(No Model.) 2 Sheets—Sheet 1.

M. HOAGLAND, Jr.

ORE CRUSHER.

No. 342,870. Patented June 1, 1886.

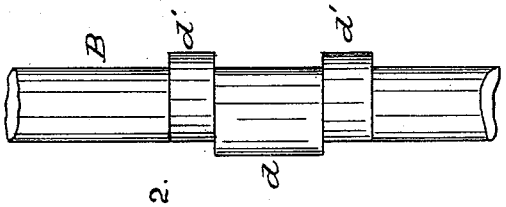

FIG. 2.

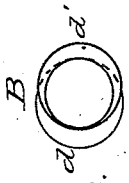

FIG. 3.

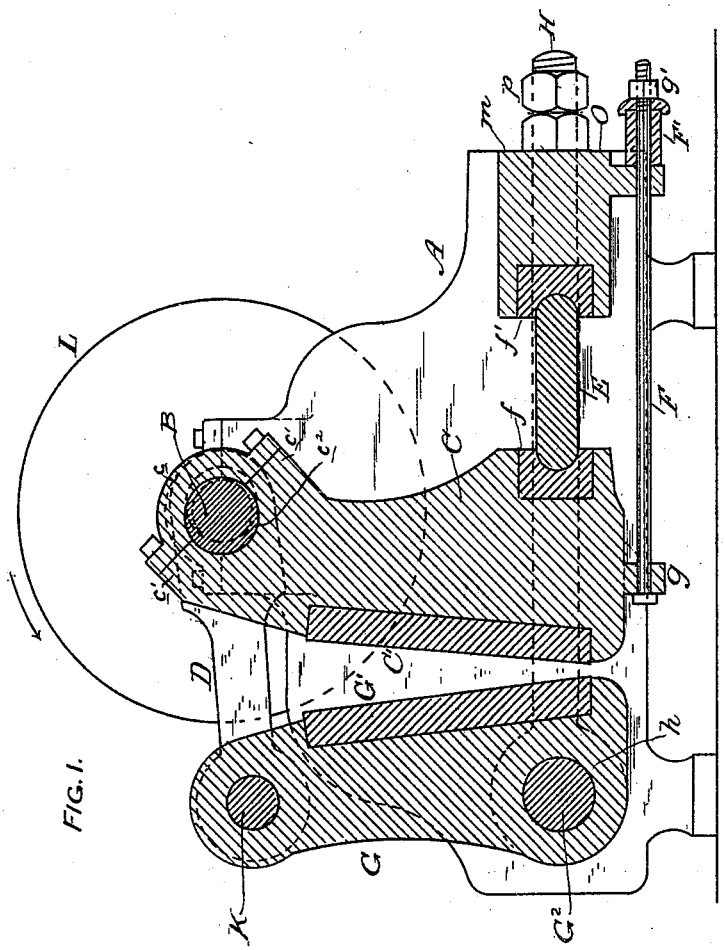

FIG. 1.

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 5.

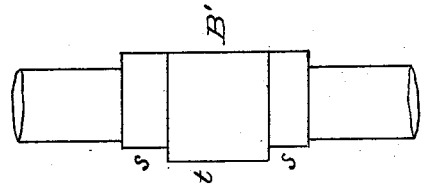


FIG. 6.

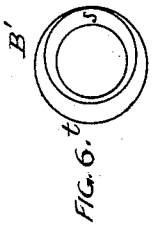
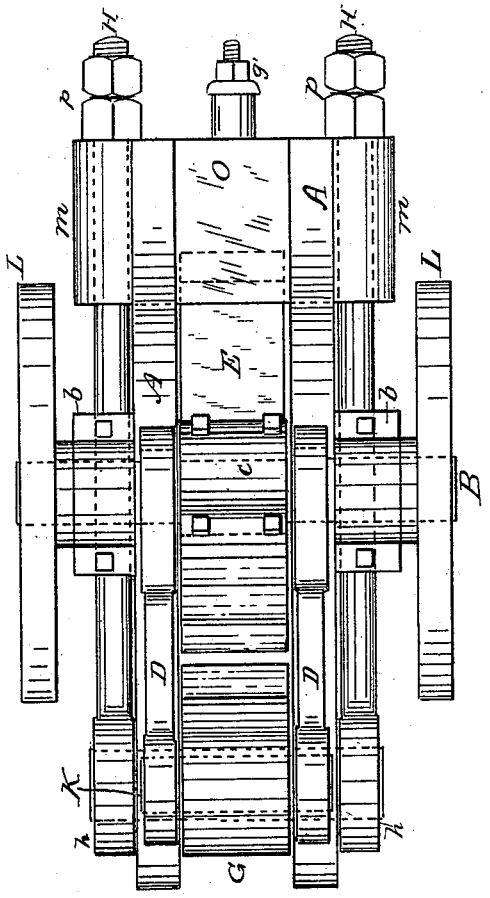


FIG. 4.



WITNESSES:
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UNITED STATES PATENT OFFICE.

MAHLON HOAGLAND, JR., OF ROCKAWAY, NEW JERSEY.

ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 342,870, dated June 1, 1886.

Application filed May 26, 1885. Serial No. 166,685. (No model.)

To all whom it may concern:

Be it known that I, MAHLON HOAGLAND, Jr., a citizen of the United States of North America, and a resident of Rockaway, county of Morris, State of New Jersey, have invented a new and useful Improvement in Ore-Crushers, of which the following is a specification.

