

No. 850,374.

PATENTED APR. 16, 1907.

C. KING.  
GRINDING MACHINE.  
APPLICATION FILED NOV. 9, 1906.

4 SHEETS—SHEET 1.

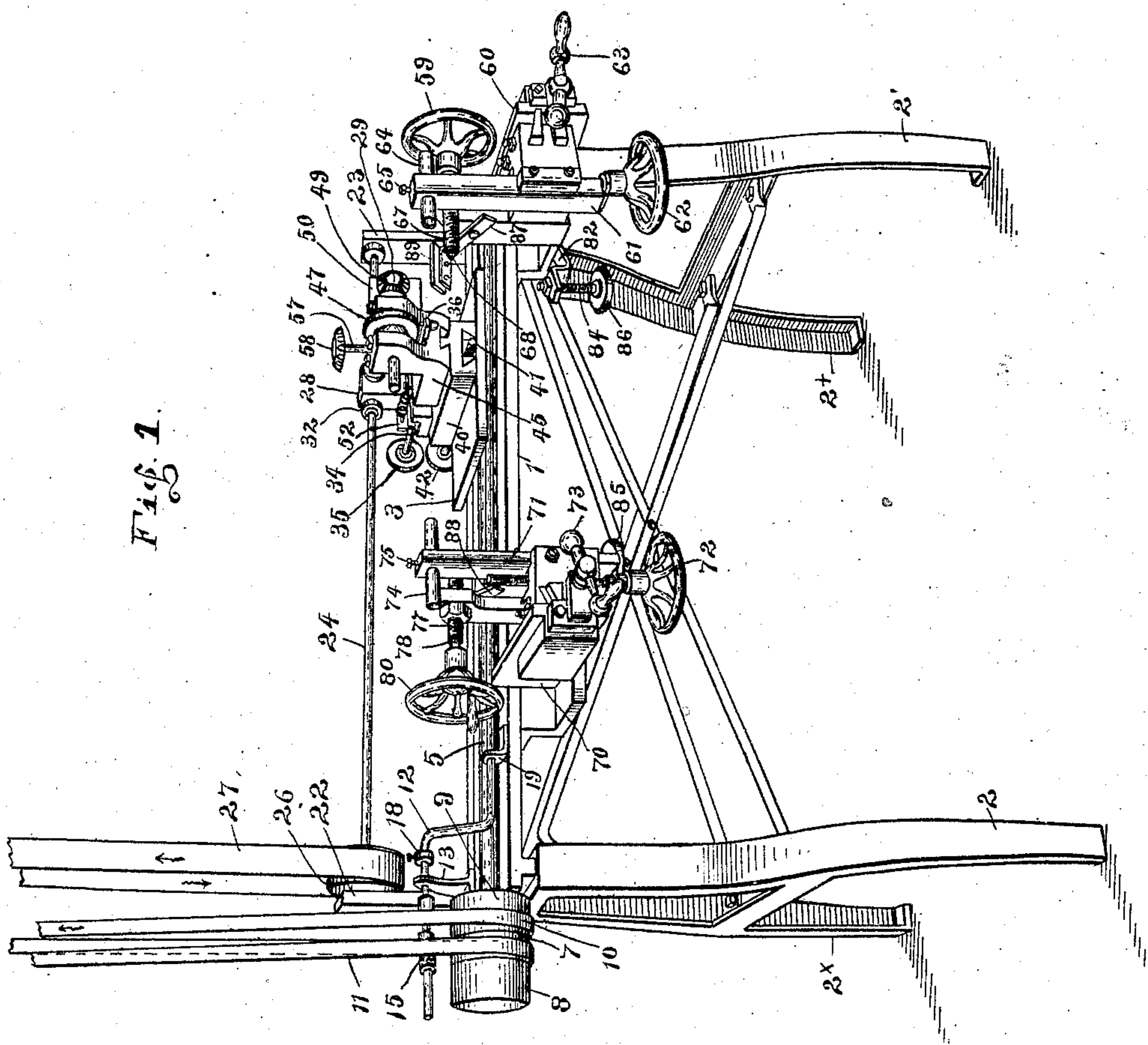


Fig. 1.

Witnesses:  
Adelaide Kearns,  
R. G. Harndt.

Charles King,  
Inventor,  
By Robert W. Randle  
Attorney.

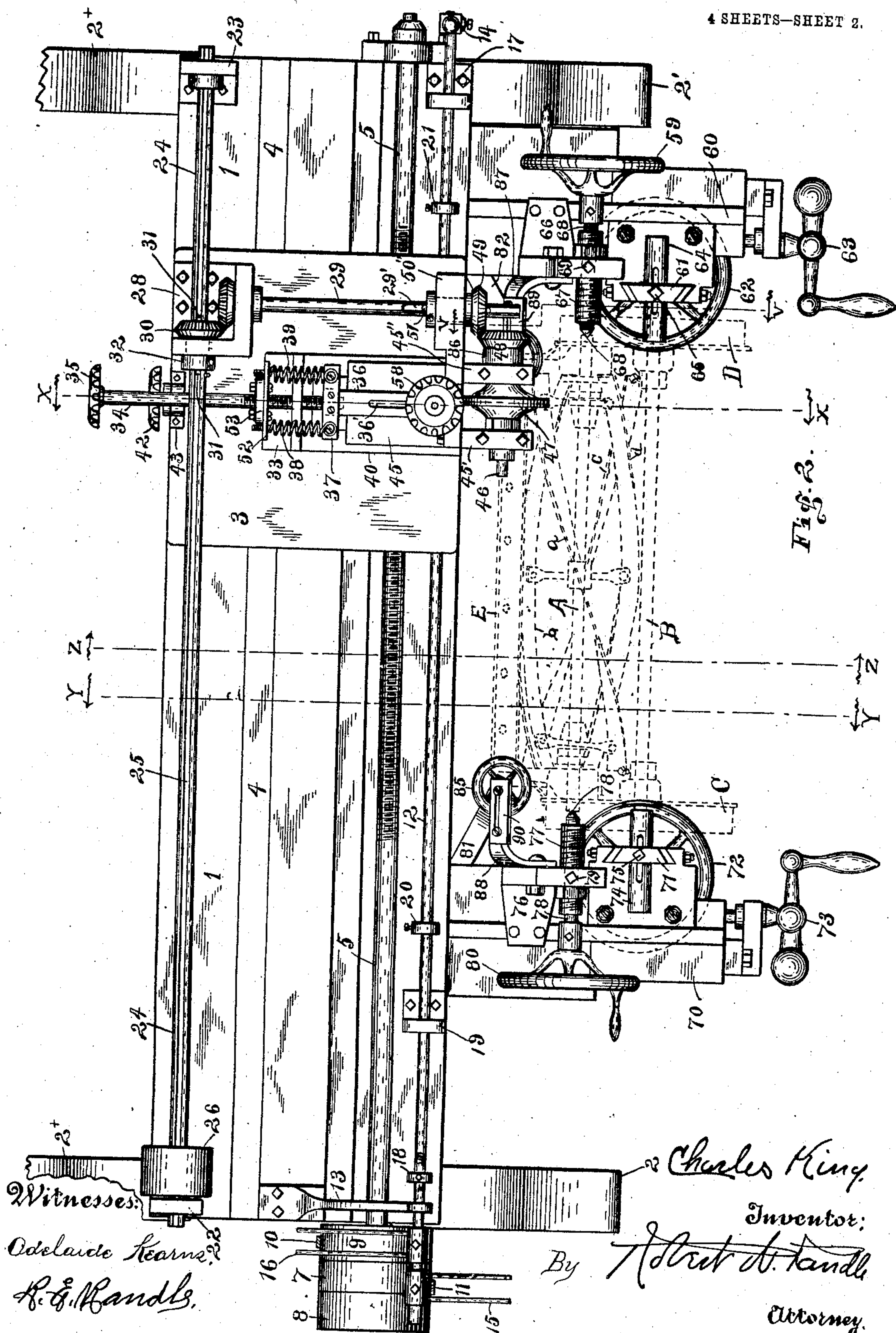
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4 SHEETS—SHEET 2.



