J. JONES.

ROLLER MILL.

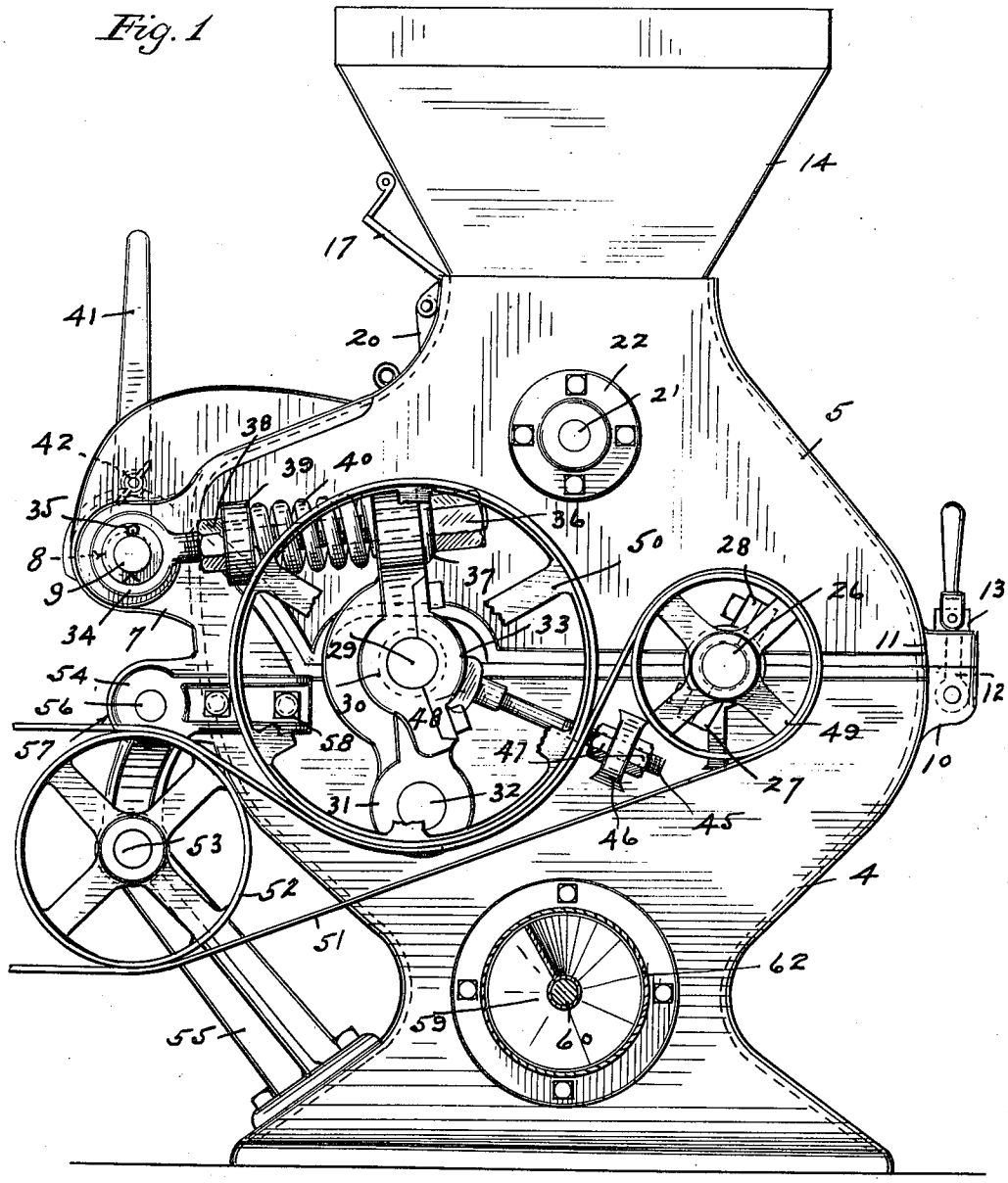
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1,311,352.

Patented July 29, 1919.

