May 30, 1961 L. J. NIELSEN 2,986,048

GRINDING WHEEL DRESSING MEANS IN SAW SHARPENING APPARATUS

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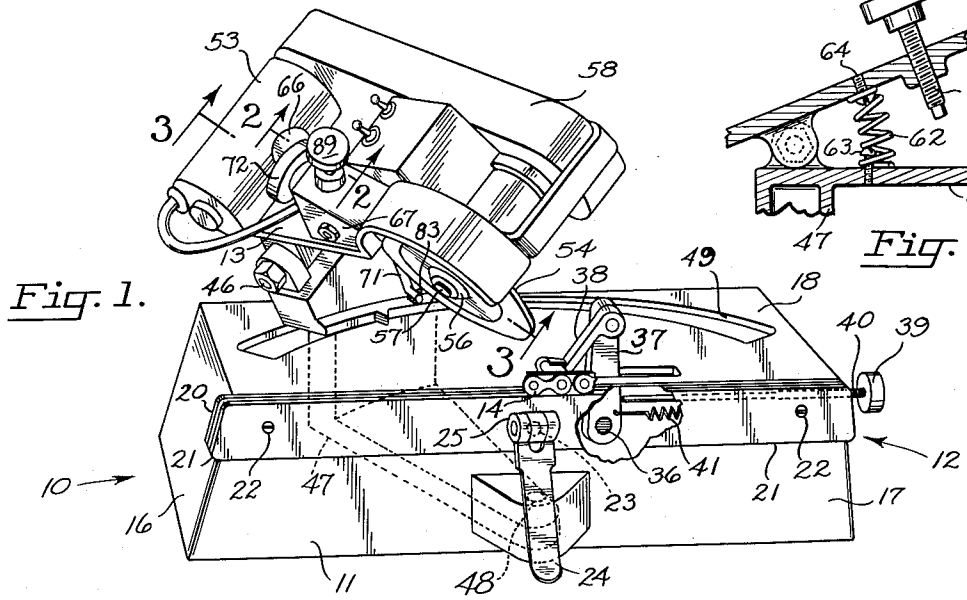

Fig. 1.

Fig. 2.

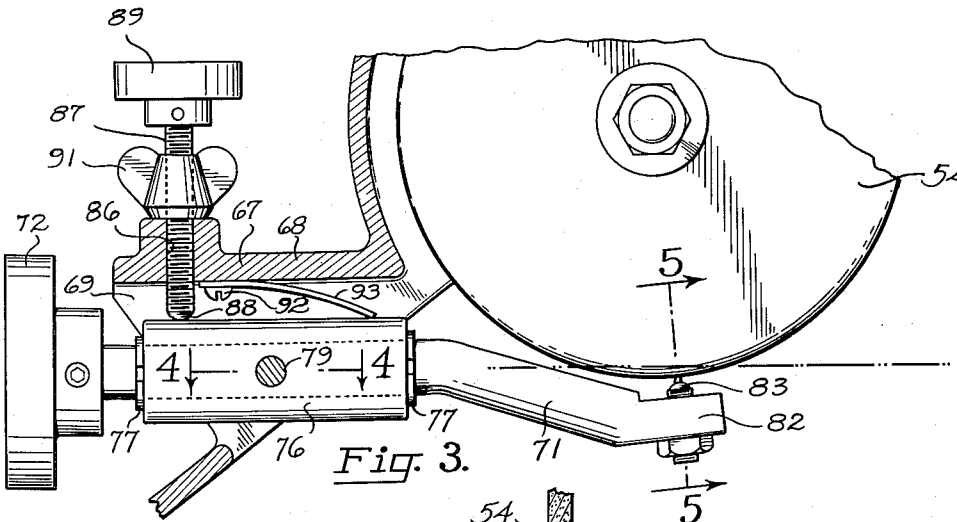

Fig. 3.

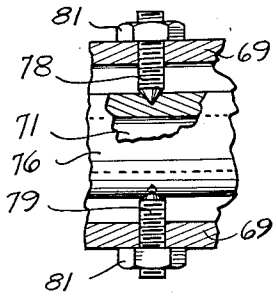

Fig. 4.

