

(No Model.)

2 Sheets—Sheet 1.

A. J. GATES.  
STONE BREAKER.

No. 491,096.

Patented Feb. 7, 1893.

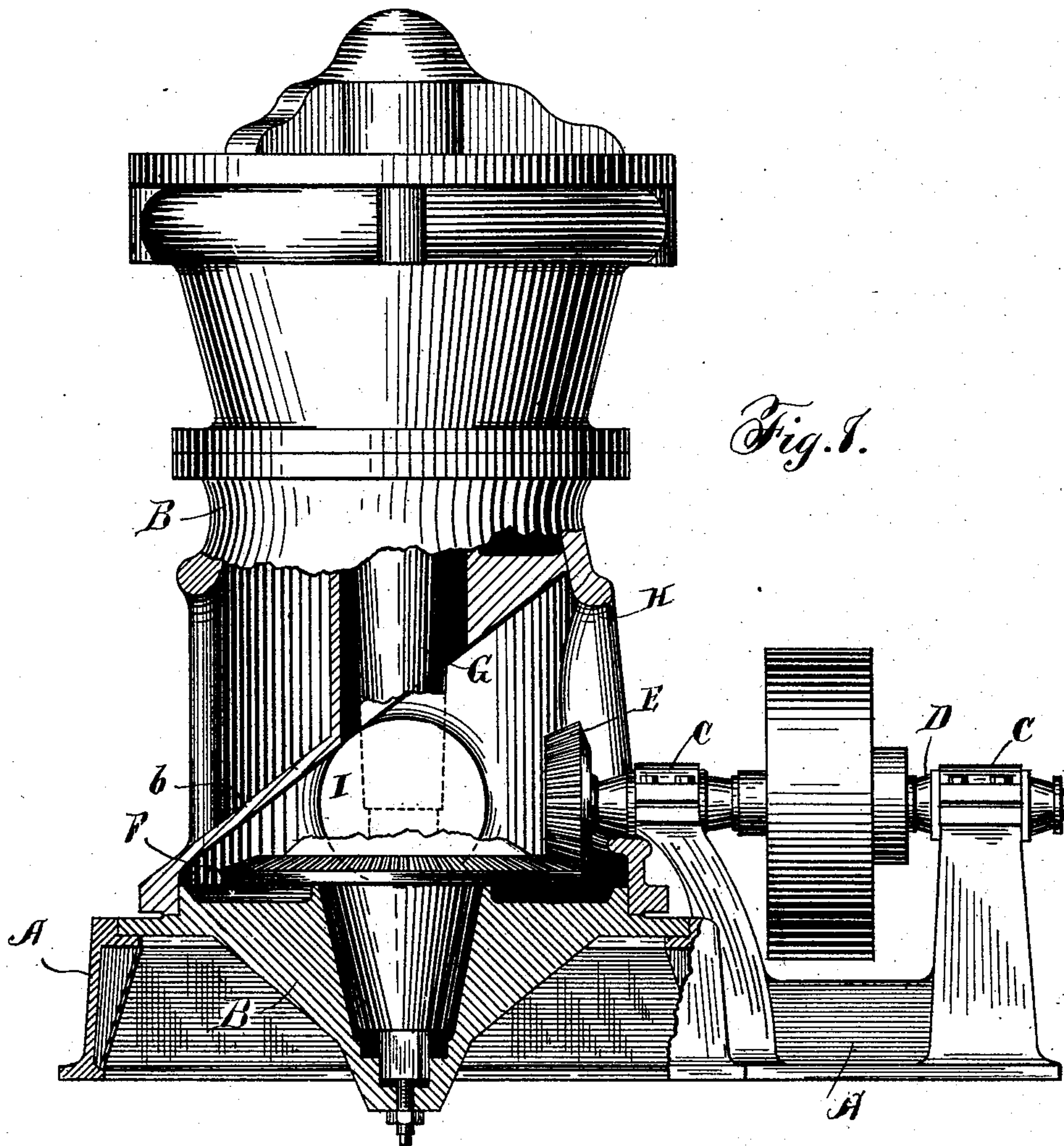


Fig. 1.

Witnesses,

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Albert J. Gates,

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Attorneys.

