

No. 750,529.

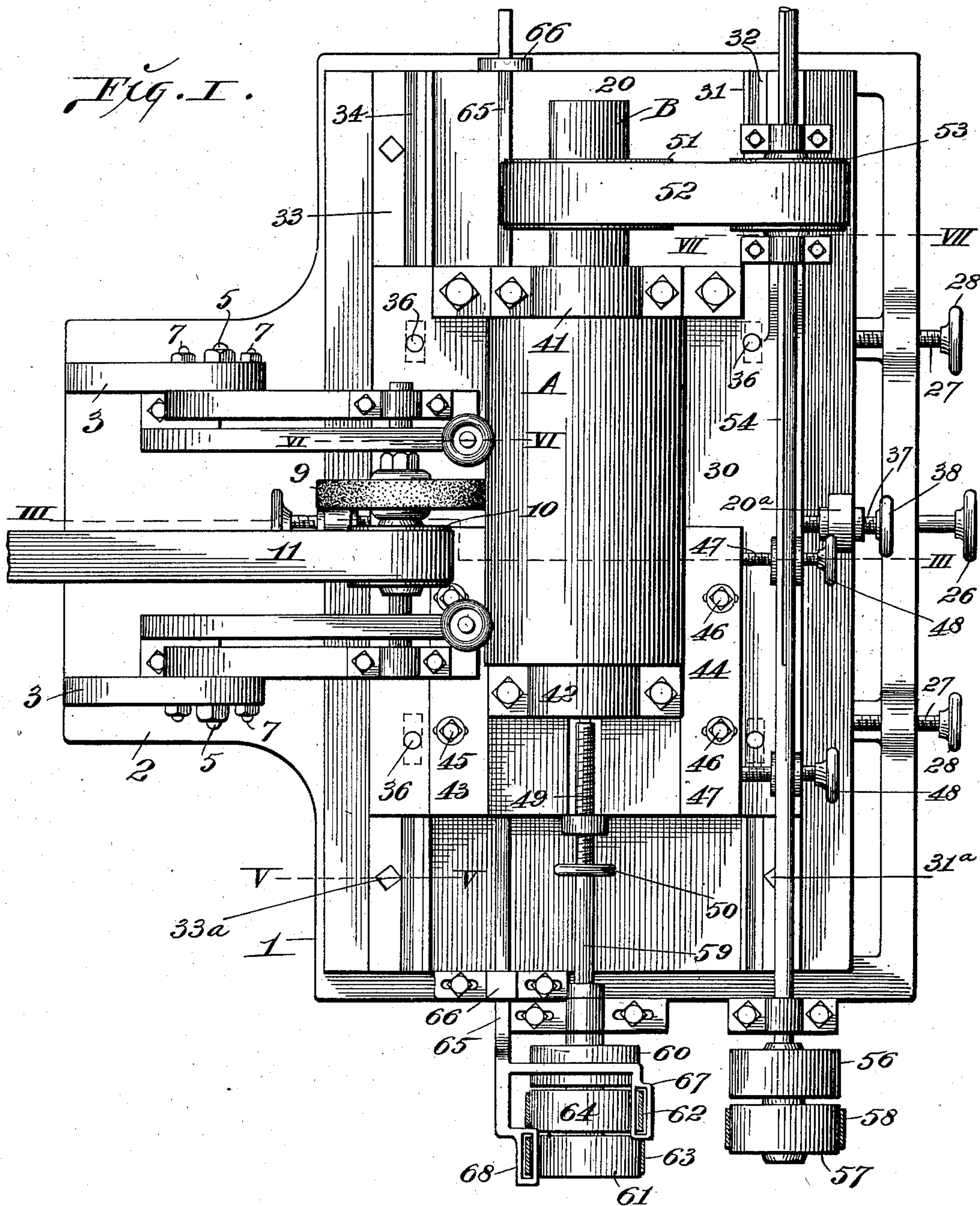
PATENTED JAN. 26, 1904.

G. R. FORD & B. F. ALLEN.
ROLL GRINDING APPARATUS.

APPLICATION FILED MAR. 12, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Attest:
M. Smith,
E. J. Knight

