

May 12, 1959

H. F. PHILLIPS

2,885,933

DEVICE FOR FORMING SPOUT STRUCTURE IN CARTON BLANKS

Filed Oct. 21, 1952

Fig. 1.

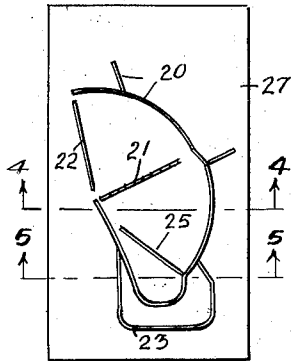


Fig. 2.

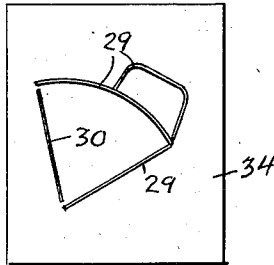


Fig. 4.

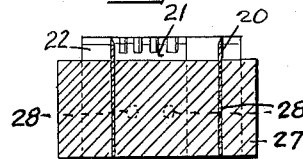


Fig. 5.

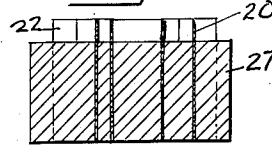


Fig. 3.

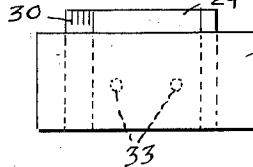


Fig. 6.



Fig. 9.

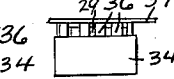


Fig. 6.

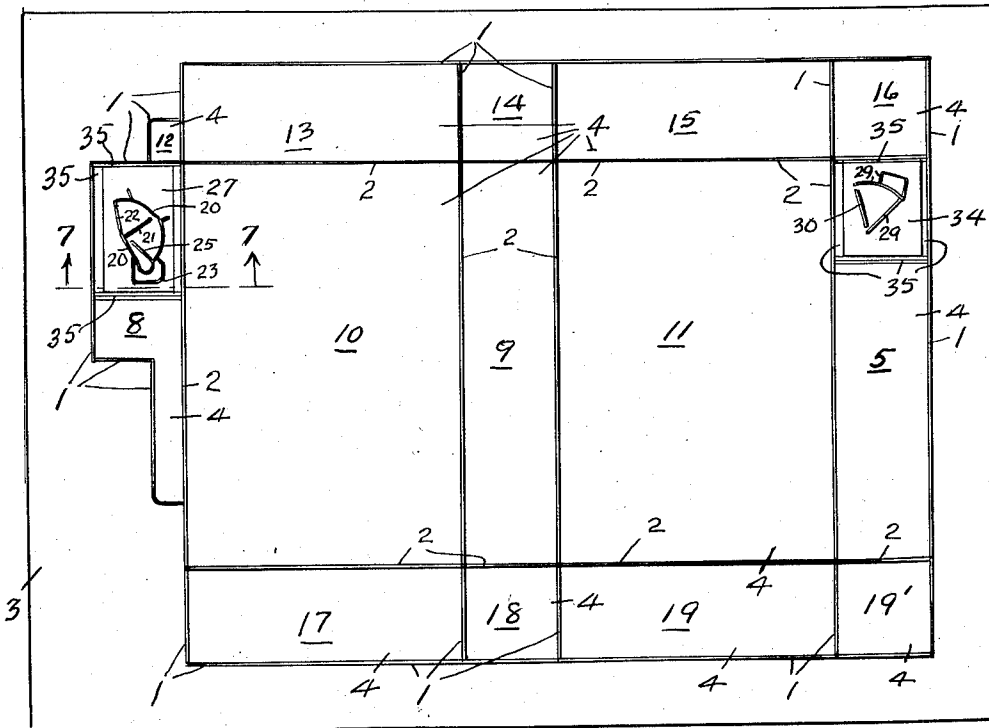


Fig. 7.

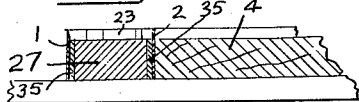
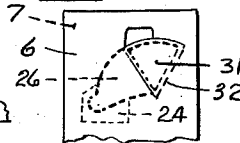


Fig. 10.



INVENTOR.
HENRY F. PHILLIPS
BY

Boyer, Mohler & Beckley
ATTORNEYS

1

2,885,933

DEVICE FOR FORMING SPOUT STRUCTURE IN CARTON BLANKS

Henry F. Phillips, Oakland, Calif., assignor to The Flo-Seal Corporation, Portland, Oreg., a corporation of Delaware

Application October 21, 1952, Serial No. 315,896

3 Claims. (Cl. 93—58)

This invention relates to means for forming pouring spout structure in carton blanks, and has for one of its objects the provision of means for economically forming uniformly accurate spout structure in carton blanks so that the fabrication of such structure is commercially practicable.

