 1, in which the strip *a* is passed between a pair of superposed rolls 1, 2, the upper roll 1 having its peripheral face in co-operative relation to the discharge-outlet 3 of a hopper-like receptacle 4 containing a suitable liquid adhesive, whereby the adhesive is applied to the strip as it passes between the rolls. The rolls 1, 2, serve the dual purpose of applying the adhesive and feeding the strip *a* to a winding and forming mandrel 5, which latter is rotated through suitable driving mechanism (not shown). Co-operating with the mandrel 5, is a sector-like compression-member 6 having a face portion 7 which is somewhat resilient and yielding, yet which exerts sufficient pressure on the successive convolutions or windings of the strip to compress them together in the formation of the compact laminated tubular body A.

The body A, being suitably pre-formed or thus specially formed, is first, according to the present process, for the most part sleeved tightly, though removably, on a cylindrical supporting-member or mandrel 8 to abut at one end against a collar 8', its opposite end-portion, designated *a'* in Figures 2 and 6, being free, that is to say, extending or projecting beyond the adjacent end of the mandrel 8. I might here state that such projecting tube end-portion *a'* has a length equal or corresponding approximately to twice the length of the disk-flange, shortly to be described, the collar 8' being adjust-

able upon the mandrel 8 in the formation of containers of various lengths. Such disposition of the tube A, if specially formed, is preferably made promptly after the formation of the tube and while its said free or projecting end a' continues or remains in a moist, soft, more or less plastic condition resulting from the application of the adhesive. In the event, however, the tube A be pre-formed or dry and hard when disposed on the mandrel 8, then its free end a' is suitably softened and rendered more or less plastic for the next step in the process of producing the finished end-closed container.

Such step contemplates the placement within the tube A of an end closure-disk B, and for such purpose the mandrel 8 is axially aligned with, and the free end a' of tube A presented in co-operative adjacent relation to, a double or compound cutting and forming die 9 that includes a disk-cutter 10 of a cutting-diameter somewhat greater than the internal diameter of tube A and a disk-flanging or upsetting-member 11 of an internal diameter approximately the same as that of the tube A. Forming substantially part of the die 9 and reciprocable longitudinally and axially relatively to the cutter 10 and flanging member 11, is a plunger 12 adapted for co-operation with, and having a working diameter somewhat less than the internal diameter of, the disk-flanging member 11, the difference in diameter between the member 11 and the plunger 12 equally approximately the thickness of the strip of material b from which the tube end-closure B is to be cut and formed, as will presently appear. Slidable longitudinally on the plunger 12, is a sleeve 13 whose inner end-portion is peripherally sharpened for co-operation with the member 10 in the cutting of a disk B out of the strip of material b , which latter is suitably fed over or across the outer face of the die-member 11 while the plunger 12 is in normally die-retracted position. In such normal position of the plunger 12, its inner end is substantially flush with the inner, cutting end of the sleeve 13, the plunger 12 and sleeve 13 being so cooperatively arranged relatively to each other and operated by a suitable rotating cam device 14 that the initial inward movement of the plunger 12 and sleeve 13 is simultaneous, whereby the disk B, which is cut from said strip of material b during this movement, is carried into close proximity to the die flanging-member 11. The travel of the cutting-sleeve 13 is then arrested, but the plunger 12 continues to move inwardly independently of the sleeve 13 and thereby forces the so cut disk B through the flanging-member 11. However, as the disk B is of larger diameter than the opening in the flanging-member 11, the disk B will, as it is carried flatwise through the die-member 11, be upset at its annular marginal portion and thereby provided with a continuous annular flange b' , best seen in Figure 6, the inward movement of plunger 12 continuing until the disk B is carried into the tube A with its body-portion disposed flatwise against the adjacent end of the mandrel 8 and its flange b' presented outwardly towards the adjacent or free end of the tube A. In this connection, it may be stated that the material-strip b is preferably moist and soft and more or less plastic at and when the disk B is blanked therefrom.

Next in the process of completing my new container, the mandrel 8 and its carried partly end-closed tube A, the material of both the tube A and disk B being still in a soft and more or less plastic condition, are shifted into axial co-operative alignment with a rotating spinning tool, which is also capable of endwise reciprocatory movement with respect to the mandrel 8 and its carried tube A. This spinning tool is best illustrated in Figure 3 and, as there shown, comprises preferably a suitably formed head carried by a shaft 16, to which latter rotary movement is imparted by a suitable shiftable belt and pulley arrangement 17, and which is movable endwise through the medium of a suitable leverage 18. Formed in the end face, and adjacent the periphery, of the die-member or head 15, is an annular groove 15' of substantially semi-circular or, rather, of more or less U-shape in cross-section, the groove 15' coinciding concentrically with the projecting end-portion a' of the tube A and receiving the same when the rotating die-member 15 is moved or shifted endwise through the leverage 18 toward the tube-carrying mandrel 8. Centrally the die-member or head 15 is further recessed, as at 15'' to provide a seat for a suitable auxiliary end-closing or key-disk C, which disk is seated in said recess in the head 15 prior to the operation now to be described.

