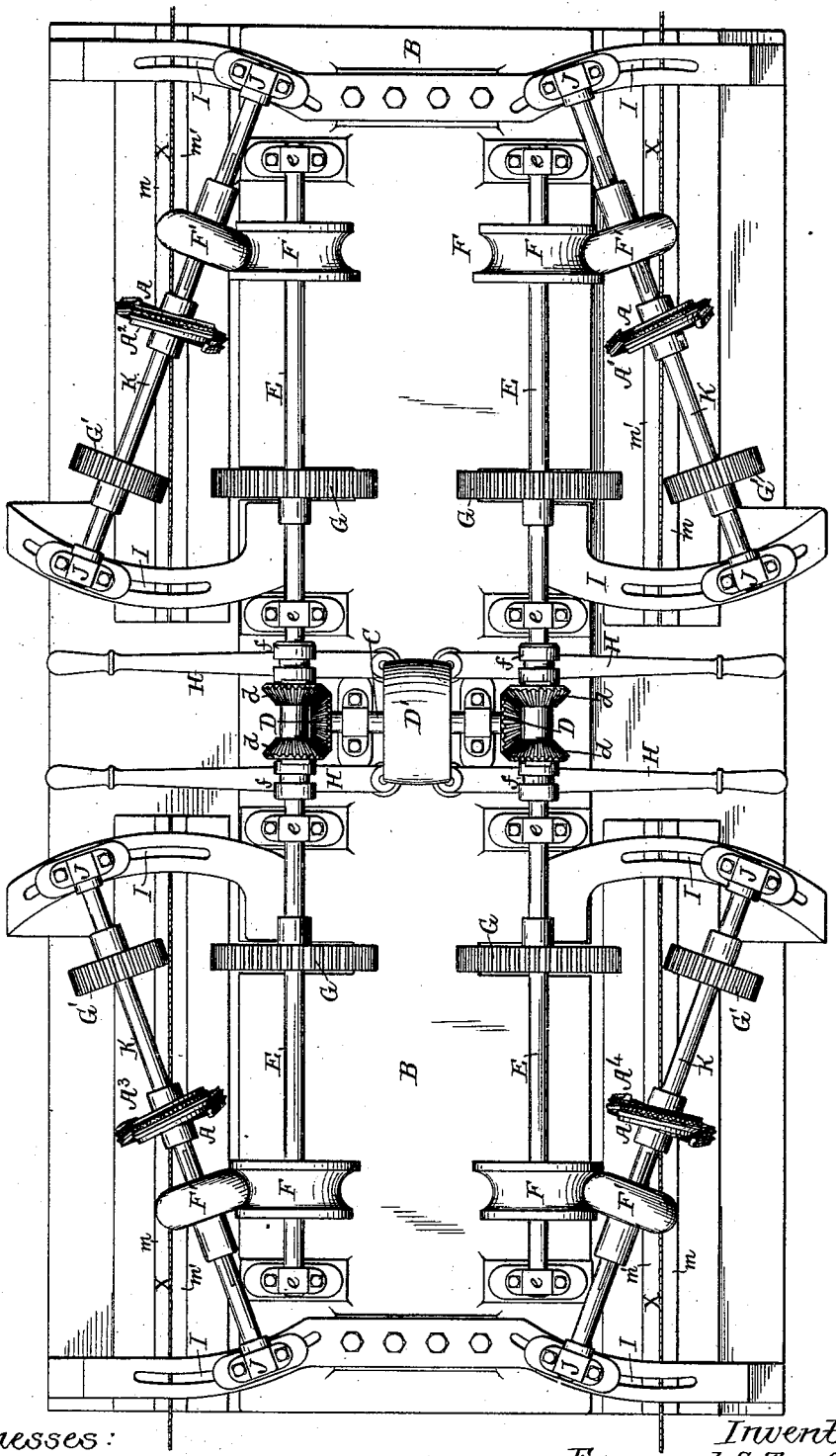
(No Model.) 4 Sheets—Sheet 1.

