

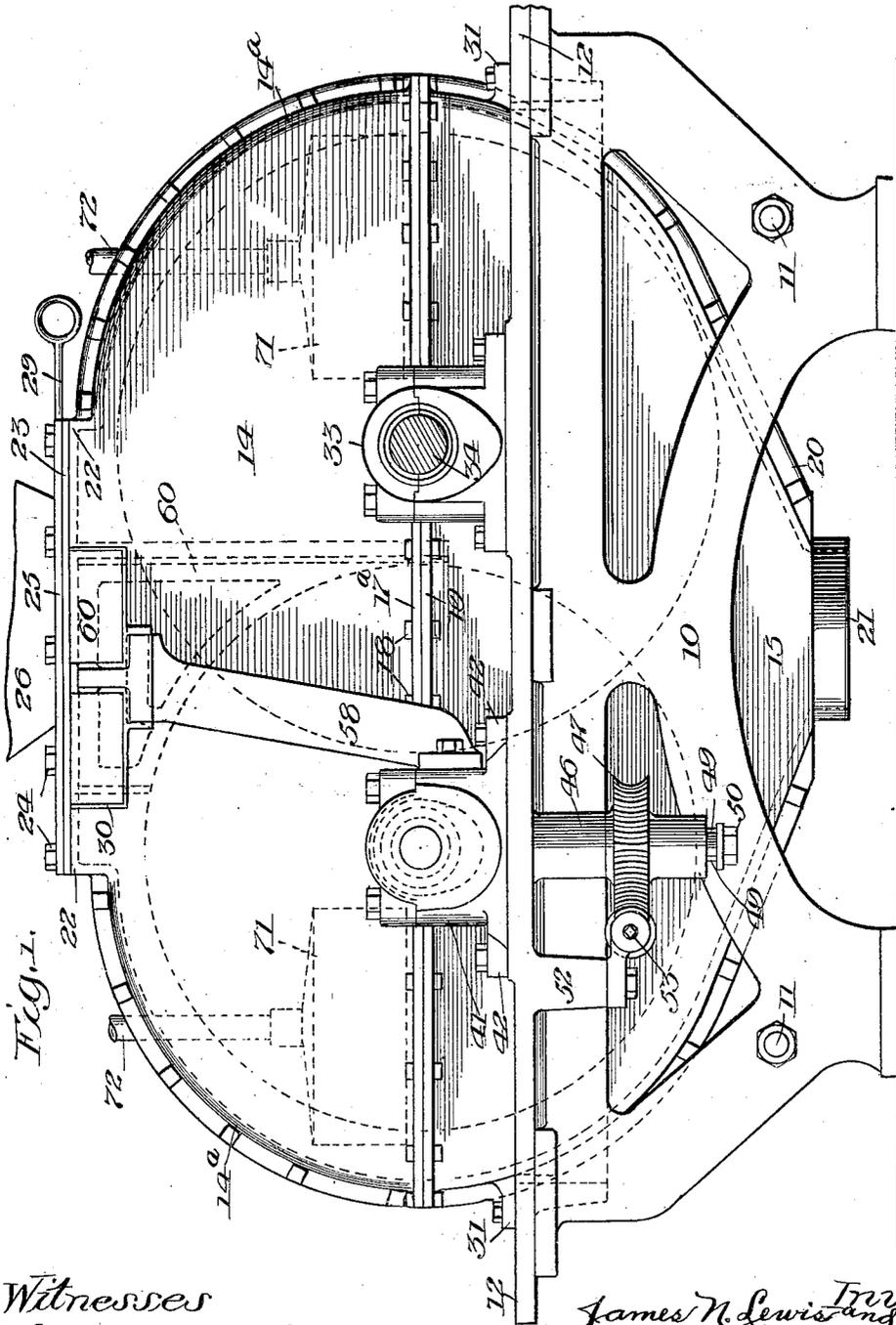
No. 887,047.

