Sept. 27, 1949. P. RAINBOLT ET AL 2,482,934

AUTOMATIC GRINDING MACHINE FOR MOWER SICKLES

Filed March 4, 1948 4 Sheets-Sheet 1

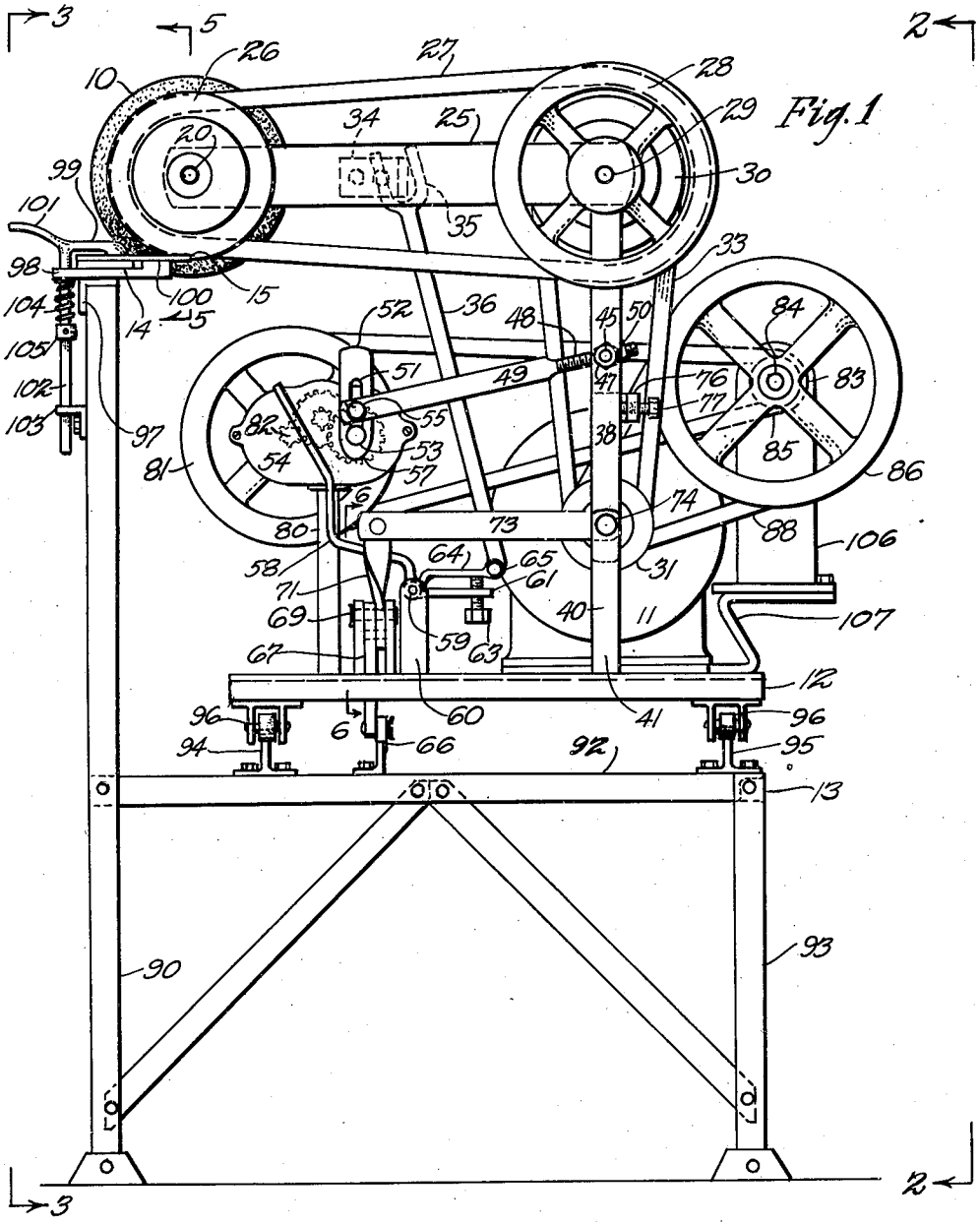


