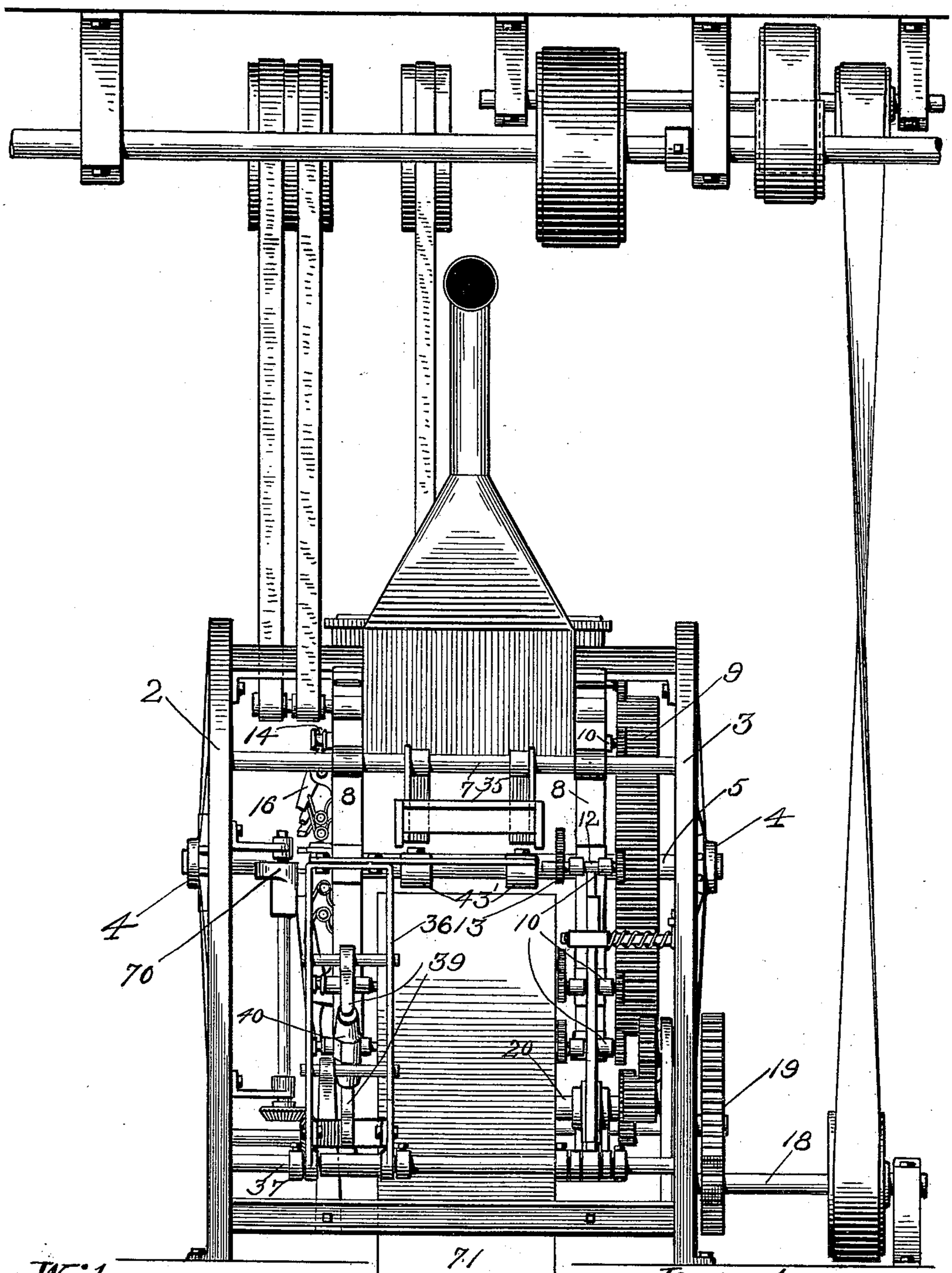
(No Model.)

5 Sheets—Sheet 1.

H. L. MANN.

MULTIPLE LATHE.

No. 547,148. Patented Oct. 1, 1895.



Witnesses:
Chas. E. Van Dorn.
Henry B. Avers.

Fig. 1.

Inventor:
Henry L. Mann.
By Paul & Hadley
his Attorneys.

(No Model.)

5 Sheets—Sheet 2.

H. L. MANN.

MULTIPLE LATHE.

No. 547,148. Patented Oct. 1, 1895.

