Nov. 24, 1936. G. MEYER-JAGENBERG 2,061,967

METHOD AND APPARATUS FOR FORMING CONTAINER CLOSURES

Filed Jan. 7, 1936 3 Sheets-Sheet 1

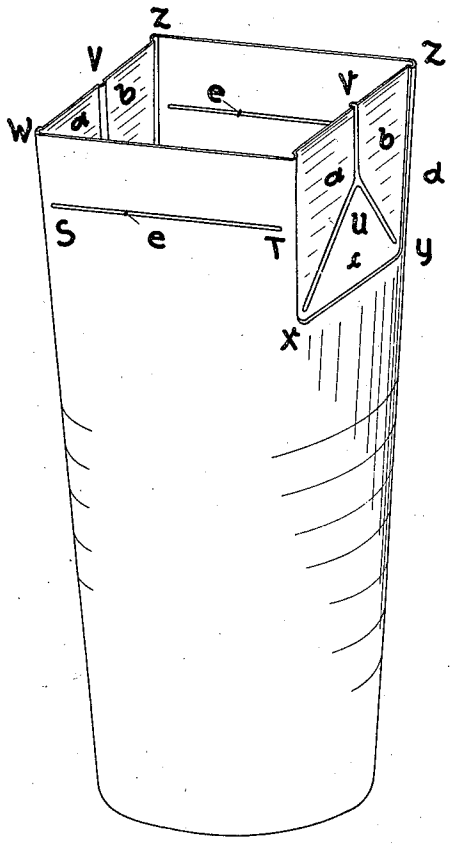


Fig. 1

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Filed Jan. 7, 1936 3 Sheets-Sheet 2

