S. Ingersoll.
Ore Crusher.

№ 49032 Patented Jul. 25, 1865

FIG: 2.

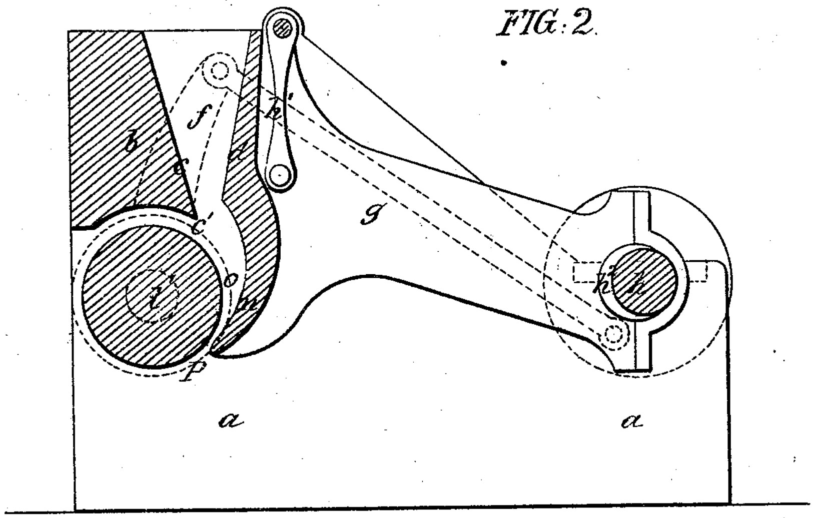
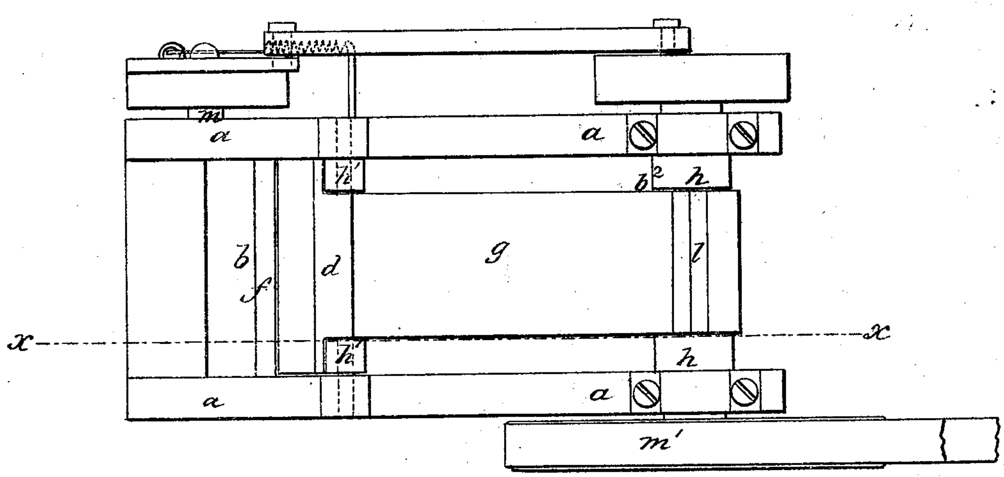


FIG: 1.



Witnesses.

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UNITED STATES PATENT OFFICE.

SIMON INGERSOLL, OF STAMFORD, CONNECTICUT, ASSIGNOR TO HIMSELF AND GEO. H. KEITH, OF SAME PLACE.

IMPROVEMENT IN ORE-CRUSHERS.

Specification forming part of Letters Patent No. **49,032**, dated July 25, 1865.

To all whom it may concern:

Be it known that I, SIMON INGERSOLL, of Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Ore-Crushers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The present invention consists, first, in the use of a movable jaw or crusher suspended at one end within the frame-work of the machine and attached at the other to an eccentric-shaft, which, as it revolves, imparts to the movable jaw a rolling motion, as it were, in a vertical plane from top to bottom toward the fixed jaw, between which and the movable jaw the ore is placed, whereby the pressure or crushing-force, in lieu of being brought directly to bear against every portion of the ore in the machine for the entire depth of the jaw, and at one and the same moment, as hitherto, is caused to act with a rolling pressure upon the same, commencing at the top and moving in a downward direction, when the eccentric continuing to revolve draws back the jaw to its original position, which again moves forward in the same manner and with the same action upon the ore as above described, and so on as long as may be desired or necessary. By thus arranging and operating the movable jaw of an ore-crushing machine, so that the crushing force of the jaw shall be gradually brought to bear upon the ore from the top to the bottom of the same, it is apparent that the strain upon the operating devices of the machine is greatly decreased, and is considerably less than it would be were the jaw made to move in a direct line toward the fixed jaw, as heretofore, thus crushing with its whole surface at one and the same moment, the disadvantages of which have long been manifest. Another advantage, in addition to the above, gained by the peculiar motion which I give to the movable jaw may be here mentioned, that there is less liability of the ore being thrown out of the machine, from the fact that as the crushing first commences at the top portion of the jaw it then assumes more of a parallel position with regard to the fixed jaw than an obtuse one, thereby grasping the ore between the jaws in such a manner as to cause it to have more of a tendency to drop downward than to fly upward, as has heretofore generally been the case with ore-crushing machines previous to this invention.

