3 Sheets--Sheet 1.

J. N. HALL.

Circular Saw-Mills.

No. 150,567. Patented May 5, 1874.

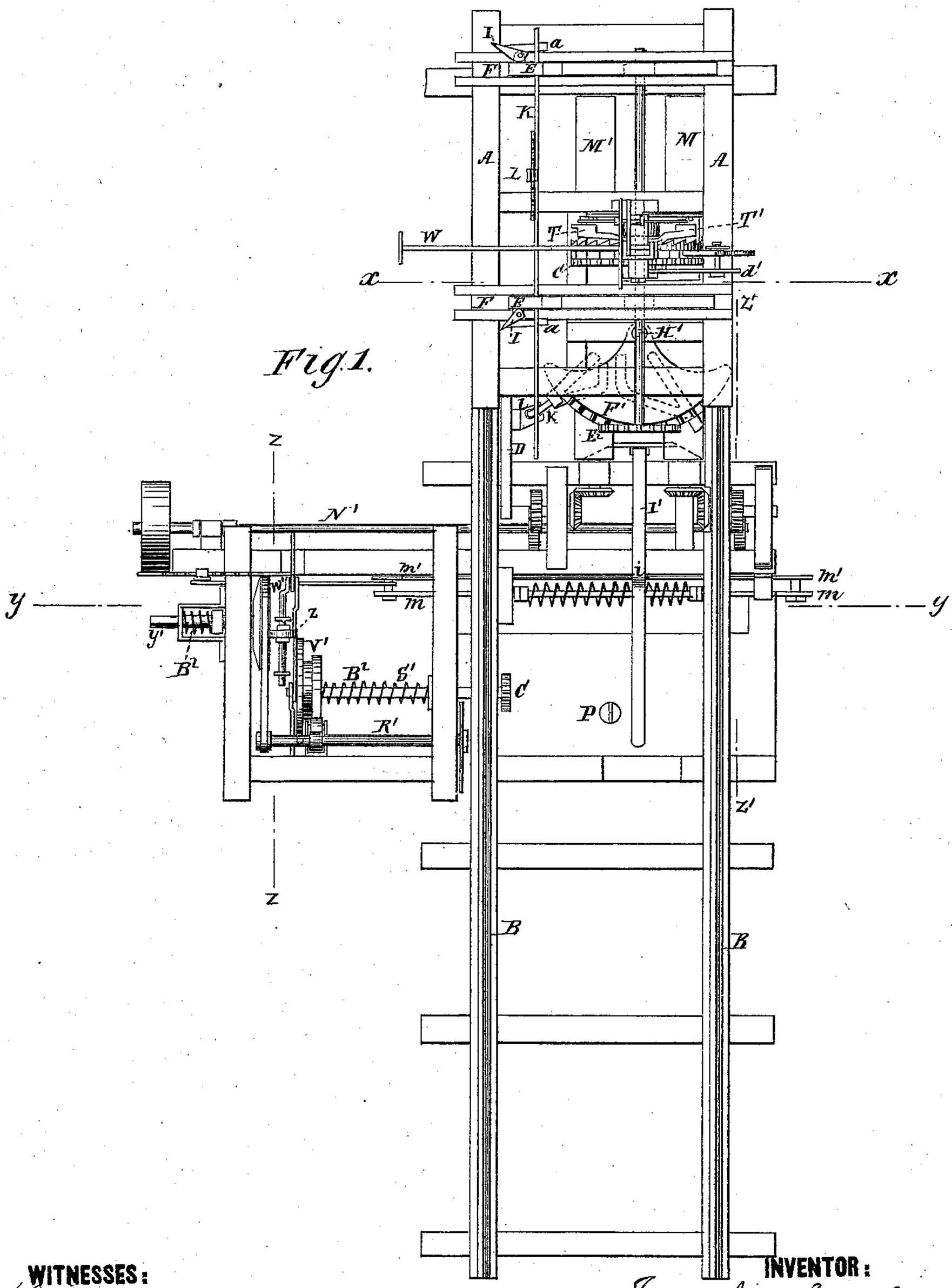

Fig. 1.

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Fig. 2.

