(Model.)

C. BECK.

PAPER CUTTING MACHINE.

No. 383,692. Patented May 29, 1888.

FIG. 1.

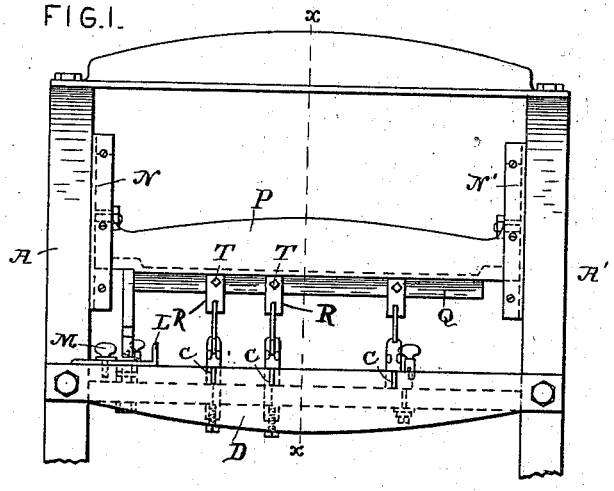


FIG. 2.

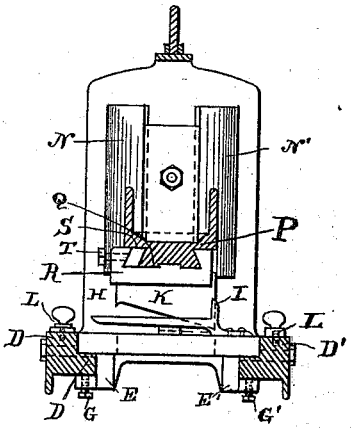


FIG. 3.

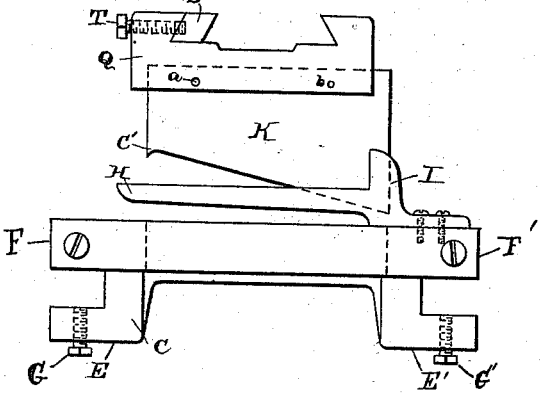


FIG. 4.

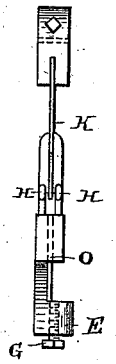


FIG. 6.

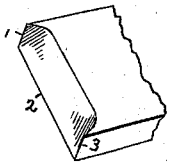


FIG. 7.

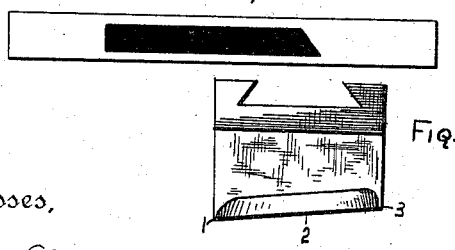
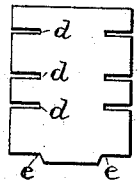


Fig. 5.

FIG. 8.



Witnesses,

Harry L. Amer.

Charles W. Merle

Inventor,

Charles Beck.

By his Attorney

O. E. Dubbs

UNITED STATES PATENT OFFICE.

CHARLES BECK, OF PHILADELPHIA, PENNSYLVANIA.

PAPER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 383,692, dated May 29, 1888.

Application filed June 11, 1887. Serial No. 241,042. (Model.)

To all whom it may concern:

Be it known that I, CHARLES BECK, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Paper-Cutting Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to paper-cutting machines, and is especially applicable to machines for cutting blanks for paper boxes.

The object of the invention is to simplify the construction, lengthen the durability, and add to the conveniences of machines of this character; and to this end my invention embodies certain details of structure, which will be hereinafter fully described in the specification and definitely indicated in the annexed claims.

In the drawings accompanying this specification, Figure 1 is a partial front elevation of a machine embodying my improvements. Fig. 2 is a sectional view taken on the line X X of Fig. 1, parts being shown in elevation. Fig. 3 is a side view of the lower die and one of the knives and its guide. Fig. 4 is a front view of a knife, its guide, and its co-operating die. Fig. 5 is a side view of the knife used for cutting off the corners of a blank. Fig. 6 is a perspective view of the corner-cutting knife. Fig. 7 is a top view of the corner die. Fig. 8 shows a blank for a paper box, which may be cut on the machine.