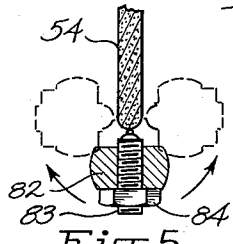

Fig. 5.

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GRINDING WHEEL DRESSING MEANS IN SAW SHARPENING APPARATUS

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This invention relates to sharpening apparatus, and more particularly to saw chain sharpening apparatus having a grinding wheel, and dresser means or mechanism for dressing the grinding wheel to take care of wear occurring during use.

Generally it is an object of this invention to provide for a grinding wheel improved dresser mechanism which enables dressing of the circumferential edge of a grinding wheel to a true and accurate radius, and which may be readily set up without complex adjustment.

Another object of the invention is to provide improved sharpening apparatus comprising a frame and a swingable grinding wheel mount, which also comprises dressing mechanism carried on the grinding wheel mount which rapidly and accurately may be set up to dress the peripheral edge of a grinding wheel, and which requires little readjustment to compensate for changes in the diameter of a grinding wheel. The dressing mechanism, when not in use, is easily swung to a position out of the way of the grinding wheel.

When sharpening the teeth of a saw chain with a grinding wheel, the wheel is lowered against a tooth with one face and the circumferential edge of the wheel abrading away the steel of the tooth. In such an operation, the shape of the edge and face of the grinding wheel determines the shape of the sharpened tooth. Thus it is important that the circumferential edge of the grinding wheel be dressed off occasionally as it wears away. In the usual instance, the edge of the wheel is dressed off so that it curves from one wheel face to the other over a radius corresponding to about one-half the thickness of the wheel. When so dressed the side faces of the wheel meet in approximate tangential relationship the convexly curving edge extending between and joining the opposite faces of the wheel.

Usually grinding wheels are dressed by hand. It is difficult with hand dressing to obtain a true round at the edge of a wheel. Dresser mechanisms held by support means against the edge of a wheel are also known, however, mechanisms known to date have required a considerable number of adjustments to set them up properly, and have also had the disadvantage that most of these adjustments have had to be made each time it is desired to dress a wheel to its then attained diameter.

This invention contemplates a construction wherein a dressing or cutting element, ordinarily a diamond point, is carried adjacent the edge of a grinding wheel by means of a supporting arm or member mounted for pivotal movement about an axis extending in a direction substantially parallel to the axis of rotation of the grinding wheel. Means are provided also for rotating the supporting arm about an axis which is perpendicular to the axis of rotation of the wheel, the rotation axis for the supporting arm being referred to herein as an "adjustment axis." This supporting arm or member has an offset portion at one end adjacent the grinding wheel, and this offset portion carries the diamond point. The diamond point is adjustable in a direction extending radially

of the rotational axis for the supporting member, i.e., radially of the aforementioned adjustment axis.

Once the diamond point is positioned on the offset portion, the cutting sweep of the diamond point, which is determined by the degree of offset of the diamond from the adjustment axis for the supporting member, is fixed. The support member may then be pivoted about its pivot axis with the diamond point riding radially toward or away from the edge of a wheel, without effecting the cutting sweep of the diamond point. The organization has the advantage of permitting the dressing of the wheel with progressive infeeding of the diamond point as the diameter of the grinding wheel diminishes with continued dressing and wear.

Another object of the invention is to provide a grinding wheel dresser which is readily adjusted to take care of grinding wheels of different thicknesses. Ordinarily the peripheral edge of a grinding wheel is rounded off an equal amount on either side of a plane extending through the median plane of the wheel parallel to the wheel faces. This requires that the supporting arm rotate about an adjustment axis lying in this plane. With substitution of a grinding wheel of a different thickness, the location of this central plane changes. The construction of this invention accommodates lateral shifting of the adjustment axis of the supporting member to take care of this change. The adjustment axis may also be shifted should it be desired to impart to the edge of a wheel a round curved about a center located closer to one face of the wheel than the other.

