

(No Model.)

3 Sheets—Sheet 1.

J. H. C. WINSTON.
SAW SETTING MACHINE.

No. 325,035.

Patented Aug. 25, 1885.

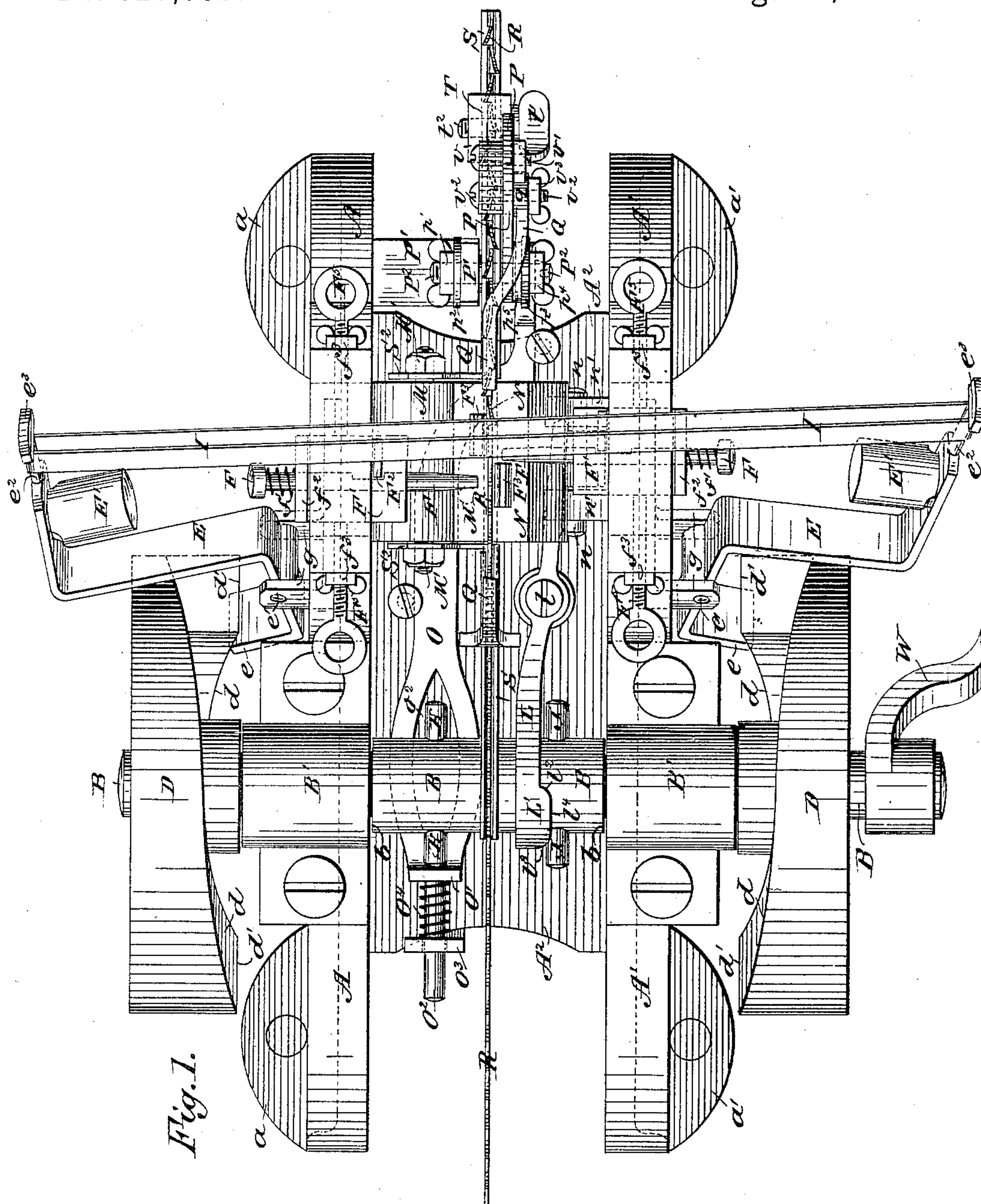


Fig. 1.

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INVENTOR:

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ATTORNEYS.

(No Model.)

J. H. C. WINSTON.
SAW SETTING MACHINE.

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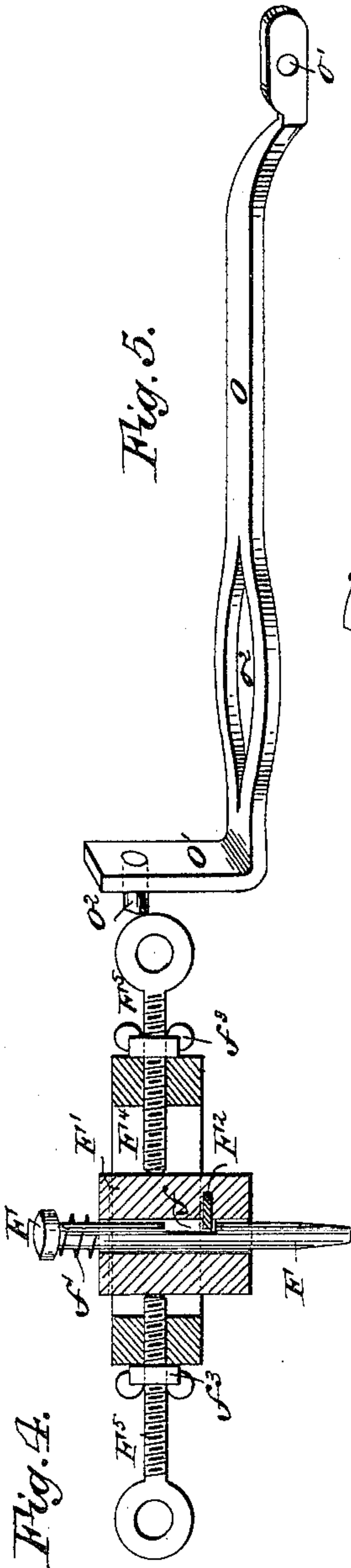


Fig. 4.

