M. PARIDON.

BOX MAKING MACHINE.

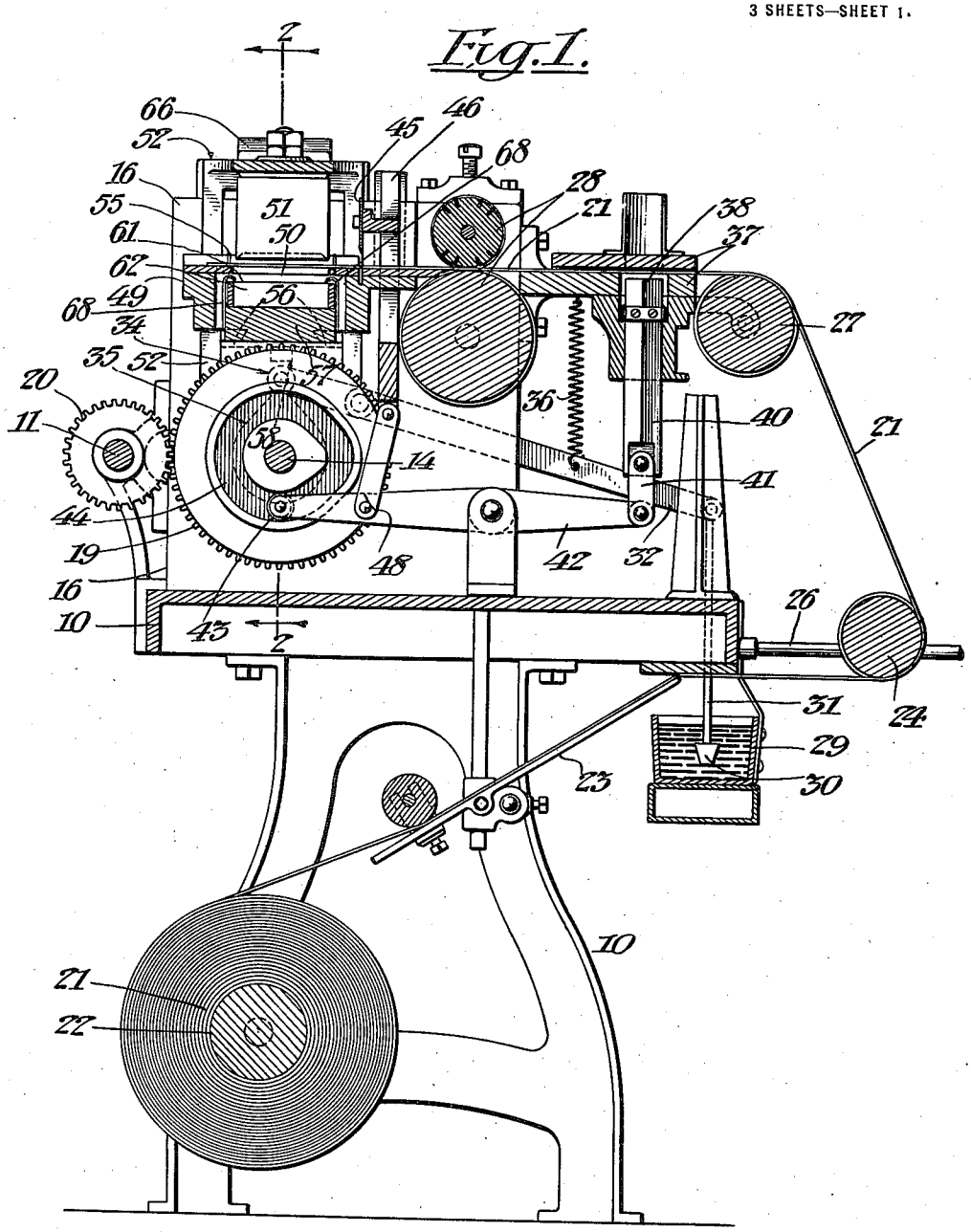
APPLICATION FILED DEC. 17, 1917.

1,277,252.

Patented Aug. 27, 1918.

3 SHEETS—SHEET 1.

Fig. 1.



