

(No Model.)

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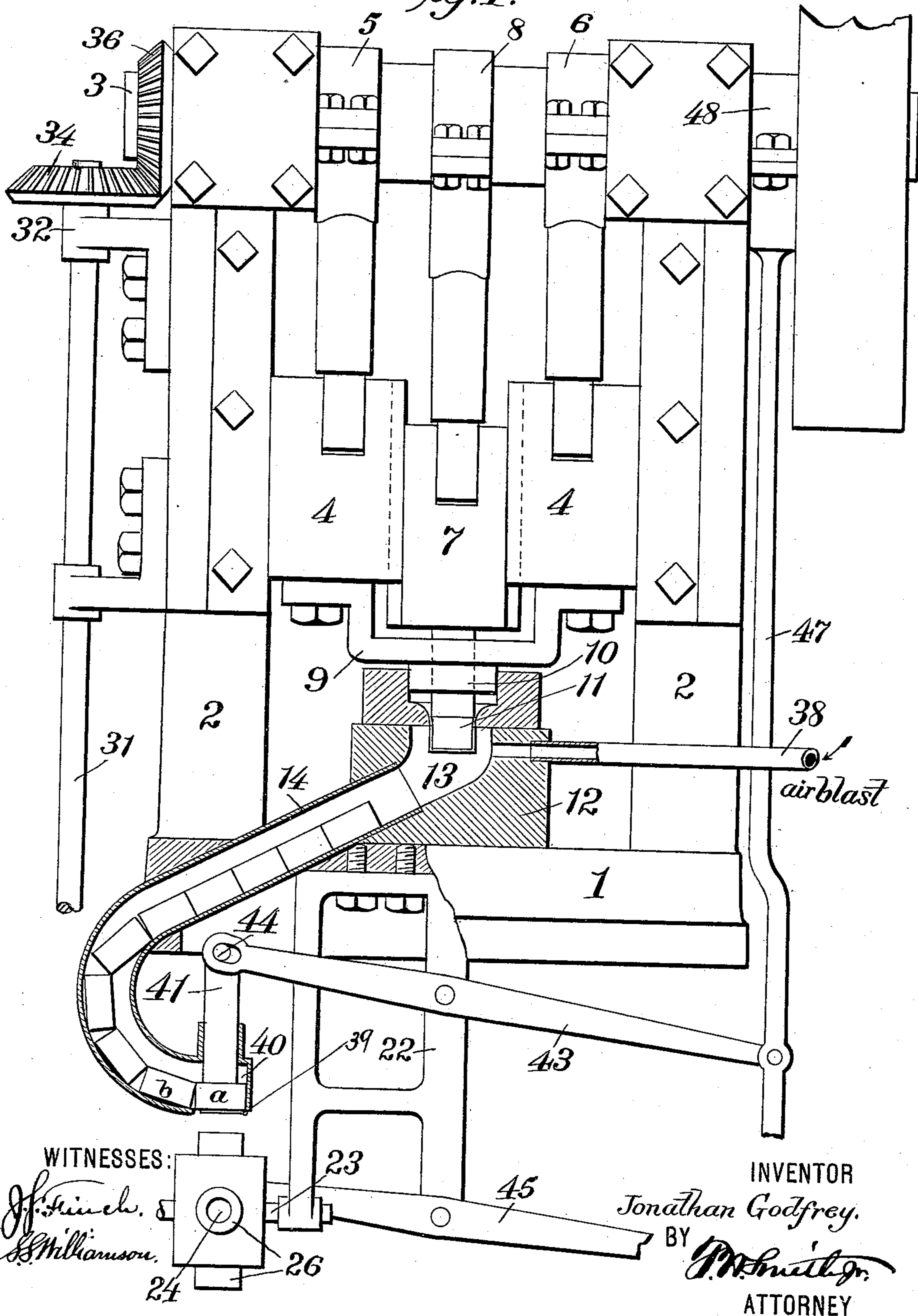
J. GODFREY.

PROCESS OF MAKING BOXES FROM PASTE OR STRAW BOARD.

No. 483,958.

Patented Oct. 4, 1892.

Fig. 1.



(No Model.)

