M. W. PANGBURN.

SAW SHARPENING MACHINE.

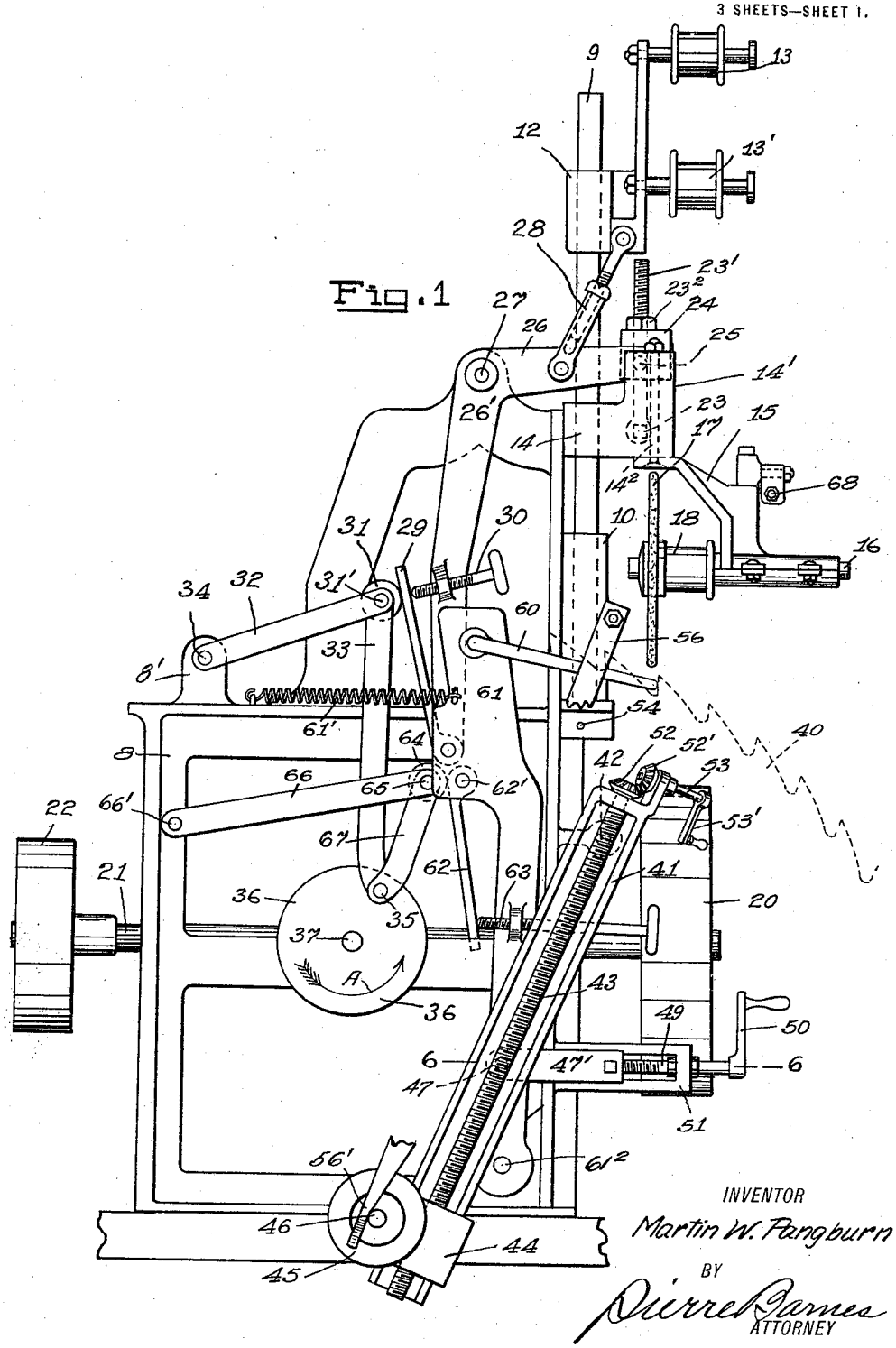
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1,179,752.

Patented Apr. 18, 1916.

