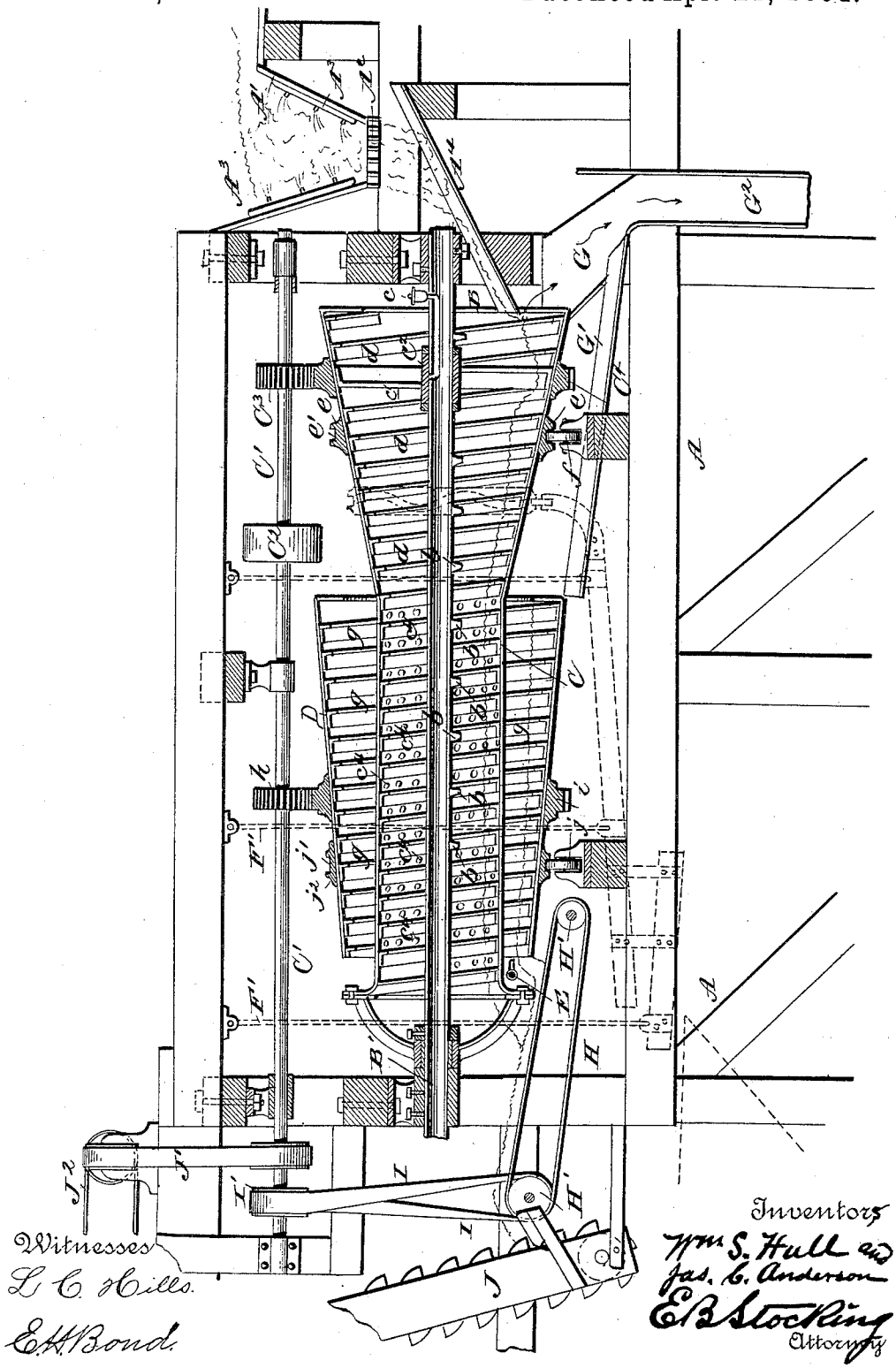
(No Model.)

W. S. HULL & J. C. ANDERSON.

ORE WASHER.

No. 450,756. Patented Apr. 21, 1891.



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UNITED STATES PATENT OFFICE.

WILLIAM S. HULL AND JAMES C. ANDERSON, OF SHEFFIELD, ALABAMA.

ORE-WASHER.

SPECIFICATION forming part of Letters Patent No. 450,756, dated April 21, 1891.

