(No Model.) 2 Sheets—Sheet 1.

# L. LITTLEJOHNS.

## SAW SHARPENER.

No. 580,875. Patented Apr. 20, 1897.

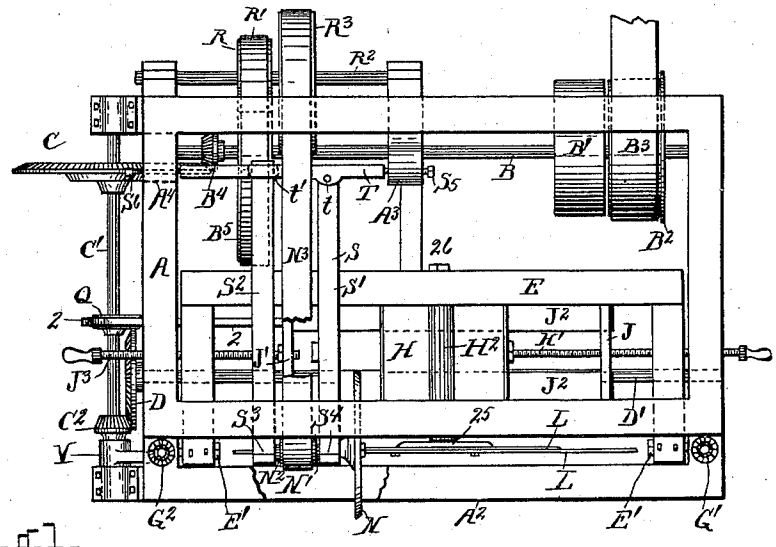

Fig. 1.

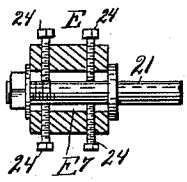

Fig. 3.

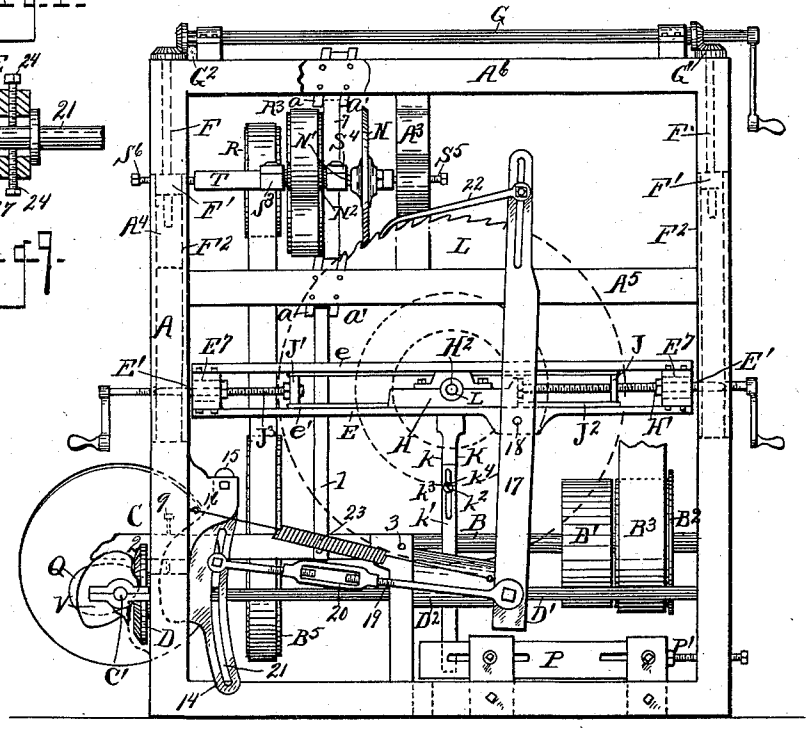

Fig. 2.

WITNESSES

O. F. Barrigar

John F. Miller

INVENTOR

Louis Littlejohns

By his Attorney

Merrill S. Wright

(No Model.) 2 Sheets—Sheet 2.

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## SAW SHARPENER.

