

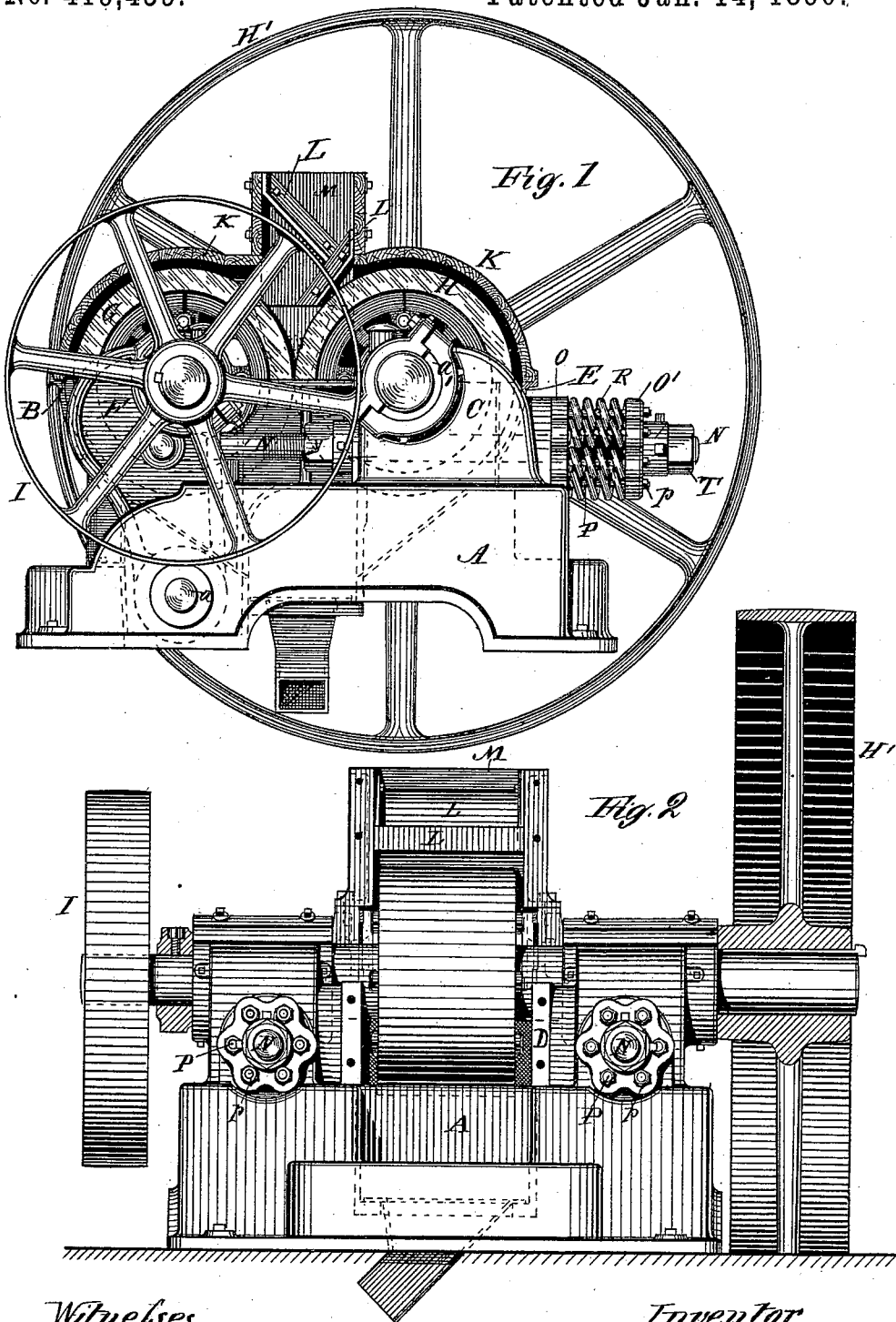
(No Model.)

2 Sheets—Sheet 1.

S. R. KROM.
ORE CRUSHER.

No. 419,459.

Patented Jan. 14, 1890.



Witnesses
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Frank B. Murphy.

