(No Model.) 3 Sheets—Sheet 1.

G. VINE.

ROLL GRINDING MACHINE.

No. 493,952. Patented Mar. 21, 1893.

Fig. 1.

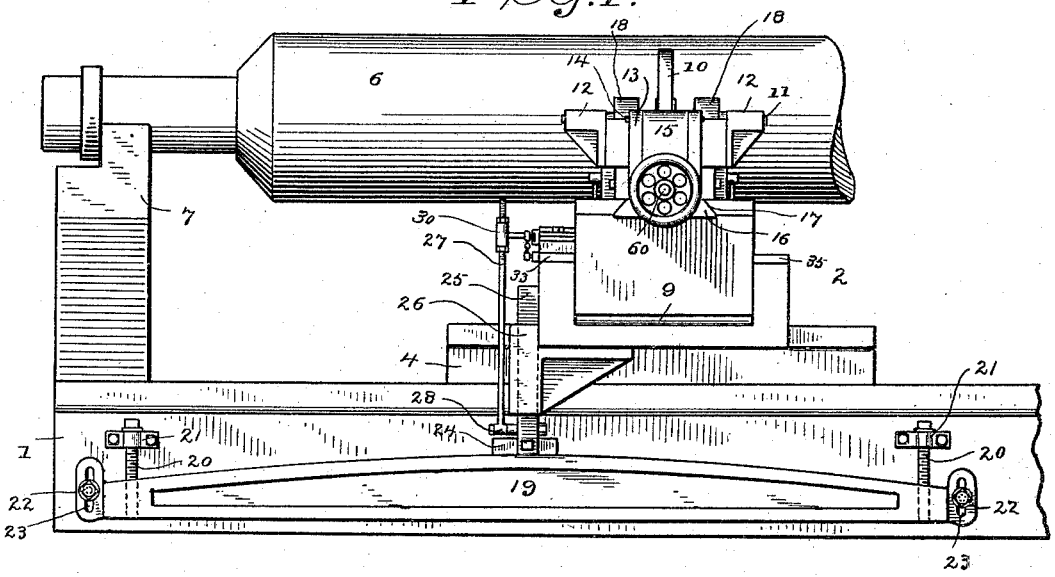
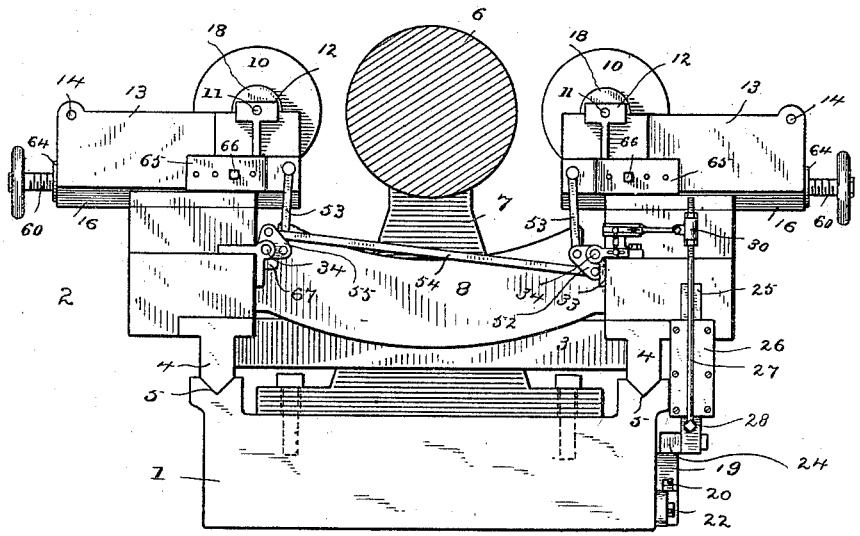


Fig. 2.