In the formation of pouring spout structure in cartons, where such structure involves the formation of a convenient pouring opening, spout and a closure for such opening, it is usual for at least two layers of sheet material to be employed so that a portion of one layer will form a closure for the opening that is provided in the other layer. Obviously a spout is also provided at the opening. When the layers are brought together, and this is normally done with automatic machinery, certain features on the different layers must be in registration or in a uniformly accurate relation to each other or the spout structure will be inoperative.

Heretofore, and at present, in the making of cartons, it has been and is the practice to make a die for the desired carton. The die usually is formed of flat pieces of wood having the desired contours for holding cutting and creasing rules between the edges of different pieces when said pieces are co-planar. The rules project from the upper side of the die that is formed and the blank to be cut and creased is positioned over the upwardly projecting edges of the rules. Upon pressing the blank against said edges by conventional means, the blank is cut along lines where it engages the cutting edges of the cutting rules and it is creased where it is in engagement with the creasing rule. Rules may also be incorporated in the die for scoring and for perforating.

The desirability of forming pouring spouts in cartons has been known for many years. The attempts to form such spout structure in the cartons have followed the obvious course of attempting to cut and fit small pieces of wood together with the desired rules in the forming of the carton die so that the spout structure would be formed at the same time the sheet material was blanked out for the carton. The result was a quite intricate localized assembly of rules and blocks or pieces at points in the die that were designed to form the spout structure.

In practice, dies as above described that provided for spout structure in blanks might perform satisfactorily for making a few hundred or for several thousand blanks, but after a relatively short run the spout structures formed in the blanks would no longer have the exact registration required, when the cartons were formed from said blanks, with the result that the spout structures became more and more difficult to operate and would soon become inoperative.

Inasmuch as practical economy dictated the use of the carton forming dies along conventional lines, as already described, the commercial production of cartons having pouring spout structure has heretofore ceased due to the fact that a uniformly accurate formation of spout structure for the normal life of the conventional carton forming dies has not been possible prior to the present time.

2

With the present invention, the formation of such spout structure has been made possible without any substantial increase in the cost of making the cartons and without modifying the conventional manner of making the main carton forming die.

Other objects and advantages will appear in the description and in the drawings.

In the drawings:

Fig. 1 illustrates a plan view of one element of a spout forming device.

Fig. 2 is a plan view of another of the elements of a spout forming device.

Fig. 3 is an edge or elevational view of the device of Fig. 2 as seen from the near or lower edge of said device, is illustrated in Fig. 2.

Fig. 4 is a sectional view of the spout forming element of Fig. 1 as seen from line 4—4 of Fig. 1.

Fig. 5 is a sectional view of the device of Fig. 1 as seen from line 5—5 of Fig. 1.

Fig. 6 is a reduced size plan view of a conventional carton forming die having the devices of Figs. 1 and 2 incorporated therein.

Fig. 7 is a fragmentary sectional view taken along line 7—7 of Fig. 6.

Fig. 8 is a reduced size plan view of the spout forming device of Fig. 2 illustrating (in connection with the device of Fig. 2) the usual means employed in blank cutting devices for freeing the blank from the cutters after a cutting operation.

Fig. 9 is an edge view of the device of Fig. 8 with a blank supported in position for cutting.

Fig. 10 is a reduced size elevational view showing the spout structure in a finished carton with the parts formed by the devices of Figs. 1 and 2 in correct registration with each other.

Before explaining the drawings and the invention in detail, it is to be clearly understood that the drawings and description are not to be considered as being restrictive to the specific spout illustrated and as hereinafter described.

The drawings and detailed description are intended to be illustrative only, inasmuch as different spout structures would have different arrangements for the cutting and creasing rules. Also, the spout structure could be formed in layers of sheet material to be secured into a carton. It may also be noted that in cartons to be provided with pouring openings in one layer and a closure in another, it is quite often essential that exact registration between structural features in such layers be maintained, and under such circumstances the present invention could be employed.

In detail, referring to Fig. 6, it is customary in the cutting and creasing or scoring of blanks for cartons, to provide a die having cutting rules 1 and creasing rules 2 that are supplied vertically in the desired relationship within a wooden frame 3 by blocks 4 of wood. The frame itself may be formed of blocks held together in any suitable manner and the blocks 4 are fitted together in much the same manner as a jig-saw puzzle with the cutting and creasing rules tightly held between them and spacing them apart the thickness of said rules.