To suitable uprights or side supports, A A′, are secured the horizontal transverse guides or ways D D′, upon and between which the female dies C are secured in sliding adjustment. These dies are made of a single piece of steel and have a channel, O, Fig. 4, for the knife, and extensions or flanges E E′ F F′ at the sides to engage the ways D D′. Set-screws G G′ secure the dies at any desired transverse position. Each die has secured to its upper face a knife-guide, Figs. 2, 3, and 4, having two arms, H H, set parallel to the plane of the die-slot O, and an upward extension, I, grooved to admit the side of the knife. The extension I is made sufficiently long to engage the knife throughout its whole path of movement. A side guide, L, Fig. 1, is provided, which, by a set-screw, M, co-operating with a slot in the guide, admits of a proper lateral adjustment of the material to be cut. As this is of common use and well-known structure, further description or illustration is thought unnecessary. Suitable ways, N N′, are secured to the side supports, A A′, above the dies, in which slides a cross-bar, P. This cross-bar is provided with a guide-rail, Q, undercut on its lower sides to support a recessed knife-frame, R, splined thereon. (See Fig. 2.) The recess in the knife-frame is sufficiently wide to enable the frame to be applied directly to the rail, the former being held thereon by a key, S, and set-screw T. By loosening the set-screw and removing the key the frame can be readily removed from the rail Q.

The frame R has a deep groove on its lower side, and the knives K are set in this groove and secured firmly in place by screws *a b*. The knife is thus stayed throughout almost its whole width. The knives K are of peculiar construction. In all machines known to me the material being cut is apt to receive a side-thrust away from the knife at the finishing stage of the cut, thus destroying the accuracy of the cut. Moreover, the knife is liable to tear the material irregularly by reason of its not closely engaging the side edge of the die, and leaves the part to be cut out hanging to the material by a narrow connecting-web. I overcome these difficulties by giving the edge which finishes the cut a hook shape, as shown at C′, (see Figs. 2 and 3,) so that the terminal of the hook will engage the material before the cut is completed and firmly hold it in place, the rigidity of the material when thus secured being sufficient to cause a clean cut. The final severance of the cut-out portion is thus brought to a point somewhere between the two end edges of the knife, and as the latter is accurately guided into the die by the forks H a sharp shearing cut is secured. The hook might be placed on the other edge

of the knife if that edge were used to cut the inner terminal, *d*, Fig. 8, of the slot. For cutting away the corners *e e*, Fig. 8, a thicker knife is used. A form which I have found to answer well is shown in Figs. 5 and 6. As there shown, the cutting-face of the knife is beveled away from an end oblique cutting-edge, 1, a longitudinal cutting-edge, 2, and a clearing-edge, 3, at the end of the knife opposite the oblique cutting-edge 1. This knife is shown with an undercut groove on its upper side to directly engage the rail Q, though, obviously, it might be secured in a frame having such a recess, as in the case of the slot-knives heretofore described.

It should be understood that the longitudinal cutting-edge 2 of the corner-cutting knife is adapted to cut the long side of the corner slot of the box-blank, and that the short oblique end edge, 1, cuts the short oblique side of the corner slot, and that the end clearing-edge, 3, guides the knife-blade and assists in holding the die for said knife more firmly in position during the cutting operation, and said end clearing-edge, 3, is also effective in assisting to force the piece cut from the corner through the die as desired, as otherwise the said piece of material cut out would wedge between the end of the die and the end of the knife, this defect being obviated by forming the clearing-edge. This knife may also be provided with the hooked edge, if desired.

The cross-bar P is given a vertical play by a link and treadle or pulley, (not shown,) as is usual in machines of this character.

The opening in the corner die is made large enough to accommodate the cut-off corners, so that the waste may be pressed through by the knife, and thus leave the machine ready for another cut.

The mode of operation of the machine will now be understood. The screws T, G, and G′ are loosened and the knives and dies are accurately set at the proper relative distances to produce the desired-size blank with the desired distances between the cuts therein. The parts are then locked by tightening the set-screws. The guides L L are then adjusted and the material placed over the dies and the knives brought into action. The forked guides H I insure an accurate engagement of the knives with the dies. After the first cut has been made, the material is reversed on the dies and the other side is then slotted or cut.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a paper-cutting machine, the combination of a die and a knife having a hooked cutting-edge at its side, as and for the purpose set forth.

2. In a paper-cutting machine, the combination of a knife, a die provided with a slot for the knife, and a forked guide above the slot, the arms of the fork extending parallel to the plane of the slot, and a grooved upward extension to the fork, said extension engaging the knife throughout its entire path of movement, as set forth.

3. In a paper-cutting machine, the combination, with a fixed bed provided with parallel transverse ways and a die provided with a slot to receive the corner-cutting knife and mounted upon said ways, of a reciprocating frame provided with a guide-rail and the herein-described knife for cutting off corners, mounted upon said guide-rail and provided with two cutting-edges and a clearing-edge, the cutting-face being beveled away from said edges, whereby the portion of the material cut off by the knife is forced through the die, substantially as described.

4. In a paper-cutting machine, the combination, with a reciprocating knife, of a die provided with a slot or opening for the knife and a forked knife-guide carried by the die, the arms of the fork extending parallel to the plane of the slot and adapted to engage the opposite side faces of the knife, substantially as described.

5. In a paper-cutting machine, a knife formed of a single piece of metal, having two cutting-edges and a clearing-edge, the cutting-face being beveled away from said cutting-edges, substantially as herein shown and described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHARLES BECK.

Witnesses:
C. B. ROBERTS,
JAS. W. FLETCHER.