Oct. 31, 1933. G. MEYER-JAGENBERG 1,933,180

METHOD AND APPARATUS FOR FORMING CLOSURES FOR PAPER CONTAINERS

Filed Dec. 6, 1932 2 Sheets-Sheet 1

Fig. 1.

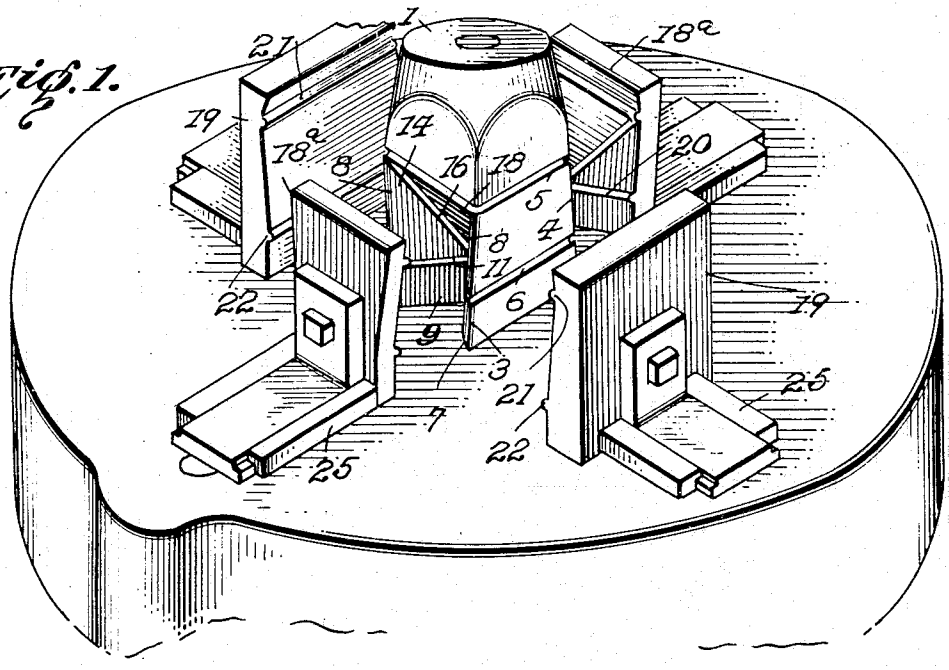
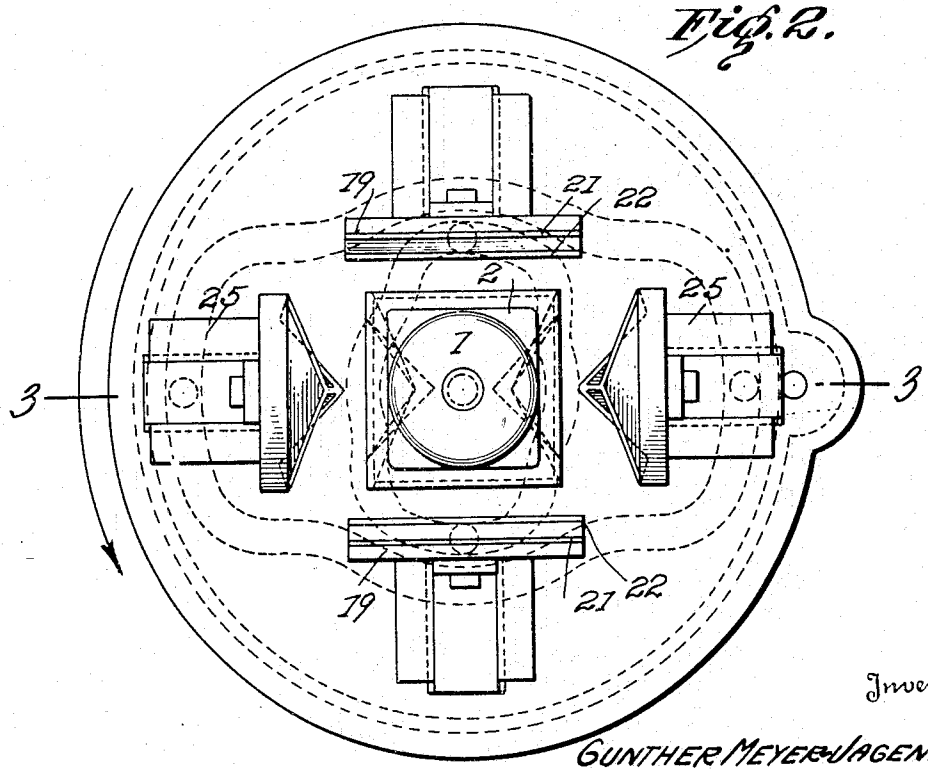


