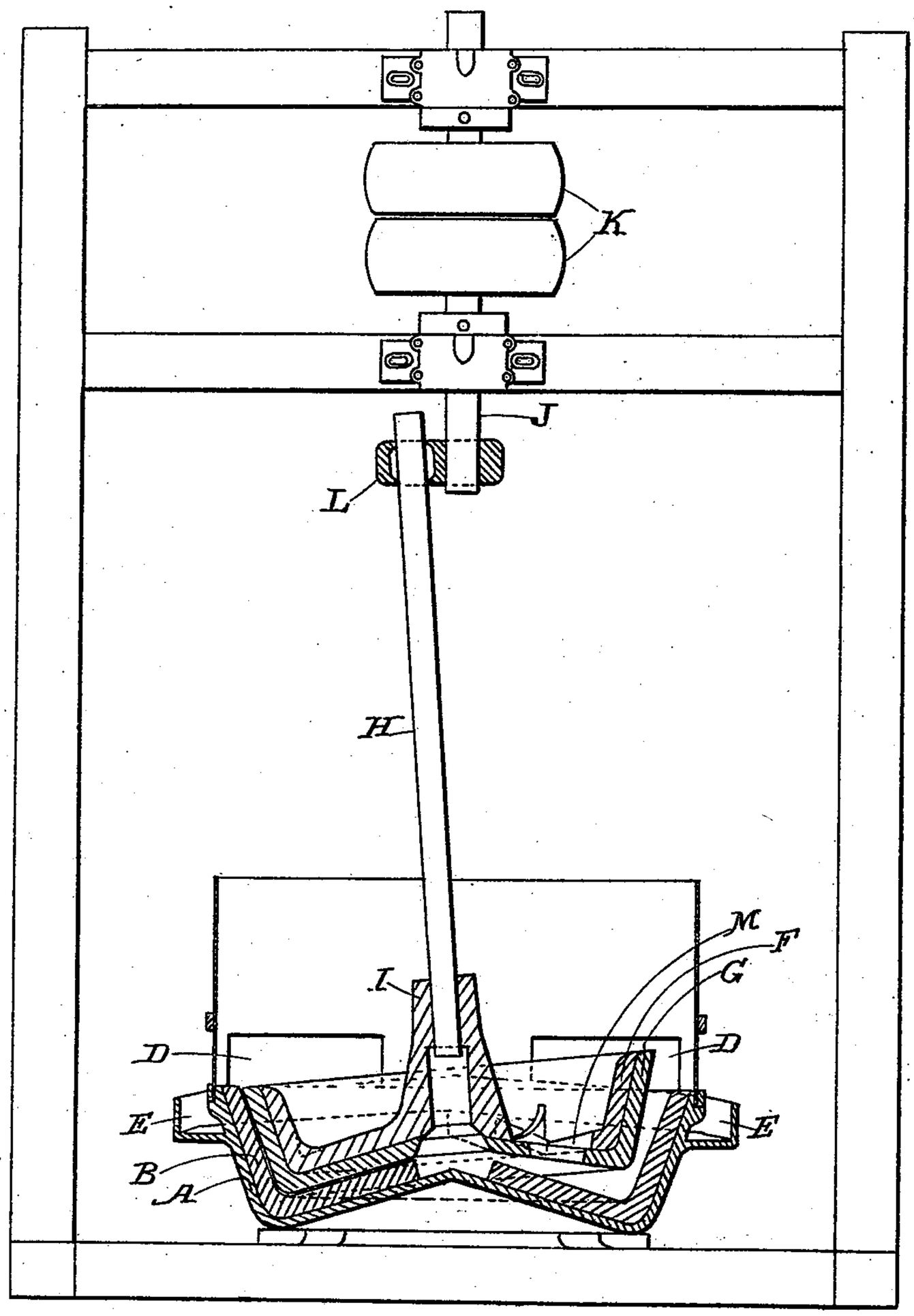
(No Model.) 2 Sheets—Sheet 1.

J. H. KINKEAD.

ROCK CRUSHING AND GRINDING APPARATUS.

No. 538,523. Patented Apr. 30, 1895.

