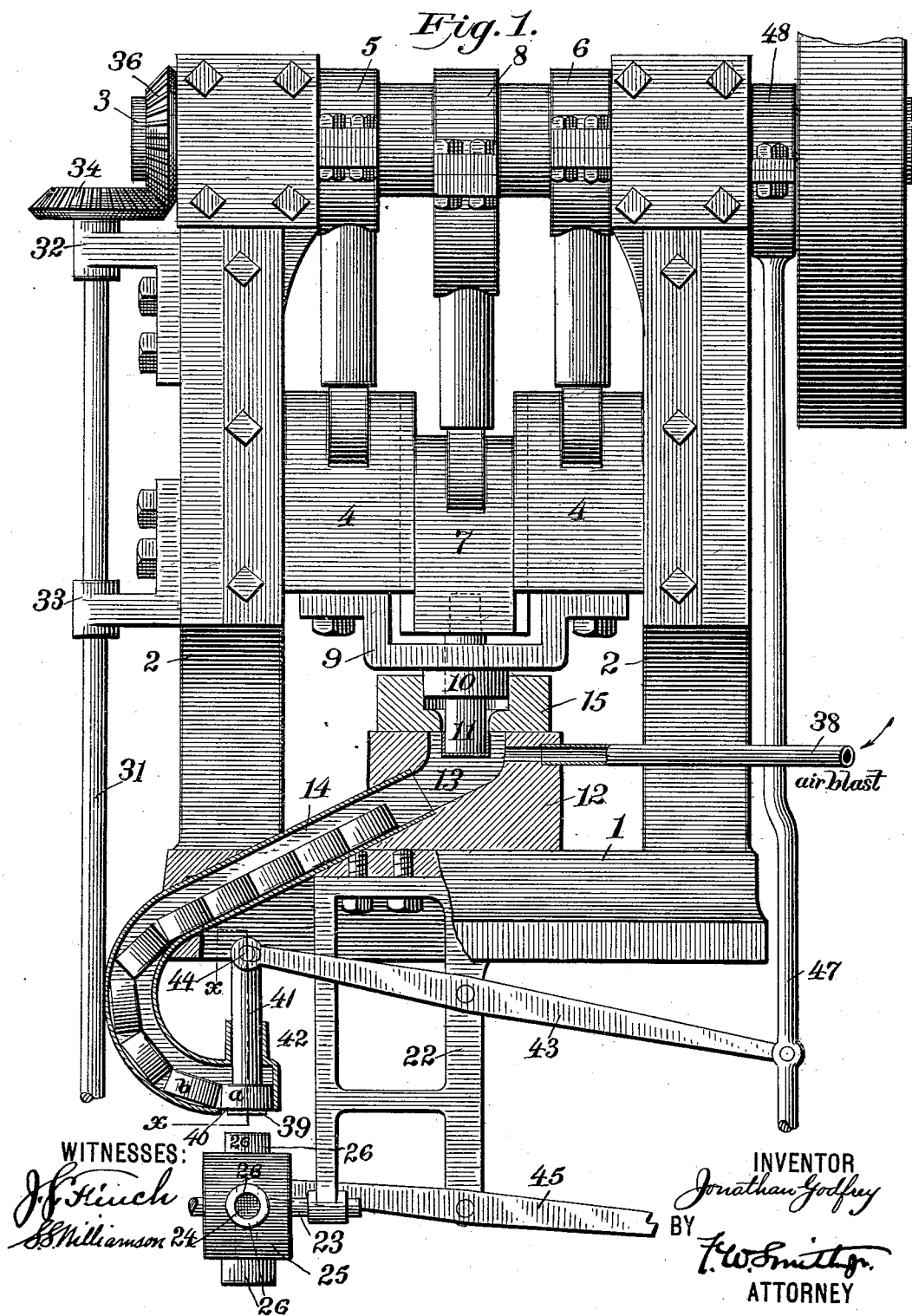


J. GODFREY.
MACHINE FOR MAKING PAPER BOXES.

No. 483,957.

Patented Oct. 4, 1892.