Witnesses:

Odelaide Kearnz?

R. G. Randle.

Charles King

*Inventor:*

By

Robert D. Randall

Attorney.



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4 SHEETS—SHEET 3.

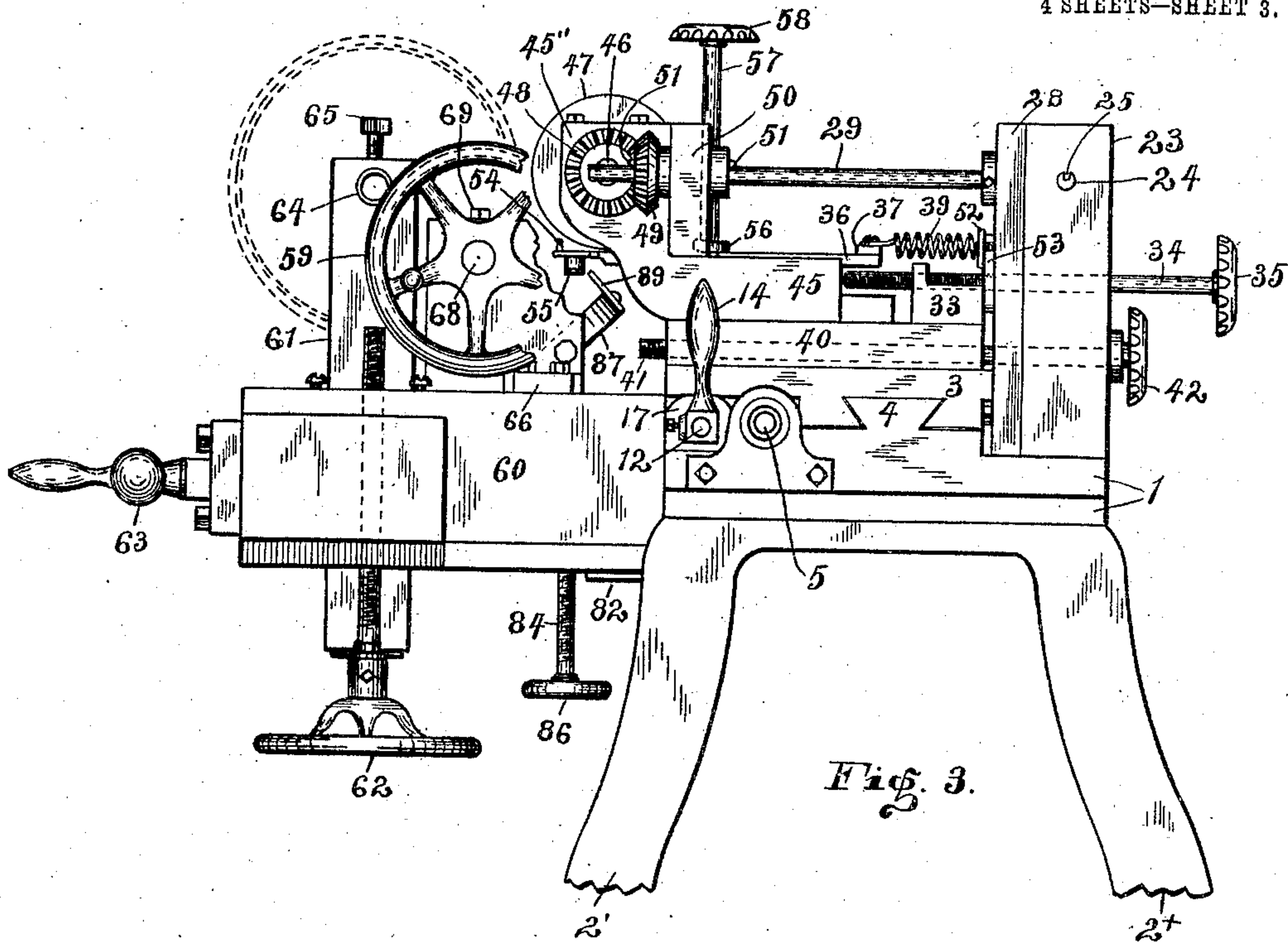
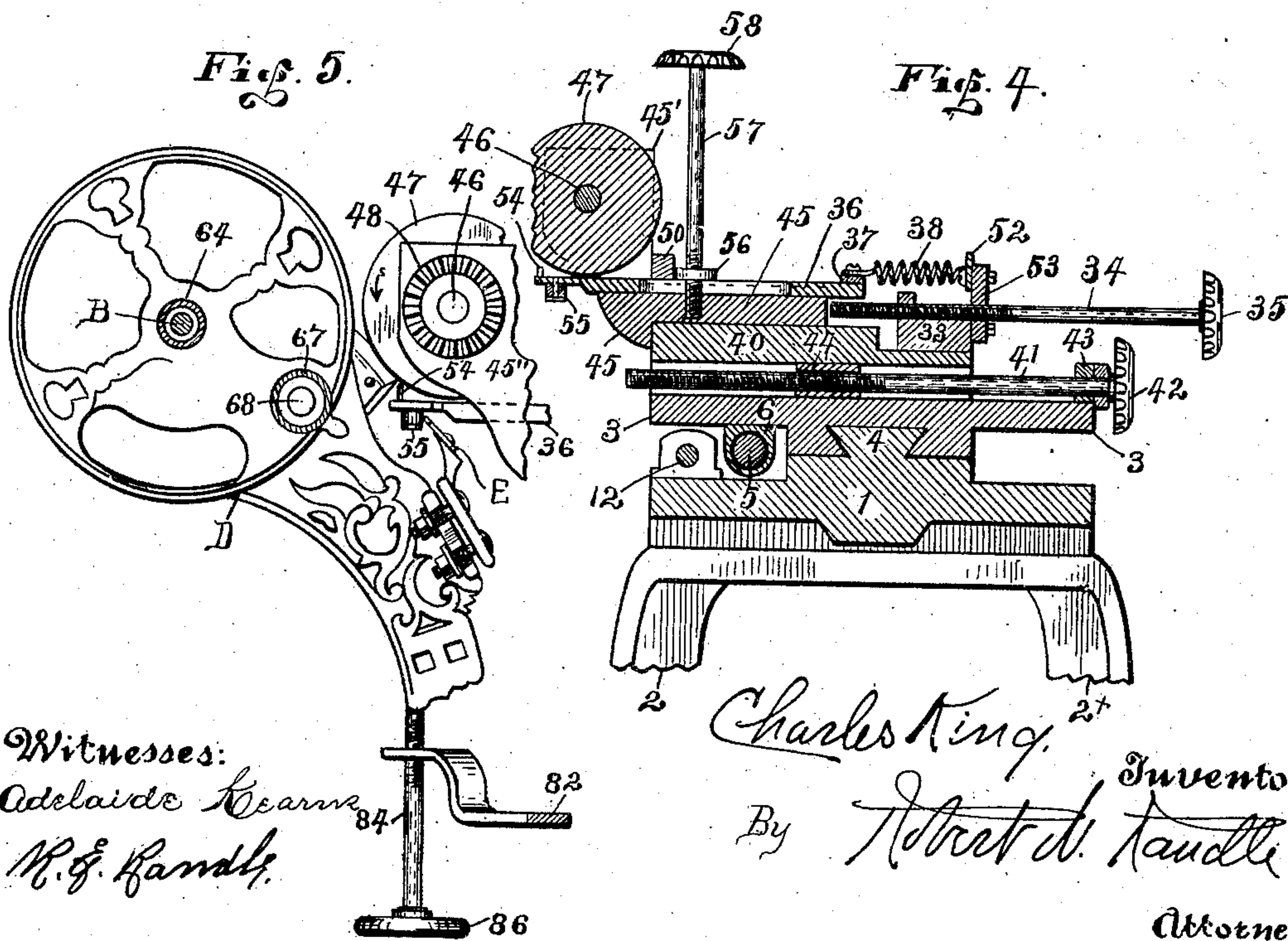