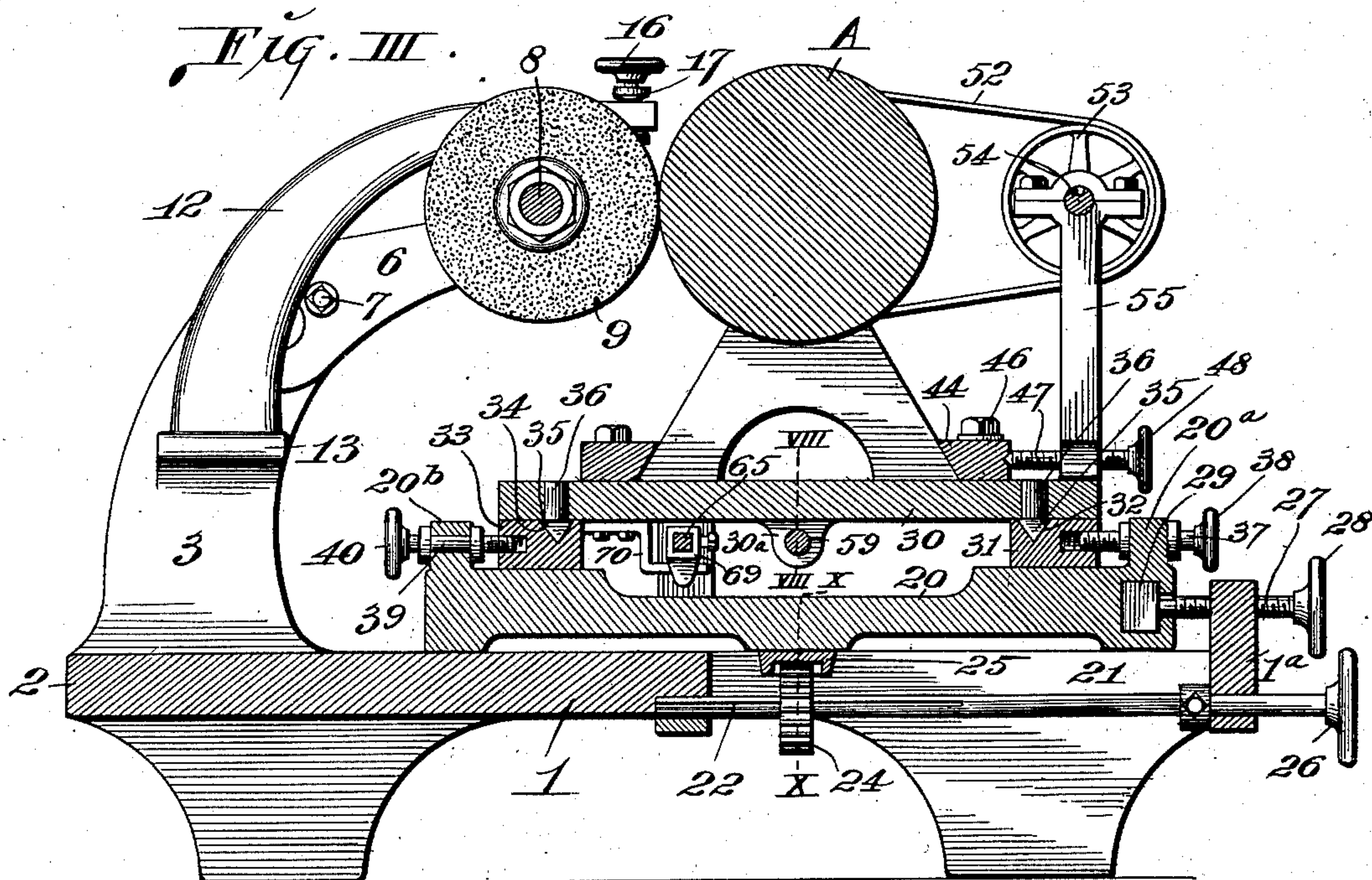
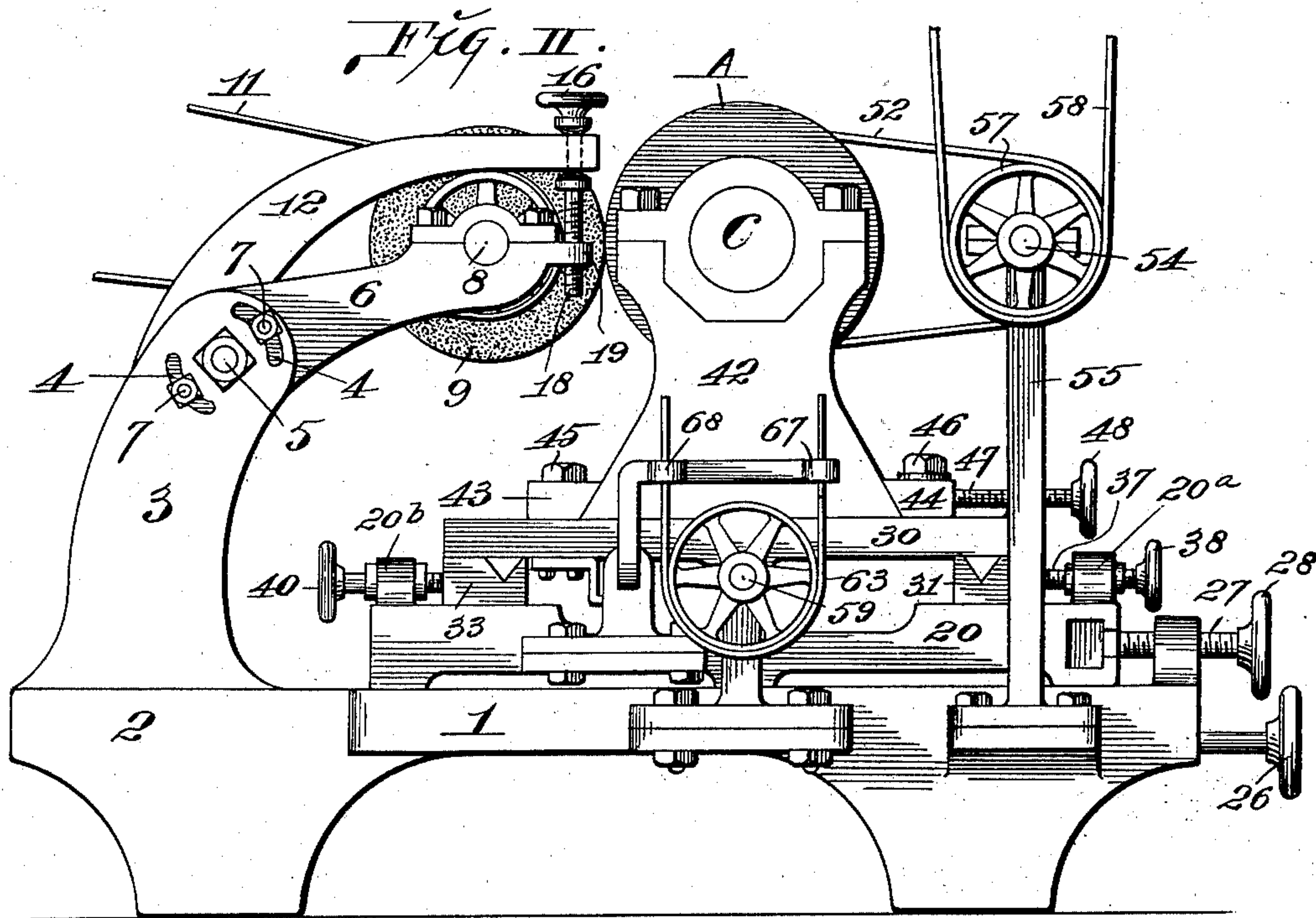
Inventors:
Geo. R. Ford and
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NO MODEL.

3 SHEETS—SHEET 2.



attest:—
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3 SHEETS—SHEET 3.

Fig. IV.

