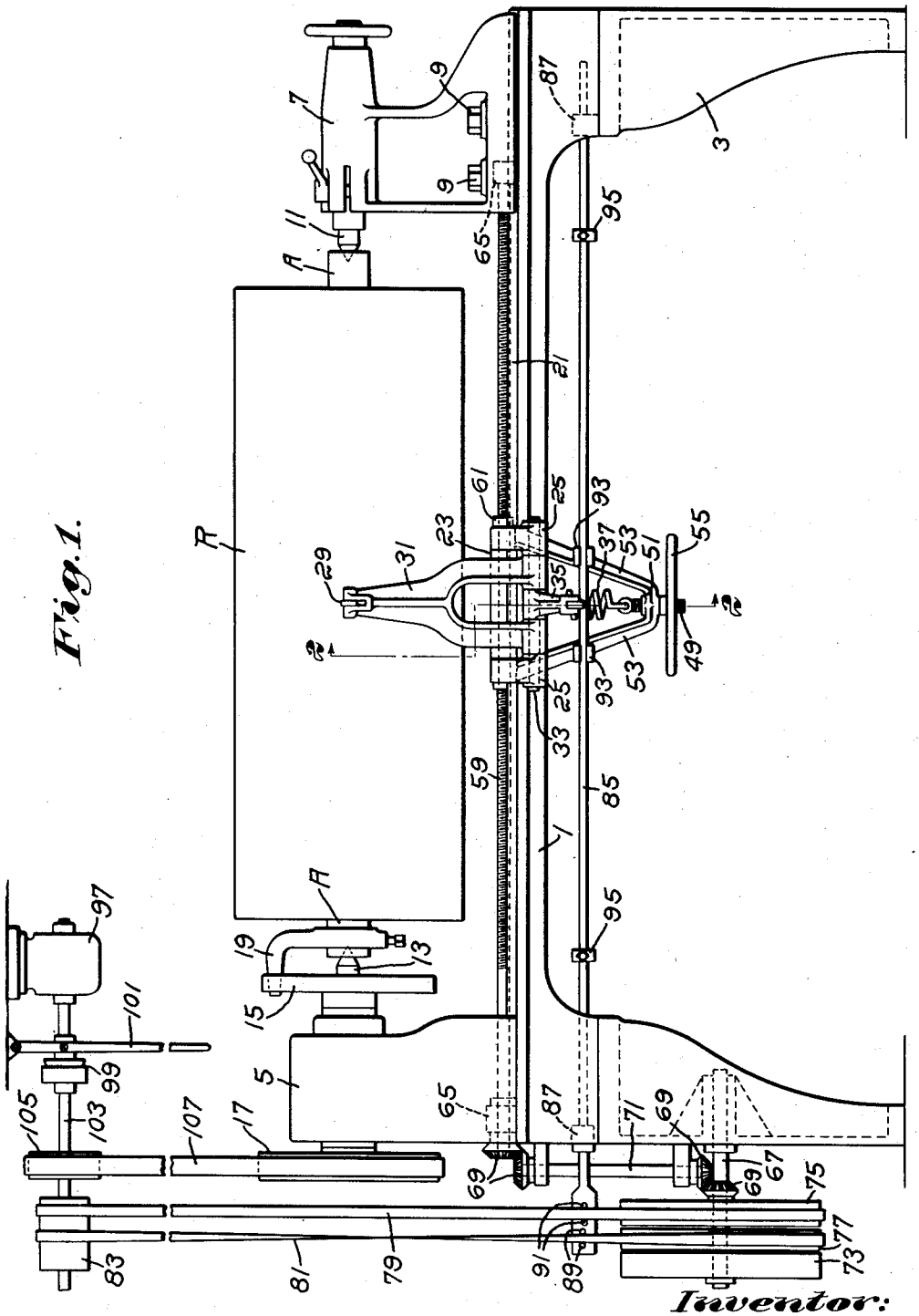
July 18, 1933. R. A. WILKINS 1,919,152

BURNISHING MACHINE

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Fig. 1.



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Fig. 3.

