No. 617,431. Patented Jan. 10, 1899.

McC. YOUNG.

WORK FEEDING MECHANISM.

(Application filed July 22, 1898.)

(No Model.) 8 Sheets—Sheet 1.

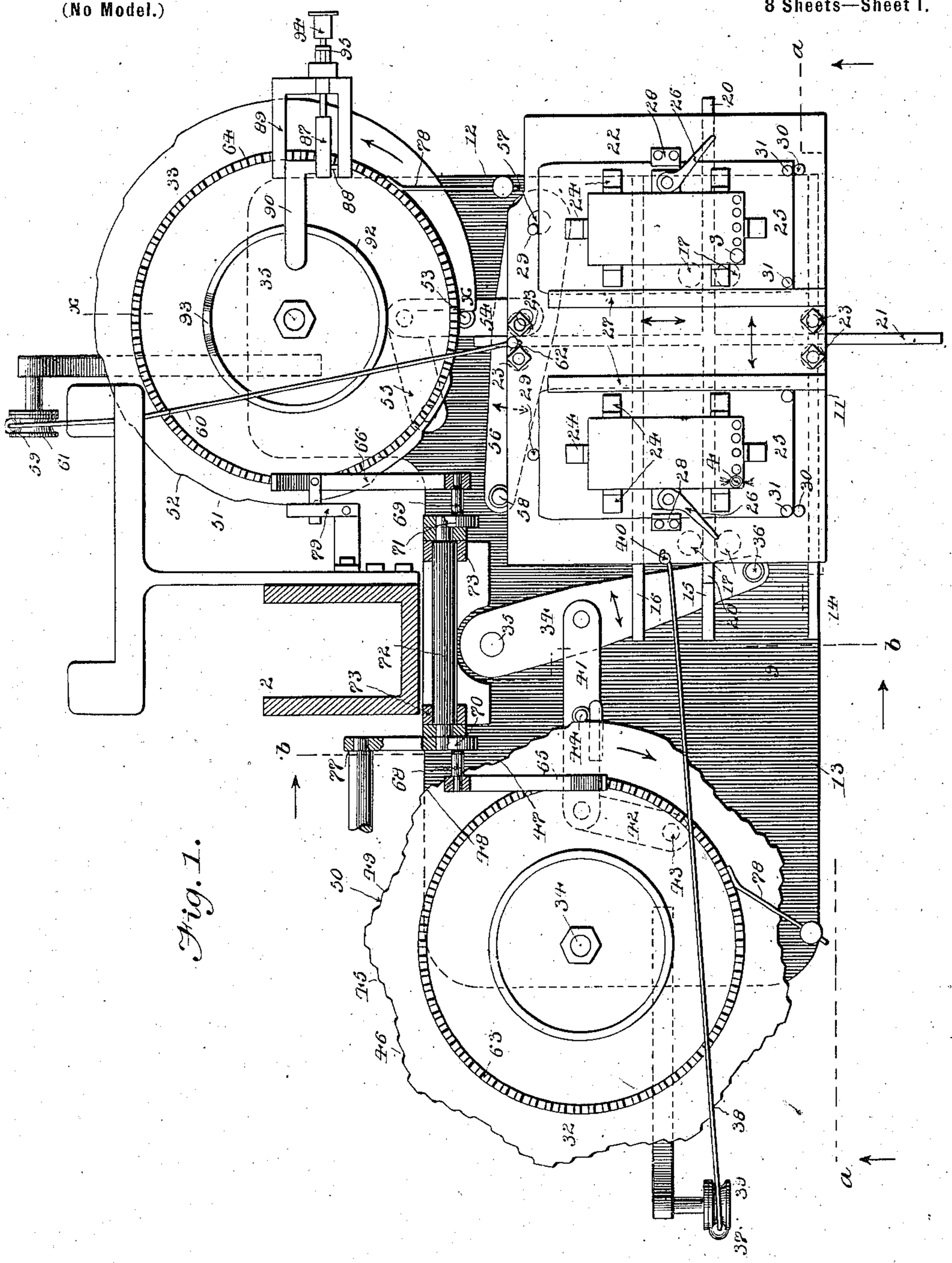

Fig. 1.

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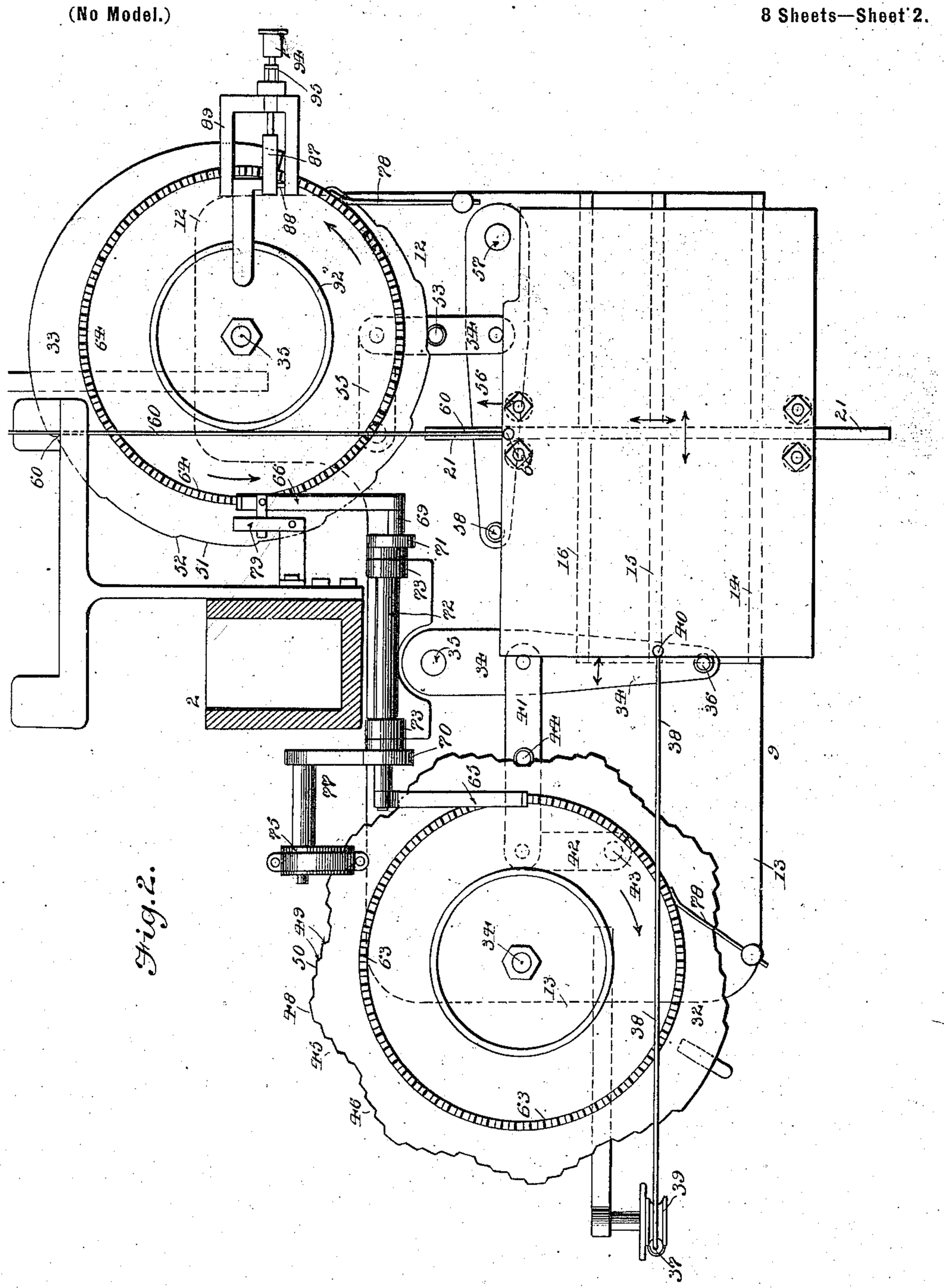

Fig. 2.