Fig. 6 shows such a die, the particular arrangement of rules 1 and 2 being such that the space 5 defined by the rules 1, 2 at one end of the die will form the outer layer 6 (Fig. 10) of a sealing flap that will overlie and be secured to an inner layer 7 (Fig. 10) and which inner layer will have the shape of the space 8 (Fig. 6) that is defined by the rules 1, 2 at the other end of the die. The two flaps so formed will form one of the two opposed side walls of the carton when said flaps are secured together. The outline of space 9 defined by rules 2 in the center of the die

will provide the other of such two opposed side walls and the spaces 10, 11 defined by rules 2 at opposite sides of space 9 correspond in outlines to those of the remaining two sides of the carton, while the rules 1 and 2 along the upper and lower edges of spaces 5, 8, 9, 10 and 11 that define the outlines of spaces 12 to 19 and 19' inclusive will form the top and bottom closure flaps for the carton.

As already stated, the die, as described, for forming a carton blank is conventional and such dies are quickly and easily fabricated inasmuch as the flaps, side, and end walls are usually relatively large and rectangular and the wooden blocks used to support the rules are easily made and fitted and will securely hold the rules in place. It is, of course, understood that the die is supported on a flat bed so that the necessary pressure on a sheet of cardboard overlying the substantially coplanar and upwardly projecting edges of the rules for cutting and creasing the sheet, will not dislodge or move the rules in direction away from such pressure. The bed will support the rules and the other elements of the die.

The usual and obvious method that has heretofore been attempted in dies where spout and closure structure is desired, has been to support cutting and creasing rules in the same manner as the rules 1 and 2, namely; by forming the rules to the desired shape and then attempting to form wooden blocks to hold the rules in place. Such structure has been unsatisfactory for the reason that the spout cutting and creasing rules gradually shift relative to each other and to the cutting and creasing rules that form the carton blank so that the spout elements formed on one portion of the blank will be out of register with the spout element formed on another portion that overlies or that underlies the first portion.

The obstacles to the conventional method of forming spout structure in carton blanks has been overcome by providing devices of the general character shown in Figs. 1 to 5. These are illustrative of devices for forming one spout structure and closure, and obviously a closure and spout structure or pouring opening of another shape and character would have the rules differently arranged.

In Fig. 1 the cutting rules 20 are arranged to define the outline of a portion of the blank that is to constitute a generally V-shaped pouring spout and a slot cutting rule 21 is positioned to form slots along the apex of the V to facilitate the bending of the material of said spout along the row of slots formed by said rule 21. Rule 22 is a creasing rule and defines the folding crease in the blank along which the spout is secured to the portion 7 (Fig. 10) of said blank, while cutting rule 23 functions with rule 20 to cut out a part 24 (Fig. 10) of the blank that is at one end of the spout portion so the latter will be free from the material of the blank when the spout is pulled or drawn through an opening in the outer layer 6 of the blank. Rule 25 (Fig. 1) is also a creasing rule one function of which is to shrink or draw the part 26 of the spout away from the surrounding material so as to facilitate the ultimate forming of the spout.

Each of these rules 20, 21, 22, 23, 25 may be formed with one or more openings 26 (Fig. 4) and the said rules are rigidly held in a body 27 of metal, plastic or other material that is cast or molded about them, with the exception of their cutting or creasing edges and their marginal portions along said edges as seen in Figs. 3 to 5 inclusive, and which material will pass through the openings 26 to lock the rules in place.

By the above structure the spout forming elements and body 27 are virtually integral and no possible change in position can occur between the various rules in each spout forming device.

The body 27 is preferably rectangular and of the same thickness as the blocks 4 and frame 3. Also the body 27 is preferably of a width that will permit it to be positioned between the rules of the die for the blank at the point where it is to be positioned, and said rules preferably extend completely through the body 27 so that their

edges that are opposite the cutting and creasing edges will be firmly supported on the bed that supports the die. Thus the downward force against the cutting and creasing edges of the rule will be directly transmitted from the rule to the bed.

Figs. 2 and 3 show the device for forming the closure for the pouring opening and to which closure the spout that is adapted to be formed by the device of Fig. 1 is glued. This device has cutting rules 29 and a slotting rule 30 and, as seen in Fig. 10, they function to form a generally triangular piece 31 with the row of slots 32 (formed by the slotting rule 30) being along the line about which said piece is adapted to swing.