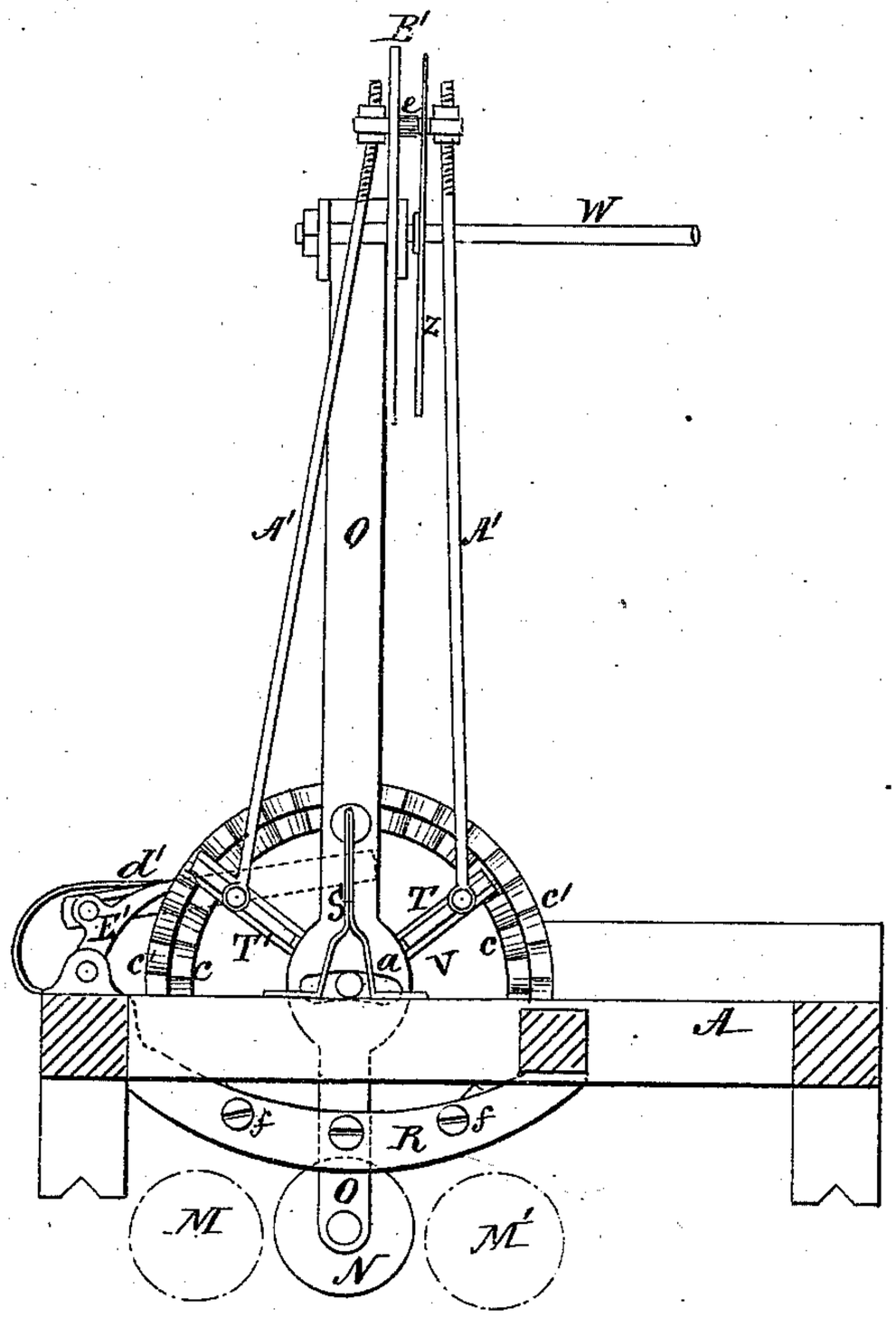

Fig. 3.