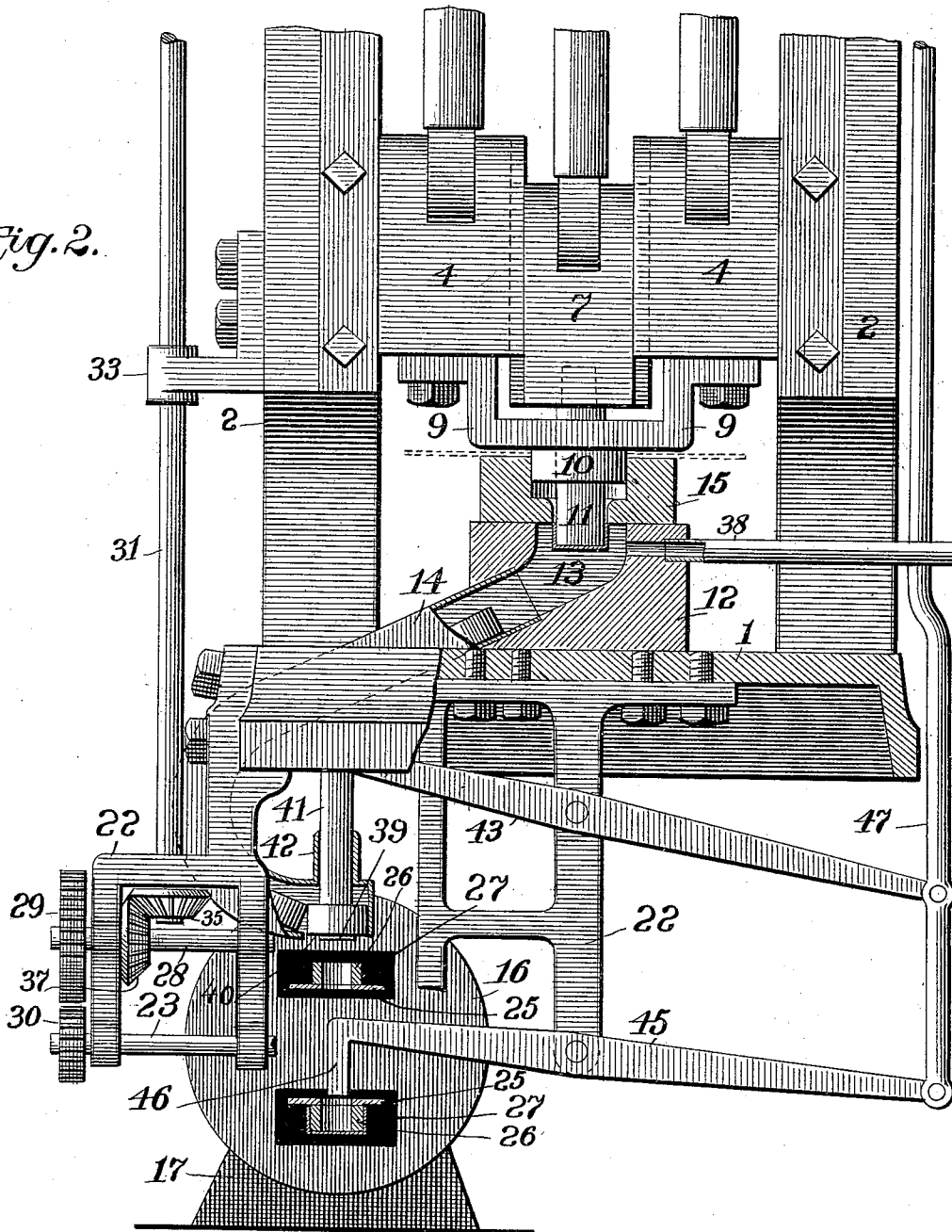


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Fig. 2.



