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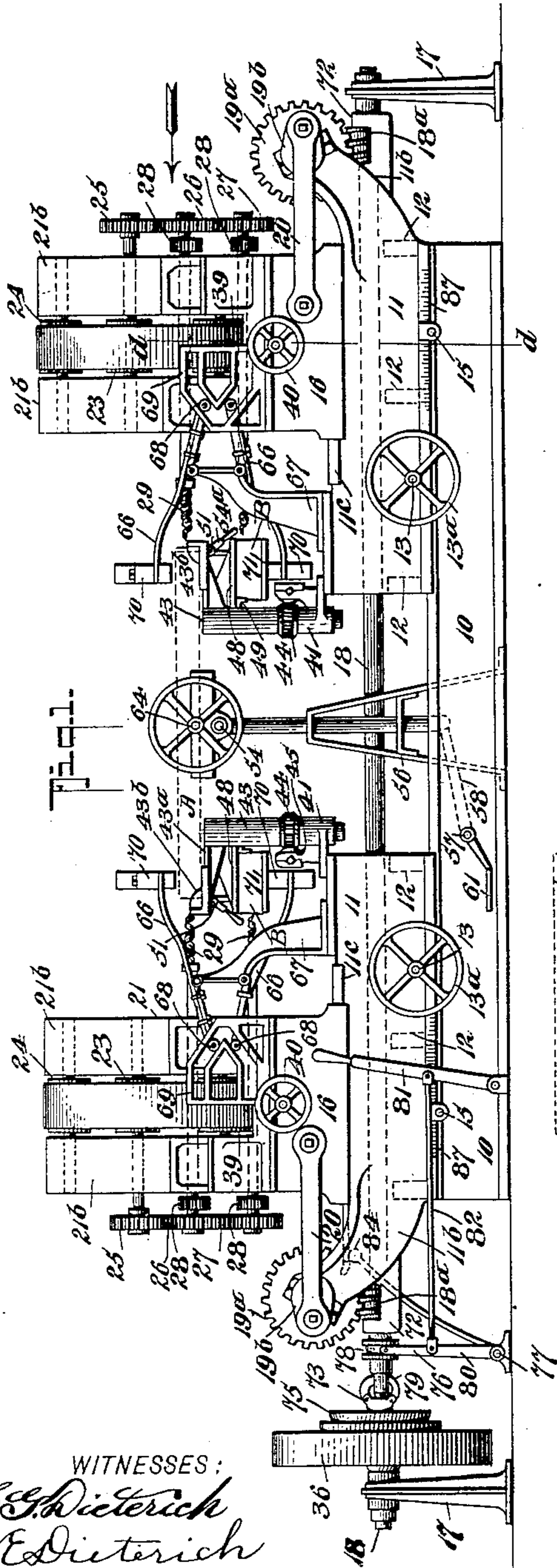
Patented Aug. 15, 1899.

A. E. WOODS.
DOWEL DOOR BORING MACHINE.

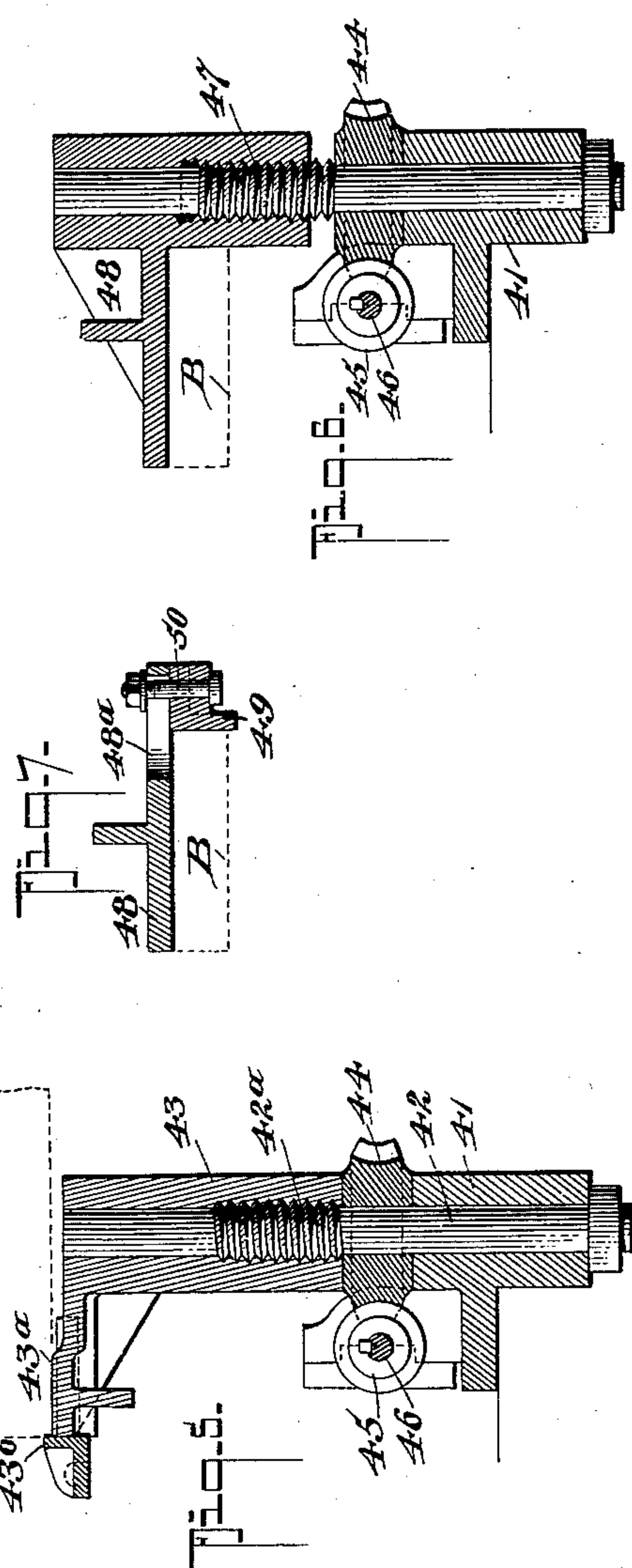
(Application filed Feb. 15, 1899.)

(No Model.)

6 Sheets—Sheet 1.



WITNESSES:
H. G. Dietrich
A. E. Dietrich



INVENTOR
A. E. Woods

BY
Fred G. Dietrich
ATTORNEY.

No. 630,963.

