(No Model.) 2 Sheets—Sheet 1.

H. L. MORRELL.

SAW FILING MACHINE.

No. 570,732. Patented Nov. 3, 1896.

Fig. 1.

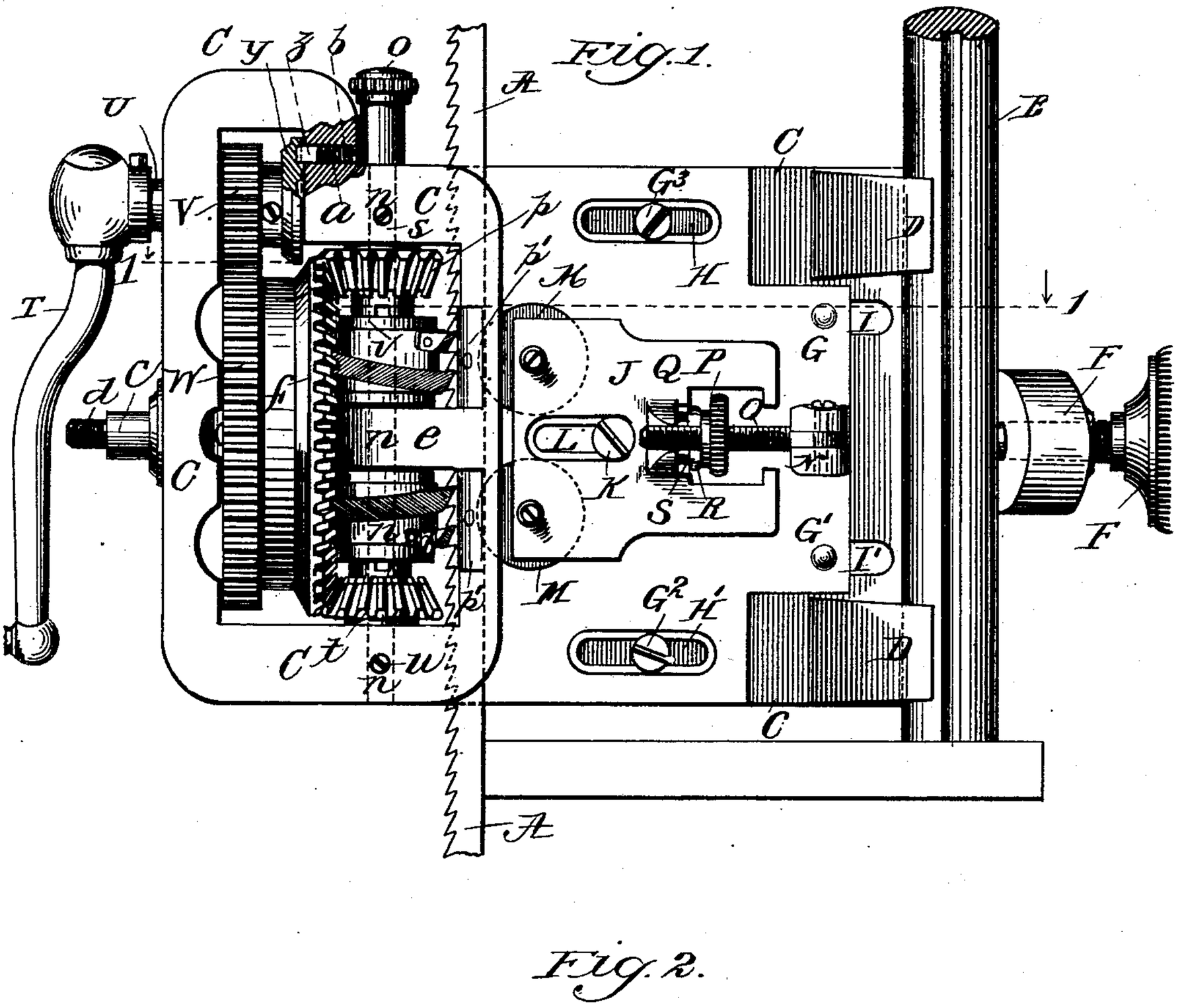
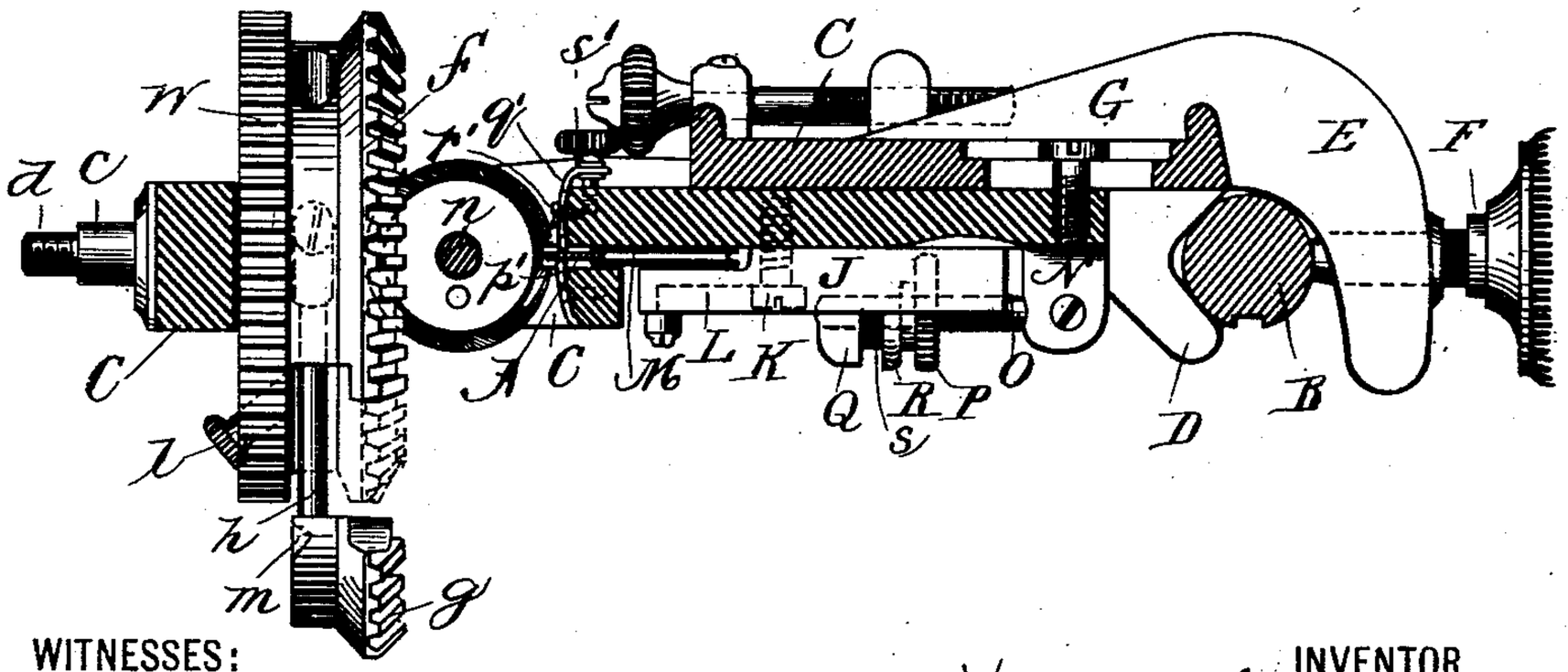


