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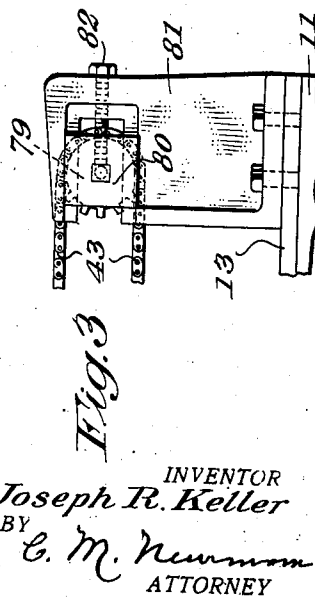
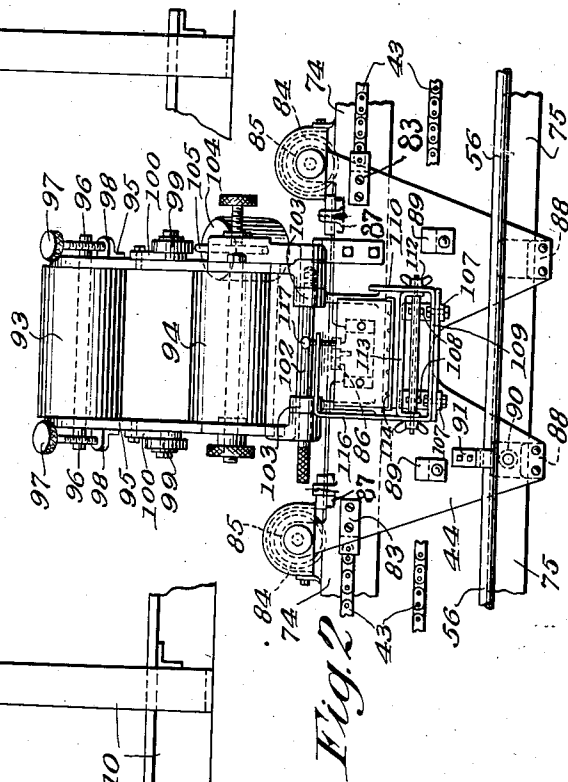
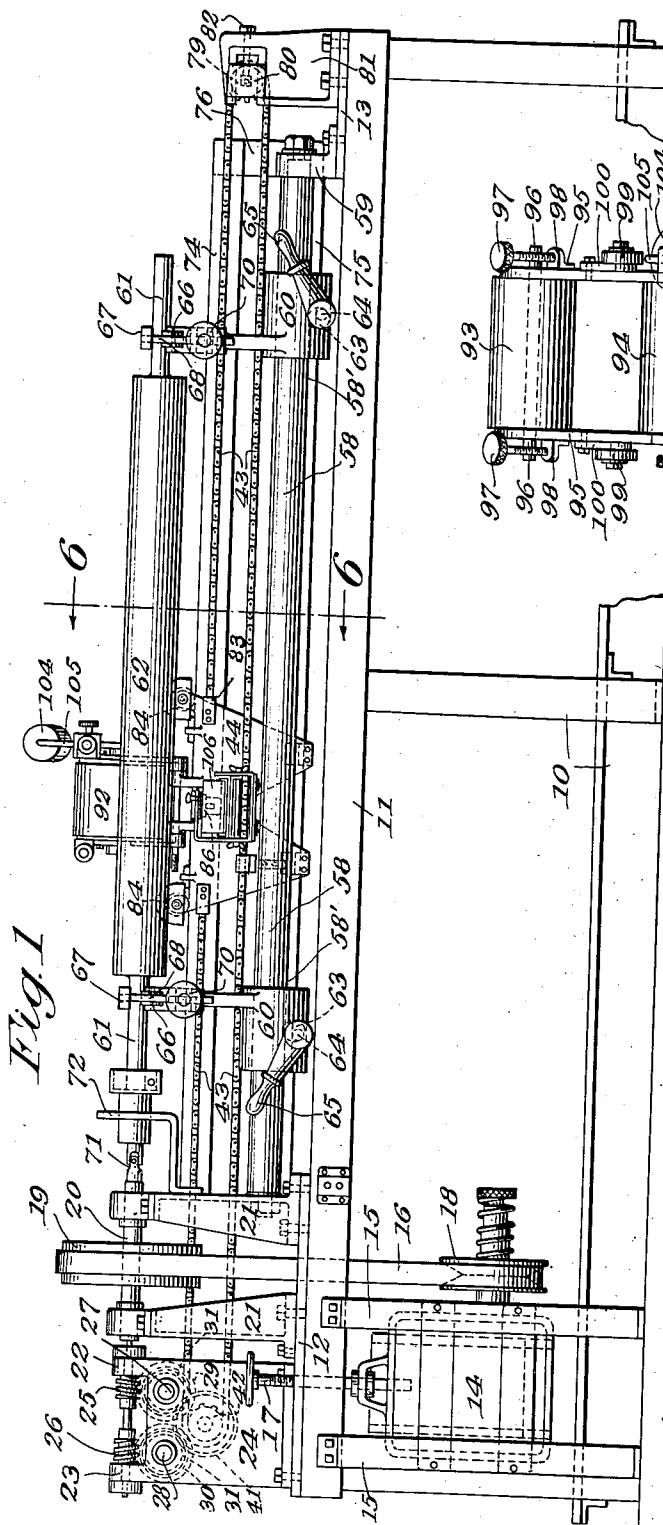
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2,119,862