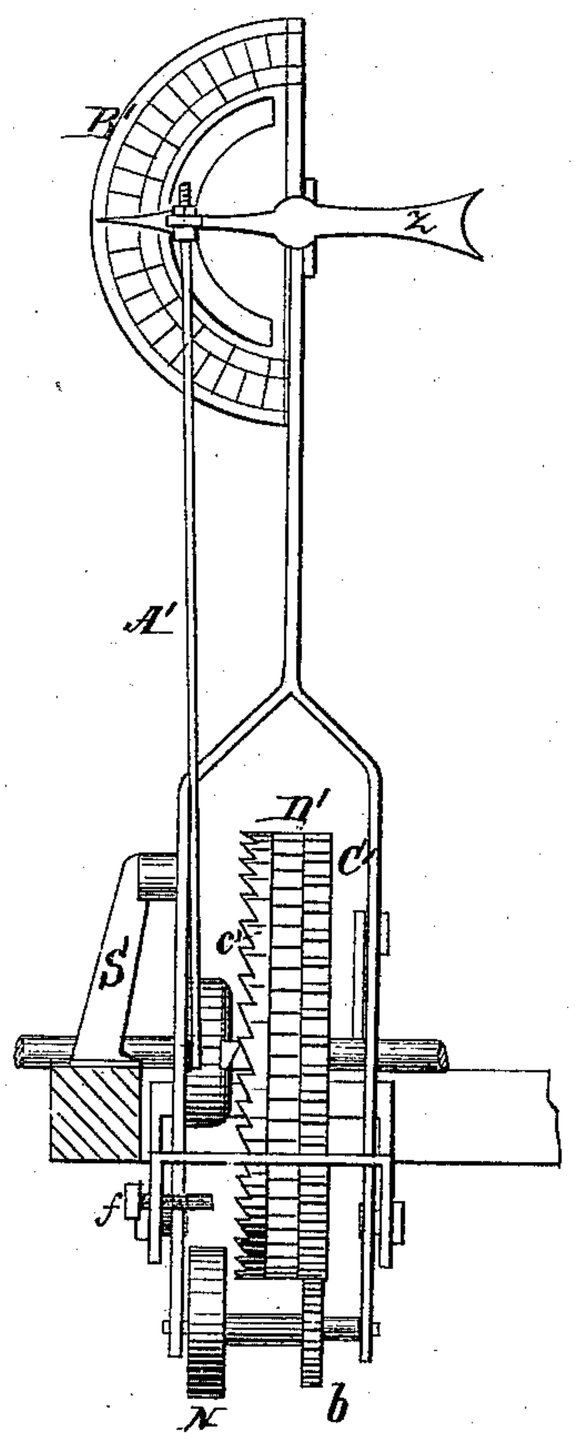

Fig. 4.

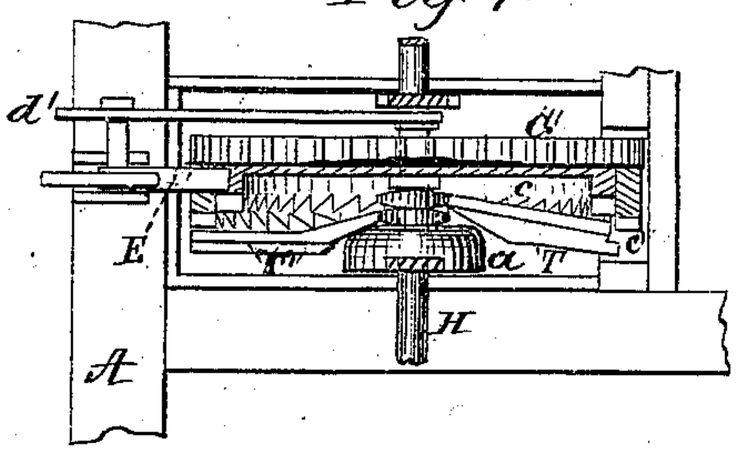

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Fig. 5.

