(No Model.) 4 Sheets—Sheet 1.

J. THOMSON.

STAMPING OR EMBOSSING PRESS.

No. 387,830. Patented Aug. 14, 1888.

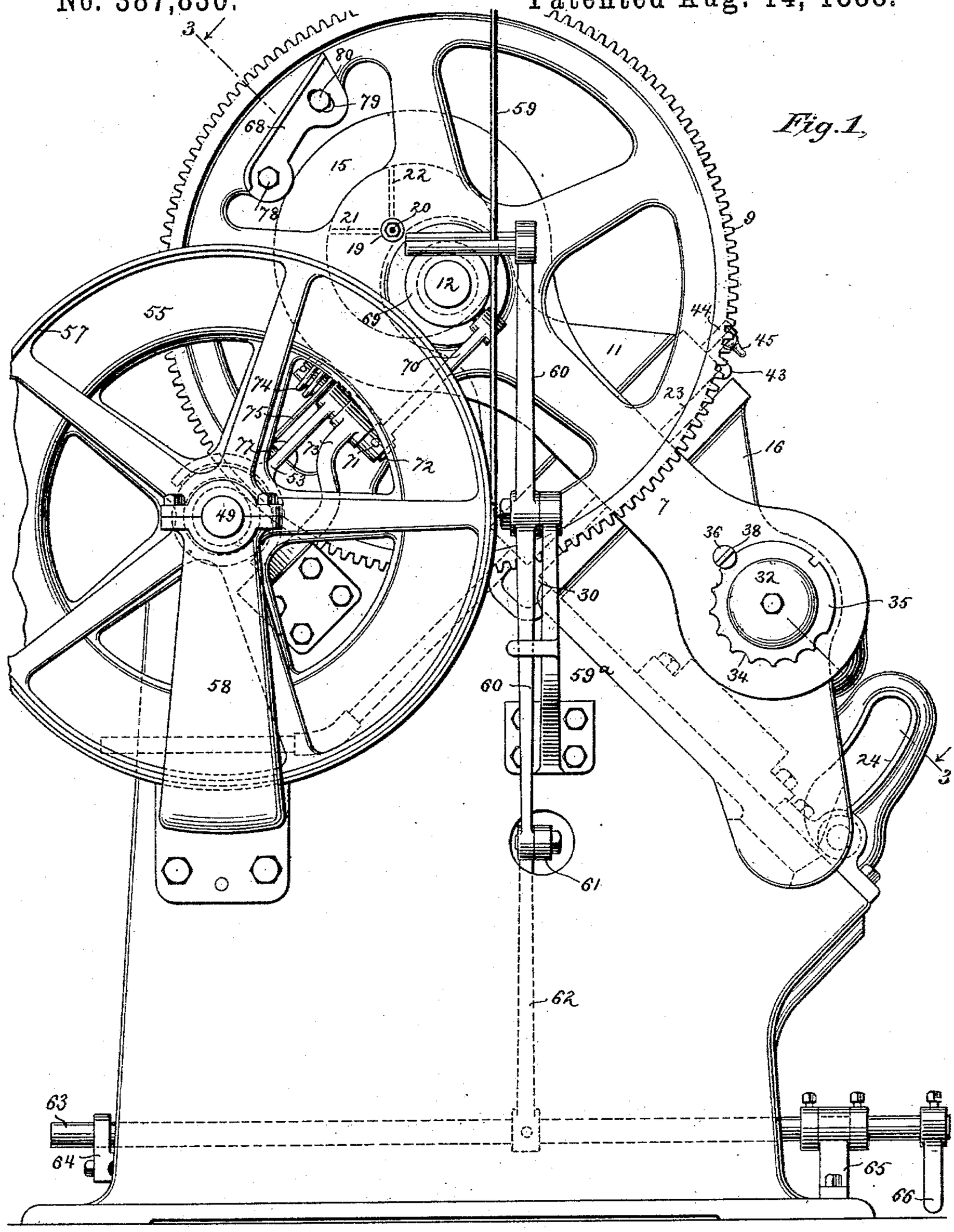

Fig. 1.

Witnesses.
Geo. W. Breck.
F. L. Freeman.

Inventor:
J. Thomson.

(No Model.) 4 Sheets—Sheet 2.