These rules 29, 30 are each provided with openings 33 (Fig. 3) that correspond with the openings 26 in the rules that are held in the body 27, and which openings are for the same purpose. Said rules 29, 30 are rigidly held in a body 34 that is preferably rectangular and that is of a width suitable for positioning between the die rules where desired.

Fig. 6 shows the body 27 and body 34 which may be called "inserts," positioned at opposite ends of the carton formed die and they are so positioned that when the carton blank is formed, they will form the spout and closure structures in the end sealing flaps 6, 7 that in turn form one of the walls of the carton when the carton is set up and said flaps are secured together as shown in Fig. 10.

From Fig. 10 it will be seen that the registration between the spout structure formed by the device of Fig. 1 and the closure structure formed by the device of Fig. 2, must be in precise relationship to each other when flaps or layers 6, 7 are secured together. This relationship is generally referred to herein as "registration" and the meaning to be conveyed is that the parts must have a very accurately preserved positional relationship to each other. A slight shifting of any of the rules of the insert or device of Fig. 1 or of Fig. 2 would result in the spout being incapable of being readily withdrawn through the opening that is normally closed by the closure 31.

The accurate positioning of the rules in the body 27 and in body 34 respectively insures that there can be no errors or shifting of the rules relative to each other in either of the said bodies.

The inserts or devices themselves may be very accurately positioned relative to each other by shims 35 (Fig. 6) on any one or more sides of each insert and once the inserts are in the die they will remain positively fixed relative to the cutting and creasing rules of the die for the life of the latter.

It is pertinent to note, as shown in Figs. 8, 9, that yieldable elements 36 of rubber or the like are indicated along the cutting and slotting rules of the insert shown in said figures. They are not shown in the remaining views because they are the conventional means for freeing each blank from the rules after each blank is cut, and are normally positioned alongside all of the cutting rules of the die and insert and wherever there is any likelihood of the blank sticking to the rules. The height of each element 36, as seen in Fig. 9, is greater than the distance the rules project above the blocks of the die or the body of each insert, and they are compressed as blank 37 is forced down for cutting and creasing, but as soon as the pressure on the blank is released, the expansion of the elements 36 elevates the blank above the rules.

The use of the term "cutting rules" is intended to cover any rules that may cut the material of the blank, whether by making full or partial cuts or slotting, and creasing rules is intended to cover the rules that form lines of weaknesses along which the blank will break for folding.

With the present invention, it is obvious that the inserts are no more complicated in setting up a die than an ordinary rectangular block of wood or the like, and a die can be dismantled without dismantling the spout and closure forming inserts which can readily be used in

5

combination with another die for making a larger or smaller carton as the case may be.

Furthermore, different spout and closure forming devices can be provided for different types of spouts and closures and for different sizes of cartons and can be placed in any carton forming die where spaces exist suitable therefor.

The relatively small size of the bodies of each insert insures against any noticeable changes in size due to temperature variations.

I claim:

1. In a die for forming a carton blank that is foldable along folding creases formed therein to make a carton of the type having different planar portions thereof secured together in lapped relation and which portions are cut and creased to define a pair of parts thereof one over the other in accurate registration enabling coactive movement of said parts from planar relation with the respective portions in which they are formed to positions projecting angularly from said portions, the combination comprising; a plurality of separable cutting and creasing rules in positions for cutting said blank from a sheet of cardboard and for forming said folding creases therein to enable forming said carton exclusive of said parts, a plurality of separate blocks between and separable from said cutting and creasing rules, one pair of said blocks being positioned at the points where said parts of said blank are to be located when said blank is formed by said cutting and creasing rules, a pair of sets of tempered steel respectively carried by said one pair of blocks, the rules of one set of said pair thereof being positioned relative to each other to form one part of said pair thereof and the rules of the other set being positioned relative to each other to form the other part of said pair thereof and the said sets of rules being positioned relative to each other so that the said parts formed in said portions by said sets of rules will be in said registration with each other when said portions are in said lapped relation, said plurality of blocks and said plurality of cutting and creasing rules and said rules of said sets being in a common plane with the cutting and creasing edges of the rules being offset to one of the sides of said blocks for simultaneously forming said blank including said portions and the said parts therein from a sheet of cardboard, each block of said one pair being a casting in firm, cast engagement with the opposite sides of the rules of the set carried thereby for holding the rules of each set rigid with and inseparable from each block and rigid against movement relative to each other whereby the said parts formed by the rules of said sets will be uniform during the life of the latter, and a frame enclosing said plurality of blocks and said plurality of cutting and creasing rules releasably holding them rigid against movement relative to each other in said common plane whereby the said parts formed in the blanks by said sets of rules will be uniformly in the same positions relative to each other in said blanks thereby assuring registration of said parts in each blank when each blank is folded to make a carton with said portions in said lapped relation.