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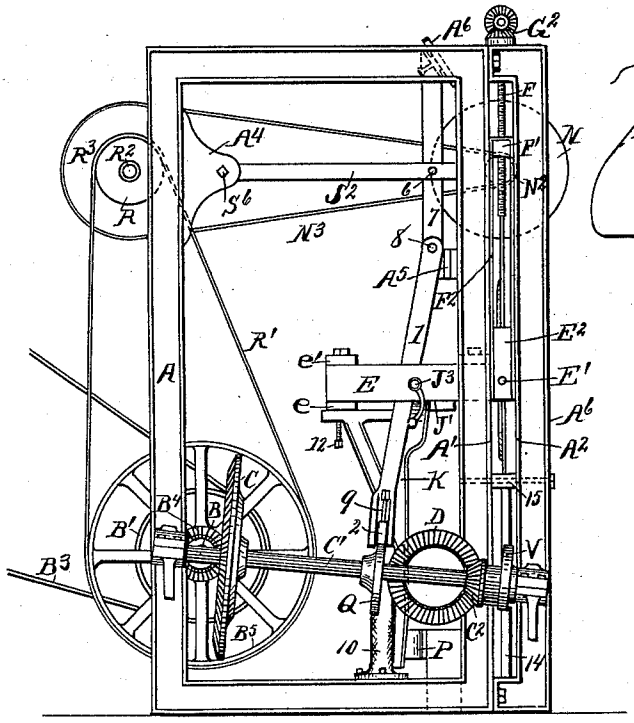


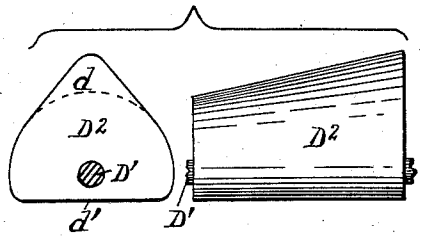
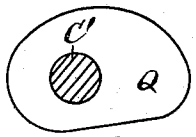


Fig. 5.

Fig. 6.



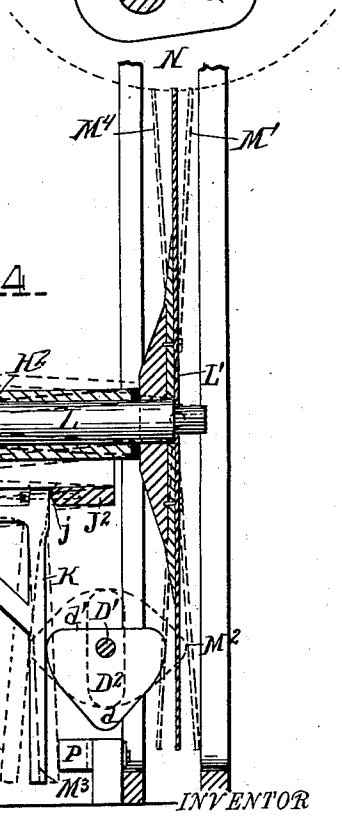


Fig. 3.

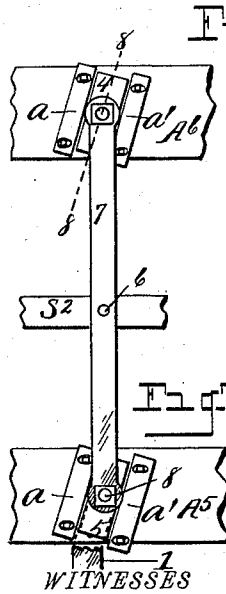


Fig. 4.

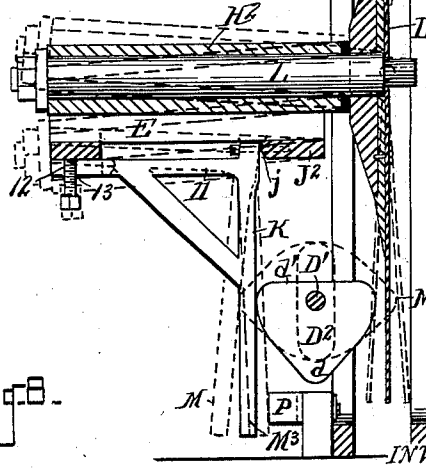


Fig. 7.



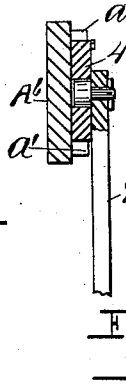


Fig. 8.