3 SHEETS—SHEET 1.

Fig. 1



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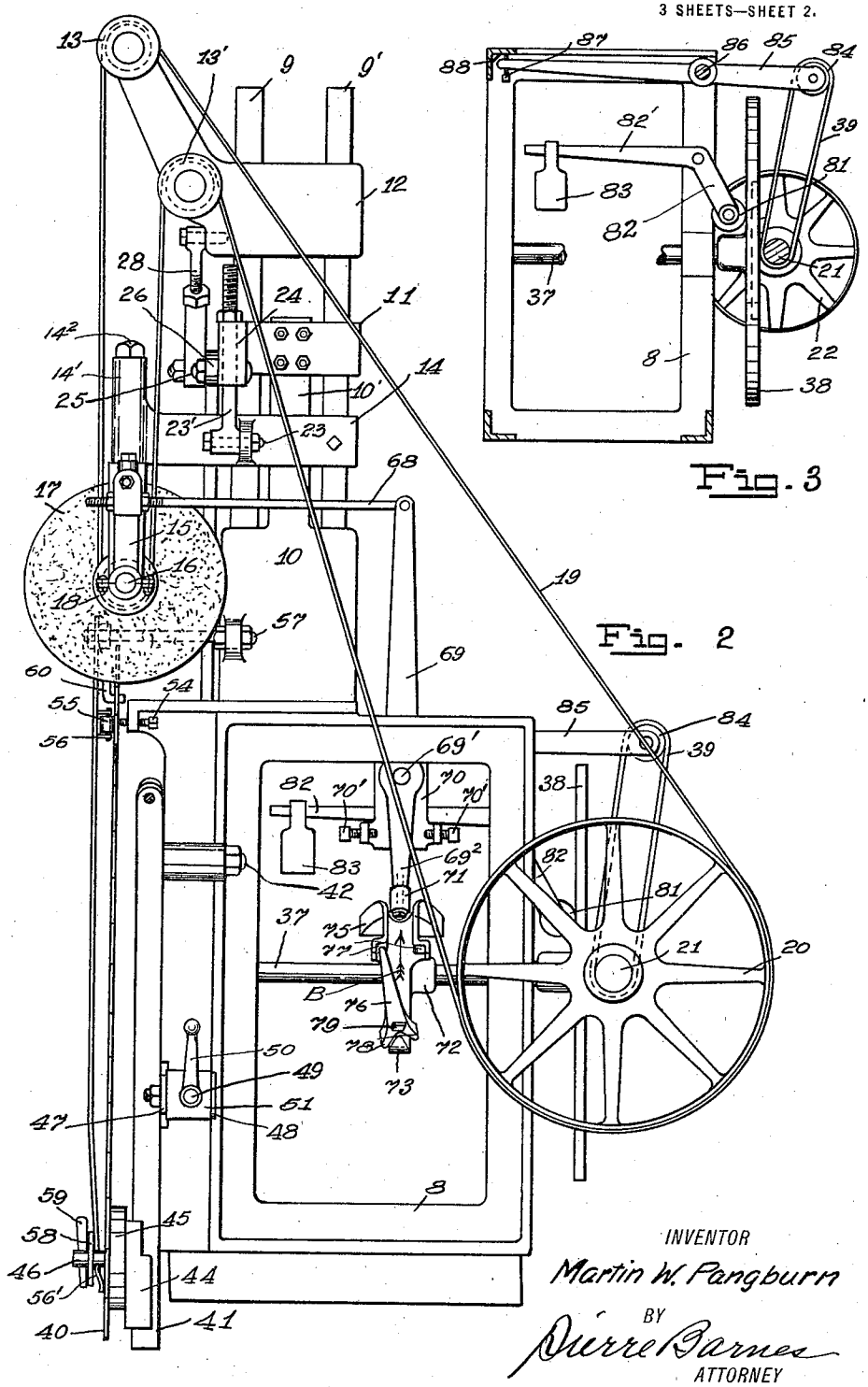