3 SHEETS—SHEET 1.

Fig. 1



Witnesses

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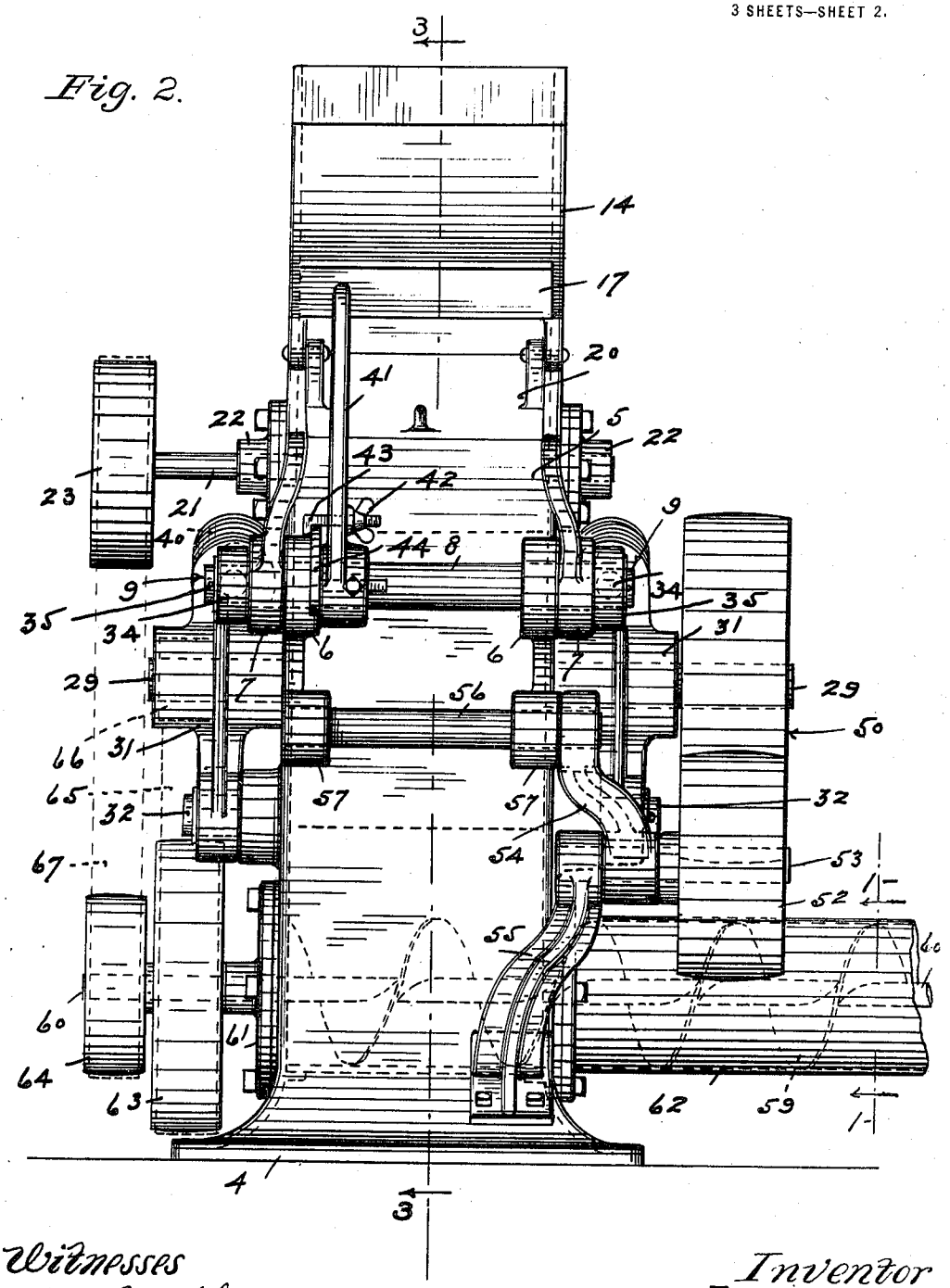
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3 SHEETS—SHEET 2.

Fig. 2.



