

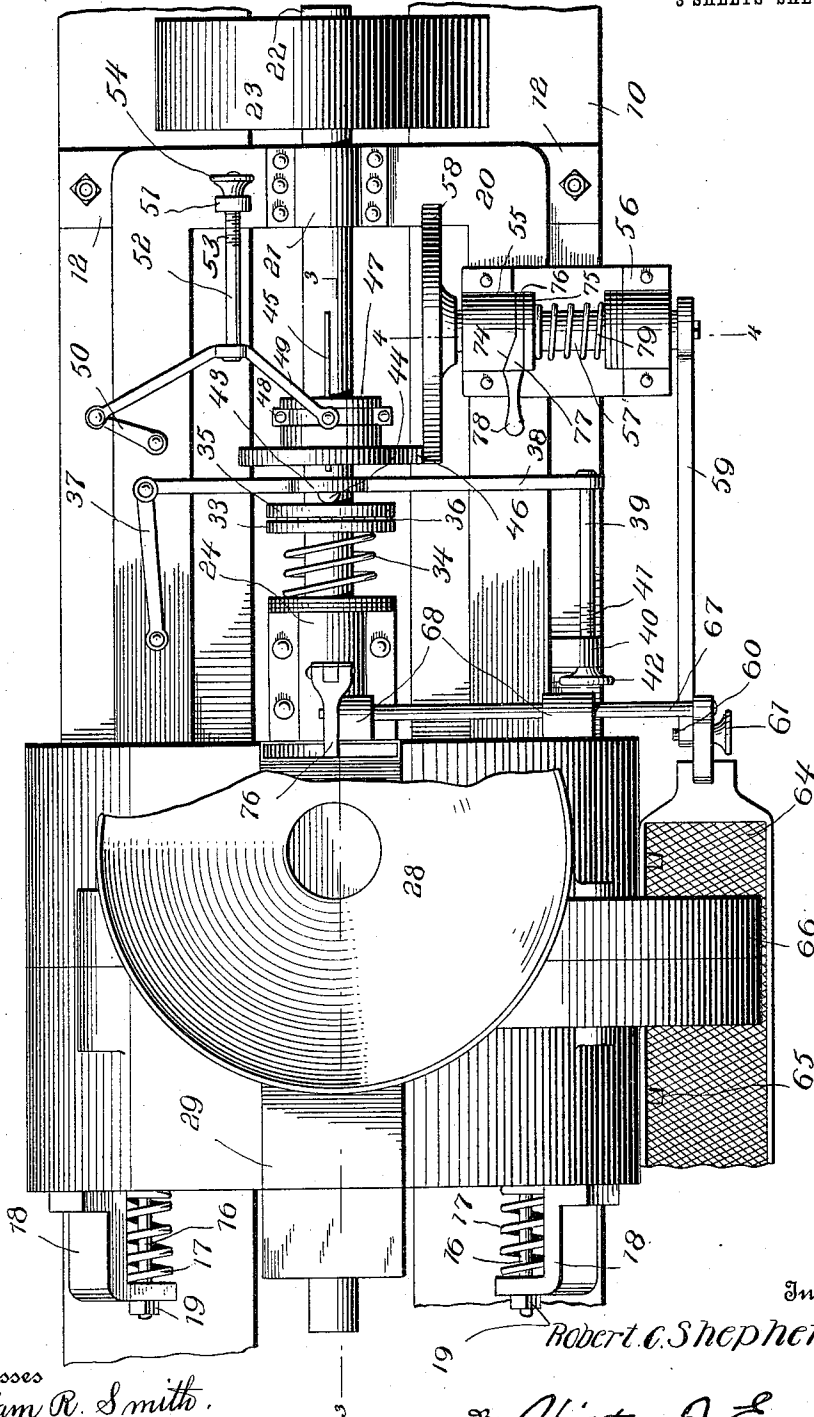
R. C. SHEPHERD.
GRINDING MILL.
APPLICATION FILED JUNE 2, 1911.

1,052,386.

Patented Feb. 4, 1913.

3 SHEETS-SHEET 1.

Fig. 1.



