(No Model.) 4 Sheets—Sheet 1.

F. H. HAWKINS.

MACHINE FOR ORNAMENTING WOOD.

No. 461,918. Patented Oct. 27, 1891.

Fig. 1.

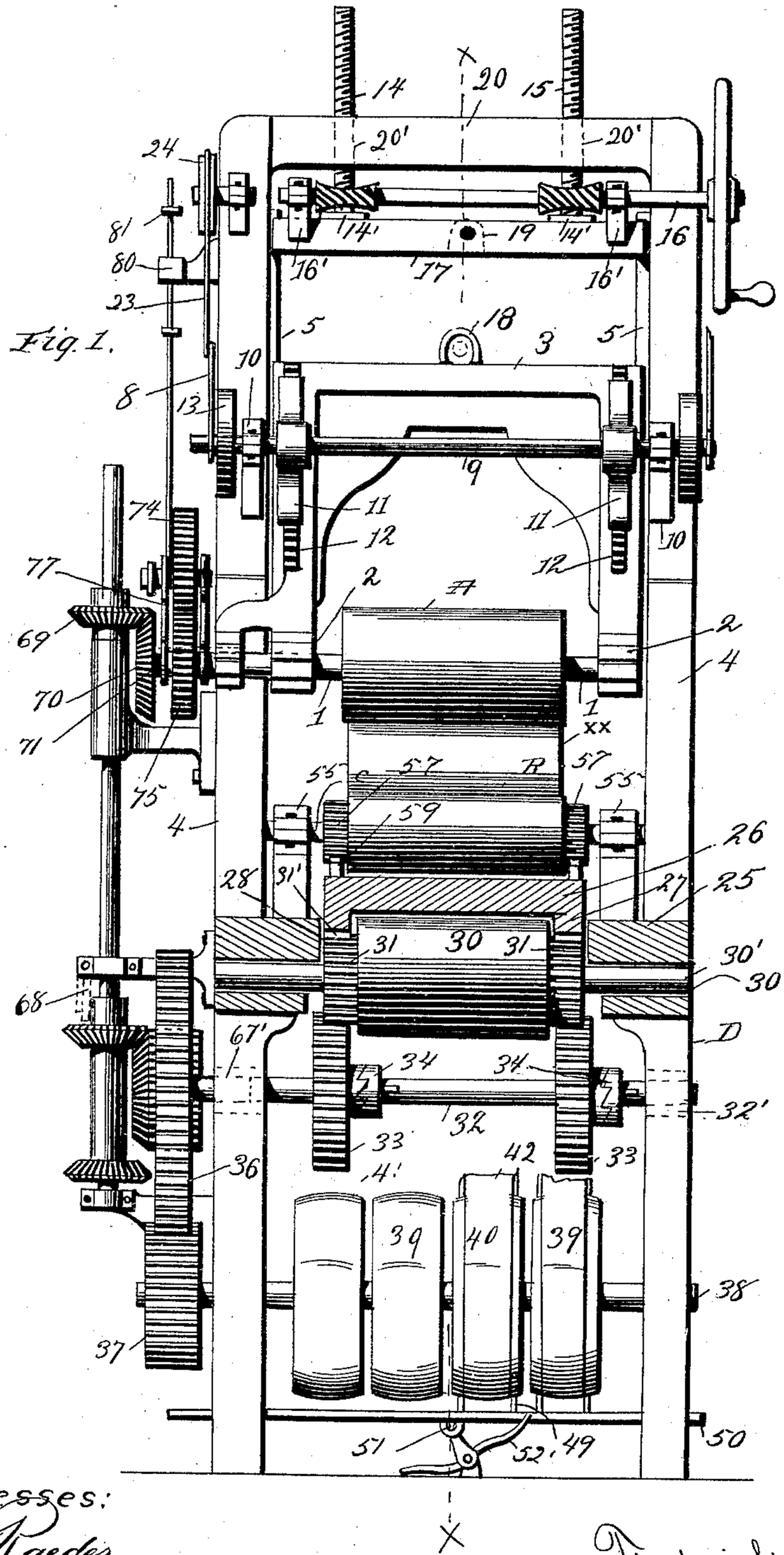

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