No. 693,985. Patented Feb. 25, 1902.

H. F. NOYES.

SAW FILING MACHINE.

(Application filed June 15, 1901.)

(No Model.) 3 Sheets—Sheet 1.

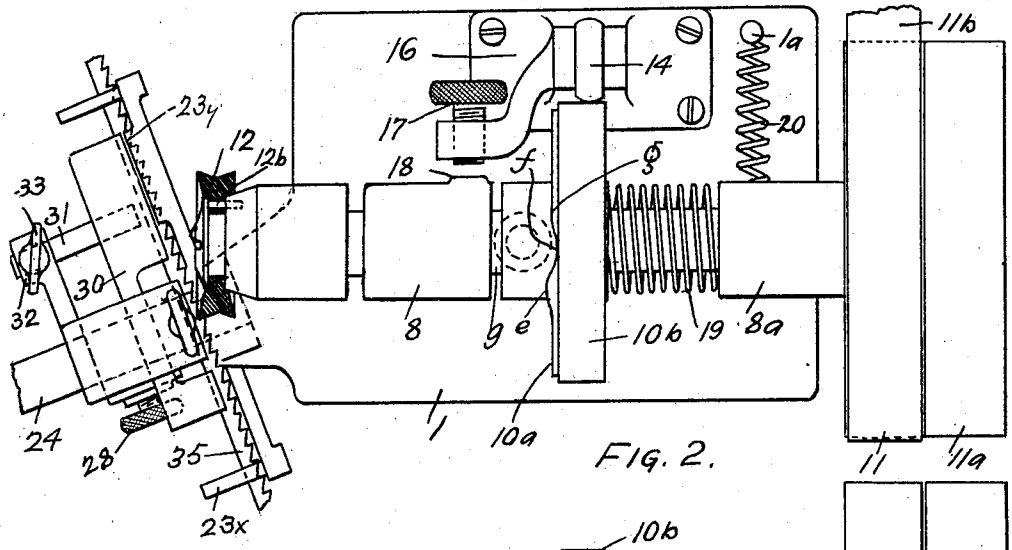


FIG. 2.

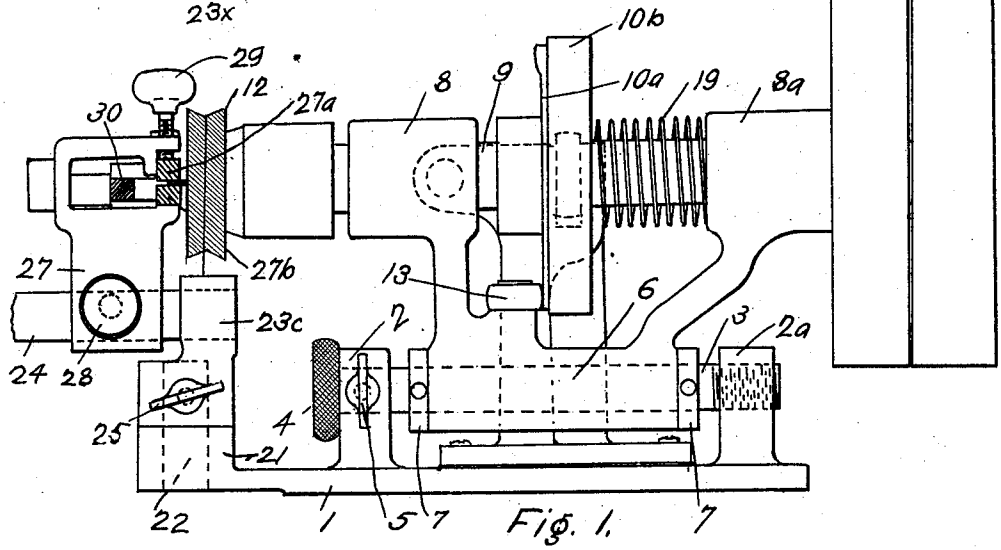


FIG. 1.