Fig. 1

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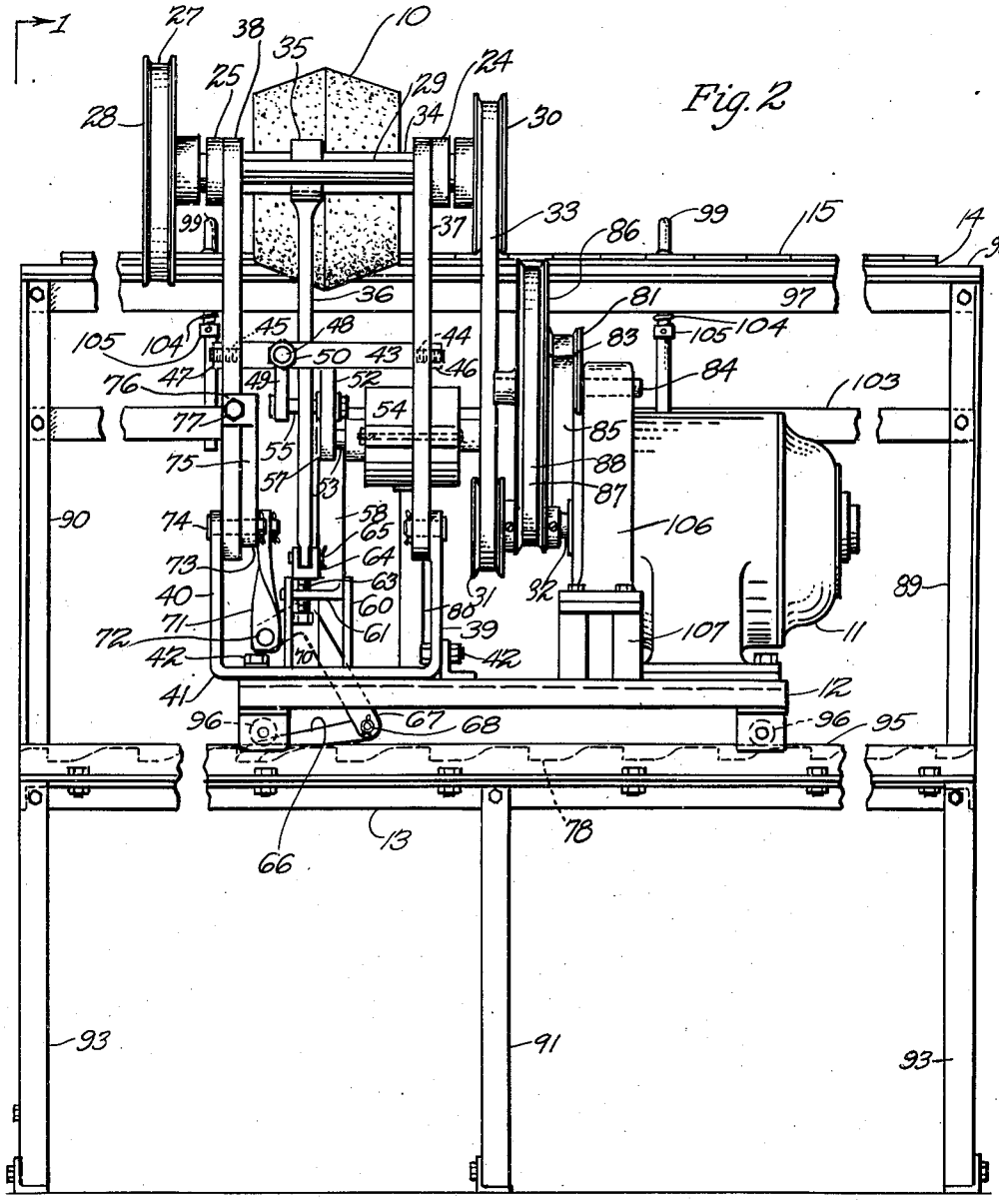
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Fig. 2



