

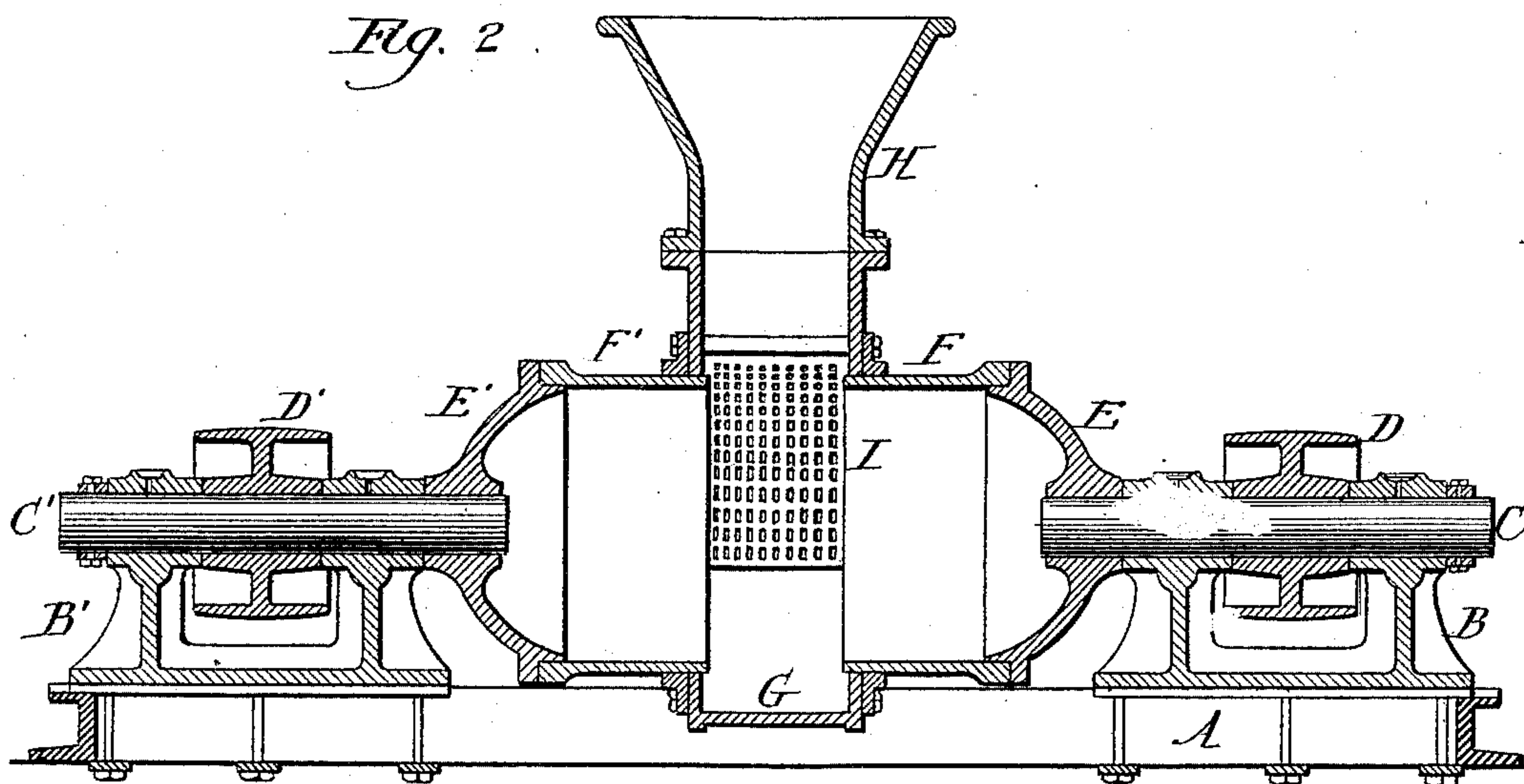
