

No. 675,936.

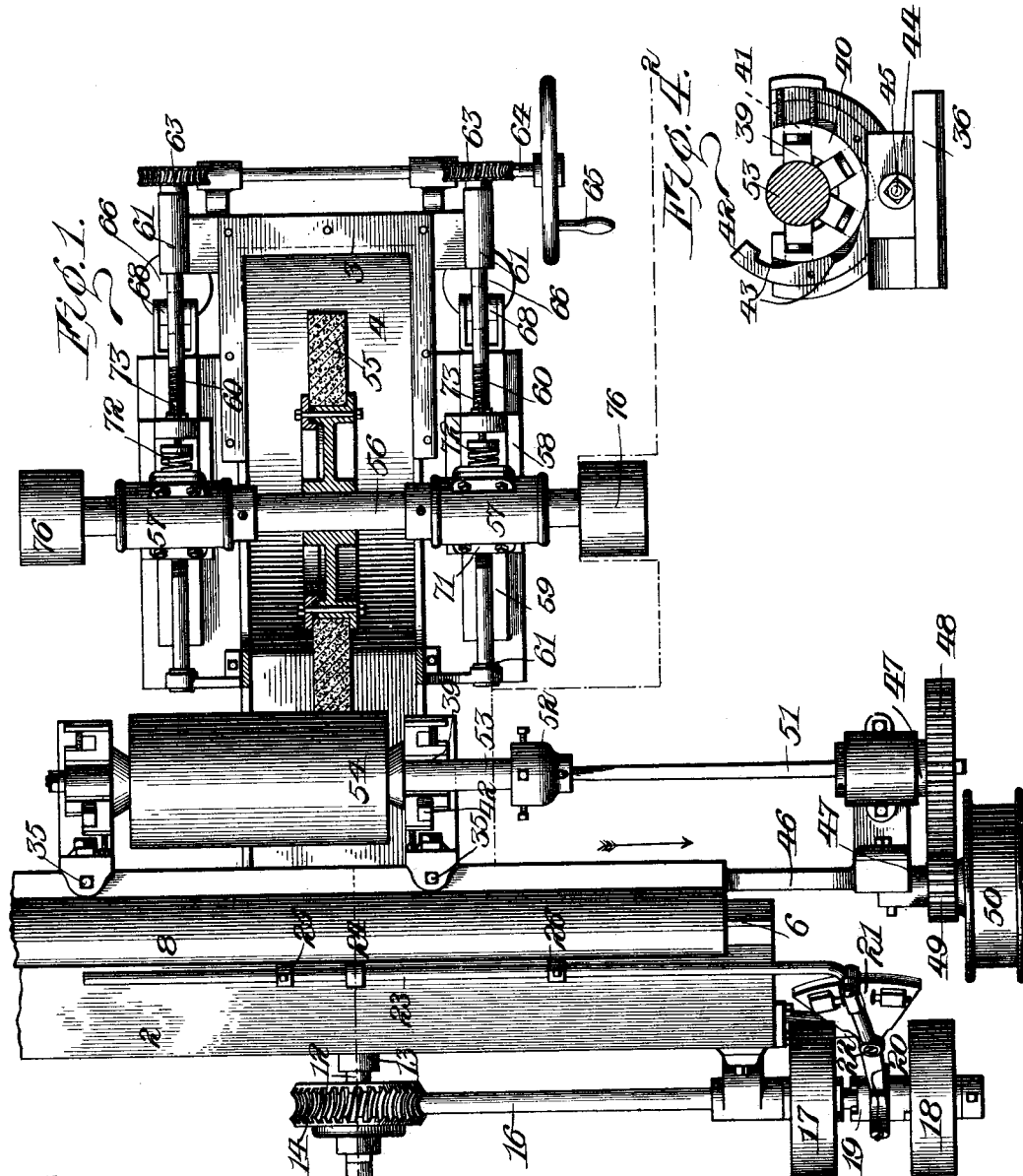
Patented June 11, 1901.

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ROLL GRINDING MACHINE.

