O. C. BEACH.

PULVERIZER.

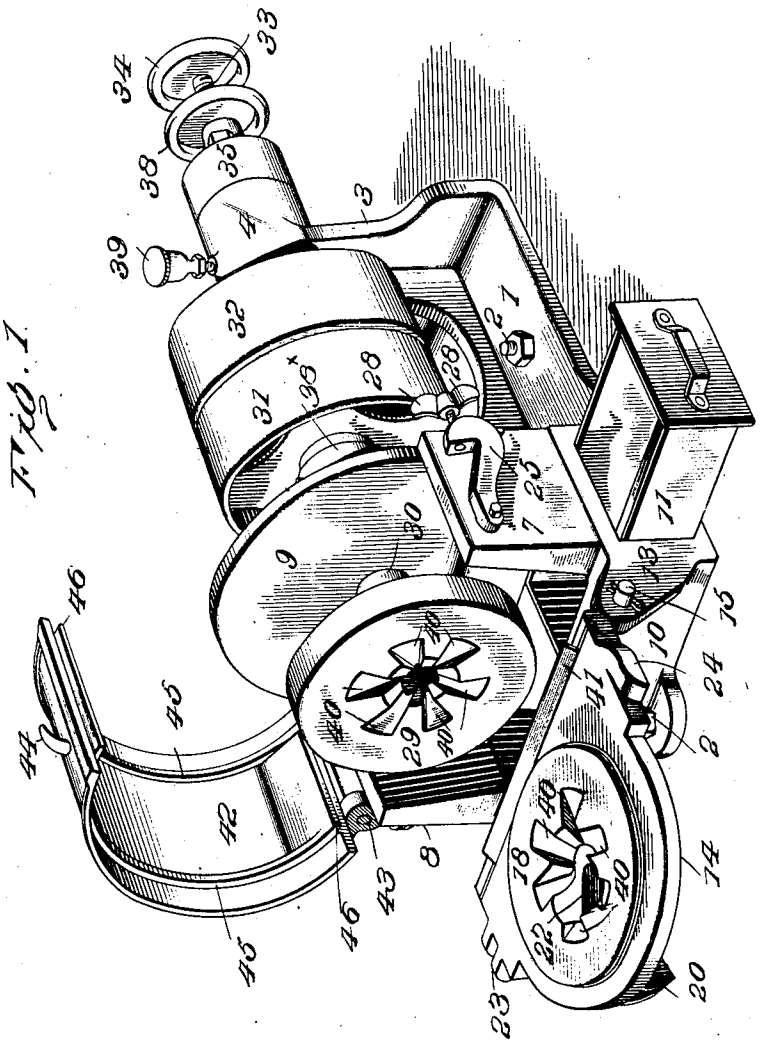
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922,242.

