

(No Model.)

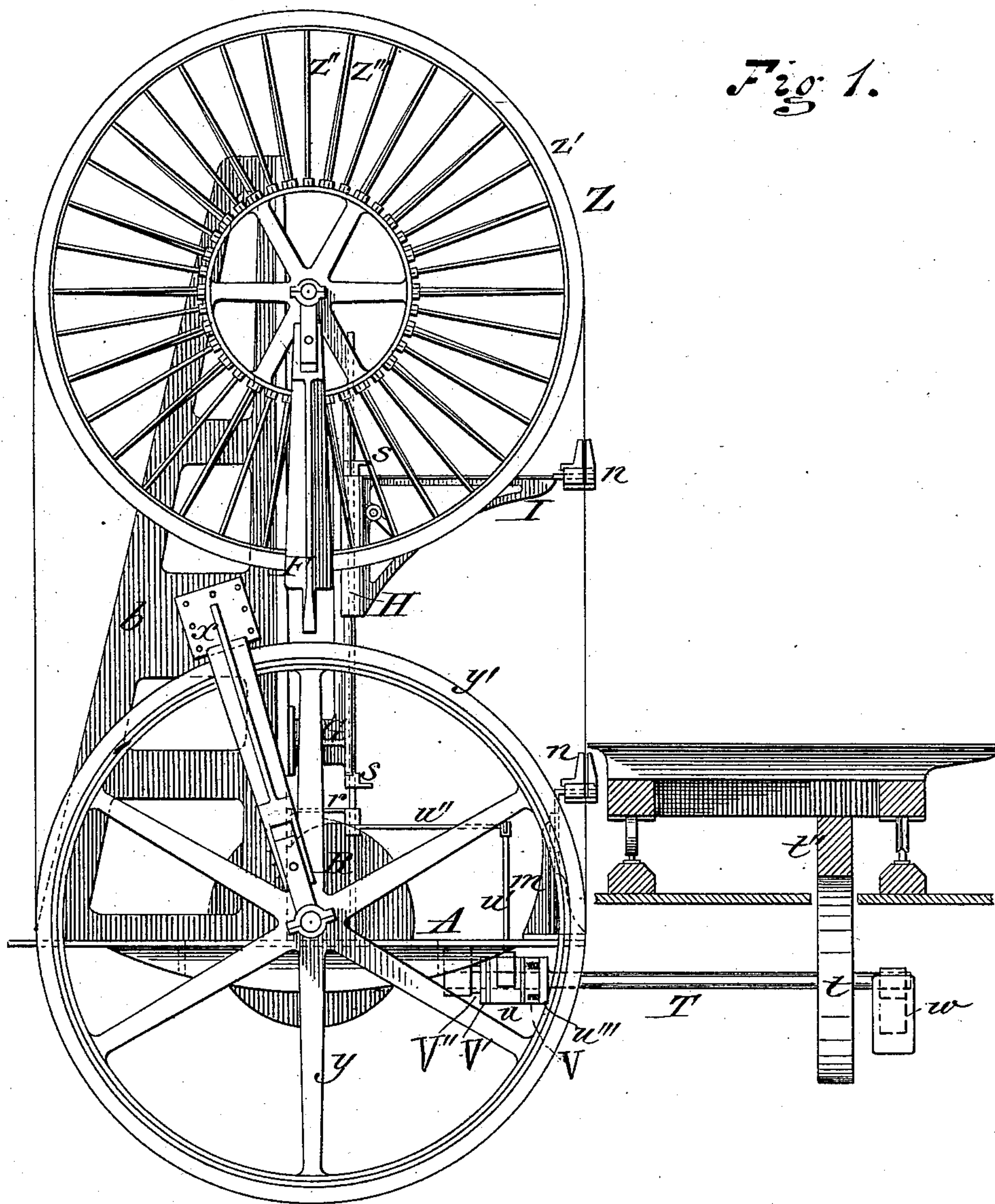
4 Sheets—Sheet 1.

D. D. WILLIAMS & J. D. WILSON.

BAND SAW MILL.

No. 362,410.

Patented May 3, 1887.



Witnesses.
Robert Weir.
Henry Douville

Inventors.
Dell. D. Williams
James D Wilson

(No Model.)

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Fig. 2.