ROLLER POLISHING MACHINE

Original Filed Nov. 7, 1936

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June 7, 1938.

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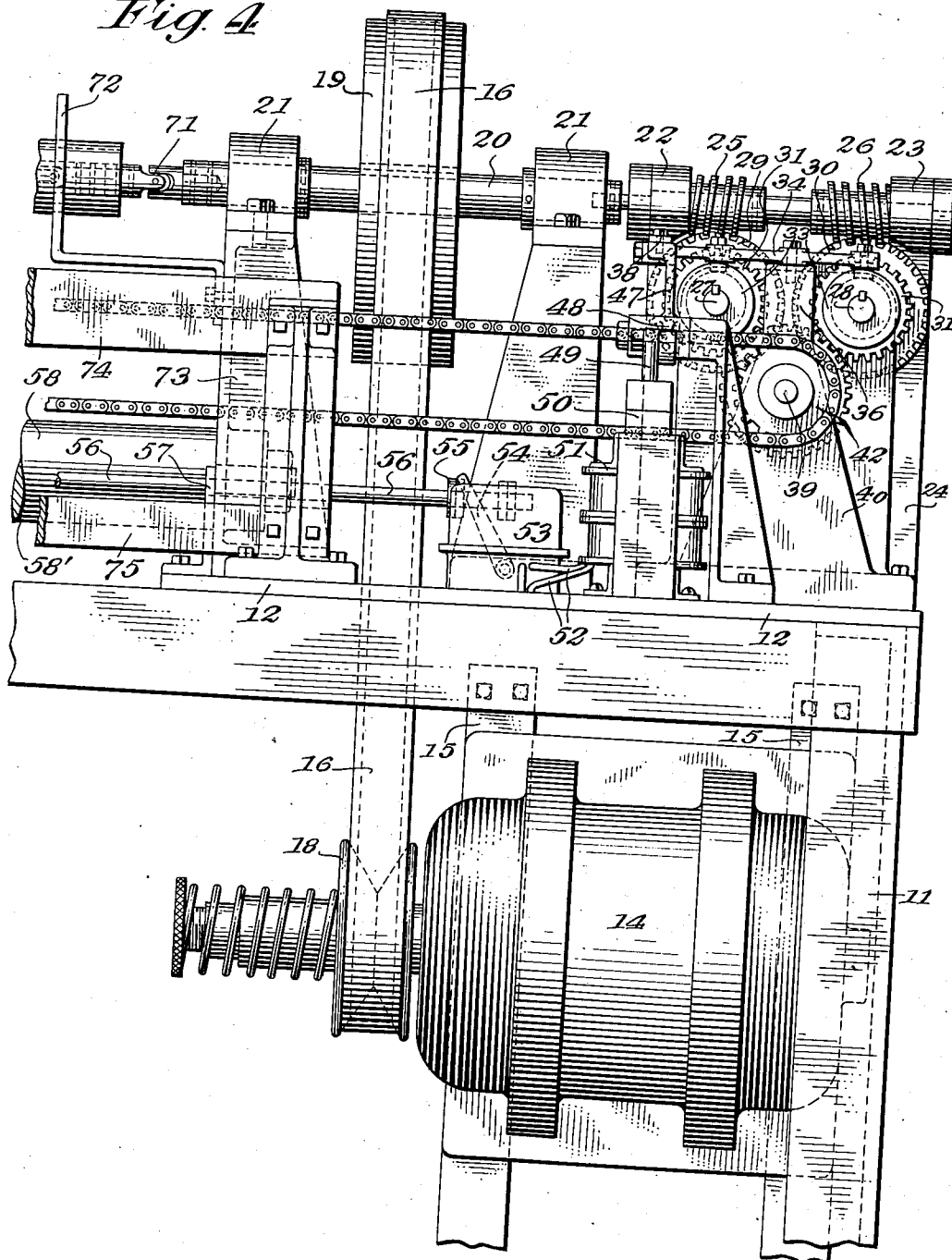
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Fig. 4