Patented May 18, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

Jno. Imirie

A. B. Williams

Inventor

Oscar C. Beach

By Wm. C. W. Entire

Attorney

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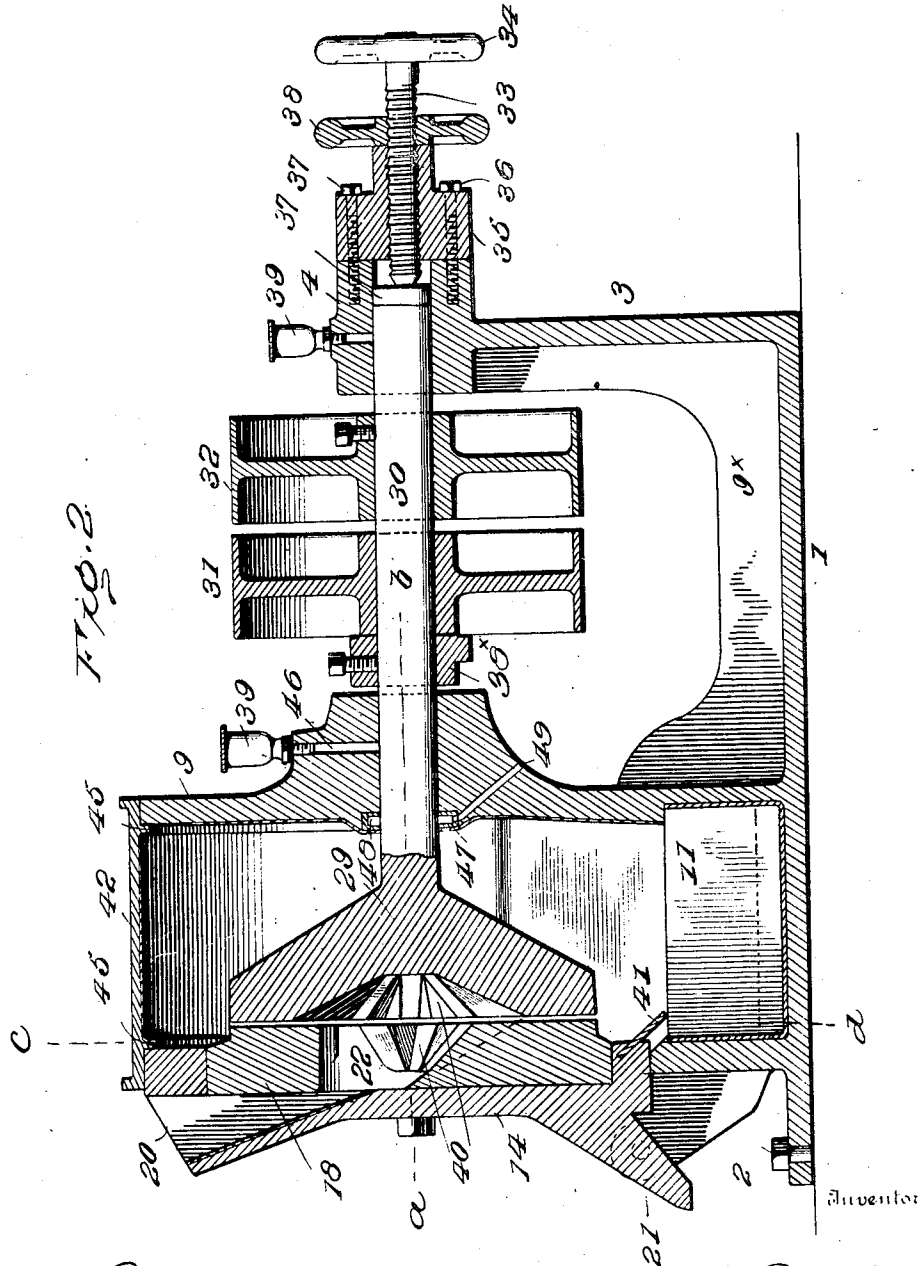
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

Oscar C. Beach

By Wm. C. W. Entire Attorney

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3 SHEETS—SHEET 3.

Fig. 3.