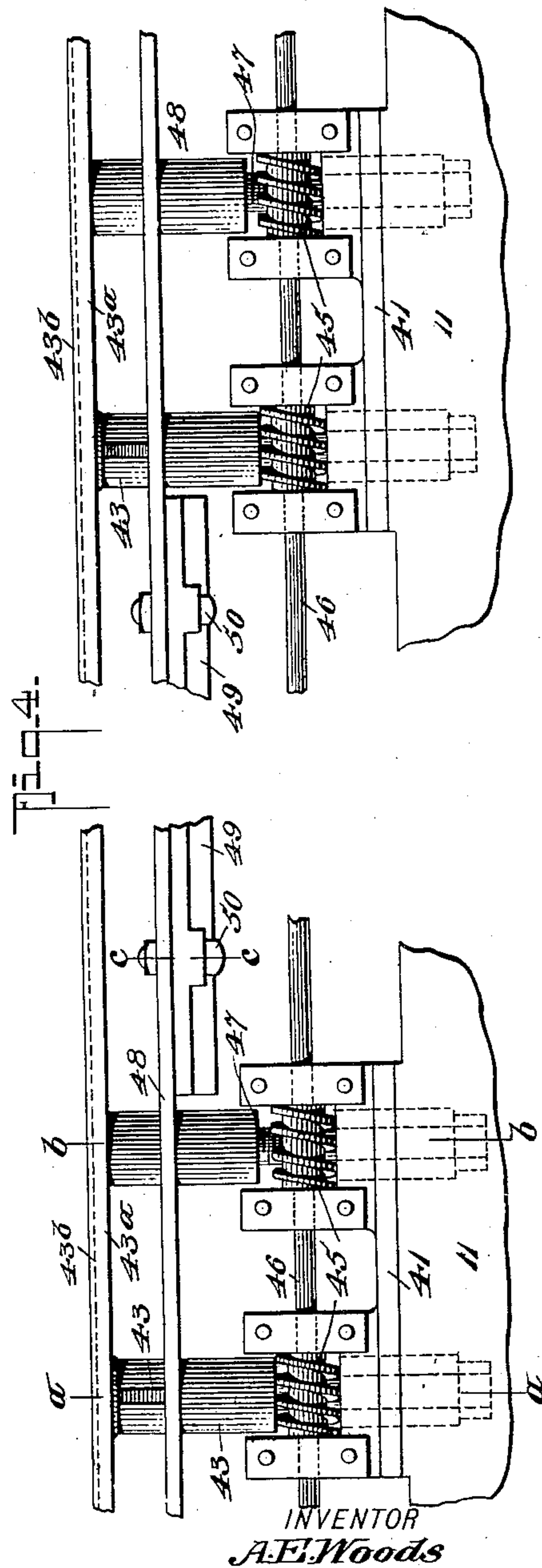
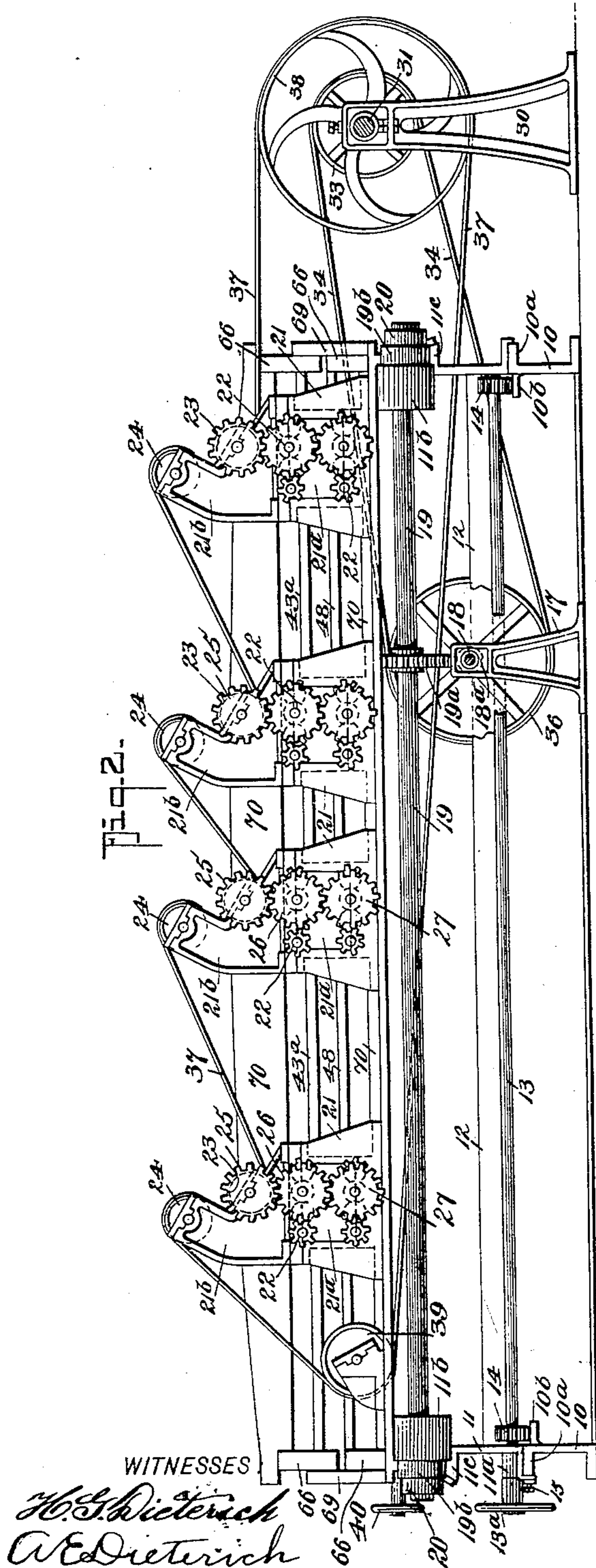
Patented Aug. 15, 1899.

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6 Sheets—Sheet 2.



BY
Fred G. Dieterich
ATTORNEY.

No. 630,963.

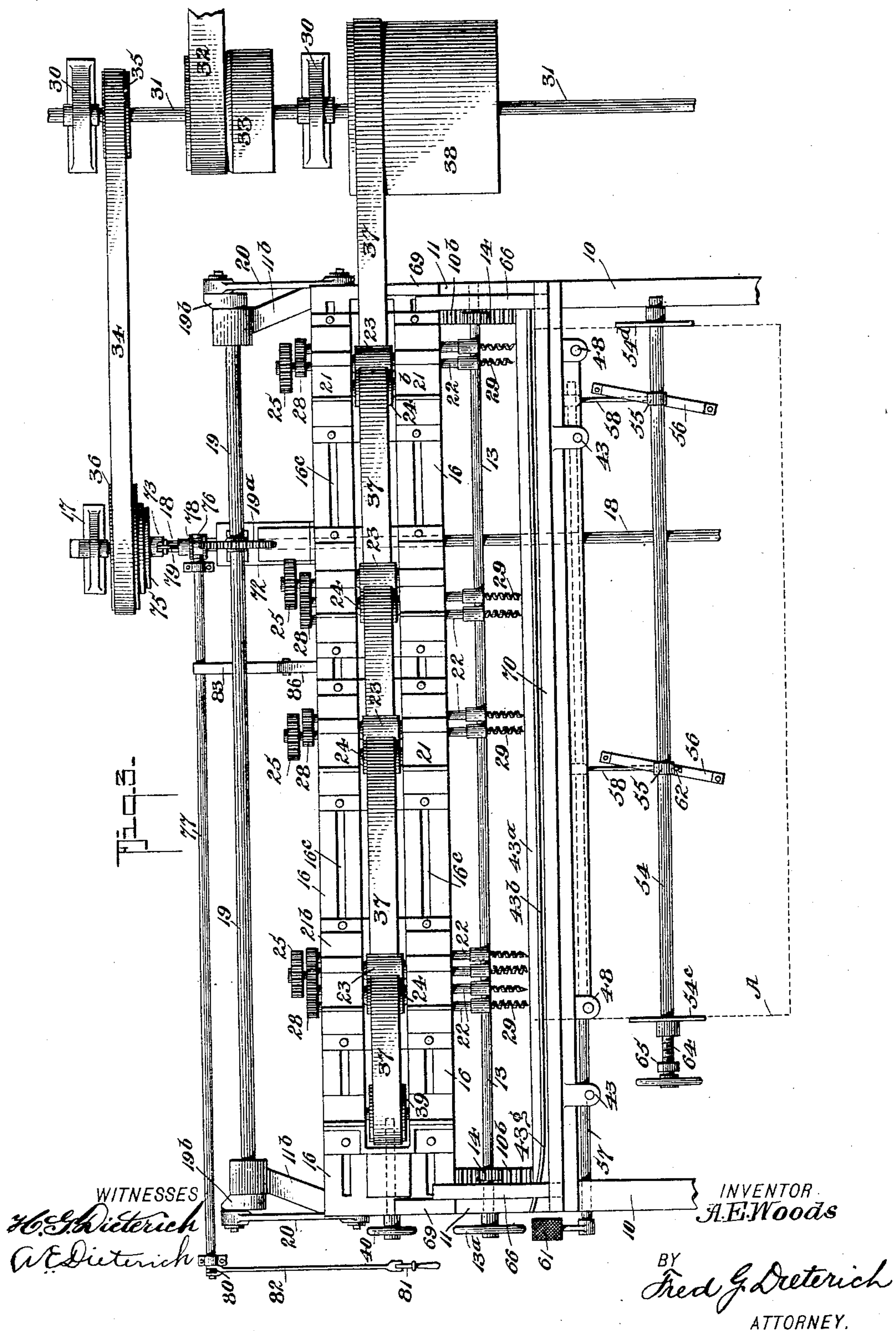
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(Application filed Feb. 15, 1899.)