Fig. 5.

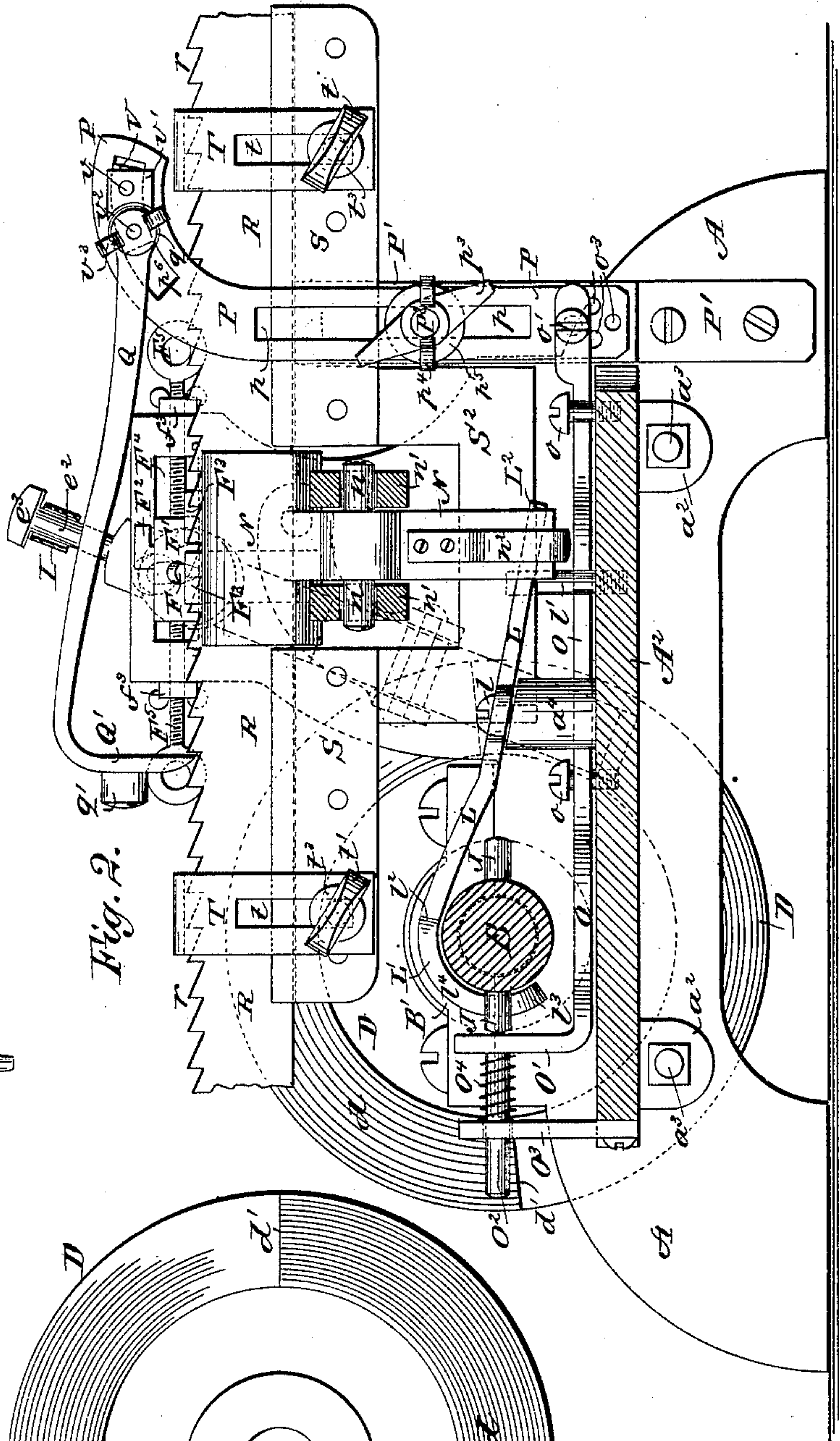
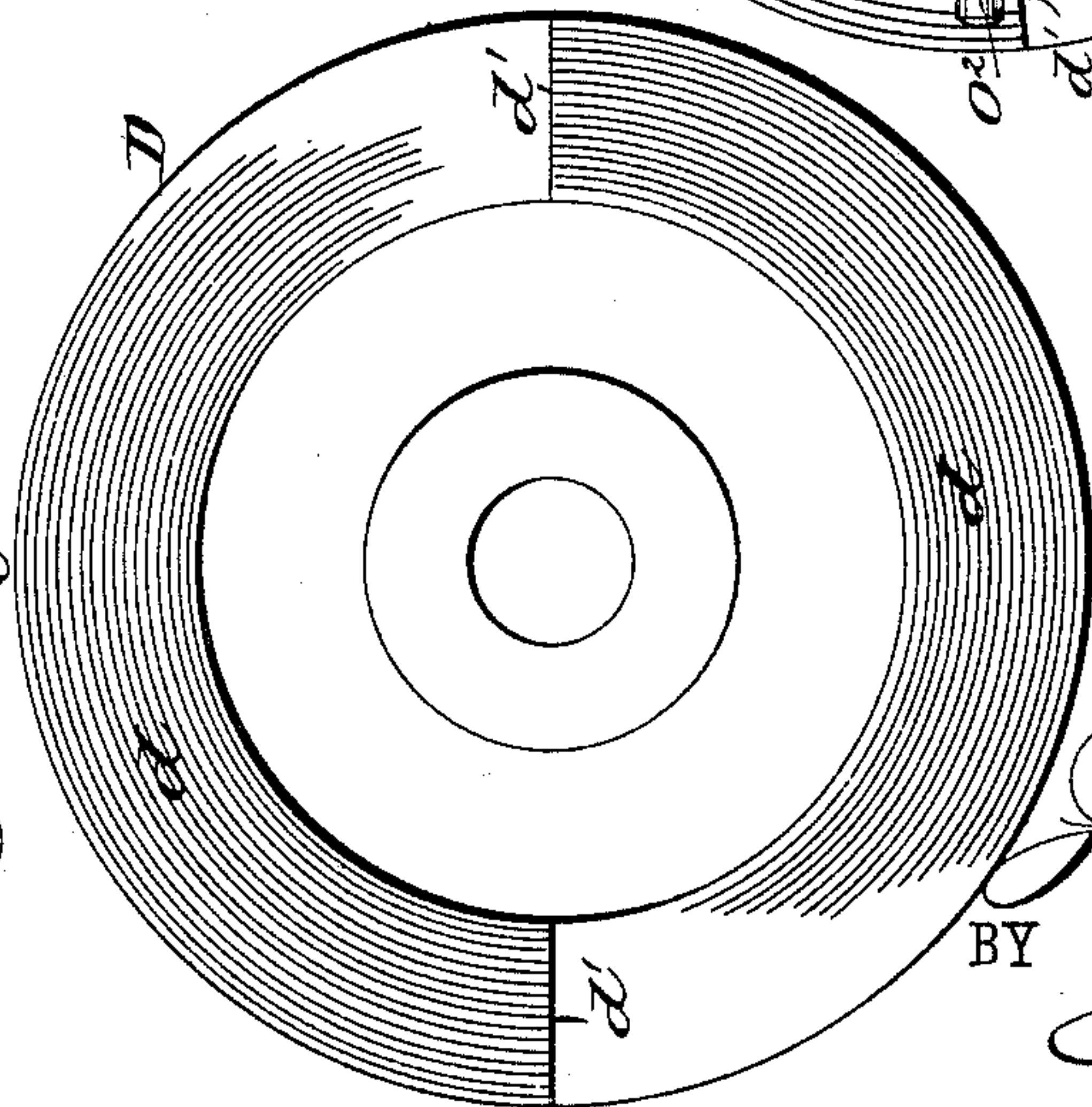