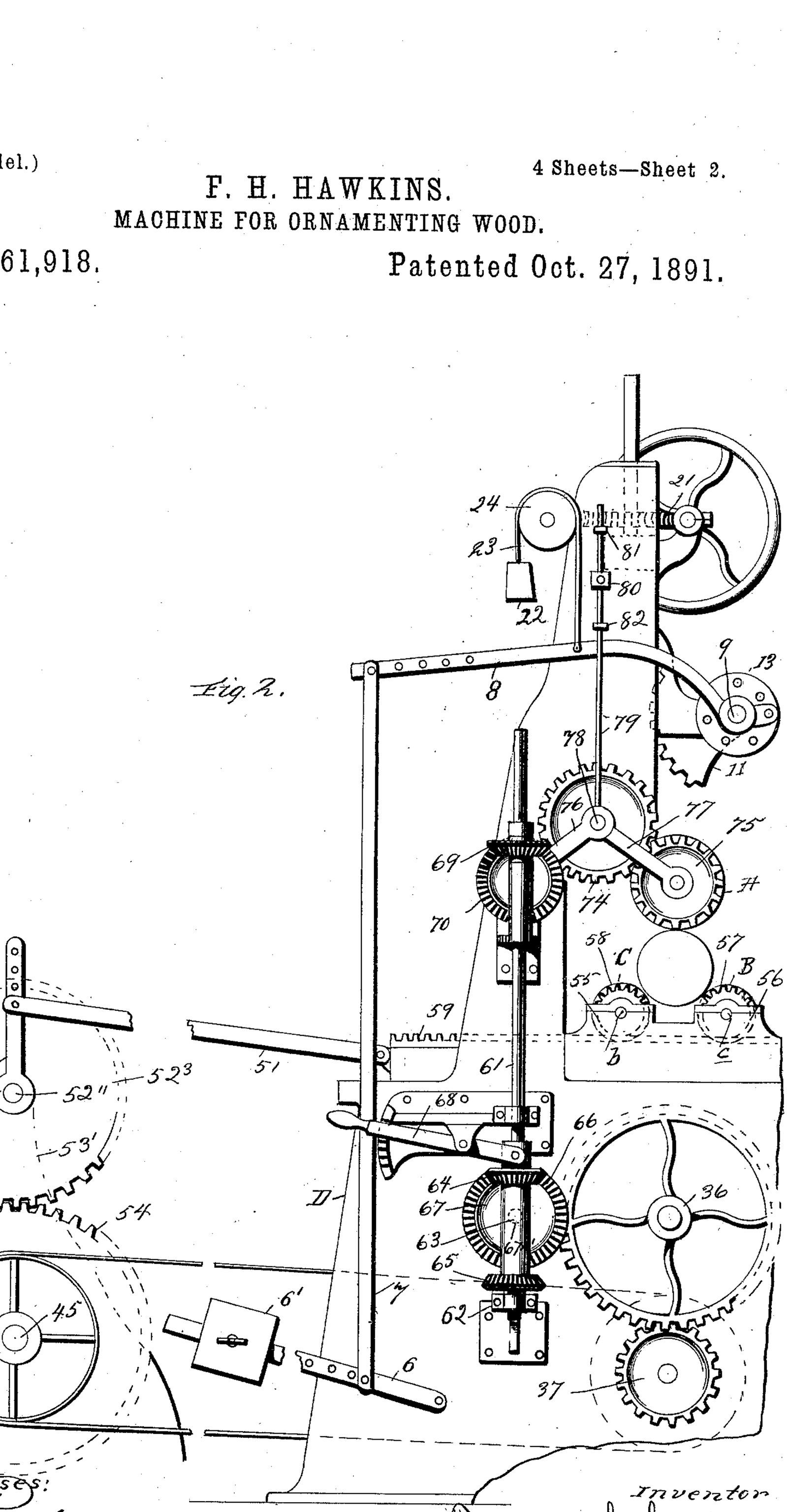
Fig. 2.



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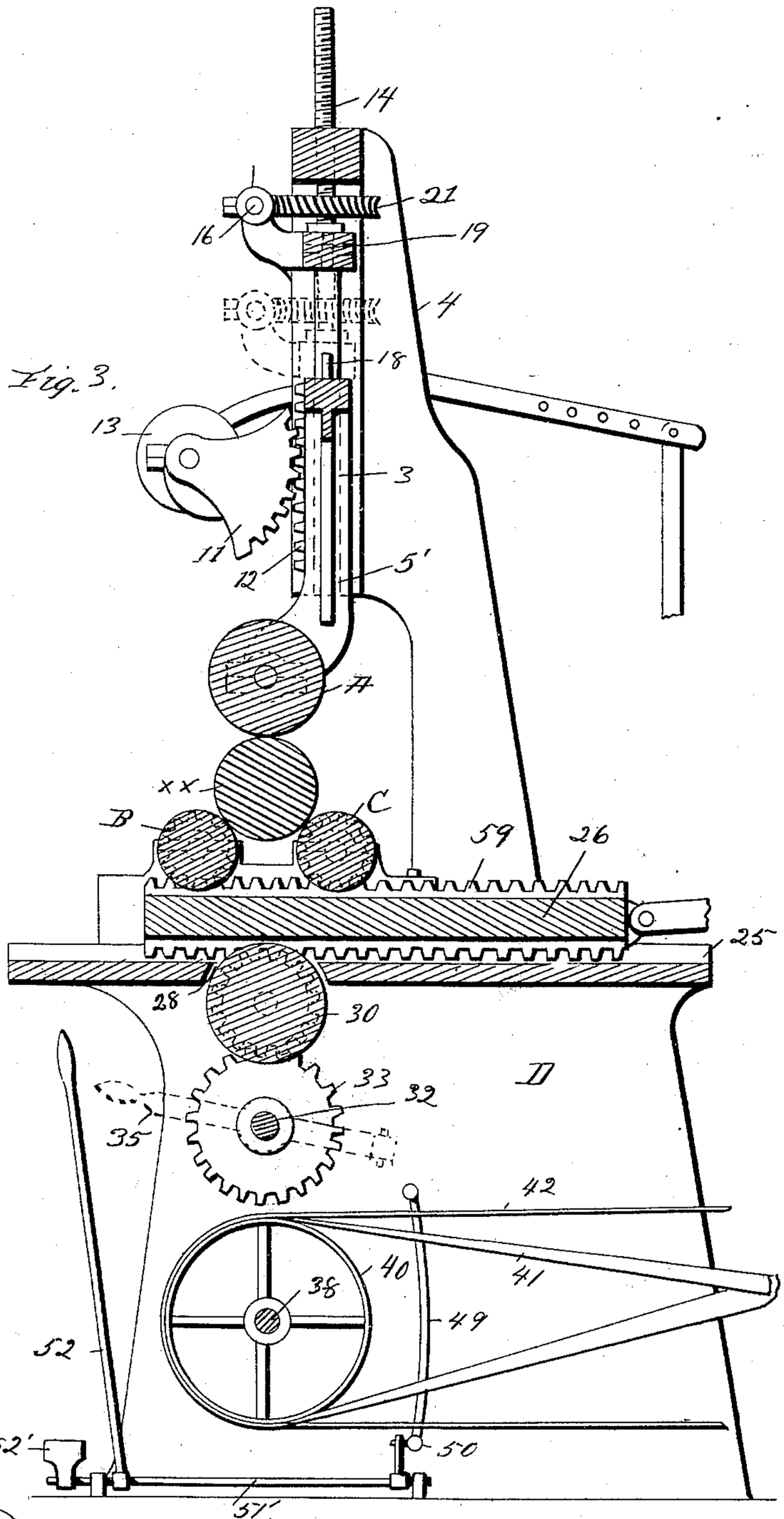
MACHINE FOR ORNAMENTING WOOD.

