(No Model.) 2 Sheets—Sheet 1.

D. J. DAVIDSON.

MACHINE FOR TRUING ROLLS.

No. 504,566. Patented Sept. 5, 1893.

Fig. 1.

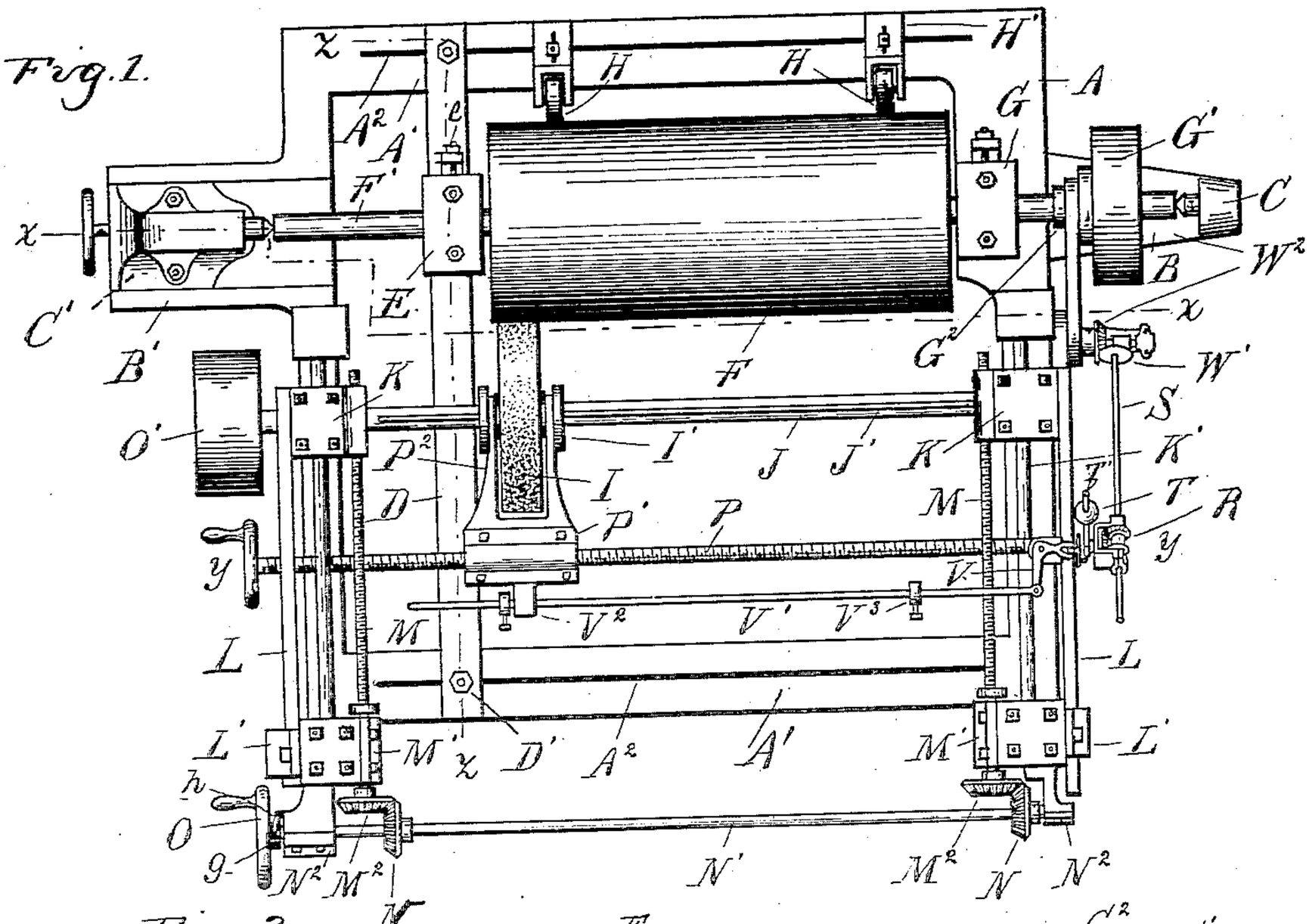


Fig. 2.

