(No Model.)

3 Sheets—Sheet 1.

L. L. NORTHUP.

SAW SETTING MACHINE.

No. 448,742. Patented Mar. 24, 1891.

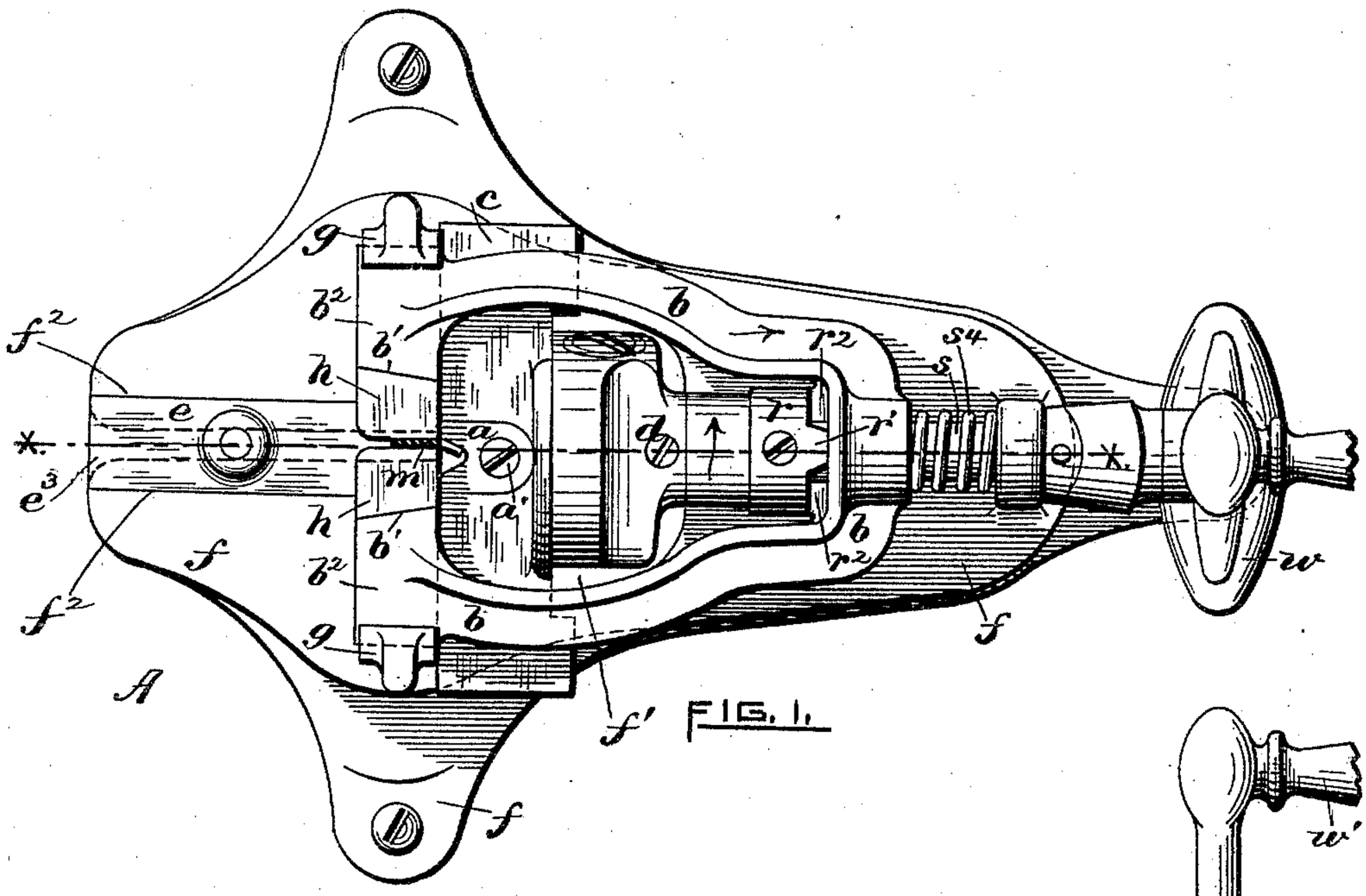
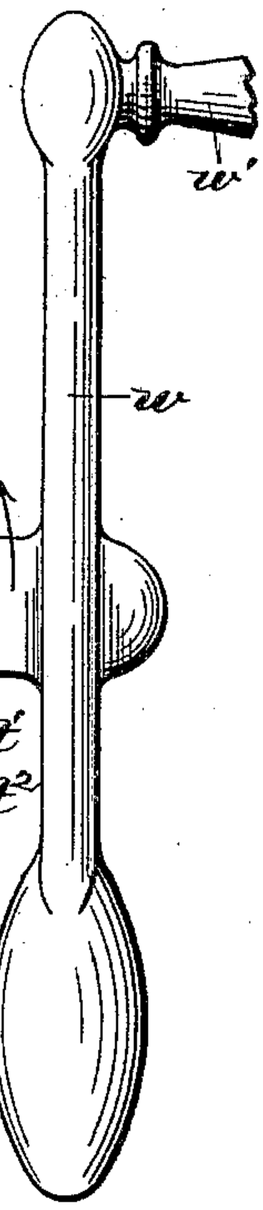


