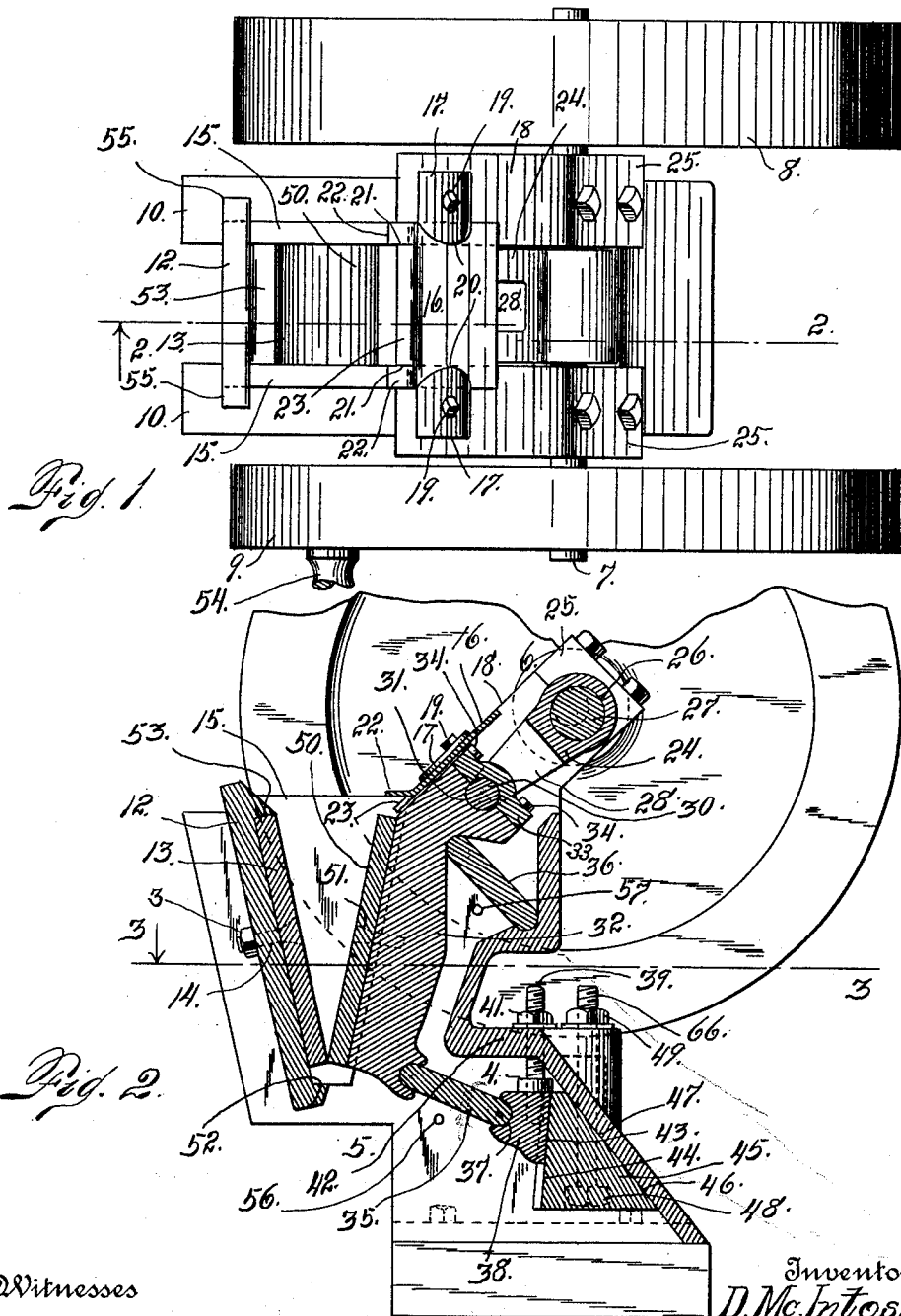


1,058,774.

Patented Apr. 15, 1913.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS-SHEET 2.