No. 461,918. Patented Oct. 27, 1891.

Fig. 3.



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MACHINE FOR ORNAMENTING WOOD.

No. 461,918. Patented Oct. 27, 1891.

Fig. 6.

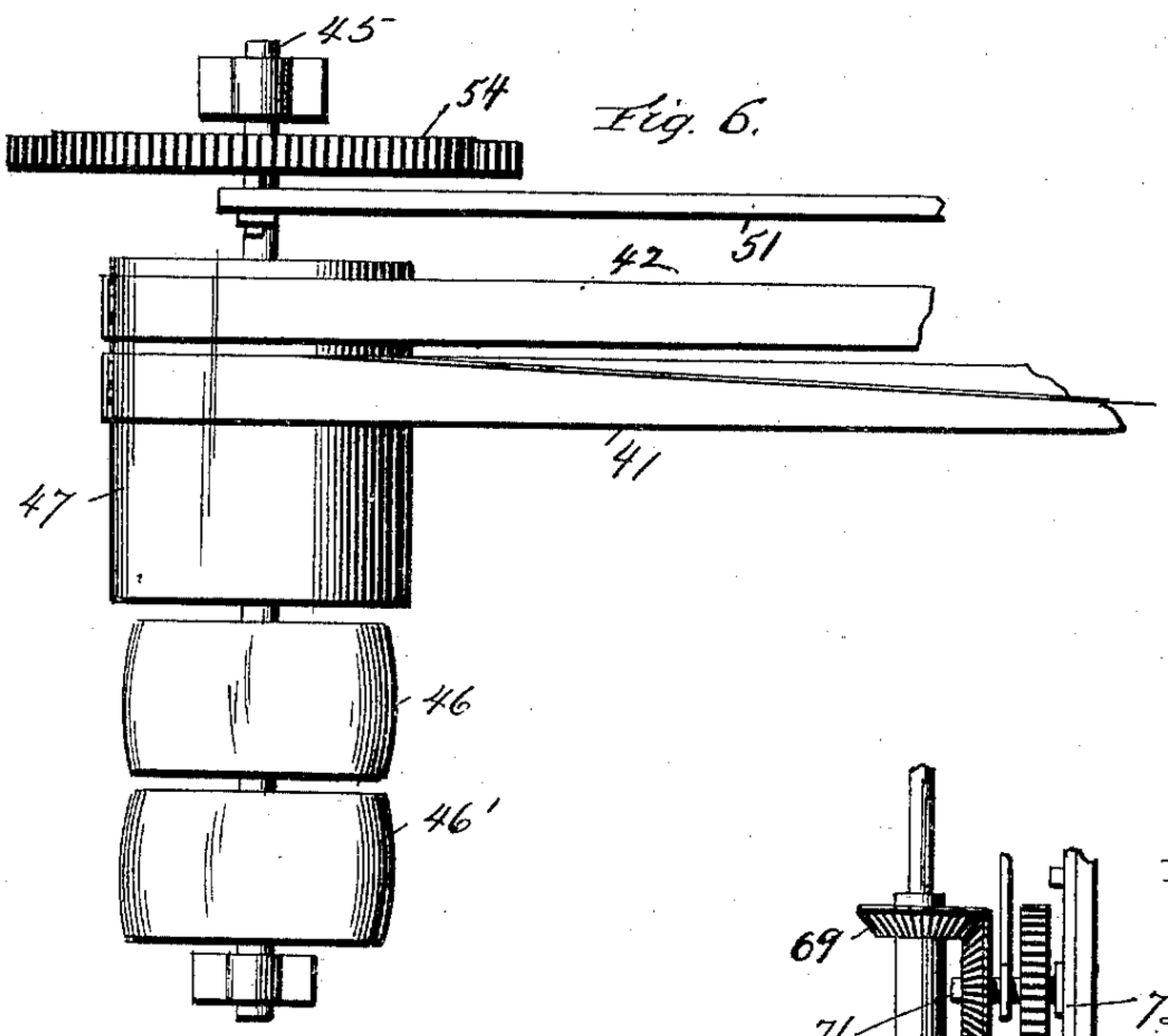


Fig. 7

Fig. 4.