PATENTED MAY 5, 1908.

J. N. LEWIS & C. STECHER.  
PULVERIZER.

APPLICATION FILED APR. 29, 1907.

3 SHEETS—SHEET 1.



Witnesses

On. Merrill

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James N. Lewis and  
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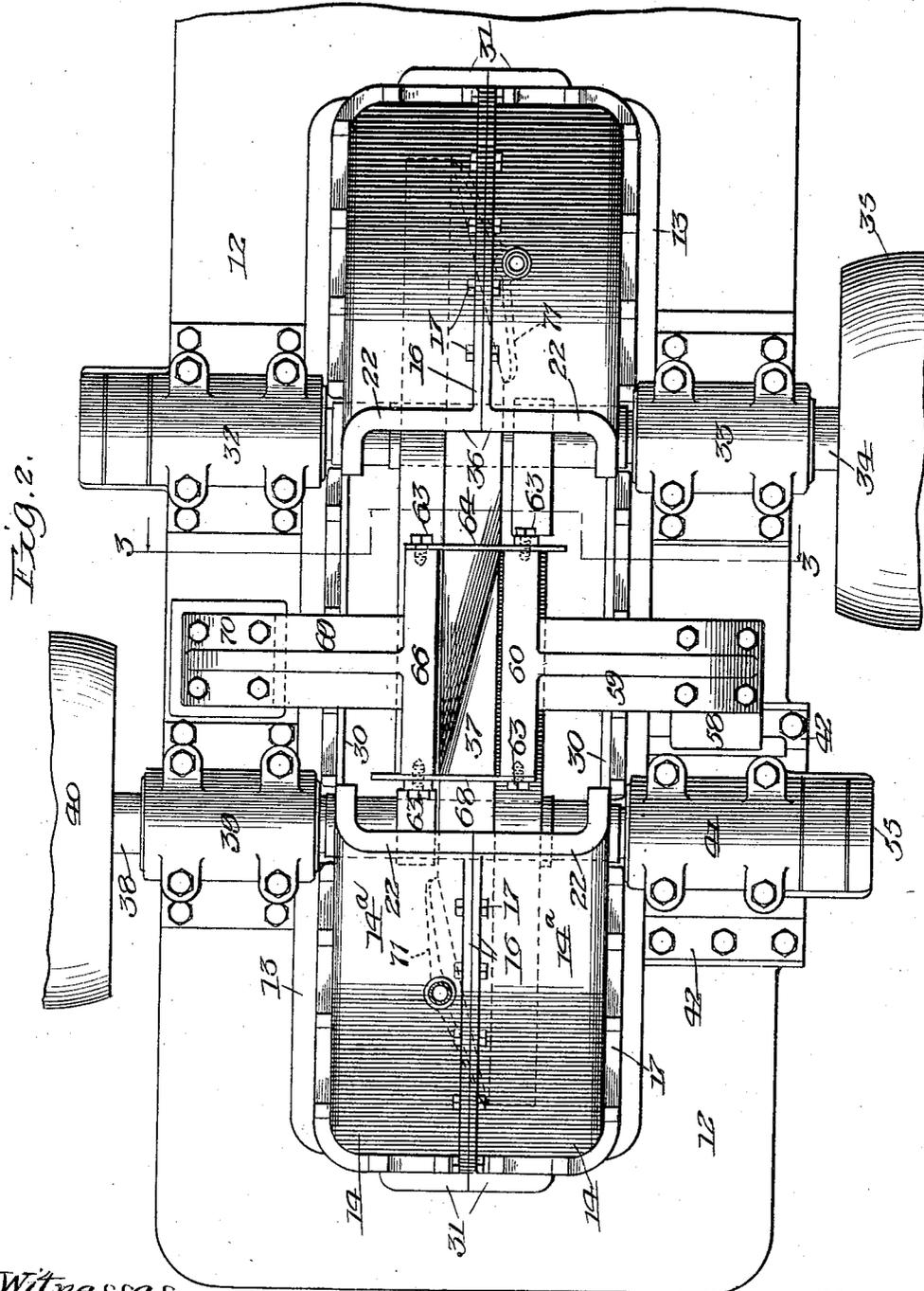
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3 SHEETS—SHEET 2.