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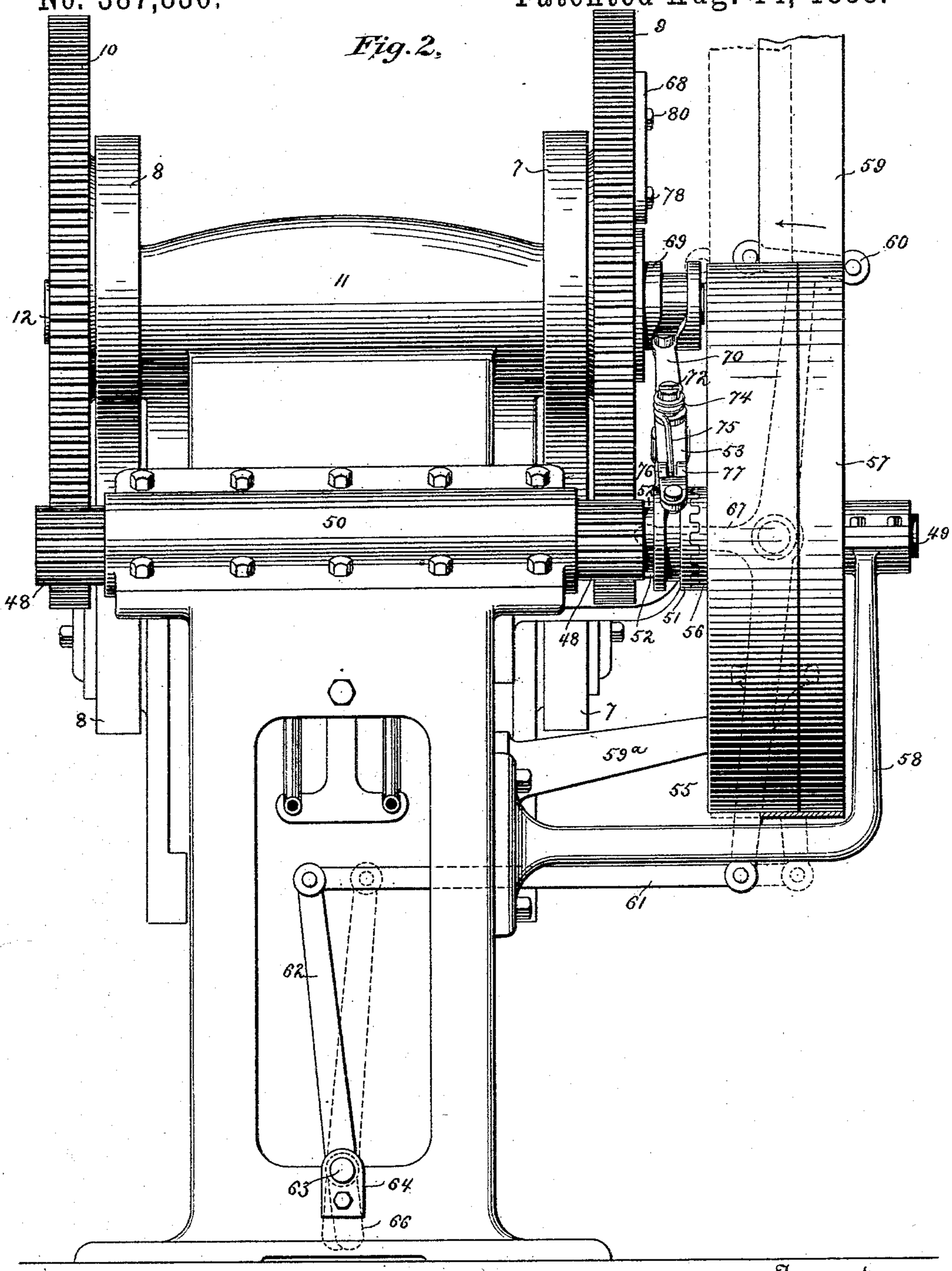
Fig. 2.



Witnesses.
Geo. W. Breck.
F. L. Freeman.

Inventor:
John Thomson.