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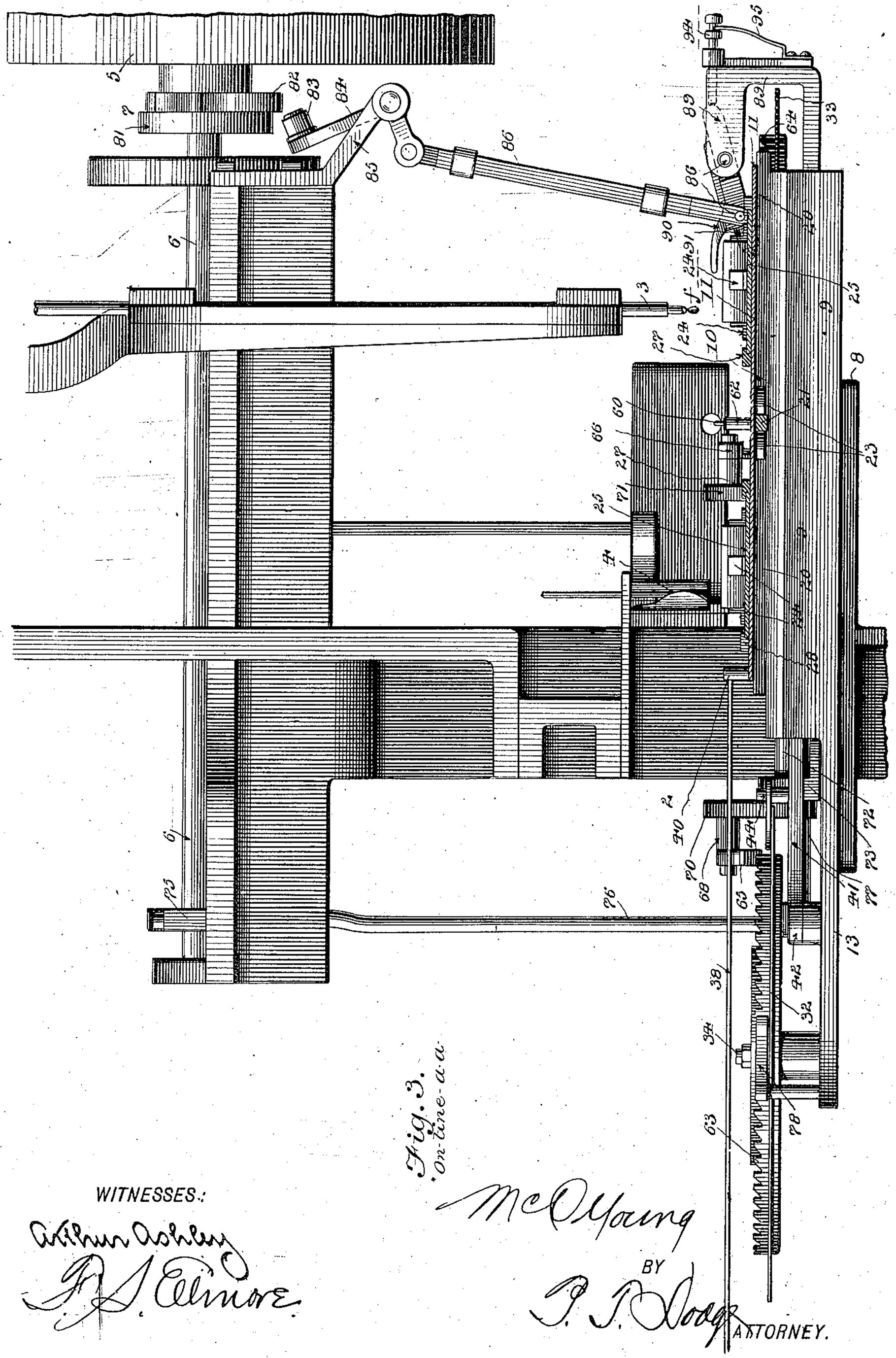

Fig. 3.
On line a-a.

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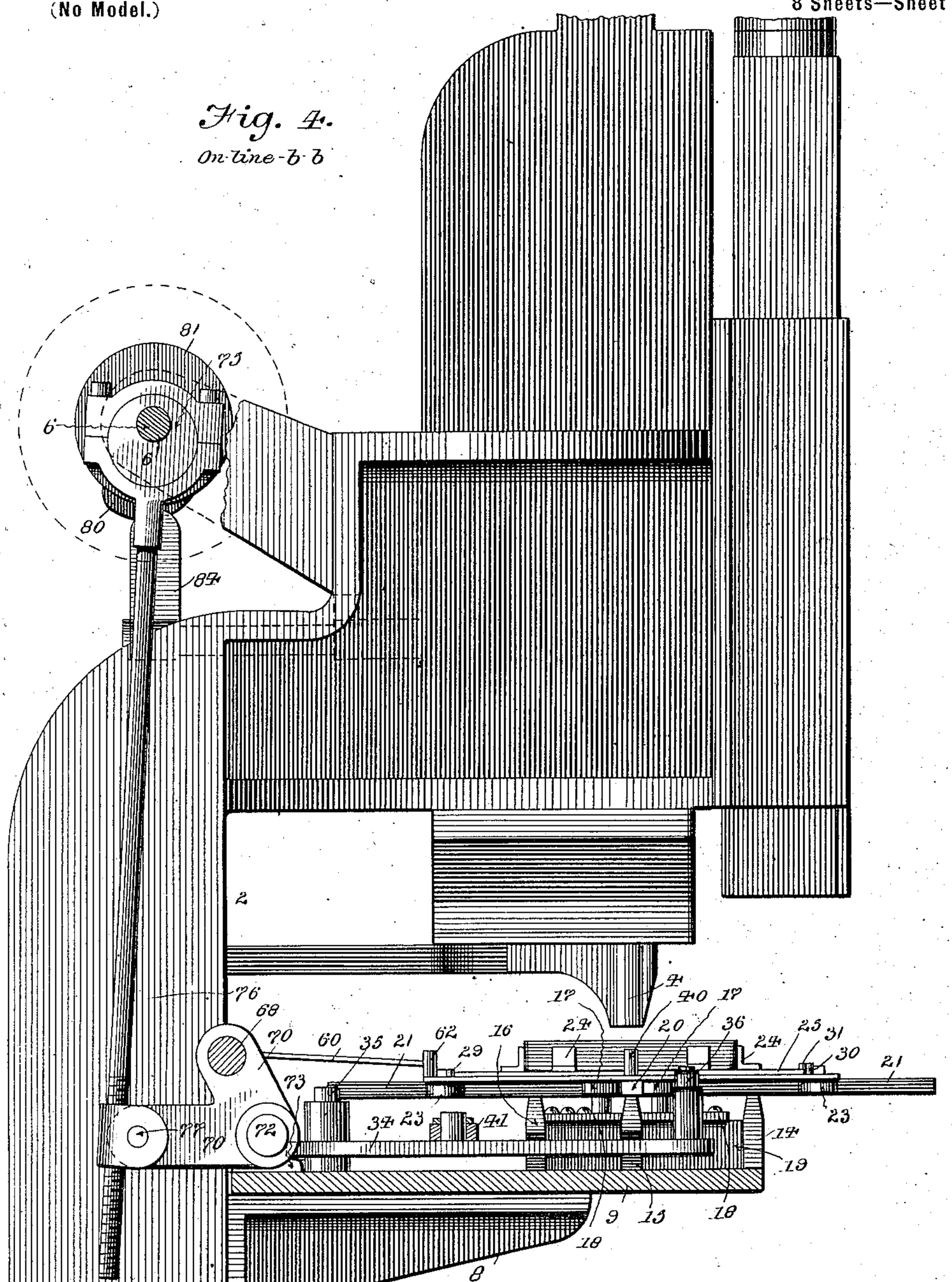
(No Model.) 8 Sheets—Sheet 4.

Fig. 4.

On line b b



Witnesses

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WORK FEEDING MECHANISM.