Fig. 2

Fig. 3

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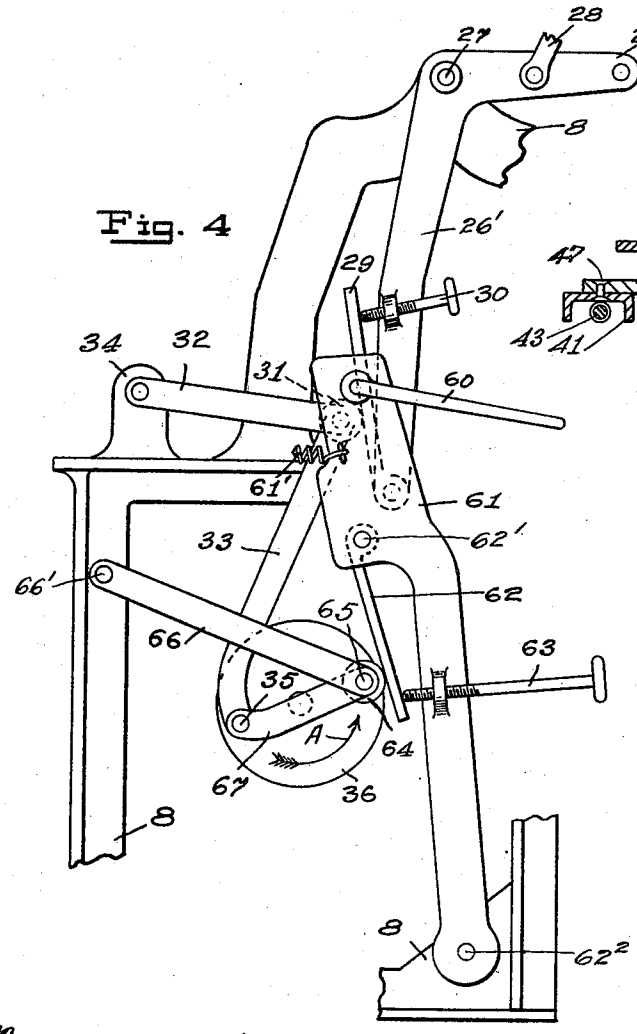
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Fig. 4



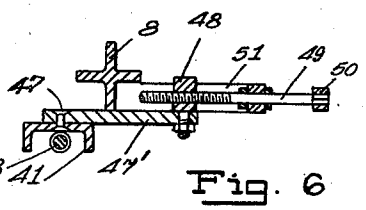


Fig. 6

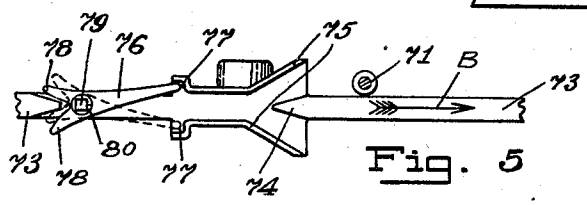


Fig. 5

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SAW-SHARPENING MACHINE.

1,179,752. Specification of Letters Patent. Patented Apr. 18, 1916.

Application filed May 26, 1915. Serial No. 30,483.

To all whom it may concern:

Be it known that I, MARTIN W. PANGBURN, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Saw-Sharpening Machines, of which the following is a specification.

This invention relates to automatic sharpening machines for circular saws; and its object is the improvement in machines of this class to render the same more efficient in operation, and more conveniently and quickly adjusted to grind saws having teeth of different shapes and sizes and in various sizes of saws.

The invention consists in the novel construction, adaptation and combination of parts as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a view in front elevation of a saw sharpening machine embodying my invention; Fig. 2 is a view in side elevation of the same; Fig. 3 is a longitudinal vertical section of a portion of the machine; Fig. 4 is a fragmentary elevational view similar to Fig. 2 to illustrate the operations of certain parts of the invention; Fig. 5 is a plan view to show the periphery of the shifting or cam wheel as it would appear if disposed in a plane; and Fig. 6 is a detail sectional view through 6—6 of Fig. 1.

In the drawings the reference numeral 8 indicates the machine frame having apertured block elements 10 and 11 which serve as guides for the upright bars 9, 9^1 which are rigidly connected by a member 14 and constitute with the latter a sash which is movable vertically.