(Application filed Mar. 26, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
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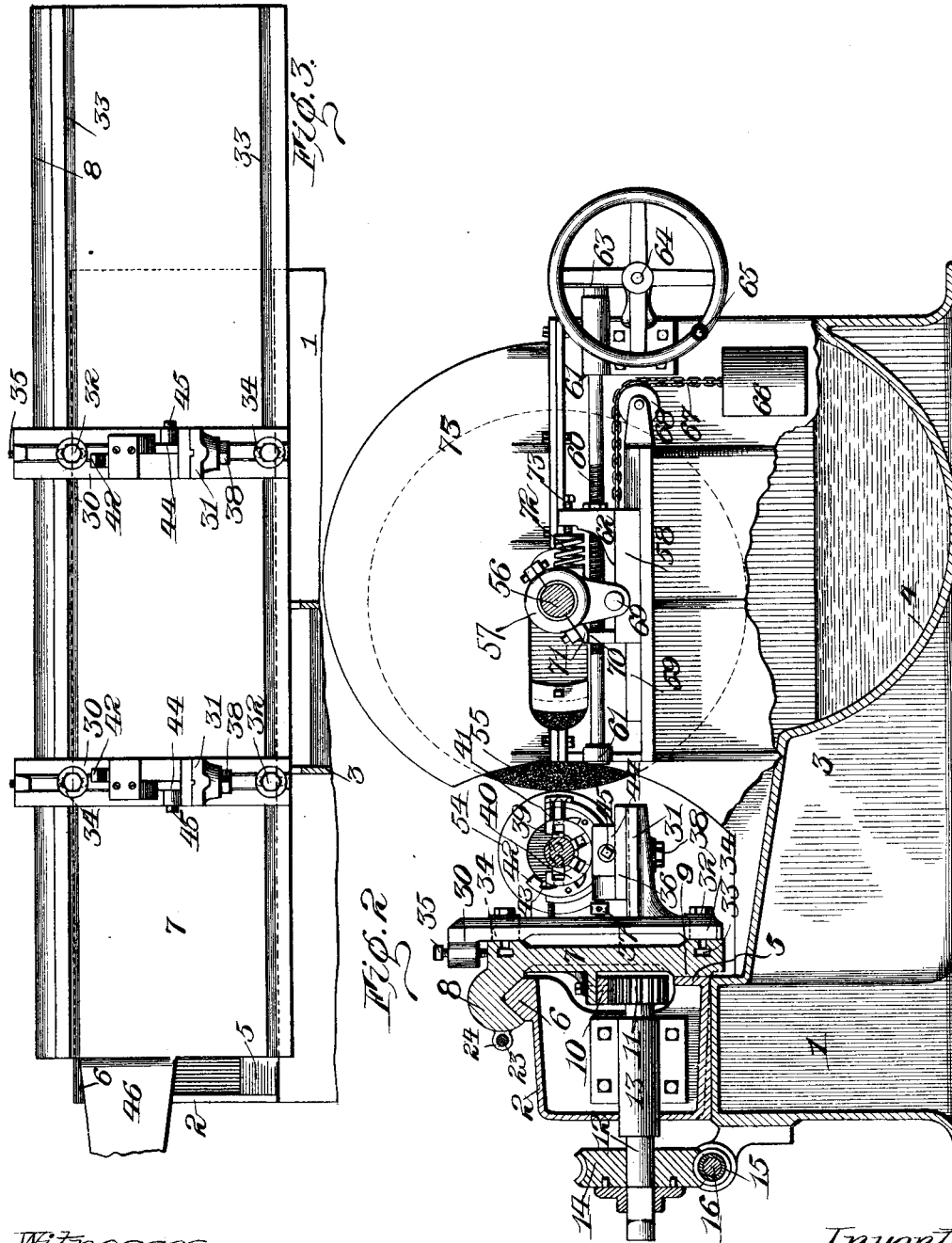
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UNITED STATES PATENT OFFICE.

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ROLL-GRINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 675,936, dated June 11, 1901.

Application filed March 26, 1900. Serial No. 10,209. (No model.)

