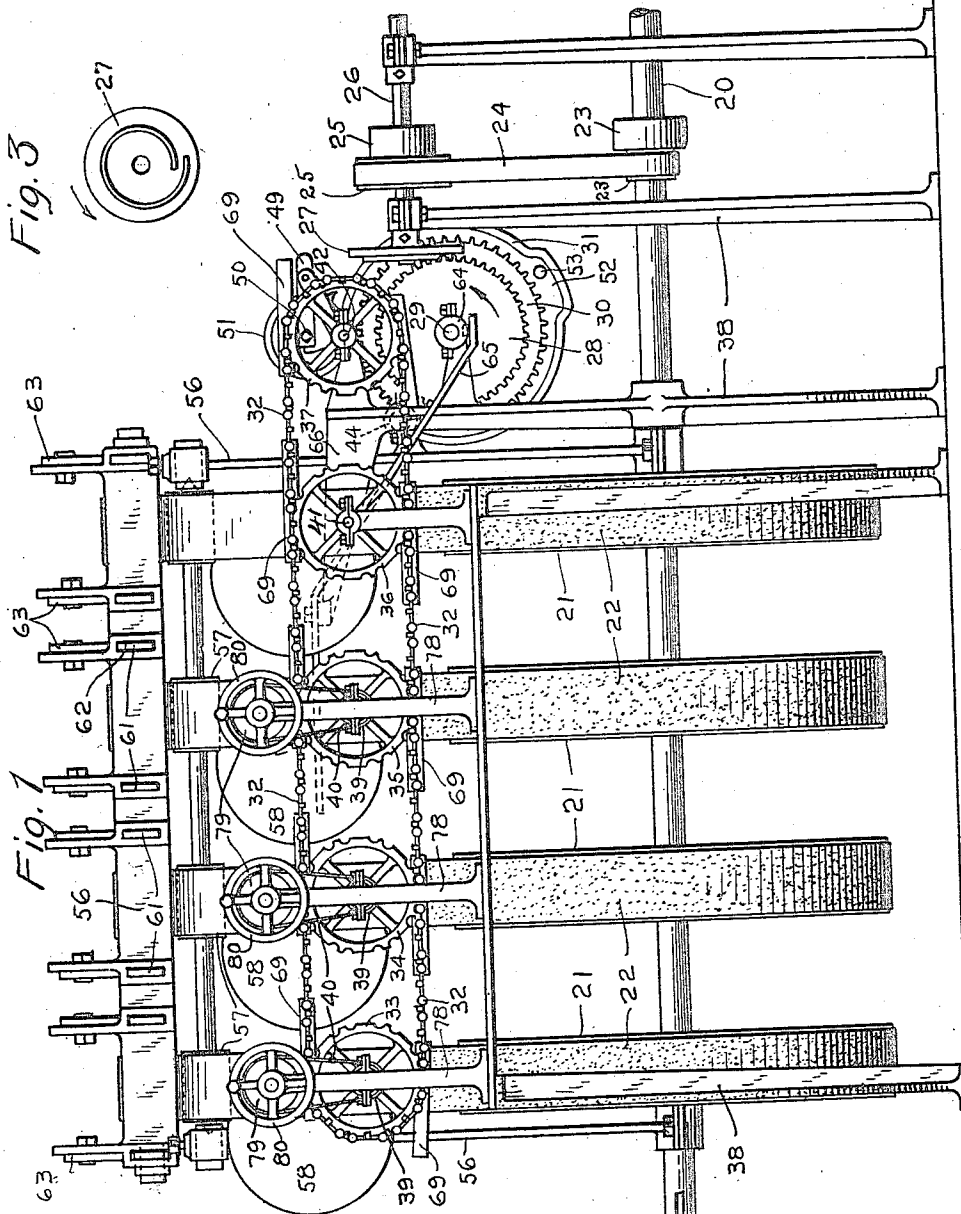


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GRINDING AND POLISHING MACHINE.
APPLICATION FILED JAN. 15, 1912.

Patented Dec. 3, 1912.

3 SHEETS-SHEET 1.

1,045,945.