E. S. TWYFORD.

SAW SHARPENING MACHINE.

No. 489,275. Patented Jan. 3, 1893.

FIG. 1.



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(No Model.) 4 Sheets—Sheet 2.

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FIG. 3.

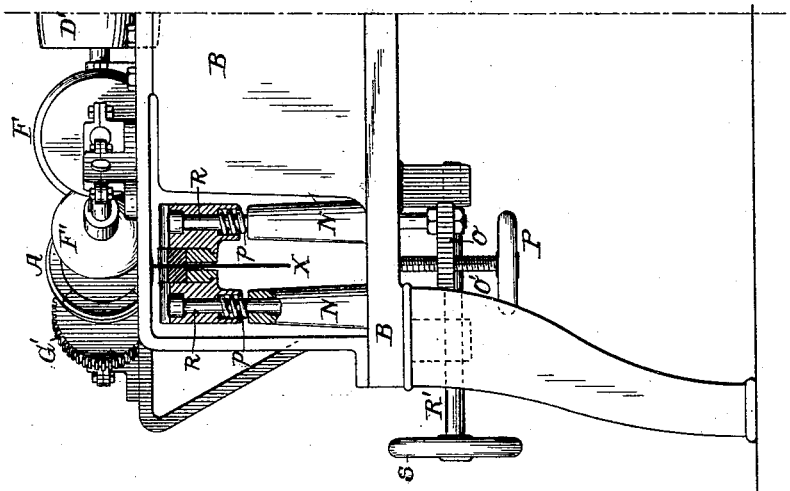
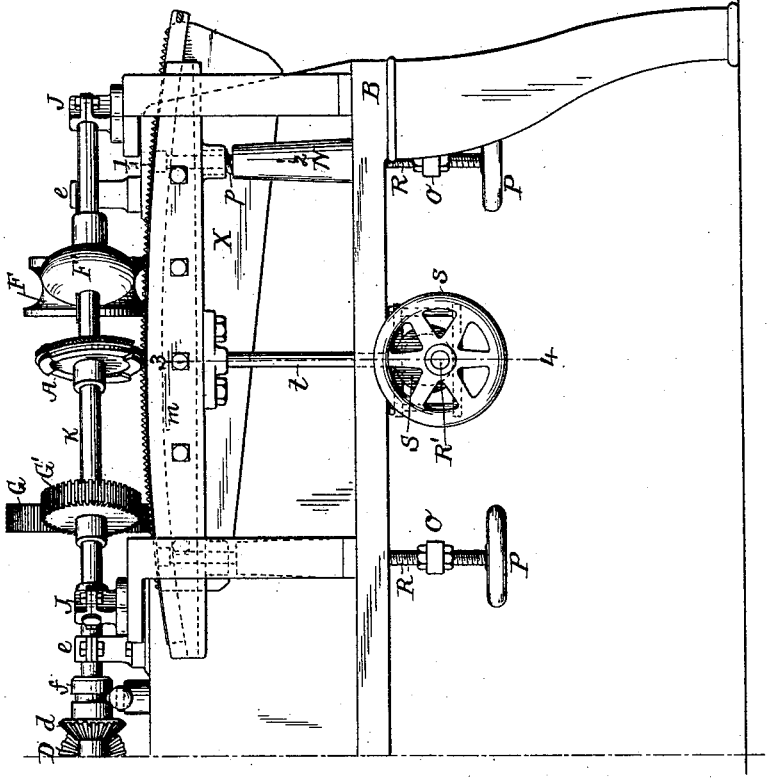


FIG. 2.



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(No Model.)

4 Sheets—Sheet 3.

E. S. TWYFORD.

SAW SHARPENING MACHINE.

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FIG. 4.

