O. W. LE MAR.

Saw-Filing Machines.

No. 199,453. Patented Jan. 22, 1878.

Fig. 1.

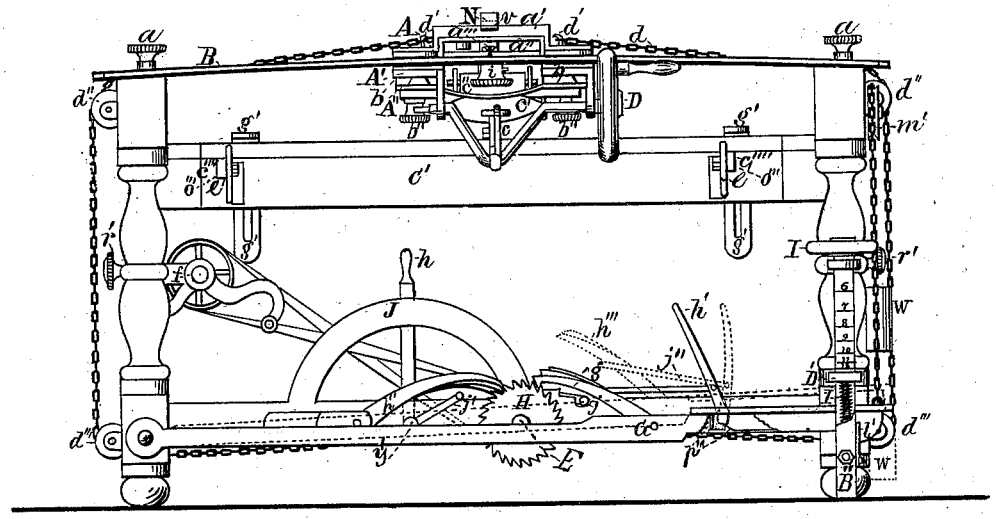
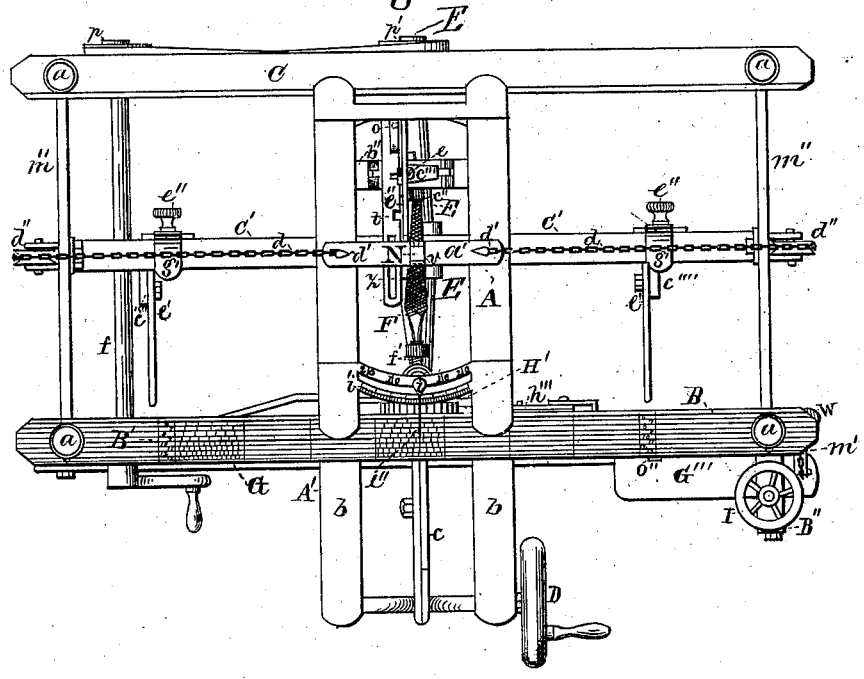


Fig. 2.



Attest.
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Inventor.
Oliver W. Le Mar
By B. C. Converse Atty.