WITNESSES

O. B. Brenzeger.

John F. Miller

INVENTOR

Louis Littlejohns

By his Attorney

Merrell S. Wright.

# UNITED STATES PATENT OFFICE.

LOUIS LITTLEJOHNS, OF CHEBOYGAN, MICHIGAN.

## SAW-SHARPENER.

SPECIFICATION forming part of Letters Patent No. 580,875, dated April 20, 1897.

Application filed March 26, 1896. Serial No. 584,924. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS LITTLEJOHNS, a citizen of the United States, residing at Cheboygan, county of Cheboygan, State of Michigan, have invented certain new and useful Improvements in Saw-Sharpeners; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to a saw-sharpening machine; and it consists of the construction, combination, and arrangement of devices hereinafter described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view. Fig. 2 is a front elevation. Fig. 3 is a side elevation. Fig. 4 is a detail, partly in section and partly in elevation, showing the devices for tilting the saw. Fig. 5 is a detail view of the cam $D^2$, shown in end view and side elevation. Fig. 6 is a detail view of the cam Q. Fig. 7 is a detail view of features of the invention for shifting the emery-wheel. Fig. 8 is a view in section on the line 8 8, Fig. 7. Fig. 9 is a detail view in section of mechanism to adjust the carriage.

The object of my invention is to provide a saw-sharpening machine of superior efficiency and utility which shall be automatic in its operation, whereby the teeth of the saw may be fleamed as may be desired, and whereby the emery-wheel may be shifted toward and from the saw, so as not to injure the point of the tooth as said wheel is entering the throat.

My invention also contemplates the general construction and operation of the machine, whereby a saw may be sharpened in a perfect and satisfactory manner, complete, so as to make the saw run true and easily.

My invention is more particularly designed for sharpening saws of shingle-machines, but I contemplate its use for all purposes to which it may be found adapted.

Heretofore saws have been fleamed by hand, in consequence of which the teeth have been unevenly fleamed, necessitating the employment of an expert, also, and a considerable amount of time and expense for labor, files, &c.

My invention is designed to fleam a saw by my improved machine, in which the work shall be automatically performed and whereby the teeth will all be uniformly and evenly fleamed in a much more perfect manner than can be possibly accomplished by hand labor.

I carry out my invention as follows:

In the drawings, A represents any suitable frame.

B represents the main driving-shaft, provided with pulleys $B'$ $B^2$, one of said pulleys being a fixed pulley and the other a loose pulley.

$B^3$ is the driving-belt.

The driving-shaft is provided with a beveled pinion $B^4$, with which meshes a beveled gear C, mounted upon a shaft C'. Upon the shaft C' is a beveled pinion $C^2$, meshing with a beveled gear D, mounted upon a shaft D'. Upon this shaft is mounted a cam $D^2$.

E denotes a carriage. This carriage has an oscillatory movement and has a jointed connection, as indicated at E', with boxes $E^2$. The whole frame E may also be raised and lowered, as may be required by the size of the saw to be sharpened. To this end the frame A is constructed with ways at A' and $A^2$, in which the boxes $E^2$ may slide vertically.

To adjust the frame E vertically, I provide adjusting-screws F, working in a nut, (indicated at F'.) The boxes $E^2$ are supported upon said nuts F' by metallic straps $F^2$.

To simultaneously raise and lower the boxes $E^2$ within the frame A, I prefer to provide a crank-shaft G, geared with the adjusting-screws F, as indicated at G' and $G^2$. The carriage E is also constructed with guide-ways *e* and *e'*, in which is engaged a box H for the arbor of the saw. This box has an adjustable engagement in the carriage, so as to be movable laterally in order to get the desired hook of the tooth. This box is adjusted laterally by means of an adjusting-screw H', connected therewith.

J and J' indicate two slides connected together by a connecting-bar $J^2$, said slides being reciprocatory in the ways *e* and *e'* simultaneously. This reciprocation is effected by means of an adjusting-screw $J^3$, connected

with the slide J'. With the bar $J^2$ is engaged also a depending post or arm K, said post being preferably formed of two parts $k$ and $k'$, adjustably connected together, as indicated at $k^2$, the part $k'$ being formed with an elongated slot $k^3$. The two parts are held together by means of a set-screw $k^4$. The post or arm K extends downward adjacent to the cam $D^2$ and therebelow and, it will be seen, is laterally adjustable with the adjustment of the slides J J' in the carriage.