Other objects, novel features and advantages are present in the invention, which is described hereinbelow in conjunction with the accompanying drawings wherein:

Fig. 1 is a perspective view of saw sharpening apparatus constructed according to this invention, the apparatus including a frame and a pivoted grinding wheel mount carried over the frame;

Fig. 2 is a section view, slightly enlarged, along the line 2—2 in Fig. 1, illustrating details of the mounting for one end of the grinding wheel mount;

Fig. 3 is a section view, also enlarged, along the line 3—3 in Fig. 1, showing the supporting arm of the invention and the mounting of the arm on the grinding wheel mount;

Fig. 4 is a section view along the line 4—4 in Fig. 3; and

Fig. 5 is a section view along the line 5—5 in Fig. 3.

Referring now to the drawings for a description of an embodiment of the invention, and in particular to Fig. 1, 10 indicates the sharpening apparatus generally. The apparatus comprises a base frame 11 shaped as a pyramidal frustrum, gripping means 12 along the forward top edge of the base frame for clamping onto a saw chain 14 during sharpening, and a pivotally mounted grinder wheel mount 13. When sharpening a saw tooth with the device, the free or nonpivoted end of grinding wheel mount 13 is pivoted downwardly toward gripping means 12 and any saw chain 14 clamped therein.

Specifically, base frame 11 has end walls 16 and side walls 17 joined together at their end edges and supporting along their top edges a horizontally disposed table surface 18. Gripping or clamping means 12 is secured to the front face of front side wall 17, and comprises a rear clamp member 20 and a front clamp member 21, which may be strips of steel. The rear clamp member is adjacent the side wall, and the front clamp member is spaced a small distance outwardly from the rear clamp member and held in place by screws 22 at each of its ends.

Front clamp member 21 bows intermediate its ends, and is flexible and resilient. Extending through the center

of the front and rear clamp members, near their base edges, is a rotatable pin 23 fixed in side wall 17 against axial movement. Pivoted to the outer end of pin 23 is a swingable cam handle 24. The cam handle is pivotable about an axis extending transversely of pin 23. The cam handle has a pair of cams 25 integral with the handle which move in against front clamp member 21 when the handle is pivoted about this axis. Cam handle 24 and cams 25 constitute a means tightly for securing a saw chain between clamp members 20, 21.

Secured to front side wall 17 and extending inwardly from its rear face is a pin 36. Rotatably mounted on pin 36 is a brace arm 37. The brace arm pivotally carries at its upper end an indexing finger 38, which depends downwardly from the brace arm with the lower end thereof over clamp members 20, 21.

Extending from an intermediate portion of brace arm 37 outwardly through one of the end walls 16 is an adjustor rod 39. Rod 39 has a threaded portion 40 received in an internally threaded bore provided in base frame 11. Turning of the adjustor rod operates either to advance or to retract the rod longitudinally of the base frame. The inner end of the rod abuts brace arm 37. If the rod is moved inwardly, the brace arm is moved in a counterclockwise direction in Fig. 1, with the lower end of indexing finger 38 moving to the left over the clamp members 20, 21.

The brace arm is urged in a clockwise direction and against the end of adjustor rod 39 by a coiled tension spring 41 fastened at one end to the brace arm and at its other end to a side wall of the brace frame. In practice, the brace arm and indexing finger 38 are adjusted so that when the indexing finger rests against the rear edge of a cutting tooth of a saw chain, the forward edge of the tooth will be properly positioned for sharpening when the grinding wheel mount is lowered downwardly over clamp members 20, 21.

Grinding wheel mount 13 is pivoted by pivot connection 46 to an L-shaped mounting bracket 47. Bracket 47 has a horizontal leg, and the forward end of the horizontal leg is pivotally secured to front side wall 17 by pivot 48. The bracket has a vertical leg integral with the horizontal leg which extends upwardly from the horizontal leg through an arcuate slot 49 to a point spaced above table surface 18. Bracket 47 can be swung from left to right in Fig. 1, about pivot 48 to enable the sharpening of both left and right hand cutting teeth in a saw chain. Means (not shown) are provided for fixing bracket 47 in different adjusted positions.

Pivot connection 46 for the grinding wheel mount accommodates movement of the mount about an obliquely disposed axis. This enables the free end of the mount to move toward a saw chain in a direction inclined from a vertical direction. The latter is necessary in order that a suitably beveled cutting edge can be imparted to a cutting tooth of a saw chain.