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Fig. 3.

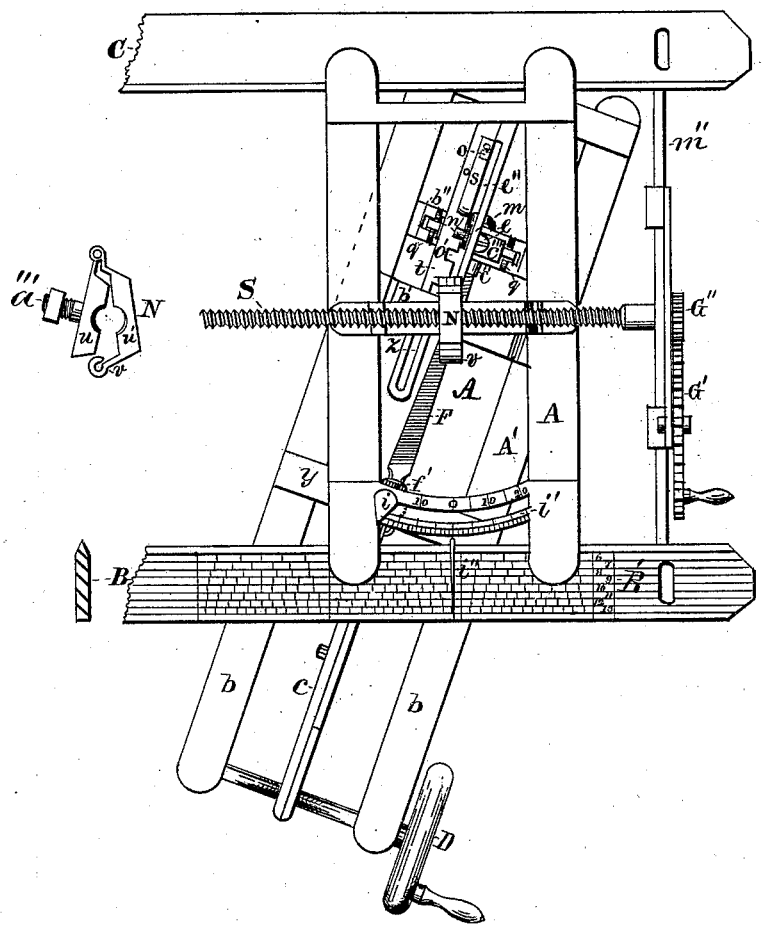
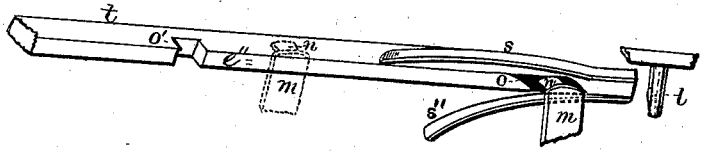


Fig. 4.



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3 Sheets—Sheet 3.

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Fig. 5.

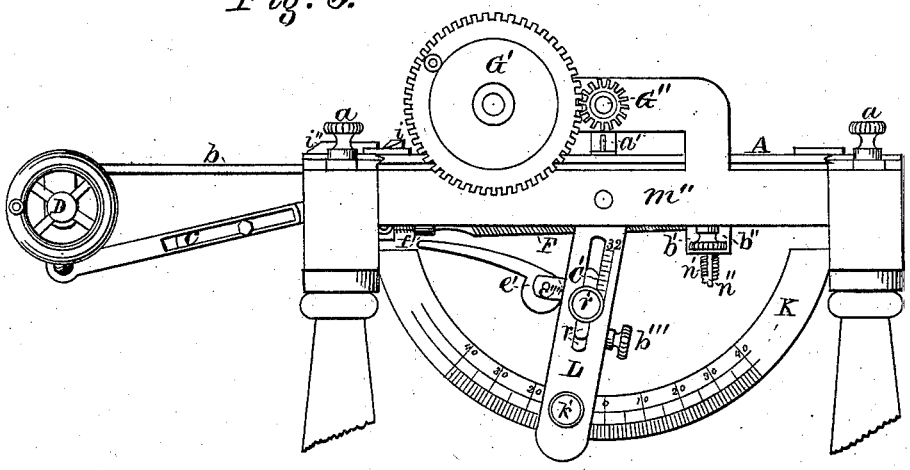


Fig. 6.

