No. 709,013. Patented Sept. 16, 1902.

J. E. HILLSTROM.

SAW SETTING MACHINE.

(Application filed Oct. 2, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

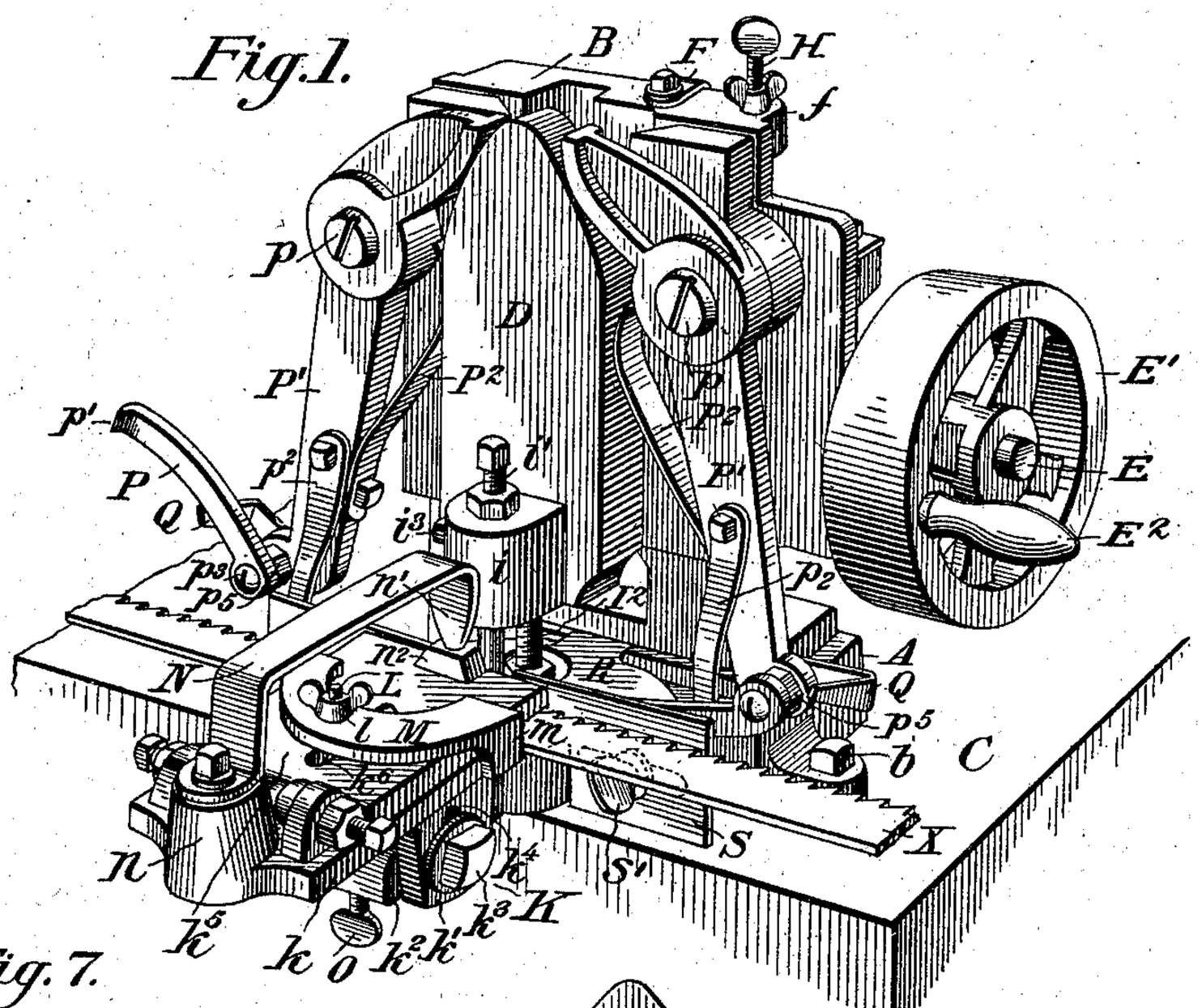
