(No Model.)

H. R. CORKHILL, Jr.

APPARATUS FOR MAKING PAPER BOX BLANKS.

No. 569,957. Patented Oct. 20, 1896.

Fig. 1.

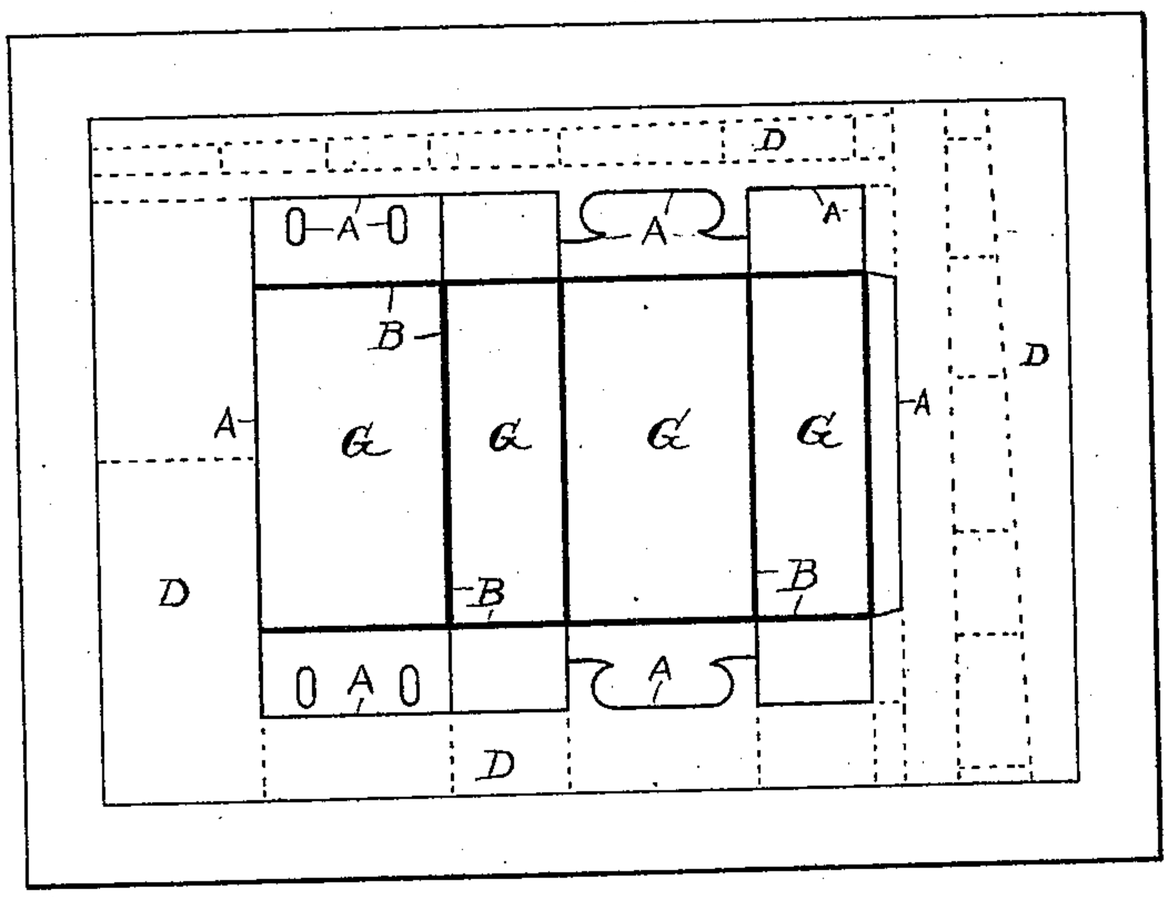


Fig. 2.