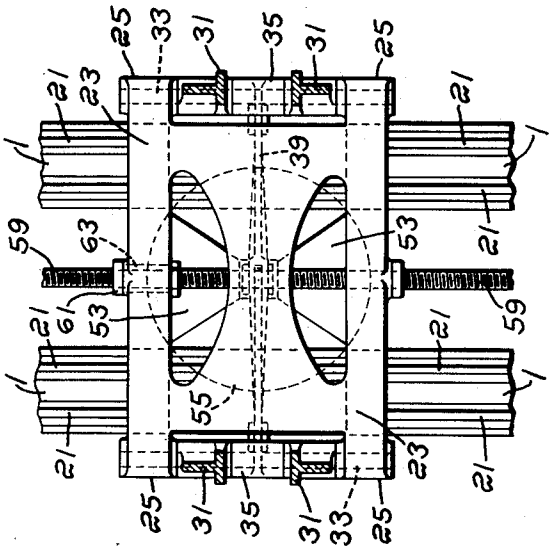
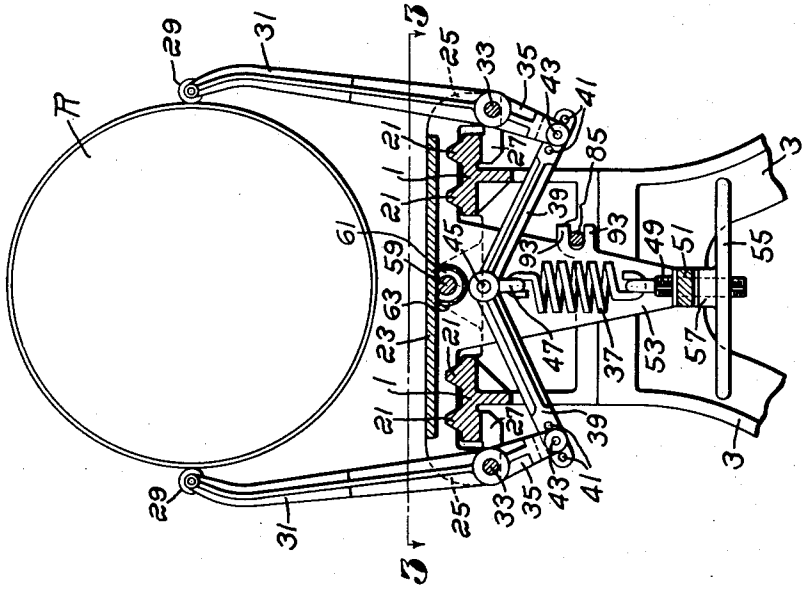


Fig. 2.



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UNITED STATES PATENT OFFICE

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BURNISHING MACHINE

Application filed December 31, 1929. Serial No. 417,700.

My invention relates to burnishing machines, particularly but not exclusively to one for burnishing rolls of material such as electro-deposited copper.

The invention will be best understood from the following description when read in the light of the accompanying drawings of a specific embodiment of the invention, which latter will be more particularly pointed out in the appended claims.

In the drawings:—

Fig. 1 is an elevation of the machine constructed according to the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1; and

Fig. 3 is a section on the line 3—3 of Fig. 2.

Referring to the drawings, I have shown a machine having a frame which comprises a pair of spaced longitudinally arranged guide bars 1 supported at opposite ends by legs 3. As illustrated, the frame at one end carries a head stock 5, while slidably mounted on the guide bars is a tail stock 7, the latter adapted to be clamped at adjusted positions longitudinally of the guide bars by clamping mechanism operated by the bolts 9 in a manner commonly employed in the machine tool art. The roll R to be burnished, as shown, is provided with an arbor A, which is mounted for rotation on the centers 11 and 13 respectively carried by the tail stock and head stock. The head stock as shown carries a face plate 15 rotated by means of a pulley 17, a dog 19 being provided for operatively connecting the arbor A of the roll R to the face plate, so that when the pulley is driven the roll will be rotated.

As illustrated, the guide bars 1 are each provided with a pair of V-shaped rails 21, upon which is reciprocably mounted a carriage 23 for the burnishing tools, the carriage having at its corners lugs 25 which extend downwardly at the sides of the guide bars, the lower ends of which lugs are formed with inwardly extending portions 27 in sliding contact with the under side of the guide bars, so as to prevent vertical movement of the carriage relative to said guide bars.

As illustrated, the burnishing tools are in the form of thin hardened steel disks 29 rotatably supported on the ends of arms 31, said arms at their lower ends being secured (as by keys, not shown) in non-rotatable relation to fulcrum pins 33, the latter rotatably mounted in the lugs 25 of the carriage at the lower ends of said lugs. As shown, the fulcrum pins 33 also carry short downwardly extending arms 35 likewise secured in non-rotatable relation thereto, which arms with the arms 31 form levers fulcrum at intermediate portions of their lengths by the fulcrum pins 33.

Herein, a spring 37 provides a common force exerting means for pressing the burnishing tools against the roll R. As shown, the lower ends of the arms 35 are connected by toggle links 39, the latter at their outer ends being provided with perforations 41 adapted to receive pins 43 for connecting them to said arms. At their inner ends the toggle links are connected by a pin 45 which carries a shackle 47, to which latter the upper end of the spring 37 is secured.

Herein, the lower end of the spring 37 is connected to an eye-bolt 49 which extends through the perforated head 51 of a bracket member 53 carried at the under side of the carriage 23. Beneath the head 51 is a handwheel 55, the boss 57 of which is screw-threaded on the bolt, the latter being preferably keyed to the head 51 to prevent it from turning relative to said head. By rotating the handwheel the eye-bolt 49 will be drawn downward, and the spring 37 will be tensioned more or less to press the burnishing tools against the roll.

Commonly the burnishing tools should exert on the roll pressure in the order of 80,000 pounds per square inch, which pressure may be obtained by use of the toggle mechanism and a stout spring 37, under which conditions the handwheel 55 preferably is of large diameter to secure the requisite leverage for tightening the spring.

