

March 10, 1953

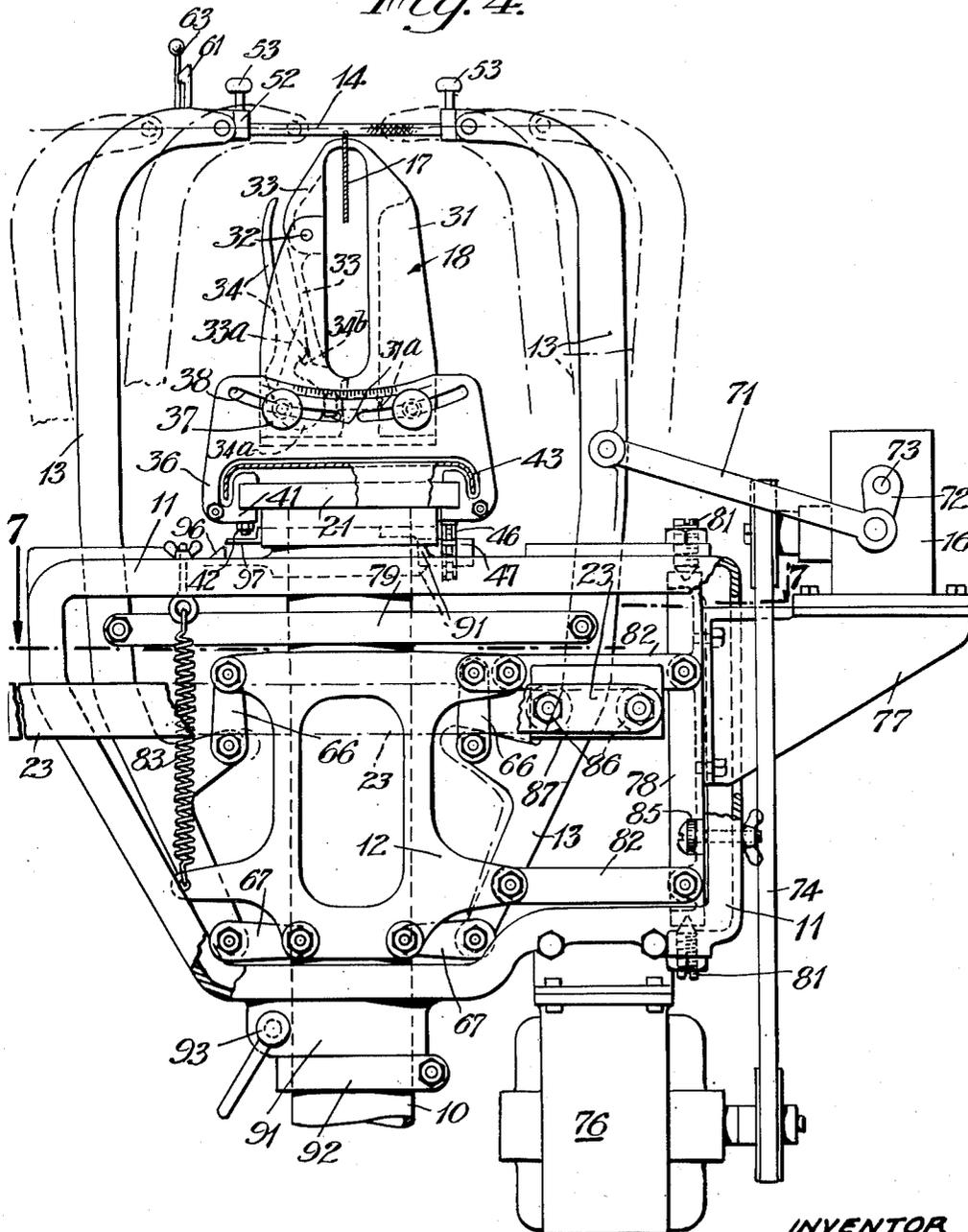
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2,630,721

Filed June 10, 1950

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Fig. 4.