Grinding wheel mount 13 carries at its pivoted or rear end an electric motor 53. At the forward or nonpivoted end of the mount is a grinding wheel indicated at 54. Wheel 54 is secured by nut and washer assembly 56 to a wheel arbor 57. Arbor 57 and motor 53 are drivingly connected by suitable belt and pulleys (not shown) enclosed within casing 58.

As can be seen in Fig. 2, mounting bracket 47 has a platform portion 61 integral therewith, projecting outwardly underneath mount 13. This portion is obscured by the mount in Fig. 1. A coiled compression spring 62 interposed between platform 61 and the under side of the grinding wheel mount operates to urge the mount to a raised position. The spring is held in place as by pin 63 and screw 64. Outwardly of the compression spring on mount 13 and threaded into a tapped portion of the mount is an adjustor screw 66. The lower end of screw 66 provides an abutment which strikes platform 61 to limit downward movement of the grinding wheel mount. The adjustor screw is adjustable longitudinally of its length to permit adjustments in this limit position.

Referring now to Figs. 1, 3, 4, and 5, integral with the grinding wheel mount and carried on the top side thereof is a mounting hood portion 67. This hood portion has a top wall 68 and side walls 69, but openings are provided at the two ends thereof, as seen in Fig. 3. Extending through the end openings of the hood portion and with one end adjacent grinding wheel 54 is a supporting arm or member 71. The other end of member 71 has affixed thereto a knob 72.

Mounting means are provided for mounting the end of arm 71 disposed away from the grinding wheel. This mounting means accommodates pivotal movement of the arm about a pivot axis which is parallel to the axis of rotation of wheel 54, and rotary movement of the arm about an "adjustment" axis which extends at right angles to the axis of rotation of wheel 54.

Specifically, arm 71 is threaded through the smooth center bore of a sleeve or support member 76 and is rotatable within this sleeve. The axis of this rotation is perpendicular to the rotary axis of the grinding wheel. The arm is secured from movement longitudinally of sleeve 76 by snap rings 77. The sleeve itself is mounted for pivotal movement relative to mount 13 by a pair of aligned trunnions 78, 79. The pivot axis provided by trunnions 78, 79 is substantially parallel to the axis of rotation of the grinding wheel. The trunnions each take the form of a threaded screw member mounted in a side wall of hood portion 67 and having a tapered end which seats in an indent formed in the outer periphery of the sleeve. The screw member is secured in fixed place in the side wall mounting the same by a lock nut 81.

The inner end of supporting arm 71 has an offset portion indicated at 82. Portion 82 is offset radially from the adjustment axis about which arm 71 rotates. Thus the end of the offset portion describes a sweep on rotation of arm 71, as best illustrated in Fig. 5.

The offset portion has mounted thereon a diamond headed dresser or cutting element 83. Element 83 is screwed into an accommodating tapped bore provided in offset portion 82, and is held securely in place by lock nut 84. When nut 84 is loosened, element 84 may be turned to vary the degree of offset of the inner or cutting end of the element from the adjustment axis for arm 71.

Top cover wall 68 of hood portion 67 contains a tapped bore 86 which receives an elongated screw 87 having a rounded end 88 and a knob 89 secured to its other end. The lower end of this screw, which constitutes an adjustable abutment means, is spaced in the path of mounting sleeve 76 when the sleeve is pivoted in a clockwise direction in Fig. 3. Screw 87 limits movement of the offset portion of arm 71 away from wheel 54, and thus acts firmly to hold dresser element 83 against the wheel during dressing. Wing nut 91 is a locking nut.

Affixed by screw 92 to the inner surface of top wall 68 is a leaf spring 93. The free end of the spring engages an end of sleeve 76, and imparts a bias to the sleeve urging the sleeve into contact with screw 87.

When the apparatus is used for sharpening, grinding wheel mount 13 is pivoted downwardly with the outer periphery edge of the grinding wheel moving against a saw tooth to sharpen it. Indexing finger 38 is adjusted so that it will properly position the saw tooth by resting against the heel of a tooth. Adjustment in the position of the indexing finger is necessary when sharpening different sizes of saw teeth, and when the grinding wheel is dressed and as a consequence has its diameter reduced. The latter adjustment follows from the fact that the wheel pivots downwardly about an oblique axis, and reducing the diameter of the wheel shifts the point of contact of the wheel with a chain longitudinally along members 20, 21.

