

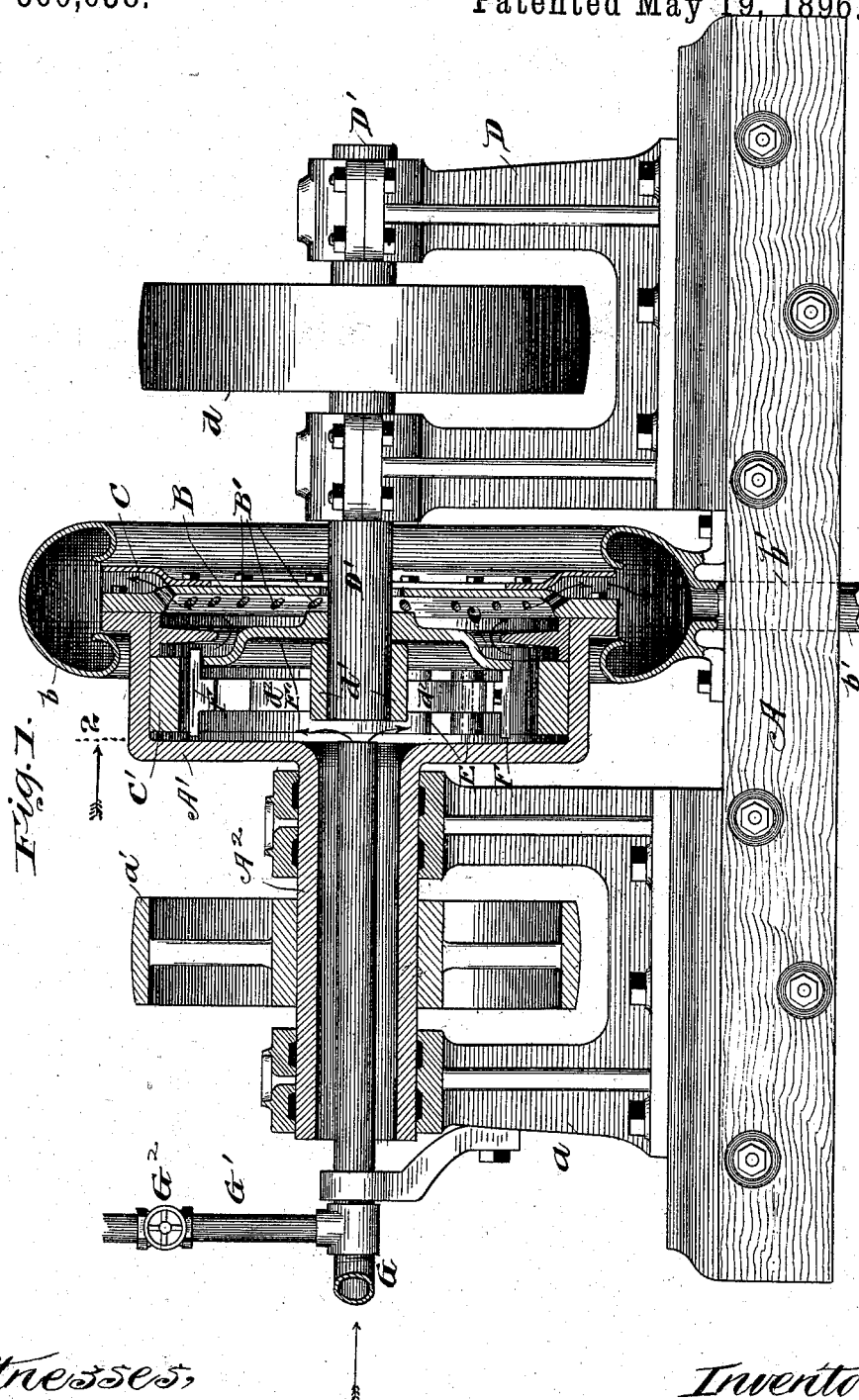
(No Model.)

2 Sheets—Sheet 1.

O. B. PECK.
PULVERIZING MACHINE.

No. 560,638.

Patented May 19, 1896.



Witnesses,
J. S. Mann,
Edmond Peck,

Inventor,
O. B. Peck

(No Model.)