Fig. 3.



Witnesses:  
Adelaide Kearns  
M. G. Randall

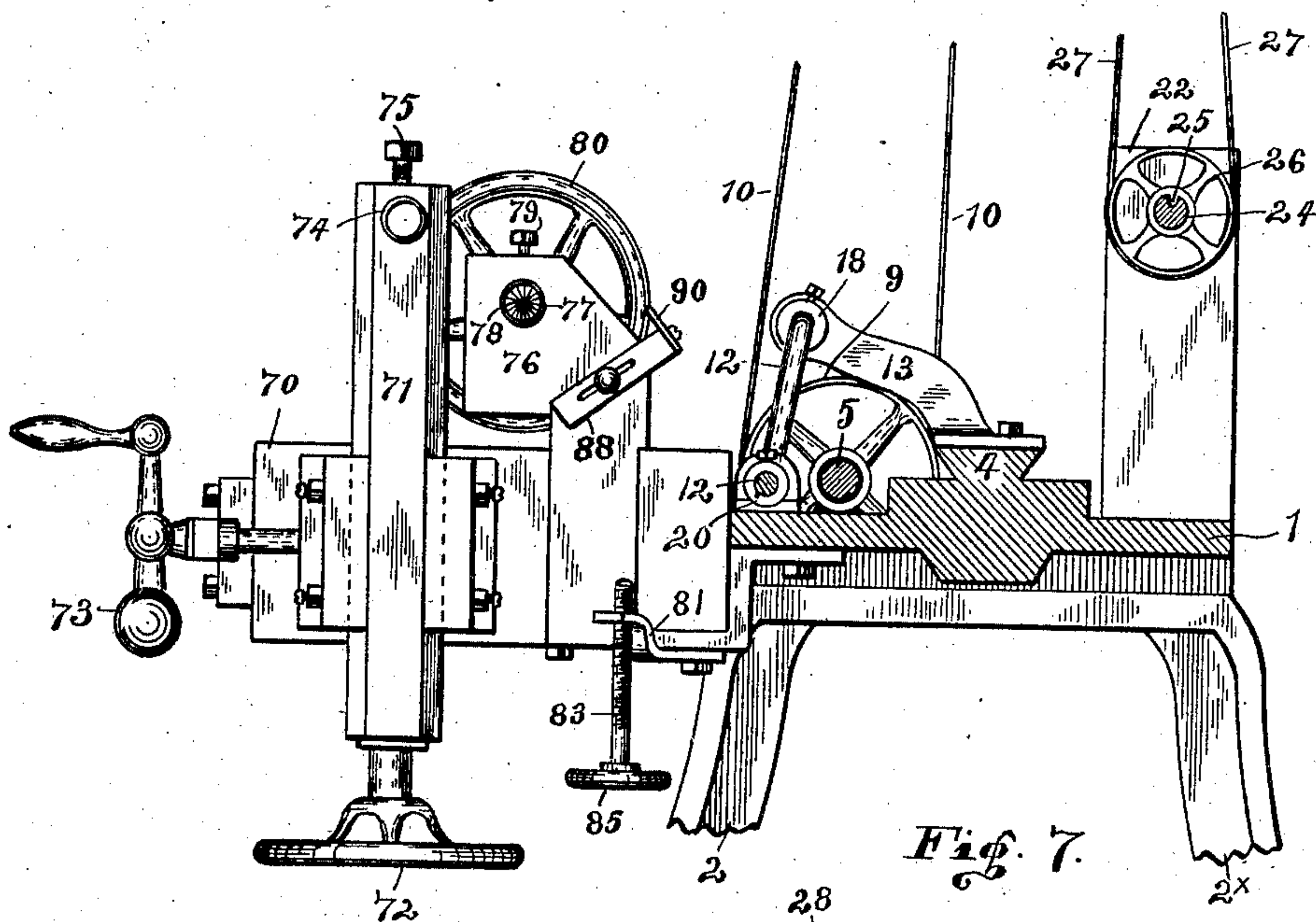
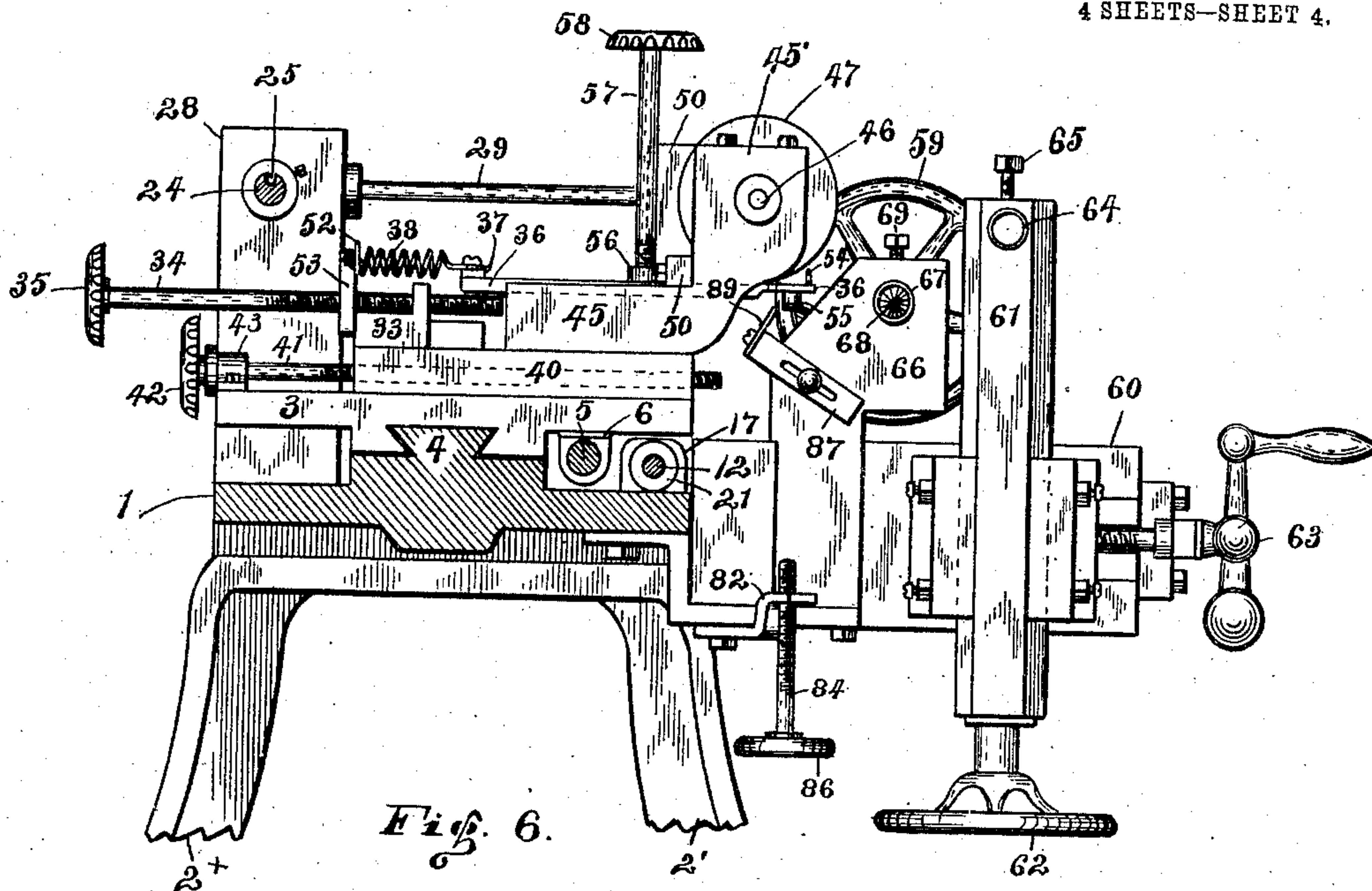
Charles King, Inventor.  
By Robert D. Randall, Attorney