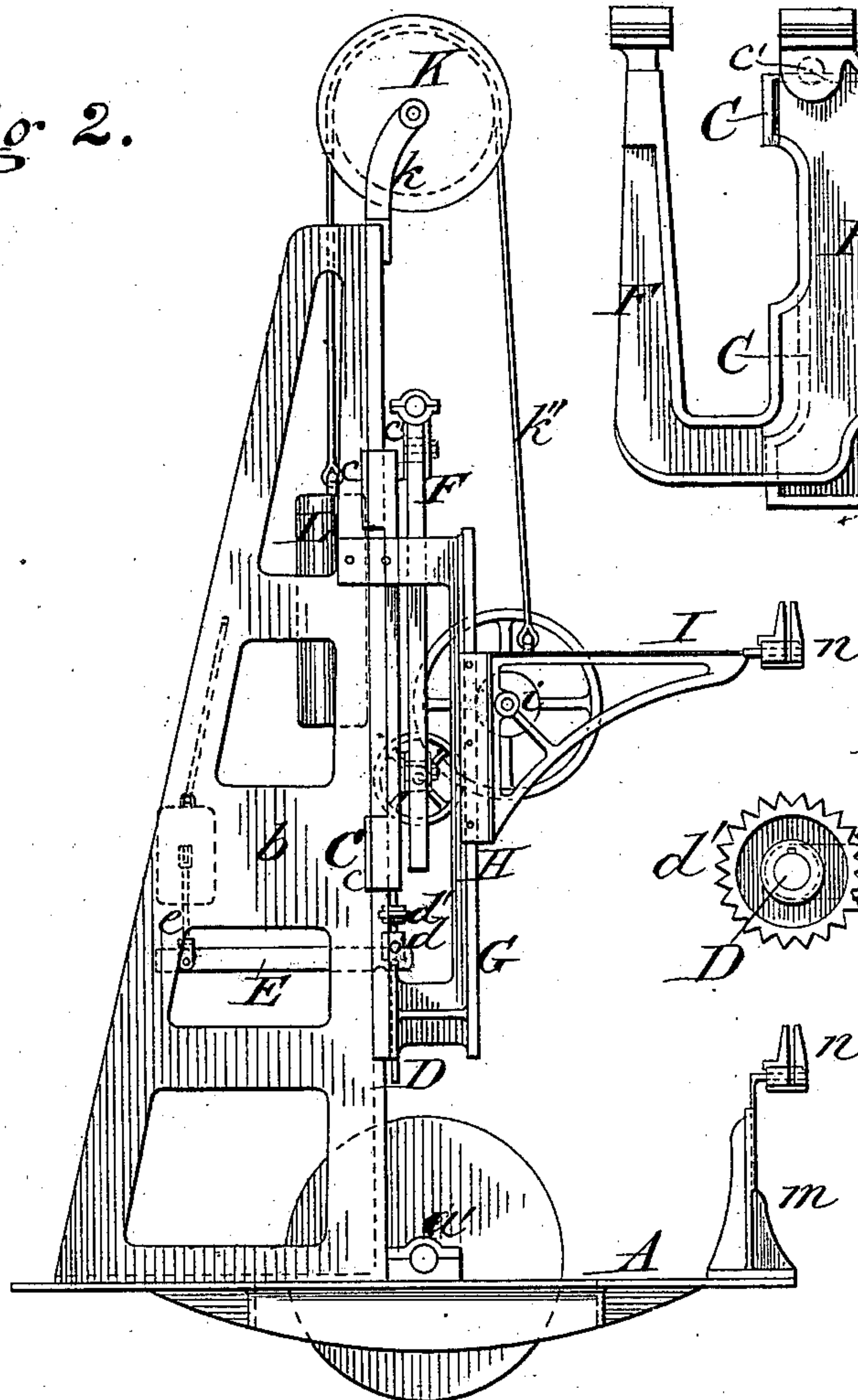


Fig. 12.^a

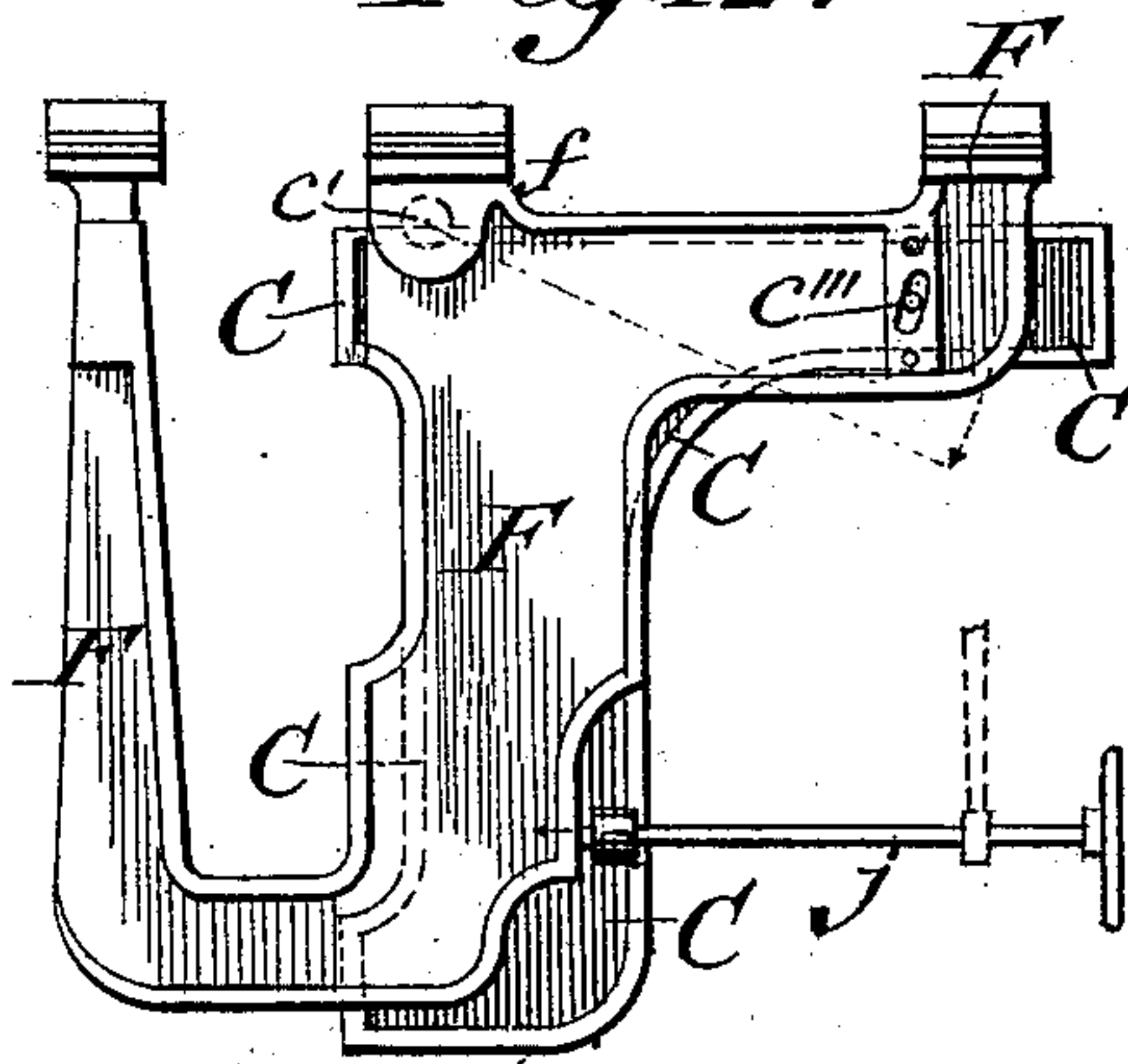


Fig. 13.

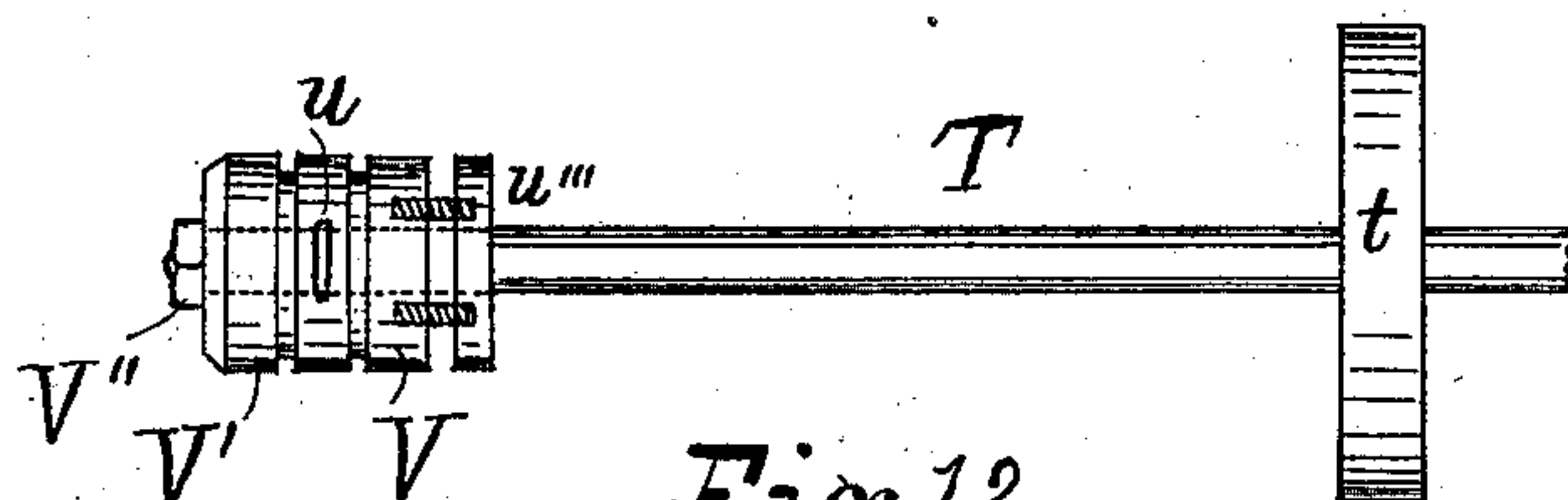
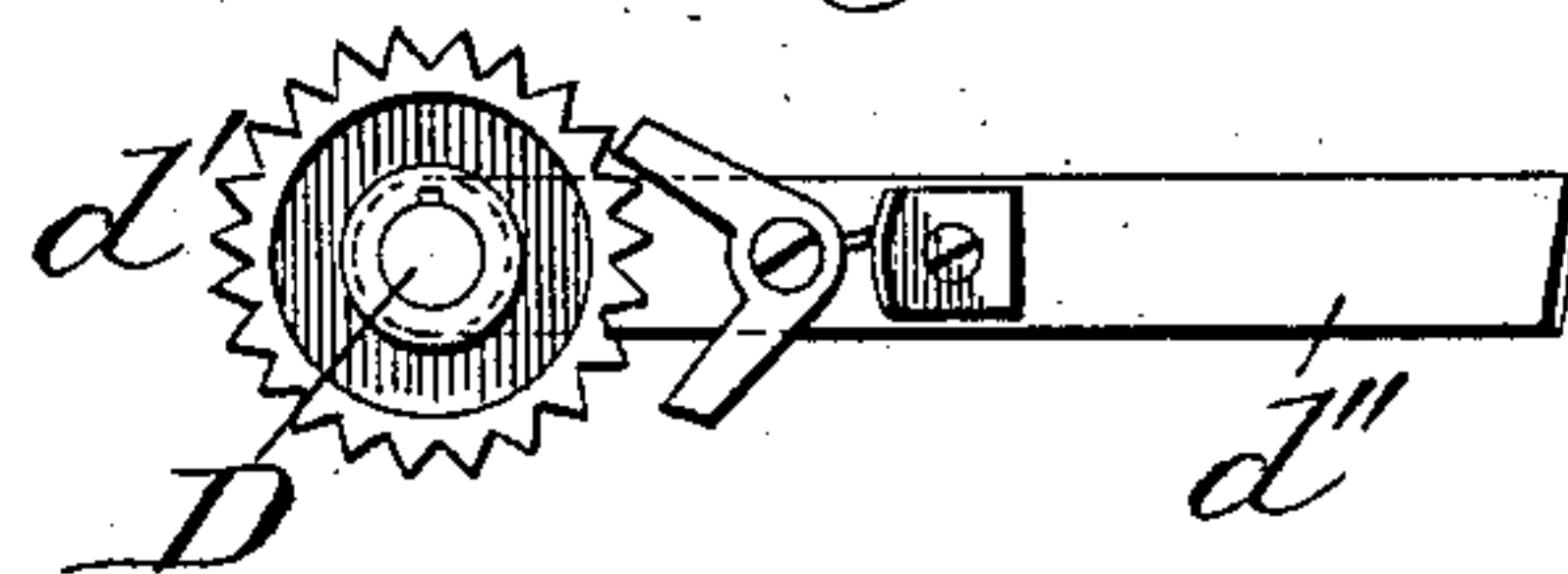