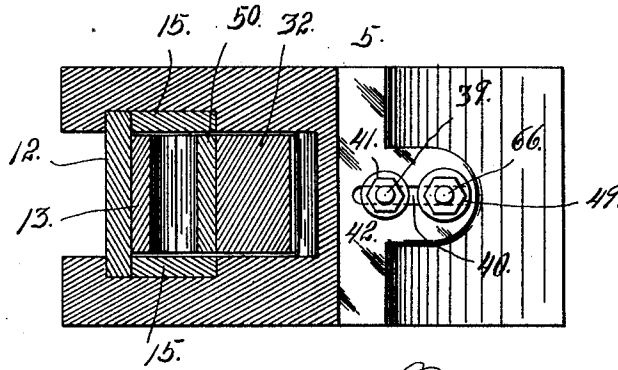


Fig. 3.

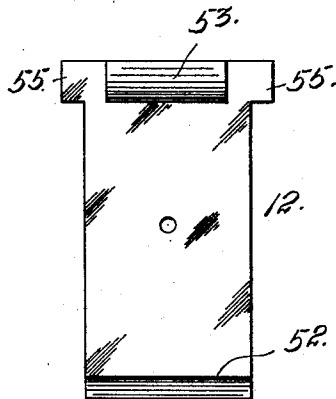


Fig. 4.

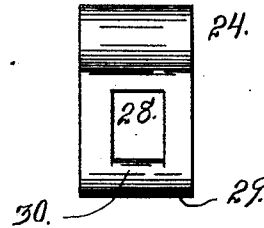


Fig. 5.



Fig. 6.



Fig. 7.

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LABORATORY-CRUSHER.

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Specification of Letters Patent.

Patented Apr. 15, 1913.

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To all whom it may concern:

Be it known that I, DAVID McINTOSH, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Laboratory-Crushers; and I do 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, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in crushers, being more especially intended for use in laboratory work where comparatively small amounts of ore are crushed or pulverized sufficiently fine for the extraction of their metallic values.

My special object is to provide a crusher of this class which shall be well adapted for the removal of particles of ore therefrom after the crushing of each sample or batch of ore. To this end provision is made for the ready removability of the stationary jaw, the cheek plates, the movable jaw being so mounted that it may be readily swung out of the frame whereby the cleaning or removal of the ore particles from all parts exposed thereto is facilitated. To this end I connect the upper extremity of the movable jaw with a relatively short pitman connected with the eccentric of an operating shaft, two toggles being interposed between the jaw and the frame below its pitman connection, one of these toggles being adjustable to regulate the mesh to which it is desired to grind, or crush, the ore.

Having briefly outlined my improved construction, I will proceed to describe the same in detail, reference being made to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing: Figure 1 is a top plan view of the crusher equipped with my improvements. Fig. 2 is a section taken on the line 2—2, Fig. 1. Fig. 3 is a horizontal section taken on the line 3—3 looking downwardly, or in the direction of the arrow, adjacent said line. Fig. 4 is a front view in detail of the stationary jaw, with its wearing plate removed. Fig. 5 is a detailed view of the pitman. Fig. 6 is a fragmentary detailed view of the eccentric shaft.

Fig. 7 is a perspective detailed view of one of the toggle members.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the frame-work of the structure, which is equipped with boxes, 6, in which the operating shaft 7 is journaled. A pulley 8 is mounted on one extremity of this shaft, and a fly-wheel 9 on its opposite extremity.

Between two separated members 10 of the frame-work is located the stationary jaw 12, to which is attached a wearing plate 13, secured to the jaw by means of a bolt 14, and a nut 3. Located forward of this jaw and on opposite sides of the ore chamber are cheek plates 15, which are held in place at the top by means of a transversely arranged plate 16, the latter being held in place by pivoted fastening plates 17, which are connected with the frame members 18 by means of set screws or bolts 19, the said plates having inwardly projecting parts 20 adapted to overlap the plate 16 and secure the latter in place when the machine is in use. The lower portion of the plate 16 is cut on lines 21, and parts 22 bent upwardly to a horizontal plane and arranged to overlap the upper edges of the cheek plates 15 whereby the latter are held in place from the top. The lower edge 23 of the plate 16 occupies a position between the cheek plates and projecting slightly below the upper edges thereof. It will be observed that the frame members 18 between which the pitman 24 is located are inclined downwardly from the removable box members 25 to an angle of approximately 45 degrees, and as the plate 16 is mounted on these members, it is also correspondingly inclined, as best illustrated in Fig. 2.