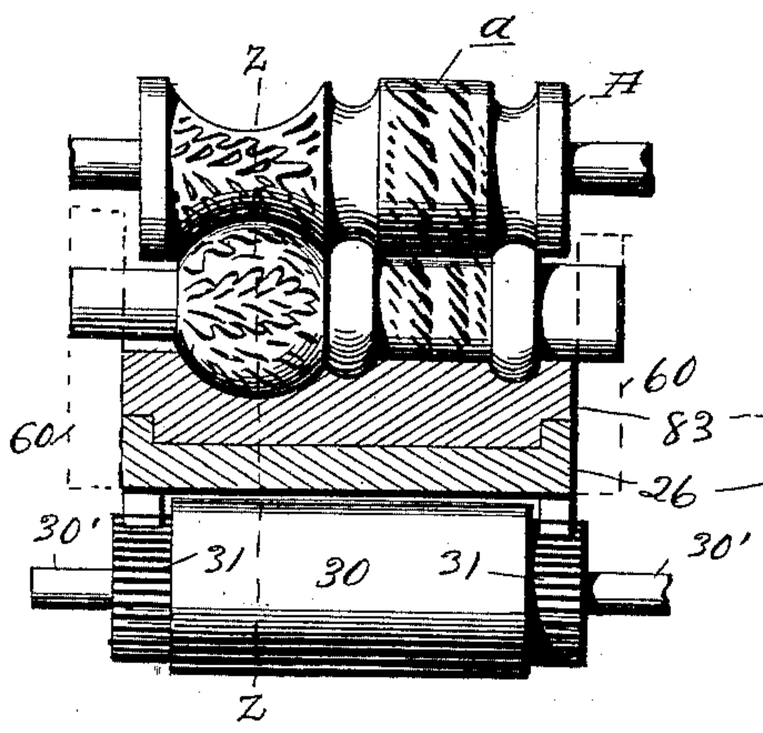
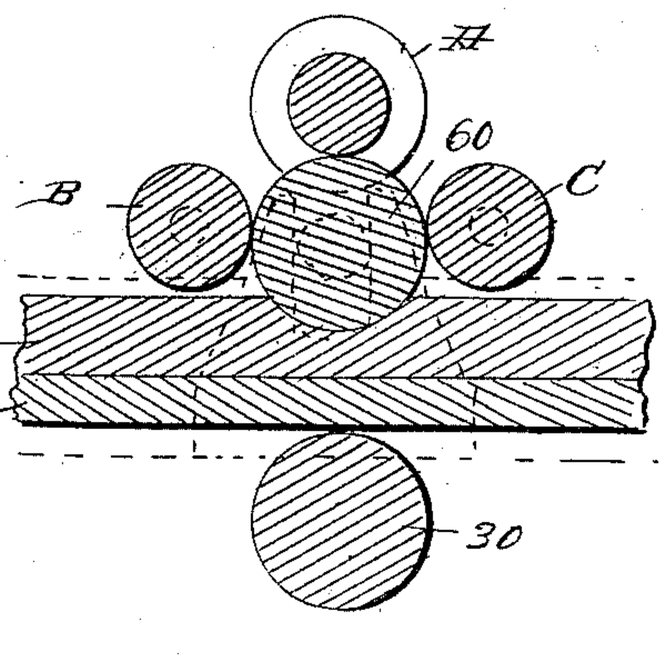


Fig. 5.



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UNITED STATES PATENT OFFICE.

FREDERICK H. HAWKINS, OF NEW YORK, N. Y.

MACHINE FOR ORNAMENTING WOOD.

SPECIFICATION forming part of Letters Patent No. 461,918, dated October 27, 1891.

Application filed November 21, 1890. Serial No. 372,215. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. HAWKINS, a subject of the Queen of Great Britain, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Ornamenting Wood, &c.; 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 appertains to make and use the same.

The present invention relates to machines for embossing wood or other compressible substances; and it is especially designed as an improvement upon the machines which form the subject-matter of earlier applications filed by me on April 22, 1890, and May 13, 1890, and bearing, respectively, Serial Nos. 349,053 and 351,703.

The primary object I have in view is to provide a novel machine capable of a much greater range of work—such as embossing designs on straight, round, and irregular surfaces or articles—than is possible with prior machines which have come to my knowledge.

In my improved machine I so arrange and combine the upper and lower die-rollers and the sliding work-bed that they can be operated in unison and harmony, as is desirable in certain classes of work, or each die can be disconnected from the other and be made to run separately and independently. Thus when the machine is to be used for straight work, such as panels, moldings, and the like, the upper die can be disconnected and the feed-rollers caused to pass the work through the machine to the lower die-roller, or vice versa; or the upper die-roller and the feed mechanism can be thrown into gear and be made to work together and in unison, which is very desirable. Again, for circular or turned articles the upper die-roller can be made to operate in connection with the lower dies or rollers, and it can be operated independently of the same.