Fig. 12.

Witnesses.

Robert Weir.
Henry Douville

Inventors.

Wm. D. Williams
James D. Wilson

(No Model.)

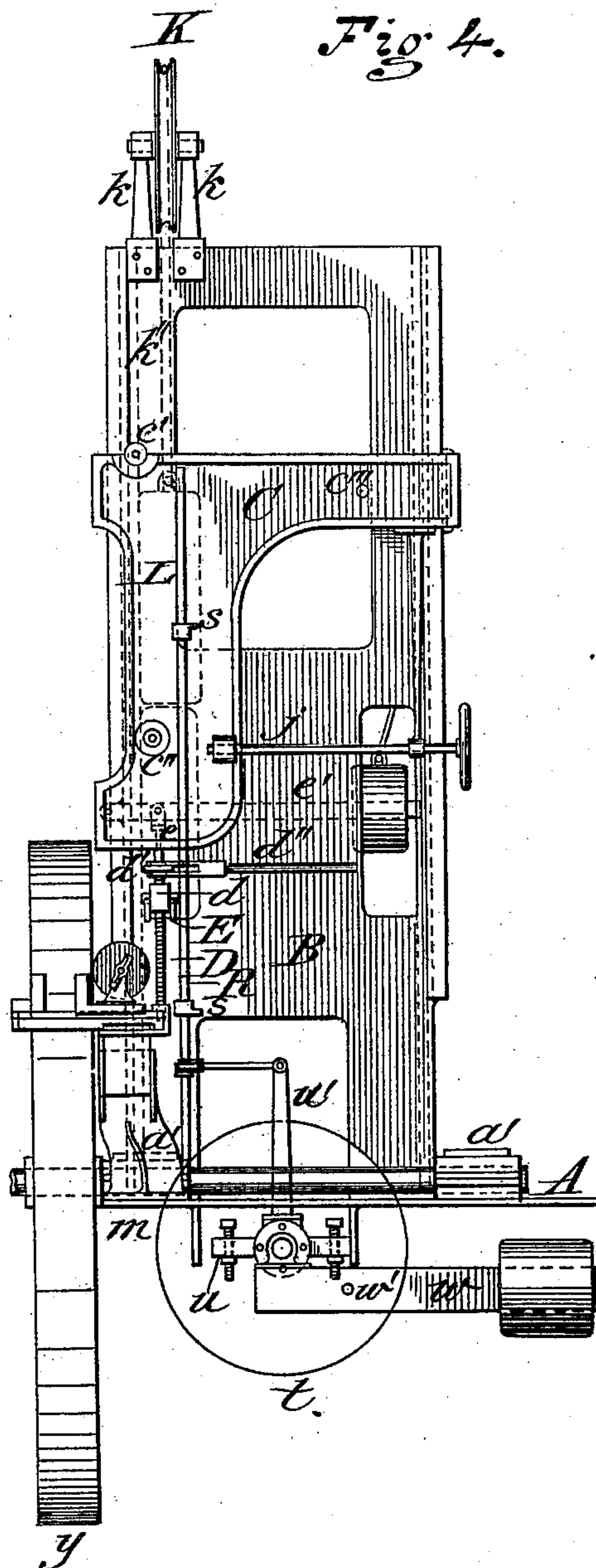
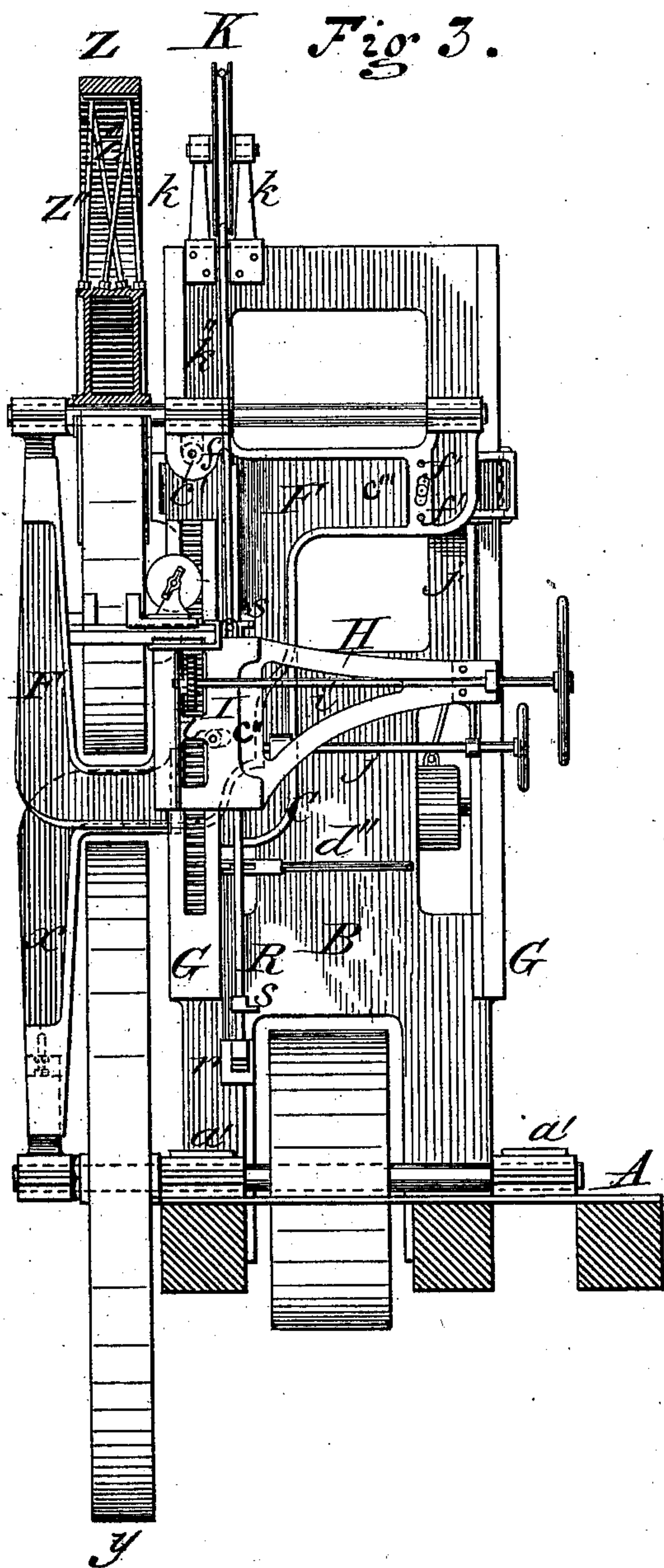
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Witnesses.

