

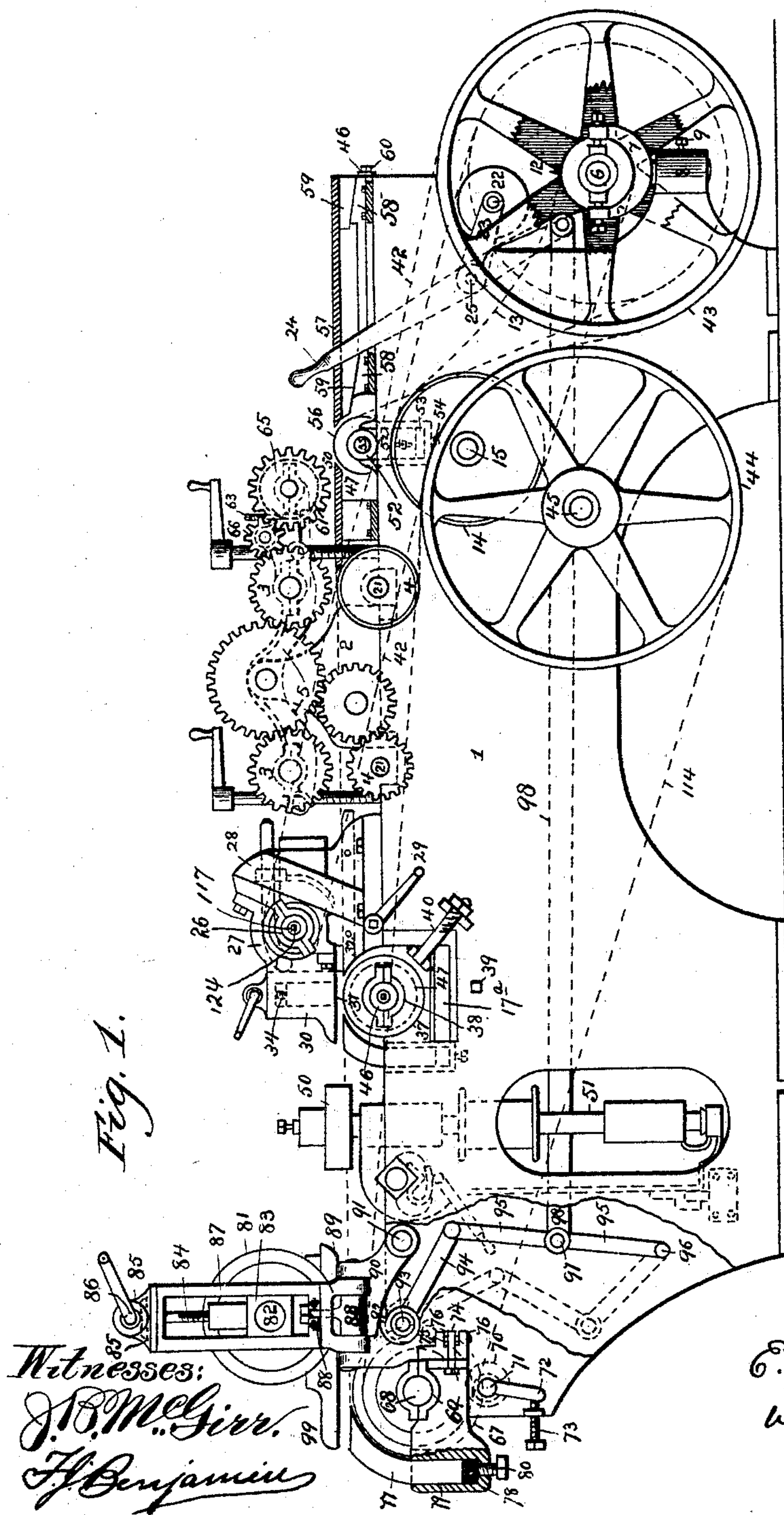
(No Model.)

4 Sheets—Sheet 1.

E. B. HAYES.
DOOR MACHINE.

No. 497,979.

Patented May 23, 1893.



(No Model.)