WITNESSES

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

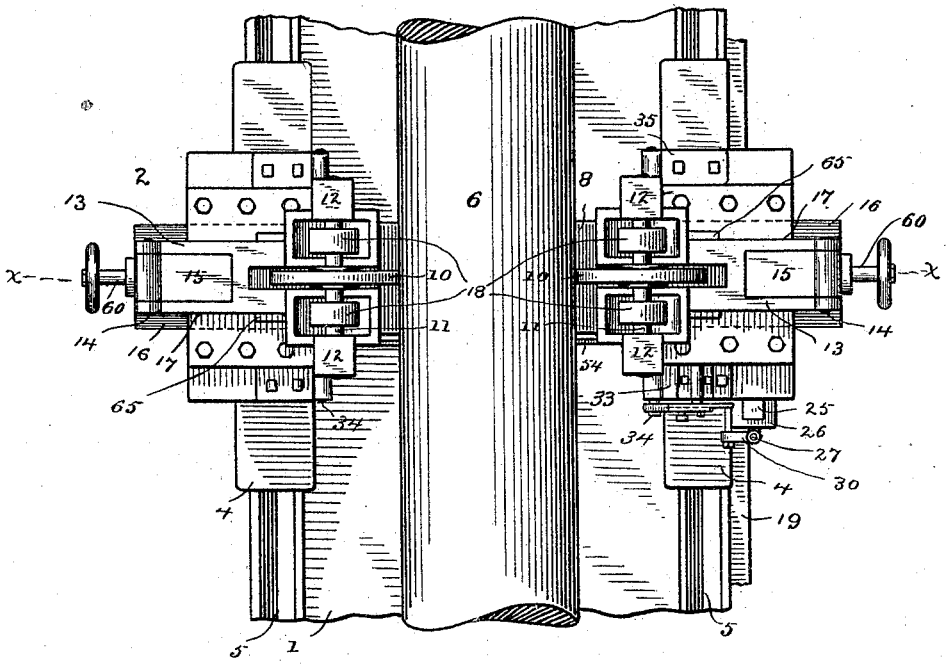
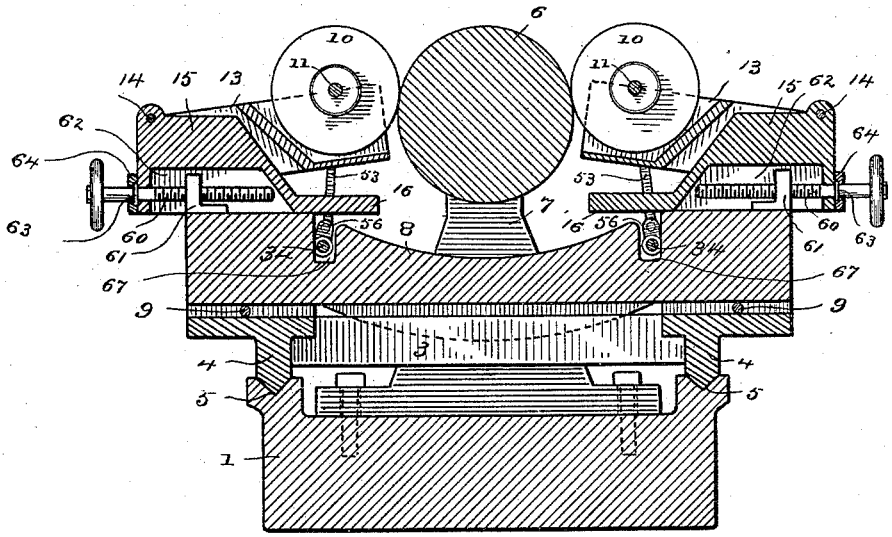


Fig. 4.