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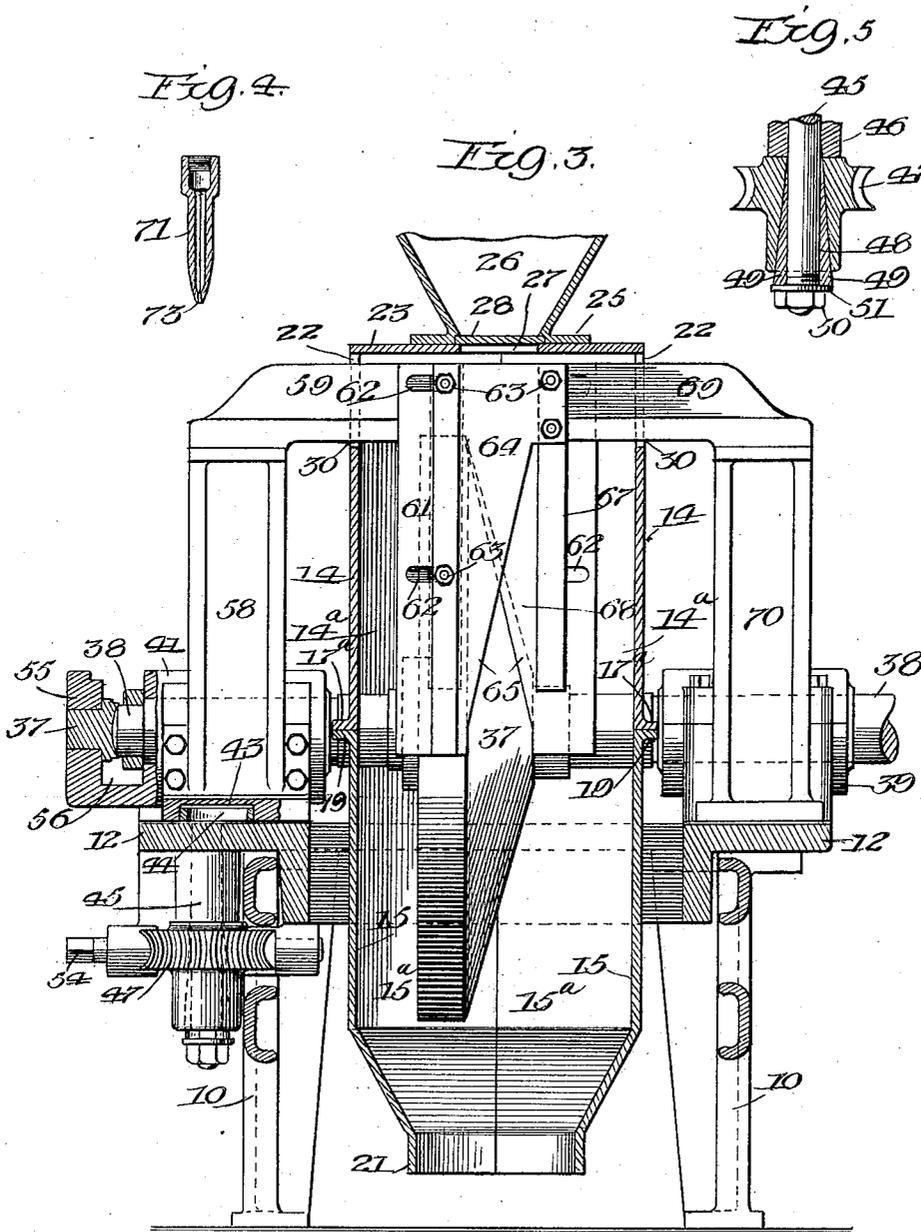
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3 SHEETS-SHEET 3.