(No Model.)

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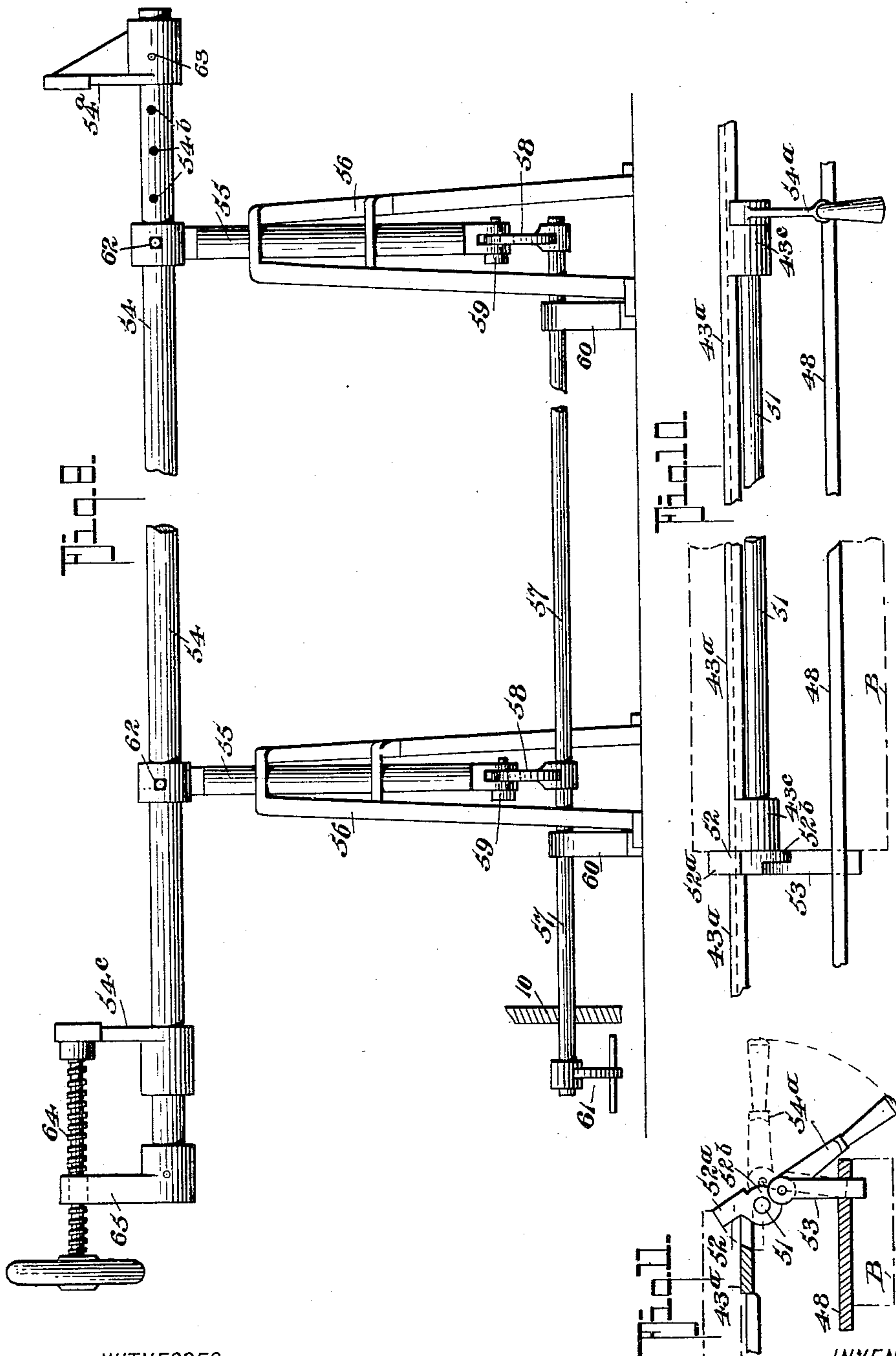
Patented Aug. 15, 1899.

A. E. WOODS.
DOWEL DOOR BORING MACHINE.

(Application filed Feb. 15, 1899.)

(No Model.)

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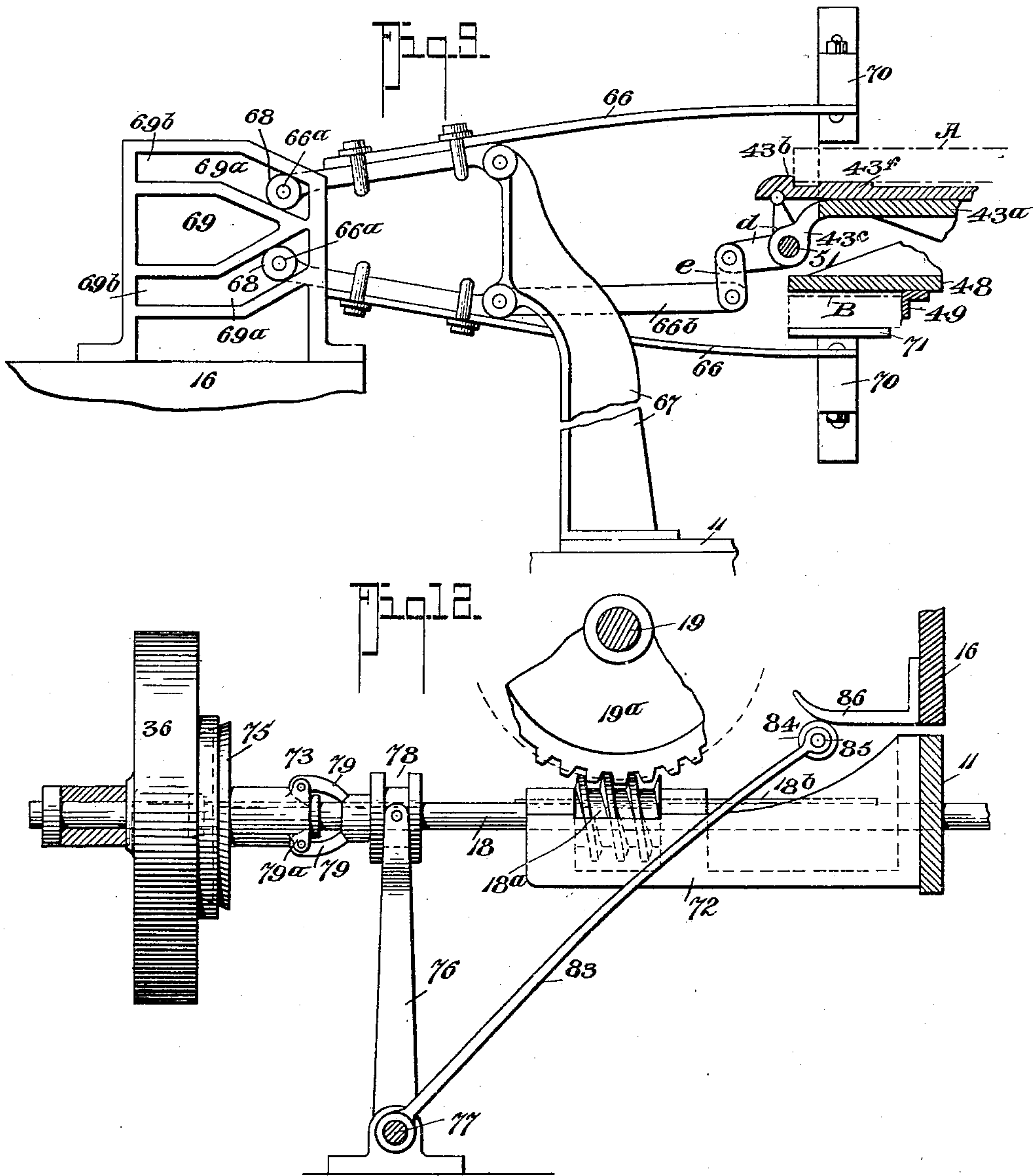
Patented Aug. 15, 1899.

