Dec. 20, 1949 J. BARDASH 2,491,947

APPARATUS AND METHOD OF PRINTING

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FIG. 1

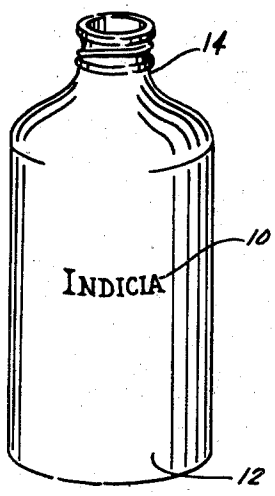


FIG. 3

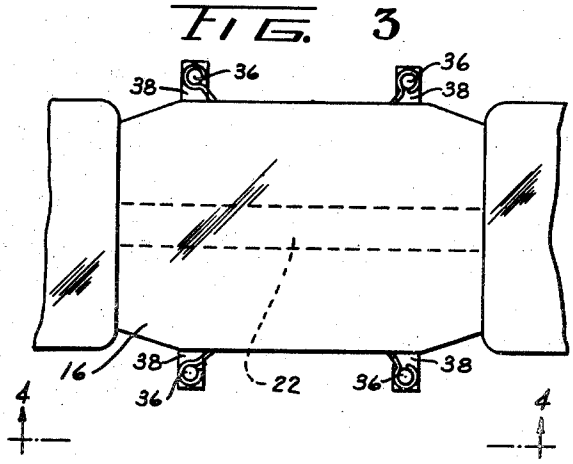


FIG. 4

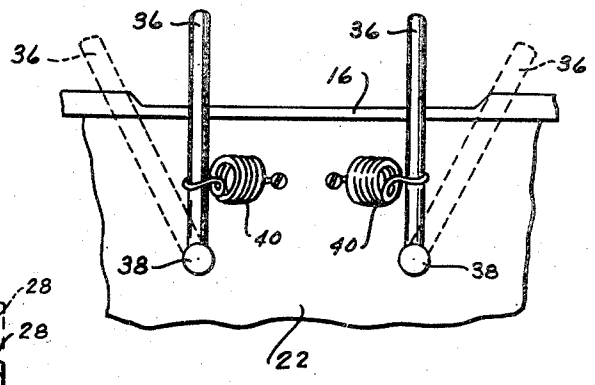
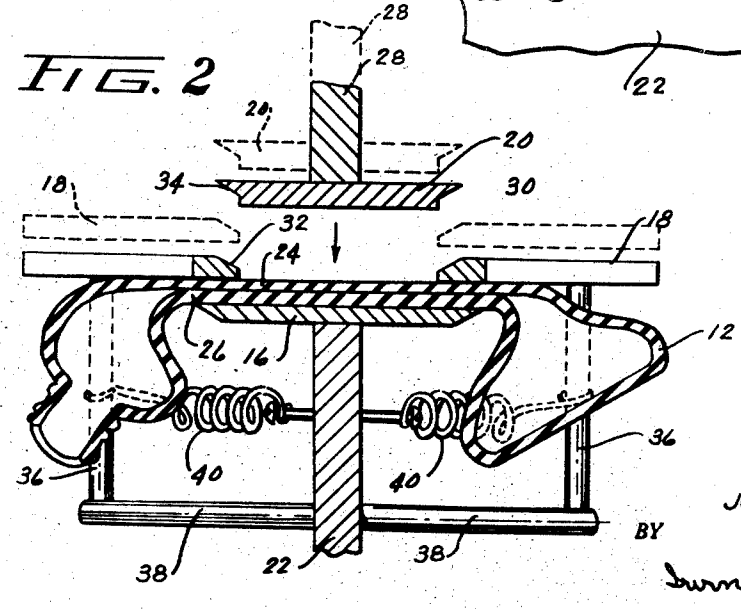


FIG. 2



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APPARATUS AND METHOD OF PRINTING