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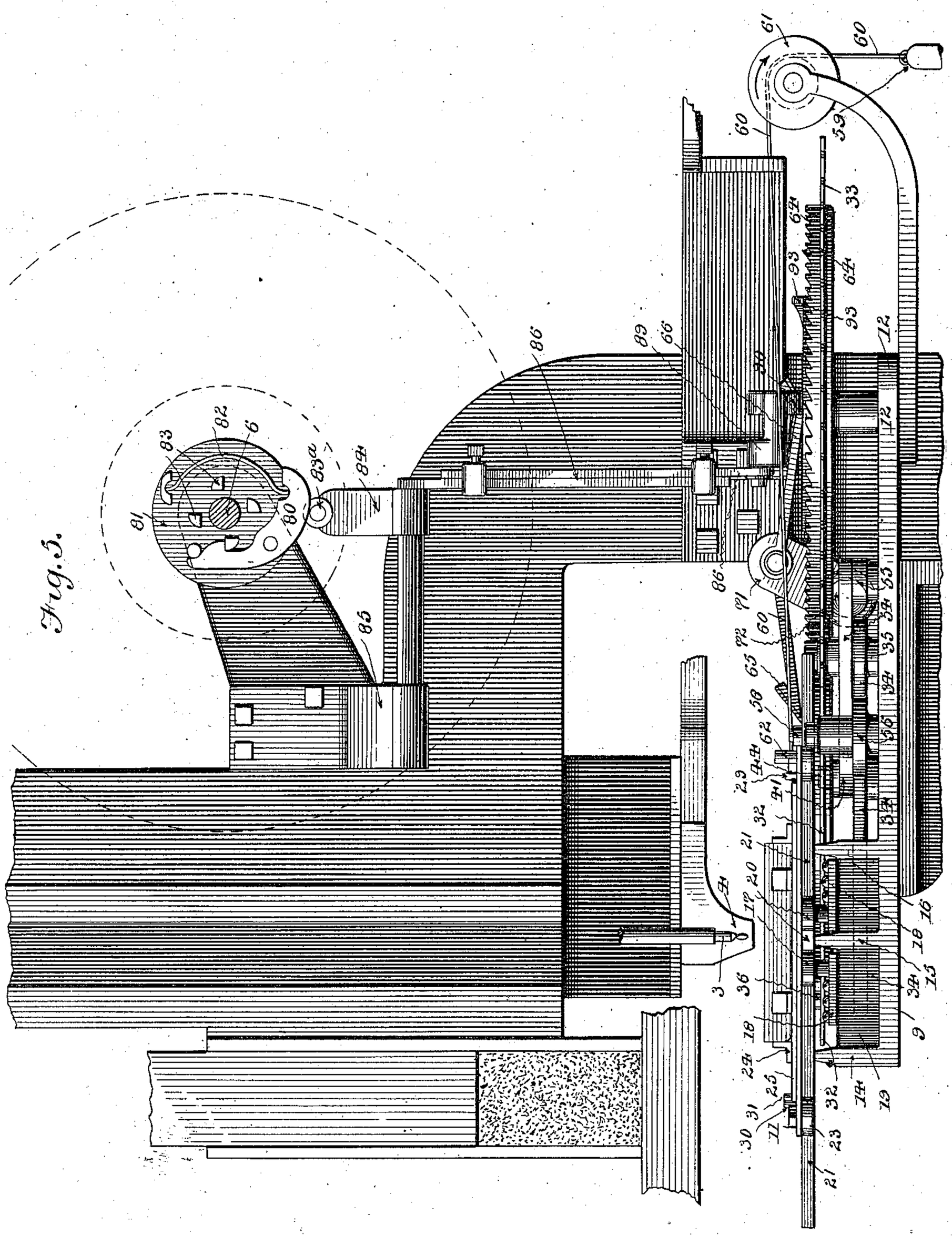
(No Model.) 8 Sheets—Sheet 5.



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(Application filed July 22, 1898.)

(No Model.) 8 Sheets—Sheet 6.

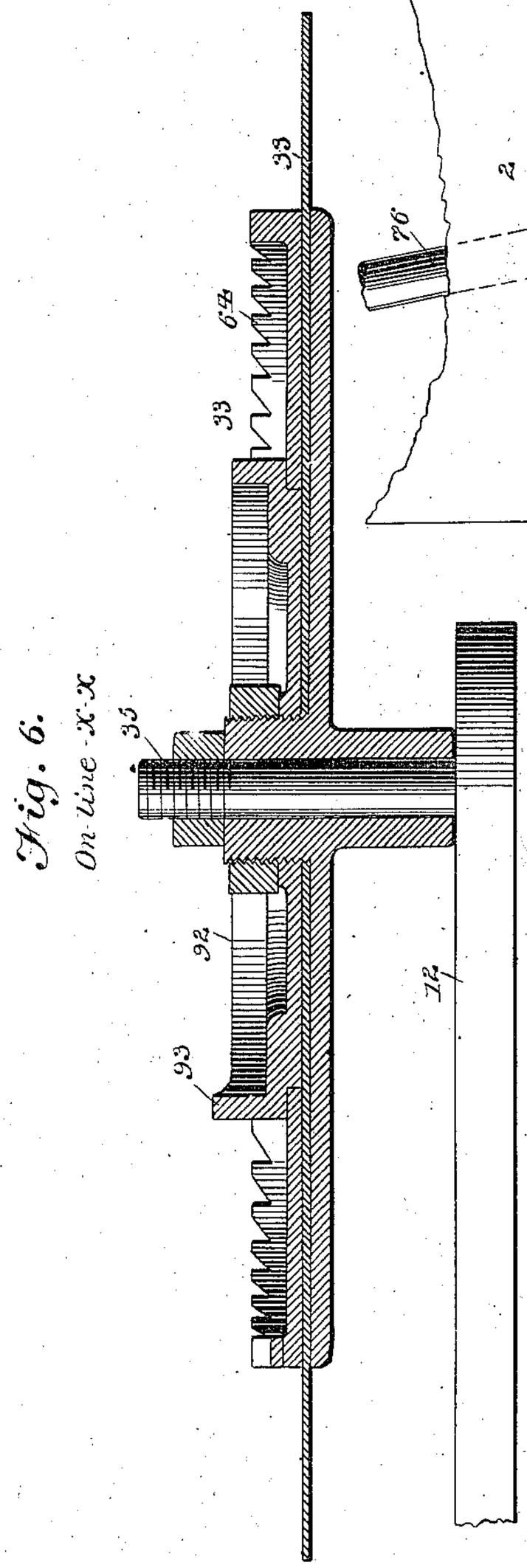

Fig. 6.