Fig. 2.

Fig. 3.



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3 Sheets—Sheet 3.

Patented Aug. 25, 1885.

Fig. 6

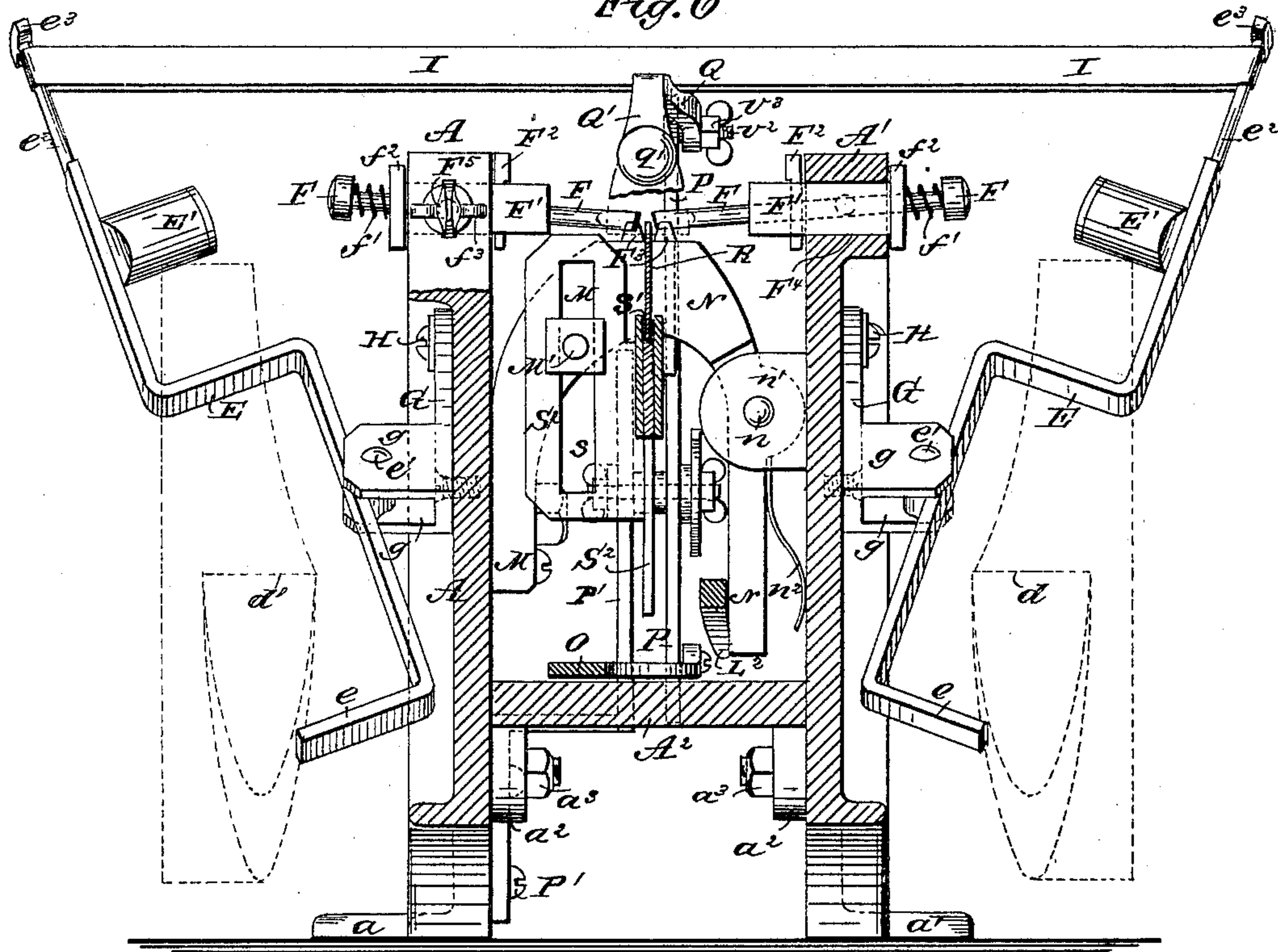


Fig. 2.

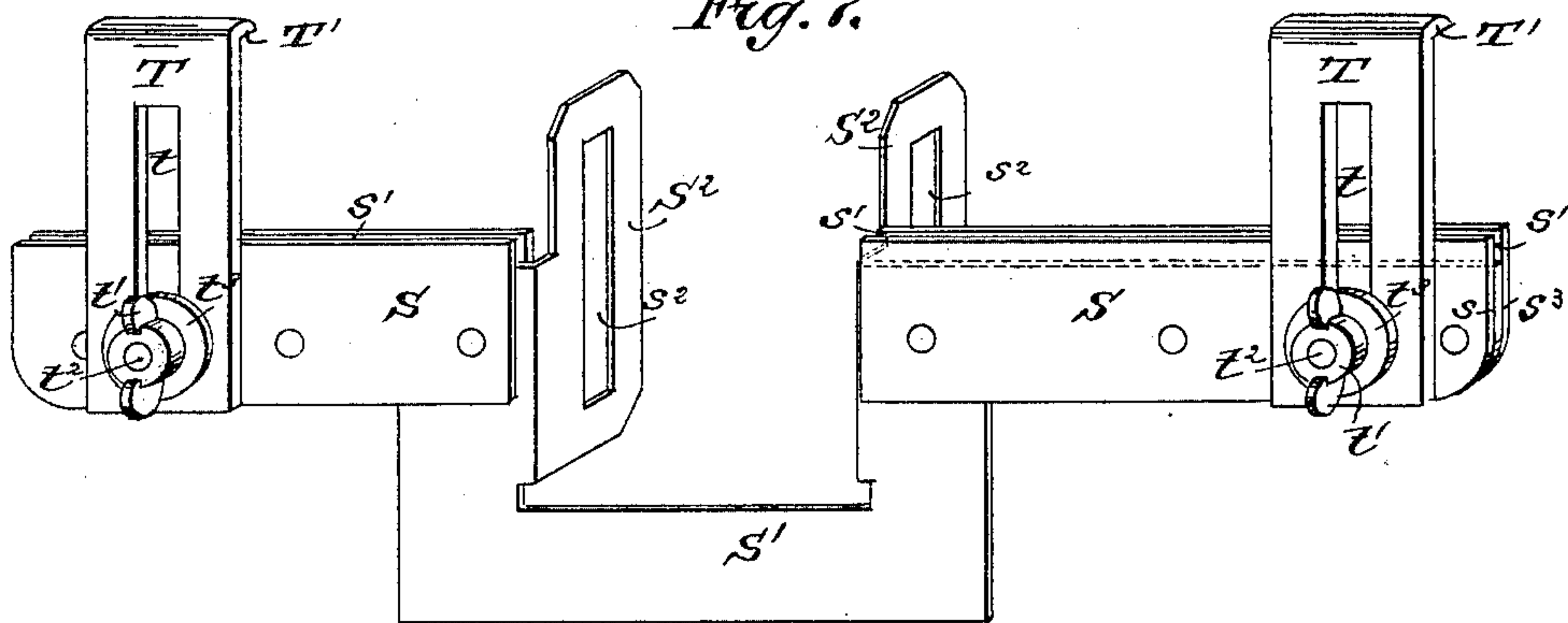
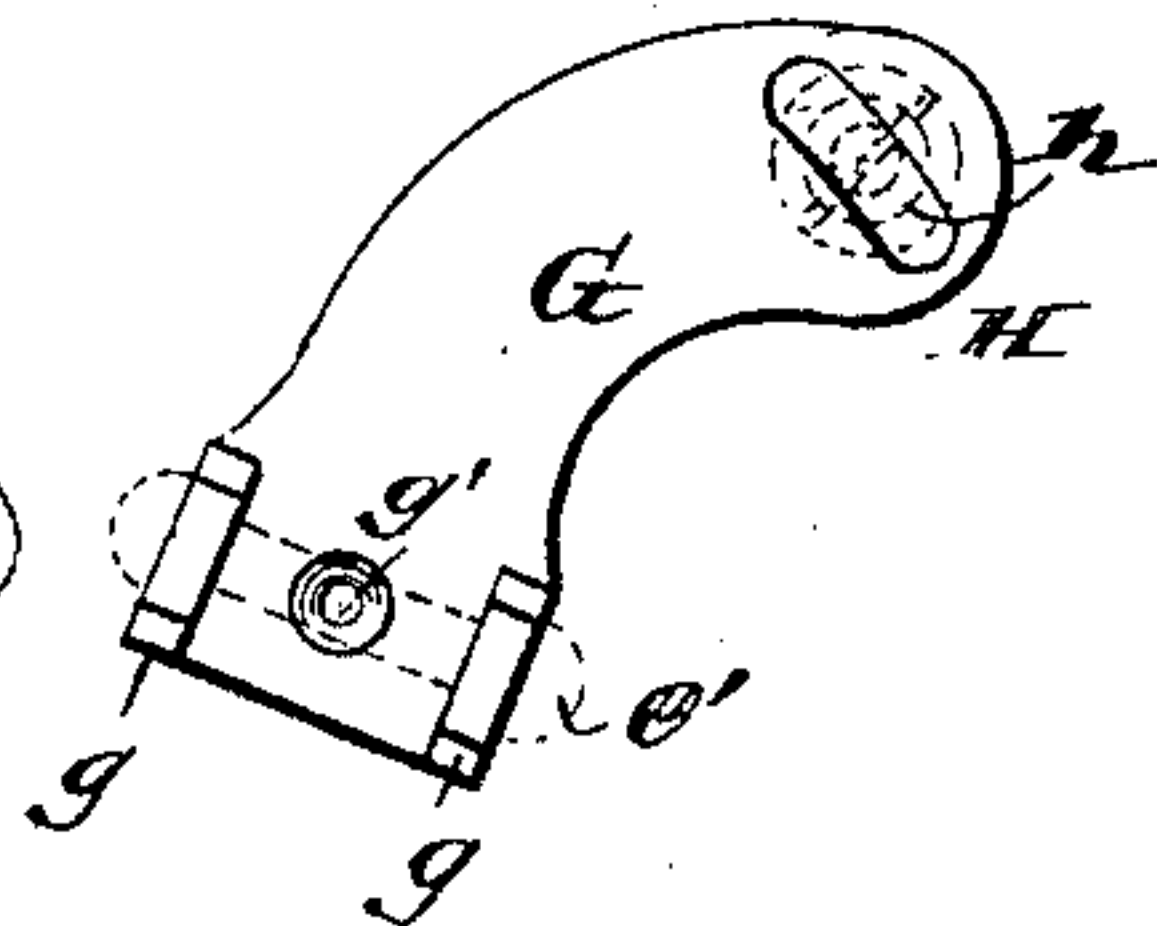



Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN H. C. WINSTON, OF LYNCHBURG, VIRGINIA.

SAW-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 325,035, dated August 25, 1885.

Application filed June 2, 1884. (No mod. l.)

To all whom it may concern:

Be it known that I, JOHN H. C. WINSTON, of Lynchburg, in the county of Campbell, and State of Virginia, have invented a new and Improved Saw-Setting Machine, of which the following is a full, clear, and exact description.

The object of my invention is to provide a simple, efficient, and durable machine which will regularly and rapidly set the teeth of band-saws or other saw-blades.

The invention consists in a saw-setting machine having a driving-shaft carrying opposite cam disks or wheels to lift oppositely-arranged pivoted hammers which are driven by an elastic band or spring against their respective punches for setting a pair of adjacent teeth at once and in reverse ways against anvils or set-blocks held in the jaws of the vise in which the saw-blade is clamped while the punches act on the teeth. The saw-blade is held about in line with the faces of the vise-jaws by a frame which is provided with guards to prevent upward jumping of the blade. The vise has fixed and movable jaws, and the movable jaw is tightened on the saw-blade at the proper time by a pivoted cam-lever acting by one end on the jaw, and itself actuated by tappet-pins on the driving-shaft. The feed-pawl for carrying the saw forward is actuated by a slide-bar moved by tappets on the driving-shaft and a spring, and said slide-bar connects by a rock-lever with one end of the feed-pawl, the other end of which engages the saw-teeth.

The invention includes particular constructions and combinations of parts of the machine, all as hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a partly broken plan view of the machine with the parts in the positions they assume just prior to the striking of the setting-punches. Fig. 2 is a longitudinal sectional elevation of the machine with the parts in similar positions. Fig. 3 is a face view of one of the hammer-operating cams. Fig. 4 is a horizontal sectional view through one of the punch-holding heads. Fig. 5 is a perspective

view of the slide bar which actuates the feed devices. Fig. 6 is a transverse vertical sectional elevation of the machine. Fig. 7 is a perspective view of the saw-holding frame, and Fig. 8 is a face view of the fulcrum-block of the setting-hammers.

The frame of the machine consists of two side frames, A A', and a transverse plate, A², which has depending lugs a², and is planed truly on the edges, so that when fastened to the frames A A' by bolts a³ it will hold the frames securely and about parallel with each other both ways at their inner faces. The side frames have lugs a a' by which to fasten the machine to a bench or suitable base-support by bolts or screws passed through the said lugs.

B is the driving-shaft, which is journaled in boxes B' B' of the machine-frame and transversely of the frame, and carries at each end a cam disk or wheel, D, which in the machine shown has two cam faces, d d, which act upon the lower end, e, of a hammer-lever, E, to carry the hammer-head E' back ready to strike the heads of the saw-tooth-setting punches F, held in suitable bearings at the top of the frame.