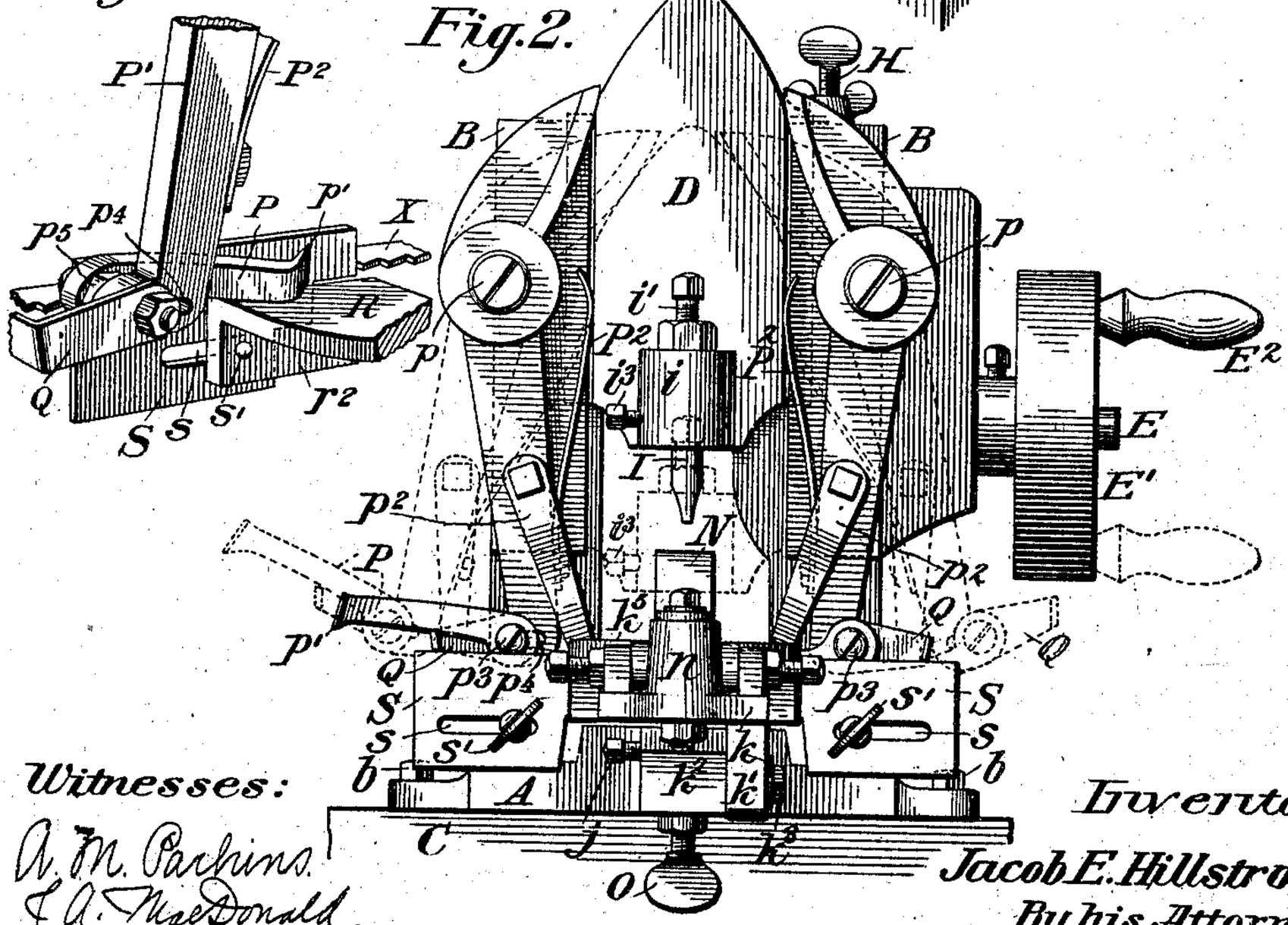


Fig. 7.

Fig. 2.



Witnesses:

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J. A. MacDonald.

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Fig. 3.