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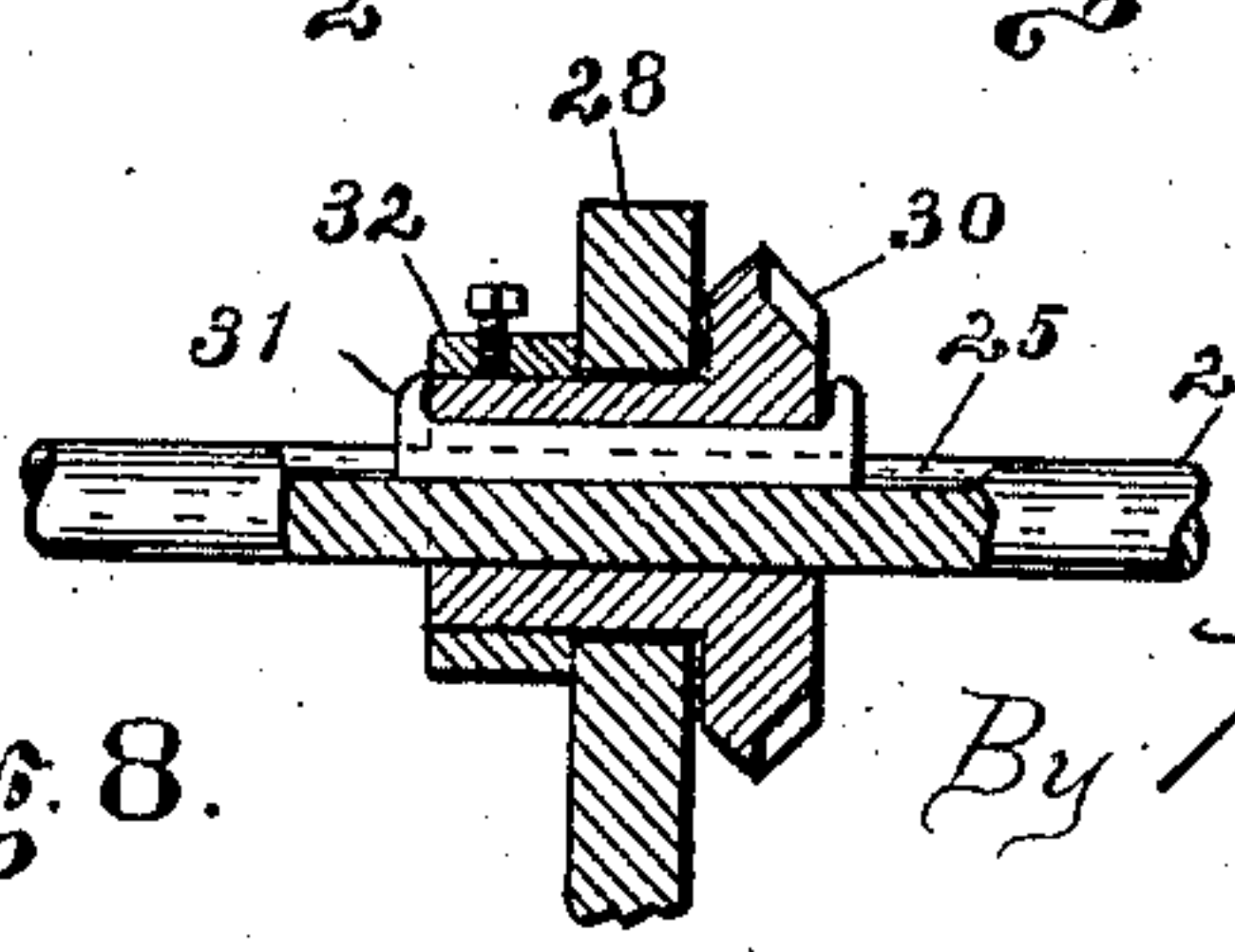
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4 SHEETS—SHEET 4.