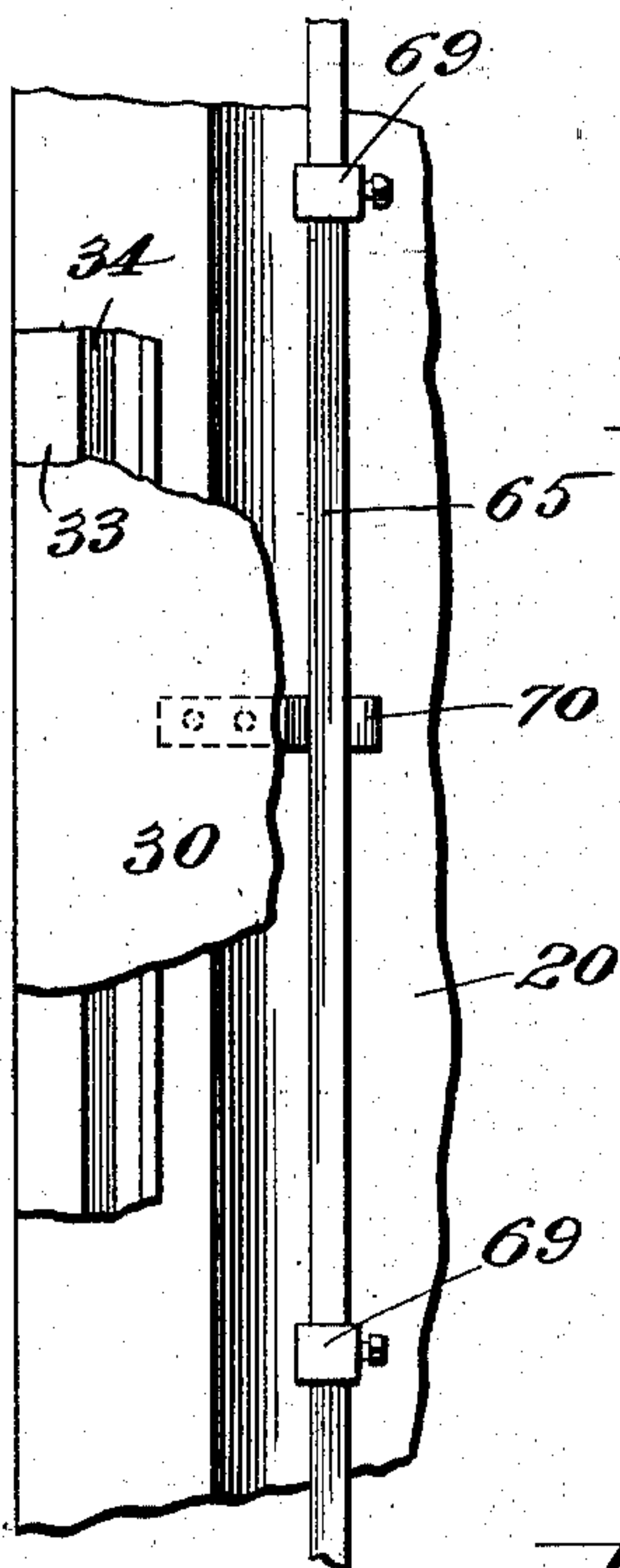


Fig. V.

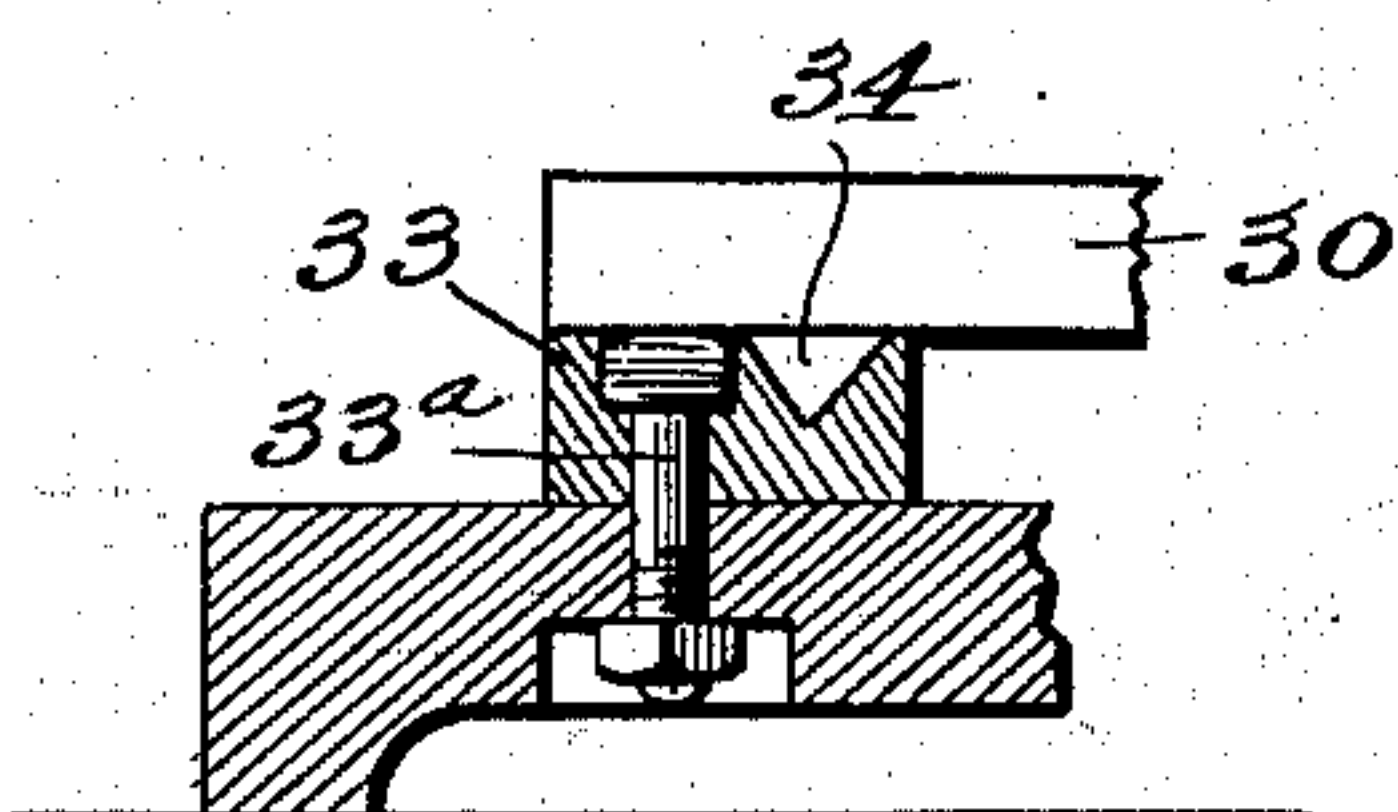


Fig. VI.