Second, in lieu of forming the fixed jaw in one straight piece equal in depth to the movable jaw, as hitherto, I use in connection with the fixed portion of it, and at its lower end, a roller or revolving jaw, partially around which, with a sufficient space between them, the lower portion of the movable jaw extends, which roller is so arranged with regard to the opening between the lower end of the fixed jaw and the movable jaw that as the latter recedes from the former by the rotation of its eccentric-shaft, on which it is hung, as described, the fine ore between them and at its mouth, in escaping therefrom, must necessarily drop upon the roller, which at the same time is revolved in a direction toward the movable jaw by means of any suitable arrangement of devices connecting it with the driving power of the machine, and either more or less, according as may be desired, thereby gradually feeding the ore thus delivered to it in a downward direction to the discharging-mouth between it and the curved portion of the movable jaw, through which it finally falls from the machine, the roller ceasing to revolve as the jaw moves forward, and again revolving as it recedes, and so on as long as the machine is used.

From the above it is apparent that the liability of the ore clogging or blocking between the fixed portion of one jaw and the opposite or movable jaw is entirely prevented, as the opening or mouth through which it passes therefrom can be made of sufficient size to allow the ore to freely pass out, for the reason that the particles of ore thus passing from the jaws are still further subjected to pressure between the roller and the lower portion of the movable jaw partially surrounding the same before being delivered from the machine, the rotation of the roller, as described, necessarily drawing and forcing the ore downward and out at the delivery-mouth without the least possibility of its clogging, as is plainly apparent to all conversant with ore-crushing.

Having thus described in general terms the

principles of my present invention and the objects sought to be attained thereby, together with its advantages, I will now proceed to describe in detail the arrangement of an ore-crushing machine according to my improvements, reference being had to the accompanying plate of drawings, in which—

Figure 1 is a plan or top view of an ore-crushing machine, and Fig. 2 a vertical section taken in plane of the line *x x*, Fig. 1.

a a in the drawings represent the frame-work of the machine; *b*, the fixed jaw, secured in any proper manner to and between the vertical sides of the frame-work, with its inner surface, *c*, at an inclination to the same, below which and projecting a little beyond its inner edge or corner, *c'*, a roller, *l'*, is placed, turning by its shaft *m m* at each end in suitable bearings of the frame-work *a a*. One shaft, *m*, of the roller is connected, by an arrangement of devices heretofore patented by me on the 6th day of July, 1858, with the driving-shaft *h* of the machine, so that as the driving-shaft is rotated by turning the crank-wheel *m'* on one end of the same, or in any other proper manner, the said roller shall be intermittently rotated, and at the proper times, in a direction toward the movable jaw *d* placed within the machine, and operated as will be presently described. The movable jaw *d* is suspended between the sides of the frame-work *a a* by short connecting-rods *h' h'*, which rods are hung at their upper ends to the frame-work *a a* and at their lower ends to the sides of the lever-arm *g*, attached to or forming a part of the movable jaw, and hung and turning by its outer end, *l*, upon the eccentric portion h^2 of the driving-shaft. The inner end of the movable jaw is placed at an acute angle to the fixed jaw, in a direction toward the lower end thereof, leaving an opening or space, *f*, between them of larger size at the upper portion than at the lower, and with its curved portion *n* extending partially around the roller *l'*, placed under the fixed jaw, as before described, at a short distance therefrom, and with a space, *o*, between them, decreasing in size from the top to the bottom portion or delivery-mouth *p* of the machine.

The ore to be crushed is first placed in the machine between the jaws, as ordinarily, and the driving-shaft turned, on the eccentric portion of which the movable jaw is hung, as described, thereby causing the said jaw to travel toward the fixed jaw with a rolling motion, as it were, from its top to its bottom, crushing and breaking the ore confined between them, which, as fast as crushed, continually falls and works itself down to the opening between the jaws, when, as the movable jaw recedes by the action of the eccentric-shaft upon its lever, the particles of ore at the said opening escape therefrom and drop upon the roller, which at the same time commences to revolve in a direction toward the fixed jaw, through the connecting devices hereinbefore alluded to, thereby feeding them to the space between the jaw and the roller, where, as the crushing-jaw again moves forward, they are again crushed, the roller then being stationary until the jaw again commences to recede, when the same movement of the roller again takes place, still further feeding the particles down until they finally escape from the machine at the delivery-mouth *p*, as is evident without further description.

It is perfectly apparent from the above detail description of my improvements and the manner in which the machine operates that the objects and advantages hereinbefore enumerated as sought to be attained by the present invention are successfully and fully secured, an ore-crusher being produced capable of exerting an extraordinary great pressure upon ores without producing a strain upon the operating devices sufficient to injure or break the same.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

In combination with the movable jaw *d*, the cam h^2 and the hangers *h' h'*, whereby the said jaw is made to operate in the manner herein specified.

The above specification of my invention signed by me this 6th day of May, A. D. 1865.

SIMON INGERSOLL.

Witnesses:

GEO. E. SCOFIELD,

THOS. HASLAM.