To adapt the machine for embossing irregular-shaped work, such as brackets, I employ a reciprocating bed, which operates between the upper and lower die-rollers by means of a pitman connected to the driving mechanism of the machine; or, in lieu of this pitman connection, the bed may be operated directly from the main feed-roller through suitable gearing. For operating on crooked work or articles of irregular longitudinal contour, such as chair-backs, the work can be passed by band under the upper die, which is driven or rotated positively, and the guide-rollers be made to serve as a rolling bed for the work to guide the latter under said upper die. In operating on hollow articles a solid mandrel or core is placed in the article and the connected mandrel and work placed on the reciprocating bed, and the whole then moved under the upper die or between the upper and lower dies.

Such being an outline of the nature of the work for which my improved machine is designed to accomplish, I will now proceed to a detailed description of the mechanism by which the aforesaid ends can be attained, to enable others skilled in the art to which the invention relates to understand the same.

In the accompanying drawings, Figure 1 is a front elevation, partly in section, of an embossing-machine constructed in accordance with my invention. Fig. 2 is a side elevation thereof. Fig. 3 is a vertical longitudinal sectional view of the machine on the plane indicated by the dotted line *x x* of Fig. 1. Fig. 4 is a detail view in side elevation and transverse section of the upper and lower die-rollers and the sliding bed, illustrating the method of embossing a cylindrical or turned surface. Fig. 5 is a sectional view on the line *z z* of Fig. 4. Fig. 6 is a detail plan view of the fast and loose pulleys mounted on the power-shaft, together with belting, &c. Fig. 7 is a detail view of a portion of the gearing.

Like letters and numerals of reference denote corresponding parts in all the figures of the drawings, referring to which—

A designates the upper die or roller, and B C are the lower rollers, which may be made to serve as the lower die-rollers or as the feed-rollers or as a rolling bed, according to the nature of the work or material to be operated on and to the method of using or manipulating the machine. The upper die-roller is susceptible of exerting a yielding pressure on the work, or it can be fed downward in a positive manner to exert an increasing pressure on the work, and I will now proceed to describe the mechanisms by which said yielding and in-

creasing pressures are secured. The die-roller A has a suitable ornamental surface *a* and a longitudinal shaft 1. This shaft is journaled in depending bearings 2, which are rigid with a vertically-movable frame 3, and this movable frame is guided in and between the vertical uprights 4 by means of vertical parallel ways or flanges 5 on said uprights, which fit in corresponding grooves 5′ in the sides of the movable die-carrying frame. The yielding pressure is imparted to the die-roller A by means of a weighted lever 6, which is fulcrumed to the base of the main frame D of the machine, and said pressure-lever is connected to the die-carrying frame 3 through the link or rod 7, the lever 8, which is rigid with the rocking or fulcrum shaft 9, that in turn is geared to the movable frame. The rocking shaft is journaled in bearings 10, rigid with the uprights 4, and said shaft carries gear-segments 11, which mesh with the vertical racks 12 in one side of the movable frame 3, as shown. The weight 6′ is adjustable longitudinally on the lever 6 and is clamped thereto by a pin or set-screw to secure different degrees of pressure on the die-roller A, and the movement of the die-carrying frame is regulated by adjustably connecting the pitman 7 to the lever 8 and connecting said lever 8 to the rocking or fulcrum shaft by the perforated plate or disk 13 and the pin which passes through an aperture in said lever 8 and through one of the series of apertures in the disk, which is rigid with the rocking shaft. The positive increasing pressure is imparted to the die-roller A by the feed-screws 14 15 and the operating-shaft 16.

To adapt the feed-screws for operation with the die-roller and the movable frame thereof, I resort to the use of a sliding cross-head 17, which is fitted between the standards or uprights 4 and connected to the vertical ways 5 to be guided by the same, and to this cross-head I connect the vertically-movable frame 3 by means of a pin or key 18, which passes through suitable perforated lugs 19 on the sliding cross-head and the movable frame 3. The feed-screws are rotatably journaled or stepped at their lower ends in the sliding cross-head by means of suitable collars 14′, and said screws operate in threaded bearings 20′, which are rigidly connected with a stationary bar 20, that is bolted to the upright standards 4 above the sliding cross-head. The operating-shaft 16 is arranged horizontally across the machine, and it is journaled in suitable bearings 16′, that are rigidly secured to the cross-head 17, and said shaft is provided with the worm-wheels 21, which mesh or engage with the feed-screws. At one end of the operating-shaft 16 I provide a band-wheel, and by turning this wheel the shaft is rotated to operate both worm-wheels and the feed-screws, so that the movable frame and the die-roller can be depressed positively to exert an increasing pressure on the work, or said frame and die-roller can be lifted to enable the attendant to readily remove the work from the machine. The weight of the movable frame and the die-roller is counterbalanced by the drop-weights 22, suspended by cords or chains 23, that are connected to the levers 8 and which pass over guide-rollers 24, suitably journaled on the uprights or standards 4.

