

P. C. FORRESTER.
PULVERIZER.
APPLICATION FILED SEPT. 29, 1913.

Patented June 8, 1915.
2 SHEETS—SHEET 1.

1,142,159.

Fig. 1

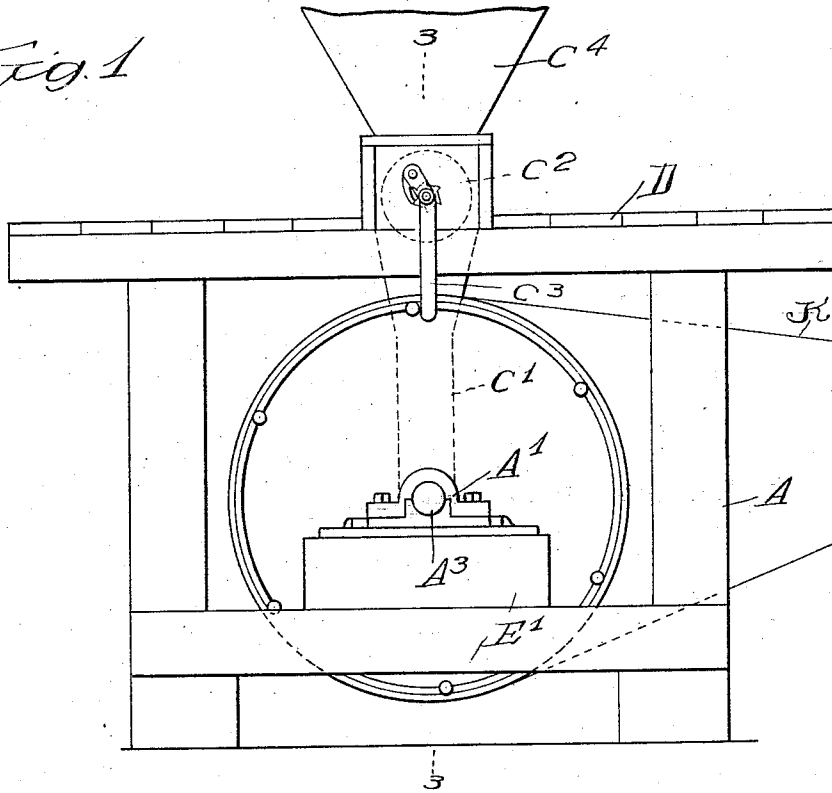
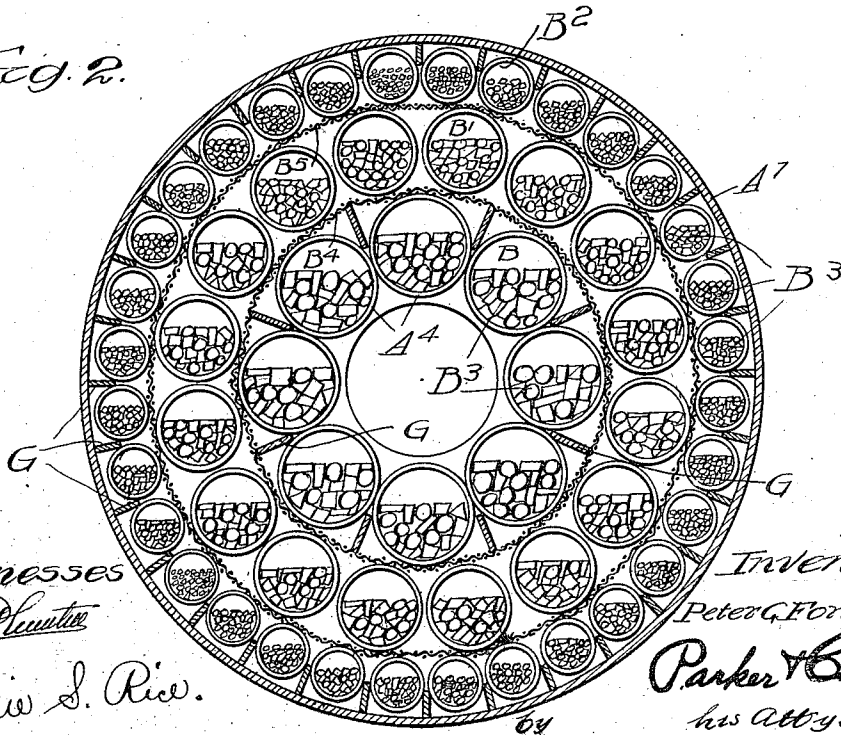


Fig. 2.