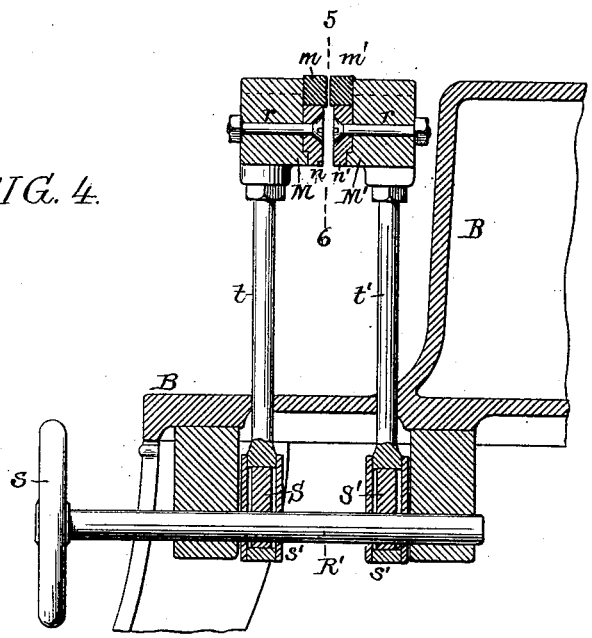


FIG. 6.

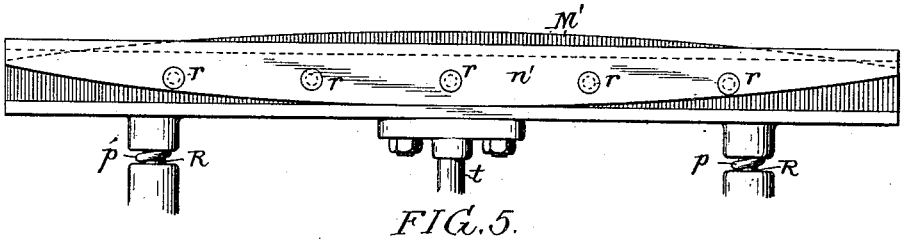
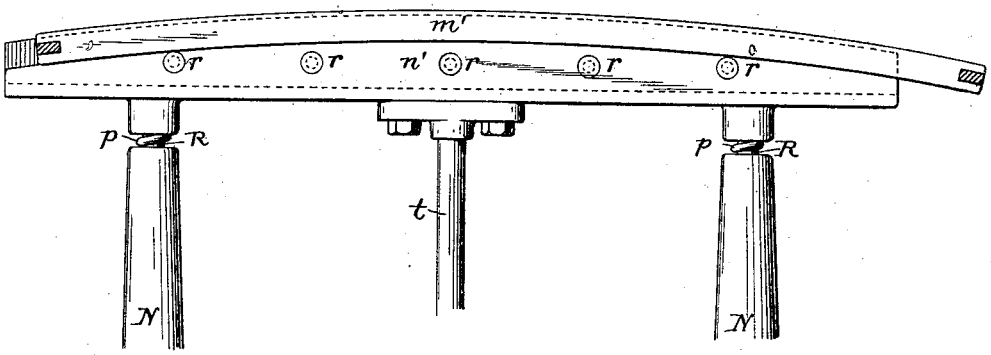


FIG. 5.



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(No Model.)

4 Sheets—Sheet 4.

E. S. TWYFORD.

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FIG. 8.

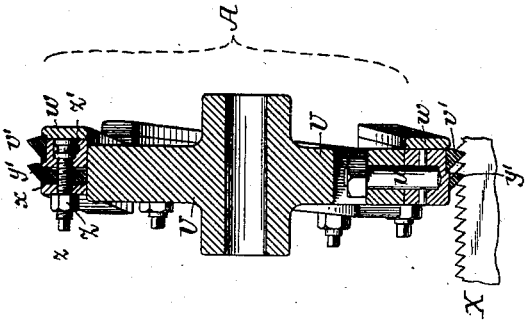


FIG. 7.