Fig. 1



Witnesses,
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J. A. Bayless

Inventor,
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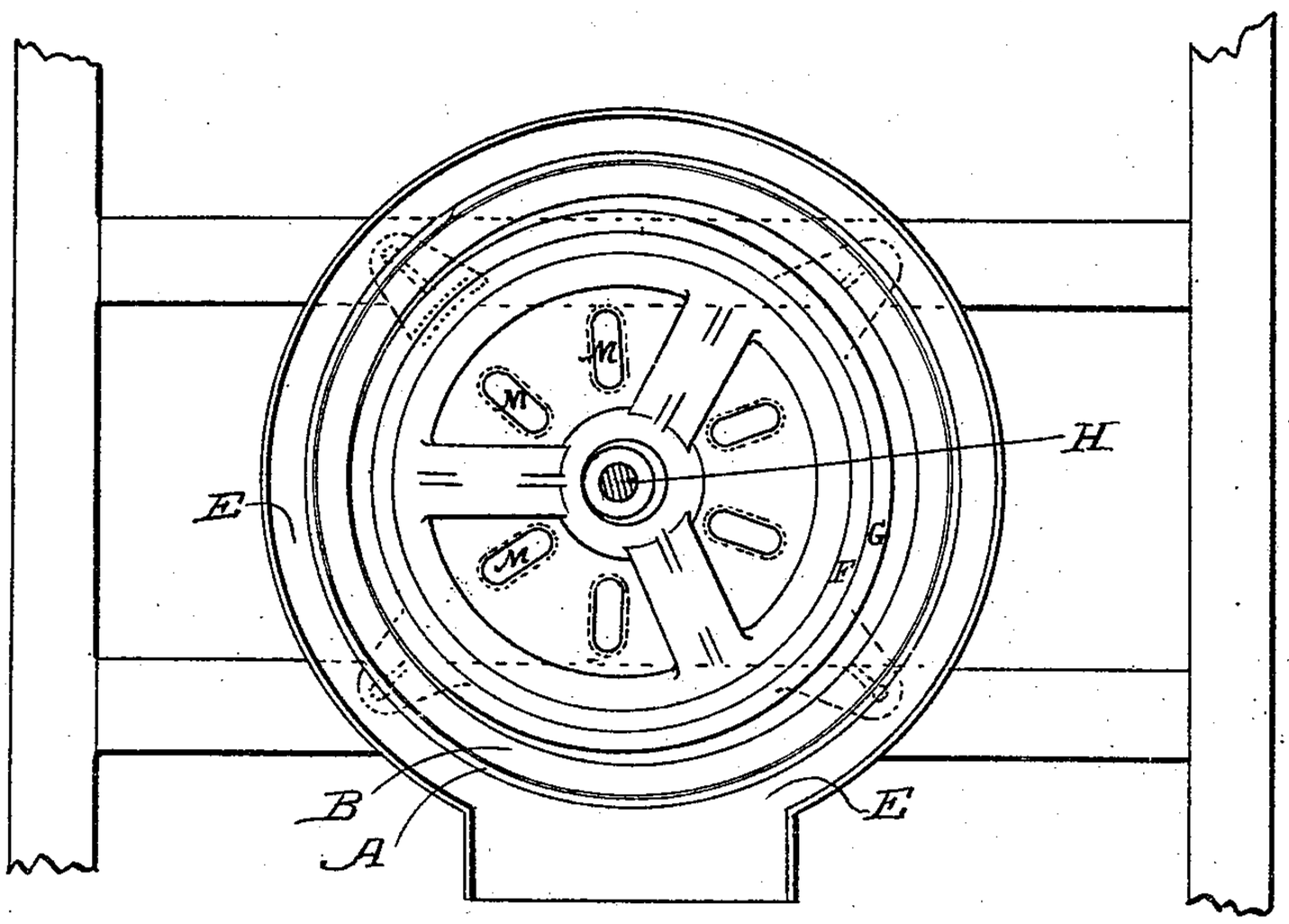
(No Model.) 2 Sheets—Sheet 2.

J. H. KINKEAD.

ROCK CRUSHING AND GRINDING APPARATUS.

No. 538,523. Patented Apr. 30, 1895.

Fig. 2



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UNITED STATES PATENT OFFICE.

JAMES H. KINKEAD, OF VIRGINIA CITY, NEVADA.