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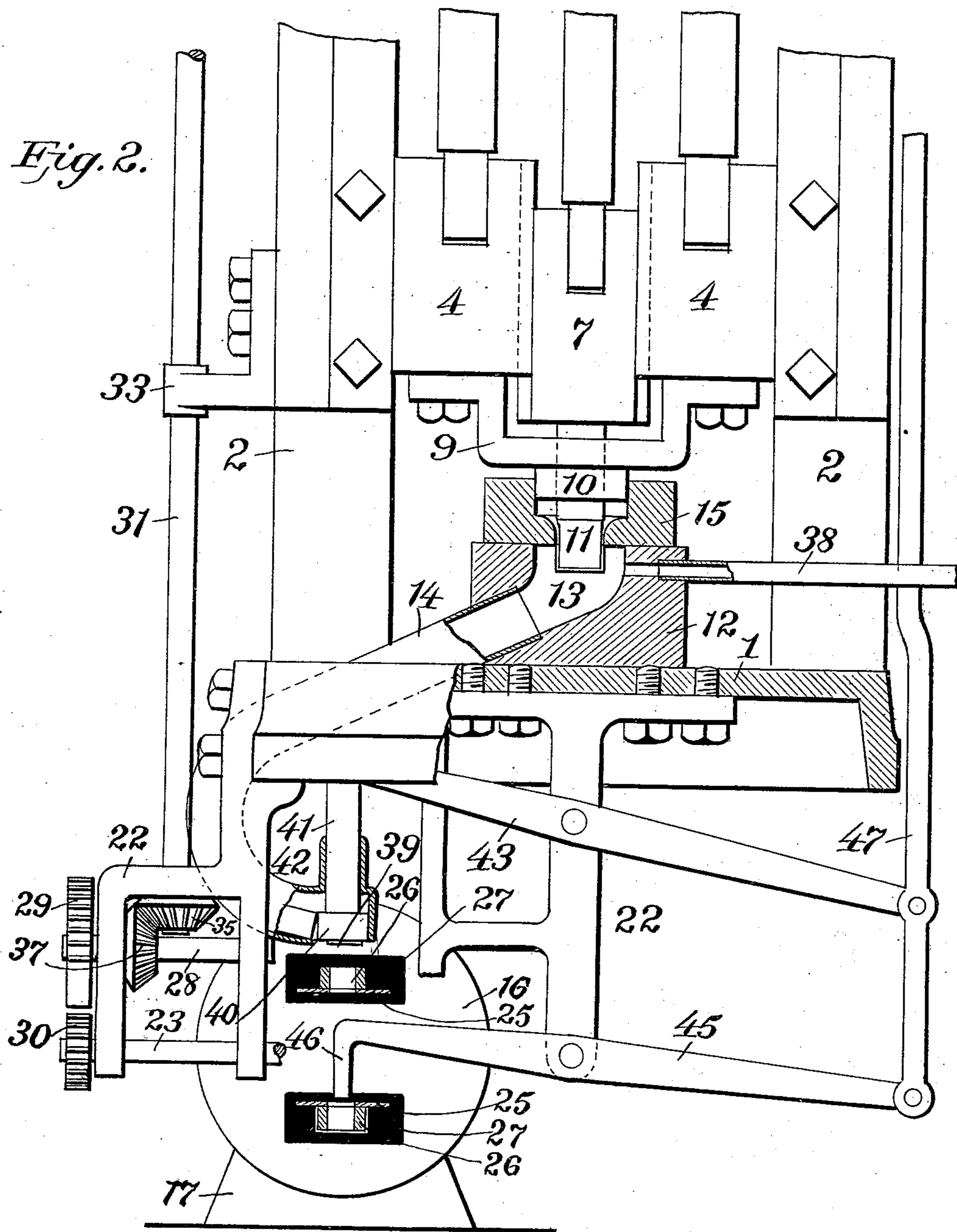
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Fig. 2.



WITNESSES:

J. Finch.
S. Williamson

INVENTOR

Jonathan Godfrey.

BY

J. M. Smith Jr.
ATTORNEY

(No Model.)