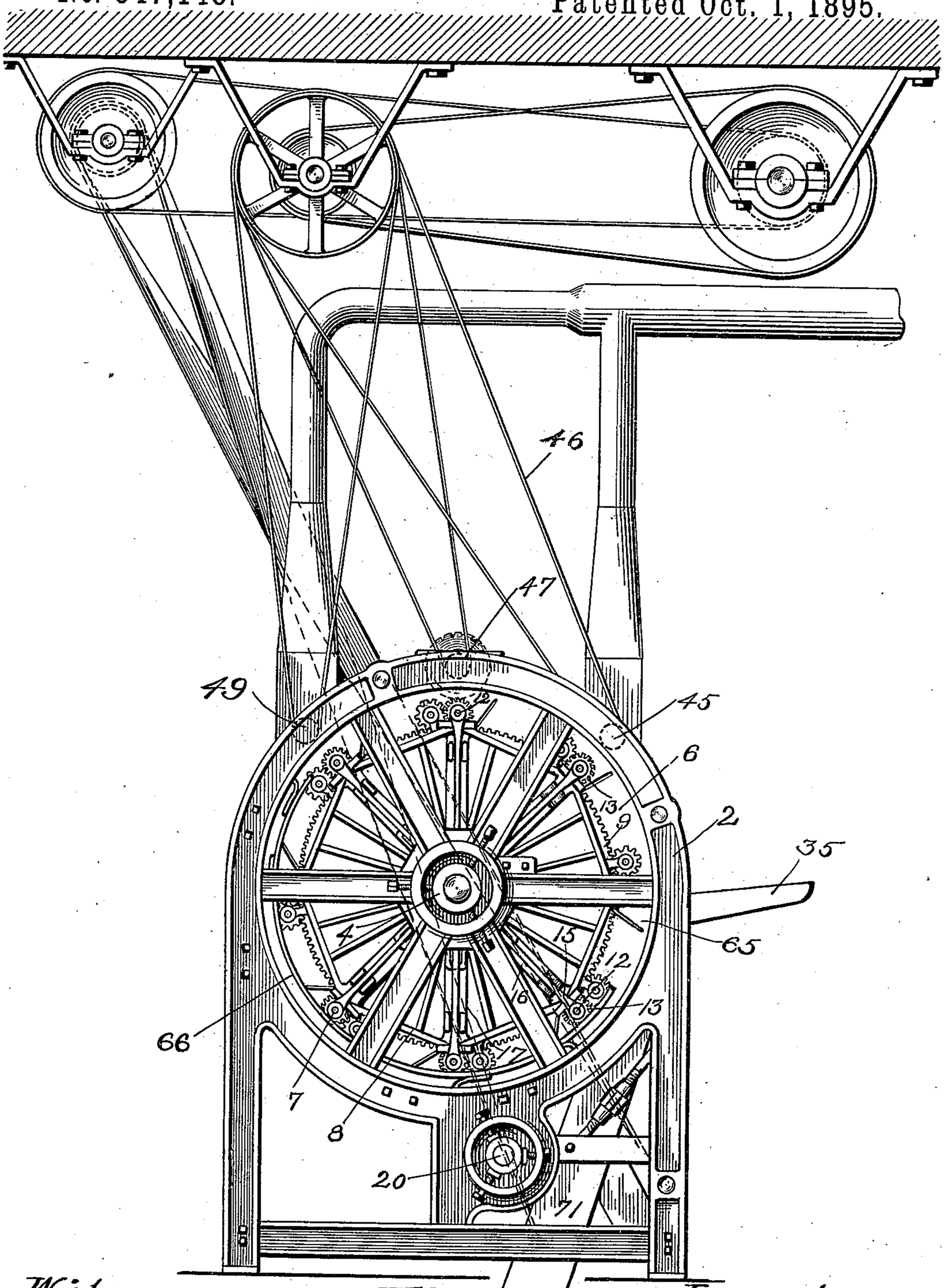


Fig. 2.

Witnesses:
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Inventor:
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(No Model.) 5 Sheets—Sheet 3.

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MULTIPLE LATHE.

No. 547,148. Patented Oct. 1, 1895.