Witnesses
William R. Smith.
[Signature]

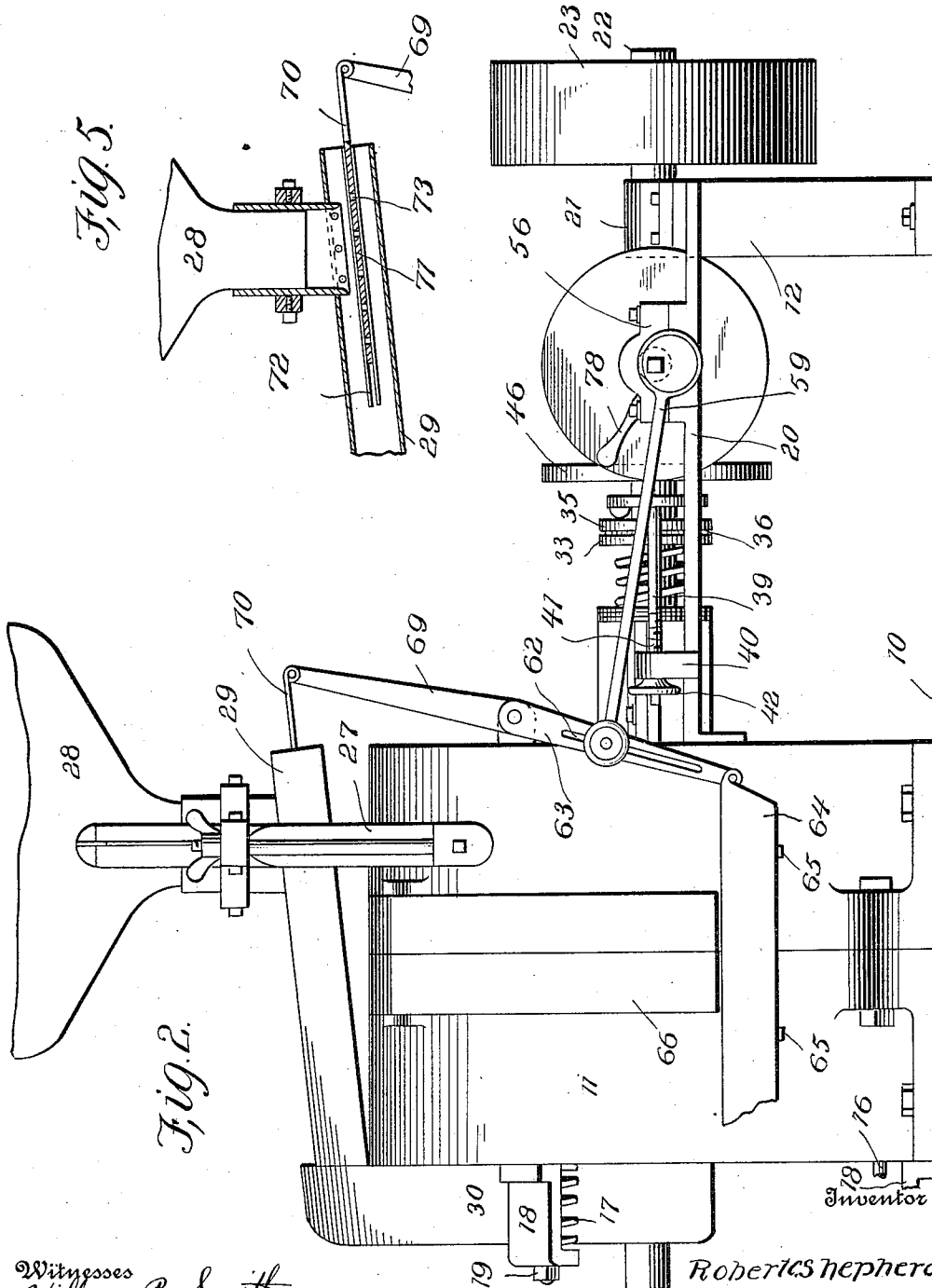
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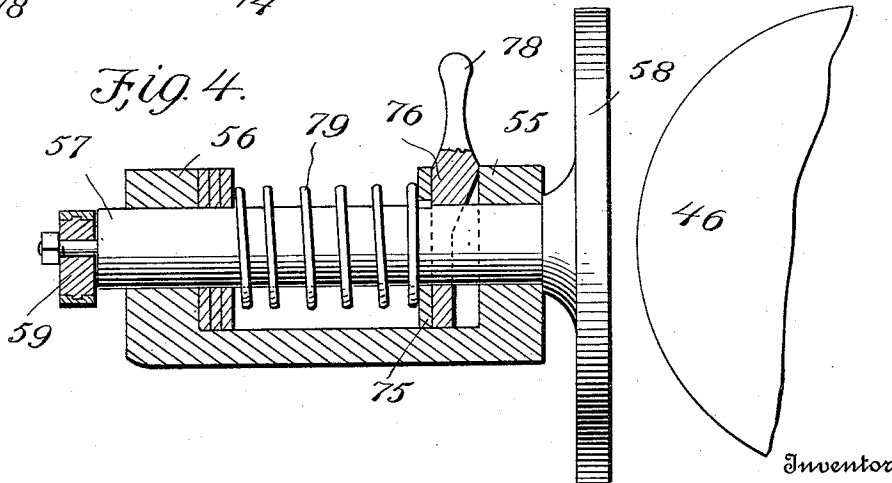