Fig. 2.



WITNESSES:

Edward Rowland.

A. B. Morrison.

INVENTOR

Henry L. Morrell

BY Phillips Abbott

ATTORNEY

(No Model.) 2 Sheets—Sheet 2.

H. L. MORRELL.

SAW FILING MACHINE.

No. 570,732. Patented Nov. 3, 1896.

Fig. 3.

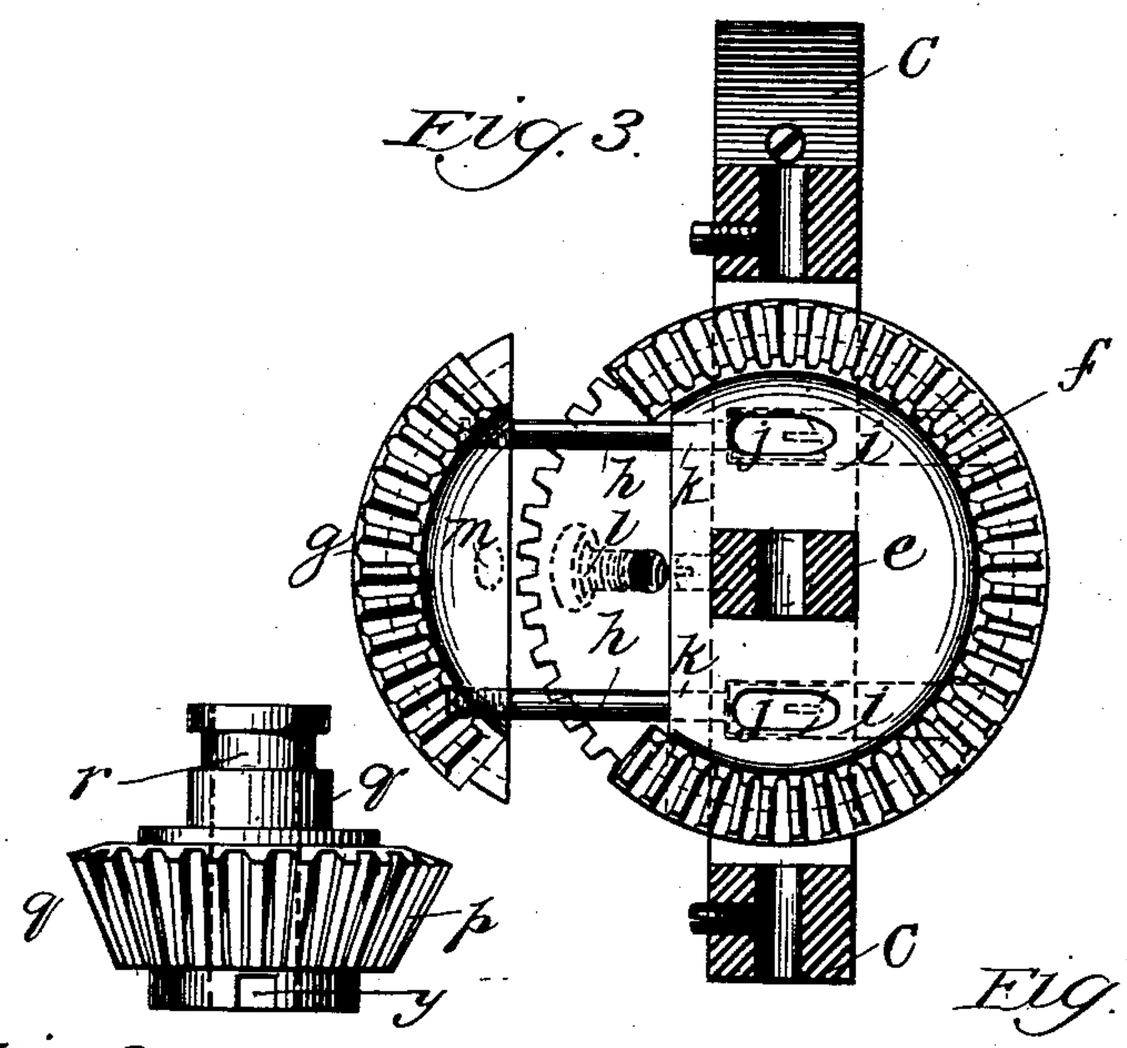


Fig. 7.

Fig. 8.

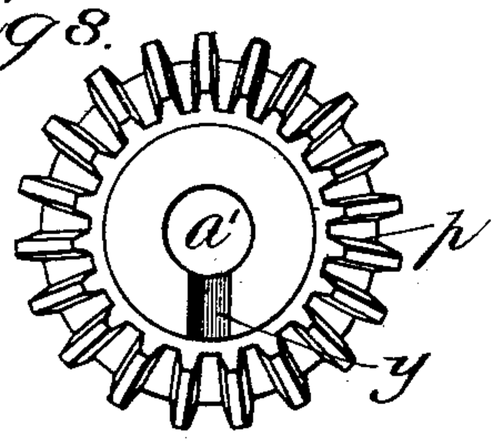


Fig. 4.

