C. F. PINKHAM & W. H. BABB.

CORNER TURNING APPARATUS FOR BOX MACHINES.

APPLICATION FILED AUG. 29, 1906.

985,205. **Patented Feb. 28, 1911.**

3 SHEETS—SHEET 1.

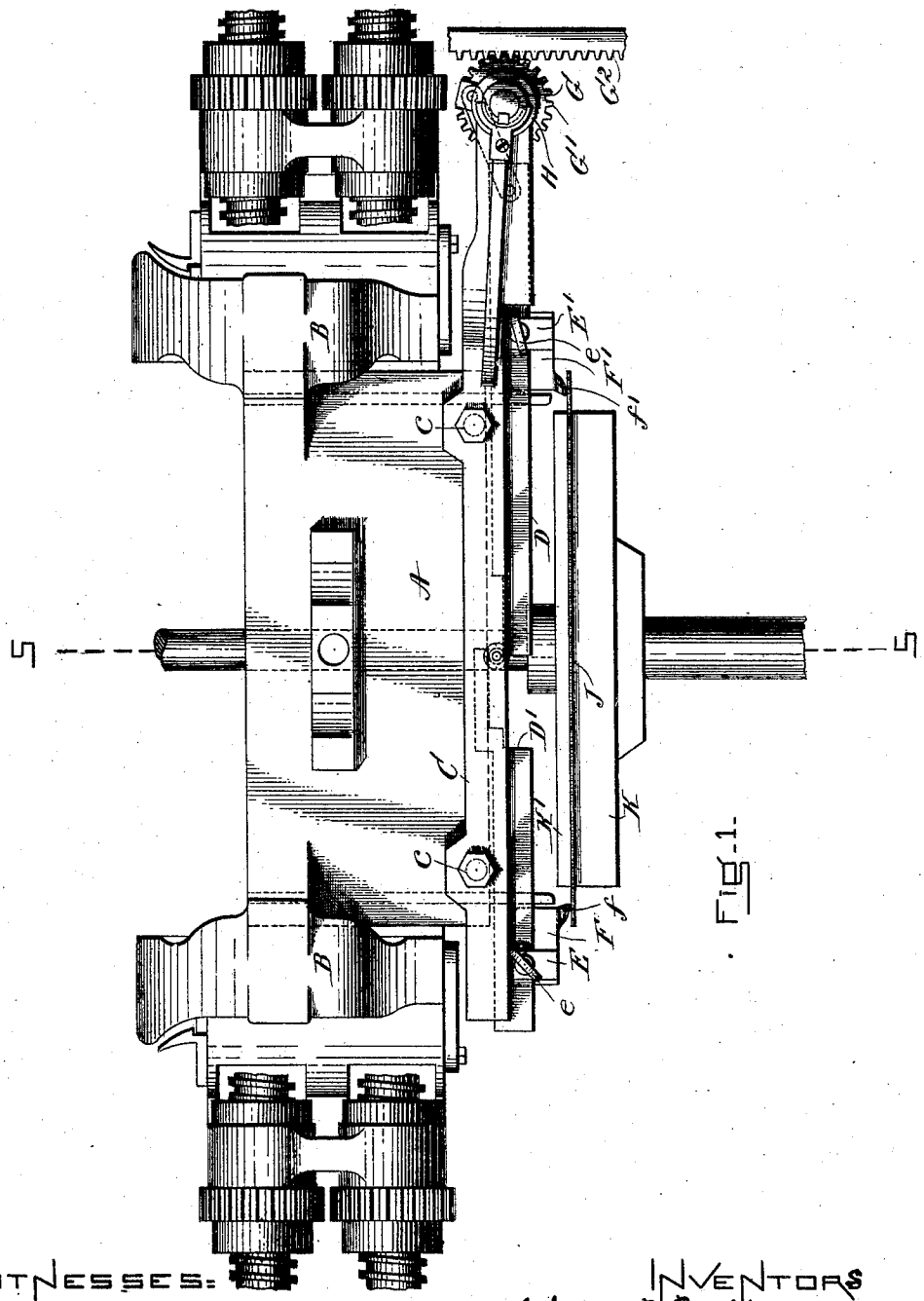

Fig. 1.