On line -x-x

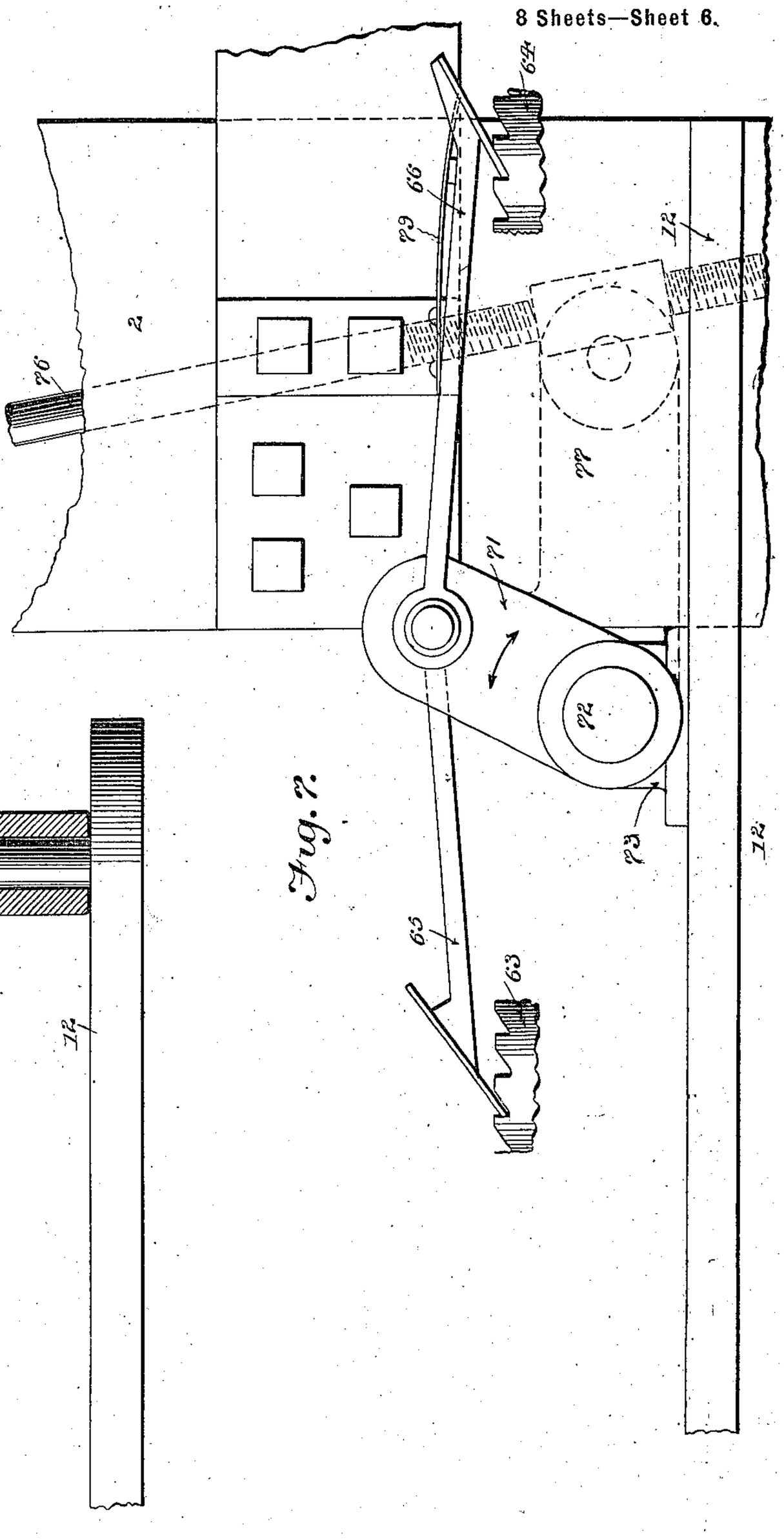

Fig. 7.

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WORK FEEDING MECHANISM.

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(No Model.) 8 Sheets—Sheet 7.

Fig. 8.

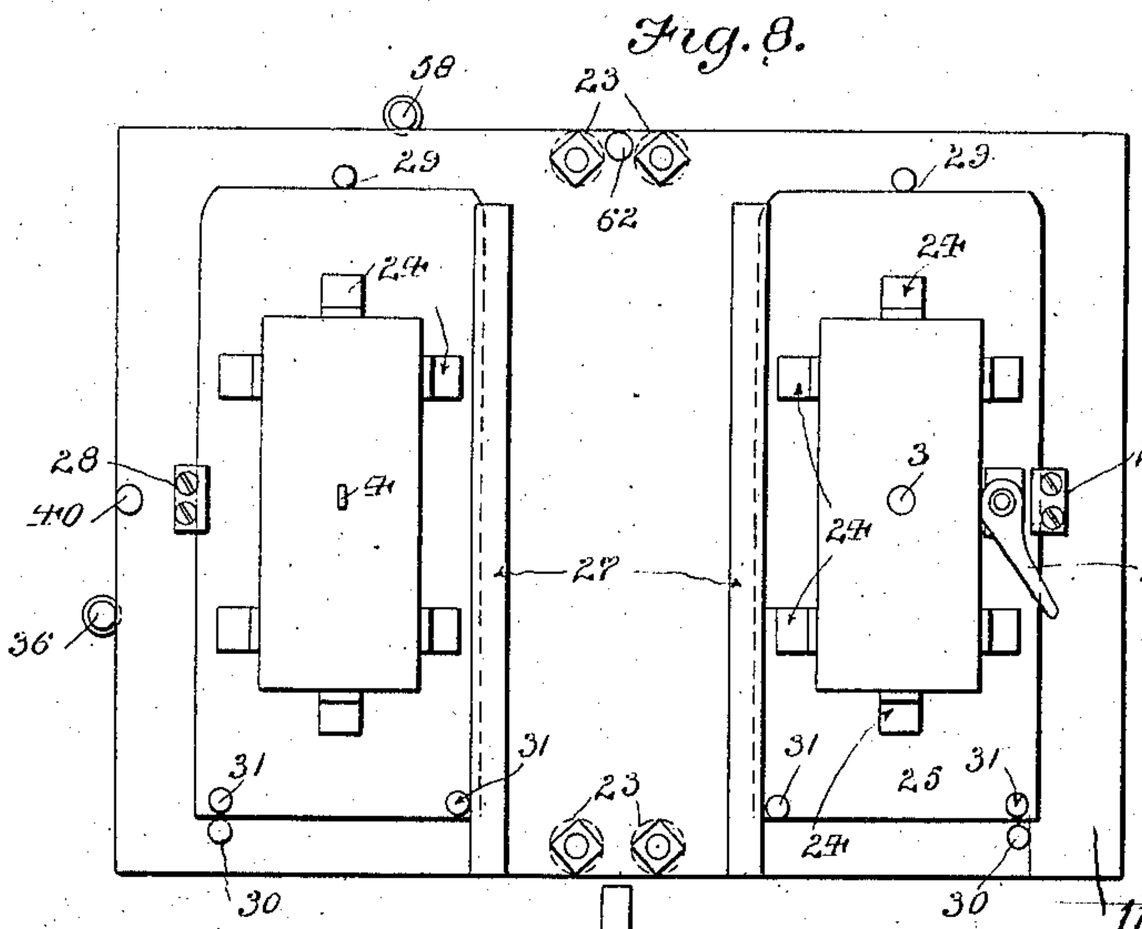


Fig. 9.

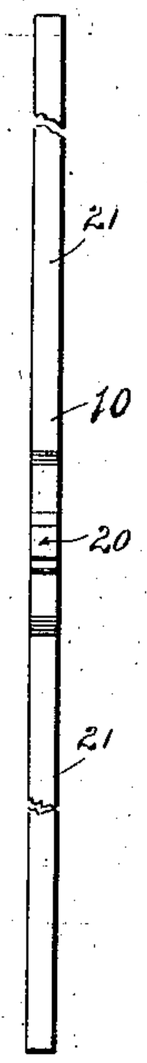


Fig. 9a.

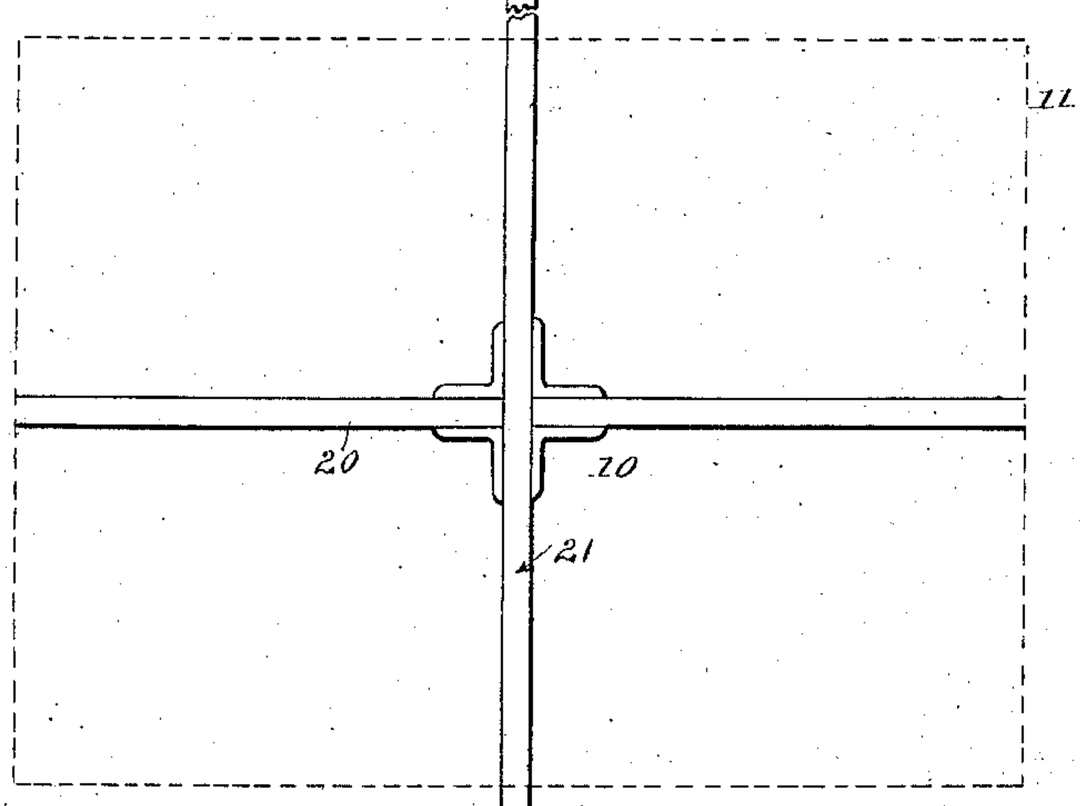


Fig. 10.