There is a hammer-lever, E, at each side of the machine to strike two punches F, ranging transversely of the machine and adapted, by their adjustable bearings or guide-blocks, to be set out of line with each other for operating upon two adjacent teeth of the saw-blade at once to set the teeth over reversely, as hereinafter more fully described. The opposite levers E are fulcrumed on pivot-pins e', passing through the lugs or cheek-pieces g, formed on the blocks G, which are secured at their lower ends to the side frames, A A', by screws or pins at g', on which the blocks may swing to allow the heads E' of the hammer-levers E to be swung forward or backward, so as to strike fairly upon the heads of punches F when the punches are shifted to set their inner ends to saw-teeth of different sizes, as will hereinafter more fully be explained. The other or upper ends of the blocks G are slotted at h in an arch described from their pivots g', so that said upper ends may shift along the set-screws H, which are

passed through the slots into the side frames for locking the blocks G and the levers E in proper relative positions with the punches.

A rubber or other elastic band, I, is passed over the upper ends of the opposite hammer-levers E E, and acts to draw their heads E' E' forcibly upon the punches F with a quick, sharp stroke to set the saw-teeth. The size of the elastic band I may vary accordingly as a heavier or lighter blow of the hammer is required in setting the teeth of thicker or thinner saw-blades, and bands of varying tension may readily be substituted one for the other by slipping them on the rounded portions e^2 , of the levers just below the heads e^3 , which latter hold the bands from slipping off the levers.

It is understood that a suitable coil or other spring may be substituted for the rubber band I; but the latter is at present preferred, as it draws the opposite hammers to their respective punches with equal force as the high ends or shoulders d' of the cam-faces d pass the ends e of the hammer-levers.

I prefer to make that portion of the driving-shaft B between the side frames, A A', heavier than the journals of the shaft, thus forming shoulders $b b$ next to the frames, which prevent endwise movement of the shaft, and the enlargement of the shaft also gives a firmer hold in the shaft, and without weakening it, of the tappet lugs or pins J K, which actuate, respectively, the cam-lever L for tightening the vise or clamp jaws M N upon the saw-blade, and the slide O for moving the lever P and pawl Q, by which the saw-blade R is fed forward prior to the action of the hammers E' on the successive pairs of the set teeth, as hereinafter more fully described.

The vise or clamp jaw M is rigidly fastened to the side frame, A, and curves upward and inward, so that its gripping-face lies in a vertical plane about at the center transversely of the space between the frames A A', and to this fixed jaw M the saw-blade-holding frame S is attached. This frame S is made preferably with a couple of side plates, $s s$, fastened together, and with a plate, s^3 , interposed between them, and so as to leave an upper groove, s' , between the plates $s s$ of a width about corresponding with the thickest saw-blades to be operated upon. At or near each end the frame S carries a guard-plate, T, which is slotted centrally and vertically, as at t , so as to be adjusted up or down, and made fast by the thumb-nut t' of a bolt, t^2 , which bolt passes through the slot t . A washer, t^3 , may be used between the nut and the plate, if desired. By adjusting the plates T their overhanging upper end flanges, T' , may be brought quite closely to the tops of the saw-teeth as the back of the saw-blade rests in the grooves s' , whereby blades of different widths may be held down and prevented from jumping from the groove as the blade is fed along the frame S.

To afford room for the free action of the movable vise-jaw, I make a downward break

in the frame S at about where the jaws come, and connect the ends at the break by a plate or frame, S' , the lower bar of which comes below the vise-jaws. This yoke S' has backwardly-extending flange-plates S^2 , which fit loosely against the opposite sides of the fixed vise-jaw M, to which the yoke, and consequently the whole saw-blade frame, may be held by screw-bolts or thumb-nuts M' . These bolts pass through slots s^2 in the plates S^2 , so that the whole frame may be set higher or lower on the vise-jaw and in relation to the setting-punches, as may be required for saw-blades of varying widths, or to accommodate the wear of the blade, the roots or bases of the saw-teeth being held always about in line with or a little above the top faces of the vise jaws.

The movable jaw N of the vise is pivoted to swing transversely and in vertical plane on a pin, n , which passes through lugs n' , cast upon or fixed to the frame A', and a spring, n^2 , acts to move the head of jaw N back from the fixed jaw to open the vise.

The lever L is pivoted at l to the bed-plate A² or a stud, a^4 , thereon, so as to swing in horizontal plane. The back end of the lever rises somewhat and curves partly around the driving shaft B next to the tappets J J, which successively act on the edge of the horizontal cam L', formed at the side of the lever for carrying its front end, L², outward against the inner face of the lower end of the jaw N, for closing the jaw against the saw-blade to bind the blade fast in the vise prior to the action of the setting-punches on its teeth. A pin, l' , fixed in the base-plate A², limits the back movement of that end of the lever L next the jaw N of the vise.

The setting-punches F are fitted to slide in bearing-blocks F', and are held to the blocks by keys F², which pass through a notch or recess, f , in the side of the punch. The side of the notch f is flat, so that the edge of the key holds the punch from turning, and the ends of the notch will come against the key to prevent the punch from moving endwise either way out of the block F'. A spring, f' , acts to force the punch back from the saw-tooth after it is driven forward by the hammer to set the tooth over against the corresponding beveled anvil or set-block F³, fixed in the jaw of the vise opposite or at the other side of the saw blade from the punch which acts against it. The punches preferably are set in inclined positions, (see Fig. 6,) and their ends are beveled vertically to drive the teeth over flat against the set-blocks.