Witnesses:  
Adelaide Kearns.  
R. G. Gandy.

Fig. 8.



Charles King,  
Inventor;  
By Albert H. Kunkle  
Attorney



# UNITED STATES PATENT OFFICE.

CHARLES KING, OF RICHMOND, INDIANA, ASSIGNOR TO THE F. & N. LAWN  
MOWER COMPANY, OF RICHMOND, INDIANA, A CORPORATION.

## GRINDING-MACHINE.

No. 850,374.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed November 9, 1906. Serial No. 342,611.

*To all whom it may concern:*

Be it known that I, CHARLES KING, of the city of Richmond, in the county of Wayne and State of Indiana, have invented a new and Improved Grinding-Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention has for its main object the grinding and jointing of the blades of lawn-mowers or the like; and my invention consists in a jointing-lathe of simple and durable construction, which will be mechanically efficient, easily operated and controlled, and especially adapted for jointing the cutting edges of the blade of lawn-mower reels with the edge of the cutter-bar thereof, whereby I provide a perfect shearing contact of said blades with said cutter-bar, and that at a single operation and without the necessity of manual labor devoted thereto, except that of tending the machine and to supply the material thereto.

To these ends my invention consists, first, of a longitudinal pedestal comprising a bed-plate adapted to carry the several necessary devices; second, a carriage operative longitudinally on the bed-plate; third, a permanent work-holder and an adjustable work-holder oppositely disposed thereto and employed in conjunction therewith; fourth, means for adjusting a lawn-mower at the proper points to insure accuracy; fifth, novel means for grinding the reel-blades uniformly alined with the edge of the cutter-bar and whereby they will thereafter form a shearing contact therewith; sixth, means for actuating the carriage to and fro over the bed-plate automatically by power; seventh, means for operating the grinding means continuously by power and independent of the carriage-actuating means, and, eighth, the legitimate combinations of the several features referred to with each other, and other specific and subordinate features not yet alluded to, all of which will be described in detail hereinafter.

For a more full comprehension of the possibilities and advantages of my invention it may be stated that heretofore it has been necessary in the manufacture of lawn-mowers to fit the shearing edge of the blades of the reel to the shearing edge of the cutter-

bar of the machine by hand—that is to say, by means of hand-tools—thereby consuming a great amount of time and labor and with more or less imperfect results, while with this invention the actual fitting of said parts is done entirely by mechanical means, thereby reducing the time and labor to a minimum, while at the same time insuring absolutely perfect joints, and thereby accomplishing a uniform and higher grade of the finished product having a maximum of mechanical efficiency.

The preferred embodiment of the invention is shown most clearly in the accompanying four sheets of drawings, in which—

Figure 1 shows a perspective view of the face side of my invention complete and in operative position. Fig. 2 is a top plan view of my invention entire. Fig. 3 is a left-hand end elevation of the invention. Fig. 4 is a cross-sectional view of the machine as taken on the line X X of Fig. 2 and as taken in the direction indicated by the arrows. Fig. 5 is a detail view showing an end elevation and the proper adjustment of a lawn-mower in the machine, the position of the several parts of a lawn-mower with reference to the machine, and showing grinding mechanism in operation and as taken on the line V V of Fig. 2. Fig. 6 is a cross-sectional view of the machine as taken on the line Z Z of Fig. 2 and as taken in the direction indicated by the arrows on said line. Fig. 7 is a cross-sectional view of the machine as taken on the line Y Y of Fig. 2 and as taken in the direction indicated by the arrows on said line, and Fig. 8 is a detail sectional view of bevel-gear 30.

Similar indices denote and refer to like parts throughout the several views of the drawings.

In order that my invention may be the more fully understood in all of its various operation, I will now take up a detail description thereof, in which I will describe the various parts and the various essential elements as briefly and as compactly as I may.

Referring now to the drawings in detail, the numeral 1 denotes the bed-plate, which is secured to and carried on the four legs, (designated by the indices 2, 2', 2<sup>x</sup>, and 2<sup>+</sup>,) which are of any ordinary construction.

The numeral 3 designates the carriage-plate, which is of same width as the bed-plate



over which it operates, but it is practically square in dimension. Said carriage-plate is adapted to slide over and above the bed-plate longitudinally thereof, being mounted thereto by the dovetail guide-tongue 4, which rises from the bed-plate and which fits in the corresponding bifurcated slot formed in a downwardly extension of the carriage-plate, substantially as shown in Figs. 4 and 6. By the above arrangement the carriage-plate 3 is securely mounted over the bed-plate and is adapted to slide from end to end thereof, being actuated substantially as hereinafter set forth.

Mounted longitudinally of the bed-plate, extending beyond either end thereof and located between the bed-plate and the carriage-plate, is the screw-shaft 5, which is revolubly mounted in suitable hangers at each end of the machine.

Secured to and extending down from the under side of the carriage-plate 3 is the nut 6, through which the shaft 5 is threaded, whereby the revolution of said shaft will actuate the carriage-plate longitudinally of the bed-plate. On the left-hand projecting end of the shaft 5 are mounted three pulleys of equal diameter and arranged to almost contact with each other, as shown. The center pulley 7 is rigidly secured to the shaft 5, while the pulleys 8 and 9 are mounted revolubly on said shaft, being what is commonly termed "loose pulleys."

The numeral 10 denotes a straight belt adapted to operate on the pulley 9 or the pulley 7, and the numeral 11 denotes a crossed belt adapted to operate on the pulley 7 or the pulley 8, said belt being crossed upon itself some distance above the machine at a point not shown. Said belts 10 and 11 extend upward, where they pass over the common drive-pulley (not shown) by which power is transmitted to the machine.