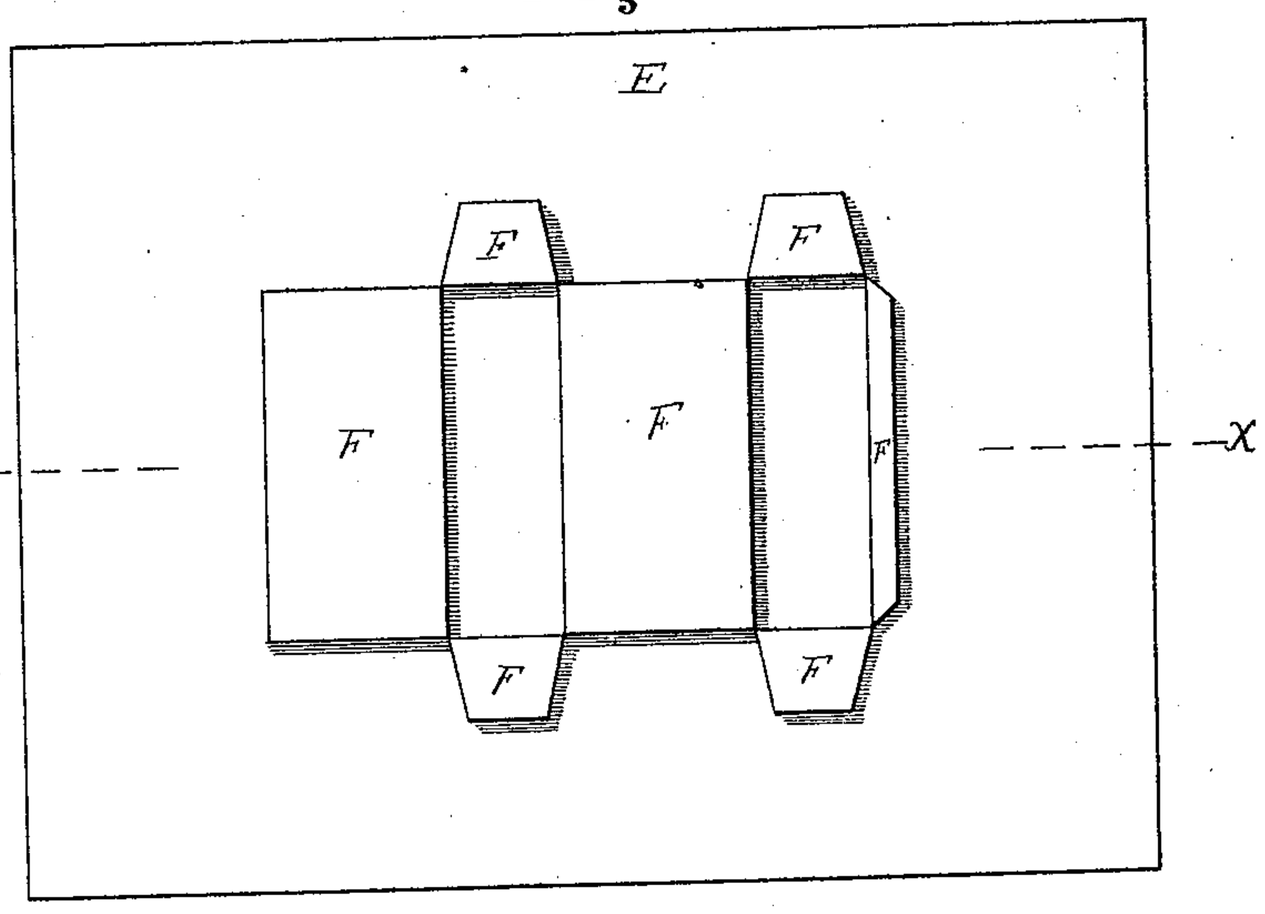


Fig. 3.

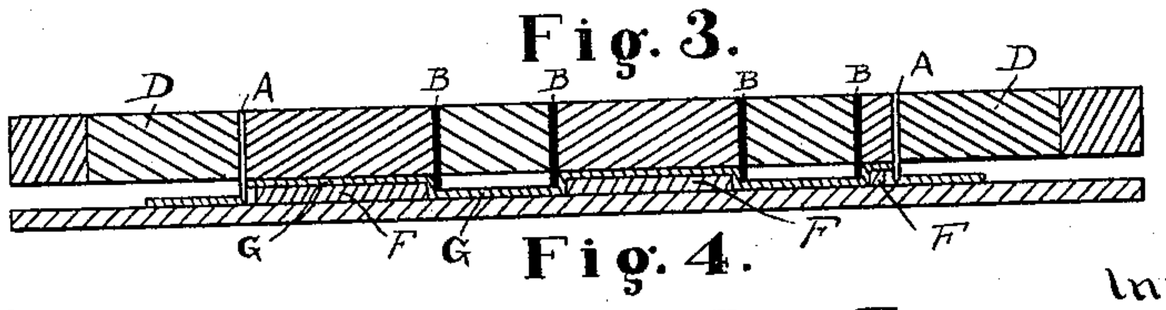
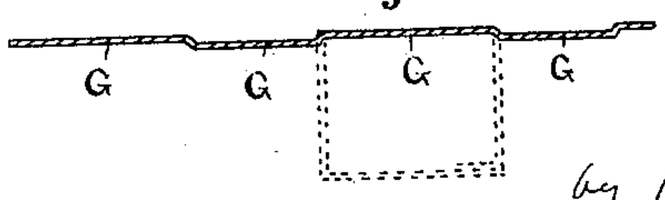


Fig. 4.



