No. 630,288.

Patented Aug. 1, 1899.

J. F. CORNISH.

SAW FILING MACHINE.

(Application filed Nov. 5, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

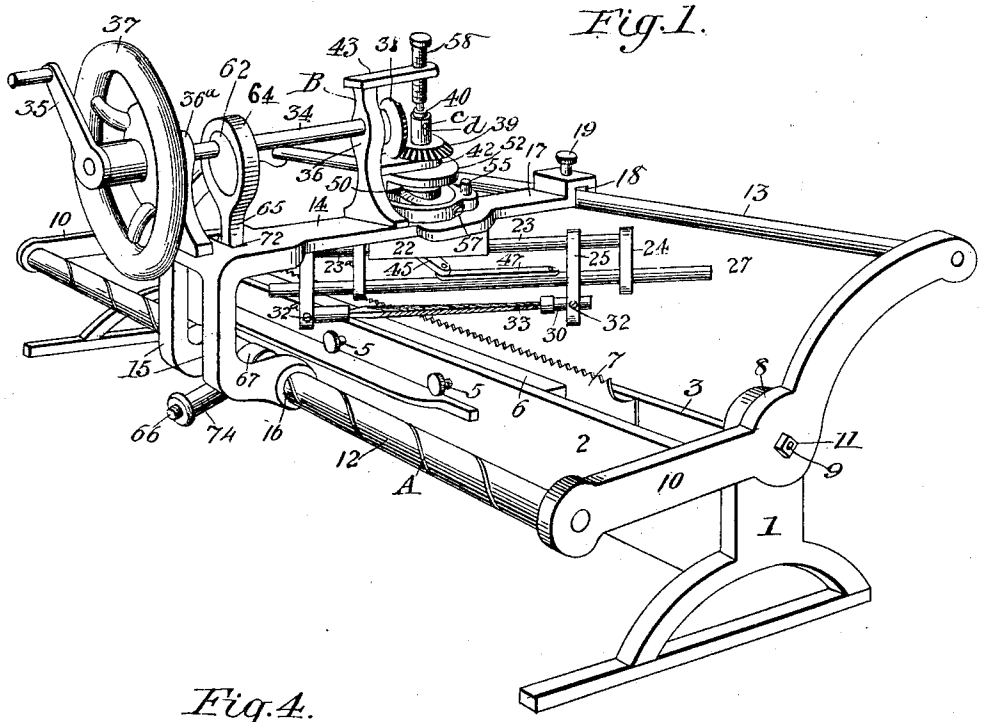


Fig. 4.

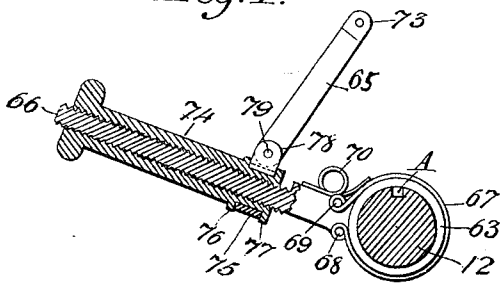
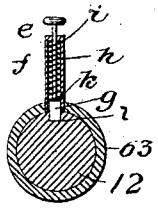


Fig. 5.



Witnesses:
C. W. Colburn
J. E. Hyde

Inventor:
Joel F. Cornish

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

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(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