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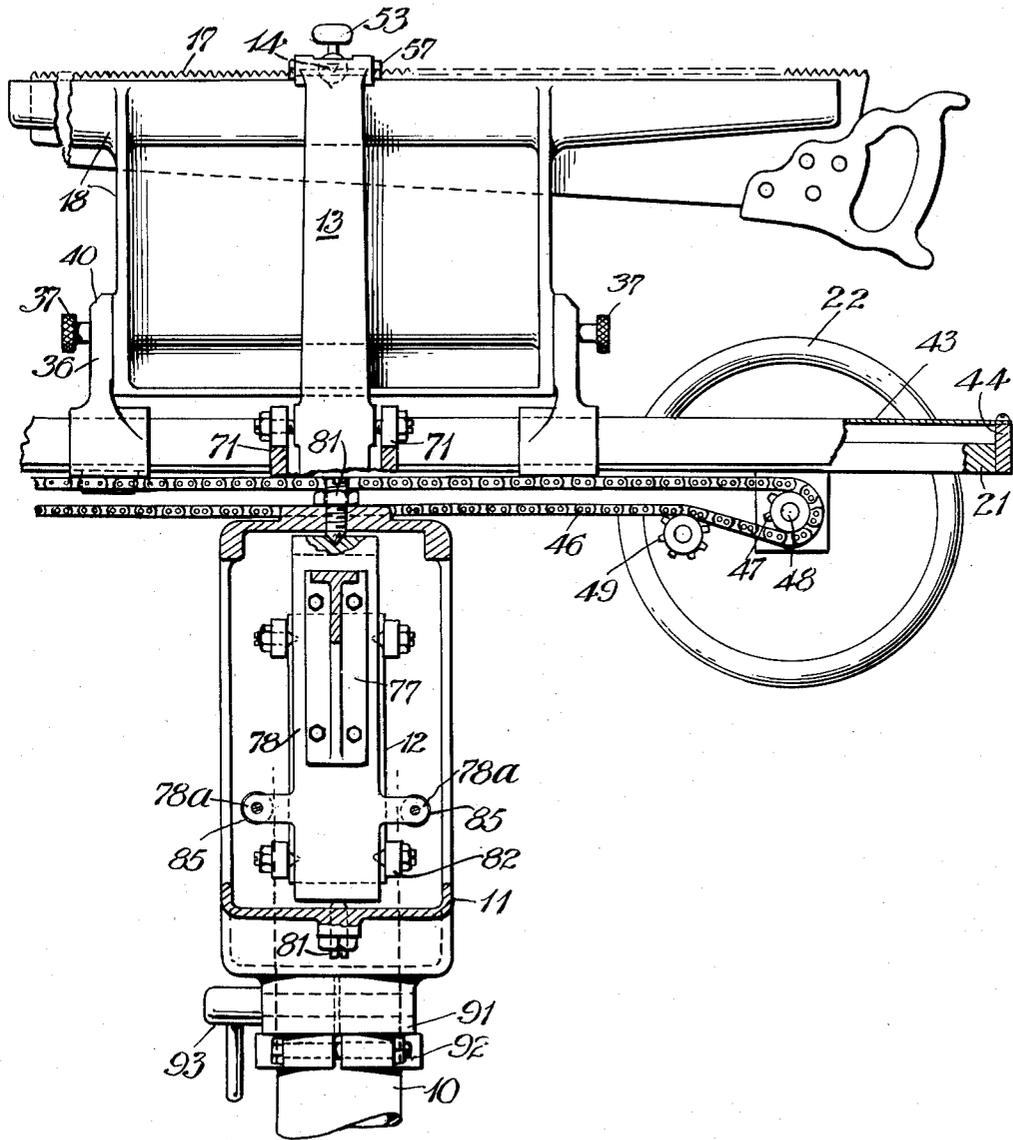
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Fig. 5.