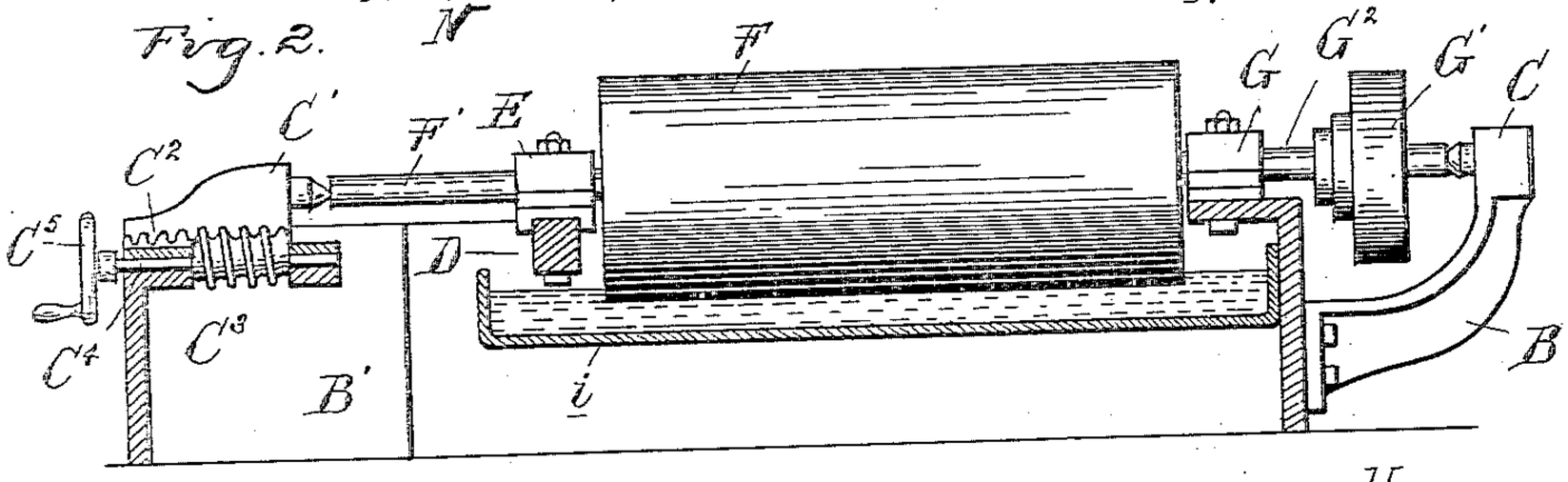
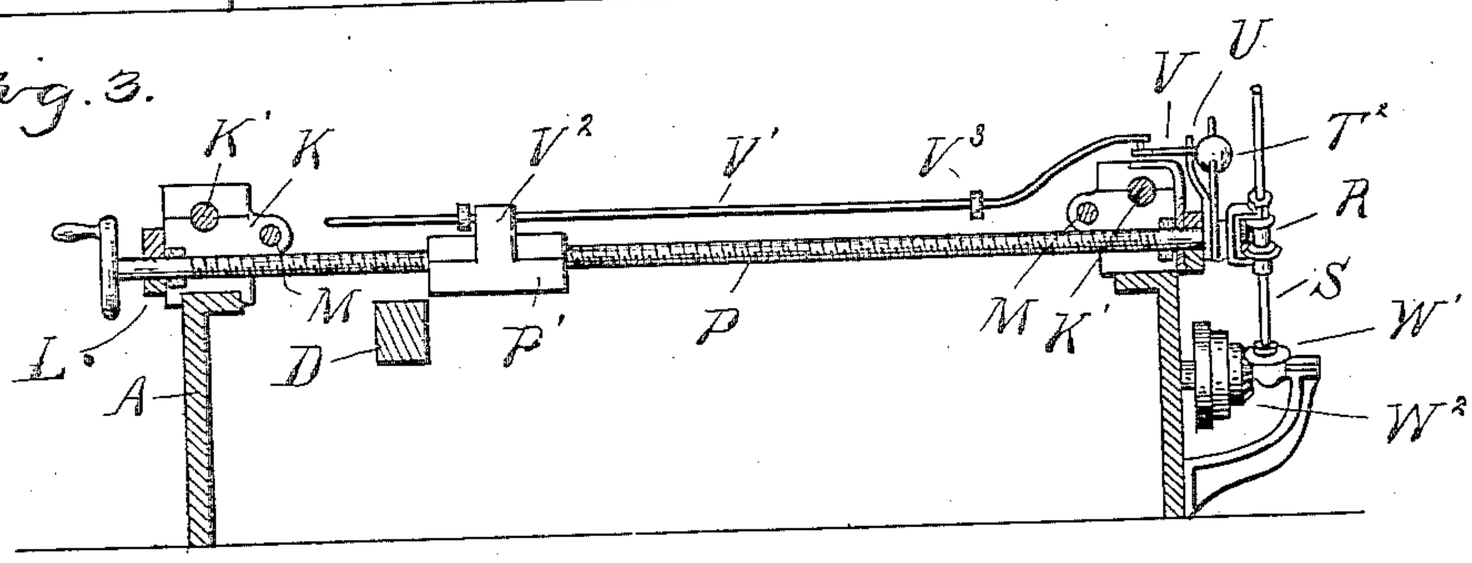