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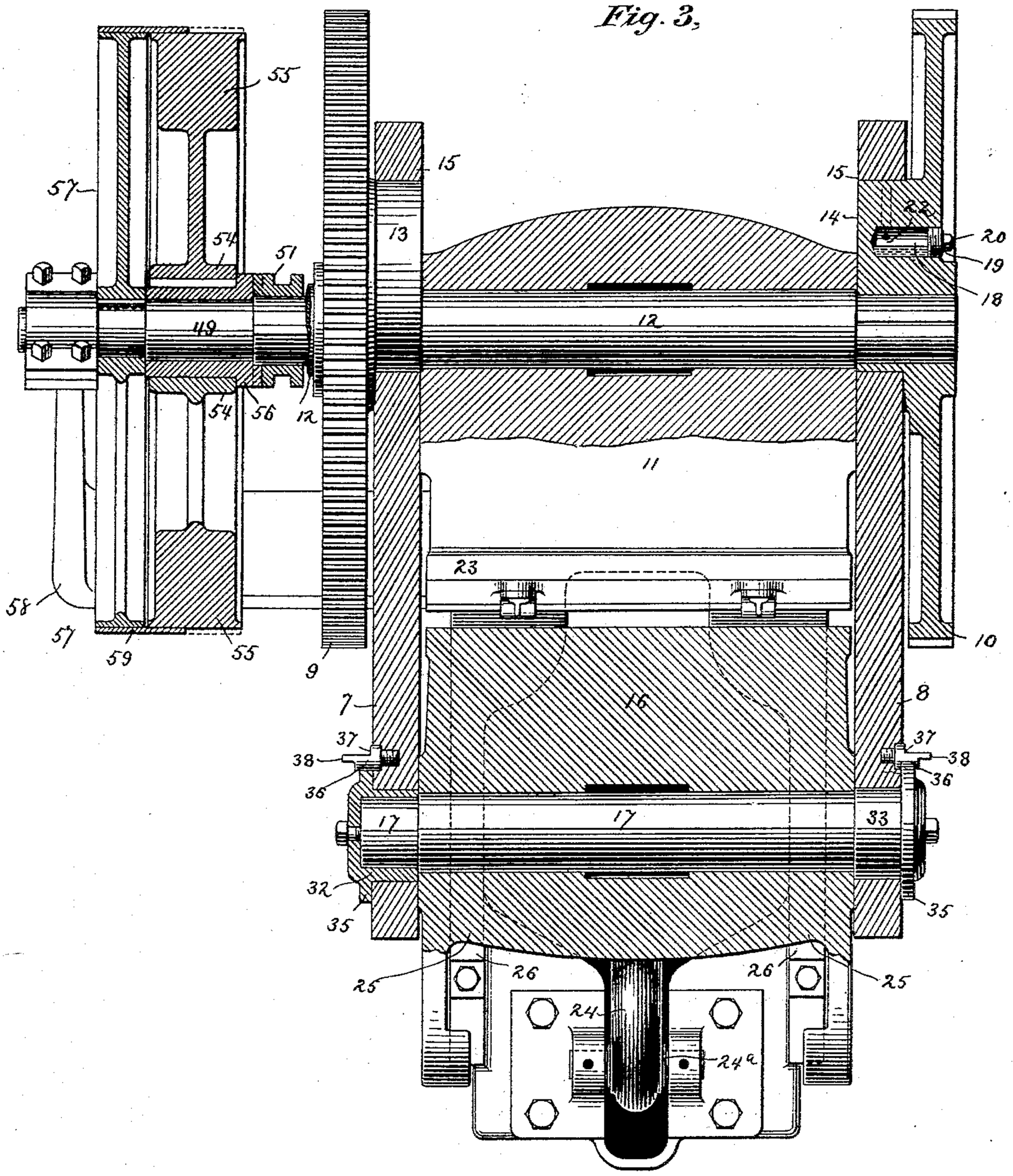
Fig. 3.



Witnesses.
Geo. W. Breck.
F. L. Freeman.

Inventor:
John Thomson.

(No Model.) 4 Sheets—Sheet 4.

J. THOMSON.

STAMPING OR EMBOSSING PRESS.

