(No Model.) 2 Sheets—Sheet 1.

R. D. GATES.

ORE PULVERIZER.

No. 485,864. Patented Nov. 8, 1892.

Fig. 1.

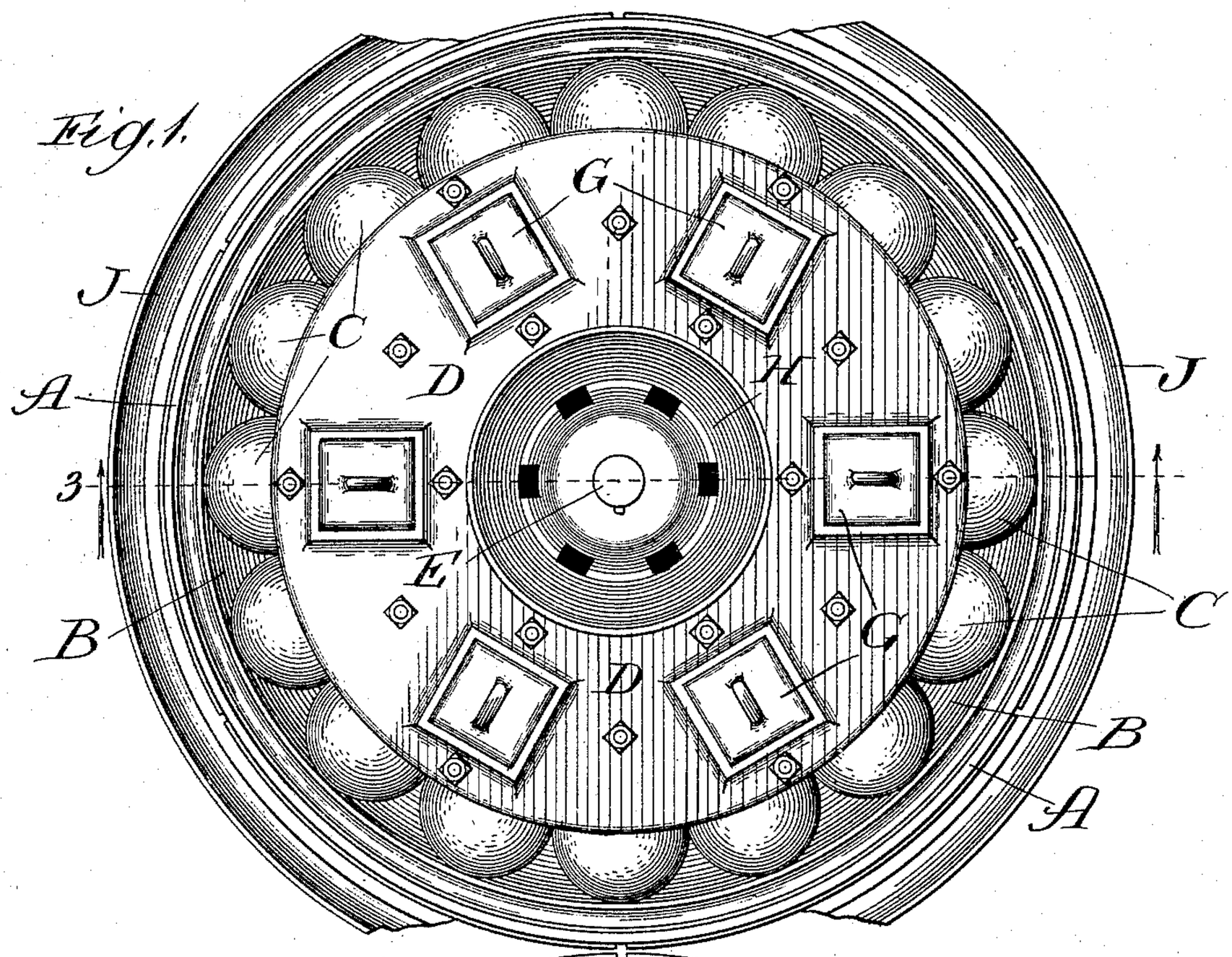
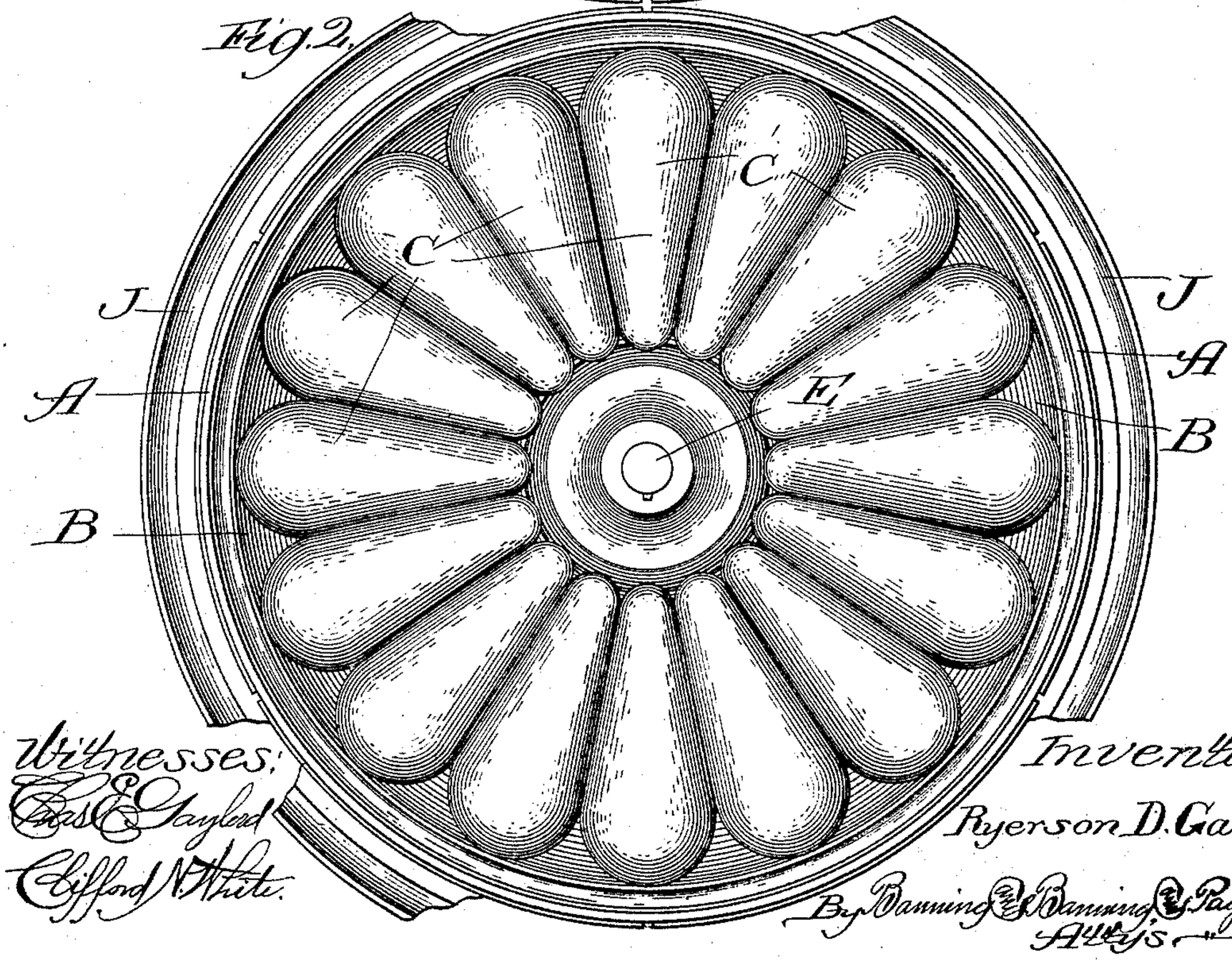