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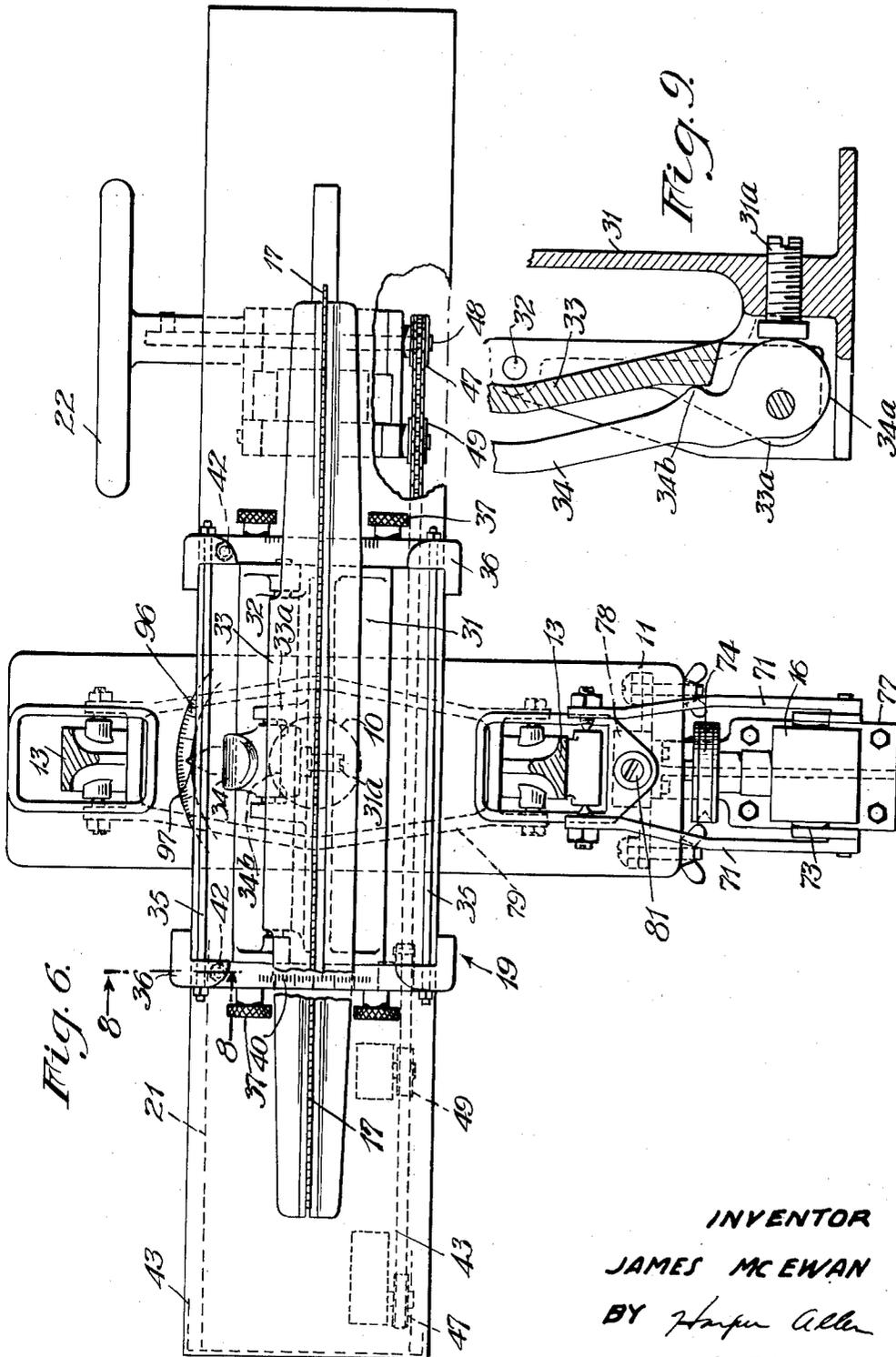
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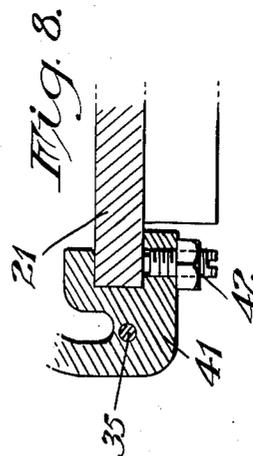
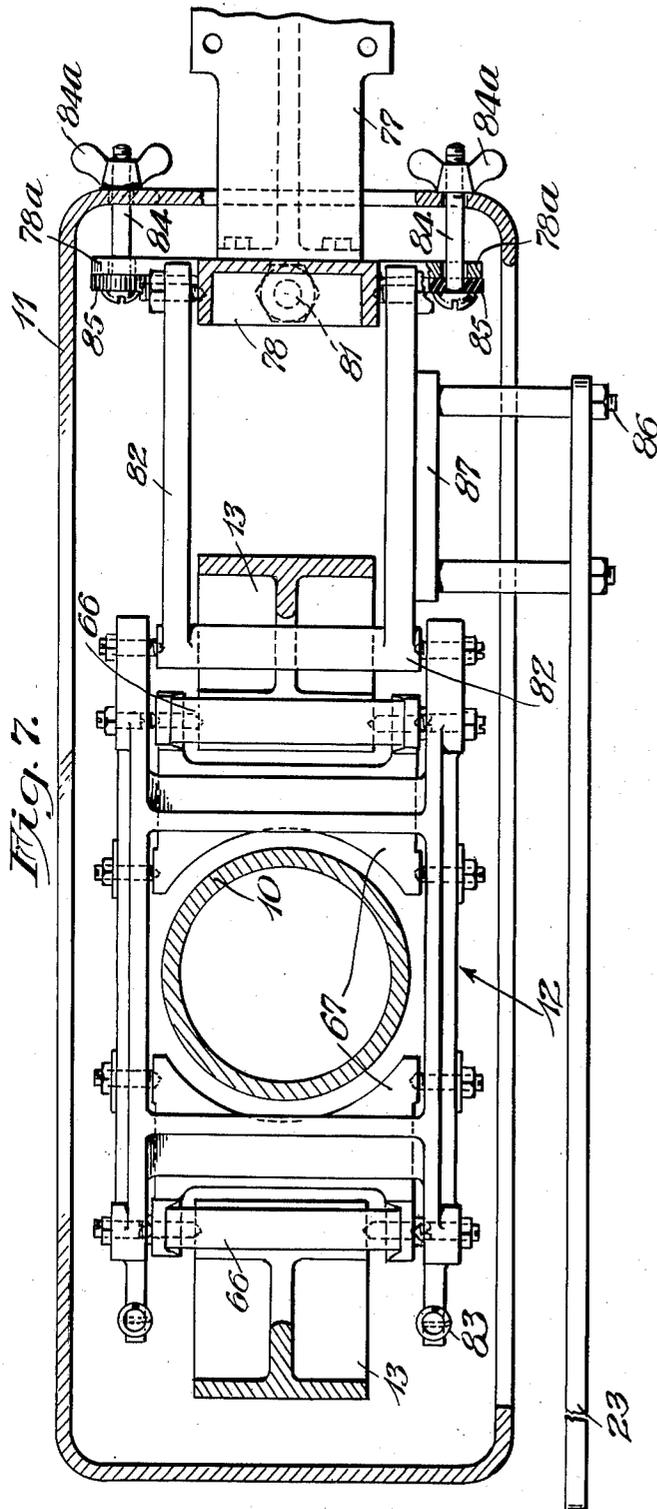
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UNITED STATES PATENT OFFICE

