

(No Model.)

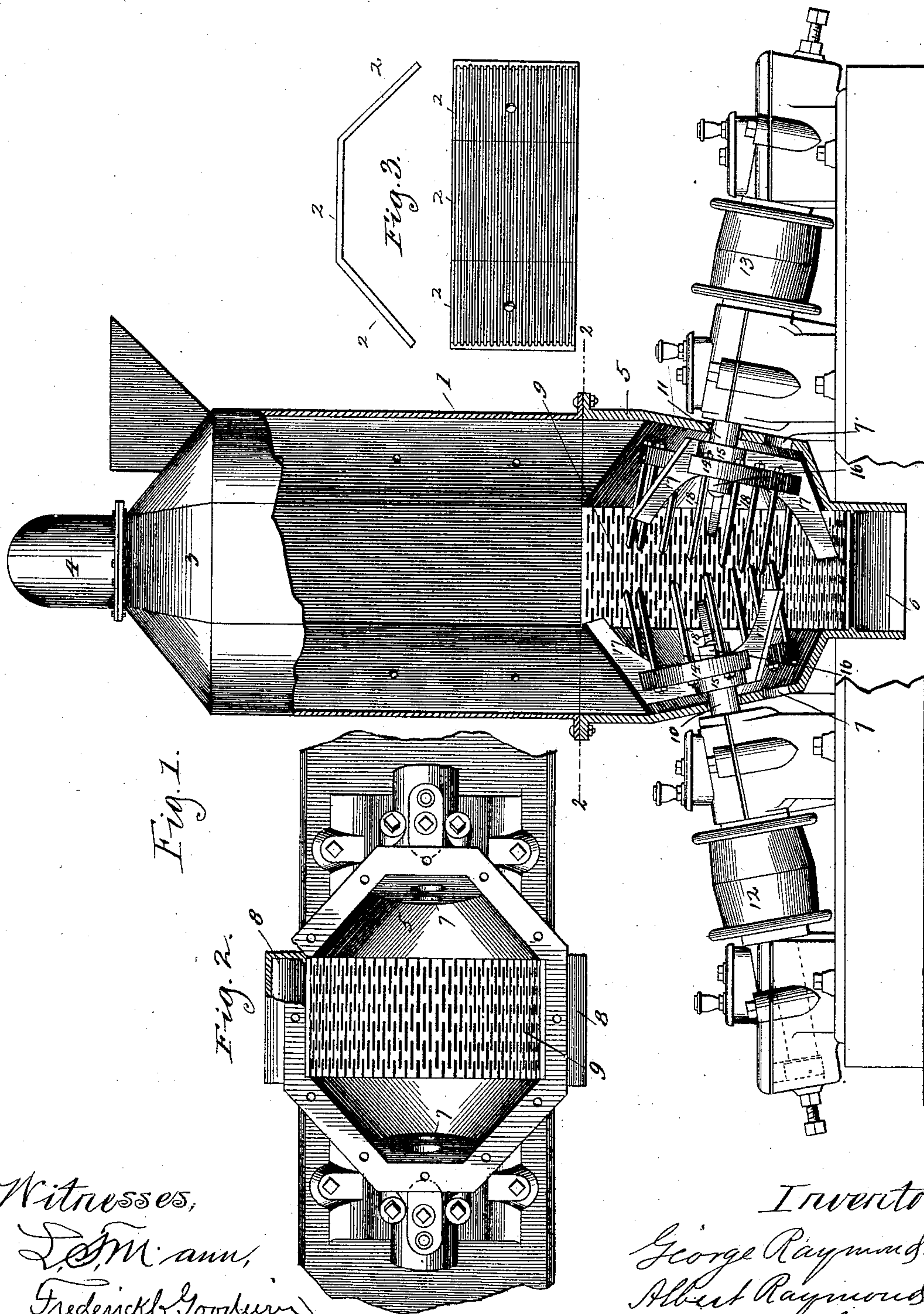
2 Sheets—Sheet 1.

G. & A. RAYMOND.

REDUCING MACHINE.

No. 387,598.

Patented Aug. 7, 1888.



Witnesses,
L. M. Ann,
Frederick Goodwin

Inventor,
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(No Model.)