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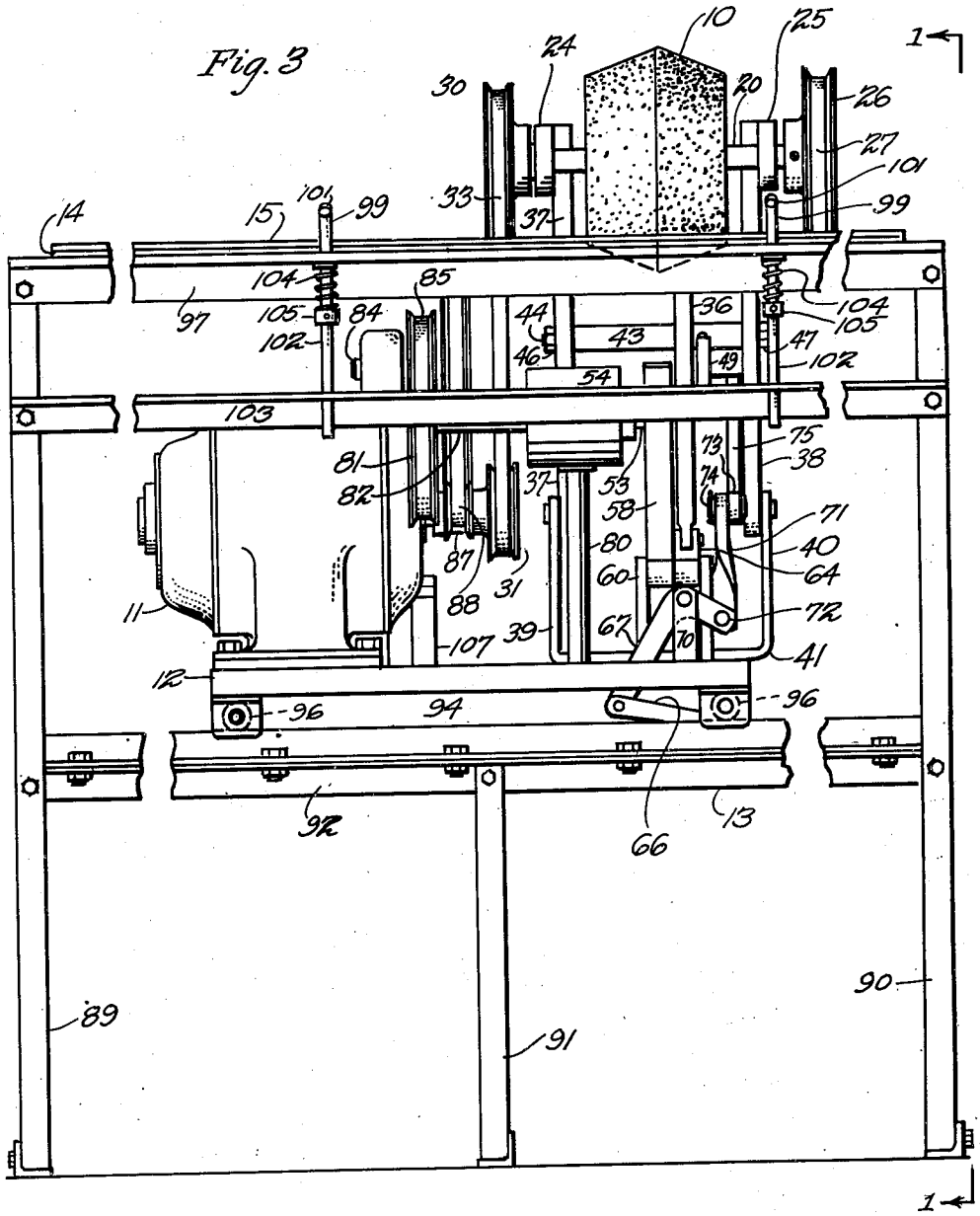
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AUTOMATIC GRINDING MACHINE FOR MOWER SICKLES