Witnesses
Ch. Plummer

Res. S. Rice.

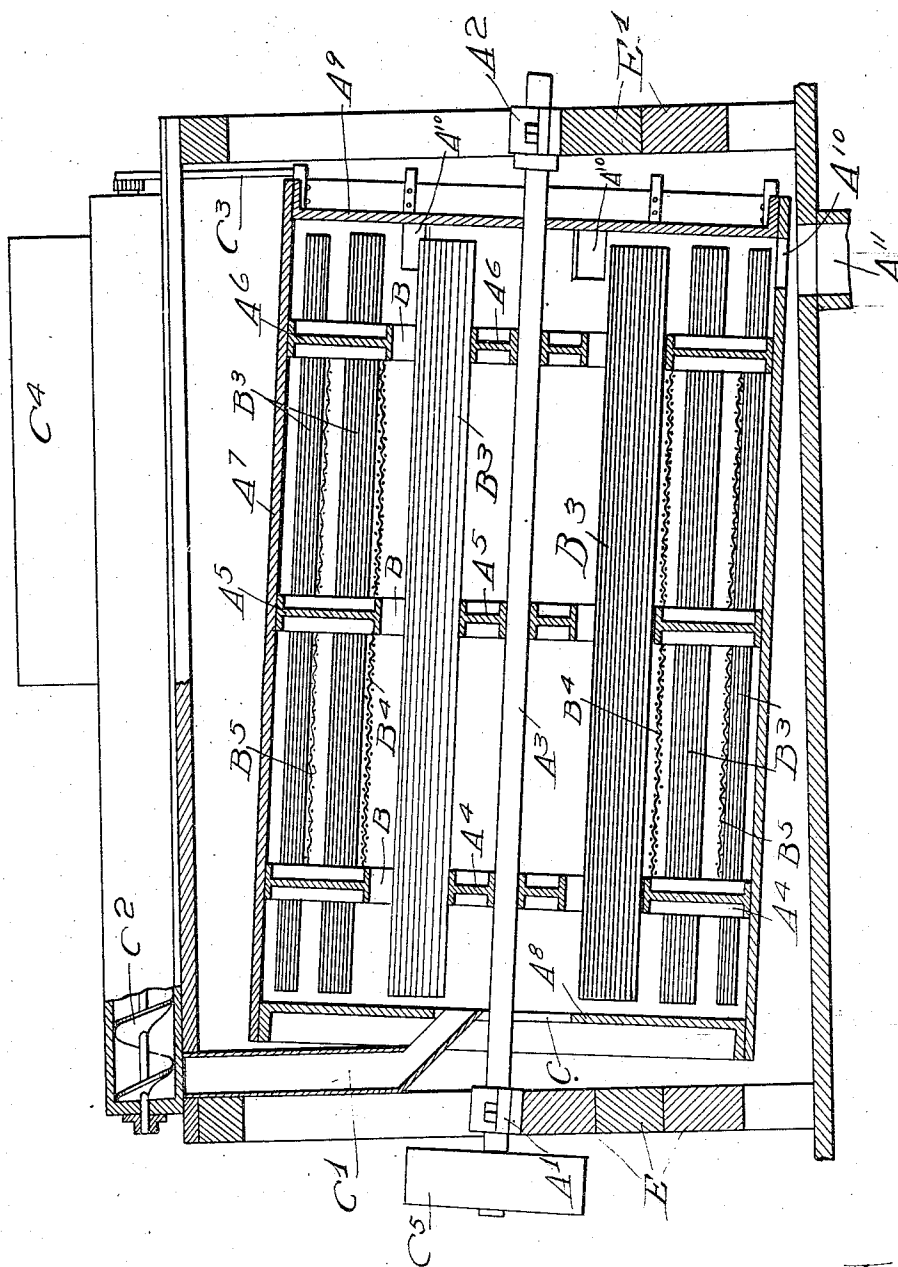
Inventor
Peter G. Forrester.