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# UNITED STATES PATENT OFFICE.

JAMES N. LEWIS, OF ANN ARBOR, MICHIGAN, AND CHARLES STECHER, OF CHICAGO, ILLINOIS,  
ASSIGNORS TO THE AUTOMATIC PULVERIZER COMPANY, OF CHICAGO, ILLINOIS, A COR-  
PORATION OF OKLAHOMA.

## PULVERIZER.

Patented May 5, 1908.

No. 887,047.

Specification of Letters Patent.

Application filed April 29, 1907. Serial No. 370,890.

*To all whom it may concern:*

Be it known that we, JAMES N. LEWIS and CHARLES STECHER, citizens of the United States, residing at Ann Arbor, in the county of Washtenaw and State of Michigan, and at Chicago, in the county of Cook and State of Illinois, respectively, have invented certain new and useful Improvements in Pulverizers, of which the following is a specification.

This invention relates to improvements in a crushing or pulverizing machine, and while it is more especially designed and intended to be used for reducing ore to fine comminuted particles, yet it is applicable for and may be used to comminute or grind to dust or flour, or very fine particles, other products, and it consists in certain peculiarities of the construction, novel arrangement, and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The invention consists, in part, of two rotary disks mounted side by side in parallelism within a suitable casing or housing and having their adjacent surfaces beveled, and of means to drive the disks and adjust one of them, as well as other parts of the machine.

The principal object of the invention is to provide a pulverizer for reducing ore and other products to small particles of fine powder, which shall be simple in construction, strong, durable and efficient in operation, and so made that one of the rotary disks may be adjusted with respect to the other and so held on the frame by means of a friction clutch that in the event of the deposit of an unbreakable article between the disks it will yield or move sufficiently to prevent breakage of the machinery.

A further object of the invention is to provide improved means for housing the crushing or grinding disks and for removing the pulverized particles or ore dust from the disks, as well as from the housing.

Other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

In order to enable others skilled in the art to which our invention pertains, to make and use the same, we will now proceed to describe it, referring to the accompanying drawings, in which—

Figure 1 is a view in side elevation of a pulverizer embodying our invention. Fig. 2 is

a plan view of the same with the top plate of the housing and the hopper removed. Fig. 3 is a transverse vertical sectional view taken on line 3—3 of Fig. 2 looking in the direction indicated by the arrows. Fig. 4 is a detached cross-sectional view of one of the spraying or water discharging devices used for washing or removing the ore dust from the disks; and Fig. 5 is a sectional view of a portion of the means used for adjusting one of the disk shafts.

Like numerals of reference, refer to corresponding parts throughout the different views of the drawings.

The reference numerals 10 designate the upright side pieces of the main or supporting frame, which may be made of any suitable size, form and material, and secured in parallelism with one another at a suitable distance apart by means of transverse tie-rods 11 located in their lower portions near each of their ends. Mounted on the top of the sides 10 is a bed plate 12 which, together with the sides 10, constitute the supporting frame of the machine. The plate 12 is provided with a longitudinally extending opening 13 for the reception of the housing or casing for the rotary disks, which housing or casing is preferably formed of four parts 14—14 and 15—15, the two upper parts 14—14 and the two lower parts 15—15 being counterparts of one another, yet rights and lefts. Each of the parts 14 of the casing or housing has its ends curved and is provided with an inwardly extending portion 14<sup>a</sup>, each of which is formed at its free edge with an outwardly extending flange 16, which are secured together by means of rivets or bolts 17, or otherwise, and the lower edge of each of the members 14 is provided with an outwardly extending flange 17<sup>a</sup> which is adapted to be secured by means of bolts or rivets 18 to outwardly extending flanges 19 formed on the upper edge of each of the pieces 15 of the casing or housing, which latter pieces are formed with inwardly extending portions 15<sup>a</sup>, each of which portions has on its free edge an outwardly extending flange 20 adapted to be secured together by rivets or bolts, or otherwise. As is clearly shown in Fig. 1 of the drawings, the inwardly extending portions 15<sup>a</sup> at the ends and lower portions of the pieces 15 of the housing are inclined towards the lower middle portion of the

pieces 15 and terminate in a circular discharge opening 21 through which the pulverized ore or other material may pass.

