

(No Model.)

2 Sheets—Sheet 1.

G. W. LYON.

ORE WASHER.

No. 323,875.

Patented Aug. 4, 1885.

Fig. 1.

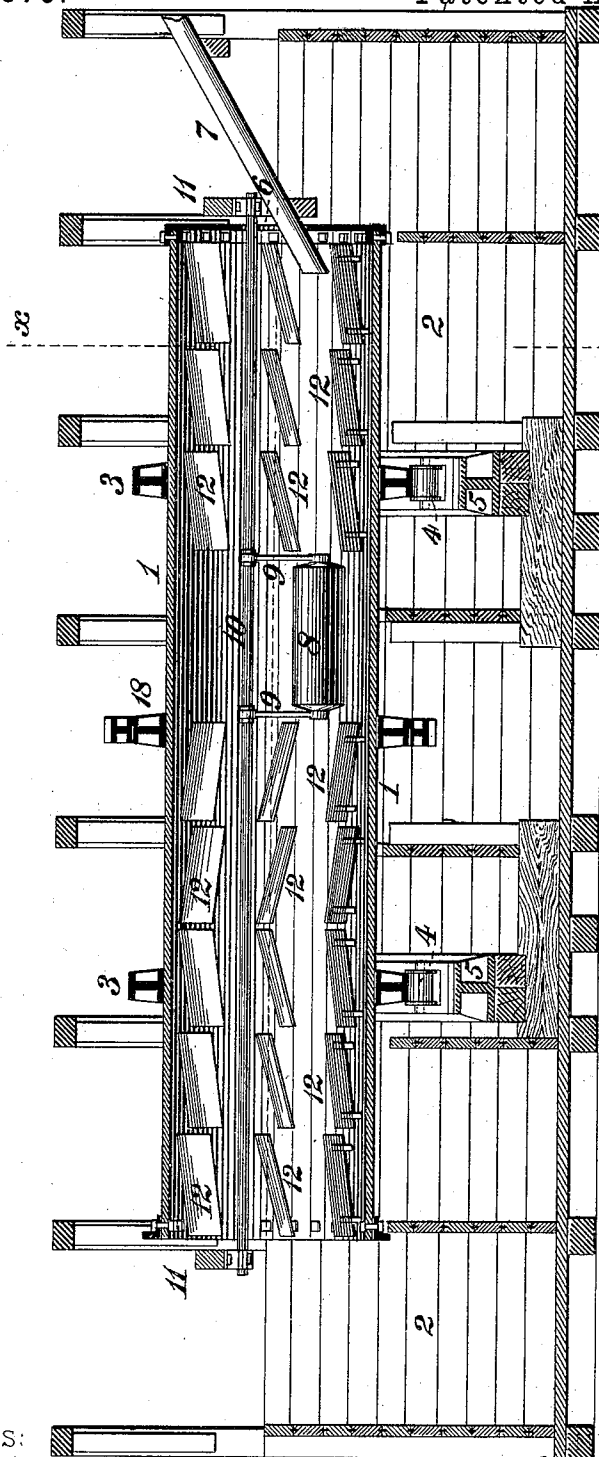
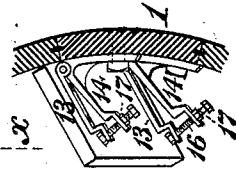


Fig. 5.

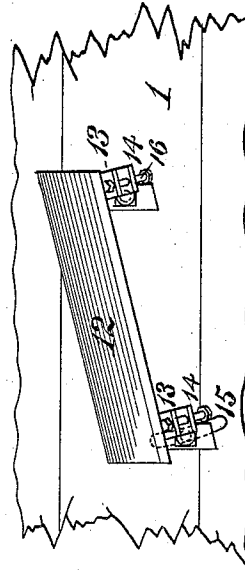


Fig. 4.

WITNESSES:

J. Sherman Bell.
E. M. Clark

VENTOR:

George W. Lyon.
BY *George H. Christy*
ATTORNEY.

(No Model.)

2 Sheets—Sheet 2.

G. W. LYON.
ORE WASHER.

No. 323,875.

Patented Aug. 4, 1885.

Fig. 2.