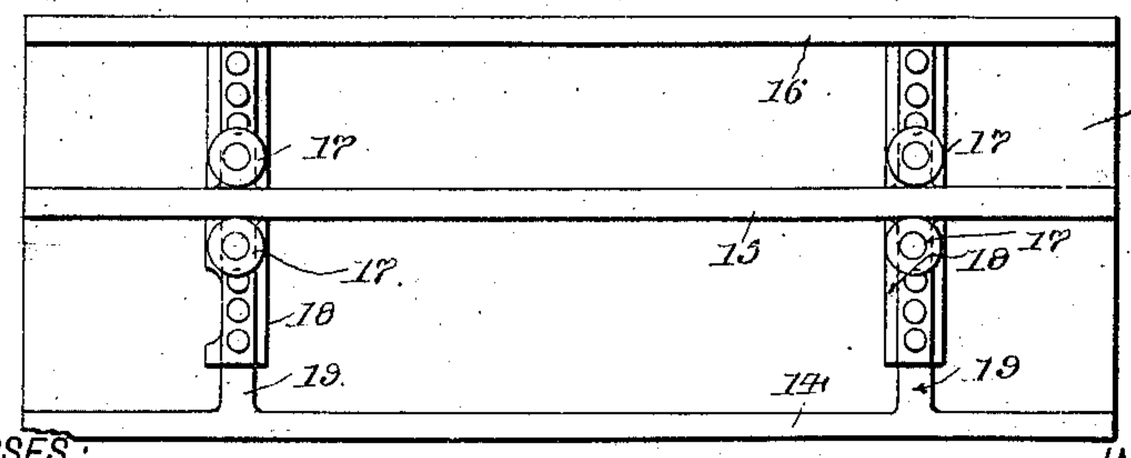
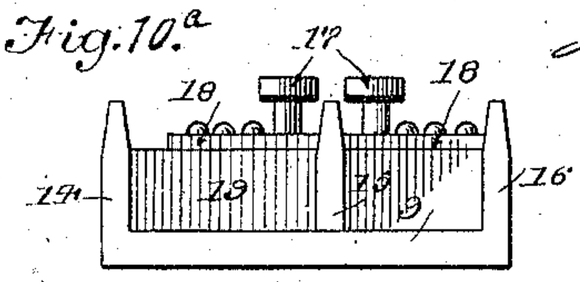


Fig. 10a.



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WORK FEEDING MECHANISM.

(Application filed July 22, 1898.)

(No Model.) 8 Sheets—Sheet 8.

Fig. 11.

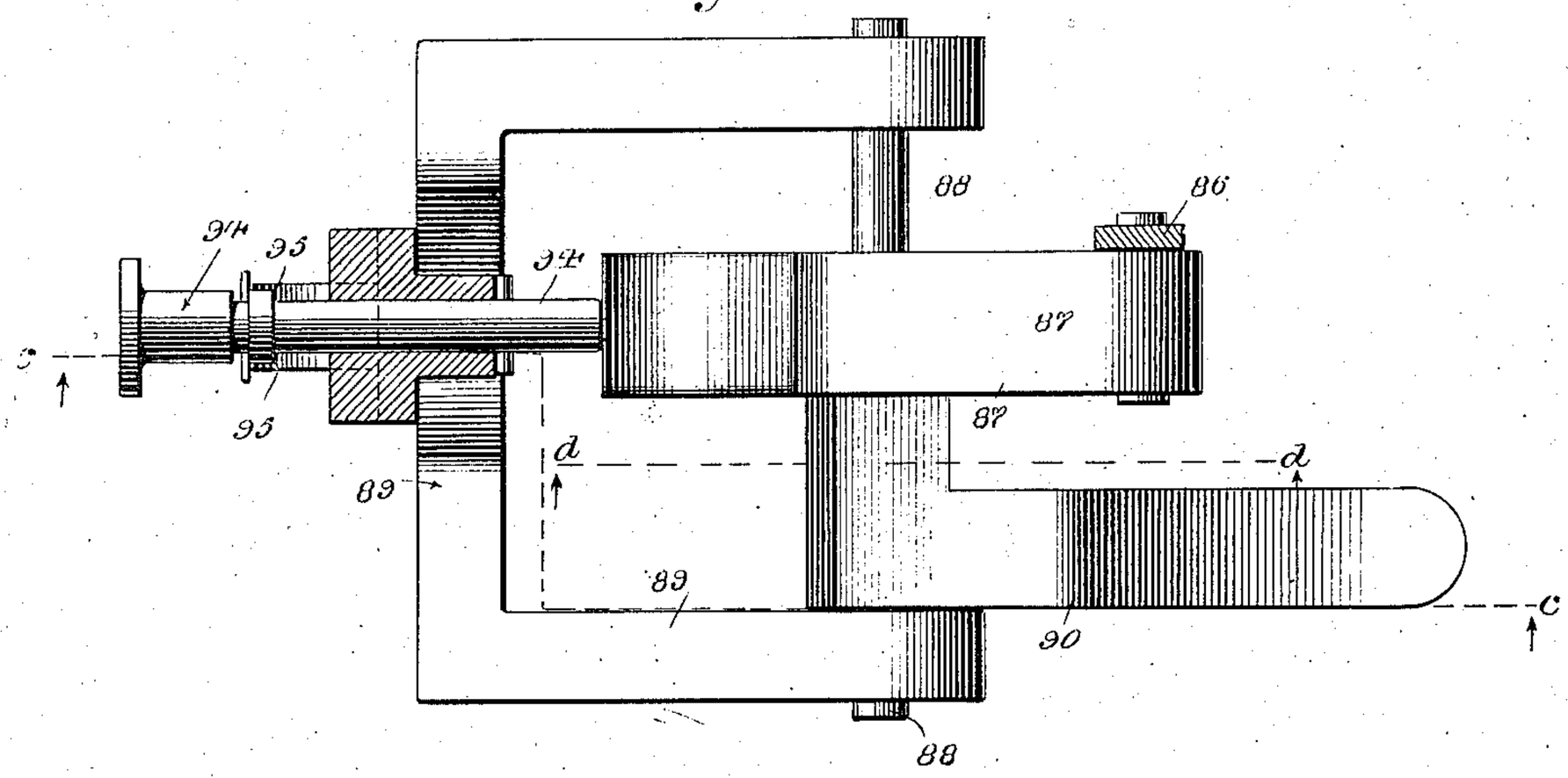


Fig. 12.
On line - c c.