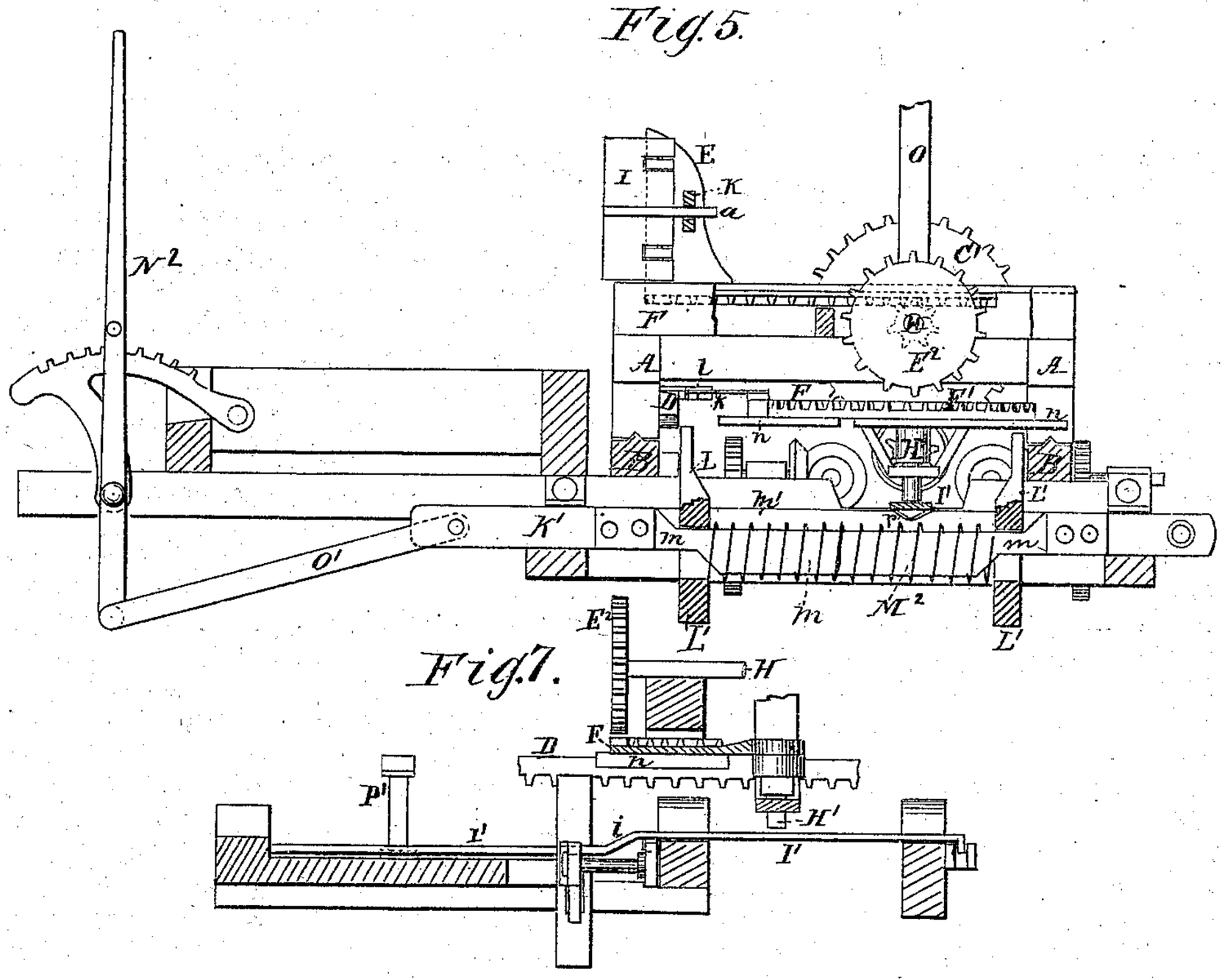


Fig. 7.

