Nov. 6, 1951 H. OTTEN 2,574,349

MACHINE FOR GRINDING AND SMOOTHING ROLLERS

Filed March 28, 1950 3 Sheets-Sheet 1

Fig. 1

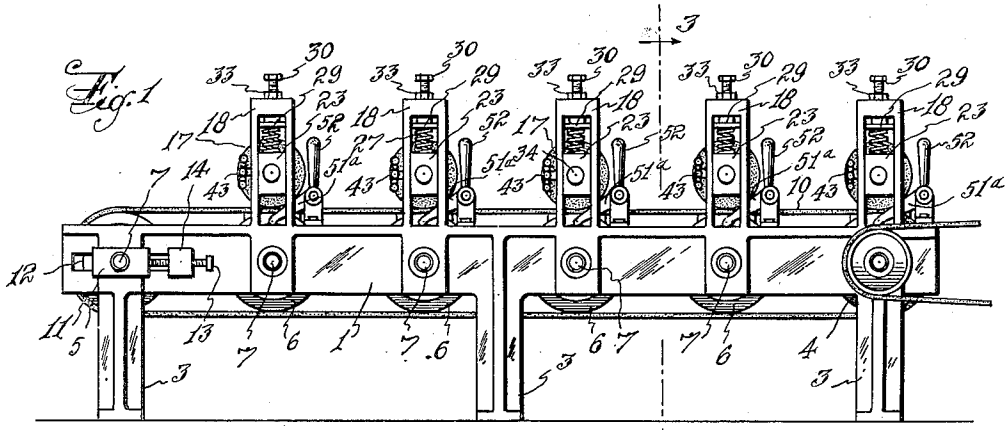


Fig. 2

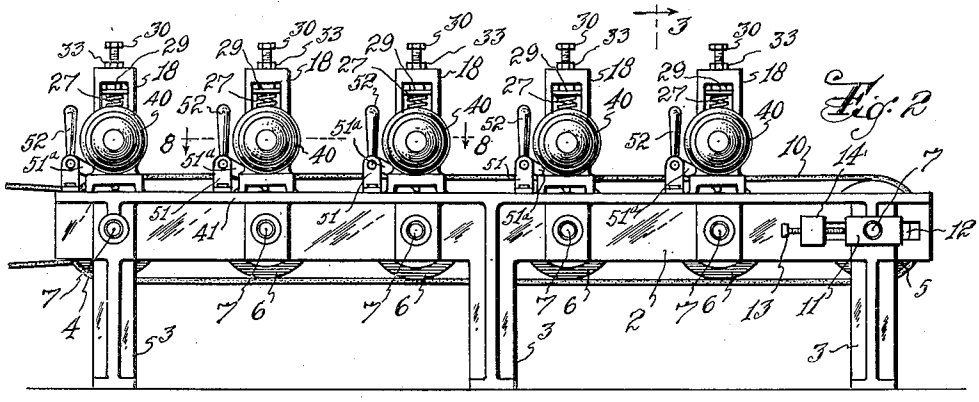
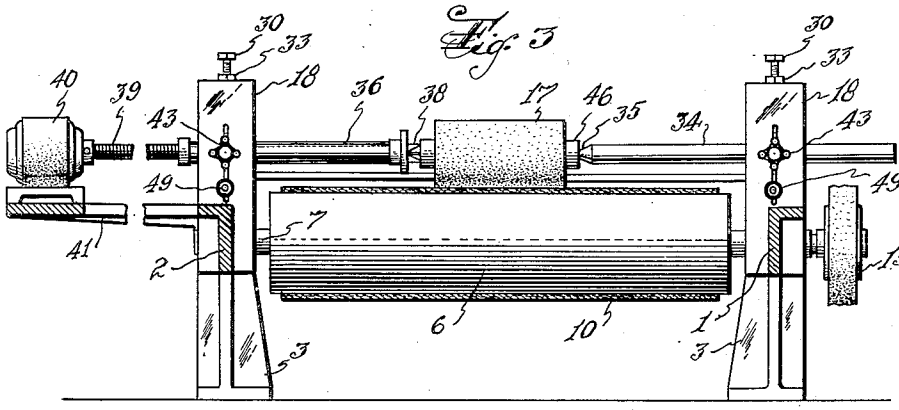


Fig. 3



Inventor:
Henry Otten,
BY Harry A. Cook,
Attorney.