Fig. 3.



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D. J. DAVIDSON.

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Fig. 1.

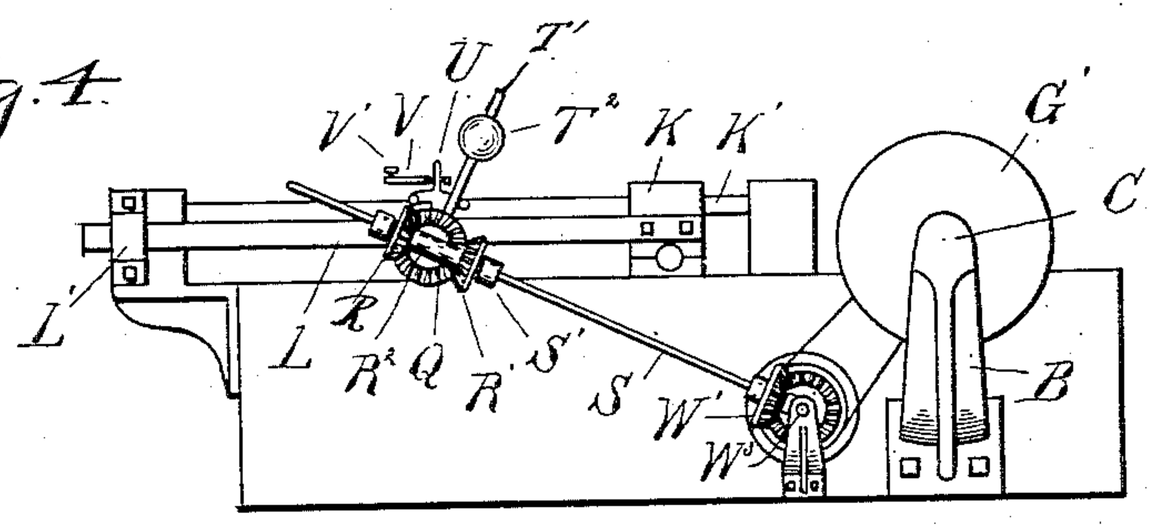


Fig. 6.