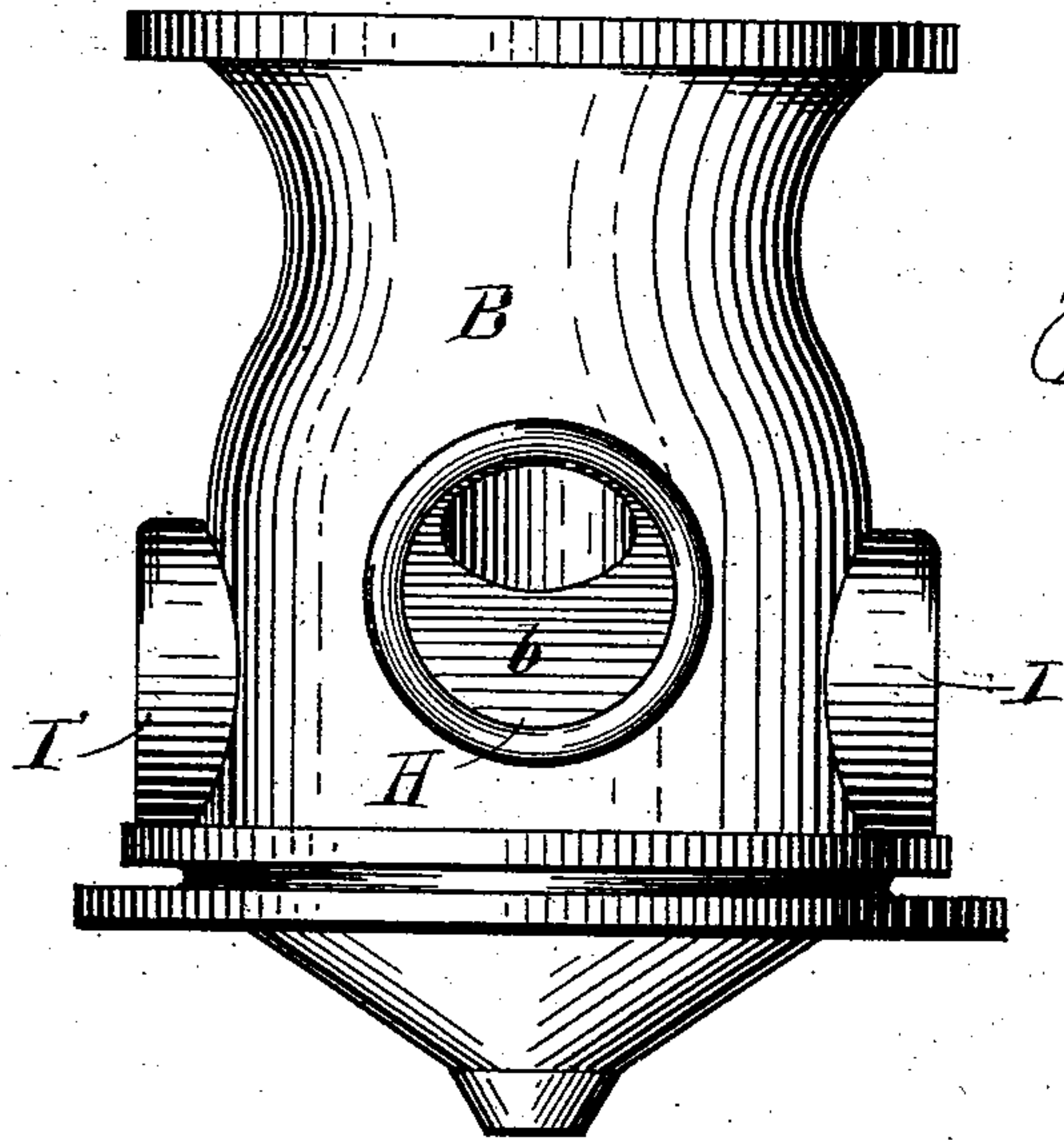
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2 Sheets—Sheet 2.