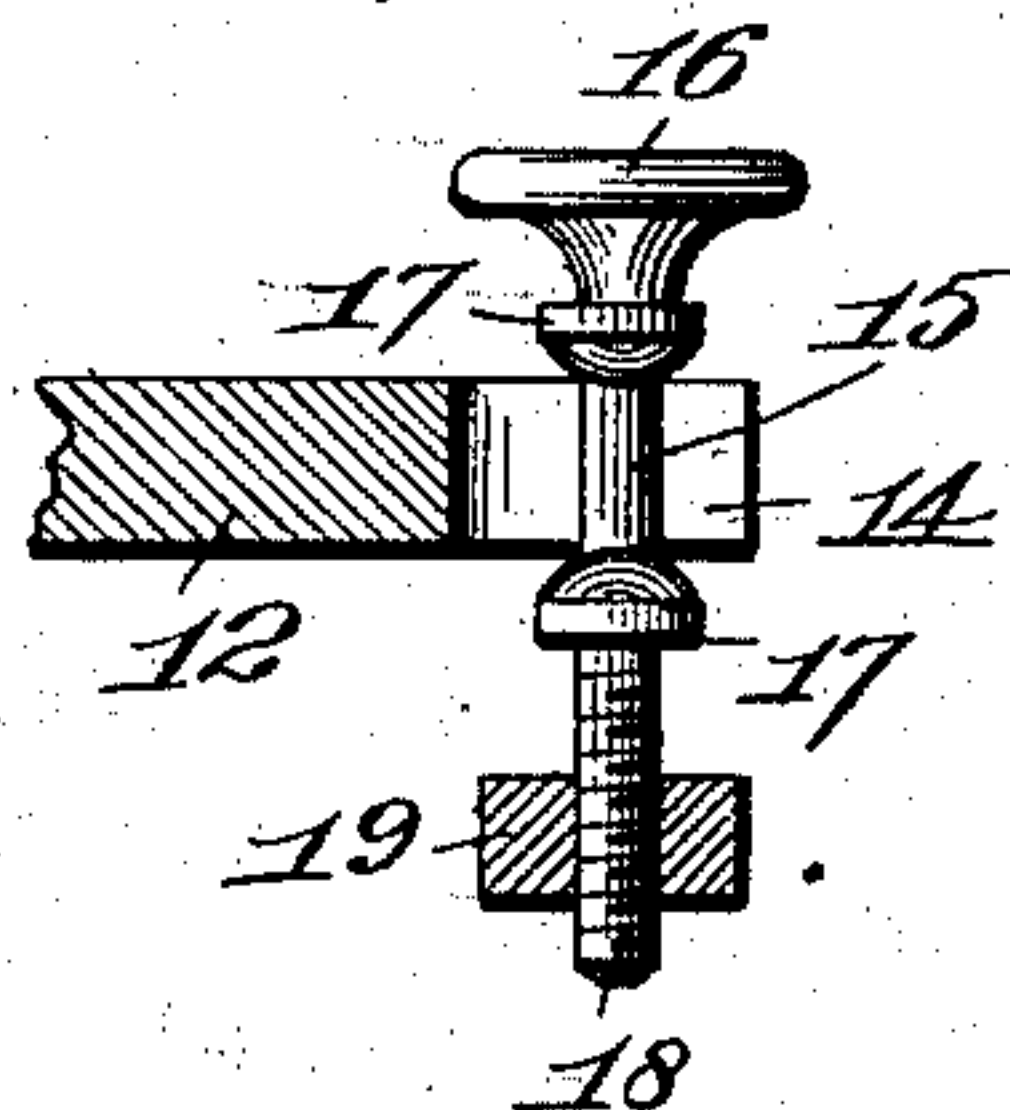


Fig. VII.