Fig. 2.



Witnesses:
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Clifford N. White.

Inventor:
Ryerson D. Gates,
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Attys.

(No Model.) 2 Sheets—Sheet 2.

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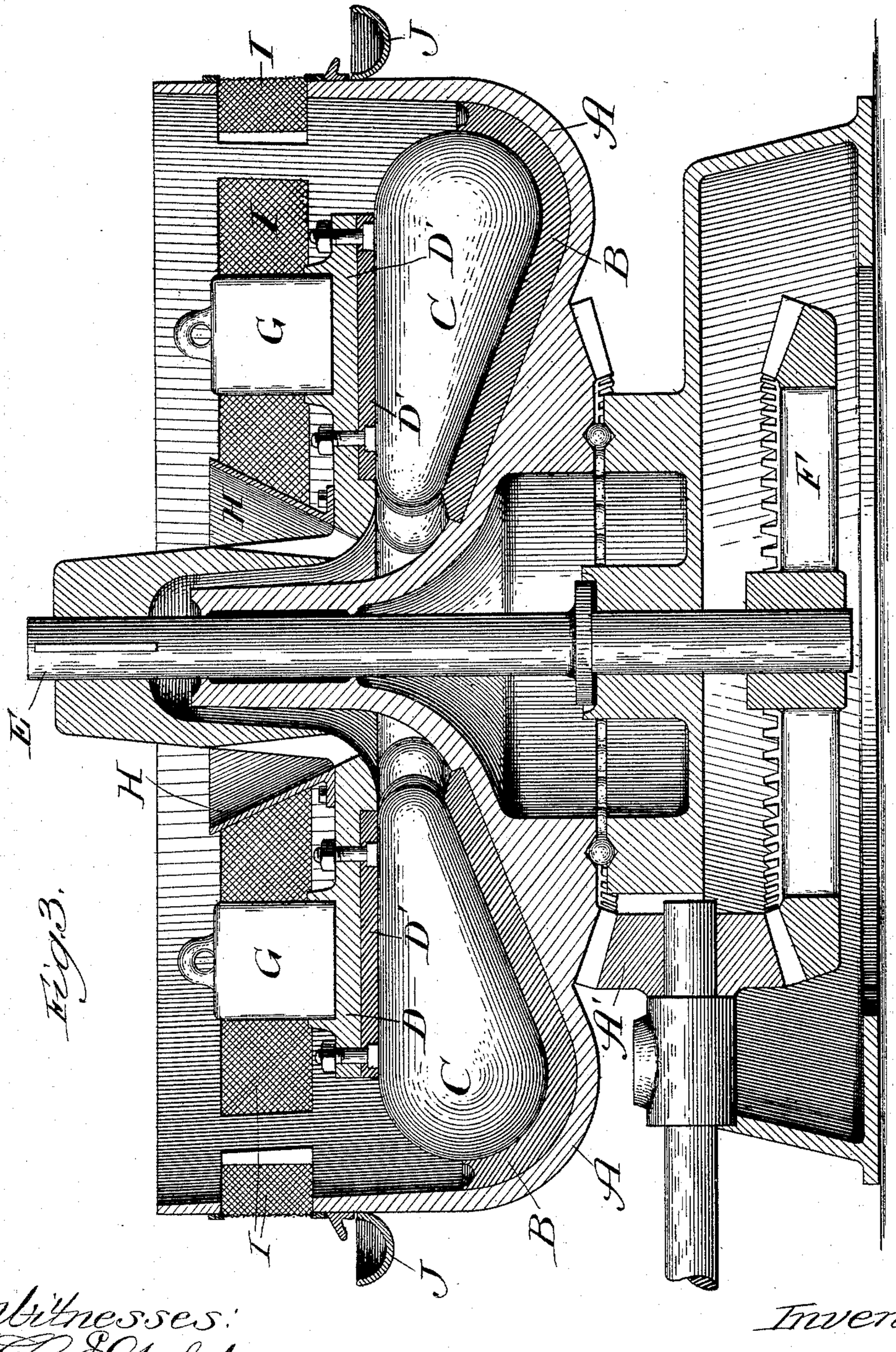

Fig. 3.

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UNITED STATES PATENT OFFICE.

RYERSON D. GATES, OF RIDGELAND, ASSIGNOR TO THE GATES IRON WORKS, OF CHICAGO, ILLINOIS.

ORE-PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 485,864, dated November 8, 1892.

Application filed May 31, 1892. Serial No. 434,964. (No model.)

To all whom it may concern:

Be it known that I, RYERSON D. GATES, a citizen of the United States, residing at Ridgeland, Illinois, have invented certain new and useful Improvements in Ore-Pulverizers, of which the following is a specification.

In the drawings, Figure 1 is a plan view of my improved pulverizer. Fig. 2 is a plan view of the same with the upper portion of the apparatus removed; and Fig. 3 is a central vertical section, partly in elevation, taken in line 3 of Fig. 1, looking in the direction of the arrows.