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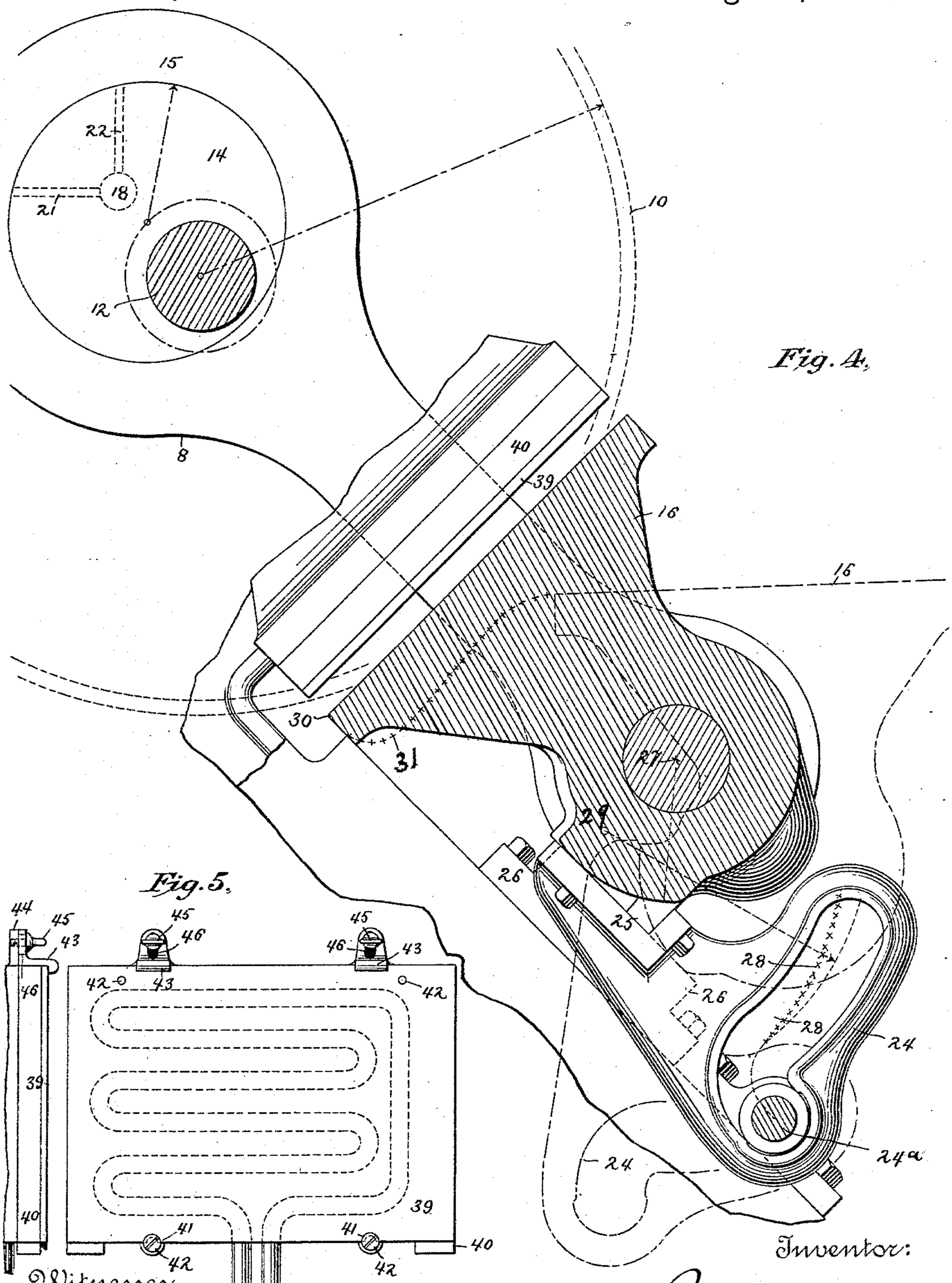

Fig. 4.

Fig. 5.

Witnesses.
Geo. W. Breck.
F. L. Freeman.

Inventor:
John Thomson.

UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF BROOKLYN, NEW YORK.

STAMPING OR EMBOSSING PRESS.

SPECIFICATION forming part of Letters Patent No. 387,830, dated August 14, 1888.

Application filed February 24, 1883. Serial No. 265,170. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMSON, of Brooklyn, Kings county, State of New York, have invented certain new and useful Improvements in Stamping or Embossing Presses, of which the following is a specification.