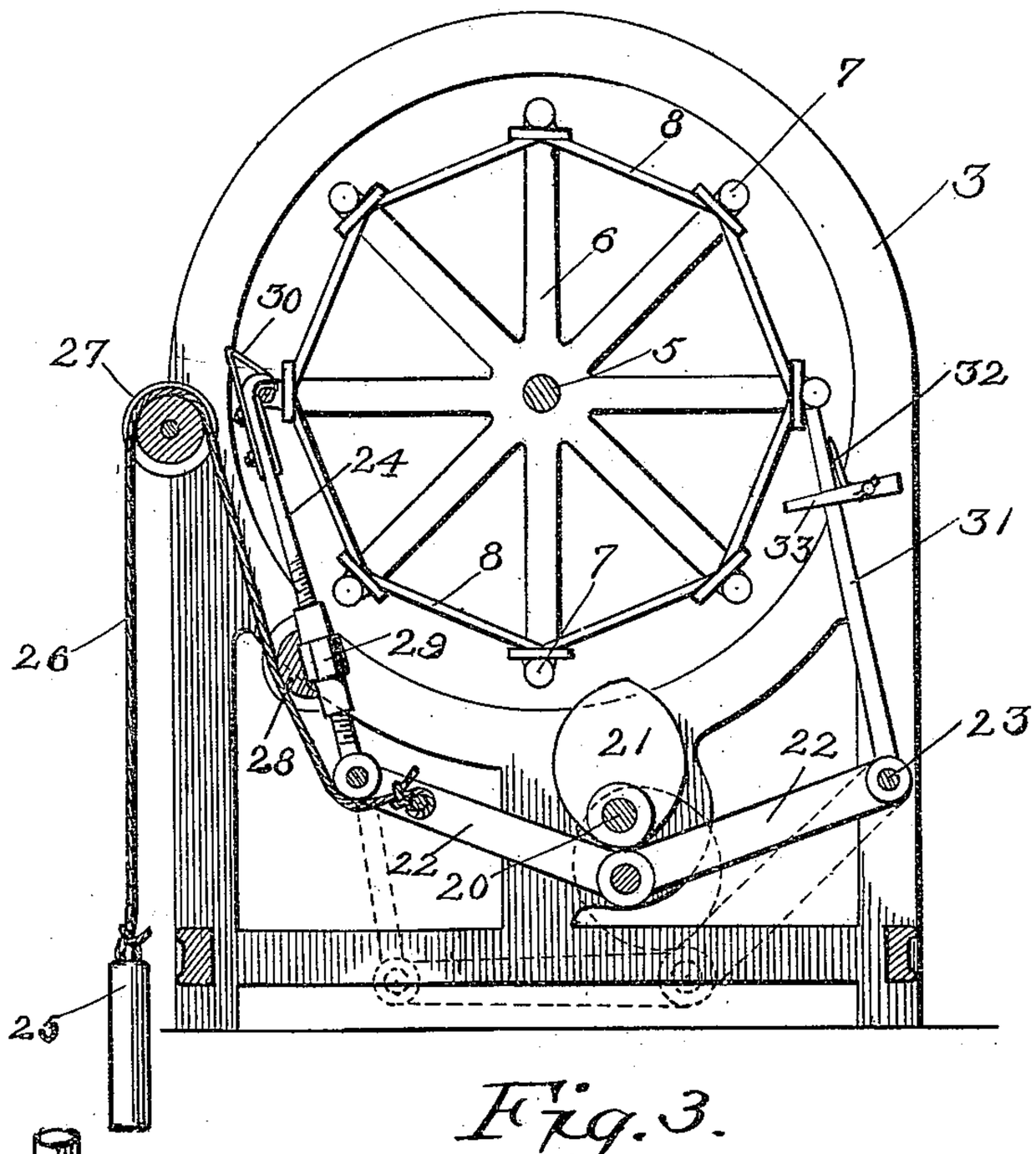

Fig. 3.

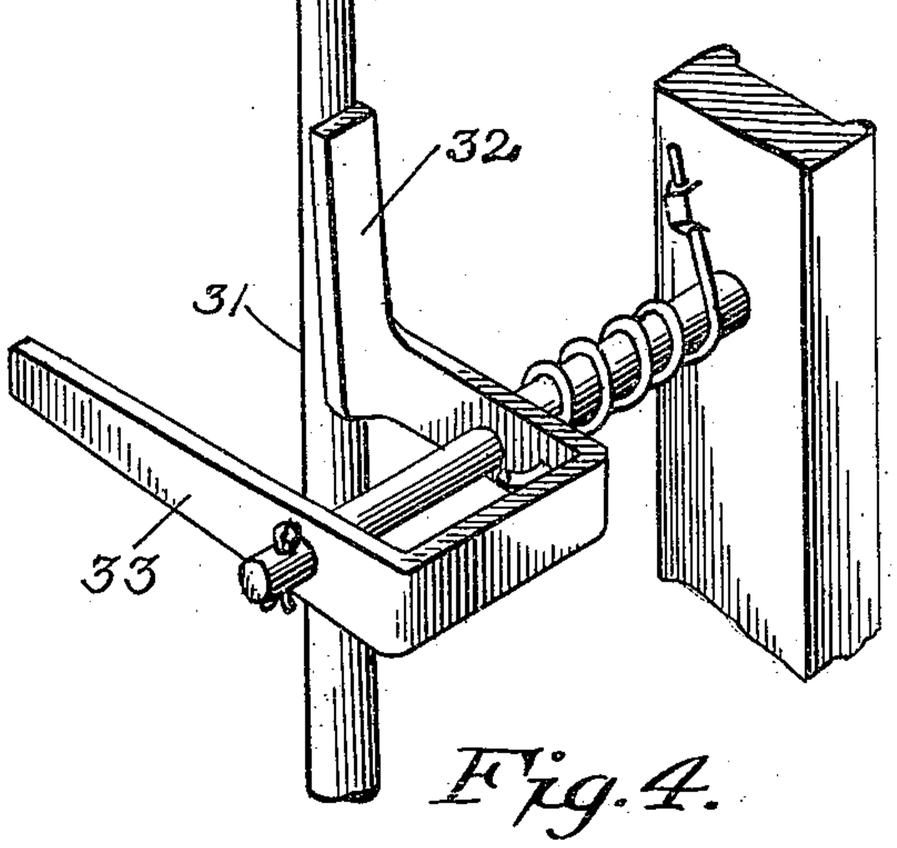

Fig. 4.

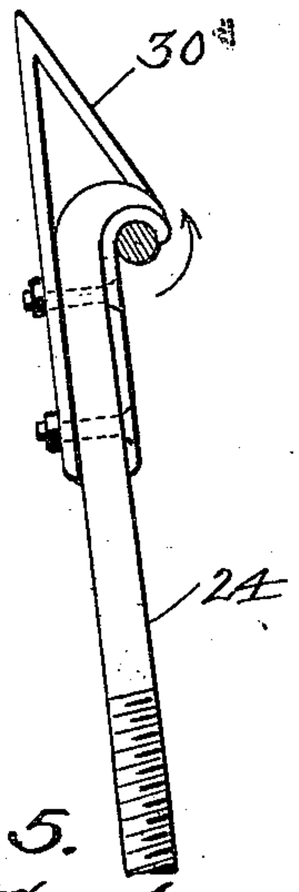

Fig. 5.

Witnesses:
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(No Model.)

5 Sheets—Sheet 4.

H. L. MANN.

MULTIPLE LATHE.

No. 547,148.

Patented Oct. 1, 1895.