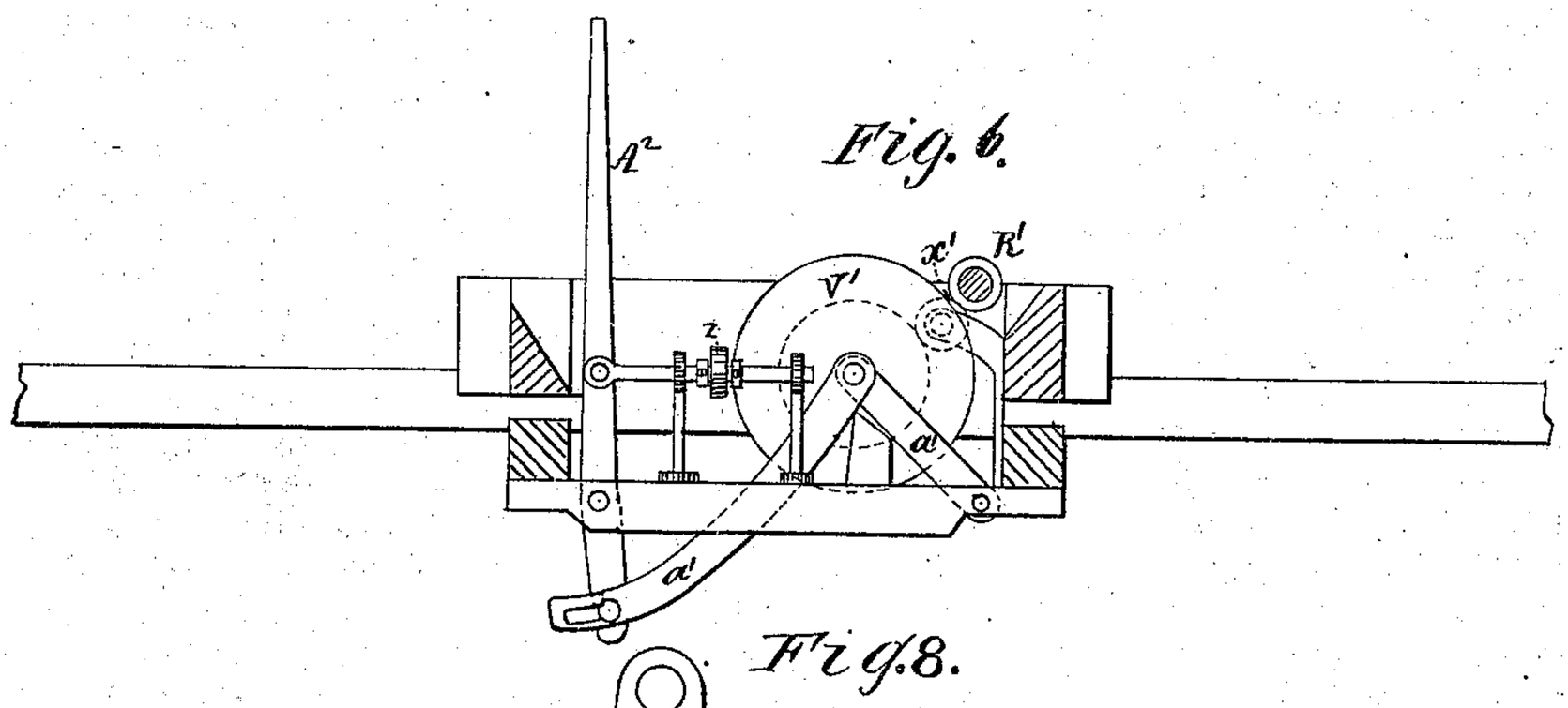
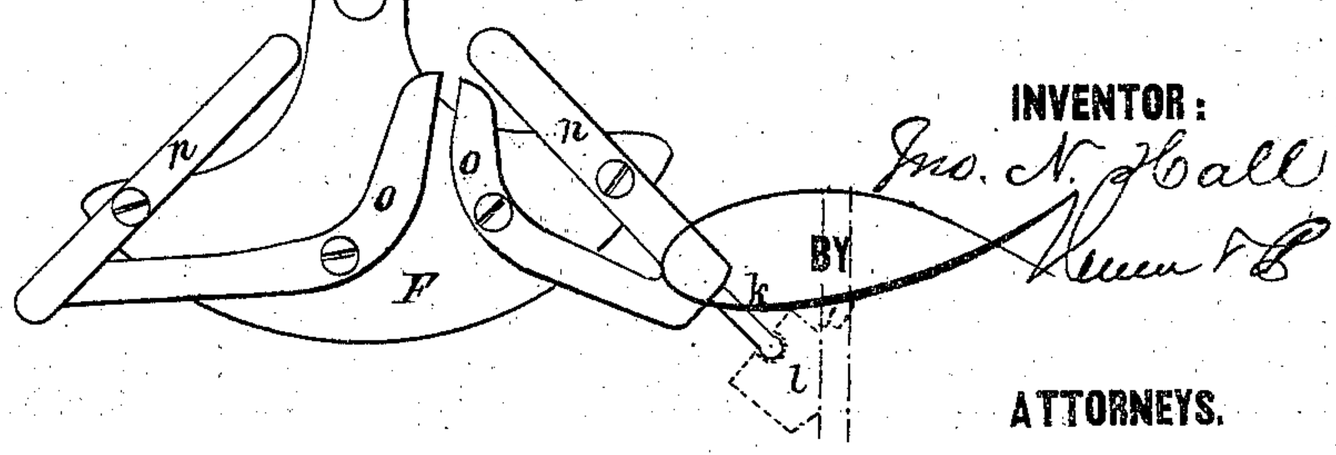