Parker & Carter
his Attys

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Witnesses:
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Fig. 3

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UNITED STATES PATENT OFFICE.

PETER C. FORRESTER, OF WEST TACOMA, WASHINGTON.

PULVERIZER.

1,142,159.

Specification of Letters Patent.

Patented June 8, 1915.

Application filed September 29, 1913. Serial No. 792,277.

To all whom it may concern:

Be it known that I, PETER C. FORRESTER, a citizen of the United States, residing at West Tacoma, in the county of Pierce and State of Washington, have invented a certain new and useful Improvement in Pulverizers, of which the following is a specification.

My invention relates to improvements in pulverizing machines and is illustrated in one form in the accompanying drawings, wherein—

Figure 1 is an end elevation; Fig. 2 is a transverse section; Fig. 3 is a section along the line 3—3 of Fig. 1.

Like parts are indicated by like letters throughout the several figures.

A A is a supporting frame containing bearings A¹, A² arranged on opposed ends thereof. A³ is a shaft supporting said bearings A¹, A² and inclined at an angle to the horizontal.

A⁴, A⁵, A⁶ are spiders rigidly attached to the shaft A³. A⁷ is a cylindrical casing surrounding said spiders and shaft and A⁸, A⁹ are head plates closing said casing. The spiders A⁴, A⁵, A⁶ are provided with apertures or orifices B, B¹ and B² arranged in annular groups about the shaft and decrease in diameter outwardly. These are partly filled with metallic bars, steel rails, shaftings and the like as indicated at B³. These bar members are the crushing members and are held against longitudinal displacement by the head plates A⁸, A⁹. Screens B⁴, B⁵ are interposed between the groups of apertures B, B¹, B² to limit the size of the product as it passes through.

A¹⁰, A¹¹ are discharge ports in the periphery of the drum A⁷ adjacent the head plate A⁹ and discharging into the chute A¹¹.

C is a feed opening concentric with the shaft A³ at the upper end of the drum. Into it discharges the feed chute C¹ fed by the screw conveyor C² which is intermittently driven by the member C³ operated by the drum A⁷.

C⁴ is a feed hopper which discharges into the feed conveyor C².

C⁵ is a pulley on the end of the shaft A³ whereby the shaft and crushing machine may be rotated by any suitable means from any source.

D is a platform supported on the frame

A whereby access may be conveniently had to the filling hopper C⁴.

E, E¹ are spacing blocks interposed between the frame A and bearings A¹, A² whereby the position of these bearings may be changed to vary the inclination of the shaft thereby controlling the rapidity for filling the mill.

It will be evident that I have shown in drawings an operative device, still many changes might be made both in size, shape and arrangement of parts without departing from the spirit of my invention, and I wish, therefore, that my drawings be regarded as in a sense diagrammatic.

When it is desired to dispense with the driving pulley on the drum shaft a belt K is placed about the drum itself and drives it from any suitable source of power.

G, G are wings or vanes interposed between the packages or bundles of crushing rods and adapted to pick up the material from the lower sides of the crushing zones and carry it around to the upper side from whence it may be discharged by gravity down upon the crushing bundles.

The use and operation of my invention is as follows: The mill is rotated by any suitable power. The crushing members which are segregated into groups or zones are kept at the same position. The material to be crushed is fed into the hopper and thence passes to the screw conveyer which operates at a fixed speed relation. The material is thereby fed into the center of the drum at the upper end and drops down on it and passes between the crushing bars. As they roll over and over they come into violent contact with one another, the material is pulverized finally dropping on to the screen. As the screen rotates, this material will be carried up and the material again dropped onto the crushing bars. As this process continues, the material will become finer and finer and pass down toward the drum. That material which is sufficiently fine will pass through the screen to the next crushing zone, where since the rods are finer and greater in number, the material will be still more finely crushed. It will subsequently pass to the outside zone where the finest crushing takes place. By this time the material will have passed down to the drum where it can pass out through

any suitable port. In the smaller mills but one zone is used, there being no screens, and the fineness of the pulverized material is regulated by the feed and the inclination
5 of the mill.