WITNESSES:

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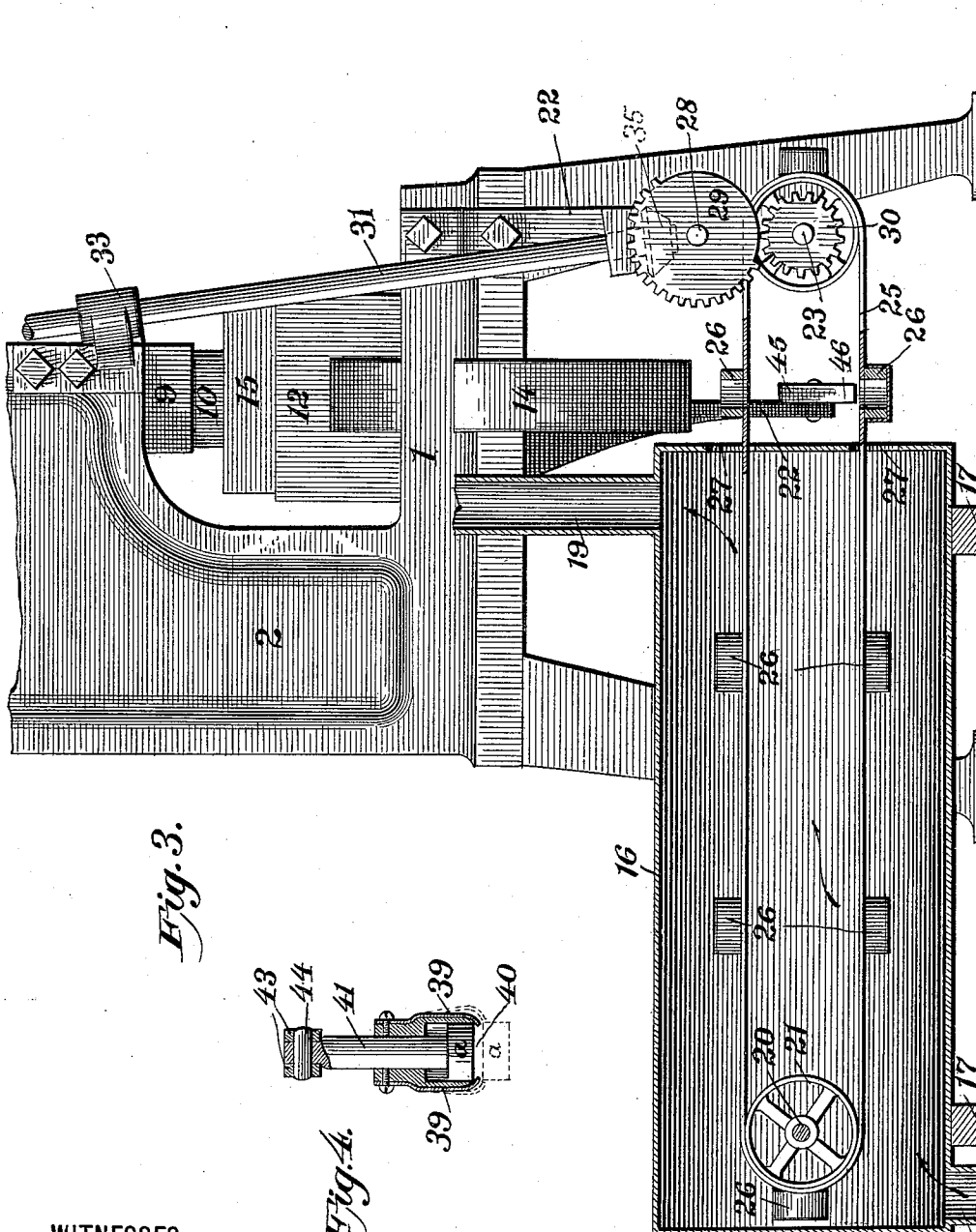


Fig. 3.

Fig. 4.