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FIG. 5

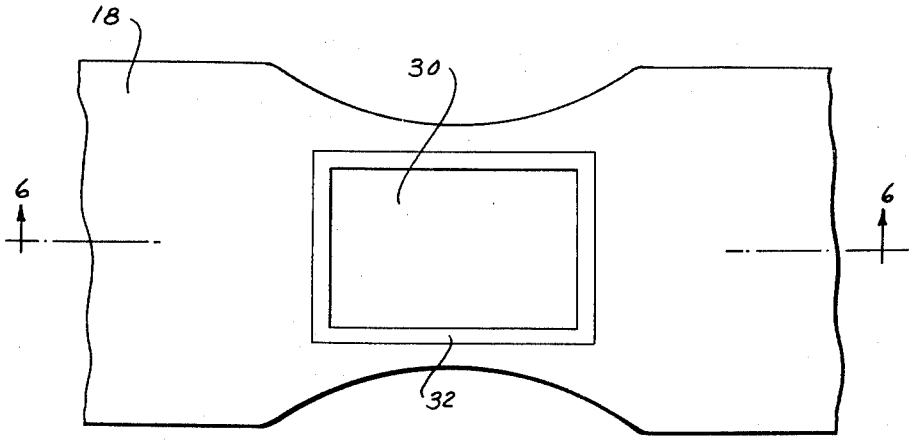
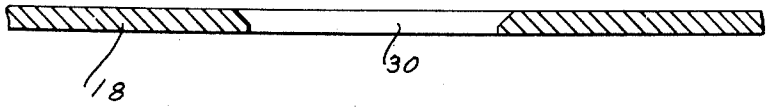


FIG. 6



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APPARATUS AND METHOD OF PRINTING

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Application June 11, 1948, Serial No. 32,353

5 Claims. (Cl. 101—35)

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The present invention relates to the method of printing indicia upon a collapsible bottle that is made from a flexible material, such as a plastic, and the jig or fixture by means of which a printing machine may be converted to practice the method.

The present invention relates primarily to a method of printing indicia on the surface of an article, which is hollow and collapsible, that is one which may be caved in upon the application of force or pressure thereto, such as a bottle, particularly one having a relatively narrow neck and which bottle is made from a plastic material, such as polyethylene.

Such bottles are flexible and will collapse upon the imposition of pressure to them. As a result, it has been difficult to inscribe on these bottles indicia, such as a trade-mark symbol, descriptions of the material contained in the bottles, instructions for use of these materials, as well as other inscriptions.

Attempts have been made to provide such indicia by securing to the articles labels on which these writings are inscribed, or by hot transfers or the like or sometimes on the caps by means of which the bottles are closed. These have not proven satisfactory because they cannot be permanently secured to the articles.

Since these articles, such as bottles, have narrow necks leading to the interior thereof, it is impossible to insert thereinto a supporting mandrill or arbor to prevent collapse of the bottle under the forces imposed thereon by the printing die.

In an attempt to provide the necessary support to prevent collapse of the bottle, attempts have been made to support the bottle against such collapse by filling the bottles with a material such as a fluid, sand or other granules. These attempts have also proven unsuccessful and up to the present time, it has been impossible to print on bottles of this character the desired indicia and therefore such bottles have been unavailable to the art although they have been highly desired.

The present invention therefore contemplates a method of printing indicia on the outside surface of collapsible articles, made from a flexible material, such as a plastic, for example a polyethylene, which comprises collapsing the article, that is causing it to cave in, on a supporting plate or platen and concurrently printing on the collapsed and supported article the desired indicia as by means of a suitable die and then releasing the pressure to permit the article to return

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to its original shape with the printed indicia inscribed on the surface thereof.

The present invention further contemplates the provision of a jig or fixture to be mounted on a printing machine for the practice of the method of this invention and which jig or fixture comprises a supporting plate or platen, a means for collapsing the article between it and the supporting plate and a printing die which is brought against the collapsed article as it is supported in position by the plate or platen to inscribe thereon the desired indicia.

The present invention still further contemplates such a jig or fixture which is provided with a means for holding the article in position on the plate or platen and which holding means is automatically adjustable to the size of the article as it is increased by its collapse under the pressure applied to it and which holding means spontaneously returns to its original position upon release of the article by the collapsing means to permit the article to flex and return into its original shape.

The present invention still further contemplates the provision of such a jig or fixture, the pressure plate of which is constructed and designed to permit the printing die to be moved into position against the collapsed article for the printing operation.

