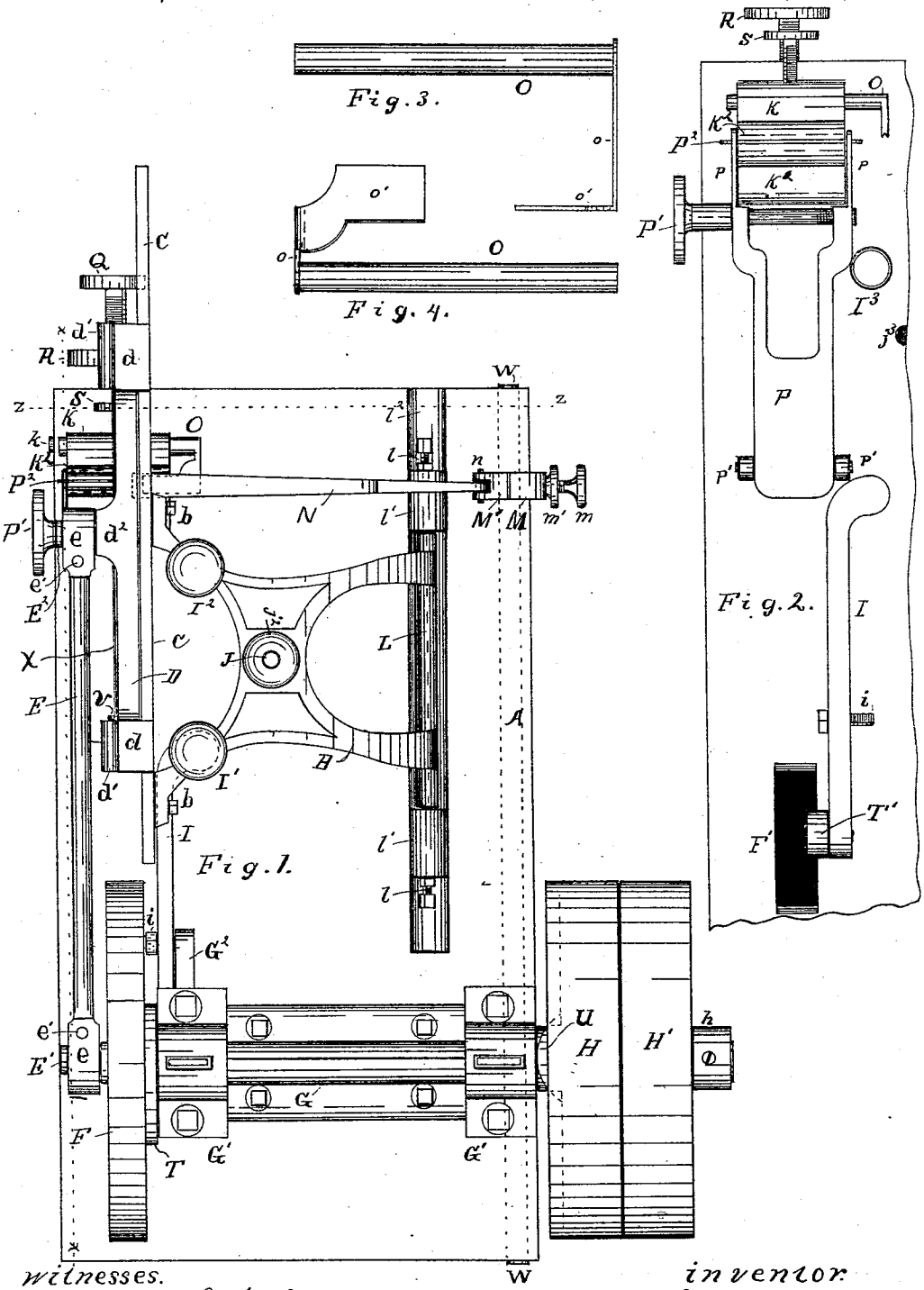
(No Model.) 2 Sheets—Sheet 1.

F. EDGE.

SAW FILING MACHINE.

No. 454,011. Patented June 9, 1891.