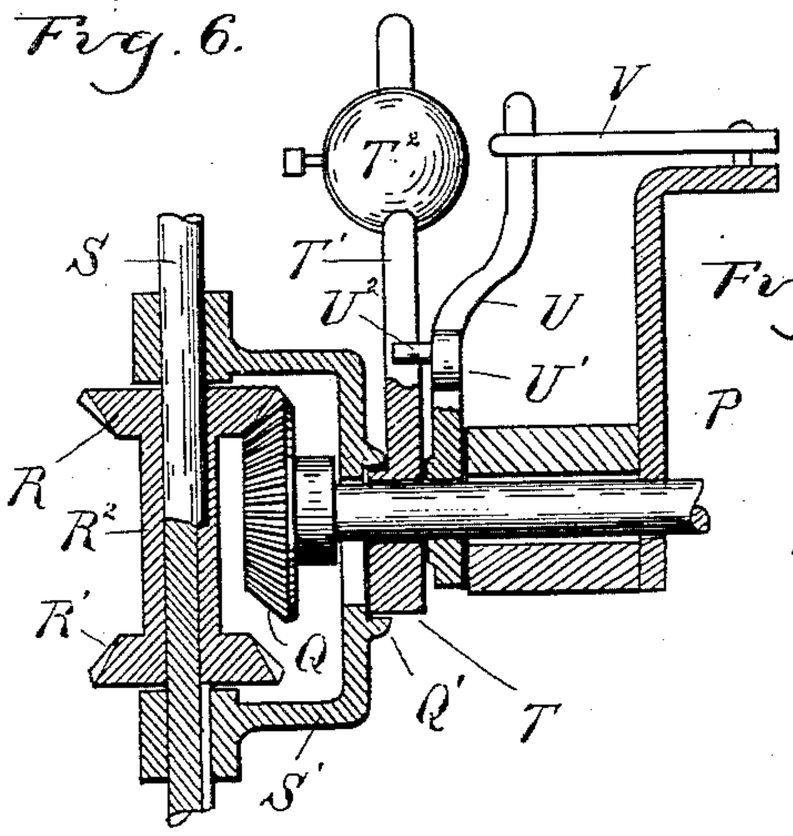


Fig. 7.

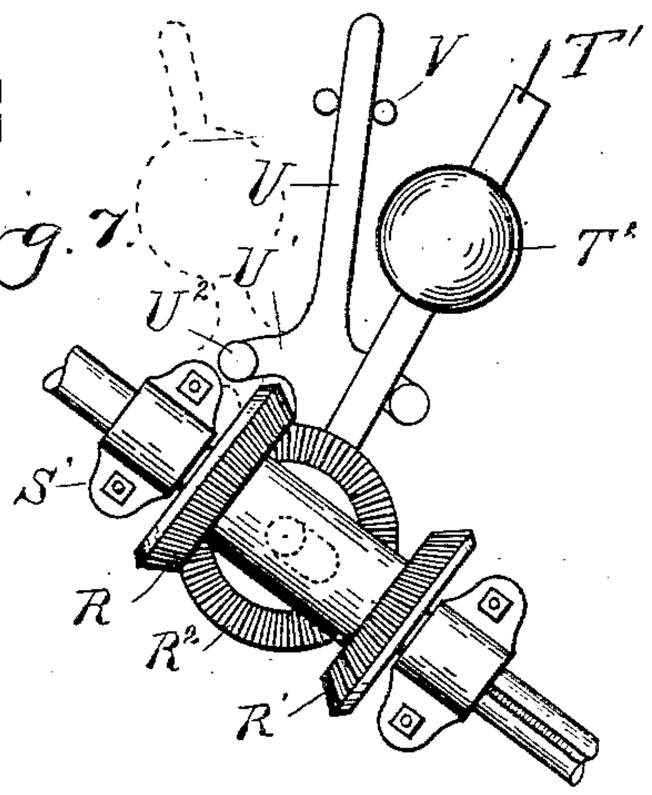
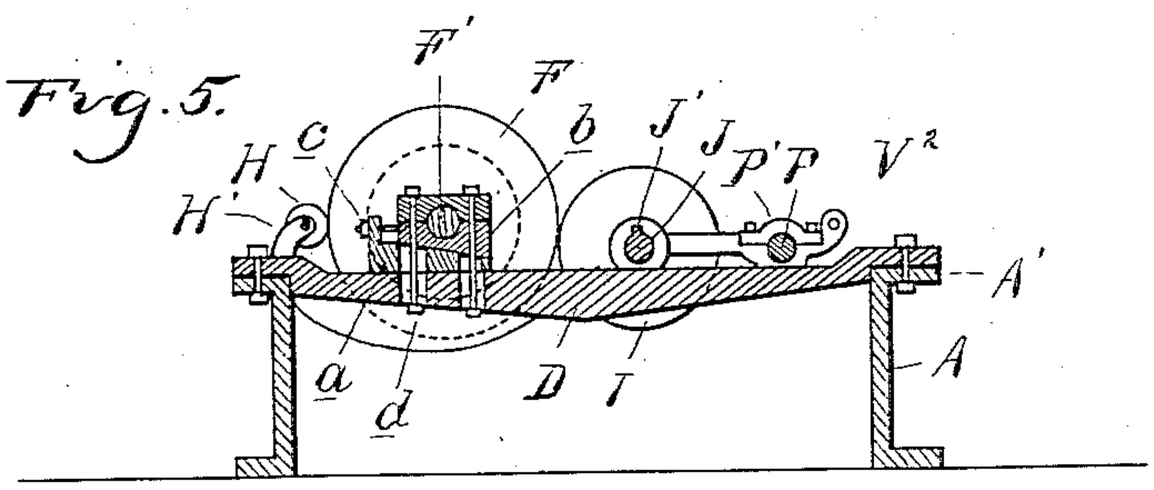


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR TRUING ROLLS.