Fig. 6.

Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN N. HALL, OF CENTRAL CITY, COLORADO TERRITORY.

IMPROVEMENT IN CIRCULAR-SAW MILLS.

Specification forming part of Letters Patent No. **150,567**, dated May 5, 1874; application filed April 4, 1874.

To all whom it may concern:

Be it known that I, JOHN N. HALL, of Central City, in the county of Gilpin, Colorado Territory, have invented a new and useful Improvement in Circular-Saw Mills; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming a part of this specification, in which—

Figure 1 is a top plan view of the whole apparatus. Fig. 2 is a cross-section of the carriage on the line *x x* of Fig. 1, showing the ratchet and adjusting mechanism; and Fig. 3 a side elevation of the same, the fragment of the carriage proper being in section. Fig. 4 is a section of the ratchet, showing the arrangement of the spring-pawl. Fig. 5 is a cross-section on the line *y y* of Fig. 1, showing part of the automatic log-setting mechanism. Fig. 6 is a section on line *z z*, Fig. 1, showing the friction apparatus for operating the log-carriage. Fig. 7 is a longitudinal section on the line *z' z'* of Fig. 1. Fig. 8 is an under-side view of the segment forming part of the automatic mechanism.

The features of my invention are, first, an improved apparatus for adjusting the ends of the log as it rests upon the head-blocks; second, for adjusting the log for slabbing; third, for automatically moving the log laterally toward the saw after each cut, or from the saw when necessary; fourth, for operating the log-carriage, as hereinafter described.

In the drawing, the log-carriage A is reciprocated on ways B by means of a pinion, C, which meshes with its rack D, and the knees E of the head-blocks F are arranged for reciprocation by means of a rack-and-pinion connection with shaft H, as usual or well known in machines of this class. The means for adjusting the ends of the log on the head-blocks consist of levers or plates I, which are pivoted vertically to the knees, and have projecting-arms *a*, which work in slots of a bar, K. Said bar is adjusted or thrown in either direction lengthwise by a lever, L, which has a well-known form of locking-mechanism, rack, and spring-lever pawl for holding it in any adjustment. At each throw of said bar one of the plates I is turned away from the log, while the other pushes against it; hence the log is moved laterally and simultaneously at each end, and thereby quickly adjusted in the desired position for slabbing, &c. The means for adjusting the knees, and thereby the log preparatory to slabbing, (or at any other time when the automatic setting mechanism cannot be used,) consist in part of two long rollers, M M¹, Figs. 1 and 2, which are arranged between and parallel to the ways B, and constantly rotated in opposite directions by suitable gear connection with the driving-shaft N', (Fig. 1,) which is in this instance arranged at right angles to the ways B and rollers aforesaid. The secondary function of the rollers is to move the knees E in one direction or the other, according as a plain-faced wheel N, Fig. 2, is brought in frictional contact with one or the other of them. This wheel has its bearings in the lower end of the forks of a lever, O, which is pivoted in a frame, R, beneath the carriage, and held vertical by a plate-spring, S, attached to the carriage on the upper side. One fork of the lever O has a boss, *a*, where the shaft H passes through it, and the aperture therein is elongated horizontally to allow the lever to vibrate on its fulcrum. The boss (which is preferably beveled on its inner side or edge) acts on the inclined shoulders of ratchet-pawl T T', which are pivoted on shaft H, and adapted to engage, one with the inner, the other with the outer, row of ratchet teeth *c c'*, on the wheel V. The teeth *c c'* are inclined in opposite directions, and the pawls are correspondingly beveled. The latter are used to limit the movement of the ratchet-wheel V, and thereby determine the adjustment of the knees E. To set the pawls, I employ the long handle W, which projects laterally from the upper end of lever O, and is adapted to rotate to adjust the pointer Z, which is connected with the pawls by rods A', so that they move together. The pointer moves over an arc, B', which is graduated from one inch to six or more, (commencing at the lower side,) and is slotted to permit suitable connection of the rods A' by means of a short bar or wrist, *e*, as shown. The adjustment of the index Z on the graduated arc determines the adjustment of the knees E for slabbing the log, since if it be set