Witnesses.
George H. White
John L. Buchanan

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

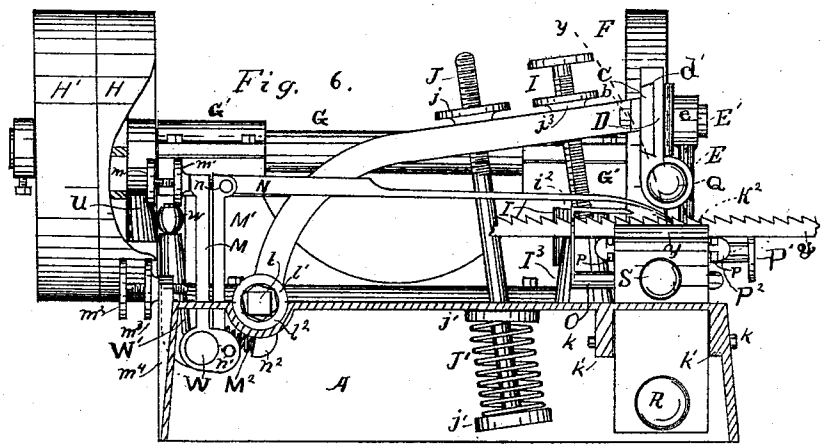
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Fig. 6.



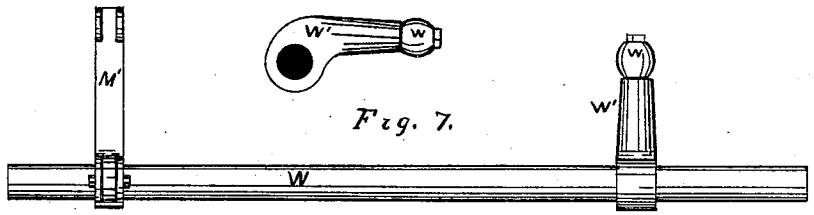


Fig. 7.

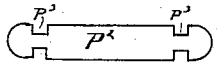


Fig. 8.

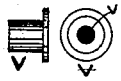


Fig. 9.

Fig. 10.

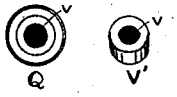
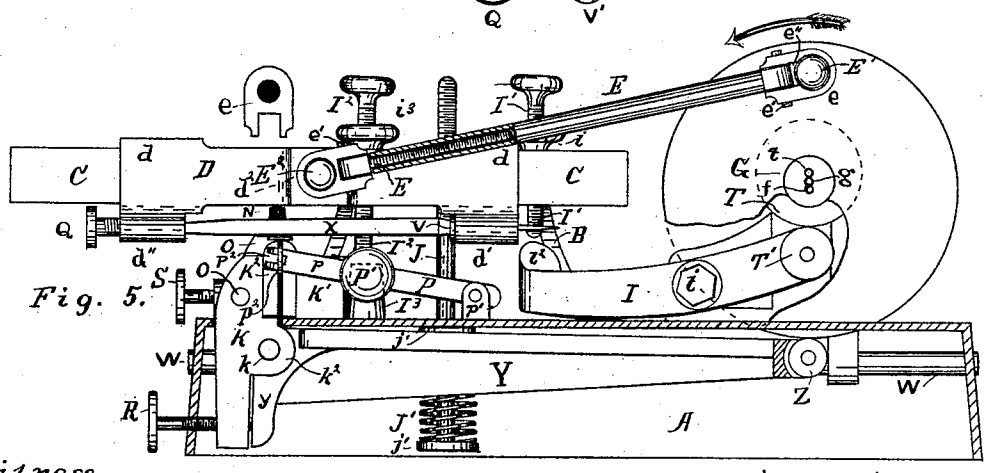


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK EDGE, OF GRAND RAPIDS, MICHIGAN.

SAW-FILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 454,011, dated June 9, 1891.

Application filed October 2, 1890. Serial No. 366,894. (No model.)

To all whom it may concern:

Be it known that I, FRANK EDGE, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Saw-Filing Machines, of which the following is a specification.