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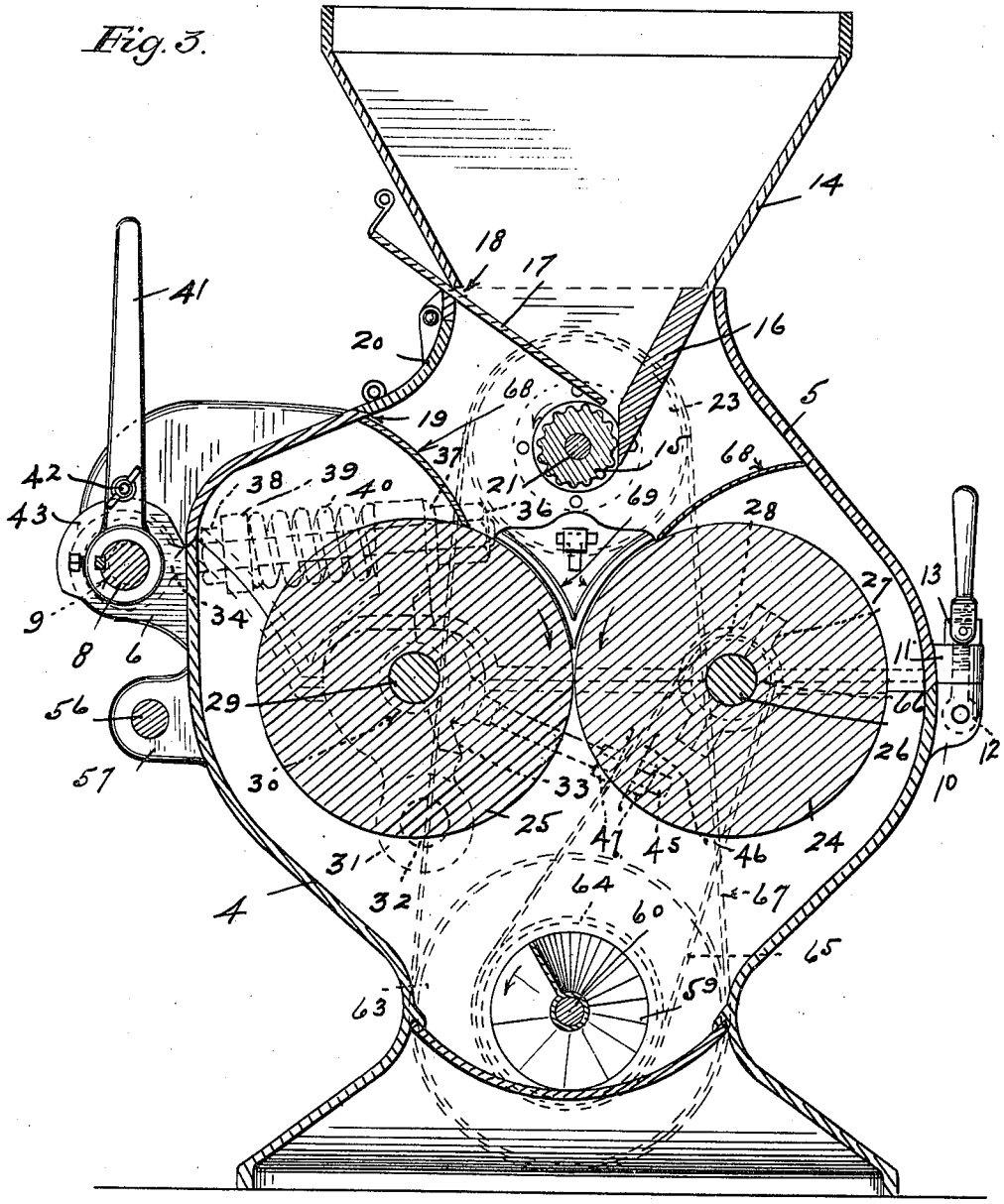
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3 SHEETS—SHEET 3.

Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN JONES, OF MINNEAPOLIS, MINNESOTA.

ROLLER-MILL.

1,311,352. Specification of Letters Patent. Patented July 29, 1919.

Application filed March 3, 1917. Serial No. 152,240.

To all whom it may concern:

Be it known that I, JOHN JONES, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Roller-Mills; 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 relates to improvements in roller mills; and, to this end, it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings,

Figure 1 is a right side elevation of the improved roller mill with some parts sectioned on the line 1—1 of Fig. 2;

Fig. 2 is a rear elevation of the same; and

Fig. 3 is a vertical section taken on the line 3—3 of Fig. 2.

