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METHOD OF AND APPARATUS FOR MAKING COLLAPSIBLE CONTAINERS

Original Filed July 10, 1936

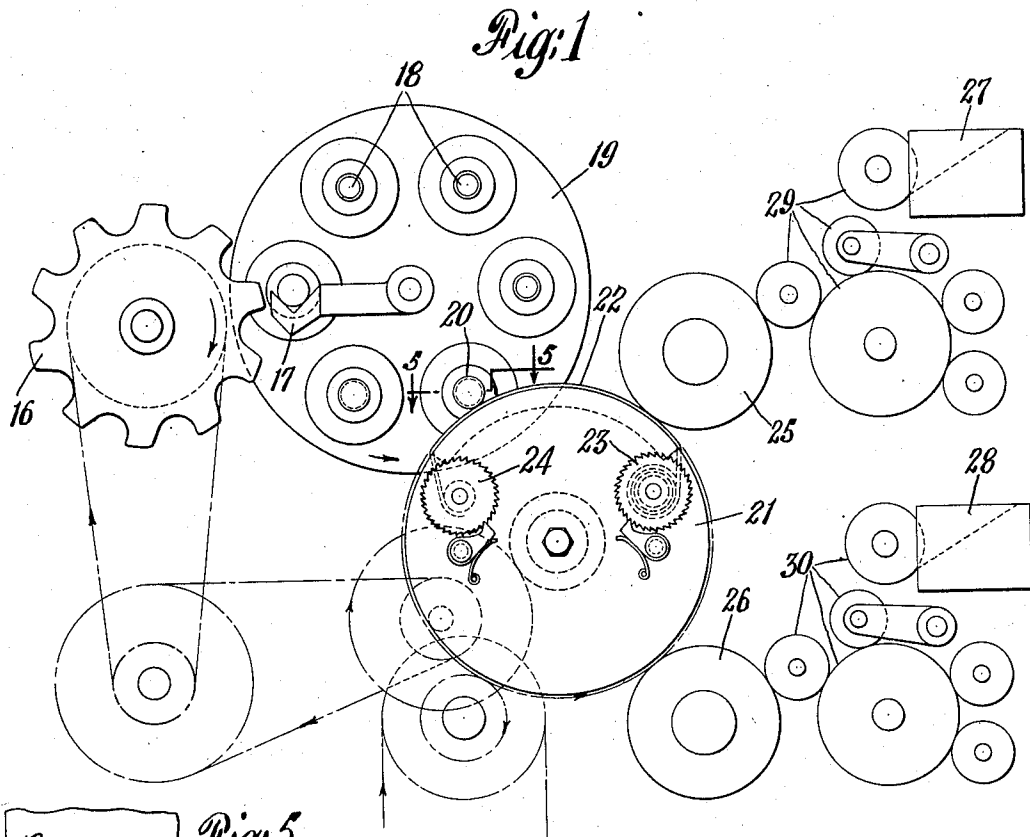
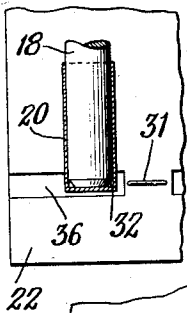


Fig. 5.

Fig. 2.

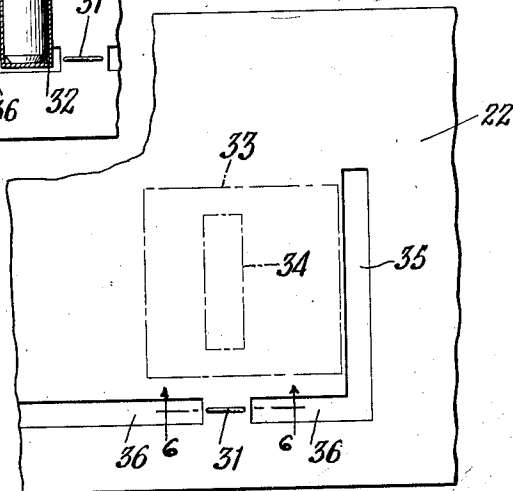


Fig. 3.

