

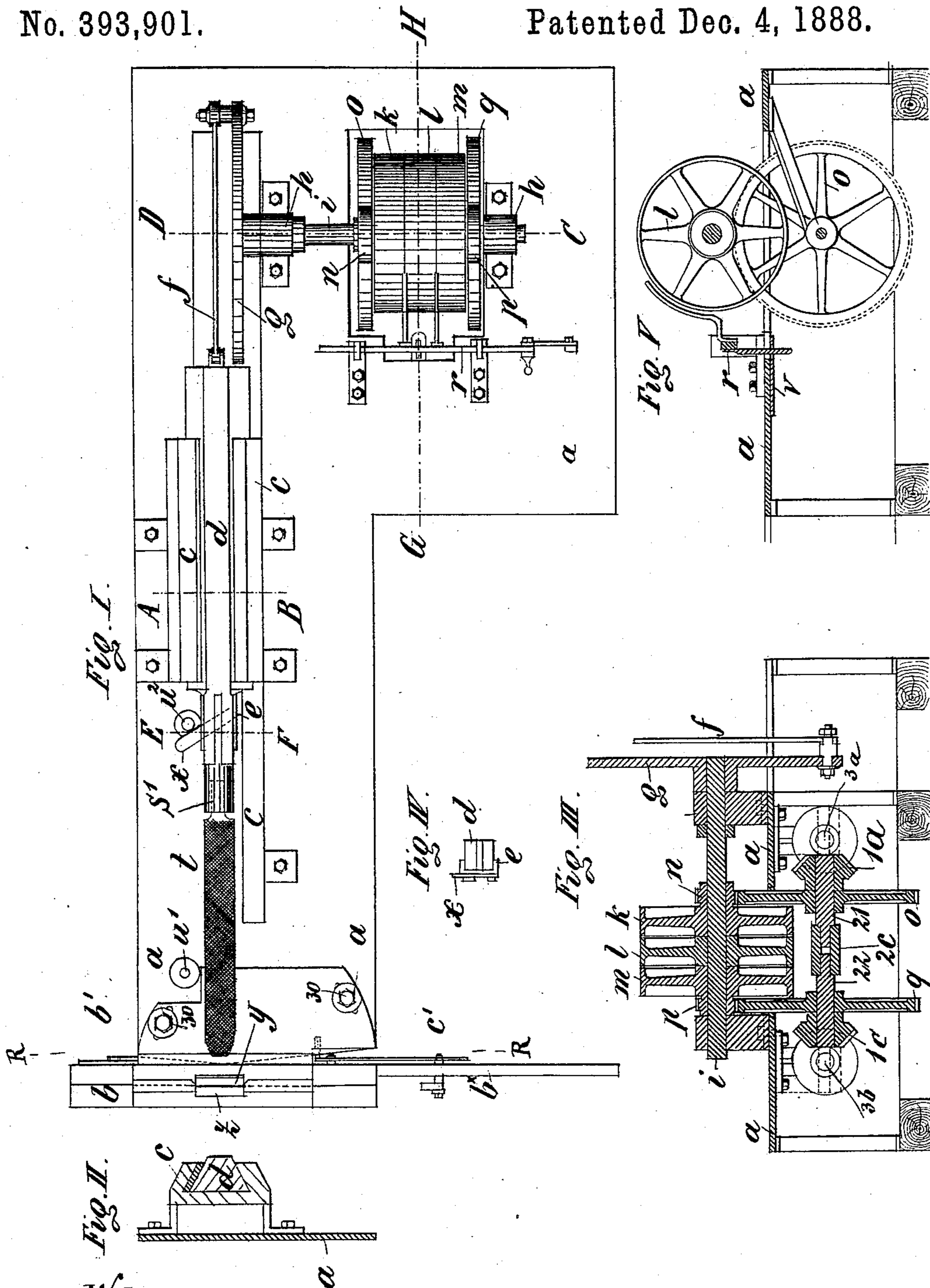
(No Model.)