To all whom it may concern:

Be it known that I, JAMES DAWSON, of Rochester, in the county of Monroe and State of New York, have invented certain new and
5 useful Improvements in Roll-Grinding Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying
10 drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention has for its object to provide an improved machine adapted particularly for grinding rolls or similar articles
15 to a true surface and accurate diameter; and it consists generally of a movable bed carrying the roll and means for revolving the latter and operating it past a revolving grindstone and devices for adjusting the parts into
20 operative relationship.

To these and other ends my invention consists in certain improvements in construction and combination of parts, all as will be described, and the novel features pointed out in
25 the claims at the end of this specification.

In the drawings, Figure 1 is a top plan view of a grinding-machine constructed in accordance with my invention. Fig. 2 is a sectional view on the line 2 2 of Fig. 1. Fig.
30 3 is a front view of the carriage and roll-supporting brackets. Fig. 4 is a side elevation of one of the centering-chucks.

Similar reference-numerals in the various figures indicate similar parts.

35 A suitable base or frame (indicated by 1) is provided with a bed 2, supporting a movable carriage or head, as will be described, and arranged at right angles thereto and opposite the central point of the bed is an extension 3, upon which is mounted the grindstone and its adjusting mechanism. This portion
40 is provided with a bottom 4, forming a receptacle for collecting the water used in cooling the stone and also any particles of matter removed during the grinding operation. Upon
45 the forward edge and near the lower side of the face of the bed 2 is provided a way or guide having the plane face 5, and along the forward edge of the bed-top is formed a guide
50 6, preferably V-shaped in cross-section,

which supports a reciprocating carriage 7, having the overhanging portion 8 engaging the guide, and the guide 9 upon its lower edge engaging the face 5. The carriage is adapted to be moved longitudinally along the
55 bed by means of a rack-bar 10, formed upon its rear side, with which engages a pinion 11, mounted upon a shaft 12, carried in a bearing 13 and provided upon its outer extremity with a worm-gear 14, in which operates a
60 worm 15 on a shaft 16. A suitable reversing mechanism to permit the shaft to be operated alternately in different directions and reciprocate the carriage is mounted on said shaft
65 at the end of the bed, consisting in the present instance of the oppositely-driven loose pulleys 17 and 18, between which operates a clutch member 19, keyed to the shaft and capable of being moved alternately into engagement with either of the pulleys.
70

20 indicates a yoke pivoted to the clutch and mounted upon the extremity of an arm 21, pivoted at 22 and connected upon its opposite end with a shifting-arm 23, passing through a sliding collar 24 on the carriage
75 and provided with adjustable stops 25 and 26, against which the collar engages as the carriage reaches the limit of its movement in either direction to shift the clutch, as will be understood. Brackets 30, having the foot or
80 extension 31, are adjustably secured to the face of the carriage by bolts 32, having their heads secured in slots 33 in the carriage, permitting lateral adjustment of the brackets thereon to accommodate rolls of various lengths,
85 the vertical adjustment being permitted by slots 34 in the brackets, the vertical movement of the latter being regulated by screws 35, bearing against the upper side of the carriage. The extensions 31 are each provided with pillow-blocks 36, movable toward or from the carriage by means of a stud having right and left
90 hand screw-threads upon its opposite extremities engaging the block and bracket and provided with a central collar or nut 37. A bolt 38, engaging the under side of the extension,
95 also serves to secure the block. Centering-chucks capable of adjustment to fit various-sized journals are mounted upon the blocks, and while those of any desired form may be 100

employed I have shown one consisting of a series of radially-movable jaws 39, carried upon a plate 40 and operating in slots 41. Their adjustment is accomplished by means of a segmental ring 42, having a series of cam-surfaces 43, cooperating with the inner ends of the jaws 39, whereby as the ring is revolved the jaws will be moved radially. The plate 40 is preferably formed integral with the pillow-block, and plate 41, secured by a bolt 45, is employed to frictionally engage the ring and lock the parts in adjusted position. This form of the device is extremely simple, and the center of the roll being close to the support vibration between the parts is entirely prevented and the roll is held firmly centered.