FIG. 1.



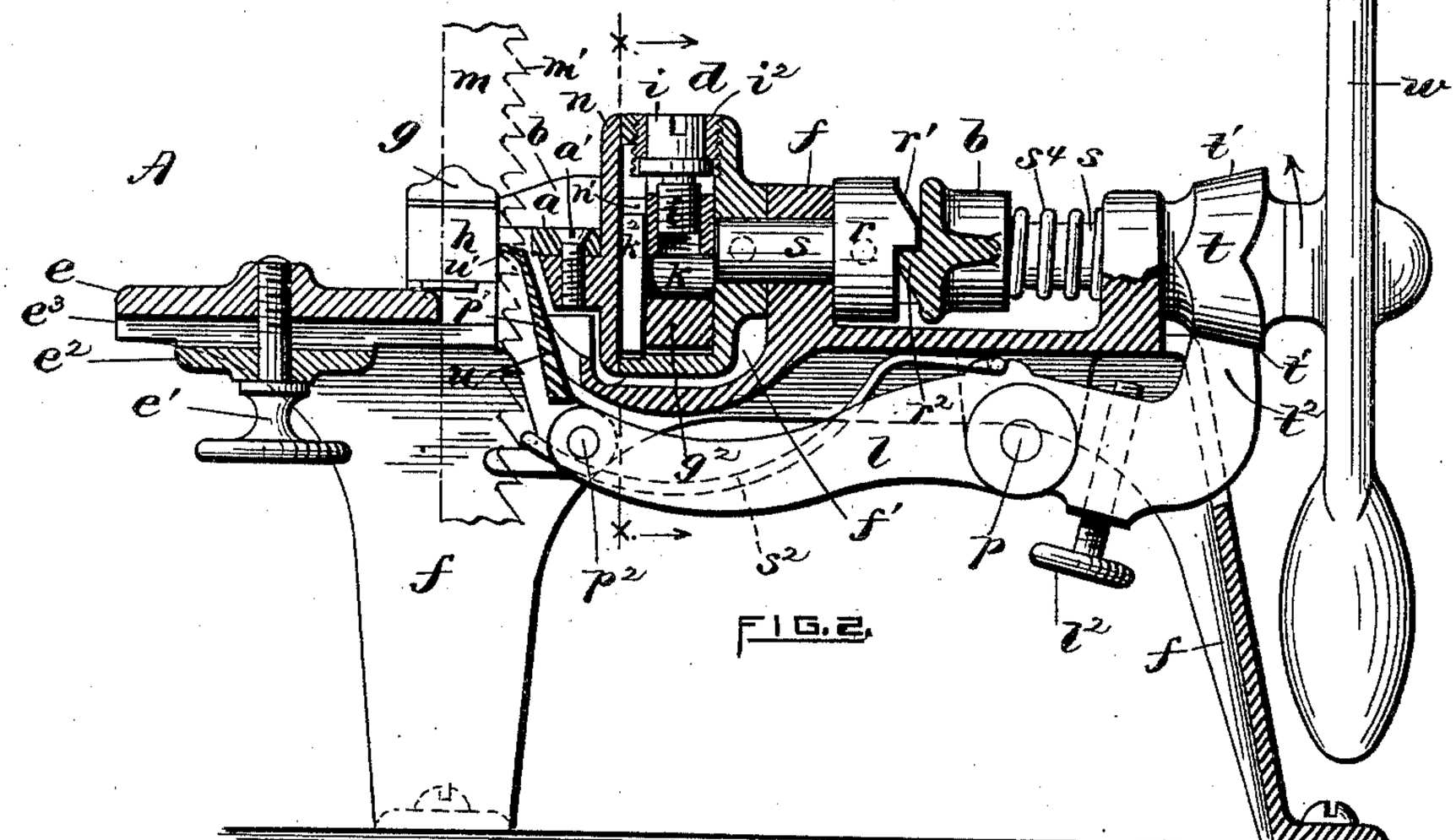


FIG. 2.

