J. JONES.

ROLLER MILL.

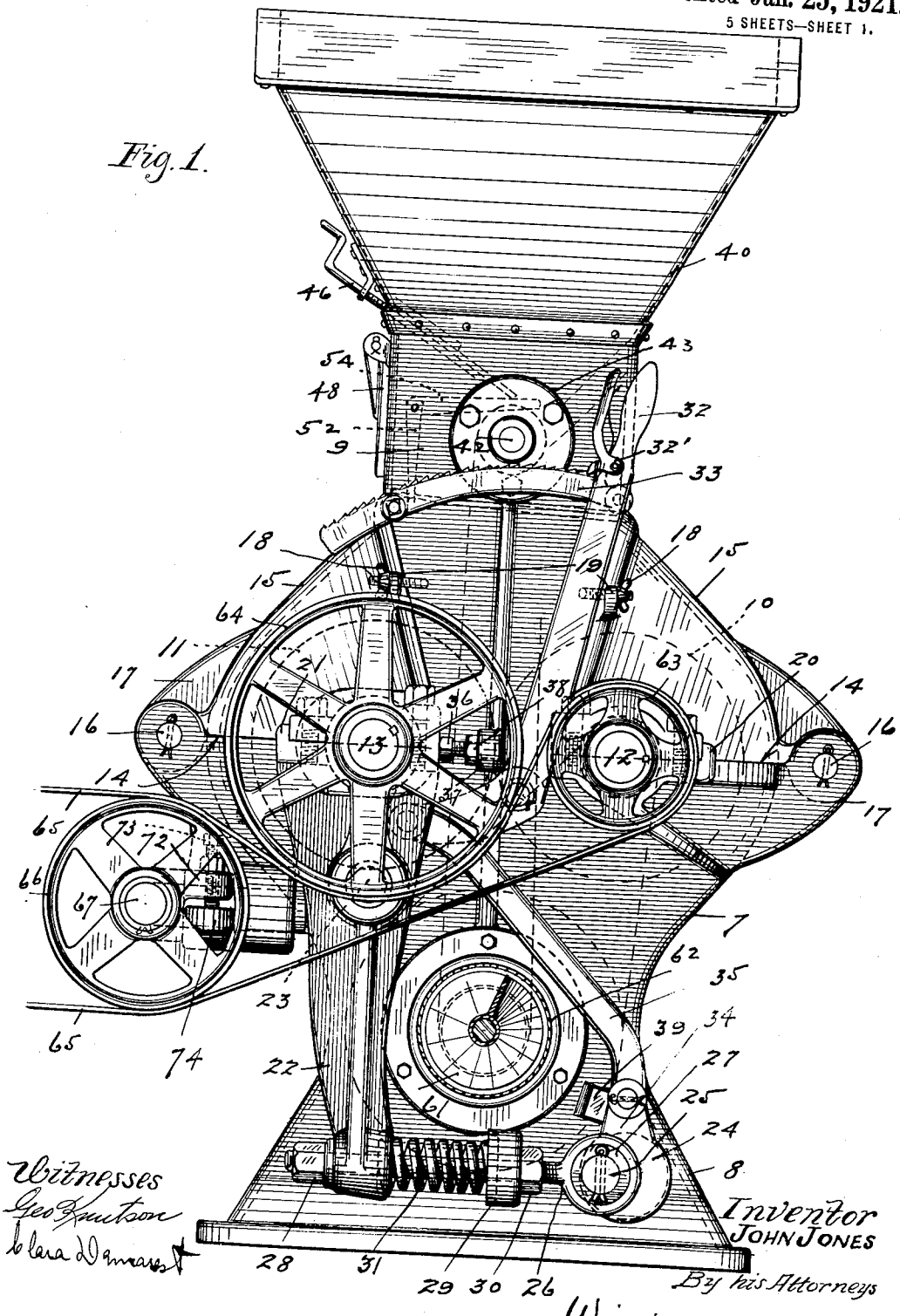
APPLICATION FILED MAR. 29, 1919.

1,366,463.

Patented Jan. 25, 1921.

5 SHEETS—SHEET 1.

Fig. 1.