Application filed October 21, 1890. Serial No. 368,814. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM S. HULL and JAMES C. ANDERSON, citizens of the United States, residing at Sheffield, in the county of Colbert, State of Alabama, have invented certain new and useful Improvements in Ore-Washers, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to certain new and useful improvements in ore-washers; and it has for its object, among others, to provide an improved device for the purpose of washing ores in which the ore will be better washed in less time and with less care and attention on the part of the operator. We provide a rotary cylinder through which is passed a hollow shaft receiving water under pressure and through which it is distributed onto the ore in the cylinder. The ore is fed to the cylinder in any suitable manner, the cylinder being preferably provided internally with spiral ribs or analogous provisions for forcing the ore along in opposition to the flow of water, the cylinder or a portion thereof being inclined toward its receiving end to provide for the discharge of all the water and the dirt and refuse removed from the ore. We may or may not employ an outer cylinder or casing, which should be provided internally with spiral ribs or projections. The washed ore is delivered either onto a jig or upon a conveyer or belt and carried to a bin or receptacle from which it is taken by a belt or elevator into a storage-bin, or into cars, if desired. We provide simple means for agitating the jig through the rotary movement of the cylinder. We provide as a whole a machine capable of accomplishing the work more satisfactorily than is done by prior constructions.

Other objects and advantages of our invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawing, which, with the letters of reference marked thereon, forms a part of this specification, and in which our invention is shown in vertical longitudinal section with parts in side elevation.

Referring now to the details of the drawing by letter, A designates a suitable framing or support for the operating parts.

A′ is a receiving-hopper into which the material is fed in any suitable manner, being provided with a slotted bottom A^2, and within this hopper are arranged pipes A^3, perforated or provided with small discharge-nozzles, as shown, being designed to receive water from any suitably source, said water being discharged upon the ore, as illustrated in the drawing, to partially wash the same and loosen the dirt and clay therefrom. Beneath this hopper is arranged an inclined chute A^4, upon which the material discharges from the hopper and which delivers said material to the interior of the cylinder, soon to be described. The hopper and chute are supported in the drawing A in any suitable manner.

B is a hollow shaft supported in suitable bearings and designed to receive water from any suitable source either under pressure or not, either from a pump, a stand-pipe, or elevated tank, and this pipe is provided for its portion within the cylinder with perforations or small discharge-nozzles *b*, through which the water is designed to be discharged onto the material in the cylinder.

C is the cylinder of suitable length and diameter and of any suitable material. It is supported by suitable means to revolve around the hollow shaft which is passed centrally therethrough. The hollow center pipe or shaft may be made of rolled iron round, or two half-round bolted together, or of cast-iron round, octagonal, square, or of any other shape, or it may be of one or more lengths secured together in any suitable manner; but it is preferred to make it of one piece of round pipe, so as to avoid joint and reduce the friction to a minimum. The cylinder may be revolved in any suitable manner. In the accompanying drawing I have shown a simple means.

C′ is a shaft journaled in suitable bearings in the framing and arranged parallel with the hollow shaft B.

C^2 is a pulley on this shaft C′, to which power is imparted from any suitable source. (Not shown.)

C^3 is a pinion fast on the shaft C′ and meshing with a circumferential gear C^4 on the

other periphery of the cylinder, by which rotary motion is imparted to said cylinder.

c is an oiling device for the bearing *c'* of the cylinder on the shaft.

The cylinder C is conical-shaped at its ore-receiving end, which end is open and into which the chute A^4 delivers. The cylinder is provided interiorly with suitable provisions for forcing the ore from its receiving to its delivery end. In the drawing we have shown spirally-arranged plates or ribs *d*, substantially L-shaped in cross-section. The conical portion of the cylinder is provided with an encircling collar *e*, provided with a groove *e'*, in which works an anti-friction roller *f*, arranged beneath the cylinder and journaled in suitable bearings, as shown.

D is an outer cylinder surrounding a portion of the cylinder C and provided with internal spiral ribs or projections *g*, similar to those in the cylinder C. This is revolved by a pinion *h* on the shaft C', which engages a peripheral gear *i* on the outer cylinder. It is supported and guided by the anti-friction roller *j*, working in the groove *j'* of the collar j^2. The larger end of the cylinder D may be supported in any suitable manner.

E is a pipe supplied with water from any suitable source and arranged to discharge the same between the two cylinders, being preferably provided with discharge-nozzle, as shown. The inner cylinder is provided with perforations c^4, through which the fine particles of ore find their way into the other cylinder.

G is a discharge-spout at the receiving end of the cylinder C, and G' is a discharge spout or chute for receiving the water and dirt from the outer cylinder. They both communicate with the spout G^2, which conducts the water and dirt to any desired place of deposit.