My invention relates to improvements in machines for filing band-saws, jig-saws, &c.; and its objects are, first, to insure the perfect movement of the saw-teeth to position for being filed; second, to provide a saw-filing machine in which the action of the file upon the saw is perfectly under the control of the operator; third, to provide a filing-machine in which the file, when being removed from the teeth, will move at an angle with the line of the saw sufficient to give the necessary hook to the teeth; fourth, to provide a saw-filing machine in which the saw may be held so that it cannot rise out of the vise when being fed through; fifth, to provide a saw-filing machine in which the distance of feed may be regulated to the size of the saw-teeth, and, sixth, to provide a connecting-rod for driving the file-carriage that will allow the carriage to describe an arc of a circle in rising without straining or twisting it upon its bearings. I attain these results by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan of my machine. Fig. 2 is a section of the base, showing the position and form of the vise and the saw-support or gage and the lever for raising the carriage-frame. Fig. 3 is a side view of my appliance for holding the saw in the vise. Fig. 4 is a top view of the same. Fig. 5 is a vertical section of my machine on the line *x x* of Fig. 1, with the driving-wheel cut away to show the position of the carriage lever and eccentric, and with the end of the connecting-rod cut away to show my manner of forming a flexible joint therein. Fig. 6 is the same on the line *z z* of Fig. 1, with the driving-pulley cut away to show the cam U. Fig. 7 is a plan of the feed-shaft and a side view of the cam-lever W′. Fig. 8 is a plan of the cross-bar or gage. Fig. 9 is a side and end view of the collar for supporting the shank end of the file; and Fig. 10 is a perspective of the collar and an end view of the screw that supports the point of the file.

Similar letters refer to similar parts throughout the several views.

A is the base of the machine.

B is the frame that supports the file-carriage.

C is the guide upon which the carriage works.

D is the file-carriage.

E′ is the wrist-pin upon the driving-wheel.

E is the connecting-rod.

E^2 is the wrist-pin upon the file-carriage.

F is the driving-wheel.

G is the driving-shaft.

G′ G′ are boxes that support the driving-shaft.

G^2 is a lug that supports the carriage-lever.

H is the driving-pulley.

H′ is the loose pulley.

I is the lever that raises the file-carriage frame.

I′ is the thumb-screw that acts with the carriage-lever for raising and lowering the carriage.

I^2 is the thumb-screw that regulates the downward movement of the carriage-frame.

I^3 is a standard for the reception of the thumb-screw I^2.

J and J′ are a bolt and spring that draw the carriage-frame down.

K is the adjustable jaw of the vise.

K′ is the stationary jaw of the vise.

K^2 represents steel linings to the vise-jaws.

L is the shaft that supports the carriage-frame.

M and M′ are the feed-levers.

M^2 is a spring for throwing the feed-levers back.

N is the feed-arms.

O is a guide for holding the saw down.

P is the arm that supports the saw-support.

P′ is a thumb-screw for clamping the same to the vise.

P^2 is the gage or saw support.

Q is a thumb-screw that secures the file.

R is a thumb-screw for adjusting the vise.

S is a thumb-screw for securing the saw-guide.

T is the eccentric that works the lever I.

T′ is an anti-friction roller on the lever I.

U is a cam for operating the feed-levers.

V is a collar for supporting the shank of the file.

V′ is a collar for supporting the point of the file.

W is the shaft that supports the feed-levers.

W′ is the lever that operates the feed-shaft.

X is the file.

Y is a lever for adjusting the vise.

Z is an anti-friction roller for facilitating the adjustment of the vise.

& is a saw in the vise.

The base A of my filing-machine is made of cast-iron, substantially of the form shown in the drawings, and I construct a frame B for the support of the file-carriage, the back or lower end of which is secured to the shaft L, which in turn is pivoted to lugs l' by means of screw-bolts and check-nuts l, and for the purpose of carrying this end of the frame as far as possible below the top of the vise, I form a concaved depression l^2 in the surface of the bed, so that the shaft lies at least one-half of its diameter below the surface of the bed, the object of this being to have the pivot upon which the frame turns far enough below the point of contact between the file and the saw that when the frame is thrown up to the position shown in Fig. 6 it will draw back as it leaves the tooth sufficiently to give the tooth the desired hook or incline. To the free ends of the arms of this frame I secure a dovetailed way or track C for the reception and free action of the file-carriage.

The file-carriage D is provided with a dovetailed or other suitable bearing d at each end, that is made to fit closely but freely upon the track C, and has a hollow bearing d' d'', one at each end. The back end, or the end that receives the shank end of the file, is provided with a flanged collar with a body of a proper size to receive the shank of the file. The opposite end of the carriage is provided with a large hollow thumb-screw Q and a small annular collar made to fit into the hole through the bearing d'', so that the point of the file may be passed through the collar and into the hole in the screw, and the file held firmly to place by screwing the thumb-screw solidly against the collar and forcing the file into both collars.