*Robert Weir,
Henry Howville*

Inventors.

*Dell. D. Williams
James D. Wilson*

(No Model.)

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Fig 5.

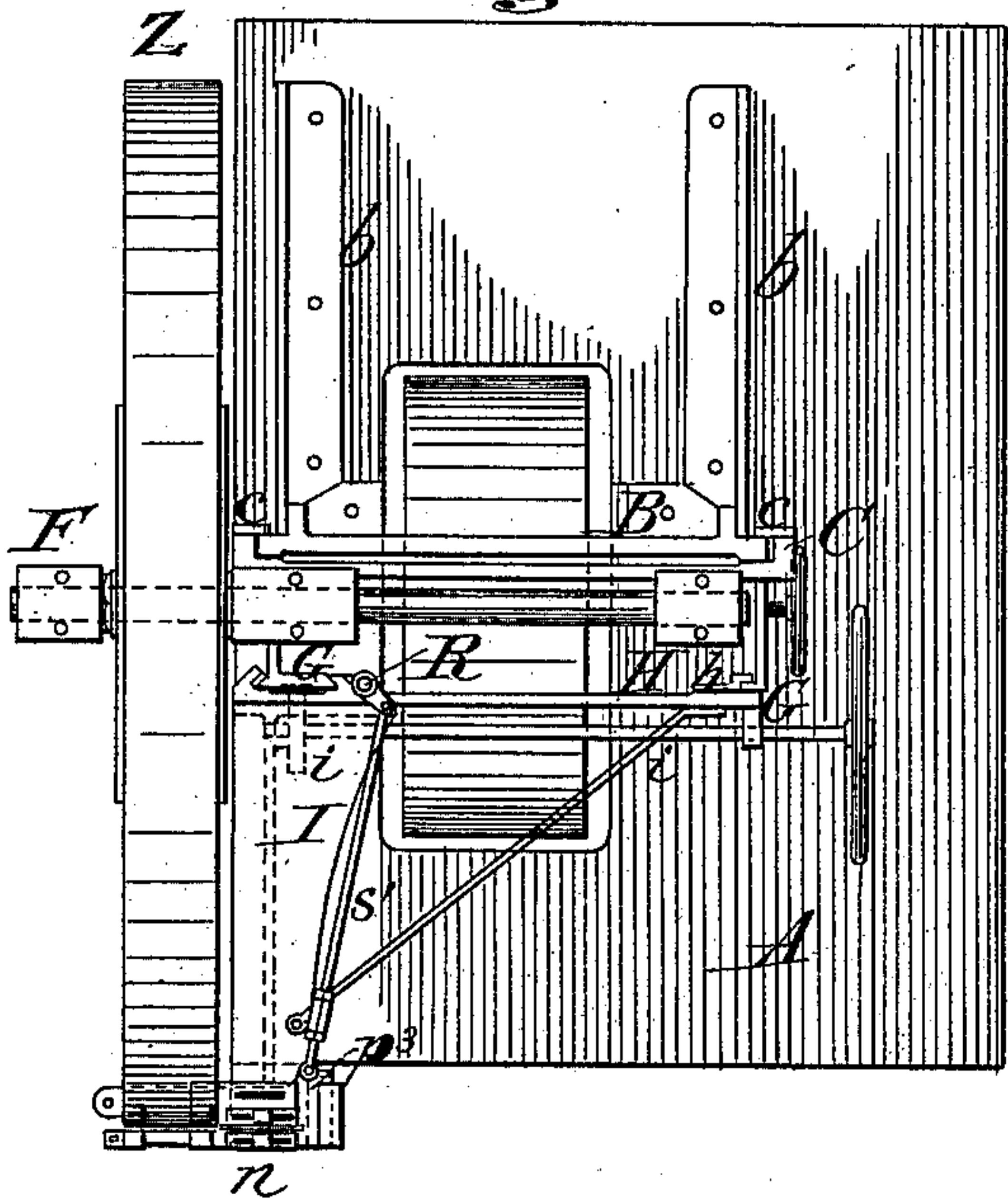


Fig 6.

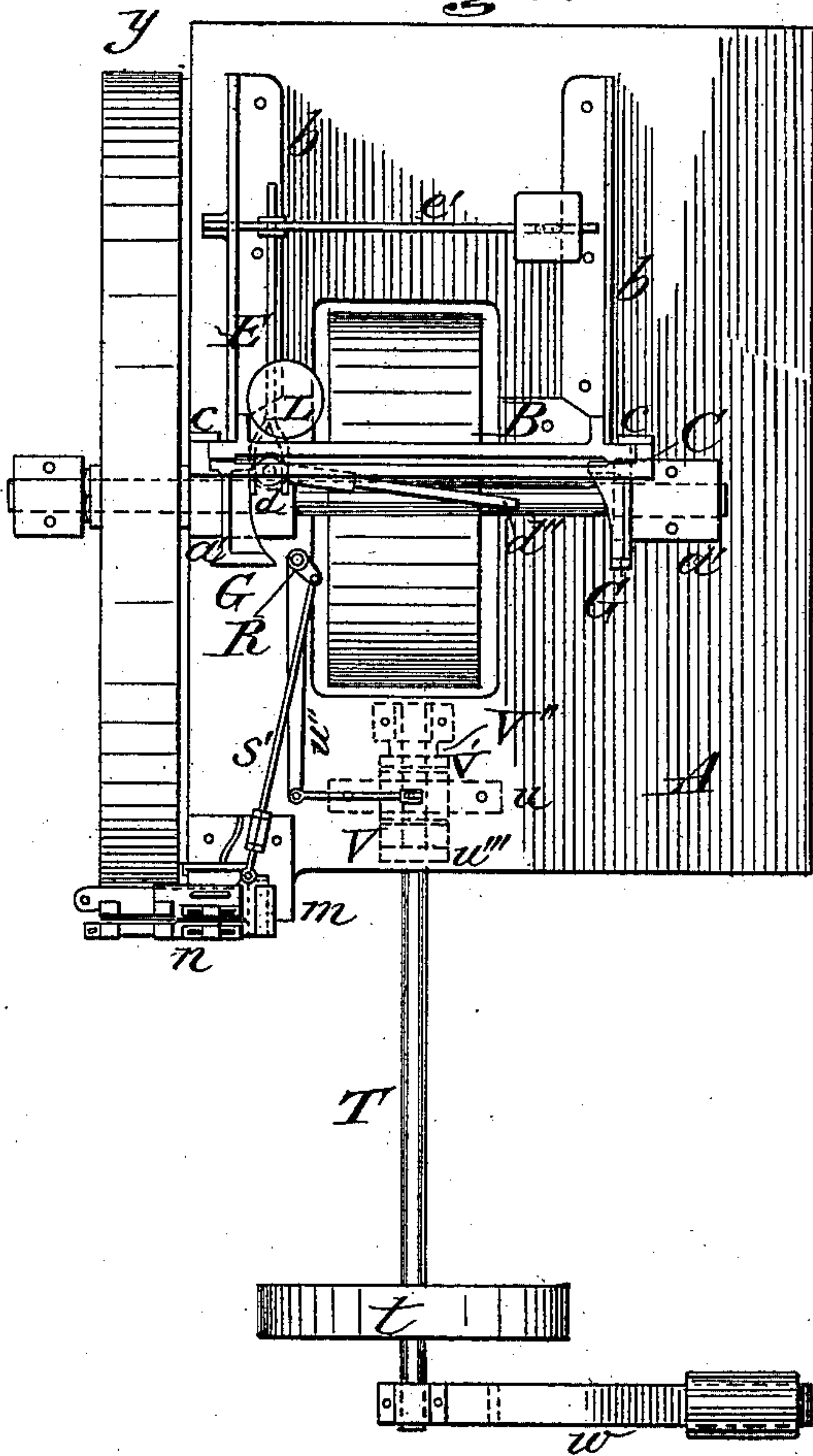


Fig 10.