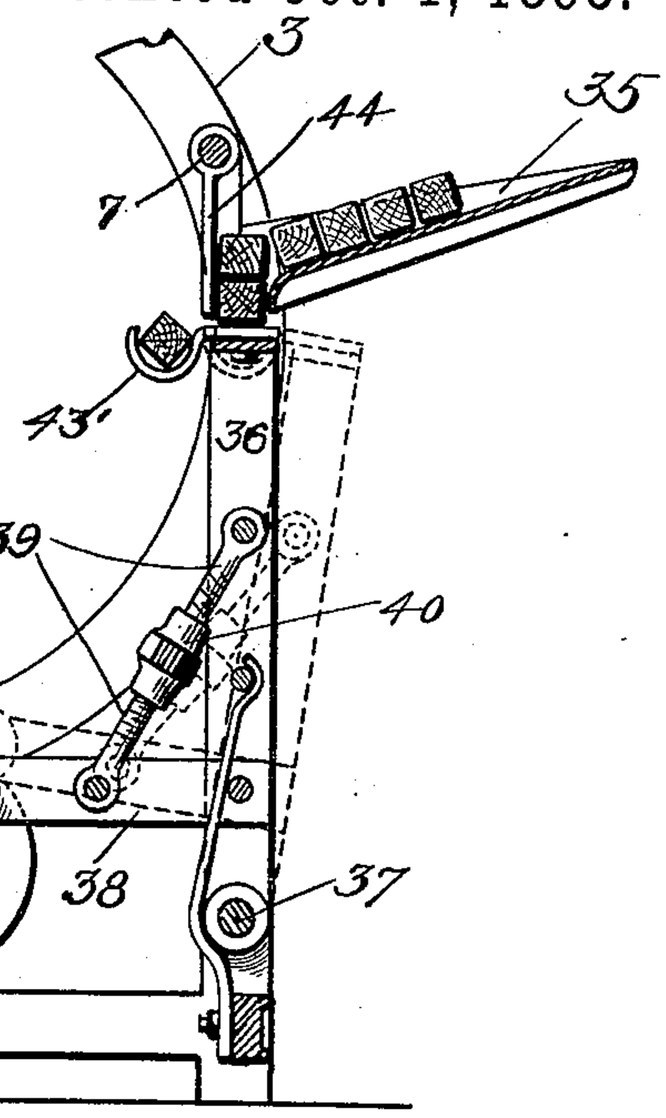

Fig. 6.

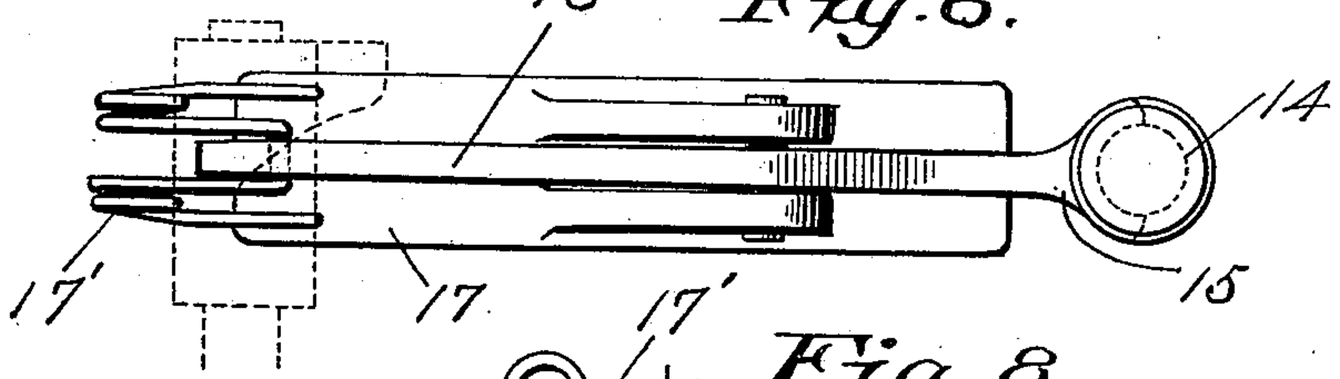

Fig. 8.

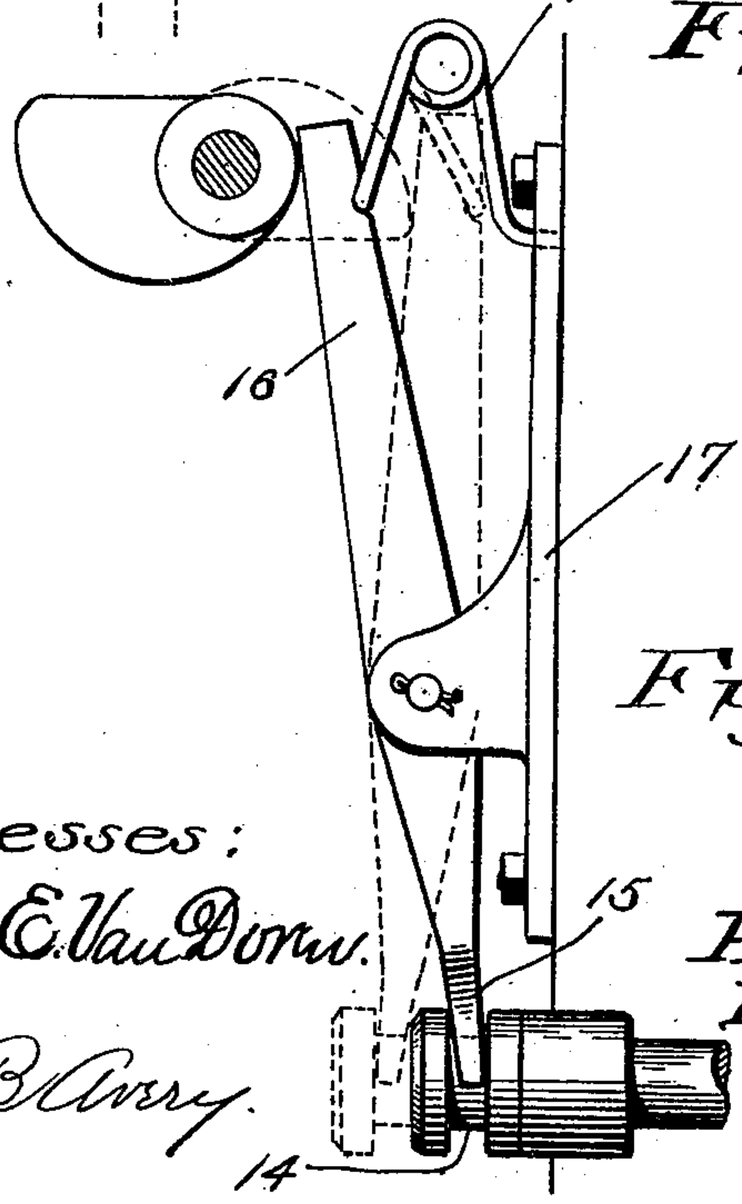

Fig. 7.