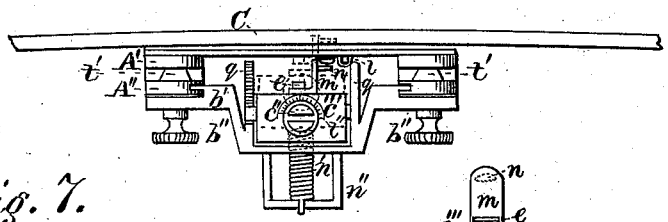


Fig. 7.

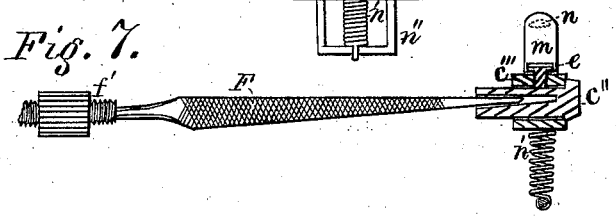


Fig. 8.

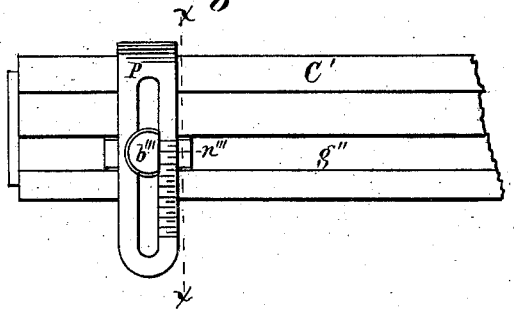
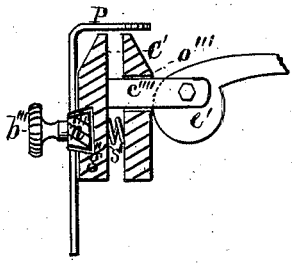


Fig. 9.



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H. H. Sawerby

Inventor.
Oliver W. Le Mar.
By B. C. Converse Atty

UNITED STATES PATENT OFFICE.

OLIVER W. LE MAR, OF NEW BURLINGTON, OHIO, ASSIGNOR OF ONE-HALF HIS RIGHT TO ARTHUR M. JUDY, OF SAME PLACE.

IMPROVEMENT IN SAW-FILING MACHINES.

Specification forming part of Letters Patent No. **199,453**, dated January 22, 1878; application filed May 31, 1877.

To all whom it may concern:

Be it known that I, OLIVER W. LE MAR, of the village of New Burlington, in the county of Clinton and State of Ohio, have made certain new and useful Improvements in Saw-Filing Machines, which are fully, clearly, and concisely set forth in the following specification and accompanying drawings.

Three sheets of drawings accompany this specification, viz., Sheet 1, with Figures 1 and 2; Sheet 2, with Figs. 3 and 4; and Sheet 3, with Figs. 5, 6, 7, 8, and 9.

Two different kinds of movement are shown and described, and both are essential to the proper operation of the machine in filing coarse and fine saws.

My invention consists of an apparatus, fully described hereinafter, in which a saw-clamp and file-operating mechanism are constructed, combined, and operated so as to file saw-teeth of any degree of fineness at any required angle or bevel.

