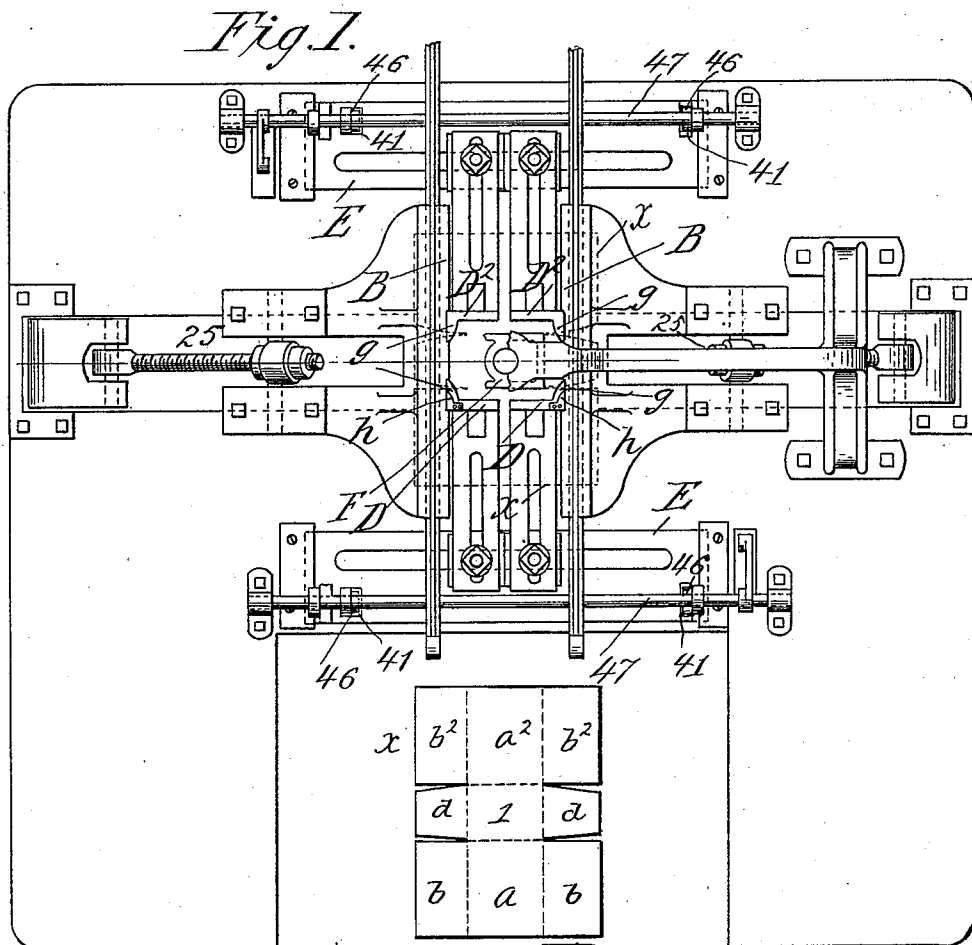
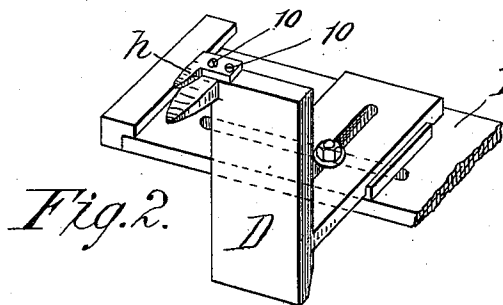
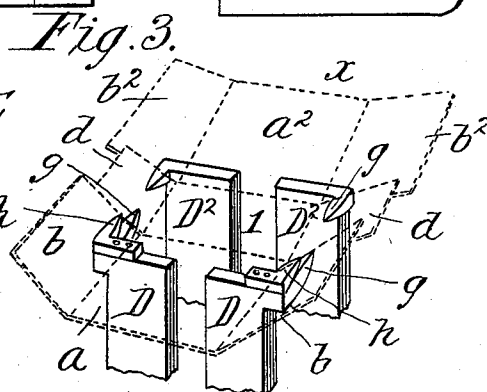
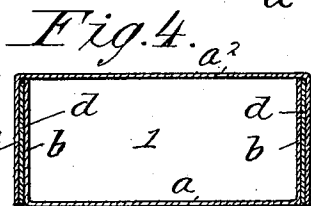


(No Model.)

A. BIRNIE.
PAPER BOX MACHINE.

No. 590,697.

Patented Sept. 28, 1897.



Witnesses:

W. M. Bellows,
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UNITED STATES PATENT OFFICE.

ALFRED BIRNIE, OF SPRINGFIELD, MASSACHUSETTS.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 590,697, dated September 28, 1897.

Application filed January 29, 1897. Serial No. 621,135. (No model.)

To all whom it may concern:

Be it known that I, ALFRED BIRNIE, a citizen of the United States, and a resident of Springfield, county of Hampden, and State of Massachusetts, have invented certain new and useful Improvements in Paper-Box Machines, of which the following is a specification.

This invention relates to improvements in paper-box machines of the class and character shown in Letters Patent of the United States, dated May 8, 1894, No. 519,531, and the present improvements pertain to the mechanism comprised in what is termed the "throat" of the machine, where the folding up of the flaps of the blank to make the completed box is performed.

The particular object of the present invention is to adapt by the provision of slight additional parts the aforementioned machine for producing a paper box of somewhat different character from that which the machine was originally designed to produce; and the invention consists in the combination, with the parts of the paper-box machine comprised in the "folding box" or "throat," of additional folding-lips or flap-turners, all as will hereinafter fully appear and be set forth in the claims.