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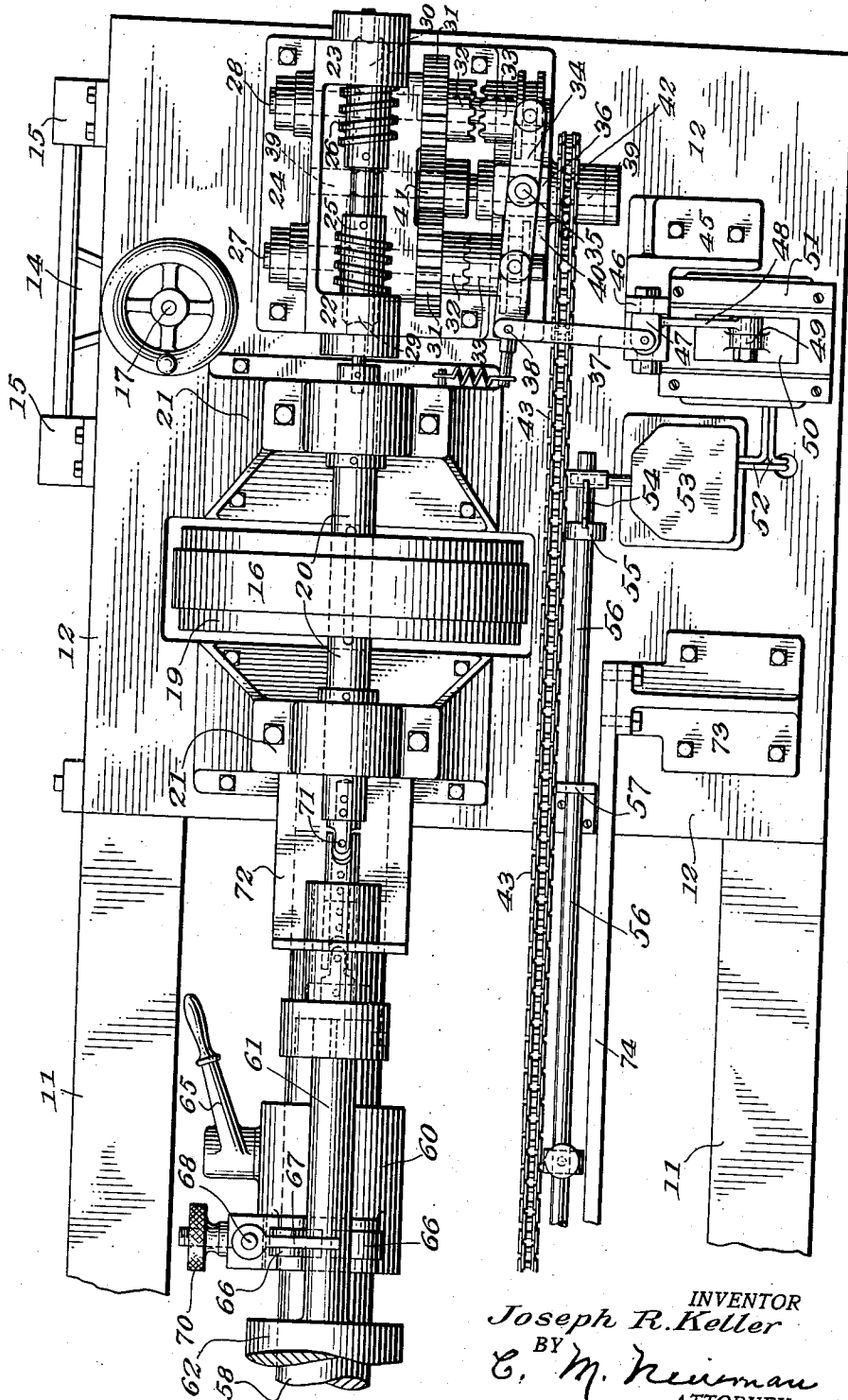
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Fig 5