Fig. 1 is a side elevation of my improved saw-filing machine with the chain-movement. Fig. 2 is a plan view of the same. Fig. 3 is a sectional plan view of the machine, with the screw-movement used in filing saws with finer grades of teeth. The chain and pulleys are removed. Fig. 4 is an enlarged view of the main inclined bar, which forms the guideway for the device which elevates the point of the file on its backward stroke. Fig. 5 is an end view (right) of the upper part of the machine, with the screw-movement, showing the inclination of the pivoted saw-clamp and the graduated scales used in regulating its adjustment. Fig. 6 is an end view (from the rear) of the under file-carriage, showing the movable parts which hold the trip end of the file. Fig. 7 is a longitudinal view of the file and the pipe-chuck which holds its shank, and a cross-section of the tip-block and movable sleeve in which the file-tip is inserted. Fig. 8 is a rear view of an end section of the saw-clamp. Fig. 9 is a cross-section of the same through line *x x*.

The carriage for the file is in three parts.

A is the top sash-frame, which slides between the bars B and C, being grooved to fit the V-shaped edges of the same. These bars are slotted transversely at their ends, so as to adjust them to the ends of the carriage, and are held on the tops of the posts by the thumb-screws *a a*. Re-enforced pieces on the ends of A lap on these bars, and also form cross-bars for its frame. In the middle of the sash A is an elevated bridge-tree, *a'*, connecting its two side rails. Under this is a second one, *a''*, connecting the two side rails *b b* of the under sash-frame A' in the same manner. A bolt, *a'''*, passes through the center of these two bridge-trees, connecting them together, and forming the pivot for the sash-frame A', which can be turned to the right or left, as shown in Fig. 3, the object being to give obliquity to the cut of file F, and obviate the necessity of removing the saw from its clamp and reversing it for filing its alternate teeth. A split nut, N, forms the head of the pivot-bolt *a'''*, which is used with the screw-movement.

The front cross-bar of the sash A is segmental, and is slotted through its entire length to receive the shank of the thumb-screw *i*, which is formed into a pointer at the top end, to indicate the degree of inclination given to the file F on the graduated scale *i'* marked on the cross-bar. It extends downward through the center of the front cross-bar *y* of the second sash, A', and has a milled nut on its lower end, which fastens it at any point required.

On the front top bar B of the machine is a scale, B', graduated from six to thirteen teeth to the inch. This is used with both the chain and screw movement. A fixed indicator, *i''*, extends from the middle of the front bar of A across this scale, marking with exactness the space through which it travels, so that each tooth shall be filed precisely to a gage, A''. The sash which carries the file F across the saw slides upon dovetailed tongues *t'* on the under side of the rails *b b* of the pivoted sash-frame A', being grooved to fit them. The construction of these parts is shown in the end view, Fig. 6. The file is held by its shank end in a split chuck, *f'*, having an external thread and a milled nut, by which it is securely fastened. This chuck projects from the center of a cross-tree or rock-shaft, *c'*, pivoted in hangers or lugs under the front end

of the sash A″. The driving-pitman *c*, which connects the crank-shaft of drive-wheel D with this rock-shaft, is linked to it on the opposite side. The crank-shaft is suspended from hangers at the ends of the extended rails *b b*, which project some distance in front of the machine. The tip of the file is inserted in a sleeve, *c″*, which passes through the tip-block *c‴* from rear to front, is capable of rotation, and has a screw-head on its rear end for the purpose of turning the file on its axis, so as to give its sides any degree of inclination required for the edges of the saw-teeth. A scale over the head of sleeve *c″* (which has a notch-mark on it) is marked for the angle required. Sleeve *c″* is held in position by set-screw *e*, which also passes through and secures the foot of the elevated tongue *m*, which stands upon the top of *c‴*. (See Figs. 2, 3, 6, and 7.)

Block *c‴* has square-shouldered tenons on its ends, which have a free up-and-down movement during the operation of the file (as seen in dotted lines, Fig. 6) in slotted guides *q*, which extend upward from the under bridge-tree *b′*. At the left end of the block one-half of the slotted guide *q* is seen cut away to show the tenon and slot. The under bridge-tree *b′* is separate from the lower sliding sash A″, its ends being tongued to allow its adjustment in grooves in the inner edges of its side rails, to suit different lengths of files. It is fastened by thumb-screws *b″ b″*.