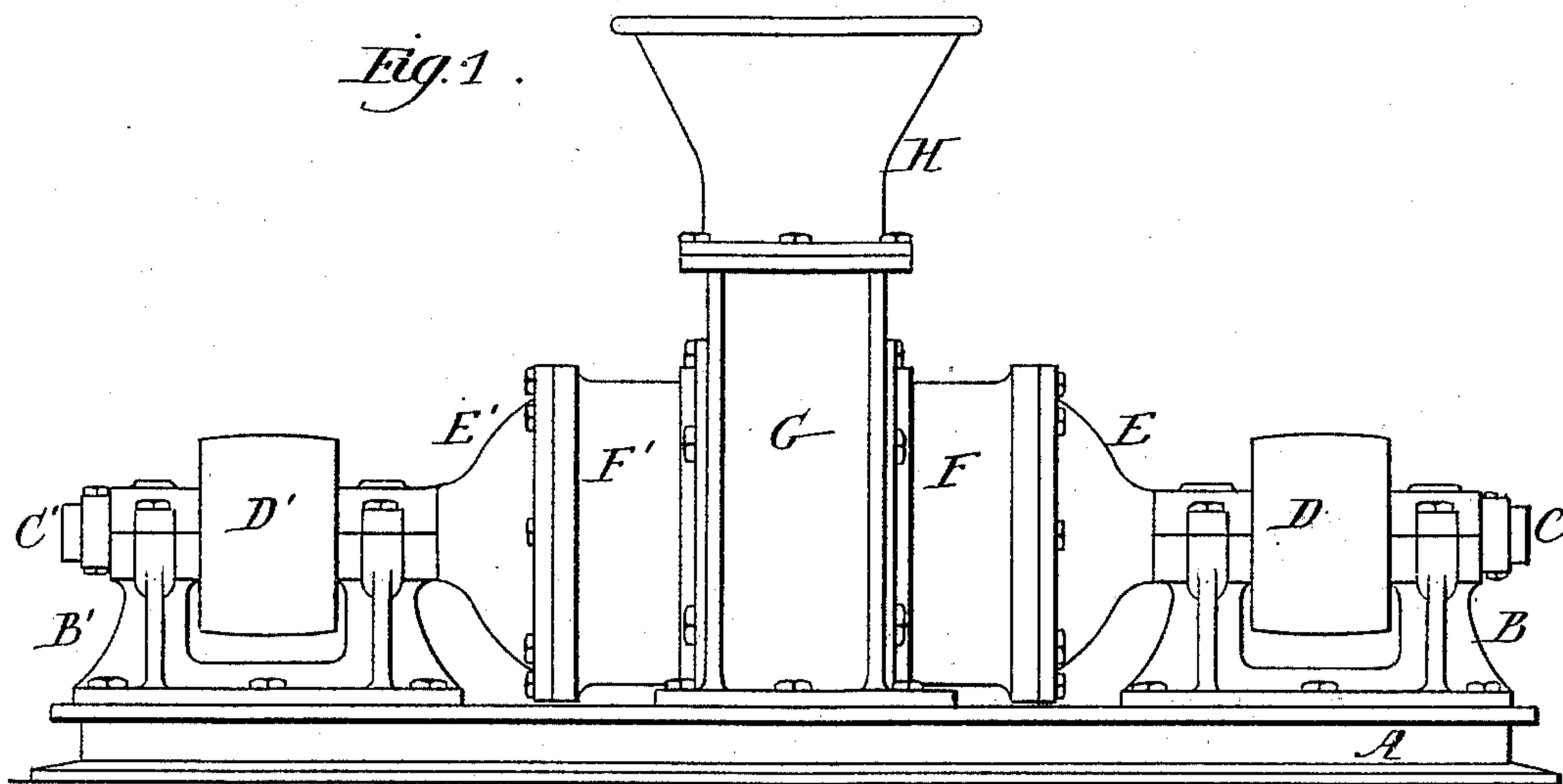
(No Model.)