SPECIFICATION forming part of Letters Patent No. 504,566, dated September 5, 1893.

Application filed September 26, 1892. Serial No. 446,894. (No model.)

To all whom it may concern:

Be it known that I, DAVID J. DAVIDSON, a citizen of the United States, residing at Brockway, in the county of St. Clair and State of Michigan, have invented certain new and useful Improvements in Machines for Truing Rolls, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention consists in the peculiar construction, arrangement and combination of the various parts, all as more fully hereinafter described.

In the said drawings, Figure 1 is a plan view of my improved machine. Fig. 2 is a cross section on line *x x* Fig. 1. Fig. 3 is a cross section on line *y y* Fig. 1. Fig. 4 is an end elevation looking at the right of Fig. 1. Fig. 5 is a section on line *z*—*z* Fig. 1. Fig. 6 is an enlarged elevation of the automatic reversing device for the feed mechanism. Fig. 7 is a section through the drive shaft of the reversing mechanism showing the actuating arms in elevation, being the position shown in dotted lines in Fig. 6.

My invention is especially intended to be used in truing rolls employed in roller mills by grinding the same.

A is the supporting frame for the operating parts of the machine which may be of any suitable construction. At opposite ends it is provided with extensions B B′ in which are secured the head and tail blocks C C′ respectively. The tail block slidingly engages a guide way in the upper face of the extension B′ and is provided on its under side with a worm gear C^2 with which a worm wheel C^3 on the shaft C^4 engages, a suitable hand wheel C^5 on the shaft forming a means for adjusting the tail block to and from the head block. The head and tail blocks are provided with the usual centers. The side bars A′ of the frame are provided with longitudinal slots A^2.

D is the cross-bar extending between the two side-bars of the frame and supported thereon at its ends.

D′ are clamping bolts which pass through the ends of the cross-bars and through slots A^2 in the side bars for clamping the cross-bar in any of its adjusted positions.

E is a box or bearing upon the cross-bar D and substantially in line with the centers of the head and tail blocks. This box has any suitable means of lateral and vertical adjustment, so that its bearing may be arranged in line with the centers. In Fig. 5 I have shown one means of accomplishing this adjustment, consisting of the bed plate *a* having an inclined upper face upon which rests the lower half *b* of the box or bearing, having a correspondingly inclined face.

The bearing *b* is adjusted up and down the incline on the bed-plate *a* by means of a set-screw *c*. The bed plate may be adjusted laterally upon the cross-bar and clamped in its adjusted position by means of the clamping bolts *d* passing through a slot in the cross-bar and clamping the two halves of the box together as well as clamping the bearing in its adjusted position.

F is the roll to be ground, which has the usual shaft F′ extending from both ends.

G is a box having the same horizontal and vertical adjustment as the box E but located on the end bar of the frame substantially in line with the centers.

G′ is the drive pulley for the roll, which is formed upon its sleeve having secured to or formed integral therewith the cone pulleys G^2. To secure the roll in position to be operated upon the operator removes the upper half of the boxes E and G and adjusts the cross bar D in such position that when the roll is in the machine its shaft will have a bearing at both ends in close proximity to the end of the roll. The operator then secures upon the end of the shaft F′ the drive pulley G′, places the roll in position with the shafts in the bearings and its end in the centers of the head and tail blocks. The tops of the boxes E and G are then secured in position and motion may be imparted to the roll by belting upon the pulley G′.

H are backing rollers bearing on the rear face of the roll F and supported in brackets H′ have lateral and longitudinal adjustment in relation to the roll.

I is the grinding wheel having a collar I′ sleeved upon the shaft J arranged transversely of the machine. The shaft is pro-

vided with a spline J′ and the collar is provided with a corresponding key way in which said spline engages. This shaft is journaled in the blocks K at each end which slidingly engage with the guides K′.