The numeral 12 denotes the shifting-rod, carried in the hanger-arm 13 on the left and the hanger 17 on the right. Said rod 12 extends along near the front edge of the bed-plate, with an operating-lever 14 secured to its right-hand end beyond the bed-plate, as shown.

The left-hand end of the rod 12 carries two pairs of forks 15 and 16 for shifting the respective belts 11 and 10 synchronously by the movement of the lever 14 longitudinally of the machine.

The numeral 19 denotes a third hanger for supporting the rod 12 toward the left-hand portion thereof.

The adjustable collar 18 is secured on the rod 12 where it may contact with the arm 13 to prevent the belts 10 and 11 from being moved too far to the left.

The numerals 20 and 21 denote adjustable collars secured on the rod 12 at ascertained proper points on either side of the plate 3,

whereby said plate 3 may in its movements over the bed-plate impinge said collars, and thereby move the rod 12 endwise in order to reverse the operation of the screw 5, it being apparent that when the rod 12 is to the right the belt 11, operating on the pulley 7, will revolve the shaft 5 in one direction, and that if the rod 12 be moved to the left then the belt 11 will be moved onto the loose pulley 8, while the belt 10, operating oppositely from the belt 11, will be moved onto the pulley 7, and therefore operate the shaft 5 reversely.

Rising from each of the rear corners of the bed-plate is a standard or hanger, they being designated by the numerals 22 and 23, in which are revolubly mounted the shaft 24, extending therebetween. Said shaft is provided with a square channel 25, extending longitudinally from end to end thereof. Secured on the shaft 24 and located near the standard 22 is the pulley 26, which is revoluble continuously by the belt 27. Said belt extends up over a drive-pulley (not shown) for supplying power.

Secured to and rising from the rear left-hand corner of the carriage-plate 3 is the double right-angular hanger 28, having an aperture through one arm thereof, through which passes the shaft 24, and in the other arm, at right angles to the former arm, is an aperture for the short shaft 29, which will presently be followed to a conclusion. Slidably mounted on the shaft 24 is the bevel-gear-wheel 30, having a stem extending to the left, fitting in said aperture in the first-named arm of the hanger 28 and extending therethrough, with a removable collar 32 securable on said stem, as shown in Fig. 2, whereby said gear-wheel 30 may be held revolubly in place with reference to the hanger 28, with the shaft 24 extending therethrough. A key-seat is formed longitudinally in the interior of the wheel 30 and its stem to receive the yoke-key 31, said key having an upturned lug at each end to engage the ends of said gear-wheel, and thus prevent the removal of said key unless the wheel 30 is removed from the shaft 24, it being understood that said key is adapted to travel endwise with the gear-wheel 30, half of said key being in the channel 25 and half in the corresponding channel in the interior of the wheel 30 and its stem. By the above it is notably apparent that the gear-wheel 30 and the shaft 24 must of necessity revolve together, while at the same time the wheel 30 may slide on the shaft 24 longitudinally.

Adjustably mounted over the carriage-plate 3 is the cross-plate 40, being adjustable forward and backward by the screw-shaft 41, and it in turn to be actuated by the hand-wheel 42. The rear end of said shaft 41 is carried in the hanger 43, which rises from the rear edge of the plate 3, whereby endwise



motion of the shaft 41 is prevented. Said plate 40 is mounted on the plate 3 in substantially the same manner as the plate 3 is mounted on the bed-plate 1, as indicated in Fig. 1, there being a nut 44, Fig. 4, extending down centrally of the plate 40, into which the shaft 41 is screw-threaded.

Located on the upper face of the plate 40, being centrally and longitudinally thereof, is the slidable carriage 45, same being mounted by a bifurcated tongue and slot substantially the same as the plate 40 is attached to the plate 3, above referred to. Said carriage 45 is composed of a base portion mounted on the plate 40 and of two forwardly and upwardly extending arm-hanger bearings 45' and 45'', carrying the bearings in which is mounted the shaft 46, the latter being located on same plane and at right angles to the shaft 29. Mounted on the shaft 46, between the arms 45' and 45'', is the abrasion-wheel 47. Located immediately to the right of the arm 45'' is the bevel gear-wheel 48, secured on the shaft 46, as shown. Extending to the right at right angles to the arms 45' and 45'' is the arm 50, the portion by which it is secured extending across the rear of the arms 45' and 45'', to which it is secured by bolts, as shown. In the arm 50 is journaled the forward portion of the shaft 29. Slidably mounted on the shaft 29 forward of the arm 50 and meshing at right angles with the bevel gear-wheel 48 is the corresponding bevel gear-wheel 49. It should be observed that a slot 39', Fig. 2, is formed longitudinally in the forward portion of the shaft 29, into which slot is operable the yoke-key 51, said key 51 also being carried in a corresponding slot formed longitudinally in the aperture of the gear-wheel 49, whereby said gear-wheel 49 is carried revolvably with the shaft 29, but at same time is slidable longitudinally thereon when the carriage 45 is actuated forward or backward. The construction and operation of the last-named parts is substantially the same as the parts 30 and 32, above referred to. Rising from the rear part of the plate 40 is the block 33, having an upwardly-extending forward lip in which is a threaded aperture, and in said aperture operates the threaded portion of the shaft 34, the latter being operated by the hand-wheel 35. The forward end of the shaft 34 is adapted to impinge the rear of the carriage 45 for moving the carriage forward for the purpose presently appearing.

Slidably mounted in the surface of the carriage 45 and projecting forward therefrom is the bar 36, having a slot 36' therethrough, as shown. Across the rear end of the bar 36 is secured the auxiliary bar 37, to the ends of which are secured the forward ends of the two helical springs 38 and 39. The rear ends of said springs are attached to the bar 52, which latter is secured to the standard 53, said standard being secured to and rises

above the rear edge of the block 33. The shaft 34 passes through an aperture in the standard 53, thereby forming a support and guide for said shaft, as shown. Rising from the front end of the bar 36 is the permanent detent or pin 54, and extending down from the front end of the bar 36, a little to the rear of the detent 54, is the roller-bearing 55, which is suitably mounted to revolve horizontally for the purpose presently set forth.

Threaded into the forward upper face of the plate 40 is the stem 57, which passes upwardly through the slot 36' and the carriage 45 and extends up some distance above the bar 36, with a hand-wheel 58 secured on its upper end. Secured to and around the stem 57 above the bar 36 is the collar 56, same being located such that when the stem 57 is screwed down into the plate 40 the collar 56 will clamp upon the bar 36, pressing it tightly into engagement with the carriage 45 for the purposes presently appearing. The tension of the springs 38 and 39 are such as to normally retain the bar 36 to its rearward limit when the collar 56 is not in contact therewith.