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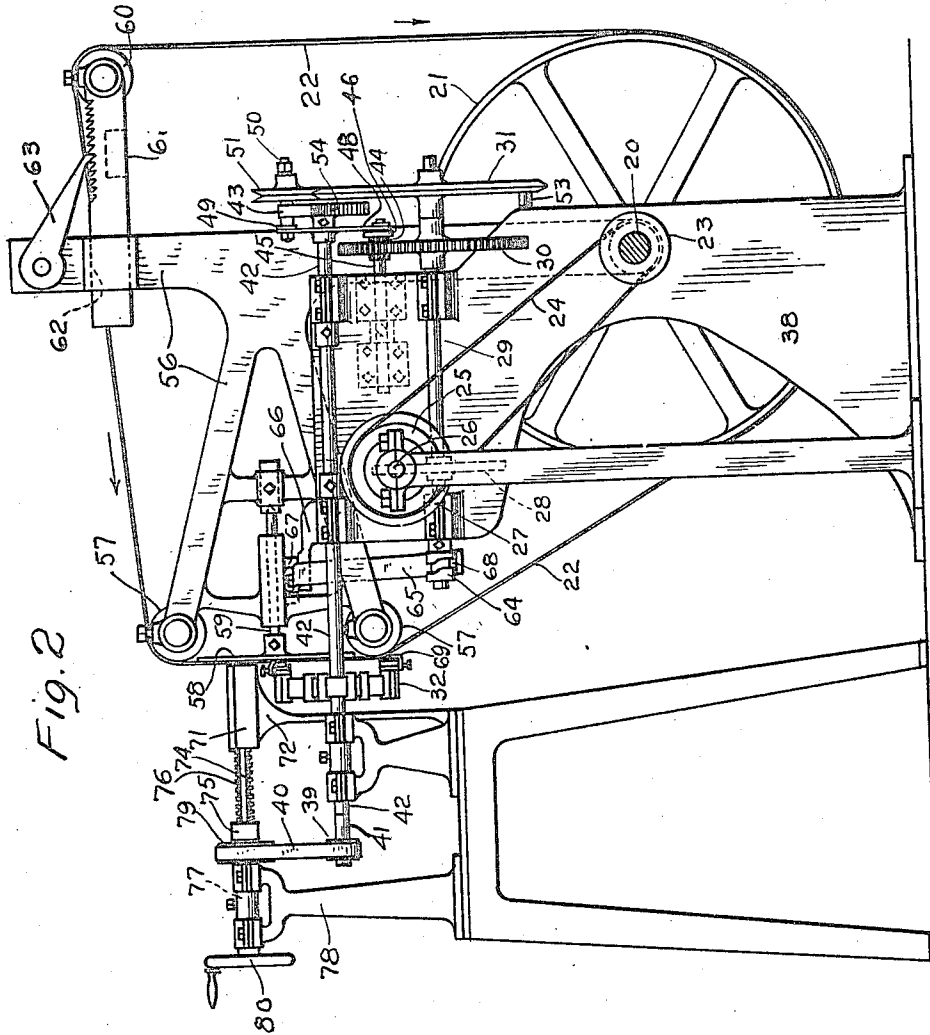