4 Sheets—Sheet 2.

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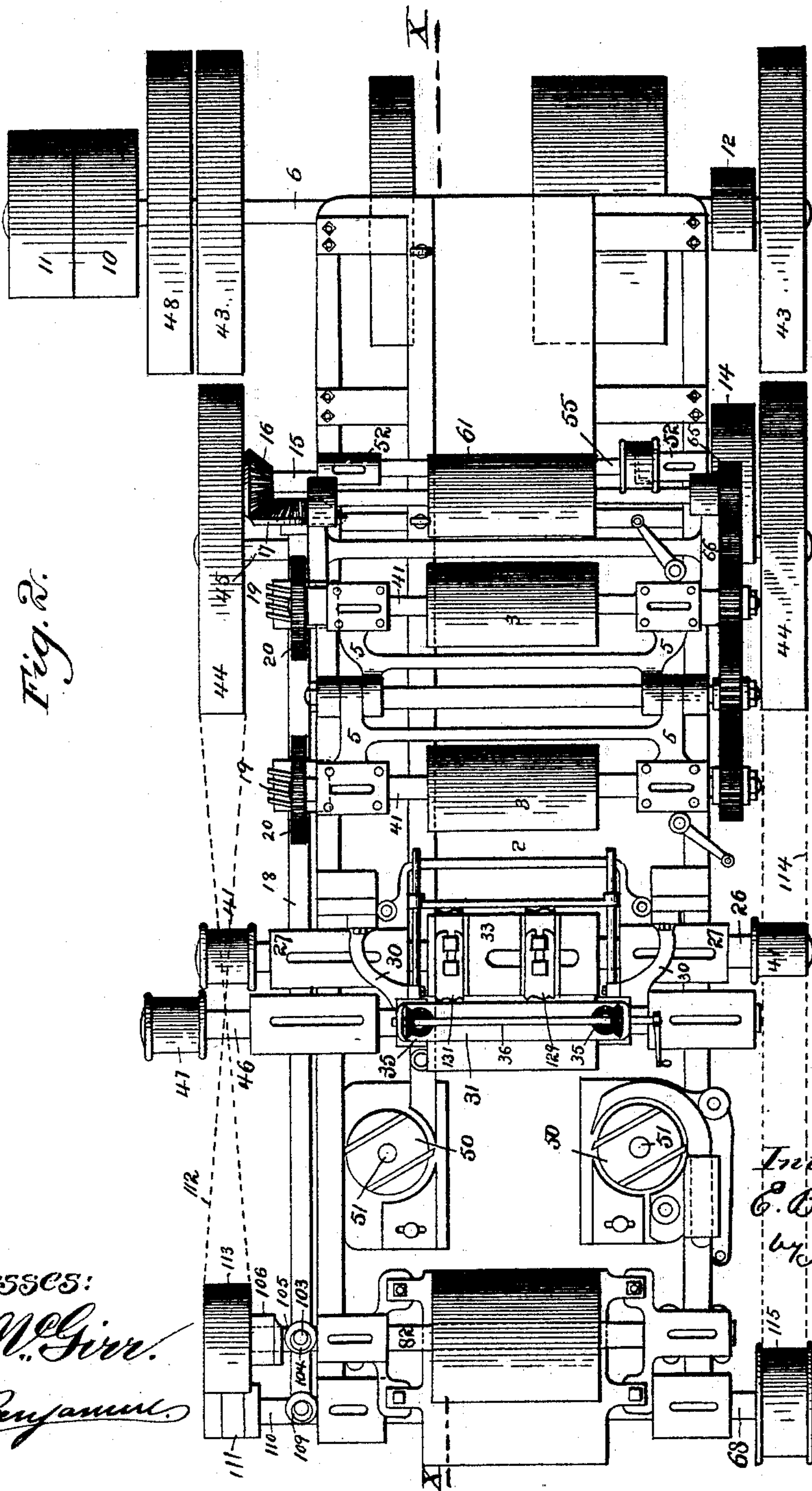


Fig. 2.

Witnesses:

J. B. McGinn.
J. H. Benjamin.

Inventor:
E. B. Hayes
by H. N. Low
attorney.