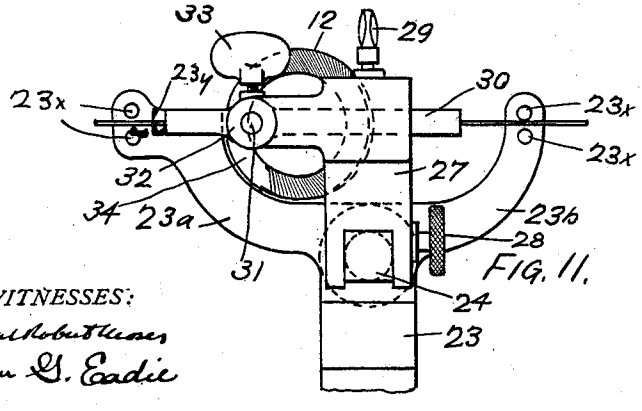


FIG. 11.

WITNESSES:

Samuel Robert Lucas

John G. Eadie

INVENTOR.

Henry F. Noyes

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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H. F. NOYES.

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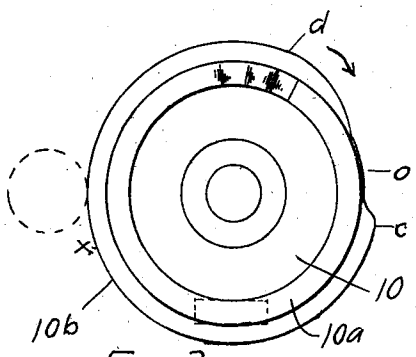


FIG. 3.

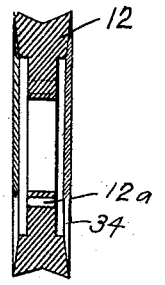


FIG 4.

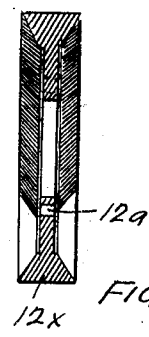


FIG 5.

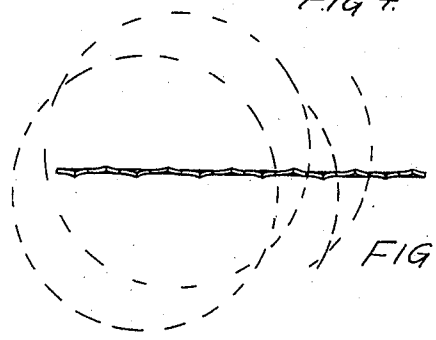


FIG. 6.

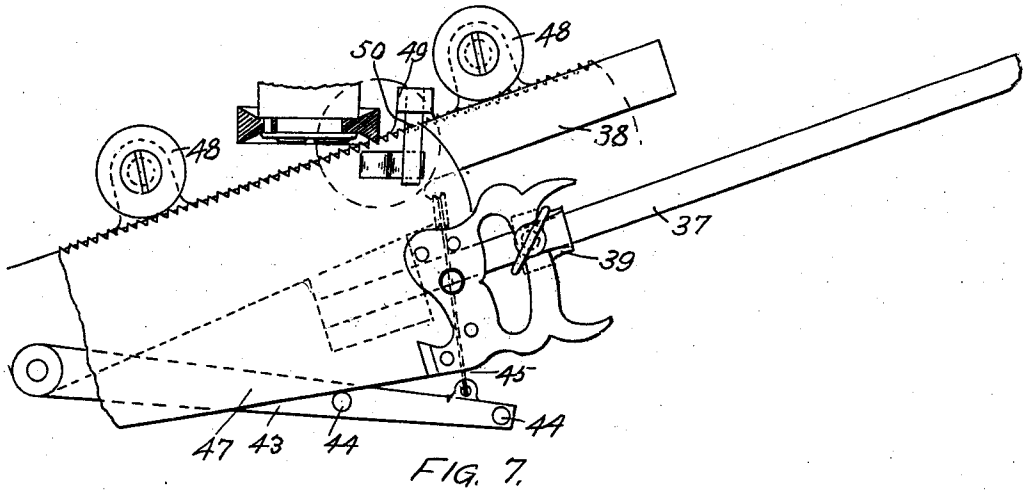


FIG. 7.

WITNESSES:

Percival Robert Moses

John L. Eadie

INVENTOR.

Henry F. Noyes

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 693,985. Patented Feb. 25, 1902.

H. F. NOYES.

SAW FILING MACHINE.

(Application filed June 15, 1901.)

(No Model.) 3 Sheets—Sheet 3.