Fig. 2

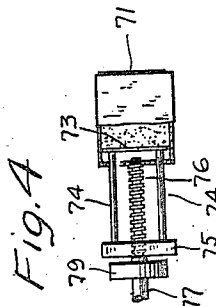


Fig. 4

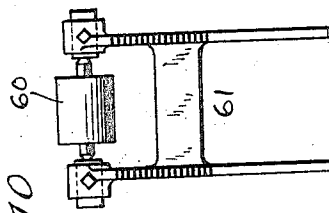


Fig. 10

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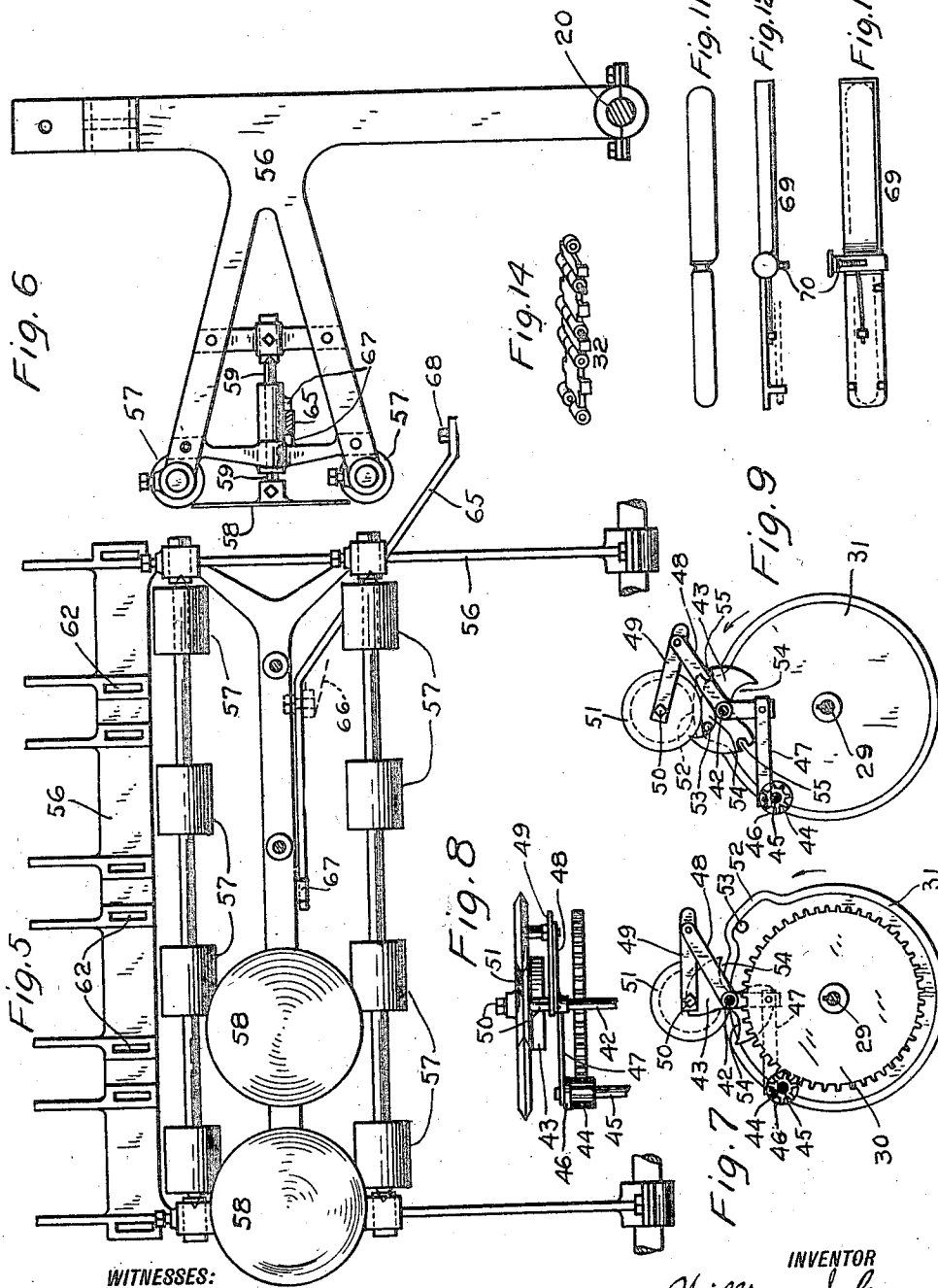
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3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

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GRINDING AND POLISHING MACHINE.

1,045,945.

Specification of Letters Patent.

Patented Dec. 3, 1912.

Application filed January 15, 1912. Serial No. 671,282.

To all whom it may concern:

Be it known that I, WILLIAM J. CARNEY, a citizen of the United States, residing at Norwich, county of New London, State of Connecticut, have invented an Improvement in Grinding and Polishing Machines, of which the following is a specification.

This invention has for its object to provide a simple and inexpensive machine for grinding, polishing and finishing a plurality of small articles simultaneously.

With this and other objects in view the invention consists in certain constructions and in certain parts, improvements and combinations which will be hereinafter described and then specifically pointed out in the claims hereunto appended.

In the accompanying drawings forming a part of this specification, I have illustrated the invention as applied to the grinding, polishing and finishing of knife blades, although it should be understood that the invention is not limited to any special application but is adapted for general use.