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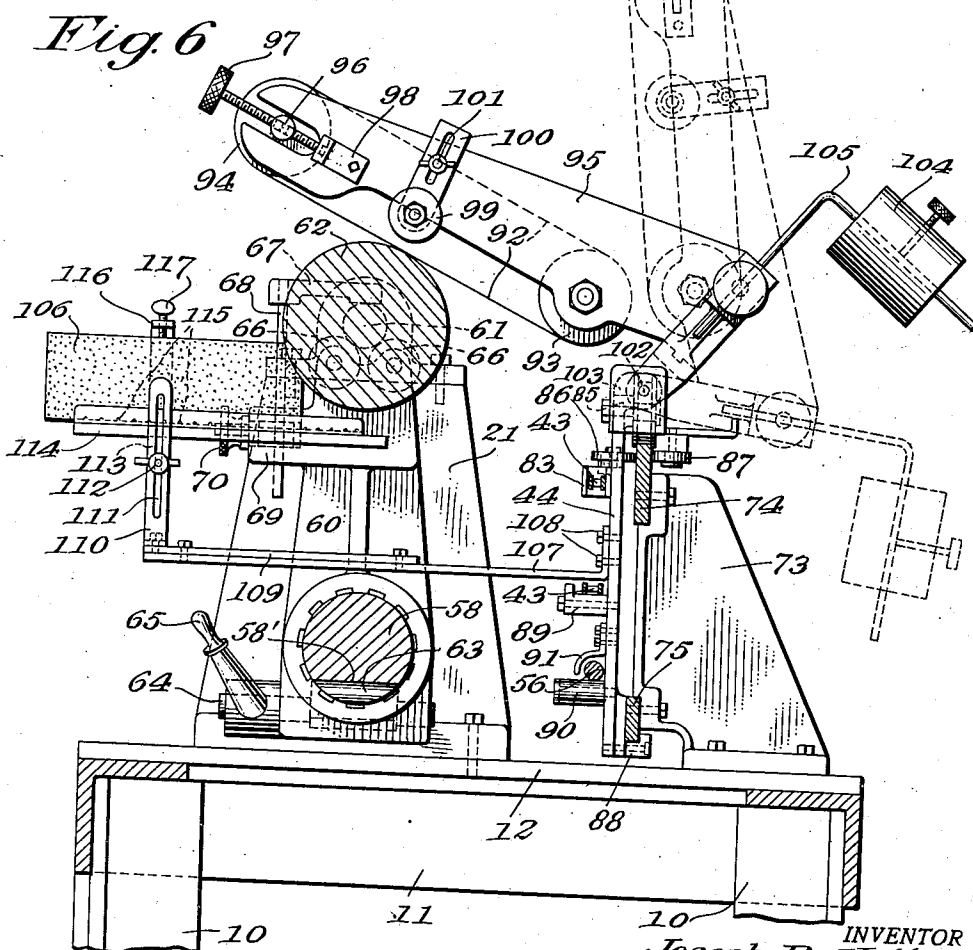
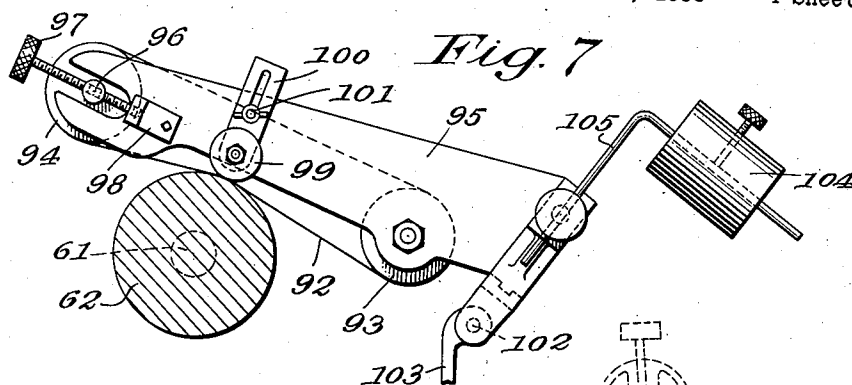
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ROLLER POLISHING MACHINE

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,119,862

ROLLER POLISHING MACHINE

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Refiled for abandoned application Serial No.
109,708, November 7, 1936. This application
November 13, 1937, Serial No. 174,361

7 Claims. (Cl. 51-142)

The subject matter of this application was originally disclosed and claimed in my application Serial No. 109,708 filed November 7, 1936.

