

W. H. HOWLAND.

Quartz Crusher.

No. 20,157.

Patented May 4, 1858.

Fig. 1,

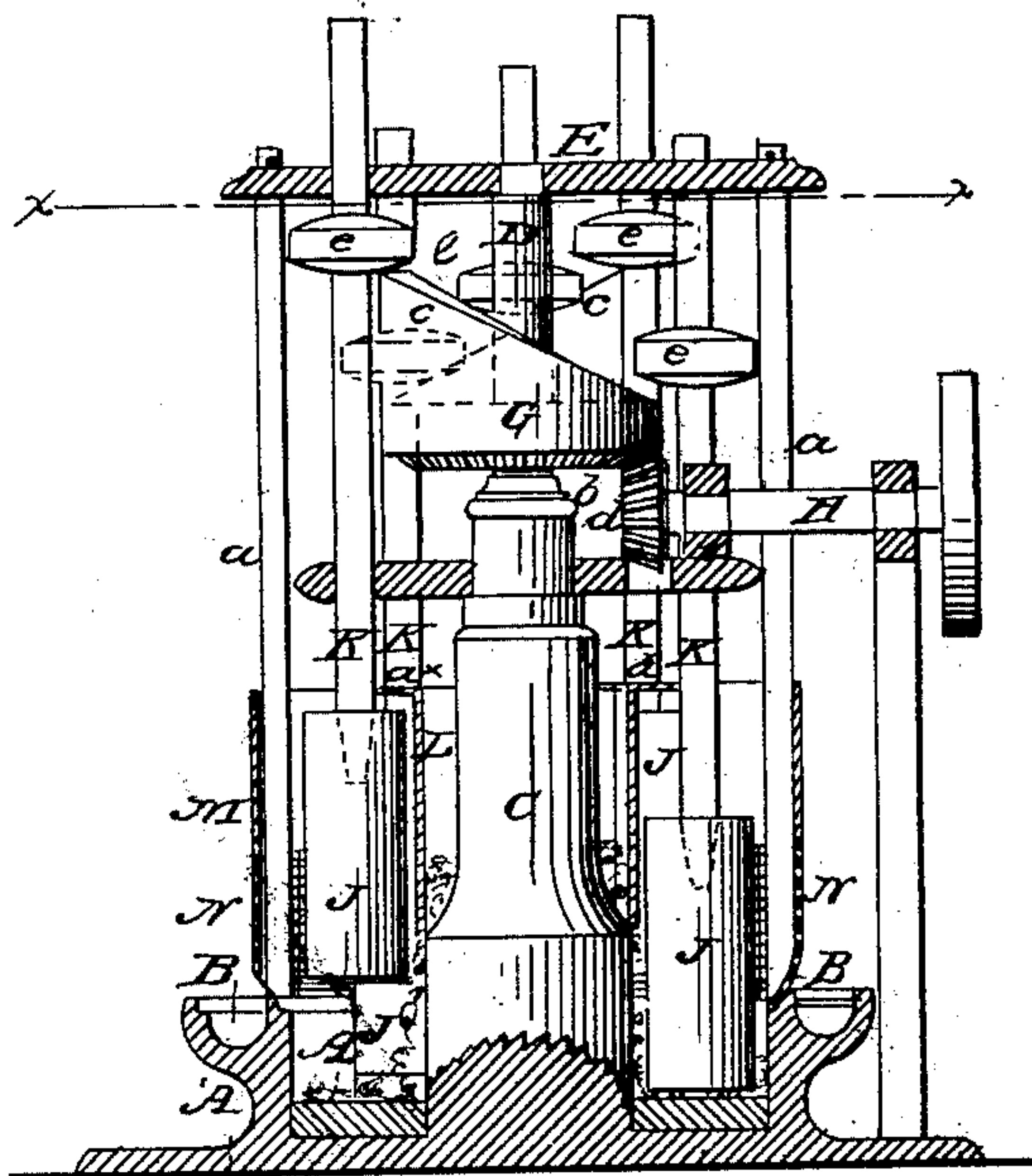
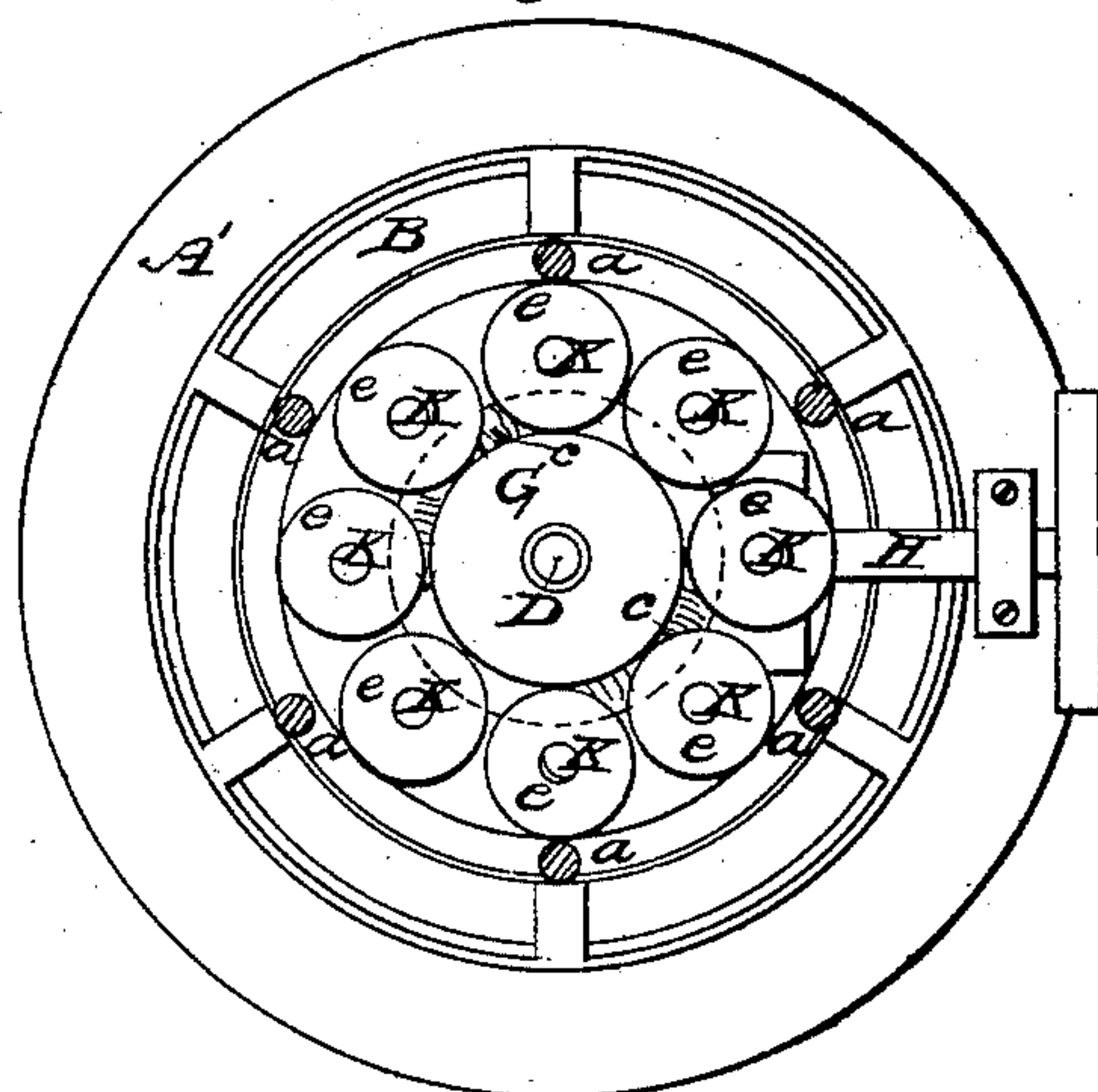