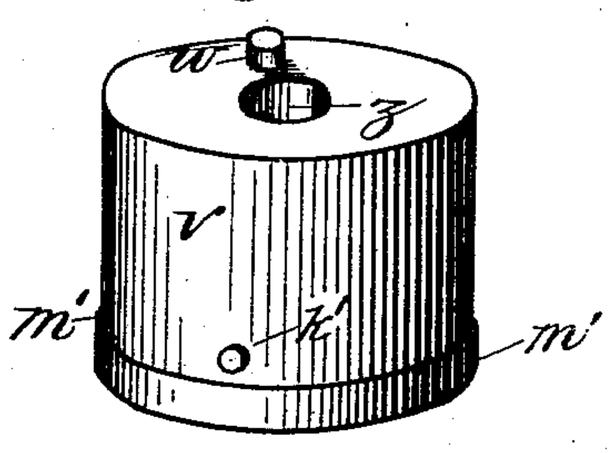


Fig. 5

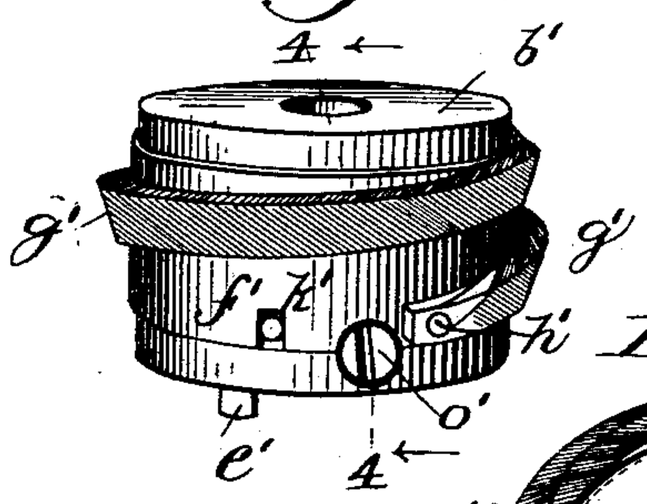
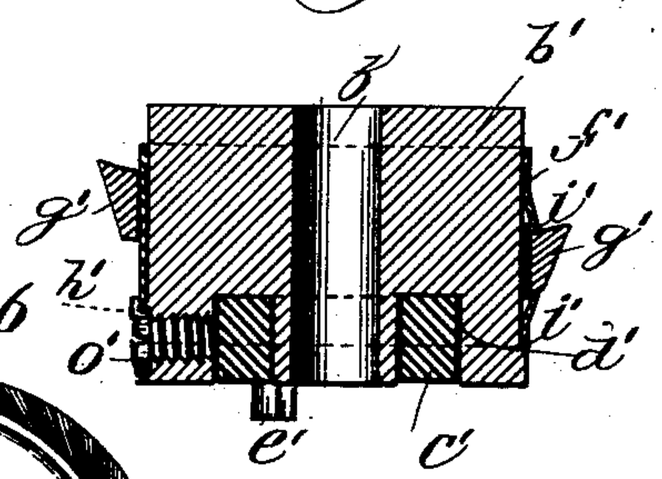
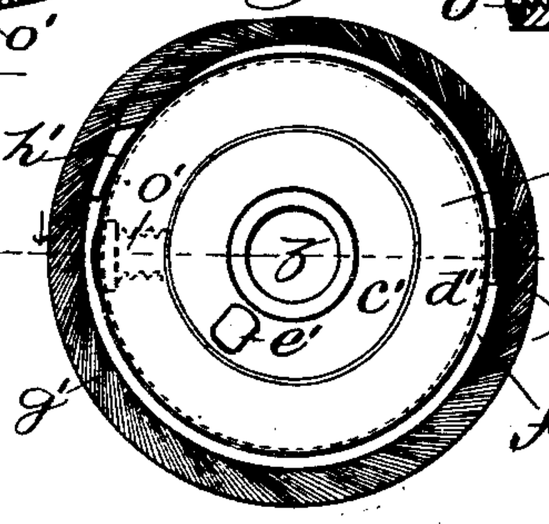


Fig. 6





WITNESSES:

Edward C. Rowland.

A. B. Morrison.

INVENTOR

Henry L. Morrell

BY

Phillips Abbott

ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY L. MORRELL, OF BROOKLYN, NEW YORK, ASSIGNOR TO JOHN M. E. MORRILL, OF DORCHESTER, MASSACHUSETTS.

SAW-FILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 570,732, dated November 3, 1896.

Application filed January 15, 1896. Serial No. 575,611. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. MORRELL, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improved Saw-Filing Machine, of which the following is a specification.

My invention relates to a new and useful improvement in the filing of band-saws; and it consists, generally stated, in apparatus adapted to be applied to the saw when in its operative position upon the saw-frame. It comprises a pair of rotary files actuated by a crank or equivalent device and suitable gearing whereby at one operation and in a continuous manner all of the teeth of the saw are filed, those having a right-hand as well as a left-hand set, the machine automatically and simultaneously with the filing operation feeding the saw gradually along, so that an entire band-saw can be filed in a fraction only of the time now required; also it is not necessary to remove the saw from the saw-frame and all the teeth thereof are brought up to gage and are made exactly equal in size, and the angle of the filing of all the teeth is likewise exactly the same.