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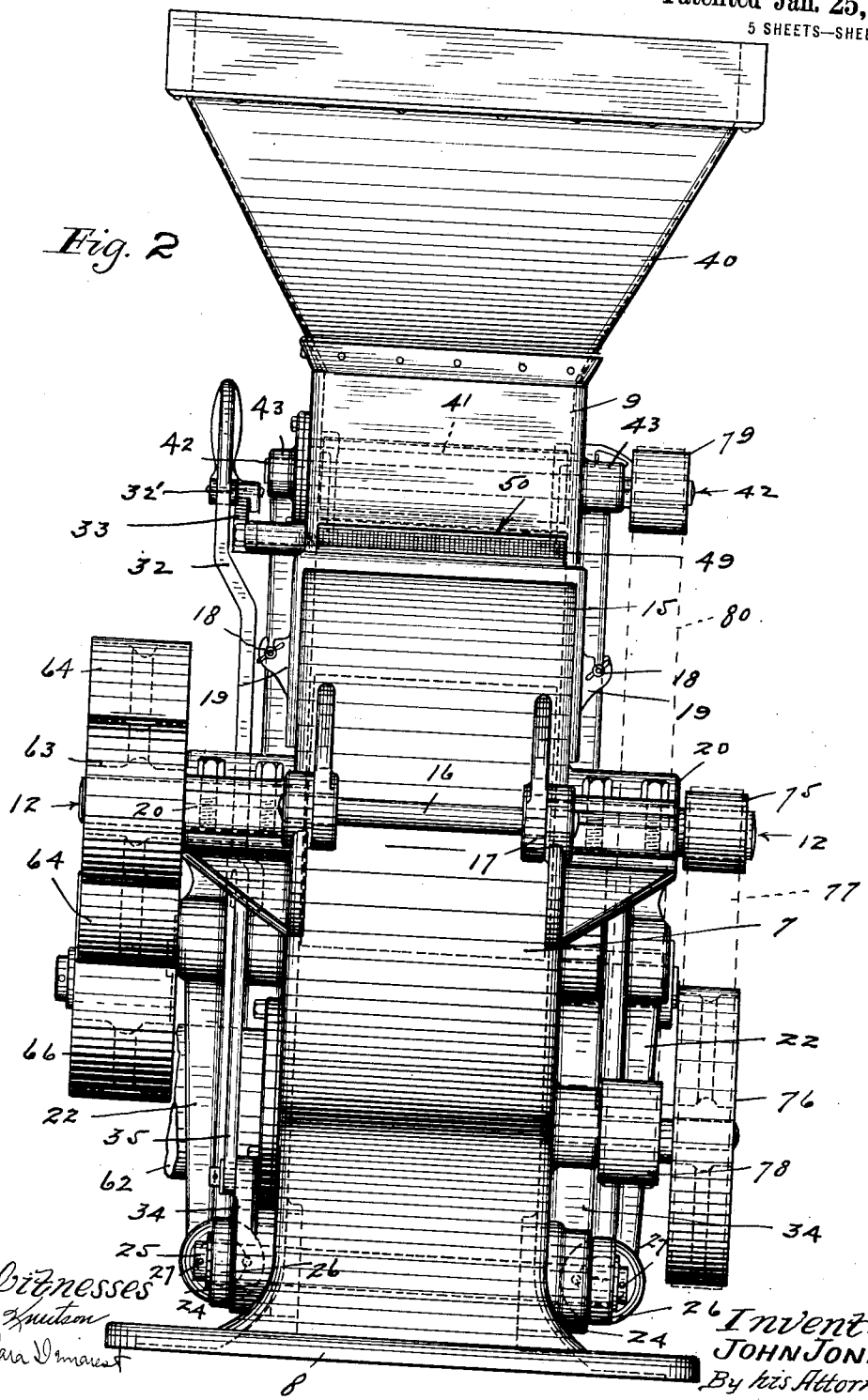
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5 SHEETS—SHEET 2.