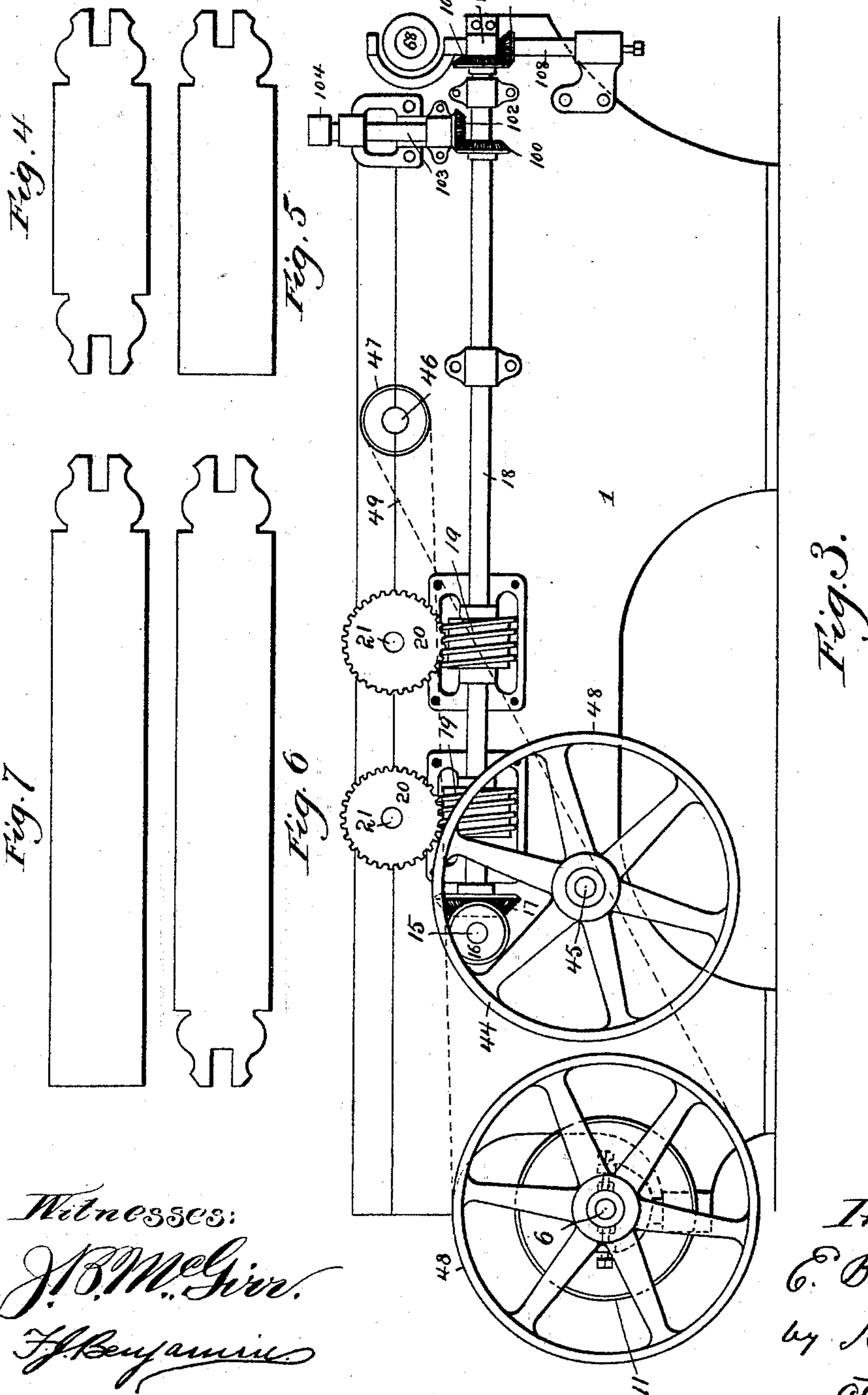
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Witnesses:
J. B. McGiv. *J. B. McGiv.*
F. Benjamin *F. Benjamin*

Inventor:
E. B. Hayes,
by H. N. Low
attorney.