Reference is to be had to the accompanying drawings, in which the present improvements are illustrated in conjunction with so much of the aforementioned patented machine as to render apparent their applicability thereon, and in the drawings—

Figure 1 is a plan view more especially of the mechanism constituting the throat and of parts intimately coöperating therewith. Fig. 2 is a perspective view of one side of the upright plates forming a part of one side of the throat, with the extra flap-turner and the movable support for such upright. Fig. 3 is a perspective view illustrating the uprights constituting the front and rear of the throat, two thereof having the extra lip-turners which contribute to constitute the gist of this invention and also showing the peculiar operation of turning up the flap or sections of the blank. Fig. 4 is a horizontal sectional view of the completed box.

The folding box or throat of this paper-box

machine is constituted by the vertical plates or uprights $D D$ and $D^2 D^2$ in opposing front and rear pairs mounted on sliding bases $E E$, which are movable in suitable ways and by the end followers $B B$. These parts have, as the rectangular folding-plunger E approaches the last stage in its descent, closing-in movements, they normally standing when the plunger is elevated at the boundaries of a rectangle somewhat larger than the plan of the completed box.

The duplicated uprights $D D D^2 D^2$ have their approaching movements, as carried by their base-slides E , imparted from the rock-shaft 47 by lever-arms 46 on the rock-shafts, which engage the walls of apertures 41 41 in the slides or other abutments. Properly-timed rocking movements are imparted to the rock-shaft by cam mechanism not necessary to here describe, being already fully ascertained in and by the aforesaid patent.

The followers $B B$ are operated by toggles, (seen at 25,) also fully described in said patent, and the followers move toward each other after the opposite sides of the throat have contracted and end-set the gummed and turned-up flaps or stay-sections.

The box of the present invention is made up from a blank x , Fig. 3, having a bottom section 1, the opposite side flaps $a a^2$, each with end flaps $b b$ and $b^2 b^2$, and the bottom section has the end stay-sections $d d$.

As the plunger descends into the throat the side flaps $a a^2$ are turned up angularly to the bottom by being, as the blank is forced down, forced with a wiping action against the upper edges of the paired uprights $D D^2$. The side flap a as it is brought up at right angles to the bottom has its end flaps $b b$ turned angularly inward at right angles to it and in the plane of the box end. The end stay-sections $d d$ are next turned up upon and against the outer faces of flaps $b b$. The flap a^2 is also turned up similarly to flap a , but slightly thereafter, so that the end flaps $b^2 b^2$ thereof will be brought outside of the stay-sections $d d$.

The upper surfaces of flaps $b^2 b^2$ having been covered with gum or paste, the several flaps constituting three layers of paper or cardboard at the end of the box are stuck and set by the end followers, which move inwardly

in proper time and crowd these said layers with sufficient pressure against the ends of the descended plunger.

This construction of box is very strong and durable and is well adapted to contain small articles of hardware and the like.

Now it will be perceived that the several uprights $D D D^2 D^2$ have at their upper outer corners the beveled lips or flap-turning projections $g g$, substantially as illustrated in the aforesaid patent. One pair of the uprights—as here shown, the front pair—has in addition to the said projections g , as heretofore, the supplemental lips $h h$, which are detachably applied by screws 10 10, which pass through their shanks and into the tops of the uprights D . These lips are preferably tapered or beveled, as shown, and are shorter and extend inwardly into the throat less far than the usual lips g , on or over which they are mounted, all as plainly shown in the drawings. Therefore as the blank illustrated and referred to in detail is crowded down and into the throat the particular end flaps to be upturned are those $b b$, because the higher positions of the supplemental lips $h h$ insure the initial impingement by said lips of those particular flaps $b b$. Then as the blank further descends the projections $g g$ on the front pair of the uprights $D D$ insure the upturning of the end stay-sections, lastly followed by the up and in turning of the end flaps $b b$, carried by the rear side flap a^2 .

The operations in proper successive order or time may be rendered somewhat more certain by so timing the movements of the slides $E E$ that the forward one thereof moves inwardly slightly in advance of the rear one. This may be done without any mechanical change from the original patented machine, of which this invention is regarded as supplemental, beyond very slightly changing the adjustment or grade of the cam which operates one of the said slides E .

It becomes manifest from the foregoing description and illustration that by the provision of the two additional lips or flap-turners $h h$ detachably, as described, the machine becomes adapted for the production of a box very different in its make-up from that

for which it was originally designed. It is also evident that the machine still retains its adaptability for use for producing, by the interchange of its folding-plunger and the adjustment of the normal relations of the parts constituting the throat, boxes of many different dimensions as to either length, breadth, or height, or as to changes in all these dimensions at once.

Except for the purposes of adjustment the front and rear uprights, instead of being in two plates $D D$, might be formed as one part, as obvious, and the invention is in no way to be restricted as to its utilization on a sectional and adjustable two-part upright $D D$ or upon one integral non-adjustable upright having the two corner projections $g g$.

I claim—

1. In a paper-box machine, the combination with the plunger, of the folding box or throat the walls of which are constituted by the end followers, and the upright opposing plates, arranged at right angles to the ends of the followers, which have the flap-turning projections $g g$ at their upper corners, and the supplemental flap-turning lips $h h$ mounted above one side pair of the projections $g g$, and each having a length less than that of the adjacent projection g , substantially as and for the purpose set forth.

2. In a paper-box machine, the combination with the plunger, of the folding box or throat the walls of which are constituted by the end followers, and the upright opposing plates, arranged at right angles to the ends of the followers, which have the flap-turning projections $g g$, and the supplemental flap-turning lips $h h$, each having a length less than that of the projection g , and each being detachably supported and confined on the projection g , substantially as described and for the purposes set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two witnesses.

ALFRED BIRNIE.

Witnesses:

FRANK H. BOWEN,
WM. S. BELLOWS.