4 Sheets—Sheet 1.

C. F. HAX.  
AUTOMATIC SAW FILING MACHINE.

No. 393,901.

Patented Dec. 4, 1888.



Witnesses.

Alfred Joughmans,  
William Partington.

Inventor.

C. Friedrich Hax  
Per Roeder & Priebe  
Attorneys.

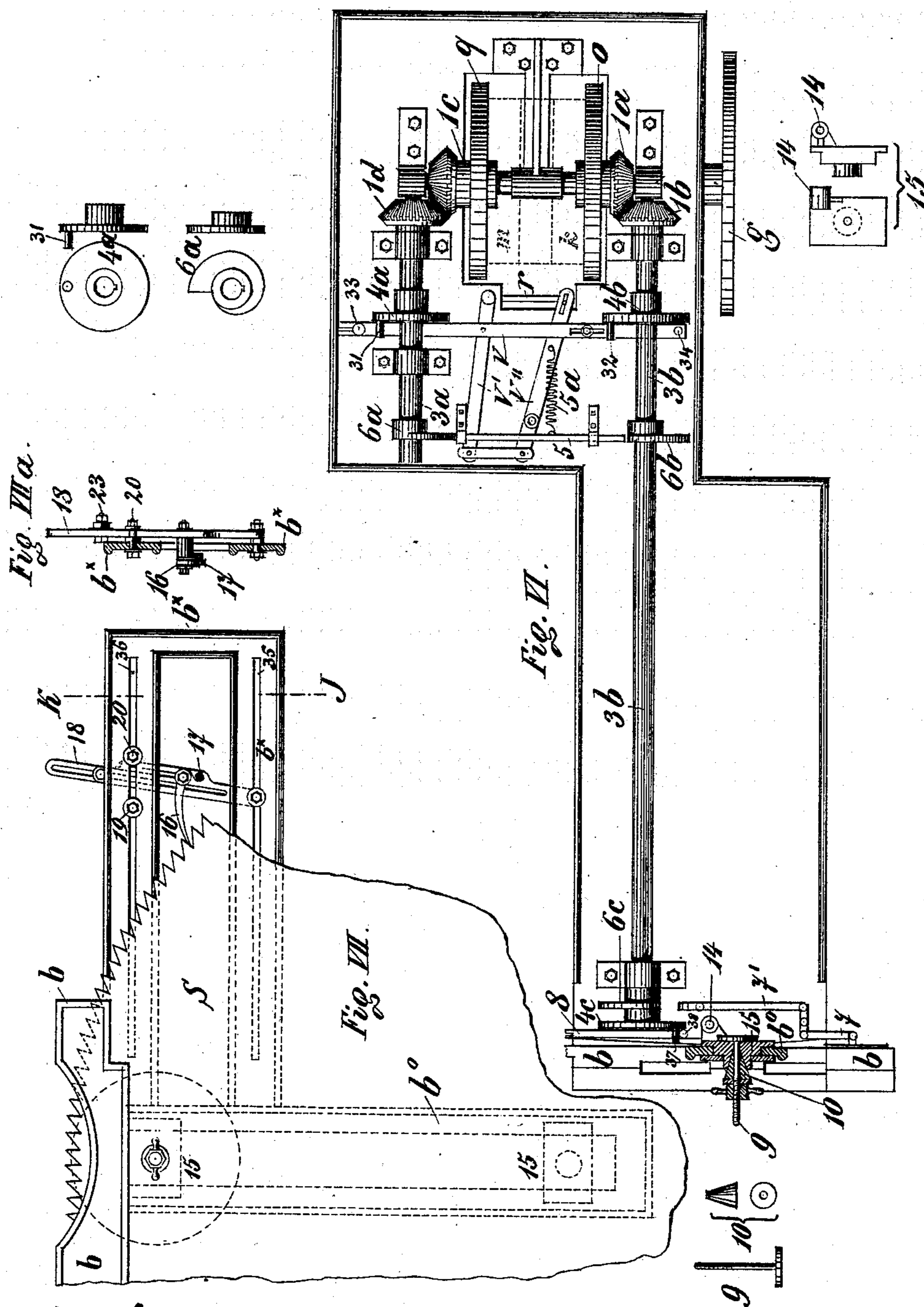
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Attorneys.