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attys.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3

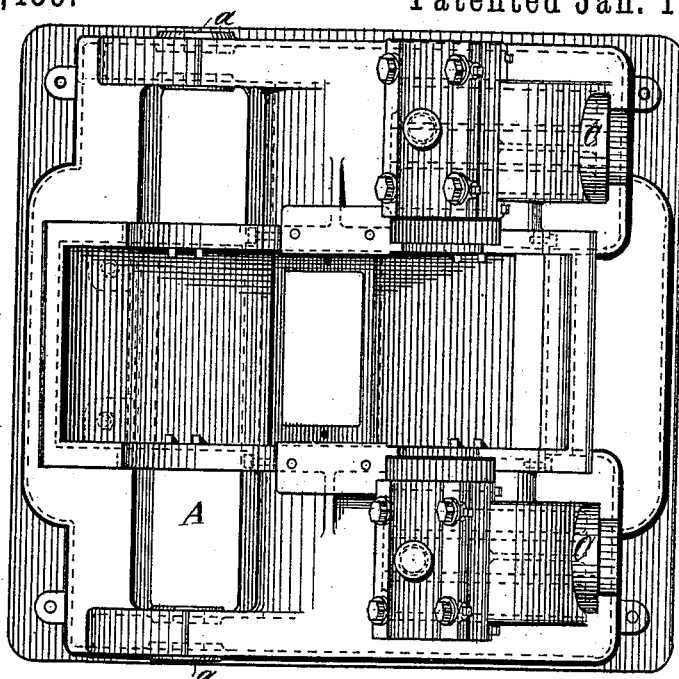


Fig. 4

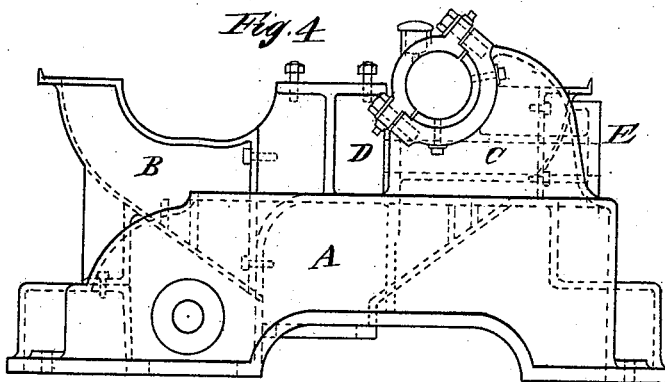


Fig. 5

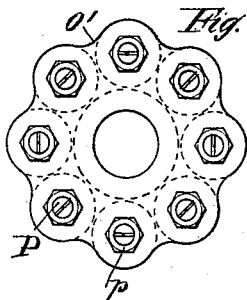
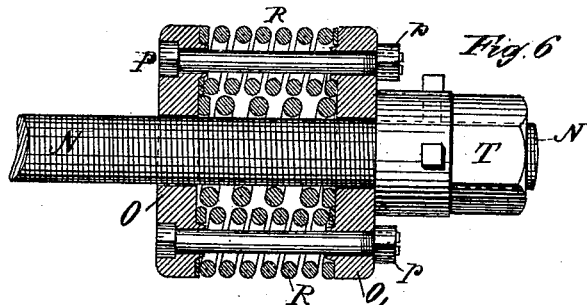


Fig. 6



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UNITED STATES PATENT OFFICE.

STEPHEN R. KROM, OF PLAINFIELD, NEW JERSEY.

ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 419,459, dated January 14, 1890.

Application filed May 3, 1888. Serial No. 272,658. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN R. KROM, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Ore-Crushers, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

In United States patents granted to me and numbered 339,664, April 13, 1886, and 340,720, April 27, 1886, and more particularly in the latter, I have shown and described machines for crushing ores having the following general characteristics. Upon a suitable bed or base are mounted two sets of pillow-blocks, one set being movable with respect to the other. In these pillow-blocks are mounted the shafts of the two crushing-rolls. The bolts passing through the stationary pillow-blocks are provided with suitable nuts and combined with adjustable spiral springs, and connect with the movable or pivoted pillow-blocks with the capability of adjusting and limiting the movement or play of the roll carried thereby with respect to the roll mounted in stationary bearings. For the purpose of inclosing the crushing-rolls a housing, partly of iron and partly of wood, is built up around the rolls and secured to the bed-plate, and a hopper is provided for conveying to the rolls the ore to be crushed.