Witnesses:
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(No Model.) 5 Sheets—Sheet 5.

H. L. MANN.

MULTIPLE LATHE.

No. 547,148. Patented Oct. 1, 1895.

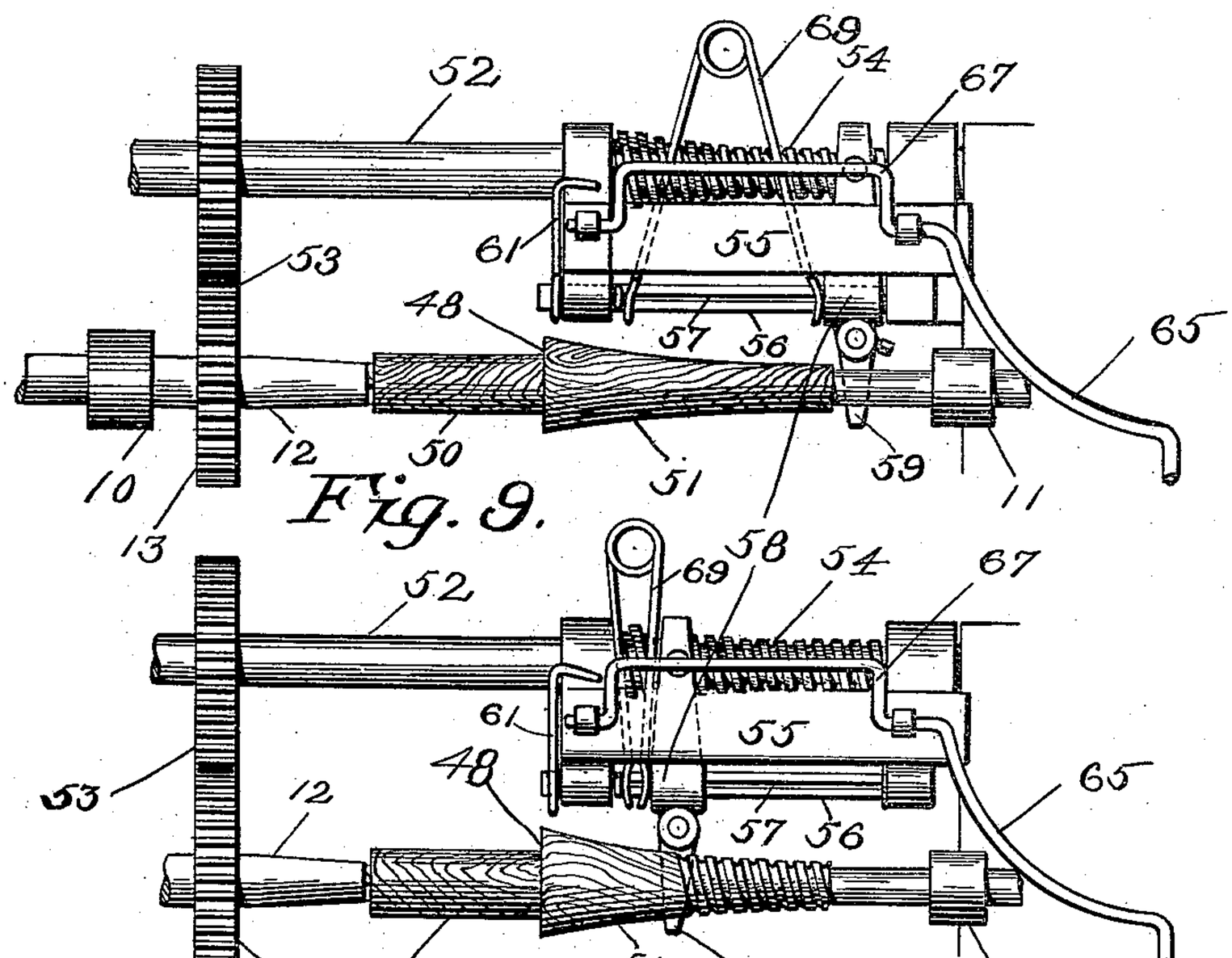
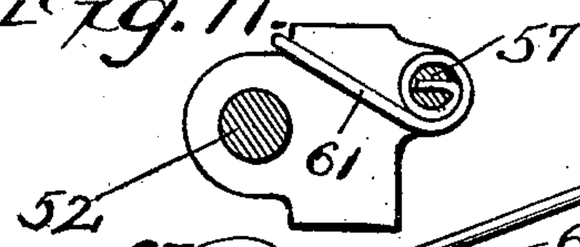


Fig. 9.

Fig. 10.

Fig. 11.



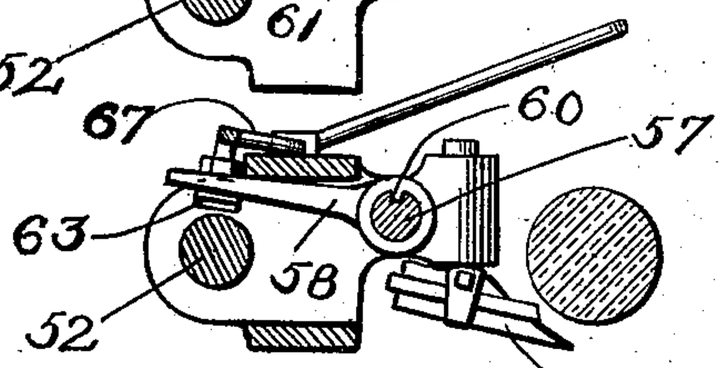


Fig. 12.