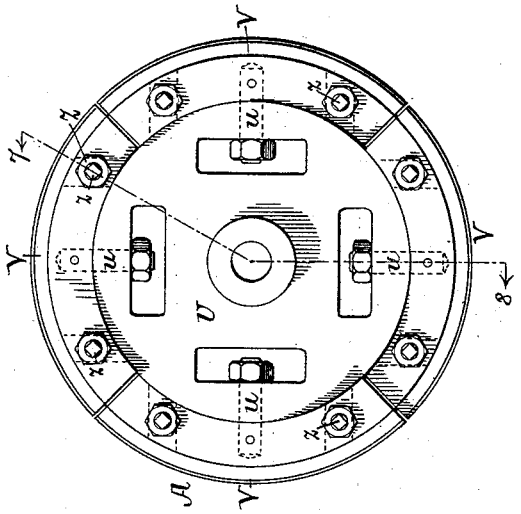
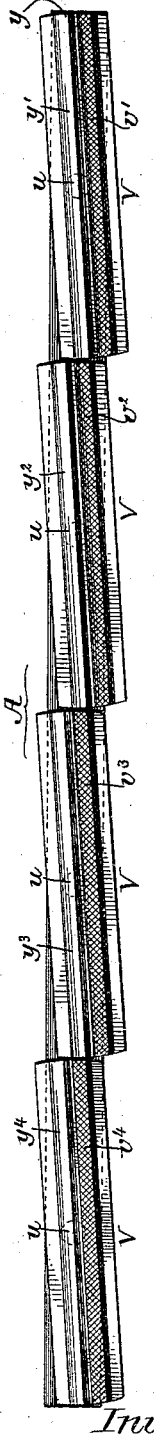


FIG. 9.



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UNITED STATES PATENT OFFICE.

EMMANUEL S. TWYFORD, OF PHILADELPHIA, PENNSYLVANIA.

SAW-SHARPENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 489,275, dated January 3, 1893.

Application filed April 15, 1892. Serial No. 429,256. (No model.)

To all whom it may concern:

Be it known that I, EMMANUEL S. TWYFORD, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Saw-Sharpening Machines, of which the following is a specification.

My invention relates to certain improvements in machines for sharpening saws, the main object of my invention being to construct a simple and economical machine which may be adjusted to sharpen saws of different shapes and sizes and having teeth of different pitch, as more fully described hereinafter.

In the accompanying drawings:—Figure 1, is a plan view of a machine constructed in accordance with my invention; Fig. 2, is an elevation of a portion of the same; Fig. 3, is an end view, partly in section, on the line 1—2 Fig. 2; Fig. 4, is a section of a portion of the machine on the line 3—4, Fig. 2, drawn on a larger scale; Fig. 5, is a section on the line 5—6, Fig. 4; Fig. 6, is a view showing the same parts as in Fig. 5, but in a different position; Fig. 7, is an elevation of one of the file holding disks; Fig. 8, is a transverse section of the same on the line 7—8, Fig. 7; and Fig. 9, is a diagram of the periphery of the disk and its files and feeding strips.

The machine shown in Fig. 1, is a double machine adapted to act at the same time upon two or four saws as desired, and is provided with four disks A′, A^2, A^3, A^4, each provided with files and each driven in exactly the same manner and being of precisely the same construction as its fellows.

The bed B is provided with suitable bearings for the reception of the primary shaft C on the opposite ends of which are bevel gears D D each of which meshes with bevel gears *d d* and rotative motion is imparted to all of the bevel gears at the same speed through a belt wheel D′. As the construction of each quarter of the machine is precisely the same as each of the other sections, the description will be confined to but one section thereof, the filing disk it carries and the supporting and driving mechanism. The bevel gear *d* turns loosely upon a shaft E mounted in bearings *e* in the frame and is provided with a grooved frictional driving wheel F and a gear wheel G. On this shaft E is a clutch block *f* keyed to the shaft and adapted to be moved from or toward clutching teeth on the rear of the pinion *d* by means of a pivoted lever H.