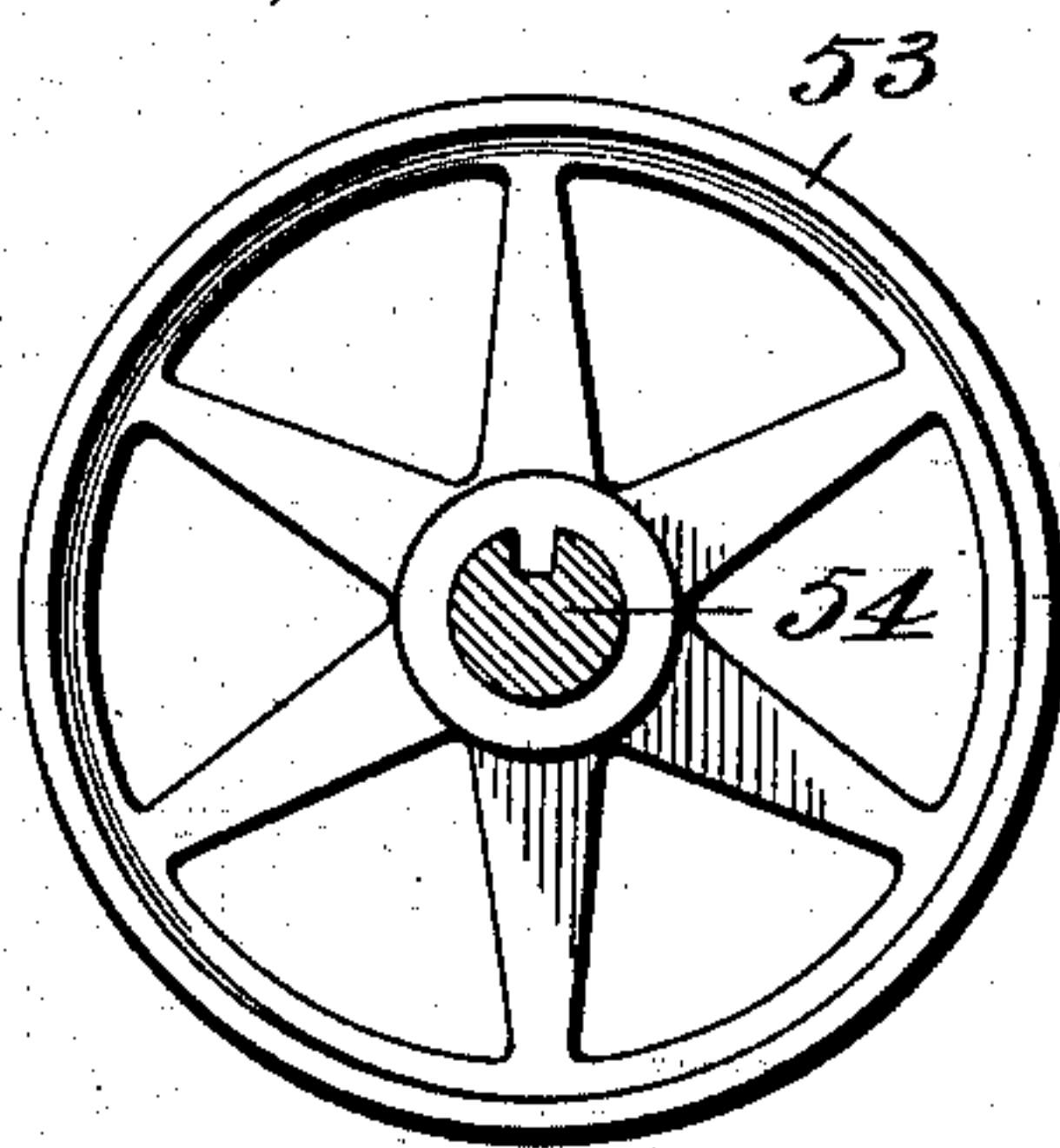


Fig. VIII.

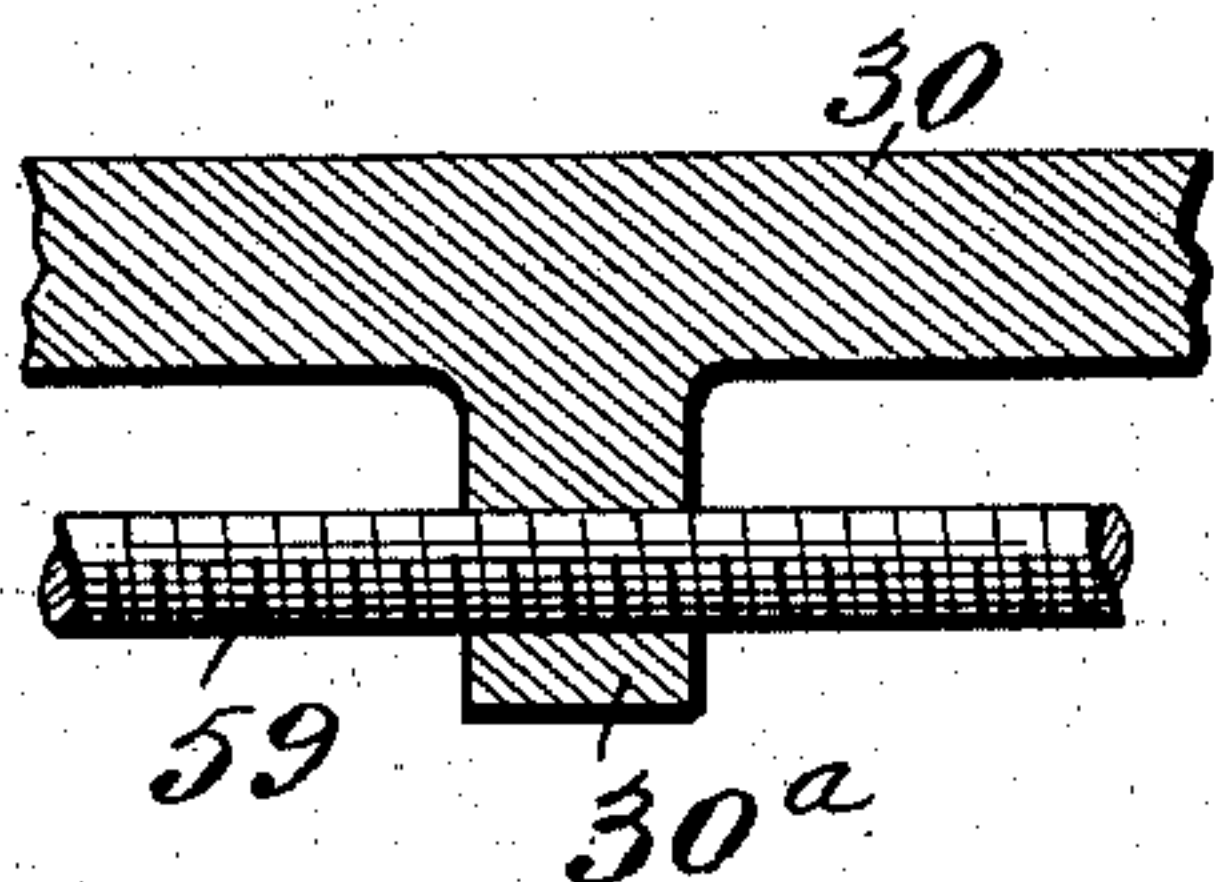


Fig. IX.