WITNESSES.

Charles Hannigan.

H. Francis Fourtellott

INVENTOR.

Louis L. Northup.

by Remington & Henthorn

Attys.

(No Model.)

3 Sheets—Sheet 2.

L. L. NORTHUP.

SAW SETTING MACHINE.

No. 448,742. Patented Mar. 24, 1891.

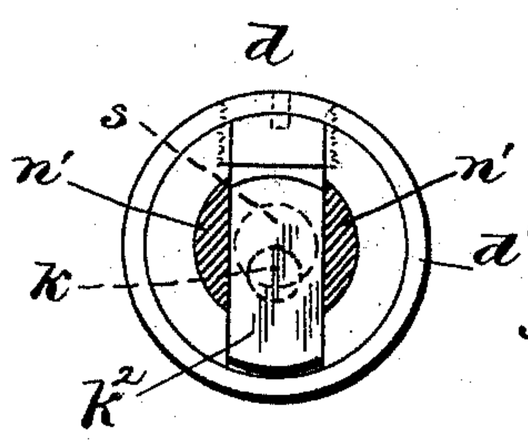
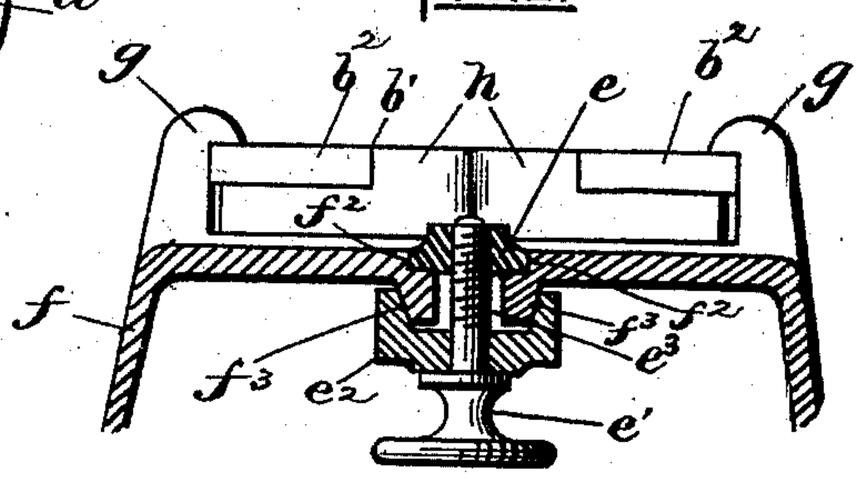


FIG. 4.

FIG. 5.