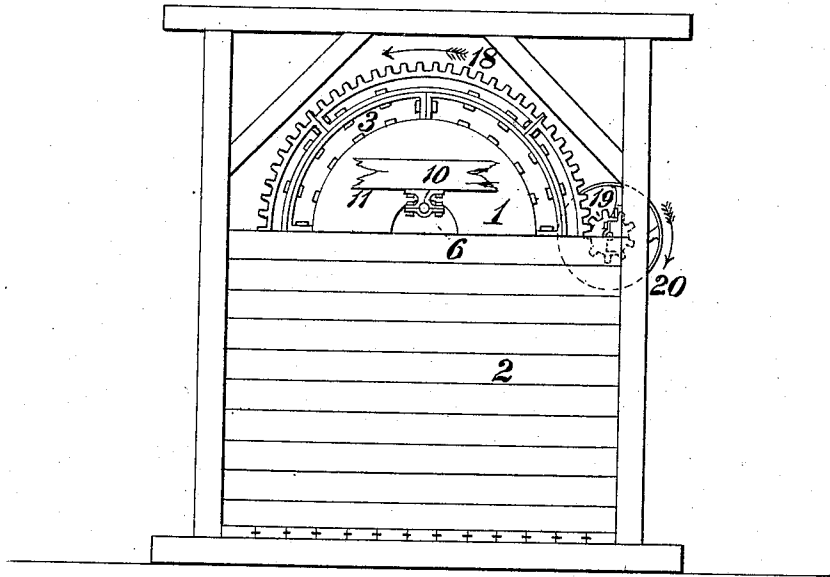
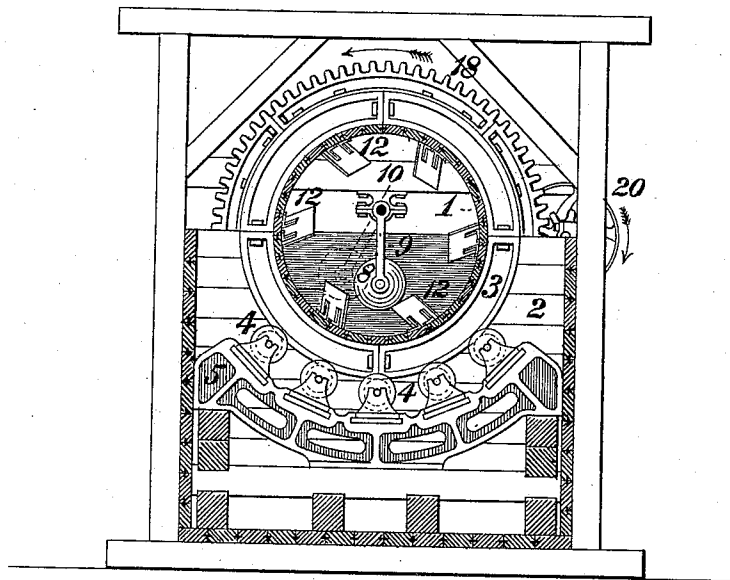


Fig. 3.



WITNESSES:

J. Thomson Bell.
E. M. Charles.

INVENTOR:

George W. Lyon.
BY *George H. Christy*
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE W. LYON, OF PENNSYLVANIA FURNACE, PENNSYLVANIA.

ORE-WASHER.

SPECIFICATION forming part of Letters Patent No. 323,875, dated August 4, 1885.

Application filed December 1, 1884. (No model.)

To all whom it may concern :

Be it known that I, GEORGE W. LYON, a citizen of the United States, residing at Pennsylvania Furnace, in the county of Huntingdon and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Ore-Washers, of which improvements the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1, Sheet 1, is a vertical longitudinal central section through an ore-washer embodying my invention; Fig. 2, Sheet 2, an end view in elevation of the same, as seen from the right; Fig. 3, Sheet 2, a vertical transverse section at the line *xx* of Fig. 1; Fig. 4, Sheet 1, a view in elevation and on an enlarged scale of a portion of the inside of the cylinder with a shelf attached; and Fig. 5, Sheet 1, a transverse section on a similar scale through a portion of the cylinder with an end view of a shelf.

The object of my invention is to provide convenient and desirable means for effecting the separation of earthy matters and other impurities from ores with thoroughness, economy, and dispatch prior to subjecting the same to the operation of smelting.

To this end my invention, generally stated, consists in the combination, with a washing-cylinder adapted to be rotated upon peripheral supports, of an inclosing chest or vat, a series of inclined elevating and conveying shelves secured adjustably to the inside of the cylinder, and a crushing-roller suspended within the cylinder with the capacity of free rotation eccentrically thereto.

The improvements claimed are hereinafter fully set forth.

In the practice of my invention, I construct, preferably of iron or wooden staves, as shown, a washing-cylinder, 1, which is supported within a water-tight chest or vat, 2, by means of two or more bearing-rings, 3, which are formed of metallic segments secured together around the periphery of the cylinder concentric with the axis thereof, each of said rings resting upon a series of flanged rollers, 4, mounted in bearings in a support, 5, secured to the framing of the chest 2. A central opening, 6, is formed in one end of the cylinder 1 into which opening an inclined feed-spout, 7, is led for the supply of ore and other material

supplied by a flow of water from a point above the level of the top of the chest, and the opposite or delivery end of the cylinder is either entirely open or may be provided with a flange by which it is partially closed adjacent to the shell of the cylinder. A crushing-roller, 8, is journaled by a pair of end trunnions in the lower ends of a pair of links or suspending arms, 9, which are journaled at their upper ends on a supporting rod or shaft, 10, extending longitudinally through the cylinder 1 and passing through the open end and the opening 6 of the opposite end thereof, exterior to which it is fixed to transverse beams 11 of the framing of the chest 2. The longitudinal position of the crushing-roller 8 within the cylinder is, in the instance shown, nearer to the supply than to the delivery end of the cylinder, but may be otherwise located at the option of the constructor, and the roller is free to rotate in its bearings in the links, eccentrically to the axis of the cylinder, either in the vertical plane thereof or in a plane inclined thereto, as indicated in Fig. 3.