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Fig. 3



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AUTOMATIC GRINDING MACHINE FOR MOWER SICKLES

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Fig. 5

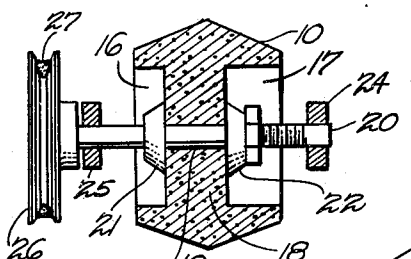
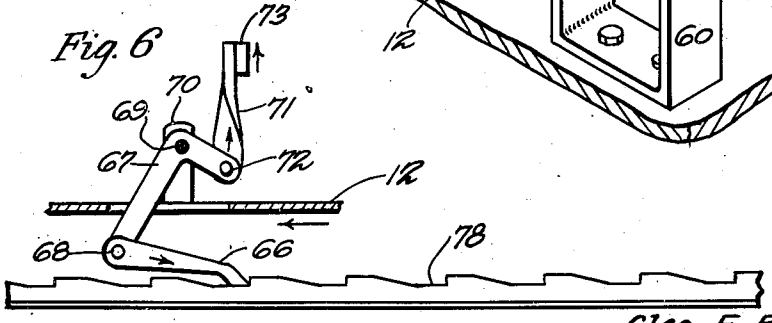


Fig. 4

Fig. 6



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Patented Sept. 27, 1949 2,482,934

UNITED STATES PATENT OFFICE

2,482,934

AUTOMATIC GRINDING MACHINE FOR MOWER SICKLES

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Application March 4, 1948, Serial No. 12,936

5 Claims. (Cl. 51—36)

1

This invention relates to automatic grinding machines of the type used for sharpening tools and the like, and in particular a rotating V-shaped grinding wheel actuated with a reciprocating and step by step movement wherein the wheel approaches and grinds the cutting edges of blades or sections of a sickle or cutter bar of a mower or the like.

The purpose of this invention is to provide means for automatically grinding the blades of a sickle or cutter bar without removing the blades from the bar.

The cutter bar or sickle element of mowers, binders, and the like travels comparatively close to the ground where it strikes stones, small stumps and the like, so that it is subjected to considerable abuse, and therefore the blades or sections thereof require sharpening at comparatively short periods of time. The blades are riveted to the bar and in removing the blades for sharpening it is necessary to cut the rivets with a chisel driven by a hammer blow, and the blow of the hammer often breaks the blades. With this thought in mind this invention contemplates a V-shaped grinding wheel adapted to enter the opening between two blades of a sickle bar and suitable instrumentalities for actuating the grinding wheel and moving the wheel along a cutter or sickle bar wherein the wheel enters the opening between each pair of blades and grinds the cutting edges thereof.

The object of this invention is, therefore, to provide a grinding wheel and means for operating the same whereby the grinding wheel will travel along a sickle bar of a mower and grind the cutting edges of the blades of the bar.

Another object of the invention is to provide an automatic grinder for blades of sickle bars of mowers which will travel continuously throughout the length of the bar without manual control.

Another object of the invention is to provide an automatic grinder for blades of sickle bars which operates with a reciprocating motion and in which the stroke thereof may readily be adjusted.

A further object of the invention is to provide a machine for automatically grinding the blades of a sickle bar which is of a comparatively simple and economical construction.

With these and other objects and advantages in view the invention consists of the new and novel combination, construction, and arrangement of parts, as hereinafter more fully described, set forth in the claims appended hereto, and disclosed in the accompanying drawings forming part hereof, wherein:

Figure 1 is a view showing an end elevation of the machine, taken on line 1—1 of Figures 2 and 3.

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Figure 2 is a view showing a rear elevation of the grinding machine taken on line 2—2 of Figure 1, with parts broken away.

Figure 3 is a view showing a front elevation of the machine taken on line 3—3 of Figure 1 with parts broken away.

Figure 4 is a detail illustrating the grinding wheel mounting and operating instrumentalities with parts omitted and parts broken away.

Figure 5 is a detail showing a section through the grinding wheel taken on line 5—5 of Figure 1.

Figure 6 is a detail taken on line 6—6 of Figure 1 showing the ratchet and dog for advancing the grinding wheel carriage from one pair of blades to another.

Referring now to the drawings wherein like reference characters denote corresponding parts the automatic sickle bar blade grinder of this invention includes a grinding wheel 10 operated by a motor 11 and mounted on a carriage 12 with the carriage adapted to travel on a frame 13, and with the frame adapted to hold a sickle bar 14 having blades 15 thereon.