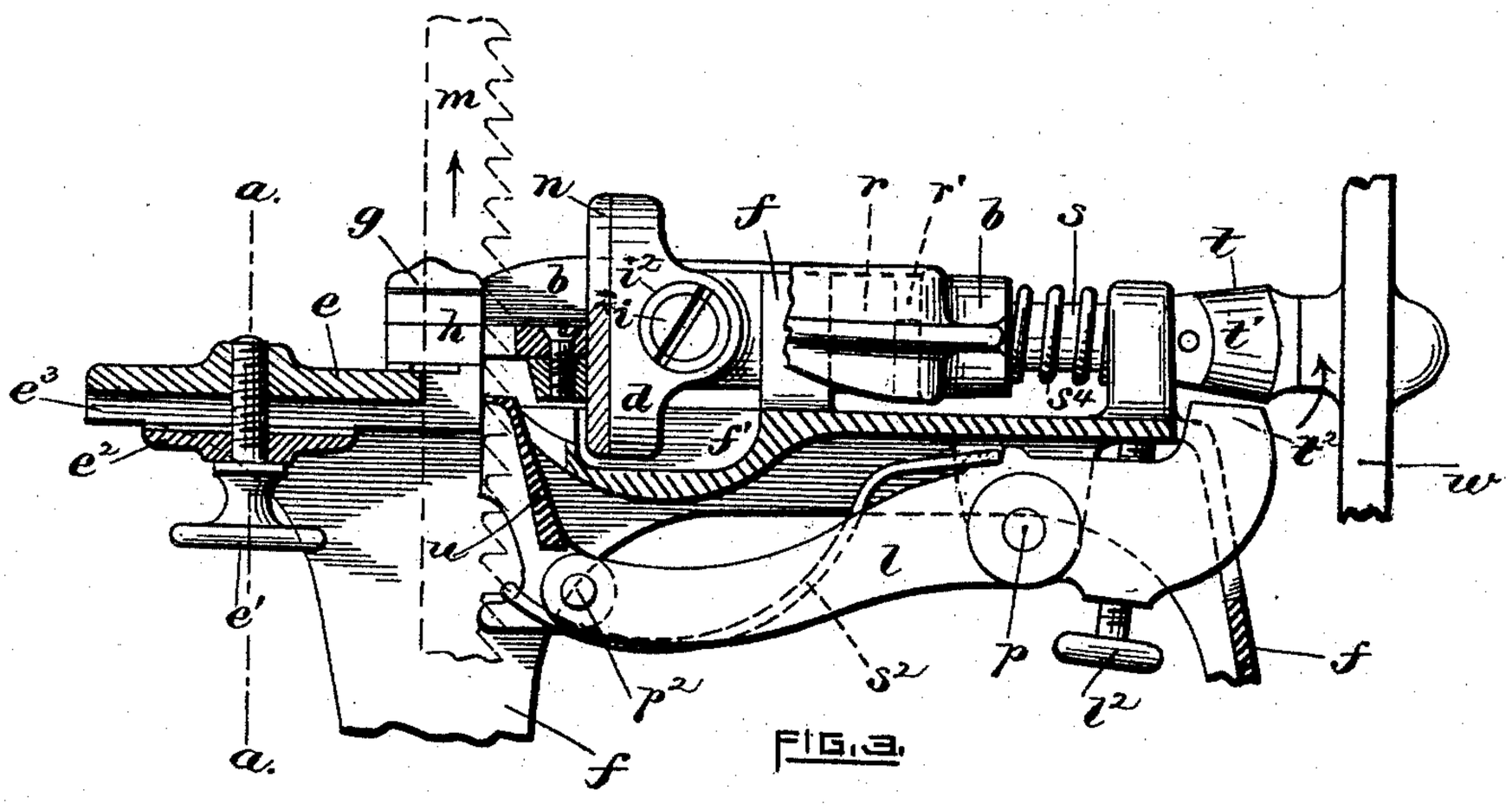


FIG. 3.

WITNESSES.

Charles Hamilgon

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Atty's.

(No Model.)

3 Sheets—Sheet 3.

L. L. NORTHUP.

SAW SETTING MACHINE.

No. 448,742. Patented Mar. 24, 1891.

FIG. 10.

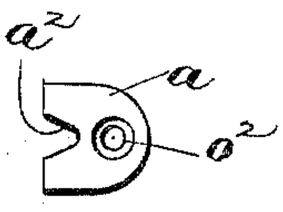

FIG. 11.

FIG. 16.

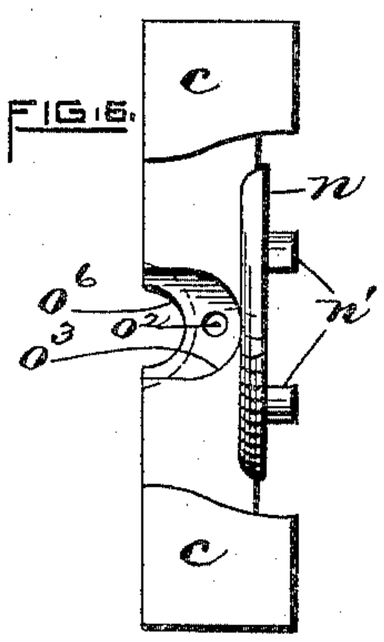

FIG. 21.

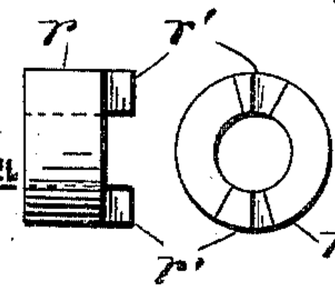

FIG. 22.

FIG. 23.

FIG. 24.

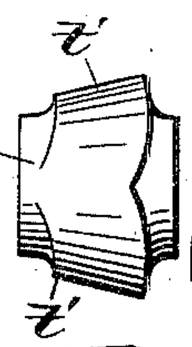

FIG. 25.