As illustrated, the block element 11 is held in superposed relations with respect to the block 10 by a post element 10^1. Slidably mounted on the sash bars 9, 9^1 is a head block 12 which serves as supports for the stub shafts of belt pulleys 13 and 13^1. The sash member 14 is provided with an arm 14^1 which is bored to receive a bolt 14^2 by which is pivotally supported a hanger 15 provided with a journal bearing for the horizontal arbor 16 of a grinding wheel 17. Mounted upon this arbor is a pulley 18 for an endless belt 19 which is led upwardly and about the guide pulleys 13 and 13^1 and thence downwardly, as shown in Fig. 2, to a driving pulley 20 mounted upon a shaft 21 located at the rear of the machine frame. This shaft is provided with a pulley 22 for a power driven belt, not shown, whereby the machine is actuated. The sash member 14, is connected by a bolt 23 to a rod 23^1 which extends through a sleeve 24, the rod 23^1 being screw threaded, as shown, to receive a nut 23^2 whereby the sash may be held in adjusted positions with respect to the sleeve 24. 25 represents a stud protruding from said sleeve and serves as a pivotal connection with the arm 26 of a bell crank lever which is fulcrumed to a pivot bolt 27 on the frame. Such lever arm is connected from a position midway between the axes of the stud 25 and fulcrum bolt 27 with the head block 12 by means of an extensible link 28 so that the movements imparted through the lever to the head block will be substantially one half of the travel of the sash and whereby the belt 19 is kept taut in every position of the sash. The other arm 26^1 of said lever extends downwardly from the bolt 27 and has hingedly secured to its lower end a plate 29 which is held at selected distances from the arm by an adjusting screw 30. Tracking against said plate is a roller 31 having an axle 31^1 which is journaled in the end of a vibratory rod 32 which is connected at its other end by a pivotal pin 34 to a lug 8^1 of the machine frame.

33 is a connecting rod between the roller axle 31^1 and the crank pin 35 of a crank wheel 36 which is mounted on the end of a shaft 37 extending longitudinally through the machine and has mounted at its rear end a disk shaped friction wheel 38. The latter is driven from the aforesaid shaft 21 through the medium of an endless belt 39, as will be hereinafter explained, to impart rotary motion to the crank wheel 36.

The saw X, indicated by broken lines 40 in Fig. 1, is supported upon a mandrel 46 projecting from a carrier or nut movable lengthwise upon a bar 41 which is pivotally connected from near its upper end by a pin 42 to the frame.

43 is a screw extending longitudinally of the bar 42 and engages the nut 44 to regulate the position of the mandrel 46 to accommodate saws of various diameters. As shown in Fig. 1, there is provided at the

upper end of the screw 43 a beveled toothed gear wheel 52 which is in mesh with a similar gear 52^1 on a shaft 53 having a crank handle 53^1 and whereby the screw may be conveniently rotated to adjustably move said nut. Below the pivotal pin 42, the bar 41 is connected by a pin 47 and a link 47^1 with a nut 48 (Fig. 6) engaging a screw 49 having a crank handle 50. Said nut is guided in a slot of a bracket member 51 formed on or rigidly secured to the frame 8.

54 designates a set screw extending forwardly from the frame to serve as an abutment against which a saw is held during the grinding operation by means of a roller 55 which is supported by a bar 56 of spring metal whose upper end is adjustably held to the frame part 10 by a bolt 57. The lower end 56^1 of the spring bar 56 is interposed between the saw 40 (Fig. 2) and a washer 58 which, in turn, is secured upon the mandrel 46 by a key 59 inserted through a slot provided in the latter.

The saw is intermittently rotated through the medium of a feed finger 60 which is connected to the upper end of an arm 61 pivotally connected from its lower end by a pin 61^2 to the frame. 62 is a plate hingedly connected by a pin 62^1 to the arm 61 and is held in adjusted positions by means of an adjusting screw 63. A roller 64 journaled on an axle 65 is provided to track against the plate 62, and is caused to traverse the latter by the joint action of a vibratory rod 66 connected at 66^1 to the frame and a connecting rod 67 between the aforesaid crank pin 35 and the axle 65, as clearly shown in Figs. 1 and 4.

61^1 denotes a spring having its ends respectively connected to the frame and to the arm 61 and tends to influence the arm to withdraw the feed finger 60 from the previously advanced saw-tooth and into engageable position with respect to the next tooth which is to be fed forward. Such feeding movement of the saw is effected through the office of the roller 64 when actuated and controlled by the operations of the mechanism comprising crank pin 35 and the rods 66 and 67. The wheel 36 is rotated to revolve said crank pin in the direction indicated by arrow A, in Figs. 1 and 4, the roller 64 thereby being caused to move over the face of the plate 62 from the position in which it is shown in Fig. 1 to the position shown in Fig. 4, thus causing the arm 61 to be oscillated on its pivot and the feed finger 60 to engage and advance a tooth of the saw 40 into position to be ground.

The rods 66 and 67 as arranged transmit from the crank pin 35 a quick return movement of the roller 64 from the extreme upper position as shown in Fig. 1 to the extreme lower position as shown in Fig. 4 to allow the spring 61^1 to withdraw the feed finger 60 quickly from a tooth while the crank pin is making approximately one-third of a revolution. Such roller is, however, moved more slowly as it ascends during the remaining part of the revolution of the crank pin, thus feeding the saw forward by a slow, steady motion as the grinding disk 17 is being raised, to properly grind and shape the back of the tooth.