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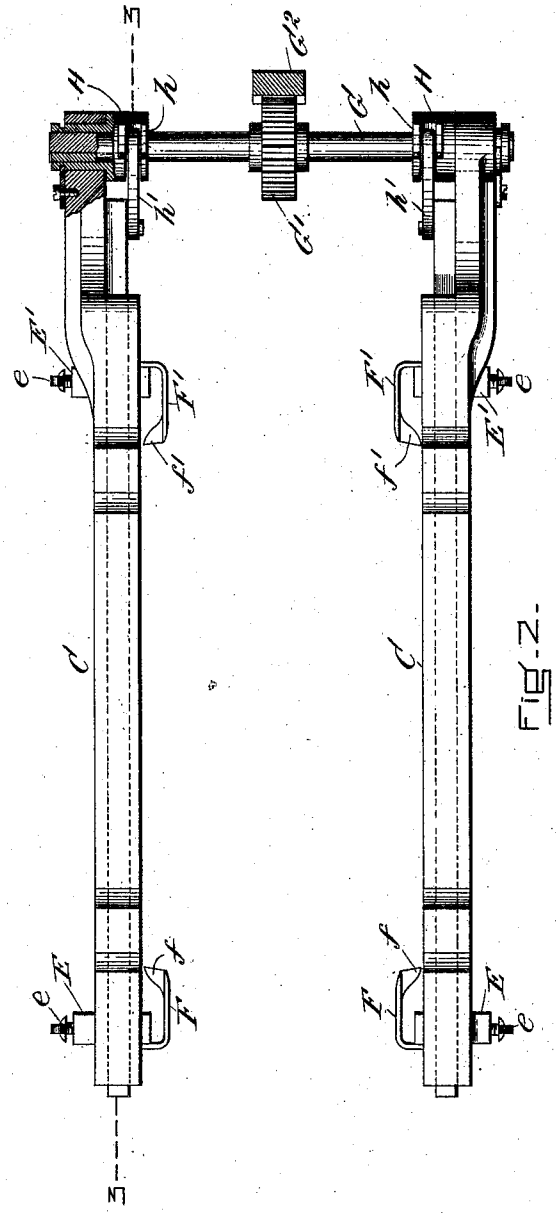

Fig. 2.

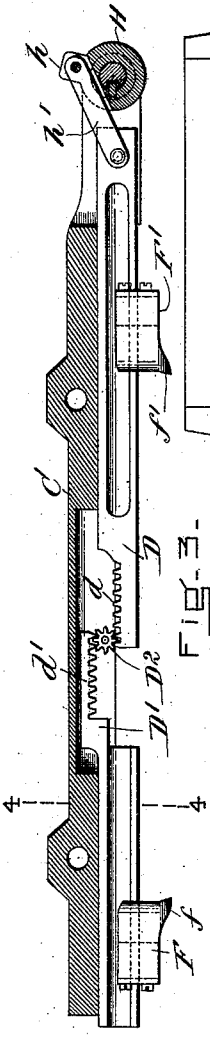

Fig. 3.

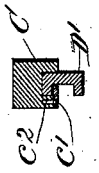

Fig. 4.

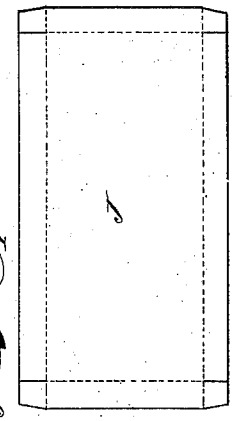

Fig. 5.

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3 SHEETS—SHEET 3.

