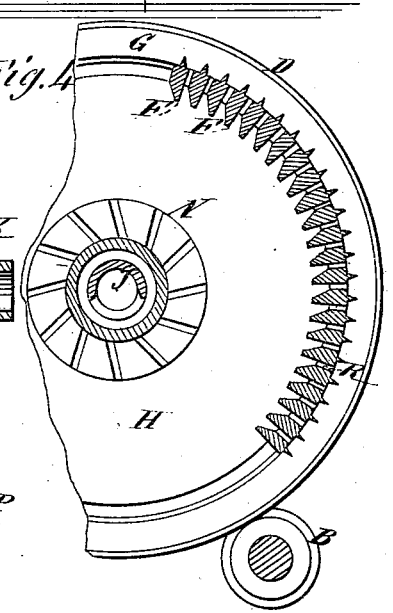
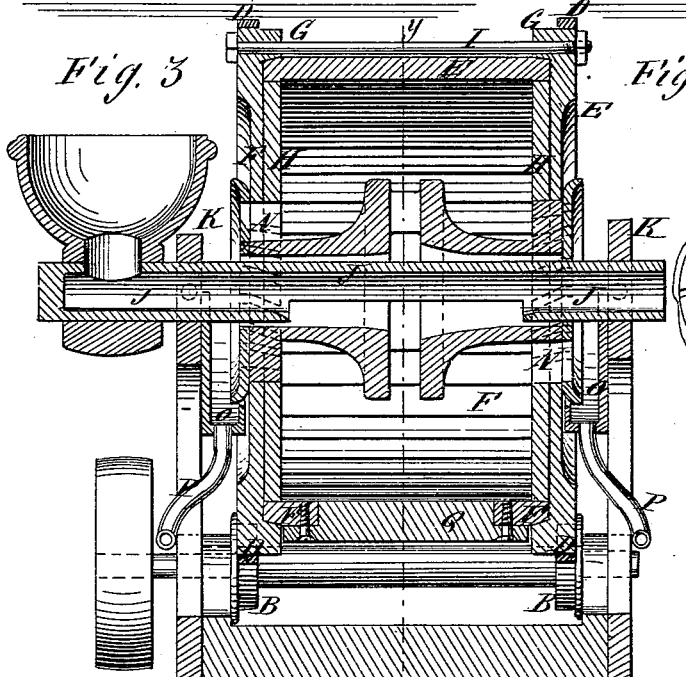
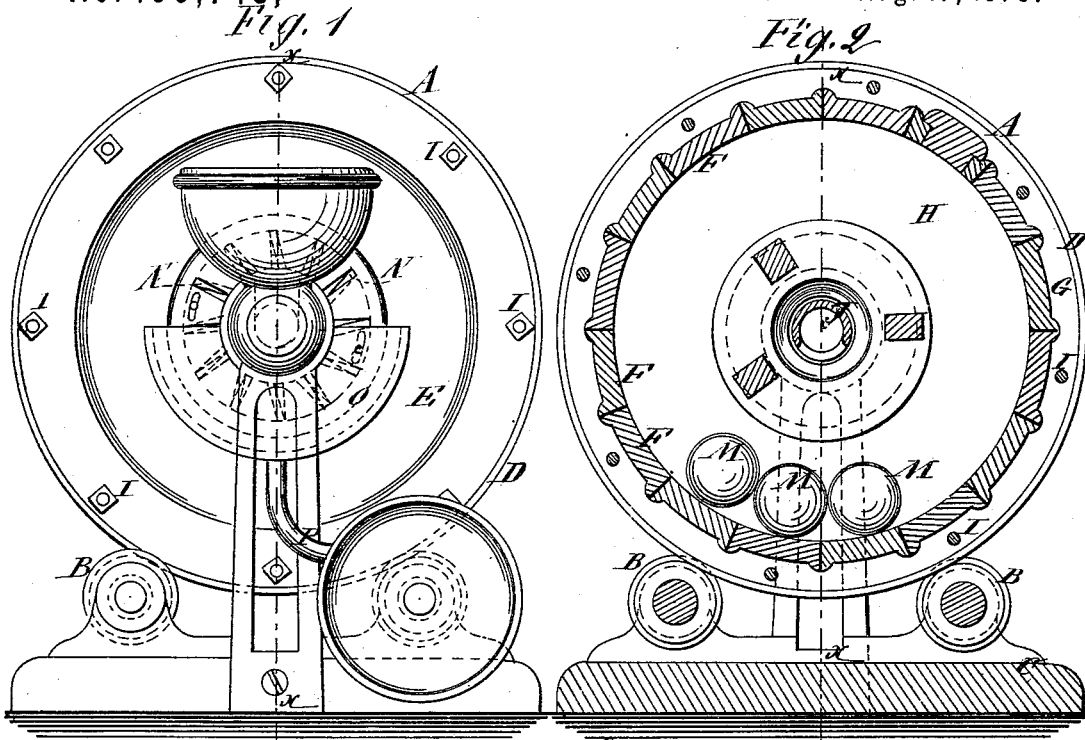


H. BOLTHOFF.
Wet and Dry Ore Crushers.

No. 166,743,

Patented Aug. 17, 1875.