4 Sheets—Sheet 3.

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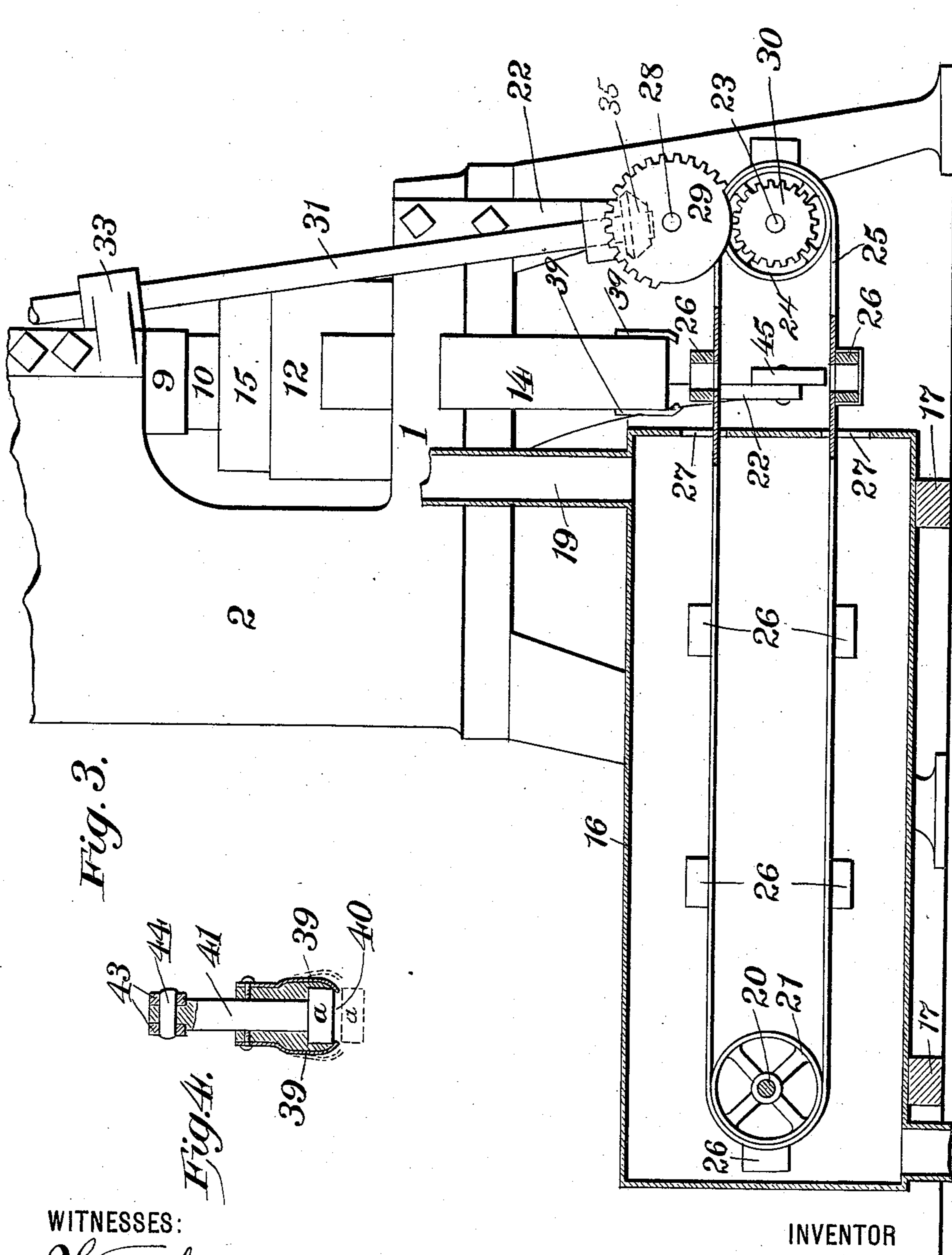


Fig. 3.

Fig. 4.

WITNESSES:

J. Hinch.
S. Williamson.

INVENTOR

Jonathan Godfrey.

BY

P. D. Smith.

ATTORNEY

(No Model.)