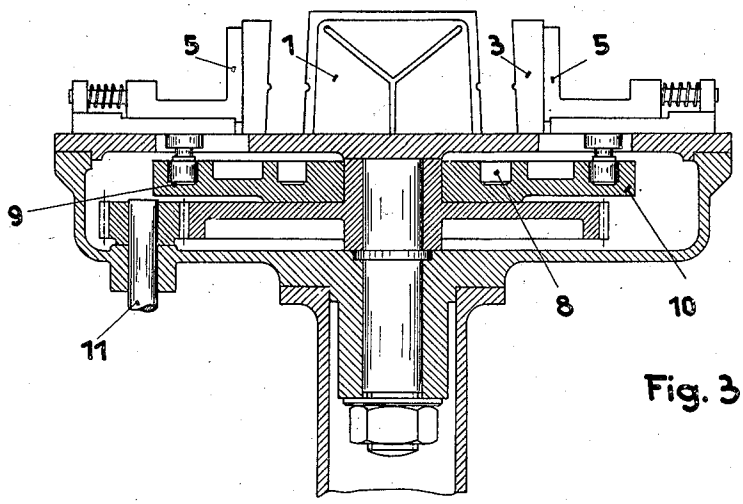


Fig. 3

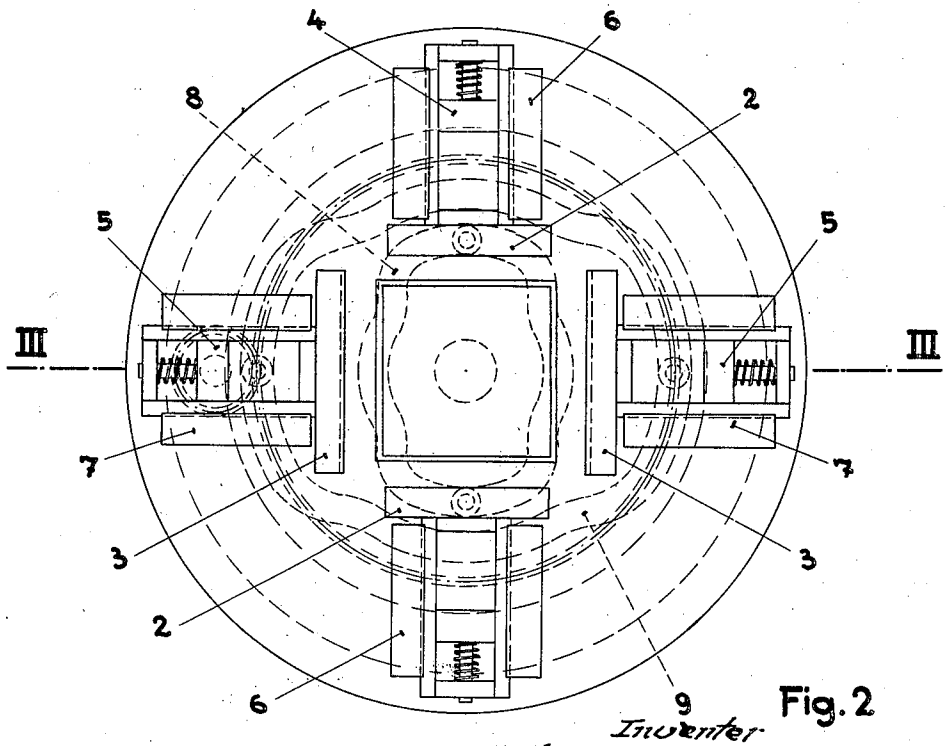


Fig. 2

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METHOD AND APPARATUS FOR FORMING CONTAINER CLOSURES

Filed Jan. 7, 1936 3 Sheets-Sheet 3

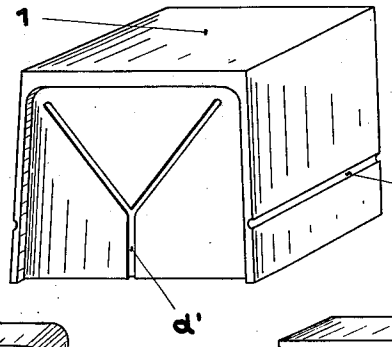


Fig. 6

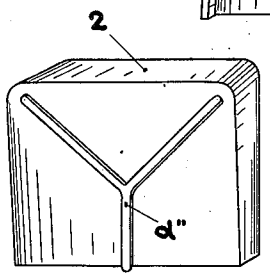


Fig. 7

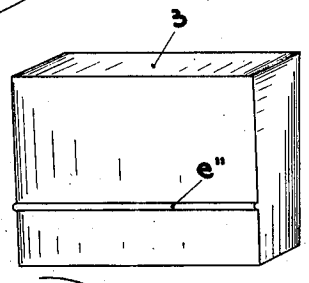


Fig. 8

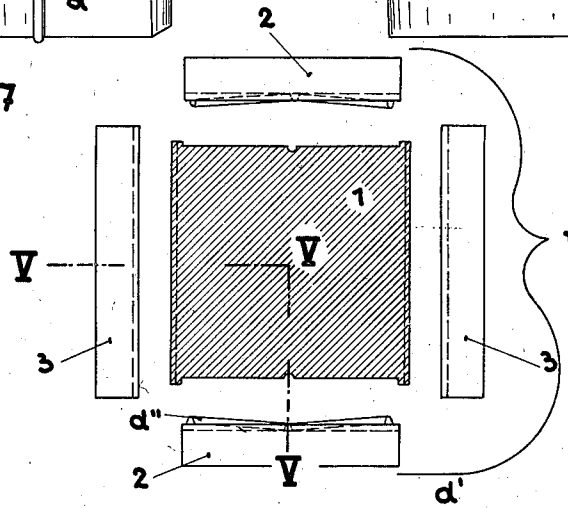


Fig. 4

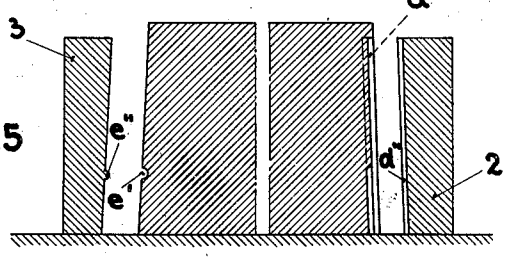


Fig. 5

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2,061,967

UNITED STATES PATENT OFFICE

2,061,967

METHOD AND APPARATUS FOR FORMING CONTAINER CLOSURES

Günther Meyer-Jagenberg, Dusseldorf, Germany

Application January 7, 1936, Serial No. 58,011
In Germany January 8, 1935

8 Claims. (Cl. 93—36.8)

This invention is directed to a process and apparatus for forming the open end of an otherwise closed paper container to provide for convenient and ready folding of such upper end to insure the conventional closure wherein the sides are infolded over the inwardly angled ends.

The type of fold employed is more or less conventional in the angular adjustment and sequence of movement of the various parts, and provision has heretofore been made to more or less predetermine the line of fold by weakening or scoring the respective parts to direct the fold. However, where, as is the generally accepted procedure, the walls of the container have been impregnated with wax or other waterproofing material, such walls have as a result been so appreciably stiffened that folding, even along the predetermined lines, has become a matter of difficulty.

