No. 662,371. Patented Nov. 20, 1900.

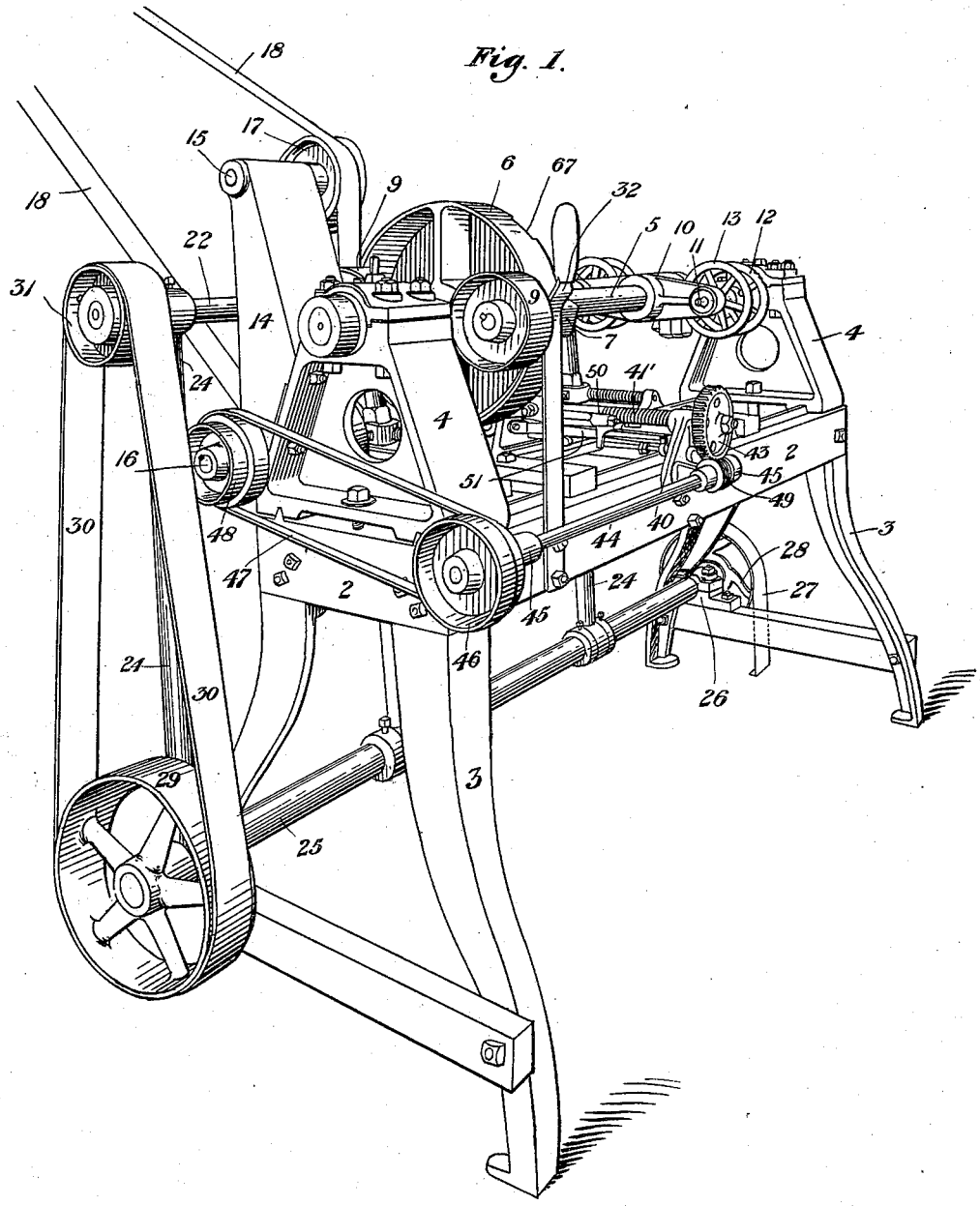
F. R. CLARK.

TURNING LATHE.

(Application filed Oct. 27, 1899.

(No Model.) 5 Sheets—Sheet 1.

Fig. 1.



Witnesses:
Watson Large
K. N. Taymon

Inventor:
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No. 662,371. Patented Nov. 20, 1900.

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(No Model.) 5 Sheets—Sheet 2.

