H. W. HARDINGE.

APPARATUS FOR SIZING COMMINUTED ORE OR OTHER MATERIAL.

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1,098,497. Patented June 2, 1914.

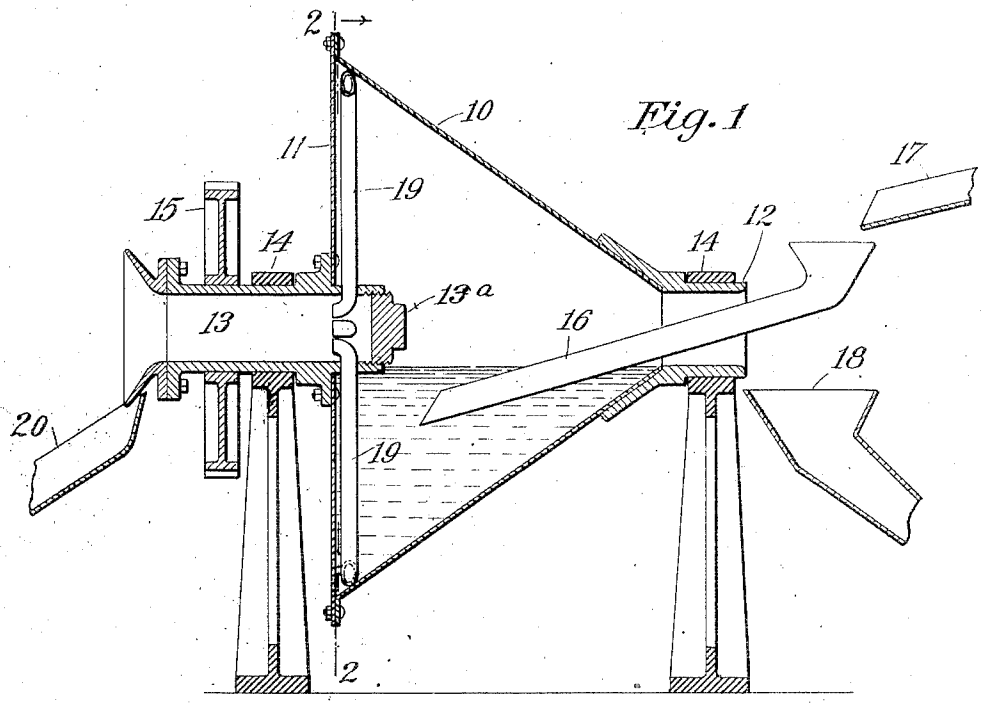


Fig. 1

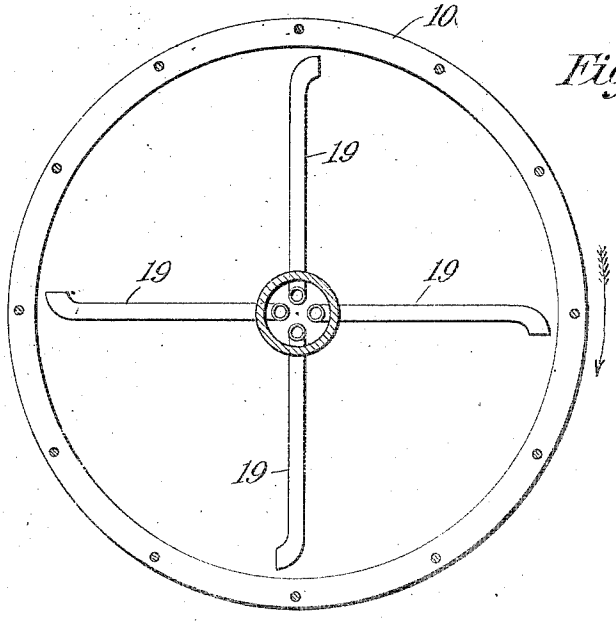


Fig. 2

Witnesses:
William P. Johnson
A. Dunham

H.W. Hardinge, Inventor
By his Attorneys
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UNITED STATES PATENT OFFICE.

HARRY W. HARDINGE, OF NEW YORK, N. Y.

APPARATUS FOR SIZING COMMINUTED ORE OR OTHER MATERIAL.

1,098,497. Specification of Letters Patent. Patented June 2, 1914.

Application filed October 5, 1912. Serial No. 724,072.

To all whom it may concern:

Be it known that I, HARRY W. HARDINGE, a citizen of the United States, residing at New York, county and State of New York, have invented certain new and useful Improvements in Apparatus for Sizing Comminuted Ore or other Material, of which the following is a full, clear, and exact description.