25 is the main or primary bed of the machine, which is rigid with the main frame, and on this primary bed operates the sliding bed 26, which sliding bed is guided in its reciprocating movements by side ways or flanges 27, which depend from said sliding bed and operate in suitable grooves in the primary fixed bed. In this primary bed I cut a vertical opening 28, of sufficient size to accommodate the main feed-roller 30, and the shaft 30′ of this main feed-roller is journaled in suitable bearings 30″ on the main frame D of the machine. The shaft 30′ of said main feed-roller 30 also carries two spur gear-wheels 31, which mesh with racks 31′ on the depending side flanges of the sliding bed, so that as the feed-roller rotates the sliding bed is moved in unison therewith, and this main feed-roller is in turn operated from a counter-shaft 32, that is arranged below said roller and parallel with the same. This counter-shaft is supported in the bearings 32′, provided therefor on the main frame D, and said counter-shaft carries two gear-wheels 33, that are adapted to be rigidly connected to said shaft by clutches 34, so that the gear-wheels can be made to rotate with the counter-shaft in order to rotate the main feed-roller 30 with the gear-wheels 31, of which said gear-wheels 33 mesh, as shown. A hand-lever 35 is connected to both of the clutches, which are keyed or feathered on the shaft 32, and the movement of the lever operates to clutch or release the gear-wheels 33 to or from said shaft, and said hand-lever is fulcrumed in the main frame and connected to the clutches in such manner as to avoid interfering with its free axial rotation. To the other end of the counter-shaft from the hand-lever is rigidly secured a large gear-wheel 36, which meshes with a broad gear 37 on one end of the driving-shaft 38 of the machine, which driving-shaft is located below the counter-shaft and geared at all times thereto in order to rotate the same. The driving-shaft is provided with the fast and loose pulleys 39 40, arranged in two series, as shown, and over the loose pulleys are passed the driving-belts 41 42, which are adapted to be jointly shifted to the fast pulleys 39 39 in order to drive said shaft 38 and operate the several mechanisms connected therewith. These belts 41 42 extend to a power-shaft 45, arranged at one side of the machine beyond the vertical plane of the several mechanisms embodied therein. Said power-shaft has the fast and loose pulleys 46 46′ to receive a belt or belts from a suitable motor or engine or a line of shafting for running the machine, and the power-shaft is also

provided with a single broad pulley 47, over which runs the two belts 41 42 for the two series of pulleys on the driving-shaft. When the machine is at rest, the two belts 41 42 from the power-shaft operate on the loose pulleys 40 of the driving-shaft, and when the machine is in operation one belt operates on one fast pulley and the other belt on a loose pulley of the driving-shaft. The shifting of the belts from the loose pulleys to the fast pulleys is conveniently accomplished by means of the pusher-arms 49, which extend vertically between the belts and are adapted to impinge against the same to shift the belts, and these pusher-arms are carried by a sliding shaft 50, that is journaled below the belts, said arm-carrying shaft being linked to an operating-shaft 51′, that has a lever 52 and a treadle 52′ for readily rocking the shaft either by hand or foot power, as is most convenient to the operator.

In addition to operating the sliding bed from the feed-roller by the intermeshing gears, I also provide connections between the bed and the driving mechanism, which consist of a link 51, that is pivoted to one end of the bed and connected to a disk or wheel 52^3, journaled on a short shaft 52″, mounted in bearings 53′, erected above the supports for the power-shaft. This disk or wheel 52^3 gears with the large gear 54 on one end of the power-shaft, and the link 51 is connected to the disk or wheel by the rocking-bar 51^5, so that it can be moved nearer to or farther from the axis of the wheel or disk in order to vary the length of the movement or play of the sliding bed, such connection between the bed and the link being readily detachable in order to enable the bed to be operated by the main feed-roller alone, as desired. The lower die-rollers or feed-rollers B C have their shafts *b c* suitably journaled in bearings 55 56, which are removably secured or bolted to the sides of the primary bed of the machine, and the shafts of these rollers are provided with gear-wheels 57 58, respectively, which mesh with racks 59 on the upper sides of the sliding bed, so that as the bed is operated the feed-rollers or lower die-rollers can be rotated positively on their axis. If the lower rollers are to serve in conjunction with the upper die-roller to ornament the work, the surface of said lower rollers should be ornamented; but if said lower rollers are to serve as feed-rollers in order to rotate or turn a curved or turned article the surface of the lower rollers should be smooth and plain. The lower rollers are arranged between the upper die-roller and the sliding bed, and they can be readily removed from the machine, as their bearings are detachably secured to the primary fixed bed, thereby enabling the machine to be properly adjusted and used for different kinds of work.

In operating on some classes of circular or turned work it may be found necessary to hold the work between the feed-rollers B C, and in this event I employ the vertical guides 60, which are fixed to the primary bed outside of the sliding bed and between the feed-rollers B C, said guides being slotted vertically, as shown by dotted lines in Figs. 4 and 5, in order to retain the work in position and at the same time enable it to be turned or rotated properly for the die-roller A to act thereon.