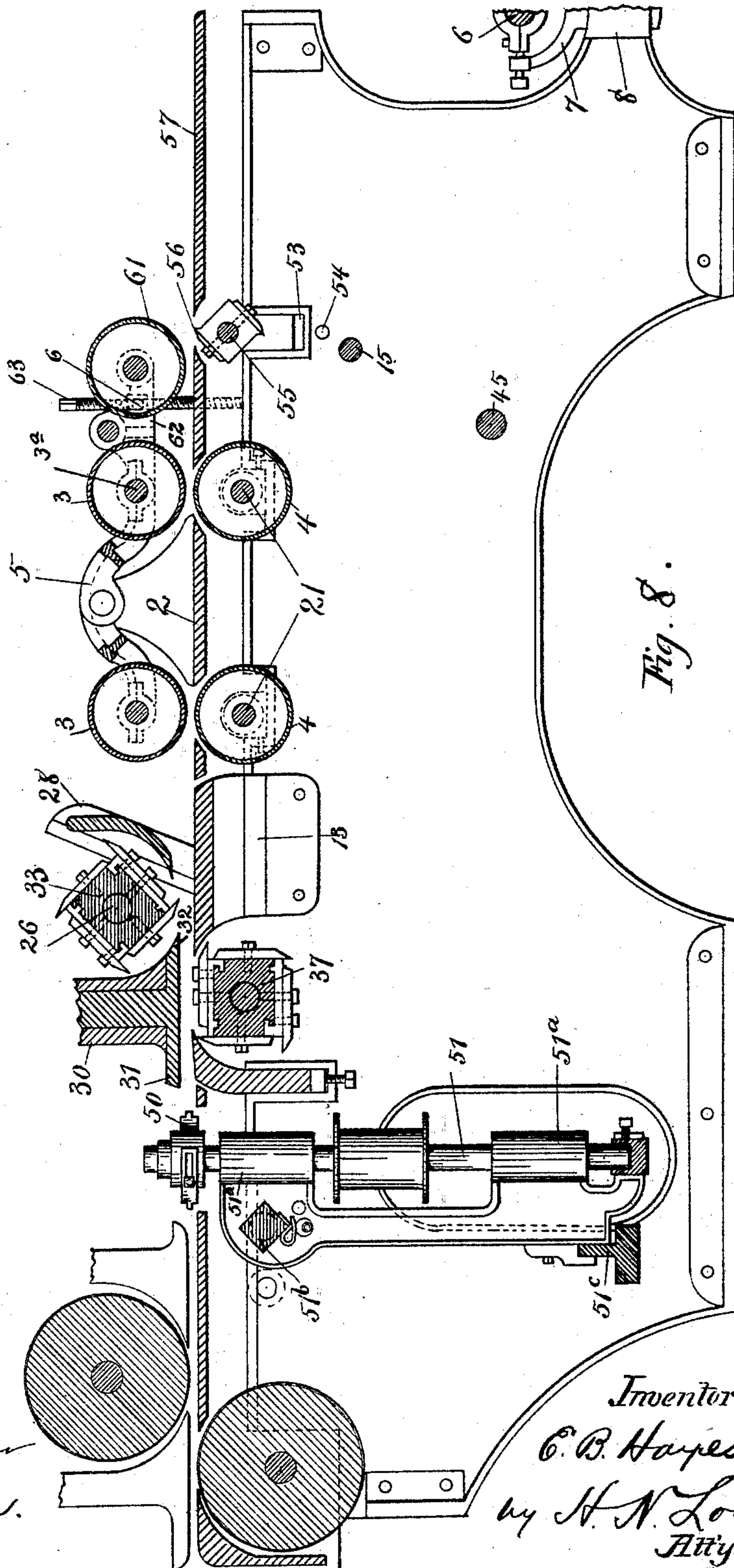
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Witnesses
C. W. Parker
J. S. Parker.

Inventor.
E. B. Hayes,
by H. N. Low
Att'y.

UNITED STATES PATENT OFFICE.

ELI B. HAYES, OF OSHKOSH, WISCONSIN.

DOOR-MACHINE.

SPECIFICATION forming part of Letters Patent No. 497,979, dated May 23, 1893.

Application filed May 23, 1892. Serial No. 434,117. (No model.)

To all whom it may concern:

Be it known that I, ELI B. HAYES, a citizen of the United States, residing at Oshkosh, in the county of Winnebago, State of Wisconsin, have invented certain new and useful Improvements in Door-Machines; and I do 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 ap-

10 pertains to make and use the same.
My improvements are especially directed to the production of a machine by which the parts of a door frame, stiles, rails, and muntins, may be rapidly and perfectly manufac-
15 tured. In this machine I attain the following valuable results, among others:—The lumber is straightened or has the vertical "wind" taken out of it as it enters the machine and before it is confined and forced against the
20 bed by the planer feed rolls; the lumber is planed and the molding or moldings (at one or both edges) is or are stuck on both sides and these moldings formed accurately opposite to each other notwithstanding bends in the edge of the lumber; the receiving shoe for the upper planer and molder head constitutes the opposing and upper planer bed for the lower planer and molder head, said heads or cutters being placed the one nearly directly
30 over the other; the upper bed and cutting head or cylinder are adjusted together for different thicknesses of lumber; the lumber is at the same time grooved and finished on the edges, and, in some instances, stuck or
35 molded on the edge as well as on the top and bottom; the lumber is sanded on both sides, and the sand rolls or drums permitted to be taken out of engagement with the lumber when the feed is stopped with a piece of work
40 in the machine, thus avoiding the cutting of the sand drums into the work while the latter is stationary and the drums gradually coming to a stop.