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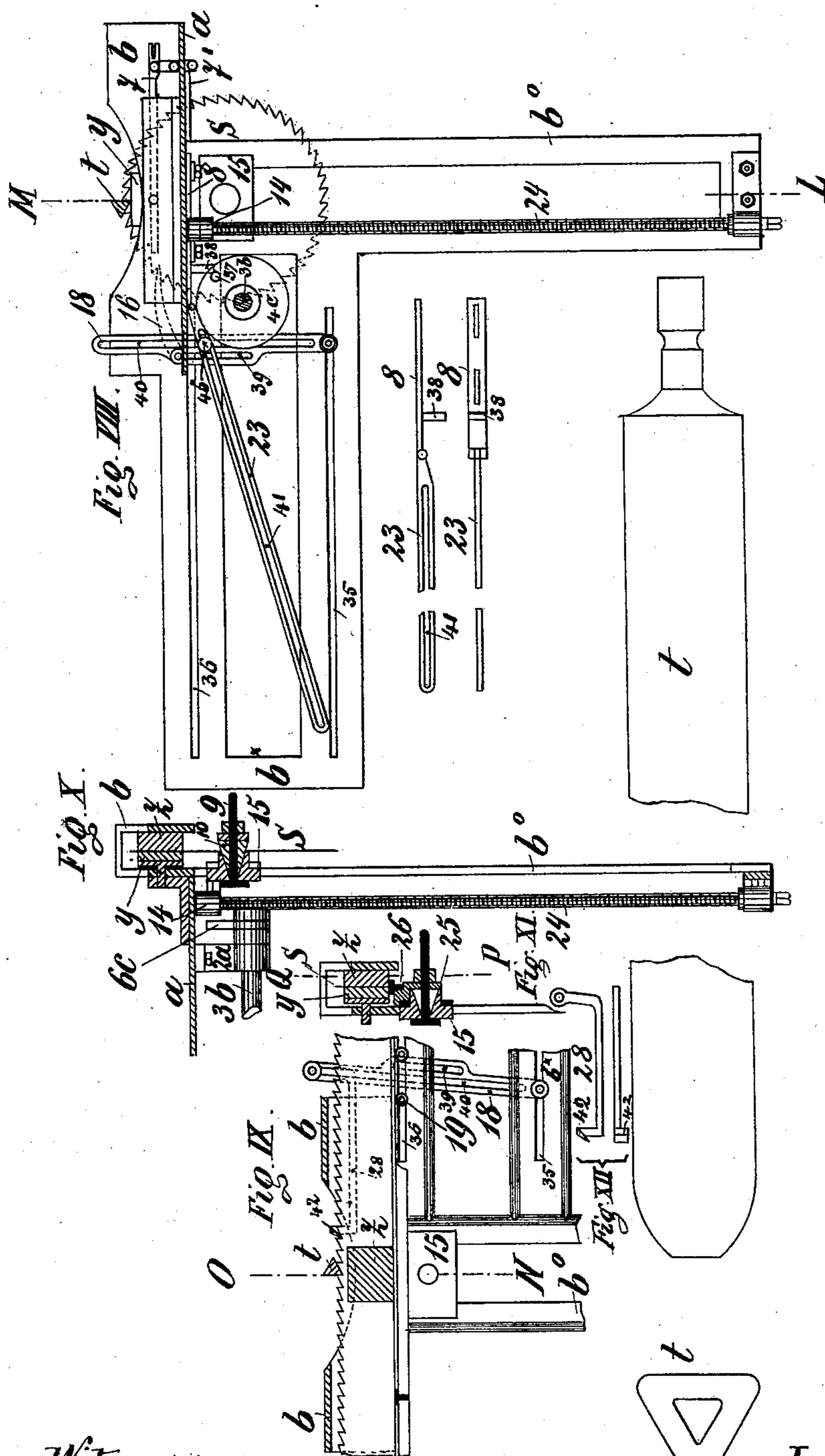
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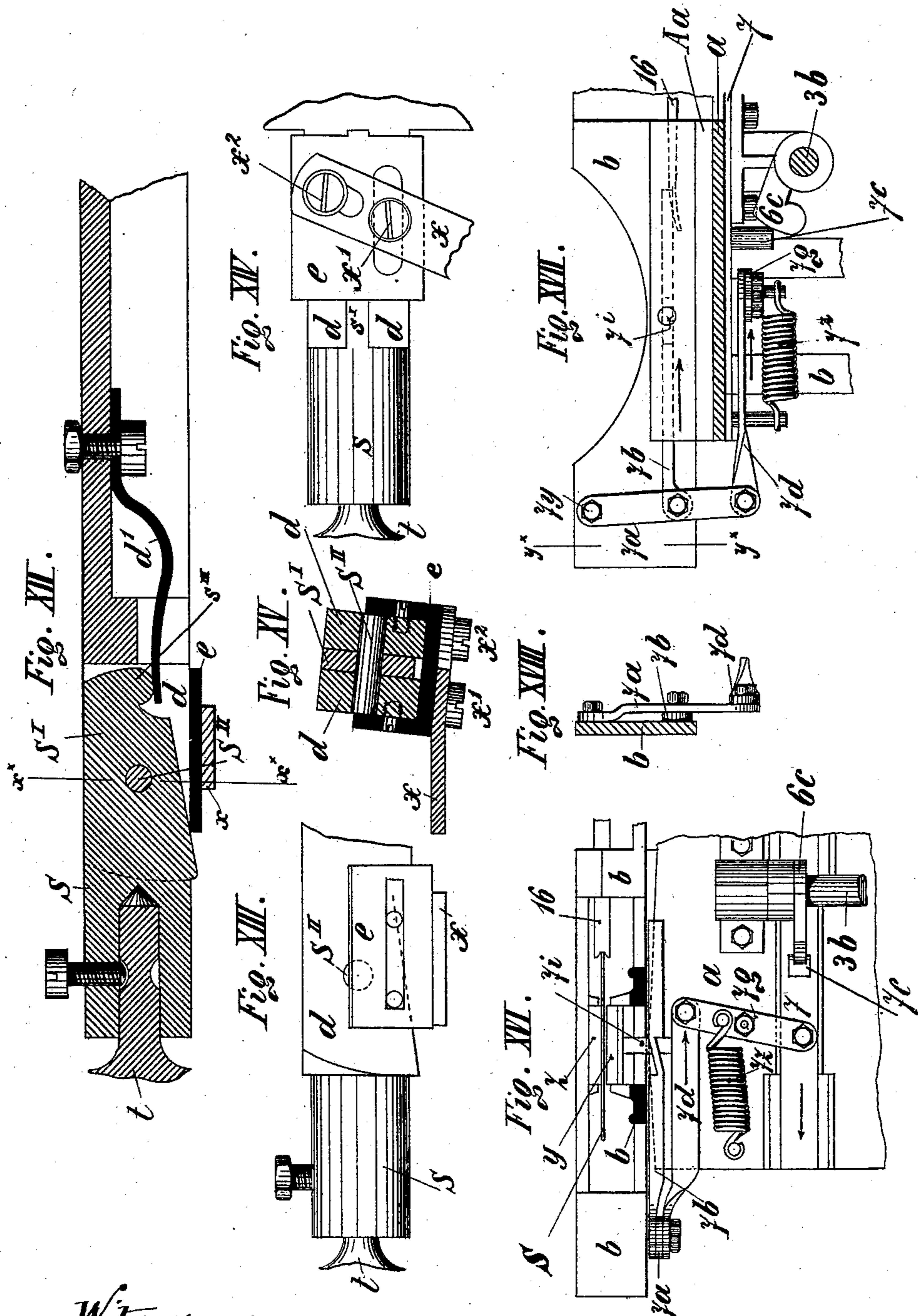
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Witnesses.  
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# UNITED STATES PATENT OFFICE.