WITNESSES:

J. F. Hinch.
S. S. Williamson.

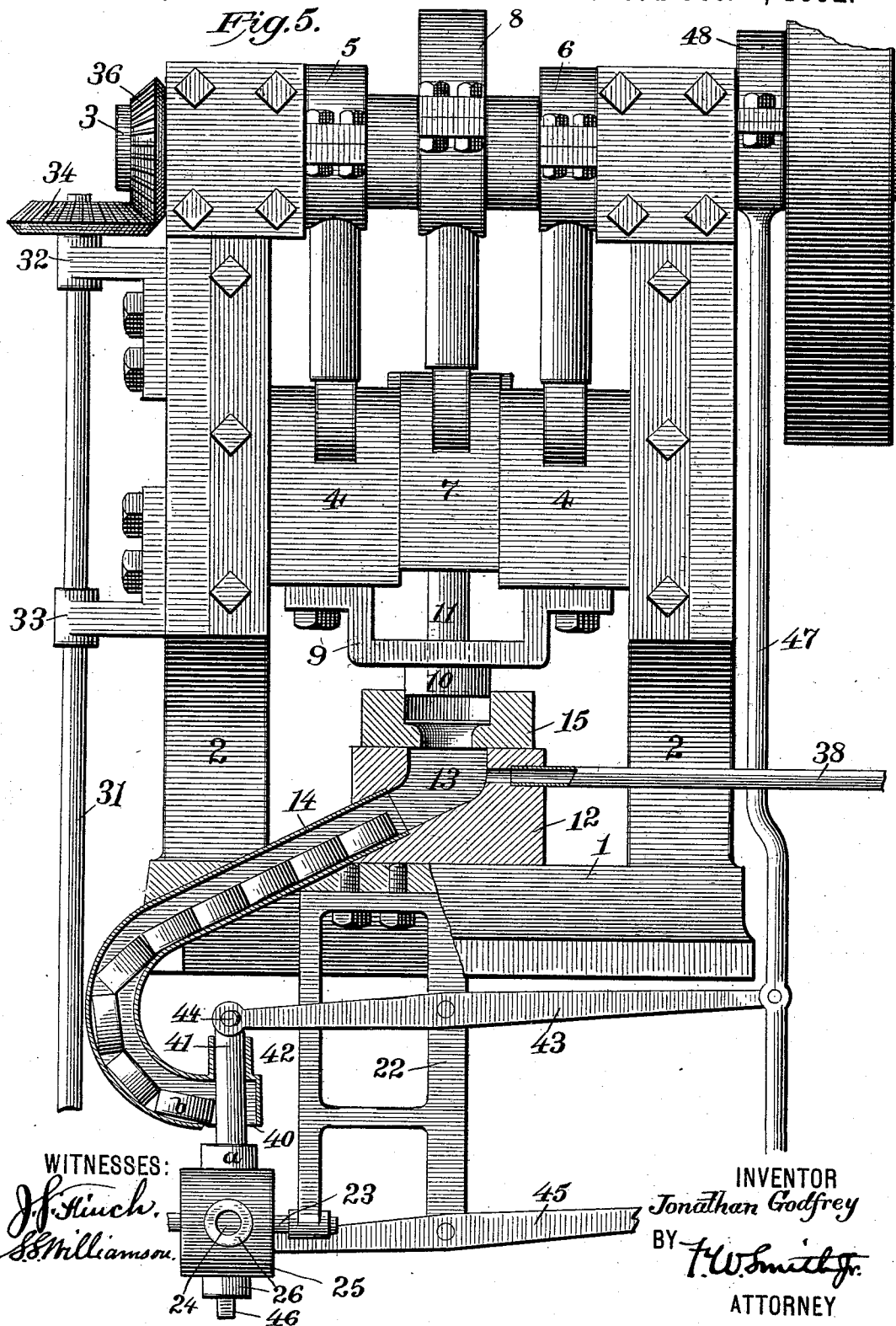
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Fig. 5.



UNITED STATES PATENT OFFICE.

JONATHAN GODFREY, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR OF ONE-HALF TO W. E. BAILLIE, OF SAME PLACE.

MACHINE FOR MAKING PAPER BOXES.

SPECIFICATION forming part of Letters Patent No. 483,957, dated October 4, 1892.

Application filed November 5, 1891. Serial No. 410,990. (No model.)