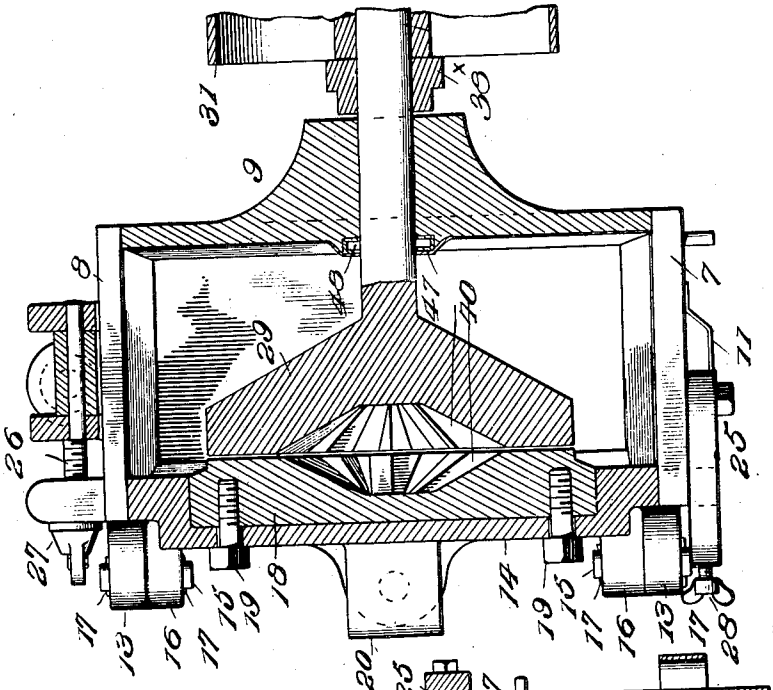
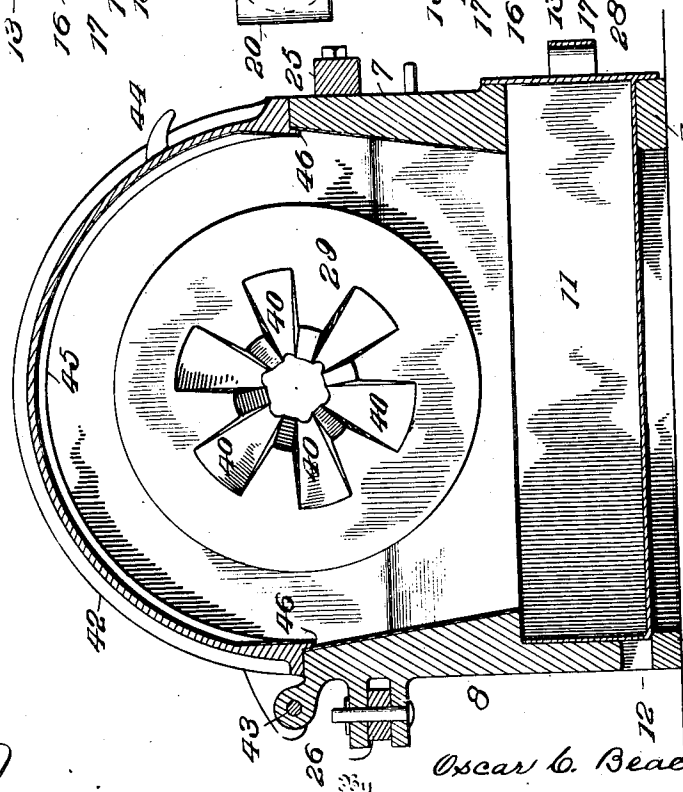


Fig. 4.



Witnesses

J. Imrie

A. B. Williams

Inventor

Oscar C. Beach

By Wm. C. W. Sutton Attorney

UNITED STATES PATENT OFFICE.

OSCAR C. BEACH, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO F. W. BRAUN COMPANY, OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

PULVERIZER.

No. 922,242. Specification of Letters Patent. Patented May 18, 1909.

Application filed March 3, 1905. Serial No. 248,315.

To all whom it may concern:

Be it known that I, OSCAR C. BEACH, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Pulverizers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in grinding mills and particularly to that class known as "disk-pulverizers" and especially adapted for assayers' needs.

My invention has for its object to secure and maintain the perfect alinement of the grinding disks in order that the material operated upon may be reduced uniformly and to a high degree of fineness.

My invention has for a further object to so construct the pulverizing chamber as to secure the complete discharge of the pulverized material into the ore pan which is essentially important to ascertain a correct assay.

Another object of my invention is to provide a lubricating chamber which while serving its purpose as such shall prevent the lubricant from entering the pulverizing chamber.

Another object of my invention is to so construct the revolving disk that during the grinding operation there shall not exist any tendency to fan the material under treatment, and my invention has for its object to prevent the accumulation of dust within the pan receptacle in order that the pan may be always properly located to catch and hold the pulverized material, and finally my invention has for its object to simplify the construction of the frame, while at the same time securing great strength.

With these general objects in view my invention consists in the details of construction and arrangement hereinafter described and claimed.

In order that those skilled in the art to which my invention appertains may know how to make and use my improved mill and fully appreciate its advantages, I will proceed to describe the same referred by numerals to the accompanying drawings in which,

Figure 1, is a perspective view of my improved mill with the hinged door, and cover open and with the ore pan partially withdrawn. Fig. 2, is a longitudinal vertical section with the parts all in operative position. Fig. 3, is a transverse section on the line *a*—*b*, of Fig. 2, and Fig. 4, is a similar section on the line *c*—*d* of Fig. 2, and looking in the direction of the arrow.

Similar reference numerals indicate like parts in the several figures of the drawing.