The operation of the file and the parts in which it is held can be readily understood by reference to the several figures, it being the same in both the chain and screw movement. The saw being clamped in clamp C′ at the proper height and angle, power is applied to the drive-wheel D, and transmitted through pitman *c*, which is made in two parts (see Fig. 5) so as to be adjustable, to the sliding sash A″, which carries the file. The latter moves from the operator in a horizontal direction. The spiral spring *n′*, which is seen in loop *n″*, and is attached to the lower bar of this loop, connects with block *c‴* at its top end, and pulls downward on the block, holding down the tip of the file until it arrives at the end of its forward stroke, catch or stud *n* on the tongue *m* of tip-block *c‴* being caught by the curved end of the under spring *s″*, (see Fig. 4,) which acts as a guide for it, and is carried along on the spring until it arrives at the opening O at the back end of the guideway or long slot *e″* of the inclined bar *t*, where it is forced upward by the action of spring *s″* through said opening, sliding up over the bevel at the upper edge of O, under the top spring *s*, which steadies its movements. It resumes its backward stroke, sliding up the bar, after passing from under spring *s*, as seen in dotted lines, raising block *c‴*, to which tongue *m* is attached, and elevating the tip of the file at the same time, so that it will clear the saw. When *n* arrives at the upper side opening O′ the file has reached the end of its backward stroke. It then drops through this opening by the action of the spiral spring *n′*, bringing down the file to the horizontal plane of its cut for the next forward stroke. This rising and falling of the file is repeated until the tooth is filed out to a finish.

Spring *s* is beveled to a feather-edge at its free end (see Figs. 3 and 4) for the purpose of allowing catch *n* to slide over it in case of a reverse movement, during the backward stroke, before it reaches the side slot O′, the spring acting as a safeguard to prevent said catch from falling back through the lower slot O, which would cause the file to fall on its backward stroke.

Tongue *m*, with its catch or stud *n*, falls entirely clear of the inclined bar *t* through side slot O′ and slot *e″*, and does not enter the latter again until it has nearly reached the end of its forward stroke, when *n* is caught upon the lower spring *s″*, which guides the upper end of *m* into the lower end of the long slot *e″* and the stud *n* into the side slot O at nearly the same time. *n* is finished with rounded V-edges, so as to adapt it for the operation described.

Block *c‴*, with its tongue *m*, spring *n′*, and slide-bar *t*, with its slots and springs, constitute the operative devices which substitute the left hand of the operator in ordinary filing by hand. The inclined bar *t* has a slot, Z, in its upper end, (see Figs. 2 and 3,) through which it is secured to the under side of the bridge-tree *a″* by a set-screw, and its lower end is inserted in a loop, *l*, under the rear cross-bar of the sash A′, making it adjustable.

The saw-clamp C′ extends lengthwise of the machine, under the middle of the file-carriage, its ends being tenoned and sliding in slots *r* of the pivoted hangers L at each end of the frame. (See Figs. 5 and 8.) These hangers are pivoted at the upper end to the middle of the upper-end cross-bar *m″* of the main frame, and have a scale on one side of the slot *r*, indicating the proper height at each end for the clamp C′, which is fastened by the thumb-screw *r′*. The lower end of L moves over a semicircular scale, K, graduated from 0 to 40° each way from the center. It is secured at any point on the scale by the thumb-screw *k′*. The hanging of the saw-clamp in this manner allows the face of the teeth of the saw to be filed to any desired angle, and does not require the saw to be removed from the clamp till the filing is complete, as the hangers L can be loosened after filing one way, and swung with the clamp to the same angle on the opposite side of the scale K, and the filing proceeded with, as before, after the angle of the file-carriage is reversed, which latter movement is only required in an oblique cut.