WITNESSES

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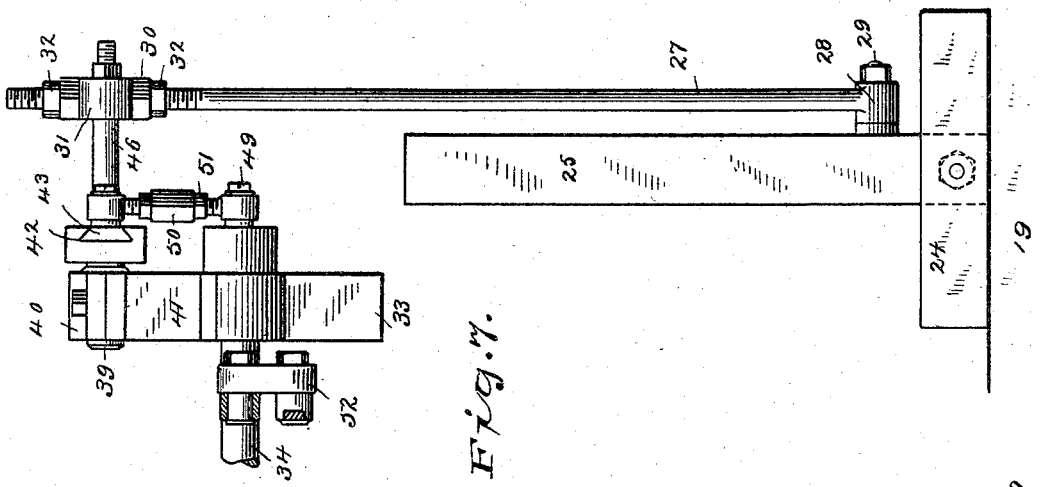


Fig. 4.

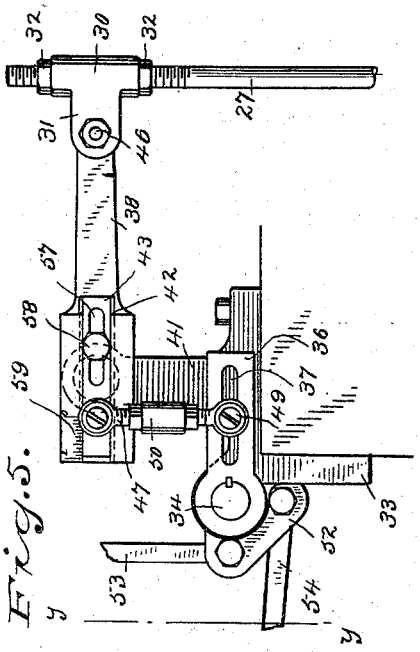


Fig. 5.

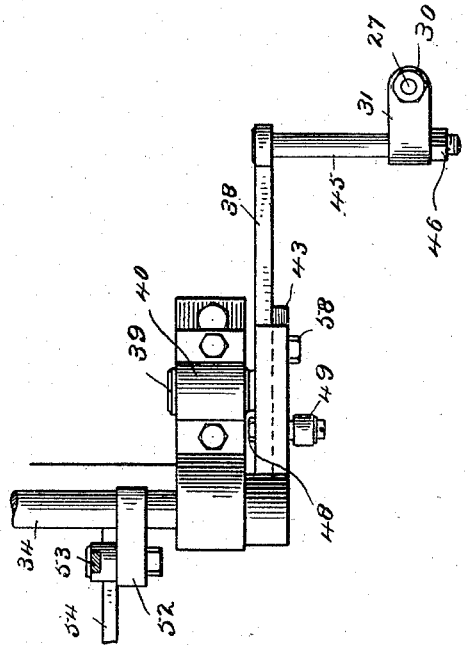
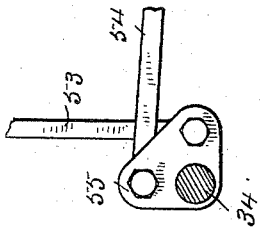
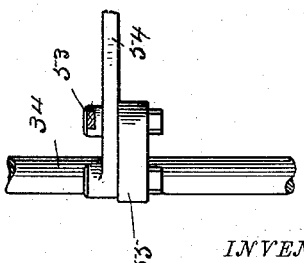


Fig. 6.





WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE VINE, OF ANSONIA, CONNECTICUT.

ROLL-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 493,952, dated March 21, 1893.

Application filed August 8, 1892. Serial No. 442,407. (No model.)