H is an endless belt or apron supported upon suitable rollers H', carried by suitable shafts, and this apron is arranged to receive the washed ore from the cylinders, as illustrated. Motion is imparted to the belt or apron by means of the belt I and pulley I' on the shaft C'.

J is an elevator of any preferred construction arranged at the discharge end of the belt H and adapted to receive the washed ore therefrom. It is operated through the medium of the belts J' and J^2, actuated from the shaft C'.

The operation will be readily understood. Ore is fed to the enlarged conical end of the inner cylinder through hopper and chute, as shown, and as the cylinder revolves the screw or spiral ribs on the inside wind or carry the ore forward, while the incline allows the water, which is admitted through the central hollow pipe or shaft, to overflow the flanges and flow back to the end at which the ore is introduced. As the ore is moved forward the jets of water thereon clean the same of clay and dirt, which is carried off through the spout G^2, and the fine ore passes through the perforations in the cylinder into the outer cylinder or shell. From the inner and outer cylinders the ore falls onto the endless belt, where it is carried to the elevator, by which it may be carried to suitable bins or other desired receptacle or place. The belt H should be slightly inclined, so as to allow any water that might still be with the ore to run off.

Various modifications and details may be resorted to without departing from the spirit of or sacrificing the advantages of the invention. We propose to sometimes make smaller-sized machines of a portable character for the purpose of washing small beds of ore.

If desired, the hollow shaft may be caused to revolve, in which case the water will be carried into the shaft through a packed joint.

What we claim as new is—

1. The combination, with the revoluble cylinder having internal spirally-arranged projections and external supports and gearing, of a non-rotatable hollow shaft arranged centrally within the cylinder, and boxes and arms operatively connecting the cylinder and shaft, substantially as specified.

2. The combination, with the revoluble cylinder having conical receiving end and spirally-arranged interior projections and perforations, of the outer rotatable cylinder, substantially as specified.

3. The combination, with the revoluble cylinder of uniform diameter having conical receiving end and spirally-arranged interior projections and perforations, of the outer rotatable shell provided with interior spirally-arranged projections, substantially as specified.

4. The combination, with the revoluble cylinder, the rotatable outer cylinder, and the central non-rotatable perforated water-supply pipe, of a water-supply pipe arranged to discharge between the two cylinders, as set forth.

5. The combination, with the perforated revoluble cylinder having conical receiving end, of the outer rotatable conical cylinder and the non-rotatable perforated water-supply pipe, substantially as specified.

6. The combination, with the perforated revoluble cylinder having conical receiving end and interior spirally-arranged projections, of the outer revoluble shell having interior spirally-arranged projections, and the axially-arranged water-supply pipe, substantially as specified.

7. The combination, with the perforated revoluble cylinder having conical receiving end and interior spirally-arranged projections, of the outer revoluble shell having interior spirally-arranged projections, and the water-supply pipes, one arranged axially within the inner cylinder and the other arranged to discharge between the two cylinders, substantially as specified.

8. The combination, with the revoluble cylinder having exterior supports and gearing, conical receiving end, and interior spirally-

arranged projections and perforations, of the outer revoluble cylinder, embracing the perforated portion of the inner cylinder and provided with interior spirally-arranged projections, and the perforated non-rotative water-supply pipe forming a support for the inner bearings of the inner cylinder, substantially as specified.

9. The combination, with the perforated revoluble inner and outer cylinders and the interior perforated water-supply pipe, of the belt arranged to receive the discharge from said cylinders, and connections, substantially as described, whereby said cylinders and belt are operated from the same shaft, substantially as specified.

10. The combination, with the perforated revoluble inner and outer cylinders and the interior perforated non-rotatable water-supply pipe, of the belt arranged to receive the discharge from said cylinders, the elevator for taking the ore from the belt, and gearing operatively connecting the elevator and belt to the main shaft, substantially as specified.

11. The combination, with the inner revoluble cylinder having conical portion with its smaller end extending inward, of the outer revoluble cylinder, the discharge-spout from the outer cylinder, the discharge-spout from the inner cylinder, and the discharge-spout common to and communicating with both of the first-mentioned spouts, substantially as described.

12. The combination, with the hollow shaft and the revoluble inner cylinder having bearings on said shaft and exterior circumferential gear, and the outer revoluble cylinder having circumferential gear, and roller-bearings for both of said cylinders, of the main shaft and means for imparting motion thereto, and pinions on said shaft meshing with the circumferential gear on said cylinders, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM S. HULL.
JAS. C. ANDERSON.

Witnesses:
C. T. MORRIS,
G. C. GRAFF.