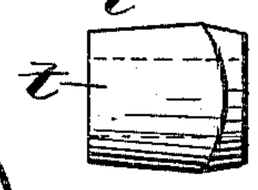

FIG. 7.

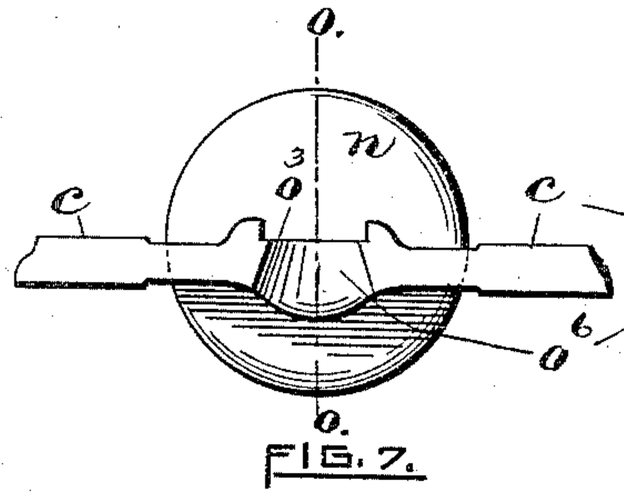

FIG. 8.

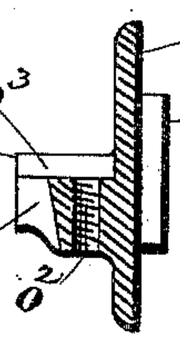

FIG. 9.

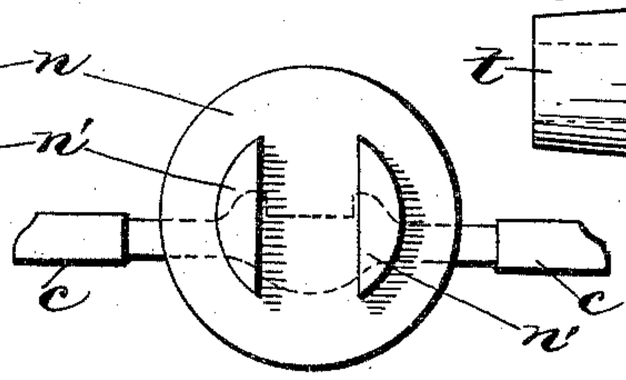

FIG. 17.

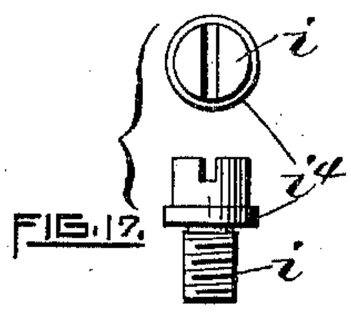

FIG. 18.

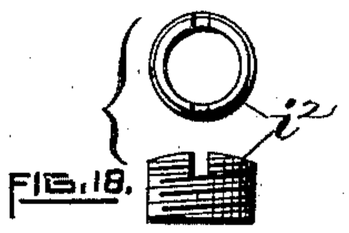

FIG. 14.

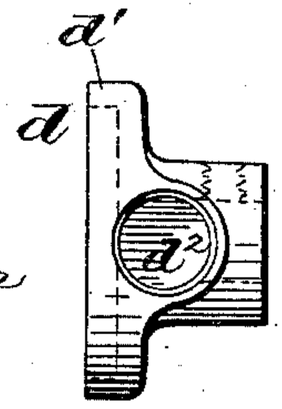

FIG. 15.

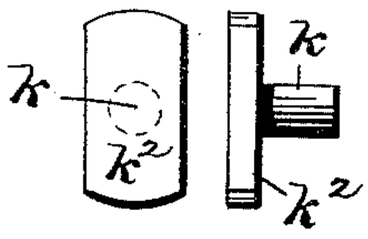

FIG. 16.

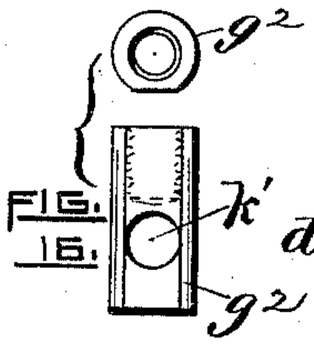

FIG. 12.