These, other and further objects and advantages of the present invention will be clear from the description which follows and the drawings appended thereto, which drawings are only in such detail as will be necessary for an understanding of my invention and in which drawings,

Fig. 1 is a perspective elevation of an article, such as a bottle, to which the present invention is applicable;

Fig. 2 is a section of a jig or fixture, according to my invention, and showing a collapsed bottle held between the pressure plate and the bottle supporting plate, with the printing die in a position of descent against the collapsed bottle;

Fig. 3 is a plan view looking down on a supporting plate according to my invention;

Fig. 4 is a partial side view on the line 4—4 of Fig. 3;

Fig. 5 is a plan view of the article collapsing plate according to my invention;

Fig. 6 is a section on the line 6—6 of Fig. 5.

Referring now to the drawings, the article upon which the desired indicia 10 is to be printed, is exemplified by the bottle 12, the neck 14 leading to the interior of which is smaller in diameter than the interior of the bottle (Fig. 1).

The bottle is flexible and therefore collapsible under pressure and is preferably formed from a plastic such as polyethylene, which although extremely desirable has not found use in the trade because no satisfactory way has heretofore been found for the permanent application thereto of indicia such as a trade-mark description or directions and the like.

In this application, I have described a jig or fixture which may be combined with a conventional printing machine, examples of which are well known in the art and one of which is broadly exemplified by the printing machine illustrated in Pat. No. 1,843,377, granted February 2, 1932, to A. M. Wickwire, Jr., although it is to be understood that this reference is in no way to be construed as a limitation.

For an understanding of my invention, it is unnecessary to illustrate or describe in detail the manner in which the stationary supporting plate 16 is mounted on the printing machine or the linkages by means of which the pressure article collapsing plate 18 and printing die 20 are moved, since these will occur to those skilled in the art upon a description of my invention.

The supporting plate, on the underside thereof, is provided with the carrying member 22 by means of which the plate is seated in a printing machine.

The bottle 10 is placed in uncollapsed condition and normal shape on the supporting plate 16 between it and the article flexing and collapsing plate 18, which in normal position has been raised, along with the printing die 20, above the supporting plate, as indicated by the broken lines of Fig. 2.

In operation, the collapsing plate 18 is brought down against the bottle 12, which is thereby clamped between it and the supporting plate 16. As the plate 18 is moved downward against the bottle 12, it flexes the bottle and collapses it against the supporting plate 16, as illustrated in Fig. 2.

This operation flattens the wall portion 24 of the bottle 12 against the wall portion 26 (see Fig. 2) on the supporting plate 16. Thus, the surface 24 on which the indicia is to be printed is held in a substantially flat immovable condition until the stamping die 20 carried by the carrying member 28, is brought down onto the surface 24 to print the indicia 10 thereon.

The pressure plate 18 is cut out at the center 30 thereof (see Figs. 5 and 6) so that the surface 24 is exposed to the printing die 20 as it is brought down thereagainst.

The edges 32 of the opening 30 are bevelled, as are the edges 34 of the die 20, in a converse corresponding direction, so that the die is immovably seated in the opening 30 upon bringing it down against the bottle.

It will be understood that the movement of the stamping die 20 lags behind the movement of the bottle collapsing and pressure or holding plate 18 so that the bottle is properly collapsed and held in position prior to the printing operation. This lag in movement need only be slight in order to give time to clamp the bottle between the plates 16 and 18 and then bring the stamping die 20 down against the collapsed bottle.

In order to properly fix the position of the bottle 12 so that the indicia 10 is uniformly printed between the sides thereof on each bottle, I mount the four holding fingers 36 in position outside of the plate 16.

Since the bottle 12 increases in width as it is collapsed under the impact of the pressure plate 18, I mount these fingers so that they will move outwardly from the normal position, illustrated by the unbroken lines of Fig. 4 by the flexing bottle 12 to the inclined outermost position illustrated by the broken lines of Fig. 4.

Each finger 36 is carried by a member 38, which member is pivoted on the carrying member 22. Each finger 36 is maintained in normal position by the contracting spring means 40, one end of which is fixed to the carrying member 22 and the other end of which is fixed to a finger 36.

Thus as the collapsing bottle 12 moves the fingers 36 outwardly, as viewed in Fig. 4, the spring means 40 are placed in tension.