A. E. WOODS.
DOWEL DOOR BORING MACHINE.

(Application filed Feb. 16, 1899.)

(No Model.)

6 Sheets—Sheet 5.



WITNESSES:

W.E. Dieterich.
J.C. Dieterich

INVENTOR

A.E. Woods

BY

Fred G. Dieterich
ATTORNEY.

ATTORNEY.

No. 630,963.

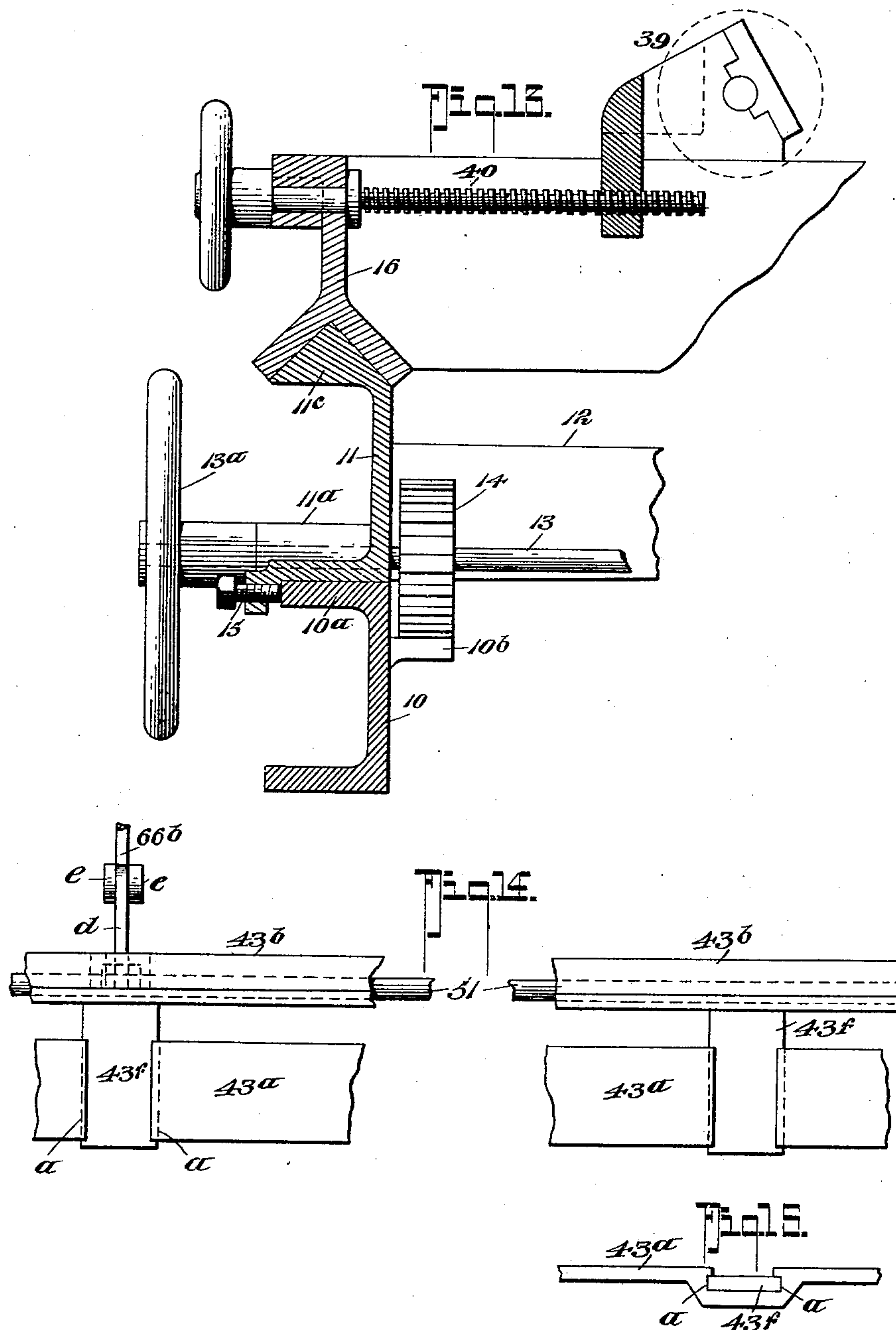
Patented Aug. 15, 1899.

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DOWEL DOOR BORING MACHINE.

(Application filed Feb. 15, 1899.)

(No Model.)

6 Sheets—Sheet 6.



WITNESSES:
A. E. Dieterich
H. G. Dieterich

INVENTOR
A. E. Woods

BY
Fred G. Dieterich
ATTORNEY.

UNITED STATES PATENT OFFICE.

ALBERT EDWIN WOODS, OF NEW WESTMINSTER, CANADA.

DOWEL-DOOR-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 630,963, dated August 15, 1899.

Application filed February 15, 1899. Serial No. 705,575. (No model.)

To all whom it may concern:

Be it known that I, ALBERT EDWIN WOODS, a citizen of the Dominion of Canada, residing at New Westminster, in the Province of British Columbia, Canada, have invented certain new and useful Improvements in Dowel-Door-Boring Machines, of which the following is a specification.

My invention relates to improvements in machines for facilitating the manufacture of wood doors, more particularly known as "doweled" doors, in which drills or bits are mounted in reciprocating frames on opposite sides of the frames on which the assembled portions and stiles of the door rest; and the objects of my improvements are, first, to provide support-frames for the assembled portions of the door and stiles on planes above and below each other, respectively, and arranged intermediately between reciprocating frames, each carrying a plurality of drills on the planes of the assembled portions of the door and stiles; second, to simultaneously move the frames carrying the drills forward and automatically clamping the assembled portions of the door and stiles from above and below, respectively, by the action of said reciprocating frames forward while the stiles and rails of a door are being bored, and, third, to provide facilities for adjusting the several parts to accommodate and bore doors of various dimensions.

Other advantages will also appear when this specification and the appended claims are fully understood.