2,630,721

SAW SHARPENER

James McEwan, San Jose, Calif.

Application June 10, 1950, Serial No. 167,273

21 Claims. (Cl. 76-31)

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The present invention relates to saw sharpeners and is concerned more particularly with the provision of an improved machine for filing saws, such as hand saws, in which the operator's skill is retained while providing for straight-line power operation of the file itself in making the sharpening cut against each tooth.

The invention has for its objects among others the provision of a saw filer in which a power driven file is supported in an unobstructed position above the saw for free vision of the operator in using the file on the work and for manual control of engagement of the file with the work, as well as the amount of pressure imparted during the filing stroke. The invention also contemplates a floating mounting and support of the file and for a straight-line transverse movement thereof with respect to the teeth of a saw, which straight-line movement is maintained automatically during control of the file with respect to the work by the operator. The invention also provides for various adjustments of the machine, all of which are made with reference to a focal point lying in the median center line of a three-cornered file.

The above and other objects of the invention will be apparent from the following description of a preferred embodiment of the invention, as illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of a saw filer embodying the invention.

Figure 2 is a fragmentary elevational view of the angular adjusting means for the file.

Figure 3 is a sectional view taken as indicated by the line 3-3 in Figure 2.

Figure 4 is a side elevational view of the machine.

Figure 5 is a rear elevational view of the machine with certain parts shown in section.

Figure 6 is a plan view of the machine with certain parts broken away and others shown in section.

Figure 7 is a sectional plan view taken as indicated by the line 7-7 in Figure 4.

Figure 8 is a fragmentary sectional view taken as indicated by the line 8-8 in Figure 6.

Figure 9 (sheet 4) is a fragmentary sectional view illustrating the construction of the vise operating handle.

Referring to Figures 1, 4, and 5, the saw sharpener or filer of the instant invention includes a base in the form of a post 10 supported upon a suitable pedestal or the like and upon which there is adjustably mounted for pivoting

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movement a frame structure 11. The frame structure 11 in turn supports a floating frame 12, referred to in detail hereinafter, which carries a pair of upstanding arms 13 between which the file 14 is carried. The arms 13 and the file 14 are reciprocated from a drive unit 16 with respect to a saw 17 carried in a saw vise 18 mounted on a carriage 19. The carriage 19 is slidable on a track 21, as described in detail hereinafter, so that the vise 18 and the saw 17 can be manually positioned by means of a control wheel 22.

The control of the movement of the file 14 with respect to the saw insofar as its vertical adjustment to engage the teeth of the saw and the side pressure exerted against the teeth, are controlled by the operator by means of a handle 23 (Figure 1) attached to the floating frame 12 so as to control its sidewise and vertical movement and likewise control the movement of the arms 13 and the file 14.