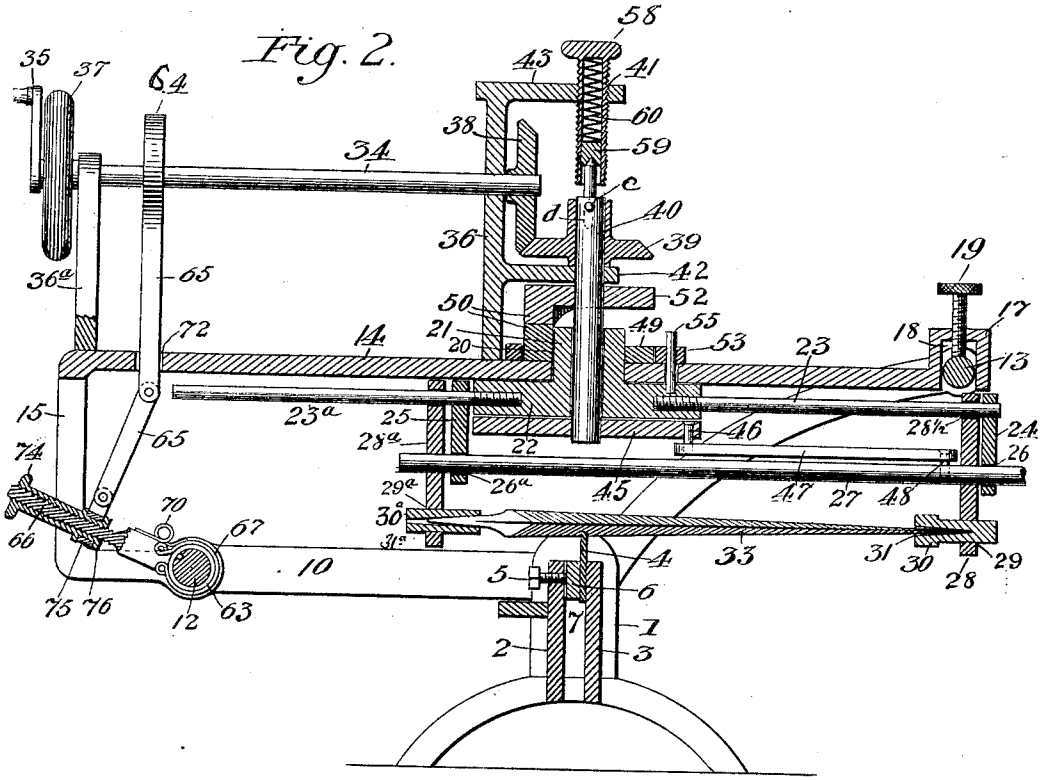
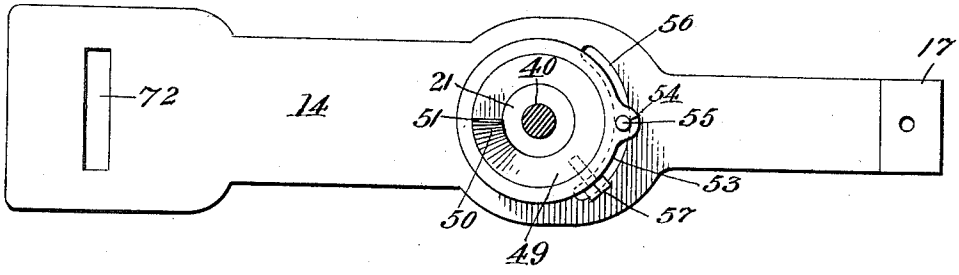


Fig. 3.



Witnesses:
E. W. Colburn
J. E. Dyer

Inventor:
Joel F. Cornish

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

UNITED STATES PATENT OFFICE.

JOEL F. CORNISH, OF WEST UNION, IOWA.

SAW-FILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 630,288, dated August 1, 1899.

Application filed November 5, 1898. Serial No. 695,633. (No model.)

To all whom it may concern:

Be it known that I, JOEL F. CORNISH, a citizen of the United States, residing at West Union, in the county of Fayette and State of Iowa, have invented new and useful Improvements in Saw-Filing Machines, of which the following is a specification.

My invention relates to improvements in saw-filing machines in which a file is reciprocated transversely and radially, in conjunction with an intermittent movement of the same longitudinally, over the teeth of the saw; and the object of my invention is to construct a machine for the filing of saws automatically by power applied to crank-shaft. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure I is a vertical view in perspective of entire machine. Fig. II is a vertical view in cross-section of part of machine. Fig. III is a top view of bed-plate of carriage, showing circular slot 56, disk 49, and collar 53, other parts removed. Fig. IV is a longitudinal view in cross-section of lever 66, showing mode of attachment of same to sleeve 63, and of the connecting-rod 65. Fig. V is a view in cross-section of rod 12, encircled by sleeve 63, showing projection *e* on sleeve 63, pin *g*, spring *h*, and projecting end of pin.

Similar letters and figures refer to similar parts throughout the several views.