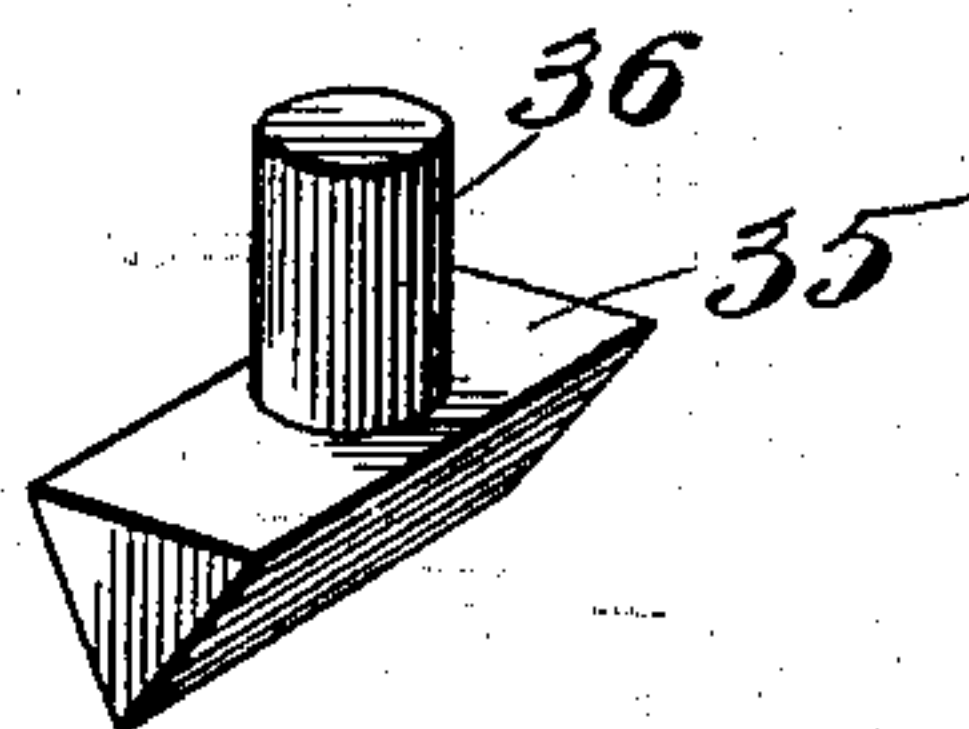
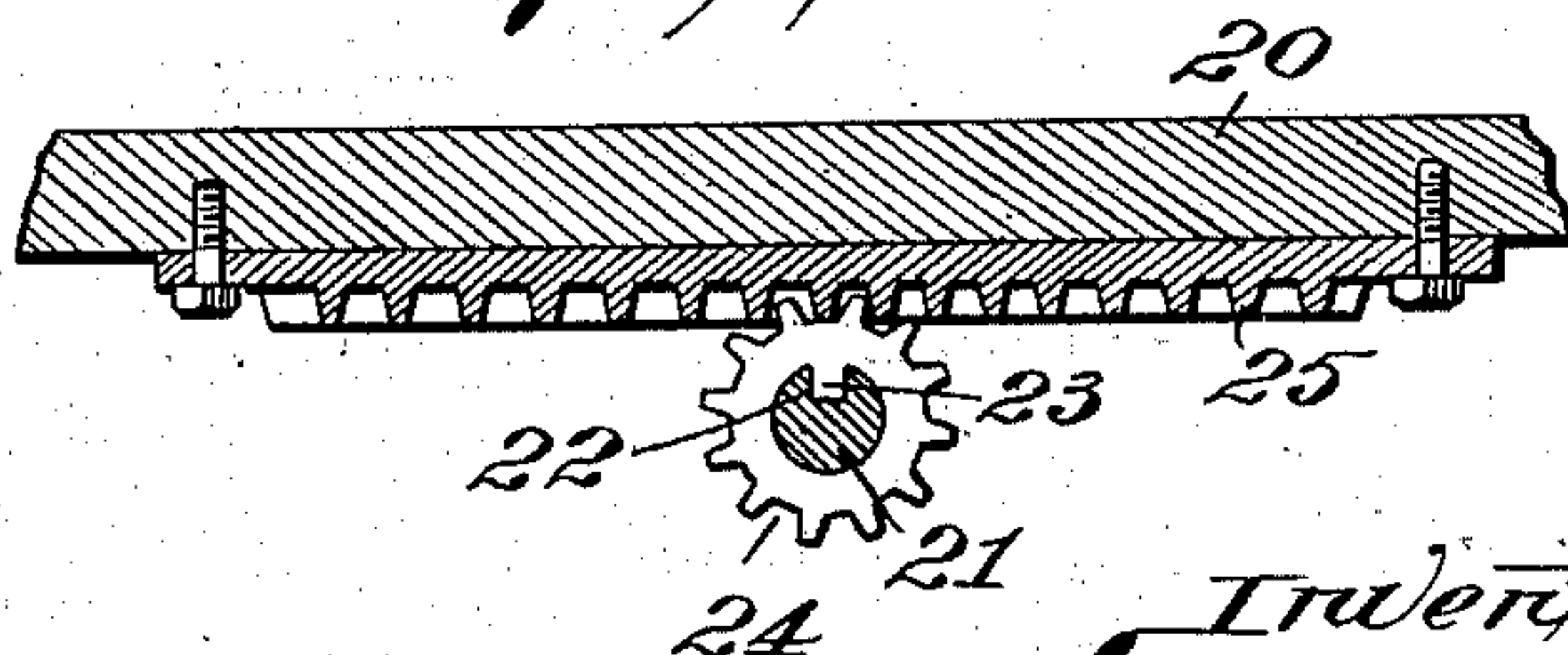


Fig. X.



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UNITED STATES PATENT OFFICE.

GEORGE R. FORD AND BENJAMIN F. ALLEN, OF ST. LOUIS, MISSOURI;
SAID ALLEN ASSIGNOR TO SAID FORD.

ROLL-GRINDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 750,529, dated January 26, 1904.

Application filed March 12, 1903. Serial No. 147,442. (No model.)

To all whom it may concern:

Be it known that we, GEORGE R. FORD and BENJAMIN F. ALLEN, citizens of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Roll - Grinding Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming
10 part of this specification.