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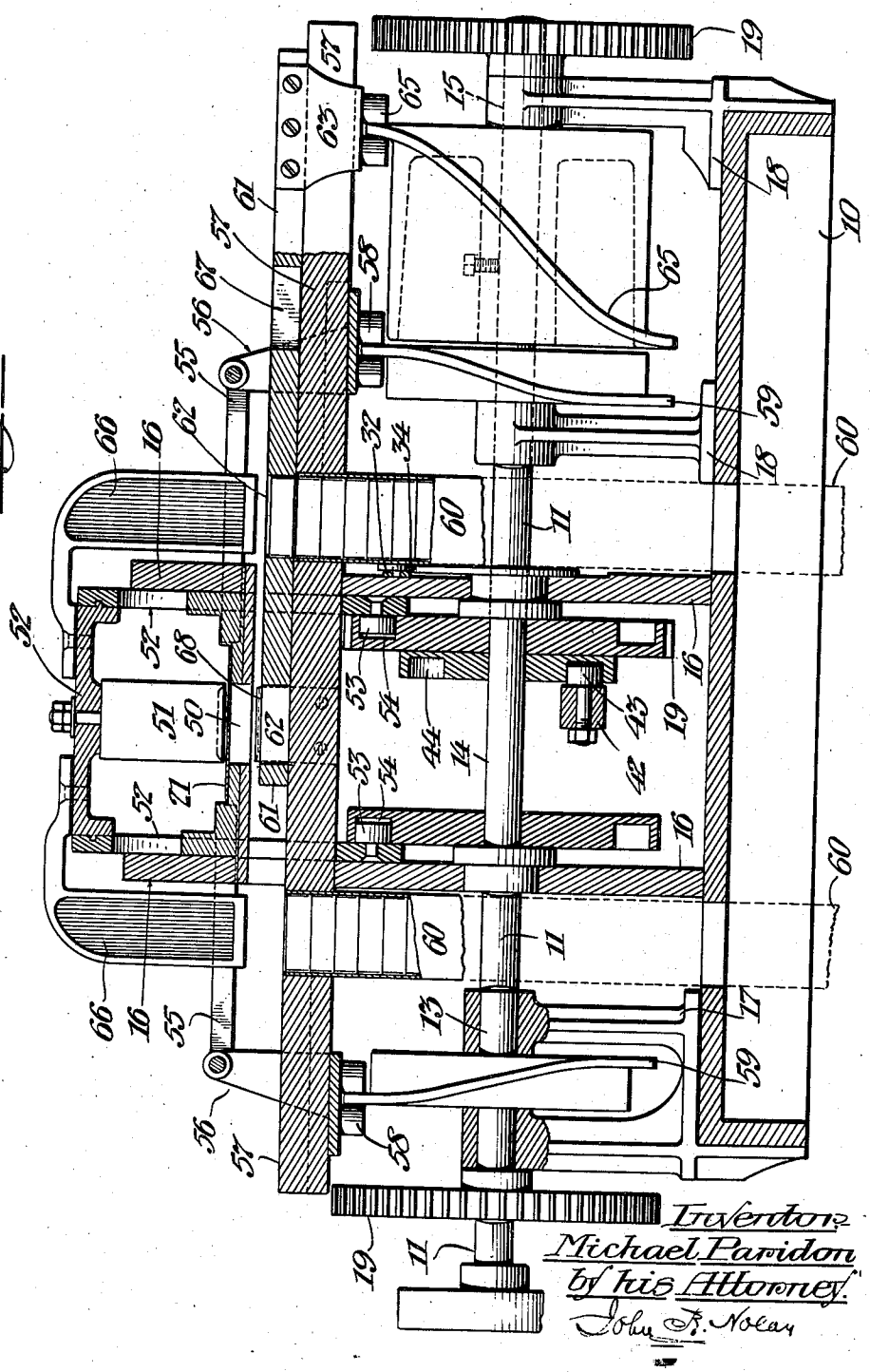
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