Fig. 2



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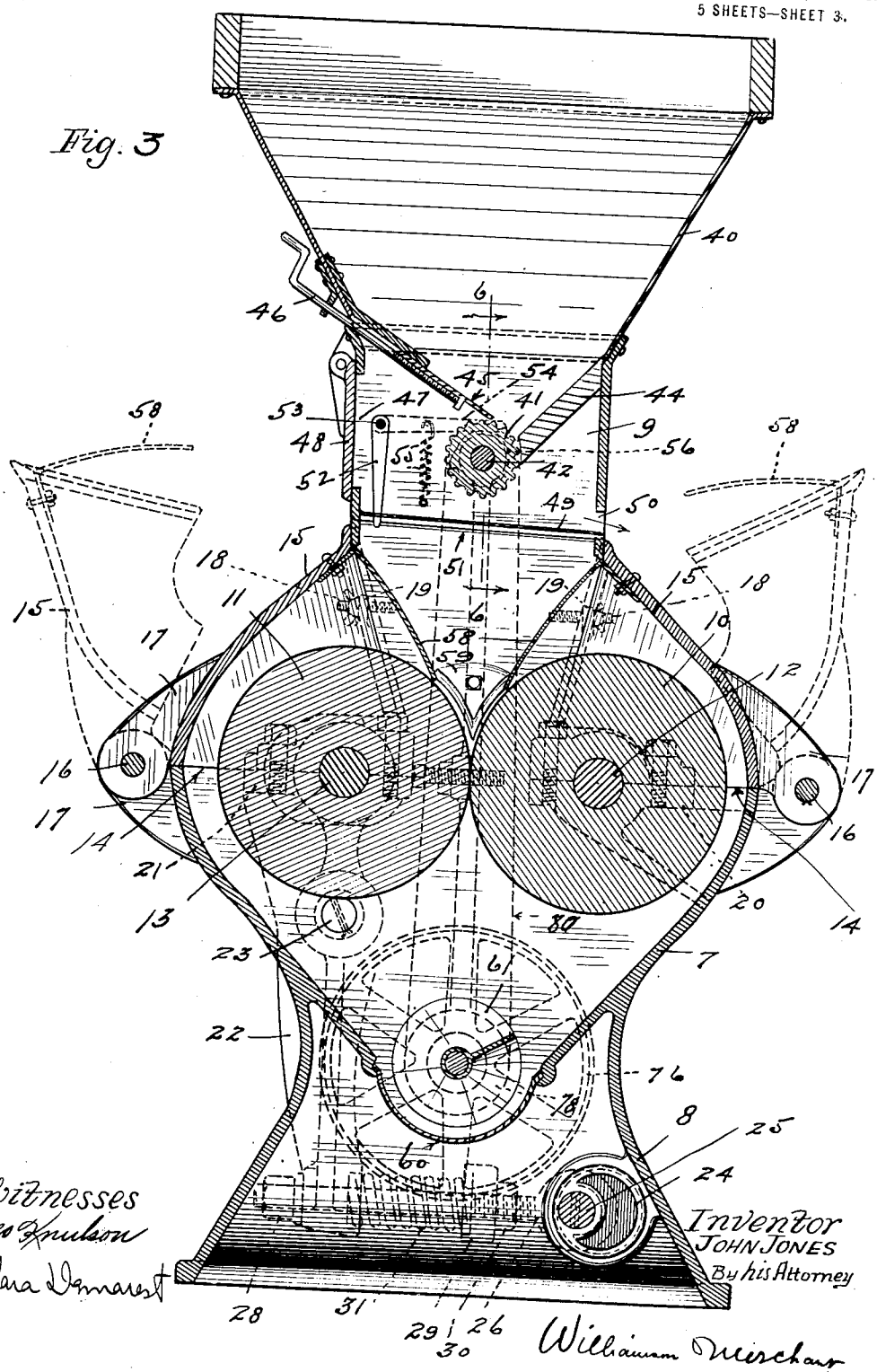
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5 SHEETS—SHEET 3.