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APPARATUS FOR MAKING PAPER-BOX BLANKS.

SPECIFICATION forming part of Letters Patent No. 569,957, dated October 20, 1896.

Application filed May 15, 1896. Serial No. 591,705. (No model.)

To all whom it may concern:

Be it known that I, HENRY R. CORKHILL, Jr., of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in the Manufacture of Paper Boxes; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-letters marked thereon.

My present invention relates to the manufacture of boxes and similar articles composed of paper or cardboard which are made from flat blanks and adapted to be folded or bent into form, as holding-receptacles, and has for its object to provide an improved paper-box blank and means for facilitating the manufacture thereof and defining the lines of folding, whereby the cost and the time required to produce the necessary apparatus for the manufacture of said blanks are reduced to a minimum.

Heretofore in the manufacture of paper-box blanks it has been customary to employ a die composed of sharp cutting-rules and blunt creasing-rules secured together in a suitable frame, as a printers' chase, by means of blocks or printers' furniture, the cutting-rules being somewhat higher than the creasing-rules, and the counter-die for coöperating with the die thus constituted consisted of a suitable hard cutting-base, as a sheet of steel, and a packing or covering on said base composed of paper or similar material, in which were cut channels or grooves along the lines where the creasing-rules would coöperate with the surface of the packing, said grooves or channels being formed in some instances by cutting out the material of the packing down to the hard base or plate. The principal objection to this method of cutting and creasing box-blanks is that it requires time and considerable skill on the part of the operator to make the two parallel cuts in the packing necessary to the formation of the channel for the creasing-rules, and particularly is this the case when a form containing a large number of small box-blanks which are to be cut and creased at a single operation is employed; and it is the object of my present invention to shorten the length of time required to produce the proper counter-die and also cheapen the cost of its production, at the same time preserving the male cutting and creasing die intact, and in one method of making, cutting, or removing the packing-sheet from the support only on large areas where no special skill is required, whereby the female die consists of a series of alternate panels or areas, those representing adjoining panels or the portions of the box-blank that are folded relative to each other being arranged in different planes, said areas or panels being bounded by the lines on which the blank is to be folded, and the bend, crease, or offset formed by the change from one plane to the other stretches or changes the fiber of the material of which the box-blanks are composed to such an extent as to render the folding easy.

In the drawings, Figure 1 is a plan view of an ordinary cutting and creasing die; Fig. 2, a similar view of a female or counter die constructed in accordance with my invention; Fig. 3, a longitudinal sectional view, somewhat enlarged, on the line *x x* of Fig. 2, showing the operation of forming the box-blanks; Fig. 4, a sectional view of a box-blank shown bent or folded in dotted lines.

Similar reference-letters in the several figures indicate similar parts.

In carrying out my invention I use the ordinary die illustrated in Fig. 1 and composed generally of sharp cutting-rules A, blunt creasing-rules B, slightly less in height than the rules A, and the whole held in position in a suitable chase or frame C by means of blocks or printers' furniture D. The cutting-rules A serve to define and sever the box material on the outlines of the box and also to form the necessary slits between the folding flaps.

E indicates the base-plate of the counter-die, composed, preferably, of steel and adapted to be applied to and removed from the platen of an ordinary printing or other press. Secured upon this plate E is a packing or covering F, composed, preferably, of paper, or, if desired, of the cardboard or material of which the blanks to be operated upon are composed, said packing being secured to the