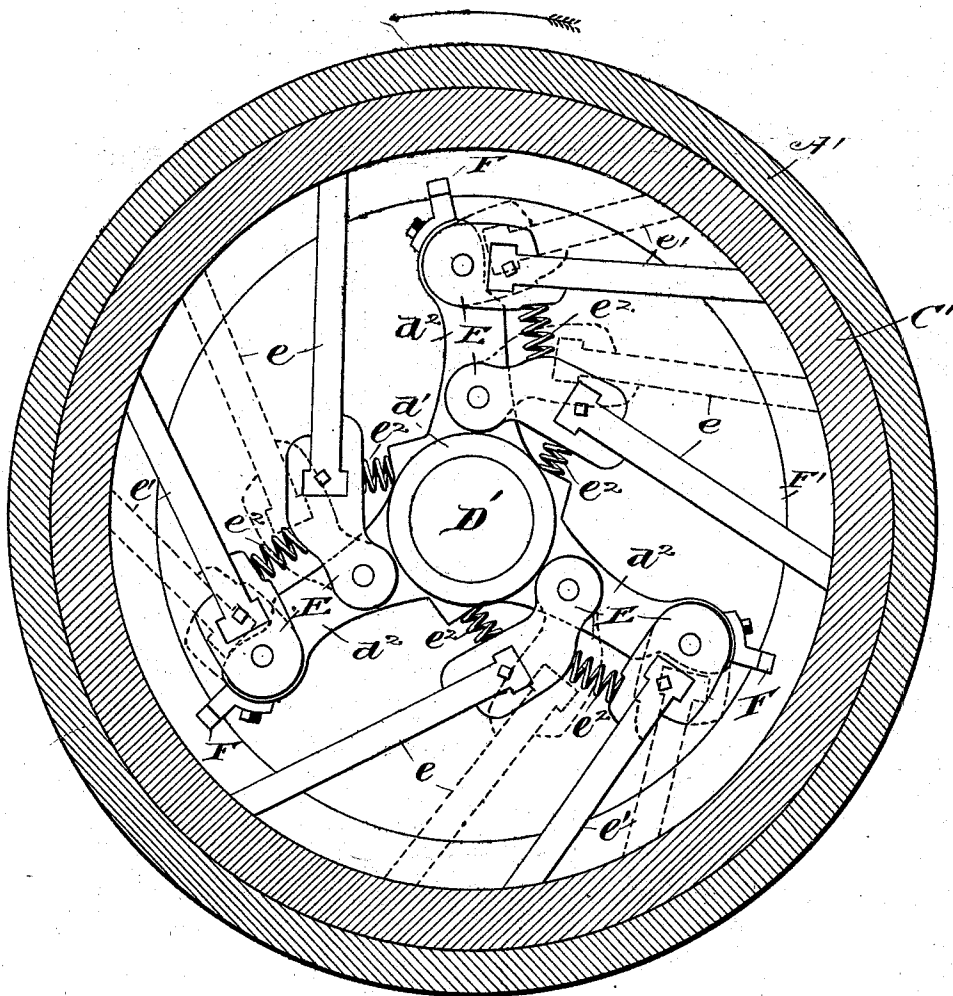
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Fig. 2.



Witnesses
J. A. Mann
Edmond A. Peck

Inventor,
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UNITED STATES PATENT OFFICE.

ORRIN B. PECK, OF CHICAGO, ILLINOIS, ASSIGNOR TO MELINDA PECK, OF
SAME PLACE.

PULVERIZING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 560,638, dated May 19, 1896.

Application filed April 21, 1894. Serial No. 508,447. (No model.)

To all whom it may concern:

Be it known that I, ORRIN B. PECK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Pulverizing-Machines, of which the following is a specification.

My invention relates more particularly to machines for pulverizing ore and similar substances, and has for its objects the various details of construction hereinafter described and claimed. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical longitudinal section through the machine; and Fig. 2 is a transverse section on the line 2 of Fig. 1, looking in the direction indicated by the arrow.

Similar letters refer to like parts throughout both views of the drawings.

A designates a base or frame upon which the rotatable pulverizing vessel A', preferably of cylindrical form, is supported by a long hollow trunnion A², journaled in a standard a. This vessel is rotated at the desired speed by a pulley a' on the trunnion, belted to a suitable counter-shaft. The opposite end of the vessel is closed by a head B, in which are discharge-orifices B' at or near the circumference. These orifices open into a hood b, surrounding the discharge end of the pulverizing vessel and having at the bottom a pipe b' to conduct away the reduced material to a suitable receptacle. Secured to the head B and extending outwardly by the orifices B' is an annular plate C, which serves to deflect the material into the hood. About the inner circumference of the vessel is the removable pulverizing ring or die C', preferably extending for a portion only of its width, and between the die and the head is an inwardly-extending annular plate c, which projects nearer to the axis than the pulverizing-surface and serves, with the centrifugal force generated by the rotation of the vessel, to retain the material therein until it has been reduced to the desired degree of fineness.