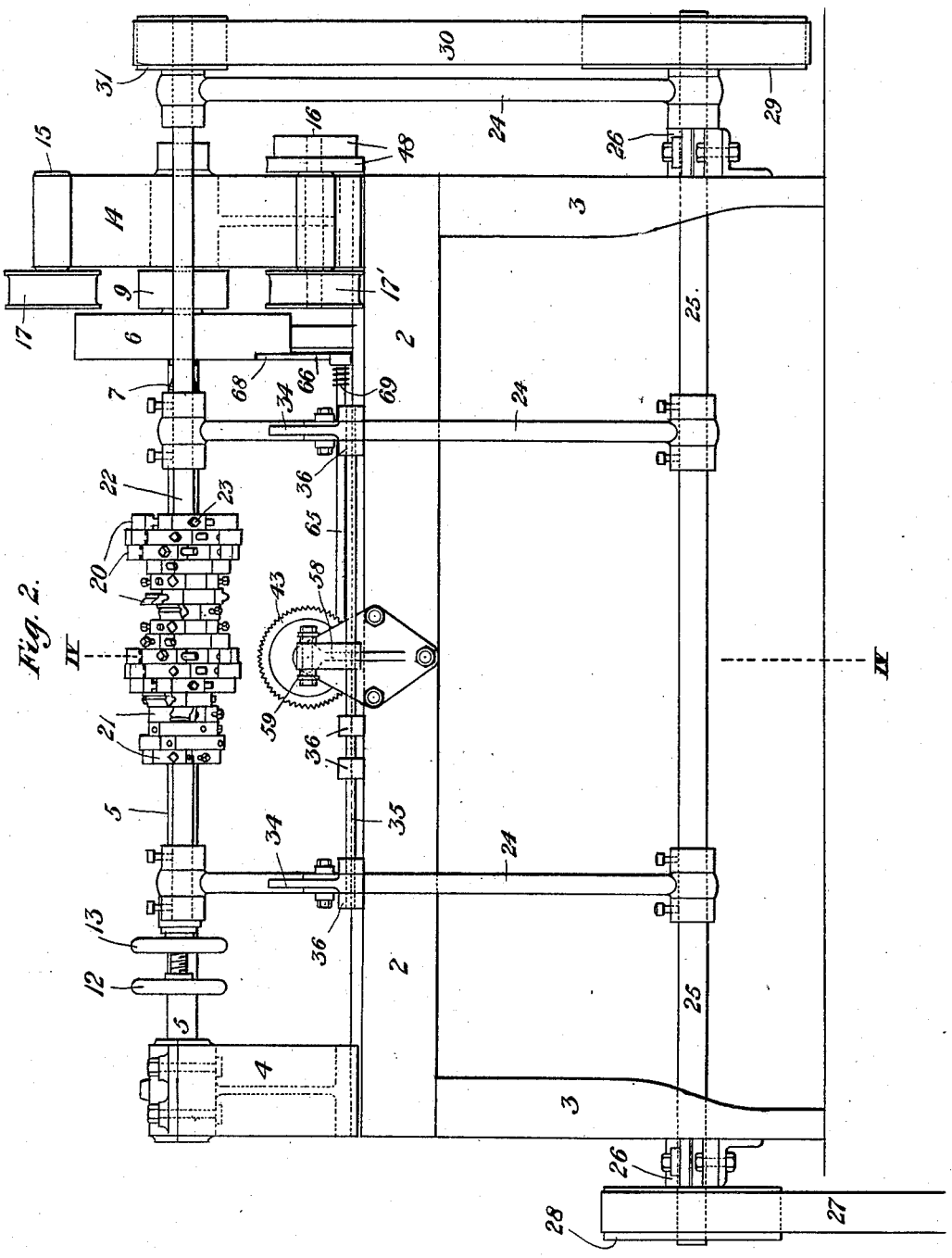

Fig. 2.

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(No Model.) 5 Sheets—Sheet 3.

Fig. 3.

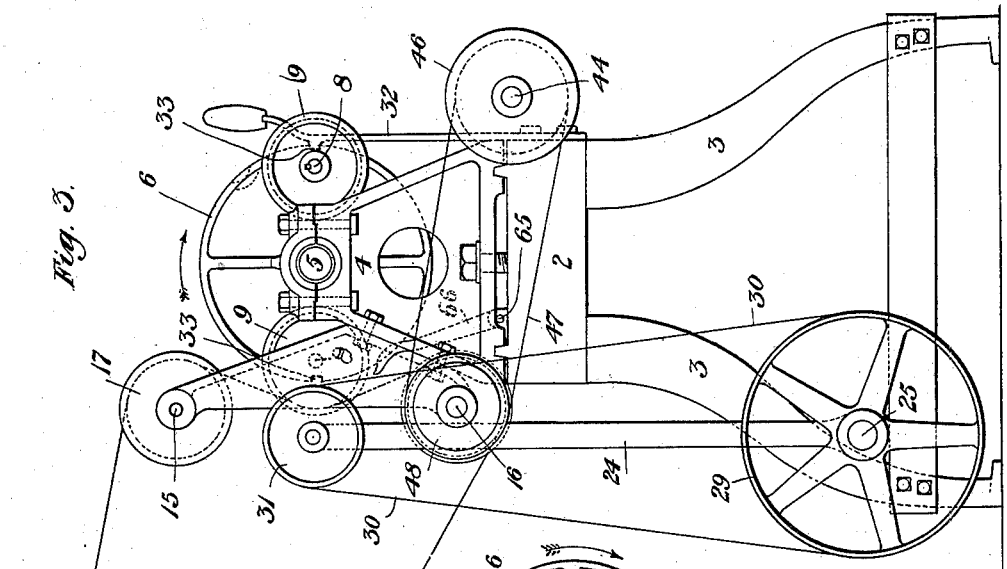


Fig. 5.