plate by glue or otherwise. Instead of extending this packing-sheet over the entire surface of the plate E, I arrange it only in alternate panels of the blank to be operated upon, so that when the die and counter-die are brought together with the box material between them one of the panels bounded by the creasing-rules will be forced into a plane lower than the top of the adjacent panel, which corresponds with the part of the packing left intact upon the plate E. It will be understood that in this operation of bringing the die and counter-die together with the material of the box-blank between them the sharp edges of the cutting-rules will sever the material against the plate E, while adjacent panels will be forced into different horizontal planes, one corresponding to the edges of the creasing-rules and the other to the top or the face of the packing F on the plate E, and it is preferred that the thickness of the packing F be slightly greater than the difference in height between the outer edges or faces of the cutting and creasing rules, so that while a sharp bend will be given to the border edges of the panels of the box-blanks defined by the creasing-rules the box material will be bent at a sharp angle over the edges of the packing F. The counter-die thus formed may be made by securing portions of packing F corresponding to alternate panels to the base E; but I prefer to employ the simpler method which consists in placing the die upon the bed of the press with the faces of the rules projecting outward, and then placing upon the support E, which may be a separate steel plate or the platen of the press if desired, a sheet of paper, cardboard, or other material capable of being cut by the cutting-rules, and securing it in position, preferably by paste or glue. Then the die and counter-die are brought together with sufficient pressure to cause the cutting-rules to cut through to the base E and the creasing-rules to make a mark upon the packing F. Then the operator cuts through the packing F on the lines marked thereon by the creasing-rules, and, beginning at one side, removes the portions corresponding to alternate panels of the box-blank outlines on the packing by the creasing-rules, and preferably trims away the portions of the packing adjacent to the lines made in it by the cutting-rules, as usual, so that a sharp cut may be obtained, and the die and counter-die are then ready for making box-blanks, the material for which is fed between them in the usual manner, and each time the die and counter-die are brought together, with the box material between them, the cutting-rules, coöperating with the hard base E, separate the box-blanks, and the alternate panels of the blank are pressed in different planes by the creasing-rules and the portions of the packing left by the counter-die, as clearly shown in Fig. 3.

By the term "panels" in the box-blank I refer to the parts G as well as the flaps at the ends, which, though not technically panels, are yet adjacent parts, the folding-lines of which are well defined by the means described.

The space between the edges of the creasing-rules and the edges of the packing F upon the support E should be slightly less than the thickness of the material being operated upon, in order to produce a sharp bend; but this relation need not be accurately preserved, as I find that by cutting and removing the whole of the line made by the creasing-rule upon the packing at the first impression excellent results are obtained, and the fold or bend made on the box material is sufficient for all practical purposes; and, further, the distance between the faces of the creasing-rules and the base E should be great enough to prevent cutting through the box material.

Some of the advantages of this method of forming the counter-die are that it does not necessitate a change from the ordinary box-die composed of cutting and creasing rules, with which the manufacturers of paper boxes are now familiar, that it does not require any particular skill on the part of the operator to remove the packing on one side only of the creased lines, as distinguished from cutting narrow channels, which must be of uniform width, in the method now practiced, thereby consuming less time, and, further, as only a single bend is formed on each of the folding-lines of the blank, considerable less power is required to operate the press, thereby reducing the wear and tear and liability of breakage of the parts.

The advantages above noted are particularly apparent when a form or die adapted to cut out a large number of small boxes at a single operation is employed, as it is oftentimes difficult for an operator to cut channels in the packing when they are close together; and it is evident that the invention can be advantageously employed on not only a bed platen-press of any description, but also on bed-and-cylinder presses, the die being arranged on the bed and the counter-die made up directly on the cylinder, as will be understood.

Boxes made by my apparatus are readily distinguishable from those which have the folding-line creased in such manner as to provide a ridge on one side and a groove on the other, and also from those which are partially bent in one direction on the fold-lines, as the latter do not contain panels in different planes.

The boxes embodying the panels wholly in different planes could of course be made by other apparatus than that herein shown, but I prefer to use this one for the reasons heretofore given.

I claim as my invention—

1. In an apparatus for making folding paper-box blanks, the combination with a die composed of a series of blunt-edged rules arranged to conform to the shape of the panels of the blank and the folding-lines between them, of a counter-die, having a series of

panels corresponding in shape and size to the panels of the box as defined by the blunt rules, the adjoining panels in said counter-die being wholly in different planes, whereby the adjoining panels of a blank pressed between the die and counter-die will be wholly in different planes, some of the panels of the blank extending over the higher panels or portions of the counter-die and the adjoining panels of the blank being moved by the edges of the rules between the higher panels or portions of the counter-die, substantially as described.

2. In an apparatus for making paper-box blanks, the combination with a die composed of cutting-rules having outwardly-projecting sharp edges and rules of less height having outwardly-projecting blunt edges arranged to define the panels of the box-blank, of a counter-die composed of a hard base or plate against which the cutting-rules operate to sever the blank material and a series of detached panels secured to the face of the plate and raised above its surface, said panels corresponding in outline, size and position with alternate or non-adjoining panels of the box-blank, as defined by the blunt rules of the die, substantially as described.

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