Fig. 2.



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Fig. 3.

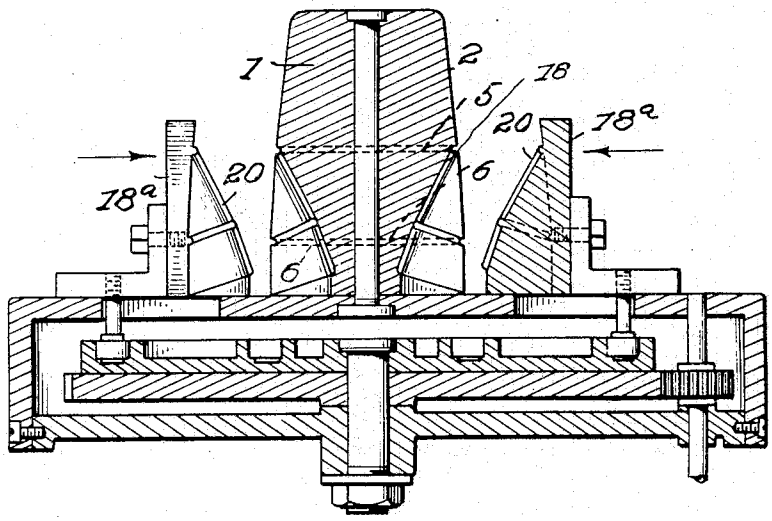


Fig. 4.

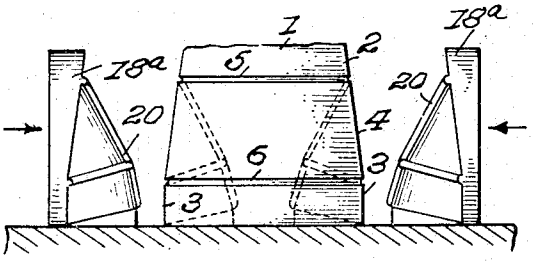


Fig. 5.

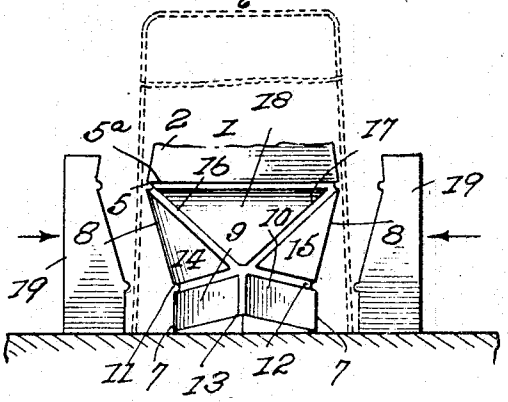


Fig. 6.

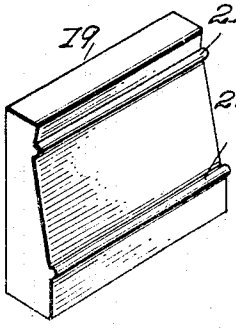


Fig. 8.

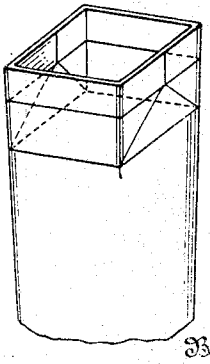
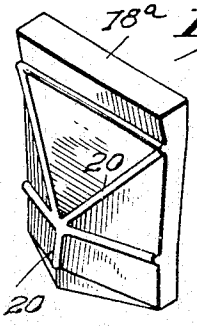


Fig. 7.