Fig. 3



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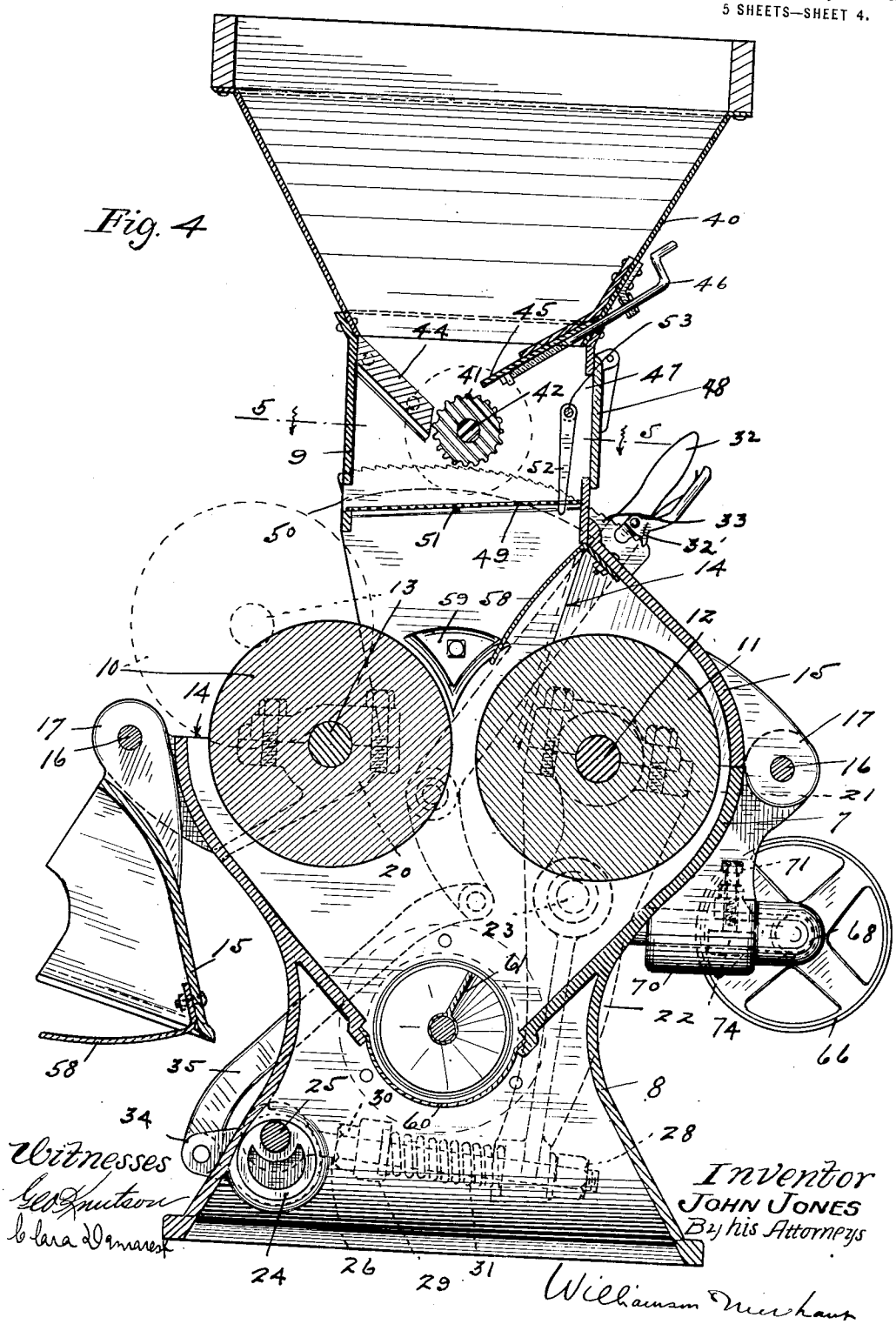
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5 SHEETS—SHEET 4.

Fig. 4



Witnesses

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5 SHEETS—SHEET 5.