An arm 46 upon one end of the carriage supports a bearing 47, in which is journaled a gear 48, meshing with a pinion 49, formed upon the flanged pulley 50. The hub of the gear is provided with a square aperture through which operates a square shaft 51, having upon its end a coupling 52, permitting universal movement and adapted to be attached to the end of the axle 53 of the roll 54. The pulley 50 is carried with the carriage and adapted to be driven by means of a belt passing around a drum, as will be understood, causing the constant rotation of the roll during the grinding operation.

The grindstone or wheel 55 is carried upon a shaft 56, mounted in bearings 57, pivoted upon blocks 58, sliding on guides or ways 59 upon the extension 3 of the frame and adjustable relative to the carriage.

60 indicates screw-threaded shafts mounted upon their opposite ends in bearings 61, their threaded portions operating in threaded apertures in the shoulder 62 on the sliding blocks 58. Worm-gears 63 are mounted upon the extremities of these shafts and adapted to be operated simultaneously by a worm-shaft 64, having an operating-handle 65, and attached to the rear end of the blocks 58 are weights 66, suspended by a chain 67, extending over the small pulleys 68. These latter serve to take up any possible wear in the screw-shaft and hold the grinding-wheel back in a firm position at all times, so that as the wheel is advanced by the screw-shafts into contact with the surface of the roll there will be no lost motion between the parts, which would prevent their accurate operation. It is desirable, however, to provide for a limited movement of the grinding-wheel in order that any marked irregularities in the surface of a roll—as, for instance, in grinding a new roll—may not cause damage to the wheel, either by breaking it or chipping its face, as would be the case if both the work and grinding-wheel were rigidly mounted. The bearings 57 are pivoted at 69 to the blocks 58, and formed upon the latter, forward of the pivot, is a stop 70, against which bears a foot 71 on the bearing when in the normal position, and in rear of the pivot is a coil-spring 72, the force of

which may be adjusted by means of a screw 73, to regulate the pressure between the face of the grinding-wheel and the roll.

A suitable casing 75 extends over the top and sides of the grinding-wheel, and being joined to the base 3 entirely surrounds it, with the exception of a small portion at the working edge. The bearings and operating devices are located exterior of the casing, and pulleys 76, mounted upon the extension of the shaft 56, form a convenient means for operating the grinding-wheel.

The operation will now be easily understood. The brackets 30 are adjusted longitudinally on the carriage to accommodate the length of roll to be ground and also vertically, by means of the bolts 32 and screws 35, to bring the center of the roll horizontal and in the plane of the center of the grinding-wheel. The roll 54 is then placed in the chucks and the rings 42 adjusted to move the jaws 39 into engagement with the axles 43, forming journals therefor, when by clamping the plate 44 by means of the bolt 45 the parts will be securely held. The coupling 52 is now attached to one of the axles of the roll, and the latter may be revolved through the gears 48 and 49 and the pulley 50. The grinding-wheel is now moved forward by means of the threaded shafts 60 and their operating-shaft 64 until its face rests against that of the roll. Power being now applied, through suitable belts, to the pulleys 76 and 50 to revolve the grindstone and the roll and to the loose pulleys 17 and 18 on the shaft 16, the clutch 19 is thrown into engagement with the pulley 18, when the carriage will be moved in the direction of the arrow, Fig. 1, until the collar 24 engages the stop 26, reversing the clutch and throwing it into engagement with the oppositely-driven pulley 17, causing the reverse movement of the shaft 16 and the return of the carriage, moving the roll past the face of the grinding-wheel in the opposite direction.

The pivoted bearings 57 having the springs 72 upon their rear sides, holding them forward in the normal position against the stops 70, allows the stone to yield in case any foreign matter happens to fall between the revolving surfaces, or, for example, in adjusting a new roll for its first grinding the operator in moving the grinding-wheel against the face of the roll may adjust it against a slightly-flattened spot upon its surface. In such a case the springs would allow the grinding-wheel to move sufficiently as the higher portions of the roll are revolved against its face, preventing injury to either the machine or the work-piece.