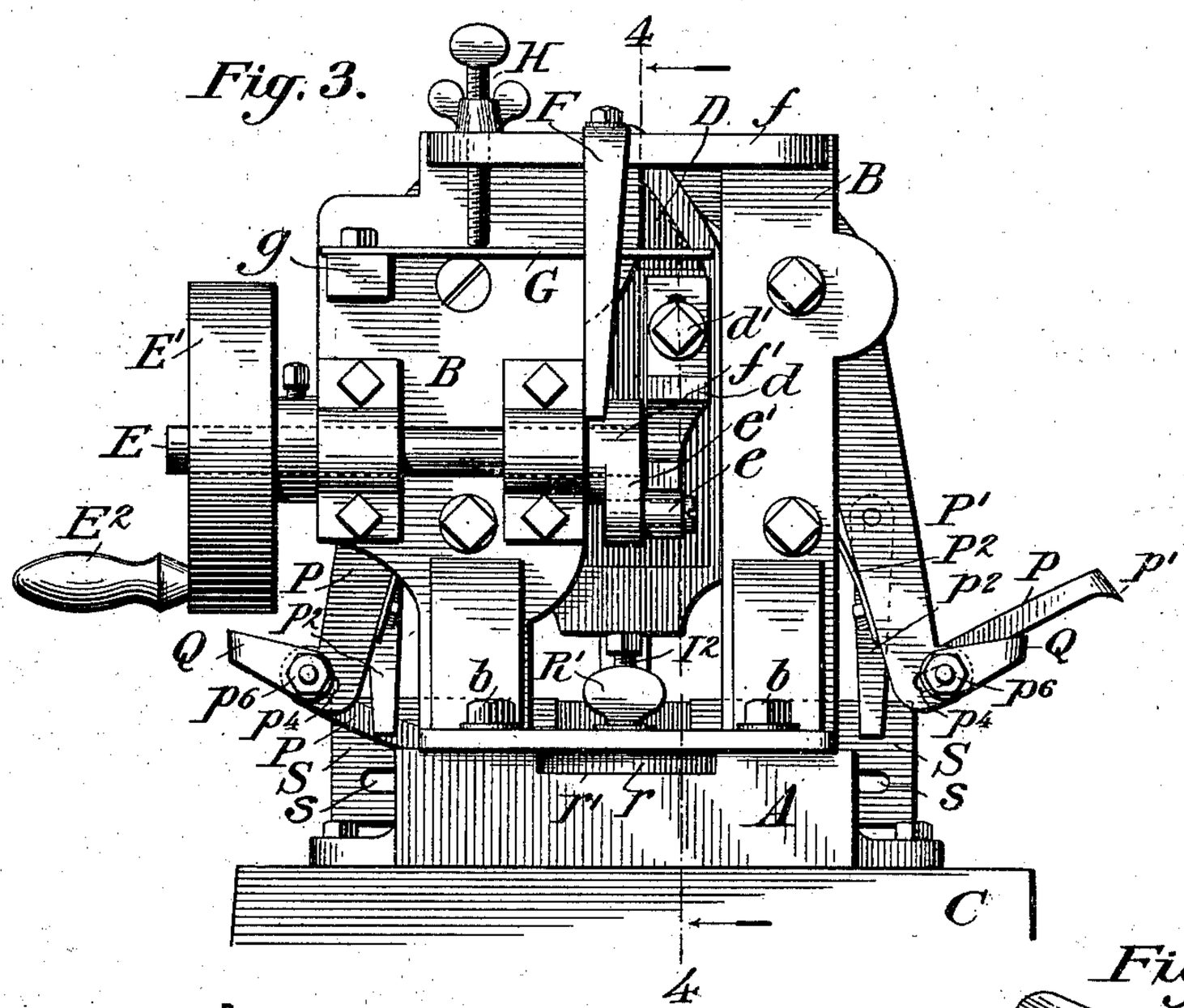

Fig. 4.