My invention relates to presses for stamping or embossing, and more particularly to that class wherein there is a stationary bed provided with means for holding the die or stamping or embossing surface, and in which there is a platen carrying the article to be stamped or embossed, and having a rocking motion from a practically horizontal position when it is adapted to receive the article to be embossed to a position practically parallel with the bed, and then to move toward the bed in lines parallel therewith, to cause the platen to approach the bed in such a manner as to insure the square impression and clearance of the dies and even register.

The object of my invention is to produce a press of the above character, adapted to emboss metal, wood, paper, and other material, and which shall be positive in its operation and practically rigid in its structure, to reduce the movements of the operative parts to a minimum, and to produce a press that is simple, cheap, and effective, and capable of accurate and efficient operation; and to these ends my invention consists in the various constructions and arrangements of parts, substantially as hereinafter set forth.

In the drawings, Figure 1 is a side elevation, and Fig. 2 is a direct back elevation, of the machine complete. Fig. 3 is a central horizontal section on the line 3 of Fig. 1, viewed in the direction indicated by the arrows, and also shows in horizontal section the pulley, fly-wheel, and clutch. Fig. 4 is a partial vertical section through the platen and bed to illustrate the construction and operation of the platen, controlling-cam, eccentrics, and main connecting-rods. Fig. 5 is a detail view of the gages for securing the register-blank.

One of the controlling objects of my invention is to produce the nearest to an absolutely rigid structure. This I obtain by placing the main connecting-rods 7 8 inside of the gear-wheels 9 10—that is, between the outside surfaces of the bed 11 and the inside faces of the wheels. The said wheels are mounted upon and keyed to the projecting ends of the main shaft 12. The eccentrics 13 14 are formed upon the inside faces of the wheels, and preferably as a part thereof, projecting inwardly through the bearings formed in the crank end "eyes" 15 of the rods. The diameters of the eccentrics depend, first, upon the desired extent of their "throw," and, second, upon the diameter of the main shaft, as will at once be apprehended by inspection of the horizontal section, Fig. 3, by which it will be seen that the eccentrics encompass the main shaft. The consequence of this arrangement is that the conditions of proportion and construction between the bed 11 and the platen 16 may be identical, and that the rods being thus brought flush with the sides of both the bed and the platen, the projecting studs of the main shaft 12 and the platen-shaft 17 are subjected to a perfect shearing strain with no cramping tendency, as in ordinary crank-actions. Larger-diameter gears may in this wise be used, as they may project, as shown, beyond the face of the bed. In other words, this reverses the ordinary construction, as in this case the crank-wheels are outside of the connecting-rods, instead of being on the inside, as heretofore.

To oil the bearing-surfaces of the eccentrics, I form a chamber or recess, as 18, from the outside of the gear-wheels and insert a plug, 19, having a small central opening or oil-inlet, 20. Then one or more oil-channels, as 21 22, are drilled from the bearing-surface of the eccentrics to intersect the chamber. Oil is applied through the opening 20 until the chamber is filled to a level therewith, and which is the limit of its capacity unless the opening be plugged. Thus, upon each revolution of the gears the oil will alternately run from the chamber through the channels to the bearing-surfaces of the eccentrics and again reverse its flow back to the chamber, constant lubrication being applied until the supply is used up by frictional loss.

Another controlling object of this invention is to reduce to a minimum the throw of the eccentrics, as this decreases their diameter as well as the diameter of the eyes of the connecting-rods and increases the impressional efficiency of the entire structure.

In the machine here illustrated the front 23 of the bed is inclined forward forty-five degrees from the vertical, and it is required to move the platen back and forth directly parallel to the face of the bed to produce a square impression and clearance of the die, and, second, to thereafter swing the platen out, whereby to deliver and receive the sheets or articles being acted upon.