Nov. 6, 1951 H. OTTEN 2,574,349

MACHINE FOR GRINDING AND SMOOTHING ROLLERS

Filed March 28, 1950 3 Sheets-Sheet 2

Fig. 4

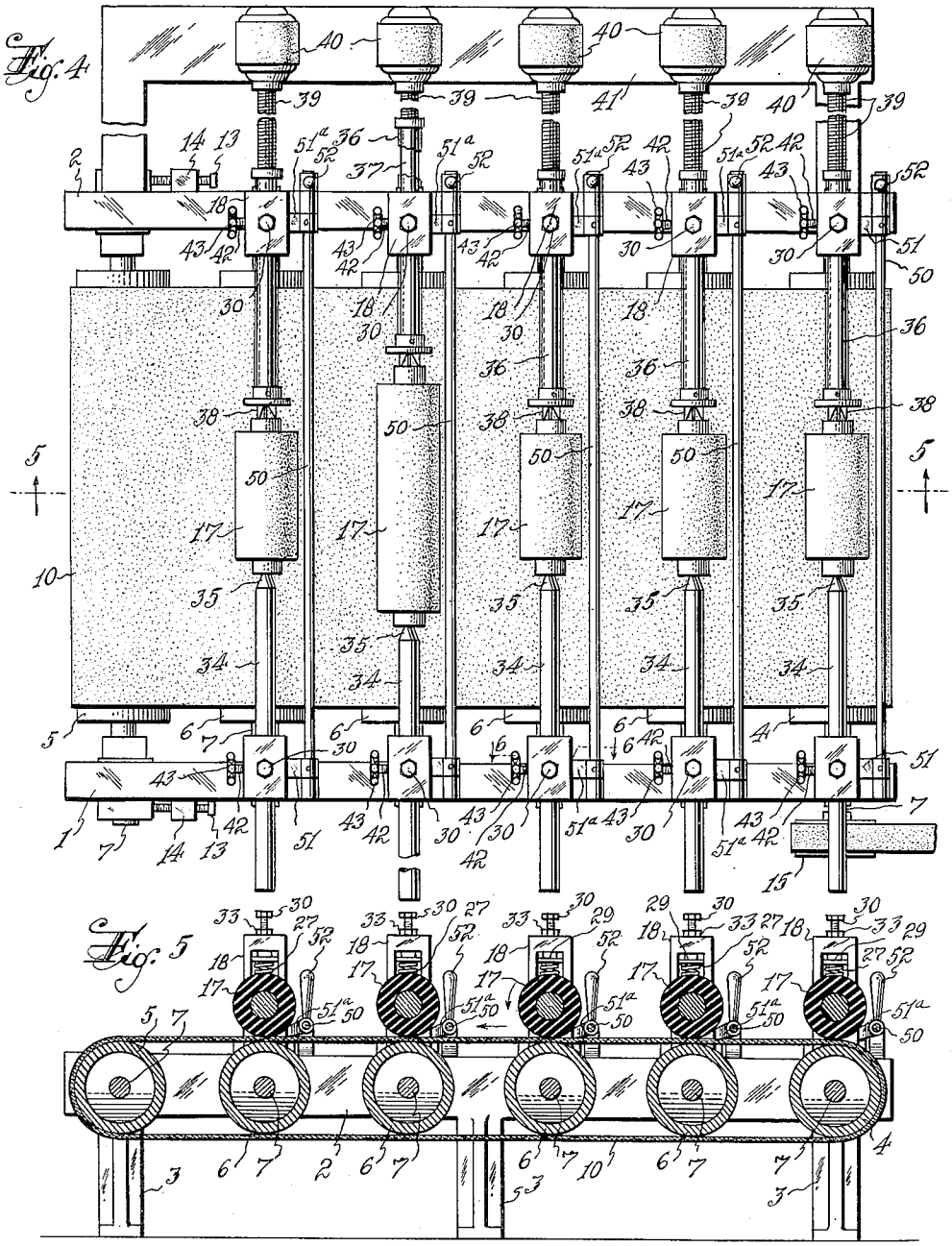


Fig. 5

Inventor:
Henry Otten,
BY Harry A. Cook,
Attorney.