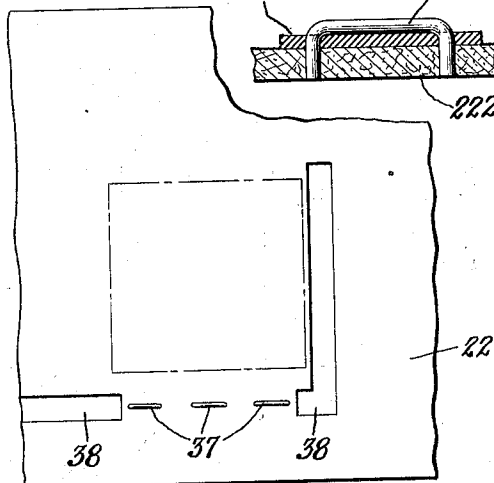
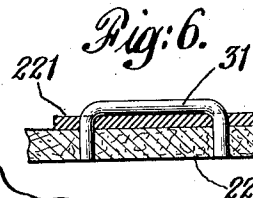
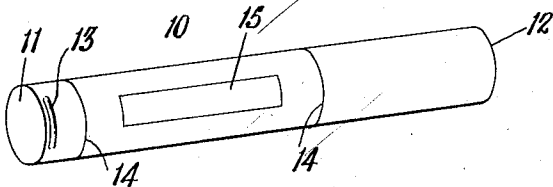


Fig. 4.



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METHOD OF AND APPARATUS FOR MAKING
COLLAPSIBLE CONTAINERSJoseph D. Martina, Newark, N. J., assignor to
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corporation of New JerseyApplication July 10, 1936, Serial No. 89,863
Renewed May 4, 1939

12 Claims. (Cl. 101—38)

This invention relates to the production of collapsible containers of the one-shot or single dose type disclosed in the pending application Ser. No. 80,476 filed on May 19, 1936 by Rudolph S. Schenk. Containers of this character may be very rapidly and economically produced by the employment of my improved method and apparatus.

In carrying out my method, a thin-walled metal tube or cup is first produced, preferably by extruding the same from a disc-like slug. One end of the container is thus formed with an integral closure, preferably, though not necessarily, in the form of a flat disc extending across the end of the tubular container. At its opposite end the container, as extruded, is open and has an irregular upper edge which is removed in trimming the tube to length. This open end is adapted to be sealed, after the container is filled, by suitably pinching the walls together and folding and crimping the end with or without the application of a clip, as desired. When the contents of the tube or container are to be used, it is necessary either to remove the integral closure or to cut off a portion of the sealed end by means of a knife or scissors. The container disclosed in said pending Schenk application is provided with one or more indentations adjacent the integral closure to enable it to be easily and quickly removed without the necessity of using any implements.

One of the objects of the invention has been to provide a simple and effective means and method of forming the indentations. A feature, in this connection, is the formation of the indentations simultaneously with the performance of one or more other operations so that no extra time is required and substantially no additional expense is involved. As a special feature, the invention contemplates the formation of the indentations simultaneously and in direct coordination with a printing operation so that a suitable correlation may be effected between the indentations and certain instructions bearing upon the use of such means.

Other objects and features of the invention will appear from the detailed description of the same which will now be given in conjunction with the accompanying drawing, in which:

Figure 1 is a front elevation, largely schematic, of a machine for carrying out the improved method.

Figure 2 is a plan view of a portion of a printing blanket used in carrying out the method.

Figure 3 is a similar view of a modified form

of blanket that may be used in providing a series of indentations in each container.

Figure 4 is a perspective view of a container of the type effectively produced by the improved method and machine.

Figure 5 is a detail view in section along the line 5—5 of Figure 1, and

Figure 6 is an enlarged sectional view through a portion of the blanket along the line 6—6 of Figure 2.

Referring first to Figure 4 of the drawing, the illustrative form of container, to the production of which the invention relates, comprises a tubular body 10 closed at one end by an integral, flat closure 11. The opposite end 12 is open to enable the introduction of any desired contents. Adjacent the closure 11 there is provided an indentation 13 of suitable dimension to allow insertion of the thumb-nail. The metal at this indentation is sufficiently thin to permit it to be easily punctured by the thumb-nail and thus initiate a tear which may be readily extended to bring about complete removal of the closure. Any desired portion of the body of the tube, such as the band between the lines 14, may be coated with an enamel, or the like, and may have any appropriate advertising material printed thereon. A zone 15, directly in line with the nail depression 13, may conveniently carry instructions for the use of the depression in opening the container.

In the production of this container the original tube, with its cylindrical body and flat closure, may be extruded in a well known manner by the action of a punch forced against a slug in a die. A suitable section, in the form of a ring, may be removed from the open end in any appropriate way to reduce the body to the desired length and at the same time eliminate the irregularity incident to the extrusion operation. The band of enamel or other coating may be applied by a suitable coating machine or in any other known way and this coating may be dried either under ordinary room conditions or by passing the container through an oven maintained at an appropriate temperature.