C. FRIEDRICH HAX, OF KEMPTEN, BAVARIA, GERMANY.

## AUTOMATIC SAW-FILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 393,901, dated December 4, 1888.

Application filed June 15, 1887. Serial No. 241,348. (No model.)

*To all whom it may concern:*

Be it known that I, C. FRIEDRICH HAX, of Kempten, Bavaria, Germany, have invented a new and Improved Sharpening-Machine for Saws, of which the following is a specification.

This invention relates to a machine for sharpening the teeth of saws; and it consists of the various improvements hereinafter fully described.

Figure I represents a top view of the machine. Fig. II is a cross-section at line A B, Fig. I. Fig. III is a cross-section at line C D, Fig. I. Fig. IV is a section at line E F, Fig. I. Fig. V is a section at line G H, Fig. I. Fig. VI is a plan of the under side of the machine. Fig. VII is an end view of the machine. Fig. VII<sup>a</sup> is a section at line J K, Fig. VII. Fig. VIII is a cross-section at line R R, Fig. I. Fig. IX is an end view, partly in section, at the line P Q, Fig. XI, showing the operation on a straight saw. Fig. X is a section at line L M, Fig. VIII. Fig. XI is a section at line O N, Fig. IX. Fig. XII represents a longitudinal section of the locking device and the mechanism to raise and lower the file. Fig. XIII is a side view of the forward part of the same. Fig. XIV is a bottom view of the same. Fig. XV is a cross-section of the same at line  $x^x$   $x^x$ , Fig. XII. Fig. XVI is a bottom view. Fig. XVII is a side view; and Fig. XVIII is a section at line  $y^x$   $y^x$ , Fig. XVII, of the mechanism for operating the clamp Y.

The other illustrations represent various parts separate by themselves.

$a$  is a plate, to which the several parts of the machinery are attached.  $b$  is an end plate or frame attached through bolts 30 to the plate  $a$ . This plate is provided with a vertical downward prolongation,  $b^o$ , and a horizontal prolongation,  $b^x$ , for the purpose hereinafter described. This plate  $a$  is from the center of the working-tool inclined toward  $b'$  and toward  $c'$ , (see Fig. I,) to allow the plate or frame  $b$ , and consequently the saw attached to the same, to be fixed at any desired angle with the plate  $a$ .

$c$  is a guide for the slide  $d$ , to which the tool or file is attached.

$t$  is the file attached through its end head  $s'$  with the slide  $d$ . The head  $s'$  has on the under side a nose or projection,  $s'''$ , against which a spring,  $d'$ , bears. (See Fig. XII.) The slide  $d$  is connected to a locking device,

$e$ , provided with an arm,  $x$ . This locking device  $e$  is made to bear against the under side of the end head,  $s'$ .

$u'$   $u^2$  are two pins attached to the plate  $a$ .

During the forward motion of the slide  $d$  and file  $t$  the arm  $x$  comes in contact with the pin  $u'$ , whereby the locking device  $e$  is moved forward under the inclined under side of the end head,  $s'$ , and thus forces the same, and consequently the file  $t$ , upward to allow, during the backward motion, said file or tool to pass clear of the tooth of the saw. At or near the end of the back motion of the file the arm  $x$  comes in contact with the pin  $u^2$  and moves thereby the locking device  $e$  back again, when the action of the spring  $d'$  moves the file downward again into its proper position. The spring  $d'$  acts at the same time to produce the required pressure of the file upon the saw-tooth during its forward motion. The file  $t$  and slide  $d$  receive their motion through rod  $f$ , attached to the disk-plate  $g$ , fast upon the shaft  $i$  and operated through pulley  $m$ .