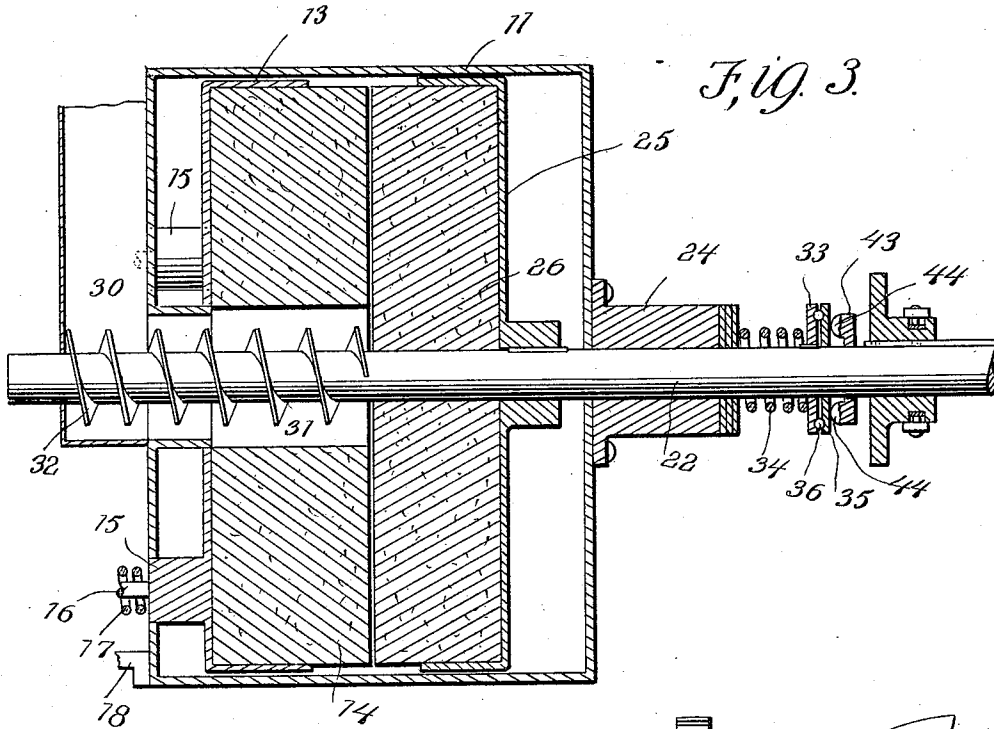
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ROBERT C. SHEPHERD, OF RONDA, NORTH CAROLINA.