The hanger 15 which carries the arbor 16 of the grinding wheel 17 is pivotally secured by the bolt 14^2 to the sash arm 14^1 and is connected with suitable mechanism by which it may be rigidly held in the position shown in Figs. 1 and 2 to grind rectangularly across the cutting edges of teeth such as employed in rip saws; or, the hanger may be swung about such pivotal bolt to grind the teeth to bevels, as on crosscut saws.

The mechanism which controls the swiveling movements of the grinding wheel 17 consists in a link 68 having one of its ends adjustably secured to the hanger 15 and its other end is connected to the upper arm 69 of a lever which is pivoted at 69^1 to a bracket 70 provided on the frame 8. The lower arm 69^2 of this lever carries a roller 71 that is adapted to be engaged by a shifter wheel 72 mounted on the shaft 37 and is thereby swerved from side to side to turn the grinding wheel 17 into different angular or tooth beveling positions.

The shifter wheel 72, as will be understood from an inspection of Fig. 5, has its periphery composed of a central rib 73 having tapering extremity 74 which projects between converging side flanges 75 of the wheel. Pivotally connected to this wheel is a switch member 76 of a substantially wedge shape which is adapted to have its pointed end seat within recesses 77 provided in the flange ends remote from the rib end 74. Said switch is provided at its butt end with diverging wing elements 78 arranged to straddle an end of the rib 73 and project outwardly to be alternately encountered by the roller 71, when the wheel is rotated in the direction indicated by arrow B, (Figs. 2 and 5) to shift the member 76 from one side to the other in the successive rotations of the wheel and thereby direct the roller 71 to opposite sides of the rib 73.

The bracket 70 has provided thereon set screws 70^1 on opposite sides of the lever arm 69^2 and are adjustable in an obvious manner to limit the sidewise movement of such arm. The switch member 76 is secured to the wheel 72 by a screw 79, a spring washer 80 being preferably interposed between the head of such screw and the switch member 78 to cause the latter to be yieldingly held in the positions to which it is shifted through the instrumentality of the lever roller 71 when impinging a wing element 78.

When the teeth of a saw are to be ground squarely across, the roller 71 is removed to render the shifting apparatus inoperative, and in which case the set screws 70^1 are regulated to have their points bear against the lever arm 69^2 to positively lock the lever in position to hold the grinding wheel at right angles to the saw.

The friction disk 38 is held in juxtaposition with the belt 39 by a roller 81, (Fig. 3) on an arm 82 of a bell-crank lever whose other arm 82^1 carries a weight 83 which serves to exercise an axial movement of the disk 38 to engage the belt 39 between the latter and the driving shaft 21. The belt 39 passes upwardly over a flanged idler pulley 84 rotatable on the outer end of a lever 85 that is slidably mounted on a rod 86 transverse of the frame.

87 is an adjusting screw extending through the lever 85, as shown, to engage a flange 88 of the machine frame whereby the tightness of the belt 39 may be regulated and enabling it to be shifted across the face of the disk 38 to vary the speed of rotation of the shaft 37.

In operation, the saw is placed on the mandrel 46, see Fig. 2, and if it is a rip saw the roller 71 is removed, as explained, to permit the teeth to be squarely ground. Power is then applied to the shaft 21 to rotate the grinding wheel 17 and also drive the shaft 37 on which the crank wheel 36 is mounted. As the wheel 36 is rotated, the saw is intermittently turned, a tooth length at a time, by the feed finger 60 while the grinding wheel 17 is being raised. The relative movements of the feed finger 60 and the grinding wheel are so timed that as the finger is being withdrawn the wheel 17 will be lowered to grind the face of a tooth and as the finger is urging the saw forward the grinding wheel 17 will be slowly lifted to grind and shape the back of such tooth.

The plates 29 and 62 are illustrated in plane forms, but in practice, curved plates may be substituted therefor to afford the movements to the grinding wheel 17 suitable for dressing teeth of different shapes.

In grinding cross cut or other saws having bevel shaped teeth, the switch member 76 and the roller 71 are used and operate as hereinbefore explained to cause the grinding wheel 17 to be swiveled about an axle diametrically of the wheel to present the same at the requisite angle to the work.