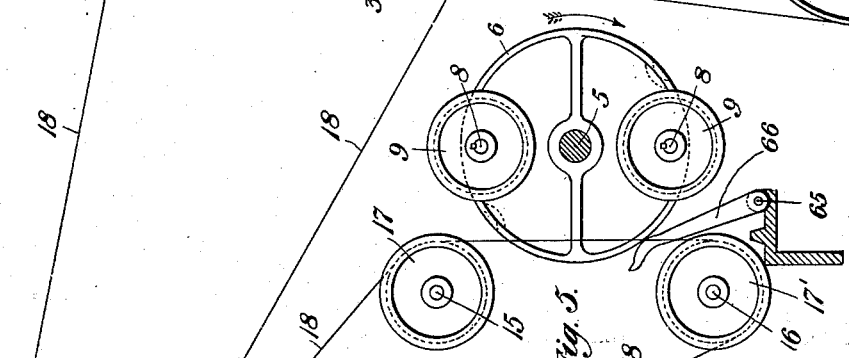
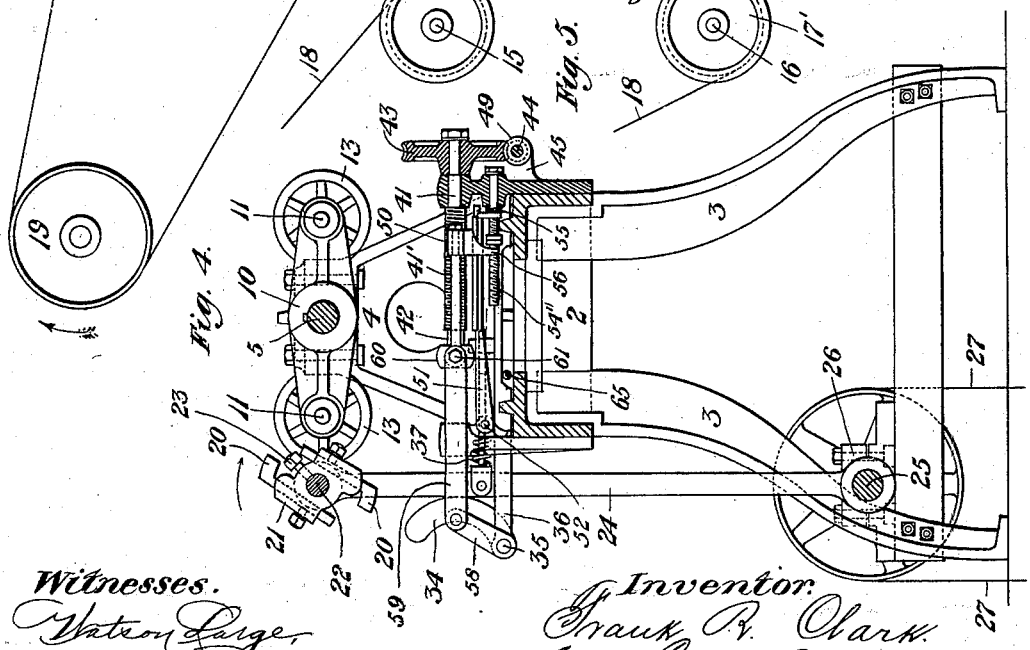


Fig. 4.



Witnesses.
Watson Large,
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(No Model.) 5 Sheets—Sheet 4.

Fig. 6.

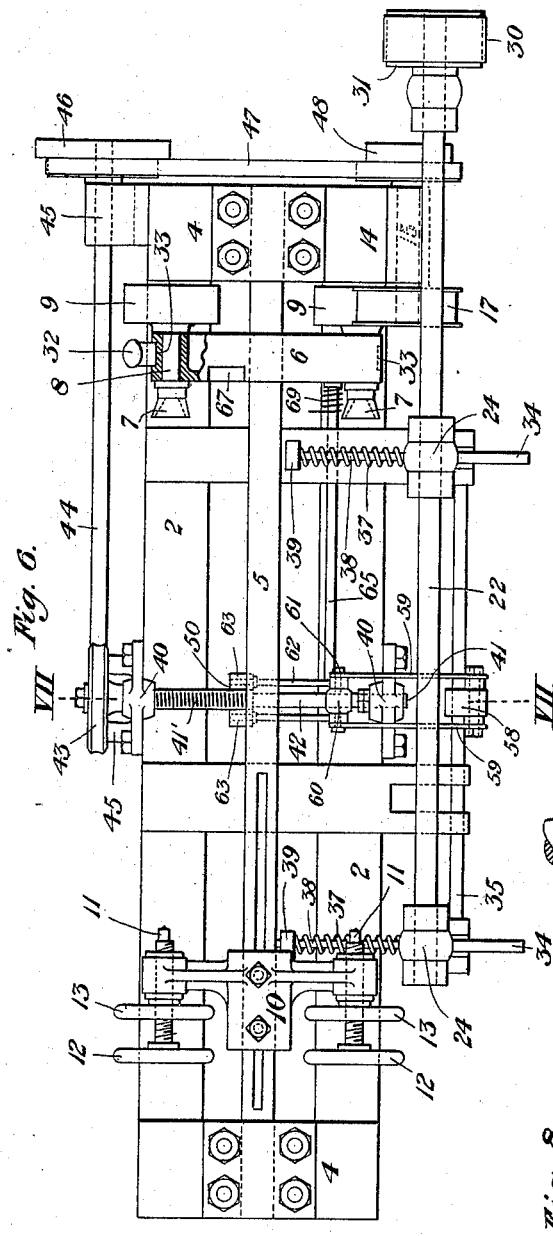


Fig. 7.