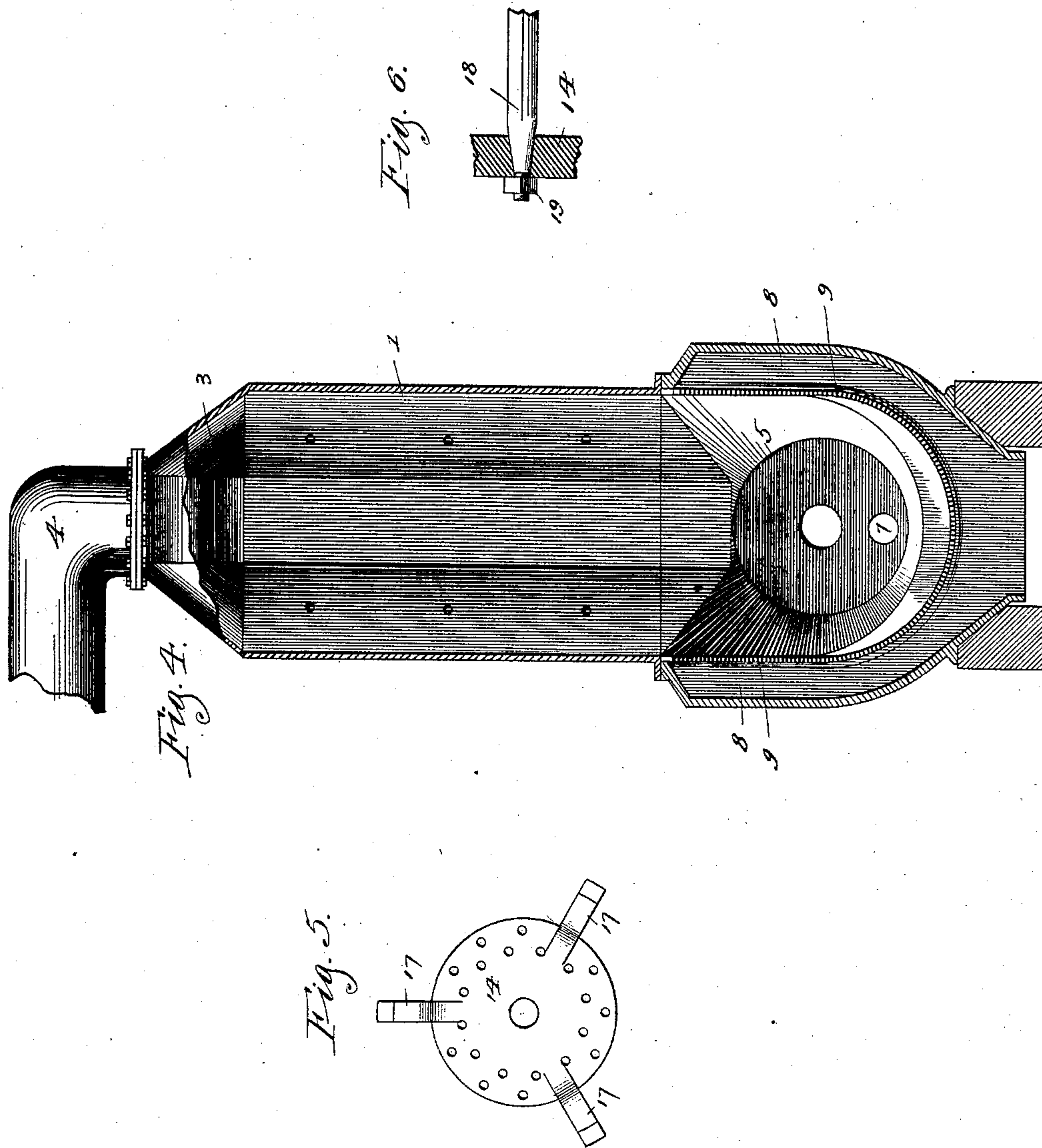
2 Sheets—Sheet 2.

G. & A. RAYMOND.

REDUCING MACHINE.

No. 387,598.

Patented Aug. 7, 1888.



Witnesses,
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UNITED STATES PATENT OFFICE.

GEORGE RAYMOND AND ALBERT RAYMOND, OF CHICAGO, ILLINOIS, ASSIGNORS TO THE CYCLONE PULVERIZER COMPANY OF THE UNITED STATES OF AMERICA, OF NEW YORK, N. Y.

REDUCING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 387,598, dated August 7, 1888.

Application filed April 26, 1888. Serial No. 271,932. (No model.)

To all whom it may concern:

Be it known that we, GEORGE RAYMOND and ALBERT RAYMOND, of Chicago, Illinois, have invented certain new and useful Improvements in Reducing-Machines, of which the following is a specification.