A series of elevating and conveying shelves, 12, is secured to the inside of the cylinder 1, said shelves being inclined both in vertical and horizontal planes, and being connected to the cylinder in such manner as to be susceptible of variation of their inclination in both directions, as presently to be described. The longitudinal inclination of the shelves between the supply end of the cylinder and the crushing-roller is in the direction of said roller, so as to cause the same to act as conveyers to move the material supplied through the feed-spout toward that portion of the cylinder in which the crushing-roller is located, and one or more circumferential rows of shelves are similarly inclined on the opposite end of the roller, the remainder of the shelves being oppositely inclined—that is to say, toward the delivery end of the cylinder. The chest 2 is provided with a suitable discharge-spout for the escape of water, adjacent to the delivery end of the cylinder, and the washed ore discharged from the cylinder into the chest may be removed therefrom by an elevator of any approved construction.

Figs. 4 and 5 illustrate means whereby the angle of the shelves 12 may be varied either longitudinally or transversely to the cylinder,

or both. To this end each of the shelves 12 is secured, at or near its ends, to plates 13, which are in turn pivoted to plates 14, secured by bolts and nut to the cylinder 1. The bolt of one of the plates 14 of each shelf fits in a corresponding hole in the cylinder, and the bolt of the plate 14 at the opposite end passes through a slot, 15, in the cylinder, which slot is curved concentrically to the center of the fixed bolt at the opposite end. By slackening the nuts of the bolts which pass through the slots 15 they may be moved along said slots and secured in desirable position therein, so as to enable the longitudinal inclination of the shelves upon the cylinder to be adjusted by raising or lowering the ends of the shelves nearest the slots 15.

Variation of the transverse inclination of the shelves may be effected by means of bolts 16, which pass through the ends of the plates 13 farthest from the hinge-pins and engage threads in the plates 14, being provided with lock-nuts 17, by which they may be held in desired position. By raising or lowering the inner sides of the shelves, which turn upon the hinge-pins coupling the plates 13 to the plates 14, and fixing them in desired position by the bolts 16 and lock-nuts 17, the transverse inclination of the shelves may be varied as required.

Rotation is imparted to the cylinder 1 through a spur-gear, 18, formed in segments and secured to its periphery, said spur-gear meshing with a corresponding pinion, 19, upon a counter-shaft carrying a driving-pulley, 20, which is rotated by a belt from the shaft of any suitable prime mover.

In operation, the chest 2 is designed to be constantly supplied with water to about the lower level of the supply-opening 6 of the cylinder. The ore to be washed, together with a stream of water for maintaining the supply, is fed to the cylinder through the spout 7, and, in the rotation of the cylinder, is alternately elevated and dropped by the shelves 12, being continuously subjected to the action of the water until it reaches the space below the crushing-roller 8, in which it accumulates, its passage therefrom being retarded by the reverse inclination of the shelves on the opposite side of the roller. Any lumps which may not have been broken up by the agitation of the material by the shelves are crushed by the roller 8, and the earthy matters are thoroughly removed in the transit of the material with the water to the delivery end of the cylinder and pass off with the water through a suitable discharge-spout, the crushed and washed ore as it accumulates passing over the reversely-inclined shelves adjacent to the

roller and being thereafter conveyed by the shelves which are inclined toward the delivery end of the cylinder to said end, out of which it falls into the bottom of the chest 2, from which it may be removed in any suitable manner.

I claim herein as my invention—

1. The combination of a chest or vat, a washing-cylinder adapted to rotate therein, a series of inclined elevating and conveying shelves secured to the inside of said cylinder, and a crushing-roller journaled in arms upon a suspending-shaft within said cylinder and adapted to rotate eccentrically thereto, substantially as set forth.

2. The combination of a chest or vat, a series of flanged rollers mounted in bearings therein, a washing-cylinder provided with external bearing-rings which are supported upon said rollers, said cylinder having a central opening at its supply end and being open throughout its delivery end, a crushing-roller suspended within said cylinder eccentrically to its axis, a feed-spout leading into the opening of the supply end of the cylinder, and a series of elevating and conveying shelves secured to the inside of the cylinder, the shelves between the supply end and crushing-roller being inclined toward said roller, one or more circumferential series of shelves on the opposite end of said roller being reversely inclined and the remainder of the shelves similarly inclined to those at the supply end of the cylinder, substantially as set forth.

3. The combination of a washing-cylinder and a series of elevating and conveying shelves, each connected at one end to a plate secured by a single bolt to the cylinder and at the other to a plate secured to the cylinder by a bolt passing through a slot therein curved concentrically to the center of the bolt of the opposite end plate, substantially as set forth.

4. The combination of a washing-cylinder, a series of elevating and conveying shelves, a series of plates, one of which is secured to the lower side of each shelf near each end thereof and is pivoted to a supporting-plate on the cylinder, and a series of adjusting-bolts each passing through a shelf-plate at the end farthest from its pivot and engaging a thread in its supporting plate, substantially as set forth.

In testimony whereof I have hereunto set my hand.

GEORGE W. LYON.

Witnesses:

R. H. WHITTLESEY,
J. SNOWDEN BELL.