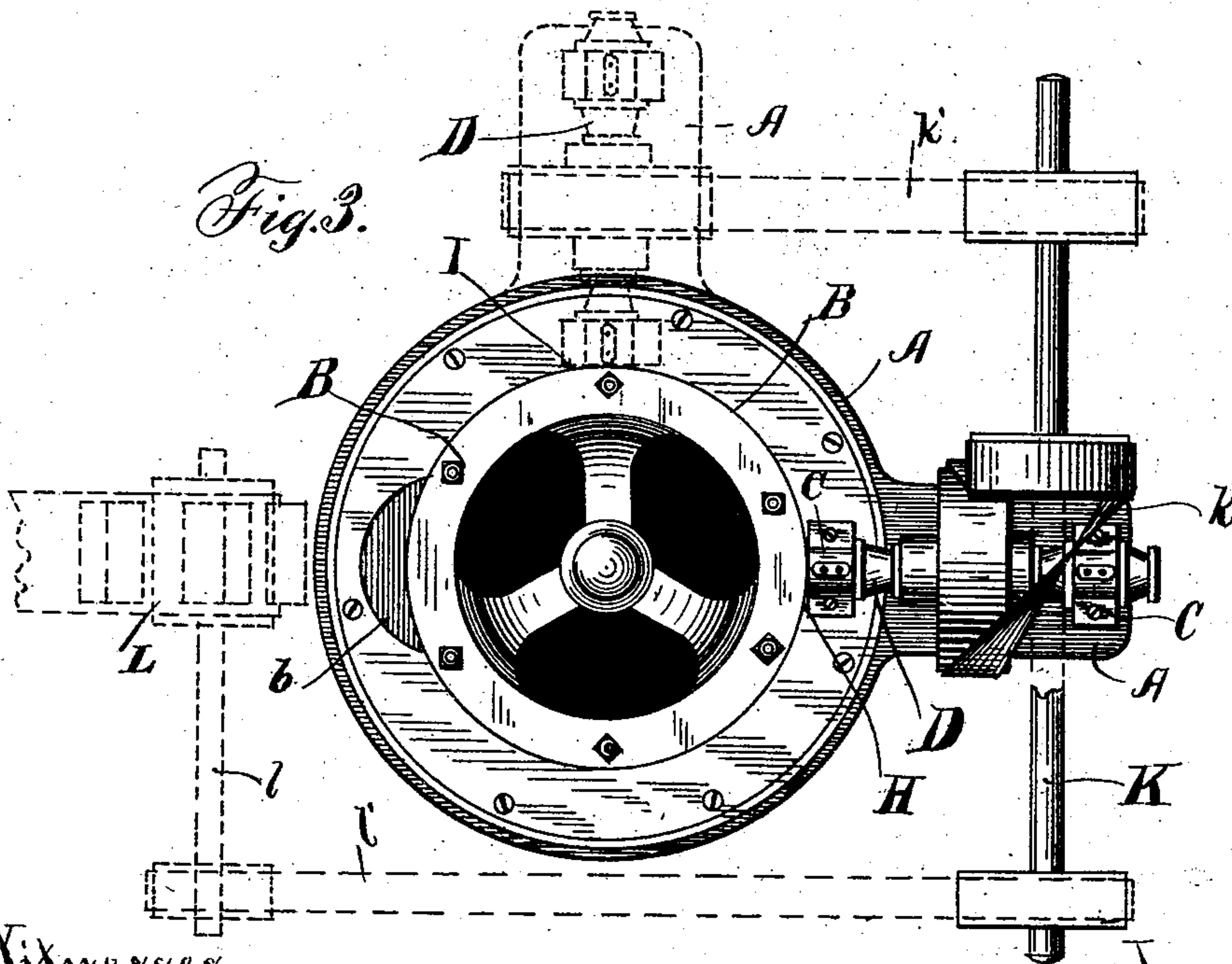
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*Fig. 2.*



*Fig. 3.*

Witnesses.

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# UNITED STATES PATENT OFFICE.

ALBERT J. GATES, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GATES IRON WORKS, OF SAME PLACE.

## STONE-BREAKER.

SPECIFICATION forming part of Letters Patent No. 491,096, dated February 7, 1893.

Application filed September 22, 1892. Serial No. 446,520. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT J. GATES, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Stone-Breakers, of which the following is a specification.

The object of my invention is to make a stone breaker or ore crusher, of such construction that the mechanism for actuating the crusher head can be driven at right angles with the motive power or parallel to the same; and my invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is an elevation, partly in section, of a stone breaker showing the driving gear at right angles to the motive power; Fig. 2 is an elevation of a portion of the stone breaker or crusher, and Fig. 3 a plan view of my improvement showing the methods used in driving the same.

In using stone breakers or crushers, the discharge opening leading from the inclined diaphragm or chute must generally be at some fixed point to discharge the broken stone or crushed ore into a screening and assorting machine, or into bins or receptacles provided for the purpose.