Saw vise and mounting.—The saw vise 18 (Figures 1, 4, 5, 6, and 9), comprises a main vise member 31 having pivoted thereto at 32 a second vise member 33 which can be adjustably tightened with respect to a saw by means of a centrally disposed clamping handle 34 pivoted in spaced ears 33a of the member 33 and having an eccentric cam 34a abutting a tension adjusting screw 31a carried by the vise member 31. The screw 31a is provided with a screwdriver slot in its threaded end to enable adjustment of the tension of the clamp. Also, a stop projection 34b on the handle 34 engages a wall of the vise member 33. The main vise member 31 is adjustably mounted in end brackets 36 of the carriage 19 which are connected by a pair of tie rods 35. Each end of the vise member 31 carries a pair of clamping screws 37 engaged in respective arcuate slots 38 of the end brackets 36 of the carriage 19. The upper edges of the carriage brackets 36 are graduated at 39 to cooperate with respective index marks 40 on the saw vise. The curvature of the slots 38 is such that their center lies in the median center line of the file 14 so that the adjustment of the saw and the saw clamp is made with respect to this center line. Each end bracket 36 of the carriage 19 has respective downwardly extending side portions terminating in inwardly facing grooved flanges 41 (Figure 4) engaging the respective opposite sides of the plate or track 21. A thrust-absorbing and guide stud 42 is (Figures 4 and 8) threaded in each of the flanges 41 of the brackets at the front of the machine for sliding engagement with the bottom surface of the track 21.

An overhead guard or shield 43 (Figures 1, 4, and 6) extends between end plates 44 of the track 21 and protects the track and its associated parts from filings and other debris.

To provide for operator-controlled endwise movement of the saw vise and its support carriage on the track 21, a chain 46 (Figure 1) is suitably connected to the carriage 19 on its upper stretch and is trained about respective end supporting sprockets 47 carried by the track 21. One of the sprockets 47 has its shaft 48 extended to carry the hand wheel 22. Suitable idler sprockets 49 are provided on the track 21 to engage the lower stretch of the chain.

File support.—The triangular file 14 (Figures 1, 2, and 3), has its ends detachably engaged within triangular sockets in respective similar file support sleeves 51 and 52 being held therein by means of respective clamping screws 53 threaded in the flanged inner ends of the sleeves. The sleeve 52 is supported in a pivoted collar 56 which is pivotally mounted by respective tapered support pins 57 in the forked end 13a of the co-operating arm 13. The sleeve 51 is mounted similarly. The support collar 56 has an upstanding arcuate flange 61 provided with a series of arcuately arranged graduations or notches 62 (Figure 3) extending to either side of a central zero point for cooperation with a resilient adjusting arm 63 carried by the sleeve 52. The spring wire arm 63 can be sprung away from the flange 61 and moved to select a desired angular adjustment of the file about its center, and because of its resiliency it will be retained in its adjusted position during operation of the machine.

To provide for straight-line back and forth movement of the file 14 with respect to the saw 17, the support arms 13 for the file 14 are mounted by a tandem arranged compensating linkage means so constructed with reference to the pivotal supports 57 of the file 14 that straight-line back and forth movement of these points is obtained. For this purpose, each arm 13 is supported by a pair of pivotally connected H-shaped links 66 (Figure 4) depending from the respective sides of the floating frame structure 12 and connected to crank extensions of the arms 13. The arms 13 are connected at their lower ends by respective parallel links 67 to the lower portion of the frame structure 12.

To effect the reciprocating movement of the arms 13, the right hand arm 13, as seen in Figure 4, is connected by a pair of links or connecting rods 71 with a pair of crank arms 72 carried by the output shaft 73 of the drive unit 16. The drive unit 16 in turn receives its power through a belt and pulley drive 74 from an electric motor 76 carried underneath the frame 11. The drive unit 16 itself is carried by an L-shaped bracket 77 which extends through an apertured portion of the frame 11 and is secured to a bracket 78 which supports the floating frame 12 as will be described. The two arms 13 are in turn connected by a two-arm-link 79 pivotally connected thereto.

Referring to Figure 4, it will be seen that the links 66 and 67 form the support for the right-hand arm 13 and that the arm in effect pivots about a vertically floating pivot axis at its connection to the link 67. The extent of vertical float of this axis is controlled by the link 66 to compensate for the otherwise arcuate travel of a pivoted member and provide for straight-line movement of the axis 57 at the upper end

of the arm 13. Thus the arms 13 are mounted for controlled endwise movement as they are reciprocated to compensate for their pivotal mounting and provide the straight-line movement of their upper end. This straight-line movement is effected as disclosed in connection with my co-pending application, Serial No. 779,001, filed October 10, 1947, now Patent No. 2,590,992.