The pulley  $m$  is fast upon the shaft  $i$ , and is connected through pinions  $p$  with wheel  $q$ , which latter operates, through bevel-gear  $1^a$   $1^b$ , shaft  $3^a$ , and the pulley  $k$ , running loose upon shaft  $i$ , is connected through pinion  $n$  with wheel  $o$ , which latter operates, through bevel-gear  $1^a$   $1^b$ , the shaft  $3^b$ . The shaft  $3^a$  carries a disk,  $4^a$ , provided with a projecting pin, 31, and a similar disk,  $4^b$ , is attached to the shaft  $3^b$ , provided with a projecting pin, 32.

In front of the disks  $4^a$  and  $4^b$  a sliding bar,  $v$ , is arranged, provided with projecting pins 33 and 34. (See Fig. VI.) This sliding bar  $v$  is connected with levers  $v' v''$ , which latter is connected to the belt-shifter  $r$ .

During the motion of the pulley  $m$  the disk  $g$  is revolved, and the operation of cutting or sharpening the tooth by means of the file  $t$  proceeds. When the pulley  $m$  has made a certain fixed number of revolutions, the pin 31 of disk  $4^a$  comes against pin 33 of sliding bar  $v$ , moving thereby said bar so that, through its connecting-levers  $v' v''$ , the belt-shifter will be operated to move the belt from the pulley  $m$  to the pulley  $k$ . The pulley  $k$  turns loose upon the shaft  $i$ , as above mentioned, and during the motion of said pulley  $k$  the motion of the file  $t$ , and consequently the filing operation, is stopped. The motion of the pulley  $k$  operates the shaft  $3^b$ , near the end of

which disks 4<sup>c</sup> and cam 6<sup>c</sup> are attached, which operate the pawl-lever 16 and the jaws Y Z, in the manner and for the purpose hereinafter described. When the pulley *k* has made a  
 5 fixed number of revolutions, pin 32 of disk 4<sup>b</sup> comes against pin 34 of bar *v*, and moves thereby the belt back again upon the pulley *m*.

To assist the operation of moving the belt  
 10 from pulley *m* to pulley *k*, or vice versa, a sliding bar, 5, is arranged, acted upon by cam-disks 6<sup>a</sup> or 6<sup>b</sup>, attached to the shaft 3<sup>a</sup> and 3<sup>b</sup>, respectively. To this bar 5 a spring, 5<sup>a</sup>, is fastened, the other end of which is attached  
 15 to the lever *v''*, Fig. VI. During the motion of the bar *v* in one or the other direction, as above described, this bar 5 is likewise moved and causes its spring 5<sup>a</sup>, as soon as the lever  
 20 *v''* has passed the center, to force the same, and consequently the belt-shifter *r*, suddenly into the direction desired.

The end plate, *b*, has an elongation, *b'*, central to the file *t*, provided with an opening in which a block, 15, is made to slide, and op-  
 25 erated by a screw, 24, attached to the elongation *b'* and passing through the threaded hub 14, attached to the block 15. This block is provided with a conical plug, 10, secured to the block 15 by bolt 9. Upon this conical  
 30 plug 10 the circular saw S is attached, passing through its center hole, and as the block 15 can be moved upward or downward any diameter of saw may be attached, so as to bring its circumference into the required po-  
 35 sition with the file *t*. The horizontal prolongation *b''* is provided with two slots, 35 and 36, Fig. VIII. Into the lower slot, 35, a lever, 18, is fastened at any required distance from the center of file *t* corresponding with the  
 40 diameter of the saw. (See Figs. VII and VIII.) This lever 18 is made with two slots, 39 and 40, to allow changing the attachment of the ratchet-lever 16 and lever 23 to this lever 18. To this lever 18 in the slot 39 a ratchet-lever,  
 45 16, is attached, acted upon by spring 17, Fig. VII. In the upper slot, 36, two projecting pins, 19 and 20, Fig. VII, are fastened—one on each side of the lever 18—to regulate the motion of said lever according to the size or  
 50 length of the teeth of the saw.

8 is a sliding bar attached to the under side of plate *a* and provided with a projection, 38. To this bar 8 a lever, 23, is hinged, provided with a slot, 41, and attached to the lever 18  
 55 by a bolt, 46, passing through the slot 41 in the lever 23 and the slot 40 in lever 18.