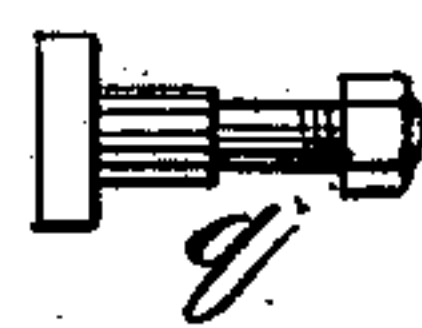
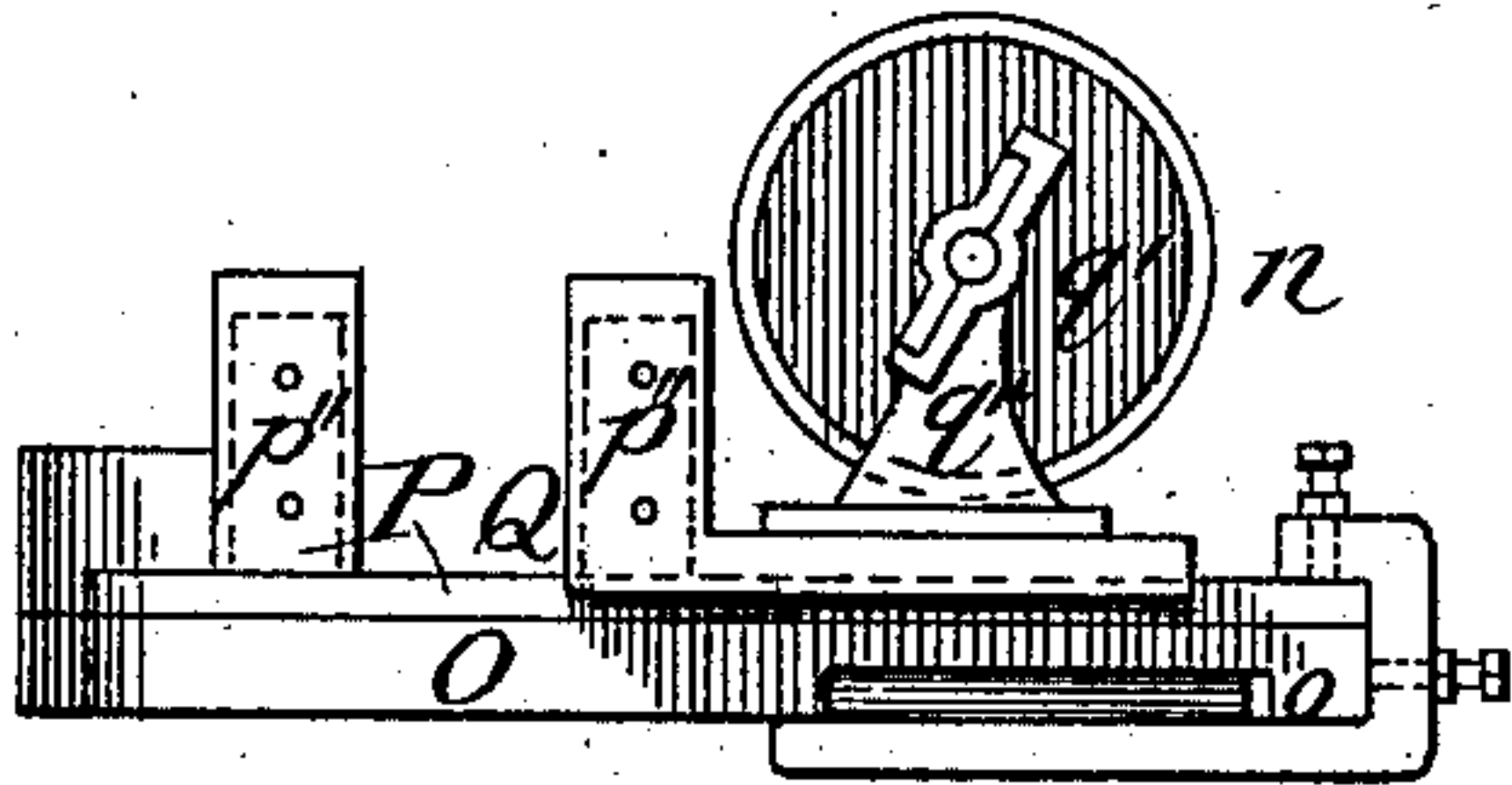


Fig 11.

Fig 7.

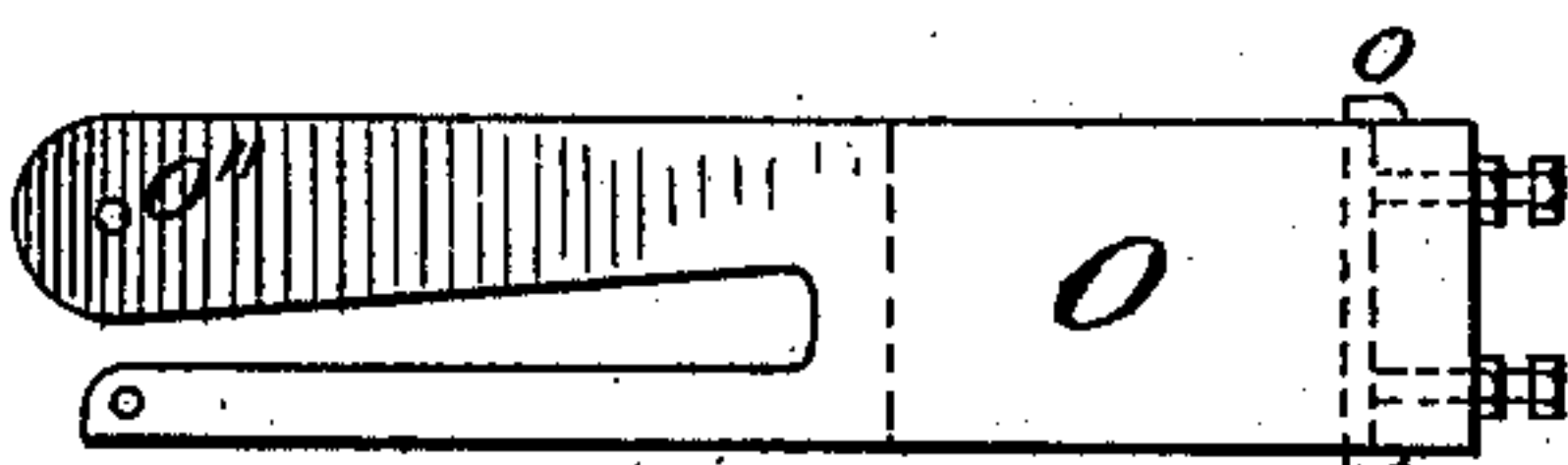


Fig 8.