It will be observed, that by use of a plurality of burnishing tools, a resultant force of zero transverse to the roll may be obtained. For example, in the present embodiment of the invention the burnishing tools are at opposite diametrical sides of the roll and

press with equal and opposite pressures against the sides of the roll. This construction avoids the difficulty heretofore experienced in prior devices occasioned by a severe side thrust on the roll.

For reciprocating the burnishing tools longitudinally of the roll, the present embodiment of the invention is provided with a long screw 59 on which is threaded a nut 61 secured to a boss 63 on the under side of the carriage. By rotating the screw the carriage will be caused to travel on the guide bars to move the burnishing tools to one end of the roll, and then by reversing the direction of rotation of the screw the carriage will be moved in the opposite direction to move the burnishing tools to the other end of the roll.

As shown, the screw 59 is mounted in bearings 65 carried by the frame, and is driven by the shaft 67 by means of the cooperating bevel gears 69 and lay shaft 71. As shown, the shaft 67 carries a pair of "fixed" pulleys 73, 75, between which is a "loose" pulley 77. Cooperating with the pulleys 73, 75 and 77 is a pair of belts 79, 81, the belt 81 being crossed, and both belts being driven by a common pulley 83. In the position of parts shown by the drawings the belt 79 is acting to drive the shaft 67 and the screw 59, the crossed belt 81 being on the loose pulley 77. By shifting the belts to the left to place the crossed belt 81 on the fixed pulley 73, and the belt 79 on the loose pulley 77, the screw 59 will be rotated in the opposite direction.

Herein, for rendering the machine automatic, a belt shifter rod 85 is provided, said rod being reciprocably mounted in guides 87 on the frame of the machine, and having pairs of belt engaging pins 89, 91 for respectively engaging the belts 81, 79. The belt shifter rod is embraced by lugs 93 carried by the bracket member 53 of the carriage 23. Cooperating with these lugs are stop collars 95 adjustable longitudinally of the belt shifter rod, these collars being set at such distances apart that the belt shifter rod will be actuated when the carriage moves the burnishing tools to the ends of the roll.

As shown, the machine is driven by an electric motor 97 through a clutch 99 operated by a lever 101, the motor being effective to drive the shaft 103, on which latter is mounted the pulley 83 for driving the screw 59. The shaft 103 also carries a pulley 105 which is connected by means of a belt 107 to the pulley 17 for driving the roll R, so that the burnishing tools will be reciprocated and the roll rotated coordinately.

It will be understood that wide deviations may be made from the submitted embodiment of the invention without departing from the spirit of the invention.

I claim:

1. A burnishing machine having, in combination, means for rotatably supporting a member to be burnished, burnishing tools disposed at opposite sides of said member, a lever for carrying each tool, toggle-links connecting said levers, and a force exerting means acting on said toggle-links for pressing said tools against said member.

2. A burnishing machine having, in combination, means for rotating a roll to be burnished, burnishing rollers disposed to act on said roll at diametrically opposite sides thereof, levers carrying said burnishing rollers, a carriage on which said levers are fulcrumed, toggle levers and a cooperating yielding force exerting means carried by said carriage for forcibly urging said levers toward each other whereby said rollers exert equal and opposite pressures on said roll, a support for said carriage comprising guiding means disposed longitudinally of said roll, and power-means for reciprocating said carriage on said guiding means coordinately with the speed of rotation of said roll.

3. A burnishing machine having, in combination, oppositely disposed burnishing tools, a common yieldable force exerting means, and force multiplying mechanism coordinately connecting said burnishing tools to said force exerting means operative to press each tool substantially equally against cylindrical work with a force in excess of that exerted by said force exerting means and providing for movement of each tool independently of the other laterally of the work for operating upon high and low spots thereon.

4. A burnishing machine having, in combination, a plurality of burnishing tools distributed circumferentially relative to cylindrical work, a common yieldable force exerting means, and force multiplying mechanism coordinately connecting said burnishing tools to said force exerting means operative to press each tool substantially equally against cylindrical work with a force in excess of that exerted by said force exerting means and providing for movement of each tool independently of the other laterally of the work for operating upon high and low spots thereon.

5. A burnishing machine having, in combination, a plurality of burnishing tools, holders for said tools mounted for swinging movement about axes parallel to the axis of cylindrical work, and means for pressing said tools against the work comprising a common yieldable force exerting means, and force multiplying means connecting said force exerting means to said holders acting to press each burnishing tool substantially equally against the work and providing for swinging movement of each holder independently of the other.

6. A burnishing machine having, in combination, a plurality of burnishing tools distributed circumferentially relative to circular work, holders for said tools pivoted for

swinging said tools laterally of the work, a common yieldable force exerting means, and force multiplying linkage connecting said holders to said force exerting means for pressing each burnishing tool substantially equally against the work and providing of independent movement of each holder relative to the work.

7. A burnishing machine having, in combination, a pair of burnishing tools, holders for said tools mounted for swinging movement about axes parallel to the axis of cylindrical work, a yieldable force exerting means, and a pair of links normally at a wide angle to each other, said links operatively connected at one of their ends to said force exerting means and severally connected at their opposite ends to the several holders, said force exerting means acting to urge said links toward a line containing the ends of said links connected to said holders.

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