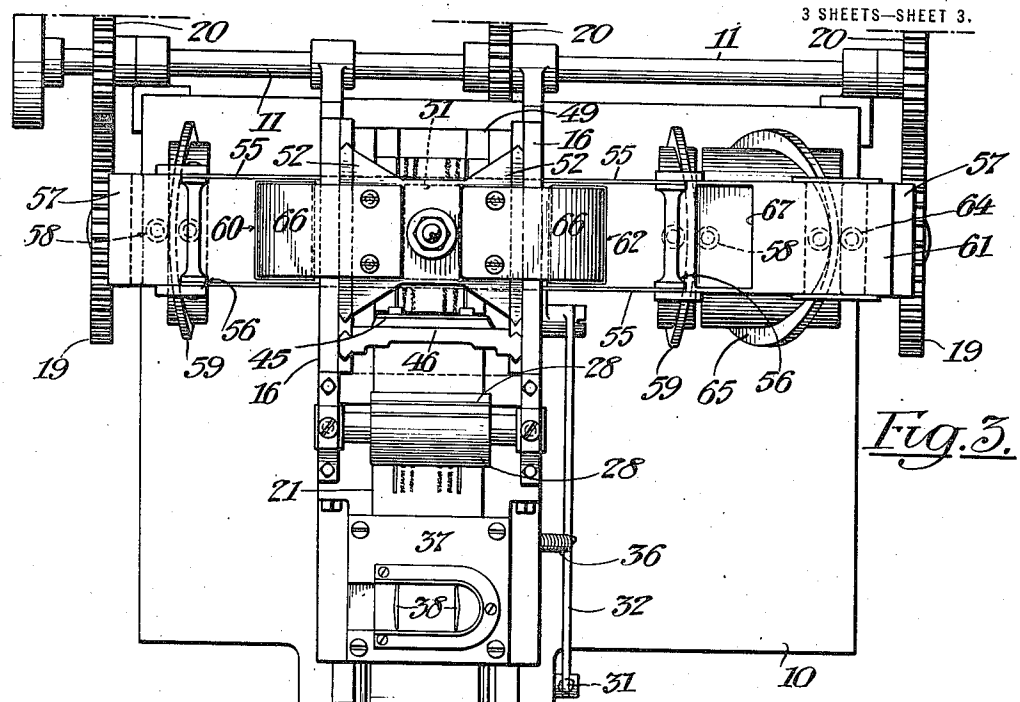


Fig. 3.

Fig. 4.

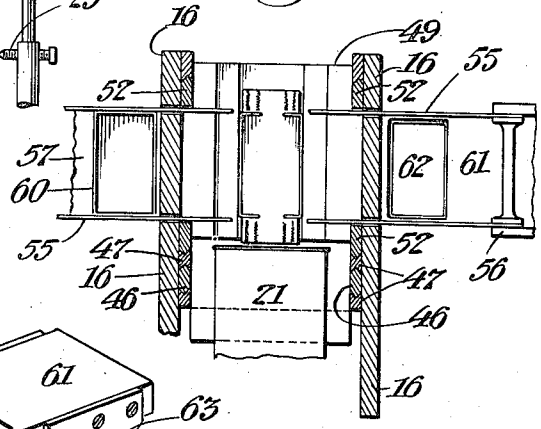
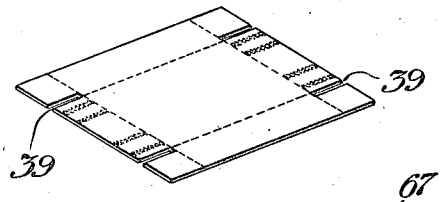


Fig. 6.



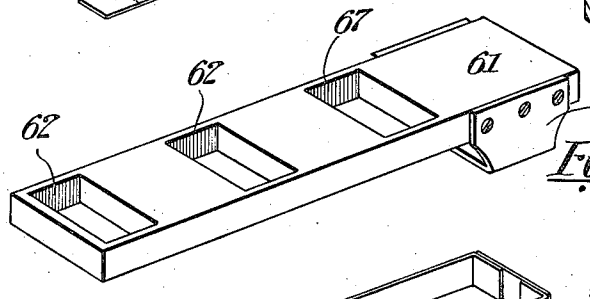
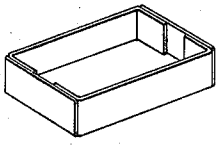


Fig. 5.

Fig. 7.



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UNITED STATES PATENT OFFICE.