I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of the machine, taken from the position occupied by the operator. Fig. 2 shows a side elevation of the machine, taken in the direction of the arrow on Fig. 1. Fig. 3 is a plan of one-half of the machine. Fig. 4 shows an enlarged detail elevation of the gear by which the door-rests and stile-rests are raised and lowered simultaneously to suit varying thicknesses of timber used in their construction. Fig. 5 is a cross-section of the same on the line *a a* of Fig. 4. Fig. 6 is a similar illustration on the line *b b* of Fig. 4. Fig. 7 is a cross-section on the line *c c* of Fig. 4, showing the fence ad-

justable for varying widths of stiles. Fig. 8 is a detailed side elevation of the clamp by which the rails and panels of a door are pressed together while being bored. Fig. 9 is an enlarged detail of the mechanism by which the rails, muntins, panels, and stiles are clamped on their respective rests during the operation of boring. Fig. 10 illustrates an enlarged detail of the stops against which the door and stiles are placed while they are being bored. Fig. 11 is an end elevation of the same. Fig. 12 is a detail of part of the primary gear for actuating the reciprocating frames and the mechanism for automatically throwing the same out of action at the return of each stroke. Fig. 13 is a vertical cross-section showing the slideways of the inter-medial and the reciprocating frames, respectively, taken on the line *d d* of Fig. 1. Fig. 14 shows a detail plan of the rails employed to aline and hold the various pieces of a door-body in proper relation while being bored, and Fig. 15 is a detail elevation showing how the projecting guide-pieces *43'* secure the alining-rails.

Similar figures and letters refer to similar parts throughout the several views.

10 indicates the bed or main frame of the machine. Adjustably mounted on suitable tracks *10^a* on each side of this frame 10 are frames 11, which are securely held together by girders 12. Journaled in bosses *11^a* and passing through these frames 11 in proximity to their base are rods or shafts 13, which are provided with hand-wheels *13^a* for turning. Securely fixed on these shafts 13 and lying just within the frames 11 are pinions 14, which engage fixed racks *10^b* on the fixed frame 10. By turning the hand-wheels *13^a* the frames may be set on the bed 10 in the relative position to each other desired and fixed in such a position by the set-screws *15* on the other side of the same for a reason to appear hereinafter.

Arranged on slideways *11^c* on the adjustable frames 11 are reciprocating frames 16. Journaled in standards 17 on each side of the machine and passing through the same on a plane about the center of the adjustable frames 11 is a shaft 18, and arranged in suitable bearings on extending ears *11^b* on each side of the machine are shafts 19. These shafts 19 pass over the opposite ends of the

shaft 18, on which is arranged worm-gears 18^a, which engage worm-wheels 19^a on the shafts 19. At the opposite ends of the shafts 19 are fixed cranks 19^b, and these cranks connect with the reciprocating frames 16 by the rods 20.

Adjustably fixed on the reciprocating frames 16 are pedestals or frames 21. These frames, as shown in Figs. 2 and 3, are movably mounted on the frames 16, and they are secured by bolts passing through slots or channels 16^c in said frames 16. This is for the purpose of setting them at any position on the said frames 16 for a reason to appear presently. The said frames 21 are each preferably made in three sections 21, 21^a, and 21^b, the portion 21 being the main bed-piece, in the center of which is a recess which receives the block 21^a, between the horizontal joints of which are arranged a plurality of spindles 22 on different planes, and the upper section 21^b provides a suitable bearing for pulleys 23 and 24. The shaft on which the pulley 23 is fixed extends through the outer side of the frame 21^b, and fixed on the end thereof is a gear-wheel 25. (See Figs. 1 and 3.) This gear-wheel 25 communicates movement to a like wheel mounted on one of the spindles 22, and in like manner movement is imparted to one of the spindles on the lower plane by the wheels 26 and 27. Secured on these spindles carrying the wheels 26 and 27 between the same and the frame 21^a are pinions 28, which mesh with like pinions secured on each of the spindles in the respective groups. This gives a uniform movement to all of the spindles.

Securely fixed to the opposite or inner ends of the spindles 22 are drills or bits 29, which, as shown in Figs. 2 and 3, may be reduced or increased in number, according to the class of work that is to be performed. As it is obvious that the spindles are moving in opposite directions, it is necessary to have the drills of right and left pitch.

Mounted in suitable bearings on supports 30 is a counter-shaft 31. Movement is imparted to this shaft 31 by a belt 32 taking around a pulley 33, secured thereon, a belt 34, driven by a pulley 35 on said counter-shaft and around a pulley 36, mounted on the shaft 18, communicates movement thereto, and a belt 37, passing over a pulley or drum 38, having a wide periphery on said counter-shaft, and over the plurality of pulleys 23 and 24, mounted in the frame 21^b, imparts a high speed thereto, and consequently to the spindles turning the drills or bits. For taking up the slack in this belt 37 and keeping it tight I provide a tightener 39, the same being operated by the wheel-screw 40 taking through the frame 16. (See Figs. 3 and 13.) The extra width of the pulley or drum 38 allows for the lateral movement of the frame 16, supporting the drill-frames. Rigidly fixed to the inner side of the adjustable frames 11 are pedestal-brackets 41, (see Figs. 1, 4, and 6,) in which are journaled screws or spindles 42, the

surfaces of which for a distance are threaded, as at 42^a, and on each of the screwed portions 42^a is a bracket 43, which is integral with and supporting the frames 43^a, extending approximately the length of the machine and forming adequate supports for the assembled portions of the door A.

Rigidly fixed on each of the spindles 42 are worm-wheels 44, which engage a worm 45, fixed on a shaft 46, suitably mounted in bearings integral with the pedestal-brackets 41. By turning the said shafts 46 it is obvious that the frames 43^a will be elevated or depressed for the purpose of arranging the body of the assembled door on an even plane with the bits, so that the hole will be bored directly in the center, leaving an even thickness of wood on each side of the apertures.

The frames controlling the elevation or plane of the stiles B are arranged on the opposite side thereof, as shown in Fig. 6. This is practically the same mechanism as is shown in Fig. 5, but with a left-hand screw 47, and thus the frames 48 control the stiles in an inverted position.

As shown in Fig. 1, when the doors A and the stiles B have been bored it is necessary to turn the stiles over to bring their bored sides opposite to the holes in the rails in the position the respective parts will be in after being put together. It is therefore necessary to bore the stiles with their "face" sides clamped upward against the brackets or frames 48, while the face of the other portions of the door lie downward upon the frames 43^a, and in adjusting for varying thicknesses of wood employed in the construction of the doors the support-frames 43^a and 48 are raised and lowered, respectively and simultaneously, by turning the shaft 46 beneath the opposite side frames, as before indicated.

As shown in Figs. 4 and 7, I provide a fence 49 along the inner edges of the frames 48 for the stile to lie against while being bored, and in the event of varying widths of stiles being used this fence may be adjusted on each of the frames 48 by the bolts 50 being moved in the slots 48^a and set so that the opposite edges of the stiles will be the proper distance from the bits 29.

As the portions of the door-body are assembled on the frames 43^a and the stiles placed in their respective positions beneath the frames 48 to prevent them from going too far and to keep them in alinement until they are secured, as will be explained presently, I provide stops. (See Figs. 10 and 11.) This consists of rock-shafts 51, mounted in lugs 43^c on the outer side of the frames 43^a. At the opposite end of each of these shafts from the operator is a fixed bracket 52, having ears 52^a and 52^b, the ears 52^a being susceptible of being thrust in the track of the assembled parts of the door, and pivoted to the ear 52^b is a depending bolt 53, which passes loosely through apertures in the frames 48. When the handle 54^a, which is secured to the oppo-

site end of each of the rock-shafts 51, is turned upward, the stops 52^a and 53 will be thrust in the way of the door pieces and stiles, as shown in Fig. 11, and when the handle is reversed these stops are withdrawn.