This invention relates to that class of ore-crushers having two movable upright opposing jaws.

The invention consists in the peculiar combinations and the novel construction and arrangement of parts, hereinafter more fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of my improved crusher. Figs. 2 and 3 are views of a double-eccentric driving-shaft constituting a portion of the improved machine. Fig. 4 is a plan of my improved crusher. Figs. 5 and 6 are views of a modification of the eccentric driving-shaft.

In the drawings, A represents the crusher-frame. B represents the double-eccentric driving-shaft, journaled in boxes *b b* on the frame sides, and having a central eccentric, *d*, for the bearing of the rear jaw, C, and at each side thereof an eccentric, *d'*, of opposite throw, designed for the bearings of the rear ends of the links D D. The rear jaw, C, having crushing-plate C', is suspended on the eccentric *d* of the shaft B. A toggle, E, held between a bearing-block, *f*, in the rear of jaw C and a bearing-block, *f'*, fixed in the crusher-frame, serves as a bearing point for the lower end of the said jaw, and this jaw is held in contact with the toggle E by means of a rod, F, and rubber spring F', the former of which is secured in the lug *g* on the lower extremity of the jaw C, and is provided with a head or nuts, *g'*, and is in all respects similar to the devices used for a somewhat similar purpose in other crushers, and no claim is made, broadly, herein to the rod F and spring F'. The front jaw, G, having crusher-plate G', is supported at the lower end on a shaft, G^2, which has bearings in the frame sides, and has its ends projecting beyond said sides far enough to enter the terminal eyes *h h* of the tension-rods H H on each side of the machine. The shaft G^2, upon which the jaw G is pivoted, is arranged to be adjusted relatively to the jaw C at will by the proper manipulation of the nuts *p*, and for this purpose the said shaft has loose bearings in the main frame. I have not deemed it necessary to show these enlarged bearings, as their construction will be obvious. These tension-rods H H extend rearward and have their ends passed through the end lugs, *m*, of the plate O, which extends across the rear of the machine-frame, and are provided with nuts *p*, whereby they can be drawn up or slackened, so as to make the jaw G approach to or recede from the jaw C, and thereby regulate or determine the grade of the crushed material passing through the machine. Similar rods with similar functions are used in other crushers. The plate O sustains the tension of the rods H upon one side and the thrust of the toggle E upon the other. These forces act in opposite directions. A straight shaft, K, passes transversely through the upper end of the jaw G, and has its ends projecting into the front eyes of the links D D; hence, when power is applied to the pulleys L on the driving-shaft B and said shaft is brought to the position shown in Figs. 1, 2, and 3, the top of the jaw C is thrown forward to its extreme limit toward the jaw G and the links D D, and thereby the top of the jaw G is thrown backward in the same measure, so that said jaws are moved toward each other as much as possible in the crushing operation, and the tension on the toggle E and rods F H is reduced to a minimum. Then, as from this position the shaft B makes a quarter-turn in the direction of the arrow, Fig. 1, the jaw C is moved downward, making a downward rubbing or grinding motion relatively to the jaw G, thereby grinding or pulverizing the stone or other material which may be between the jaws, and the inner ends of the links are raised and the top of the jaw G is moved rearward. At the next quarter-revolution the tops of the jaws C G are drawn together to their extreme limit; and on the third quarter of the revolution the jaw C is moved upward with an upward rubbing or grinding motion relatively to the jaw G, the inner ends of the links are depressed, and the top of the jaw G is moved slightly forward. Thus it will be seen that at each revolution of the driving-

shaft there is a reciprocating grinding movement combined with the crushing movement of the working-jaw.

In Figs. 5 and 6 is shown a modified form of driving-shaft, B′, which with good effect may be substituted for the shaft B, hereinbefore described, for certain kinds of work. This shaft B′ is also a double eccentric; but its link and jaw bearings *s t* respectively are so formed and relatively arranged that its use will give to the jaws more of the grinding or pulverizing action in combination with their crushing action.

I deem it important to arrange the parts so as to equalize the strain—that is to say, the central eccentric, *d*, which operates the jaw C, is directly over the rod F, which holds said jaw C against the toggle, while the eccentrics *d′*, which operate the jaw G, are arranged upon a plane between the central eccentric, *d*, and that of the rods H, which hold the pivot of said jaw G adjustably, as seen in Fig. 1.

I am aware of the Patent No. 58,089, of 1866, in which the two eccentrics are distant from the central eccentric, and in which the parts do not hold the relation specified.

What I claim as new is—

The combination of the rod F, shaft B, provided with central eccentric, *d*, and eccentrics *d′*, arranged one upon either side of said central eccentric, toggle-block E, the jaw C, held centrally by said rod F and operated by the central eccentric upon said shaft, the rods H, the shaft G^2, and the jaw G, mounted thereon and held in the direction of the toggle-block E by said rods H, arranged near the sides of the frame, and the links D, the said jaw being operated by said links D and eccentrics *d′*, arranged one upon either side of the center and between the center and the vertical plane of the said rods H, whereby the strain is equalized between the holding-rods, the toggle, and eccentrics, as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 9th day of May, 1885.

MAHLON HOAGLAND, Jr.

Witnesses:
JACOB J. STORER,
WM. E. STILLINGS.