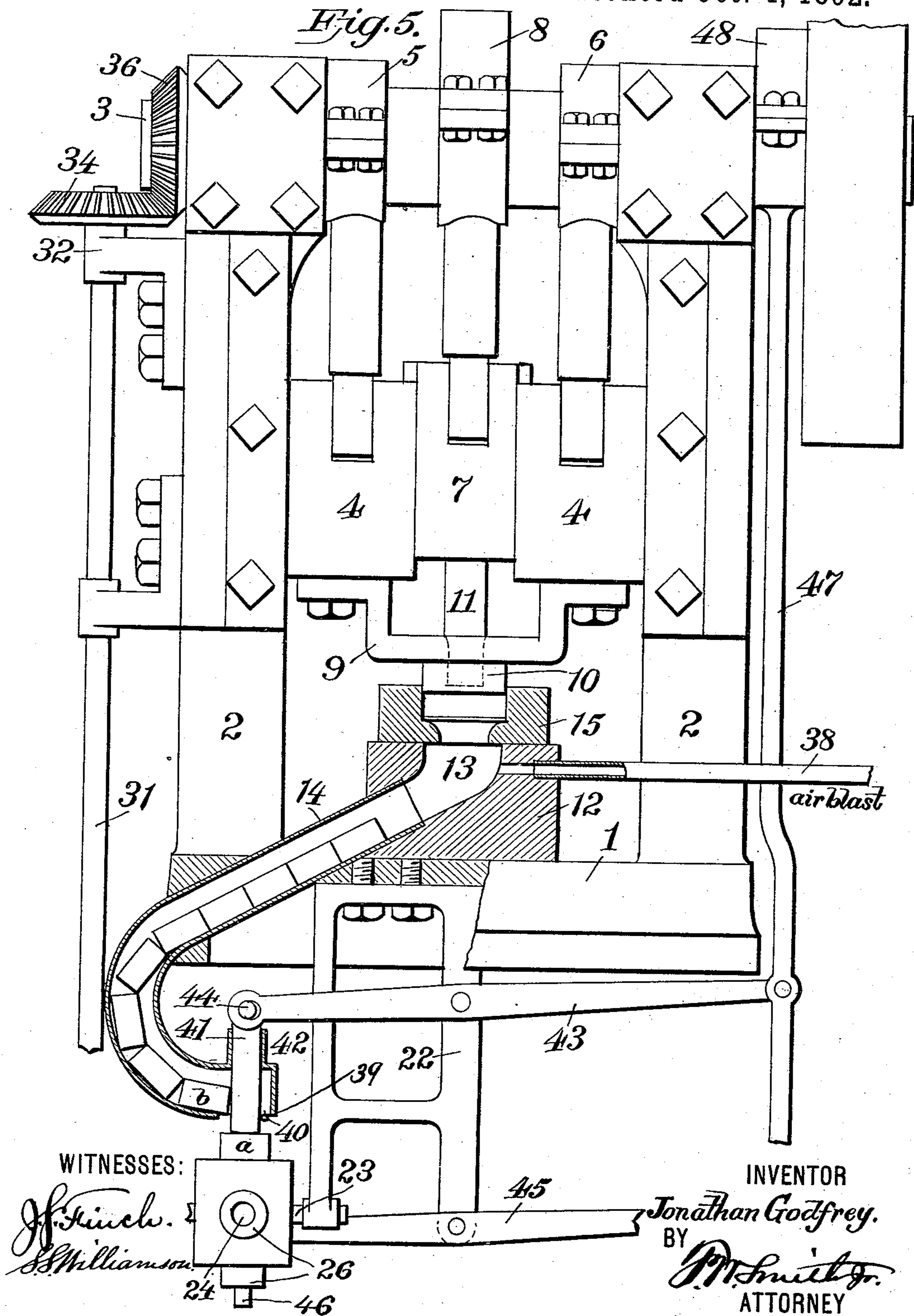
4 Sheets—Sheet 4.

J. GODFREY.

PROCESS OF MAKING BOXES FROM PASTE OR STRAW BOARD.

No. 483,958.

Patented Oct. 4, 1892.



UNITED STATES PATENT OFFICE.

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

PROCESS OF MAKING BOXES FROM PASTE OR STRAW BOARD.

SPECIFICATION forming part of Letters Patent No. 483,958, dated October 4, 1892.

Application filed April 8, 1892. Serial No. 428,371. (No specimens.)

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 Processes of Making Boxes from Paste or Straw Board; 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 the process of manufacturing boxes from moist paste or straw board; and for a full and complete understanding of my invention I would refer to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a front elevation, partly in section, of a machine for carrying out my invention; 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 uprights 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 hav-

ing a chamber 13, which leads into the 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 intermittently, owing to the mutilation of the gear 19. 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 bot-

tom 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 openings 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.

45 is a lever pivoted to the hanger 32 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 46 are pivoted, so that it will be readily understood that the vertical reciprocation of the rod 47 will effect a similar reciprocation of the 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 directly 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 reception 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 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 sides of the boxes made from moist paste or straw board have a tendency to shrink inwardly or to flare outwardly during drying, according to the shape of the dies which cup them up.

Boxes whose sides tend to shrink inwardly during drying I force on and around a block preparatory to drying, while in the instance of boxes whose sides have a tendency to open or flare outwardly I force such boxes within a block preparatory to drying, so that in both instances the boxes when dried will not be distorted. The drying-forms are therefore constructed to resist the tendency of the sides of the boxes to distort, whether inwardly or outwardly, and the structure of such forms is not of the essence of my invention, the gist of which, in this respect, lies in the broad idea of supporting the moist boxes preparatory to drying on forms which resist the tendency of the sides of such boxes to warp.

I claim—

1. The herein-described improvement in the art of making boxes from moist pasteboard, which consists in cupping up the boxes in the proper shape, transferring said boxes when cupped up onto forms which resist the tendency of the boxes to distort, and then drying the boxes while on such forms without bringing the unsupported surfaces of the boxes into foreign contact, substantially as set forth.

2. The herein-described improvement in the art of making boxes from moist paste-

board, which consists in cupping up the boxes
into the proper shape, transferring them onto
forms which support the boxes as against lat-
eral distortion, and then passing the forms
5 through a heating-chamber without bringing
the boxes into contact with the walls of said
chamber, substantially as set forth.

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

JONATHAN GODFREY.

Witnesses:

F. W. SMITH, Jr.,

J. S. FINCH.