To all whom it may concern:

Be it known that I, GEORGE VINE, a citizen of the United States, residing at Ansonia, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Roll-Grinding Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to simplify and at the same time to greatly improve the construction and operation of machines for grinding rolls.

With these ends in view I have devised the novel construction which I will now describe referring by numbers to the accompanying drawings, forming part of this specification in which:

Figure 1 is a side elevation illustrating the machine in use, one end of the bed being broken away, the mechanisms for rotating the roll that is being ground, and for reciprocating the carriage being wholly omitted as they form no portion of my present invention, it being contemplated that any ordinary or preferred form of carriage operating, and roll rotating mechanism be used in connection with my improved construction. Fig. 2 is an end elevation, the roll that is being ground being in section and the nearest roll bearing being removed. Fig. 3 a plan view. Fig. 4 a section on the line *x x* in Fig. 3. Fig. 5 an enlarged detail view showing in elevation the mechanism for adjusting the oscillating carriers which carry the grinding wheels (the central portion of the connecting rod being broken away) whereby the taper of the roll is determined. Fig. 6 a plan view corresponding therewith, and Fig. 7 is an end elevation as seen from the left in Fig. 5 the connecting rod being in section on the line *y y*.

1 denotes the bed, 2 the carriage the sides of which are connected by a cross piece 3 and are provided with guides 4 adapted to reciprocate in ways 5 in the bed, the special mechanism for reciprocating the carriage being omitted as already stated as it forms no part of my present invention.

6 denotes the roll that is being ground which is supported in bearings 7 at the ends of the bed. The mechanism for imparting rotary movement to the roll is likewise omitted as it forms no part of my present invention.

8 denotes the swing rest which is adapted to reciprocate transversely on the carriage for a purpose presently to be explained. In the present instance I have shown the rest as supported by rollers 9. As the special mode in which the rest is caused to swing forms no part of my present invention I have not deemed it necessary to illustrate other forms of making the connection.

10 denotes the grinding wheels carried by shafts 11 journaled in boxes 12 on carriers 13, the outer ends of which are pivoted as at 14 to blocks 15 upon slides 16 adapted to reciprocate transversely in ways 17 in the swing rest. Rotary motion is imparted to the grinding wheel by belts not shown passing over pulleys 18 on shafts 11.

It will of course be understood that for some purposes it is required that rolls be ground so as to have more or less convex surfaces and for other purposes it is required that they be so ground as to have more or less concave surfaces. In the present instance I have illustrated the machine so adjusted as to produce a roll having a slightly convex surface as for example a paper calender roll. In order to produce a convex surface it is necessary that the grinding wheels should rise uniformly as the longitudinal center of the roll moves toward them, and fall uniformly after the center of the roll has passed the grinding wheels and toward the other end of the roll. To produce a concave roll the grinding wheels should be so adjusted as to be highest at the ends of the roll and move downward as the center of the roll approaches the grinding wheels and move upward again uniformly after the center of the roll has passed the grinding wheels. It is also necessary that the rolls should be capable of adjustment so as to grind larger or smaller sized rolls, and that they should also be self adjusting to provide for a possible slight inaccuracy in centering the roll.

19 denotes a curved track plate upon one side of the bed. The track plate requires to be adjusted with great care to produce the desired result and when once adjusted does not

require to be changed in use. I have shown the track plate as capable of being raised or lowered by means of screws 20 which turn in holders 21 and the ends of which engage the track plate near the ends thereof. The track plate after adjustment is locked in position by set screws 22 passing through slots 23.

24 denotes a shoe adapted to ride upon the track plate. This shoe is pivoted to a slide 25 adapted to move vertically in a guide 26 which is rigidly secured to the carriage so that the shoe and slide will move forward and backward with the carriage.

27 denotes a vertical rod the lower end of which is provided with an eye 28 which turns on a stud 29 extending outward from slide 25 and the upper end of which is threaded and passes through a sleeve 30 provided with an extension 31. The sleeve is locked in position on rod 27 by nuts 32 on both sides thereof.