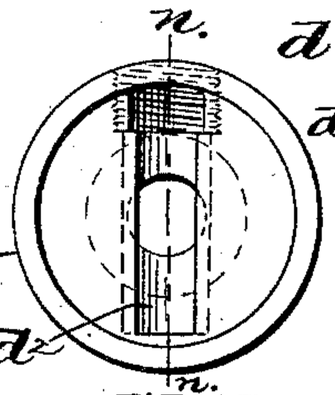

FIG. 13.

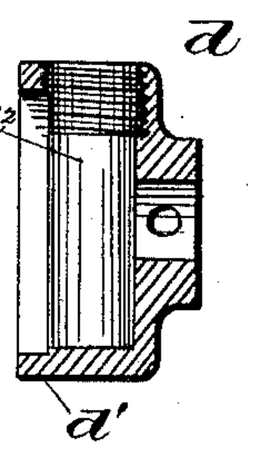

FIG. 19.

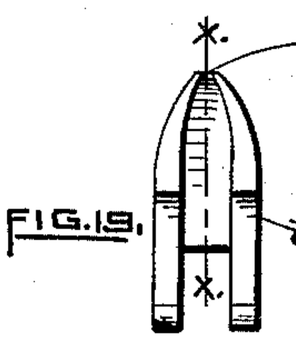

FIG. 20.

WITNESSES.

Charles Hannigan.

H. Francis Parkhurst

INVENTOR.

Louis L. Northup.

by Remington Hawthorn

Attys.

UNITED STATES PATENT OFFICE.

LOUIS L. NORTHUP, OF PROVIDENCE, RHODE ISLAND.

SAW-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 448,742, dated March 24, 1891.

Application filed September 25, 1890. Serial No. 366,086. (No model.)

To all whom it may concern:

Be it known that I, LOUIS L. NORTHUP, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Saw-Setting Machines; and I do hereby 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 letters of reference marked thereon, which form a part of this specification.

My present invention has relation to machines for automatically setting the teeth of saws, more especially band-saws; and it consists, essentially, in the novel form of the reciprocating swaging-block and means for adjusting the lateral movement or stroke thereof, in combination with an adjustable feeding device arranged to intermittingly carry the saw-blade ahead immediately after the swaging mechanism has acted upon the adjacent tooth, all as will be more fully hereinafter set forth and claimed.

The object I have in view in the invention illustrated herewith is to produce a comparatively inexpensive saw-setting machine adapted to be easily and rapidly operated, and at the same time susceptible of being quickly adjusted to saws having teeth of different pitch and length.

Usually, so far as I am aware, machines of this class have been so constructed and arranged that when used for setting the teeth of band-saws the latter must necessarily be disconnected from the sawing-machine in order to introduce it to and be operated upon by the setting-machine. By means of my improvement the time, labor, and inconvenience formerly incurred in removing the saw from the sawing-machine preparatory to setting the teeth is wholly overcome, because my machine is adapted to be secured to the table or to the frame contiguous to the saw-blade, the latter being normally in place during the setting operation.

In the accompanying three sheets of drawings, representing my improved saw-setting machine, Figure 1, Sheet 1, is a plan view; and Fig. 2 is a partial longitudinal central sectional view taken on line $x\,x$ of Fig. 1, showing the position of the parts just prior to the withdrawal of the feed-lever from and just prior to the final action of the swaging-block upon the tooth. Fig. 3, Sheet 2, is a similar sectional view showing the feed-lever in a new position ready to force the saw-blade ahead. Fig. 4 is an end view, in partial section, of the swaging-head, taken on line $x\,x$ of Fig. 2. Fig. 5 is a transverse sectional view taken on line $a\,a$ of Fig. 3. Fig. 6, Sheet 3, is a plan view in detail of the swaging-block. Fig. 7 is a front view. Fig. 8 is a transverse sectional view taken on line $o\,o$, Fig. 7; and Fig. 9 is an end view of the swaging-block. Figs. 10 and 11 are respectively plan and side views of the swaging-die itself. Fig. 12 is an end view of the driver or head which actuates the swaging-block. Fig. 13 is a central sectional view taken on line $n\,n$ of Fig. 12. Fig. 14 is a plan view of the same. Figs. 15, 16, 17, and 18 are detail views of portions of the driving-head mechanism. Fig. 19 is a side elevation of the pawl adapted to be jointed to the feed-lever. Fig. 20 is a vertical sectional view of the same, taken on line $x\,x$ of Fig. 19. Figs. 21 and 22 are side and end views of the jaw-operating cam; and Figs. 23, 24, and 25 are respectively end, side, and plan views of the feed-cam.