45 With such objects in view my invention consists in the parts and combinations thereof hereinafter set forth and claimed.

In order to make the invention more clearly understood I have shown in the accompanying drawings means for carrying the same into

effect, without, however, intending to limit my 50 improvements, in their practical applications, to the particular construction which, for the sake of illustration, I have delineated.

In said drawings: Figure 1 is a side elevation of a planing and molding machine embodying my improvements. Fig. 2 is a plan 55 view of the same, excepting a portion of the sand drum adjusting devices. Fig. 3 is an elevation from the opposite side of the machine showing the gearing which operates the 60 feed rolls and reciprocates the sanding drums. Figs. 4, 5, 6 and 7 are end views respectively of a muntin, a top rail or stile, a lock rail, and a bottom rail, of the character which I can produce by my improved machine. Fig. 8 is a 65 longitudinal vertical section on line X—X, Fig. 2.

It is primarily the design of my present invention to produce certain of the parts (the rails and muntins) of a flush or sunk molded 70 door in which the moldings are formed integrally with said parts. In order to produce such frame pieces the moldings must be stuck from the side instead of from the edge and must be caused to register accurately 75 with each other—that is to say, the base of the molding on one side of the frame piece must be exactly opposite to the base of the molding on the other side—in order that when the frame pieces are mitered for the pur- 80 pose of being joined together, and portions of the moldings contiguous to the mitered cuts removed, the joints on both sides of the door may be perfect. I shall therefore describe my improved machine as especially adapted 85 for this work, but I desire it to be understood that various parts of my improvements may be availed of for other purposes.

Referring to the drawings, 1 indicates the main frame of the machine of which 2 is the 90 main work table or bed above and below which are mounted the feed rolls 3—3 and 4—4 in the usual manner, the upper rolls preferably upon swinging frames or gates 5—5, as indicated.

6 indicates the power shaft mounted at one 95 end of the machine in vertically adjustable yoke bearings 7, the lower ends of which fit

in vertical bearings 8 formed on the frame, in which they are adjustable and may be clamped by set screws 9.

10, 11, indicate the tight and loose driving belt pulleys on the main shaft.

12 is a small driving pulley on the shaft 6 and connected by a loose belt 13 with a pulley 14 which latter is mounted upon transverse shaft 15 carrying at its other end a bevel gear 16 meshing with a corresponding gear 17. The latter is mounted upon the longitudinal feed shaft 18 which is provided with worms 19. These latter mesh with worm wheels 20 on the ends of the lower feed roll shafts 21. From these latter shafts motion is communicated to the upper feed rolls by gearing in a well known manner.

22 is a belt tightener pulley mounted in line with the belt 13 upon an arm 23. The latter is supported by a controlling lever 24 fulcrumed upon the main frame at 25. By oscillating this lever the tightener pulley may be forced against or removed from the loose belt 13 with the result of causing the feed gearing to operate or remain stationary.

26 is the shaft of the upper planing and molding cutter head mounted in bearings 27 which slide and are adjustable up and down upon brackets 28 secured to the main frame. This vertical adjustment is effected by the operation of a crank arm 29 which operates upon miter gears and screws connected with the bearings 27 in a well known manner.

30 is a frame or pair of brackets rigidly secured to or formed with the bearings 27, in which brackets is mounted a vertically adjustable rigid bed 31. The rear end 32 of this bed forms a shoe which is situated in close proximity to and behind the upper cutter head 33. Said bed and shoe are vertically adjustable by screws 34, miter gearing 35 connected with the upper ends of the screws, and a crank shaft 36 by which the said miter gearing is operated.