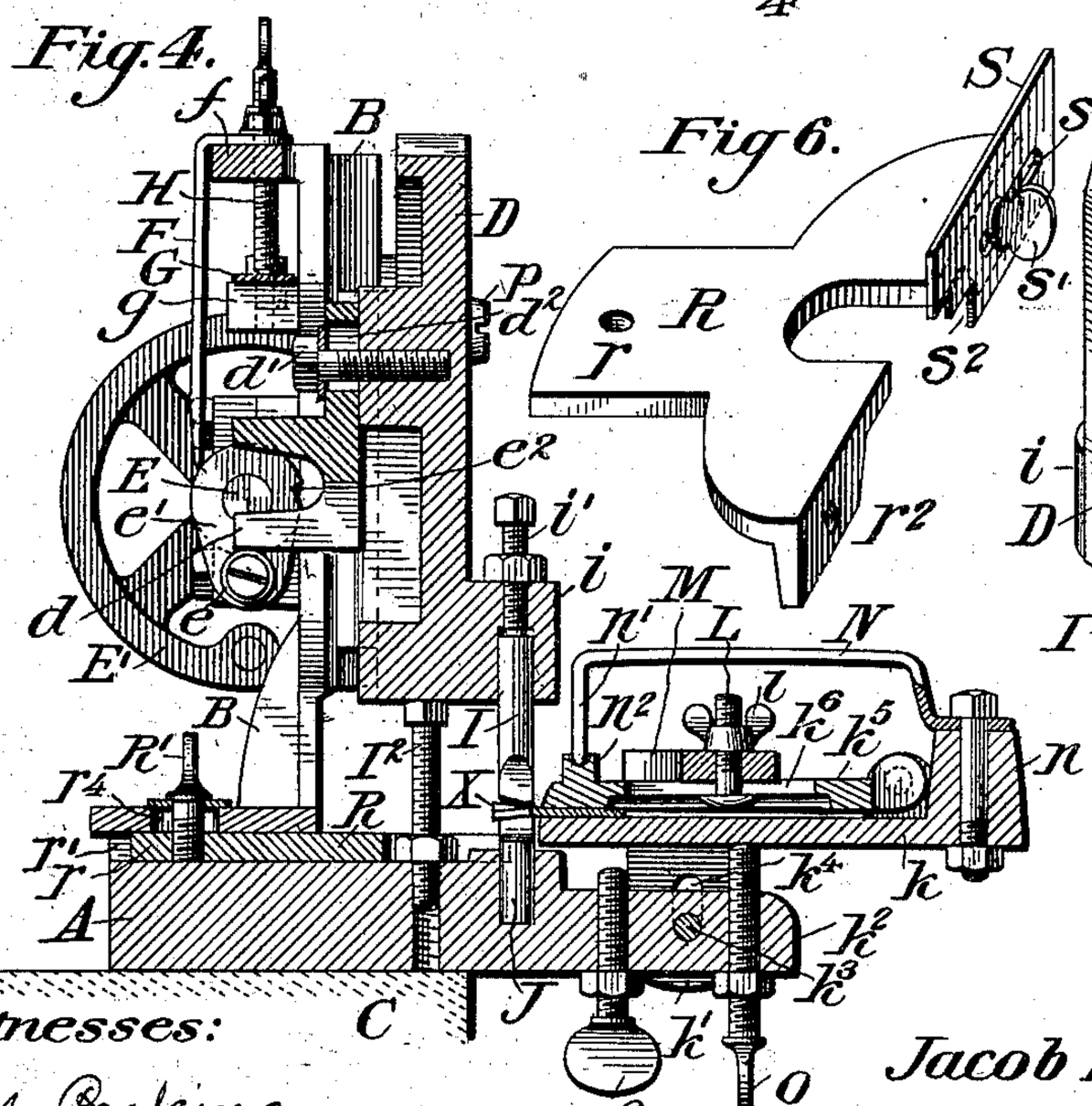

Fig 6.