2. In a die for forming a blank adapted to be folded to form a carton of the type having a pair of flap portions in lapped, face to face engaging relation and a pair of cooperatively related groups of cuts and creases respectively in said flap portions arranged and adapted to form a pair of parts adapted to form a pouring spout and to register with each other for movement together from an inoperative position in which said parts are coplanar with said portions to an operative pouring position in which said parts extend angularly relative to the said portions the combination of; a plurality of separable carton cutting and creasing rules in positions for cutting and creasing said blank exclusive of rules for forming the cuts and creases of such groups, means for releasably supporting said plurality of cutting and creasing rules in said positions and in a common plane against movement relative

6

to each other comprising a plurality of blocks separable from said cutting and creasing rules and a frame enclosing said blocks and said cutting and creasing rules frictionally holding said blocks and said cutting and creasing rules together, said cutting and creasing rules being selectively removable and replaceable independently of each other and of said blocks and frame and said blocks being selectively removable and replaceable independently of each other and of said frame, one pair of said blocks being spaced apart and positioned at the points where said parts of said blank are to be located when said blank is formed by said plurality of cutting and creasing rules, a set of rules carried by each block of said one pair rigid therewith and inseparable therefrom and held therein solely by the material of each block against movement relative to each other, the rules of one set in one block of said one pair thereof being arranged and adapted to form one group of said pair of groups of cuts and creases and the rules of the other set in the other block of said one pair thereof being arranged and adapted to form the other group of said cuts and creases, the said sets of rules in said one pair of blocks being in said common plane for simultaneously forming said pair of parts with the cutting and creasing of said blank including said flap portions by said plurality of cutting and creasing rules, said plurality of cutting and creasing rules coacting with said plurality of blocks for supporting said one pair of blocks against movement of the latter relative to each other whereby the parts of said pair thereof will be formed in the same predetermined positions within each of said flap portions to enable maintaining accurate registration between said parts when each blank formed by the said plurality of cutting and creasing rules and by said sets of rules is folded to form a carton with said flap portions in said lapping relation.

3. In a die for forming a carton blank including folding creases therein for folding said blank to form a carton of the type having a pair of spaced portions each of which has a group of cooperatively related cuts and creases formed therein arranged and adapted to define a pair of parts in registration with each other for cooperative movement of said parts together relative to said portions; a plurality of flat sided steel cutting and creasing rules in positions for cutting said blank from a sheet of cardboard and for forming said folding creases therein, a plurality of blocks between said rules separable from said cutting and creasing rules and a frame enclosing said blocks and said cutting and creasing rules holding said blocks and said cutting and creasing rules together in a common plane against movement relative to each other, one pair of said blocks being spaced apart and positioned at the points where said parts of said blank are to be located when said blank is formed by said cutting and creasing rules, a set of rules carried by each block of said one pair rigid therewith and inseparable therefrom and held therein solely by the material of each block against movement relative to each other, the rules of one set in one blank of said one pair thereof being arranged and adapted to form one group of said pair of groups of cuts and creases and the rules of the other set in the other block of said one pair thereof being arranged and adapted to form the other group of said cuts and creases simultaneously with the formation of said blank and said folding creases by said plurality of cutting and creasing rules, the said pair of blocks being rectangular and having flat outer edges perpendicular to said plane, each of said edges being in opposed parallel relation to one of said plurality of cutting and creasing rules adjacent thereto, each block of said one pair being separately removable independently of the other blocks and independently of said cutting and creasing rules and said frame and each set of rules in each block of said one pair being spaced inwardly of said outer edges whereby said one pair of blocks may be replaced by another pair of blocks

of the same size but having said sets of rules therein arranged and adapted to form said parts in a different size.

References Cited in the file of this patent

UNITED STATES PATENTS

346,580	Cobb	Aug. 3, 1886
360,674	Fiske	Apr. 5, 1887
430,315	House	June 17, 1890
871,487	Denmead	Nov. 19, 1907

5

972,300
1,056,805
1,238,795
1,854,552
2,095,359
2,338,261
2,576,594
2,682,208

Varva	Oct. 11, 1910
Laub	Mar. 25, 1913
McCarthy	Sept. 4, 1917
Liftwich	Apr. 19, 1932
Dudley	Oct. 12, 1937
Roth	Jan. 4, 1944
Goldstein	Nov. 27, 1951
Monroe et al.	June 27, 1954

10