The arrangement of the carriage and bed which I employ, whereby the former hangs upon the V-shaped guide and is supported at its bottom upon the broad plane face 5, prevents any lateral movement of the carriage either when the parts become worn or through any undue pressure exerted by the grinding-wheel, allowing the roll to be moved back-

ward and forward in exactly the same plane and its surface to be ground or polished with the greatest accuracy. The adjustable features of the brackets 30 and of the pillow-blocks 36 on the extensions 31 also permits me to grind taper or crown rolls by adjusting the bearings so that the axis of the rolls will lie at an angle to that of the grinding-wheel, as will be understood by those skilled in the art.

It will be noted that the long plane face 5 of the bed or support 2, upon which the carriage operates, is opposed to the thrust exerted between the grinding-wheel and the roll operated upon, and the carriage being supported and guided merely upon the V-shaped guide 6 there is no tendency to move the carriage vertically or to move or bind on or in ways or guides; also, that in the present embodiment the center of the roller operated upon is between the support or bed 2 and the grinding-wheel, which obviates any springing or binding of the parts, and that the carriage being at least as long or longer than the ways 6 any wear on the latter is uniform throughout the length and will insure the uniform grinding of the roller operated upon.

I claim as my invention—

1. In a grinding-machine, the combination with a stationary frame having a supporting guide or way thereon, and a bearing-surface on one face beneath the way, of a reciprocating carriage supported on the way and engaging the bearing-face, a grinding-wheel, and roller-supports on the carriage arranged between the bearing-surface in the frame and the grinding-wheel.

2. In a grinding-machine, the combination with a stationary frame having a supporting way or guide thereon, of a reciprocating carriage having a bearing-surface longer than the way and movable thereon, roller-supports on the carriage and means for rotating a roller therein and a grinding-wheel for operating upon the surface of a roller held in the bearings.

3. In a grinding-machine, the combination with a stationary frame having a guide or way at the upper side and a bearing-face below it, of a movable carriage suspended on the way and longer than the latter and operating against the bearing-face on the frame, roller-holding devices on the carriage arranged below the plane of the supporting-way and a grinding-wheel for operating upon the surface of a roller on the carriage.

4. In a grinding-machine, the combination with a stationary frame having a V-shaped guide or way at the upper portion thereof and a smooth bearing-face below and beneath the guide, of a carriage suspended on the way and engaging the face, means for rotating a roller on the carriage and a grinding-roll for operating upon a roller held on the carriage.

5. In a grinding-machine, the combination with a stationary frame having the guide or way at the upper side thereof, of a movable

carriage suspended upon the way and bearing against the face of the frame, brackets on the face of the carriage and roll-holding devices on the brackets, a grinding-wheel operating upon the roller in the holder and separate means for operating the grinding-wheel and the roll.

6. In a grinding-machine, the combination with a stationary frame having the guide or way at the upper side thereof, a movable carriage suspended upon the way and bearing against the face of the frame, roll-holding devices and means on the carriage for revolving the roll in its supports and a grinding-wheel mounted on a stationary frame for operating upon the roll.

7. In a grinding-machine, the combination with a stationary frame having the guide or way upon the upper side and the smooth bearing-face beneath the guide, of the movable carriage supported upon the guide and bearing against the face, vertically and horizontally adjustable brackets mounted upon the carriage having roll-holding devices thereon, means for revolving the roll movable with the carriage and a grinding-wheel for operating upon the roll.

8. In a grinding-machine, the combination with the support having the guide or way upon its upper side, of the movable carriage suspended upon the guide and bearing against the face of the support, roll-holding devices on the carriage, a grinding-wheel operating upon the roller, and a reciprocating mechanism for moving the roll past the face of the grinding-wheel.

9. In a grinding-machine, the combination with a support having the way or guide upon its upper side, the movable carriage operating thereon and bearing against the face of the support, and a reciprocating mechanism for operating the carriage, of the brackets mounted upon the carriage and adjustable relatively to each other, roll-holding devices on the brackets, means for revolving the roll upon its supports, and a grinding-wheel.