The disk C being so seated in the head 15, the head 15, rotating under the driven force of the belt 17, is shifted endwise through the leverage 18 toward the mandrel 8, whereupon, under spinning engagement by the head 15 at its groove 15', the end-portion a' of the tube A is turned inwardly and crimped upon and interlocked with the flange b of the disk B and, at the same time, the key-disk C is pressed in between the interturned end-portion of the tube and laid flatwise against the outer face of the disk B, the disk C thus not only reinforcing the end-closure B, but also affording a lock for securing the interturned tube end-portion and the flange b' in crimped, interlocking engagement. It might be added that the disk C is also, when so placed in position, in more or less plastic condition and, under the

pressing force of the head 15 against the abutting end of the mandrel 8, is intimately substantially cemented to the disk B and adheres thereto when the die-member 15 is withdrawn.

The container is now in its semi-finished condition as illustrated in Figure 7 and is then removed from the mandrel 8 and disposed upon a block or anvil 19 for the final or finishing operation of the container-forming process, as illustrated in Figure 4. Adapted for co-operation with the anvil or block 19 in such final container-forming operation, is an axially aligned, endwise movable finishing die-member which comprises a head 20 carried by a suitable shaft 21, the head 20 being formed with an outer annular recess 20^a concentric with the crimped tube-end portion and with preferably an intermediate suitably spaced annular recess 20^b, concentric and for co-operation with an annular rib 19' provided or formed on the end-face of the anvil 19. With the so partially formed and end-closed container A disposed upon the block 19 with its closed end presented towards the die-head 20, the die-head 20 is forcibly pressed down upon the anvil 19, under the pressure of which the end-portion *a'* of the tube A and the inserted disks B and C are tightly matted and compacted together into a fixed substantially homogeneous whole, and thus the container is formed with what may well be described as an integral end-closure. In the final structure, the interlocked edge portions of the tube and disk are molded and swagged into an annular bead or flange 22, which forms a thickened reinforcement at the outer end-closed corner of the container, and by means of the co-operating die-recess 20^b and anvil rib 19', the now closed end of the container is further reinforced by a correspondingly annular embossment 23. The die-member 20 is now moved from its described container-pressing engagement, and the formed and completely end-closed tube removed for such polishing or other finishing operations as may be desired.

A container produced according to my present invention is comparatively inexpensive, air-tight, longitudinally stiff and rigid, and practically unbreakable in ordinary and regular usage. Obviously, the container may be made moisture-proof by immersion in hot paraffine or by treating it otherwise with water-proofing material. So, too, the containers may be made in various lengths and diameters, the mouth or open end of the container being adapted for closing by an ordinary cork or stopper or by a closure made from paper in a manner similar to the con-

tainer itself and fitting telescopically either inside or outside the tube.

It is further obvious that the container may be suitably burnished and polished, as desired, and if the tube is specially formed, as I have described, the strip of paper *a* may originally bear suitable printed matter for exposure upon the outer face of the formed tube, whereby I not only obviate the extra operation and expense of attaching a separate label to the finished container, but also obtain greater uniformity and more artistic effect than is possible in the application of the usual separate, pasted labels. In this connection further I might state that the finishing die-member 20 may be formed with counterparts of a trade-mark, name, or other matter concerning the proposed contents of the container, which is impressed upon the bottom or closed end of the container in the final operation in the formation of the finished container.

It is to be understood that changes in the form and construction of the container and in the process or method of producing the same may be substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a tubular end-closed container, a chambered body, a flanged disk disposed within the body, the body having an end-portion inturned and clinched upon the flange of the disk, and a second disk seated upon the first disk and peripherally engaging the inturned end of the body, said disks and body end-portion being compressed and compacted together and forming an integral end-closure for the body.

2. The process of producing a closed-end container, which consists in providing a tubular body the wall of which at an end thereof is soft and plastic, then seating a plastic flanged end-closure within the body at the plastic end thereof, then by spinning, inturning, and clinching the plastic body end-portion over and upon and into interlocking engagement with the flange of the closure, then seating a second plastic closure upon the first closure and in peripheral engagement with the inturned end of the body, and then compressing and compacting said closures and the body end-portion substantially integrally together.

In testimony whereof, I have signed my name to this specification.

ROBERT G. CLYNE.