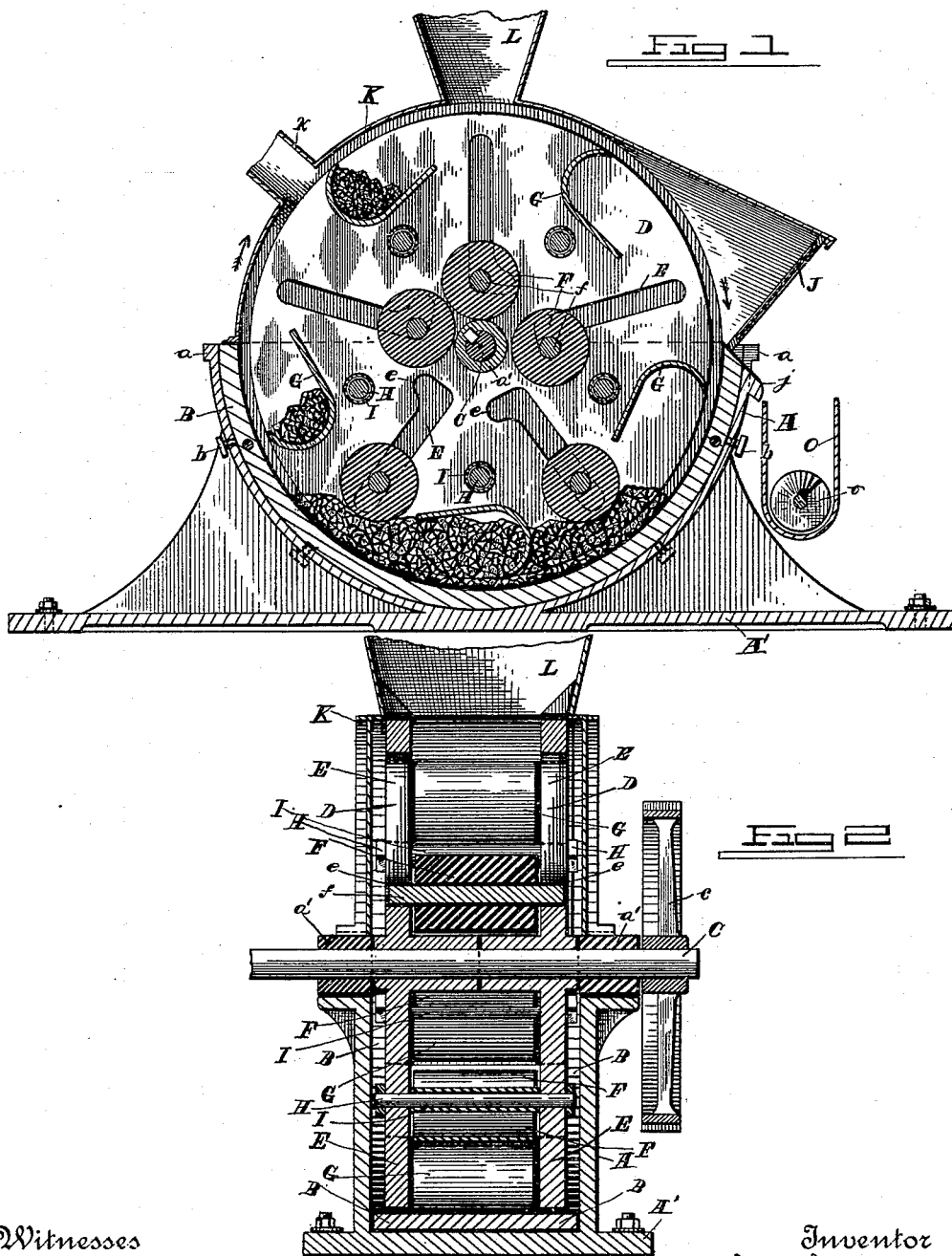


(No Model.)

J. R. TOBIN.
GRINDING MILL.

No. 440,072.

Patented Nov. 4, 1890.



Witnesses

C. W. Seville.
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Inventor

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UNITED STATES PATENT OFFICE.

JOHN RICK TOBIN, OF CHARLESTON, SOUTH CAROLINA.

GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 440,072, dated November 4, 1890.

Application filed September 8, 1890. Serial No. 364,303. (No model.)

To all whom it may concern:

Be it known that I, JOHN RICK TOBIN, of Charleston, in the county of Charleston and State of South Carolina, have invented certain new and useful Improvements in Grinding-Mills; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a central longitudinal vertical section through my improved grinding-mill. Fig. 2 is a central vertical transverse section through the same.

This invention is an improved mill for crushing and grinding ores, &c.; and it consists in the novel construction and combination of parts hereinafter described and claimed.

Referring to the drawings by letter, A designates a narrow semi-cylindrical metallic trough supported upon a base A', with which it may be cast integral, the ends of the trough being closed by integral or removable pieces a, as shown.