The bearing-blocks F' have end shoulders, as at f^2 , which come against one face of the side frames, and the punch-holding keys F² come against the opposite faces of the frames to hold the blocks F' in the slots F⁴, made along the head portions of the side frames, A A', but so that the blocks may be adjusted forward or backward in the slots to carry their respective punches into proper positions to act upon saw-teeth of various sizes, the blocks

being set to line the opposite punches with two adjacent teeth of the saw-blade for setting the teeth over against the opposite set-blocks F^3 in opposite directions, and at the same time, by the stroke of the hammers E' . Set-blocks F^3 , having different inclines at their working-faces, may be substituted one for the other to vary the set of the saw-teeth as may be required. The bearing-blocks F' , when properly set in the slots F^4 , are held firmly to place by screws F^5 , entered through tapped holes in the frame into opposite ends of the slots and against opposite ends of the bearing-blocks, and lock-nuts f^3 are provided on the screws to hold them against turning loose. When the punch-blocks F' are shifted and secured, the hammer-levers may be shifted correspondingly by turning their fulcrum-blocks G on their pivots g' and then tightening up the screws H , and so as to cause the hammers E' to strike the punch-heads fairly.

The slide-bar O , which works the feed devices, has an upturned end, O' , to which is fixed a pin, O^2 , which moves through a post, O^3 , on the frame to guide that end of the slide-bar; and headed screws $o o$, set into the frame-plate A^2 , serve to guide the other end of the bar and hold it down. A spring, O^4 , on the pin O^2 , acts between the end O' of the bar O and the post O^3 to move the slide-bar forward again after it is carried back by the action of each of the tappet-pins $K K$ on the shaft B . The slide-bar O is pivoted at o' to the lower end of the feed-lever P , which itself is pivoted on a bolt, P^2 , to a post or standard, P' , fixed to the frame. The lever P is slotted vertically or lengthwise, as at p , and the post P' also is slotted vertically, so that the bolt P^2 passes through the slots of both the lever and post. The bolt P^2 has a central fixed collar somewhat thicker than the saw-holding frame S , and immediately below it, to separate the lever P and post P' to give room for the frame S to extend along between them, and both ends of the bolt are threaded to receive suitable lock-nuts and washers, as at $p' p^2$, at the back of the post P' , for locking the pivot-bolt P^2 rigidly to the post at any desired height, and as at $p^3 p^4 p^5$, next the lever P , to adjust the lever by shifting its slot p lengthwise along the pivot-bolt P^2 and to hold the lever securely to the bolt, but so that it may rock on it freely back and forth as the slide-bar O is moved by the tappets $K K$ and the spring O^4 . I show the slide-bar split or slotted at o^2 to give room for the revolving tappets K ; but this will be unnecessary with other proportions of the parts. It will be understood that any suitable adjustable fastenings may be used to hold the pivot-bolt P^2 to the post P' and permit the lever P to rock on the pivot. The top of the rock-lever P curves forward and is slotted in a corresponding curve, as at p^6 , in which slot is held a sliding block, V , which has side flanges or shoulders overlapping one face of the lever P , and is held to the lever by a headed screw, v , and a nut, v' , on the screw, said nut over-

lapping the opposite face of the lever and serving to bind the block V at any point along the slot p^6 . (See Fig. 2.) A screw, v^2 , passes loosely through the block V , and fits threads in the eye q of the feed-pawl Q , and a nut, v^3 , on the screw v^2 , outside of the eye q , holds the feed-pawl to the block V , and so that the pawl may be swung up and down at its hook end Q' to leave and enter the teeth of the saw-blade R for feeding it forward to carry successive pairs of the teeth between the setting-punches $F F$. The acting end Q' of the pawl is weighted, as at q' , to prevent its jumping and cause it to more certainly engage the saw-teeth, and the elastic hammer-driving band I also stretches across the top of the pawl-lever to hold it to the saw-teeth when the hammers are drawn fully back.

A number of holes, o^3 , are provided in the lower end of the lever P to receive the pivot-pin o' that connects the lever to the slide-bar O , which allows the head of the lever to be raised or lowered to secure the best action of the pawl Q on the teeth of saw-blades R of varying widths, and allows the feed-pawl Q to be set with accuracy to catch upon teeth of varying lengths along the saw-blade. By adjusting the block V in the slot p^6 the saw-teeth will be stopped at the proper point along the set-blocks F^3 .

The hammer-working cams $D D$ are set alike on the driving-shaft B , or with the high ends or shoulders d' of both cams directly opposite each other, to permit the ends e of opposite hammer-levers to pass said ends d' at the same instant for allowing the two hammers $E' E'$ to strike their respective punches $F F$ as the shaft is rotated by power applied to its hand-crank W , or a drive-pulley fixed to the shaft.

The operation of the machine is as follows: The saw-blade R is placed in the slot s' of the holder-frame S , and said frame is set and held by the slots s^2 and nuts $M' M'$ to the jaw M of the vise, with the bases of the teeth just above the jaw. The guard-plates T are adjusted above the teeth, and the feed-pawl Q is adjusted and let fall to engage the teeth. The punches F and the hammers E' are now set, and the band I is adjusted to the hammer-levers. When the opposite tappets, $J J K K$, range about vertically, or the upper ones incline slightly forward, the upper tappet J will stand just forward of the front shoulder, t^2 , of the cam portion L' of the lever L , and the spring O^4 will have forced the slide-bar O forward until its end O' comes against the shaft B , which movement has rocked the lever P on its pivot P^2 to carry the feed-pawl Q backward for a new hold on the teeth r of the saw-blade, and the jaw N of the vise then is open or loose and does not clamp the blade, and at this time the ends e of the hammer levers have traveled up the cam-faces d' sufficiently to lift the hammers E' from the punches F and permit the springs f' to throw the punches outward with their striking ends clear of the saw-teeth. If, now,