Our invention relates to certain improvements in construction upon the machine for reducing ores described in our patent, No. 293,786, of February 19, 1884; and we have shown, in connection with such improved construction, certain features of the improvements described in our application for Letters Patent of the United States, Serial No. 264,927, filed February 23, 1888.

In the accompanying drawings, Figure 1 is a view in side elevation, partly in section, of a machine embodying our present improvements. Fig. 2 is a plan view taken on line 2 2 of Fig. 1, portions of the driving mechanism omitted. Fig. 3 is a side elevation of a lining for the interior of the separating-chamber, and showing, also, at the top, in section, a portion of the wall of said chamber. Fig. 4 is a central vertical section of the machine (the moving parts omitted) and taken in the line of the driving-shafts. Fig. 5 is a front elevation of the beater, carrying disks and showing holes therein to receive the pins shown in the detail, Fig. 6, the latter figure presenting a section of the disk and a side elevation of the pin secured therein.

In the drawings, 1 is the separating-chamber, of diameter equal to the portion of the chamber wherein the beaters work, composed of the metallic sections 2, which converge at their upper ends to form the top 3, and terminate in a discharge-pipe, 4. The material is fed in at the top and falls vertically upon the beaters. A casing, 5, is joined to the separating-chamber at or near the upper limit of travel of the beaters, and said casing surrounds the beaters, forming a pulverizing-chamber. This chamber has a discharge-opening, 6, in its bottom. Said casing has an annular extension, preferably of the width of one of the sections 2, (see Figs. 1 and 2,) and this extension furnishes an annular chamber. (Shown in cross-section at 8 8, Fig. 2.) A per-

forated plate, 9, is interposed between the two chambers last described. Air-inlets are shown at 7.

The lining shown in Fig. 3 is intended to be made in sections and secured to the walls of the separating-chamber, and, if desired, to the walls of the pulverizing-chamber. It is composed of chilled iron, corrugated to form attrition-surfaces to assist in reducing the material during the operation. The material, after being reduced to such-sized particles as will pass through the perforations of plate 9, will, if the discharge-opening 6 is open, pass out of the machine; or, if it be closed, will fill the annular chamber 8 8, and, preventing the further passage of articles through the grate, adapt the machine for reducing the material to a powder, in which condition it is drawn off through pipe 4.

In the present improvements driving-shafts 10 11 are arranged in the same manner set forth in our application before mentioned—*i. e.*, inclined one to the other—and these shafts are intended to be driven by means of pulleys 12 13 in opposite directions. These shafts project through the casing 5, and carry disks or heads 14, which have hubs 15, the heads being secured by nuts 16, turned on threads cut in the shaft. These heads 14 carry beater-arms 17, which may be cast in one piece with the heads. In the present example three of these arms for each head are shown. They are straight, and project at an obtuse angle to the face of the head, so as to operate close to the walls of the chamber. Secured upon the heads are pins 18, which project angularly from the face of the plate, to which they may be attached in any suitable manner. A convenient method is shown in Fig. 6, where the attached end of the pin is shown reduced, and, passing through a hole in the plate, has a nut, turned on its end. These pins may be of any number desired, and arranged on the head in concentric series, as shown, or in any other manner desired. It results from the arrangement of the driving-shafts here shown that the beater-arms and pins will approach much nearer to each other at the lowest point in their movement than at the highest. We have shown

these pins 18 of such length as to pass by the center of the pulverizing-chamber and cross each other's paths of rotation during a portion of their movement below the axis of their shaft, while in the upper half of their movement they do not so cross. This arrangement furnishes a throat or opening into which the material falls and is drawn, and then such material will be intercepted by the revolving pins as it passes down, thus insuring the passage of such materials immediately into the whirling vortex.

The machine above described is peculiarly adapted to the reduction of coarse material—such as clays, bones, bark, &c. The beaters 17 operate close to the walls of the pulverizing-chamber, and hence urge the material inward, while the pins 18 engage it and cause its rapid revolution and the violent contact of its particles, thus insuring rapid and thorough reduction.

We claim—

1. In a reducing-machine, in combination with the separating-chamber, disks or heads mounted therein and provided with beaters arranged to operate close to the walls of said chamber, and with pins or spikes projecting from said heads, substantially as described. 25

2. In a reducing-machine having an inclosed operating-chamber, two oppositely-rotating shafts projecting into said chamber and downwardly inclined with reference to each other outwardly from the chamber, heads secured to said shafts and provided with beaters arranged to operate close to the walls of said chamber, and pins or spikes projecting from said heads, substantially as described. 30 35

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