Referring again to the drawings, A indicates my improved saw-setting machine as a whole. The main frame, including the standards, is designated by f. The upper face of the frame is provided with a central depression or recess f' to permit the driving-head d to freely revolve. A central driving-shaft s is mounted longitudinally of the machine, to the front end of which the head d is secured. Just at the rear of the front bearing a double-acting cam r is secured to the shaft, said cam having two inclined lugs r' adapted to engage adjacent extensions r^2, formed on the horizontally-mounted jaw-operating lever b. This lever extends toward the front of the machine in two sides or arms, each terminating in an end b^2, having oppositely-inclined faces b', which engage loosely-mounted jaws h. The jaws are adapted to freely receive and retain a saw-blade m between them. The front portion of the frame f is provided with a central longitudinal slot e^3, well rounded at its mouth, communicating

with the space formed by the lateral separation of the jaw. This slot or opening is for the introduction of the saw-blade, the latter being backed by a gage-plate *e*, fitted to slide in the ways f^2, formed in the upper part of the frame *f*. The under side of this part of the frame is provided with oppositely-beveled ribs, (see f^3, Fig. 5,) which are clasped by the clamp e^2. A screw *e'*, passing through the parts *e* e^2, retains the whole together firmly and at the same time prevents the frame from spreading laterally.

A spring s^4, located between the rear end of the lever *b* and the outer main bearing, serves to quickly return the lever and tighten it upon the saw-retaining jaws *h* immediately succeeding the rotation of each cam *r'* past a lug r^2 of the lever. The rotary movement of the shaft *s* is effected by power applied to the handle *w'* of the crank-lever *w*, secured to the shaft. In lieu of the lever a pulley may be substituted, the machine then being adapted to be operated by a belt.

The driving-head *d*, or mechanism for actuating the swaging or tooth-setting block *c*, mounted to reciprocate to and fro transversely or at right angles to the edge of the saw-blade, is as follows, (see Sheet 3 of the drawings, &c:) The frame or casing of the head *d* is rigidly secured to the front end of the shaft *s*, and is provided with an overhanging flange *d'*, which is enlarged and drilled transversely at d^2 to receive the crank-pin block g^2, which in turn is tapped at one end to receive an adjusting-screw *i*. The corresponding or outer end of the hole d^2 of the head *d* is also tapped to receive an annular adjusting-screw i^2. As the crank-pin *k* is fitted to a hole *k'*, drilled transversely of the block g^2, it follows that the "throw" or stroke of the crank is effected by means of the said two screws *i* i^2. The head of the screw *i* has a flange i^4, which bears against the lower end of the screw i^2, the latter also serving as a check-screw. Now by turning the screw *i* in one direction it will move the block g^2 endwise—say toward the screw—thereby shortening the stroke, a reverse movement of the screw lengthening the stroke, the screw i^2 in both instances being correspondingly operated. By this arrangement a very fine stroke adjustment may be easily and quickly effected. To the outer end of the crank-pin *k* is secured an enlarged head k^2, having parallel sides or edges (Fig. 15) adapted to reciprocate freely between the two lugs *n'*, attached to the rear face of the flange or head *n*, forming a part of the guided reciprocating swaging-block *c*, Figs. 6 to 9, &c. The upper face of said block at the center is recessed at o^3 to receive the small steel swaging-die *a*, Figs. 10 and 11, and easily-removable screw *a'*, passing through the holes o^2, holding the die in place. The latter is provided with a V-shaped notch a^2, the sides of which in use intermittingly engage the teeth *m'* of a saw *m* and give to the teeth the desired "set" or lateral offset, the amount of the set being regulated and controlled by the driving-head mechanism before described. Fig. 4 also shows an end view of said mechanism. If desired, the block g^2 can be adjusted so that the centers of the crank-pin *k* and shaft *s* will coincide, thereby producing no movement whatever to the plate *e* and die *a*. The die is easily removable in order to be replaced by another having a different notch-opening, such substitution being rendered necessary according to the size, gage, and depth of saw-teeth.