The upper central portion of each of the members 14 of the housing is cut away or left open, as shown in Figs. 1 and 2 of the drawings, and each of said members is provided at its upper inner end with a transversely and upwardly extending strengthening rib 22, upon which the top plate 23 of the housing may rest and be secured by means of bolts 24 which may also be used for securing the flanges 25 of the hopper 26 thereto. The central portion of the top plate 23 of the housing is provided with a longitudinal opening 27 through which the ore or material may pass from the hopper, and this opening may be closed or opened by means of a sliding gate or valve 28 mounted between the lower portion of the sides of the hopper and on the upper surface of the plate 23, and which valve or gate may be provided with a handled rod 29 used for operating it.

As shown in Figs. 1 and 2 of the drawings, each of the side members 14 of the housing is formed at its upper portion between the ribs 22 with a longitudinally extending recess 30 for the reception and operation of certain parts of the machine, as will be presently explained. Each of the lower members 15 of the housing is provided at each of its ends near its top edge with a horizontally and outwardly projecting lug or bracket 31 to rest on and be secured to the bed plate 12 of the supporting frame, thus supporting the entire housing within the opening 13 of said bed plate. Transversely journaled in suitable journal boxes 32 and 33 mounted on the bed plate is a shaft 34, on one end of which is mounted a pulley 35 to which power may be applied from any suitable source for driving said shaft. Rigidly mounted on this shaft within the housing is a disk 36, which is adapted to co-act with another disk 37 which is rigidly mounted on a shaft 38 which is also transversely journaled near one of its ends in a suitable journal box 39 mounted on the bed plate of the main frame, and has on one of its ends a pulley 40 to which power may be applied from any suitable source for driving said shaft. The shaft 38 on which the disk 37 is rigidly mounted within the housing is slidably mounted near one of its ends in the journal box 39, and said shaft, as well as the shaft 34, extends through suitable openings in the members 14 and 15 of the housing, which openings are preferably formed at the juncture of said members. The shaft 38 is journaled near its other end in an adjustable journal box 41 which is slidably mounted on the upper surface of the bed plate 12 between two transversely extending ribs 42 secured to the bed plate, as is clearly shown in Figs. 1 and 2 of the drawings. The lower portion of the journal box 41 is pro-

vided with a recess 43 in which is located an eccentric 44 mounted on the upper end of a shaft 45, which is vertically extended through a suitable bearing 46 on the lower surface of the bed plate, directly beneath the shaft 38, and the journal box 41 in which said shaft is journaled near one of its ends. Mounted on the shaft 45 is a worm gear 47, the hub of which is provided with a flared opening 48 to receive friction clutch members 49 which are interposed between the hub of the worm gear and the shaft 45 and are curved on their inner surfaces in cross-section to accommodate them to the form of the shaft and hub opening. Located on the screw-threaded lower end of the shaft 45 is a nut 50, between which and the lower ends of the wedges 49 is placed a washer 51 to rest against said ends of the wedges. Mounted on a depending bracket 52 near the bearing 46, in which the shaft 45 is journaled, is a worm 53 which is in engagement with the worm gear 47 and may be provided with a squared end 54, to which a crank may be connected for turning the worm when it is desired to adjust the shaft 38 and the disk 37 thereon. The outer end of the journal box 41 is provided with an upward extension 55 spaced from the box 41 to form a recess 56, into which recess one end of the shaft 38 projects, and said end of said shaft is rounded or convexed to fit into the concave portion of a hardened steel plug 57 located in an aperture in the extension 55 to form an end thrust bearing for said shaft. Mounted on one side of the journal box 41 is an upright 58, which has at its upper portion a horizontal extension 59 which projects through the opening 30 in one of the members 14 of the housing, and is provided on its inner end with an arm 60 which extends longitudinally with the housing and over a portion of the disk 37, and for this purpose may be made segmental in form, as is shown by dotted lines in Fig. 1 of the drawings, thus providing a vertical portion 61 on one end of the arm 60, which is provided with openings 62 to receive bolts 63 used for adjustably securing a guiding plate 64 to said arm, which plate is cut away as at 65 at one of its sides to correspond with the beveled face of the disk 36, which disk, as well as the disk 37, has its inner face beveled, as is clearly shown in Fig. 2 of the drawings. The guiding plate 64 is rigidly secured to one end of an arm 66, which extends longitudinally within the housing and is preferably similar in shape to the arm 60—that is—it overlies a portion of the disk 36 and has a vertical portion 67, to which a plate 68, cut away at one of its edges as at 65 (see Fig. 3), is adjustably secured by means of bolts 63 passing through slots 62 in said plate and openings in the vertical portion of the arm 66. The plate 68 is rigidly secured at the upper portion thereof adjacent to the disk 37 to the