MICHAEL PARIDON, OF BARBERTON, OHIO, ASSIGNOR TO THE DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

BOX-MAKING MACHINE.

1,277,252. Specification of Letters Patent. Patented Aug. 27, 1918.

Application filed December 17, 1917. Serial No. 207,444.

To all whom it may concern:

Be it known that I, MICHAEL PARIDON, a citizen of the United States, and resident of Barberton, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Box-Making Machines, of which the following is a specification.

This invention relates to machines for making boxes, and more especially machines of that class whereby paste-board, or other box stock, is drawn from a roll and advanced through the box-making path, including means whereby glue is applied to the stock at intervals; means whereby the stock is appropriately slitted, scored, and cut into box blanks; means whereby the blanks are folded into box form and are deposited thus folded into the hollow links of an intermittently-movable endless chain which holds them until the glue hardens, and means whereby the completed boxes are discharged from the links. A machine of the class mentioned is illustrated in Letters Patent of the United States No. 554,975, dated February 18, 1896, to which reference may be had.

The object of the present invention is to simplify and otherwise improve the construction of box-making machines of the character referred to, and at the same time to attain increased speed of operation with correspondingly increased output of product.

According to my invention I dispense with the endless chain of hollow links and its actuating mechanism, and provide in lieu thereof a positively reciprocating transfer element having box-receivers in spaced relation to each other into which the boxes are delivered in alternation from the box-forming mechanism; two box-receiving chutes arranged below the path of the transfer element and in such spaced relation thereto that the boxes delivered to the said element are transferred thereby to the mouths of the chutes in alternation, and means reciprocable through the respective receivers of the transfer head when they are positioned above the chutes, whereby the boxes are entered into the said chutes in alternation and are progressively advanced therethrough during a sufficient interval of time to insure the drying of the glue on the overlapping end folds of the boxes.

The invention also comprises features of construction and combinations of parts which will be hereinafter described and claimed.

In the drawings—

Figure 1 is a transverse vertical section through a box-making machine embodying my invention.

Fig. 2 is a longitudinal vertical section of the upper portion of the machine, on a larger scale, as on the line 2—2 of Fig. 1.

Fig. 3 is a plan of the machine.

Fig. 4 is a sectional plan of the mechanism for folding the corners of the box.

Fig. 5 is a perspective view of the reciprocating transfer head for the boxes.

Fig. 6 is a view of a box blank.

Fig. 7 is a view of a completed box.

Referring to the drawings, 10 designates a supporting frame, including a table and standards therefor; and 11 designates a main or drive shaft having suitably-disposed bearings 12 on the frame.

13, 14 and 15 designate three short shafts in axial alinement with but spaced apart from each other. The central shaft 14 has its bearings in spaced standards 16 on the table, and the end shafts 13, 15 are journaled in suitably-disposed bearing posts 17, 18 respectively, on the table. Each of the short shafts is provided with a spur wheel 19 in mesh with a pinion 20 on the main shaft; the ratio of the gearing being such that the three short shafts are correspondingly and concurrently driven from the main shaft.

21 designates paper or paste-board stock for the boxes, which stock is drawn from a roll 22 mounted between the standards of the main frame. The stock as it leaves the roll is directed upwardly upon an inclined bridge bar 23 beneath the table; thence horizontally to and about a roller 24 supported between adjustable bearing points 25 borne by brackets on projecting rods 26 at one end of the table; thence about an elevated roller 27; thence horizontally between a pair of feeding and scoring rollers 28 by means of which the free end of the stock to which glue has been previously applied at suitable spots, is appropriately scored and intermittently advanced to coördinated blank cutting and forming mechanisms.

29 designates a glue pot supported beneath

the table at the rear of the machine; said pot having therein suitable means for applying glue to the undersurface of the box stock at the portions where the corner folds of the sides of the completed boxes are secured. Such means in the form illustrated includes a vertically-movable glue applying member 30 supported within the glue pot by a plunger 31 which is suitably guided on the table. The upper end of the plunger is jointed to the longer arm of a lever 32, the shorter arm of which is provided with a roller 34 which is maintained in operative contact with a cam 35 on the shaft 14 by means of a suitably-disposed spring 36 (see Fig. 1). The cam and spring coöperate to oscillate the lever 32, and thereby effect the timely vertical reciprocation of the plunger and its glue-applying member.