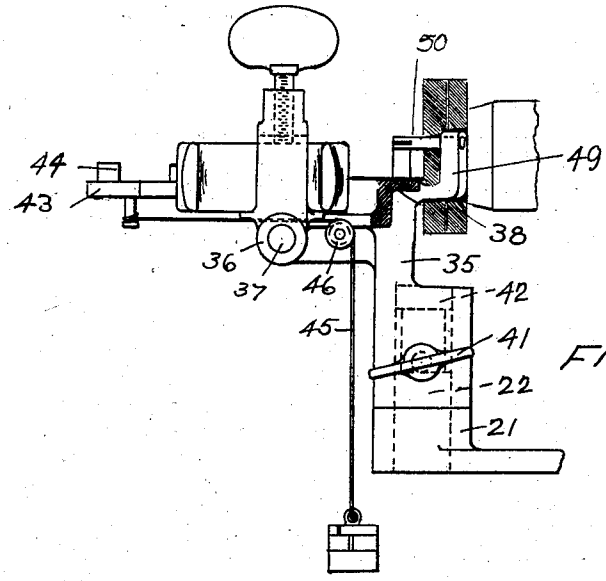


FIG. 8.

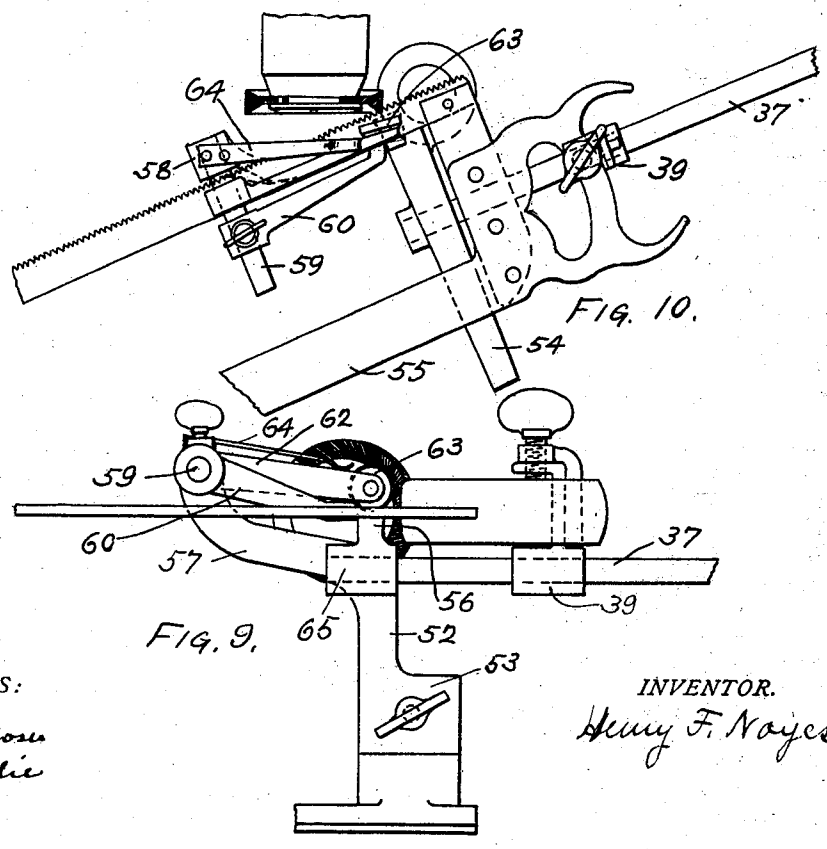


FIG. 10.

FIG. 9.

WITNESSES:

Percival Robert Moses

John L. Eadie

INVENTOR.

Henry F. Noyes

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY F. NOYES, OF INDIANAPOLIS, INDIANA.

SAW-FILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 693,985, dated February 25, 1902.

Application filed June 15, 1901. Serial No. 64,650. (No model.)

To all whom it may concern:

Be it known that I, HENRY F. NOYES, a citizen of the United States, and a resident of Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Saw-Filing Machines, of which the following is a specification.

This invention relates to saw-filing machines, and in particular to that class of saw-filing machines in which a rotary file is employed.