To all whom it may concern:

Be it known that I, JONATHAN GODFREY, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Machines for Making Paper Boxes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in machines for manufacturing boxes from paste or straw board, and for a full and complete understanding of my invention I would refer to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a front elevation, partly in section, of my newly-invented machine; Fig. 2, a detail sectional front elevation showing particularly the operation of the devices whereby the boxes are forced upon and off from the traveling apron; Fig. 3, a detail side elevation, the drying-drum being in section; Fig. 4, a detail section at the line *xx* of Fig. 1; and Fig. 5, a view similar to Fig. 1, but illustrating the operative parts in their relative positions immediately after a blank has been cut.

Similar numbers and letters denote like parts in the several figures of the drawings.

1 is the bed of an ordinary power-press; 2, the uprights rising therefrom; 3, the shaft, and 4 the gate guided within the upright and actuated from the eccentrics 5 6 on the shaft in the usual manner.

7 is an independent gate adapted to slide freely in bearings at the center of the gate 4, said gate 7 being actuated from the eccentric 8 on the shaft 3.

9 is a yoke, which is secured to opposite sides of the gate 4 and extends beneath the gate 7, and 10 is the blanking-die secured to the bottom of said yoke.

11 is the shaping-die which cups up the boxes and depends from the gate 7. The die 10 is perforated to admit the die 11 there-through, for the purpose presently explained.

12 is a block secured on the bed 1 and having a chamber 13, which leads into a chute 14,

which latter is secured within the bed in any suitable manner.

15 is the die-block mounted on the block 12 and chambered to afford the complements of the dies 10 11.

16 is a drying-drum, which is located below the bed of the press and is supported in any suitable manner, as by foot-blocks 17.

18 is the hot-air inlet and 19 the outlet, respectively located at the top and bottom of the drum.

20 is a shaft journaled in the rear end of the drum and having a pulley 21, mounted thereon.

22 is a hanger secured to the bed 1, and 23 a shaft journaled in said hanger and having mounted thereon a pulley 24.

25 is an endless apron around the pulleys 21 24, said apron having secured thereon at regular intervals perforated drying forms or blocks 26. The forward end of the drum has openings 27 to admit the apron and blocks during their travel.

28 is a short shaft journaled in the hanger 22 and having thereon a mutilated gear-wheel 29, which meshes with a spur 30 on the shaft 23.

31 is a vertical shaft journaled in brackets 32 33 at the side of one of the uprights and having at the top and bottom bevel-gears 34 35, which mesh, respectively, with bevel-gears 36 37 on the shafts 3 and 28.

From the foregoing it will be clear that rotary motion is imparted to the pulley 24 from the shaft of the press. It also will be clear that the gear 29 will constantly revolve, but that the spur 30 will revolve intermittingly, owing to the mutilation of the gear 29. It is necessary that the spur 30 should be stationary at certain predetermined times, in order that the boxes may be deposited on and driven off from the blocks on the apron. As fast as the boxes are stripped from the shaping-die they fall within the chute and are impelled down the latter by an air-blast, which enters by a pipe 38, which latter leads into the upper end of the chute. This blast is not absolutely necessary, since the boxes will generally slide down the chute by gravity, but they are so very light that I prefer to use the air-blast as a sure means for driving the boxes. The bottom of the chute terminates directly

over the apron, and is at that point open, as seen at 40; but two slight springs 39 are secured to opposite sides of the chute and extend beneath the opening in the latter to afford ledges, on which the lowermost box may rest, as shown at Figs. 1 and 4.

41 is a plunger guided within a housing 42, extending upward from the chute immediately above the opening 40, and 43 is a lever pivoted to the hanger 22 and loosely connected at 44 to the top of the plunger 41.

25 is a lever pivoted to the hanger 22 and having a stud 46 depending from its inner end immediately over the lower plane of the apron.

47 is a vertical rod depending from a strap 48 around an eccentric (not shown) on the shaft 3, and to this rod the outer ends of the levers 43 45 are pivoted, so that it will be readily understood that the vertical reciprocation of the rod 47 will effect a similar reciprocation of the plunger 41 and stud 46. The timing of the gears 29 30 and the rod 47 is such that when the travel of the apron is arrested the plunger and stud will be in their elevated positions and a block 26 on the upper plane of the apron will have been brought immediately beneath the plunger, while a similar block on the lower plane of the apron will have been brought immediately beneath the stud, as will be readily understood by reference to Fig. 2. The apron will remain stationary until the rod 47 has been elevated to depress the plunger and stud.