at any number—say, three inches—on the arc the pawls will be raised correspondingly, and then the lever being pulled over toward the right, in Fig. 2, (*i. e.*, toward the knees,) the boss *a* causes the pawl T to engage with the inner ratchet *c*, and simultaneously also the wheel N is brought into contact with roller M. The rotary movement of this wheel is communicated to the shaft H, and the knees E thereby reciprocated through the medium of a pinion, *b*, Fig. 3, which is fast on the same axis as N, and meshes with the large spur-gear C′ that is fast on said shaft. If the lever O be pushed in the opposite direction—*i. e.*, toward the left, as seen in Fig. 2—the other pawl, T′, will engage the ratchet *c′* and the wheel N with the roller M^1, so that the knees will be moved back. A ratchet-faced wheel, D′, Fig. 3, is arranged between the wheels V and C′, and a pivoted pawl, E′, engages it. This pawl and wheel hold the knees E steady against the log during the sawing operation. A slotted bar, *d′*, connects it (the pawl) with lever O, so that the pawl is always thrown out of the ratchet when the lever is tilted toward it—*i. e.*, to the left, Fig. 2. The slot permits the lever O to tilt toward the right. It will be understood that in this operation of adjusting the log for slabbing, the pawl T or T′, which is locked into its ratchet, is carried around with it or with the wheel V as the latter revolves, and continues thus locked as long as the lever O is being pulled or pushed toward it, (the pawl.) The downward movement of the pawls is arrested by pins or stops *f* on the frame when the lever O is released, and resuming the vertical position by the action of spring S the pawl is also released.

I will now proceed to describe the automatic log-setting mechanism. It has no operative connection with the rollers M M^1 or ratchet mechanism above described, but acts on the knees E of the log-carriage (to reciprocate them in one direction or the other, as required) through the medium of a spur-gear, E″, Figs. 1, 5, which is fixed on the end of shaft H, and meshes with a toothed segment, F′, as the log-carriage is moved back after a board has been cut off. This segment is arranged horizontal, but fixed on a vertical axis, H′, Figs. 1 and 5, which has its bearings in a frame at the end of the log-carriage, and is adapted for slight endwise movement. When the log-carriage is jigged back the lower end of the shaft H′ moves over and in contact with the long bar I′, the latter being raised at the inner end by means to be shortly described. The shaft thus rides up a short incline, *i*, Figs. 1, 6, formed on said bar, which lifts the locking-arm *k* out of the notched plate *l*, thus freeing the segment and causing it to mesh with the spur-gear E″. They are held in mesh during the further backward movement, and the knees thus moved to the desired extent. When the log is again fed up to the saw the segment is restored to its normal central position and locked as before. The means for elevating the bar I′ and turning the segment on its axis are a double bar, K′, and dogs L′ L′. The latter are slotted and arranged to slide on one part, *m*, of the double bar K′, being held apart by a spiral spring, M^2. The part *m* has inclined shoulders on the upper and under side at each end, which, when the bar K′ is reciprocated by the hand-lever N^2 and connecting-rod O′, cause the one or the other of the dogs to rise vertically, and move laterally, toward the other dog. The position thus assumed by one of the dogs enables it to turn the segment F′ on its shaft by coming in contact with and acting on one of the projecting bars *n* attached to its under side, Figs. 1, 5, 7. When the log-carriage is fed forward the segment is returned to its normal central position by a fixed standard, P′, Figs. 1, 6, whose thin upper end enters between the curved bars *o*. The other part, *m′*, of the double bar K′ has a central notch, *r*, in which a projection on the under side of bar I′ rests when the hand-lever is in the vertical position—*i. e.*, when the automatic mechanism is not set for operation. The moving of the bar K′ in either direction causes the projection to rise out of the notch, and thus elevate the bar I′, as above described.