Nov. 6, 1951 H. OTTEN 2,574,349

MACHINE FOR GRINDING AND SMOOTHING ROLLERS

Filed March 28, 1950 3 Sheets-Sheet 3

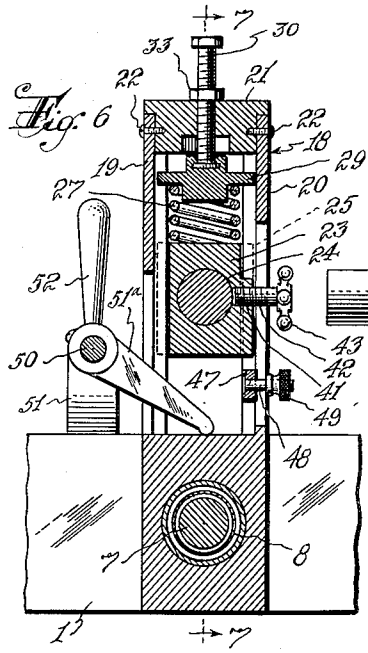


Fig. 6

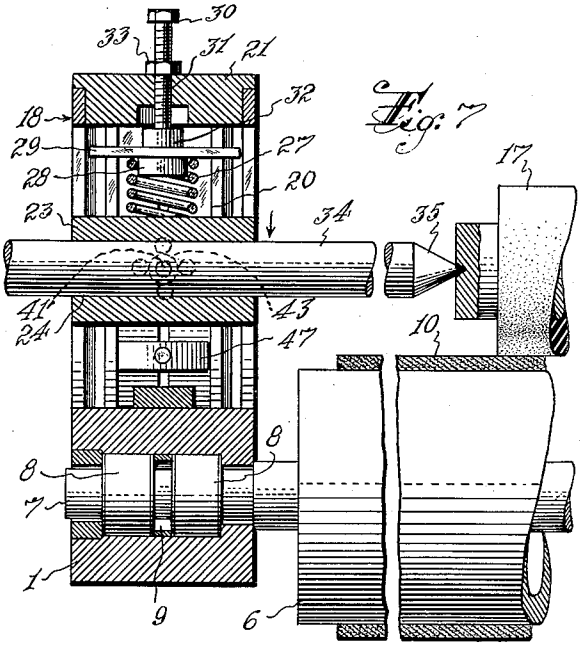


Fig. 7

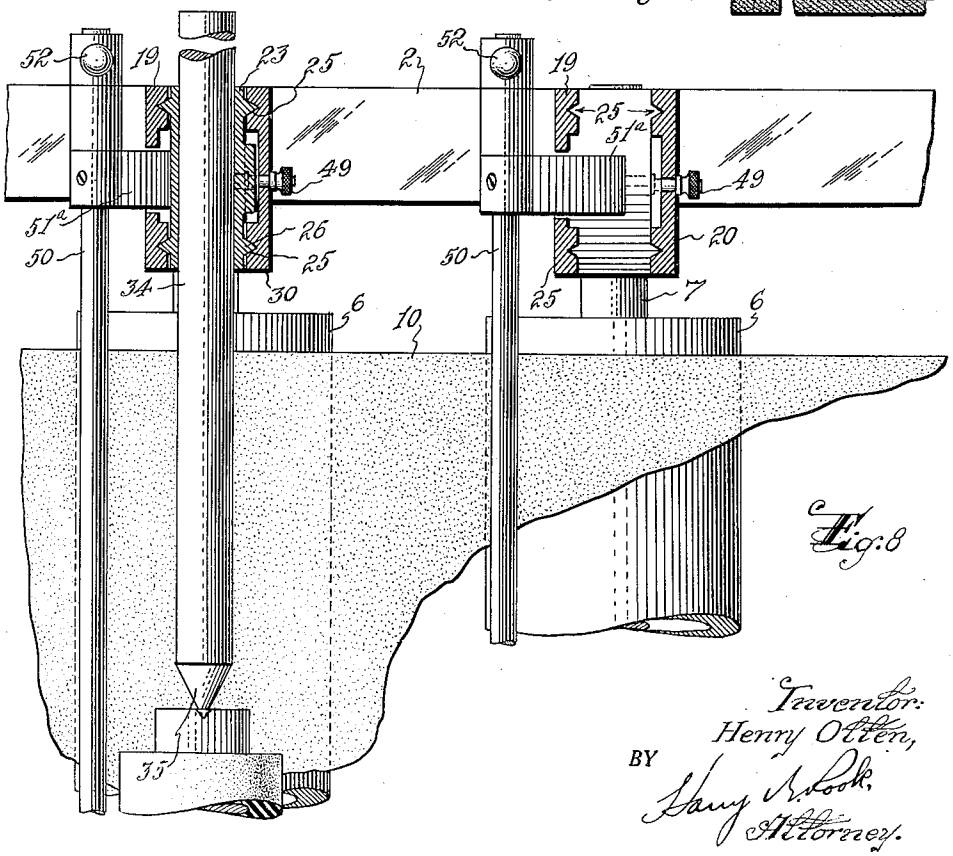


Fig. 8

Inventor:
Henry Otten,
BY
Gary N. Cook,
Attorney.