The feeding device may be described as follows: To the under side of the frame is pivoted at *p* the feed-lever *l*, the rear end l^2 of which is adapted to engage a double cam *t*, secured to the shaft *s*. The cam is provided with oppositely-arranged lugs *t'*, so that one revolution of the shaft produces two double reciprocations of the feed-lever. The latter at its front end has a pawl *u* pivoted thereto arranged to engage the teeth of the saw-blade, a spring s^2 being connected with the pawl *u* in such manner that it automatically carries the free end *u'* of the pawl to the root of the saw-teeth, the spring at the same time also serving to force the lever downwardly to its limit or until arrested by the adjustable screw-stop l^2. (See Fig. 3.)

I would further state that by means of my improvement the time and labor usually required in setting band saws are greatly reduced, one reason therefor being that the several moving parts are so accurately fitted and aligned that a lateral adjustment or centering of the saw is rendered unnecessary, the operator simply having to introduce the blade into the slot e^3 and between the jaws *h*, so that the teeth will properly engage the die *a*, then replace the gage-plate *e*, and secure it in place by the screw *e'*, the plate then touching the back of the saw. He next readily effects the desired stroke or amount of reciprocating movement of the die-carrying plate *c* by means of the two screws *i* i^2, the final adjustment being that of the feed-lever *l*, the screw l^2 affording a convenient means therefor. Now, by turning the shaft *s* one-half a revolution in the arrow direction, the first action of the mechanism will be to quickly open the jaws *h* by reason of the dog *r'* engaging a lug r^2 of the lever *b* and forcing it rearwardly, instantly followed by forcing the pawl *u* upwardly through the medium of the cam *t* and the lever *l*, thereby carrying the saw ahead (upwardly) one tooth. As the pawl ceases its movement the dog passes the lug r^2, when the pressure of the spring s^4 instantly forces the lever *b* ahead and causes the jaws to firmly clasp the saw-blade. The plate *c* meanwhile is also moving, thereby causing the die *a* to engage the side of the adjacent saw-tooth and set it. The relation of the cams *r'* and *t'* are such that during this latter part of the operation the pawl is withdrawn from its tooth downwardly into engagement with the next succeeding tooth, ready to again force the saw

ahead during the next half-revolution of the machine, which then carries the plate *c* back to its first position, and at the same time setting the corresponding tooth in a reverse direction to that of the tooth immediately preceding it. From this it is apparent that the capacity of the machine is limited only by its rate of movement. I have by the aid of my improved saw-setting machine set the entire number of teeth in a band-saw at the rate of three hundred teeth per minute, the result being more uniform and satisfactory than that accomplished by the use of a hammer.

I claim as my invention—

1. The combination, in a saw-setting machine, of clamping and releasing mechanism arranged to intermittingly engage the saw-blade, a feeding device adapted to successively engage each saw-tooth and advance the blade, a swaging-plate, as *c*, carrying a removable setting-die, and a rotary driving-head connected with said swaging-plate, provided with mechanism for varying the stroke or movement of the plate, substantially as hereinbefore described, and for the purpose specified.

2. In a saw-setting machine, the combination, with intermittingly-operating saw feeding, gripping, and releasing mechanism, of a die-carrying plate mounted to reciprocate transversely of the machine and saw-blade, and a driving-head having means for adjusting the stroke of said plate, substantially as described.

3. In a saw-setting machine, the combination, with a reciprocating swaging or setting die and saw-feeding mechanism, of jaws *h*, a guided two-arm clamping-lever *b*, provided with a spring adapted to normally maintain it in contact with said jaws, and a double cam secured to the driving-shaft, adapted in revolving to intermittingly and automatically force the clamping-lever rearwardly, thereby releasing the jaws and permitting the saw to be advanced one tooth, substantially as set forth.

4. In a saw-setting machine, the combination, with a reciprocating swaging or setting die and intermittingly-operating saw-releasing mechanism, of a saw-feeding device consisting of a pivotally-mounted lever *l*, provided with an adjustable stop, a rotary double-acting cam *t*, arranged to engage and actuate said lever, and a yielding or spring pawl *u*, jointed to the front end of the lever, adapted to engage the saw-teeth, substantially as set forth.

5. A saw-setting machine having the forward portion of its frame provided with an open slot communicating with the space formed by the lateral separation of the saw-clamping jaws, an adjustably-mounted gage-plate *e*, a clamping-plate e^2, having beveled sides engaging similarly-inclined surfaces formed on the under side of the said frame contiguous to the slot, and a binding-screw passing through said plates, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

LOUIS L. NORTHUP.

Witnesses:

CHARLES HANNIGAN,

GEO. H. REMINGTON.