Our invention relates to an apparatus for turning or dressing mill-rolls, the apparatus comprising a construction in which the grinding-wheel is held in a fixed position and the
15 roll to be operated upon is reciprocated across the face of said wheel.

The object of the invention is to furnish a construction in an apparatus of the character described whereby rolls may be rapidly and
20 efficiently ground with either a straight, convex, or concave surface.

The invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

25 Figure I is a top or plan view of our apparatus. Fig. II is an end elevation. Fig. III is a vertical section taken on irregular line III III, Fig. I. Fig. IV is a top view of portions of the roll-carriage, bed-plate, carriage-base, and shift-rod with parts broken away. Fig. V is a vertical section taken on line V V, Fig. I. Fig. VI is a vertical section taken on line VI VI, Fig. I. Fig. VII is a side view of the drive-pulley through which the roll is
35 rotated, the shaft bearing said pulley being shown in section taken on line VII VII, Fig. I. Fig. VIII is an enlarged vertical longitudinal section taken on line VIII VIII, Fig. III. Fig. IX is a perspective view of one of the roll-carriage shoes. Fig. X is a vertical longitudinal section taken on line X X, Fig. III.

1 designates the base or frame of our grinding apparatus, and 2 is an extension projecting rearwardly from said base.

45 3 designates standards surmounting the base extension 2, the standards 3 containing at their upper ends a pair of slots 4 and receiving pivot-bolts 5, located intermediate of said slots.

6 designates swing-arms mounted on the

pivot-bolts 5 and adapted to be held to said standards 3 by clamp-bolts 7, that are seated in the arms and pass through the slots 4 in said standards.

8 is a shaft journaled in the forward ends of the swing-arms 6 and bearing a grinding-wheel 9, that rotates between said swing-arms with the shaft 8, on which it is mounted. The grinding-wheel shaft 8 is furnished with a pulley 10, that receives a driving-belt 11, which leads thereto from a suitable source of power.

12 designates posts mounted upon and secured to lugs 13, projecting from the inside faces of the standards 3, as seen in Fig. III. These posts 12 extend upwardly and forwardly from the standards 3, and their forward ends terminate in forks 14, (see Fig. VI,) located above and in advance of the grinding-wheel shaft 8. (See Figs. II and III.) The posts 12 are utilized to support the swing-arms 6 and the grinding-wheel journaled thereto, and their forks receive the shanks of adjustment supporting-screws 15, that are provided with hand-wheels 16 and bear enlargements 17, that set against the top and bottom of the forks of the posts, as seen most clearly in Fig. VI. The screws 15 have threaded stems 18, that pass through threaded apertures in lugs 19, carried by the swing-arms 6. In obtaining the desired adjustment of support of the swing-arms 6 to properly position the grinding-wheel 9 the clamp-bolts 7 are first loosened, and then the supporting adjustment-screws 15 are manipulated through their hand-wheels to raise or lower the swing-arms with respect to the posts 12 until the desired position of the grinding-wheel is obtained, and the clamp-bolts 7 are then tightened to assist, in connection with the supporting-screws, in upholding the swing-arms 6.

20 designates a bed-plate reciprocally mounted on the base 1 of the apparatus for both longitudinal and transverse movement on said base. The bed-plate is moved longitudinally on the base through the medium of a rotatable rod 21, that is mounted in bearings in the base and a front bar 1^a, and the rod is provided with a longitudinal groove 22, that receives an internal tongue 23 of a pinion 24. (See

Figs. III and X.) The tongue 23 permits movement of the pinion 24 longitudinally of the rod 21, while holding it from turning on the rod. The pinion 24 meshes with a rack-bar 25, secured to the under side of the bed-plate 20.

26 is a hand-wheel fixed to the outer end of the rod 21 for the actuation thereof.

Transverse reciprocation of the bed-plate 20 is obtained through the medium of shift-screws 27, bearing hand-wheels 28 and mounted in the front frame-bar 1^a, in which they have screw-threaded engagement. The inner ends of the shift-screws 27 are loosely seated in slotted blocks 29. (See Figs. II and III.) Upon rotation of the shift-screws 27 the bed-plate 20 is reciprocated transversely between the front base-bar 1^a and the standards 3 of the apparatus by reason of their screw-threaded engagement in the front bar, and the bed-plate is moved forwardly or rearwardly to or from the vertical plane in which the grinding-wheel 9 is located. In this transverse reciprocation of the bed-plate the pinion 24 slides freely on its operating-rod 21, while at the same time being mounted in engagement with the rack 25, with which it meshes for longitudinal reciprocation of the bed-plate.

30 designates the base of a roll-supporting carriage that is reciprocally mounted on guide-bars 31 and 33, that contain, respectively, in their upper sides runways 32 and 34, preferably of V shape, as shown.

35 designates shoes, preferably of V shape to fit the contour of the runways 32 and 34 and having their shanks 36 seated in the carriage-base 30.

The guide-bars 31 and 33 are held to the bed-plate 20 by set-bolts 31^a and 33^a, (see Figs. I and V,) which secure the bars to the bed-plate near their outer ends.

37 is an adjustment-screw having a hand-wheel 38 and loosely mounted in a bearing 20^a at the front of the bed-plate 20. (See Figs. I, II, and III.) The inner end of this screw has engagement with the guide-bar 31, as seen in Fig. III. The location of the adjustment-screw 37 is at approximately the longitudinal center of said guide-bar, so that upon manipulation of the adjustment-screw the central portion of the guide-bar may be sprung laterally either rearwardly or forwardly for the purpose to be hereinafter explained.

39 is an adjustment-screw having a hand-wheel 40 and loosely mounted in a bearing 20^b at the rear side of the bed-plate 20. The inner end of this adjustment-screw 39 has engagement with the guide-bar 33 at a central location, so that the central portion of the guide-bar may be sprung forwardly or rearwardly in similar manner to that referred to with respect to the guide-bar 31.

A designates a roll to be ground in the apparatus, and B and C the spindles of said roll.

41 is a journal-standard mounted on the carriage-base 30 to receive the roll-spindle B.

