No. 649,112. Patented May 8, 1900.

H. B. SMITH.

MACHINE FOR CUTTING BOX BLANKS.

(Application filed Mar. 8, 1900.)

(No Model.)

Fig. 1.

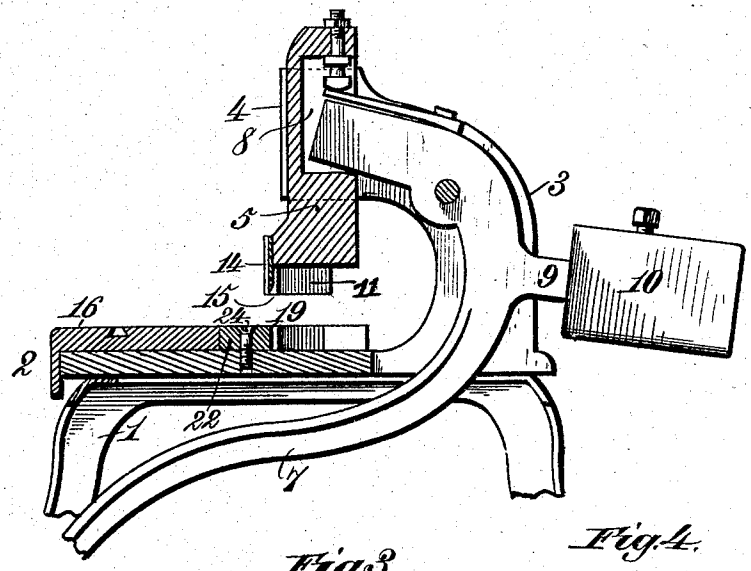


Fig. 2.

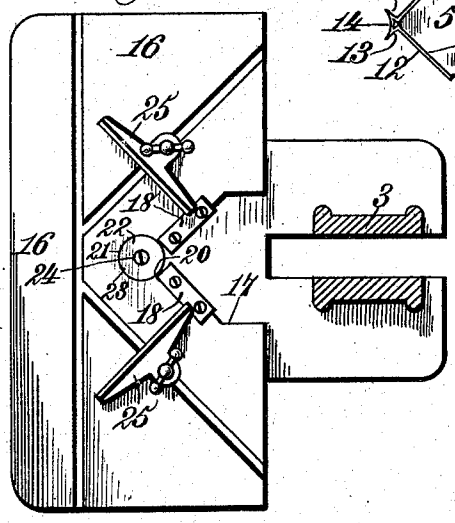


Fig. 3.

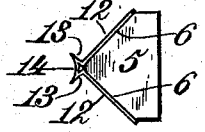


Fig. 4.

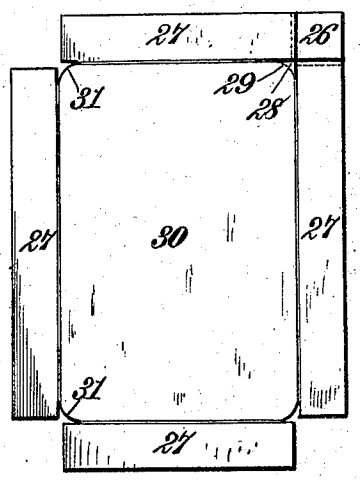


Fig. 5.

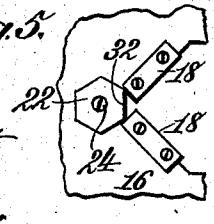
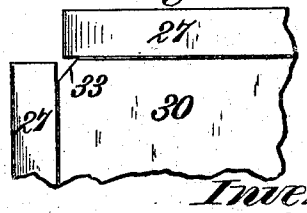


Fig. 6.



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UNITED STATES PATENT OFFICE.

HARRY B. SMITH, OF NEW YORK, N. Y.

MACHINE FOR CUTTING BOX-BLANKS

SPECIFICATION forming part of Letters Patent No. 649,112, dated May 8, 1900.

Application filed March 8, 1900. Serial No. 7,801. (No model.)

To all whom it may concern:

Be it known that I, HARRY B. SMITH, a citizen of the United States, residing at New York, (Brooklyn,) Kings county, State of New York, have invented certain new and useful Improvements in Machines for Cutting Box-Blanks, of which the following is a specification.

This invention relates to improved means for forming the cut-away corners of paper-box blanks, and has for its object to provide improved means by which the corners of the box-blank are cut away at a single operation in an accurate, uniform, and expeditious manner.