The disk 4<sup>c</sup> is provided with a projecting pin, 37, which, when coming in contact with the projection 38 of sliding bar 8, moves the  
 60 same, so that through the lever 23, connected with lever 18, the pawl-lever 16 will act upon the teeth of the circular saw S to turn the same one or more teeth around, as may be desired.

65 As before mentioned, the saw S is carried upon the conical plug 10 in the block 15. Near the file *t*, at the circumference of the

saw, the same is held steady between two friction-blocks, Y Z. The block Z is attached to the frame *b*, while the block Y is made mova-  
 70 ble and attached through levers to a sliding bar, 7, attached to the under side of the plate *a*. (See Figs. VI and XVI.)

Before the disk 4<sup>c</sup> operates the bar 8, and consequently the pawl-lever 16, for the pur-  
 75 pose of turning the saw, as before described, the cam 6<sup>c</sup> acts against the pin 7<sup>c</sup>, attached to the sliding bar 7. This sliding bar 7 is connected through levers 7<sup>a</sup> and 7<sup>d</sup> with lever 7<sup>b</sup>, which latter operates the rod 7<sup>b</sup>. This rod 7<sup>b</sup>  
 80 works in a wedge-shaped opening in a rod, 7<sup>i</sup>, attached to the block Y. By this connection the block Y is moved away from the face of the saw, thus allowing the saw to be turned freely around by the action of the pawl-le-  
 85 ver 16, as above mentioned. To the lever 7<sup>a</sup> a spring, 7<sup>z</sup>, is attached, which moves all the levers back again in their original position as soon as the pin 7<sup>c</sup> is relieved of the  
 90 cam 6<sup>c</sup>.

When the teeth of a straight saw are to be sharpened, the conical plug 10 is removed and an angle-piece, 25, attached to the block  
 15, (see Fig. XI,) provided with a T-rail, 26, upon which the straight saw rests. The  
 95 ratchet-lever 16 is removed and a lever, 28, provided with a nose, 42, as shown in Fig. XII in plan and elevation, is attached to the lever 18 to move this straight saw forward.

What I claim is—

1. The combination of pulley *m*, shaft *i*, disk *g*, slide *d*, file *t*, with head *s'*, lever *x*, locking device *e*, and stop-pins *u'* *u''*, substan-  
 100 tially as described.

2. The combination of pulleys *k* *l* *m*, shafts  
 3<sup>a</sup> and 3<sup>b</sup>, with intermediate gear, with disks  
 4<sup>a</sup> and 4<sup>b</sup>, sliding bar *v*, and belt-shifter *r*, as  
 105 well as the intermediate connections, substantially as set forth.

3. In combination with shafts 3<sup>a</sup> and 3<sup>b</sup>, op-  
 110 erated through pulleys *m* and *k*, respectively, as described, the cams 6<sup>a</sup> and 6<sup>b</sup>, sliding bar 5, spring 5<sup>a</sup>, levers *v'* *v''*, sliding bar *v*, and belt-shifter *r*, arranged to operate in the man-  
 115 ner and for the purpose set forth.

4. The combination of shaft 3<sup>b</sup>, operated by pulley *k*, as described, and disk 4<sup>c</sup>, with slid-  
 120 ing bar 8, link 23, and lever 18, and ratchet-lever 16, with spring 17, as and for the purpose described.

5. The combination of shaft 3<sup>b</sup>, operated by pulley *k*, as described, and cam 6<sup>c</sup>, with slid-  
 125 ing bar 7, link 7<sup>a</sup>, rods 7<sup>d</sup>, link 7<sup>a</sup>, and rod 7<sup>b</sup>, and with rod 7<sup>i</sup> and friction-clutch Y, substantially as described.

6. In combination with prolongation *b'* of plate *b*, the block 15, with angle-pieces 25, T-iron 26, and screw 24, substantially as and for the purpose described.

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Witnesses:

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 J. WEICKMAN.