GRINDING-MILL.

1,052,386.

Specification of Letters Patent.

Patented Feb. 4, 1913.

Application filed June 2, 1911. Serial No. 630,824.

To all whom it may concern:

Be it known that I, ROBERT C. SHEPHERD, a citizen of the United States, residing at Ronda, in the county of Wilkes and State of North Carolina, have invented new and useful Improvements in Grinding-Mills, of which the following is a specification.

The invention relates to mills, more particularly to grinding mills and has for an object to provide a mill for grinding grain and the like. For the purpose mentioned, use is made of a plurality of coacting grinding disks, between which the grain is received and ground, the said grinding disks being independently adjustable, means for feeding the grain from a hopper to the grinding disks, means for refining the ground products by sifting the same after they have been operated upon by the grinding disks, means for operating the grinding disks and means for oscillating the sieve adapted to sift the ground products.

Reference is to be had to the accompanying drawings, constituting a part of this specification, in which similar characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a fragmentary plan view of my grinding mill. Fig. 2 is a fragmentary side elevation. Fig. 3 is a vertical sectional view taken substantially on the line 3—3 in Fig. 1. Fig. 4 is a vertical sectional view taken on the line 4—4 in Fig. 1, the driving wheel being shown diagrammatically with the friction wheel spaced therefrom. Fig. 5 is a fragmentary vertical sectional view of the agitator.

Referring more particularly to the various views, I provide a base 10 having a casing 11 bolted thereto and at one end thereof, an upright 12 being secured to the other end of the base for a purpose that will be hereinafter more fully disclosed. Mounted within the casing 10 is a disk casing 13 having a grinding disk 14 secured therein and extended laterally from the disk casing 13 are equidistantly spaced flanges 15 extending through apertures in the casing 11 and terminating in rods 16 disposed exteriorly of the casing 11, the said rods being encircled by expansible springs 17 having their inner ends abutting against the flanges 15 and their outer ends abutting against brackets 18, secured to the casing 11, the said rods 16 being slidably extended through apertures in the brackets 18 and

having nuts 19 threadedly connected thereto at the outer ends thereof.

Mounted on the upright 12 and extending horizontally to connect with the casing 11 is an auxiliary frame 20 having a bearing 21 mounted thereon and in which is journaled a driving shaft 22, the said shaft 22 having a pulley 23 keyed to the outer end thereof with the other end of the said shaft extending horizontally through the casing 11 and extended slidably through a bearing 24 secured to the casing 11. A disk casing 25 is revolvably mounted within the casing 11 and is rigidly keyed to the shaft 22, the said disk casing 25 having mounted therein a grinding disk 26 as shown in Fig. 3, the inner or grinding face of the grinding disk 26 being disposed oppositely and adjacent to the inner grinding face of the grinding disk 14.

Secured to a bracket 27 extended from the upper side of the casing 11 is a hopper 28, the said hopper having a chute 29 connected thereto and positioned at an incline to receive the grain from the hopper 28 and empty the same into a receiver 30 positioned at the rear end of the casing 11 and extending into the casing, the grinding disk 14 being provided with a transversely extending opening 31, substantially in register with the inner opening of the receiver 30 as shown in Fig. 2. Secured to the shaft 22 and positioned in the lower end of the receiver 30 and the opening 31 in the grinding disk 14, is a spiral conveyer 32, the said conveyer being adapted to convey the grain from the receiver 30 to the inner faces of the grinding disks 14 and 26.

Keyed to the shaft 22 is a collar 33 and mounted to encircle the shaft 22, between the bearing 24 and the collar 33 is an expansible spring 34 having its ends abutting against the bearing 24 and the collar 33, a second collar 35 being loosely mounted on the shaft 22 and spaced from the collar 33 by a ball bearing 36 as shown in Figs. 1, 2 and 3. Pivotaly mounted on the auxiliary frame 20 is a rod 37 having one end of a lever 38 pivotally connected thereto, the other end of the lever 38 being connected with an adjusting screw 39 mounted to slidably extend through an apertured flange 40 secured to the auxiliary frame 20, the said adjusting screw 39 being provided with threads and having adjustably mounted thereon a knob 42. The lever 38 is provided with an

integral flanged portion 43, loosely encircling the shaft 22 and secured to the flanged portion 43 are a plurality of buttons 44 adapted to engage the collar 35 loosely mounted on the shaft 22. Now by operating the knob 42, the lever 38 will be operated to adjust the grinding disk 26 relatively to the grinding disk 14. If, for instance, it is desired to position the inner face of the grinding disk nearer to the inner face of the grinding disk 14, when the knob 42 is operated to move the lever 38 toward the casing 11, the buttons 44 engaging the collar 35 will cause the collar to exert an inward push on the collar 33, which keyed to the shaft 22, will exert a pressure against the spring 34 so that the shaft will move inwardly toward the casing 11 and as the grinding disk 26 is keyed to the shaft 22, as heretofore mentioned, the grinding disk 26 will be moved into closer proximity to the grinding disk 14, as will be readily understood. In the same manner the knob 42 can be operated so that the lever 38 will be moved away from the casing 11, thus causing the grinding disk 26 to be moved away from the grinding disk 14, to enlarge the space between the grinding disks, the expansion of the spring 34 being adapted to move the shaft 22 outwardly inasmuch as the spring 34 abuts against the collar 33, keyed to the shaft 22.