The casing for the improved roller mill comprises a base section 4 and a top section 5. Integrally formed with the back of the base section 4, is a pair of heavy laterally spaced and axially alined hinge lugs 6. Embracing these hinge lugs 6 and axially alined therewith, is a pair of heavy hinge lugs 7 integrally formed with the top section 5. A heavy hinge pin 8 is mounted in the hinge lugs 6 and 7 and pivotally connects the top section 5 to the base section 4 for vertical swinging movement to and from a closed position. The ends of the hinge pin 8 are extended outward of the hinge lugs 7 and are reduced to form eccentrics 9, the purpose of which will presently appear.

Integrally formed with the front walls of the base section 4 and top section 5, are lower and upper bifurcated lugs 10 and 11, respectively. An eye-bolt 12 is pivoted to and between the prongs of the lug 10 for vertical swinging movement to and from an upright position between the prongs of the lug 11. A hand piece equipped nut 13 is provided for the eye-bolt 12 and is adapted to be turned into frictional engagement with the lug 11 to afford a lock to secure the top section 5 onto the base section 4.

Mounted on the top section 5, is a hopper 14 having an open bottom which opens into said top section. Extending transversely through the top section 5, just below the hopper 14, is a feed roller 15 having circumferentially spaced grooves in its periphery. A deflecting board 16 in the top section 5 directs the grain in the hopper onto the feed roller 15. Coöperating with the deflecting board 16, is a gate 17 mounted in an opening 18, between the top section 5 and hopper 14 at the back thereof, for sliding movement toward and from the deflecting board 16. Obviously, by adjusting this gate 17, the flow of grain to the feed roller 15 may be adjusted, at will. In the back of the top section 5, just below the gate 17, is a sight opening 19 normally closed by a door 20. This door 20 is hinged at its upper edge to the top section 5 and is arranged to be closed by gravity. By opening the door 20, the action of the feed roller 15 and the flow of grain thereto may be watched.

The shaft 21 for the feed roller 15 is journaled in cap bearings 22. If desired, the cap bearing, on the right side of the top section 5, may be cast integral therewith, but it is important to note that the removable cap bearing 22, on the left hand side of the top section 5, covers an opening in said top section having a diameter slightly greater than that of the feed roller 15 and through which, when the respective cap bearing 22 is removed, said feed roller may be moved axially into and out of said top section. Keyed to the left hand end of the shaft 21, is a driving pulley 23 for the feed roller 15.

Coöperating fixed and movable grinding rollers 24 and 25, respectively, are mounted in the casing of the mill and extend parallel to and below the feed roller 15. The shaft 25 for the fixed roller 24 is journaled in fixed bearings 27 integrally formed with the base section 4 and set oblique, with respect to the vertical. These bearings 27 are provided with removable caps 28, which face toward the movable roller 25. Said movable roller 25 is located in the same horizontal plane with the fixed roller 24 and its shaft 29 is journaled in bearings 30, formed in the intermediate portions of a pair of vertically disposed levers 31, located in the outside of the base section 4. Pivot pins 32 connect the lower ends of the levers 31 to the sides of the base section 4 for oscillatory movement radially toward and from the fixed roller 24. The bearings 30

are provided with caps 33 which face toward the caps of the bearings 27.

A pair of eye-bolts 34 are pivoted to the eccentrics 9 and their threaded ends are loosely extended through apertures in the upper or free ends of the levers 31. Washers and cotter pins 35 hold the eye-bolts 34 against removal from the eccentrics 9. On the threaded ends of the eye-bolts 34, are adjusting nuts 36. Washers 37 are interposed between the levers 31 and nuts 36. Also screwed onto the eye-bolts 34, are nuts 38 which afford adjustable abutments located between the eyes of the bolts and the levers 31. Washers 39 on the eye-bolts 34 bear against the outer face of the nut 38. Encircling the eye-bolts 34 and compressed between the levers 31 and washers 39, are coiled springs 40 which yieldingly hold said levers against the washer 37.

By adjusting the nuts 36, the levers 31 may be moved to carry the roller 25 either toward or from the roller 24, depending on what degree of fineness or coarseness the grain is to be ground. Under undue pressure between the rollers 24 and 25, caused by clogging or otherwise, the springs 40 will yield and allow the levers 31 to move longitudinally on the eye-bolts 34 and thereby separate said rollers. When the obstruction between the rollers 24 and 25 has been removed or passed therebetween, the springs 40 will immediately return the roller 25 to its predetermined set position.