To tightly press the assembled portions of the door rails and panels together, I provide a clamping device 54, supported and vertically movable on supports 55, which are mounted in pedestals 56. (See Figs. 1, 3, and 8.) Fixed in a pivoted manner to the lower ends of the supports 55 and with their opposite ends fixed to a way-shaft 57 are levers 58. To allow for the versed sine of the arc of the levers 58, slots are made therein for the connecting-pins 59 to slide and allow an easy movement for the vertical rise and fall of the supports 55. The said shaft 57 is suitably supported in brackets 60 and is passed through the front shell of the frame 10, and securely fixed to its projecting end is a pedal 61, by which the vertical movement is controlled.

The clamp-bar 54 is rigidly fixed to the supports 55 and is prevented from turning by set-screws 62, and on one end is a fixed pressure-bar 54^a, secured by a pin 63, passing there-through, and the rod. The clamp-bar may be adjusted to engage doors of shorter dimensions by removing the pin 63 and moving it along the rod and inserting the pin in one of the several holes 54^b, as shown. On the opposite end is arranged a slidable pressure-bar 54^c, which is moved along the rod by a screw 64 taking through a fixed nut 65 on the end of the rod.

The foregoing clamp when not in use is at a plane below the frames 43^a, so that the members of a door may be slid directly to their proper position without inconvenience from any part of the clamp. The operator then depresses the pedal 61, which raises the clamp to its proper position for receiving the door, and a few turns of the screw will force the pressure-bar 54^c toward the bar 54^a and clamp the assembled portions of the door tightly together while the boring is performed, which will now be explained.

As each revolution of the shaft 19 occurs by reason of the connecting-rods 20 communicating between the cranks 19^b on the opposite ends of the said shafts 19 and the frame 16 the said frames will be driven toward each other and returned a distance in proportion to the lengths of the said cranks. When such forward movement takes place, clamping-bars will be pressed down on the upper opposite edges of the assembled rails and panels, (see Figs 1 and 9,) and the stiles are forced upward against the bed-plate frames 48 and securely held by similar mechanism while the boring is done or while the frames carrying the auger-bits are being reciprocated.

The mechanism which clamps the assembled portions of the door-frame from above consists of spring-levers 66, fulcrumed on brackets 67, which are rigidly fixed to the adjustable frames 11. The inner ends of these

levers 66 have laterally-deflected pins 66^a, on which are mounted rollers 68, and these rollers take upwardly in sloping channels in brackets 69, which are securely bolted to the reciprocating frames 16. This causes the outer ends of these levers to be raised when the frames 16 move inward, and consequently their inner ends, which are connected by clamping-bars 70, will be pressed downward upon the assembled portions of the door A. The stems of the levers 66 between their fulcrums and the bars 70 are of a slight springy nature, so that any inequalities in thickness of timber employed in the doors being bored or the varying heights of the support-frames 43^a will not materially change the downward pressure exerted by the clamping-bars 70.

The mechanism for forcing the stiles upward against the frames 48 is an exact duplicate of the upper clamps, but inverted to act upwardly, and on the upper side of the under clamp-bars 70 are support-slides 71, on which the stiles rest.

To provide for the assembled members of the door A being alined and held firmly in proper position while resting on the frames 43^a and being bored, I arrange alining rails 43^b, which project above the plane of the said frames and are made to move laterally in or out to engage or release the ends of the assembled pieces of the door. (See Figs. 9, 14, and 15.) These rails are supported by having laterally-projecting guide-pieces 43^c, which pass through slots *a* in the frames 43^a. The mechanism for pressing the rails 43^b in and out consists of the laterally-projecting lugs 43^c on the outer sides of the frames 43^a, rock or way shafts 51, journaled in said lugs, bell-cranks *d*, pivoted on the rock-shafts, the upper ends of which are provided with push-heads resting in suitable sockets in the opposite ends of the rails 43^b, and links *e*, connecting with rigid arms 66^b on the levers 66. It is evident that as the frames 16 move forward the ends of the arms 66^b, having the connection with the alining rails 43^b, will be thrown upward. This will cause the bell-cranks *d* to force the said rails forward simultaneously, and thus the assembled rails of the door A will be forced into proper alinement before engaging the thrust of the drills and firmly be clamped in position while being bored. The backward movement of the frames 16 reverses the operation, thus causing the assembled portions of the door to be released and permitting their removal from the machine.

In order that the lateral clamping of the door-pieces may be performed by the alining-rails 43^b before the upper bars 70 are brought down on the assembled door, the lower levers are caused to act more quickly than the upper ones. This more acute movement is effected by reason of the lower grooves or channels in the frames or brackets 69 being of a steeper pitch, which causes the lower levers

to operate the alining-rails 43^b and the under bar 70 before the up or down movement of the upper bar is fully effected, and thus in the event of the portions A not being in their proper alinement when placed in the machine the forward movement of the frames 16 will cause the alining-rails to reciprocate and engage the opposite ends of the said portions and force them to their proper positions. As shown in Figs. 1 and 3, the alining-rails 43^b are provided at their forward ends with outward curves 43^c, forming a bell-mouth at the entrance to the alining-frames 43^a for the door-pieces. This facilitates the placing of the door-body in the machine preparatory to the operation of boring.

From the above it is manifest that the bell-cranks *d* are fulcrumed on the same shaft 51 that operates the stop mechanism for the door body and stiles. This, however, need not be the case, as the bell-cranks *d* may be suitably fulcrumed on studs secured to projecting lugs from the bed-frames 43^a. The change of detail in this arrangement will not change the mode of operation nor will it materially change the mechanism employed.

In operation the several parts should be adjusted so that the frames 16 may move sufficiently for the levers 66 to be forced apart to the point 69^a before the drills engage the timber. (See Fig. 9.) This provides for all the boring to be done while the rollers travel the level planes 69^b, and consequently there will be no movement or varying pressure of the levers while the work is being performed. As before intimated, movement is imparted to the shafts 19 by means of a worm 18^a on the shaft 18 meshing with worm-wheels 19^a, secured on the said shaft 19, (see detail Fig. 12,) and it also appeared that the frames 11 were intended to be adjusted so that the machine might operate upon doors of different widths. Now it is evident that in order to perform such adjustment the worms 18^a, mounted on the shaft 18, must be moved with any movement of the frames 11. This is accomplished by such worms 18^a being inclosed in brackets 72, securely fixed to the opposite sides of the said frames, and the worms made to slide on feathers 18^b on such shaft, and thus controlling the parts in a simple and practical manner. At each stroke of the connecting-rods 20 and the mutual reciprocating action of the frames 16 the several members of a door are bored, and it is obvious that the movement of the frames carrying the drills should cease during the time required for removing the members just operated upon and introducing another piece of work. Therefore I provide an intermitting movement for the shaft 18, and consequently the said frames 16.