The cam $D^2$, as will be seen by reference to Figs. 2 and 5 particularly, is made with an inclined face longitudinally of the cam.

$H^2$ is a sleeve about the arbor L of the saw L' to be sharpened, said sleeve being engaged in the box H.

It will be apparent that when the cam $D^2$ is rotated it will bear against the post or arm K to tilt the carriage E accordingly. The cam $D^2$ is made preferably heart-shaped or resembling the point of a heart, the point $d$ thereof projecting eccentrically from the shaft D'. The cam on the opposite side of said shaft is preferably cut away on a straight line, as indicated in Figs. 4 and 5 at $d'$. By reference to Fig. 4 it will be seen that when the point $d$ of the cam is in a vertical plane with the shaft D' the saw will be held in a straight vertical or perpendicular direction, as indicated in full lines in Fig. 4. It will also be observed that should the cam $D^2$ be rotated toward the left the point $d$ of the cam will throw the post or arm K in a corresponding direction, as indicated in the outer dotted lines at M, throwing the free edge of the carriage upward and tilting the upper edge of the saw to the right of a vertical plane, as indicated in the dotted line at M'. Should the point $d$ of the cam, on the other hand, be thrown over to the right of the shaft D', as indicated in dotted lines at $M^2$, the flat face $d'$ of the cam would ride free from the post K, in consequence of which the carriage of its own gravity would drop, bringing the post K into the position shown in dotted lines at $M^3$. The free edge of the carriage would drop downward, thereby throwing the upper edge of the saw to the left, as indicated in dotted lines at $M^4$. Thus by the rotation of the cam $D^2$ the saw L' will be thrown alternately to the right and left of a central vertical position, whereby the grinding or emery wheel N will fleam alternate teeth in a corresponding manner.

Should it be desired to fleam the teeth more on one side than on the other of the saw, I provide an adjustable wedge P, with which is engaged an adjusting-screw P', which may be set to limit the movement of the post or arm K in a direction toward the wedge, occasioning a corresponding limitation of the movement of the saw in a corresponding direction, so as to limit the fleam upon the corresponding side of the saw. To give to the teeth more or less fleam, as may be desired, the slides J J' are adjusted laterally in a corresponding direction, so as to move the arm or post K toward one end or the other of the inclined or wedge faced cam $D^2$.

It will be readily seen by reference to Fig. 2 that if the post K be moved to the right the cam would tilt the saw in a less degree than were said post to remain in the position indicated in Fig. 2. So, also, were said post moved to the left the cam actuating the post would tilt the saw to a greater degree than were said post to remain in the position indicated in Fig. 2. By this means—viz., the adjustment of the slides J J' in the carriage— any desired fleam may readily be given to the teeth of the saw, and by means of said wedge the teeth can be fleamed readily more on one side or the other whenever desired.

The grinding or emery wheel N is mounted upon an arbor N', provided with a driving-pulley $N^2$. To drive the emery-wheel the main drive-shaft B is provided with a pulley $B^5$, belted to a pulley R, as by a belt R', the pulley R being mounted on a shaft $R^2$, provided with a pulley $R^3$, belted to the pulley $N^2$, as by a belt $N^3$. The shaft N' of the emery-wheel is journaled in a movable frame S, formed with bars S' $S^2$, having journal-bearings $S^3$ $S^4$ in the ends of the bars S' $S^2$. At the opposite extremities of the bars S' $S^2$ is located a cross-bar T, having a jointed connection with the adjacent end of the bar S', as indicated at $t$. The cross-bar T is constructed with an elongated slot, (indicated in dotted lines at $t'$,) in which is loosely engaged one end of the bar $S^2$. The cross-bar T is pivotally supported at its extremities, as by a bolt $S^5$ in a bracket $A^3$ and by a bolt $S^6$ in a bracket $A^4$, (indicated in dotted lines in Figs. 1 and 2,) the bracket $A^4$ corresponding in form to the bracket $A^3$. By this construction it will be observed that a swinging movement is permitted to the emery-wheel. To move the emery-wheel away from the saw, I provide a connecting-rod (indicated by the numeral 1) engaged at one end upon an oscillatory lever 2, fulcrumed, as indicated at 3, to a suitable portion of the frame. Upon the shaft C' is located a cam Q to actuate the lever 2.