My invention relates to roller polishing machines such as are adapted for the polishing of rubber or composition printing press rollers or in fact any form of elongated rollers or cylinders which require to be smoothly and accurately finished or refinished.

The object of the invention is to generally improve upon machines of this character with a view of producing a more productive and more accurately operating machine and which is adapted for a large variety of kinds, sizes and lengths of rollers with a relatively small amount of adjustment of parts; to provide a machine of this character including a reciprocatory carriage, carrying a polishing element which is adapted to be moved longitudinally backward and forward in its polishing operation with respect to the roller being polished.

A further object is to provide improved means for insuring proper alignment of the roller when mounted, with respect to the guide rails upon which the polishing element is guided in its backward and forward reciprocatory movements. Further to provide adjusting means whereby a larger or smaller area of the rollers may be covered by the polishing element; further to provide a means upon the carriage for adjustably mounting a dusting brick in close proximity to the surface of the roller being polished.

A further object of the invention is to simplify the machine by connecting the drive shaft with an electric motor and to provide means for mounting the roller to be ground in axial alignment with the drive shaft; to mount a pair of worms upon the drive shaft and to include clutches and clutch shafts to be driven in opposite directions and to provide a sprocket and a sprocket chain connected with the carriage carrying the polishing element for feeding the same forward and backward.

Other and important objects of the invention will be apparent as the description hereof progresses in connection with the accompanying drawings forming a part of the specifications and upon which like reference characters will be found to designate similar parts of the several figures of the drawings, and of which:

Fig. 1 shows a front elevation of my improved roller polishing machine partially broken away.

Fig. 2 is an enlarged detached view of the carriage, shown in Fig. 1.

Fig. 3 is an enlarged detailed view of the ad-

justable support for the sprocket, shown at the right in Fig. 1.

Fig. 4 is an enlarged rear elevation of the left hand end of the machine including electric motor for operating the machine.

Fig. 5 is a top plan view on a similar enlarged scale of the mechanism shown in Fig. 4.

Fig. 6 shows an enlarged cross section taken on line 6-6 of Fig. 1 better to illustrate the carriage, the guide rails and means for supporting the roller to be polished, and

Fig. 7 shows a further sectional view illustrating the action of the polishing belt when slackened by adjustment.

As will be seen, the machine comprises in part a metal frame 10 including legs, cross and elongated top angle irons 11 positioned front and rear along the top edge portions of the frame. A plate 12 is positioned at one end upon the top of these two angle iron members in a manner to form a base for the driving mechanism shown at the left in Fig. 1. A somewhat similar though shorter plate 13 is likewise positioned at the outer end of the top angle irons of the frame to support the several bearings later to be referred to. The machine as designed is provided with an electric motor 14 that is adjustably mounted in hangers 15 in the lower part of the frame and is adapted to be raised and lowered to tighten or loosen its belt 16 by means of an adjusting screw 17 that is threadably mounted in the beforementioned plate 12. The motor is preferably provided with a spring actuated adjustable pulley 18 around which the belt 16 travels, the said belt being connected to drive a pulley 19 upon the main drive shaft 20. This shaft is journaled in bearings of the two uprights 21-21 secured to the beforementioned bed plate 12. The drive shaft is further journaled in bearings 22 and 23 of the column 24 which is likewise secured to the bed plate 12.

This column 24 not only carries the main driving shaft and a right and left worm 25 and 26, but also carries clutch shafts 27 and 28 journaled below the driving shaft and at a right angle thereto whereby power is transmitted through the two said worms to the respective worm gears 29 and 30 mounted on the beforementioned shafts 27 and 28 whereby power is transmitted from the driving shaft through said worms and gears to the two clutch shafts in a manner to drive the same in opposite directions. Upon each of the clutch shafts 27 and 28 is mounted a gear 31 having a clutch face 32 which is adapted to be engaged by the alternately operatable clutch

members 33 mounted on the respective clutch shafts. These clutch members are connected to be operated by a yoke 34 which is pivotally mounted as at 35 upon a post 36 which forms a part of the column. One end of a link 37 is pivotally connected to one end of the yoke as at 38 to operate the same by rocking it upon its pivot 35 in a manner to alternately throw the respective clutch members 33 into and out of engagement with the clutch face of the gears 31—31 and whereby reversed drives from the main driving shaft are transmitted to the sprocket shaft 39 journaled in the housing and bracket 40, see Fig. 4. This sprocket shaft is provided with a small pinion 41 that meshes with and is alternately driven by the gears 31 upon the worm driven clutch shafts 27 and 28. Upon the outer end of the sprocket shaft 39 is mounted a sprocket 42 that carries a sprocket chain 43 for operating the carriage 44 later to be described.