The stock as it advances to the feed rollers 28 passes through a guide path between two spaced plates 37, across which reciprocate at predetermined intervals spaced punches 38 that slit the paper at the portions thereof (as at 39, Fig. 6) where the side corners of the boxes are to be folded. The punches are carried by the upper end of a plunger 40 which is connected at its lower end by means of a link 41 with one arm of a rocker lever 42, the other arm of which is provided with a roller 43 which runs in the cam groove 44 of a cam on the shaft 14.

45 designates the cutting knife for severing the scored and slitted blank lengths from the end of the stock. This knife is carried by the upper portion of a vertically-reciprocative cross-head 46 which is guided in ways 47 on the standards 16 rising from the table. The cross-head is connected at its lower end by means of a link 48 with the rocker-lever 42. The severed blank is supported upon a die structure 49 having therethrough a rectangular opening 50 in vertical alinement with a former 51 carried by a vertically-reciprocable frame 52, which die structure is supported by and between the standards 16. The depending side members of the frame 52 are provided with rollers 53 which enter the grooves 54 of cams on the shaft 14; the contour of the grooves being such that when the blank is imposed over the opening of the die structure the former 51 is caused to descend a short distance so as to force the blank down into the die opening and thus fold up the side edges of the blank to form the sides of the box. One of the cams is preferably constituted by one of the gear wheels 19 on the shaft 14.

55 designates a series of suitably-disposed fingers which are mounted to reciprocate toward and from the respective slitted ends of the bent-up sides of the blank. These fingers in their inward movement fold the corner ends inward at right angles, or substantially so, to the sides of the box. The fingers are carried by slides 56 which are mounted in guide ways in a horizontal bed 57 that is supported above the table by means of the standards 16. The slides have depending anti-friction rollers 58 which embrace appropriate rib cams 59 on the respective shafts 13, 15.

The mechanism thus far described is substantially the same in construction and operation as in the machine disclosed in the patent above referred to, excepting that in the present apparatus three short cam shafts in spaced endwise relation to each other are employed, instead of a single long shaft.

60 designate two chutes fitted into and depending from rectangular apertures in the bed 57, each of which chutes is interiorly of cross-sectional form and size corresponding with the opening in the die structure, so as to permit the entry of the boxes snugly into the chute and their passage therethrough under the influence of pressure. The chutes are equidistant from the median line of the box former and die structure, and they depend through the spaces between the adjacent ends of the shafts 13, 14, 15 respectively.

Mounted on the bed 57 so as to be reciprocable beneath the overhanging die structure, is a transfer head 61 having two rectangular openings 62 therethrough, whereof each corresponds in size with the die opening. These openings 62 are in such spaced relation to each other that when one is in register with the die opening the other is in register with the mouth of one of the chutes. One end of the head is provided with a bracket 63 which slidingly embraces the bed 57, said bracket being provided on its under side with depending anti-friction rollers 64 which embrace a rib cam 65 on the adjacent shaft 15. The contour of the cam rib is such that the head is reciprocated longitudinally of the bed so as to position the openings of the head alternately in register with the die-opening.

As each opening 62 of the head is brought beneath the die opening the former 51 is further depressed, thus forcing the blank down through the latter and into the opening of the head, and, perforce, folding up the ends of the blank and completing the box. This done, the cams 54 operate to raise the head 52 and the former to their original position. Thus the boxes are successively formed and entered into the two openings of the head in alternation. Now, as each opening, with its contained box, is brought into register with the mouth of a chute the box is ejected from the opening and into the chute by means of a plunger 66 carried by the reciprocating cross-head 52. Hence as a box is being entered into one of the openings of the transfer head by means of the former 51 a box is being ejected from the

other opening of the head into its proximate chute. There are two plungers 66, one overhanging each of the chutes, which plungers are simultaneously operated, but one moves idly while the other is acting upon a box contained in the transfer head.