To this end my invention consists in the improved construction of cutting mechanism arranged and operating in the manner hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a view, partially in side elevation and partially in section, of my improved die-cutting apparatus embodied in an organized operative machine. Fig. 2 is a top plan view of the nether die and the bed or table of the machine. Fig. 3 is a bottom plan view of the upper die. Fig. 4 is a view of the box-blank, illustrating the configuration of the cut-away corners shaped by the die-cutting mechanism illustrated in Figs. 1, 2, and 3. Fig. 5 is a top plan view of the nether die of a modified form of die cutting apparatus employed for imparting an angular shape or configuration to the corners of the box-blank, and Fig. 6 is a view of a portion of a box-blank, illustrating the shape or configuration imparted thereto by the die-cutting apparatus illustrated in Fig. 5.

Referring to the drawings, the numeral 1 indicates the frame of a machine by means of which my improved die-cutting apparatus may be conveniently actuated and showing the cutting-dies applied thereto in operative position. On the upper portion or top of the frame 1 is a table or bed 2, from which rises a bifurcated or forked upright 3, terminating in vertical guideways 4. Arranged to reciprocate vertically in the guideways 4 is a head-stock 5, which, as shown in Fig. 3 of the drawings, is preferably triangular in cross-section at its lower end or so shaped as to present two flat vertical faces 6, that are formed at right angles to each other, corresponding to the angular shape of the corner of a rectangular box. Pivoted between the two members of the forked or bifurcated upright 3 is a curved lever 7, the lower end of which is provided with a treadle, (not shown,) and the upper end thereof projects into a recess 8, formed in the rear side of the head-stock 5. Projecting rearwardly from the lever 7, below the fulcrum of the latter, is an arm 9, on which is mounted a weight 10, that operates to normally hold the lever in a position to maintain the head-stock in its elevated position. On the right-angular face 6 of the head-stock is rigidly fixed—as by screws, for example—a die-cutter 11, comprising a blade right angular in cross-section and provided at its apex with a forwardly-projecting extension corresponding in shape to the portion of the corner of the bottom of the box-blank which it is designed to cut away. For example, as illustrated in Fig. 3, the rectilinear converging faces 12 of the die-cutter are formed at right angles to one another, and at their apex said faces extend outward in divergent lines, forming faces 13, which are disposed at right angles to one another, each one of said faces 13 lying in a plane parallel to the plane of the face 12 on the opposite side of the die-cutter. The outer ends of the faces 13 are united by a concave web 14, formed on the arc of a circle. The faces 12, 13, and 14 are beveled and sharpened at their lower edges, as indicated at 15, Fig. 1 of the drawings, to form cutting edges. As shown most clearly in Fig. 3 of the drawings, the opposite faces 12 and 13 of the die-cutter do not lie in the same vertical plane, the plane of each face 12, if projected or extended, lying slightly in front of the plane of the face 13 on the opposite side of the die-cutter, the purpose being to cut off the ends of the side flaps of the box-blank, so that when their ends are bent into shape they will just abut, as will more fully hereinafter be explained.

On the bed 2 is arranged a table 16, in which is formed a recess 17, approximately

the shape of the head-stock 5 and arranged immediately beneath the latter. Screwed or bolted to the upper side of said table, along the right-angled edges of said table, are two die-plates 18, provided with knife-edges 19, that are arranged to lie in close juxtaposition to the faces 12 of the die-cutter 11 when the latter is forced down into the recess 17. The adjacent ends 20 of the die-plates are at true right angles to the knife-edges that coact with the faces 13 of the extension on the die-cutter 11. The apex of the recess 17 merges into an approximately-circular recess 21, in which is disposed an intermediate die-plate 22, having a curved knife-edge 23, corresponding to the curved shape of the blade or web 14 of the die-cutter. The intermediate die-plate 22 is preferably circular in shape and is adjustably secured to the table by a screw 24, that passes centrally through said die-plate and is screwed into the table, whereby by loosening the screw 24 the die-plate 22 may be turned around to bring a new cutting edge into position to coact with the cutting edge of the web or blade 14 of the die-cutter 11. Gages 25 are adjustably arranged on the table 16 and operate as guides to center the box-blanks properly beneath the die-cutter.

The operation of my improved cutting mechanism will be readily understood by those skilled in the art.