The pitman 24 is provided with an opening 26 at its upper extremity, adapted to receive the eccentric member 27 of the operating shaft 7. Intermediate the extremities of the pitman the latter is cut away, as shown at 28, the lower extremity 29 of the pitman including a centrally located cylindrical part 30 which engages a half-bearing 31 formed in the upper extremity of the movable jaw 32, the other half of the recess for the part 30 of the pitman being formed in a removable journal box member 33 which is secured to the upper extremity of the jaw by means of bolts 34, or other suitable fas-

tening devices. In this manner the pitman is connected with the movable jaw 32 for operating purposes, said connection being made at the upper extremity of the jaw.

5 This movable jaw is engaged by toggle members 35 and 36, the member 35 being lowermost, one of its extremities engaging a recess 37 formed in an adjustable block 38 with which is connected a vertically dis-
10 posed screw 39, the latter passing through a slot 40 formed in the frame-work and having its lower extremity threaded into the block 38, a lock nut 4 being employed to limit the travel of the screw into the block.
15 The block may be adjusted vertically by turning a nut 41 applied to the screw, and engaging the horizontal top surface of a member 42 of the stationary frame-work of the structure.

20 One face of the block 38 is slightly inclined, as shown at 43, to engage an oppositely inclined face 44 formed on the block 45, the latter having its opposite face 46 inclined to engage an inclined face 47
25 formed on the frame-work. This face 47 of the frame-work extends forwardly and upwardly from its lower extremity, whereby as the block 45 is raised it travels simultaneously forwardly and upwardly. This
30 block is connected with a bolt 66 passed through the slot 40 of the frame-work, and also through the block 45, the head 48 of the bolt being countersunk in the lower part of the block. This block may be adjusted by
35 turning a nut 49 applied to its upper extremity and seated on the horizontal part 42 of the frame-work, which the nut overlaps on opposite sides of the slot 40. As shown in the drawing, the front face of the block
40 45 is grooved, or recessed, to receive the block 38.

A wearing plate 50 is connected with a movable jaw 32 by means of a suitable fastening device 51.

45 The lower extremity of the stationary jaw 12 is provided with a rearwardly extending ledge 52 which the cheek plates 15 engage when the parts are assembled. This jaw is also provided with a rearwardly projecting
50 offset 53 at its upper extremity, which offset engages the upper end of the wearing plate 13.

When the apparatus is in use, the ore or other material to be crushed or pulverized is
55 fed into the chamber between the wearing plates 13 and 50 of the two jaws, the movable jaw being operated by the pitman through the instrumentality of the eccentric 27 of the operating shaft 7, the latter being
60 rotated by connecting the fly-wheel 9 with any suitable power. The fly-wheel 9 is provided with a handle 54 whereby the machine may, if desired, be operated by hand.

The manner of taking the machine apart
65 for cleaning purposes after crushing any

batch or sample of ore, will be readily understood. The fastening plates 17 are first loosened by unscrewing their fastening bolts or set screws 19, after which they may be swung to a position to release the top plate
70 16. As soon as this is done, the plate 16 may be removed, after which the cheek plates 15 may be lifted out. Finally, the stationary jaw may be removed. This jaw is provided at its upper extremity with lateral projec-
75 tions 55, which overlap the frame members 10 beyond the cheek plates, thus supporting the stationary jaw in position. As soon as the parts heretofore mentioned are removed, the movable jaw may be swung upwardly
80 and forwardly away from the toggle members 35 and 36, in which event these members will rest upon stops 56 and 57 with which the frame-work of the structure is equipped. The object of removing said parts and
85 swinging the movable jaw upwardly from its normal position after each crushing or pulverizing operation, is to clean the said parts from all particles of ore. This is im-
90 portant in order that the next batch of ore treated may be entirely free from any particles belonging to the previous batch or sample. In this manner, perfect assays may be obtained of any number of batches of ore
95 successively crushed or pulverized by the use of my improved machine.

An important feature of my invention consists in the vertically adjustable block 38, which forms the bearing for the rear extremity of the toggle 35. By virtue of this
100 adjustability, the mesh or fineness to which the material is reduced may be regulated.