At suitable points on the frame are cut segmental guiding slots I on which are placed bearing blocks J for the file shaft K, and the securing bolts of the bearings pass through the segmental guiding slots and are bolted in any suitable position to present the filing disk A at any desired angle to the saw.

Rotative movement is imparted to the shaft K when in the position illustrated in Fig. 1, by means of a friction disk F′, secured to the shaft by a feather and adapted to be driven by frictional contact with the rotated friction wheel F on the shaft E. The feathering of the friction disk F′ is found necessary in order to permit its longitudinal adjustment on the shaft when the shaft K is adjusted to present the filing disk at any desired angle to the saw. When, however, straight filing is to be done the shaft K is so adjusted as to extend on a line parallel with the length of the saw and a more positive driving is then desirable. To effect this end the shaft K is provided with a pinion G′ adapted to mesh with a gear wheel G carried by the shaft E and is driven in a positive manner.

The saw X, shown in Figs. 2 and 3, has its teeth on a curved line and it is clamped between two bars *m m′*, the opposite ends of which are hinged together and the sides of the bars being sprung between the saw so that when the opposite ends of the bars are brought together and secured the saw will be firmly clamped throughout its length and as an additional precaution the clamping faces may be covered with rubber or similar material, as shown. The surfaces of the clamping bars *m*, *m′* are curved to correspond to the curvature of the line of teeth of the saw, and these clamps are adapted to guideways M M′ having suitable curved guiding strips *n n′* on which the clamp may travel in such manner that the successive teeth will always present precisely the same position to the action of the file; the shape of these guides is determined by the shape of the saw to be filed, thus, if a saw having its teeth in a perfectly straight line is to be filed the guiding strips are perfectly straight and if the teeth of the saw are on a curved line, as illustrated

for instance in a somewhat exaggerated form in Fig. 2, the guides are correspondingly shaped, as will be seen on reference to Fig. 5.

It will be noticed on reference to Figs. 5 and 6, that the guiding strips $n\,n'$ are secured in position in the guideways M M′ by a series of bolts r and that when a saw having its teeth in a straight line is to be sharpened the guiding strips may be removed and reversed and secured in position by the same line of bolts, the guiding face being then on a straight line as shown in Fig. 6.

The guideways M M′ are held in proper relative position with respect to the filing disk A by means of rods R which extend through the guideways and through posts N to cross heads o, the guideways being held in the highest position by means of springs p surrounding the rods R and extending between the top of the posts N and the guideways. Through the cross head o passes a screw o' the upper end of which presses against the framework B and to the lower end of the screw is secured a hand wheel P, by means of which the screw may be turned, and the cross head, and through it, the guiding bars M M′ are adjusted from or toward the filing disk.

To provide for the putting in of new saws and the removing of saws that have been sharpened without disturbing the adjustment of the cross heads and guiding bars, I provide a cam shaft R′ having upon one end an operating wheel s and adapted to suitable bearings on the frame of the machine. This cam shaft carries two cams S S′ adapted to turn in boxes $s'\,s'$ secured to the lower ends of vertical rods $t\,t'$, the upper ends of which are secured respectively to the guide ways M M′, so that when it is desired to place a saw in proper position the turning of the hand wheel will draw the guide ways M M′ down against the action of the springs p, the rods R remaining undisturbed and the guideways sliding upon them. After the saw has been placed in position, with the first tooth under the filing disk A, the cam shaft is turned and the guideways are forced up by the springs p until stopped by the heads of the rods R which have previously been adjusted to proper position, or which may be again adjusted by turning the hand wheels P.