My means of holding the carriage-frame toward the bed consists of a bolt J, which passes through the top of the body at j^3 and through the carriage-frame, and is provided at its upper end with a screw-thread and a thumb-nut j^2 above the frame, and a spring J′ below the bed for drawing it down, the tension of the spring being controlled by the use of the thumb-screw j^2.

My manner of preventing the carriage from dropping too low consists of a thumb-screw or bolt I^2, which screws through one arm of the frame and projects down to come in contact with the top of a projecting stop I^3 upon the base, and is held in place by means of the check-nut i^3. I also provide a thumb-screw or bolt I′, that screws through the other arm of the frame and projects down to come in contact with the lever I for the purpose of raising the frame and the file from the saw, as is hereinafter more fully explained, which may be screwed up or down to vary the distance of raising the frame, and may be secured to place in the desired position by means of the check-nut i'.

The connecting-rod E is attached to the driving-wheel F by means of a wrist-pin E′ and a strap e, which passes around and works freely upon the pin, and is connected to the rod by means of a pin e', that passes through both the strap and the end of the rod to form a flexible joint for the purpose of allowing the opposite end of the rod-bolt a vertical and a lateral motion sufficient to meet the inclination of the motion of the carriage-frame from the perpendicular when moving to and from the vise to carry the file without cramping upon the wrist-pin, and I provide against the danger of pounding, either by inserting a box e^2 or by making the strap solid and drilling a hole for the wrist-pin. To connect the opposite end of the rod with the carriage, I attach a similar wrist-pin E^2 to the carriage at d^2, drill a hole into the end of the connecting-rod, and insert a long screw E^3, (see Fig. 5,) which is fitted to turn freely in the rod for the purpose of meeting the twisting motion that would be exerted upon the rod by the divergence of the carriage-frame from a parallel line with the face of the driving-wheel when receding from and approaching the vise. This screw is provided with a large head fitted to engage with the strap e, to which it is connected by means of a pin e', which passes through both, and the strap passes around the pin E^2 upon the carriage and forms a flexible joint, similar to the one between the opposite end of the connecting-rod and the driving-wheel.

By constructing the connecting-rod and its several parts in the manner specified I am enabled to meet both the vertical and the lateral motion of the carriage without binding or cramping any of its several bearings.

My appliance for raising and lowering the carriage consists of an eccentric T, attached to the main shaft and the driving-pulley, a lever I, pivotally attached to a lug G^2 and provided at one end with an anti-friction roller T′, arranged to travel upon the periphery of the eccentric, and at the other end with a flat inclined surface i^2, and is so arranged that the revolving of the eccentric will cause it to bring the surface i^2 in contact with the end of the regulating-screw I′ and raise the carriage-frame to the desired height. The bolt J and the spring J′, hereinbefore described, draw the frame down, when the end i^2 of the lever is lowered by revolving the eccentric to bring the opposite side of its periphery to bear upon the roller T′.

My device for holding the saw consists of a vise having an adjustable jaw K, and a stationary jaw K′, which I usually make of cast-iron and line with steel sub-jaws K^2 for the purpose of insuring a perfect and permanent wearing-surface to come in contact with the saw. I provide the adjustable jaw K with lugs k^2, with an open space between them for the end of the arm or lever Y, which I pivot to the jaw by means of a bolt k, which passes through both and continues on through ears or lugs k' upon the under side of the base of the machine, as shown in Figs. 5 and 6, and pivots the whole to the base, and the arm or lever to the jaw in such a manner that the jaw may be moved to open and close the vise by raising and lowering the suspended end of the lever; or the lever may be moved independent of the jaw. I form the lever with a downwardly-projecting arm y' and an outwardly-projecting lever, which latter terminates with an anti-friction roller Z, designed to travel upon the periphery of the driving-wheel. I make the driving-wheel slightly eccentric, the center of the wheel being at the point f opposite the wrist-pin, while its traveling center is at g, for the purpose of governing the action of the vise so that it will press solidly upon the saw during the forward stroke of the file, as shown in Fig. 5, and relax its pressure when the driving-wheel is thrown to its opposite quarter and the carriage is raised, as in the act of drawing the file back and throwing the feed-lever ahead to move the saw along, as shown in Fig. 6, so that the saw may move easily through between the jaws of the vise. The center f of the driving-wheel is set to the opposite side of the center g of the shaft from the center t of the eccentric T, so that the carriage will be raised and the file withdrawn simultaneously with the opening of the jaws of the vise, and vice versa. I regulate the pressure of the jaws of the vise upon the saw by means of a thumb-screw R, which I screw through the lower end of the adjustable jaw K and against the arm y of the lever.