1 represents the legs and standards, to which is securely attached, at the ends thereof, the clamps 2 and 3, between which the saw 4 to be filed is held firmly in position for filing by thumb-screws 5 5, forcing strip 6, situated in recess 7 of clamp 2, against saw, also attached to standards 1 1 by pivot-joint 8 8, the center of the pin 9, holding joint, being exactly in alinement with the base of the teeth of the saw to be filed. The pivot-pins 9 9 have thumb-nuts 11 11 for clamping and holding cross-bars 10 10 to standards 1 in any desired position. Securely attached to cross-bars 10 10 and parallel with clamps 2 and 3 is rod 12, provided with a spiral groove A in same extending the whole length of rod 12. Also attached to bars 10 10 on opposite side of clamps from rod 12 is rod 13, which rods 12 and 13 form a track or ways, hereinafter called "ways," for carrying a carriage B, to which is attached the file 33 and mechanism operating the same. This mechanism consists of bed-plate 14, provided on its rear end with legs 15 15, having round opening 16 in the feet thereof through which passes rod 12, the legs 15 extending downward from the plane of the bed-plate 14 to the said rod 12. A horizontal extension 17 of bed-plate 14 passes outwardly over rod 13, upon which it rests in groove 18 on the under side of said extension 17. Said extension is provided with an adjusting thumb-screw 19 through that part of same above groove 18 and rod 13, by means of which the bed-plate 14 is adjusted either upward or downward by the end of adjusting-screw resting on rod 13.

Situated midway between ways 12 and 13 and exactly in radial alinement with the axis of the pivot-pins 9 9 as a center is round opening 20 in bed-plate 14, within which is situated the pivot-sleeve 21, to which is rigidly attached flange 22, to which is attached guideways 23 and 23^a. Guideway 23 is provided at its outer end with a right-angled extension 24 downward, at the lower end of which is opening 26, within which slides reciprocating rod 27. Guideway 23^a is also provided with a similar right-angled extension 25 with similar opening 26^a, within which slides reciprocating rod 27, the extension 25 being at the inner end of guideway 23^a, next to flange 22. The reciprocating rod 27 is provided with cross-heads 28 and 28^a, the upper ends of which have openings $28\frac{1}{2}$, which receive guideways 23 and 23^a, the cross-head 28 sliding on guideway 23 within extension 24 and flange 22 and the cross-head 28^a sliding on guideway 23^a between extension 25 and outer end of guideway 23^a. The cross-heads 28 and 28^a extend below reciprocating rod 27 a distance sufficient to enable openings 29 and 29^a to be made in same, within which are placed the adjustable sliding file-centers 30 and 30^a. The file-center 30 is provided with a triangular opening 31, into which is inserted the file 33, the center 30 being adjustable and held by thumb set-screw 32 in cross-head 28. The file-center 30^a is also provided with round openings 31^a and thumb set-screw 32^a in cross-head 28^a for holding file in position.

The means for reciprocating the rack holding the file is by power, hand or otherwise,

applied to shaft 34 and rotating same. In the drawings I illustrate hand-power by crank 35, attached to shaft 34. The crank-shaft 34 is supported parallel with the bed-plate 14 by the upright standards 36 and 36ª. Upon shaft 34 is secured balance-wheel 37, near its inner end, close to crank. Upon the outer end of shaft 34 is secured miter gear-wheel 38, gearing into similar miter gear-wheel 39, of same size, loosely secured to shaft 40, which extends downward through sleeve 21 in bed-plate and below flange 22, at which place is attached crank-disk 45, which is connected to reciprocating rod 27 by crank-pin 46, connecting-rod 47, and pin 48. Miter-wheel 39 is loosely secured to shaft 40 by pin *c* in and through shaft 40, the ends of which project a sufficient distance in longitudinal slot *d* in hub of miter-wheel 39, provided for that purpose, to engage the hub and prevent wheel 39 from turning on shaft 40, yet allowing the free movement of said shaft 40 longitudinally within the said wheel 39. Shaft 40 is held in position at bottom end by sleeve 21, within which it operates, the upper end being held by projections 42 and 43 of upright 36. Rigidly attached to top side of bed-plate 14 at that part where sleeve 21 passes through same is circular disk 49, having a projection 50 on its upper face, sleeve 21 extending through the center of said disk to the highest part of said projection. Said projection extends across face of one side of disk from circumference to sleeve 21 and has shoulder 51 on the left side of projection, the right side of same being chamfered from highest point at shoulder 51 to one-fourth distance around disk to plane of said disk. Rigidly attached to shaft 40 is disk 52, having the same kind of projection as described for disk 49 on the bottom face thereof, except square shoulder is on right side of projection and chamfered on left, so that as the faces of the two disks 49 and 52 come together and disk 52 being rotated the chamfered side of the projection on disk 49 comes into contact with the chamfered side of projection on disk 52 and causes disk 52, together with shaft 40, and consequently all mechanism thereto attached holding the file, to be raised a distance equal to the height of the projection above the plane of the disk. This is for the purpose of lifting the file over the points of the teeth of the saw during the backward stroke of the file and while same is moving longitudinally over the teeth of the saw by mechanism to be hereinafter described. Encircling disk 49 is collar 53, provided with a recess 54, which receives pin 55, which is rigidly attached to flange 22 and extends upward through circular slot 56 in and through bed-plate 14, said pin 55 being free to move vertically within recess 54, reference being had to the plane of bed-plate 14, and laterally through the arc of a circle in slot 56, comprising about forty-five degrees, for the purpose of adjusting the file transversely or diagonally to the axis of the pivot-pin 9 and 9ª, where same may be held by thumb set-screw 57 in said collar 53 upon disk 49.