$A^5$ and $A^6$ are portions of the frame, each provided with ways $a$ $a'$, in which the connecting-bar 7 has a sliding engagement, said connecting-bar is provided with sliding blocks 4 and 5. The bar 7 has a fixed engagement with the bar $S^2$, as indicated at the numeral 6. It has also a jointed engagement at its lower end with the bar 1, as indicated at the numeral 8.

It will be perceived that as the cam Q is rotated the lever 2 will be raised, lifting the bar 1 and the bar 7, carrying the bars S' $S^2$, in which the emery-wheel is journaled, thereby lifting the emery-wheel away from the teeth of the saw. As the cam Q continues to rotate and rides out from in under the lever 2

the emery-wheel will descend by its own gravity, the drop of the lever 2 being preferably limited, as by a stud or screw, (indicated at the numeral 9,) which may have an adjustable engagement with the block 10, rising from the base of the frame. By adjusting the screw 9 the movement of the wheel may be adjusted as required.

To properly center the saw, so that the saw will hang plumb under the emery-wheel when the saw is first put into the machine, I provide the post or arm K with an arm 11. This arm 11 with the post K are connected with the sliding connecting-bar $J^2$ by a screw *j*, the bar $J^2$ being rounded at its edge adjacent to the opposite end of the post or arm K, so that the post or arm K may be adjusted upon the adjacent edge of said bar $J^2$. This may be done by means of an adjusting-screw 12, having a screw-threaded engagement in the arm 11, as indicated at 13. The screw 12 bears against the carriage E, and by means of said screw it is obvious that the free edge of the carriage may be adjusted as required to properly center the saw under the emery-wheel. To rotate the saw, the shaft C′ is provided with an additional cam V.

14 denotes a swinging arm jointedly suspended at its upper end, as indicated at 15, to a bracket 16 upon the frame A.

17 is an operating-lever fulcrumed, as at 18, on the carriage E, a connecting-rod 19 uniting the lower end of the lever 17 with the swinging arm 14, the connecting-rod 19 being preferably provided with a turnbuckle 20.

The swinging arm 14 is constructed with an elongated arc-shaped slot 21, in which the connecting-rod 19 is adjustably engaged, to lengthen or shorten the movement of the lever 17, to regulate the shape of the tooth, and to give it more or less throat, according to the gage of the saw. The operating-lever 17 carries at its upper end a pawl or dog 22, engageable with the teeth of the saw and whereby the saw will be rotated one step at each operation of the lever 17, the rotation of the saw thus corresponding to the movement of the emery-wheel therefrom.

23 is a retracting-spring.

It will be evident that the cams $D^2$, Q, and V are so constructed and arranged as all to work in such harmony together and to effect their several results at the proper intervals of time, so as to tilt the saw, move the emery-wheel, and turn the saw just at the proper points of time.

By reference to Fig. 4 it will be seen that when the saw is tilted in the position shown, for example, at M′, the inside of the tooth will be ground shorter than the outside portion of the tooth. So, also, when the saw is swung in the position indicated at $M^4$ a similar result will be attained; but the bevel will be the reverse of that formed when the saw is in the position indicated at M′. As the saw moves alternately in the positions indicated at M′ and $M^4$ it will be seen that the teeth are fleamed alternately on reverse bevels, as required.

The carriage has a jointed connection by means of pivot-pins at E′ with the boxes $E^2$. It is essential that the center of said pivot-pins should be on a horizontal plane with the center of the arbor of the saw. To permit the adjustment of the carriage upon said pivot-pins, the end pieces of the carriage are provided with a vertically-elongated slot, (indicated at $E^7$,) the carriage being provided with set-screws 24, whereby it may be adjusted vertically in any desired position on said pivot-pins. To adjust the center of the arbor of the saw horizontally with the center of said pivot-pins, I provide a rubber gasket 25 between the collar on the arbor of the saw and the end of the sleeve $H^2$. On the opposite end of the arbor is a nut 26, by means of which the saw can be adjusted horizontally, as required, the arbor slipping through the sleeve $H^2$ as the said nut is tightened or loosened thereupon.