The wheel 10 is formed with recesses 16 and 17 in the ends and a web 18 between the recesses is provided with a bore 19 by which the wheel is mounted on a shaft 20 with the web held between collars 21 and 22 by a lock nut 23, as shown in Figure 5. The shaft 20 is rotatably mounted in the ends of arms 24 and 25 and the outer end of the shaft is provided with a pulley 26 by which the grinding wheel is rotated with a belt 27 from a pulley 28. The pulley 28 is fixedly mounted on a stub shaft 29 on which the inner ends of the arms 24 and 25 are pivotally mounted and on the opposite end of the stub shaft 29 is a pulley 30 that is driven from a pulley 31 on a motor shaft 32 by a belt 33. The arms 24 and 25 are held in spaced relation by a cross bar 34, as shown in Figure 4, and the bar 34 is positioned in a yoke 35 at the upper end of a strut 36 which holds the arms and grinding wheel upward and elevates the wheel at the end of the stroke.

The inner ends of the arms 24 and 25 and the shaft 29 are supported in vertically disposed bars 37 and 38 which are pivotally mounted in upwardly extending ends 39 and 40 of a bracket 41, and the bracket is mounted on the carriage 12 by bolts 42. The bars 37 and 38 are held in spaced relation by a cross bar 43 which has threaded ends 44 and 45 that extend through the bars 37 and 38, respectively, and the threaded

ends are held by nuts 46 and 47. A threaded end 48 of a connecting rod 49 is held in the cross bar 43 by a nut 50 and the opposite end of the rod 49 is adjustably mounted in a slot 51 of an eccentric having a cam surface 52 and the eccentric is mounted on a shaft 53 that extends from a gear reduction unit 54. The end of the connecting rod 49 is mounted in the slot of the eccentric by a pin 55 having a head 56 on the inner end, as shown in Figure 4.

A nose 57 is provided on one end of the eccentric having the cam surface 52 and an arm 58 is positioned to be engaged by the cam surface wherein with the arm 58 pivotally mounted on a pin 59 in a bracket 60, a projection 61 on the opposite end of the arm will move upward as indicated by the arrow 62 as the cam engages the arm 58. An adjusting screw 63 is provided in the projection 61 and the screw is positioned to engage a link 64 pivotally mounted at one end on the pin 59, and pivotally connected, at the opposite end to the lower end of the strut 36, by a pin 65. By this means the eccentric 52, turning about the shaft 53 engages the arm 58 and raises the link 64 which moves the strut 36 upward, and the upward movement of the strut elevates the arms 24 and 25 and the grinding wheel 10, whereby with this movement properly timed the grinding wheel will be moved upward at the end of the stroke to clear the blades of the sickle bar.

As the grinding wheel moves upward at the end of the stroke the eccentric 52 continues to move and in the return stroke the carriage 12 is moved forward one step wherein the grinding wheel is positioned between the next pair of blades, and then the forward movement of the wheel is repeated. The forward movement of the carriage is accomplished by a dog 66 pivotally mounted on the lower end of a crank 67 by a pin 68, as shown in Figure 6, and the crank is pivotally mounted on a pin 69 in a bearing 70 with the opposite end of the crank connected to a link 71 by a pin 72. The link 71 is carried by the end of a lever 73 which is pivotally mounted on a pin 74 that connects the lower end of the bar 38 with the end 40 of the bracket 41, and the lever 73 is formed with a vertically disposed leg 75 at the upper end of which is a projection 76 in which is a set screw 77 that is positioned to be engaged by the bar 38 as it is moved backward by the eccentric. With the parts arranged in this manner the bar 38 will strike the screw 77 moving the leg 75 back and elevating the forward end of the lever 73 which will raise the end of the crank 67 and push the dog against the rack 78, and as the rack is stationary on the frame 13 the carriage will move ahead.

The speed reduction gear unit 54 is mounted on the carriage by a post 80 and at one end of the unit is a pulley 81 on a shaft 82 and the pulley is driven from a pulley 83 on a jack shaft 84 by a belt 85. The jack shaft 84 is also provided with a pulley 86 by which it is driven from a pulley 87 on the motor shaft 32 by a belt 88. It will be understood that although V-belts are shown in the drawings, belts of any other type may be used and also that any other means may be used for driving the parts from the motor.

The frame 13 is formed with vertically disposed members 89 and 90 at the ends and members 91 between the ends, and the opposite ends of horizontal members 92 are supported by posts 93. Rails 94 and 95 are provided on the horizontal members 92 and rollers 96 are positioned

on the under side of the carriage 12 through which the carriage is mounted on the rails.