33 is an angle bracket rigidly secured to the carriage in which one end of a rock shaft 34 is journaled, the other end of said shaft being journaled in a bracket 35 at the other end of that side of the carriage.

36 denotes a crank arm which is keyed to rock shaft 34 and is provided with a slot 37.

38 is a lever having projecting inward therefrom a stud 39 journaled in a box 40 at the top of an upward extension 41 of bracket 33. The outer face of the inner end of this lever is provided with dove-tail ways 42 which receive a slide 43. The outer end of the lever is provided with an eye 44 through which a pin 45 passes loosely. The outer end of this pin is reduced see Fig. 6 and passes through extension 31 of sleeve 30, the parts being locked in place by a nut 46 engaging the threaded outer end of the pin. The slide is shown as provided with a slot 57. A bolt 58 passes through this slot and locks the slide in position after adjustment. 47 denotes an adjustable connecting rod one end of which is pivoted to slide 43, the other end being adjustably connected to crank arm 36. I have shown the connection as made by means of a bolt 48 which passes through slot 37. The outer end of the bolt is reduced and the eye of the connecting rod turns freely thereon being held in place by a screw 49 engaging the outer end of the bolt. The connecting rod is made in two parts both of which are threaded, one having a right and the other a left hand thread, and engage a central nut 50 the parts being locked in position after adjustment by set nuts 51.

52 denotes a bell crank on rock shaft 34 to one arm of which is pivoted a connecting rod 53 which extends upward and is pivoted to one of the carriers 13.

54 denotes a connecting rod which extends across the bed of the machine and is pivoted to a bell crank 55 on a similar rock shaft 34 in the opposite side of the carriage, another connecting rod 53 extending upward from bell crank 55 to the carrier on that side of the machine. I have shown but one connecting rod 54 although two may be used if preferred one upon each end of the carriage and extending across to the opposite side. The opposite end of each rock shaft is provided with a crank arm 56, see Fig. 4 from which a connecting rod 53 extends upward and is pivoted to the opposite side of the corresponding carrier so that oscillation of the rock shafts must necessarily oscillate the carriers on their pivots 14 and impart to the grinding wheels corresponding upward or downward movement, the movement of the grinding wheels in the present instance being upward as they move toward the center of the roll and downward after the center of the roll has been passed. In use connecting rod 47 is always maintained at the vertical position. Suppose now that it is required to increase the convexity of the roll that is being ground. Bolt 58 and screw 49 engaging the outer end of bolt 48 are loosened so as to permit slide 43 to be moved toward the left as seen in Fig. 5 and bolt 48 to be moved toward the left in slot 37. In order that this change of convexity of the roll may be produced quickly and without difficulty, after the machine has once been adjusted I provide a suitable scale 59 upon lever 38 which indicates with perfect accuracy the convexity of the roll. As shown in Fig. 5 the adjustment is normal and the convexity of track plate 19 will be reproduced in the roll.

In order to provide for grinding different sized rolls I provide adjusting screws 60 see Fig. 4 which engage correspondingly threaded projections 61 on the swing rest, the underside of blocks 15 being recessed as at 62 to receive the projections and the screws being provided with collars 63 which are recessed into plates 64 secured to the blocks so that when the adjusting screws are rotated the slides, carriers and grinding wheels will be moved in or out as may be required, no other changes in adjustment being required unless the convexity of the roll is changed. As it is desirable in order to produce the best results that connecting rods 53 should operate in a vertical or nearly vertical position, instead of pivoting the upper ends of said rods directly to the carriers I pivot them to plates 65 which are adapted to be moved in or out independently of slides 16 and the carriers, and are locked to the carriers by means of bolts 66. After the grinding wheels have been adjusted to operate upon larger or smaller sized rolls bolts 66 are removed and plates 65 properly adjusted relatively to the carriers *i. e.* so as to place connecting rods 53 in a nearly vertical position after which the plates are locked in position again by bolts 66.