In United States Patent No. 331,846, granted to me December 8, 1885, I have shown in detail a device for controlling an action of this kind, in which one of the main objects was to produce a rocking motion without grind or slip. In the present case, however, the platen-controlling cam 24 differs from my said former invention in that the cam is purposely formed to cause the rockers 25 of the platen to slip upon the bearing-blocks 26 of the frame. The rockers are segments of circles whose centers are at 27 on the center of the platen-shaft. A true rolling contact between the rockers and their seats would produce a cam having the contour of a cycloidal arc, (indicated by the points 28;) but the present form, as illustrated, is the arc of a circle whose center is at 29. Now, the consequence of this is that, as the eccentrics force the platen back, the cam, by its contact with the friction-roller 24ª, augments the throw of the eccentrics by causing the platen to swing upon the rockers and bearings of the bridge-shaft. In practical construction the elements of the problem are, first, the radius of the eccentrics; second, the radius of the platen-rockers; third, the slip of the rockers to be produced by the cam, while the limiting factor is the path nearest to the face of the bed that may be described by the lower edge, 30, of the platen as it swings out, which, theoretically, is a straight line parallel thereto. Its actual path under the conditions here shown—which are reductions from practice—is indicated by the points 31, and is as close an approximation as may be expected. The face of the platen on the out motion is brought approximately to a horizontal position for feeding, as indicated by the dotted outline.

The extent of the direct parallel motion of the platen may be altered by means of the eccentric-sleeves 32 33. The novelty of this application is in the manner of locking the sleeves to the main connecting-rods, which consists in milling a series of circular recesses, 34, in the flange 35 of the sleeves. The semi-circular locking-stud 36 is then screwed into the face of each connecting-rod, the half-section being cut away, as at 37. The squared projection 38 is for the purpose of applying a wrench. The arrangement and relation are such that the circular portion of the stud normally engages one of the circular recesses, the sleeve being then rigidly keyed against rotation; but upon giving the stud half of a revolution the circular segment is turned out and the sleeve is relieved and may be set to a new position.

The detachable register-blank 39 is for the purpose of securing the dies which are intended to be used in the bed of the press. They are secured to the blank when out of the press, and then are placed all together as one part in position. The blank is first secured to the bottom of the steam-blank 40 by two notches, 41, adapted to engage the bevel-headed screws 42. Its position or register sidewise is provided for by the steady-pins 42ª, and it is finally rigidly locked to the steam blank or bed by means of the lipped gages 43, which are clamped to the bosses 44 by the thumb-screws 45. The gages are slotted, as at 46, whereby it is only required to loosen the tension of the thumb-screws, when the gages may be slid upward sufficiently to clear the lips and the blank may be removed or inserted.

The final object of this invention is to provide disengaging mechanism whereby the platen may be caused to remain open until its operation is again desired, and to accomplish this either automatically or at will or in combination without stopping the fly-wheel and driving-belt. The gear-wheels, comprising, also, the eccentrics and connections, are driven by the pinion 48, fast to the pinion-shaft 49, mounted in the box-bearing 50.

On an extension of the pinion-shaft outside of the pinion is mounted the driven sliding-clutch member 51, which is prevented from rotating independently upon the shaft by the feathers 52, but is free to be slid back and forth by the lower extension, 53, of the clutch-lever. Contiguous to the sliding-clutch member, and keyed fixedly to the hub 54 of the fly-wheel 55, is the fixed or driving-clutch member 56, but which, with the fly-wheel, is free to rotate on the shaft, while next to the fly-wheel is the light driving-pulley 57, keyed tightly to the shaft. The extremity of the shaft is supported by the bracket 58, bolted to the frame.

The width of the driving-belt 59 is preferably equal, or nearly so, to the face of the fly-wheel, while the face of the driving-pulley is only about half that of the fly-wheel; but the diameters of the two are equal. The belt is adapted to act entirely on the fly-wheel or partially on both the fly-wheel and the driving-pulley, which comprise its only conditions of operation.

With the described arrangement of parts it will be seen that the driven-clutch member 51, being back toward the pinion, and hence disengaged from the driving member 56, and the belt acting upon the driving-pulley, and also upon the fly-wheel, the press will be operated entirely by the driving-pulley to the extent of the pull of the belt, as the fly-wheel is then carried idle, being without means to transfer its momentum to the gear-wheels. It will furthermore be seen that if the sliding-clutch member be still held out of engagement, and the belt is slid entirely off from the driving-pulley and over the fly-wheel, as indicated

by the dotted lines, the press will stop, but the fly-wheel will still be driven free, like a "loose" pulley.

I now pass to the means for making use of the conditions just described.