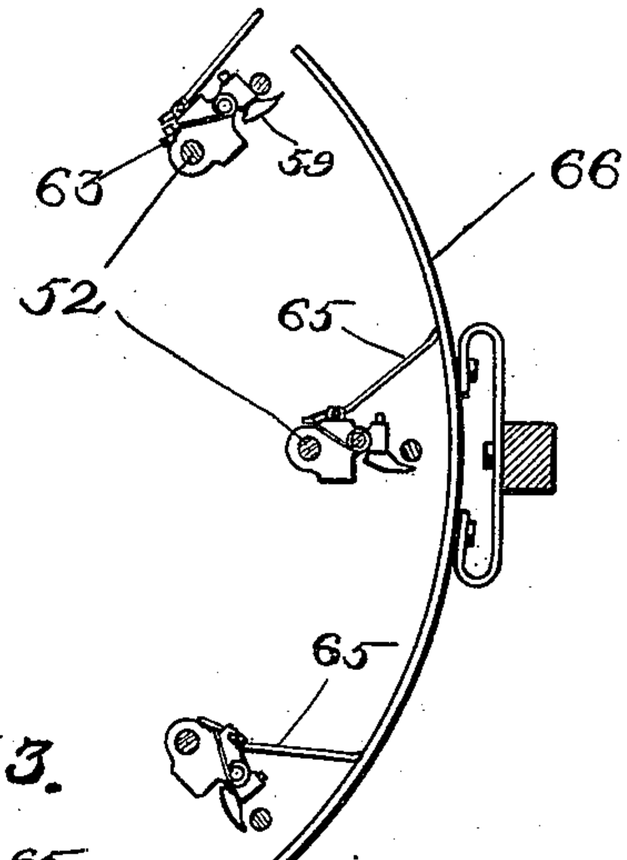


Fig. 13.

Witnesses.
Chas. E. MacDonnell.
Henry B. Avery.

Inventor
Henry L. Mann.
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his Attorneys.

UNITED STATES PATENT OFFICE.

HENRY L. MANN, OF MINNEAPOLIS, MINNESOTA.

MULTIPLE LATHE.

SPECIFICATION forming part of Letters Patent No. 547,148, dated October 1, 1895.

Application filed August 20, 1894. Serial No. 520,762. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. MANN, of the city of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Multiple Lathes, of which the following is a specification.

My invention relates to improvements in multiple lathes, and the object which I have in view is to provide a lathe for turning and threading telegraph-pins, which will be capable of rapid and thorough work, and which will require no attention except to place the rough blocks on the shelf or hopper.

The invention consists in general in the construction and combinations hereinafter described, and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front elevation of a machine embodying my invention. Fig. 2 is an end elevation of the same. Fig. 3 is a side elevation showing the mechanism for operating and locking the multiple chuck, a part of the frame being broken away. Fig. 4 is a detail of the locking mechanism. Fig. 5 is a detail of the adjustable arm that engages the multiple chuck in the operating mechanism. Fig. 6 is a transverse section showing the mechanism for feeding the blocks into the machine. Fig. 7 is a detail view of the mechanism for drawing the tail-blocks back to receive the rough blocks when they pass into the machine. Fig. 8 is a plan view of the same. Figs. 9 and 10 are plan views of the mechanism for threading the tapering end of the pins. Figs. 11 and 12 are details of the cutters for threading the pins. Fig. 13 is a view showing the thread-cutters, the levers arranged thereon being in engagement with a semicircular band while the cutters are operating upon the pins.

As shown in the drawings, 2 and 3 are opposite and like frame parts, having adjustable bearings 4 at their centers to receive the main shaft 5 of the machine. The lathe-carrier, which is made up of the two frames 6, suitably connected by cross and tie rods 7 and 8, is adapted to revolve freely upon the shaft 5, and the main gear-wheel 9 may also revolve thereon or be fixed thereto, as desired, the latter being preferred. The lathe-carrier is fitted with oppositely-arranged head and tail stocks 10 and 11, the head-stocks being each provided with a short spindle 12, which is longitudinally stationary in the stock, and is provided on its outer end with a small pinion 13, adapted to mesh with the large gear-wheel to be rotated thereby. The tail-stock is movable through its bearing 11, and has an annular groove 14 in its outer end adapted to receive a yoke 15, which is provided upon the end of a short lever 16, pivoted upon the spoke 17 of the carrier. There are a large number of these small lathes upon the carrier, at least eight being ordinarily employed, and for each of the lathes there is a lever 16, the several levers being radially arranged on the end of the drum or carrier, with their ends extending inwardly and normally pressed out by suitable springs 17′. The main gear-wheel 9 is driven at a slow speed from the power-shaft 18 and through reduction-gears 19. From these gears a cross-shaft 20 is driven, and upon this cross-shaft I provide a cam 21, adapted to engage with the elbow or toggle joint or lever 22. This lever 22 is pivoted at 23 on the frame and its opposite end is pivotally connected to an upwardly-extending hook 24, which is adapted to engage the short sections or parts of the head-spindles between the bearings of the stocks, so that as the cam revolves downwardly and the toggle 22 is depressed the hook 24 will be drawn down to rotate the lathe-carrier one section or space. The hook and the levers are held up by a weight 25, from which a cord 26 passes over a pulley 27, and thence down to a connection on the end of a toggle-lever 22, and the hook is held or sprung against the carrier by the insertion of a block 28 between the hook-rod and the inner section of the rope or cord 26. The hook is preferably adjustable, being made in two sections which are oppositely threaded and joined by a turnbuckle or sleeve 29. The upper end of the hook has a bevel extension 30, which acts as a guard to throw the hook out when it is raised and strikes the carrier. In this manner the lathe-carrier is rotated step by step to carry the several lathes beneath the cutters and saws.