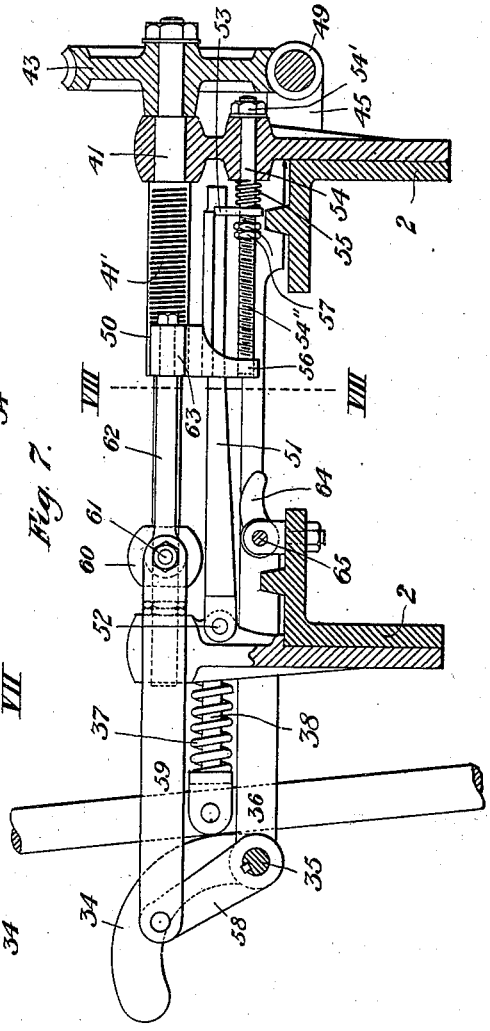
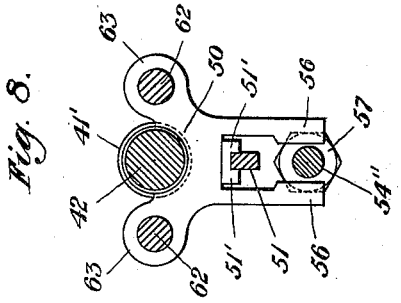


Fig. 8.



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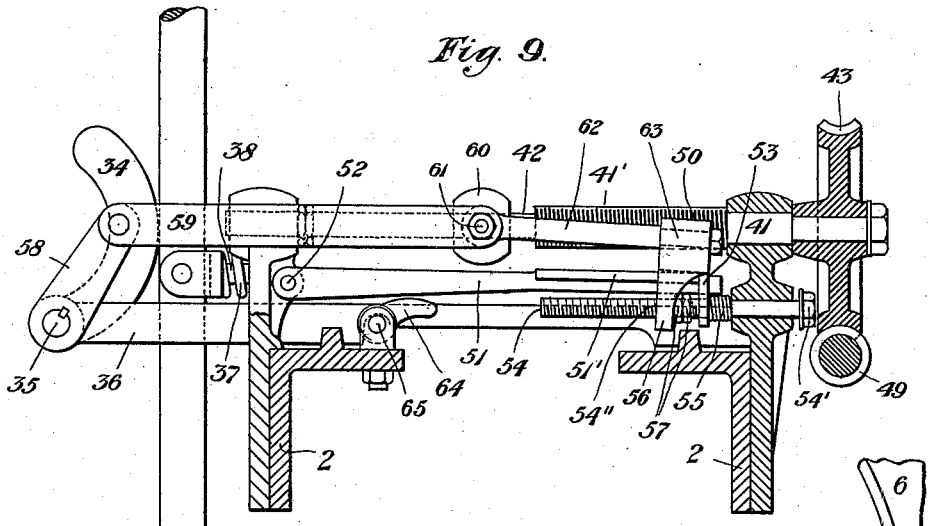
(No Model.) 5 Sheets—Sheet 5.

Fig. 9.



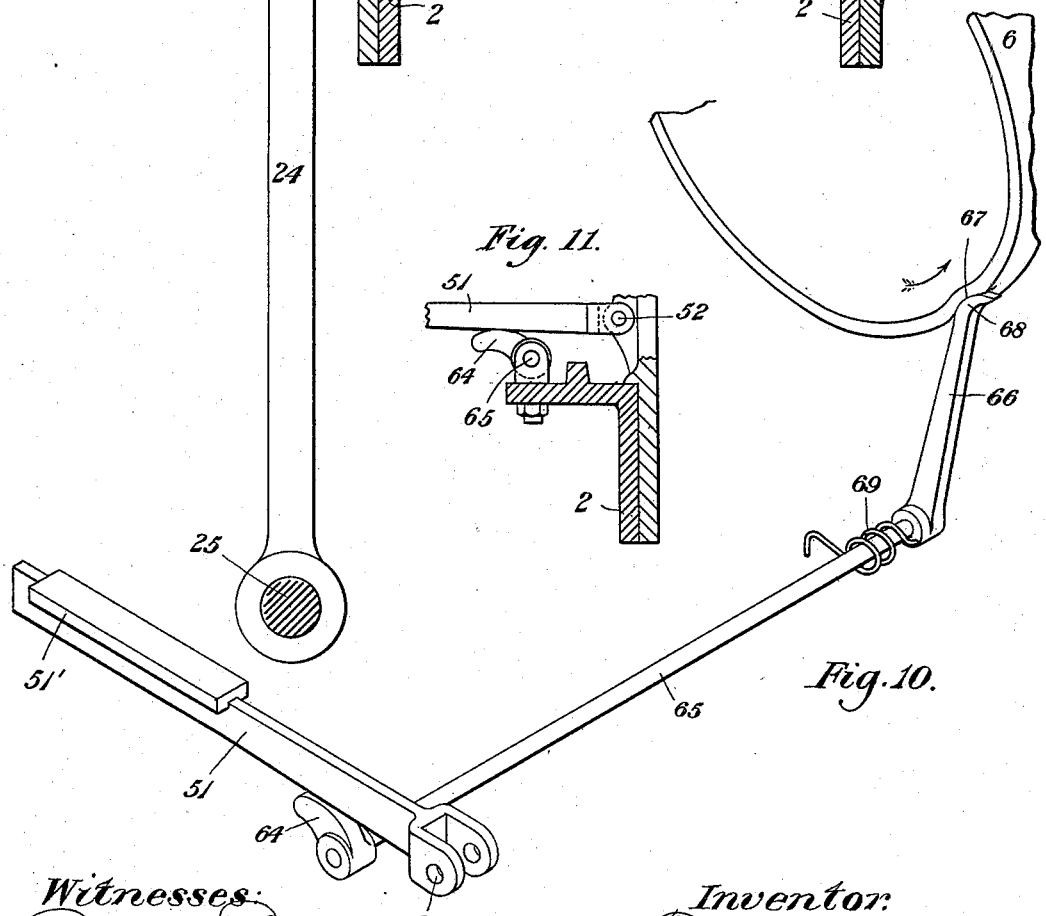


Fig. 11.