Bolted to the side of the frame is a bracket, 59ª, upon the extremity of which is pivotally mounted a belt-shifter, 60. The lower end of the belt-shifter is pivotally connected by the rod 61 to the arm 62, the latter being fixed to the rocker-shaft 63, mounted in the brackets 64 65, secured to the base of the frame. The rocker-shaft is suitably extended in front of the machine, and is there provided with a pedal-lever, 66. Thus by the foot this belt-shifter may be vibrated toward the right or the left, carrying the belt on or off from the driving-pulley. Of course the pedal-lever might be extended upward, so as to be also capable of operation by the knee or the hand. Projecting inward from the belt-shifter toward the gear-wheel is an arm, 67, dotted outline, Fig. 2, and secured to the outer face of the gear-wheel is a shoe, 68, adapted to engage and depress the said arm at a certain part of the rotation of the wheel. Secured to a hub formed on the main shaft, projecting beyond the face of the gear-wheel, is an ordinary "drunken" cam, 69, to be hereinafter termed the "clutch-lever cam," which properly engages the upper extremity, 70, of the clutch-lever, this member being fixedly secured, as by the pin 71, to the spindle 72. The said spindle is pivotally mounted in the bracket 73, which is bolted to the frame. The lower extension, 53, of the clutch-lever is next pivotally mounted upon the spindle, and to the end of the spindle is fixedly attached the clutch-lever-driving spring 74, the free end or tongue 75 of which projects downward and lies between the two pins or bosses 76 77, formed upon the lower extension of the said clutch-lever. The form of the clutch-lever cam is such as to alternately vibrate the lever at each revolution of the gear-wheel, and after completing each of such vibrations to hold the lever at a state of rest or "dwell." The relative position of the cam is such as to be at half-throw in either direction, when the eccentrics are also at mid-throw.

Now, with the platen open, the clutch disconnected, and the belt entirely on the fly-wheel, it is evident that the fly-wheel will be the only part of the machine in motion; but the instant the operator is ready the pedal-lever is forced over, thus carrying the belt, through the medium of the arm, connecting-rod, and belt-shifter, back upon the driving-pulley. This, by belt-friction, will at once noiselessly start the entire machine, so that when the clutch-lever cam acts to throw the clutch-lever, and thereby the driven member of the clutch into engagement, the rotative speeds of both the driving-pulley and the fly-wheel will be equal, or nearly so, and consequently the final engagement will be effected without shock or jar; but should the cam act when the teeth of both clutch members are exactly opposite each other, the upper part, 70, of the clutch-lever will be forced over, but the tongue of the driving-spring will yield, and when the relation between the clutch members will have changed sufficiently, either by normal differential action or by impact of the platen on the die, the spring will then act to actuate the lower extension, 53, of the clutch-lever, and thus by spring-tension force the sliding member of the clutch into engagement. Thus the real function of the spring is to act as a yielding resistance between the clutch-lever cam and the teeth of the clutch, as it is clear that in a rigid apparatus there would be constant liability of breaking the parts. Of course, when the clutch members are in engagement the momentum of the fly-wheel is transmitted through the gearing to the eccentrics and connecting-rods, as well as the entire effective pull of the belt, which acts both upon the fly-wheel and the driving-pulley as if they were joined, for each, in effect, is then keyed to the shaft. It will furthermore be seen that after the members of the clutch will have been disengaged, the shoe 68 will contact with the arm 67 of the belt shifter, thereby automatically drawing the belt entirely off from the driving-pulley and entirely over upon the fly-wheel, when the motion of the platen and gears will cease until again started, as already described.

The shoe is pivotally secured to the crank-wheel, as at 78, the forward end being slotted at 79 and secured by the bolt 80. This is for the purpose of adjusting the throw of the belt-shifter.

Attention is directed to the fact that the contour of the acting-surface of the shoe may be of such form and extent as to very gradually shift the belt, so that as it is leaving the driving-pulley it will slip, as in starting up, thus bringing the platen to rest without annoying vibration; and it is to assist in effecting this that, as shown, the driving-pulley is made as proportionately light and narrow as possible, in that it is under the more perfect control of the belt.

Although I have shown the disconnecting mechanism of the press as applied to but one side thereof, it may be applied with equal facility to both sides by simply changing the connection from the rocker-shaft to one of the belt-shifters, so as to produce the proper unison and direction of motion in both belt-shifters. In this wise the press would be in theoretically perfect equipoise, being driven by equal forces from both sides.