The upper ends of the vertically disposed members 89 and 90 carry an angle 97 with a plate 98 on the upper surface thereof upon which a sickle bar 14 may be held by clamps 99 with the blades 15 resting on a ledge 100 at the outer edge of the plate. The clamps 99 are formed with handles 101 and downwardly extending rods 102 the lower ends of which are slidably held in an angle 103, and the clamps are held downward by springs 104 which bear against set collars 105, as shown.

The motor 11 is mounted on the upper surface of the carriage 12 and the jack shaft 84 is mounted in a bearing stand 106 on a bracket 107 extending upward from the carriage.

With the parts arranged in this manner a sickle or cutter bar with the blades or sections thereon is clamped on the upper plate 98 and with the grinding wheel 10 positioned at one end the motor is started and as the eccentric starts to turn the grinding wheel enters the space between a pair of blades grinding the sharp cutting edges thereof, and as the wheel reaches the end of the stroke it is raised, as hereinbefore described, and the carriage is moved ahead to position the wheel between the next pair of blades. This cycle of movements is continued until the last pair of blades are sharpened, although it will be necessary to sharpen the outer edges of the end blades by hand.

It will be understood that modifications may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. A sickle bar blade grinding machine comprising a frame, means mounting a sickle bar with blades thereon on the frame, a carriage mounted to travel on the frame in a direction parallel to the sickle bar, a V-shape grinding wheel carried by the carriage, means reciprocating the grinding wheel toward and away from the sickle bar to grind the cutting edges of a pair of blades, means elevating the grinding wheel at the end of each grinding stroke, and means moving the carriage to shift the grinding wheel from one pair of blades to another pair of blades.

2. In an automatic grinding machine for sickle bars and the like, a frame having a horizontally disposed work holding plate and a track thereon with the track positioned parallel to the plate, a carriage having wheels positioned to travel on the track, a grinding wheel pivotally mounted on the carriage, means rotating the grinding wheel, actuating means feeding the grinding wheel along cutting edges of blades of the sickle bar, and means synchronized with the feeding means of the grinding wheel for intermittently moving the carriage.

3. In an automatic grinding machine for sickle bars and the like, a frame having a horizontally disposed work holding plate and a track thereon with the track positioned parallel to the plate, a carriage having wheels mounted on the track, a grinding wheel rotatably mounted in the ends of arms rockably mounted on the carriage, an eccentric for actuating the arms and wheel with a reciprocating motion, means elevating the grinding wheel at the end of the stroke, means rotating the grinding wheel, and means moving the carriage on the track.

4. An automatic grinder for blades of sickle bars of mowers and the like comprising a frame

having a work holding plate and a track thereon with the track parallel to the plate, means clamping a sickle bar on the work holding plate, a carriage mounted on wheels positioned to travel on the track, a rack on the frame, a dog, means pivotally mounting the dog on the carriage with the dog positioned to engage the rack to move the carriage, a V-shaped grinding wheel, horizontally disposed arms in the ends of which the grinding wheel is rotatably mounted, vertically disposed bars pivotally mounted on the carriage with the arms in which the grinding wheel is mounted pivotally mounted in the upper ends thereof, an eccentric for actuating the vertically disposed bars and grinding wheel with a reciprocating movement, a cam on the eccentric for raising the grinding wheel at the end of the grinding stroke, and a lever positioned to be actuated by the vertically disposed bars for operating the dog to move the carriage.

5. In an automatic grinder, the combination, which comprises, a frame having a work holding plate longitudinally positioned thereon, clamping means on the plate, a track positioned parallel to the plate also mounted on the frame, a carriage having wheels mounted to travel on the track, vertically disposed bars pivotally mounted

on the carriage, horizontally disposed arms carried by the upper ends of the bars, a V-shaped grinding wheel, means rotatably mounting the grinding wheel between the ends of the arms, driving means for the grinding wheel mounted on the carriage, an eccentric mounted on the carriage and connected to the vertically disposed bars for reciprocating the bars and grinding wheel, a cam on the eccentric, means elevating the grinding wheel by the cam at the end of the grinding stroke, and means moving the carriage a predetermined distance at the end of the grinding stroke.

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