I also provide mechanism for rotating the upper die-roller positively on its axis, which will now be described. At one side of the machine I arrange a vertical shaft 61, which is journaled at its lower end in a rigid bearing 62 on the main frame and near its upper end in a rigid bearing, which is removably fixed to one of the uprights or standards 4. Near the lower end of this vertical shaft is fitted a sliding or adjustable sleeve 63, which carries two bevel-gears 64 65, one at either end, and said bevel-gears are adapted to separately mesh with the beveled surface 66 on one face of a driving-pinion 67, which is loosely journaled on a short shaft or stud 67′, rigid with the main frame. This driving-pinion has spur gear-teeth on its periphery to adapt it to mesh with the larger gear on the end of the counter-shaft, so that said driving-pinion is rotated from the driving-shaft through the counter-shaft to rotate the vertical shaft in either direction, according as the upper or lower bevel-gears on the adjustable sleeve are engaged with the beveled surface of said driving-pinion. The sleeve is keyed or feathered to the vertical shaft, and to said sleeve is connected by a swiveled joint the lever 68, by which the sleeve and its attached gears can be adjusted. Near the upper end of the vertical shaft is arranged another beveled pinion 69, which is feathered or keyed to the vertical shaft and stepped in the movable upper bearing of said shaft, and this upper pinion 69 meshes with a similar pinion 70, rigid with one end of a horizontal sleeve or short shaft 71, that is loosely journaled on a stud 72, rigid with one of the standards or uprights of the frame. This horizontal sleeve also carries a spur-gear 73, which rotates with the sleeve as the latter is operated from the vertical shaft, and the gear 73 meshes with an intermediate or counter gear 74, which in turn operates upon a gear-wheel 75, fixed to one end of the shaft of the upper die-roller A, thereby giving positive rotation to said upper die-roller. Links or arms 76 77 are connected, respectively, to the horizontal sleeve and to the shaft of the upper die-roller A, and the other ends of said links are connected together by a common bolt or pin 78, on which is loosely journaled the intermediate or counter gear between the horizontal sleeve and the upper die-roller. To this bolt or pin is also connected the vertical rod or bar 79, which passes through an oscillating block 80, pivoted to one of the standards 4, and on this vertical bar is secured the stops 81 82, which operate to limit the movement or play of the bar and

hence the vertical movement of the die-carrying frame and the upper die-roller.

When the machine is intended for ornamenting turned articles, I employ a false bed 83, which is suitably secured to the top of the sliding bed and has a recess or chamber in its upper side to receive the article or work to be operated on by the upper die-roller, as indicated in Fig. 4 of the drawings.

In the accompanying drawings the machine is illustrated to indicate the manner of embossing turned or circular articles with the several parts working in unison—that is to say, the upper die is positively rotated and pressed down with a yielding pressure while the sliding bed is being brought forward by the main feed-roller, and the rollers B C are rotated in one direction by the movement of the sliding bed.

In Figs. 2 and 3 of the drawings a turned or circular piece of work *x x* is shown between the upper die and the lower bearing-rollers.

In Figs. 4 and 5 I have shown the process of ornamenting a turned article, in which operation are employed the upper positively-driven roller-die, the sliding bed, and the feed-rollers B C, which rollers are spread apart or separated so as to act as the guide-rollers, and a false recessed bed is attached to the sliding bed, which is of a suitable shape to receive the work to be ornamented. As the bed is positively moved back and forth the turned article on the false bed is rotated under the upper die and the latter is fed or moved down with an increasing pressure by rotating the operating-shaft until the desired effect is produced. In this method of treating and ornamenting the work it may be necessary or advisable to employ the vertical slotted guides.

To use the machine for ornamenting irregular-shaped work, such as brackets, the lower feed or bearing rollers B C are removed from the machine and the sliding bed operated in conjunction with the upper die-roller. For straight work, such as moldings, the sliding bed and the rollers B C should be removed and the material then pressed between the upper die-roller and the main feed-roller.

I am aware that changes in the form and proportion of parts and details of construction of the several mechanisms as herein shown and described as constituting my invention can be made without departing from the spirit or sacrificing the advantages of my invention—as, for instance, the dies, the feed-roller, and the bearing and feed rollers can be made of such size and shape as may be required to properly ornament the various-shaped articles which the machine is designed to operate upon; also, various sizes of gears can be used in order to rotate the upper die-roller at a proper speed suited to the size of the article to be ornamented, and, further, to make the various running parts operate in unison and harmony. I therefore reserve the right to make such changes and alterations as fairly fall within the scope of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an embossing-machine, the combination of a main frame, a vertically-movable frame guided in said main frame and carrying a rotatable die-roller, a movable cross-head also guided in said main frame above the vertically-movable frame and adapted to be detachably connected thereto, the feed-screws operating in bearings in the main frame, a rotatable shaft journaled on the cross-head, and worm-screws fixed on said shaft and adapted to engage the feed-screws to adjust the movable cross-head, substantially as specified.

2. In an embossing-machine, the combination, with a main frame and a vertically-movable frame operating therein and carrying a rotatable die-roller, of a yielding pressure mechanism connected with said movable frame and operating to permit said frame and the die-roller to move freely both up and down in the main frame, the sliding cross-head guided in said main frame and adapted to be detachably connected to the vertically-movable frame, the feed-screws operating in bearings in the main frame and connected to the sliding cross-head to move the latter and die-carrying frame with a positive motion, and an operating-shaft for rotating the feed-screws, for the purpose described, substantially as set forth.