By removing the shoe or swinging it inward so as to pass free of the arm, the press will operate continuously, or may be both stopped and started at the will of the operator.

I claim—

1. In combination, the bed, platen, connecting-rods, and gear-wheels, the said rods located between the outside faces of the bed and the inside faces of the wheels, and the ec-

centrics projecting inward toward the press, substantially as described.

2. The combination, with the bed having its face inclined at an angle of about forty-five degrees from the perpendicular, of a rocking platen arranged to rock from a practically horizontal position to a position parallel to the bed and to move toward the bed in lines parallel therewith, and a cam for controlling the movement of the platen, substantially as described.

3. The gear-wheels, mounted upon a shaft, having eccentrics formed upon their inner sides and connecting-rods adapted thereto, the main-shaft bearings being within the compass of the eccentrics, whereby the faces of both the eccentrics and the connecting rods bear directly against the sides of the bed.

4. The gear-wheels having the oil-chamber or recess 18, provided with a central inlet, 20, to the chamber, and outlet channel or channels 21 22, extending from the chamber to the bearing-surface, whereby the lubricant may be applied from the outside of the machine and be fed intermittently to the bearing-surface of the eccentrics at each rotation thereof.

5. The combination of the eccentrics, connecting-rods, platen, rockers, friction-roll, and controlling-cam, the form of the cam being such as to augment the motion of the platen by causing it to slip upon its bearings, substantially as described.

6. The combination of the eccentrics, connecting-rods, platen, rockers, friction-roll, and controlling-cam, the relation and form of the eccentrics, rockers, and cam being such that the lower edge of the platen is caused to travel upward in a line approximately parallel to the face of the bed, substantially as described.

7. The combination, with the platen, main connecting-rods, bed, and gear-wheels, of the eccentric adjusting-sleeves having a flange in which are formed circular recesses, and the semicircular locking-stud, substantially as described.

8. The lipped gage having a slot, as 46, in combination with the thumb-screw, steam-blank, and register-blank, for the purpose specified.

9. The combination, with the gear-wheels, pinions, and driving-shaft, of the belt, the driving-pulley keyed to the shaft, the fly-wheel loose on the shaft and having a clutch member fast thereto, a sliding-clutch member, a pivoted clutch-lever, and a cam mounted on the crank-wheel for actuating the clutch-lever, the arrangement and construction being such as to force the clutch into engagement when or after the rotative speeds of the two members of the clutch are equal, substantially as specified.

10. The combination of the fly-wheel having a driving-clutch, the sliding-clutch member having teeth corresponding to those of the fly-wheel, a cam mounted on the crank-wheel, and a pivoted clutch-lever, one extremity of said lever being adapted to engage the sliding-clutch member and the other extremity of which is adapted to be engaged and actuated by the cam and having a yielding resistance between the said cam and clutch, for the purpose specified.

11. The combination, with the driving-shaft, clutch, and clutch mechanism substantially such as described, of the fly-wheel loose on the shaft, the pulley tight to the shaft, the belt, and the belt-shifter, the adjustment and operation of the latter being such as to shift the belt on and entirely off from the tight pulley, but never entirely off from the fly-wheel, substantially as described.

12. The combination, with the clutch-lever cam, the pivoted clutch-lever having a yielding resistance, and the sliding clutch member, of the shoe fast to the crank-wheel, the belt-shifter having an arm adapted to be engaged by the shoe, the belt, the pulley tight to the shaft, and the fly-wheel loose on the shaft and provided with a driving-clutch member, the relative arrangement being such that the said cam first acts to disengage the clutch members, the belt being then drawn from the tight pulley entirely onto the fly-wheel, substantially as described.

13. The combination of the belt-shifter, having suitable connections for manual or pedal operation, with the belt, tight pulley, fly-wheel, clutch members, clutch-lever, and clutch-lever cam, the construction and relative arrangement being such that the belt is slid partially across the face of the fly-wheel onto the tight pulley, thereby starting the machine by belt-friction, the clutch-lever cam being thus put in motion by the primary action of the belt to throw the sliding member of the clutch into engagement, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subcribing witnesses.

JOHN THOMSON.

Witnesses:
THOS. C. BYRNES,
GEO. H. GRAHAM.