The beforementioned clutches for shifting the direction of rotation and drive of the sprocket shaft are automatically operated by an electrically controlled solenoid 50, see Figs. 4 and 5, through the beforementioned link connection 38. In this respect, see Fig. 4, it will be seen that the bracket 45 which is secured to the bed plate 12, forms a bearing 46 for a bell crank lever 47 whose upwardly disposed arm is pivotally connected to the beforementioned link 37 while the rearwardly extended arm 48 is pivotally connected to a plunger 49 carried by the solenoid 50 within the casing 51, said solenoid being connected by electric wires 52 with a switch 53 having a projected operating stem 54 that is engaged by a collar 55 on a trip rod 56 slidably mounted in suitable bearings 57 secured to the bed of the machine. This trip rod is obviously operated by the backward and forward movements of the reciprocatory carriage 44, yet to be described.

A relatively heavy bar 58 having a flat under surface 58', see Fig. 6, is supported above the frame, one end being secured in the upright 21 and the other end in a bracket 59 that is secured to the short plate 13. This bar serves to carry the two bearing brackets 60 which are alike in construction and serve to provide aligned bearings for the trunnion end 61 of the rollers 62 to be polished. These bearing brackets are clearly shown in Figs. 1, 5 and 6 and include a cylindrical hub portion to receive the bar in which is mounted an eccentric 63 designed to engage the flat under surface of the bar in a way to secure the two said brackets in true alignment when adjusted upon the bar as for rollers of different lengths. These eccentrics are mounted upon short shafts 64 journaled in the brackets and have an operating handle 65 whereby the eccentric is operated to engage or disengage the flat side 58' of the bar 58 to lock or unlock the bearing brackets 60 upon the bar. The upper end portion of the bearing brackets are each provided with a pair of spaced apart rollers 66 upon which the trunnion 61 of the roller 62 is rotatably mounted. An arm 67 that is designed to rest upon the trunnion and hold it down upon the said rollers 66, is carried by a vertically disposed rod 68 adjustably mounted in an arm 69 of the bearing bracket 60 where it is adapted to be secured in its adjusted position by a lock nut 70.

The axis of the roller 62 to be polished is therefore supported in approximate alignment with the driving shaft to which it is connected by a flexible coupling 71 that is positioned in an opening of a bracket 72 made fast to the face

of the upright 21. This coupling 71 is obviously for the purpose of driving the roller and serves to compensate for any difference which may exist in the alignment of the axis of the rollers and the drive shaft, it being understood that different size rollers are provided with different size trunnions and thus may be mounted higher or lower with respect to the axis of the drive shaft.

A bracket 73, see Fig. 5, is secured to the bed plate 12 and serves to support the end portions of the two guide rails 74 and 75, one above the other, and upon which the carriage 44 is reciprocally mounted, the other end of said rails being similarly supported in a bracket 76 mounted on the other end portion of the machine.

The sprocket shaft 39 carries a sprocket 42 upon which a sprocket chain 43 is belted. An idler sprocket 79 over which the same sprocket chain is carried, is mounted in a bearing 80 carried in a bracket 81 secured to the top of the outer end of the machine frame, see Figs. 1 and 3. An adjusting screw 82 is carried by the bracket for adjusting the bearing to tighten and loosen the chain. The ends of the chain are secured to plates 83 secured to opposite edge portions of the carriage 44, see Figs. 1 and 2 and whereby the same is connected to be moved longitudinally backward and forward upon the rails through the reversibly driven sprocket shaft.

This carriage comprises a frame that extends down upon the near side of the rails as shown in Figs. 1 and 2, and is carried on rails 74 and 75. A pair of rollers 84—84 are journaled in housed extensions 85 of the carriage frame and ride on the top rail 74, in a way to support the carriage thereon.