Fig. 10.

Witnesses:
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R. H. Tayman

Inventor:
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UNITED STATES PATENT OFFICE.

FRANK R. CLARK, OF ST. ALBANS, WEST VIRGINIA, ASSIGNOR TO THE MONTAGUE MANUFACTURING COMPANY, OF SAME PLACE.

TURNING-LATHE.

SPECIFICATION forming part of Letters Patent No. 662,371, dated November 20, 1900.

Application filed October 27, 1899. Serial No. 735,002. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. CLARK, a citizen of the United States, residing at St. Albans, in the county of Kanawha and State of West Virginia, have invented or discovered a new and useful Improvement in Turning-Lathes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of the lathe complete. Fig. 2 is an elevation from the back. Fig. 3 is an end elevation. Fig. 4 is a vertical cross-sectional view taken on the line IV IV of Fig. 2. Fig. 5 is a detail view of the spindle-driving mechanism. Fig. 6 is a plan view. Fig. 7 is a cross-section, on an enlarged scale, of the upper portion of the lathe, illustrating the spindle-feeding mechanism, taken on the line VII VII of Fig. 6. Fig. 8 is a cross-sectional view taken on the line VIII VIII of Fig. 7. Fig. 9 is a view similar to Fig. 7, but showing the parts in a different position. Fig. 10 is a detail perspective view showing the mechanism for lifting the nut-supporting bar. Fig. 11 is a sectional detail view showing the lifting-dog and arm raised.

My invention relates to wood-turning lathes, and has for its object the automatic turning of balusters, &c., in a much more uniform, economical, and expeditious manner than heretofore; and it consists in the novel arrangement and construction of the parts and their method of operation, as I shall now proceed to describe.

Referring now to the drawings, 2 is the frame or bed of the lathe, supported upon suitable legs 3 and provided at each end with upright pillow-block bearings 4. In these bearings is journaled the shaft 5, upon which at one end is rigidly mounted the spindle-drum 6, provided with oppositely-located spindle-sockets 7, adapted to receive the end of the blank, the sockets being secured to the inner ends of short shafts 8, journaled in the spindle-drum and bearing at their outer ends the driving-pulleys 9.

At the outer end of shaft 5, in spline engagement and longitudinally adjustable on the shaft, is the chuck-head 10, provided with oppositely-disposed arms having bearings corresponding in location to the spindle-sockets 7, and mounted by screw-threads in these bearings are the centering-chucks 11, having hand-wheels 12 and locking-wheels 13.

Adjacent to the spindle-drum 6 is an extension 14 of the pillow-block bearing 4, in which at upper and lower positions equidistant from the center of shaft 5 are journaled the shafts 15 16, each shaft having on its inner end a pulley 17 and 17′, respectively, in alinement with the pulleys 9. Around these pulleys passes a belt 18, leading off from a power-pulley 19, constantly driven, and when the spindle-drum 6 is in operative position, as shown in Figs. 3 and 6, one of its pulleys 9 will be thrown into contact with the belt 18, exerting a frictional tension upon it sufficient to impart rotary motion to pulley 9 and to the spindle-socket 7 and likewise the blank held therein to be operated upon. When, however, both of the pulleys 9 are out of contact with the belt, as in the act of turning to discharge the finished article and to bring the new blank into the path of the knives, both pulleys 9 are out of contact and inoperative. This is indicated in Fig. 5. It will also be understood that one only of the pulleys 9 can be in contact, the opposite one extending forwardly from the front of the machine, with its chuck-spindle, and in such inoperative position affords an opportunity for releasing the finished article and filling with a new blank.

The cutter-knives 20 are adjustably set in heads 21, mounted upon shaft 22, and adapted to be secured in any desired arrangement, so as to provide a spiral leading cut, as shown in Fig. 2, by means of set-screws 23. The shaft 22 is of sufficient length to accommodate as many knives as may be desired and is journaled in the upper ends of arms 24, bearing at their lower ends upon shaft 25, resting in bearings 26 of the frame. This shaft 25 is continuously driven by means of belt 27 and pulley 28 at one end, the other end being provided with pulley 29, adapted to transmit rotatory motion at a high speed to shaft 22 through belt 30 and pulley 31 at whatever position the shaft 22 may be in.

Shaft 5 is free to rotate in its bearings and is turned by the operator a half-revolution

for each blank operated upon. The shaft and its parts are held against rotation by means of a spring locking-arm 32, provided with a handle and a projecting key, which fits into one of two notches 33, oppositely located on the face of the spindle-drum 6, so that movement cannot be imparted to rotate the shaft and heads until this spring locking-arm is withdrawn.

Forward movement of the cutting-knives 20 (which constantly rotate by reason of belt 30) is accomplished through curved cam-arms 34, keyed to shaft 35, mounted in bearings 36 at the back of the machine, which cam-arms bear upon the cutter-supporting arms 24 and in their travel throw it forward. Counteracting springs 37 tend to throw the arms backwardly when the cam-arms are reversed, and this action is clearly shown in Fig. 7, the springs being coiled around rods 38, pivoted to arms 24, and having bearings 39 on the upper side of the main frame.