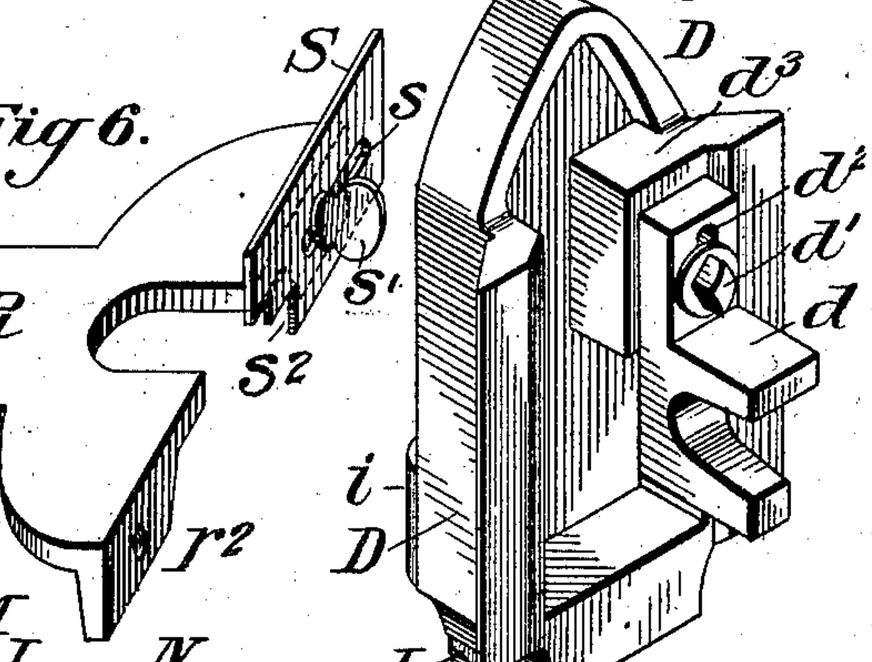

Fig. 5.

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UNITED STATES PATENT OFFICE.

JACOB E. HILLSTROM, OF MICHIGAN CITY, INDIANA.

SAW-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 709,013, dated September 16, 1902.

Application filed October 2, 1901. Serial No. 77,287. (No model.)

To all whom it may concern:

Be it known that I, JACOB E. HILLSTROM, a citizen of the United States, residing at Michigan City, in the county of Laporte and State of Indiana, have invented certain new and useful Improvements in Saw-Setting Machines, of which the following is a specification.

The object of my invention is to provide an improved saw-setting machine which shall be simple in construction and efficient and rapid in operation and readily adjustable to accommodate saws of different kinds and sizes and to impart blows of different force to the saw-teeth.

For setting the teeth I rely on the momentum of a weighted hammer, which is lifted and allowed to drop on the teeth successively to give to them the desired set. The hammer is secured to the lower end of a heavy plunger, which is guided in a suitable frame and which is preferably raised by an arm on a crank-shaft, which may be driven by hand or by power. The momentum of the plunger, and consequently the force of the blow given to the teeth of the saw, may be varied by varying the upward movement of the plunger, and consequently the distance through which it drops. A spring may be employed, if desired, to start the plunger in its downward movement, so as to increase the force of the blow, and the plunger may be held elevated when desired by a stop provided for the purpose.

Some parts of my invention are applicable to setting teeth of circular saws as well as band-saws; but I have herein shown my improvements as applied to a machine for setting the teeth of band-saws. The band-saw is held in a clamp provided with a gage for holding the saw in the proper position relatively to the hammer and the anvil, and this clamp is adjustable in order that the set of the teeth may be accurate and in order that the machine may be adapted to accommodate saws of different kinds and sizes. The saw is fed forward in either direction by means of dogs carried by levers operated by the plunger in its vertical movements. Only one feed-dog is employed when feeding the saw in one direction, at which time the other feed-dog is thrown out of operation. Devices are employed for regulating the penetration of the feed-dogs between the saw-teeth and for varying the amount of movement given by the dogs to the saw. Thus the machine may be adapted for operating upon saws of various kinds and sizes.

In the accompanying drawings, Figure 1 shows a perspective view of a band-saw-setting machine embodying my improvements. Fig. 2 shows a front elevation thereof, dotted lines showing the position of some of the parts when the crank-shaft has been moved. Fig. 3 shows a rear elevation of the machine. Fig. 4 shows a vertical transverse section of the machine on the line 4 4 of Fig. 3. Fig. 5 is a perspective view of the plunger, and Fig. 6 is a perspective view of a portion of the gage used for regulating the penetration of the feed-dogs into the saw. Fig. 7 is a detail view in perspective, showing particularly some parts of the saw-feed mechanism.