Patented Nov. 6, 1951

2,574,349

UNITED STATES PATENT OFFICE

2,574,349

MACHINE FOR GRINDING AND SMOOTHING ROLLERS

Henry Otten, Port Washington, N. Y.

Application March 28, 1950, Serial No. 152,448

8 Claims. (Cl. 51—145)

1

This invention relates to machines for grinding or smoothing cylindrical work pieces, particularly rubber or composition rollers such as typewriter platens. More particularly, the invention contemplates a machine of the type wherein the roller is rotated while being held in contact with an abrading surface, for example an endless belt having suitable abrasive material thereon.

One object of the invention is to provide a machine of this character embodying novel and improved means whereby a roller can be expeditiously and accurately ground or smoothed with a minimum of skill and attention required of the operator.

A further object of the invention is to provide a novel and improved machine for simultaneously grinding, smoothing or polishing a plurality of rollers of different sizes and lengths.

Another object of the invention is to provide means for adjusting the tension of the rollers against the abrading medium.

Still another object of the invention is to provide a machine of the character described which shall include mounting means for the roller to be ground which can be easily and quickly adjusted to accommodate rollers of different diameters and lengths and which will accurately hold the roller in contact with the abrading belt.

Other objects and advantages of the invention will be apparent from the description thereof to follow taken in connection with the accompanying drawings in which—

Figure 1 is a front view of a machine for grinding rubber rollers embodying my invention.

Figure 2 is a rear view thereof.

Figure 3 is a cross-sectional view taken on the plane of the line 3—3 of Figure 1.

Figure 4 is a top plan view thereof.

Figure 5 is a cross-sectional view taken on the plane of the line 5—5 of Figure 4.

Figure 6 is an enlarged cross-sectional view taken on the plane of the line 6—6 of Figure 4.

Figure 7 is a vertical sectional view taken on the plane of the line 7—7 of Figure 6.

Figure 8 is an enlarged sectional view taken on the plane of the line 8—8 of Figure 2 with parts being omitted.

The frame of the machine comprises front and rear beams 1 and 2, respectively, supported by legs 3. A number of spaced cylinders are rotatably mounted between the front and rear beams including end cylinders 4 and 5 and intermediate cylinders 6. The shafts 7 of these cylinders are journaled in roller bearing members 8,

2

8 mounted in openings 9 in the beams. An endless belt 10 of emery cloth or similar material travels over the cylinders and is mounted for adjustment upon the end cylinders 4 and 5. The shaft 7 of end cylinder 4 is fixed and extends forwardly of the front beam. The shaft 7 of cylinder 5 however has its ends journaled in bearing boxes 11 slidably mounted in horizontally disposed slots 12 formed in the beams adjacent their ends. This cylinder 5 is adjustable toward and away from the end cylinder 4 by means of set screws 13 passing through lugs 14 on the beams and engageable with the bearing boxes. By this arrangement, the endless belt 10 may be tightened or loosened in order to adjust the tension thereof. A pulley 15 fixed on the protruding end of the shaft of cylinder 4 is driven by a belt 16 connected to any suitable source of power. The cylinder 4 thus drives the endless belt 10 around the other cylinders, the belt frictionally rotating the cylinders during its travel.