As the lathe-carrier revolves in an opposite direction to the main gear-wheel to which the lathe-spindles are geared, it is necessary to provide means for preventing backward movement of the carrier. For this purpose I provide a gravity-pawl consisting in the pivoted rod or bar 31, which is adapted to rest beneath the head-stock upon the opposite side of the machine from the hook. This rod is normally locked in place by the spring dog 32, having an arm 33, which projects into the path of the head-stocks on the carrier, to be lifted thereby when the carrier or drum is moved. By the lifting of the locking-dog the pawl is liberated and may move out of the way of the carrier until thrown back by the release and return of the spring-dog. The space between the spindles of the head and tail stocks is just large enough to receive one of the rough blocks from which the pins are turned. These blocks are fed into the machine automatically, it being only necessary to place the same upon the inclined table 33, the machine having sufficient vibration to cause the blocks to slide slowly downward thereon. The blocks are taken from the table one by one by means of the automatic feed device. (Shown best in Fig. 6.) As shown therein, 36 represents a small pivoted upright frame pivoted on the shaft 37 and having an inwardly-extending arm 38, which is adjustably connected with the upper part of the frame by means of the oppositely-threaded rods 39 and the sleeve 40. The end of the arm 38 has a small roller 41, adapted to engage the cam 42, provided on the shaft 43 in the lower part of the machine, and like the other shafts operated through the gears from the main shaft 18. As the cam revolves the arm 38 is raised and lowered to move the frame 36 in and out. The frame is provided with the two hooks or rests 43′ of a size to admit a block, and as these hooks are moved out a block will drop into the same from the slot between the inner end of the table and the guide 44. Then as the frame 36 returns the block is carried inwardly and into position to be gripped between the head and tail spindles of the particular lathe which chances to stop opposite the same. The block is carried upwardly step by step by the revolution of the carrier and first passes beneath a rapidly-revolving cutter 45, operated from a belt 46, extending over an overhead pulley. This cutter has knives which are adapted to take the rough corners off the block, which while beneath the cutter is slowly revolved through the medium of the lathe-pinion and the slowly-revolving gear-wheel 9. With the next movement of the carrier the block is carried beneath the small circular saw 47, which cuts the shoulder 48 upon the pin, and the next movement of the carrier carries the lathe with the block around beneath the second rotating cutter 49, the knives of which are of a form to cut the straight shank 50 and the tapered end 51 of the pin, as shown in Figs. 9 and 10.

The lathes may be made to pass nearer to the cutters by moving the whole carrier upward, as such and other adjustments are rendered possible by the employment of the movable bearings 4 before spoken of. The threads are cut upon the tapered ends of the pins after the pins leave the last cutter, and the threading is done automatically through the employment of the automatic traveling knives, which are arranged opposite lathes upon the carrier. This mechanism is best shown in Figs. 9 and 13, wherein 52 represents a small cross-shaft arranged parallel with the spindles of the lathe and connected to the tail-stock thereof by small gears 53, which are of the same size, so that the lathe parts and the shaft 52 revolve at the same speed. On the shaft I provide a tapering screw 54, having a thread corresponding in pitch to that to be cut upon the pin. A small frame 55 is secured upon the main carrier, being partially supported on the shaft 52 and carrying a short guide-shaft 56 having a groove 57. The lever 58, which holds the knife 59, is arranged to slide upon the shaft 56, but is held from revolving with respect thereto by a small key 60 entering the groove 57 in the shaft. The shaft and the lever are normally pressed out by a spring 61, which tends to hold the knife away from the pin. The opposite end of the lever 58 has a lug 63, adapted to enter the thread upon the screw 54 when the lever is pressed down and at the same time that the knife on the lever engages the pin in the lathe. As the shaft 52 revolves, the knife-carrying lever will obviously be moved longitudinally when the lug 63 is in engagement with the thread of the screw 54. The knife is thrown in automatically after the pin leaves the last cutter by the engagement of the arm 65 with a semicircular or curved band 66, fixed in the frame of the machine. The arm 65 is pivoted upon the frame 55 and has a backwardly-extending loop 67, which when the arm is raised by engagement with the band 66 presses down on the knife-lever to force the same against the threads. The length of the band 66 is such that as the pin in the lathe is slowly revolved while the carrier is moving space by space the full thread will be cut upon the end of the pin. This being accomplished and the band ending just beneath the table 65, the knife-lever acts against the pressure of a bow-spring 69, the ends of which are curled around the shaft 57. The spring is compressed as the knife travels back on the pin, and as the arm 65 is released to permit the lever to disengage itself from the screw 54 the spring 69 will act to throw the lever 58 back to its original position on the shaft 56. Just as the threads upon the pin are completed the lathe is carried upward by the movement of the carrier and the lever 16, attached to the tail-spindle of the lathe, is car-

ried into position to be engaged by a rotating cam 70, which forces back the inner end of the lever and thus draws out the outer ends thereof to withdraw the center from the end of the wooden pin, which, being unsupported, will fall into the hopper and chute 71 arranged beneath it and extending to any convenient receptacle. The cam 70 is arranged on an upright shaft fixed in suitable bearings and is revolved by bevel-gears arranged on said shaft and one of the cross-shafts of the machine, and the cam is so revolved that it will hold the lever 16 until the lathe arrives opposite the hooks or recesses in which the blocks are delivered. The lever 16 is released at the moment that the lathe arrives in this position, so that the tail-stock will be forced against the end of the block and will thus be caught between the two centers or heads of the tailpieces.