10. In a grinding-machine, the combination with the support having the guide upon its upper side, the movable carriage operating thereon and bearing against the face of the support and devices for reciprocating the carriage upon the support, of relatively adjustable brackets mounted upon the support, roll-holding devices on the brackets, and a grinding-wheel adjustable relatively to the carriage.

11. In a grinding-machine, the combination with a support a reciprocating carriage mounted thereon, and work-supporting devices on the carriage, of a grinding-wheel and yielding bearings therefor and adjustable laterally of the direction of the plane of movement of the carriage.

12. In a grinding-machine, the combination with a main frame, a reciprocating carriage thereon, and work-supporting devices on the carriage, of a support having guides, blocks

adjustable upon the guides, bearings yieldingly supported on the blocks and a grinding-wheel mounted in the bearings.

13. In a grinding-machine, the combination
5 with a frame having the bed, a movable carriage thereon and work-support mounted on the carriage, of a support having guides thereon, a grinding-wheel mounted upon a shaft
10 carried in bearings arranged upon opposite sides of the wheel, blocks sliding upon the guides and pivotal connections between the bearings and the blocks.

14. In a grinding-machine, the combination
15 with a frame having the bed, a movable carriage thereon having the work-support, of a support having the guides, sliding blocks mounted upon the latter, a grinding-wheel carried in bearings pivoted to the blocks, and
20 stops on the latter, means for holding the wheel in the forward position on the blocks and permitting its pivotal movement thereon and adjusting devices for moving the blocks on the guides.

15. In a grinding-machine, the combination
25 with a frame having the bed, a movable carriage thereon having the work-support, of the support having the guides, the blocks on the latter having the stops, a grinding-wheel mounted in bearings pivoted to the blocks in rear of the stops,
30 springs holding the bearings against the latter and permitting a movement of the wheel, and adjusting devices for moving the blocks simultaneously on the guides.

16. In a grinding-machine, the combination
35 with a frame, a movable carriage thereon having work-supporting devices and a support having the guides, of the grinding-wheel supported in bearings, blocks on the guides having the stops and pivotal connections between
40 the blocks and the bearings in rear of said stops, the shoulders on the blocks having the threaded apertures, the threaded shafts co-operating therewith and gear connections between their outer extremities for moving the
45 blocks simultaneously on the guides, springs normally holding the bearings forward against the stops, adjusting devices for regulating the pressure of the springs and means for holding the blocks rearward upon the
50 threaded shafts.

17. In a grinding-machine, the combination with a stationary bed having the guide or way upon its upper side, the bearing-face beneath the latter on the face of the bed, the movable carriage suspended from the upper guide and
55 resting upon the face, having roll-holding devices, of a roll-driving mechanism mounted upon an end of the carriage, adjustable connections between the driving mechanism and the roll, and a grinding-wheel operating upon
60 the roll.

18. In a grinding-machine, the combination with a stationary bed having the guide or way upon its upper side, the bearing-face beneath the latter, the movable carriage supported
65 upon the guide and face having bearings for the roll, of an arm on the carriage, a roll-operating member supported in a bearing thereon and provided with the central aperture, a shaft adjustable through said aperture adapted
70 to be driven by the member and a connecting device for securing the shaft to the roll, means for revolving the said member, and a grinding-wheel operating upon the roll.

19. In a grinding-machine, the combination
75 with a bed having the guides, a reciprocating carriage mounted thereon having bearings to support the roll, of an arm extending from one end of the carriage having the aperture, the gear operating therein, the shaft sliding
80 through the aperture and revolving with the gear, and the coupling loosely mounted upon the end of the shaft adapted to engage the axle on the roll, means for operating the gear and a grinding-wheel operating upon the roll.
85

20. In a roller-grinding machine, the combination with a stationary frame having a guide or way at the upper side thereof and a bearing-surface on one face beneath it, of a reciprocating carriage having a bearing-surface
90 supported on the guide or way and longer than the latter, and a surface engaging the face on the support, roller-supporting devices on the carriage, means for rotating a roller thereon, and a stationary grinding-wheel for
95 operating upon the surface of the roller.

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