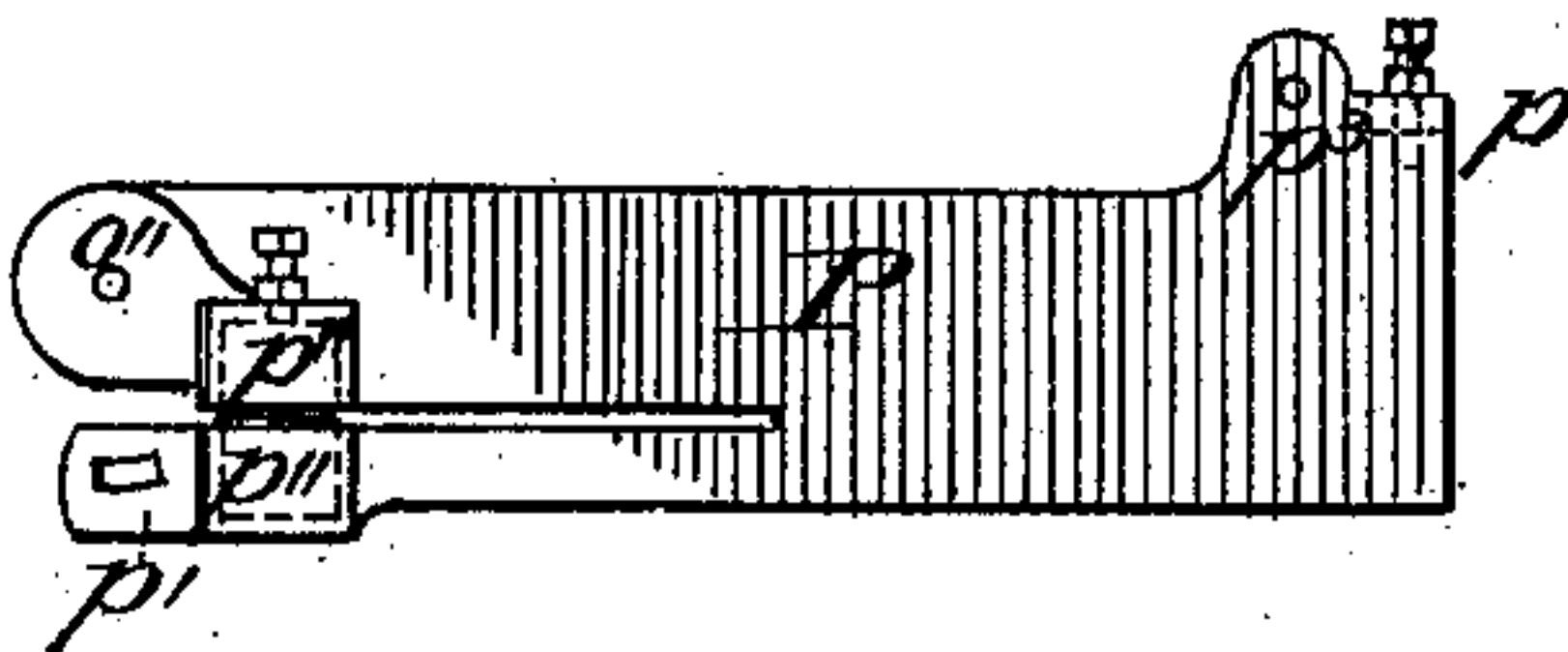
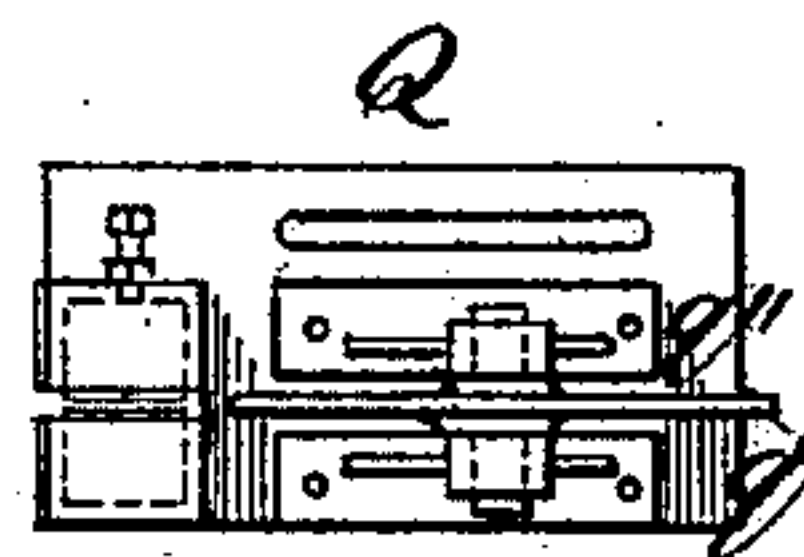


Fig 9.



Witnesses.

Robert Weir
Henry Douville

Inventors.

D. D. Williams
James D. Wilson

UNITED STATES PATENT OFFICE.

DELL. D. WILLIAMS, OF MUSKEGON, AND JAMES D. WILSON, OF MONTAGUE,
MICHIGAN.

BAND-SAW MILL.

SPECIFICATION forming part of Letters Patent No. 362,410, dated May 3, 1887.

Application filed March 23, 1886. Serial No. 196,233. (No model.)

To all whom it may concern:

Be it known that we, DELL. D. WILLIAMS and JAMES D. WILSON, citizens of the United States, residing respectively at Muskegon and Montague, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Band-Saw Mills; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to an improvement in band-saw mills, and more particularly to that class of machinery wherein band-saws are adapted to be used in mills for cutting logs into boards, &c.; and the invention consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described, and then more particularly pointed out in the claims.

In the annexed drawings illustrating our invention, Figure 1 is a side elevation of our improved band-saw mill, showing the band-wheels, the position of the outside bearings for the shafts, the automatic devices for operating the saw-guides, and the accompanying parts of the machine. Fig. 2 is a side elevation of the main frame, the yokes, saw-guides, slides, counter-weights, &c., with the band-wheels and outside bearings removed. Fig. 3 is a front elevation of the complete machine, without the automatic arrangement for operating the saw-guides. Fig. 4 is also a front elevation, showing the inside yoke and mechanism for raising and lowering the same, the lower saw-guides, the vertical rod for operating the guides, and the automatic mechanism for giving motion to the rod. Fig. 5 is a plan view showing the outside yoke, the main frame, and the driving-pulley, the upper band-wheel, rack-wheel bracket with mechanism for operating the same, and the upper saw-guide. Fig. 6 is a plan view showing, principally, the main frame, the driving-pulley and its shaft, the inside yoke, the rack and slides for the rack-bracket, balance weights and levers, the lower saw-guide, and the automatic mechanism for

operating the same. Figs. 7, 8, and 9 are enlarged detail views of the saw-guide. Fig. 10 is an enlarged side elevation of the saw-guide, and Fig. 11 is a detail of a portion of the same. Fig. 12 is a detail view of a portion of the devices by means of which the carriage operates to offset the saw-guides. Fig. 12^a is a view showing the relative arrangement of the inner and outer yokes. Fig. 13 is a detail view of the double-pawled lever and ratchet-wheel.

Like letters indicate like parts.

A represents the bed-plate or bottom frame of the machine, and it is provided with a central opening for the main driving-pulley, which is mounted on a shaft journaled in boxes located on the upper surface of the bed-plate on each side of the opening. The main vertical frame is composed of the front plate, B, and side plates, *b b*, securely fastened together in a vertical direction, preferably by means of flanges formed on the front plate for the purpose, said parts being also preferably fastened to the bed-plate by means of flanges extending around the three sides. The front plate, B, is formed with slides on both sides projecting past the outside of the side frames, *b*, and on these slides the inner yoke, C, travels up and down vertically, it being held in position by means of the plates *c*, (see Fig. 5,) securely fastened thereto, so as to form grooves of a sufficient size to permit of an easy movement without shaking.