In addition to these carrying rollers, I also provide additional rollers 86 and 87, on the carriage, one roller 86 being on the near side as shown in Figs. 1 and 2 and two 87 upon the far side, see Fig. 2. These obviously engage opposite sides of the top rail and retain the carriage in proper alignment. The lower ends of the carriage are also provided with guiding means, see Figs. 2 and 6, that engage the lower rail 75, which comprise plates 88 that are secured to opposite edge portions of the depending leg portions of the carriage and are cut away, see Fig. 6 to receive the lower edge portion of the lower rail 75 in a way to retain it in proper vertical relation to the rails. Guide brackets 89—89 are attached to the front side of the carriage frame, see Figs. 2 and 6 to support the chain against sagging and better to insure a uniform movement of the carriage with respect to the rotation of the roller. The carriage is also provided with a support for the trip rod 56 beforementioned and, as will be seen, includes a roller 90 attached to the face of the carriage and a shield 91 both of which permit the free and independent movements of the carriage and rod.

This carriage is designed to carry an improved form of polisher for this class of work and includes as a polishing medium an endless belt 92 of sand-paper, emery cloth or the like and is mounted for adjustment upon rollers 93 and 94, the spindles both of which are journaled in parallel side members 95—95 forming part of the polishing frame. The first mentioned roller 93 is mounted upon a fixed shaft while the upper roller is mounted upon a shaft 96 that is adapted to be adjusted to and from the roller 93 through the medium of an adjusting screw 97 that extends through the tapped outer ends of the shaft 96

and abuts against the bracket 98 for the adjustment of tension of abrasive belt 92.

A bearing roller 99 is carried upon a plate 100 adjustably secured to the outer face of the side members 95—95 by means of a slot in the plate and an adjusting screw 101. By the adjustment of this screw 101 and the screw 97 the sandpaper may be tightened or loosened and thus made to engage more or less of the cylindrical surface of the printing rollers 62, it being apparent that when the sandpaper is tightened and the roller 99 lowered there would be a lighter engagement of the sand-paper with the roller, whereas if the said parts are otherwise adjusted to slacken the sand-paper then the sand-paper would lay over and cover a greater peripheral area of the roller which I find produces smoother work, as for instance, in finishing than is possible where a tight belt of sand-paper is employed.

The lower portions of the side plates 95 are provided with aligned holes which permit them to be mounted for swinging movement upon a rod 102 carried in bearings of 103 that project up from the side of the front of the carriage frame. A weight 104 is mounted upon a rod 105 attached to the polishing frame, to form an adjustable counterbalance for the polishing unit and thus allows the same to be more freely raised and lowered and also allows more or less pressure to be applied by the polishing element on the face of the roller.

In the polishing of rubber printing rollers of the class referred to it is desirable to use a polishing material which in this instance is in brick form and is adjustably mounted to lightly engage the rotating printing roller and whereby the surface of the roller is better maintained at a uniform temperature while being polished.

This material 106 is adjustably mounted on the carriage and is adapted to be positioned against the roller and moved along in light engagement therewith, and simultaneously with the polishing means referred to. It is preferably positioned below the polishing means and comprises in part a pair of supports 107—107 that are secured to the front of the carriage as at 108 and extended out beneath the roller in position to carry the adjustable brick holding means. These supports carry a plate 109 that is adjustably secured to the said supports and in turn have a U-shaped bracket 110 secured thereto and whose spaced apart upwardly extended arms are provided with elongated slots 111. A screw bolt 112 is positioned in the slots of these arms and likewise passes through slots of arms of a somewhat similar though inverted U-shaped bracket 113 and whereby the one bracket is made adjustable with respect to the other. The inverted upper bracket 113 carries a pan 114 having a series of upwardly disposed teats 115 to engage the under side of the brick 106. A strap 116 extends across under this pan up over and around the brick and is provided with a clamping screw 117 that engages the top of the brick and holds it on the pan.

From the foregoing it will be seen that I have produced a roller polishing machine which can be used in conjunction with our roller grinding machine illustrated in prior Patent No. 1,968,550, dated July 31, 1934, the said grinding operations by the said machine being obviously performed in advance of the polishing and whereby it is practical to take the rollers, after having been ground, from the grinding machine and mount them in this polishing machine for completion of the finishing or refinishing operations. The ma-

chine, as herein presented, is adjustable and adapted to accommodate rollers of different lengths and different sizes and is provided with supporting bearings which insures true axial alignment of the trunnions in opposite ends of the respective rollers, so that any roller can be finished with a diameter that will not vary $\frac{1}{1000}$, as is required today for the accurate and rapid work of high class printing presses.