In order to provide clearance for the right hand ejecting plunger 66 (as viewed in Fig. 2) during its idle stroke, the transfer head is provided with a suitably-spaced additional opening 67. Of course the head may be otherwise shaped to afford the requisite clearance for the plunger, but the form shown is preferable by reason of its structural simplicity.

68 designate two upstanding laterally-yielding stripper plates secured to the respective longitudinal edges of the bed. The upper portions of these plates are turned inwardly and are so positioned as to engage the upper edge of each side of the box immediately when it is entered into an opening of the transfer head by the former 51; thereby preventing upward movement of the inserted box during the ascent of the former.

From the foregoing it will be seen that my invention provides a box making machine of simple and relatively inexpensive construction. The elimination of the long chain of holders which required nice fitting and mounting, as well as much attention and adjustment, materially reduces the cost of construction and operation; and the arrangement in coöperative relation to the box-forming instrumentalities of the relatively light transfer head, the two box-receiving chutes and the ejecting plungers, insures an efficient high speed machine.

It is to be understood that my invention is not limited to the specific construction shown and described, as the mechanism may be variously modified within the principle of my invention and the scope of the appended claims.

I claim—

1. The combination of box-forming mechanism including a reciprocating former, two box-receiving chutes arranged in spaced relation to each other having their mouths in a horizontal plane below the said mechanism, a transfer element reciprocable in a plane between the said mechanism and the mouths of the chutes, said element having two box-receivers in such spaced relation to each other that by actuation of the element the receivers are positioned to receive the boxes from the box-forming mechanism and transfer them adjacent the mouths of the chutes in alternate succession, means for reciprocating said element, and means operable simultaneously with the reciprocating former for ejecting the boxes from the transfer head into the chutes in alternation.

2. The combination of box-forming mechanism, including a reciprocating former, two box-receiving chutes arranged in spaced relation to each other having their mouths in a horizontal plane below the said mechanism, a transfer element reciprocable in a plane between the said mechanism and the mouths of the chutes, said element having two box-receivers in such spaced relation to each other that by actuation of the element the receivers are positioned to receive the boxes from the box-forming mechanism and transfer them adjacent the mouths of the chutes in alternate succession, means for reciprocating said element, box ejecting plungers overhanging the respective chutes, and means whereby the said plungers are reciprocated simultaneously with the said former.

3. The combination of box-forming mechanism, including a reciprocating former, a die structure and end folders, a series of short shafts in spaced endwise relation to each other, means for simultaneously rotating said shafts, means, including cams on certain of said shafts, for actuating the said end folders, means, including cams on one of said shafts, for actuating the said former, two box-receiving chutes arranged in spaced relation to each other having their mouths in a horizontal plane below the said mechanism and depending through the spaces between the adjacent ends of the shafts, a slide reciprocable in a plane between the said mechanism and the mouths of the chutes, said slide having two box-receiving openings in such spaced relation to each other that, by actuation of the slide, the openings are positioned to receive the boxes from the box-forming mechanism and transfer them adjacent the mouths of the chutes in alternate succession, a support for said slide, means including a cam on one of said shafts, for reciprocating the said slide, and means operable simultaneously with the reciprocating former for ejecting the boxes from the slide into the chutes in alternation.

4. The combination of box-forming mechanism, including a reciprocating former, a die structure and end folders, a series of short shafts in spaced endwise relation to each other, means for simultaneously rotating said shafts, means, including cams on certain of said shafts, for actuating the said end folders, means, including cams on one of said shafts, for actuating the said former, two box-receiving chutes arranged in spaced relation to each other having their mouths in a horizontal plane below the said mechanism and depending through the spaces between the adjacent ends of the shafts, a slide reciprocable in a plane between the said mechanism and the mouths of the chutes, said slide having therein three openings in spaced relation to each other, two of said openings being adapted to receive the boxes from the box-forming mechanism and

transfer them adjacent the mouths of the chutes in alternate succession, and the remaining opening affording clearance for an ejecting plunger, a support for the slide, means, including a cam on one of said shafts, for reciprocating the said slide, box-ejecting plungers overhanging the respective chutes, and means whereby the said plungers are reciprocated simultaneously with the said former.

Signed at Barberton, in the county of Summit and State of Ohio, this 12th day of December, A. D. 1917.

MICHAEL PARIDON.