This consists of the wheel 36 being loosely mounted on the shaft 18 and is thrown in and out of gear by a friction-clutch 73 engaging the inner side of a cone 75 in the wheel, and the clutch is operated by a lever 76, secured to a rock-shaft 77, suitably mounted beneath

and passing at right angles to the shaft 18. The upper end of the lever 76 engages a grooved slidable sleeve 78, and this sleeve when pushed forward opens the jaws 79, which acting upon a fixed collar 79^a, pinned to shaft 18, forces the cone 75 forward, thus engaging the friction-clutch; but when the lever is reversed the clutch will be disengaged. This clutch is not new, but is in common use in operating mechanism of this class. As better shown in Figs. 1 and 3, secured to the rear end of the shaft 77 is a short bar 80, and communicating between this and a handle-lever 18 is a connecting-rod 82. Each time the operator wishes to start the frames 16, carrying the drills, forward he pushes the handle-lever 81 forward. This throws the clutch mechanism into action, and the drills start forward and make one stroke, and consequently the members of a door are bored ready for the introduction of the dowel-pins, which is a subsequent operation. To cause the clutch to let go automatically at the return of each stroke without the assistance or attention of the operator, I provide a lever 83, secured to the said rock-shaft 77 and placed at an oblique angle toward the machine. On the end of this lever 83 (see Fig. 12) is an antifriction-roller 84, arranged to turn on a pin 85 in the end thereof. This roller 84, when the clutch is contracted, is poised in the path of an upwardly-curved bracket 86, which is secured on one of the moving frames 16. It is obvious that as the frame returns the bracket 86 will depress the end of the lever 83. This will rock the shaft 77, and consequently will withdraw the sleeve 78 and allow the clutch to release, thus stopping the motion of carriages 16. The lever 83 is made of sufficient resiliency to allow of the lever 76 being forced over by the handle-lever 81, when the carriage 16, carrying the bracket 86, will immediately move forward and disconnect with the roller 84, and the said roller will be in the proper position for tripping the clutch at the return of the next stroke.

The adjustment of the drill-carriages 21 for boring doors of various sizes and designs is extremely simple. (See Figs. 2 and 3.) By loosening the bolts that hold these carriages down they may be slid along the frame 16 to the positions desired and secured by tightening up the said bolts, which take through the slots 16^c, as shown, and the number of drills 29 may be increased or decreased for boring the respective set of holes as desired.

As indicated by the numerals 87 in Fig. 1, the frames 11 and frame 10 are provided with gage-indicators to facilitate the adjustment of the said frames 11 for operating on doors of various widths.

In the practical operation of my improved dowel-door-boring machine the frames 11 are adjusted and set on the bed 10 in the proper positions, according to the width of the doors to be operated upon, as will be shown by the

indicators. The support-frames or slideways 43 and 48 for the doors and stiles are then adjusted up or down, as required, to make the centers of the wood come fairly in alignment with the drills. This adjustment will depend upon the thickness of the wood employed. The assembled members forming the body of a door are then placed on the frames 43^a (after having first set the stops 52 and 53 in position) and the stiles are pushed to their proper place. The clamp is then thrown into position by the operator depressing the pedal 61, and the wheel 64 is turned up tight, thus clamping the assembled members together. The lever 81 is pushed over. This sets the frames 16 in motion, which movement presses the clamping-bars 70 on the door from above and the clamping-bars up from below on which the stiles rest, thus securing the assembled door-body on the bed plate or frames 43^a and the stiles against the under sides of the bed plate or frames 48 while the boring is performed. When the carriages or frames 16 return, they rest in this position by reason of the clutch having released the wheel 36 from its shaft and allowed it to run free. The operator removes the stops from the opposite end of the several members of the door, when he may push them forward through the machine and insert another set of members to be acted upon, when the operation is repeated.

The several members of the door are prevented from moving laterally while being bored by the ends of the portions A resting against the alining-rails 43^b, movably arranged on the outer edges of the frames 43^a, and the stiles are held in a like manner by the fences or guides 49. (See Figs. 5, 7, and 9.) This prevents the possibility of the parts being moved by the thrust of the drills.

Having now described my invention, what I claim as new, and desire to be protected in by Letters Patent, is—

1. In a machine for the purposes set forth, having a bed 10 and adjustable frames 11, mounted thereon, with oppositely-projecting ears and crank-shafts 19, mounted in suitable bearings on the said ears, in combination with reciprocating frames mounted on slideways on the adjustable frames, connecting-rods 20 connecting the cranks of the said shafts with reciprocating frames and means for imparting an intermitting movement to the shafts 19, whereby the said frames will be reciprocated, as specified.

2. In a machine of the class described, having a bed 10, and adjustable frames 11 mounted thereon, and reciprocating frames 16, mounted on the frames 11, carrying a plurality of drills arranged in sets in different horizontal planes, in combination with assembling-frames 43^a, for supporting members of a door-body on the plane of the upper drills, and frames for supporting the stiles on a plane with the lower drills, and means for automatically clamping the assembled members, for

rotating the drills, and for moving the frames forward and back at intervals, as specified.

3. In combination with reciprocating frames 16, carrying sets of drills at different horizontal planes, oppositely-faced support bed-plate frames 43^a and 48, for holding the door rails and stiles, respectively, of means for simultaneously moving the frames 16 forward and back at intervals, and while being moved forwardly for automatically clamping the several members of a door, as specified.

4. In a dowel-door-boring machine, having a bed and adjustable frames 11, mounted on the same, and reciprocating frames 16, slidably fixed on the frames 11, oppositely-projecting ears 11^b, integral with the frames 11, shafts 19, having cranks suitably mounted on said ears, in combination with a shaft 18, traversing the bed at right angles to the crank-shafts 19, worm-gears slidably mounted on the opposite ends of said shaft 18, and worm-wheels secured on the crank-shaft 19, meshing with the said worms and connections from the crank-shafts to the reciprocating frames 16, as and for the purposes specified.

5. In a machine for the purposes set forth, having a bed 10, adjustable frames 11, mounted thereon, and reciprocating frames 16, on the frames 11, in combination with drills mounted in sets on different horizontal planes, movable with the frames 16, of bed-plate frames 43^a and 48 arranged between the said drills and positioned so that the door members will be held thereon and thereunder, respectively, in direct lines with the planes of the drills, and means for automatically clamping the doors from above and below by the movement of the frames 16, as set forth.

6. In a machine for the purposes described, having a frame 10, adjustable frames 11, and reciprocating frames 16, carrying drill-carriages having drills in sets on different planes, in combination with vertically-movable bed-plate frames 43^a and 48, supported by the inner sides of the frames 11, means for lowering the frames 43^a, and raising the frames 48, simultaneously and for clamping the members of a door from above and below by the mutual reciprocation of the frames 16, as specified, and for the purposes set forth.

7. The supporting-frame 43^a for assembling doors, in combination with adjustable frames 11, arranged on a suitable bed, pedestal-brackets 41, secured to the inner sides of said frames 11, vertically-placed spindles 42, in such brackets, screw-threads on said spindles and nuts 43, on the same, which are integral with door-assembling frames 43^a, and means for turning said spindles 42, having the screws whereby the frames will be raised or lowered, as specified.

8. A mechanism for raising and depressing door-assembling bed-plate frames 43^a and 48, simultaneously, consisting of pedestal-brackets 41, secured on suitable supports, spindles 42 and 47 having right and left hand screws,

respectively, nuts on said screws integral with the assembling-frames, shafts 46, arranged in suitable bearings at right angles to and in proximity with said spindles, worm-gear on
 5 said shafts, and worm-wheels fixed to the spindles 42 and 47, whereby, by the turning of the shafts 46 the frames 43^a, will be elevated or depressed and the frames 48 will be moved in the opposite direction, simultane-
 10 ously, as set forth.

9. Stop mechanism attached to the outer sides of support-frames 43^a, over frames 48, which consist of rods or way-shafts 51, arranged in brackets 43^c, lugs 52^a and 52^b, on
 15 brackets 52, secured to the forward ends of said shafts, depending bolts 53, pivoted to the lugs 52^b and passing through apertures in the said frames 48, and handles 54, affixed to the rear ends of said shafts by which the
 20 shafts are turned, whereby the lugs 52^a, will be thrust over the plane of the frames 43^a, and the bolts 53, will be projected below the under plane of the frames 48, by a downward movement of the handles 54^a, and will be
 25 withdrawn by an upward movement of the same.