42 is a movable tail-stock adjustably mounted on the carriage-base 30 to receive the roll-spindle C. The tail-stock 42 is positioned between a guide 43 and a guide 44. These guides are held to the carriage-base 30 by bolts 45 and 46, that pass through slots therein into the carriage-base. (See Fig. I.) The guide 44 is adapted to be adjusted laterally to the tail-stock 42 by adjustment-screws 47, that are mounted in bearing-lugs on the carriage-base, and are provided with hand-wheels 48 in order that when wear of the tail-stock of the guides occurs incident to shifting the tail-stock longitudinally on the carriage-base to accommodate rolls of varying lengths the guide 44 may be shifted to compensate for such wear.

49 is a shift-screw mounted in a bearing on the carriage-base and having a hand-wheel 50. This shift-screw has engagement with the tail-stock 42 to move it longitudinally on the carriage-base to adjust the tail-stock properly with respect to the standard support the roll A that is to be operated upon.

51 is a pulley on the roll-spindle B that receives a belt 52, which travels on a pulley 53, feathered to a longitudinally-grooved drive-shaft 54, journaled in supporting-posts 55. The drive-shaft 54, through the medium of which the roll A is rotated by the operation of the belt 52, is equipped with tight and loose pulleys 56 and 57, that are adapted to receive a power-transmitting belt 58. (See Figs. I and II.)

59 is a feed-screw that passes through a screw-threaded lug 30^a, carried by the carriage-base 30 (see Figs. III and VIII) and through the medium of which the roll-carrying carriage is reciprocated in a longitudinal direction with respect to the grinding-wheel 9. This feed-screw 59 has fixed to it tight pulleys 60 and 61, that are adapted to receive power-transmitting belts 62 and 63. Intermediate of the tight pulleys on the feed-screw is a loose pulley 64, on which either of the belts 62 or 63 travels when the other of said belts is acting to revolve the feed-screw by traveling on the corresponding tight pulley.

65 is a shifter-rod extending longitudinally of the apparatus and slidably mounted in guides 66. (See Fig. I.) This shifter-rod is provided with a loop-arm 67, that receives the belt 62, and a loop-arm 68, that receives the belt 63.

69 designates collars adjustably secured to the shifter-rod at a central location and adapted to be engaged by a trip-finger 70, depending from the roll-carriage base 30. (See Figs. II, III, and VI.) At the predetermined limit of travel of the roll-carriage in each direction the trip-finger 70 strikes the collar-finger which it approaches and moves the shifter-rod 65 longitudinally in a corresponding direction and causes the belt 62 or 63, previously

operating to rotate the feed-screw 59 to be shifted onto the loose pulley 64 and the other belt to be shifted from said loose pulley onto the other tight pulley to effect reverse rotation of the feed-screw and cause the roll-carriage to reciprocate in a direction the reverse of its previous movement, thereby providing for continuous reciprocation to and fro of the roll-carriage. By this means the roll is reciprocated to and fro across the face of the opposing grinding-wheel 9.

In the practical use of our apparatus the grinding-wheel 9 and roll A are rotated and the grinding-wheel carriage is reciprocated in the manner hereinbefore fully explained. When it is desired to produce a straight ground face upon the roll operated upon, the guide-bars 31 and 33, in which the shoes 35 of the roll-carriage travel, are permitted to lie in straight lines for the guiding of said carriage to convey the roll across the face of the grinding-wheel, through the medium of which the grinding operation upon the roll is accomplished. The construction of the apparatus provides, however, for the direction of the roll-carriage out of a strictly longitudinal reciprocation into a curving path of travel, so that the grinding-wheel will be caused to operate to a greater extent centrally of the roll operated upon or to a greater extent at its ends to either concave or convex the roll. When it is desired to concave the roll, the guide-bars 31 and 33 are sprung rearwardly at their central portions through the medium of the adjustment-screws 37 and 39, thereby causing the roll-carriage to move rearwardly toward the grinding-wheel throughout the central portion of its travel, with the result that the grinding-wheel acts to a greater extent on the central portion of the roll to concave it. When it is desired to convex the roll, the guide-bars 31 and 33 are sprung forwardly by the adjustment of the screws 37 and 39 and the roll-carriage will travel in a forward curving path, with the result that the roll receives greater action by the grinding-wheel at its ends than at its center, and its surface is therefore rendered of convex form.

We claim as our invention—

1. In a roll-grinding apparatus, the combination of a grinding-wheel, a reciprocating roll-carriage, guide-bars on which said carriage moves, and means for bowing said guide-

bars to vary the path of travel of said carriage, substantially as set forth.

2. In an apparatus of the character described, the combination of a grinding-wheel, a roll-carriage, guide-bars provided with runways and on which said carriage reciprocates, and shoes connected to said carriage and operating in said runways, substantially as set forth.

3. In an apparatus of the character described, the combination of a grinding-wheel, a roll-carriage, guide-bars provided with runways and on which said carriage reciprocates, shoes connected to said carriage and operating in said runways, and means for bowing said guide-bars to vary the path of travel of said shoes, substantially as set forth.

4. In an apparatus of the character described, the combination of a reciprocating roll-carriage, and an adjustably-supported grinding-wheel, substantially as set forth.

5. In an apparatus of the character described, the combination of a reciprocating roll-carriage, a grinding-wheel and a vertically-adjustable support for said grinding-wheel, substantially as set forth.

6. In an apparatus of the character described, the combination of a reciprocating roll-carriage, a pair of standards, swing-arms adjustably connected to said standards, and a grinding-wheel journaled in said swing-arms, substantially as set forth.

7. In an apparatus of the character described, the combination of a reciprocating roll-carriage, a pair of standards, swing-arms pivoted to said standards, a grinding-wheel journaled in said swing-arms, posts adjacent to said swing-arms, and means whereby said swing-arms are adjustably connected to said posts, substantially as set forth.

8. In an apparatus of the character described, the combination of a reciprocating roll-carriage, a pair of standards, swing-arms pivoted to said standards, a grinding-wheel journaled in said swing-arms, posts adjacent to said swing-arms, and adjustment-screws connecting said swing-arms to said posts, substantially as set forth.

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In presence of—

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M. P. SMITH.