Extending out forward from the right-hand portion of the bed-plate 1, rigidly secured thereto and located on a level therewith, is the bracket 60, forming the main part of the permanent clamping mechanism or work-holder. The numeral 61 denotes a vertically-disposed slidable panel mounted in the face of the forward portion of the bracket 60, as shown in Fig. 6, being adapted to be adjusted vertically by a screw-shaft operable by the hand-wheel 62 and when adjusted to be securable by the hand-gear 63, which parts are all of a well-known construction. In the upper portion of the panel 61 is an aperture to receive horizontally the hollow cone 64, said cone being adapted to be secured by the set-screw 65. Also carried by the bracket 60 is the hanger 66, in which is mounted the horizontally-disposed cone 67, which is interiorly threaded to receive the centering-screw 68. Said cone 67 is securable in said hanger by the set-screw 69. The centering-screw 68 is revoluble by the hand-wheel 59.

Extending out forward from the left-hand portion of the bed-plate 1, being adjustably secured thereto and on a level therewith, is the bracket 70, forming the main part of the adjustable clamping mechanism or work-holder, as shown in Fig. 7. The numeral 71 denotes a vertically-slidable panel mounted to the inner face of the forward portion of the bracket 70, being like unto, aligned with, and oppositely disposed from the panel 61, above referred to. The panel 71 is adapted to be adjusted vertically by a screw-shaft operable by the hand-wheel 72 and when adjusted thereby to be secured by the hand-gear 73, which parts are of ordinary con-



struction. In the upper portion of the panel 71 is an aperture to receive horizontally therein the hollow cone 64, said cone being adapted to be secured by the set-screw 65. Also carried by the bracket 70 is the hanger 76, in which is mounted the horizontally-disposed cone 77, which is interiorly threaded to receive the centering-screw 78. Said centering-screw 78 is revoluble by the hand-wheel 80. Said cone 77 is securable in said hanger by the set-screw 79.

As shown by the dotted lines in Fig. 2, the letters *a*, *b*, *c*, and *d* designate the blades of the lawn-mower reel. The letter A denotes the shaft on which the reel carrying the blades is rigidly mounted in the usual manner. The letter B denotes the axle of the lawn-mower, to which axle the carrying-wheels (not shown) are revolubly mounted. The letters C and D denote the end casings of the lawn-mower, and the letter E denotes the cutter-bar of the lawn-mower, a portion of a lawn-mower also being shown in Fig. 5. When secured in the machine, the lawn-mower is inverted from the normal position it occupies when in operative position.

Prior to beginning the work to be performed by my invention the lawn-mower is assembled to the extent indicated by the above and as shown in Figs. 2 and 5.

Extending at an angle inwardly and forwardly from the under side of the rear portion of the brackets 60 and 70 are the respective arms 81 and 82, in which are threaded the vertical stems 83 and 84, respectively, said stems being revoluble by the hand-wheels 85 and 86, secured to the lower end of the respective stems 83 and 84. The upper ends of the stems 83 and 84 are adapted to support the respective ends of the lawn-mower frame in its adjusted position by means of the contact with the lower parts of the respective end members C and D, substantially as shown in Fig. 5.

To the opposing or inner face of the respective hangers 66 and 76 are adjustably secured the diametrically-opposed upwardly and inwardly extending arms 87 and 88, on which are adjustably secured the extension-bars 89 and 90, respectively, which are to be alined with and form extensions of the cutter-bar E when the latter is in its adjusted position.

Operation: Having now fully described the preferred construction of my invention, I will now describe one manner of its operation, from which, together with the preceding description, may be gathered the chain of causation. The lawn-mower to be operated on is first adjusted in the machine as shown in Fig. 2—that is to say, the hand-wheels 59 and 80 are revolved to press inwardly the screws 68 and 78 centerward, thereby centering their points on the respective ends of the shaft A. The cones 64 and 74 are brought

toward each other with their inner ends surrounding the ends of the axle B, where they are secured by their respective set-screws. The hand-wheels 85 and 86 are then turned to bring the upper ends of the stems 83 and 84 in contact with the lower points of the end members C and D of the lawn-mower, adjusting said stems 83 and 84 to bring the cutter-bar E into alinement with the extension-bars 89 and 90. Said extension-bars 89 and 90 should also be adjusted whereby they will form uninterrupted extensions of the cutter-bar, as shown in Fig. 2. Just prior to bringing the cutter-bar 3 up to its adjustment, as above stated, the carriage 45 should be pressed back to its limit. The stem 57 is then run down to clamp the bar 36 to the carriage 45, and the shaft 34 is then run forward, carrying the forward end of the bar 36 forward against the resiliency of the springs 38 and 39 until the roller 55 has passed the cutter-bar E. After the above the cutter-bar E is then brought up to position, as previously stated. The shaft 34 is then retrieved back to its limit, allowing the roller 55 to contact with the cutter-bar, as in Fig. 5, being resiliently held thereagainst by the springs 38 and 39. It will now be notably apparent that the blades—as, for instance, the blade *a*—may rest at one point on the pin 53, said pin acting as a bearing for the blade while the blade is being ground or jointed at the point thereabove; but before describing the grinding I will first refer to the movements of the carriage.

When in operation, the bands or belts 10 and 11 operate continuously in the direction indicated by the arrows thereon in Fig. 1, the carriage traveling alternately to the right and left, as has previously been explained. Also the belt 27 travels in the direction as indicated by the arrow thereon in Fig. 1, thereby revolving the abrasion-wheel 47 continuously at a high rate of speed in the direction indicated by the arrow thereon in Fig. 5.

In Fig. 5 the carriage is represented as to have just started to the left, thereby bringing the right-hand end of the edge of the blade *a* in contact with the abradant 47, and as the carriage continues to travel to the left the abradant 47 will cut away the edge of the blade the proper amount and to the proper angle in order to give it the desired shearing contact with the edge of the cutter-bar. As the blades *a*, *b*, *c*, and *d* are spiral, it will be apparent that as the carriage advances the reel, of which the said blades are a part, will turn revolubly sufficient in which that the blade being operated will at all times be forced to travel in the triangular space formed by the abradant 47 and the pin or dentent 54. When the carriage has reached the left-hand end of the blade, it may pass therebeyond, allowing the extension 90 to take the



place of the cutter-bar E against the roller 55, or preferably the carriage may be instantly reversed at this point and a second operation may be taken over the same blade. When the carriage has returned to the right, the abradant 47 will pass beyond the right-hand end of the blade, allowing the extension 89 to take the place of the cutter-bar E against the roller 55. When the operation is at the last-named point the reel will be free to revolve, and therefore the blade *a* being finished the blade *b* may then be turned to the position shown as occupied by the blade *a* in Fig. 5 and the same operation is gone through with as that just described with relation to the blade *a*, and so on until all of the blades are completed, after which this particular lawn-mower may be removed from the machine to be replaced by another to be operated on as described.