2 Sheets—Sheet 1.

R. YATES.
ROTARY PULVERIZER.

No. 412,823.

Patented Oct. 15, 1889.



Witnesses:

Harry T. Jones

Robert A. Mellar

Inventor:

Robert Yates

(No Model.)

2 Sheets—Sheet 2.

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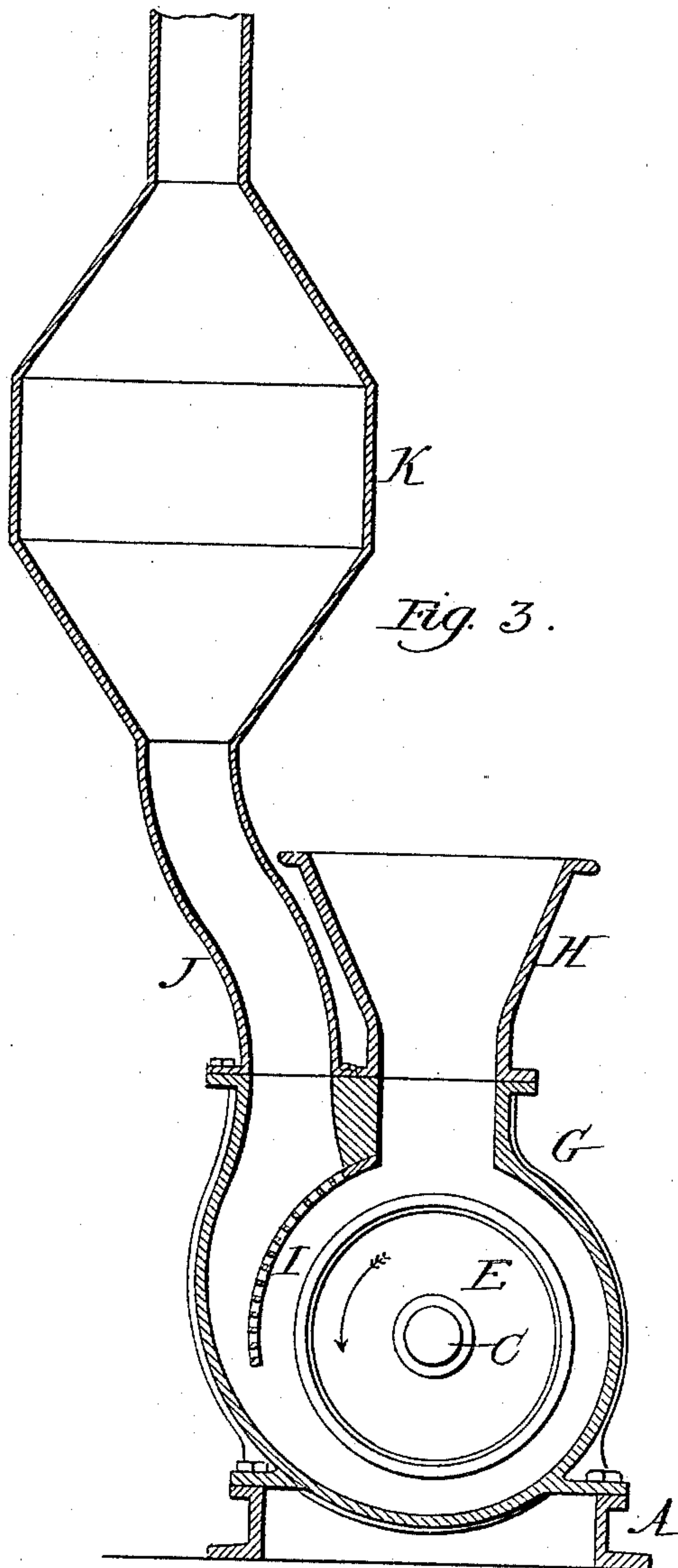


Fig. 3.