The containers in this condition may be deposited one by one, either automatically or by hand, into the recesses of a rotatable carrier 16. As the carrier rotates, the containers are dropped one by one into a trough 17 aligned with one station of a series of spindles 18 carried by a head 19. Inasmuch as the details of the machine have no bearing upon the invention, the machine has been illustrated only schematically. It is sufficient to understand that by means well known

in the art (but not herein shown), the head 19 is turned step by step, in the direction indicated by the arrow, thus carrying an empty spindle periodically into line with the trough 17. Containers deposited successively in the trough are transferred to the aligned spindles by any suitable means, such as a reciprocating plunger, not shown. As the head 19 rotates, it carries the spindles with their containers successively to the station indicated at 20 opposite a printing drum 21. This drum is arranged to be rotated once upon each step of movement of the head 19. A small portion of its periphery, say an arc of about 90°, carries a blanket 22 formed in any suitable way to present a rubber or similar ink-transferring surface toward the spindle at 20. Blankets of this type, which are well known, frequently have a backing of one or more layers of canvas or similar fabric 222 with a layer of rubber 221 bonded to the upper surface. The blanket may be of any suitable length and may extend from a supply roller 23 to a take-up roller 24. It will be understood that as a given section of the blanket becomes worn in use, it is shifted toward the take-up roller and a fresh section is brought to the effective position at the surface of the drum.

After the printing impression has been transferred to the container on the spindle at station 20, this container is carried into the next position, at which it may be removed by the attendant of the machine. In this connection it should be observed that the shifting of the head 19 takes place when the blanket 22 is out of a position opposite the spindle at 20. The container on the spindle at this station will contact the blanket but it will not contact the periphery of the drum; therefore there is no interference with the movement of the head when the blanket is traveling through the lower, major portion of its movement.

The manner in which the blanket 22 receives the ink which it transfers to the container on the spindle at station 20 is well known in the printing art and, therefore, need not be described in detail. Suffice it to say that the design to be printed in one color is carried by a cylinder or support 25 while another part of the design which may be printed in another color is carried by a cylinder or support 26. These designs may be engraved directly in the surface of the cylinder or may be provided on a detachable plate arranged to be clamped in place on the support in any suitable way. Ink is transferred from the boxes 27 and 28 by means of the series of rollers designated generally by the numbers 29 and 30 and is deposited in the depressions forming the designs in or on the supports 25 and 26. As the blanket 22 is carried around on the drum 21, it first picks up the ink deposited in the depressions of the lower printing plate and it then picks up the ink of a different color from the upper printing plate, care being used to bring the two plates into proper adjustment so that the designs in the different colors will be in proper registry on the blanket. In the continued movement of the blanket, the entire design in the several colors will be transferred to the container. It will be understood that means, not shown, are provided for rotating the supports 25 and 26 and various portions of the inking devices in synchronism with the rotation of the drum 21. The spindles, while at the station 20, may also be positively driven, if desired, at the same peripheral speed as the blanket, or they may be

simply frictionally driven by the engagement of the blanket.

Now, for the purpose of forming the indentation 13 in the container, there is provided a staple or wire 31, preferably about $\frac{1}{2}$ of an inch in diameter, having its ends bent over and embedded in the blanket. The wire is preferably curved slightly to conform with the curvature of the drum 21, although this is not necessary since the curvature is so slight for the length of the wire—about $\frac{3}{8}$ of an inch—that it is practically negligible. The bent ends of the wire may be sharpened or pointed slightly, if desired, to facilitate insertion in the blanket and they are preferably of such length (see Figure 6) as to just extend through the blanket when the body of the wire rests on the surface of the blanket. This places the ends of the wire in contact with the surface of drum 21. It is not essential, however, to do this inasmuch as the container metal is sufficiently soft and pliable to be suitably indented even though the wire may be permitted to yield slightly in the blanket. Moreover, the bent ends may be made slightly longer than the thickness of the blanket without causing any particular difficulty.

It will be understood that as the blanket is carried past the container on the spindle at 20, and the container is rolled across the face of the blanket, the wire 31 will press into the container and form the indentation 13. The normal clearance between the container and the supporting spindle may be sufficient to permit the indentation to be formed but preferably the end of the spindle is bevelled slightly, as indicated at 32 (Figure 5), to permit a somewhat deeper indentation to be formed. If the indentation were to be made at a greater distance from the closed end of the container, the spindle might simply be grooved slightly in the plane of the wire 37.