Figure 1 is a front elevation of the machine complete; Fig. 2 an end view as seen from the right in Fig. 1; Fig. 3 a view of the scroll gear detached; Fig. 4 a plan view of an emery box detached, the cover being partly broken away; Fig. 5 an elevation of the swinging frame detached; Fig. 6 an end elevation as seen from the right in Fig. 5; Fig. 7 an elevation of the carrying chain operating mechanism, detached; Fig. 8 a plan view corresponding with Fig. 7; Fig. 9 an elevation corresponding with Fig. 7, the gear being removed, showing a changed position of the parts; Fig. 10 a plan view of one of the adjustable belt pulley slides, detached; Fig. 11 an illustration of a knife as an article to be operated upon by the machine; Figs. 12 and 13 are respectively a plan view and elevation of a knife holder, detached; and Fig. 14 is a detail perspective of the carrying chain, detached.

20 denotes the main shaft of the machine to which power is applied in any suitable manner. This shaft carries pulleys 21 over which the grinding and polishing belts 22 pass and a pulley 23 over which a belt 24 passes. Belt 24 also passes over a pulley 25 on a shaft 26 carrying a scroll gear 27 and imparts rotary movement thereto. The scroll gear meshes with a gear wheel 28 on a shaft 29 and imparts rotary movement to

said shaft and a grooved cam 64, a gear wheel 20 and a cam wheel 31 carried thereby.

32 denotes the carrying chain which is itself carried by sprocket wheels 33, 34, 35, 36 and 37. Sprocket wheels 33, 34, 35 and 36 are idlers and sprocket wheels 33, 34 and 35 carry on their shafts (which are indicated by 41 and are suitably journaled in the framework of the machine, indicated as a whole by 38) belt pulleys 39 over which belts 40 pass, the function of which will presently be described. Sprocket wheel 37 (the driving sprocket wheel) is carried by a shaft 42 which also carries a two-winged cam 43.

44 denotes a pinion, on a shaft 45, which meshes with gear wheel 30 and carries a crank disk 46.

47 denotes a link pivoted to the crank disk and to a bell crank lever 48 which is mounted to oscillate on shaft 42. An arm 49 pivoted to the bell crank lever carries a stud 50 on which a wheel 51 is journaled, which contacts with the cam wheel. The cam wheel is provided with a boss or cam 52 and the boss or cam is provided on one side with a pin 53. The cam wheel and cam are provided with a beveled edge and wheel 51 is grooved to correspond therewith, whereby it is retained against lateral displacement. Two-winged cam 43 is provided on opposite sides with curved recesses 54 and each wing of the cam has a curved periphery and is provided with a notch 55 which is adapted to receive stud 50.

It will be understood that shaft 42 carrying sprocket wheel 37 receives intermittent rotary movement from the two winged cam and bell crank lever and cooperating parts and imparts intermittent forward movement to the carrying chain. The articles to be ground and polished are carried by the chain and are subjected successively to the operation of the grinding and polishing belts, four in number in the present instance, which run from relatively coarse to relatively fine. The first belt to whose action the articles are subjected (the belt toward the right as seen in Fig. 1) is relatively coarse and performs a grinding operation, while the last belt is relatively fine and imparts a final finish to the articles.

An important feature of the invention is that while the articles are being subjected to the action of the belts, that is between

the forward movements, the carrying chain and the articles thereon have imparted to them a backward and forward reciprocation transversely of the belts. During this 5 reciprocatory movement the parts are in substantially the position shown in Fig. 7 and the two-winged cam, through the engagement therewith of stud 50, is oscillated by means of the crank disk, link, bell crank 10 lever and arm and imparts oscillation to sprocket wheel 37 and reciprocation to the carrying chain and carriers thereon. Cam wheel 31 is continuously rotating, however, and when the parts reach substantially the 15 position shown in Fig. 9, wheel 51 will be raised by boss or cam 52, stud 50 will be lifted out of the notch 55 with which it has been engaged, thus releasing the two-winged cam, and pin 53 on the boss or cam will 20 pass into one of the recesses in the two-winged cam and will impart a half rotation, as indicated in Fig. 9, to shaft 42 and sprocket wheel 37, which will move the carrying chain forward carrying the articles 25 thereon from the belt which has been operating upon them to the next belt. An instant later stud 50 will drop into the other notch 55 in the two-winged cam, the parts will be again in the position shown in Fig. 7 and 30 the backward and forward reciprocation of the carrying chain and articles thereon transversely to the belts that are acting upon them will again commence.