I desire that it be understood that the specific construction of the details of this invention in which novel features are embodied, as well as the general construction of the parts which are old, may be variously changed without altering the essential principles which are claimed as new.

The terms "upward," "downward," "front," "rear," and other similar terms are used for convenience of description, and it is not intended by their use to limit the arrangement of the parts to the relative positions indicated.

Having now fully shown and described the construction and the operation of my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In combination with a grinding-machine for lawn-mowers or the like, means for adjustably mounting the lawn-mower in the machine, a carriage carried back and forth from end to end of the blades of the lawn-mower, a resiliently-mounted bar carried by the carriage, a roller carried by said bar and adapted to hook over the cutter-bar of the lawn-mower, a pin extending up from said bar on which pin the blades of the lawn-mower may slide, and a continuously-revolving abrasion-wheel carried by the carriage for operating on said blades opposite to and above said pin, all substantially as described.

2. In a grinding-machine for lawn-mowers, the means for centering and retaining a lawn-mower at the proper points for operation thereon, a carriage operative longitudinally of the blades of the lawn-mower, means carried by the carriage to resiliently engage the cutter-bar of the lawn-mower and for providing a support for the blades when being ground, means mounted on the carriage for guiding the blades by power as the carriage travels to and fro, and means for gaging the grinding whereby the ground blades will

have a predetermined shearing contact with the cutter-bar, all substantially as shown and described.

3. In a mechanism for grinding lawn-mower blades and fitting them to operate in conjunction with their cutter-bar, the combination of the following elements: an adjustable carriage 45, having forwardly and upwardly extending arms carrying revolvably therebetween an abradant disk, a bar 36 slidably mounted on the carriage and extendable forward under said disk, springs for resiliently drawing said bar to the rear, a roller mounted on the under side of the forward portion of said bar to engage over the cutter-bar of a lawn-mower, a pin extending up from the forward portion of said bar for supporting the blades of the lawn-mower, one at a time, while they are being ground by the abradant disk corresponding to the periphery of said cutter-bar.

4. In a machine for operating on a lawn-mower having a reel carrying blades and having a cutter-bar, of a carriage operated by power over a bed-plate, an abradant disk revoluble continuously by power in one direction and carried by said carriage, a spring-controlled bar operative under the abradant disk and carried with said carriage, a roller mounted to the under side of said bar to engage over the cutter-bar of the lawn-mower, a pin extending up from said bar to provide a support at that point for the blade then being operated on by the abradant disk located thereabove, and means for securing the lawn-mower in position for the blades to be operated on and for allowing the reel of the lawn-mower to turn as the abradant wheel is advanced by the carriage.

5. A machine for operating on a lawn-mower having a shaft carrying spiral blades, and a cutter-bar and an axle, a jointing-machine for grinding the blades to conform to the cutter-bar, adjustable means for supporting said axle at its ends, adjustable means for pivoting said shaft at its ends, means for bringing the cutter-bar to the proper point and for supporting it at the height desired, a carriage movable longitudinally of the blades, an abrading-disk carried by the carriage, means for adjusting the carriage to bring said disk to the proper working point, means carried by the carriage for supporting the blade, being ground, in position to be operated on by the abrading-disk, said means being controlled by the edge of the cutter-bar substantially as shown and described.

6. The herein-described machine comprising a bed-plate, a carriage movable from end to end of and carried on the bed-plate, a screw-shaft for operating the carriage, a clamping and pivoting mechanism for supporting a lawn-mower in position, a bar carried by the carriage and slidable thereon and at right angles to the movement thereof and



being resiliently mounted to pull away from the lawn-mower, means for frictionlessly connecting said bar to the lawn-mower cutter-bar, means carried by said bar for supporting the blade of the lawn-mower being operated on, and an abradant disk carried by the carriage and adapted to grind the edge of the blade to the desired clearance in order to give it a shearing contact with the cutter-bar, all substantially as shown and described.

7. In a grinding-machine for lawn-mowing machines, the combination with a suitable supporting-frame, of a carriage operable horizontally on said frame, means for operating said carriage by power in combination with means for reversing the movements of the carriage, a circular revoluble abradant carried on the carriage, means for operating the abradant continuously by power independent of the means for operating the carriage, means for holding a lawn-mower in position for the blades thereof to be ground by said abradant, and resilient means for gaging the grinding of the blades whereby when ground they will correspond to and have a shearing contact with the cutter-bar therefor, all substantially as shown and described.

8. A grinding-machine for lawn-mowers or the like, comprising means for securing a lawn-mower thereto in position for the blades thereof to be operated on, means for adjusting the cutter-bar of the lawn-mower, a carriage adapted to be carried from end to end of the lawn-mower blades, a continuously-revolving grinding-disk mounted on the carriage, a bar slidable in and out on said carriage, springs for normally retaining said bar to the rear limit of its movement, a roller carried on the under side of the front portion of said bar and adapted to hook over and be held resiliently in contact with the edge of the cutter-bar, a pin extending up from the front end of said bar to provide a rest for the

blade being ground at that point by the grinding-disk located directly thereabove, means for advancing the carriage for moving said pin and roller and the grinding-disk from end to end of the blade and the cutter-bar whereby the blade will be ground to conform to the cutter-bar, all substantially as shown and described.

9. The combination in a grinding-machine for lawn-mowers, of a lawn-mower retaining and centering mechanism, a guide for the lawn-mower blade being ground, a yielding support for said guide which support is controlled by the edge of the lawn-mower cutter-bar, a revolving abrasion-disk carried above said guide and its yielding support, means for adjusting said disk with relation to the blade being ground, means for carrying said guide and its yielding support and said disk from end to end of the cutter-bar by power, and means for revolving the disk by power, all substantially as shown and described.

10. In a mechanism for supporting the cutter-bar of a lawn-mower, means for holding the lawn-mower rigidly in position at same time allowing the blades of the lawn-mower to revolve, yielding means controlled by the cutter-bar for supporting the blade being ground, means for grinding the blades from end to end, and means for allowing said supporting means and the grinding means to pass beyond either end of the blades to allow the other blades to be brought into position to be ground without disconnecting said supporting means, all substantially as shown and described.

In testimony whereof I have hereunto subscribed my name to this specification in the presence of two subscribing witnesses.

CHARLES KING.

Witnesses:

R. E. RANDLE,  
R. W. RANDLE.