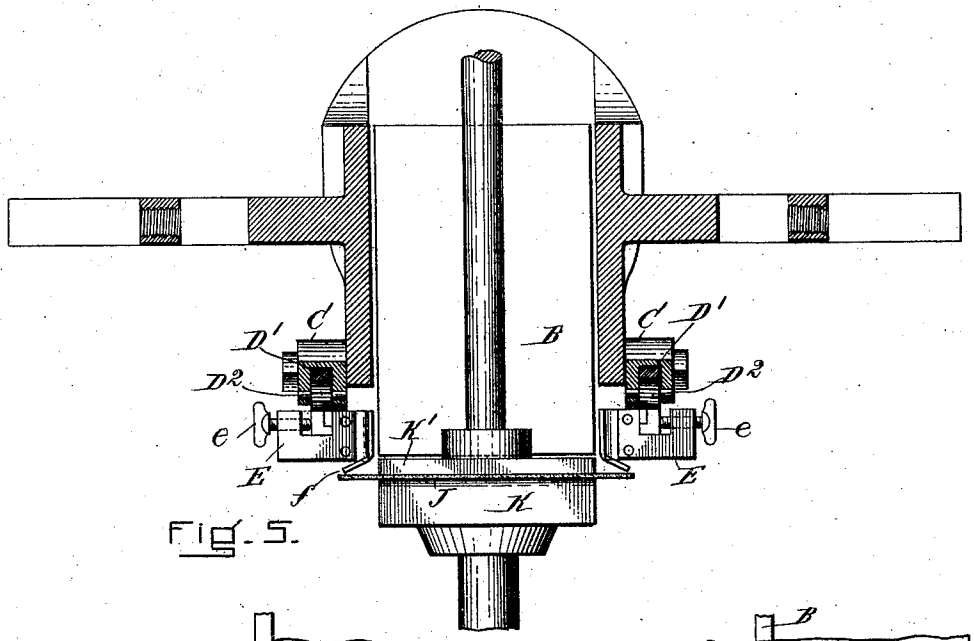

Fig. 5.

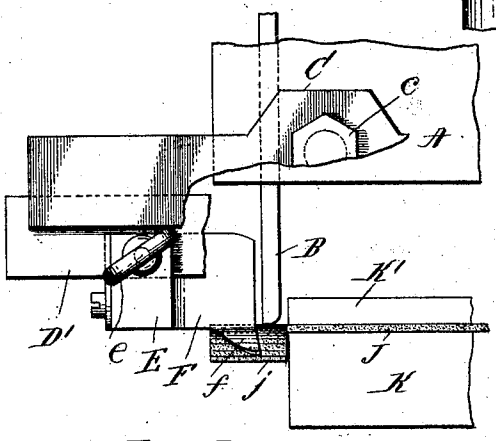

Fig. 6.

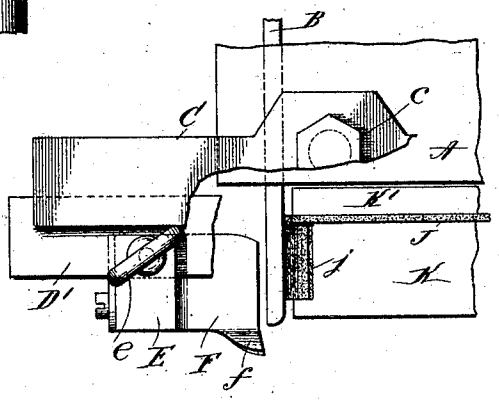

Fig. 7.

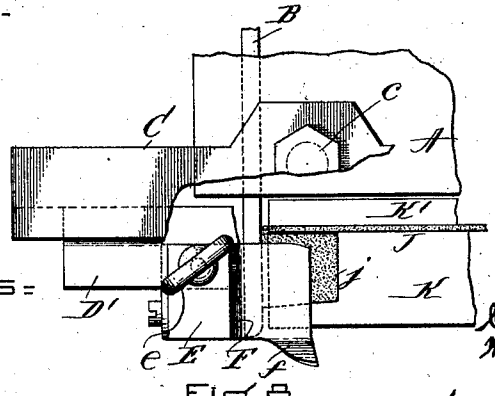

Fig. 8.

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CORNER-TURNING APPARATUS FOR BOX-MACHINES.

985,205. Specification of Letters Patent. **Patented Feb. 28, 1911.**

Application filed August 29, 1906. Serial No. 332,549.

To all whom it may concern:

Be it known that we, CHARLES F. PINKHAM, of Boston, in the county of Suffolk and State of Massachusetts, and WILLIAM H. BABB, of North Andover, in the county of Essex, in said State, both citizens of the United States, have invented a new and useful Improvement in Corner-Turning Apparatus for Box-Machines, of which the following is a specification.