3. In an embossing-machine, the combination of a main frame, the vertically-movable frame guided in said main frame and carrying a rotatable die-roller, the yielding pressure-lever, the rock-shaft connected to said pressure-lever and geared to the movable frame, the sliding cross-head guided within the main frame and adapted to be detachably connected to the vertically-movable frame, the feed-screws operating in bearings in the main frame and stepped in the sliding cross-head, the operating-shaft geared to the feed-screws, and the drop-weight supported on the main frame and connected to the vertically-movable frame, substantially as specified.

4. In an embossing-machine, the combination of a main frame, a balanced vertically-movable frame carrying a die-roller and provided with the racks, the rock-shaft having the gear-segments which mesh with said racks, the yielding pressure-lever, and the lever adjustably connected to the rock-shaft and linked to the pressure-lever, substantially as described.

5. In an embossing-machine, the lower bearing-rollers or dies suitably journaled in a frame, in combination with a sliding bed operating beneath said lower bearing-rollers or dies and geared thereto, for the purpose described, substantially as set forth.

6. In an embossing-machine, the combination, with an upper die-roller, of the lower bearing-rollers or dies and a sliding bed below said dies and geared together, substantially as specified.

7. In an embossing-machine, the combination, with an upper die-roller and a sliding bed, of the removable lower bearing-rollers or dies arranged in a plane between the upper die-roller and the bed, substantially as specified.

8. In an embossing-machine, the combination of the upper die-roller, means for rotating the same, a positively-fed bed operating beneath the die-roller, and the lower bearing-rollers arranged between the bed and die-roller and geared to the bed, substantially as described.

9. In an embossing-machine, the combination of a rotatable upper die-roller, the main feed-roller adapted to be positively driven, the sliding bed guided in a suitable frame and geared to the main feed-roller, and the lower bearing-rollers or dies arranged between the bed and die-roller and geared to the bed, substantially as described.

10. In an embossing-machine, the combination of a die-roller, a main feed-roller, the shaft geared to said main feed-roller, the vertical shaft, the vertical sleeve fitted on the vertical shaft and geared to the feed-roller-driving shaft, the lever connected to said vertical sleeve for adjusting the same to disengage the vertical shaft from the feed-roller-driving shaft, and gearing intermediate of the roller-shaft and the vertical shaft, substantially as described.

11. In an embossing-machine, the combination of an upper die-roller, a main feed-roller, counter-shaft, the clutches keyed thereon, a lever for moving the clutches, the gear-wheels meshing with the main feed-roller and adapted to be clutched to the counter-shaft, the vertical shaft, the adjustable sleeve fitted on said vertical shaft and having the gears, the driving-pinion geared to the counter-shaft and adapted to mesh with one of the gears on the adjustable sleeve, a lever connected to said sleeve, and gearing intermediate of the die-roller and vertical shaft, substantially as described.

12. In an embossing-machine, the combination of an upper die-roller, the vertical shaft adapted to be positively rotated and carrying a bevel-gear near its upper end, the horizontal sleeve or shaft fitted loosely on a suitable stud and geared to the bevel-gear on the vertical shaft, and the intermediate gear meshing with a pinion on the horizontal sleeve and with the die-roller shaft, substantially as specified.

13. In an embossing-machine, the combination of a main frame, the vertically-movable frame, a die-roller journaled in said movable frame, the vertical shaft adapted to be positively driven by the driving mechanism of the machine, the bevel-gears feathered on the upper end of said vertical shaft, the horizontal sleeve or shaft fitted loosely on a stud and geared to said bevel-gear on the vertical shaft, the vertical rod or bar guided in a pivoted block and having the stops, the short pin or stud carried by said vertical bar, and the intermediate gear on said pin or stud and geared to the horizontal sleeve and the die-roller, substantially as described.

14. In an embossing-machine, the combination of a die-roller, a sliding bed operating beneath the same, the power-shaft geared through intermediate shafting with said bed, and a wheel or disk also geared to the power-shaft and linked to the sliding bed, substantially as described.

15. In an embossing-machine, the combination of a main frame having a fixed bed, an upper die-roller, a reciprocating bed supported and guided on the fixed bed, and the bearing-rollers intermediate of the sliding bed and die-roller and constituting a roller-bed for rotating the work, substantially as described.

16. In an embossing-machine, the combination, with a sliding bed and a die-roller, of the lower bearing-rollers and the fixed work retainers or guides, substantially as specified.

17. In an embossing-machine, the combination, with a die-roller and the sliding bed, of the lower bearing-rollers arranged between the bed and die-rollers, and the slotted work retainers or holders fixed to the primary bed outside of the sliding bed and arranged between the bearing-rollers, substantially as described.

18. In an embossing-machine, the combination, with the die-roller, of the lower bearing-rollers, the sliding bed below said bearing-rollers, and the false bed fixed to said sliding bed, substantially as specified.

19. In an embossing-machine, the combination of an upper die-roller, the main feed-roller, the counter-shaft geared to said feed-roller, the vertical shaft geared to the die-roller and to the counter-shaft, the driving-shaft geared to said counter-shaft and bearing the fast and loose pulleys, the power-shaft having the pulley, the belts passing over the pulleys on the driving-shaft and the power-shaft, the shifting-arms adapted to impinge against said belts and carried by a rock-shaft, and an operating-shaft linked to said rock-shaft, substantially as described.

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

FREDERICK H. HAWKINS.

Witnesses:
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M. L. FOOTE.