In accordance with the present invention, provision is made for supporting a number of rubber rollers, such as the typewriter platens 17 shown in the drawings, in contact with the moving endless belt 10 whereby the surfaces of such platens are ground by the abrasive action of the moving belt. For this purpose, on top of each of the front and rear beams, over each of the shafts 7 of the cylinders, excepting the shaft of the end cylinder 5, is an upstanding frame member 18. As shown in detail in Figures 6 and 7, this frame consists of side plates 19 and 20 formed integrally with the beams. A top plate 21 closes the top of the frame and is secured to the side plates by screws 22. An elongated movable horizontally disposed bearing block 23 having a central passage 24 is slidable vertically between the plates 19 and 20. This movement is guided by V-shaped grooves 25 on the inner surfaces of said plates coacting with tapered protuberances 26 on each side of the block. The block is urged downwardly by a helical spring 27 having one end seated on the top of the block and its other end encircling the annular boss 28 on the lower face of a pressure plate 29 movable between the side plates. A set screw 30 passes through an opening 31 in the top plate 21 and has its inner end swivelly connected to an annular boss 32 on the top face of the plate. Tension of the spring on the block may be adjusted by means of this screw, and the parts may be held in adjusted position by a lock nut 33 on the screw.

As best seen in Figure 4, the top frames 18 are oppositely disposed on the front and rear beams. Each bearing block 23 of a frame 18 on the front beam 1 slidably supports a horizontally disposed shaft 34 in its passage 24, the inner end of the shaft being pointed as indicated at 35. On the rear beam, each bearing block 23 of a frame supports a horizontally disposed sleeve 36 for longitudinal movement, each sleeve extending through and projecting beyond the sides of the block. A rigid shaft 37 extends freely through and is rotatable in each sleeve 36 which has a shoulder or collar 37a abutting each end of the sleeve; and fastened on the inner end of the shaft is a spur center or other suitable means 38 for drivingly connecting said shaft 37 to the roller to be ground. The outer end of the shaft is operatively connected to one end of a flexible shaft 39 connected to an electric motor 40 supported on an extension frame member 41 protruding and spaced rearwardly of the rear frame beam 2. Longitudinal movement of the shafts 34 and 37 are prevented by set screws 42 having handles 43 passing through threaded openings 44 in the blocks 23 at right angles to the passages 24 and adapted to engage the sleeve 36 and the shaft 34 respectivley. A typewriter platen 17 or other rubber roller is supported between each pair of shafts 34 and 37, the spur driving members 38 penetrating or being inserted into holes in the adjacent ends of the axles or shafts 46 of the platens, while the inner pointed ends of shafts 34 provide pin point bearings for the opposite ends of said axles. The flexible shafts drive the platens and serve to compensate for any difference in lengths of the platens. In Figure 4 of the drawings, one platen is shown longer than the others. The flexible shaft permits this.

As seen in Figure 5, the platens 17 are positioned on the endless belt 10 directly over the cylinders so that the cylinders form rigid supports for the platens. The platens are held against the belt under compression by the helical springs 27, the compressive force of which is adjustable by the set screws 30 so that the platens will always be in operative position against the belt 10. The belt and platens move in the directions of the arrows as shown in Figure 5 thereby effecting the grinding action.

The downward movements of the bearing blocks 23 carrying the platen supporting shafts 34 and 37 are limited by abutting plates or stops 47 on the inner ends of screws 48 adapted to be moved up and down in slots 48 in the side plates 20 and adapted to be engaged by the bottom ends of the bearing blocks whereby further downward movements of the blocks are stopped and the grinding ceases. The stop members 47 are held in moved position by locking nuts 49 on the screws 48 engaging the outer surfaces of the plates 20.

I have also made provision for lifting the platens off of and away from the endless belt 10 when the grinding has been completed or for any other purposes. For this purpose, an elongated shaft 50 is rockably mounted in opposed brackets 51 on the front and rear beams of the frame, the brackets extending upwardly slightly from the beams. Each shaft 50 is disposed parallel with a pair of supporting shafts 34 and 37 and close to the pair of opposed top frames 18. A finger member or lever 51a is fastened adjacent each end of the shaft and projects laterally and downwardly therefrom with its free end positioned below the bottom end of the adjacent bearing block 23. An operating handle 52 is fastened to one end of each shaft whereby the shaft is rocked. When rocked in a counter clockwise direction as viewed in Figure 6, the lever will engage the bottom of the block and lift it upwardly thereby moving the supporting shaft carried by the block and the platen 17 mounted on said shaft off of and away from the endless belt, for removing the platen or for any other desired purposes.

When the endless belt is in motion and the platens are rotating in the directions shown by the arrows in Figure 5, the abrasive surface of the belt grinds the surfaces of the platens, the rotation of the platens distributing the grinding action completely around the surfaces. As the grinding progresses, the diameters of the platens will decrease and the bearing blocks 23 will descend until they strike the stop members 47 whereupon their descent is stopped and the grinding action ceases.