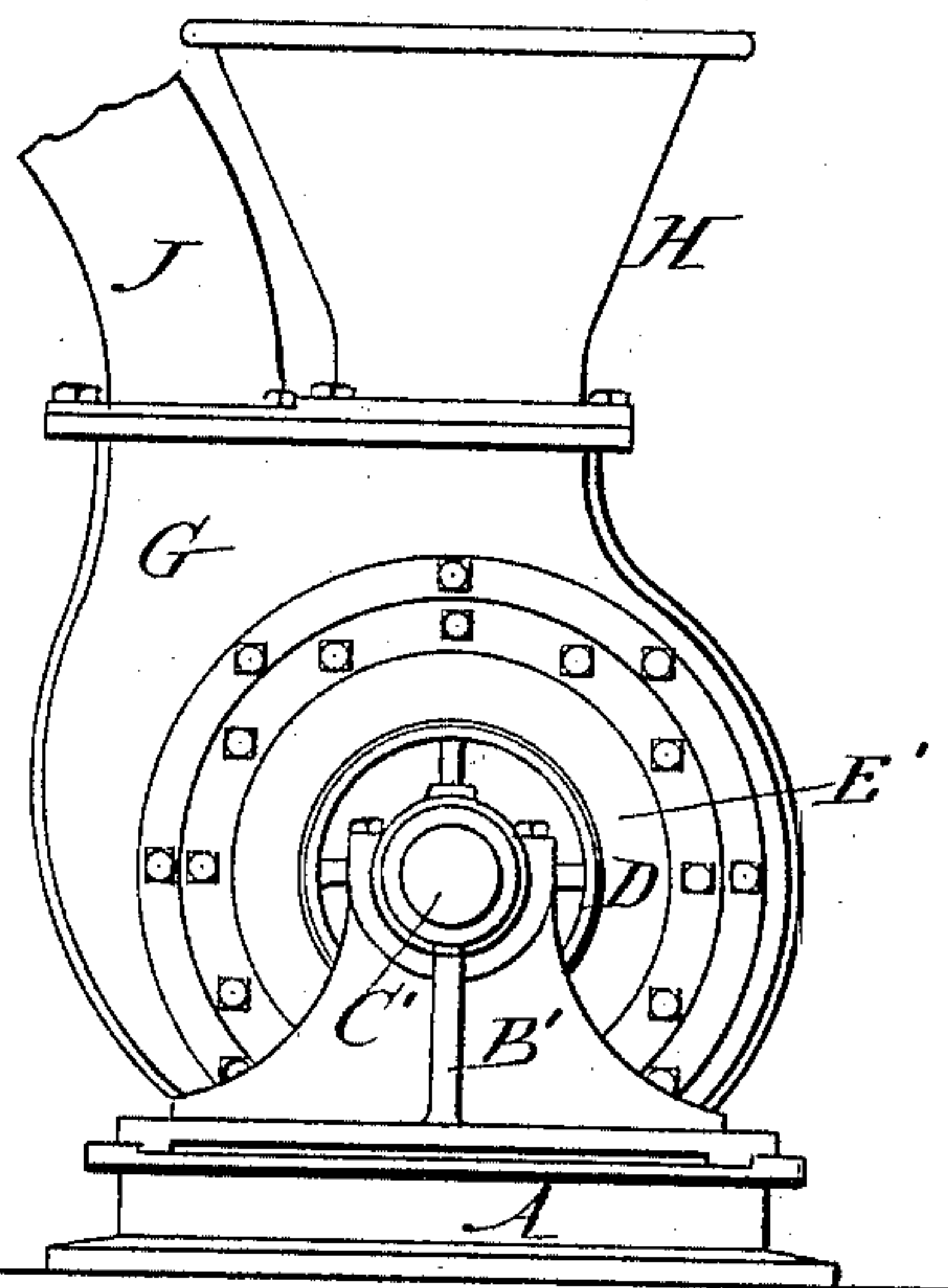


Fig. 4.

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Harry T. Jones.
Robert A. Millar

Inventor:

Robert Yates

UNITED STATES PATENT OFFICE.

ROBERT YATES, OF OMAHA, NEBRASKA, ASSIGNOR TO HIMSELF, AND CHARLES
KAESTNER AND FRANK A. HECHT, BOTH OF CHICAGO, ILLINOIS

ROTARY PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 412,823, dated October 15, 1889.

Application filed June 7, 1888. Serial No. 276,315. (No model.)

To all whom it may concern:

Be it known that I, ROBERT YATES, residing at Omaha, in the county of Douglas and State of Nebraska, and a citizen of the Dominion of Canada, have invented a new and useful Improvement in Rotary Pulverizers, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation. Fig. 2 is a central longitudinal section. Fig. 3 is a central cross-section. Fig. 4 is an end elevation.

The object of this invention is to overcome the difficulties heretofore experienced in the use of this class of machines, as they were liable to discharge their material in a partially ground or pulverized state.

By the application of the improvements hereinafter described, the machine becomes a crusher, pulverizer, and a complete grinding-machine, delivering only such material as has been ground to a fine powder; and its nature consists in the improvements hereinafter described, and made the subject-matter of the claims.

In the drawings, A indicates the base.

B B' indicate the supporting-frames for the shafts; C C', the shafts; D D', the driving-pulleys; E E', cup-shaped concavo-convex heads; F F', containing-cylinders.

G indicates a middle non-rotating section; H, a hopper; I, a perforated plate or screen, and J an exhaust-pipe having an enlarged section or separating-chamber K.

The machine is usually made of cast-iron, with the exception of the shafts, which may be made of wrought-iron or steel forgings, and the exhaust-pipe with its enlarged section or separating-chamber, which may be made of sheet metal.