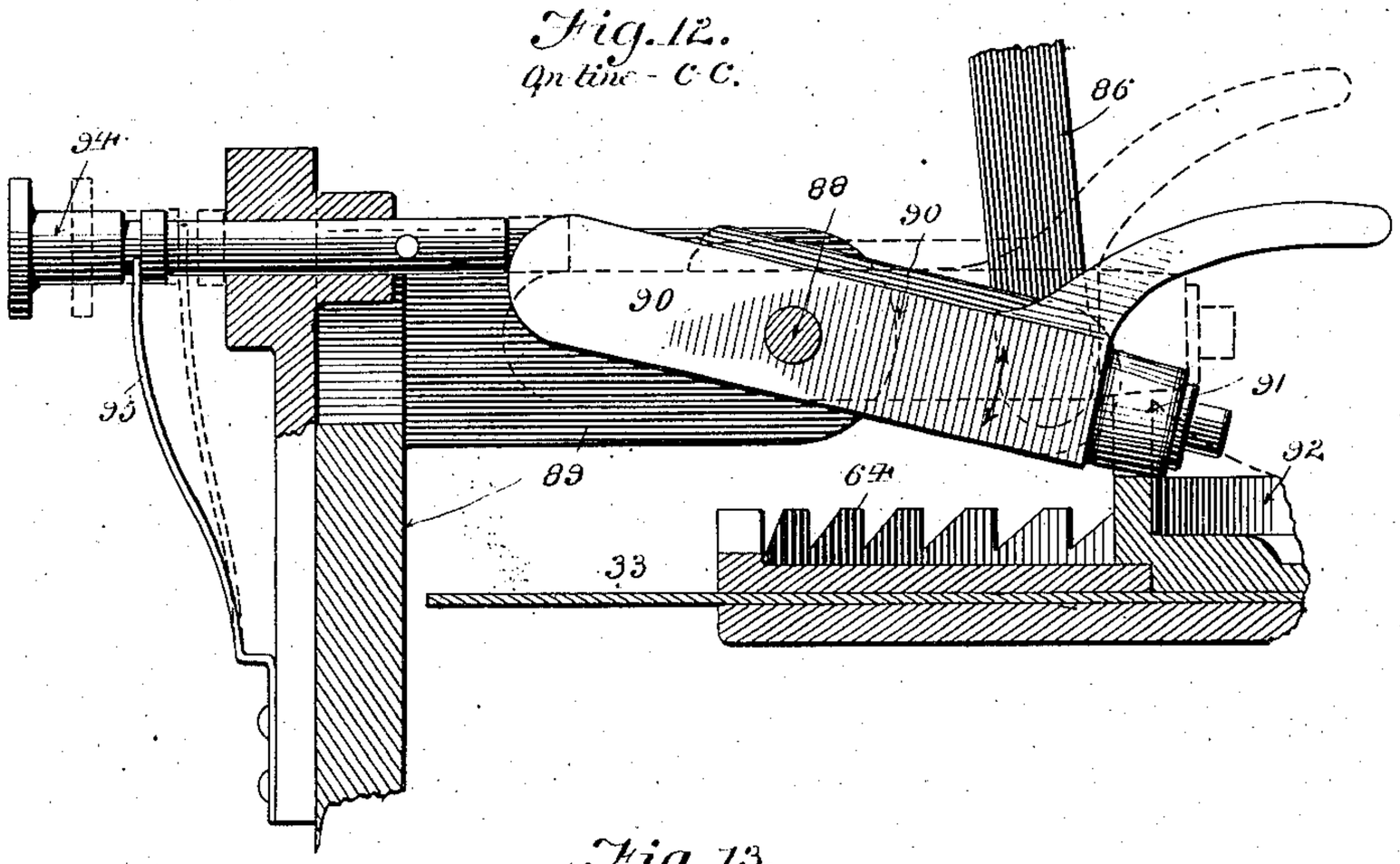
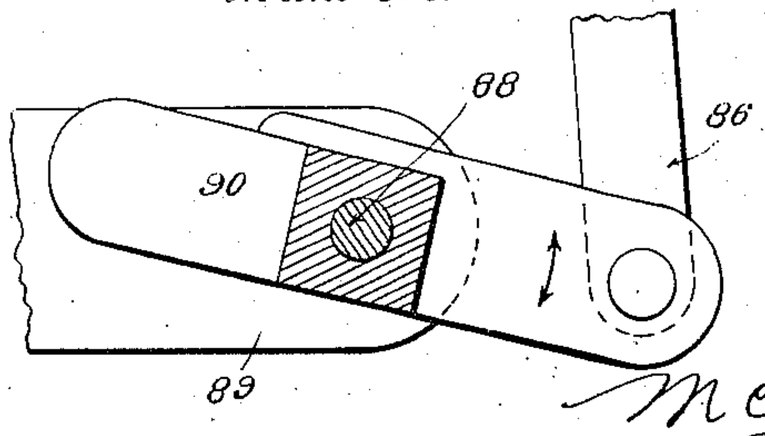


Fig. 13.
On line - d d



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UNITED STATES PATENT OFFICE.

McCLINTOCK YOUNG, OF FREDERICK, MARYLAND, ASSIGNOR TO THE PALMETTO FIBRE COMPANY, OF ILLINOIS.

WORK-FEEDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 617,431, dated January 10, 1899.

Application filed July 22, 1898. Serial No. 686,620. (No model.)

To all whom it may concern:

Be it known that I, McCLINTOCK YOUNG, of Frederick, county of Frederick, and State of Maryland, have invented a new and useful Improvement in Work-Feeding Mechanism, of which the following is a specification.

This invention has reference to a work-feeding device for use more particularly, but not necessarily, in connection with brush-machines in which the brush-block is bored and tufted. In machines of this character, of which United States Letters Patent No. 578,907, granted to me on the 16th day of March, 1897, is an example, the brush-block is supported on a fixed table beneath a boring-tool, by which holes are bored, and it is then moved beneath a tufting-tool, which drives and secures the tufts in the holes.

The present invention has for its object the automatic feeding of the blocks to the borer or tufter; and it consists in combining with these mechanisms, or either of them, a brush-block support and improved means for automatically feeding the support to present the brush-block successively in predetermined positions to receive the holes or tufts at the proper points.

The invention also consists in the details of construction and combination of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a horizontal sectional elevation of my improved mechanism applied to a brush-machine in which the brush-blocks are bored and tufted. Fig. 2 is a similar view with the parts in a different position. Fig. 3 is a vertical sectional elevation on the line *a a* of Fig. 1. Fig. 4 is a similar view on the line *b b* of Fig. 1. Fig. 5 is an end elevation as viewed from the opposite side of the machine. Fig. 6 is a vertical section through one of the cam-wheels, on an enlarged scale, on the line *x x* of Fig. 1. Fig. 7 is an elevation, on an enlarged scale, of the driving-pawls for operating the cam-wheels. Fig. 8 is a top plan view of the brush-block support and the block-holders proper. Fig. 9 is a top plan view of the secondary supporting-frame for the same. Fig. 9^a is an end elevation of the secondary supporting-frame. Fig. 10 is a top plan view of the fixed guiding-frame. Fig. 10^a is an end elevation of the same. Fig. 11 is a horizontal sectional elevation, on an enlarged scale, on the line *f f* of Fig. 3, showing the mechanism for automatically stopping the machine. Fig. 12 is a vertical sectional elevation of the same on the line *c c* of Fig. 11. Fig. 13 is a vertical sectional elevation on the line *d d* of Fig. 11.

In the accompanying drawings I have represented my invention as applied to a brush-machine in which the block is bored and tufted, the automatic mechanism being formed to feed two brush-blocks simultaneously, one a blank block beneath the borer to receive its holes and the other a bored block beneath the tufter to receive the tufts; but it will be understood that the mechanism may be employed as well to feed the blank block in an independent boring-machine or it may be employed to feed a bored block in a machine in which the tufting operation only is accomplished, the essence of the invention residing in the automatically-operating mechanism for feeding the brush-block to receive its holes or tufts in predetermined positions.

Referring more particularly to Figs. 1 to 5, 2 represents the frame of a brush-machine of the character illustrated and described in the patent referred to. 3 represents a boring-tool for forming the holes in the brush-block, and 4 a tufting-tool for seating the tufts in the holes. These parts receive motion from a main driving-shaft (not shown) in the base of the frame, from which motion is imparted to a driving-pulley 5, clutched to a secondary driving-shaft 6 by means of a clutch mechanism 7, more fully described hereinafter.

The foregoing parts form no part of the present invention, being described and illustrated in the patent alluded to, to which reference may be had for a more detailed description.

The automatic work-feeding mechanism constituting the present invention is sustained beneath the boring and tufting tools, as shown more particularly in Figs. 3, 8, 9, and 10, on a bracket 8, fixed to the frame of the machine, and this mechanism comprises a fixed guiding-frame 9, a secondary movable frame 10, supported thereby and movable

longitudinally thereof, and a brush-block-supporting-frame 11, sustained by the secondary frame and movable with respect to the same transversely of the fixed guiding-frame. As a result of this arrangement the brush-block-supporting frame is movable both longitudinally and transversely of the fixed frame, so that the blocks may be fed laterally to effect the spacing of the holes in the rows and longitudinally to effect the spacing of the individual rows, as will be more fully described hereinafter.

The fixed guiding-frame 9 extends rearward, as at 12, and laterally to one side, as at 13, and is provided near its front edge with three parallel supporting-ribs 14, 15, and 16, on which the secondary frame is supported. On opposite sides of the central rib friction-rollers 17 are mounted on plates 18, adjustably secured to the tops of transverse ribs 19, the purpose of which is to guide the secondary frame longitudinally of the fixed frame. The secondary frame consists of two rails 20 and 21, crossing each other at right angles and firmly secured together in fixed relations at the point of intersection. The rail 20 is adapted to rest on the central rib 15 of the guiding-frame, between the friction-rollers, the secondary frame being thus freely movable longitudinally of the fixed frame.