One object of this invention is to provide a simple and automatic machine for filing band-saws; and a further object of this invention is to provide a filing-machine which shall also be adapted to file band-saws, handsaws, or butcher-saws by providing a saw-filing mechanism which shall be adapted to be combined with interchangeable saw-guiding mechanisms, one of which shall be suitable for each of said classes of saws. In sharpening saws of this character one of the chief difficulties met with is due to the fact that the teeth of the saw are more or less irregular in their spacing and height, according to the degree of skill of the workman who has filed them. Therefore it is desirable that a filing-machine for saws of this character should have its feeding mechanism embodied in the file itself, so that the irregularities of the tooth-spacing shall not be sufficiently multiplied to interfere with the regularity of the feeding movement. Therefore a further object of this invention is to incorporate a feeding movement in the movement of the file itself, as well as a rotary movement, whereby the file is adapted to perform the functions of a pawl. In order to avoid the possibility of any undue cutting action of the file while the feeding movement is taking place, it is desirable that that portion of the file which is in contact with the saw at the instant the feeding movement takes place be smooth and not provided with teeth. Therefore a further object of this invention is to provide a form of rotary file in which the file-teeth are omitted from a certain portion of the cutting-surface.

In order to provide a form of file which shall have two cutting edges, and thereby a longer life, I prefer to make the file with the cutting edges projecting from each side of a central disk. These files are made of different cross-sectional shapes to provide for different forms of saw-tooth, but preserve the general form of a cupped ring having cutting edges formed by the intersection of two differently-angled conical surfaces or by the intersection of cylindrical and conical surfaces, the circle of intersection being in all cases outside of the plane of the central disk, or, in other words, the angle formed by the interior conical surface with the center line of rotation of the file is in all cases less than a right angle.

Further objects of this invention will be hereinafter mentioned.

One embodiment of my invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation showing a construction of my invention in its form adapted for band-saws. Fig. 2 is a plan of the same, showing a section of the file. Fig. 3 is an elevation of a cam for effecting a feeding movement of the saw. Fig. 4 is a cross-section of a form of file used for band-saws. Fig. 5 is a cross-section of a form of file used for handsaws and for butcher-saws. Fig. 6 is a diagrammatic view showing the position of the file for sharpening the alternately-beveled teeth of handsaws. Fig. 7 is a plan showing a portion of the file-carrying mechanism in conjunction with a saw-rest adapted for handsaws. Fig. 8 is an elevation of the same. Fig. 9 is a front elevation of the file-carrying mechanism in conjunction with a saw-rest adapted for butcher-saws. Fig. 10 is a plan of the same. Fig. 11 is a front elevation of the band-saw-filing mechanisn.

I will first describe that form of my invention which is adapted for filing band-saws, having reference to Figs. 1 to 4, inclusive, and to Fig. 11. The mechanism included in this and in the other forms of my invention may well be divided into two general mechanisms—the file carrying and operating mechanism and the saw rest or guide.

The file carrying and operating mechanism, which is identical in all three forms of my invention, comprises a bed 1 of any suitable form. This bed is provided with upwardly-extending lugs 2 and 2^a, carrying a rock-shaft 3. This shaft is threaded in the lug 2^a and provided with a knurled head 4, the purpose of

which will be explained farther on. A thumb-screw 5, fitted to the lug 2, normally prevents the shaft from turning. A file-carrying rocker 6 is pivoted upon the rock-shaft, any endwise movement thereon being prevented by the collars 7. The rocker is provided with two boxes 8 and 8^a, carrying a file-shaft 9. Firmly fastened to the file-shaft between the boxes 8 and 8^a is a cam 10. One end of the file-shaft is provided with tight and loose pulleys 11 and 11^a, respectively, and the other end is provided with a rotary file 12.