In an application for Letters Patent, Serial No. 321,031, filed June 9, 1906, by Eugene H. Taylor, there is described mechanism especially designed for turning the corners of boxes made upon machines of that character in which the box is formed in the act of inserting the blank into the die by means of the former. In making the box body the parts which are folded to form the sides or ends of the box have continuations which are called tabs which are folded at right angles to attach to the sides or ends.

Our invention relates more specifically to means for turning down these continuations or tabs which are to be gummed against the inner surfaces of the sides or ends of the box, and it will be understood by reference to the drawings, in which—

Figure 1 is a front elevation of so much of the box machine as comprises the folding die. Fig. 2 is a plan of the corner or tab-turning mechanism referred to above. Fig. 3 is a longitudinal section on line 3—3 of Fig. 2. Fig. 4 is a cross section on line 4—4 of Fig. 3. Fig. 5 is a vertical section on line 5—5 of Fig. 1. Figs. 6, 7 and 8 show our improvement in various positions, these views being somewhat enlarged details, a portion of the frame being broken away so that the various positions of the blank may be seen. Fig. 9 indicates the shape of a blank which may be folded upon our machine.

We will not explain the details of the die or pressure mechanism shown in Fig. 1 as all these may be like the corresponding parts shown in the Taylor application above referred to. Briefly, the die comprises side pieces A, and end pieces B, the end pieces being movable slightly by means of screws or otherwise so that at the proper time the necessary amount of pressure may be brought to bear upon the surfaces which have been gummed and are in contact to cause the parts to adhere. To the bottom of each side piece A is attached a rail C by means of bolts c, which rail is shown in cross section in Fig. 4, from which it will be seen that it is grooved so as to receive slide bars D and D^1. These slide bars are preferably held in place by means of a strip c^1 secured by screws c^2 to the under surface of the rail. Each slide bar D, D^1, carries a clamp E, E^1 adjustably secured to it by means of thumb screws e. Each clamp has mounted upon it an arm F, F^1, right-angled in shape and having projecting from one side a finger f, f^1. This finger, it will be noted (see Fig. 5), is at a considerable angle to the arm, and it will be seen, particularly from Figs. 2 and 3 that the tip of the finger lies slightly in advance of the front edge of the arm. This is desirable for reasons hereinafter explained.

The slide bars carrying the arms are caused to approach each other by some convenient means. As shown, we have provided a shaft G carrying a gear G^1 operated by a rack G^2 which is connected with the driving mechanism of the machine in such a way that it reciprocates, giving an oscillatory movement to the shaft G. At each end of this shaft G there is keyed a hub H having an arm h projecting from it and connected by a link h^1 with a slide bar D. The end of this slide bar carries a rack d which engages a pinion D^2 mounted in the rail C and each slide bar D^1 also has a rack d^1 at its inner end which engages the periphery of the pinion D^2 diametrically opposite the rack d, this construction being such that upon the rotation of the shaft G the movement given to each slide bar D causes the rotation of its gear D^2 and a reciprocation of its slide bar D^1 so that each pair of slide bars D, D^1 approach and recede from each other with each oscillation of the shaft G.

The shaft G is given sufficient movement to cause the arms F, F^1 and their fingers f, f^1 to approach each other from a position behind the end pieces B of the die to a position somewhat in front thereof. This will be understood from Figs. 6, 7 and 8, Figs. 6 and 7 showing the first or outward position of one of the arms and its finger and

Fig. 8 showing the same arm and finger in its forward position where it will be noted it has passed the line of the end B of the die.