It will be understood that the dogs are set when the carriage is ready to be jigged back, and, until the thickness of cut requires change, the adjustment may remain the same, the segment returning each time to its place, and being successively turned to move the knees, and thereby the log, up to the saw.

The saw-shaft R′ is constantly rotated in one direction by a band from the shaft, and the counter-shaft S′, on which the pinion is mounted, is rotated alternately in one direction or the other to feed or jig the log-carriage, it being only necessary to bring the friction-disk V′, which is on the inner end of shaft S′, alternately into or out of contact with the idler *x′*, as usual in machines of this class. A like friction-disk, W′, is mounted on a short shaft, Y′, in the same horizontal plane, and in such proximity to shaft S′ that one disk overlaps the other about one-third of its diameter. A small friction-wheel, *z*, is arranged for adjustment between the two disks, so as to bear against the face of both when in use for forward motion, and to be out of contact with both, or with disk V′, when the log-carriage is at rest. The shaft of the friction-wheel *z* is slid in its bearings by the hand-lever, whose jointed rods *a′ a′* form the bearing for the inner end of shaft S′. Thus said shaft S′ is elevated, and the friction-wheel *z* simultaneously adjusted, by the same movement of the lever. A cross-belt passes from disk W′ to a pulley on saw-shaft R′. They hence rotate reversely. When the wheel is moved to the right, Figs. 1, 8, or in the direction of the arrow, the log-carriage is fed up to the saw, that movement continuing so long as said wheel and the disks are in contact, and increasing as the wheel is carried nearer the axis of

disk. When the lever is thrown to the left the wheel is drawn back out of contact with disk V′, which latter is then brought in frictional contact with the idler *x′* and the carriage jigged back. A spiral spring, B″, is applied to each of the disk-shafts to cause them to press against the friction-wheel *z* with sufficient force to create the desired degree of friction.

It is evident a weight or other device might be used in place of the springs.

What I claim is—

1. The combination, with the knees of the head-blocks, of pivoted log-adjusting plates or levers, and a connecting-bar and lever mechanism for operating them, substantially as shown and described.

2. The combination, with the sliding knees of the head-block and a shaft, H, of a ratchet-wheel, a pawl, a pivoted lever for acting on said pawl, and a mechanism for adjusting it, the friction-gear N, a roller, a pinion, *b*, and spur-gear C′, substantially as shown and described.

3. The lever O, carrying the friction-wheel N, and provided with the elongated transverse slot to receive the shaft H, and adapt it to vibrate on its fulcrum in the frame R, and the spring S, combined as shown and described, for the purpose specified.

4. The combination of the slotted bar *d′*, lever O, pivoted pawl E′, and ratchet-wheel D′ with shaft H and sliding knees E, as shown and described.

5. The combination, with the sliding knees, of the head-blocks and shaft H, of spur-gear e^2, toothed segment F′ having bars *n n*, dogs L L′, and adjustable bar K′ *m*, substantially as shown and described.

6. The double bar K, having notch *r* in one part thereof, the bar I′, in combination with segment F′, its adjustable shaft H′, and the spur-gear e^2 on shaft H, as shown and described.

7. The standard P′, in combination with the pivoted segment F′, having curved bars *o* on its under side, as shown and described.

8. The combination of friction-wheel *z*, with disks V′ W′, saw-shaft R′, and adjusting mechanism, as shown and described.

9. The combination, with the shafts S′ Y′, and their disks V′ W′, and wheel *z*, of springs B′, as shown and described.

10. The rollers M M^1, rotated in opposite directions, and arranged parallel to the ways B and to each other, to operate the knees of the head-blocks through the medium of wheel N, and suitable intermediate apparatus, substantially as shown and described.

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Witnesses:

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A. W. HART.