In the course of printing, as explained, ink corresponding with the matter to be printed will be picked up by the blanket from the cylinders or supports 25 and 26, this ink appearing on the blanket at the same point during a continuous series of operations so long as the adjustment of the parts remains the same. In Figure 2 the area over which the printed matter appears on the blanket is indicated by the broken line 33. Now, if we assume that within this area a portion defined by the broken outline 34 is devoted to instructions for opening the container, i. e., corresponds with the printed area 15 on the container, the wire 31 may conveniently be arranged in direct line with this portion 34, thereby insuring proper association of the instructions 15 with the indentation 13 on the container. The wire is not inserted in the blanket until after it is noted just where the area 34 falls following any new adjustment of the blanket.

In order to avoid blurring and provide a sharp impression at the end of the printed matter, which is usually arranged to just meet or slightly overlap the beginning of the printed matter, the rubber or similar surface of the blanket is preferably cut away over a small area 35 at the end of the printing area and over a small area 36 at one or both sides of the printing area. The cut-away area 36, however, is interrupted for the space in which the wire 31 is arranged.

Referring to Figure 3, there is shown a blanket in all respects similar to that in Figure 2, except that a series of three wires 37 is provided, in lieu of the single wire 31. These wires 37 are spaced appropriately to form a series of equally

spaced indentations around the container, adjacent its closed end. The cut-away area 38 at the side of the printing area on the blanket is preferably interrupted for the entire space occupied by the wires 37.

While a preferred method and apparatus for producing containers of the type specified have been disclosed in some detail, it is to be understood that various changes may be made in both without departing from the principles and scope of the invention. The terms and expressions used herein have been employed as terms of description and not of limitation.

What I claim is:

1. In apparatus of the class described means for supporting a hollow article, a drum adjacent said supporting means, a flexible, yielding member on the surface of said drum, a rigid member extending from the face of said yielding member, and means for producing a relative rolling movement between an article on said supporting means and said yielding member.

2. In apparatus of the class described means for supporting a hollow article, a drum adjacent said supporting means, a flexible, yielding member on the surface of said drum, a rigid wire carried by said yielding member on its outer face, and means for producing a relative rolling movement between an article on said supporting means and said yielding member.

3. In apparatus of the class described means for supporting a hollow, tubular article, means for printing upon the outer surface of said article, said means including a yieldable transfer member, and means carried by said transfer member for indenting a portion of the wall of said article.

4. In apparatus of the class described means for supporting a hollow, tubular article, means for printing upon the outer surface of said article, said means including a yieldable printing blanket, and a wire carried by said blanket arranged to engage the wall of said article to indent the same.

5. In apparatus of the class described means for supporting a hollow, tubular article, means for printing upon the outer surface of said article, said means including a yieldable transfer member, and a wire carried by said member arranged to engage the wall of said article to indent the same.

6. In apparatus of the class described means for supporting a hollow, tubular article, means for printing upon the outer surface of said article, said means including a yieldable transfer member, and a series of wires carried by said member ar-

anged to engage the wall of said article to form a series of spaced indentations therein.

7. In apparatus of the class described means for supporting a hollow, tubular article, means for printing upon the outer surface of said article, said means including a yieldable transfer member, and means adapted to be retained by said member at any selected point for indenting a portion of the wall of said article.

8. In apparatus of the class described means for supporting a hollow, tubular article, means including a member having a yielding surface for applying a coating substance to the surface of said article, and means carried by said member for indenting a portion of the wall of said article.

9. In apparatus of the class described, a spindle for supporting a closed end collapsible hollow tubular article, said spindle having a beveled end for contact with the closed end of said article, means for printing upon the outer surface of said article including a printing roll, said printing roll having means cooperating with said beveled end of the spindle to indent the wall of the article.

10. In apparatus of the class described, a spindle for supporting a closed end collapsible hollow tubular article, said spindle having a beveled end for contact with the closed end of said article, means for printing upon the outer surface of said article including a printing roll, said printing roll having a rigid projection cooperating with said beveled end of the spindle to indent the wall of the article.

11. A method of producing a thin-walled, tubular, metal container of the character described which comprises rotating the container about its own axis, supporting the major portion but not all of the wall of the container internally to resist indentation thereof, moving a flexible printing blanket relative to said container in rolling contact therewith and forming an indentation in a portion of the wall of the container which is unsupported internally by the action of a rigid projection on said blanket.

12. In apparatus of the class described means for supporting a thin-walled, tubular container for rotation about its axis, said means engaging and lending support to the major portion of the wall of said container, a flexible printing blanket, a rigid projection thereon, and means for supporting said blanket and shifting the same relative to said container in rolling contact therewith.

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