Upon the opposite side of the pulverizing vessel from its supporting-standard is a similar standard D, secured to the base-plate, in which is journaled a shaft D', rotated at a

different rate of speed from the vessel by a pulley d, belted to the same counter-shaft as is a', or to any suitable source of power. Upon the extremity of the shaft D', within the vessel A', is secured a hub or spider d', having radiating arms d², preferably three in number. To these arms are pivotally secured the holders E, preferably two upon each arm. The holders are recessed to receive the T-shaped heads of the pulverizing-bars e e', which are secured in the recess by a bolt passing through the bar and into a cheek on the opposite side of the holder. To assist centrifugal force in holding the ends of the bars against the face of the pulverizing-die, spiral springs e²e³, or similar elastic cushions, are interposed between a supporting projection on the hub and the holder of bar e and between the holders of bars e and e'.

The inner pulverizing-bar e is longer than the outer bar e', and when they are so worn by their contact with the material and pulverizing-surface that the longer has been reduced in length to about that of the shorter at the beginning they may be removed, e' discarded and e substituted in its place, while a new bar is inserted in the holder of the latter. This arrangement enables each pulverizing-bar to be used until a considerable part of its length is worn away. The dotted lines in Fig. 2 show about the relative positions at the time of removal.

Upon the ends of the arms d² are secured transversely-extending agitating-bars F, projecting close to the face of the die and nearly to the head of the vessel and the retaining-ring c. These bars serve to keep material from packing in at the sides of the die and pulverizing-bars and to agitate it to assist in the removal of the finer portion. On the shaft D', between the hub and the head B, is a circular plate F', the outer edge of which is bent in toward the vessel and extends by the inner periphery of the ring c, forming therewith a passage through which the material is discharged. This plate serves to prevent the material from being thrown out of the pulverizing-vessel by the agitation or splashing produced by the bars and inner rotating parts.

In operation the material having received,

if necessary, a preliminary crushing by some of the ordinary methods is fed into the vessel, preferably mingled with water, through a pipe G, extending through the trunnion A².

5 A separate water-supply pipe G', in which is a valve G², preferably communicates with the pipe G and enables the quantity of liquid flowing through the vessel to be varied irrespective of that mingled with the material
10 as it comes from the auxiliary crusher or other source of supply. The centrifugal force developed by the rotation of the pulverizing vessel carries the material outward to the face of the die and holds it there while
15 being subjected to the action of the pulverizing-bars, which are held outward by the centrifugal force developed by their rotation and by the pressure of the springs upon their holders. The water introduced with the material flows through the vessel and escapes
20 over the annular plate or retaining-ring through the discharge-orifices, and when the material has been sufficiently reduced to allow the disturbance produced by the pulverizing and agitating bars and the flow through
25 the vessel to effect the suspension of the lighter portion in the liquid it passes inward toward the axis of rotation and is discharged therewith and conveyed by the pipe b' to a
30 suitable receptacle.

The pulverizing-bars may be revolved in the same direction as the die at a greater rate of speed, or in the opposite direction at any desired speed. In either case the resultant
35 travel of the bars will be in the direction indicated by the arrow on Fig. 2. The speed of rotation of the vessel will vary according to the particular material under treatment. When it is of a refractory nature and difficult
40 to pulverize or an extremely fine state of division is required, the rotation will be rapid, to cause the centrifugal force to retain it for a longer time under the influence of the reducing agencies. The speed and direction of
45 rotation of the bars will be governed by that of the vessel and also by the nature of the material, depending on whether it is desirable to strike it quick sharp blows as the bars spring down from the higher points of inwardly-projecting fragments of material, or

to get a slower grinding action. Upon the relative speeds of the two rotating portions will depend the violence of agitation produced in the body of material and liquid, and therefore the size of the particles discharged
55 in suspension. The sizing may also be regulated without regard to the variations in speed by the adjustment of the valve G², thus controlling the velocity of flow through the vessel. The more rapid the flow, other things being
60 equal, the coarser will be the material discharged.

It is not absolutely essential that the force of a flowing liquid be employed to oppose centrifugal force and effect the removal of
65 reduced material, as it might be fed into the pulverizing vessel in a dry state and removed by an air-blast delivered against the reducing-surface by a pipe or pipes, or by suction applied to the discharge-passages, and it is
70 therefore not intended to limit the scope of the invention to the use of a liquid. It is also obvious that many changes in construction might be made without departing from the spirit thereof.

75 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a pulverizing-machine, the combination of a rotatable reducing-surface, a rotatable hub within said surface, reducing-bars
80 pivoted thereto, and springs to assist in holding them against the surface, substantially as described.

2. In a pulverizing-machine, the combination of a rotatable reducing-surface, a hub
85 within said surface, reducing means pivoted thereto, and an agitator or agitators secured to said hub extending across the reducing-surface and in proximity thereto, substantially as described.

3. In a pulverizing-machine, the combination of a reducing-surface, two or more reducing-bars of different length held against
90 said surface, said bars being removable to enable the longer to be substituted for the shorter when worn, substantially as described.

ORRIN B. PECK.

Witnesses:

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R. L. TERRY.