The horizontal projecting arm of the yoke C is provided on the extremity with a gib, the purpose of which is to take up any slack that may be occasioned by wear. This gib is set up in place by means of screws, as shown. The yoke is also provided with two bosses, *c'* and *c''*. The upper boss, *c'*, is the fulcrum on which the outer yoke oscillates, the half-collar of the said boss, which projects slightly past the face of the casting, being rounded on the face to allow of the necessary adjustment for the outer yoke. The lower boss, *c''*, also has a collar, rounded on the face, similar to that of *c'*, against which collar the outer yoke is screwed up tight. A stud-bolt, *c'''*, is also provided near the end of the upper arm of the yoke, and is used likewise for tightening both the yokes together.

The mechanism for vertically raising or low-

er the yoke C consists of a screw, D, a nut, *d*, provided with pins on each side, which are parallel with the face of frame B, a ratchet-wheel, *d'*, and a ratchet-handle, *d''*, constructed with a double pawl for working the screw in either direction. The upper end of the screw rests directly below the center of the yoke, (see Fig. 4,) and the nut *d* is threaded to receive the screw. By working the ratchet-handle in either direction the ratchet-wheel and screw rise and fall along with the yoke.

The counter-balance for the yoke C consists of a forked lever, E, (see Figs. 2, 4, and 6,) a connecting-link, *e*, and a weighted lever, *e'*. The forked lever E is fashioned with a groove on the under side of each tongue of the fork. This construction allows the lever to rest on the body of the vertical plate B of the main frame. The upper side of the fork is also provided with grooves, in which rest the projecting pins of the nut *d*. The weighted lever *e'* is fulcrumed upon jaws cast on the outside of the frame, and is located at right angles to the forked lever E. These two levers are connected together by a double jawed vertical link. The weight is affixed movably to the lever, so as to allow the proper adjustment to be given to balance nicely the yoke and its attachments and to give the saw its proper tension or strain.

F represents the outer yoke, which carries the upper band-wheel shaft. This yoke, as shown in Fig. 3, is provided with three journal-boxes. The outside journal-box is adjustable in the outer arm of the yoke F. Near the center of the yoke, below the middle journal-bearing, a slot is provided, the lower portion of which is circular and fits the boss *c'* on the yoke C. A block, *f*, is inserted between the upper half of the boss and the under side of the journal-box, which forms the fulcrum on which this yoke oscillates. The slot is preferably covered with a flange secured in place by means of a bolt tapped into the center of the boss. The yoke is further provided with slots opposite the boss *c''* and bolt *c'''*. These slots extend in such lines and are of such length as to allow of the necessary adjustment of the yoke, which will effect the desired adjustment of the band-wheel and its shaft. Two set-screws, *f' f'*, situated near the bolt *c'''*, assist in the adjustment.

On opposite sides of the machine are situated two slides, G G, which are securely fastened to the main vertical frames, Figs. 2 and 3. The slide nearest the wheels is formed with a rack extending nearly its whole length, and of sufficient width to prevent any binding between its sides and the wheel operating therein.

A frame or bracket, H, extends across the face of the machine and moves in a vertical direction upon the slides G, already described. This bracket H, nearest the band-wheel side of the machine, is formed with a V-shaped slide. (See Fig. 5.) Between the bracket and the slide G is a gib extending the whole depth of the frame, and used for tightening the bracket sufficiently to enable it to slide up

and down without shaking, said gib being set up by a series of screws, as shown in Fig. 2. The end of the bracket away from the band-wheel portion of the machine is provided with a plate, *h*, (see Fig. 5,) fastened thereto and constituting the slide at this end. The bracket H is also provided with a boss, which serves as one of the bearings for the vertical rod R, which works the saw-guides. The outer end of the bracket is provided, in addition to plate *h*, with a bearing for carrying the rack-wheel spindle.

I represents a bracket for carrying the upper saw-guide, and this bracket is securely fastened to the sliding bracket H, and is provided at the vertical rib with a boss for carrying the wheel end of the rack-spindle. A diagonal brace, as shown in Fig. 5, is fastened to the bracket H and the bracket I, and aids in stiffening the end of the latter sidewise. *i* is the rack-wheel, and *i'* the spindle for working the same, said spindle carrying at its outer end a hand-wheel for operating it, and said rack-wheel meshing with the rack upon the slide G, as shown in the drawings. *j* represents a spindle for moving the outer yoke, F, when it is desired to bring the upper band-wheel, which is carried by said yoke, into position. This spindle is secured at one end by proper means to the yoke C, and works in a boss cast on the said yoke and tapped to receive it, the other end of the spindle being provided with a hand-wheel for operating it; and, further, the spindle *j* is fastened into a bearing secured to the under side of the projecting arm of the yoke C. (See Fig. 4.) The inner end of the spindle is adapted to bear against the yoke F, so that when rotated in its bearings it may adjust said yoke F.

K represents a rope-sheave journaled between two brackets, *k k*, fastened to the main frame. A wire rope or chain is attached at one end to the upper saw-guide bracket, I, and then passes over the sheave K, and is fastened at the other end to the counterbalance-weight L.

m represents a bracket fastened to the bed-plate and carrying the under or lower guide for the saw, while *n n* are the clamping-jaws of the upper and lower saw-guides, and are situated opposite in line with each other, as shown in Fig. 2. An enlarged side view of the saw-guides *n* is shown in Fig. 10, and Figs. 7, 8, 9, and 11 represent details of the same.

O is the bottom plate, formed on the under surface with a recess, which fits upon the brackets used to carry the guides. A gib, *o*, is also inserted into this recess, and is used for tightening the guide to the bracket in conjunction with screws for the same purpose. This plate always remains stationary when once in position, and is provided with a slot, Fig. 7, for the saw, said slot being of sufficient width to allow of the saw being moved from the cut while the carriage is reversing.

P designates the upper plate, which carries the forward guides. This plate is pivoted to

the lower plate at the bolt o'' and is formed on the under surface with a lug, p , through which is screwed a bolt, Fig. 8. This bolt is used for guiding the saw in line with the carriage and also for giving the necessary range of movement laterally to this plate in clearing the saw from the log. Provision is also made for connecting the moving apparatus to this plate by a bolt at p'' . The forward end of the plate P is kept in position by the bolt q , Fig. 11. This bolt is made square beneath the head, and is fastened securely to the plate O at the end of the narrow arm. The slot shown at p' fits the square portion of the bolt, and is of sufficient length to give the necessary adjustment to the plate. Bolt q is provided, also, with a large head, and when fastened in its place just clears the top of the plate enough to allow the latter to move laterally, but not to lift up.

Q represents an upper plate, which carries the guides for the back of the saw. This plate is preferably formed with a lip on each side for inclosing the plate P , and fastened to the plate Q are two brackets, q'' , in which is journaled the disk q' . This disk is preferably formed of cast iron with a steel rim, and runs in contact with the back of the saw, receiving the thrust therefrom. A long slot is made in the plate Q , so that it may be moved forward as the saw becomes narrower. The guide-blocks $p'' p''$ are formed, in general, of hard wood, and are inserted into recesses on the plates and kept in position by iron plates of any suitable kind fastened to the casting. The blocks are adjusted to the saw by means of any convenient device, such as screws tapped into the casting.