B designates a semi-cylindrical shoe fitted within the trough, and b b are set-screws tapped through the walls of the trough and by which the shoe can be adjusted and secured therein.

a' a' are bearings formed on or attached to the end pieces a of the trough, and C designates a shaft journaled therein, and on one projecting end of said shaft is a drive or gear pulley c.

D D designate similar circular disks keyed on said shaft and depending in the trough A and radially slotted at corresponding points, as at E E, the slots extending from points near the hubs of the disks to, or nearly to, the peripheries thereof. The inner ends of the slots are curved laterally, or notched, as at e, as shown.

F F designate a series of cylindrical or other shaped impact-rolls having stub-shafts f f, which rest in opposite slots E E of disks D D, as shown, thus allowing the rolls to move freely between the disks in a radial direction and yet carry them around with the disks as the latter are revolved. When at the outer extremity of slots E, the peripheries of rolls

F will project slightly beyond the peripheries of disks D, and when at the inner end of slots E the rolls lie close to shaft C.

Between each pair of slots E are arranged curved buckets or scrapers G G, secured between and to the disks D D and adapted to carry up the material in the trough at one side of the disks and dash it down at the opposite side against a screen J, arranged at one side of the trough A. The disks may be bound together by transverse bolts H, passing through sleeves I, interposed between the disks to keep them a uniform distance apart.

K designates a semi-cylindrical casing fitted over the upper portions of the disks and secured onto the trough A, as indicated, and having an opening k at one side which may be connected with a fan or air blast, and having at top a hopper or feed opening L, through which the material to be crushed is fed into the mill. The side of the casing opposite opening k is projected slightly beyond the side of the trough, and is open, and in this extended portion is secured a screen J, set at an angle, as indicated, inclining outwardly away from the disks, and below this screen is a chute j, which directs the screened material into a trough O, wherein is a conveyor o, or the material may be delivered directly into a receptacle, as may be most convenient.

The operation of the mill is about as follows: The disks are revolved toward the screen J, and the material fed in through hopper L drops between the disks onto shoe B. The rolls as they are moved by the disks when they reach the ascending side of the same move inward in slots E until they reach the inner ends thereof adjoining shaft C and remain there while being carried over the shaft. As they begin to descend at the opposite side of the shaft, they drop into notches e and are kept from rolling toward the outer extremity of the slots until the slots have assumed a nearly vertical position, when they slip out of notches e and drop down upon the material in the bottom of the trough, giving a violent blow thereon, varying with the weight of the rollers and the inclination of the slots at the moment of their escape from notches e. It is obvious that by varying the angle of notches e in relation to the body of the slot the times of droppings of the rolls can

be regulated so as to let them drop perpendicularly or at various angles, as may be found most desirable. After the rolls drop they remain at the peripheries of the disks 5 until they are again lifted upward as they reach the ascending side, and I thus obtain both an impact and a grinding action on the material by the rolls. The material is also carried up by the buckets and dashed down 10 at the descending side of the mill onto screen J, where the pulverized material passes out while the coarse particles drop back into the trough to be further comminuted.

The shoe B can be adjusted by the screws 15 to compensate for wear thereon, and can be readily replaced when worn out.

All parts of the mill are readily accessible, and its effectiveness will be readily comprehended from the drawings and description. 20 The screen J is so placed that the heavy coarse pieces of ore will not be likely to fall thereon, but drop at once into the trough; but the finer particles will be thrown there-against by centrifugal force and the action 25 of the air-blast. The wings or buckets will themselves assist in creating a draft that may be sufficient at times to effectively work the mill in grinding some materials. As the rolls are at the peripheries of the disks during 30 only about a third of the revolution thereof, a saving in power is obtained.

Having described my invention, what I claim as new, and desire to secure by Letters Patent thereon, is—

35 1. The combination of the pair of disks formed with radial slots extending from near

the axis to near the peripheries thereof, said slots having notches or offsets at their inner ends, with the impact-rolls mounted between the disks and having their shafts playing in 40 said slots, for the purpose and substantially as set forth.

2. The combination of the trough, the shaft journaled thereon and the removable shoe therein, with the radially-slotted disks mount- 45 ed on said shaft, the impact-rolls having their shafts playing in the slots of the disks, and the buckets secured to and between the disks and alternating with the rolls, and the screen at one side of the trough against which the 50 contents of the buckets are discharged, substantially as described.

3. The combination of the trough, the pair of revoluble disks having a series of radial slots extending from near the axis to near 55 the peripheries thereof, the buckets, and the crushing-rolls between said disks mounted on short shafts playing in the slots thereof, the casing covering the upper portion of said disks and having a feed-opening, and an off- 60 set at one side of the casing and the screen set therein, all constructed and arranged to operate substantially as and for the purpose described.

In testimony that I claim the foregoing as 65 my own I affix my signature in presence of two witnesses.

JOHN RICK TOBIN.

Witnesses:

FREDERICK J. SMITH,
CHAS. BOYLE.