A key 45 is secured in the shaft 22 and slidably mounted on the shaft is a driving wheel 46, the said driving wheel being in engagement with the key 45 so that the driving wheel will rotate with the shaft, but will be slidable longitudinally thereof. Formed on the driving wheel 46 is a collar 47 having a recessed portion in which is loosely mounted an adjusting band 48, the said band having pivotally connected thereto an angularly shaped lever 49 pivotally mounted on a rod 50 having pivotal connection with the auxiliary frame 20. An apertured flange 51 is secured to the auxiliary frame 20 and slidably extended therethrough is an adjusting screw 52 connected to the lever 49, the said screw being provided with threads 53 for threadedly receiving the knob 54 so that by operating the knob 54 the adjusting screw 52 can be operated, thus causing the adjusting band 48 to slide the driving wheel 46 on the shaft 22.

A plurality of bearings 55, 56 are mounted on the auxiliary frame 20 and journaled therein is a shaft 57 having a friction wheel 58 rigidly secured to the inner end thereof, the said friction wheel being disposed at right angles to the driving wheel 46 and having the periphery of the driving wheel 46 in frictional engagement with the outer face of the friction wheel 58. Eccentrically mounted on the outer end of the shaft 57 is an eccentric rod 59 having an end thereof

loosely mounted on an adjusting screw 60, provided with a knob 61 and extended through a slot 62 of an oscillating beam 63, the adjusting screw 60 being mounted on the oscillating beam 63 so that the mentioned screw can be adjusted in the slot 62 of the oscillating beam for a purpose that will be hereinafter more fully disclosed.

Pivotally mounted on the lower end of the oscillating beam 63 is a sifter 64, the said sifter being operable over suitable guides 65 and positioned beneath a receiving chute 66 having the upper end thereof terminating within the casing 11 so that the grain after being ground between the grinding disks 14 and 26 will be expelled from the casing 11 by the rotative motion of the grinding disk 26 and passing through the chute 66 will be received in the sifter 64, the said sifter being disposed immediately beneath the outer end of the chute 66 as heretofore mentioned.

The upper end of the oscillating beam 63 is keyed to one end of a rod 67 rotatably extended through the apertured flanges 68 secured to the casing 11 and the other end of the rod 67 is keyed to a second oscillating beam 69 having pivotally connected thereto a rod 70 terminating in an agitator 71 mounted to reciprocate on guides 72 secured to the sides of the chute 29, the mentioned agitator being positioned beneath the outlet of the hopper 28 and consisting preferably of a plate provided with a series of spaced apertures 73.

The bearing 55 is provided with an inclined side 74 and keyed to the shaft 57 and spaced from the bearing 55 is a collar 75, the cam 76 being loosely mounted to encircle the shaft 57, between the bearing 55 and the collar 75, the said cam 76 being provided with a projecting side 77 adapted to engage the inclined side 74 of the bearing 55, a suitable lever 78 being formed on the cam 77 to permit of conveniently operating the same.

In the operation of my device, a suitable belt is passed around the pulley 23 and connected with any convenient driving mechanism to rotate the shaft 22. The hopper 28 is now filled with grain and the mentioned grain will gravitationally feed downwardly and onto the agitator 71, which is being reciprocated by the agitating beam 69, operated by the eccentric rod 59 mounted on the shaft 57, which in turn is rotated by the friction wheel 58 in engagement with the driving wheel 46 keyed to rotate with the shaft 22. As the grain is agitated by the agitator 71 it passes downwardly into the chute 29 and thence into the receiver 30 from which it is conveyed to the grinding disks by the spiral conveyer 32 rotating with the shaft 22. As the grain is received between the faces of the grinding disks 14, and 26, the grinding disk 26 rotating with the