The brush-block-supporting frame consists of a flat rectangular plate 22, adapted to rest on the cross-rails of the secondary frame, and is movable and guided in the direction of the cross-rail 21 by means of two pairs of friction-rollers 23, journaled on the under side of the plate, near its front and rear, and arranged to bear against the opposite sides of the rail 21.

The brush-blocks are adapted to be held on the block-supporting frame side by side, respectively, beneath the boring and tufting tools, as shown in Fig. 1, and each is firmly clamped between lugs 24 on block-holding plates 25 by means of clamping-levers 26, formed with cam-surfaces adapted to bear against the side of the block. The holding-plates are removably seated on the block-supporting frame, which latter is provided with two parallel ribs 27, undercut in their outer edges, and two undercut lugs 28, the edges of the holding-plate being adapted to extend in the undercut portions of the ribs and lugs. Near its rear edge the supporting-frame is provided with two stop-pins 29, against which the rear edges of the holding-plates are adapted to abut, and two locking-pins 30 are provided near the front edge of the supporting-frame to bear against the front edge of the holding-plates to retain them firmly in position. These locking-pins extend but a short distance above the surface of the supporting-frame, and the holding-plates are sprung in place over the locking-pins, and being pushed rearward against the stop-pins they rest flatly on the supporting-frame between the pins and ribs. The holding-plates may be removed by grasping pins 31, fixed near the forward edge of the same, and lifting the plates free of the locking-pins, when they may be drawn forward from between the ribs. The foregoing construction constitutes a simple and effective means for holding the brush-blocks removably but securely in fixed relations on the block-supporting frame, the arrangement admitting of the rapid removal of the finished brush from beneath the tufter, its replacement by the bored brush, and the application of a new blank block beneath the borer, these operations being performed when all the holes in the previously-bored block have been filled by the tufter and when all the holes in the blank block have been bored.

The block-supporting frame, with the brush-blocks held thereon, respectively, beneath the boring and tufting tools, as described, is adapted by the mechanism now to be described to be moved intermittently to the left in Fig. 1 to effect the spacing of the holes of the rows and at intervals forward to effect the spacing of the individual rows. These movements of the supporting-frame are controlled by two horizontal rotary cam-wheels 32 and 33, (see Figs. 1 and 2,) mounted on studs rising, respectively, from the upper side of the lateral extension 13 and rear extension 12 of the fixed guiding-frame. The cam-wheel 32 controls the lateral movement of the block-support through the medium of an arm 35, pivoted at its rear end on a vertical axis, as at 35, and having at its front end a friction-roller 36, bearing against the edge of the supporting-frame, which latter is urged constantly to the left by means of a weight 37, attached to a cord 38, passing over a guide-pulley 39 and fixed at its end to the support, as at 40. The pivoted arm 34 has joined to it between its ends one end of a link 41, the opposite end of which is pivoted to a lever 42, which is in turn pivoted to the guiding-frame, as at 43. A pin 44 extends upward from the link 41 between its ends and bears against the edge of the cam-wheel and is held yieldingly in engagement therewith through its connection with the pivoted arm 34, which is subject to the action of the weight. The general contour of the cam-wheel is such that as it is rotated the block-support will be caused to reciprocate laterally, its movements being effected alternately by the weight and cam, the former urging it to the left and the cam moving it in the opposite direction. To effect this reciprocating movement, the edge of the cam-wheel presents a wavy outline extending inward and outward alternately, as at 45 and 46, each inward and outward surface being stepped. Assuming the cam-wheel is moving in the direction of the arrow in Fig. 1, the edge of the wheel extends inward step by step until the innermost surface 47 is reached, when it extends out again step by step until the outermost surface 48 is reached. As each stepped surface is brought opposite the pin 44 the block-support will be moved by the weight intermittently to the

left step by step, coming to a full stop at each movement and presenting the blocks successively in the predetermined positions, respectively, beneath the borer and tufter to bore a row of holes in one block and fill the corresponding row in the other block. The relative size, arrangement, and form of these parts are such that by the time the end of a row is reached the innermost surface 47 will be opposite the pin 44, at which time the cam-wheel 33 acts on the supporting-frame, as more fully described hereinafter, and moves the same outward to space for the next row, and as the cam-wheel 32 continues to rotate the outwardly-extending edge of the cam engages the pin 44 and forces the block-support back step by step against the influence of the weight, thereby presenting the blocks to the proper predetermined positions beneath the borer and tufter to bore and fill the second row. It will be seen that the stepped surfaces of the inward and outward cams are formed by inclined surfaces 49 to effect the movement of the block-support between the holes and curved surfaces 50 to provide for the temporary pause of the blocks while the borer and tufter are operating.

The cam-wheel 33, by which the block-support is moved forward to space between the rows, has its edge formed with a series of long curved surfaces 51, joining each other by inclined outwardly-extending surfaces 52, as shown in Fig. 1. The edge of this wheel engages a pin 53, projecting upward from a link 54, connected at its rear end to a lever 55, pivoted to the guiding-frame. At its front end the link is pivoted between the ends of an arm 56, pivoted to the frame, as at 57, and at its opposite end the arm is provided with a friction-roller 58, bearing against the rear edge of the block-support. The support is urged constantly against the pin by means of a weight 59, attached to a cord 60, passing over the pulley 61 and secured to the support 62. Assuming that the cam-wheel rotates in the direction of the arrow in Fig. 1, the support will remain at rest until the inclined surface engages the pin, when the arm 56 will be moved outward, thereby forcing the support outward a distance representing the space between the rows of holes in the brush-block. This movement of the support takes place, as before stated, at the end of each reciprocating movement or action of the cam-wheel 32, the result being that by the combined actions of the two cam-wheels the brush-blocks are moved beneath the borer and tufter in one direction laterally of the block step by step to form one row, then longitudinally of the block to space for the next row, then step by step in the opposite direction laterally of the block to bore and fill another row, and so on.

The cam-wheels are so formed that there will be bored and tufted in each block twelve rows of four holes each. Of course the relative number of holes and rows may be varied to suit the fancy by varying the form and arrangement of the cams.

In order that the cam-wheels may be rotated to effect the movements of the support described, I provide each wheel on its upper side with a circular series of ratchet-teeth 63 and 64, as shown more particularly in Figs. 1, 3, 5, and 6, which teeth are adapted to be engaged, respectively, by vibrating pawls 65 and 66. (See Figs. 1 and 7.) These pawls extend in opposite directions from studs 68 and 69, projecting laterally from the upper ends of arms 70 and 71, which are fixed to the ends of a rock-shaft 72, mounted in bearings 73 on the fixed guiding-frame, between two wheels. The shaft is rocked by means of an eccentric 75, Figs. 3 and 4, on the secondary drive-shaft 6, connected by a pitman 76 to the end of an arm 77, projecting from the arm 70. When the shaft is rocked, the pawl will be moved back and forth and, engaging the ratchet-teeth, will rotate the cam-wheels step by step. It will be understood, of course, that other means for rotating the cam-wheels may be employed; but I prefer that shown, as being simple and effective. In order to prevent the back or forward slip of the wheels, I provide spring-fingers 78, fixed to the guide-frame and having their free ends arranged to bear, respectively, against the vertical sides of the series of ratchet-teeth. As shown in Fig. 7, the pawl which drives the cam-wheel 32 is acted on by a spring 79, fixed to the frame and bearing on the end of the pawl. This spring serves to hold the pawl in engagement with the teeth, insuring its proper and uniform action. In order that when all the holes in the blocks have been formed and tufted the finished block may be removed, the bored block set beneath the tufter, and a new blank set beneath the borer, I provide for automatically operating the clutch 7 to disengage the driving-pulley and thereby stop the machine. This clutch comprises a dog 80, pivoted on a disk 81, fixed to the drive-shaft and adapted to be moved by a spring 82 to engage a series of pins 83 on the hub of the driving-pulley, which is mounted loosely on the shaft. The clutch is disengaged by moving a roller 83 in the path of the dog and thereby disengaging the same from the pins on the driving-pulley. The roller is mounted on an elbow-lever 84, pivoted on an arm 85, fixed to the frame, and it is connected by a pitman 86 to the inner end of an operating-lever 87, Figs. 11, 12, and 13, mounted between its ends on a pivot-pin 88, sustained by a frame 89, adjacent to the cam-wheel 32, the arrangement being such that the elevation of the pitman by the upward movement of the inner end of the lever will move the roller 83 in the path of the dog and disengage the clutch. In order that the lever may be moved at the proper time and automatically to thus disengage the clutch, I provide the lever with an arm 90, having on its end a friction-roller 91, arranged to bear on

the upper surface of a circular cam extending upward from the rotary cam-wheel. The cam-surface is of uniform height, except at 93, where it suddenly curves upward, (see Fig. 6,) and is so formed with relation to the friction-roller and operating-lever that while the cam-wheel is being revolved to space the rows of holes in the brush-block the operating-lever will occupy the position shown in Figs. 3, 11, and 12, with the clutch engaged. When the upwardly-curved part 93 of the cam passes beneath the roller, it elevates the pitman and moves the roller 83 in the path of the dog and disengages the clutch, thereby instantly stopping the machine. The raised cam-surface 93 is situated with relation to the operating-lever to engage the same after the last row of holes has been bored and tufted, and at this moment the machine is automatically stopped to permit the brush-blocks to be changed.