The flexible coupling 71 between the driving spindle 20 and the trunnion of the rollers readily compensates for any slight difference in axial alignment of the roller with the shaft, thus so long as the bearings for the roller are in alignment and they in proper alignment with the travel of the carriage and the polishing element there can be no imperfection in the operations.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. A roller polishing machine comprising a frame and guide rails, a carriage mounted thereon, a driving shaft, means for mounting a roller to be polished in alignment thereon, a pair of worms mounted upon the driving shaft, two gears and clutch shafts operated through said worms, movable clutch members carried on the clutch shafts adapted to engage the gear clutches to drive the shafts in opposite directions, a sprocket shaft connected to be selectively driven by either of said clutch shafts, a sprocket carried by the sprocket shaft, an idler sprocket, a sprocket chain connecting the said sprockets with the carriage for reciprocating the same upon the guide rails, and trip means adapted to be operated by the carriage to shift the said clutches and reverse the direction of the movement of the carriage.

2. A roller polishing machine comprising a frame and a pair of guide rails, a carriage mounted thereon, a driving shaft, means for mounting a roller in alignment therewith to be polished, a pair of worms mounted upon the driving shaft, two gears and clutch shafts operated through said worms, clutches carried on the clutch shafts adapted to drive them in opposite directions, a sprocket shaft connected to be selectively driven by either of said clutch shafts, a sprocket carried by the sprocket shaft, an idler sprocket, a sprocket chain connecting the said sprockets with the carriage for reciprocating the same upon the guide rails, an electric switch and solenoid for operating the clutches, and trip means adapted to be operated by the carriage to operate the switch, solenoid and clutches to reverse the movement of the carriage.

3. In combination with a pair of guide rails and other parts of a polishing machine, a carriage mounted upon the rails and including rollers to engage both the top edge and the side of the rail and one or more guides to engage the under edge of the bottom rail, an operating chain having its two ends connected to opposite edge portions of the carriage, means for operating the chain to move the carriage upon the rails, a polishing element hingedly connected to the carriage and comprising spaced apart rollers, an endless polishing belt carried over the said rollers, means for adjusting the belt to engage more or less of the peripheral surface of the roller being polished, an adjustable mounted contacting means for engagement with the roller to be polished and to limit the pressure of the polishing element on the roller.

4. In combination with a pair of guide rails and other parts of a polishing machine, a carriage mounted upon the rails and having rollers

- to engage the top edge of one rail, rollers to engage the opposite sides of said rail, guides upon the carriage to engage the under edge of the bottom rail, an operating chain having its two ends connected to opposite edge portions of the carriage, means for operating the chain to move the carriage upon the rails, a polishing element carried by the carriage, an endless polishing belt carried by the carriage, means for adjusting the belt to engage more or less of the peripheral surface of the roller being polished, an adjustably mounted contacting means for engagement with the roller to be polished and to limit the pressure of the polishing belt on the roller.
- 15 5. A roller polishing machine including guide rails and means for rotatably supporting a roller to be polished, a carriage mounted on the rails, means for reciprocating the carriage, a polishing element hingedly connected to the carriage and
- 20 comprising spaced apart rollers, an endless polishing belt carried over the said rollers, means for adjusting the belt to engage more or less of the peripheral surface of the rollers being polished, a dusting brick holder adjustably secured to the
- 25 carriage and including aligned supports extending from the carriage, an adjustable clamping means carried thereby, a pan for supporting the dusting brick having means for engaging said adjustable clamping means and means carried
- 30 by the pan for securing the dusting brick at different angles with respect to the roller being polished.

6. In a roller polishing machine the combination with a bed, of guide rails, one above the other secured to the bed, means for supporting a rotatable roller to be polished, a carriage mounted for reciprocatory movement on the guide rails, polishing means hingedly connected to the carriage for operation on the roller and adapted to be swung up on top of the carriage, a dusting brick holder secured to the carriage to travel with it and including a support extended therefrom, a pan carried thereby for supporting the dust brick and means carried by the pan for securing the dust brick at different angles with respect to the side of the roller.

7. A roller polishing machine comprising a frame including parallel guide rails one above the other, a supporting bar mounted upon the frame, a pair of roller supporting brackets carried by the bar and each including means for engagement with the bar whereby the brackets may be adjusted thereon and secured in true alignment one with the other, said brackets being further provided with bearings to receive the trunnions of a roller to be polished, a carrier mounted upon the guide rails having a polishing element hingedly connected to the carriage and including an endless polishing belt for contact with the roller to polish the same, a dusting brick carried by the carriage for contact with the roller during its polishing operation on the length of the roller.

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