The floating frame support bracket 78 (Figures 4 and 6) is pivotally mounted about a vertical axis in the frame 11 by means of tapered pivot studs 81 engaging respective sockets in the upper and lower ends of the bracket 78. The bracket 78 has respective upper and lower links 82 pivoted thereto and to the floating frame 12 providing a parallelogram linkage mounting therefor, with the weight of the floating frame 12 compensated for by a pair of springs 83 connected at their lower ends to the respective sides of the frame 12 and at their upper ends to the frame 11. To allow limited pivotal movement of the bracket 78 with respect to the frame 11, respective rubber washers 85 are held adjustably on respective ears 78a of the bracket 78 by respective bolts 84 which pass freely through respective apertures in the ears 78a and the frame 11. Wing nuts 84a on the bolts 84 serve to adjust the amount of limited yielding movement of the bracket 78 about its vertical axis and correspondingly limited sidewise movement of the floating frame 12, the arms 13 and the file 14 with respect to the saw in the saw vise.

From the above description, it is seen that the floating frame 12 is mounted for limited sidewise movement and for vertical movement with respect to the frame 11 so as to provide corresponding movements of the file under control of handle 23, which is secured by studs and spacers 86 to a pad 87 on the upper link 82.

The frame 11 is pivotally mounted on the post 10 by means of spaced bosses 91 above a collar 92 secured on the post to support the frame 12. The lower boss 91 is split and is provided with a clamping bolt 93 for securing the frame 11 in a selected angular adjustment with respect to the track 21 and the saw in the saw vise. The angularly adjusted position is indicated by the scale 96 on the frame 11 and a pointer 97 (Figure 5) on the track 21. This angular adjustment is about a vertical axis intersecting the axes of adjustment of the file and the vise at the focal point of such adjustments.

In operation of the machine, the machine is first set up by adjusting the frame 11 to place the saw at the desired angular relation with respect to the file 14 as far as transverse angle of the face of the tooth is concerned. The saw vise 18 is mounted in the desired angular adjustment on the carriage 19 for the desired tilt transversely of the saw with respect to the file, and the file 14 is adjusted by means of its control handle 63 to the desired angularity. The saw is placed in the vise 18 and the operator takes his place with his left hand on the wheel 22 and his right hand on the handle 23 for manual control of the feeding of the saw, and of the engagement of the file 14 with the saw, and the pressure of such engagement. Subsequently, tooth by tooth the saw 17 is fed past the file 14 which is reciprocating back and forth in a straight-line movement under power. When the operator has the saw 17 properly positioned, he depresses the handle 23 which in turn carries the floating frame 12, the arms 13 and the file

14 downwardly to engage the file with the tooth of the saw during its stroke to the right as viewed in Figure 4. The amount of pressure of the file downwardly and laterally is controlled by the operator by manipulation of the handle 23. When the operator releases pressure on the handle 23, the file and associated parts are returned by the springs 83 and rubber washers 85 to their normal position.

It is seen that this method of operation of the machine retains all of the skill and judgment of the operator insofar as the actual filing of a tooth is concerned while relieving him from the work of pushing the file and also maintaining an even stroke of the file. This type of operation not only lends itself to faster sharpening of saws but it maintains angular uniformity in three directions impossible to obtain by hand filing and also provides for increased life of the file itself as it is always properly stroked with respect to a saw.

While I have shown and described certain preferred embodiments of the invention, it will be understood that the invention is capable of both variation and modification from the form shown so that its scope should be limited only by the scope of the claims appended hereto.

I claim:

1. In a saw sharpener, a central support post, a saw vise carried by said support post to position the teeth of a saw in intersecting relation to the vertical axis of said post, a frame structure carried by said post for angular adjustment about said axis and with respect to said vise, a floating frame carried by said frame structure for vertical movement and for transverse movement, a pair of arms extending upwardly from said floating frame at either side of said saw vise, means mounting said arms on said floating frame for simultaneous back-and-forth movement of the upper ends thereof, and a sharpening element carried by said arms.

2. In a saw sharpener, a central support post, a saw vise carried by said support post to position the teeth of a saw in intersecting relation to the vertical axis of said post, a frame structure carried by said post for angular adjustment about said axis and with respect to said vise, a floating frame carried by said frame structure for vertical movement and for transverse movement, support means extending upwardly from said floating frame past said saw vise, means mounting said support means on said floating frame for back-and-forth movement of the upper end thereof, and a sharpening element carried by said support means.