I have shown the drum inclined to the horizontal in order to assist in the feeding process. It is obvious, of course, that this is not essential but that the drum would
10 feed itself even though not inclined.

I claim:

1. In a crushing machine a plurality of groups of crushing members, said groups of crushing members being arranged annu-
15 larly about a common axis of rotation and fixed with respect one to another, the members in said groups being free to move with respect one to another but constantly as-
sembled *en masse* and means for rotating said groups in unison about said common
20 axis and means for introducing material to be crushed to said groups at one end thereof adjacent the axis of rotation.

2. A crushing machine comprising a shaft
25 and means for rotating it, spiders rigidly attached thereto and having apertures in register, a drum inclosing said spiders and provided with head plates closing the ends thereof, said drum having an opening in
30 each of its ends, crushing bars loosely contained in said spider apertures and loosely abutting at either end on the head plates.

3. A crushing machine comprising a shaft
35 and means for rotating it, spiders rigidly attached thereto and having apertures in register, a drum inclosing said spiders and provided with head plates closing the ends thereof, said drum having an opening in
40 each of its ends, crushing bars loosely contained in said spider apertures and loosely abutting at either end on the head plates, the apertures in said spiders being arranged in concentric zones.

4. A crushing machine comprising a shaft
45 and means for rotating it, spiders rigidly attached thereto and having apertures in register, a drum inclosing said spiders and provided with head plates closing the ends thereof, said drum having an opening in
50 each of its ends, crushing bars loosely contained in said spider apertures and loosely abutting at either end on the head plates, the apertures in said spiders being arranged in concentric zones, and the apertures in the
55 inner zone being larger than and less numerous than in the outer zone.

5. A crushing machine comprising a shaft and means for rotating it, spiders rigidly attached thereto and having apertures in

register, a drum inclosing said spiders and
60 provided with head plates closing the ends thereof, said drum having an opening in each of its ends, crushing bars loosely contained in said spider apertures and loosely
65 abutting at either end on the head plates, the apertures in said spiders being arranged in concentric zones, and the crushing bars in the smaller apertures being smaller than those in the larger apertures.

6. A crushing machine comprising a shaft
70 and means for rotating it, spiders rigidly attached thereto and apertures in register, a drum inclosing said spiders and provided with head plates closing the ends thereof, said drum having an opening in each of its
75 ends, crushing bars loosely contained in said spider apertures and loosely abutting at either end on the head plates, the apertures in said spiders being arranged in concentric zones, and the apertures in the in-
80 ner zone being larger than and less numerous than in the outer zone, the crushing bars in the smaller apertures being smaller than those in the larger apertures.

7. In a crushing machine a plurality of
85 separate groups of crushing members arranged in separate concentric crushing zones, means for rotating said groups of crushing members in unison about a central axis, the groups being fixed in position with respect
90 each to the other, the crushing members in each group being free to move with respect one to another but constantly assembled *en masse*, and means interposed between the
95 separate groups of crushing members for conveying the material from the upper to the lower side of the crushing zones.

8. A crushing machine comprising a hol-
low crushing drum, a series of separate
100 groups of crushing bars extending substantially the length of the drum, said bars held in close groups whose cross sectional area on a plane perpendicular to the axis of the
105 drum is but slightly larger than the total cross sectional area of the individual bars, said groups being held in fixed relation with respect each to the drum, means for rotating
the drum and means for feeding material to be crushed thereto and discharging it into
110 said groups and means for discharging said material to the drum.

In testimony whereof, I affix my signature in the presence of two witnesses this eighth day of September 1913.

PETER C. FORRESTER.

Witnesses:

WM. A. O'DONNELL,
LUCIA R. O'DONNELL.