Immediately beneath the bed 31 and in close proximity to the cutter head 33 is mounted the lower cutting and molding head 37. By thus mounting the lower head, in immediate proximity to the head carrying the upper molding cutters, I have insured that the molding or moldings upon the bottom side of the rail or muntin shall be stuck exactly opposite to the molding or moldings upon the top surface, notwithstanding the horizontal curvature or bend which often occurs in the lumber being operated upon, and which would throw the bottom molding out of line with the upper if the lower molding cutters were situated at a distance from the upper molding cutters.

The bearings 38 for the lower cutter head are supported by wedges 39 which are movable transversely of the machine, by means of a screw 39 so as to give a slight vertical adjustment to the lower cutter. The said bearings are held in place by hinge bolts 40, (Fig. 1), by releasing which the lower cylin-

der may be drawn out laterally for changing or sharpening the cutters. The upper cutter shaft 26 is provided with pulleys 41 which are driven by belts 42 passing from pulleys 43 on the main power shaft over pulleys 44 mounted on the ends of a transverse shaft 45, thus not only driving the upper planer but imparting motion to the said shaft 45.

The shaft 46 of the lower planer and molder is provided with a belt pulley 47 from which it may be connected with a driving pulley 48 on the main shaft by a crossed belt 49 (Fig. 3).

50 indicates the vertical cutter heads adapted to finish and groove the edges of the stiles, rails and muntins, and in some instances to co-operate with the top and bottom molding cutters in forming an elaborate molding thereon, which heads are carried upon the upper ends of vertical spindles 51 mounted and actuated in any suitable or well known manner. The bearings 51^a of one of the spindles 51 are laterally adjustable upon the main frame to accommodate different widths of lumber sliding on transverse bars 51^b 51^c (Fig. 8).

The lumber, as it is fed to the machine between the feed rolls often has a vertical curve, bend, or "wind" and to produce finished work it is necessary not only to plane the surfaces of such pieces but to remove more of the surface at some points than at others. To this end I mount in suitable vertically adjustable bearings 52, which may receive such adjustment from wedges 53 and a transverse operating screw 54, a transverse shaft 55 carrying a jointing or planing head 56. This latter is situated beneath the work table 2 and just in advance of the feed rolls. In advance of this cutter head I mount an independent work table 57 which can readily receive such amount of vertical adjustment as is necessary to take the bend or wind out of the lumber. This adjustment I preferably effect by means of longitudinally movable wedges 58 engaging corresponding inclines or wedges 59 on the under side of the table 57 and engaged and movable by a screw-shaft 60. Just behind the cutter head 56, so that it will not engage the lumber until it has been operated upon by said head, I mount a supplemental upper feed roll 61 which is carried by a hinged frame 62. This latter can oscillate upon the shaft 3^a of one of the upper feed rolls 3 as a center, and is vertically adjustable to bring the roll 61 nearer to or farther from the table 2 by means of a vertical screw 63 which engages the frame 62 and the main frame of the machine. Connected with this supplemental feed roll is a gear wheel 65 which is operated by an idler 66 from the upper feed roll gearing.

I will now describe the sanding devices by which the door frame pieces are finished as they leave the machine.

The lower sand cylinder or drum is indicated at 67, the shaft 68 of which is mounted in

any suitable bearings 69. The latter are vertically adjustable by means of cams or eccentrics 70 which bear against their under sides and are mounted upon and operated by a transverse shaft 71. The latter may be turned to give the slight needed adjustment to the bearings of the lower sand drum by a crank arm 72 and a screw 73 which engages the latter. The bearings 69 are clamped in place by hinge bolts 74 which are mounted upon vertical pivots 75, the latter fitting in ears 76 formed upon the main frame. The slight vertical adjustment above referred to is permitted by the distance between the ears 76, which is greater than the vertical dimension of the hinge bolt 74.