The bed A of the machine may be secured to any suitable support C. To this bed is secured by means of bolts *b* an upright frame B, having guides for the vertically-moving plunger D. To the rear side of the plunger is secured a bracket *d*, which may be adjusted vertically on the plunger by means of a bolt *d'*, extending through a slot d^2 in the bracket and into an enlargement d^3 on the back of the plunger. A crank-pin carrying a roller *e* is secured to the outer end of a crank-arm *e'* on a crank-shaft E, mounted in suitable bearings on the back of the frame B and having secured to one end a crank-wheel E', provided with a handle E^2. The roller *e* is adapted to engage the under side of the bracket *d* and to raise the plunger to the limit of its upward movement and to then allow the plunger to drop by its own weight. The point to which the plunger may be raised vertically may be varied by adjusting the position of the bracket *d* on the plunger by means of the set-bolt *d'*. When the plunger is raised, it may be held in an elevated position by means of a spring-finger F, secured to a flange *f* at the top of the frame B and having its lower end bearing on the hub *f'* of the crank-arm *e'*. This hub is provided with a shoulder e^2, with which the lower end of the finger F engages to hold the plunger elevated. The finger may be readily made to engage with the shoulder by simply stopping the movement of the

crank-shaft when the finger is in line with the shoulder. A spring G, secured to a lug *g*, projecting from the rear side of the frame B, extends crosswise of the frame above the bracket *d*. When the plunger is raised to nearly its full extent, the spring comes in contact with the upper side of the bracket, and the further upward movement of the plunger puts the spring under tension. By this means the plunger is given a quick downward movement at the start of its descent, which will cause it to increase its momentum. The force of the spring may be adjusted by means of a set-screw H. It is often desirable to adjust the blow of the hammer carried by the plunger, as the machine is intended to operate upon saws of various sizes and kinds. The force of the blow is regulated not only by this spring G, but also by the position of the bracket *d* on the plunger.

The hammer I is secured by means of a set-screw i^3 in a socket in a bracket *i*, projecting from the front side of the plunger D, and a set-screw *i'* is employed for adjusting the position of the hammer in its socket. The downward movement of the plunger is regulated by means of a set-screw or stop I^2. This stop is adjustable vertically, and therefore limits the movement of the hammer relatively to the anvil J. This anvil is secured by means of a set-screw *j* in a socket in the bed-plate A, as indicated in Fig. 4. By the devices described the force of the blow and the amount of set given to the teeth of the saw may be very nicely adjusted. The anvil is beveled on its upper end, as indicated, to operate efficiently on each individual saw-tooth, and the lower end of the hammer is correspondingly beveled.