The machine which forms the subject of my present invention is, in so far as the principle of operation is concerned, substantially like that of the Patent No. 340,720, but in certain particulars of construction it presents important differences. These reside mainly in the following improvements.

First. My previous machines were built up of a number of parts more numerous than I now use. The portion of the machine constituting the bed or frame was cast in separate parts, bolted together, while in my present machine I cast the stationary pillow-blocks, the bearings for the pivoted pillow-blocks, and a portion of the iron housing all in one piece with the bed-plate, and bolt to this solid casting the remaining metallic portions of the housing. This construction secures special advantages in this class of machines, for

it does away to a large extent with the bolts and nuts used to connect the various parts, which, in a machine like this, subjected to tremendous jars and strains, are very liable to loosen and wear unevenly. It gives the machine greater rigidity and stability and cheapens the cost of its construction.

Secondly. In my previous machines the tie-bolts for adjusting the movable roll were provided near their middle with collars and passed through cylinders in the stationary pillow-blocks, against the end of which cylinders the collars abutted. The ends of the tie-bolts carried adjusting-nuts, and between abutments on the stationary pillow-blocks and the nuts on the ends of the bolts extending through the same were arranged a series of stout springs. By means of the said nuts the tension of the springs was increased or diminished as circumstances required, but as an adjustment of the rolls and springs was frequently required and could only be obtained by the application of a power sufficient to overcome the tension of all the springs, their use was attended with much difficulty and trouble. In lieu of this arrangement I now connect the ends of the tie-bolts to the movable pillow-blocks, whether sliding or swinging, and use with the tie-bolts adjustable collars, by means of which the relative position of the rolls is determined. I also pass over the ends of the tie-bolts that extend through the stationary pillow-blocks cushions composed of two heads connected by a number of bolts which are surrounded by spiral springs. These cushions are held in place by nuts on the ends of the main tie-bolts.

These features will be described more in detail by reference to the drawings, in which—

Figure 1 is a view of my improved crusher in side elevation, the housing being in section. Fig. 2 is an end view with a portion of the housing removed. Fig. 3 is a top plan view of the frame. Fig. 4 is a side elevation of the same. Fig. 5 is an end view of the tension device or spring-cushion. Fig. 6 is a sectional view of the same, showing the manner of its application to the tie-bolts.

A is the bed plate or base of the frame of the machine. The stationary pillow-blocks

C C and the side plates of the housing D are cast in one piece with said bed-plate, as indicated in Fig. 4. This produces a compact and strong structure, which adds materially to the value of the machine. The bearings *a* for the swinging pillow-blocks and *a'* for the shaft of one of the crushing-rolls are centered and cut in the solid casting.

F is one of the swinging pillow-blocks, and G the roll mounted therein. H is the other roll mounted on the stationary pillow-blocks C C, and which is driven by the large driving-wheel H'. The smaller wheel I is secured to the shaft of the roll G to keep up the movement of the said roll in order to insure the proper crushing action of the machine when quartz or ore is fed to the rolls.

B is a metal housing, which is secured to the main frame and incloses the roll G on the swinging or pivoted pillow-blocks. E is also an iron housing secured to the main frame.

K K is a cover or housing, preferably composed of wood, which is placed upon the iron housings already described.

M is the hopper secured by bolts to the side plates of the iron housing. It contains two inclined chutes L L, which deliver the quartz or other material to the crushing-rolls.

N N are the tie-bolts. They are pivoted at one end to the swinging pillow-blocks and their other ends extend through that portion of the casting forming the stationary pillow-blocks.