The invention also relates to a new and improved file adapted to use upon a saw-filing machine, and it also includes the details of construction hereinafter specifically set forth.

Referring to the drawings hereof, Figure 1 illustrates an elevation of the machine, a section of a band-saw being shown in position thereon. Fig. 2 illustrates a plan of a machine, taken on the line 1 1 of Fig. 1. Fig. 3 illustrates an elevation of the sectional beveled gear of the machine. Fig. 4 illustrates an elevation of the lower file. Fig. 5 illustrates a vertical section thereof, taken on the line 4 4 of Fig. 4. Fig. 6 illustrates a view of the under side of the file shown in Figs. 4 and 5, Fig. 5 being taken on the line 6 6 of Fig. 6, looking in the direction of the arrow. Fig. 7 illustrates a perspective of the upper file-supporting block. Fig. 8 illustrates an elevation and under side view of the beveled pinion to which the upper file-block is attached.

A is the band-saw.

B is the usual guide-post for the saw.

C is a metal frame for the support of the parts. It is made in two parts, as shown clearly in Fig. 2, one of which engages with the post B and is provided with two projecting thumb-like parts D D, which embrace the post B, and it also has a hook-like projection E, provided with a thumb-screw F, passing through the hook E, whereby the device as a whole can be clamped to the post B. The other part of the frame is connected with the part just mentioned by four screws G G′ G^2 G^3. The two latter work through slots H and H′ in one of the parts of the frame, and the screws G G′ work through slots I and I′ in the other part of the frame. The purpose of these screws and slots is so that the operative parts of the machine may be adjusted, as may be necessary, to coincide with the distance separating the teeth of the saw from the post B, and also, in some cases, to compensate for the width of the saw. In order to distinguish between the two parts of this frame, I will call the part which is rigidly held to the post B the "stationary" frame and the other part, which carries the operative mechanism, the "movable" frame.

J is a horizontally-sliding plate or casting which is held to the movable part of the frame by a set-screw K, which passes through a slot L, made in the plate J, so that the latter has free longitudinal movement upon the movable part of the frame.

M M are two small wheels or pulleys which have a deep **V**-shaped self-centering groove in their peripheries, as shown in Fig. 2, of the proper width to embrace the rear straight edge of the band-saw.

N is a lug on the movable part of the main frame, in which is pivoted a threaded spindle O, upon which travels a threaded nut P. The projecting end of the threaded spindle O is adapted to drop within a slot or recess made in a lug Q on the face of the sliding plate J, and also through a like slot made in a bushing R, which has between it and the lug Q a rubber cushion S, so that by means of the swinging spindle and the thumb-nut P the sliding plate J, carrying the grooved wheels

M M, can be forced to the left and there held rigidly, thus holding the saw firmly against the files.

The devices which more particularly effect the filing of the saw are supported upon the left-hand end of the movable frame, as is shown in Fig. 1, and they are as follows:

T is a crank keyed to a shaft U, upon which shaft is fastened a pinion V, which meshes into a larger pinion W. Upon the shaft U there is also fastened a plate or flange Y, which may be part of the piece from which the pinion V is made, and the face of this flange is provided with a series of inclined teeth, in which a spring-pawl Z, actuated by a spring *a*, engages as the flange Y revolves, thus preventing backward movement. The spring *a* is held in place by a small screw *b*, threaded into the hole or recess which contains it. The shaft upon which the large pinion W is keyed is shown at *c*, and the end of it, as at *d*, is threaded, so that the crank may be attached to it, if desired, thus increasing the speed of the files and economizing in time when the saw to be sharpened is such that a more rapid movement of the files is desirable. The other end of the shaft *c* enters a boss *e*, forming part of the frame.

f is a sectional beveled gear keyed on the shaft *c*. As illustrated in Figs. 2 and 3, a section *g* of this beveled gear is radially movable; that is to say, it is physically separated from the major portion of the beveled gear and is supported upon two spindles *h h*, which enter holes *i i*, bored in the rear part of the beveled gear, and the spindles have enlarged portions *j j* on their ends within these holes, so that they cannot pass outwardly through the more contracted parts *k k* thereof. Consequently, although this movable section of the gear can be pulled out to a considerable extent, as shown in Fig. 3, it cannot be entirely separated from the balance of the gear. They also serve as guides for the movement of the movable section.