After the indicia is printed on the surface 24 of the bottle 12, the printing die 20 is raised to be followed by the raising of the pressure plate 18 as by any conventional linkage.

Since the article or bottle 10 is formed from a flexible material, upon raising the pressure plate 18 therefrom, and thus releasing it from collapsing pressure, the article or bottle 12 will assume its normal unflexed and non-collapsed condition or shape, the fingers 36 returning to normal position by the contraction of the extended spring means 40, thereby assisting the return of the article or bottle 12 to normal condition.

The printed article or bottle 12 is then removed from the supporting plate 16, replaced by an unprinted article or bottle and the sequence of operations repeated.

Of course it will be understood that more than one jig or fixture of the kind here illustrated may be mounted on a printing machine and that the articles or bottles may be automatically fed onto the supporting plate 16 in position for the printing operation.

It will now be recognized that I have made it possible to print indicia on a hollow article such as a bottle, which is not rigid but which will flex and collapse under pressure by proposing a method which includes the steps of collapsing the article, supporting it in the collapsed condition, printing indicia on the collapsed and supported bottle and then releasing the bottle to enable it to return to its original shape, with the indicia printed on an exposed surface thereof.

It will be further recognized that I have provided a jig or fixture having a supporting plate and a movable pressure plate, between which plates such an article or bottle may be clamped and collapsed against the supporting plate, and held there for the printing operation.

While I have described my invention with reference to a specific form thereof, it will be understood that changes and modifications thereto may be made without departing from the spirit and scope of the invention.

I claim:

1. The method of printing on the external surface of a container having a tubular side wall, a closed bottom wall and an open neck at the top, and possessing inherent characteristics that solely maintain said container in its shape and resiliently resist deformation of said side wall, comprising the steps of placing the container between a backing member and a deforming member so that substantial end lengths of said side wall extend beyond the opposite sides, respectively, of one of said members, relatively moving said members toward each other thereby collapsing an intermediate length only of said side wall and bringing opposite wall portions thereof into

parallel contacting relation with each other without substantially deforming said bottom wall and neck of the container, holding said opposite wall portions in said parallel contacting relation with each other, printing on the outer surface of one of said opposite wall portions while the latter is held in said parallel contacting relation with the other wall portion, and relatively moving said members away from each other after printing to permit said side wall to recover its normal tubular shape.

2. The method of printing on the external surface of a hollow container having a normally self-sustaining predetermined shape and having a closed bottom, an open neck and a flexible tubular wall therebetween resiliently opposing deformation, comprising the steps of placing the article in position in which said wall is disposed against backing, pressing an apertured member against an intermediate length only of said wall and thereby moving said wall length inwardly of the article toward said backing to a definite position in which the latter prevents further inward movement of said wall length, printing on said wall length exposed in the aperture of said member, while said wall length is in said definite position, and releasing said apertured member from said walls to allow the latter to regain its normal tubular shape.

3. The method of printing on the external surface of a hollow container having a normally self-sustaining predetermined shape and having a closed bottom, an open neck and a flexible tubular wall therebetween resiliently opposing deformation, comprising the steps of placing the article in position in which said wall is disposed between a backing and an apertured member relatively movable toward and away from each other, relatively moving said backing and member toward each other to press opposed portions

of an intermediate length only of said wall toward each other to a definite position in which said opposed wall portions are pressed against each other, printing on the opposed wall portions exposed in the aperture of said member while said wall portions are in said definite position, and relatively moving said backing and member away from each other to allow said wall to regain its normal tubular shape.

4. In apparatus for printing on a hollow container having a closed bottom, an open neck and a tubular wall therebetween resiliently resisting deformation, the combination of a support member, a frame member, means for relatively moving said members toward each other to flatten an intermediate length only of the tubular wall of an article placed therebetween, and a printing die movable against the exposed portion of the flattened article wall in said frame member, one of said members being provided with opposite recesses to clear the non-flattened end lengths of the tubular wall of a flattened article between said members.

5. The combination in printing apparatus as set forth in claim 4, further comprising spaced outwardly yielding means between which an article is with its tubular wall guided into correct position between said members.

JOSEPH BARDASH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
141,542	Burnet et al.	Aug. 5, 1873
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1,879,964	Whitlock	Sept. 27, 1932