The machine is made substantially in the form shown, giving each shaft two bearings. The heads E E', having the interior concave, are attached to the inner ends of the shafts, and are provided with sections or cylinders F F', the inner ends of which project inward to the interior of the section G. The middle section G is made in the form shown and of a larger diameter than the cylinders F F', as shown. The section G is provided at its back

with a perforated concavo-convex plate I, through which perforations the pulverized material can pass and be exhausted out at the pipe J. This perforated plate is attached so as to be renewable when desired, and it is arranged as shown in Fig. 3, so that any fragments escaping that are not properly pulverized or ground may drop back to it and re-enter the machine for further grinding; and in order that a strong suction may be used without carrying such insufficiently-ground parts over and out of the machine the pipe J is provided with an enlarged section or separating-chamber K, for the purpose of slacking the current, so that the heavier parts may fall back into the machine and be reground. Any suitable suction or exhaust device may be applied to the end of the pipe J to withdraw the properly-pulverized material from the machine. It will be seen that the perforated concavo-convex plate or screen I is so arranged with the concave face inward as to assist greatly in holding the unpulverized material within the pulverizing-chamber, while permitting the escape of the material that is sufficiently crushed to pass through its perforations. It will also be observed that the convex outer surface of this screen facilitates the passage over it of the coarser material that drops back through the exhaust-pipe. The partly-crushed ores which are fed into the hopper pass out of the section G into the cylinders F F', and when the machine is filled the rotation of the cylinders and the material contained therein by coming in contact with the non-rotating material in the section G gives a rapid grinding and pulverizing action, which action tends also to wear away the rotating cylinders, and as they wear away they may be moved inward by moving the shafts C C', so as to nearly or quite wear them out up their entire length. This action would also wear away the heads E E', if they were in a plane at right angles with the ends of the cylinders, as the material fed into the section G assumes a somewhat conical form in the line of action between the rotating and non-rotating parts. By making the heads E E' interiorly concave they do not wear away, so that these revolving cylinders can be renewed

without renewing the heads E E', thus making a material saving in the renewal of the parts.

In operation the material is thrown into the case through the hopper H and forms itself
5 into a solid mass in the cylinders or cups and throughout the body of the central section. The cylinders or cups are revolved rapidly, and the material contained therein is crushed and ground against comparatively stationary
10 materials within the section G, and as it is reduced it is thrown or drawn out through the screen I and caught by the current of air and exhausted through the pipe J, and such particles or portions of the material as are
15 thrown or drawn through the screen and are too heavy to be carried out by the current of air will be separated in the enlargement or separating chamber K, and rolled down over the screen and through the opening at the
20 bottom into the case to be further ground. Two cylinders or cups give the best results when they are both rotated in the direction indicated by the arrow in Fig. 3; but it will be obvious that they may be rotated in oppo-
25 site directions, if desired; and it will be further obvious that an operative machine may be produced by omitting one of the rotating cylinders, so that it will be single instead of double acting; but the double-acting form
30 shown gives the best results, although requiring more power. As shown, the parts are put together with lag-bolts; but by making the flanges wider headed bolts with nuts may be used.

35 I am aware that pulverizing and grinding

machines have been heretofore made which embody two revolving heads or cylinders arranged opposite to each other in the general form here shown; and I do not, therefore, broadly claim them. 40

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

1. In a rotary pulverizer, the combination, with the pulverizing-chamber, the rotary cylinders F F', and the exhaust-pipe J, communicating with the pulverizing-chamber, of the
45 concavo-convex screen I, located between the pulverizing-chamber and the exhaust-pipe to screen the material passing from the chamber to the exhaust-pipe, said screen being terminated short of the wall of the exit-passage
50 from said chamber to form an open channel for the return of coarse material to the chamber, substantially as described.

2. In a rotary pulverizer, the combination
55 of the non-rotating central section G, the rotary sections or cylinders F F', having concaved heads, the hopper leading into non-rotating section, the upwardly-extending exhaust-pipe J, communicating with the non-
60 rotating section and formed with an enlarged section or separating-chamber K, and the concavo-convex screen I, located at the rear of the non-rotating section between it and the exhaust-pipe, substantially as described.

ROBERT YATES.

Witnesses:

HARRY T. JONES,
ROBERT A. MILLAR.