As already stated it is necessary that the grinding wheels should be self adjusting to provide for any slight inaccuracy in centering the roll. This is accomplished by placing all of the operative parts of the machine upon the part which is termed the swing rest and providing that the swing rest shall have free

transverse movement which of course requires to be but very slight, said transverse movement being wholly independent of any of the adjustments just described. The limit of movement of the swing rest is determined by the width of slot 67 in which rock shafts 34 lie, see Fig. 4. It follows therefore in use that this freedom of transverse movement of the swing rest will permit the grinding wheels to adjust themselves to the roll that is being ground should there be for any reason a slight inaccuracy in adjusting the roll.

Having thus described my invention, I claim—

1. In a machine of the class described the combination with the reciprocating carriage, the swing rest and the grinding wheels carried by oscillating carriers pivoted to the swing rest, of a curved stationary track plate, a shoe engaging said track plate and moving with the carriage, and intermediate connections substantially as described and shown whereby the upward and downward movements of the shoe upon the track plate is communicated to the carriers causing the grinding wheels to move upward and downward as the carriage is reciprocated in use.

2. The combination with the reciprocating carriage, of the swing rest, the grinding wheels, oscillating carriers therefor pivoted to the swing rest, and suitable means substantially as described and shown for raising and lowering the carriers and grinding wheels as the carriage reciprocates.

3. The combination with the reciprocating carriage, the curved stationary track plate and a shoe adapted to ride thereon, of the swing rest transverse slides 16 in said rest, the grinding wheels, carriers therefor pivoted to the slides, suitable intermediate connections between the carriers and the shoe for the purpose set forth, and suitable means for adjusting the slides and carriers in and out whereby the machine may be adapted to operate upon different sizes of rolls.

4. The combination with the carriers, grinding wheels, the track plate and the shoe, of rod 27, rock shafts 34, connecting rods 53 and 54, crank arm 36 upon one of the rock shafts, lever 38 one arm of which is connected to rod 27, and an adjustable connecting rod 47 between crank arm 36 and lever 38.

5. The combination with the rock shaft 34 having crank arm 36, and lever 38 having slide 43 and scale 59, of adjustable connecting rod 47 pivoted to the slide and adjustably connected to the crank arm, and a vertically movable rod connected to the lever whereby movement is imparted to the rock shaft.

6. The combination with the grinding wheels and oscillating carriers therefor, of vertically moving connecting rods 53 and plates 65 to which said rods are pivoted and which are adjustably connected to the carriers.

7. The swing rest having projections 61, transverse slides 16 in the swing rest, the grinding wheels, carriers therefor pivoted to the slides, and adjusting screws 60 engaging projections 61 whereby the slides, carriers and grinding wheels may be moved in or out independently to the swing rest.

8. The combination with the carriage, the grinding wheels, carriers therefor, slides to which the carriers are pivoted, and a swing rest adapted to move transversely to the carriage to which said slides are adjustably secured.

9. The combination with the track plate, shoe 24 and slide 25 by which the shoe is carried, of the carriage having a suitable guide for the slide, rod 27 pivoted to the slide, the swing rest, slides 16, the grinding wheels, carriers therefor pivoted to the slides and suitable intermediate connections between rod 27 and the carriers whereby the upward and downward movements of the shoe are communicated to the carriers and grinding wheels.

10. The combination with the carriage, the grinding wheels, the carriers and adjustable slides to which the carriers are pivoted, of a swing rest supporting the slides and moving upon the carriage.

11. The combination with the grinding wheels, carriers therefor, the swing rest and the carriage, of the track plate, the shoe, rock shafts 34 upon the carriage and intermediate connections between the shoe and the rock shafts whereby the latter are oscillated.

12. The carriers, plates 65 adjustably secured thereto, the rock shafts and connecting rods 53 one end of said rods being connected to the carriers the other to arms extending from the rock shaft, in combination with the carriage, the shoe carried thereby, a curved track plate upon which the shoe rides, and intermediate connections by which the vertical movements of the shoe are caused to oscillate the rock shaft.

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

GEORGE VINE.

Witnesses:
A. M. WOOSTER,
PEARL M. REYNOLDS.