Fig. 2,



UNITED STATES PATENT OFFICE.

WILLIAM H. HOWLAND, OF SACRAMENTO, CALIFORNIA.

QUARTZ-CRUSHER.

Specification of Letters Patent No. 20,157, dated May 4, 1858.

To all whom it may concern:

Be it known that I, W. H. HOWLAND, of Sacramento city, in the county of Sacramento and State of California, have invented a new and Improved Quartz-Crushing Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a vertical central section of the mortar and frame of my improvement the working parts not being bisected. Fig. 2, is a horizontal section of the framing taken in the line (x) (x) Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures.

The object of this invention is to obtain a very compact and efficient machine, one that will not be liable to get out of repair, and having its parts so arranged that each will perform its full portion of the work to be accomplished.

The invention is designed for crushing auriferous quartz.

This invention consists in the arrangement and combination of an annular mortar and pestle substantially as and for the purpose herein set forth; it also consists in a novel arrangement of an annular feeding chamber as will hereafter appear.

To enable those skilled in the art to fully understand and construct my invention I will proceed to describe it.

A represents an annular chamber which is the mortar of the machine. This chamber is formed in a circular casting A' which serves as the base of the machine and around the upper part of the chamber A an annular trough B is formed on its outer side. A vertical upright C projects from the center of the casting, and a vertical arbor or shaft D is stepped on its upper end, the upper end of said arbor having its bearing at the center of a circular plate E, which is supported by uprights (a) the lower ends of which are secured to the base or casting A' between the chamber A and trough B. A circular plate F, is attached to the upper part of the upright C, as shown in Fig. 1. The base A', with trough B, and upright C are cast in one piece.

On the arbor or shaft D, a cam G is placed. This cam is cogged or toothed on its lower surface as shown at (b) Fig. 1. The upper surface or face of the cam is

formed of two semicircular inclined flanches (c) (c) placed directly opposite each other and in reverse positions, that is, the elevated end of one flanch is connected to or joins the depressed end of the other flanch. A pinion (d) gears into the under side of the cam G, said pinion being on a driving shaft H.

Within the annular chamber or mortar A a series of circular dies I are placed. These dies rest on the bottom of the mortar and J represents a series of pestles of cylindrical form. These pestles are constructed of proper weight and are attached to rods K, the upper ends of which pass through the plate E which serves as a guide for them. Each pestle rod K has a circular disk (e) upon it, and the face sides of the cam or the inclined flanches (c) (c) act against these disks.

Around the upright portions C of the casting or base A' a cylinder L is placed. This cylinder is of sufficient diameter to allow a requisite space between its inner surface and the upright C to form a feed passage leading into the mortar A. See Fig. 1.

To the upper part of the mortar A a cylinder or curb M is placed and this cylinder or curb has screens N fitted in it all around the mortar, the lower ends of said screens being quite near the upper edges of the mortar A and trough B. The upper edge of the cylinder L has a flanch (a') projecting horizontally from it.

Motion is given the shaft H in any proper manner and the quartz, reduced to a requisite size by any proper means, is fed down the space between the cylinder L and upright C, into the mortar A, a requisite quantity of water being also fed into the mortar with the quartz. The cam G is rotated by the gearing (b) (d) and the inclined ledges (c) (c) raise the pestles J by acting against the disks (e) and as the ledges (c) act against said disks at one side of their centers the pestles will be rotated as they are raised. The pestles fall by their own gravity as the prominent portions of the ledges (c) (c) pass from underneath them. The quartz of course is crushed by the descent of the pestles J, and the pulp by the motion of the pestles passes through the screens N into the trough B.

By having the pestles J rotate as they ascend each portion of their bottoms are subjected to an equal wear and they will be

kept perfectly even or level. And by having the pestles placed in circular form in an annular mortar all the quartz within the mortar will be perfectly acted upon by the
5 pestles. In the usual rectangular mortars the quartz is liable to be forced into the angles or corners of the mortar and there remain so as to prevent the suitable action of the end pestles, the bulk of the work being
10 done by the central ones. This difficulty is obviated by my improvement. By having the cam G constructed and arranged so as to actuate the pestles as shown an equal bearing is obtained all around the cam, and
15 there is no loss of power, as is the case where tappets on a rotating shaft are employed for the gearing by which the cam is rotated is placed directly under the ledges (c) which act against the disks (e). Another
20 other advantage attending my improvement is that the quartz being fed into the mortar A between the inner side of the cylinder L and upright C as shown the quartz may be fed into the mortar at any point around the

machine, and the screens N will not be injured by quartz falling against them as is frequently the case in the ordinary machines. 25

I do not claim broadly the raising of a pestle or weight by having a horizontal cam acting upon a pulley or circular disk on its end or shaft for this is a device that has
30 been previously used for analogous purposes for operating rock drills, &c.; but, having thus described my invention—

What I claim as new and desire to secure by Letters Patent, is, 35

1. The arrangement and combination of the annular mortar A, and pestles J, substantially as and for the purposes herein set forth. 40

2. Having an annular feeding chamber between the upright C, and the inner surface of the cylinder L, arranged substantially as and for the purposes set forth.

WILLIAM H. HOWLAND.

Witnesses:

I. H. GASS,
JOHN SEECOM.