shaft 22 will crush and grind the grain against the stationary grinding disk 14 and when the grain has been properly ground, the same will be thrown outwardly from the casing 11, through the chute 66 and from which it will gravitationally pass into the sifter 64, which operated by the agitating beam 63, connected with the eccentric rod 59 will sift the ground grain and the sifted products are then received in a suitable receiving box or the like, placed beneath the sifter 64. By turning the knob 54, the driving wheel 46 will be slidably operated relatively to the shaft 22 so that the periphery of the driving wheel 46 will frictionally engage various portions of the face of the friction wheel 58 so that the rotating speed of the friction wheel 58 can be increased or decreased according to the particular position of the periphery of the driving wheel 46 on the face of the friction wheel 58, thus either increasing or decreasing the reciprocating motion of the eccentric rod 59. Now by turning the knob 61 so that the same can be slidably operated in the slot 62 of the agitating beam 63, the outer end of the eccentric rod 59 can be adjusted at various distances on the agitating rod 63, thus permitting of either increasing or decreasing the reciprocating motion of the sifter 64 or the agitator 71, the rod 67 acting as a fulcrum for the agitating beams 63 and 69. By turning the nuts 19, thus compressing the springs 17, the position of the casing 13, having the stationary grinding disk 14 therein, can be properly adjusted at all times so that the spacing of the grinding disks 14 and 26 can be easily regulated. The grinding disk 26 is also adjustable relatively to the grinding disk 14 and by turning the knob 42, thus operating the lever 38, the shaft 22 can be moved longitudinally relatively to the casing 11 and as the grinding disk 26 is keyed to the shaft 22, the desired adjustment of the grinding disk 26 relatively to the grinding disk 14 can be easily accomplished. A further provision of the springs 17, mounted to encircle the rods 16, enables the casing 13 to adjust itself against the tension of the springs 17 when an object, other than grain inadvertently is received between the crushing faces of the grinding disks 14 and 26, thus preventing the mentioned crushing faces from being mutilated. When the cam projection 77 of the cam 76 is in engagement with the inclined side 74 of the bearing 55, the friction wheel 58 will be engaged by the periphery of the driving wheel 46 and if it is desired to cut out the reciprocating movement of the sifter 64 and agitator 71, the lever 78 is grasped and operated to move the projection 77 of the cam 76 into engagement with the side of the bearing 55 that is not inclined, thus moving the collar 75 out-

wardly against the tension of a spring 79, positioned to encircle the shaft 57, and having one end thereof abutting against the collar 75 and the other end thereof abutting against the bearing 56. As the collar 75 is moved outwardly, the said collar, keyed to the shaft 57 will cause the shaft to move longitudinally in the bearings 55 and 56, thus disengaging the friction wheel 58 from the driving wheel 46 and the mentioned friction wheel 58 will then cease rotating, thus causing both the sifter 64 and the agitator 71 to assume a stationary or inoperative position.

From the foregoing description it will be readily seen that with the provision of my grinding mill I employ a mechanism in which the grain is constantly supplied to the grinding disks and after the grain has been properly ground, the same is ejected from the casing in which the grinding disks are mounted, by the revoluble action of one of the grinding disks and the ground grain is then received in a sifter, which actuated in a reciprocating manner, properly sifts the ground product so that the same can be received in a suitable container as the refined substance. It will be further seen that with the provision of various adjusting means, the crushing force of the grinding disks can be regulated at all times, the reciprocating speed of the agitator and the sifter can be controlled in one operation and the mentioned agitator and the sifter can be moved into either operative or inoperative position.

Having thus fully described the invention, what I claim as new, is:—

1. A simultaneously operated agitator and sifter for use with a grinding machine including a grinding apparatus and a power mechanism therefor, the said agitator being reciprocatingly mounted in a chute of the grinding machine having connection with the inlet of the grinding apparatus, the said sifter being reciprocatingly mounted beneath the outlet of the grinding apparatus, and an oscillating beam connecting the said agitator and sifter with the power mechanism of the said grinding machine.

2. A simultaneously operated agitator and sifter for use with a grinding machine including a grinding apparatus and a power mechanism therefor, the said agitator being reciprocatingly mounted in a chute of the grinding machine having connection with the inlet of the grinding apparatus, and the said sifter being reciprocatingly mounted beneath the outlet of the said grinding apparatus, an eccentric rod connected to the said power mechanism, and an oscillating beam connected to the said agitator and sifter and having connection with the said eccentric rod.

3. A simultaneously operated agitator
and sifter, for use with a grinding machine
including a grinding apparatus and a power
mechanism therefor, the said agitator being
5 reciprocatingly mounted in a chute of the
grinding machine having connection with
the inlet of the grinding apparatus and the
said sifter being reciprocatingly mounted
beneath the outlet of the said grinding ap-
10 paratus, an oscillating beam connecting the

said agitator and said sifter, and an eccen-
tric rod having connection with the said
power mechanism and adjustably connected
to the said oscillating beam.

In testimony whereof I affix my signature 15
in presence of two witnesses.

ROBERT C. SHEPHERD.

Witnesses:

A. H. RAGAN,
C. H. SEMELEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