The nut 44 is adjustable on the arm 41 to accommodate saws of different diameters, such adjustments being attained by the screw 43. The arm 41 by being swung about its pivotal support 42 by means of the screw 49, is regulated to enable the cutting edges of the saw teeth to be ground to different angles or "hook" as it is conventionally called.

In the operation of the shifting wheel 72 the roller 71 follows along one side of the rib 73 until it is engaged and moved toward center by one of the flanges 74 and is thereupon engaged and moved to the opposite side of the rib 73 by the switch member 76. The roller 71 in passing the switch member is urged to one side to influence the lever 69—69^2 and upon the roller engaging a wing 78 of the switch member the latter is thereby swerved to transfer the point of such member from one notch 77 to the opposite notch 77, thus causing the end of the lever 69—69^2 to be shifted in the next rotation of the wheel 72.

What I claim as my invention, is:—

1. In a machine of the class described, the combination with the machine frame, and a power driven shaft journaled in said frame, of a sash arranged for vertical reciprocatory movements, a grinding wheel, an arbor therefor carried by the sash, means to effect the reciprocation of said sash, a belt for driving said arbor from the shaft, a vertically movable head block, guide pulleys for said belt carried by said head block, and means operatively connecting said head block with the aforesaid means whereby said guide pulleys are elevated and lowered simultaneously with and to a less extent than said arbor.

2. In a machine of the class described, the combination of the frame, a sash, a hanger depending from the sash, a grinding wheel having an arbor journaled in said hanger, a belt pulley mounted on said arbor, a block arranged for vertical movements relatively to the sash, belt tightener pulleys carried by the block, a driving pulley, a belt passing about all of said pulleys for driving said grinding wheel, a lever fulcrumed to said frame, means engaging an arm of the lever to impart oscillatory movements thereto, operative connections between the end of the other arm of said lever and the sash for effecting vertical reciprocatory movements thereto, and operative connections between the central portion of the last named arm and said block whereby the latter is caused to travel approximately one half the distance traveled by the sash whereby the pulleys carried by the block serve to maintain said belt in taut condition.

3. In a machine of the class described, the machine frame, a grinding wheel mounted for vertical movements with respect to said frame, a driving shaft, devices connecting said grinding wheel with said shaft for driving the wheel, and means for effecting the vertical movements of said wheel, said means including a crank wheel operatively connected with said grinding wheel, a shaft for the crank wheel, a friction disk mounted on the last named shaft, and a belt movable longitudinally of said driving shaft and in-

terposed between the latter and said friction disk whereby motion is imparted to the latter to rotate said second named shaft at a speed proportional to the position of the belt radially of the disk.

4. In a machine of the class described, a grinding wheel having an arbor mounted in a vertically movable hanger, a lever for reciprocating said hanger, means for oscillating said lever, an adjustable saw holding support, an oscillatory arm, a saw feed-finger pivotally connected to said arm, a spring connected to said arm, a power driven crank-wheel, and devices actuated by said crank wheel and operatively engaging said arm coöperating with said spring to produce a slow forward movement and quick return of said feed finger.

5. A machine of the class described, having a grinding wheel, an arbor therefor, a hanger affording a bearing for the arbor, means for rotating said arbor and wheel, saw holding devices, and means for turning said arbor and grinding wheel into angular positions with respect to the saw, said means comprising a lever, a link connecting said lever with said hanger, and a shifter wheel provided with a centrally disposed peripheral rib and a switch member adapted to co-act with the lever to direct an arm thereof to opposite sides of the rib in the alternate rotations of the shifter wheel.

6. In a machine of the class described, a grinding wheel, an arbor therefor, a hanger affording a bearing for said arbor, means including a lever and a shifting wheel therefor for turning said arbor and grinding wheel about an axis rectangular to the axis of said arbor, and means engageable with said lever whereby the aforesaid means are rendered inoperative.

7. In a machine of the class described, a grinding wheel, an arbor therefor, a swiveled support provided with journal bearings for said arbor, a shifter wheel, means for rotating said shifter wheel, operative connections between said shifter wheel and said support whereby said arbor and grinding wheel are turned about an axis rectangular to the axis of the arbor, and means engageable by said connections whereby the turning movements of the grinding wheel and arbor are limited.

Signed at Seattle, Washington, this 17th day of May 1915.

MARTIN W. PANGBURN.

Witnesses:
PIERRE BARNES,
A. L. BOWEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."