A lever 41 is provided for oscillating the hinge pin 8, and hence, the eccentrics 9 on the ends thereof to impart endwise movement to the eye-bolts 34, and thereby radially move the roller 25 toward or from the roller 24. This lever 41 is keyed to the hinge pin 8, close to the left hand hinge lug 6. To lock the hinge pin 8 in different oscillated positions, a thumb-nut equipped bolt 42, having a hook-like head 43, is extended transversely through the lever 41 and transversely over a segmental flange 44 integrally formed with the adjacent hinge lug 6, with freedom for endwise sliding movement. The head 43 on the lock bolt 42 is arranged to engage the opposite face of the flange 44 from the lever 41 and, by adjusting the thumb-nut on the lock bolt 42, the head 43 thereof may be frictionally clamped onto said flange 44.

To prevent the movable roller 25 from coming in direct contact with the fixed roller 24 during the adjustment thereof, or, in case the caps 33 of the bearings 30 should work loose, I provide positive stops therefor. As shown, these stops are in the form of a pair of upwardly and rearwardly inclined rods 45 located, one on each side of the mill with their lower or screw-threaded ends extended through bores in lugs 46 integrally formed with the sides of the base section 4. Opposing nuts 47 on the screw-threaded ends of the rods 45 engage opposite faces of the lugs 46 and thereby rigidly, but adjustably hold said rods. Segmental heads 48, on the upper ends of the rods 45, directly engage the caps 33 of the bearings 30 and, as previously stated, afford positive stops therefor.

The driving connections for the rollers 24 and 25 are as follows:

On the right hand end of the shaft 26, is a relatively small pulley 49 and, on the shaft 29, is a relatively large pulley 50 alined with the pulley 49. A driving belt 51 driven by any suitable means, not shown, runs over the pulley 49 and the upper section thereof runs under the pulley 50. An idle pulley 52 is mounted to run within the belt 51 and holds the upper section thereof in direct engagement with the pulley 50 and the lower section thereof out of engagement with said pulley. By this arrangement of the belt and pulleys, the rollers 24 and 25 are driven in the proper directions while, at the same time, the pulley 50 is free to move on the belt 51, during the adjustment on the roller 25.

The idle pulley 52 is mounted on a short shaft 53 which, in turn, is mounted in alined bores formed in the lower end of the vertical arm of an angle bracket 54 and the upper end of an upwardly and rearwardly inclined standard 55 bolted to the base section 4. The angle bracket 54, at its elbow, is secured to the right hand end of a heavy rod 56 mounted in lugs 57 integrally formed with the rear wall of the base section 4. The horizontal arm of the angle bracket 54 is rigidly secured by bolts 58 to the right hand side of the base section 4. The standard 55, in addition to affording an increased bearing for the shaft 53, affords a brace for the bracket 54 and rigidly holds the same to eliminate vibratory movement of the idle pulley 52 produced by the belt 51.

The ground grain or feed from the rollers 24 and 25 is removed from the bottom of the base section 4 by a spiral conveyer 59. The left hand end of the shaft 60 of this conveyer 59 is journaled in a cap bearing 61 bolted to the left hand side of the base section 4 and the right hand end portion of the conveyer 59 works in a cylindrical casing 62 bolted to the right hand side of said base section. Keyed to the left hand end of the conveyer shaft 60, is a relatively large pulley 63 and a relatively small pulley 64. A belt 65, diagrammatically illustrated by means of broken lines, runs over the pulley 63 and a relatively small alined pulley 66 on the shaft 26 and drives the conveyer 59 from the roller 24. A belt 67, diagrammatically illustrated by means of broken lines, runs over the pulley 64 and the pulley 23 on the shaft 21 and drives the feed roller 15 from the conveyer 59.

Covers 68, in the form of concave plates secured to and within the base section 4, de-

flect the grain between the rollers 24 and 25 and prevent the same from falling between the front and rear walls of said base section and the respective rollers 24 and 25. To the sides of the base section 4, are also secured guards 69 which overlap the ends of the rollers 24 and 25 and prevent the grain from working therebetween and the sides of the base section 4.