l is a set-screw set at an angle into the rear surface of the pinion W, the front end of which, passing through the same, enters a recess *m* in the rear side of the movable section *g*, so that when the movable section is in place, completing the gear, and the thumb-screw screwed up tight no movement of the movable section can take place, and when the parts are so arranged the operation of the beveled gear is the same as though it were an ordinary integral structure. The purpose of making this portion of the beveled gear movable is so that the rotary files, about to be explained, may be readily removed from the machine when desired. If it were not for this peculiar construction of the beveled gear, there would not be sufficient space for the removal and insertion of the rotary files unless they were made objectionably small. Consequently the important result is secured that the parts when once properly assembled need never be disturbed when introducing or removing the files.

Referring now to Figs. 1 and 2, in conjunction with Figs. 4, 5, and 6, *n* is the axis upon which the rotary files turn. It has a head *o*, preferably milled, so that it can be more easily manipulated for inserting and withdrawing.

p (see Figs. 1 and 8) is a beveled pinion, which has an upwardly-extending hub *q*, provided with an annular groove *r*. This hub enters a suitable recess in the frame and rotates therein. A screw *s*, screwed through the frame, enters the annular recess *r* and prevents the pinion from dropping, although it will not do so when in use, because the beveled gear *f* holds it in place. I prefer, however, to use a screw. *t* is a similar beveled pinion at the lower side of the machine, which has a similar hub and set-screw *u*.

v represents the upper supports for the spiral file, which parts I call the "file-blocks." This upper one is shown in Fig. 7. It has a stud *w* on its upper surface, which enters a slot *y* in the under side of the beveled pinion *p* and fits somewhat snugly therein, so that when the pinion is turned the block necessarily turns. This block also has a hole *z* through it vertically, which coincides with a hole *a'* through the pinion. The spindle *o* passes downwardly through these parts. The lower file-block is shown in Figs. 4, 5, and 6, and in those figures is marked *b'*; but in this case, for a purpose hereinafter to be described, the block has not only the hole *z* for the spindle *o*, but has also on its under side a rotary ring *c'*, which is adapted to rotate in a recess *d'*, made in the under side of the block, and this ring has a stud *e'*, which enters a recess in the lower pinion *t*, the same in all respects as the recess *y* in the upper pinion. It will be understood that the spindle *o* extends straight downward through a central boring or axis hole made through all the parts, that is to say, in the upper part of the frame, through the upper pinion, through the upper file-block, through the central part of the casting, (marked *e* in Fig. 1,) through the lower file-block, the lower pinion, and entering the lower portion of the casting, and the pin fits in all these parts accurately. Consequently they are all correctly centered by and turn on the pin, which, being a relatively small bearing, friction is reduced and accurate alinement secured.

Before describing the spiral files I will state that both of them are the same in all respects, except that they are right and left, respectively, in their spirality and in the cutting of the file-teeth thereon, that is to say, the upper beveled pinion *p* engages with the upper arc of the sectional driving-gear *f*, and the lower beveled pinion *t* engages with the lower arc of that wheel. Consequently one of them turns to the right and the other to the left. This is exactly what I wish in this machine, because thereby I am enabled to arrange upon

the upper file-block a spiral file, the spirality and the file-teeth whereof are adapted to file the saw-teeth which have a set in one direction, and upon the lower block I can apply a spiral file adapted to sharpen the file-teeth having the opposite set. In describing, therefore, the files, I will describe one set only, for the reason that with the exception of certain modifications which I shall refer to the upper and the lower ones are identical.

Having made the above explanation, and referring now to Figs. 4, 5, and 6, f' is a short section of brass or other metallic tube, the inner diameter of which is such as to adapt it to fit easily over the circular file-blocks b' and v, respectively. g' are the spiral files, and it will be noted that these are peculiarly-constructed devices, and are entirely novel in their construction and arrangement, and form a part of my invention. They are strips of file-steel, which when soft are spirally coiled, as shown in the drawings. The face which is next to the metal sleeve f' is not provided with file-teeth, but the outer and upper sides are provided with such teeth and are cut in such manner as may be preferred for the best action upon the saw-teeth. Of course, as well understood by file-makers, the pitch and the number and also the angle of these teeth should be such as to best act upon the saw-teeth and sharpen them with the least power and least wear upon the files. The ends of these files, as shown at h' in the last-named figures, are riveted to the metal sleeve f' at both ends, and in order to sustain them centrally I punch sections i' (see Fig. 5) out from the sleeves f' from the inside, and these punchings are, by special machinery invented by me, so located as that they are exactly at the edge of the spiral files and abut against the same. In fact, the files themselves serve as an "anvil," so to speak, against which these punchings are made. In this manner the files and the sleeves f' are in effect a single structure, and are made and sold by the set to users of this machine.