In order that the lever may be maintained in a raised position and the clutch disengaged until the attendant is ready to begin operations anew, I provide an automatic locking-pin 94, mounted to slide horizontally in the frame 89, with its inner end in position to engage over the outer end of the operating-lever, as shown by dotted lines in Fig. 12. This pin is acted on by a spring 95, which tends to hold it inward, and when the roller is traveling on the lower part of the cam-surface the outer end of the operating-lever is elevated and the locking-pin bears against the same. When, however, the raised cam lifts the operating-lever, its outer end is lowered and the pin springs in over the same and holds it, with the clutch, disengaged until the attendant starts the machine by withdrawing the pin and allowing the lever to drop and the pulley to engage the cam.

The operation of the machine is as follows: The block-holding plates being supplied one with a bored block and the other with a blank, they are seated on the block-support, the bored block beneath the tufter and the blank beneath the borer. The supporting-frame occupies the position shown in Fig. 1, in which position the blocks will occupy the same relative position to the borer and tufter, the two tools being over the corner of the blocks to begin the first row. The cam-wheel 32 is in such position that one of its outermost cam-surfaces engages the pin 44, while the cam-wheel 33 occupies a position with its innermost cam-surface engaging the pin 53. To start the machine, the spring locking-pin 94 is withdrawn, the roller 91 dropping on the cam 92 and withdrawing the roller 83 and allowing the dog 80 to engage the revolving pulley. The eccentric being revolved, the driving-pawls 65 and 66 will be vibrated, thereby rotating the two cam-wheels step by step. The cam-wheel 32 permits the weight to pull the block-support to the left as the stepped surfaces successively engage the pin 44, and at each pause of the support the boring and tufting tools perform their functions, the first boring the hole in the blank block and the second filling the corresponding hole in the bored block. The movement of the blocks thus step by step to the left continues until the innermost surface 47 of the cam moves opposite the pin, the long cam-surface of the wheel 33 having in the meantime traveled past the pin 53 without moving it. By the time the cam-surface 47 of wheel 32 arrives opposite the pin the inclined surface 52 on wheel 33 arrives at its pin and, engaging the same, forces the block-support outward a distance corresponding to the distance between the rows of holes. The cam-wheel 32 now comes into action again, and as the outwardly-extending cam-surfaces 46 move against the pin 44 the block-support is pushed laterally in the opposite direction to that first traveled and a second row of holes is bored and tufted. When this row is finished, a second inclined surface on wheel 33 engages its pin and pushes its support outward again to space for the third row, and these operations are continued until all the rows in the blank block have been bored and all the bored holes in the other block filled. At this stage of the operation the raised cam 93 on wheel 33 will have made nearly a complete revolution, with the outermost of the stepped surfaces against the pin 53. The raised cam now moves beneath the roller on the operating-lever, and, as heretofore described, the clutch is disengaged and the machine is stopped, the locking-pin at the same time engaging over the outer end of the lever and holding it out of action. When the blocks have been changed, to begin the operation anew the locking-pin is withdrawn, the clutch thrown into action, and the machine started.

In brush-machines such as illustrated and described in my patent referred to the boring-tool is mounted to reciprocate vertically to bore one hole and retreated for the next operation, and the tufting-tool acts in the same manner and simultaneously with the borer. In adapting the present automatic feed mechanism to machines of this character the size, relative arrangement, and form of the operating-cams and other connected parts are such that when the blocks come to a rest after each lateral and longitudinal movement the borer and tufter will descend to perform their respective functions.

Having thus described my invention, what I claim is—

1. In a brush-block-feeding mechanism, the combination with a block-supporting frame movable both longitudinally and transversely, of means for securing the brush-block thereon, mechanism acting on said frame in one direction to move it longitudinally, and mechanism acting also on said frame in another direction to move it transversely.

2. In a brush-block-feeding mechanism, the combination with a block-supporting frame

movable both longitudinally and transversely, of means for holding the brush-block thereon, a rotary cam-wheel, intermediate devices operated by the cam-wheel and acting on the frame to move it in one direction, a second rotary cam-wheel, and intermediate devices operated thereby and acting on the frame to move it in another direction.

3. In a brush-block-feeding mechanism, the combination with a block-supporting frame and means for securing the brush-block thereon, said frame being movable back and forth, of a rotary cam-wheel having its edge extending alternately inward and outward and formed with stepped surfaces comprising surfaces 49 and 50, and intermediate devices acted on by the edge of the cam-wheel and engaging the block-supporting frame; whereby the frame will be moved alternately back and forth, step by step, and pausing at each step to permit the tool to act.

4. In a brush-block-feeding mechanism, the combination with a block-support movable transversely and longitudinally, of a rotary cam, intermediate devices operated thereby for moving the support in one direction, a second rotary cam, intermediate devices operated thereby for moving the support in another direction, a series of driving-teeth on said cam-wheels, a rock-shaft and pawls carried by said shaft and engaging the driving-teeth.

5. In a brush-block-feeding mechanism, the combination with the block-supporting frame and means for holding the block thereon, said frame movable on guides, of a rotary cam-wheel, a pivoted lever 34 engaging the edge of the frame, a link 41 pivoted to the lever and engaged by the cam-wheel, and means acting on the support to yieldingly hold the link 41 in engagement with the cam-wheel.

6. In a brush-block-feeding mechanism, the combination with the fixed frame provided with guides, of the secondary frame comprising a rail 20 movable in said guides and a rail 21 at right angles, and a block-supporting frame formed with guides in which rail 21 extends; whereby the block-supporting frame is movable both laterally and longitudinally of the fixed frame.

7. A brush-block-feeding mechanism comprising a block-support movable longitudinally and transversely, means acting on the support to constantly urge the same longitudinally, means acting on the support to constantly urge the same transversely, and mechanisms acting on the support to automatically move the same at intervals in opposition to the constantly-acting means.

8. A brush-block-feeding mechanism comprising a block-support movable longitudinally and transversely, a weight acting on the support and urging it in one direction transversely, a rotary cam-wheel and intermediate devices formed to control the movement of the support under the action of the weight and acting on the support to move the same longitudinally, and a cam-wheel and intermediate devices to control the movement of the support longitudinally under the action of the weight and acting on the support to move it in opposition to the weight.

9. In a brush-block-feeding mechanism the combination with a fixed guiding-frame, of a secondary frame sustained thereby and movable longitudinally thereof, and a block-support sustained by the secondary frame and movable with relation thereto transversely of the fixed frame.

10. The combination with a block-support provided with undercut ribs and retaining-pins, of a block-holder adapted to be inserted between the ribs and sprung in place between the pins.

11. In a brush-machine the combination with a driving-shaft a driving-pulley and clutch, of an operating-lever and intermediate connections, a block-feeding mechanism, a rotary cam-wheel controlling the movement of the same, and adapted to engage the clutch-operating lever and operate the clutch.

12. In a machine for boring and tufting brush-blocks, the combination with a borer and tufter and means for operating the same, of a work-support movable thereunder longitudinally and transversely, means for holding the brush-blocks on the support respectively beneath the borer and tufter, means for automatically moving the support transversely to present the brush-blocks at different predetermined positions beneath the borer and tufter to bore and fill a row of holes, and means for automatically moving the support longitudinally to effect the spacing of the rows.

In testimony whereof I hereunto set my hand, this 6th day of June, 1898, in the presence of two attesting witnesses.

McCLINTOCK YOUNG.

Witnesses:
EDWIN C. MARKELL,
MARSHALL FONT.