When dressing a wheel, the rounded end of screw 87 is moved downwardly to move the offset portion of arm

71 toward the periphery of the wheel, and the diamond point into engagement with the wheel periphery.

In dressing a wheel, the motor is turned on and the wheel rotated against the diamond mount. To impart a round to the edge of the wheel, arm 71 is rotated about its adjustment axis in sleeve 76. This moves the dresser element in a sweep. As long as the diamond element remains in fixed position, the radius of the sweep does not change, even though arm 71 is pivoted about the trunnions to take care of a reduction in the diameter of the wheel. Adjustment of the position of the dresser element in offset portion 82 changes the radius of the sweep.

The organization is readily adjusted for dressing grinding wheels of varied thickness. Ordinarily the adjustment axis for arm 71 is positioned so that it lies in a plane coinciding with a plane parallel to the opposite faces of the wheel but disposed centrally between the faces, if a truly semicircular round between the wheel faces is desired. To take care of a thicker or thinner wheel, the adjustment axis may be shifted laterally by appropriate adjustment of trunnions 78, 79.

It is claimed and desired to secure by Lettters Patent:

1. In saw sharpening apparatus having a frame and a grinding wheel mount mounted for movement on said frame, said grinding wheel mount mounting a grinding wheel arbor that is adapted to hold a grinding wheel and is rotatable about a grinding wheel rotation axis, the improvement comprising wheel dresser means mounted on said grinding wheel mount and carried thereby for movement therewith, said wheel dresser means comprising a tubular sleeve extending substantially perpendicularly to said grinding wheel rotation axis, a pair of oppositely disposed and aligned trunnions carried by said mount adjustable in position in the direction of their length, the inner ends of said trunnions pivotally mounting said sleeve intermediate its ends for movement of the sleeve about a pivot axis extending parallel to said grinding wheel rotation axis, an elongated supporting arm extending through and journaled in said sleeve for rotation about an adjustment axis perpendicular to said grinding wheel rotation axis and paralleling said sleeve, said supporting arm having an end adjacent a grinding wheel mounted on said arbor, said end having an offset portion that is offset from said adjustment axis in a direction radially outwardly of said grinding wheel rotation axis, a cutting element mounted on said offset portion projecting radially inwardly toward said grinding wheel rotation axis, and screw adjustment means carried by and adjustable on said mount and bearing on said sleeve and inhibiting pivotal movement of the sleeve in a direction where said offset portion of said supporting arm moves radially outwardly of said grinding wheel rotation axis.

2. The saw sharpening apparatus of claim 1 which further comprises bias means bearing on said sleeve and interposed between said sleeve and said mount constructed to urge the sleeve in a direction where said offset portion of said supporting arm moves radially outwardly of said grinding wheel rotation axis.

3. In saw sharpening apparatus having a frame and a grinding wheel mount mounted for movement on said frame, said grinding wheel mount mounting a grinding wheel arbor that is adapted to hold a grinding wheel and is rotatable about a grinding wheel rotation axis and also mounting cover structure extending over and thus covering upper proportions of such a grinding wheel, the improvement comprising wheel dresser means mounted on said grinding wheel mount and carried thereby for movement therewith, said wheel dresser means having an elongated supporting arm with an end of the arm disposed beneath said cover structure and under and adjacent such a grinding wheel, a tubular sleeve journalling said supporting arm with the arm paralleling the sleeve and with the sleeve extending substantially perpendicularly to said grinding wheel rotation axis, a pair of oppositely disposed and aligned trunnions carried by the mount and adjustable in position in the direction of their length, the inner ends of said trunnions pivotally mounting the sleeve for movement about a pivot axis extending parallel to said grinding wheel rotation axis, said end of said supporting arm having an offset portion beneath said cover structure offset from said grinding wheel rotation axis in a direction radially outwardly of said rotation axis, a cutting element beneath said cover structure mounted on said offset portion projecting radially inwardly toward said rotation axis, and screw adjustment means interposed between said grinding wheel mount and said sleeve and bearing on said sleeve and inhibiting pivotal movement of the sleeve in a direction where said offset portion of said supporting arm moves radially outwardly of said grinding wheel rotation axis.

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