The saw-clamp C′ is constructed of two parallel bars with beveled jaws, the rear one being provided with the fixed bars *c‴′*, Fig. 9, which extend through mortises O‴ in the front bar, and having the eccentrics *e′* pivoted to their front ends.

A spiral spring, *s′*, is introduced between the

clamp-bars, to open them when the eccentrics are released. The rear bar of the saw-clamp has a dovetailed groove, g'', on the back, extending lengthwise, with a sliding block, n''', (see Figs. 8 and 9,) fitted therein, to which an edge-clamp, P, is secured by thumb-screw b''' passing through its slot and through the block n'''. This edge-clamp extends up over the saw-clamp C′, turning at right angles at the top, so as to clamp the upper edge of the saw at the ends of the same. A scale on one side of the slot marks the point of adjustment, indicating the length to be given to the teeth of the saw above the jaws of the clamp C′.

Figs. 1 and 2 show the parts in adjustment for a straight or right-angled cut. Chain d has its ends fastened to hooks d' at each end of the bridge-tree a' on sash A, leading each way over pulleys d'' d''' at the ends of the machine, in line with its center and around shaft E, extending across the middle of the two lower rails.

In attaching the chain, the right end is first attached to the hook d' on the right side of bridge-tree a', and passed over the right-end pulleys d'' and d''', under the lower-end cross-bar, and around the windlass-shaft E, from left to right, thence under the lower-end cross-bar and up over the pulleys at the left end of the machine to the hook d' on the left end of bridge-tree a'.

For moving the file-carriage at regular intervals, the long foot-lever G is used. Its end is pivoted, by a bolt, near the foot of the left front post, and it extends the full length of the machine in front of the lower rail, and between the sub-post B″ and the right-corner post, with a foot-board on this end, which is balanced by a counter-weight, W, at the end of a chain attached to the lever and extending over pulley m' at the top of the corner-post.

Lever G is connected, by the catch-pawls g, with the outside ratchet-wheel H, rotating shaft E to the right, moving the file and its carriage through chain d.

The movements of lever G and of the file-carriage and its file in connection therewith are regulated by the block-nut D′ on the vertical screw I, which extends downward through the connecting-bars which attach the sub-post B″ to the corner-post of the machine. It has a hand-wheel on its top end, and is seen in Fig. 1, a portion of the sub-post B″ being broken away to show the screw.

In operating the foot-lever G, after the proper adjustment of the nut-block D′ by the scale on the front of the sub-post B″, which it slides over, it is in a raised position, as seen in dotted lines in Fig. 1, it being drawn up to the stop-block D′ by the counter-weight W. As it rises each time, after being released from foot-pressure, it raises the small hand-lever h' to a perpendicular. This lever having rod j'' rigidly attached to it by one end, while the other is turned backward at right angles under the push-pawls h''', the latter are raised with it. These pawls operate on the reversed teeth of the inside ratchet-wheel H′ on shaft E, behind the wheel H. (See Fig. 2.) As soon as lever G is pressed down pawls h''' drop into the teeth of wheel H′, stopping the rotation of E at each movement. A small slot, O″, on the inside of the foot-piece of G, (see Fig. 2,) slides up the lever h' as it is drawn up by the counter-weight W, throwing it back until it raises pawls h''', the end of G striking the stop-block D′, at the same time moving the file-carriage according to the height which the stop-block D′ marks on the scale on the front of sub-post B″, which coincides with the size of the teeth of the saw. Shaft E is also operated from a belt-and-pulley connection with crank-shaft f (on the rear side of the machine) in moving the file any distance at a time, or in reversing the movement.

All the push and catch pawls are thrown off the ratchet-wheels H and H′ by hand-lever h, rods j and j' being rigidly attached to its shaft y', (which has its bearings in the lower front rail and a bracket attached thereto on the rear side,) and extending at right angles under the pawls. A stop on the rear side of segment J retains lever h when thrown to the left to raise the pawls. Lever h' acts independently in raising pawls h'''. It is pivoted to the lower front rail, at the bottom of which, on the front side, is the spring p'', which has a notch on it which holds the lever when raised. When lever G falls, a pin on it strikes the end of spring p'' and releases lever h', which allows pawls h''' to fall back on wheel H′.