The sleeves are prevented from rotation upon the file-blocks by pins k', (see Figs. 4 and 7,) which are set into the file-blocks, and which enter slots l' made in the sleeves, and a slight shoulder m' on the lower part of each of the file-blocks prevents the sleeves from dropping too far downwardly.

It will be observed that owing to the teeth on different saws being of different size and pitch means must be provided whereby the files may be made to properly register with the saw-teeth. The size and pitch are arranged for by having a series of files and sleeves which accompany each machine, and in order to secure the proper registration of the files with the teeth of the saw I construct the lower file-block as shown in Figs. 4, 5, and 6, that is to say, the ring c', already described, is adapted to rotation independently of the file-block b', and a set-screw o', tapped through the side of the file-block, (the sleeve f' being cut away to accommodate it,) can be set up against this independently-rotating ring c', thus locking it when it is found to be in the proper position. By this means I secure the proper relation between the files, the pinions by which their blocks are driven, and the teeth of the saw. Two files of the proper size, &c., to fit the teeth of the saw which is to be sharpened being selected, they are both introduced into the machine. Then the adjustment-screw of the lower file is loosened, the saw is moved up to its proper position by means of the plate carrying the grooved wheels, and the machine being slightly turned the upper file will of course immediately properly register with the saw-teeth and feed the saw upwardly. Meantime the file on the lower block may or may not properly register with the teeth it has to sharpen. If it does properly register therewith, then the adjusting-screw will be tightened up at once. If not, the turning of the crank will bring it to a proper adjustment either by rotating the lower block until the proper adjustment occurs or more likely by reason of the rotation of the ring within the block, the block itself being stationary. Thereupon the adjusting-screw being turned up tight the whole machine is in proper operative position, whereupon the crank being continuously turned both files rotate in proper engagement with the teeth and thus the saw is sharpened; and it will be particularly observed that the front end of each of the spiral files, as illustrated in Figs. 4, 5, and 6, is tapered both in thickness and in width, so that there is good, free entrance of the file into the succeeding teeth, and, furthermore, owing to the files being made in spiral form, that as they rotate the saw will be compelled to move upwardly. Thus it is continually fed during the filing operation, and the requisite degree of friction is supplied by retarding the free movement as may be found necessary. Ordinarily the mere resistance of the saw-frame mechanism will be sufficient for this purpose.

To properly support the saw laterally, I provide what I term "anvil-plates." (See Figs. 1 and 2.) They are stiff plates of steel attached to the frame. Two of them, p' p', are stationary, being rigidly screwed to the frame, and the other two, q' q', are movable, being held in position by a screw r', which passes through a short slot made in them, and their outer ends are turned at substantially right angles, through which ends a set-screw s' passes, which is threaded into the main frame. By turning this set-screw in one way or the other the movable anvil is moved in or out, thus adapting it to saws of different thickness.

The operation of the device is as follows: When desiring to sharpen the saw, it is stopped but not removed from the saw-frame. The sharpening-machine is then clamped to the guide-post of the saw, as illustrated in Fig. 1, and the proper adjustments, already described, to compensate for the distance

separating the saw and the post and also to compensate for the width of the saw itself are quickly made by sliding one part of the frame over the other and setting up the screws G G′ G^2 G^3. The sliding plate J is during this operation in its withdrawn position. It is then moved toward the left, the wheels M M being made to embrace the rear edge of the saw. This plate J is then clamped in position by means of the threaded spindle O and thumb-nut P, and it will be observed that owing to the cushion S slight yielding of the saw is possible, so that all danger of breaking the saw-teeth or injuring the files is avoided. The appropriate files are then put in position, the section *g* of the main beveled gear being withdrawn to easily permit of their insertion. The spindle *o* is lifted and again replaced, passing through the file-blocks during the act of inserting the files. The movable section of the main gear is then returned to place and locked therein by means of the set-nut *l*, and the files being then properly registered with the saw-teeth and the crank turned the teeth are filed, as already described.