The cam 10 is provided with two operating-surfaces, one, 10^a, on its face is adapted to contact a roller 13, which is carried by the rocker 6; the other operating-surface, 10^b, is on its edge; a bracket 16 is carried by the bed 1 and provided with a roller 14 which is adapted to contact the edge surface 10^b. The bracket 16 is also provided with an adjustable thumb-screw 17, adapted to contact a boss 18, which is situated on the box 8. By reference to Fig. 3 it will be noted that the operating-surface 10^b is provided with a depression O between the points *c* and *d* and that the remainder of its circumference *c x d* is approximately of the same radius. It will be noted from Fig. 2 that a belt 11^b leads to the left, whereby the belt-pull normally holds the surface 10^b against the roller 14. As the cam revolves when the depression O reaches the roller 14 the rocker swings to the left until the boss 18 contacts the thumb-screw 17. Interposed between the cam 10 and the box 8^a is situated a compression-spring 19. This spring is adapted to hold the cam-face surface 10^a in contact with the roller 13. This surface 10^a is provided with a slight hill *e*, followed by a slight depression *f*. From *f* the surface rises to *g*, whence it is straight until the point *e* is reached again. This hill and depression of the face-surface 10^a are arranged with such a relation to the depression of the edge surface 10^b that just as the roller 14 begins to go into the depression O the roller 13 begins to ascend the hill *e*, reaching the top at about the same time that the roller 14 reaches the bottom of the depression O. While the roller 14 is still in the depression O, the roller 13 goes into depression *f*, and then at about the time it begins to rise to *g* the roller 14 begins to rise from O to *d*. The result of this construction is that simultaneously a backward movement and a movement to the left is imparted to the file, to be followed by a forward movement and then simultaneously by a slight backward and a movement to the right, bringing the file into the position from which it started. The object of these movements will be referred to farther on. In case other than belt-power is to be used for driving the file-shaft—as, for instance, a crank—a tension-spring 20 is provided attached to the rocker 6 and to a pin 1^a, which is firmly fastened to the bed 1. This spring is, however, unnecessary, if the belt is arranged as described.

Referring now to the saw-carrying mechanism, I provide the bed 1 with a suitable boss 21, in which is located a vertical pin 22. Located upon this pin is a U-shaped piece 23, having at the junction of two arms 23^a and 23^b a boss 23^c, adapted to carry a horizontal square rod 24. The arms 23^a and 23^b are each provided with two pins 23^x, adapted to guide a band-saw between them, while the arm 23^a is also provided with slotted or grooved portion 23^y, adapted to receive and guide the points of the saw-teeth before they reach the file. A thumb-screw 25 normally holds the guide-piece 23 from turning upon the pin 22, while by loosening this thumb-screw the guide may be turned so as to bring the saw into a suitable position for any angle of saw-teeth. The rod 24 is adapted to carry a saw-rest 27, which is adapted to be adjusted toward or from the file and is normally held in its proper position by a thumb-screw 28. The saw-rest is provided with two wearing-strips 27^a and 27^b, preferably of steel, the part 27^b being firmly fastened to the rest, while the part 27^a is adapted for adjustment by means of a thumb-screw 29. To form a guide for the back of a saw a back-guide 30 is provided, having a pin 31, which is adapted to slide easily and to be supported by a boss 32, with which the rest 27 is provided. By this means the back may be moved in or out to accommodate itself to the width of saw-blade, and to firmly clamp it in its proper position a thumb-screw 33 is provided. The file 12 is provided with an uncut or smooth place 34, and approximately central of this uncut portion is located a small hole 12^a, which is adapted to receive a pin 12^b, carried by an enlarged end of the shaft 9. The object of this hole 12^a is to locate the uncut portion of the file with a certain reference to the cam 10, and by locating the hole approximately central of the uncut portion of the file the same hole is adapted for use to locate either cutting edge of the file.

I will now proceed to describe the operation of the machine. A band-saw 35 having been placed in position between the wearing-strips and the back-guide 30 adjusted to suit the width of the saw-blade and the thumb-screw 29 adjusted to allow the saw to slip easily without being loose between the strips, the file is adjusted to just touch the bottoms of the saw-tooth spaces by turning the knurled head 4 as may be necessary. The thumb-screw 17 is then adjusted so that when the roller 14 reaches the depression O the rocker 6 and the file-shaft 9 and file swing to the left an amount slightly greater than the saw-tooth spacing. The position of the uncut place upon the file is so located with reference to the cam 10 that just as the roller 14 reaches the depression O and the roller 13 reaches the hill *e* the uncut place reaches the saw-teeth and during the return movement of the file acts as a pawl in effecting a feeding movement of the saw, the cut portion of the file only reaching the saw-tooth after this longi-

tudinal feeding movement has been completed. The object of this arrangement is to prevent any undue wear of the file, for if the feeding and cutting operations were to take place simultaneously the teeth of the file would wear out very fast, and to prevent the file from filing off a tooth if a saw should not move readily between the strips.

