

(No Model.)

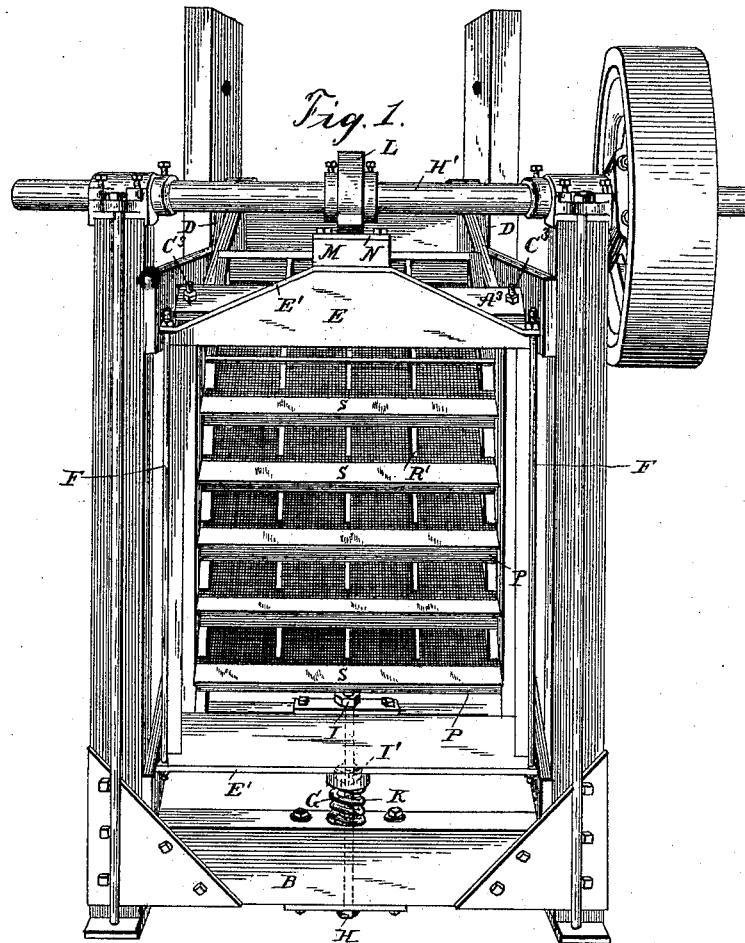
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J. D. COPLEN.

MACHINE FOR FEEDING, SIZING, AND WASHING ORES.

No. 417,907.

Patented Dec. 24, 1889.



Witnesses

Edwin Bradford

Wm. M. Stackbridge.

Inventor

John D. Coplen

By his Attorneys

W. D. Stackbridge & Son.

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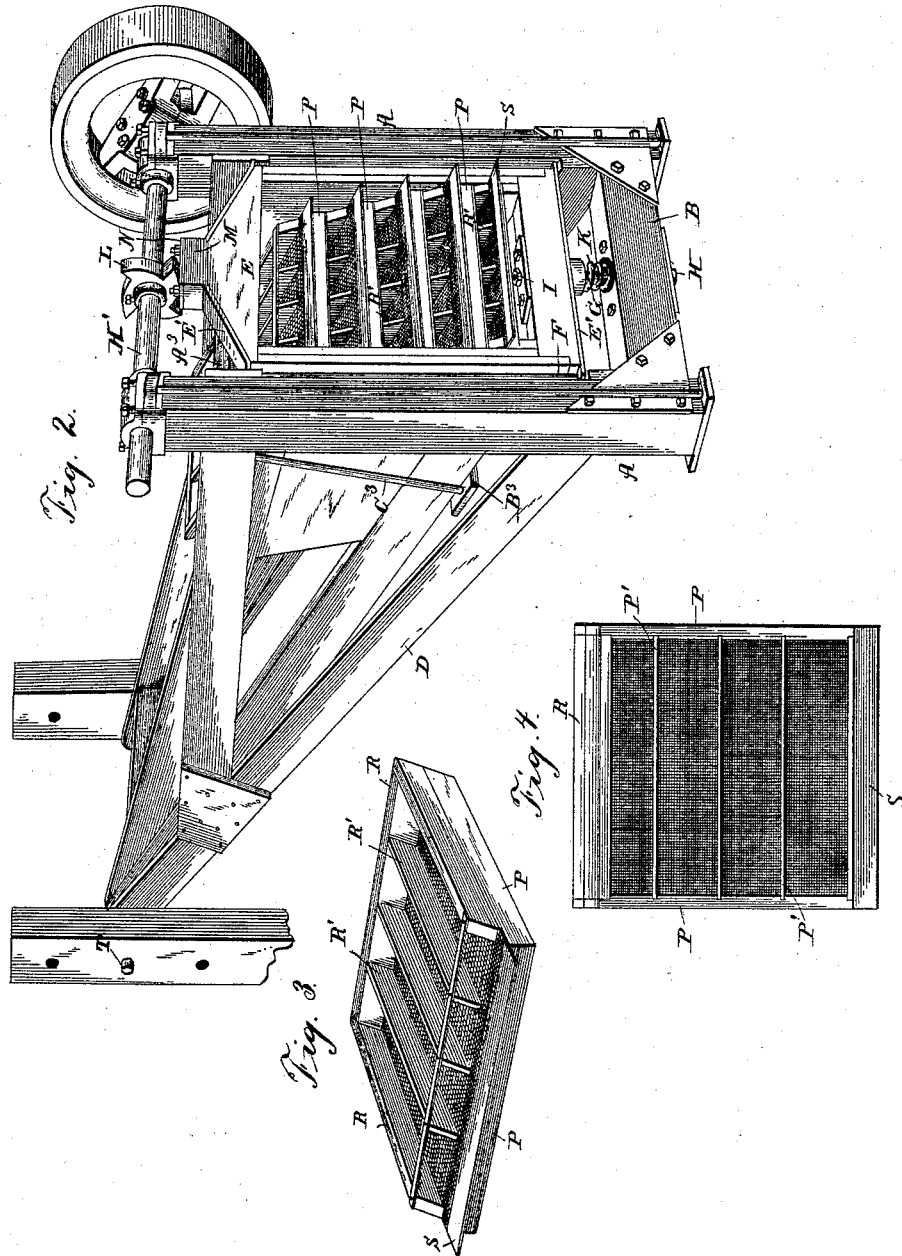
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UNITED STATES PATENT OFFICE.