It will be noted that in opening 41 in projection 43 of upright 36 is screw-threaded bushing 58 to fit screw-thread in opening 41, said bushing being closed at top end, while the lower end receives and forms boxing for end of shaft 40. Within the closed top of said bushing and the end of shaft 40 is situated a movable plug 59, resting on upper end of shaft 40, while between said movable plug and the closed top of the said bushing is coil-spring 60, pressing downward upon said movable plug and shaft 40, which pressure may be increased or diminished by screwing said bushing upward or downward, as required.

Secured to crank-shaft 34 is eccentric wheel 62, which is connected to sleeve 63 on way 12 by strap 64, connecting-rod 65, lever 66, and strap 67 around middle part of sleeve, both ends being attached to lever 66 by hinge-joints 68 and 69, said sleeve 63 being placed between the legs 15 15 of carriage B upon way 12, the peculiar construction of that part of lever 66 resting on sleeve 63 being such that sleeve may turn in only one direction within strap 67. That part of lever 66 coming into contact with sleeve 63 is of concave form, corresponding with the circumference of sleeve 63, the pin holding the joint 68 being somewhat closer to sleeve than the pin holding joint 69, while securely attached to strap 67 by one of its projecting ends is coil-spring 70, with its free end resting against lever 66, so that the point of lever 66 at that part where joint 68 is situated is held in contact with sleeve 63 at all times, and the leverage being shorter at hinge 68 than at hinge 69 a greater pressure is exerted on sleeve 63 at joint 68, so that by depressing spring 70 by lever 66 strap 67 is slightly lengthened and the friction of same on sleeve 63 is released, and sleeve may turn within strap 67 in the direction of hinge 69 to hinge 68.

Situated on sleeve 63 to the left of strap 67 is radial projection *e*, provided longitudinally with an opening *f*, extending through shell of sleeve, within which is situated the movable pin *g* and coil-spring *h* around said pin, the opening *f* being recessed within to receive said spring, forming annular shoulder *i* at the ends thereof for holding said spring in position. The pin *g* is also provided with shoulder *k*, which engages spring *h* and by it is pressed inward, the inner end of said pin *g* forming a projection *l* within sleeve 63, which fits into and is received by spiral groove A in way 12. Said pin *g* is capable of being withdrawn from engagement with groove A. Lever 66 is oscillated by means of its attachments to eccentric wheel 62.

It will be noticed that connecting-rod 65, which passes through slot 72 in bed-plate, is provided with a hinge-joint 73 at that part just below the bed-plate. The slot 72, within which connecting-rod operates, holds same in

alinement with eccentric wheel 62, the hinge permitting the lower end of connecting-rod to move in the arc of a circle in oscillating lever 66, as it must necessarily do. Lever 66 and connecting-rod 65 are adjustably connected, by means of which the connection may be moved in or out from the fulcrum of the lever 66, and thus increase or diminish the throw of lever 66, and consequently increase or diminish the rotation of sleeve 63 at each oscillation of the lever, and consequently the speed of carriage B will be increased or diminished. Upon lever 66, which is screw-threaded for the purpose, is screwed the thimble 74, the inner end of which is encircled with sleeve 75, which is held in position by annular shoulders 76 and 77, said sleeve being provided with a projection 78 on one side thereof, to which connecting-rod 65 is attached by pin 79, forming hinge-joint, as shown.