77 is a receiving shoe or plate situated in rear of and in close proximity to the lower sand drum. This shoe is supported upon springs 78, which may be of rubber. These springs are mounted in sockets 79 formed in extensions of the bearings 69 and tend constantly to lift the lumber out of contact with the lower sand drum. The tension of said springs can be increased or diminished by vertical screws 80 which pass into said sockets from below. The upper sand cylinder is indicated at 81. Its shaft 82 is mounted in vertically adjustable bearings 83 which are engaged and operated by screws 84, miter gears 85 and a transverse crank shaft 86, in a well known manner, the mechanism of which I do not claim and are guided in their movements by a frame 87. The latter is connected by hinge bolts 88 with ears 89 formed upon frames 90. The latter are mounted upon transverse pivots 91 and it will be observed that by an upward oscillation of the frames 90 the upper sand cylinder may be lifted clear of the work. Such upward movement may be imparted by cams or eccentrics 92 which are mounted on a transverse shaft 93 and engage the under sides of the frames 90. The shaft 93 is provided with a crank arm 94 connected by toggle links 95 with a fixed fulcrum or pivot 96. The toggle pivot 97 which joins said links is connected by a longitudinal rod 98 with the lower arm of the feed-controlling lever 24. The normal position of the eccentrics is indicated in full lines and the position which they occupy when the upper sand cylinder is disengaged from the work, by dotted lines. It will be seen that they are moved into this last position whenever the feed controlling lever is thrown forward and the tightener pulley 22 removed from the loose belt 13.

99 is an upper bed plate carried by the frame pieces 90 and situated above the lower sanding drum. When said frame pieces and the upper sand drum are in their lowermost or normal positions the downward pressure of the plate 99 upon the top of the work overcomes the springs 78, depressing the shoe 77 and bringing the work into engagement with the lower sand drum. When, however, the upper sand cylinder is thrown out of operation, as already described, the shoe 77, under

the pressure of the springs 78, automatically lifts the work from the lower sand drum. I have thus insured that should the feed of the machine be stopped by lever 24 for any purpose while the machine contains a piece of work, the sanding drums will be disengaged therefrom and the work preserved. Without this provision the rotation of the sand drums, which would continue some little time after the feed was stopped, would cut into the surface of the work upon both the upper and lower sides and make it useless.

I derive the reciprocating movement of the sand drums from the worm shaft 18 by means of bevel gears 100, 101, carried thereby. The former engages a bevel gear 102 fixed on the lower end of a vertical shaft 103, which carries on its upper end a small eccentric 104 connected by a link 105 with a loose collar 106 upon the shaft 82 of the upper sand drum. The wheel 101 meshes with a corresponding gear wheel 107 mounted upon a shaft 108. The latter carries at its upper end an eccentric 109 which is connected by a link 110 with a loose collar 111 on the shaft 68 of the lower sand drum.

The upper sand drum is driven by a crossed belt 112 which passes around a pulley 113 upon the shaft of the drum and around one of the pulleys 44. The other pulley 44 is connected by a straight belt 114 with a pulley 115 on the shaft of the lower sand drum.

What I claim is—

1. The combination with a lower planing and molding cutter head, of an upper molding and planing head situated in proximity thereto, a rigid frame attached to and adjusted with the carrying frame of the upper cutter, and a rigid bed situated over the bottom cutter and adjustable in said rigid frame substantially as set forth.

2. The combination with the cutters and the feed mechanism therefor, of a sanding drum situated on the line of the feed of the work and adapted to operate upon the latter, and mechanism for disengaging said drum from the work upon the stoppage of the feed, substantially as set forth.

3. The combination with the cutters and the feed mechanism therefor, of a sanding drum situated on the line of the feed of the work and adapted to operate upon the latter, mechanism for disengaging said drum from the work, means for controlling the feed mechanism, and a connection between said controlling means and the drum disengaging mechanism, substantially as set forth.

4. The combination with the upper and lower sand drums of a spring-actuated support adapted to separate the work from one of said drums, an opposing plate for holding the work against said drum, and means for moving said plate and the other sand drum away from the work, substantially as set forth.

5. The combination with the cutters, and the feed mechanism, of sanding drums situated on opposite sides of the line of the feed of

the work and adapted to operate upon the latter, mechanism for disengaging one of said drums from the work, and means for simultaneously disengaging the work from the other
5 drum, substantially as set forth.

6. The combination with the cutters, the feed rolls, and a worm feed for the latter comprising a longitudinal shaft, of the upper and lower sand drums, vertical shafts geared with
10 said longitudinal shaft, and carrying cams or eccentrics and connections between said eccentrics and the bearings of the sand drums, substantially as set forth.

7. The combination with the cutters, the

feed mechanism, and the upper sand drum, 15
of a pivoted frame carrying said drum, cams or eccentrics engaging said frame and adapted to move the drum away from the work, means for controlling the feed, and connections between said eccentrics and the feed 20
controlling means, substantially as set forth.

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

ELI B. HAYES.

Witnesses:

F. J. BENJAMIN,
H. N. LOW.