3. In a saw sharpener, a central support post, a saw vise carried by said support post to position the teeth of a saw in intersecting relation to the vertical axis of said post, a frame structure carried by said post for angular adjustment about said axis and with respect to said vise, a floating frame carried by said frame structure for vertical movement and for transverse movement, a pair of arms extending upwardly from said floating frame at either side of said saw vise, means mounting said arms on said floating frame for simultaneous back-and-forth movement of the upper ends thereof, and a sharpening element carried by said arms and pivotally supported therein.

4. In a saw sharpener, a central support post, a saw vise carried by said support post to position the teeth of a saw in intersecting relation to the vertical axis of said post, means mounting

said vise for sliding movement on said frame structure, a frame structure carried by said post for angular adjustment about said axis and with respect to said vise, a floating frame carried by said frame structure for vertical movement and for transverse movement, a pair of arms extending upwardly from said floating frame at either side of said saw vise, means mounting said arms on said floating frame for simultaneous back-and-forth movement of the upper ends thereof, and a sharpening element carried by said arms.

5. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure past said vise, a compensating linkage mounting for each of said arms on said structure to provide for back-and-forth straight line movement of the upper ends of said arms, parallel linkages supporting said linkage mountings on said structure providing for bodily raising and lowering movement of said linkage mountings and said arms, and a sharpening element carried by said arms.

6. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure past said vise, a compensating linkage mounting for each of said arms on said structure to provide for back-and-forth straight line movement of the upper ends of said arms, parallel linkages supporting said linkage mountings on said structure providing for bodily raising and lowering movement of said linkage mountings and said arms, said parallel linkages being carried by a member pivoted on said frame about a vertical axis, and a sharpening element carried by said arms.

7. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure past said vise, a compensating linkage mounting for each of said arms on said structure to provide for back-and-forth straight line movement of the upper ends of said arms, parallel linkages supporting said linkage mountings on said structure providing for bodily raising and lowering movement of said linkage mountings and said arms, a manual control member for said parallel linkages, and a sharpening element carried by said arms.

8. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure past said vise, a compensating linkage mounting for each of said arms on said structure to provide for back-and-forth straight line movement of the upper ends of said arms, parallel linkages supporting said linkage mountings on said structure providing for bodily raising and lowering movement of said linkage mountings and said arms, said parallel linkages being carried by a member pivoted on said frame about a vertical axis, a manual control member for controlling both vertical and pivoting movement of said linkages and said linkage mountings, and a sharpening element carried by said arms.

9. In a saw sharpener, a frame structure, a saw vise on said structure, means including a manual control member for effecting back and forth movement of said vise on said frame structure, a pair of support arms extending upwardly from said frame structure past said vise, a compensating linkage mounting for each of said arms on said structure to provide for back-and-forth straight line movement of the upper ends of said arms,

parallel linkages supporting said linkage mountings on said structure providing for bodily raising and lowering movement of said linkage mountings and said arms, a manual control member for said parallel linkages, and a sharpening element carried by said arms.

10. In a saw sharpener, a frame structure, a saw vise on said structure, means including a manual control member for effecting back and forth movement of said vise on said frame structure, a pair of support arms extending upwardly from said frame structure past said vise, a compensating linkage mounting for each of said arms on said structure to provide for back-and-forth straight line movement of the upper ends of said arms, parallel linkages supporting said linkage mountings on said structure providing for bodily raising and lowering movement of said linkage mountings and said arms, said parallel linkages being carried by a member pivoted on said frame about a vertical axis, a manual control member for controlling both vertical and pivoting movement of said linkages and said linkage mountings, and a sharpening element carried by said arms.

11. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure past said vise, a compensating linkage mounting for each of said arms on said structure to provide for back-and-forth straight line movement of the upper ends of said arms, parallel linkages supporting said linkage mountings on said structure providing for bodily raising and lowering movement of said linkage mountings and said arms, said parallel linkages being carried by a member pivoted on said frame about a vertical axis, and drive means mounted on said pivoted member for effecting back and forth movement of said arms and said sharpening element.

12. In a saw sharpener, a central support post, a saw vise carried by said support post to position the teeth of the saw in intersecting relation of the vertical axis of the post, a frame structure carried by said post for angular adjustment about said axis and with respect to said vise, a floating frame carried on said frame structure for vertical movement and transverse movement relative thereto, spring means supporting said floating frame, resilient means providing for limited transverse movement of said floating frame, a pair of arms extending upwardly from said floating frame at either side of said saw vise, means mounting said arms on said floating frame for straight-line back and forth movement of the upper ends thereof, a sharpening element carried by said arms, and a control handle connected to said floating frame for manual control of the vertical and transverse movement of said floating frame and thereby of said arms and said sharpening element.