Having thus described my invention, what I claim is:

1. In a crusher, the combination of a
105 frame-work having two members separated to form the ore chamber, a movable jaw closing the ore chamber in the rear, a stationary jaw closing the said chamber in front, the stationary jaw having lateral pro-
110 jections overlapping the separated members of the frame in front, whereby the last named jaw is suspended and liftably removable to leave the ore chamber entirely
115 unobstructed in front, means for preventing outward swinging movement upon said projections, the movable jaw being pivoted at its upper extremity whereby it is adapted to swing upwardly and forwardly through the
120 space between the forward extremities of the spaced frame members when the stationary jaw is removed.

2. The combination of a frame closed at the rear and open in front, a jaw inserted in the frame to close the front opening, said
125 jaw being stationary when the machine is in operation, a second jaw located in the rear and movably mounted, toggles engaging the second jaw from the rear, a pitman connected in operative relation with the up-
130

per extremity of the second jaw, the latter being free to swing forwardly and upwardly when the first jaw is removed, the latter being liftably removable to leave room for the said swing action of the second jaw.

3. In a crusher, the combination with a frame of fixed and movable jaws inserted therein, cheek plates spaced to permit the movable jaw to operate between them, the forward extremities of said plates engaging the fixed jaw, a securing plate mounted on the frame above the movable jaw and having parts overlapping the cheek plates from above, means adjustably applied to the frame for holding said securing plate in position.

4. In a crusher, the combination with a frame, of fixed and movable jaws inserted therein, cheek plates spaced to permit the movable jaw to operate between them, the forward edges of said plates engaging the fixed jaw, a securing plate mounted on the frame above the movable jaw and having parts overlapping the cheek plates from above, and means adjustably applied to the frame for holding said securing plate in position.

5. The combination with a frame, of fixed and movable jaws inserted therein, the fixed jaw closing the ore chamber in front, said jaw being liftably removable to leave the chamber open in front and entirely unobstructed, the movable jaw being pivotally mounted at the top and adapted to swing upwardly and forwardly through the unobstructed opening formed by the removal of the fixed jaw, cheek plates engaged on opposite sides and spaced to permit the movable jaw to operate between them, the forward edges of said plates engaging the fixed jaw, a securing plate mounted in the frame above the movable jaw and having parts overlapping the cheek plates from above, the fixed jaw having a ledge extending forwardly from its rear extremity below the rear extremities of the cheek plate, and means adjustably applied to the frame for holding said securing plates in position.

6. In a crusher, the combination with a frame, of fixed and movable jaws inserted therein, cheek plates spaced to permit the movable jaw to operate between them, a securing plate mounted in the frame above the movable jaw and having parts overlapping the cheek plates from above, the lower

free edge of the said plate between the overlapping parts being interposed between the cheek plates, the said edge lying in the plane of the body of the securing plate, and means adjustably applied to the frame for holding said securing plate in position.

7. In a crusher, the combination with a frame, of fixed and movable jaws inserted therein, the movable jaw having toggle members interposed between the rear surface of the jaw and the frame, one of these members being located near the top of the jaw and the other at the lower extremity thereof, and a vertically adjustable block forming a bearing for the lower toggle member, whereby the center of the arc of movement of the lower edge of the movable jaw may be vertically adjusted.

8. In a crusher, a frame, a crushing jaw, means for imparting reciprocative motion thereto, a toggle member between said jaw and frame and a vertically adjustable bearing block which the rear extremity of the toggle member engages, and a second adjustable block located in the rear of the first named block and engaged by the latter, the second block having its rear surface inclined, a correspondingly inclined surface formed on the engaging part of the frame, the second block being vertically adjustable whereby as it is raised it also moves forwardly by virtue of the engagement of its inclined surface with the corresponding surface of the frame, the forward face of the second block which is engaged by the first named block being oppositely inclined to the rear face, substantially as described.

9. In a crusher, a frame, a crushing jaw, means for imparting reciprocative motion thereto, a toggle connection between said jaw and frame, and a bearing block adjustable in a direction substantially parallel to the direction of reciprocation of the jaw, the rear extremity of the toggle engaging said block whereby the center of the arc of movement of the portion of the jaw engaged by the toggle may be adjusted.

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

DAVID McINTOSH.

Witnesses:

A. J. O'BRIEN,
MAY CLEMENTS.