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METHOD AND APPARATUS FOR FORMING CLOSURES FOR PAPER CONTAINERS

Günther Meyer-Jagenberg, Dusseldorf, Germany

Application December 6, 1932, Serial No. 645,988, and in Germany December 7, 1931

7 Claims. (Cl. 93—36)

This invention relates to improvements in a method and apparatus for creasing the upper portion of paper containers to permit convenient closing of the container when in use.

In my former applications for patents Serial Nos. 440,354, filed Mar. 31, 1930, and 573,188, filed Nov. 5, 1931, I described and claimed a method and apparatus for forming closures for containers, and a container. In these applications I described a method and apparatus involving the use of dies and molds operating in conjunction with a flat block, shaped in cross section to correspond with the body of the container, and so creased and pressed the paper on the block as to disrupt the fibers and hence destroyed the resiliency. Thus when the closure creases were formed, the mouth of the container was more or less closed and when wanted for use it was necessary to force the mouth open. Furthermore according to the previous process it was necessary to insert the forming block in the container from the top, and then bring the dies into operation on top of the block and thereafter remove the block, steps which entailed loss of time in manufacture.

According to the present invention the cooperative pressure and movement of the die and mold with reference to each other is such as to enable me to obtain the desired creases for folding without destroying the fibers of the paper, hence retaining substantially the original resiliency of the paper, so that when the operation is completed the mouth of the container is open, thus making the interior of the container readily and quickly accessible.

A further object of the invention is to provide means for quickly producing paper containers with creases to form a closure, to thereby expedite the manufacture and materially reduce the cost. These advantages are paramount in the manufacture of an article of this character when it is borne in mind that the containers are used but once, and then thrown away, hence economy in production and convenience in handling become important.

The invention also comprehends improvements in the details of construction and arrangement of parts which will be hereinafter described and particularly pointed out in the claims.

In the accompanying drawings:

Fig. 1 is a conventional perspective view of a machine for carrying out the invention.

Fig. 2 is a plan view of the same.

Fig. 3 is a sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a side elevation of the die and molds, one of the latter being omitted to illustrate the face of the die.

Fig. 5 is a similar view taken at right angles to Fig. 4.

Fig. 6 is a detail perspective view of one of the mold sections.

Fig. 7 is a similar view of one of the companion mold sections.

Fig. 8 is a detail perspective view showing a cup creased by the molds and die.

In the drawings 1 indicates a fixed die, substantially square in outline in plan view and formed at its upper end with a bevel 2 to readily permit of a container having an open end to slip over the top of the die. In side elevation in one dimension, the die has vertical edges 3 at the bottom and then tapers toward the top as at 4, and joins the bottom of the bevel. On these side faces are upper and lower horizontal grooves 5 and 6, the groove 6 being at the meeting edges of the vertical edges 3 and the lower end of the bevel edges 4, while groove 5 is at the juncture of the bevel 2 and the upper end of the side tapered edges 4. The two opposite faces of the die are alike, but the outline at the edges differ materially from the outline of the companion faces previously described. That is to say, the lower edge walls are vertical, as at 7, and incline upwardly as at 8, and join the bottom of the bevel 2. From the lower corners of the vertical walls 7, and for a width corresponding to the height of the grooves 6, the face of each elevation of the opposite sides referred to, incline inwardly and upwardly toward the centre as indicated at 9 and 10, and above the upper edges of these inclined faces are grooves 11 and 12, and a center groove 13 extends downwardly from the apex of grooves 11 and 12. From the edges 8, and following the grooves 11 and 12, the face of the die inclines inwardly toward the center as shown at 14 and 15 to the apex of the grooves 11—12 and 13. This inclination is defined by grooves 16 and 17 extending from the apex of grooves 11—12 and 13 upwardly and outwardly and joins grooves 5a in alignment with grooves 5 on the first described faces. The surface 18, on each opposite face between the confines of the grooves 5a—16 and 17 while flat is at a different angle from the surfaces each side of the grooves 16 and 17.