L are cross-bars secured to the blocks K extending parallel with the end bars of the frame and slidingly engaging in bearings L′ at the end thereof. The bars L, blocks K and shaft J form substantially a three sided frame, adjustable to and from the roll F by means of the screw shafts M, at each end, engaging suitable screw threaded bearings in the blocks and journaled in suitable boxes M′ at the side of the machine. These screw shafts are provided with bevel gear wheels M^2, which in turn mesh with the bevel pinions N upon the shaft N′ journaled in transverse bearings N^2 at the side of the machine, a hand wheel O being provided for rotating the shaft N′, thereby imparting motion to the screw shafts to adjust the three sided frame and with it the grinding wheel to or from the roll F. The shaft J is provided with a drive pulley O′ to which motion may be imparted from any suitable source of power.

It is necessary that a feed device be provided with a grinding wheel which will feed it gradually across the roll, it being maintained meantime in its adjusted position in relation to the roll. This feed mechanism I preferably construct as follows: P is a screw-shaft journaled in bearings in the sliding frame. P′ is a block suitably secured thereto to engage that shaft and having the arms P^2 engaging in grooves in the collar I′ of the grinding wheel so that when longitudinal motion is imparted to the block P′ the grinding wheel will be correspondingly moved. The screw shaft P is provided at its end with a beveled gear wheel Q, which is adapted to mesh with one of the two opposite beveled gear pinions R R′, which are connected together by the sleeve R^2 slidingly secured upon the drive shaft S, having a spline and key way engagement therewith, so that the rotation of the shaft will impart motion to the pinions. The upper end of this shaft is journaled in the yoke S′ which is apertured to allow the shaft P to pass therethrough, the aperture being of such size and shape as to allow of the longitudinal movement of the yoke upon the shaft. The yoke is provided with a circular flange Q′ eccentrically arranged in relation to the shaft P. In this circular flange the eccentric T engages, being journaled upon the shaft P. This eccentric is provided with an arm T′ upon which is adjustably secured a weight T^2. U is an actuating lever for the crank journaled upon the shaft P and provided with a head U′ having pins U^2 at each end upon opposite sides of the arm T′. V is a bell crank lever pivoted on the three-sided frame and engaging at one end with the upper end of the lever U. The other end of this bell crank lever is connected to the tripping rod V′ slidingly engaging through a bearing V^2 in the block P′ and it is provided with adjustable tripping blocks V^3 at each end. The lower end of the shaft P is journaled in the pivoted bearing W and is provided with a gear wheel W′ meshing with the pinion W^2 upon the transverse shaft W^3 which is driven by belt connections from the cone pulleys G^2.

The parts being thus constructed their operation is as follows: The roll being secured in position as previously described and the grinding wheel adjusted in proper position in relation to the roll as previously described and motion being imparted to the roll and grinding wheel in opposite directions, it is evident, (the parts of the feeding mechanism being previously adjusted) that the rotation of the shaft P will impart a rotary motion to the shaft T and feed the grinding wheel longitudinally across the face of the roll. As it nears the end of its movement the bearing V^2 will strike the tripping block V^3 and rock the bell crank lever V which in turn will move the lever U turning it upon its pivot until one of the pins U^2 strikes the arm T′ and rocks that arm from its normal position beyond the vertical position. As soon as it reaches this point the weight will throw the arm downward to the limit of its movement, rotating the eccentric T which will reciprocate the yoke S′ and cause the sleeve R^2 to slide along its shaft engaging the pinion of the opposite end of the sleeve thereby reversing the motion of the shaft P; when the block P′ has reached the other end of its travel the motion will again be reversed in the same manner. Thus it will be seen that notwithstanding the fact that the frame which carries the grinding wheel is laterally adjusted, the driving mechanism for the feed shaft is provided with means to compensate for that adjustment, whereby the drive mechanism is always in engagement with the shaft, regardless of the adjustment of the frame which carries it. I preferably lock the hand wheel O against accidental displacement or from being moved by the jarring of the machine by forming a ratchet wheel *g* on said hand wheel and a pawl *h* on the frame engaging therewith. The pawl acts to prevent the turning of the shaft to allow the withdrawal of the grinding wheel from the roll. I also preferably arrange a pan *i* below the wheel to contain water in which the lower face of the roll dips.