The mode of the operation of the machine is as follows: Having secured the saw between the clamps, the base of the teeth of same on line of axis of pivot-pins 9 9, the file is adjusted to the desired horizontal or oblique angle, reference being had to the vertical position of the saw-blade, and by means of collar 53 around disk 49 the file is adjusted transversely or diagonally, as desired, to the longitudinal direction of the saw, and the desired travel of carriage B upon ways 12 and 13 being adjusted by means of thimble 74 on lever 66 to suit the number of teeth of the saw to the inch. The carriage is placed at the left end of ways 12 and 13, with file resting against first tooth of saw. Power being applied and crank-shaft 34 rotated the file is caused to reciprocate transversely to the axis of the pivot-pins 9 9 by reason of its connections with said crank-shaft. Upon the backward stroke of the file the same is raised from between and over the points of the teeth of the saw by reason of the chamfered projection on the faces of disks 49 and 52, while simultaneously with the back stroke of the file carriage B is propelled from left to right on ways 12 and 13 the distance necessary to carry the file to the tooth of the saw next to be filed by reason of sleeve 63 on way 12 between legs 15 15 of carriage B being rotated on way 12 by oscillating lever 66, connected to crank-shaft 34, as shown, and the sleeve 63 having radial pin extending into groove A the rotation of said sleeve causes the said projection *l* to slide in groove A, and thus carry with it from left to right on ways 12 and 13 the carriage B, or carriage B may be held stationary, and clamp 2 and 3, holding saw, together with ways 12 and 13, will be moved from right to left and produce the same results as though carriage moved and ways remained stationary.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination in a saw-filing machine of clamps for holding a saw, ways on each side thereof and parallel therewith, a pivotal connection connecting said clamps and said ways for the adjustment of same to the plane of the saw, a carriage upon said ways provided with a shaft in radial alinement with the axes of the pivot-joints connecting said clamps and said ways, a frame holding a file, pivotally connected with said radial shaft, the shaft forming the axis of the connection, and means whereby said radial shaft is automatically reciprocated radially to the axis of said pivotal connection connecting said clamps and said ways substantially as shown and described.

2. In a saw-filing machine the combination of clamps for holding a saw, ways on each side and parallel therewith, a pivotal connection connecting said clamps and said ways, a carriage upon said ways provided with a crank-shaft to which power is applied, gear-wheels connecting said crank-shaft to a shaft secured in radial alinement with the axis of the pivotal connection connecting said clamps and said ways, a sleeve loosely secured to said radial shaft at that part where same passes through bed-plate of carriage, a frame holding a file, secured to said sleeve, a disk rigidly secured, face downward, to said radial shaft provided with a projection on the face thereof, having a square shoulder on one side of same and chamfered on the other side, a disk rigidly secured face upward, to bed-plate of carriage through the center of which passes said radial shaft, a projection on the face of said disk of same size and shape as disk secured to radial shaft, an adjustable spring pressing upon the upper end of said radial shaft for holding the faces of the disks in close engagement and regulating the file-pressure on the saw, a collar encircling the disk aforesaid attached to the bed-plate of carriage, adjusting-screw for securing and adjusting said collar to said disk, a recess in said collar to receive a pin rigidly secured to file-frame for the adjustment of same, and connections between said radial shaft and said file for the operation of same for the filing of saws, substantially as described and for the purpose specified.

3. The combination in a saw-filing machine of clamps for holding a saw, ways parallel therewith, one of which is a rod provided with a spiral groove extending longitudinally the greater length of same, a carriage upon said ways carrying file, and mechanism connecting said carriage and said way provided with spiral groove, by means of which, carriage is automatically moved intermittently upon said ways substantially as described and for the purpose specified.

4. In a saw-filing machine the combination of clamps for holding a saw, a carriage carrying a frame provided with a file, ways for supporting said carriage one of which is so constructed that by reason of its connections with the carriage the said carriage is caused to automatically move longitudinally upon

said ways and provide means for regulating the travel of the carriage during the backward stroke of the file, substantially as described and for the purpose specified.

5. The combination in a saw-filing machine of clamps for holding a saw, ways on each side thereof and parallel therewith a pivotal connection connecting said clamps and said ways at the ends thereof, a carriage upon said ways provided with a shaft radially situated as to the axis of said pivotal connection, means for rotating of said radial shaft, a connection between said radial shaft and a frame holding a file, and means for the adjustment of said file at any required angle to the horizontal or perpendicular plane of the axis of the said pivotal connection, substantially as described and for the purpose specified.

6. The combination in a saw-filing machine of clamps for holding a saw, ways on each side thereof and parallel therewith, a pivotal connection connecting said clamps and said ways at the ends thereof, the axis of the said pivotal connection being in alinement with the base of the teeth of the saw to be filed, a carriage moved automatically upon said ways and provided with a frame, holding a file, pivotally connected thereto, the axis of the connection being in radial alinement with the axis of the pivotal connection connecting said clamps and said ways, and means whereby said file is adjusted and automatically reciprocated transversely and radially at any required angle to the axis of the said last-named pivotal connection, substantially as described.

JOEL F. CORNISH.

Witnesses:
L. L. AINSWORTH,
P. M. WEAVER.