JOHN D. COPLEN, OF DENVER, COLORADO.

MACHINE FOR FEEDING, SIZING, AND WASHING ORES.

SPECIFICATION forming part of Letters Patent No. 417,907, dated December 24, 1889.

Application filed March 18, 1889. Serial No. 303,638. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. COPLEN, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Machines for Feeding, Sizing, and Washing Ores; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved machine for separating pulverized ores into grades of different sizes, for washing ores, and for automatically feeding the same to pulverizers or stamping-mills.

It is the object of my invention to provide a strong and compact machine which may be adapted to any one of the purposes above enumerated by means of interchangeable parts, so as to take the place of the separate machines now required for the purpose, which are necessarily heavy and cumbersome in their construction, and can only be transported to mining regions at great expense.

My invention consists in an upright main or outer frame and an inner frame, the front portion of which is constructed to reciprocate vertically in said main frame, the said frames being provided with rearward extensions connected by means of a common shaft, on which they may rest, the shaft being adjustable vertically in suitable bearings, so that the pitch of the frames may be varied at will, as more fully hereinafter explained.

My invention further consists in certain improved mechanism whereby an interrupted reciprocating motion may be imparted to the inner frame, so as to clear the meshes of the sieves or separators of the material upon the same at each upward movement of the vertically-reciprocating inner frame.

In the accompanying drawings, Figure 1 represents a front view of my improved apparatus complete, showing the separating-screens applied thereto. Fig. 2 represents a perspective view of the same. Fig. 3 represents a perspective view of one of the screens and binding-frames detached, and Fig. 4 an inverted or bottom plan of the same.

A is the main frame of the machine, which consists of two parallel vertical standards

connected at the lower ends by a cross beam or sill B and having rearward obliquely-set extensions D, for a purpose hereinafter explained.

E is an inner frame, the front of which is rectangular in shape, and sets between the vertical standards of the main frame. This frame has a close bottom and sides, and is provided with smooth regular exterior surface, and fitted so as to reciprocate freely within the main frame. The inner frame is provided with binding-plates E', of metal, embracing the upper and lower sills thereof, and the plates are securely connected together by rods or stays F, which serve to bind the forward parts of the inner frame firmly together, so as to effectually resist the strain resulting from impact in its upward movement.

Through the lower cross sill or base of the front portion of the main frame A of the machine extends loosely a vertical bolt G, which is provided at its lower end with a large flat head H. This head bears normally against the lower face of the cross-sill of the main frame, and the bolt is adjustably and firmly secured to and connected with the bottom sill of the inner frame by means of locking-nuts I and I'.