the shaft B be turned, the lower tappet K will act against the end O' of the bar O and carry it backward against the tension of spring O⁴ to move the feed-pawl Q forward and carry the saw-blade with it for a distance of two teeth, and just as the full feed-movement is given to the slide-bar O the lowermost tappet J commences to act on the lower inclined edge or face, *l*³, of the cam L' on lever L to close the jaw N of the vise tightly on the saw-blade. In riding up the cam-face *l*³ the lever L is free to spring somewhat to accommodate itself to saw-blades of different thickness. As the opposite tappets, J J K K, reach about a horizontal position, the acting tappet J will begin its upward and forward travel along the straight face or portion *l*⁴ of cam L² to hold the saw-blade firmly clamped in the vise, and the acting tappet K will pass upward and forward to allow the spring O⁴ to force the slide-bar O forward again for carrying the feed-pawl Q back for a space of two saw-teeth, ready for the next feed. Just after the tappet K leaves the end O' of the slide O in its upward movement, and while the tappet J still is on the face *l*⁴ of the cam L', and the vise consequently closed on the saw-blade, the ends *e* of the hammer-levers E will escape from or over the shoulders *d*' of the cams *d*, and the hammers will strike the punches F to set the pair of saw-teeth reverse ways against the anvils or set-blocks F³, and with quick, sharp blows, which will set tempered saw-teeth much more certainly than a much greater force applied by a gradually-increasing pressure, and softer or untempered saw-teeth can only be set back to the angle of the set-blocks F³. The teeth of tempered and untempered saw-blades, or unevenly-tempered teeth of the same blade, will thus be set regularly to either side for the full length of the blades. After the hammers strike the punches the next cam-face *d* will begin to act to raise the hammers again, and as the hammers leave the punches F and the latter are freed from the saw-blade by their springs *f*' the acting tappet J will pass the shoulder *l*² of the cam L' of lever L and allow the spring *n*² to swing the vise-jaw N back and release the saw-blade. The parts are now in the positions stated at first, and as the now lowermost tappet K acts on the end O' of the slide-bar O, the loose saw-blade will again be fed forward and the setting operation be repeated, as above described.

As there are two cam-faces *d* on each cam disk or wheel D, and two tappets J and K on the shaft B, there will be two adjacent pairs, or four, of the saw-teeth set for every revolution of the driving-shaft. Should there be but one cam-face *d* on each wheel D, and one tappet J and K on the shaft B, but two teeth would be set for every revolution of the shaft; but the duplicate construction shown and described is preferred.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for setting saws, the following elements in combination: a driving-shaft, B, provided with cam-disks D D and tappets J K, a vise having a fixed jaw, M, and a movable jaw, N, a saw-holding frame, S, held in line with the meeting faces of the vise-jaws, a cam-lever, L, actuated by the tappets J to close the vise-jaw N upon the saw-blade, a pair of opposite punches, F F, acting to set two adjacent saw-teeth reverse ways against anvils or set blocks on the vise-jaws opposite hammers E' E', actuated by the cams D, and a connecting elastic band or spring to strike the setting-punches, and a feed-pawl, Q, connected to a rock-lever, P, pivoted to a slide-bar, O, which is actuated by a spring and the tappets K on the driving-shaft, all constructed and arranged to operate substantially as shown and described.

2. The combination, with the opposite side frames, A A', opposite setting-punches F F, set to slide transversely in the frames, and opposite hammers E E' E E', pivoted to the frames, of the opposite cams D D, set on the main shaft and acting to lift and release both hammers simultaneously, and an elastic band, I, or equivalent means for driving the hammers against the punches, substantially as shown and described.

3. The combination, with the side frames, A A', of the setting-punches F, fitted to slide transversely in blocks F', which are adjusted longitudinally in slots F⁴ of the frames, and the hammers E E', pivoted in fulcrum-blocks G, which are pivoted at one end to the frame and connect therewith at their other end by a slot and bolt, allowing the hammers to be shifted relatively as the punches are shifted, substantially as shown and described.

4. The combination, with the frames A A', slotted at F⁴, and the punch-carrying blocks F', fitted in the slots, of the set-screws F⁵, substantially as shown and described.

5. The combination, with the side frames slotted at F⁴, of the punch-blocks F', provided with a shoulder, *f*², at one face of the frame, and a key, F², at the other face, said key passing into a recess, *f*, in the punch to hold it to the block and prevent its turning, and said key-serving also to lock the block F' to the frame, substantially as shown and described.

6. The combination, with the side frames, A A', of the vise-jaw M, fixed to the frame A, and the movable vise-jaw N, pivoted at *n* to the frame A' and opened by a spring, *n*², and said jaws M N being provided with anvils or set-blocks F³, substantially as shown and described.

7. The saw-holding frame S, made with a top groove, *s*', and guard-plates T, having head flanges T' and attached to the frame by a slot-and-bolt connection, substantially as shown and described.

8. The saw-holding frame S, made with a

top groove, s' , and end guards, T, and with slotted wing-plates S^2 , whereby the frame may be fastened to the fixed jaw M of the vise, substantially as shown and described.

5 9. The saw-holding frame S, made with a top groove, s' , end guards, T, and a yoke, S' , to pass beneath the vise-jaws, substantially as shown and described.

10 10. The combination, in a saw-setting machine, of the shaft B, having tappets K, the slide O, driven backward by the tappets and forward by a spring, the rock-lever P, pivoted to the slide O and fulcrumed on a post of the frame, and the feed-pawl Q, connecting with

the slotted head of lever P and engaging the saw-teeth, substantially as shown and described.

11. The combination, with the movable vise-jaw N, of the shaft B, having tappets J, and the cam-lever L, pivoted to rock horizontally, and provided with the cam-shoulder l^2 and cam-faces l^3 l^4 , substantially as shown and described.

JOHN H. C. WINSTON.

Witnesses:

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WM. D. MAYS.