What I claim as my invention is—

1. In a saw-sharpening machine, the combination of an oscillatory carriage, a box engaged therewith to carry the arbor of a rotatable saw, whereby a saw may be carried thereby in a plane essentially at right angles to the plane of the carriage, means to tilt said carriage to throw the periphery of the saw alternately to the right and left of a perpendicular plane, and mechanism to adjust the carriage to cause the saw to hang normally plumb, for the purpose described.

2. In a saw-sharpening machine, the combination of an oscillatory carriage, a box engaged therewith to carry the arbor of a rotatable saw, whereby a saw may be carried thereby in a plane essentially at right angles to the plane of the carriage, means to tilt said carriage to throw the periphery of the saw alternately to the right and left of a perpendicular plane, and mechanism to give to said carriage both a vertical and a horizontal movement, for the purpose described.

3. In a saw-sharpening machine, the combination of a carriage, a box for a rotatable saw-arbor carried by said carriage, a frame connected therewith provided with a depending post or arm, and a longitudinally-beveled-faced cam adjacent to said post or arm to tilt said carriage to throw the periphery of the saw alternately to the right and left of a perpendicular, said post and said cam being the one adjustable relative to the other longitudinally of the cam, for the purpose described.

4. In a saw-sharpening machine, the combination of a carriage, a box for a rotatable saw-arbor carried by said carriage, a sliding frame connected with said carriage provided with a depending post or arm, and a bevel-faced cam, whereby said post or arm may be moved to either side of the vertical plane, to tilt said carriage to throw the periphery of

the saw alternately to the right and left of a perpendicular, said carriage being adjustable to carry said post to a desired point longitudinally of the cam, for the purpose described.

5. In a saw-sharpening machine, the combination of a carriage, a box engaged therewith to carry the arbor of a rotatable saw, a post or arm connected with said carriage, and a cam beveled on opposite sides to move said post or arm alternately back and forth to opposite sides of a vertical plane, to tilt said carriage to throw the periphery of the saw alternately to the right and left of a perpendicular plane, for the purpose described.

6. In a saw-sharpening machine, the combination of a carriage, a box engaged therewith to carry the arbor of a rotatable saw, a sliding frame connected with said carriage, provided with a depending post or arm, a longitudinally-beveled-faced cam to actuate said post or arm, and means to adjust said post or arm longitudinally of the cam, to tilt said carriage to throw the periphery of the saw alternately to the right and left of a perpendicular plane, for the purpose set forth.

7. In a saw-sharpening machine, the combination of a carriage, a box for a rotatable saw-arbor carried by said carriage, tilting mechanism to tilt the carriage to throw the upper edge of the saw back and forth to opposite sides of a vertical plane, and means to regulate the tilting mechanism to throw the upper edge of the saw more to one side of a vertical plane than the other side of said plane, for the purpose described.

8. In a saw-sharpening machine, the combination of a tilting carriage to carry the saw, a sliding frame connected therewith, provided with a depending post or arm, a cam to actuate said post or arm, and a wedge to govern the movement of said post or arm to put more fleam on one side of the saw than on the other, substantially as set forth.

9. In a saw-sharpening machine, the combination of a main frame, a carriage provided with a slide J′, reciprocatory in said carriage, and a bearing to engage the arbor of the saw, reciprocatory in said carriage, and means to tilt the carriage to throw the periphery of the saw alternately to the right and left of a perpendicular, for the purpose described.

10. In a saw-sharpening machine, the combination with a grinding-wheel, of a movable frame in which said grinding-wheel is journaled, a reciprocatory connecting-rod 1, and a connecting-bar 7 jointedly connected with the connecting-rod, inclined ways in which said connecting-bar has a sliding engagement, said connecting-bar engaged with said frame, substantially as and for the purpose described.

In testimony whereof I sign this specification in the presence of two witnesses.

LOUIS LITTLEJOHNS.

Witnesses:
N. S. WRIGHT,
JOHN F. MILLER.