10. In a machine for simultaneously boring rails and stiles of doors having a bed, adjustable frames 11, arranged on opposite sides
 30 thereof, and reciprocating frames 16, mounted on said frames 11, in combination with suitable supports for assembling door-bodies, and frames for supporting the stiles, spring-levers 66, arranged in sets pivoted on brackets 67,
 35 secured on the frames 11, rollers 68, on the ends of the levers, oppositely-deflected vertical guideways in brackets 69, receiving said rollers, and clamping-bars 70, secured on the resilient ends of said levers, and means for
 40 moving the frames 16, toward each other simultaneously, whereby the upper bars 70 will press downward and the lower one will press upward, as and for the purposes set forth.

11. In combination with suitable frames 16,
 45 carrying drill-carriages mounted on suitable slideways, bed-plate frames 43^a, for supporting the assembled body of a door, the clamp-bar 54, having a fixed and a movable clamp on its opposite ends, said clamp being mount-
 50 ed on suitable supports and means for raising and lowering said clamp-bar to the plane of the assembled portions of the door-body, as specified.

12. In a dowel-door-boring machine, having
 55 a fixed bed 10, adjustable frames 11, mounted thereon, and reciprocating frames 16, arranged on the frames 11, in combination with nests of spindles carrying drills on different planes, having means for imparting a uniform speed
 60 thereto, of bed-plate frames for arranging the members of a door-body on a plane with the upper drills, and for also arranging the stiles thereto on a plane with the lower drills, but in an inverted position in respect to the as-
 65 sembled portions of the door, and means for securing said respective members and for

moving the drills forward, as specified, and for the purposes set forth.

13. In a machine, as specified, having a bed adjustable frames 11, mounted thereon, and
 70 reciprocating frames 16, arranged to simultaneously move on the frames 11 and drill-carriages adjustably mounted on the frames 16, as shown; in combination with spindles mounted in sets carrying drills on different
 75 planes, in said drill-carriages, of bed-plate frames 43^a, and 48, to receive the "face" side of door members and means for securing the same, and of imparting a uniform speed to the drills and for mutually reciprocating the
 80 said carriages, as set forth, and for the purposes described.

14. In combination with a machine for dowel-boring the respective members of doors, having a bed 10, and adjustable frames 11, mount-
 85 ed thereon, with means for moving same laterally along the bed, ears or lugs oppositely projecting from and integral with the frames 11, shafts 19, having cranks at their opposite ends suitably mounted in said lugs, connect-
 90 ing-rods secured to said cranks and to reciprocating frames 16, having drill-carriages thereon, with drills on different planes, means for arranging the members of the doors in the tracks and on different planes of the drills,
 95 and means for imparting an intermitting movement to the shafts 19, whereby the drills will be pushed forward and withdrawn, as specified.

15. In combination with adjustable frames 100 11, and reciprocating frames 16, lugs 11^b, integral with the frames 11, shafts 19, having cranks on their opposite ends, connections between the cranks and the reciprocating frames, a shaft 18, arranged in suitable bear-
 105 ings at right angles to the shafts 19, worms 18^a, slidably mounted on the opposite ends of the said shafts 18, meshing with worm-wheels 19^a, fixed on the shaft 19, and means for imparting movement to the shaft 18, and
 110 for automatically stopping the same at the return of each stroke of the said reciprocating frames, as specified.

16. In a dowel-door-boring machine, having mutual reciprocating frames 16, mounted on
 115 suitable slideways, the same carrying swiftly-turning drills or bits in sets on different planes, means for supporting the work in different planes means for moving the said frames forward and back remittently, which
 120 consist of shafts 19, having cranks mounted in suitable bearings on opposite sides of the said frames, said cranks connecting with the frames, a shaft turning at right angles thereto, having worms secured thereon, meshing
 125 with worm-wheels secured on the shafts 19, and a clutch mechanism secured on the shaft 18, for gripping and releasing a wheel 36, turning on said shaft, as specified.

17. In a machine for the purposes described,
 130 having a bed 10, adjustable frames mounted thereon, and reciprocating frames 16, caused

to move upon the adjustable frames, shafts 19, having cranks on their opposite ends suitably mounted on the opposite sides of the frames 16, and connections from the said cranks to the frames 16, a shaft 18, placed at right angles to the shafts 19 and means for communicating movement from the said shaft 18, to the crank-shafts 19, in combination with a clutch secured on the shaft 18, and means for tripping the same automatically at each return stroke of the frames 16, substantially as specified.

18. In a machine for the purposes described, having a bed 10, adjustable frames mounted on said bed, and reciprocating frames 16, carrying drill-carriages, having drills mounted on different planes, means for supporting the work in different planes and means for moving the said frames carrying the drill-carriages forward, and of automatically stopping the same at the return of each stroke, consisting of a shaft 18 arranged to turn at right angles to and beneath the reciprocating frames, said shaft having a loose pulley mounted thereon, a friction-clutch on said shaft arranged to connect with an integral cone, and a sleeve slidably fixed on the shaft 18, a rock-shaft 77, suitably mounted beneath the shaft 18, having a lever fulcrumed thereon, said lever connecting with the said sleeve, and a resilient lever 83, fulcrumed on said shaft 77, and deflected in the path of a fixed bracket 86, secured to one of the moving frames 16, as specified.

19. In combination with a machine of the class described, having a bed-frame 10 and adjustable frames 11, and reciprocating frames 16, mounted on opposite sides of door-assembling frames 43^a, and 48, alining-rails 43^b, slidably mounted on opposite sides of the frames 43^a, compound levers fulcrumed on the frames 43^a, and on pedestals or brackets 67, on the frames 11, inclined grooves in brackets 69, on the frames 16, connecting with and acting as guideways for the outer ends of the levers fulcrumed on the brackets 67, and means for moving the frames 16, forward, whereby the alining-rails will be moved forward during part of the travel of the frames 16, substantially as specified.

20. In a machine for simultaneously boring

rails and stiles, of doors having a bed, adjustable frames 11, arranged on opposite sides thereof, and reciprocating frames 16, mounted on said frames 11, in combination with suitable bed plates or frames 43^a, for assembling door-bodies, and like frames for supporting the stiles, spring-levers 66, arranged in sets to work vertically from above and below pivoted on brackets 67, secured on the frames 11, rollers 68, on the outer ends of the levers, oppositely-deflected vertical guideways in brackets 69, receiving said rollers, and clamping-bars 70, secured on the resilient ends of said levers; in combination with laterally-movable alining-rails 43^b, slidably mounted on the opposite sides of the supports 43^d, and compound levers communicating between the same and the lower levers 66, and means for moving the frames 16, toward each other simultaneously whereby the upper bar 70, will press downward and the lower one will press upward, and the alining-rails 43^b, will be thrust forward, as and for the purposes set forth.

21. A mechanism for simultaneously clamping the assembled members of a door-body from above and its stiles from below, and for alining the door-body on opposite sides, bed-frames 43^a, and 48, on which and under which the door-body and the stiles rest, respectively, clamp-bars 70, arranged above and below the door members, moving frames 69, arranged on opposite sides of the frames 43^a and 48, fixed brackets 67, arranged between the moving frames 69, and the frames 43^d and 48, levers 66, fulcrumed on said brackets 67, and communicating between the bars 70, and the moving frames 69, oppositely-deflected guideways in the frames 69, from the ends of the said levers 66, to travel the lower channels of which or the guideways engaging the lower levers 66 are of more acute angle than the upper ones; in combination with alining-rails 43^b, slidably fixed on the opposite sides of the frames 43^a, and compound levers communicating between the lower levers 66 and such alining-rails, all substantially as specified.

ALBERT EDWIN WOODS.

Witnesses:

W. G. TRETHEWEY,
ROWLAND BRITAIN.