The necessary lateral adjustment of the saw-guides is accomplished by operating a rod, R , the lower end of which rests upon the bed-plate, while the upper end enters a journal provided therefor on the plate or bracket H . The lower journal-box is fastened to the main frame, and is designated by r , Fig. 3. Secured to the rod R are the lever-arms $S S$, which serve to operate the saw-guides. They are connected by rods S' with the plate P of the saw-guide at p^3 . (See Figs. 5 and 6.) These connecting-rods are provided with a right and left hand screwed coupling for lengthening or shortening the rods.

The automatic mechanism for actuating the rod R , which is thus connected with the saw-guides, and in consequence of this actuation of the rod R offsetting the saw-guides, consists of a shaft, T , (see Fig. 1,) placed horizontally below the frame of the saw-carriage. On this shaft is secured a friction-wheel, t , which receives its motion from a friction-bar, t'' , forming part of the saw-carriage. The shaft T is also provided with a double-ended lever, u , having a set-bolt passing through each end for regulating the throw of the lever u' . The lower end of lever u' is fastened to the double-ended lever, and the upper end is connected by a rod with the lever u'' , which is fastened to the upright rod R . The shaft T is provided with a

solid collar, u''' , Fig. 1, to the face of which two dowel-pins are fastened. (See Fig. 4.) A loose collar, V , which is placed next the face of the solid collar u''' , is provided with four holes drilled into the face, two of which are opposite each other and receive the dowel-pins on the collar u , this arrangement constituting the connections by which the collar is revolved. The other two holes, opposite each other and in a line at right angles to the first two, contain spiral springs, Fig. 1, which serve the purpose of giving the double-armed lever the amount of tension necessary to effect a change in its position.

V' is a loose ring, secured by a feather to the shaft T , and V'' is a nut for setting up the same on either side of the double-armed lever, and between the loose collars are inserted leather washers, which assist the friction and also keep the faces from cutting while the shaft is revolving. The shaft T is journaled in two boxes, the outside box being carried on a bar, W , pivoted at w' and weighted at the outer end, Fig. 4. This arrangement affords adjustability for the friction-wheel, and consequently keeps it continually in contact with the friction-bar.

From this description of the combination and arrangement of the several parts of the machine the operation will be evident, for it will be seen that as the saw-carriage travels in either direction continuous motion will be imparted to the friction-wheel shaft T for operating the automatic mechanism which acts upon the guides. When the double-armed lever is brought to a stop, the friction between the lever and the leather rings is sufficient to keep the whole arrangement in position until the carriage reverses, when the lever is thrown to the other side and the same effect is produced, for the friction-bar t'' , operating on the pulley t , will revolve the same and rotate the shaft T . This will tilt the double-ended lever and oscillate the lever u' to one side, and the lever u' being connected with the vertical rod R by means of the rod u'' , said rod R will be rotated, and will, through its connecting leverage—to wit, arms $S S$ and rods $S' S'$, with the saw-guides—offset said guides. The collar u''' on the shaft T is fastened rigidly to the shaft. The collar V is loose upon the shaft, but is carried around with the shaft when it revolves by means of the dowel-pins, which are placed on the collar u''' and enter recesses in collar V , and by means, also, of the springs. The collar adjacent to collar V is loose on the shaft, and is that which carries the stop-lever u . The collar V' is also loosely mounted, but is feathered to the shaft. The nut V'' keeps the whole series of collars in proper position, there being leather washers interposed between the collar V' and that carrying lever u and between the latter and collar V . The friction-pulley t being tight on the shaft, when the carriage moves in one direction, it will roll the pulley in the same direction. The action of the springs against collar V during this motion

serves to keep the series of collars together; consequently all the rings or collars move in the same direction until the lever *u* strikes the stop on one of its ends. The ring to which the lever *u* is connected then stands still, while the rest of them revolve along with the shaft. When the carriage reverses, the lever *u* is tilted reversely until it strikes the opposite stop, when the same continuity of revolution of the other parts proceeds. The leather washers are merely used by compression to turn the collar having the lever *u* thereupon, and when said collar stops the friction is reduced to a minimum by the use of the leather. The nut on the end merely regulates the distance required to operate the device to the best advantage. This automatic movement offsets the saw from the log when the carriage is being reversed, and when the carriage is advancing through the cut the guides are, by the motion of the friction-wheel, kept rigidly in their places. Although we adopt this automatic arrangement for moving the guides, the same results can be attained by the use of a foot-lever.

X designates the outside bearing for the driving shaft. (See Figs. 1 and 3.) This bearing is securely bolted to the side frame of the machine. The journal-box is adjustable in an upward direction and is set up by means of a screw and jam-nut. The upper journal-box on the arm F is also adjustable and is set up in a similar manner. The lower wheel, Y, is preferably constructed entirely of cast-iron. It is preferably furnished with a double set of arms and is clad on the periphery with a wooden rim. The upper wheel, Z, is preferably constructed with a cast-iron center having double arms, a wrought-iron rim, and wrought-iron spokes, the construction and formation being similar to that shown in Figs. 1 and 3. The periphery of the cast-iron center, Fig. 3, is formed with an uneven surface, and is drilled to receive the rods which serve as spokes for the wheel. The surface for each row of spokes is formed at right angles to the rod, so that the jam-nut will bed down evenly on its face. The outer rim is drilled with holes corresponding in number to the number of spokes used, and are arranged in a double row around the wheel. The outsides of these holes are counter-sunk and the spokes made to fit. A corresponding number of holes are drilled in the cast center and tapped to receive the inner screwed end of the spokes. After the spokes are properly secured to their place a jam-nut provided on each is tightened against the rim of the casting. In Fig. 1 each alternate line of spokes is constructed in the same way, Z' representing in Fig. 3 the outside rows, while Z'' represents the inner rows, which cross each

other. This wheel is also generally clad with wood at Z', and is of the same width as the under wheel. The shafts that carry these wheels are slightly tapered to receive the hubs of the wheels, and by this method of construction a perfect fit is obtained at the outer end of the hub. The shaft is screwed between the hub and the outside bearing, the nuts on this portion serving to keep the wheel in place.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of the guides G G, the bracket II, movable thereon, the bracket I, carried by the bracket II, the counterbalance-weight L, suspended by a wire rope, which passes around the pulley K and is secured to the bracket I, the vertical rod R, operated automatically by a suitable leverage connection with the log-carriage, the saw-guides, constructed as described, and the arms S S and rods S' S', for connecting rod R with said guides, substantially as specified and shown.

2. In a band-saw mill, the automatic mechanism for offsetting the saw-guides, which consists of a shaft, T, a friction-wheel, *t*, secured thereon, the traveling log-carriage having a friction-bar, *t'*, in contact with said friction-wheel, the rigid collar *u'''*, sliding collar V, and loose collar V', and the lever-carrying collar, said collars *u'''* and V being connected by interposed springs and pins, while the other collars are separated by washers, the horizontal double-ended lever *u*, carried by the lever-carrying collar, the vertical lever-arm *u'*, connected to lever *u*, rock-shaft R, having arm *u''*, connected to arm *u'*, and arms S, connecting-rods S', and the saw-guides, constructed as described, all arranged substantially as set forth.

3. The combination of the shaft T, friction-wheel *t*, secured thereon, the traveling log-carriage having a friction-bar, *t'*, in contact with said friction-wheel, the pivoted weighted lever W, connected to the extremity of the shaft T, the series of collars arranged upon said shaft, as described, the horizontal double-ended lever *u*, carried by the lever-carrying collar, the vertical lever-arm *u'*, connected to lever *u*, the rock-shaft R, having arm *u''*, connected to arm *u'*, and arms S, connecting-rods S', and the saw-guides, all arranged and operating substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

DELL. D. WILLIAMS.
JAMES D. WILSON.

Witnesses:

WILLIAM J. BAXTER,
HENRY DONVILLE.