In making my improved ore-pulverizer I make a pulverizing-pan A, adapted to be rotated in any suitable way and by any suitable motive power. As shown in the drawings, I rotate the pulverizing-pan by means of a pinion A′, meshing with gear-teeth arranged on the bottom of the pulverizing-pan, though other means may be adopted, if desired, for rotating the pan. The pulverizing-pan has its bottom inclining outwardly and downwardly and then upwardly at the outer edge to form a pan of sufficient depth for the purposes intended. I arrange in the bottom of the pan a hardened pulverizing surface or die, on which the work of pulverization is intended to be done. Arranged within the pan and resting upon the pulverized surface are a number of conical-shaped pulverizing-rolls C. These rolls are arranged in a series around the pulverizing-pan with their smaller ends toward the axis of the pan, so that the axes of the rolls form radii to the center of the pan, and preferably in sufficient number to fill the entire pulverizing-surface of the pan. These pulverizing-rolls are arranged loosely in the pan, so that each may rotate on its own axis in the work of pulverizing material. In order to impart rotation to the rolls, I arrange a disk D above the rolls and provide it, preferably, with a hardened wearing-surface D′, which comes into immediate contact with the rolls. This disk is intended to be rotatable, and to that end it is fixed by a feather or spline to a shaft E, which passes up through the center of the pulverizing-pan, and which may be rotated by any convenient motive power. As shown in the drawings, it is provided with a large gear-wheel F at its lower end, with its teeth intermeshing with the teeth of the pinion A′, so that as the pinion A′ is rotated it will rotate the pulverizing-pan and the rotatable disk resting on the pulverizing-rolls, but in opposite directions to each other. As the pulverizing-pan rotates in one direction the disk rotates in the opposite direction. In order to cause the disk to bear with sufficient pressure on the pulverizing-rolls, I provide means for regulating, increasing, or diminishing the weight of the disk, so that it may be adjusted to suit different requirements arising from the pulverizing materials differing in hardness or difficulty of pulverizing. The means that I have shown in the drawings consists of weights G, resting upon the rotatable disk. These weights may be removed and heavier or lighter ones put in their place whenever it is desired to change the pressure bearing upon the upper surface of the pulverizing-rolls. I arrange a hopper or spout H, through which the material to be pulverized, with the water used to dilute it and assist pulverization, may be introduced. I arrange around the circumference of the pan as many screens I as may be desired, through which the pulverized material as it is carried up by the water in the pan may pass out, and to catch it as it passes out I arrange a trough J, preferably stationary, around the pulverizing-pan, into which the material will be caught as it passes out through the screens and from which it may be carried to any desired place of deposit.

In operation the material to be pulverized and the desired quantity of water are introduced through the hopper or chute into the pulverizing-pan. The pan is slowly rotated and the disk above and resting upon the rolls is slowly rotated in the opposite direction. This causes the pulverizing-rolls to be rotated on the pulverizing-surface. The material slowly works its way by gravity down the pulverizing-surface and toward the outer edge. As it thus passes across the pulverizing-surface the rolls operate upon it and pulverize it to the desired degree of fineness. As it reaches the outer edge of the pulverizing-surface the fine pulverized material is carried by

the water upward between the conical ends of the pulverizing-rolls to the screens, where it passes out, is caught in the trough, and carried to the desired place of deposit.

What I regard as new, and desire to secure by Letters Patent, is—

1. In ore-pulverizers, the combination of a rotatable pulverizing-pan, means for rotating the pan, conical pulverizing-rolls arranged in the pan with their upper sides in a horizontal plane, a rotatable disk resting on the rolls, and means for rotating the disk in a direction opposite to the direction of rotation of the pan, substantially as described.

2. In ore-pulverizers, the combination of a rotatable pulverizing-pan provided with a pulverizing-die, conical pulverizing-rolls arranged in the pan with their upper sides in a horizontal plane and on the surface of the pulverizing-die, a rotatable disk provided with a hardened wearing-surface resting on the rolls, and means for rotating the disk in a direction opposite to the direction of rotation of the pan to effect the rotation of the pulverizing-rolls, substantially as described.

3. In ore-pulverizers, the combination of a rotatable pulverizing-pan, means for rotating the pan, conical pulverizing-rolls arranged in the pan with their upper sides in a horizontal plane, a rotatable disk resting on the rolls, means for rotating the disk in a direction opposite to the direction of rotation of the pan, and means for regulating the pressure exerted by the disk on the rolls, substantially as described.

4. In ore-pulverizers, the combination of a rotatable pulverizing-pan, means for rotating the pan, conical pulverizing-rolls arranged in the pan with their upper sides in a horizontal plane, a rotatable disk resting on the rolls, means for rotating the disk in a direction opposite to the direction of rotation of the pan, means for introducing material and water into the pulverizing-pan and for screening and catching the pulverized material as it passes from the pan, substantially as described.

5. In ore-pulverizers, the combination of a rotatable pulverizing-pan provided with a gear on its bottom, conical pulverizing-rolls arranged in the pan with their upper sides in a horizontal plane, a rotatable disk resting on the rolls, a vertical rotatable shaft rotating the disk and provided with a gear below the gear on the pan and containing an equal number of teeth, and a horizontal rotatable shaft provided with a pinion arranged between and engaging the gear on the pan and the gear on the vertical shaft and imparting an equal speed of rotation to both, substantially as described.

RYERSON D. GATES.

Witnesses:
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