The circular carrier or skeleton drum revolving upon the central shaft and equipped with the several small lathes may be termed a "multiple-chuck," wherein a large number of pins are held to be acted upon during various periods of the movement thereof. The skeleton form of the multiple-chuck prevents the lodgment of shavings or dust, which might interfere with the working of some parts of the machine, particularly the smaller parts thereof, such as the short-cutting attachments. The shavings are preferably taken directly from the cutters and saw through suction hoods and pipes connected with the driven suction-fan, these hoods, as shown in the drawings, forming perfect guards over these rapidly-moving parts. The speed of the small lathes is such that the block is revolved once while either of the tools, with the saw or the cutters, are revolved at very high speeds. As so few movements are required and so few parts employed, the multiple-chuck or lathe-carrier may be revolved at a quite high rate of speed, so that a great many finished pins are turned out within a very short time, the working of the machine being so rapid in fact as to keep a person busy in feeding the rough blocks upon the table 35.

Owing to the small compass within which it is possible to arrange the lathes through the employment of the circular drum or carrier, the entire machine occupies much less floor-space than machines hitherto designed for doing the same or similar work. The shafting and belts for driving the several parts are shown, but it is deemed unnecessary to explain the same in detail.

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

1. The combination, with a suitable frame and an annular skeleton drum or carrier revolubly arranged on a shaft in said frame, a series of small lathes arranged about said drum or carrier and parallel with the axis thereof, a large gear wheel concentric with said drum, means for revolving the same, the head spindles of said lathes being provided with pinions meshing with said gear wheel, revolving cutters, periodically actuated means for rotating said drum or carrier a given distance or step by step to move said lathes beneath said cutters successively, a thread cutting attachment provided in connection with each lathe, an outwardly extending arm composing a part of said attachment, and a substantially semi-circular guide or band fixed upon said frame and with which the arms of said attachments are adapted to engage after leaving the positions of the cutters, substantially as described.

2. The combination, in a multiple lathe, of a suitable frame, and the main shaft thereof, with a drum or carrier revolubly arranged therein, a series of lathes arranged about the periphery of said drum, means for revolving said lathes, cutters arranged in said frame to operate upon blocks carried in said lathes, a second shaft, a cam arranged thereon, a toggle lever to be engaged by said cam, a vertically movable hook attached to the free end of said toggle lever and adapted to engage said drum or carrier, and a weight for returning said hook, substantially as described.

3. The combination, in a multiple lathe, of a suitable frame, with an annular skeleton drum or carrier revoluble therein, a series of lathes arranged upon said drum, means for revolving said lathes, cutters to operate upon blocks held in said lathes, a shaft 20, a cam 21 provided thereon, a toggle lever 22 to be operated by said cam, a hook attached to the free end of said lever and adapted to engage said drum to revolve the same, automatic means for returning said hook, the gravity pawl to engage said drum to prevent movement thereof except by said hook, and a lock for said pawl, said lock adapted to be operated by the movement of the drum to release said pawl, substantially as described.

4. The combination, in a multiple lathe, of a frame, with an annular drum or carrier revoluble therein, a series of lathes arranged upon said drum or carrier, means for revolving said lathes, cutters arranged in said frame, means for partially revolving said carrier periodically or step by step to carry the lathes beneath said cutters, a feed table, a swinging lever or frame 36 arranged beneath the same and provided with hooks or rests 43, a revoluble cam arranged to operate upon said frame or lever to actuate the same a pivoted lever arranged in connection with the tail spindle of each lathe, said levers being carried upon the drum, springs for normally pressing said levers and spindles inward, a shaft, and a cam thereon to engage said levers successively as they arrive with the lathes opposite the said feed table and said rests whereby the tail spindles of the lathes are withdrawn and released in time to catch the block from said rests, substantially as described.

5. In a multiple lathe, the combination, with

a suitable frame, of a revoluble drum arranged therein, a series of lathes arranged upon the periphery of said drum parallel to the axis thereof, means for rotating said drum with the lathes step by step, means for rotating the lathes independently, cutters to operate upon blocks carried in the lathes, a short shaft 52 arranged in proximity to each lathe, means for driving the same at the speed of the lathe, said shaft provided with a tapering screw thread 54, a small frame 55, a grooved shaft carried therein, a knife lever carrying a knife and secured upon said shaft to move longitudinally thereon only, the opposite end of said lever provided with a lug adapted to engage the threads of said screw, a spring to normally hold the same out of engagement therewith, a pivoted lever having a loop bearing upon the end of the knife lever, and provided with an arm 65 and a guide or band upon the frame of the machine with which said arm is adapted to engage whereby said knife lever is engaged with said screw to be moved thereby, substantially as described.

6. In a machine of the class described, the combination of the lathe spindles, the shaft 52 arranged in proximity thereto, means connecting the lathe spindles and said shaft whereby the latter is operated, said shaft being provided with a tapering screw at one end, a frame carried by said shaft near said screw, the guide shaft carried by said frame, the lever carried by said guide shaft and arranged to slide thereon, said lever being provided at one end with a knife to engage the block carried by said lathe spindle, and its opposite end being provided with a lug to engage the threads of said screw, an arm 65, and a semi-circular band arranged in position to engage said arm 65 to hold said knife in engagement with the block during the process of cutting the thread, substantially as described.

7. In a machine of the class described, the combination, of the lathe spindle, the shaft 52 arranged parallel thereto, means for operating said shaft from said spindle, the screw provided at one end of said shaft, the frame 55 also carried by said shaft and having the short guide shaft 56, the lever carried by said guide shaft, provided with the cutting knife at one end and a lug at its opposite end to engage the threads of said screw, the arm 65 provided with the backwardly extending loop arranged to bear upon the end of said lever above said screw, a semi-circular band arranged in position to engage the outer end of said arm 65, and a spring 69 carried by said guide shaft to be compressed by said lever during the process of cutting the thread, and to return said lever to its normal position when said arm 65 is disengaged from said semi-circular band, substantially as described.

In testimony whereof I have hereunto set my hand this 27th day of July, A. D. 1894.

HENRY L. MANN.

In presence of—

C. G. HAWLEY,

FREDERICK S. LYON.