Located about midway across the bed of the machine and in bearings 40 thereon is a rod 41, provided with a screw-threaded portion 41′ and a reduced smooth portion 42, having on its outer end a worm-wheel 43. A shaft 44 is mounted in bearings 45 in the front of the machine and provided with one or more pulleys 46, constantly driven by belt 47 from pulleys 48, mounted on the outer end of short shaft 16, carrying pulley 17′ in constant engagement with belt 18. The shaft 44 carries at its end a worm-gear 49, which intermeshes with and imparts motion to worm-wheel 43, and consequently to the rod 41, which in its turn engages by the threaded portion 41′ a half-nut 50, adapted to bear upon the under side in engagement with the threads or to fall by gravity out of engagement when unsupported. This half-nut has a bearing and slides upon a longitudinal bar 51, pivoted at 52 and supported at the other end upon a trigger 53, which trigger is secured to a sliding rod 54, having a long bearing to give rigidity and a limiting-nut 54′ on its outer end. The trigger is held outwardly in a supporting position just under the end of side flanges 51′ of bar 51 by means of coiled spring 55, as in Fig. 7, and the trigger is thrown back out of engagement by means of downwardly-depending knocker-arms 56 of the half-nut, which in the forward travel of the nut and near the desired limit of its movement come into contact with adjustable nuts 57, mounted upon a screw-threaded portion 54″ of rod 54. These nuts 57 may be set, one acting as a lock-nut for the other, at any position on the threaded portion of rod 54, so that the time of contact of the knocker-arms and dislodgment of the trigger may be very accurately regulated in reference to the desired travel of the knives. Forward motion of the half-nut will continue until the trigger is thrown outwardly from under the end of flanges 51′, compressing spring 55 and permitting bar 51 to fall by gravity, and with it the half-nut 50, thus disengaging the half-nut from the screw-thread 41′. The purpose of this construction is to provide an automatic forward feed of the cutters toward the spindle and against its surface, and motion is imparted by means of a crank-arm 58, keyed to the shaft 35, carrying cam-arms 34, which crank-arm 58 is pivotally connected with link-bars 59, attached at the opposite end to a sliding cross-head 60, mounted on the portion 42 of rod 41 and also by means of stud-bolts 61 to rods 62, which connect the cross-head with the half-nut 50. These link-bars 59 and rods 62 are in pairs disposed at each side of the rod 41 for convenience and equalization of the strain, and it will be noted that the half-nut 50 is provided with lateral lugs 63 for engagement with the ends of rods 62 at each side. As thus connected the forward travel of the half-nut when in engagement with the constantly-operating threaded portion 41′ of rod 41 will draw the crank-arm 58 gradually forward until the cutters have done their required work and the half-nut has dislodged the trigger, releasing the half-nut, as has been described, when the cams 34, crank 58, link-bars 59, cross-head 60, rods 62, and half-nut will be thrown back into initial position again by expansive action of springs 37, in which position they will remain until the half-nut is again raised into engagement.

It will be noted that when the spindle-drum is being turned and both pulleys 9 are out of engagement with belt 18 the belt will be slack and will consequently not impart movement to the worm-gear feeding mechanism, so that although the half-nut may be in engagement with screw 41′ it will not feed forward the cutter-shaft until the blank is in position and tension has been exerted on the belt, thereby driving pulley 17′, shaft 16, and pulleys 48. This state of rest of the cutter-feed is of advantage in that it allows the drum to be held in an inoperative position for an indefinite time, if desired, and there is no loss of movement, the full travel of the cutters taking place after the blank is in position. During this state of rest of the cutters, the blank having been turned, the operator having already placed a new blank in front draws back the spring-arm 32 and gives the spindle-drum 6, shaft 5, and its assembled parts a half-rotation, throwing the new blank into range of the cutters and bringing the finished article in front of him, so that it may be removed and a fresh blank inserted during the cutting operation at the other side. During the half-rotation of the spindle-drum the bar 51 is thrown up, raising the half-nut into screw engagement and permitting the trigger to reëngage itself under the ends of flanges 51′ under action of spring 55 by means of a raising dog 64, located immediately under the bar 51. This dog is normally in a lowered position out of contact, as in Fig. 7, permitting a free fall of the bar, and is raised only during the rotation of the

spindle-drum 6 and then only momentarily, so as to hold the bar 51 up long enough to permit of engagement of the trigger.

The dog is secured on one end of a rock-shaft 65, mounted in suitable bearings on the bed of the machine, and at the other end is an arm 66, secured to the rock-shaft, extending upwardly into the path of the periphery of the spindle-drum 6, which is provided with oppositely-located recesses 67 in such a position that when the drum 6 is at rest the curved shoe end 68 of arm 66 will be thrown into one of the recesses by reason of the retracting action of a coiled spring 69, the same action throwing the dog 64 down free from contact with the bar 51. Upon rotation of the drum the arm 66 will be thrown outwardly by action of the peripheral face of the drum, the shaft 65 will be partially rotated against the force of the spring, and the dog 64 will be raised, lifting bar 51 and half-nut 50, as has been described, and again setting the cutter feed mechanism into motion. This operation is continuously carried on, and the work of turning a blank is rendered extremely simple, accurate, and rapid, while the time required to recharge the lathe is reduced to a minimum, and such operation is performed while the lathe is working.