It is evident that it will operate successfully upon saws of very irregular teeth, being only limited by the condition that the largest tooth-space be not as great as the two smallest, a condition that would almost never happen.

It will be noted that the only adjustments necessary are to bring the file to the bottoms of the teeth and for the tooth-space and for the thickness of the saw, all of which adjustments may be made while the machine is running. It will also be noted that in putting in a new saw the saw-rest can be quickly moved outward by loosening the thumb-screw 28. Thus all the operations necessary in setting the machine can be performed in the smallest portion of time.

I will now proceed to describe the attachment for handsaws. The bed and file operating mechanism remain the same as used for the band-saw mechanism, using the form of file 12^x, as illustrated in Fig. 5. A swiveling rest-carrier 35 is provided, adapted to fit and to turn slightly on the pin 22 and having a horizontally-extending saw-rest 38, and the rest-carrier 35 is provided with a thumb-screw 41, adapted to clamp the rest to the pin 22. It will be noted that the plane of the saw-rest is normally disposed a certain distance below the center of the file; also, that by loosening the thumb-screw 41 the carrier and rest may be raised an equal distance above the center of the file, as shown by the broken line in Fig. 8. The pin 22 is provided with a slight shoulder 42, adapted to locate the thumb-screw, so that the rest will be an equal distance above the center of the file. The object of this construction will be referred to farther on. Pivoted to the rest 38 is a lever 43, having vertical pins 44, extending above the plane of the rest and adapted to contact a saw-back, and a cord 45, attached to the lever 43 and passing over a guide-pulley 46, provides a means for holding a saw 47 up to its work. To guide the saw-teeth, two rollers 48 are suitably supported by the rest, and as a further guide for the saw the rest is provided with a lug 36, in which is firmly fastened a rod 37, situated parallel to a line touching the face of the rollers, and this rod is provided with a sliding lug 39, adapted to be clamped to the saw-handle, and thereby to guide the saw as it moves along. The operation of the filing mechanism is in this case similar to that described for the band-saw mechanism.

In order to provide for the two alternate bevels of teeth common to the cut-off saw, the vertical adjustment of the rest has been provided, those teeth having one bevel being filed with the rest in its normal position below the center of the file and the remaining teeth being filed with the rest above the center of the file. In both cases the movement of the file is adjusted so that it will skip one tooth each revolution. This operation of the file is further illustrated in the diagrammatic view of Fig. 6.

For sharpening saws with rip-saw teeth the rest is placed at the center of the file, and a file similar to the band-saw file, Fig. 4, is used, one tooth being fed at a time.

Taking up now the butcher-saw mechanism, as illustrated in Figs. 9 and 10, the filing mechanism is such as has been described with reference to the band-saw mechanism. In this case it is desirable that the blade be sharpened without its frame being detached. To provide a construction of mechanism which shall be adapted to effect this desired end, I provide a saw-rest 52 with a boss 53, adapted to fit and to be clamped to the pin 22. This rest is provided with a horizontal arm 54, adapted to support the frame of a saw 55, while disposed in proximity to the file 12 the rest is provided with a flat support 56 for the saw-blade. The rest is also provided with an upwardly-extending arm 57, having a boss 58, in which is located a pin 59. A saw-back guide 60 is adapted for adjustment upon the pin 59 and forms a guide for the back of the saw-blade. Also fitted to the pin 59 is an arm 62, provided with a roller 63, adapted to contact the blade of the saw, while a spring 64, supported by the boss 58, is adapted to hold the roller into close contact with the blade. It will be noted that the roller 63 is arranged upon an axis not quite perpendicular to the line of travel of the saw-blade, whereby the roller is adapted to hold the saw-blade back against the guide. The saw-rest is also provided with a boss 65, having firmly fastened thereto a horizontal rod 37, and adapted to slide upon this rod is a traveling lug 39, adapted to be clamped to the handle of the saw-frame, and thereby to form a guide whereby the feeding movement of the saw-blade is effected in a line parallel to this rod. The operation of this mechanism is similar to that in both mechanisms previously described.