O O' are two heads or plates with central perforations, through which pass the tie-bolts, and with a number of perforations near their peripheries, through which pass small bolts P P. Spiral springs R surround the bolts P, and their degree of compression is regulated by nuts *p*, that screw on their ends. I also surround the main tie-bolts N with a spiral spring between the two heads O and O', as shown in Fig. 6, and I prefer to make this spring somewhat stouter than the others, so that it is capable of withstanding a greater strain. One of these cushions is fitted over the projecting end of each tie-bolt N, together with nut T, and their purpose and the mode of adjusting them are as follows:

To adapt the machine for use, the springs R are compressed to the desired extent by turning up the nuts *p* on bolts P P and bringing up the pivoted pillow-blocks by advancing the nut T until the rolls are secured at the desired distance apart. The nuts V, which I sometimes use on the tie-bolts, are then adjusted so that they abut against the stationary pillow-blocks C. Under these conditions a practically rigid connection between the two sets of pillow-blocks is maintained. Should a lump of ore or some foreign substance find its way between the rolls that the usual pressure is not sufficient to crush, the springs R will yield, the head O' being drawn up, sliding over the bolts P, and the bolts N will be drawn through the pillow-blocks C C, to relieve the pressure. The tension of the

springs is adjusted so that only an extraordinary strain upon them will cause their further perceptible compression.

In the operation of the machine the wear upon the rolls is very severe, so that frequent adjustments of their positions are required. To make these adjustments the nuts V on the tie-bolts are turned back to permit the rolls to be brought up together to compensate for the wear which has taken place, after which the nuts T are turned up the same distance to shorten the tie-bolts. This is readily accomplished, for the reason that the heads O O' being prevented by the bolts P P from moving apart so as to relieve the tension of the springs R there will be no spring-pressure upon the nuts V or T, and hence they may be turned with comparative ease.

An adjustment of the tension of the springs R may be effected by tightening up the bolts P, one at a time, with the application of much less force than would be required to compress them simultaneously by the one large nut T.

By the construction devised by me and above described several important results are secured. It will be understood from the character of the work to be performed by the machine that the strain upon it is enormous, which strain effects certain portions of the machine more than others; but by casting in one piece all those portions upon which the strain mainly falls I obviate the consequences of jarring and uneven straining and greatly prolong the life of the machine as a whole. The entire frame-work of the machine, it will be observed, has this distinguishing feature that the parts which bear the jars and strains incident to the crushing of the ore are formed of a single piece of solid metal, while the remaining metal portions which are not so affected, but which go to complete the frame-work or basis for the superstructure or housing, are bolted to the solid portions. With respect also to the devices for adjusting the rolls, great advantages are gained by my improvements. The spring-cushions for the tie-bolts in machines of this kind must be capable of withstanding a strain of perhaps twenty or thirty tons; so that to merely loosen a single nut against which such a pressure is exerted has heretofore required special tools and the application of a greater force than it is often practicable to obtain.

What I now claim as my invention is—

1. The combination, in an ore-crusher of the kind described, with the solid casting formed with the stationary pillow-blocks, the bearings for the pivoted pillow-blocks, the side plates D, and the bed-plate, of the metal housing B, bolted to the solid casting, as herein set forth.

2. The combination, in an ore-crusher of the kind described, with a solid casting formed with stationary pillow-blocks, bearings for swinging pillow-blocks, side plates, and a bed-

plate, of the metal housing B and end plate E, bolted to the casting and forming an inclosed support, as set forth.

3. In an ore-crusher, the combination, with
5 the crushing-rolls and adjustable tie-bolts connecting the movable supports of one roll to a fixed portion of the machine, of a cushion for each of said tie-bolts for receiving the strain upon the same, and composed of heads
10 with intermediate spiral springs and bolts for securing the heads together, and provided with nuts whereby the distance between the heads and the consequent tension of the springs may be varied by the independent
15 adjustment of the nuts on the bolts, as set forth.

4. In an ore-crushing machine, the combination, with the rolls, one mounted in stationary and the other in pivoted or swinging pillow-blocks, and adjustable tie-bolts passing
20 through the stationary and connected to the pivoted pillow-blocks, of an independently-adjustable spring-cushion for each tie-bolt, and composed of the perforated heads O O', the connecting-bolts P, and spiral springs surrounding the bolts, as set forth.
25

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