The grinding and polishing belts are carried by a swinging frame 56 which is 35 mounted upon shaft 20. This frame carries a pair of rollers 57 for each grinding and polishing belt and between each pair of rollers a disk 58 which acts as a backing for the corresponding belt and holds it flat 40 against the article upon the carrying chain that is being operated upon and prevents rounding of the edges. The disks are carried at the ends of shafts 59 which are 45 mounted to rotate freely in the swinging frame. It will be noted (see Fig. 1) that the contact of the belts with the disks is entirely at one side of the center of the disks so that the disks will be rotated by the belts 50 and friction reduced to the minimum. As a means of tightening the grinding and polishing belts independently, they are passed over rollers 60 on slides 61. These slides move freely in sockets 62 in the swing- 55 ing frame and are provided with rack teeth which are engaged by pawls 63 to retain the slides and rollers in position after adjustment.

Just before each forward movement of 60 the carrying chain, frame 56 is swung backward slightly to relieve the pressure of the grinding and polishing belts upon the articles. This movement of the swinging frame is effected by means of a lever 65 which is fulcrumed on an arm 66 project-

ing from the framework, the forward end of said lever lying between two lugs 67 on the swinging frame. The other end of the lever is provided with a pin or roller 68 which engages the groove in cam 64. 70

The means for attaching the articles to be operated upon, for example—knives, to the carrying chain forms specifically no portion of the present invention. It is sufficient for the purposes of this specification 75 to state that suitable carriers, indicated by 69, are provided which are adapted to receive and hold firmly the articles to be operated upon and are provided with clips 80 70 which while they retain the articles securely in place permit them to be removed and a new one placed therein in an instant's time and without stopping the machine. It will be noted that the grinding and polishing operations take place while the carriers 85 are on the upper side of the belt and that after the operation of the last belt (the one toward the left in Fig. 1) the carriers pass downward over sprocket wheel 33 and back again under the sprocket wheels to the other 90 end of the machine, where each finished article is removed from the carrier and another placed therein before the carrier passes to position for the article therein to be operated on by the grinding belt. 95

The successive operations upon the article by the grinding and polishing belts from right to left may be called respectively grinding, whitening, glazing and finishing. 100 In order that the operations may be performed continuously, I provide boxes 71 for automatically dressing the whitening, glazing and finishing belts by means of emery or other abrading material in cakes adapted to the special purpose. These boxes are 105 mounted upon brackets 72 upon the framework. The forward ends of these boxes lie contiguous to the belts and the emery or other cake is forced forward by means of a pusher 73 carried by rods 74 which pass 110 through the rear end of the box and are connected at their outer ends by a cross piece 75 which is engaged by a screw 76. The forward end of the screw is journaled in the rear end of the box, rotary movement of 115 the screw acting to move the cross piece, rods and pusher forward and thus keep the belts continually dressed by means of the emery or other material. The screw is formed upon a shaft 77 journaled in bearings upon a bracket 78, carries a pulley 79 120 over which belt 40 passes and is provided at its outer end with a hand wheel 80 which may be used at any time to retract the pusher or to force it forward more rapidly 125 than it would be carried by the belt.

Having thus described my invention I claim:

1. In a machine of the character described, the combination with a carrying 130

chain, of means for imparting intermittent forward movement to said chain and means for imparting reciprocatory movement thereto between the forward movements.

5 2. In a machine of the character described, the combination with a carrying chain and sprocket wheels over which it passes, of means for imparting intermittent forward movement to one of said sprocket
10 wheels and means for imparting oscillatory movement thereto between the forward movements.

3. In a machine of the character described, the combination with a carrying
15 chain, a driving sprocket wheel therefor, a two-winged cam and a shaft by which said sprocket wheel and cam are carried, of a bell crank lever mounted loosely on said shaft, means for oscillating said lever, an
20 arm pivoted to said lever, a stud carried by said arm and adapted to engage either wing of the cam and a cam wheel adapted to raise the stud out of engagement with the two-winged cam and having a pin adapted to
25 engage said cam and impart a half rotation thereto when said cam is disengaged from the stud.

4. In a machine of the character described, the combination with a carrying
30 chain and a driving sprocket wheel therefor, of a two-winged cam from which the sprocket wheel receives movement and means for imparting alternate half-rotations and oscillatory movement to said cam.

5. In a machine of the character described, the combination with a carrying chain and a driving sprocket wheel therefor, of a two-winged cam from which the
35 sprocket wheel receives movement, a cam wheel carrying a pin adapted to engage the two-winged cam to impart half rotations thereto, and means for imparting oscillatory movement to said cam between the half rotations.