K is a spiral spring; which surrounds the bolt, and is located between the lower sill of the main or outer frame and the lower sill of the inner frame, and normally keeps the lower head of the bolt pressed against the lower face of the sill or cross-piece of the main frame, so that the lower head of the bolt will receive the impact from the upward movement of the inner frame and thus relieve the trip-cam and driving-shaft from the strain consequent upon said impact. The upper ends of the two vertical standards of the main frame are provided with bearings, in which is journaled the driving-shaft H' of the machine, the outer ends of the shaft having fixed bearings to permit a free swinging of the machine when being adjusted and to maintain its relative position to the motor. This shaft is actuated by any suitable motor, and about midway between its ends is provided with a trip-cam L, the cam-teeth of which serve to depress the inner reciprocating frame. The upper cross-bar of the inner frame at its center is pro-

vided with a block or projection M, which is faced with a metallic plate N and sets directly under the trip-cam, and is pressed normally thereto by means of the spiral spring surrounding the bolt, and receives the impact of the cam-teeth when the trip-cam is rotated to give the downward movement to the inner frame.

The screens or separators are made with rectangular frames P P, having transverse supports P' P' for the reticulated fabric of the bottom, and frames R R, provided with bars R' R', which serve the purpose of separating the screen fabric into compartments and of holding and binding it firmly down upon the lower or base frames P P. These screens are made to fit one above another within the forward part of the inner reciprocating frame of the machine. At the forward ends of the lower frames P P, I arrange protecting shelves or aprons S S for discharging coarse ore, such as will not pass the meshes of the screen into suitable stationary receptacles. The screens are so constructed that when set in the inner frame their aprons S will project successively beyond each other, so as to discharge into separate receptacles or chutes suitably arranged to receive the ore. The screens are clamped in place in the inner frame by means of the beams A³ B³, which pass transversely under the bottom and over the top of the inner frame, and are connected by means of brace-rods C³ at the sides of the frame, which extend through the projecting ends of the beams and are secured by means of lock-nuts which are screwed upon their ends, so as to bind the screens securely in the inner frame, but permit of their convenient removal when required.

The rearward extensions of the inner and outer frames are pivoted to a common shaft T, as before mentioned, and the shaft may be adjusted in any one of a series of bearings arranged one above another, so that the pitch or inclination of the respective frames may be changed at will, as occasion may require, without changing the relative position of the two frames.

When using my machine simply as an automatic feeder, the screens are removed and the broken ore is fed into the rear end of the receptacles of the inner frame, the driving-shaft in the meanwhile being put into operation. The reciprocating motion imparted thereby gradually distributes the ore to the forward part of the machine, where it is discharged in regulated quantities to the pulverizer.

When the machine is to be used as a separator, the screens are arranged within the inner frame, as indicated in Fig. 1, and the pulverized ore is fed into the rear of the upper frame and is discharged in different grades of comminution over the outer shelves of the screens into suitable receptacles or chutes provided for the purpose.

When the apparatus is to be used as an ore-washer, the screens are set in place, as before mentioned, and the ore or pulp is fed into the rear of the upper screen with water sufficient to effect the washing, the screened portions passing off over the shelves into proper receptacles or chutes, from which it can be conveyed to amalgamators or any other description of apparatus for separating metals from ores.

Having now described my invention, I claim—

1. The combination, in an apparatus for separating and feeding ores, of a main outer frame, an inner frame arranged to reciprocate therein, and a common shaft to which the frames are loosely connected and which may be adjusted at different elevations to vary the inclination of the frames and the pitch of the inner frame, substantially as and for the purpose set forth.

2. In a machine for separating ores, the combination, with a main frame, of an inner frame arranged to reciprocate vertically therein, having a head at its lower end adapted to receive the strain of the bolt on its upward movement, the spiral spring surrounding said bolt, and the trip-cam, whereby an interrupted vertical reciprocating motion is imparted to said inner frame, substantially as described.

3. The combination, with the inner and outer frames and their rearward extensions, of the common shaft, to which the same are loosely connected, whereby the pitch or inclination of the frame may be regulated or adjusted to deliver the ore at the front of the machine, substantially as specified.

4. An inner frame comprising the pivoted rearward extensions, the upper and lower sills, and the rods by which the same are securely fastened and bound together, in combination with an outer frame and means for vertically reciprocating said inner frame, substantially as described.

5. The combination, in an ore-separator, of the inner vertically-reciprocating frame, the screens having upper and lower frames, the transverse beam or binder, and the connecting tie-rods, whereby the said screen-frames and interposed frames may be firmly bound within the inner frame, substantially as specified.

6. In an ore-separator, a screen consisting of a lower frame having a series of partitions or supporting-bars across the same, a foraminous or reticulated web, and a superposed binding-frame, which separates the screens into compartments, in combination with a vertically-reciprocating frame, substantially as described.

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

JOHN D. COPLEN.

Witnesses:

SANFORD HOAG,
THOS. W. LIPSCOMB.