In the present form or construction of stone breakers and crushers, the driving gear or mechanism is generally applied in the rear of the machine, directly opposite the discharge opening, and sometimes the application of power at this point is a disadvantage, more especially when an elevator is used to carry the material to be crushed or broken to the top of the crusher and discharge it into its hopper. The shafting of the elevator, and the driving gear in such an arrangement being at right angles to each other, necessitate either what is termed a quarter turn belting, and consequently a great loss of power in transmission, or a system of beveled gearing to actuate the driving gear, which means additional expense as well as loss of power in transmission. To obviate this difficulty, and to provide means by which the crushing mechanism can be actuated at either right angles or parallel to the motive power, I make a crusher of two main portions A and B. A is the base of

the machine, and contains the driving gear through which power is transmitted from the motive power to the crushing mechanism; B is the ore breaker or crusher proper, and is fitted into the base A in such a manner that the base can be rotated around the upper portion to the desired position and secured therein. Secured to the base A are suitable brackets C, in which is journaled a shaft D, carrying at its inner end a beveled gear E, which engages with a beveled gear F, which in turn drives the gyrating shaft G and actuates the crushing mechanism. The driving gear E enters an opening H in the crusher frame provided for that purpose, as shown in Fig. 1, and is at right angles with the motive power.

In order to drive the crushing mechanism by the driving gear attached to the base from a point parallel to the motive power, I provide a crusher frame B with openings I I' at right angles to the opening H. The upper portion or crusher frame B is secured to the base A by bolts, clamps, or in any suitable manner. These are loosened or withdrawn and the base A rotated a quarter of a circle to come in line with the openings I, as shown in dotted lines in Fig. 3. It will be noticed that the openings I I' are somewhat smaller in diameter than the opening H, or are of such diameter that they altogether clear the inclined diaphragm or chute *b*. The base with its driving gear having been rotated a quarter of a revolution and in alignment with either of the circular openings I I', the driving beveled gear E is taken off if desired, and a smaller one substituted to engage with the beveled gear F. The upper portion of the crusher is now firmly secured in its place, and the driving gear D being parallel with the motive power, the elevator for raising material can be driven without the intervention of quarter turning or extra gearing.

In Fig. 3 I have illustrated my improvement in two of its three positions with the necessary connections for operating the same. K is a main driving shaft, driving the mill shaft D by means of a quarter turn belting *k*. When it is desired, the mill shaft or driving gear D can be rotated till it comes in position parallel to the main driving shaft, as shown in dot-



ted lines in Fig. 2. It is then secured in that position, and a straight belting  $k'$  can be used to operate it, doing away with the necessity of a quarter turn belting. In dotted lines, L, I have shown the elevator, opposite the discharge chute  $b$ , in position to raise the crushed stone or ore to any desired point. The elevator is driven by means of a shaft  $l$ , and the driving belt  $l'$ . As it is necessary that the elevator should always be opposite the discharge chute of the crusher, in the old forms of construction a quarter turn belt would be necessary to drive either the mill shaft or elevator. It will be remembered that in all cases the discharge chute  $b$  must remain at a constant or fixed point, and the base must be rotated when it is necessary to change the location of the driving gear; and from the foregoing description and an inspection of the drawings, it will be seen that in my improvement this can be done readily and economically.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

25 1. In stone breakers or crushers, the combination of a lower portion forming the base, driving mechanism firmly secured thereto, an upper portion, containing the crushing mechanism, having openings through which the

driving gear is inserted, and secured rotatably to the lower portion, substantially as described. 30

2. In stone breakers or crushers, the combination of a lower portion forming the base, driving mechanism firmly secured thereto, an upper portion secured rotatably to the lower portion, containing the crushing mechanism, and provided with three openings through which the driving gear is inserted, two of said openings being slightly smaller in diameter than the remaining one, substantially as described. 35 40

3. In stone breakers or crushers, the combination of a lower portion forming the base, driving mechanism firmly secured thereto, an upper portion secured rotatably to the lower portion, containing the crushing mechanism, the frame provided with an inclined diaphragm or discharge chute, an opening in the opposite side of the frame through which the driving gear can be inserted, and two openings somewhat smaller in diameter at right angles to the same, substantially as described. 45 50

ALBERT J. GATES.

Witnesses:

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