The band-saw X is supported in a clamp K, the lower jaw *k* of which is formed with a downwardly-projecting lug *k'*, pivotally connected with a bracket k^2, projecting forwardly from the bed-plate. The bolt k^3, which connects the jaw *k* to the bracket k^2, passes through a slot k^4 in the lug *k'*. By this means the clamp may be adjusted vertically, and the clamp may also be tilted and set in the desired position. When properly adjusted, the bolt is screwed home tightly to hold the lower member of the clamp rigid. The upper jaw k^5 is pivoted at its front end to the front end of the lower jaw *k*. This jaw has a slot k^6 extending longitudinally fore and aft of the machine, and through this slot extends the bolt L, having a set-nut *l*. The bolt L also extends through an aperture in the gage M, which is provided with downwardly-extending portions *m* at its rear end and on opposite sides of the clamp. The bolt may be moved back and forth in the slot k^6. The gage moves with the bolt, and by means of the nut *l* the gage may be set at any desired position on the clamp. The gage is adapted to bear against the back of the saw, as indicated in Figs. 1 and 4. The upper jaw of the clamp is pressed toward the lower jaw at its rear end by means of a spring-finger N, secured to a boss *n* at the front end of the lower jaw, and at its front end the spring-finger has a downwardly-projecting portion *n'* bearing against a lug n^2 on the top of the upper jaw. By these devices the saw is held with sufficient firmness, but by a yielding pressure which will allow it to be fed forward after each blow of the hammer. The vertical position of the clamp on the bed may be regulated by means of set-screws O working through the forward projection k^2 of the bed-plate on opposite sides of the bolt k^4. The spring-finger N is pivoted to the boss *n* and may be swung around its pivot and the upper member of the clamp raised to any desired extent when it is desired to insert the saw between jaws of the clamp. When the saw is inserted, the finger may be swung back and engage with the lug *n* in order to hold the clamp members together, as before described. The saw is fed by means of dogs P, pivotally connected to the lower ends of levers P', which are in turn pivotally connected at *p* to the vertical frame B. The upper ends of the levers P are inclined toward each other and engage with the tapered upper end of the plunger D. When the plunger moves upwardly, it causes the lower ends of the levers, which carry the dogs P, to move inward toward the hammer. When the plunger has descended, the lower ends of the levers P' are moved outward by means of springs P^2, secured to the levers and bearing against the vertical side edges of the plunger. The free ends of the dogs P are bent forward to form teeth *p'* to engage the teeth of the saw, and they are pressed outward or forward toward the saw by means of springs p^2, carried by the levers P'. The pivotal connection between the dogs and the levers is a loose one, enabling the dogs to be moved forward by means of the springs, as above suggested. The pivot-pins p^3, which connect the dogs with the levers, extend through slots p^4 in the lower ends of the levers. By this means the dogs may be adjusted toward and from the anvil and may be held securely in place when adjusted by means of the nuts p^5 p^6, carried by the pins. The dogs may be swung out of operative position, as indicated in Fig. 2, and when swung out of operative position they may be supported by brackets Q, secured in any suitable way and in proper position to the lower ends of the levers. Of course only one feed-dog at a time is active, and instead of allowing the other dog to ride idly over the saw or to engage in any way therewith I find it desirable to throw it out of the way and support it as above explained.

R indicates a plate carrying guides S for the dogs. The plate R is formed with a tongue *r*, adapted to move in a guide-groove *r'* between the bed-plate and the upper portion B of the frame. The plate R may be

held in any of the suggested positions by means of a set-screw R′, extending through a slot r^1 in the frame B and entering a screw-threaded aperture in the tongue r. At its front end the plate R carries the guides S, above referred to. These guides consist of vertical plates having slots s, through which extend set-screws s', that engage screw-threaded openings in the front flange r^2 of the plate R. The dogs move back and forth on the plate R, adjacent to the vertical plates S, and the springs p^2 press the dogs against the plates S during the greater portion of the movement of the dogs; but after the dog in operation has passed the inner end s^2 of the plate it is caused to engage a tooth of the saw, and by its further movement to feed the saw forward. By properly adjusting the plates S the amount of movement given to the saw by the dogs may be varied. It will be understood that each dog when in operation feeds the saw forward a distance of two teeth, and after every other tooth has been set the saw is reversed and fed back by the other dog; but of course the amount of movement given to different saws must vary with the size and kind of saw, and hence the adjstments and gages above referred to are employed. By properly adjusting the plate R the guides S may be moved toward and from the saw-clamp K, so as to regulate the position of the saw-teeth relatively to the anvil. The saw is placed in the clamp, and the gage M is made to bear against the back of the saw, as indicated in Figs. 1 and 4, while the front ends of the saw-teeth bear loosely against the faces of the plates S, the saw thus being guided at the rear by the gage M and at the front by the plates S. By moving the plate R, and consequently the plates S, toward the clamp or toward the gage M the position of the saw-teeth relatively to the anvil and the hammer may be varied. If the plates S are moved away from the saw-clamp, the saw may be moved farther over on the beveled anvil and a wider set of the saw will be effected, more of the tooth being exposed to the weight of the hammer. When the plate R is moved in the opposite direction, the saw is adjusted away from the anvil, so that smaller portions of the teeth are subjected to the blow of the hammer and less set is given to the saw.