Fig. 6

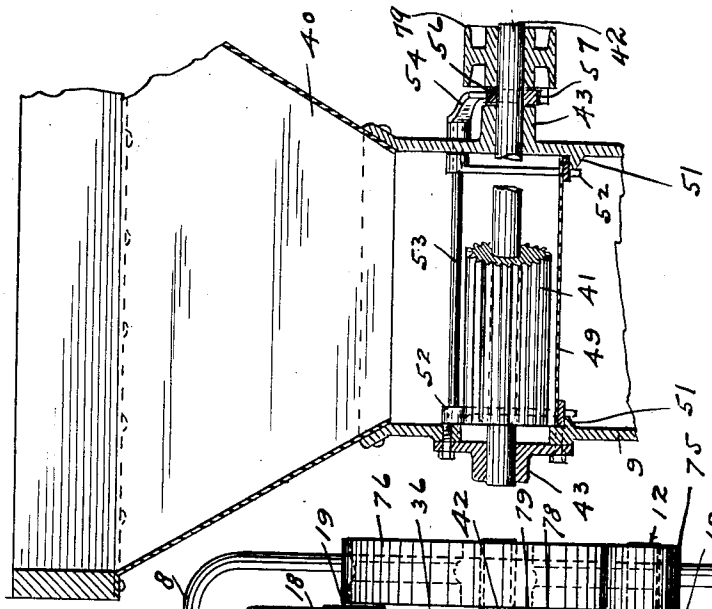
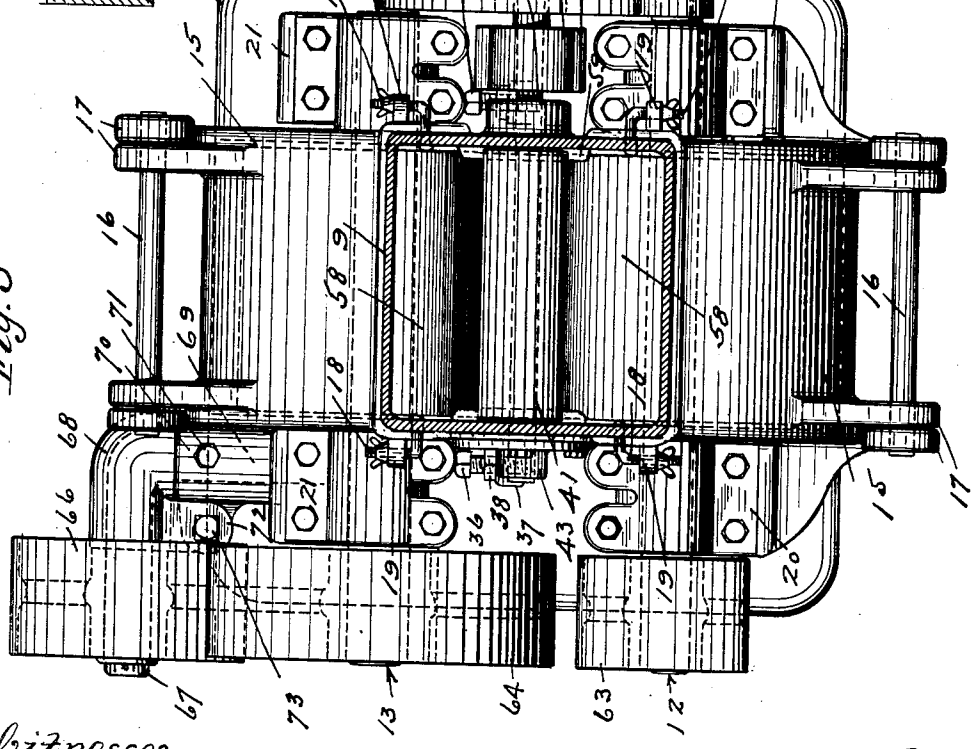


Fig. 5



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UNITED STATES PATENT OFFICE.

JOHN JONES, OF MINNEAPOLIS, MINNESOTA.

ROLLER-MILL.

1,366,463. Specification of Letters Patent. Patented Jan. 25, 1921.

Application filed March 29, 1919. Serial No. 286,135.

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 left side elevation of the improved roller mill;

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

Fig. 3 is a central vertical section taken transversely through the grinding rollers, and viewing the same from the right, some parts shown in different positions, by means of broken lines;

Fig. 4 is a view corresponding to Fig. 3, with the exception that the same is viewed from the left and with some parts set in different positions;

Fig. 5 is a view, principally in plan, with some parts sectioned on the line 5—5 of Fig. 4; and

Fig. 6 is a fragmentary detail view, principally in section, taken on the line 6—6 of Fig. 3.