The machine which I have described is especially adapted for the use of the miller himself and is made portable so that it may be moved to any desired part of the mill where power can be obtained to drive the machinery.

What I claim as my invention is—

1. In a machine for truing rolls, the combination of the frame, the head and tail block, the boxes at each end, having vertical and lateral adjustment, a drive pulley adapted to be secured to the shaft of the roll, a longitudinally movable grinding wheel for engaging the roll, and means actuated by the pul-

ley for moving the wheel substantially as described.

2. In a machine for truing rolls, the combination of the frame, the tail and head blocks, the cross-bar having the adjustable box thereon, the complementary adjustable box on the frame, the drive pulley adapted to be secured upon the shaft of the roll, and a longitudinal movable grinding wheel actuated by the roll actuating means substantially as described.

3. In a machine for truing rolls, the combination of the frame, the head and tail blocks the cross bar extending across the frame, and adjustable thereon, the adjustable box thereon, the complementary adjustable box on the frame, the drive pulley adapted to be secured upon the shaft of the roll, the adjustable backing rolls H, and a longitudinal adjustable grinding wheel actuated by the roll actuating means substantially as described.

4. In a machine for truing rolls, the combination of the frame the roll shaft journaled in bearings therein, the drive pulleys on said shaft, a grinding wheel, and a feed device for longitudinally adjusting said grinding wheel driven from the roll shaft, substantially as described.

5. In a machine for truing rolls, the combination of the frame, the roll shaft journaled in bearings therein, the grinding wheel, a driven shaft on which said wheel slidingly engages, a laterally adjustable frame in which said shaft is journaled, and a feed device for longitudinally adjusting the grinding wheel comprising a screw shaft journaled in the grinding wheel frame, and mechanism for driving said screw shaft from the roll shaft, substantially as described.

6. In a machine for truing rolls, the combination of the frame, the roll shaft journaled in bearings therein, means for actuating the shaft the grinding wheel, a driven shaft on which said wheel slidingly engages, a laterally adjustable frame in which said shaft is journaled, a feed device for the grinding wheel comprising a screw shaft journaled in the grinding wheel frame, means for actuating the screw shaft, actuated by the roller-shaft actuating means and automatically reversing feed mechanism for said screw shaft, substantially as described.

7. In a machine for truing rolls, the combination with the bearings in the frame, the roll shaft journaled therein, the means for driving said roll shaft, the driven grinding wheel, the feed mechanism for said grinding wheel driven from the roll shaft and comprising the shaft W^3 having bevel gear thereon, the shaft P, journaled in a pivoted bearing and having a bevel pinion meshing with the gear on the shaft W^3, the sleeve R^2 keyed on the shaft P, and sliding thereon, the yoke S′ embracing the sleeve and forming the bearing for the upper end of the shaft P, the bevel gear wheels R R′, on the sleeve, the bevel pinion Q, the screw shaft P on which said pinion is secured, the flanged bearing Q on the yoke, the eccentric T engaging therein, the weighted arm T′ on said eccentric, the actuating lever U having head U^2 on opposite side of the arm T′, the bell crank lever V, tripper rod V′, tripper blocks V^3 and the block P′ adapted to strike said blocks and engaging the grinding wheel, substantially as described.

8. In a machine for truing rolls, the combination of the frame, the bearing for the roll shaft, the grinding wheel journaled in an adjustable frame, the feed shaft for said grinding wheel also journaled in said frame and a driving mechanism for said driving shaft having means for automatically compensating for the adjustment of the shaft, substantially as described.

9. In a machine for truing rolls, the combination of the frame, the bearing for the roll shaft, the grinding wheel journaled in the adjustable frame, the feed shaft for said grinding wheel journaled in said frame, a gear wheel on the end of said feed shaft, a sliding sleeve carrying opposing gear wheels, either of which is adapted to be thrown into engagement with the gear wheel on the feed shaft and a pivoted driving shaft for said sleeve slidingly engaging with the drive shaft, substantially as described.

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

DAVID J. DAVIDSON.

Witnesses:
WILLIAM H. BALLENTINE,
JENNIE B. BALLENTINE.