Thus will be seen the advantages of this invention.

A simple machine is produced whereby it is possible by simply changing the saw-rest to sharpen either band-saws, hand-saws, or butcher-saws.

A machine is produced which is adapted to operate successfully upon saws having irregularly-spaced teeth.

A machine is produced which is adapted to operate with the least possible wearing of the files and to use a file having two cutting edges.

A file is produced having a certain portion of its surface unprovided with file-teeth, whereby it is adapted to perform the func-

tions of a pawl without detracting from its life. It will also be noted that the spring 19 acts to hold the file in contact with the saw-teeth, whereby a yielding pressure is applied thereto and the life of the file is promoted.

While I have described this invention with more or less completeness as regards the details thereof and as being embodied in a more or less precise form, I do not wish to be limited thereto unduly, as I contemplate all proper changes of form, the omission of parts, and the substitution of equivalents, as circumstances may suggest or necessity render expedient.

I claim—

1. In a saw-filing machine, in combination with a suitable saw-support; a rotary file suitably supported; a means adapted to impart to said file a bodily movement longitudinally of said saw-support, whereby said file is adapted to perform the functions of a pawl in effecting a feeding movement of a saw; and a means of rotating said file; as and for the purpose set forth.

2. In a saw-filing machine, in combination with a suitable rest a rotary file suitably supported and provided with an untoothed portion whereby it is adapted to effect a feeding movement of a saw; and a means of rotating said file as and for the purpose set forth.

3. A rotary file comprising a ring having circumferential surfaces cut to form file-teeth, and intersecting to form an entire cutting edge; and that portion of said surfaces which is included within a certain arc, being uncut; as and for the purpose set forth.

4. A rotary file comprising an entire ring having a circumferential surface provided with file-teeth; said teeth being omitted from that portion of said surface which is included within a certain arc; as and for the purpose set forth.

5. In a saw-filing machine, in combination with a suitable rest; a spindle suitably supported and adapted to carry at one end a rotary file; a means adapted to impart to the file-carrying end of said spindle a movement longitudinal of said rest; and a means of rotating said spindle; as and for the purpose set forth.

6. In a saw-filing machine, in combination with a suitable rest; a spindle suitably supported and adapted to carry a rotary file; a cam carried by said spindle and adapted to impart thereto a movement longitudinally of said rest; and a means of rotating said spindle; as and for the purpose set forth.

7. In a saw-filing machine, in combination with a suitable rest; a spindle suitably supported and adapted to carry a rotary file; a means carried by said spindle and adapted to impart thereto a longitudinal movement whereby it is adapted to remove a file from contact with a saw-tooth preparatory to a feeding movement thereof; a saw-feeding means; and a means of rotating said spindle; as and for the purpose set forth.

8. In a saw-filing machine, in combination with a means adapted to carry a rotary file; a suitable means of rotating said file-carrying means; a bed adapted to support said file-carrying means; a saw-rest fastened to said bed; a rod fastened to said rest and disposed longitudinally thereof; a traveling means adapted to be fastened to a saw thereby to guide the same; as and for the purpose set forth.

9. In a saw-filing machine, in combination with a means adapted to carry a rotary file and provided with a suitable means of rotation; a bed adapted to support said file-carrying means; a saw-rest fastened to said bed; a rod fastened to said rest and disposed longitudinally thereof and provided with a traveling means adapted to form a guide for said saw; and a means carried by said rest and adapted to guide the back of a saw; as and for the purpose set forth.

10. In a saw-filing machine, in combination with a suitable rest; a bed adapted to support said rest; a spindle carried by said bed and provided with a suitable means of rotation and adapted to carry a rotary file; a means adapted to impart coincidently to said spindle movements both longitudinally of and transversely of said rest; as and for the purpose set forth.

11. In a saw-filing machine, in combination with a suitable rest; a bed adapted to support said rest; a rocker pivoted to said bed; a spindle carried by said rocker and adapted to carry a file; a means of rotating said spindle; a means carried by said spindle and adapted to impart thereto a movement longitudinally of said rest; as and for the purpose set forth.

HENRY F. NOYES.

Witnesses:
PERCIVAL ROBERT MOSES,
JOHN G. EADIE.