The numeral 7 indicates a casing having cast integral therewith a base 8 and a contracted top section 9 that is square in cross section. Coöperating fixed and movable grinding rollers 10 and 11, respectively, are mounted in the casing 7 and their shafts 12 and 13, respectively, with which they rotate, extend in the same horizontal plane and project through the sides of said casing. Door openings 14 are formed in the front and rear walls of the casing 7 and their lower edges are in the same horizontal plane with the axes of the shafts 12 and 13. The height of the door openings 14 is such that the grinding rollers 10 and 11 may be passed therethrough, and which openings also extend into the sides of said casing to afford clearance for the shafts 12 and 13, during the lateral movement of the rollers to and from the casing.

Cast dust-proof doors 15 normally close the door openings 14 and have side flanges which also close the openings in the sides of the casing 7. Hinge rods 16, passed through hinge lugs 17, integrally formed with the casing 7 and doors 15, connect said doors at their lower edges to said casing for outward and downward swinging movement, as best shown in Fig. 4. The doors 15 are locked in closed positions by thumb nut-equipped screw studs 18 pivoted to the sides of the casing 7 and arranged to enter notched lugs or ears 19 integrally formed with the side flanges of said doors and against which the thumb nuts of said studs impinge to hold the doors closed.

The shaft 12 is journaled in fixed bearings 20 integrally formed with the sides of the casing 7. The shaft 13 is journaled in bearings 21, integrally formed on the upper ends of a pair of vertically disposed levers 22, located outward of the sides of the casing 7 and which bearings have removable caps. These levers 22 are intermediately pivoted on eccentrics 23 secured to and projecting outward from the sides of the casing 7. The levers 22 are yieldingly held in different set positions and hence the movable roller 11, by the following connections, to wit:—

Eccentrics 24 are mounted in the sides of the base 8 and carry a shaft 25, the ends of which project through the heads of a pair of eye-bolts 26 held on said shaft by washers and cotter pins 27. These eye-bolts 26 project through bores in the lower ends of the levers 22 and have nuts 28 applied to their outer ends, and which nuts impinge against said levers. Also mounted on the eye-bolts 26, with freedom for axial sliding movement thereon, are caps 29 held in position by set nuts 30 having screw-threaded engagement with said bolts. Coiled springs 31, encircling the eye-bolts 26, are compressed between the levers 22 and caps 29. Obviously, the eye-bolts 26 and nuts 28 afford positive connections for operating the levers 22 to move the roller 11 away from the roller 10, and the springs 31 permit said roller 11 to move away from the roller 10, as will presently appear. By adjusting the nuts 28 on the eye-bolts 26, the levers 22 may be moved to carry the roller 11 either toward or from the roller 10, depending on

the degree of fineness or coarseness the grain is to be ground. Under undue pressure between the rollers 10 and 11, caused by clogging or otherwise, the springs 31 will yield and allow the levers 22 to move longitudinally on the eye-bolts 26, and thereby separate the rollers. When the obstruction between the rollers 10 and 11 has been removed or passed therebetween, the springs 31 will immediately return the roller 11 to its predetermined set position.

To manually operate the eccentrics 24 and hence the movable roller 11, through the several connections just described, there is intermediately pivoted to the left side of the casing 7 a hand lever 32 having a spring-pressed pawl 32′ arranged for coöperation with ratchet teeth on a lock segment 33 bolted to said casing, said teeth being arranged to hold the lever against movement to prevent the roller 11 from moving away from the roller 10, under the grinding action of the mill. The short end of the lever 32 is connected to a short arm 34 on the underlying eccentric 24 by a link 35. It may be here stated that the other eccentric 24 is also provided with an arm 34.

To prevent the movable roller 11 from coming in direct contact with the fixed roller 10, during the adjustment thereof, or, in case the caps of the bearings 21 should work loose, I provide positive stops 36, in the form of set screws, mounted in lugs 37 integrally formed with the sides of the casing 7, and which screws are arranged to be engaged by the bearings 21 to limit the approaching movement thereof toward the fixed roller 10. Lock nuts 38 on the set screws 36 impinge against the lugs 37 and hold said set screws where adjusted.