1, is the base of a cast metal frame which is adapted to be rigidly secured upon a suitable support by bolts and nuts 2, or in any other desired manner. This frame extends at one end upwardly as shown at 3, and terminates in a bearing 4, for the driving shaft 5, which operates the revolving disk 8. The opposite end of this frame constitutes two of the sides and the rear end of the pulverizing chamber; the sides being designated by the numerals 7 and 8 and the rear end by the numeral 9. The portions 3 and 9 are connected by a vertical strengthening rib $9^{\times}$. The front end 10, is not so high as the sides 7 and 8, and forms with such sides and the bottom portion of the rear end 9, a receptacle for the pan 11, and the side 8, is formed with an opening 12, (see Fig. 4), for preventing the accumulation of dust which might retard or prevent the accurate location of the dust pan. The short end 10, of the frame is provided with lugs or ears 13, to which the stationary disk door 14, is hinged by pintles 15, which pass through said ears and corresponding lugs or ears 16, cast upon the said door, the pintles being secured by cotter pins 17, or in any other desired manner, (see particularly Fig. 3). The disk door 14, is formed on the inside with a circular recess adapted to receive the stationary disk 18, which is secured firmly in place by screw bolts 19, (see Fig. 3), and thus the said disk may be expeditiously removed and replaced when occasion requires.

20 is a hopper or mouth formed in the upper portion of the disk door and through which the material is fed to the mill, and 21, is a tail which abuts against the end 10, when the door is in its open position and sustains the same in such position.

The stationary disk 18 is constructed with a throat or passage 22, forming a continuation of the feed hopper 19, in the door 14.

The door 14, is provided on one side with a bifurcated lug 23, and on the opposite side with a lip 24, and when said door is in its

closed or normal position, it is held in such position by a hook 25, pivoted upon the side 7, of the frame, and a swinging screw rod 26, with a wing nut 27, hinged to the opposite side 8, as best shown at Fig. 3. The hook 25 is provided with a wing screw 28, and when this and the wing nut 27 are properly adjusted the disk door 14 is securely held in position.

29 is the revolving disk which is formed with a shaft or stem 30, which is journaled in babbitted bearings in the portions 3 and 4 of the frame and is provided with fast and loose pulleys 31 and 32, and is rendered adjustable by means of an adjusting screw 33 and hand wheel 34, the screw 33 being threaded in a cap 35, secured by screw bolts 36, to the bearing 4, as clearly shown at Fig. 2, and a suitable washer 37, is interposed between the end of the shaft 30 and the adjusting screw 33, while a set wheel nut 38, holds the adjusting screw 33 in any desired adjustment.

38× is an adjustable collar upon the shaft or stem 30, and is provided with a set screw by which it may be rigidly secured in place to limit the forward movement of the revolving disk 29, as may be desired, the screw 34, heretofore referred to holding the revolving disk and stem 30 against backward movement during the grinding operation.

39, is an oil cup secured in position upon the rear end 9 of the pulverizing chamber, and 46 is an oil duct leading to the shaft 30, said shaft being lubricated in an obvious manner.

In order that the lubricant may be prevented from entering the pulverizing chamber, the rear end 9 is provided with a washer 47 formed with an annular chamber 48 which communicates at the bottom with a drip channel 49.

The shaft 30 of the revolving disk 29 passes through the washer 47, and fits reasonably close therein, all as most clearly shown in Fig. 2.

From the construction shown and described it will be readily seen that the lubricant fed from the oil cup 39 to the shaft 30 will as it approaches the pulverizing chamber, feed into the annular chamber 48, of the washer 47, and will flow therefrom through the drip channel 49, and in this way will be prevented from entering the disk chamber. The revolving disk 29, is tapered from its periphery to the shaft 30, as shown at Fig. 2, and is machine finished to prevent the fanning of the material when in operation.

As it is of the utmost importance to secure and maintain perfect alinement between the disks 18 and 29, and as such alinement could not be maintained if the hinged connection between the door 14 and the frame should sag and should be solely relied upon, I machine finish the lower edge of the door and the upper edge of the front end 10, of the frame, so that when the door is in its upright, closed position, it is supported upon the end 10 of the frame and is not dependent in any sense upon its hinged connection for such support. The contact surfaces of the door and the sides 7 and 8, are also machine finished to secure tight joints and to prevent the escape of the pulverized material.

The adjacent faces of the disks 18 and 29, are also machine finished and are each formed with central radial grinding pockets of substantially the form indicated by the numeral 40. The two sides 7 and 8, and the end 9, of the frame are tapered vertically and the door 14, is provided with an inclined lip 41, in order that the open bottom of the pulverizing chamber shall be of less area than the pan 11, thus insuring the deposit of all of the pulverized material in the pan.