WITNESSES:
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A. F. Terry

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

HENRY BOLTHOFF, OF CENTRAL CITY, COLORADO TERRITORY, ASSIGNOR
TO HIMSELF AND CHARLES F. HENDRIE, OF SAME PLACE.

IMPROVEMENT IN WET AND DRY ORE CRUSHERS.

Specification forming part of Letters Patent No. 166,743, dated August 17, 1875; application filed
May 1, 1875.

To all whom it may concern:

Be it known that I, HENRY BOLTHOFF, of Central City, in the county of Gilpin and Territory of Colorado, have invented a new and Improved Ball-Pulverizer, of which the following is a specification:

The invention will first be described in connection with the drawing, and then pointed out in the claims.

Figure 1 is an end elevation of my improved machine. Fig. 2 is a transverse section taken on the line *y y* of Fig. 3. Fig. 3 is a longitudinal sectional elevation on line *x x* of Figs. 1 and 2, and Fig. 4 is a section showing the arrangement of staves for dry-pulverizing.

Similar letters of reference indicate corresponding parts.

A is a hollow cylinder of any required size, made of cast-iron or other suitable material, and caused to revolve upon four truck-wheels, B, placed in a frame, C. The motive power is applied to one of the truck-wheel shafts, driving the mill by friction of the truck-wheels on the periphery of the heads, which are banded with tires D, to prevent wear of machine.

The cylinder consists of two heads, E, connected together by staves F, made of cast-iron or other suitable material. The heads have a flange, G, on the outer rim, and are protected from wear on inner side by liners H.

The staves are fitted between the outside flange of heads and the outer rim of liners, and are tapered at the ends to fit taper on flanges, so that when the connecting-bolts I are drawn up the taper acts like a hoop on a barrel, to tighten the staves together.

For wet-crushing these staves are made water-tight by the insertion of proper packing between them and at the ends, each stave having projecting ribs to help hold the packing and stiffen the stave.

Through the center of the cylinder, which is open, is placed a hollow pipe, J, held in place by two stands, K. Through this pipe is fed the ore and water, the pipe having openings, L, for discharge of same into inside of cylinder. I propose to utilize this pipe for the shaft of the cylinder. Balls M, of cast-iron or other suitable material, are placed in-

side, and by the motion of cylinder the ore and balls are brought into contact, and the crushing is done by concussion and abrasion, and when the ore is sufficiently fine to float, it rises to the top of the water and passes out in form of pulp through registers N on either side near the center into hoppers O, fastened to the stands; thence it passes in pipes P to the amalgamating-coppers, as used with stamps. The registers N may be contrived to discharge the pulp higher or lower by means of regulators, to regulate the concentration by specific gravity. At intervals the feeding of the ore can be stopped, and some mercury put into the cylinder, which will take up all the loose, free gold there may be left in the cylinder, and then, after a thorough mixing of mercury with the pulp, the hand-hole plates Q can be removed from the stave, and a grate inserted in the place with holes small enough to prevent the balls escaping, but let all the pulp discharge into a dolly-tub or settler, in which the amalgam and concentrated tailings can be separated and obtained, the amalgam retorted, and the gold and tailings, or ore that will not amalgamate, will be sufficiently concentrated to heat by smelting.

The above is the arrangement as used for wet-crushing, and principally on gold ores.

For dry-crushing, of course the ore is fed in dry, and instead of discharging at the centers, it discharges around the periphery through interstices R between each stave, which are made much narrower than the wet-mill stave, to give more discharging capacity, and are so shaped on inside as to form corrugations, thus preventing packing of ore and balls, and thus aiding free discharge. These staves are slightly thicker at each end than the rest, to separate them for the interstices and spaces for the discharge of the ore.

In my dry-crusher, the pulverized ores are discharged at the periphery through interstices between staves, whose narrowness enables the discharge-space to be increased, and whose corrugated shape on the inside prevents the balls and unbroken ore from interfering with the discharge. The pulverizing capacity of a given machine is thus greatly augmented.

Having thus described my invention, I claim

as new and desire to secure by Letters Patent—

1. A wet-pulverizer for ores, discharging the pulp near its center through a series of registers, N, of varying altitude, thereby regulating the fineness of the crushed ore by its own gravity.

2. The combination of heads E E, having flanges G and lining H, with end-tapered

staves F, having rib, the said staves and heads being bolted together in the manner described.

3. A dry-pulverizer for ores, having staves made narrow, intervalled and corrugated on the inside, as and for the purpose specified.

HENRY BOLTHOFF.

Witnesses:

CHAS. WITHROW,
JAMES BURRELL.