When grinding fine, it is highly essential to hold the movable roller 11 against vibration, and, to accomplish this, there is provided a pair of stop lugs 39 cast integral with the casing 7 and arranged to be engaged by the arms 34. With the arms 34 thus held, the movable roller 11 is adjusted the proper distance from the fixed roller 10 by the nuts 28 on the eye-bolts 26. To angularly adjust the movable roller 11 into parallel arrangement with the fixed roller 10, the eccentrics 23 may be adjusted. Suitable means, such as set screws, may be provided for holding the eccentrics 23 where set.

Rigidly secured to the top section 8, is a hopper 40 into which materials to be ground are delivered, and mounted in said section, is a corrugated feed roller 41 having a shaft 42 journaled in bearings 43, one of which is integrally formed with the top section 8 and the other of which is detachably secured thereto and covers an opening in said section through which the feed roller 41 may be moved endwise in placing the same within said top section or removing the same therefrom. A fixed inclined feed board 44 closes the opening between the back of the top section 8 and the roller 41 and an adjustable feed board 45, mounted on the hopper 40, is provided for regulating the feed to the roller 41. This adjustable feed board 45 is operated by a crank-equipped screw rod 46. Access may be had to the interior of the top section 8, for the purpose of watching the feed of materials from the feed roller 41 to the grinding rollers 10 and 11 through an opening 47 in the front of said top section 8. A gravity closed door 48 normally closes the opening 47.

Underlying the feed roller 41, is a rearwardly inclined scalping screen 49 provided for removing straw, sticks or other materials, and preventing the same from passing to the grinding rollers 10 and 11. Materials tailed over the screen 49 are discharged through an opening 50 in the back of the top section 8. Oscillatory movement is imparted to the screen 49, which loosely rests on guides 51 formed with the top section 8, by a pair of depending fingers 52 on a rock shaft 53 and extending through apertures in the sides of said screen. The rock shaft 53 is journaled in the sides of the top section 8 and has secured thereto, outward of the right side of the top section 8, an arm 54 yieldingly held by a coiled spring 55 on a wheel 56 secured for rotation with the shaft 42 and provided with a ratchet-like tooth 57 arranged to lift the arm 54 under each revolution of the shaft 42 and then drop the same to impart the required oscillatory movement to the sieve 49.

Covers 58, in the form of curved plates, for the outer portions of the grinding rollers 10 and 11, are secured, one to the upper edge of each door 15 with their lower edges terminating close to said rollers to direct the grain from the feed roller 41 therebetween. To the sides of the casing 7, are secured guards 59 which overlap the ends of the rollers 10 and 11 between the covers 58 and prevent grain from working between said ends and casing. The covers 58 are removable from the casing 7 with the doors 15, as best shown by dotted lines in Fig. 3.

Ground grain from the rollers 10 and 11 is precipitated into a semi-circular trough 60 in which works a spiral conveyer 61. The trough 60 is supported by extending the converging front and rear walls of the casing 7 into the base 8 and providing the same with grooves to receive the longitudinal edges of said trough. Outward of the casing 7, the conveyer 61 works in a tubular spout 62 secured to said casing for delivering the ground grain to an elevator, not shown.

The driving connections for the rollers 10 and 11, feed roller 41 and conveyer 61 are

as follows:—On the left-hand end of the shaft 12, is a relatively small pulley 63 and, on the shaft 13, is a relatively large pulley 64 alined with the pulley 63. A driving belt 65, driven by any suitable means, not shown, runs over the pulley 63 and the upper section thereof runs under the pulley 64. An idle pulley 66 is mounted to run between the two sections of the belt 65 and holds the upper section thereof in direct engagement with the pulley 64 and the lower section thereof out of engagement with said pulley. By this arrangement of the belt and pulleys, the rollers 10 and 11 are driven in the proper direction, while, at the same time, the pulley 64 is free to move on the belt 51, during the adjustment of the roller 11.