The advantages of my invention will be appreciated by those skilled in the art to which it refers, and it will be understood that various changes and modifications may be made in its design, construction, arrangement of cutters, and in other details without departing from my invention as embodied in the following claims.

What I claim is—

1. A turning-lathe provided with a rotating work-supporting structure, oppositely-located independently-rotatable blank holding and centering devices thereon, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt and means for advancing the cutters toward the work, substantially as set forth.

2. A turning-lathe provided with a rotating work-supporting structure, oppositely-located independently-rotatable blank holding and centering devices thereon, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt and means for advancing the cutters toward the work and retracting them therefrom, substantially as set forth.

3. A turning-lathe provided with a rotating work-supporting structure, oppositely-located independently-rotatable blank holding and centering devices thereon, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt, means for advancing the cutters toward the work and means for arresting their forward travel, substantially as set forth.

4. A turning-lathe provided with a rotating work-supporting structure, oppositely-located independently-rotatable blank holding and centering devices thereon, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt, means for advancing the cutters toward the work and adjustably arranged means for arresting their forward travel at any desired point of operation, substantially as set forth.

5. A turning-lathe provided with a rotating work-supporting structure, oppositely-located independently-rotatable blank holding and centering devices thereon, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt, means for advancing the cutters toward the work and a holding device for retaining the supporting structure in operative position, substantially as set forth.

6. A turning-lathe provided with a rotatable work-supporting shaft, a spindle-drum thereon provided with spindle-sockets, a longitudinally-adjustable chuck-head mounted on the shaft provided with centering-chucks in alinement with the spindle-sockets, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt, and means for advancing the cutters toward the work, substantially as set forth

7. A turning-lathe provided with a rotatable work-supporting shaft, a spindle-drum thereon provided with oppositely-located spindle-sockets, a longitudinally-adjustable chuck-head mounted on the shaft provided with oppositely-located centering-chucks in alinement with the spindle-sockets, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt, and means for advancing the cutters toward the work, substantially as set forth.

8. A turning-lathe provided with a rotatable work-supporting shaft, a spindle-drum thereon provided with oppositely-located spindle-sockets secured to driving-shafts carrying pulleys, a driving-belt adapted to make driving-contact with one of the pulleys when in operative position, a longitudinally-adjustable chuck-head mounted on the shaft provided with oppositely-located centering-chucks in alinement with the spindle-sockets, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally

mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt and means for advancing the cutters toward the work, substantially as set forth.

9. A turning-lathe provided with a rotatable work-supporting shaft, a spindle-drum thereon provided with oppositely-located spindle-sockets, a longitudinally-adjustable chuck-head mounted on the shaft provided with oppositely-located centering-chucks in alinement with the spindle-sockets, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt, means for advancing the cutters toward the work, means for locating the contained blank in proper range of the cutters and simultaneously imparting a rotary movement to the blank, substantially as set forth.

10. A turning-lathe provided with a rotatable work-supporting shaft, a spindle-drum thereon provided with oppositely-located spindle-sockets, a longitudinally-adjustable chuck-head mounted on the shaft provided with oppositely-located centering-chucks in alinement with the spindle-sockets, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt, means for advancing the cutters toward the work, means for locking the spindle-drum in operative position whereby the blank is located in range of the cutters and whereby the inoperative centering-chuck and spindle-socket are located in position for removal and renewal, substantially as set forth.

11. A turning-lathe provided with a rotatable work-supporting shaft, a spindle-drum thereon provided with oppositely-located spindle-sockets, a longitudinally-adjustable chuck-head mounted on the shaft provided with oppositely-located centering-chucks in alinement with the spindle-sockets, rotating cutters mounted on a supporting-shaft journaled in swinging arms pivotally mounted on a power-shaft, a driving-pulley on the power-shaft, a driven pulley on the cutter-shaft, a connecting-belt, means for advancing the cutters toward the work, and a spring-arm adapted to interlock with the spindle-drum and hold it in position, substantially as set forth.

12. A turning-lathe provided with a rotatable work-supporting shaft, a spindle-drum thereon provided with oppositely-located spindle-sockets secured to driving-shafts carrying pulleys, a driving-belt passing around upper and lower pulleys mounted in the frame of the machine and in the path of the spindle-socket pulleys, a longitudinally-adjustable chuck-head mounted on the shaft provided with oppositely-located adjustable centering-chucks in alinement with the spindle-sockets, rotating cutters adjustably mounted on a driving-shaft, supporting-arms for the driving-shaft journaled on a power-shaft, means for transmitting power from the power-shaft to the cutter-driving shaft, feeding devices for the cutter-supporting mechanism adapted to be automatically thrown into gear when the blank is placed in position to be operated upon and means for disengaging such feeding devices.

13. A turning-lathe provided with a rotatable work-supporting shaft, a spindle-drum thereon provided with oppositely-located spindle-sockets secured to driving-shafts carrying pulleys, a driving-belt passing around upper and lower pulleys mounted in the frame of the machine and in the path of the spindle-socket pulleys, a longitudinally-adjustable chuck-head mounted on the shaft provided with oppositely-located adjustable centering-chucks in alinement with the spindle-sockets, rotating cutters adjustably mounted on a driving-shaft, supporting-arms for the driving-shaft journaled on a power-shaft, means for transmitting power from the power-shaft to the cutter-driving shaft, feeding devices for the cutter-supporting mechanism adapted to be automatically thrown into gear when the blank is placed in position to be operated upon, means for disengaging such feeding devices and means for returning the cutter-supporting mechanism and feeding devices to the initial position.