In filing circular saws of large size they can be placed on shaft E and the machine set over a pit, chain d being detached. The crank-shaft f can be used to rotate it.

In the screw-movement none of the devices shown in the lower part of the machine are used. The chain is detached from the hooks d', and the screw S is used in its stead for moving the file-carriage. This screw extends from one end to the other over the middle of the machine, its ends turning in elevated bearings bolted to the upper end rails m''. It is operated by a spur-wheel, G′, hung upon the outside of the same bearing-frame at the right end, gearing into the pinion G″ on the end of the screw-shaft. Wheel G′ is provided with a crank-handle for turning it. The file-carriage is connected with screw S by the nut N, which forms the head of the pivot-bolt a''', which connects the upper and lower sections A and A′ of the file-carriage. The nut and bolt are shown in detail, Fig. 3. The nut is divided horizontally in two equal parts, u and u', and is hinged together on the rear side. Only the top section u' is threaded, the lower half of the hole for the screw S in u being left smooth, so as to allow of its sliding along the screw when the top-hinged part is thrown up. The upper section u' is provided with a clasp-spring, v, which fastens the parts together when closed.

The screw-movement is used exclusively for

fine saws, and the file-clamp with its gages and scales is used in this as in the chain-movement, also the scales on the top-carriage A and on bar B.

I claim as my improvement—

1. A saw-filing machine constructed with a frame supporting two top bars, B and C, which guide a file-carriage, have transverse slots at both ends, are adjustable, are secured by means of thumb-screws *a a* to the upright supports, and connect and brace the latter, substantially as shown and described.

2. The file-carriage having two main parts pivoted together, the upper adapted to guides B C, and the lower suspended below the upper, and adjustable on its pivot, as specified.

3. A file-carriage adapted for holding a file for filing saws in a saw-filing machine, constructed in three sections, A A′ A″, the first section, A, sliding lengthwise of the machine upon the top bars B and C, and having the same relative position thereto at all points on said bars, with section A′, which carries the cross-sliding sash A″, on which the file F is hung, pivoted under said bars to the top section A, so as to allow it to be moved radially in a horizontal plane to any required angle to the line of the saw, as and for the purpose hereinbefore described.

4. A file-carriage for saw-filing machines, constructed in three sections, A, A′, and A″, sections A and A′ each constructed with an elevated bridge-tree, *a′* and *a″*, respectively, extending across their side rails, between the top bars B and C of the machine, through which the latter section, A′, carrying the section A″, is pivoted to the former section, A, as and for the purpose set forth.

5. A saw-filing machine having a file-carriage with a top sliding section or sash-frame, A, having the same relative position at all points to its guide bars or ways B and C, and a lower section pivoted to the upper, and consisting of the pivoted frame A′, and frame A″, sliding on the frame A′ and carrying the file F, as set forth.

6. In the file-carriage A A′ A″, connected by a pivot-bolt, *a‴*, through its two first sections, as shown, the scale *i′* on the top section A and the index or pointer *i* extending through the center of the front bar V of section A in line with file F, and through a slot in said scale, and having a milled clamp-nut on the lower end of its threaded shank, for clamping the two sections together and fastening the index *i* at any point on the scale, for indicating the angle or degree given to the file, substantially as shown and described.

7. The graduated guide-plate B, arranged as shown, and combined with the sliding file-carriage having a curved index on the upper section, a pointer, *i*, carried by the lower section, and a pointer, *i″*, extending over the graduations on the guide, as set forth.

8. In a file-carriage for saw-filing machines in sections A A′ A″, the pivoted section A′, having rails *b b* extended in front of the machine, and provided with hangers, a crank-shaft and drive-wheel, D, mounted thereon, and connected by an adjustable pitman, *c*, with the cross-sliding sash A″, for giving to the latter a reciprocating movement, as and for the purpose specified.