6. In a machine of the character described, the combination with a carrying
45 chain, a driving sprocket wheel therefor, a two-winged cam and a shaft by which said sprocket wheel and cam are carried, of a cam wheel by which half rotations are imparted to said cam, shaft and sprocket wheel, a bell crank lever mounted to oscillate on said shaft, an arm pivoted to said lever and carrying a stud adapted to engage
50 the cam, for the purpose set forth, and a wheel which is engaged by the cam wheel to disengage the stud from the cam.

7. In a machine of the character described, the combination with a carrying
60 chain, of grinding and polishing belts and rotatable backing disks over which the belts pass, the contact of the belts with the disk being wholly at one side of the center so that the disks will be rotated by the belts.

8. In a machine of the character de-

scribed, the combination with a carrying chain, grinding and polishing belts and rotatable backing disks over which the belts pass at one side of the center, of a swinging frame by which said belts and disks are carried and means for automatically swinging
70 said frame to move the belts into and out of operative position with relation to the carrying chain.

9. In a machine of the character described, the combination with a carrying chain, grinding and polishing belts and rotatable backing disks over which the belts pass at one side of the center, of a swinging frame by which said belts and disks are carried, lugs on said frame, a lever engaging
80 the lugs and means for operating said lever to swing the frame, for the purpose set forth.

10. In a machine of the character described, the combination with a carrying chain, grinding and polishing belts and rotatable backing disks over which the belts pass at one side of the center, of a swinging frame by which said belts and disks are carried, and means carried by said frame for
90 regulating the tension of the belts.

11. In a machine of the character described, the combination with a grinding and polishing belt, dressing material for the belt
95 in a cake and a box to receive said cake, of a pusher in said box to move the cake forward, a screw engaging the pusher, an intermittently moving carrying chain and means acted upon by said chain to rotate
100 said screw, substantially as described, for the purpose specified.

12. In a machine of the character described, the combination with a carrying chain, a shaft 42 by which said chain is driven, a shaft 29, a gear wheel 30 on said shaft, a pinion meshing with the gear wheel and carrying a crank disk, a bell crank lever mounted to oscillate on shaft 42 and a link connecting the crank disk and the bell crank lever, of a cam wheel on shaft 29 carrying a pin, a two-winged cam on shaft 42 which receives half rotations from said pin, an arm pivoted to the bell crank lever and carrying a stud adapted to engage the two-winged cam and impart oscillation thereto and a wheel carried by said stud which is raised by the cam wheel to disengage the stud from the two-winged cam when the latter is engaged by the pin on the cam wheel.
110 120

13. In a machine of the character described, the combination with a carrying chain, a shaft 42 by which said chain is driven, a shaft 29 and a gear wheel 28 on said shaft, of a scroll gear meshing with said gear wheel, a two-winged cam on shaft 42, means actuated from shaft 29 for imparting half rotations to said cam and means actuated from said shaft for oscillating said cam between the half rotations.
125 130

14. In a machine of the character described, the combination with a carrying chain, grinding and polishing belts, a frame by which said belts are carried and means for swinging said frame to move the belt into and out of operative position with relation to the chain, of means for imparting intermittent forward movement to the chain and means for reciprocating said chain between the forward movements.

15. In a machine of the character described, the combination with a carrying chain, grinding and polishing belts and means for dressing said belts while in operation, of means for imparting intermittent forward movement to the chain and means for reciprocating said chain between the forward movements.

16. In a machine of the character described, the combination with a carrying chain, grinding and polishing belts and backing disks for said belts, of a frame by which said belts and disks are carried and means for swinging said frame, for the purpose set forth.

17. In a machine of the character described, the combination with a carrying chain, means for imparting intermittent forward movement thereto and means for reciprocating said chain between the forward movements, of grinding and polishing belts, backing disks for said belts and means for moving said belts into and out of operative position with relation to the carrying chain.

18. In a machine of the character described, the combination with a carrying chain, means for imparting intermittent forward movement thereto and means for reciprocating said chain between the forward movements, of grinding and polishing belts, backing disks for said belts, a swinging frame by which said belts and disks are carried and means on said frame for regulating the tension of the belts independently.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. CARNEY.

Witnesses:

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FRANK N. GARDNER.