Cooperating with the die are two pairs of molds or presser plates, 18a—18a and 19—19,

operated to slide to and from the die, by mechanism to be described. The face of each mold section 18a corresponds exactly with the adjacent face of the die, and is provided with ribs 20 to fit in the grooves described. Correspondingly the face of each mold, section 19, corresponds exactly with the adjacent face of the die, and is provided with upper and lower ribs 21 and 22 to fit in the grooves 5 and 6.

The mold sections operate in suitable guideways 25, and are reciprocated by suitable cams actuated by connections from a power shaft.

The cams are so timed as to first move the molds 18a inwardly toward the die to bend and crease the angular faces of the closure top, and about the time this operation is completed, the molds 19 come into play and form the horizontal creases in the opposite sides of the paper.

The pressure exerted by the molds, while amply sufficient to bend the paper, is such as will not disrupt the fibers, and at the same time the resiliency of the paper is preserved.

In operation a container, either square in cross section or with a tapered body as disclosed in my previous applications, is placed over the die, as shown in the drawings, and the mold sections are advanced against the walls of the container below the top of the die. In this manner the closure creases are formed and it will be noted that this formation takes place without flattening the paper, as in my previous applications. When the mold sections are withdrawn, because of the light pressure necessary to obtain the desired result, the resiliency of the paper is preserved and the mouth of the container remains open. However, the pressure at the top of the die is quite sufficient to form a fixed square outline to shape the container when the invention is used in making the body of the containers either square or of tapered form.

Usually containers of this type are paraffined to render them waterproof, and when the invention is used on this type of containers, the pressure required is more or less just sufficient to disrupt the paraffin in forming the creases. However, the use of the invention is not limited to containers so coated, as equally advantageous results are obtained when creasing plain paper.

The molds and die may be heated, if desired, in any appropriate manner.

What I claim is:

1. The method of preparing stiff paper containers, which consists of placing a container over a die of less dimensions than the finished container, the container being arranged to have a closure extension portion extending lengthwise of the die, folding the blank extension by pressure against the sides of the die to form the closure to provide fold lines along which the paper is readily bendable, removing the pressure from the die and finally removing the container from the die.

2. That method described in claim 1 wherein the pressure forming the folds is only sufficient to form creases without materially disrupting the fibers of the paper.

3. An apparatus for forming closure folds in containers comprising a die formed with a series of angular depressions on opposed faces, mold sections having angular faces corresponding to the angular faces on opposed faces of the die, the faces of the other opposed faces having upwardly inclined surfaces with horizontal crease forming lines at the top and bottom of said surfaces, and means, when a container is placed over the die, for advancing the mold sections toward the die to form fold lines in that portion of the container confined between the mold sections and die.

4. An apparatus described in claim 3, wherein the top of the die is exposed to receive an open mouth container to be creased to form closure folds.

5. An apparatus described in claim 3, including mechanism for first advancing the opposed mold sections having the angular depressions, and mechanism for thereafter advancing the other mold sections to form the horizontal creases.

6. An apparatus for forming closure folds in containers comprising a die having its outer end exposed and formed with a plurality of opposed faces and mold sections corresponding to the faces on the die, cooperating depressions and corresponding ribs formed on the faces of the die and the faces of the mold sections, and means, when a container is placed over the exposed end of the die, for advancing the mold sections toward the die to form fold lines in that portion of the container confined between the mold sections and die.

7. An apparatus for forming closure folds in containers comprising a die formed with a plurality of faces having depressions, a plurality of mold sections having ribs corresponding to the depressions in the faces of the die, means for first advancing oppositely disposed mold sections toward the opposite faces of the die, and means for thereafter advancing other oppositely disposed mold sections toward other opposite faces of the die to thereby first form creases in opposite sides of a container and subsequently form creases in other opposite sides of a container.

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