I do not limit myself to the details of construction shown and described, because it will be evident to those who are familiar with this art that modifications may be made therein without departing from the essentials of my invention.

I claim—

1. The combination of a rigid frame, a clamp to rigidly attach the same to the guide-bar of a band-saw frame, a sliding frame adjustably secured to said rigid frame, and provided with right and left spiral, rotary files, means to rotate the files and another sliding frame adjustably secured to the rigid frame, provided with grooved wheels adapted to support the band-saw, for the purposes set forth.

2. The combination of a frame, a clamp to rigidly hold the same to the guide-bar of a band-saw, a sliding frame adjustably secured to said rigid frame, and provided with a pair of right and left rotary, spiral files, driven pinions for the files, the files being located between them, and means to support the teeth of the saw, located opposite the files, for the purposes set forth.

3. The combination of a frame, a clamp to rigidly hold the same to the guide-bar of a band-saw, a sliding frame adjustably secured to said rigid frame, continuous, spiral files supported by the sliding frame, and located between the driven pinions therfor, said driven pinions themselves, a gear to drive the pinions, means to support the rear edge of the saw, and other means located opposite the files to support the teeth thereof against the lateral stress of the files, for the purposes set forth.

4. The combination of a frame, a clamp to rigidly attach the same to a stationary part of a band-saw frame, a sliding frame adjustably secured to the rigid frame, right and left spiral files, having continuous file-surfaces located between said driven pinions, and another sliding frame adjustably secured to the rigid frame, provided with means to support the back edge, and also the teeth of the saw, for the purposes set forth.

5. In a saw-filing apparatus, the combination of a movable frame having adjustable anvils or supports for the teeth of the saw, composed of flat plates, located upon the front edge of the movable frame, and an additional support for the back edge of the saw, also connected with said frame, for the purposes set forth.

6. The combination in a saw-filing machine of a frame which supports a gear-wheel, a section whereof is adapted to be removed radially, pins attached to the movable section, and which engage in holes in the body of the gear, for guiding and supporting said section, pinions which mesh into said driving-gear, and two rotary spiral files, right and left handed respectively, located between said pinions, and connected with them, for the purposes set forth.

7. The combination in a saw-filing apparatus of a beveled driving-gear, a section whereof is radially removable, said section being guided and supported upon pins which enter recesses in the body of the gear, two pinions which mesh into said gear, rotary, spiral files attached to said pinions, and located between them, and means to revolve the several devices, for the purposes set forth.

8. A filing device for saw-filing machines, consisting in a metallic sleeve adapted to slip over and be supported upon an interior block and having a continuous, spiral file attached to its exterior surface, for the purposes set forth.

9. A filing device for saw-filing machines, consisting in a metallic sleeve adapted to slip over and be supported by an interior block, and having upon its exterior, a continuous, spiral file, the ends of said file being tapered, for the purposes set forth.

10. A filing device for saw-filing machines, consisting in a metallic sleeve, adapted to slip over and be supported by an interior block, a continuous, spirally-wound file attached to its exterior, and supported between its ends by projections from the sleeve, for the purposes set forth.

11. In a saw-filing machine, the combination of two file-supporting blocks, each having a pin whereby it is connected with its driving-pinion, and a slot in each of the driving-pinions, adapted to receive said pin, the pin of one of said blocks being located in a movable part thereof, said movable part itself, and means to clamp the movable part to its block, for the purposes set forth.

12. In a saw-filing machine, a block for the support of a file, an independently-movable part connected with said block, means to lock said independently-movable part to the block, and a pin on said movable part adapted to

connect the block with its driving mechanism, for the purposes set forth.

13. In a saw-filing machine, the combination of removable blocks for the support of the file, pinions which engage with the said blocks, and a driving-gear engaging with said pinions, a section whereof is laterally movable for the removal of said blocks, for the purpose set forth.

14. The combination in a saw-filing machine of two blocks for the support of the files, driven pinions with which said blocks engage, and a movable part upon one of the blocks which carries the device which locks it to the pinion, and means for locking the said part to the block, for the purposes set forth.

Signed at New York, in the county of New York and State of New York, this 13th day of January, A. D. 1896.

HENRY L. MORRELL.

Witnesses:
PHILLIPS ABBOTT,
E. SIMPSON.