With this construction, it will be observed that the cylinders 4, 5 and 6 serve as accurate supports for the belt in opposition of the pressure exerted on the belt by the roller being ground, and the work-supporting centers 34 and 37 permit the rubber rollers to adjust themselves to the abrading belt and surfaces, whereby accurate grinding of the peripheries of the rubber rollers is ensured. Moreover, the stops 47 provide for automatic interruption of the grinding operation so that excessive grinding of the rollers is obviated.

While I have shown and described the invention as embodied in certain details of construction, it should be understood that this is primarily for the purpose of indicating the principles of the invention and that many modifications and changes may be bade in the structure of the machine within the spirit and scope of the invention.

What I claim is:

1. A roller grinding machine comprising a frame, a plurality of cylinders rotatably mounted on said frame, an endless abrading belt having one reach movable on and in contact with said cylinders, driving means and a driving connection between said driving means and at least one of said cylinders to rotate said cylinder, a bearing block at each of opposite sides of said reach of the endless abrading belt, guides on said frame in which said bearing blocks are mounted for sliding movement toward and from said belt reach, supporting centers for a roller to be ground one in each of said bearing blocks and one of which is rotatable, the axes of said centers being disposed in a common plane with the axis of one of said cylinders, whereby such a roller to be ground can be held in contact with said belt reach of said endless belt at the side thereof opposite said cylinder so that the cylinder will support said belt in opposition to the pressure of such roller on the belt, and driving means and a driving connection therebetween and said rotatable center to rotate the roller.

2. The roller grinding machine as defined in claim 1 wherein at least one of said roller supporting centers is mounted for longitudinal movement in its corresponding bearing block to provide for mounting rollers of different lengths between and on said centers.

3. The roller grinding machine as defined in claim 1 with the addition of means on said frame in the path of movement of said bearing blocks toward said belt reach to be abutted by said bear-

ing blocks for limiting movement of the roller being ground toward the belt reach.

4. A roller grinding machine as defined in claim 1 with the addition of means yieldingly urging said bearing blocks toward said belt reach to yieldingly hold the roller in contact with said belt reach.

5. A grinding machine as defined in claim 1 with the addition of means for moving said bearing blocks simultaneously away from the endless belt and for lifting the roller from said belt.

6. A machine for grinding rollers and the like comprising a frame, a plurality of cylinders rotatably mounted on said frame, driving means and a connection between said driving means and at least one of said cylinders to rotate said cylinder, an endless abrading belt carried by said cylinders, a plurality of pairs of spaced shafts mounted on said frame to removably support rollers to be ground, the axes of the shafts of each pair being in a common plane with the axis of one of said cylinders, one shaft of each pair being rotatable means to drivingly connect said rotatable shaft and the corresponding roller, a motor on the frame in line with each pair of shafts, a flexible shaft connecting each motor with the rotatable shaft of its respective pair of shafts whereby the roller supported by said pair of shafts is rotated, and spring means urging said shafts toward the endless belt whereby movement of the belt grinds the surfaces of the rollers.

7. The machine as defined in claim 6 with the addition of adjustable stops in the paths of said movement of the roller supporting shafts toward said belt for interrupting the grinding of the rollers.

8. A roller grinding machine comprising a

frame, a plurality of cylinders rotatably mounted on said frame, an endless abrading belt carried by said cylinders, driving means and a connection between said driving means and at least one of said cylinders to rotate said cylinder, means for removably mounting a roller to be ground on said frame over one of said cylinders so that said cylinder supports said belt in opposition to the pressure of said roller on the belt, said means for mounting a roller including a bearing block at each of opposite edges of said reach of the endless abrading belt, guides on said frame and in which said bearing blocks are mounted for sliding movement toward and from said belt reach, supporting centers for said roller one in each of said bearing blocks and one of which is rotatable, at least one of said roller supporting centers being longitudinally adjustable in its corresponding bearing block to provide for mounting rollers of different lengths between and on said centers, a motor on said frame having a driving shaft, and a flexible shaft connection between said motor shaft and said rotatable roller supporting center for rotating the latter.

HENRY OTTEN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
339,125	Allen	Apr. 6, 1886
1,057,785	Vance	Apr. 1, 1913
1,464,727	Rawson	Aug. 14, 1923
1,984,453	Bates	Dec. 18, 1934