9. The combination of the sliding section A″, carrying the file, crank-shaft, pitman *c*, the rock-shaft *c′* for holding the tang of the file, and the sliding block *c‴* for holding the point, substantially as specified.

10. In a file-carriage adapted to be operated in a saw-filing machine, the bridge-tree *b′*, block *c‴*, sleeve *c″*, with its scale *t″*, and set-screw *e*, for the purpose of holding the end of the file, and allowing it to be turned on its axis and secured at any angle or degree required, for the purpose set forth.

11. In a saw-filing machine having a file-carriage operated as described, the adjustable inclined bar *t*, with its long slot *e″*, side slots O and O′, springs *s″* and *s*, operated in connection with tongue *m*, and its catch or stud *n*, sliding block *c‴*, provided with the tip holding and adjusting devices specified, spring *n′*, loop *n″*, the adjustable bridge-tree *b′*, having thumb-screws *b″*, all arranged and operated for the purpose of raising the file-tip and clearing the file from the saw on its backward stroke.

12. In combination with the devices for elevating the tip end of the file F, as adapted to be operated in the file-carriage of a saw-filing machine, and as herein shown and described, the rock-shaft *c′*, having file-chuck *f′* for holding the shank end of said file and allowing its radial movement, the adjustable pitman *c*, drive-wheel D, and shaft, and the file-carriage A″, A′, and A, the whole arranged to be operated by either a chain or screw movement, substantially as and for the purpose described.

13. In combination with a movable file-carriage for saw-filing machines supported upon guide-bars B and C of the same, above the saw-clamp *c′*, the chain *d*, attached thereto by hooks *d′* in line with saw-clamp, pulleys *d″* and *d‴*, supported by the end bars of the frame of the machine, windlass E, having ratchet-wheels H and H′, and pawls *g*, *h″*, and *h‴*, hand-levers *h* and *h′*, and the crank-shaft *f* with its belt and pulleys *p p′*, as and for the purpose hereinbefore set forth.

14. In combination with the windlass-shaft E, with its ratchet-and-pawl devices, shown and described, for operating the file-carriage of a saw-filing machine by a chain, *d*, connected therewith, as set forth, the long foot-lever G, with its catch-pawls *g*, chain, and counter-weight W, as shown and specified.

15. The screw I, stop-block nut D′, sub-post B, and its scale, as and for the purpose hereinbefore set forth.

16. In combination, shaft E, with its chain-and-pulley connections for the operation of the file-carriage A A′ A″, ratchet-wheel H, pawls *g* and *h″*, lever *h*, with its rods *j* and *j′*, foot-lever G, slot O″, spring *p″*, hand-lever *h′*,

rods j'', pawls h''', and ratchet-wheel H, with an arresting block-nut, D′, adjustable upon a screw, I, to any required point on a graduated scale, adapted to be operated with said foot-lever and its counter-weight W, substantially as and for the purpose specified.

17. The sectional nut N, its pivot a''', in combination with the file-carriage, and screw S, substantially as set forth.

18. The horizontally-divided nut N, having but one section thereof threaded, its two sections hinged together and fastened by a spring-clasp, v, and adapted to be operated upon an extended screw, substantially as hereinbefore set forth.

19. The combination of the file-carriage, chain, windlass, pawls, and ratchet-wheels, operated by the foot-lever, and the adjustable stop D′, substantially as set forth.

20. The pivoted hangers L, provided with slots r, for the insertion of the ends of the saw-clamp C′, a graduated scale thereon, and a thumb-screw for adjusting the height of said clamp, as shown and specified, substantially as and for the purpose set forth.

21. The combination of the horizontal swinging saw-clamp C′, its pendent arms L, set-screws k', and graduated stationary segment, as set forth.

OLIVER W. LE MAR.

Witnesses:
B. C. CONVERSE,
A. M. JUDY.