The operation of the machine will be clear from the foregoing description; but, briefly stated, it is as follows: After the saw is arranged in the clamp and the gage M has been properly adjusted and the clamp is adjusted to the proper elevation and inclination the guides S are adjusted to cause the proper dog to feed the saw to the desired extent. The feed of the dog may also be varied by adjusting the position of the pivot-pin p^3 in the slot p^4. The forward movement of the dog between the teeth may also be regulated by adjusting the plate R. After these adjustments a series of blows may be given to the saw-teeth to set the teeth by merely revolving the crank-shaft. The force of the blows may be regulated in the manner before described.

I claim as my invention—

1. The combination of a vertically-moving plunger, means for operating it, a support for the saw, a feed-dog, a lever to which it is pivoted, a spring for moving the lower end of the lever outwardly, and an inclined surface on the upper end of the plunger engaging the lever for moving its lower end inwardly.

2. A saw-setting machine comprising a vertically-moving plunger, an anvil coöperating therewith, a saw holder or clamp, a guide-plate for the front or toothed end of the saw, and means for adjusting the guide-plate toward and from the saw-holder in a direction at right angles to the direction in which the saw moves.

3. A saw-setting machine, comprising a vertically-moving plunger having a tapered upper end, a dog-carrying lever having at its upper end an inwardly-projecting portion engaging the inclined upper end of the plunger, and a spring for moving the lower end of the lever outwardly.

4. A saw-setting machine comprising a vertically-moving plunger, a feed-dog, means for operating it, a guide-plate in contact with which the end of the dog moves, and by which the dog is guided, and means for adjusting the guide-plate in a direction at right angles to the direction in which the saw moves.

5. A saw-setting machine, comprising a vertically-moving plunger, a feed-dog, a guide-plate for the dog, and means for adjusting the position of the plate in the line of movement of the dog, and also at right angles relatively thereto.

6. In a saw-setting machine the combination of a frame, a saw-holder arranged to hold the saw in a horizontal plane, a dog-carrying lever pivoted to the frame above the saw-holder and arranged to move in the same direction as the saw, a dog pivoted to the dog-carrying lever at its lower end and arranged to move relatively to the dog-carrying lever about an axis at right angles to the line of movement of the saw and also to move relatively to the dog-carrying lever about an axis perpendicular to the line of movement of the saw, and a spring for moving the dog horizontally toward the saw.

7. In a saw-setting machine, the combination of a dog-carrying lever adapted to move in a direction parallel with the line of movement of the saw, an anvil, a dog pivoted to the dog-carrying lever, and devices whereby the pivot of the dog may be adjusted on the lever toward and from the anvil.

8. The combination of the bed-plate, the lower member of the clamp, adjustably connected therewith, the upper member of the clamp pivoted to the lower member, and a pivoted spring-finger for pressing the upper

member of the clamp toward the lower member.

9. The combination with the bed-plate of the machine, of the lower member of the clamp, pivotally connected with the bed-plate, devices for adjusting the position of the lower member vertically relatively to the bed-plate without changing its inclination, and for also adjusting its inclination thereon, the upper member of the clamp pivoted to the lower member, and the gage adjustable longitudinally on the clamp.

10. The combination with the bed-plate of the machine, of the lower member of the clamp pivoted thereto, and adjustable vertically thereon, the upper member of the clamp pivotally connected with the lower member, the gage adjustable longitudinally on the clamp, and the spring-finger pivoted to the lower member of the clamp, and adapted to engage the upper member.

11. In a saw-setting machine, the combination of the bed-plate, the feed-dogs, means for operating them, a holder for the saw, a plate formed with a tongue and moving in the grooves in the bed-plate toward and from the saw-holder, guides on the end of said plate next the saw-holder, and means for adjusting the guides toward and from each other in a direction parallel with the line of movement of the saw.

In testimony whereof I have hereunto subscribed my name.

JACOB E. HILLSTROM.

Witnesses:
JOHN J. GLASSCOTT,
EDWIN J. BOWER.