The primary object of the present invention is to form the respective opposed ends of the respective folds of the container on planes inwardly offset from the normal plane, and further forming such ends with inverted Y-shaped grooves depressed into the surfaces of the ends relative to the outer surface thereof; the sides of the folded portion having similar grooves or depressions on lines transverse the container and in definite relation to the end grooves to facilitate the folding operation.

A further object of the invention is the provision of an apparatus whereby the inward offsetting of the ends of the area to be folded and of the formation of the sides and ends with the defined grooving may be effected in a single operation; with such apparatus involving a central appropriately formed die over which the folding area of the mouth of the container is placed, together with pressing blocks appropriately cooperating with the ends and sides of the die through the interposed material to simultaneously complete the formation, the pressing blocks being simultaneously removable into and out of operation.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of a conventional form of container, with the end to be folded to form the closure made up according to the present invention.

Figure 2 is a plan of the apparatus for forming the folding sections of the present invention.

Figure 3 is a section of the line III—III of Figure 2.

Figure 4 is a plan of the die and cooperating pressing blocks, the parts being shown separated and the die being in horizontal section.

Figure 5 is a vertical section on the line V—V of Figure 4.

Figure 6 is a perspective view of the die.

Figures 7 and 8 are perspective views respectively of the end and side pressing blocks, the views being taken to show their operative faces.

The invention is here illustrated as applied to a more or less conventional type of paper or like container in which the lower end is circular or oval, the main length of body wall rounded, and the upper end substantially rectangular, which upper open end is designed to have its end portions infolded on reentrant angles to bring the side portions into substantial contact, the side portions folded down upon themselves to complete a conventional closure. Ordinarily the ends and sides are scored or marked to guide the line of fold, but where the container as a whole is impregnated with wax of other water-proofing material, as is usually the case, the indicated lines of fold are so stiffened by the water-proofing material as to be of little value in indicating a folding operation or in facilitating such operation, and thus folding becomes more or less difficult.

In carrying out the method, the sections *a*, *b*, *c*, hereinafter termed the end sections of the closure, are bodily pressed inwardly to normally rest as an entirety in a plane inwardly of the normal plane of these portions of the closure. These inwardly offset end portions are embossed to form channels *d* which are of inverted Y-form and depressed relative to the outer face of the end. The leg of the Y-form depression extends from the upper edge of the end vertically and centrally thereof to a point approximating the center of such end, the branches of the Y extending from the lower end of the leg to the opposite lower edges of the end but terminating short of the margins of the depressed portion.

Thus, the inwardly offset ends of the fold, outlined by the lines W—X, X—Y, Y—Z, and Z—W, have an inverted Y-shaped channel, the meeting lines of which join at the point U. The side walls of the closure are also formed at an appropriate point with a groove or channel *e*, depressed with respect to the outer face of the side, and extending transverse the container from the point S to the point T. The line of the depression *e* is approximately on the same horizontal plane as the point U, to facilitate forming the creasing lines along the length S—T in folding the closure.

The apparatus provided for carrying out the

method includes a die 1 and pressing blocks 2 and 3, each of which latter is of course in duplicate. The die 1 is formed on the faces cooperating with the ends of the closure of the container with an inwardly offset area constituting substantially the full area of the ends of the die except for a narrow margin. This inwardly offset face is formed with a recess or channel d' corresponding to the channel d to be formed in the ends of the closure. The side walls of the die have a depressed groove or channel e' to form the groove e in the closure.

The pressing blocks 2 for cooperating with the ends of the die to form the ends of the closure have a pressure face sized to cooperate with the inwardly offset face of the ends of the die and a rib d'' to accurately cooperate with the groove or channel d' in the ends of the die. The pressing blocks 3 are plain except for a transverse rib e'' positioned to cooperate with the groove or channel e' in the side faces of the die.

The dies and pressing blocks are supported upon a base or table, the die being centrally arranged thereon; the end pressing blocks 2, positioned to cooperate with the ends of the dies, are connected to slides 4 movable between guides 6; and the side pressing blocks 3, positioned to cooperate with the sides of the die, are connected to slides 5 movable between guides 7. Rotatable beneath the base or table is a cam plate 10 having cam grooves 8 cooperating with roller pins depending from the end pressing blocks 2, with the cam plate having an additional cam 9 to cooperate with roller pins depending from the presser blocks 3 or the slides 5 carrying such blocks. A power shaft 11 acting through appropriate gearing drives the cam plate 10 and the respective cam grooves 8 and 9 are so formed that the pressing blocks 2 are first moved toward the die and when the movement of the blocks 2 is nearly complete, the movement of the blocks 3 is inaugurated.