end of the arm 60, opposite that to which the plate 64 is adjustably secured. As shown, the arm 66 is carried by a horizontal extension 69 on an upright or standard 70, which is mounted on the bed plate 12 of the supporting frame near the journal box 39, and said horizontal portion is extended through an opening 30 in one of the members 14 of the housing.

10 Located within the casing and near each end thereof is a water discharger 71, each of which is coupled to a pipe 72 leading to a source of water supply, and which pipes are extended through suitable openings in the upper portion of the housing. Each of the 15 dischargers 71 consists of a flat hollow casing having at its lower edge a very small or narrow opening 73 extending longitudinally of the discharger, so that the water may pass therefrom in sheet-like form. As will be observed in Figs. 1 and 2 of the drawings, the 20 discharger near one end of the housing is located in alinement with the beveled portion of the disk 36, while the one located near the other end of the housing is arranged in alinement with the beveled portion of the disk 37, so that the water discharged from said devices will be forced against the beveled 30 portions of the disks, and as the latter rotate towards each other, as indicated by the arrows in Fig. 1 of the drawings, the pulverized material will be washed or removed from the disks and allowed to pass out through the opening 21 in the lower portion of the housing, thus preventing accumulation of the 35 powdered or pulverized material between the approximated portions of the disks.

By reference to the drawings, and particularly to the dotted lines in Fig. 1, it will be 40 seen that the disk 36, which is non-adjustable, is considerably larger than the disk 37,

which is adjustable, thus affording differential speed.

Having thus fully described our invention, what we claim as new, and desire to secure 45 by Letters-Patent, is—

1. In a grinding or crushing mill, the combination with a frame, of parallel shafts thereon having co-acting beveled-faced grinding disks thereon, means to shift a shaft to 50 vary the relation of the disks comprising a journal box slidably mounted on the frame and in which the shaft has bearing, said box having a recess in its underside, an eccentric pivoted on the frame and located in said recess, and means to turn the eccentric, a 55 housing inclosing the disks and mounted on the frame and having means for the intake and outlet of material, means to drive said disks, and a water discharger consisting of a 60 hollow flat casing having a narrow longitudinal opening in its lower portion located near each end of the housing and arranged to discharge water in a sheet against the beveled faces of the disks. 65

2. In a grinding or crushing mill, the combination with a supporting frame, of a shaft slidably mounted near one of its ends, a journal box for said slidable shaft mounted thereon, and on the supporting frame and 70 having at its outer end an upward extension spaced from said box to form a recess into which the end of said shaft projects, a plug or piece rigidly supported on the extension and having its inner surface concave to impinge against and receive the convex end of 75 the shaft, and means to move the journal box.

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