A rectangular piece of cardboard forming the blank from which the box is to be made is placed flat upon the table 16, and one corner is pushed between the gages 25 until the two sides of the blank lie in contact with the faces of said gages. The blank will then be in proper position to be operated on by the die-cutter. The lever 7 is then oscillated or rocked, causing the die-cutter 11 to descend onto the cardboard blank, and in its continued descent the cutting edges of the die-cutter cut through the paper-stock and slide past the cutting edges 19 and 23 of the die-plates, thereby cutting the blank on sharply-defined lines. The die-cutter described operates to cut a square piece 26 (see Fig. 4) out of the corner of the blank, thus cutting off the ends of the flaps or sides 27 of the blank squarely or at true right angles, and at the same time cuts out a piece 28 from the blank of the general shape of a triangle having a curved base 29. It will be seen, then, that at a single operation the die-cutter removes the square corner of the blank, cuts off the ends of the flaps 27, and cuts away and rounds the corner of the bottom 30 of the box. By arranging the opposite faces 12 and 13 of the die-cutter in slightly-different vertical planes, as before described, the flaps 27, after all four corners of the blank have been cut in the manner described, are of such length that when the flaps or sides 27 are bent up at right angles to the bottom 30 and their free ends bent or curved to conform to the rounded cut-away corners 31 of said bottom their ends will exactly abut, thereby forming a smooth rounded corner with no projecting or overlapping ends or portions.

It will be obvious that various different configurations may be given to the corners of the box by altering the shape of the die-cutter. For example, instead of making the web or blade 14 of the die-cutter curved, as above described, it may be made rectilinear, in which case the intermediate die-plate 22 will be provided with one or more straight edges 32, corresponding to the rectilinear edge of the said blade or web. Such an arrangement will operate to cut away the corner of the blank at an angle, as indicated at 33 in Fig. 6 of the drawings, thereby giving to the box beveled corners. In like manner other shapes may be imparted to the corners of the box. The intermediate die-plate 22 is shown as being provided with a plurality of straight faces 32. Hence by loosening the screw 24 the die-plate may be lifted up and given a partial turn to bring a new cutting edge into operative position when it becomes necessary or desirable.

I have shown a machine of a well-known type for operating my improved cutting apparatus, but no claim is made thereto *per se*, and any machine suitable for the purpose may be employed.

Having described my invention, what I claim is—

1. A die-cutter for cutting away the corners of box-blanks, comprising a cutting-blade having two faces arranged at a right angle to each other and provided at their adjacent ends with right-angled extensions, and a cutting blade or web uniting the outer ends of said extensions, substantially as described and for the purpose specified.

2. A die-cutter for cutting away the corners of box-blanks, comprising a cutting-blade having two faces arranged at a right angle to each other and provided at their adjacent ends with right-angled divergent extensions, and a cutting blade or web uniting the outer ends of said extensions, each of said right-angled faces of the die-cutter lying in a different vertical plane from but parallel to the extension on the opposite side of the die-cutter, substantially as shown and described and for the purpose specified.

3. A die-cutter for cutting away the corners of box-blanks, comprising a cutting-blade having two faces arranged at a right angle to each other and provided at their adjacent ends with right-angled extensions, and a cutting blade or web uniting the outer ends of said extensions, in combination with two fixed die-plates having straight converging edges arranged in approximate alinement with the cutting edges of the said right-angled faces of the die-cutter and an intermediate die-plate disposed between the squared ends of the die-plates and having an edge corresponding in contour to the cutting edge of the said blade or web of the die-cutter, substantially as described.

4. A die-cutter for cutting away the corners of box-blanks, comprising a cutting-blade having two faces arranged at a right angle to each other and provided at their adjacent ends with right-angled extensions, and a cutting blade or web uniting the outer ends of said extensions, in combination with two fixed die-plates having straight converging edges arranged in approximate alinement with the cutting edges of the said right-angled faces of the die-cutter, and an intermediate die-plate arranged between the squared end of the die-plate and having a plurality of edges each corresponding in contour to the cutting edge of the said blade or web of the die-cutter, said intermediate die-plate being rotatably adjustable to permit either of its edges to be brought into operative position relatively to the said blade or web, substantially as described and for the purpose specified.

5. A die-cutter for cutting away the corners of box-blanks, comprising a cutting-blade having two faces arranged at right angles to each other and provided at their adjacent ends with right-angled extensions, and a curved cutting blade or web uniting the outer ends of said extensions, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HARRY B. SMITH.

Witnesses:
PHILIP S. SMITH,
ALMA C. STERN.