13. In a saw sharpener, a central support post, a saw vise carried by said support post to position the teeth of the saw in intersecting relation of the vertical axis of the post, a frame structure carried by said post for angular adjustment about said axis and with respect to said vise, a floating frame carried on said frame structure for vertical movement and transverse movement relative thereto, spring means supporting said floating frame, resilient means providing for limited transverse movement of said floating frame, a pair of arms extending upwardly from said floating frame at either side of said saw vise, means mounting said arms on said floating frame for straight-line back and forth movement of the upper ends there-

of, said mounting means for each arm including a horizontally disposed link pivotally connected between said arm and said frame and a vertically disposed link pivotally connected therebetween, a sharpening element carried by said arms, and a control handle connected to said floating frame for manual control of the vertical and transverse movement of said floating frame and thereby of said arms and said sharpening element.

14. In a saw sharpener, a central support post, a track on said post, a saw vise slidably carried by said track to position the teeth of the saw in intersecting relation of the vertical axis of the post, a frame structure carried by said post for angular adjustment about said axis and with respect to said vise, a floating frame carried on said frame structure for vertical movement and transverse movement relative thereto, spring means supporting said floating frame, resilient means providing for limited transverse movement of said floating frame, a pair of arms extending upwardly from said floating frame at either side of said saw vise, means mounting said arms on said floating frame for straight-line back and forth movement of the upper ends thereof, a sharpening element carried by said arms, and a control handle connected to said floating frame for manual control of the vertical and transverse movement of said floating frame and thereby of said arms and said sharpening element.

15. In a saw filing machine, a pair of opposed arms having respective forked ends for supporting a file extending across a working space, a saw vise for supporting a saw in said space, a pair of mounting sleeves for said file, means mounting one of said sleeves in each of said arms for rotative adjustment therein, each of said mounting means being pivotally connected in one of said forked ends about a horizontal axis, a flange extending upwardly from one of said mounting means, and a resilient arm carried by one of said sleeves and engaging said flange to indicate and retain an angular setting of the file.

16. In a saw filing machine, a pair of opposed arms having respective forked ends for supporting a file extending across a working space, a vise for supporting a saw in said space, a pair of mounting sleeves for said file, means mounting one of said sleeves in each of said arms for rotative adjustment therein, each of said mounting means being pivotally connected in one of said forked ends about a horizontal axis, a flange extending upwardly from one of said mounting means, and a resilient arm carried by one of said sleeves and engaging said flange to indicate and retain an angular setting of the file, and support means for said arms providing for straight-line movement of the portions thereof containing said horizontal axes.

17. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure past said vise on opposite sides of said vise, a sharpening element carried between said arms and extending across said vise, means mounting each of said arms for back and forth straight line movement of the upper ends of said arms, support means on said structure for said mounting means providing for bodily raising and lowering movement of said arms and said elements with respect to saw vise, and a manual control member for controlling said support means.

18. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure

past said vise on opposite sides thereof, means mounting each of said arms for back and forth straight line movement of the upper ends of said arms, support means on said structure for said mounting means providing for bodily raising and lowering movement of said mounting means and said arms, said support means being carried by said frame structure for transverse movement lengthwise of said vise, and a manual control member for controlling both vertical and transverse movements of said arms and sharpening element.

19. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly past said saw vise, a sharpening element extending between said arms and across said saw vise, and means disposed below said saw vise for supporting and controlling movement of said arms and the sharpening element carried thereby with respect to a saw in said vise, said support arms and said element comprising the sole obstruction to an operator's view of a saw in said vise.

20. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure past said vise on opposite sides thereof, a sharpening element extending between said support arms and across said vise, and means mounting each of said arms on said structure to provide for back and forth straight line movement of the upper ends of said arms, said support arms and said element comprising the sole obstruction to an operator's view of a saw in said vise.

21. In a saw sharpener, a frame structure, a saw vise on said structure, a pair of support arms extending upwardly from said frame structure past said vise on opposite sides thereof, a sharp-

ening element extending between said arms and across said vise, means mounting each of said arms on said structure to provide for back and forth straight line movement of the upper ends of said arms, said mounting means also including means providing for bodily raising and lowering of said arms and said sharpening element and means providing for transverse movement thereof with respect to said saw vise, a manual control member carried by said frame structure for controlling the vertical and lateral movement of said arms and said sharpening element with respect to said saw vise, and power operated means for effecting said back and forth straight line movement of said arms.

JAMES McEWAN.

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