The open upper end of the otherwise completed container is positioned over the die, in proper relation thereto, and the cam disk operated to insure the appropriate described operation to complete the described formation of the respective ends and sides of a closure part of a container. If desired and to facilitate the folding operation, the parts may be heated through any appropriate electrical or other heating means, which is entirely conventional and not necessary to illustrate. Of course, the form of the container, otherwise than with respect to that portion thereof forming the closure, is wholly immaterial, and all possible and permissible forms of container are to be considered within the scope of this invention.

The invention is to be distinguished from heretofore proposed constructions wherein, for example, a forming block is placed within and designed to fill the container and to have the closure ends initially folded over this block to provide a folding guide for later use. This construction is objectionable as it requires the opening of the container after initial folding and the removal of the forming block, necessitating a troublesome and extended operation. Another known method involves the use of a forming block inserted into the container against which the walls of the closure are pressed, with the forming block providing folding lines of weakness. In this method, there is initial folding of the closure, and after the forming parts are removed, there is a tendency in the closure to assume at least a partially folded position. This is highly objectionable, particularly where the containers are to be used in an automatic filling machine or are to be disposed in nested relation for single withdrawal in use.

What is claimed to be new is:

1. A step in the method of forming the walls of an infolding closure of containers, consisting in offsetting the ends of the closure section bodily inwardly in flat relation.

2. A step in the method of forming the walls of an infolding closure for paper containers, consisting in arranging the ends of the closure on planes inwardly of and substantially parallel with the normal plane of the container.

3. A method of forming the walls of an infolding closure for containers, consisting in offsetting the end portions of such closure bodily inwardly in flat relation and forming in the inwardly offset ends an inverted Y-shaped channel.

4. A method of forming the walls of an infolding closure for containers, consisting in offsetting the end portions of such closure bodily inwardly in flat relation and forming in the inwardly offset ends an inverted Y-shaped channel, with the ends of the branches of the channel terminating short of the offset end portions.

5. An apparatus for forming an infolding end closure for containers, including a die over which the closure end is to be placed, and pressure blocks cooperating with the ends and sides of the die through the interposed container, the ends of the die being recessed to a substantially uniform depth to present a flat bottom and the pressure blocks cooperating therewith fitting within the recess to bodily offset the ends of the closure against the flat bottom to an extent permitted by the depth of the recess with respect to the normal plane of the container.

6. An apparatus for forming an infolding end closure for containers, including a die over which the closure end is to be placed, pressure blocks cooperating with the ends and sides of the die through the interposed container, the ends of the die being recessed for a substantially uniform depth to present a flat bottom and the pressure blocks cooperating therewith fitting within the recess to bodily offset the ends of the closure to an extent permitted by the depth of the recess, the offset portions being flat and in planes substantially parallel to the normal plane of the container, and cams for moving the pressure blocks into cooperation with the container walls overlying the die.

7. An apparatus for forming an infolding end closure for containers, including a die over which the closure end is to be placed, pressure blocks cooperating with the ends and sides of the die through the interposed container, the ends of the die being recessed for a substantially uniform depth to present a flat bottom and the pressure blocks cooperating therewith fitting within the recess to bodily offset the ends of the closure to an extent permitted by the depth of the recess, the offset portions being flat and in planes substantially parallel to the normal plane of the container, and cams for moving the pressure blocks into cooperation with the container walls overlying the die, said cams operating to move the pressure blocks forming the ends of the closure in advance of the pressure blocks forming the sides of the closure.

8. An apparatus for forming an infolding end

closure for containers, including a die over which the closure end is to be placed, and pressure blocks cooperating with the ends and sides of the die through the interposed container, the ends of the die being recessed for a substantially uniform depth to present a flat bottom and the pressure blocks cooperating therewith fitting within the recess to bodily offset the ends of the closure to an extent permitted by the depth of the recess, the offset portions being flat and in planes substantially parallel to the normal plane of the container, the walls of the die and the faces of the pressure blocks being formed to depress channels in the ends and side walls of the closure portion of the container.

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