The idle pulley 66 is journaled on a trunnion 67 formed with a casting 68 having a stem 69, which extends at right angles to the trunnion 67 and is mounted in a sleeve 70, integrally formed with the casing 7. A set screw 71 having screw-threaded engagement with the sleeve 70 is arranged to impinge against the stem 69 and detachably and adjustably secures the idle pulley 66 to the casing 7. To hold the idle pulley 66 in proper alinement, there is formed with the casting 68 a forwardly projecting lug 72 with which a lock nut-equipped set screw 73 has screw-threaded engagement and arranged to impinge against an underlying lug 74 formed with the sleeve 70.

On the opposite end of the shaft 12 from the pulley 63, is a small pulley 75 alined with a relatively large pulley 76 on the projecting shaft of the conveyer, and over said two pulleys runs a belt 77 to drive said conveyer from the roller 10. Also secured to the projected shaft of the conveyer 61, is a pulley 78 alined with a pulley 79 on the shaft of the feed roller 41, and over said two pulleys runs a belt 80 to drive the said feed roller from said conveyer.

From the above description, it is evident that the operation of the improved roller mill, while running, may be watched by opening the doors 15 and 48. In case it is necessary to remove one or both of the grinding rollers from the casing, for the purpose of sharpening or repairing the same, it is only necessary, with respect to the roller 10, to remove the caps of the bearings 20 and the belts 65 and 77 from the pulleys 63 and 76 and lift the same laterally through the respective opening 14, together with its shaft 12 and said pulleys. To remove the movable roller 11 from the casing 7, it is only necessary to remove the caps of the bearings 21 and lift said roller laterally through the respective opening 14, together with its shaft 13 and pulley 64. It will thus be seen that the rollers 10 and 11 may be removed from the mill and then replaced, without disturbing any of the adjustments of the mill.

By providing the mill with the doors 15, it is possible to remove the rollers 10 and 11 without disturbing the hopper or grain held therein. The lever 32 and coöperating lock segment 33 afford convenient means that can be very quickly operated to set the movable roller 11 in different adjustments, with respect to the roller 10, to vary the opening therebetween.

What I claim is:—

1. The combination with a casing, of cooperating grinding rollers mounted in the casing, a feed hopper above the grinding rollers, door-equipped openings in the casing below the feed hopper, and cover plates for the grinding rollers secured to the doors for said openings and movable therewith into and out of the casing and arranged to direct material from the feed hopper to the grinding rollers.

2. The combination with a casing, of cooperating grinding rollers transversely mounted in the casing and having journals extending through the sides thereof, a feed hopper in the casing above the grinding rollers, front and rear openings in the casing below the feed hopper and extending into the sides of said casing to expose the journals of the grinding rollers whereby said rollers may be moved laterally through said openings, and doors having integral side flanges for closing said openings and forming sections of the casing.

3. The combination with a casing, of cooperating fixed and movable grinding rollers mounted in the casing, a pair of levers intermediately pivoted to the casing and provided at one of their ends with bearings in which the movable roller is journaled, arm-equipped eccentrics mounted in the casing, nut-equipped eye-bolts secured to the eccentrics and loosely extended through the other ends of the levers, adjustable caps on the eye-bolts, coiled springs encircling the eye-bolts and compressed between the caps and levers, a latch lever, a link connecting the latch lever to the arms of one of said eccentrics, and stops arranged to be engaged by the arms of said eccentrics to limit the movement of the movable roller toward the fixed roller.

4. The combination with a casing, of cooperating fixed and movable grinding rollers mounted in the casing, a pair of levers intermediately pivoted to the casing and provided at one of their ends with bearings in which the movable roller is journaled, eccentrics mounted in the casing, yielding connections between the eccentrics and said pair of levers, means for operating the eccentrics to adjust the movable roller with

respect to the fixed roller, and means for limiting the movements of the eccentrics during the movement of the movable roller toward the fixed roller but permitting free movement of the eccentrics during the movement of the movable roller from the fixed roller.

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

JOHN JONES.

Witnesses:
CLARA DEMAREST,
HARRY D. KILGORE.