42, is a semi-circular cover to the pulverizing chamber which is hinged at 43, to the side 8, and is provided with a lifting finger 44, at its free end. This cover is formed with machined ribs 45, which when the parts are in working position contact with the machined surfaces of the end 9, and the door 14, and produce substantially dust proof joints and each end is formed with a machined lip 46 adapted to contact with the machined surfaces of the sides 7 and 8, as most clearly shown at Fig. 4, to produce dust tight joints.

The interior surfaces of the pulverizing chamber, such as are not machine finished as heretofore described, and the tapered body of the revolving disk 29, are preferably enameled to prevent the adhesion of any pulverized material, in order that the entire product of the pulverizing operation may be concentrated in the pan 11, and a correct assay thus secured.

From the construction shown and described, it will be obvious that the adjustments for producing varied degrees of fineness in the material operated upon may be expeditiously made; that the machine is dust proof; that the entire product of the pulverizing operation is deposited in the receiving pan; that the pulverizing disks wear to place, and that the wearable parts which have a long life, are renewable and readily replaced at comparatively small cost, thus rendering the machine economical and durable.

When the machine is in its closed position the material is fed through the hopper or mouth 20, and gravitating into the throat 22 of the stationary disk 18, is delivered into the pockets 40 and is acted upon in an obvious manner, and reduced to powder of a fineness in proportion to the adjustment of the disks, and is then deposited in the pan 11, the inclined or tapered walls of the pulverizing chamber and the lip 41, at the bottom of the door 14, securing the accurate and complete delivery into the pan.

With a machine constructed in accordance

with my invention, I have found from practical experience that an eight ounce granite rock can be reduced to 100 mesh in one half of a minute and that other degrees of fineness according to adjustments made, may be obtained in proportionally more or less time, and it will, of course, be obvious that by reason of the hinged door and cover, and the removable pan that the machine may be quickly cleaned after any given operation. Many changes may be made in the details of construction and design of the machine without departing from the spirit of my invention and I therefore do not wish to be limited in these respects so long as the general features of construction having in view the objects to be obtained are observed.

Having described the construction and operation of my improved pulverizer, what I claim as new and desire to secure by Letters Patent is:

1. In a pulverizer such as described; in combination with a cast metal frame adapted to be secured upon a suitable support and formed with a pulverizing chamber and pan receptacle at one end, and with bearings for the shaft of a rotary pulverizer, a shaft mounted in the bearings of the frame and provided at one end with a rotary disk pulverizer located in the pulverizing chamber; a horizontally hinged door at the front end of the pulverizing chamber provided on its interior with a fixed pulverizing disk, and with a hopper and throat leading from the exterior through the pulverizing disk; means for locking the door in fixed relation to the rotary pulverizing disk; and an arched cover hinged transversely to the door and adapted to constitute a closure of the pulverizing chamber, substantially as hereinbefore set forth.

2. In a pulverizer such as described and embodying a frame with a rotary pulverizing disk mounted therein and located within a pulverizing chamber at one end of the frame; a door provided with an interior fixed pulverizer disk, said door hinged at its base to the frame and having its base extending inwardly and machine finished, and adapted to be supported upon the upper edge of the front wall of the pulverizing chamber, whereby the hinge joint is relieved from strain, and the stationary pulverizer is maintained in axial relation with the rotary pulverizer, as hereinbefore set forth.

3. In a pulverizer such as described, a frame constituing at one end a pulverizing chamber having downwardly converging walls; a door hinged to the front end of the frame and provided with a downwardly inclined lip overhanging a pan located below the same; a stationary disk and a rotary disk within the pulverizing chamber, and a pan below the pulverizing chamber and of an area greater than the open bottom of the pulverizing chamber, substantially as and for the purpose set forth.

4. In a pulverizer such as described provided with a pulverizing chamber and with a rotating and a stationary disk located therein, a pan receiving chamber below the pulverizing chamber and provided at its closed end with a slot or opening in alinement with the floor of said chamber, whereby any accumulation of dust in said chamber may be readily removed, as hereinbefore set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

OSCAR C. BEACH.

Witnesses:
J. R. SMITH,
E. G. WITT.