The filing disk A, as shown in Figs. 7, 8 and 9, comprises a central disk body U on which are swiveled by pins u, four segmental blocks V, which may be adjusted at a greater or less angle to the face of the disk, as shown in the diagram, Fig. 9, which represents a view of the periphery of the disk and its files extended. The files are four in number, corresponding to the number of segments, and are adapted to slots in the body of said segments and are held in said slots by means of plates w also having grooves and bolted to the segments so as to hold the files securely in position, as shown in Fig. 8. Extending parallel to each file is a feeder or guide y secured to blocks x which extend down through openings in the segments and are adapted to be adjusted by means of a screw z which may be turned by means of a key adapted to its squared end, the opposite end of the screw being provided with an annular groove through which passes a pin z' so that while the screw is permitted a free movement on its axis all longitudinal motion is prevented. By this means the feeder or guide may be adjusted to any distance from the file that may be desired, and this distance is, of course, determined by the pitch of the teeth of the saw being sharpened, while to permit finer adjustments the side of the feeder nearest the file is cut away in order that its point may be adjusted nearer to the working faces of the file and thus accommodate saws having teeth of very small pitch, after adjustment the screw z is locked in position by means of a nut Z. When the parts have been adjusted to proper position they will have, when the periphery of the disk is extended, the appearance shown in Fig. 9, the feeder of one segment being on exactly the same plane as the file of the next succeeding segment, so that as the disk revolves the file v' will act on the first tooth of a saw as shown in Fig. 8, and its feeder y' will act on the third tooth; the file v^2 will act on the third while its feeder y^2 is acting on the fifth tooth; the file v^3 will act on the seventh tooth while its feeder is acting on the ninth tooth; the file v^4 will act on the ninth tooth as a continuation of the movement of the feeder y^3 and the feeder y^4 will bring the eleventh tooth in position to be acted upon by the file v'. It will thus be seen that at one rotation of the disk the first, third, fifth, &c., teeth will be sharpened and the saw will be gradually fed along and the alternate teeth filed until the saw passes to the guide next in line, where the same operation takes place upon the second, fourth, sixth &c., teeth.

Having thus described my invention, I claim and desire to secure by Letters Patent:—

1. The combination in a saw sharpening machine of the driving shaft, a friction driving wheel thereon, a filing disk, a shaft K carrying the same, a longitudinally adjustable friction disk carried by said shaft K and clamps for carrying the saw to be filed, substantially as specified.

2. The combination of the rotated shaft, a friction wheel thereon, a positive driving wheel G mounted on said shaft, a file disk, an adjustable shaft carrying the same, a friction disk mounted thereon and engaging with the friction disk of the driving shaft and a pinion carried by said shaft and adapted to engage with the gear wheel G, substantially as specified.

3. A machine for filing saws comprising a series of file disks, a series of adjustable shafts carrying said disks, supplementary driving shafts, a friction wheel or disk on

each of said adjustable shafts and supplementary driving shafts, a bevel gear on each of said supplementary driving shafts, and a main driving shaft having beveled gears engaging with those of the supplementary driving shafts, substantially as specified.

4. A file holding disk for saw sharpening machines comprising a disk body, a series of segments pivoted to said disks and files carried by said segments, substantially as specified.

5. A disk for saw filing machines comprising a main disk body, a series of segments pivoted to said disk body and adjustable thereon, a series of files adapted to the periphery of said segments, and clamp plates for holding each of said files in position, substantially as specified.

6. A file holding disk for saw sharpening machines comprising a main disk body, a series of segments pivoted thereto, files carried by said segments and a series of feeding strips also carried by said segments and adjustable from and toward the files, substantially as specified.

7. A file holding disk for saw sharpening machines comprising a main disk body, a series of segments pivoted to said disk body, files carried by said segments, feeders parallel to said files and blocks x on said feeders, with adjusting screws adapted to engage with said blocks x, substantially as specified.

8. A clamping device comprising the guideways M M′, the clamping bars m m' and the reversible guiding strips n n' each having one curved and one straight face, substantially as specified.

9. The combination with a filing disk, of a guiding strip or strips curved to correspond to the curvature of the teeth of the saw being sharpened and holding clamps for said saw, adapted to travel on said guiding strips, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMMANUEL S. TWYFORD.

Witnesses:

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JNO. E. PARKER.