ROCK CRUSHING AND GRINDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 538,523, dated April 30, 1895.

Application filed July 21, 1894. Serial No. 518,270. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. KINKEAD, a citizen of the United States, residing at Virginia City, Storey county, State of Nevada, have invented an Improvement in Rock Crushing and Grinding Apparatus; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in rock crushing and grinding apparatus.

It consists in certain details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of my apparatus. Fig. 2 is a plan view.

The object of my invention is to provide a machine for crushing and grinding rock, and especially quartz and other valuable metal bearing rock.

A is an iron pan having a raised or convex bottom, the radial lines of which are straight, as shown, and sides which extend upwardly and outwardly from the periphery of the bottom at essentially right angles therewith. Within the pan is fixed an iron die B which is secured with bolts, wooden wedges or other devices so as to be removable, and this receives the wear and may be replaced whenever necessary. Around the top of the pan is a ledge to which is fixed a cylindrical screen frame having screen openings D made in it at as many points around the circumference as may be desired. Through screens fixed in these openings, the pulverized material is discharged as fast as it becomes fine enough to pass the meshes of the screen, and falls into a sluice or channel E which is cast around the periphery of the pan.

The crushing and grinding device consists of a pan-shaped muller F having a bottom which is made convex, to produce a concave grinding surface but of a convexity less than that of the bottom of the pan, the muller having also sides extending upward at an angle approximately at right angles with the bottom of the muller. Upon the exterior of this muller is fixed an iron shoe G, either in a continuous piece or in sections, the bottom of the shoe having a concavity which is a little less in depth than the corresponding convexity of the die of the outer pan, and the sides of the shoe extend upwardly in such a manner that when the muller is tilted or rolled around within the pan, the bottom and sides of the shoe form a close contact with the inner face of the die of the pan upon one side, while a considerable space will be left upon the opposite side. As the muller is rolled around within the pan, this space is constantly changing, and the sides and bottom of the muller are continually closing in against the sides and bottom of the pan so as to produce a consecutive grinding and crushing action all around the interior periphery of the pan.

The movement of the muller is produced by means of a shaft H keyed into the central hub I of the muller and extending upwardly to some distance above the pan. Above the pan and in line with its center is a vertical shaft J, having suitable driving pulleys or gears K by which motion is imparted to it. Upon the lower end of this shaft is fixed a crank L which projects horizontally to one side, and has an opening at its end adapted to receive the upper end of the shaft H which fits loosely into the opening, and when the guiding shaft is caused to rotate, the upper end of the shaft H, which connects with the muller, is carried around in a circle equal to the diameter of the circle in which the crank travels. This causes the tilting or rolling motion of the muller within the pan at the bottom, and the continuous contact of the different portions of the muller and pan sides by which crushing is produced.

The bottom of the muller has formed in it slots or openings M, and the ore or other material to be crushed is delivered into the inside of the muller, gradually passing through these openings, and as it revolves around within the pan, the ore will pass through the openings and between the muller shoe and the die, and will be crushed as the muller rolls around within the pan.

The weight and momentum of the apparatus is sufficient to crush any ore or rock which may be employed, and as fast as it becomes sufficiently fine it will be delivered through the screens previously described.

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

An improved crushing and grinding appa-

ratus consisting of a pan having a conical bottom declining outwardly from the center, sides extending upwardly at right angles therewith, a pan-shaped muller having a conical bottom and diverging sides, said bottom having a concavity slightly less in depth than the corresponding convexity of the bottom of the pan, and said muller being entirely open at its top whereby its sides and bottom form a deep receiving chamber into which the ore to be crushed is delivered, and having said bottom provided with openings which are covered when the bottom of the muller forms close contact with the corresponding grinding face of the pan, and opened or exposed when the muller lifts away from said grinding face whereby the ore is automatically fed through said openings during the gyrations of the muller, and is delivered directly to and crushed between the bottom surfaces of the pan and muller, a driving shaft having a crank connected loosely with the shaft of the muller and vertical extensions of the sides of the pan having screen openings for the discharged material.

In witness whereof I have hereunto set my hand.

JAMES H. KINKEAD.

Witnesses:
J. MATHESON,
C. E. MACK.