The operation of my improvement is as follows: The pasteboard in dampened condition is fed beneath the dies 10 11 on the block 15. The die 10 operates in advance of the die 11 to cut out a blank, as shown at Fig. 5, and the die 11 afterward descends to shape the blank into cup form, as shown at Fig. 2. When the die 11 ascends, the boxes will strip themselves from said die by impact against the bottom of the block 15, and will fall within the chute and be driven down the latter by the air-blast. Referring to Fig. 1, I will designate the lowermost box in the chute by the letter *a* and the succeeding box by the letter *b*. The box *a* is supported by springs 39, as shown particularly at Fig. 4, and when the plunger 41 descends it will force said box down and over the block 26 immediately thereunder. Simultaneous with this action of the plunger the stud 46 will be driven through the block 26 beneath it and will strip the box therefrom. The blocks 26 will during the travel of the apron be successively brought beneath the plunger 41 for the reciprocation of the boxes, thence carried through the drying-drum, and finally brought in succession beneath the stud 46, whereby the boxes are stripped and allowed to drop into any suitable receptacle.

When the box *a* has been deposited on the apron and the plunger has been returned to normal position, the box *b* will be driven into the end of the chute by the air-blast and will

be forced down upon the apron by the next descent of said plunger.

The drying of the boxes while on a block gives very good results in that the sides of the boxes will not become warped as would be the case were said boxes simply deposited on a drying-shelf.

Heretofore in the manufacture of these boxes they have in some instances been deposited on drying-shelves after shaping by dies; also, in some instances they have after being shaped been forced through an elongated hot tube.

It has been demonstrated that these boxes made from damp pasteboard, if dried on shelves or in mass, will warp out of shape, thereby necessitating a final shaping operation. Again, if after they are struck up by the dies said boxes are forced through an elongated hot tube they will be but imperfectly dried, while the operation of stripping them from the form on which they are forced prior to being driven through said tube frequently causes a distortion of the boxes. There is, however, an additional objection to the forcing of the boxes through a hot tube, due to the fact that the sides of the boxes are rendered thinner, and consequently are drawn out by the compression between the form and tube, thus seriously affecting the uniformity of the boxes. The gist of my present invention rests in the broad idea of automatically forcing the boxes on and off forms preparatory to drying and not in any particular adaptation of chute or traveling apron.

My invention is applicable to the manufacture of round, square, or any other shape of box.

I claim—

1. In a machine for making paper boxes, the combination, with suitable dies for forming the boxes from a moist strip of paste or straw board, of a drying-drum, an endless apron traveling in said drum and provided with blocks for the reception of the moist boxes, means for depositing said boxes successively upon said blocks, and means for stripping said boxes from said blocks, substantially as set forth.

2. In a machine for making paper boxes, the combination of suitable dies for forming the boxes from moist pasteboard, drying-forms beneath said dies, means for forcing said boxes while moist upon said forms prior to drying, and means for stripping said boxes from said forms after the completion of the drying, substantially as set forth.

3. In a machine for making paper boxes from moist pasteboard, the combination, with suitable dies whereby the boxes are shaped, of drying-forms, means for automatically bringing said forms to a predetermined position, instrumentalities for depositing the boxes while moist on said forms preparatory to drying, and instrumentalities for stripping said boxes from said forms after drying, substantially as set forth.

4. In a machine for making paper boxes from moist pasteboard, the combination of suitable dies for shaping the boxes, automatically-controlled drying-forms, and appliances for forcing the boxes while moist successively upon said forms preparatory to drying, substantially as shown and described.

5. The combination of the shaping-dies, the apron adapted to travel within the drying-drum, the forms carried at regular intervals by said apron, the chute whereby the boxes are successively delivered above the forms,

the reciprocatory plunger whereby the boxes are forced upon said forms, and the reciprocatory stud whereby the boxes are stripped from said forms, substantially as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JONATHAN GODFREY.

Witnesses:

F. W. SMITH, Jr.,
J. S. FINCH.