In addition to the parts above referred to the machine is provided with a former K and follower K^1, both of the character well known in machines of this class and both operated by the ordinary driving mechanism of the machine to receive and clamp the blank and carry it up into the die by which it is folded. These parts are shown in Fig. 5 in the position where the blank J has been clamped between them and they are about to start into the die, the blank being folded as they raise it by its engagement with the walls of the die. Fig. 6 shows the blank lifted slightly higher than in Fig. 5, Fig. 6, being, however, a view taken at right angles to Fig. 5. It will be seen in Fig. 6 that the downward projection of the finger f^1 has caused the tab j, which is to form the corner piece of the blank, to be turned slightly downward and to be given a slight set, which as the blank is carried up into the die as shown in Fig. 7, causes the tab to remain in substantially the position in which the finger f has folded it so that in the second operation of folding it will be sure to fold under the adjacent section j^1. The arm is then moved forward into the position shown in Fig. 8 which wipes the tab around the side of the former and holds it in that position while the former and follower rise still further to cause the engagement of the adjacent section or side of the blank, which is indicated at j^1, with the edge of the corresponding side A of the die. This movement, of course, is caused by a proper timing of the shaft G which after it has moved the arms into position and caused the tabs to be folded down, reverses its movement and withdraws the arms and their fingers so that this portion of the mechanism is in position and condition to receive a new blank and repeat its operation.

While arms such as those shown might be effective to turn tabs of this character, in certain lines of work, and while arms with fingers which do not project as those shown in the drawings, may also be used, we prefer to shape the fingers as shown with a slightly advanced edge and set them at an angle to the arms, for the reason that by this means the first contact between the finger and the tab is near the outer edge of the tab and at a point quite near where it is separated from what is to form the side flap of the cover. By reaching over and engaging this portion of the tab in the first instance it is guided in such a way that it will crease properly and fold into proper position to receive against it the adjacent section j^1 which carrying the gum finally holds it in place. By giving this initial movement to the tab by means of a positively moving part we are enabled to use a blank having tabs separated from the adjacent sections by a slit instead of a V which has heretofore been used and has been considered necessary to prevent possibility of the engagement of the tabs with the edges of the sections adjacent thereto during the folding operation.

We have attached the arms to the slide bars by means of clamps simply because such a means allows very careful and easy adjustment according to any peculiar conditions of the work depending upon the cut of the blank of the material of which it is made. It is evident that other means may be substituted for that shown, but the means shown is simple and has operated very satisfactorily.

What we claim as our invention is:

1. In a box making machine, mechanism for turning tabs comprising a former, a follower, means whereby they are brought together to clamp a blank between them, side pieces and end pieces adapted to form a die within which said former and follower may slide, slide ways mounted on said side pieces and below the lower edge thereof, arms carried by said slide bars, and means whereby the movement of one slide bar in one direction will cause the movement of the other slide bar in the opposite direction, as described.

2. In a box-making machine, tab-turning mechanism comprising arms, each having a finger projecting forward and downward therefrom in combination with a former, a follower, a die and means for moving said arms toward and from the line of movement of said former, whereby each tab is first brought in contact with a finger as the blank is carried to the die and is given a slight bend out of the plane of the blank and afterward the blank is moved partially into the die and each tab is wiped around the former by an arm, as set forth.

3. In a box-making machine, a die, two opposing edges of which project lower than the adjacent sides, a former and a follower adapted to clamp a blank between them and carry said blank within said die whereby the sides of the blank will be folded, the sides engaging the projecting edges of the die being first folded, tab turners, one located at each end of each projecting edge of the die, and means for moving said tab turners toward each other to turn tabs on the sides of the blank which is first to be folded and withdrawn from engagement therewith prior to the folding of the adjacent sides of the blank, said tab turner, each comprising an arm and a finger, said finger being adapted to give the first turning movement to the tab and thereafter to lose contact therewith, and said arm being adapted to complete the turning of the tab, as described.

4. In a box making machine, in combina-

tion with a former, a follower and a die, said former and said follower being adapted to clamp a blank by its middle portion, tab turners comprising arms located in pairs, adapted to move toward and from each other in a line approximately in the plane of the edge of the former, said pairs of tab turners being opposite each other and each arm of each tab turner having a finger projecting outwardly and downwardly and adapted to engage the blank near its edge, as set forth.

5. In a box making machine, means for folding the blank comprising a former and a follower adapted to clamp the blank between them, a die adapted to shape the margin of the blank, and tab turners each having a finger the point of which is adapted to engage a corner of the tab near its outer edge and its line of separation from the blank and insure the disengagement of said corner from the adjacent edge of the blank each finger being mounted upon an arm adapted to fold said tab about said former, as set forth.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."