14. In a lathe of the class described provided with a constantly-driven cutter-shaft mounted on swinging arms, and a power-imparting belt adapted to be thrown into operative tension by movement of the work-supporting structure; feeding mechanism for the cutters consisting of a threaded shaft, gearing whereby such threaded shaft is rotated from the power-imparting belt when under tension, a nut adapted to engage the threaded shaft, and means connecting the nut with mechanism adapted to impart forward movement to the cutter-shaft arms.

15. In a lathe of the class described provided with a constantly-driven cutter-shaft mounted on swinging arms, and a power-imparting belt adapted to be thrown into operative tension by movement of the work-supporting structure; feeding mechanism for the cutters consisting of a threaded shaft, gearing whereby such threaded shaft is rotated from the power-imparting belt when under tension, a nut adapted to engage the threaded shaft, means connecting the nut with mechanism adapted to impart forward movement to the cutter-shaft arms and means for disconnecting the nut from the threaded shaft.

16. In a lathe of the class described provided with a constantly-driven cutter-shaft mounted on swinging arms, and a power-imparting belt adapted to be thrown into operative tension by movement of the work-supporting structure; feeding mechanism for the cutters consisting of a threaded shaft, gear-

ing whereby such threaded shaft is rotated from the power-imparting belt when under tension, a nut adapted to engage the threaded shaft, means connecting the nut with mechanism adapted to impart forward movement to the cutter-shaft arms, means for disconnecting the nut from the threaded shaft and for retracting the cutter-shaft arms.

17. In a lathe of the class described provided with rotating cutters, mechanism for advancing the cutters, work-supporting mechanism provided with a spindle-drum, a feeding-screw, and a half-nut adapted to engage the screw; a sliding bar for the half-nut and a supporting-dog therefor mounted on a rock-shaft provided with an arm adapted to bear against the spindle-drum.

18. In a turning-lathe, in combination with a rotating work-supporting shaft, oppositely-located independently-rotatable blank holding and centering devices thereon and rotating cutters mounted on a supporting and driving mechanism; a rotating shaft provided with a threaded portion, a half-nut adapted to engage the thread thereof, connections therefrom to the cutter-supporting mechanism, a pivoted slide-bar adapted to support the half-nut in engagement, and a trigger adapted to support the slide-bar with means for dislodging the trigger, substantially as set forth.

19. In a lathe of the class described, a rotating threaded shaft, a half-nut adapted to engage the shaft having knocker-arms, connections from the nut to the cutter-supporting mechanism, a pivoted slide-bar adapted to support the half-nut in engagement, a trigger adapted to support the slide-bar mounted on a movable rod provided with adjustable nuts in the path of the knocker-arms, and means for raising the slide-bar.

20. In a lathe of the class described, a rotating threaded shaft, a half-nut adapted to engage the shaft having knocker-arms, connections from the nut to the cutter-supporting mechanism, a pivoted slide-bar adapted to support the half-nut in engagement, a trigger adapted to support the slide-bar mounted on a movable rod provided with adjustable nuts in the path of the knocker-arms, means for raising the slide-bar and a spring adapted to force the trigger into supporting engagement with the slide-bar.

21. In a lathe of the class described, a rotating threaded shaft, a half-nut adapted to engage the shaft having knocker-arms, connections from the nut to the cutter-supporting mechanism, a pivoted slide-bar adapted to support the half-nut in engagement, a trigger adapted to support the slide-bar mounted on a movable rod provided with adjustable nuts in the path of the knocker-arms, an intermittently-movable dog adapted to support the slide-bar and means for raising the dog.

22. In a lathe provided with cutters mounted on a rotating shaft supported in pivoted arms, cams adapted to bear upon the arms to press them forward toward the blank and forwardly-traveling feeding mechanism connected with and adapted to impart motion to the cam-operating shaft.

23. In a lathe provided with cutters mounted on a rotating shaft supported in pivoted arms, cams adapted to bear upon the arms to press them forward toward the blank, forwardly-traveling feeding mechanism connected with and adapted to impart motion to the cam-operating shaft and means for disconnecting the feeding mechanism and for retracting the pivoted arms.

24. In a lathe provided with cutters mounted on a rotating shaft supported in pivoted arms, cams adapted to bear upon the arms to press them forward toward the blank, a cam-shaft, a lever secured to the shaft, and forwardly-traveling feeding mechanism connected with the lever and adapted to rotate the cam-shaft.

25. In a turning-lathe, the combination of a rotating work-supporting shaft, oppositely-located independently-rotatable blank holding and centering devices, a spindle-drum mounted on the shaft and carrying such devices, oppositely-located recesses on the periphery of the drum, a partially-rotatable spring-actuated arm mounted on a shaft provided with a raising-dog, a feed-nut-supporting bar adapted to be raised by the dog upon rotation of the drum, the arm being adapted to spring back to engage one of the recesses when the drum is at rest in operative position, permitting the dog and supporting-bar to fall by gravity, a spring locking-arm adapted to engage oppositely-located notches in the face of the drum, independent driving-pulleys mounted on the outer ends of the shafts of the blank holding and centering devices and a slack driving-belt adapted to come into contact with the driving-pulleys when the blank-holding devices are in operative positions and to be released from contact when the blank-holding devices are in positions of rest, with guiding-pulleys for the belt, substantially as set forth.

In testimony whereof I have hereunto set my hand.

FRANK R. CLARK.

Witnesses:
THOMAS K. DAVISON,
E. H. REID.