My device for holding the saw in position consists of a gage P^2, somewhat thinner than the saw-plate, which is provided with bearings p^3 to enter the slots p^2 in the supporting-arm, and is placed between the jaws of the vise and held in place by the support P, which is pivoted to the base upon standards p', and is provided with arms p that project by the ends of the vise, as shown in Fig. 2, and terminate with slots p^2, for the reception of the gage P^2. This support is held in the desired position by means of a thumb-screw or bolt P′, which passes through both arms of the support directly back of the stationary jaw of the vise and screws into the arm opposite from its head for the purpose of clamping the arms to the jaw of the vise. This device is for the purpose of holding the saw at the desired height, and to prevent the saw from rising out of the vise when being fed through I provide a cap O, having a shaft, an arm o, at right angles with the shaft, and a cap o', which projects over and is nearly parallel with the shaft. To use this device I place the shaft in a hole through the adjustable jaw, with the cap o' thrown over so as to stand above the vise, as shown in Figs. 1, 2, and 6, and secure it to place by means of a thumb-screw S, that screws into the side of the jaw and against the shaft. This cap acts the double purpose, first, of holding the saw down to place, and, second, of a support for the end of the feed-arm N, to prevent it from taking effect upon the wrong tooth when throwing the saw ahead.

My device for feeding the saw ahead consists of a shaft W, which is supported in the bed of the frame in the position indicated in Figs. 1, 5, and 6, and is operated by a lever W′, which is secured at one end to the shaft and is provided at the other end with an anti-friction roller w, which travels over the cam U on the driving-pulley H. Near the other end of the shaft I secure an arm M, provided with a lug n', to which I pivot a second arm M′, both of which project up through the top of the base, as shown in Fig. 6. The arm M′ is provided with a lug or lugs n at its upper end, to which I pivot the feed-arm N, which projects from this point over to the top of the vise in a proper position to engage with the saw-teeth and throw the saw ahead, as desired. The distance that the saw is thrown ahead with each stroke of the feed-arm is regulated by the thumb-screw m, which passes through the top of the arm M and against the top of the arm M′ and is secured to place by means of the check-nut m'. The backward stroke of the feed-arm is regulated by the thumb-screw m^2, which passes through the lug m^4 and against the arm M and is secured to place by the check-nut m^3; but when the presser-bar O is used this thumb-screw may be dispensed with, as the end of the feed-arm rests upon the bar when drawn back, which renders it impossible for it to engage with the wrong tooth.

To throw the feed-shaft over and the feed-arm ahead, I place a cam U on the side of the driving-pulley in position to act upon the lever W′ when the rod E is on the back-stroke, or drawing the file-carriage toward the driving-wheel, and I throw the feed-arm back, with the spring M^2 supported by a lug on the lower side of the base and pressing against the front side of the arm M′.

I drive the machine with a tight pulley H, and provide a loose pulley H′ in the usual manner.

The placing of the center of motion of the table-frame at the point l below the surface of the base and raising the top of the vise considerably above the surface of the base causes the file to move in the curve of the line $y\ y$, Fig. 6, which insures sufficient hook to the saw-teeth without endangering the cutting off of the points when the file is rising from

the saw, and the general construction of the machine gives me a short vise, supports my file at both ends and brings it close to the driving-wheel, places the regulating-screw I^2 close to the vise, so as to avert the danger of the file-frame trembling when the file is passing over the saw, and the feed-arm always acts upon the tooth to be next filed.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in a saw-filing machine, of a base, a carriage-frame pivoted to the base below the top of the saw-vise, a vise having a stationary and an adjustable jaw, a lever pivoted to the adjustable jaw and operated by the eccentric driving-wheel, a regulating-screw in the adjustable jaw, a saw-gage and clamping device, a guide, a carriage-track, a file-carriage, file-supporting collars, a clamping-screw Q, adjusting-screws for the carriage-frame, a bolt and spring for drawing the carriage-frame down, a connecting-rod having a pivot connection at each end, a head E^3, screwed into the end of the connecting-rod to form a rotatory joint, straps, wrist-pins, an eccentrically-hung driving-wheel, an eccentric, a lever, a main shaft and driving-pulley, a cam, a lever for driving the feeding mechanism, a shaft, a feed-lever secured to the shaft, an adjustable lever, regulating-screws, a spring M^3, and a feed-arm, substantially as and for the purpose set forth.