From the above description, it is evident that the rollers 24 and 25, the adjusting means and stops for the roller 25, and the driving connections for said rollers are all entirely carried by the base section 4, thus making it possible to open the top section 5, after the belt 67 has been removed from the pulley 23 and the latch 12—13 released, without disturbing any of said parts carried by the base section 4. It is also evident that the top section 5 may be opened, while the mill is still running, for the purpose of inspecting the interior thereof.

To remove the rollers 24 and 25 from the base section 4, the latch bolt 42 is first operated to release the lever 41. With the lever 41 released, the hinge pin 8 may be oscillated by said lever to retract the roller 25 through the connections 31 and 34. After the roller 25 is moved into a retracted position, the cap bearings 28 and 33 are removed, together with the belt 51, from the pulley 49. The rollers 24 and 25 are now free to be removed from the base section 4, and it is first necessary to remove the roller 24 and then the roller 25. In thus removing the rollers 24 and 25, for the purpose of sharpening or repairing the same, it is not necessary to disturb the adjusting means or stops for the roller 25.

After the rollers 24 and 25 have been replaced in the mill, the lever 41 is moved toward the mill, until the cap bearings 33 again engage the heads 48 of the stop rods 45. The latch 42 is then tightened to secure the lever 41 in its original position. One of the many advantages of being able to open the top section 5, without disturbing the adjustment of the mill, is the amount of time saved, and the small amount of work required. In the roller mills, now in general use, it is necessary to completely re-adjust the same after they have been opened up, thus requiring a large amount of time and work.

What I claim is:—

1. The combination with a casing, of cooperating fixed and movable grinding rollers, said movable roller having bearings that are mounted for radial movement toward and from the fixed roller, and positive stops with which said bearings directly engage to limit the movement of the movable roller toward the fixed roller and thereby hold the same spaced therefrom a predetermined distance.

2. The combination with a casing comprising a base section, a displaceable top section, and a hinge pin connecting the top section to the base section, said base section having a pair of axially alined fixed bearings, of a pair of levers fulcrumed on the base section and having at their intermediate portions a pair of axially alined bearings with removable caps which face said fixed bearings, a pair of coöperating grinding rollers journaled in said two pairs of bearings, and adjusting means carried by the hinge pin and operative on the free end of said levers for moving the roller carried thereby radially toward and from the other of said rollers, said top section adapted to be moved to and from a closed position without disturbing either of said two rollers or the means for adjusting said levers.

3. The combination with a casing having a pair of coöperating fixed and movable grinding rollers journaled therein, of a pair of alined pulleys on the shafts of said two rollers, a belt arranged to run over the pulley for the fixed roller and under the pulley for the movable roller, a bracket and a standard on the casing, a shaft mounted in alined bores in said bracket and standard, and an idle pulley journaled on said shaft and over which pulley the belt runs to hold the same in contact with the pulley for the movable roller.

4. The combination with a casing comprising a base section and a displaceable top section having coöperating hinge lugs and a hinge pin connecting the same, of coöperating grinding rollers journaled in the casing, and means, including an eccentric on the hinge pin, for adjusting one of the grinding rollers toward and from the other thereof.

5. The combination of the casing comprising a base section and a displaceable top section having coöperating hinge lugs and a hinge pin connecting the same, of coöperating grinding rollers journaled in the casing, means, including an eccentric on the hinge pin, for adjusting one of the grinding rollers toward and from the other thereof, and means for adjusting the hinge pin to operate said eccentric.

6. The combination with a casing comprising a base section and a displaceable top section having coöperating hinge lugs and a hinge pin connecting the same, of coöperating grinding rollers journaled in the casing, means, including an eccentric on the hinge pin, for adjusting one of the grinding rollers toward and from the other thereof, a lever for turning the hinge pin, and means for securing the lever to the base section in different adjustments.

7. The combination with a casing comprising a base section and a displaceable top section having coöperating hinge lugs and

a hinge pin connecting the same, said hinge pin adapted to be rotated into different positions, of coöperating grinding rollers mounted in the casing, and connections actuated by the movement of the hinge pin for adjusting one of the grinding rollers toward and from the other thereof.

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

JOHN JONES.

Witnesses:
HARRY D. KILGORE,
MAY A. SMITH.