This invention relates to apparatus for "sizing" finely divided material, such as metalliferous ores, and its chief object is to provide a simple, cheap, and withal thoroughly effective device for separating the finer particles of the material from the coarser so that the latter can be subjected to further grinding or dividing or other treatment.

To this and other ends the invention consists in the novel features of construction and combinations of parts hereinafter described.

One form of the invention is illustrated in the accompanying drawing, in which—

Figure 1 shows my improved sizer in longitudinal section, and Fig. 2 is a cross section, on line 2—2.

In its preferred form, the apparatus includes a barrel 10 in the form of a cone with a flat base or closure 11, having at its apex a combined inlet and outlet trunnion 12 coaxial with the barrel and at its base an outlet trunnion 13. These trunnions are mounted in bearings 14 to permit the barrel to rotate about its longitudinal axis, and on the trunnion 13 is a driving gear 15 by which the barrel can be rotated. Into the trunnion 12 extends a tubular spout 16, receiving, as from a delivery trough or launder 17, a stream of water and finely divided material and discharging the same at a point preferably below the bottom of the trunnion 12. As the stream of material flows into the barrel from the spout 16 the barrel fills until the water level reaches the bottom of the trunnion 12, whereupon the water flows out again (the trunnion 13 being closed on the inside, as by a removable plug 13ª), carrying with it such particles of material as are fine enough to float at or be suspended near the surface of the water. The larger and heavier particles, however, sink more or less rapidly to the lowest point of the barrel, which point in the present instance is at the base of the cone. The slime issuing from the trunnion 12 is received by a trough or conduit 18 and is delivered thereby to any desired point for further treatment.

For the purpose of removing from the barrel the coarse and heavy particles which collect at the bottom, the barrel is provided with one or more conveying devices in the form of tubular arms 19, extending from the zone of greatest diameter, that is, from points near the periphery of the barrel where its diameter is greatest, to the inside of the trunnion 13. By preference these conveying arms or tubes have their outer ends open in the direction in which the barrel revolves, as by giving their extremities a slight bend in the manner shown. In order to prevent material discharged from an arm from falling into the arm below, the inner ends of the arms are also bent, preferably toward the mouth or outlet of the trunnion, as shown; and to prevent material from running back from the trunnion into a downwardly extending arm the inner ends of the arms are extended into the trunnion far enough to keep them above the water line at all times. As the barrel revolves (in the direction of the arrow in Fig. 2) the conveying arms or tubes 19 scoop up coarse material from the bottom of the barrel, and as the arms revolve the material flows into the trunnion 13, whence it is discharged into a suitable trough or chute 20 and is delivered thereby to any desired point, after which the material can be returned to the grinding apparatus for further reduction, if desired.

The conical form of barrel illustrated is the form which I prefer to employ, as the zone of greatest diameter is narrow and thus gives greater concentration, so to speak, of the coarse and heavy particles.

It is to be understood that the invention is not limited to the construction herein specifically illustrated and described but may be embodied in other forms without departure from its proper spirit and scope, as defined by the following claims.

I claim:

1. In a sizing apparatus for the purpose set forth, in combination, a rotary barrel having its bottom inclined to the horizontal and having an inlet opening for water and comminuted material, one or more tubular conveyers open to the interior of the barrel at the periphery thereof only and extending toward the axis of the barrel and open to

the outside of the barrel at their ends next to the said axis, said conveyers being fixed to the barrel and revolving therewith.

2. In a sizing apparatus, in combination, a barrel of conical form rotatable about its axis and having an opening for the delivery of water and comminuted material into the barrel and the discharge of water and fine material, and one or more tubular conveying devices extending from inside the barrel where the diameter is greatest and delivering coarse material to the outside of the barrel.

3. In a sizing apparatus, in combination, a conical barrel rotatable about its axis, having an inlet and outlet trunnion at its apex and at its base an outlet trunnion closed to the interior of the barrel, means for delivering water and comminuted material into the barrel through the first-named trunnion, and one or more tubular conveying devices extending from the inside of the barrel near the periphery thereof at the base and opening into the second-named trunnion for the delivery of coarse material thereto.

4. In a sizing apparatus, in combination, a conical barrel, a combined inlet and outlet trunnion at the apex of the barrel, an outlet trunnion at the base of the conical barrel and closed at its inner end, the barrel being rotatable on said trunnions, and one or more tubular arms extending radially from the outlet trunnion to the periphery of the base of the conical barrel on the inside thereof, the outer ends of the arms being open in the direction of rotation of the barrel and their inner ends being open into the interior of the said outlet trunnion, whereby as the barrel and arms revolve the arms will scoop up coarse material and discharge the same into the said outlet trunnion.

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

HARRY W. HARDINGE.

Witnesses:

M. LAWSON DYER,

S. S. DUNHAM.