2. The combination, in a saw-filing machine, of a base, an automatic vise, a driving-shaft, a driving-wheel and pulleys, an automatic feed mechanism, an eccentric, a lever pivoted to the base, and a file-carriage with a carriage-frame pivoted to the bed in position to raise the carriage at an inclination from the perpendicular, adjusting-screws, a connecting-rod, straps pivotally attached to the rod, and a screw connection E^3, substantially as and for the purpose set forth.

3. The combination, in a saw-filing machine, of a base, a carriage-frame pivoted to the base, adjusting-screws and spring, adjusting-lever, eccentric, main shaft, driving-wheel and pulleys, an adjustable vise and lever, with a feed mechanism consisting of a cam, a lever attached to the feed-shaft and operated by the cam, a feed-shaft, a feed arm or lever, an adjustable feed-lever, a spring for throwing the feed-lever back, adjusting-screws, and a feed-arm, substantially as and for the purpose set forth.

4. The combination, in a saw-filing machine, of a base, a main shaft and pulleys, a feeding mechanism, a carriage-frame, a track, a file-carriage, adjusting-screws and spring, an adjusting-lever, and eccentrics, a connecting-rod, straps, wrist-pins, a pivot-head E^2 on the connecting-rod, and a driving-wheel eccentrically hung upon the driving-shaft, with a vise having a stationary jaw, an adjustable jaw pivoted to the base, a lever pivoted to the adjustable jaw, an adjusting-screw R, an arm extending to and operated by the driving-wheel, and an anti-friction roller, substantially as and for the purpose set forth.

5. The combination, in a saw-filing machine, of a base, boxes, shaft, pulleys, driving-wheel, feeding mechanism, carriage-frame, adjusting-screws and spring, carriage-track, file-carriage, adjusting-lever and eccentric, connecting-rod, and an automatic vise, with a saw-support consisting of a thin plate P^2, an arm pivoted at one end to the bed, the other end divided to pass each side of the vise and provided with slots, and a clamping-screw, substantially as and for the purpose set forth.

6. The combination, in a filing-machine, of a base, driving mechanism, feeding mechanism, carriage-frame, adjusting-screws and spring, adjusting-lever and eccentric, carriage, connecting-rod, automatic vise, and a file-support, with a saw-guide consisting of a shaft having a flat standard and a spring-guide, and a set-screw, substantially as and for the purpose set forth.

7. The combination, in a saw-filing machine, of a base, driving mechanism, feeding mechanism, an automatic vise, a saw-support, carriage-frame, and an eccentric upon the main shaft, with an adjusting-lever pivoted to the lug G^2, with one end provided with an inclined surface i^2 to act upon the adjusting-screw I′ and the other end provided with an anti-friction roller to act with the eccentric T, substantially as and for the purpose set forth.

8. The combination, in a saw-filing machine, of a base, driving mechanism, feeding mechanism, a carriage-frame having adjusting mechanism, a file-carriage, file-supports, an automatic vise, a saw-support and a saw-guide with a connecting-rod pivotally attached at each end to straps *e* and provided at one end with a bearing E^3, consisting of a head having a long screw-body that is fitted to screw freely into the end of the rod to form a free pivot-joint therewith, substantially as and for the purpose set forth.

9. The combination, in a saw-filing machine, of a base, driving mechanism, feeding mechanism, an automatic vise, a carriage frame and track, adjusting mechanism therefor, a connecting-rod and a file-carriage, with a file-support consisting of hollow bearings upon the carriage, annular plugs to fit into the hollow bearings, one of said plugs having a flange larger than the opening, and a hollow adjusting-screw, substantially as and for the purpose set forth.

Signed at Grand Rapids, Michigan, this 27th day of September, 1890.

FRANK EDGE.

In presence of—
G. B. COLES,
ITHIEL J. CILLEY.