

W. K. NIX, JR.
PULVERIZING MACHINE.
APPLICATION FILED JAN. 19, 1909.

935,161.

Patented Sept. 28, 1909.

4 SHEETS—SHEET 1.

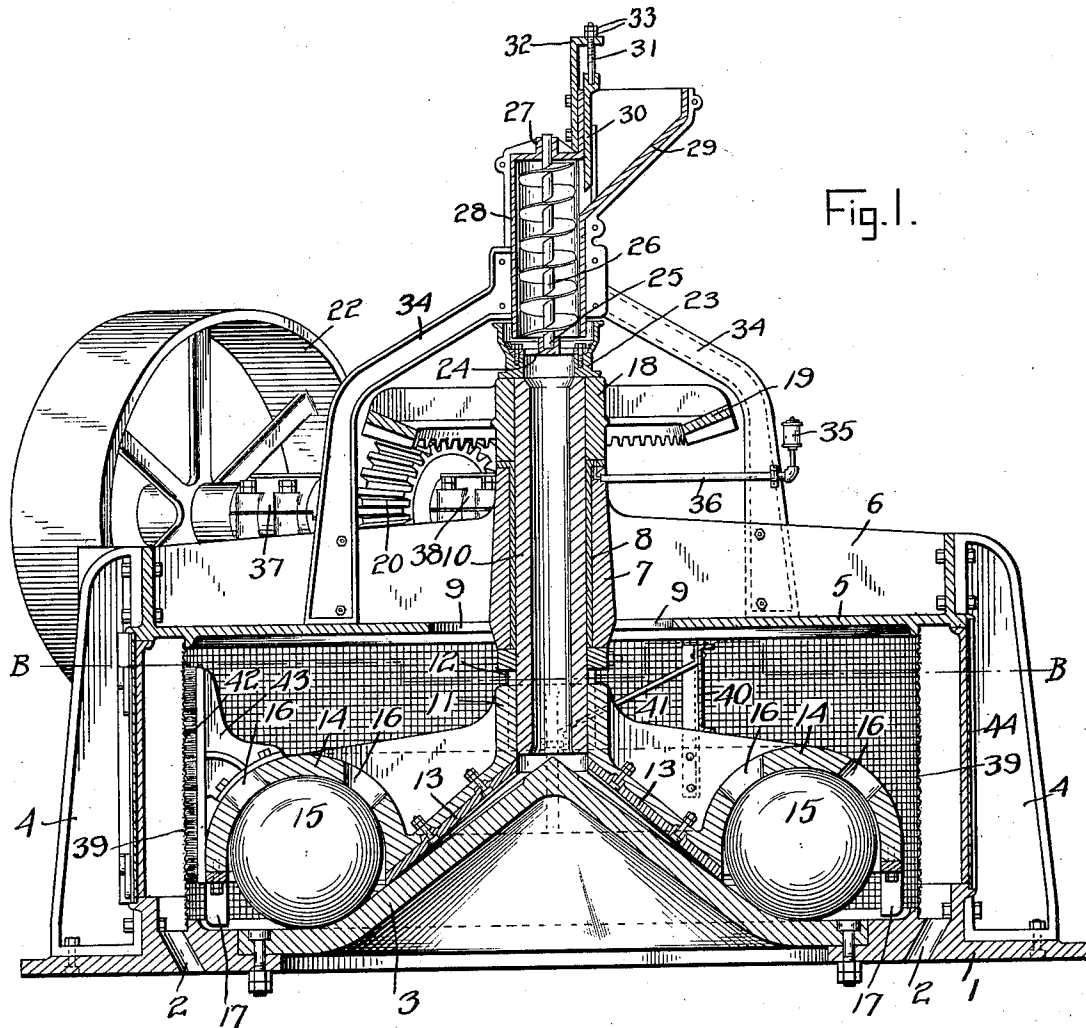


Fig. 1.

Witnesses

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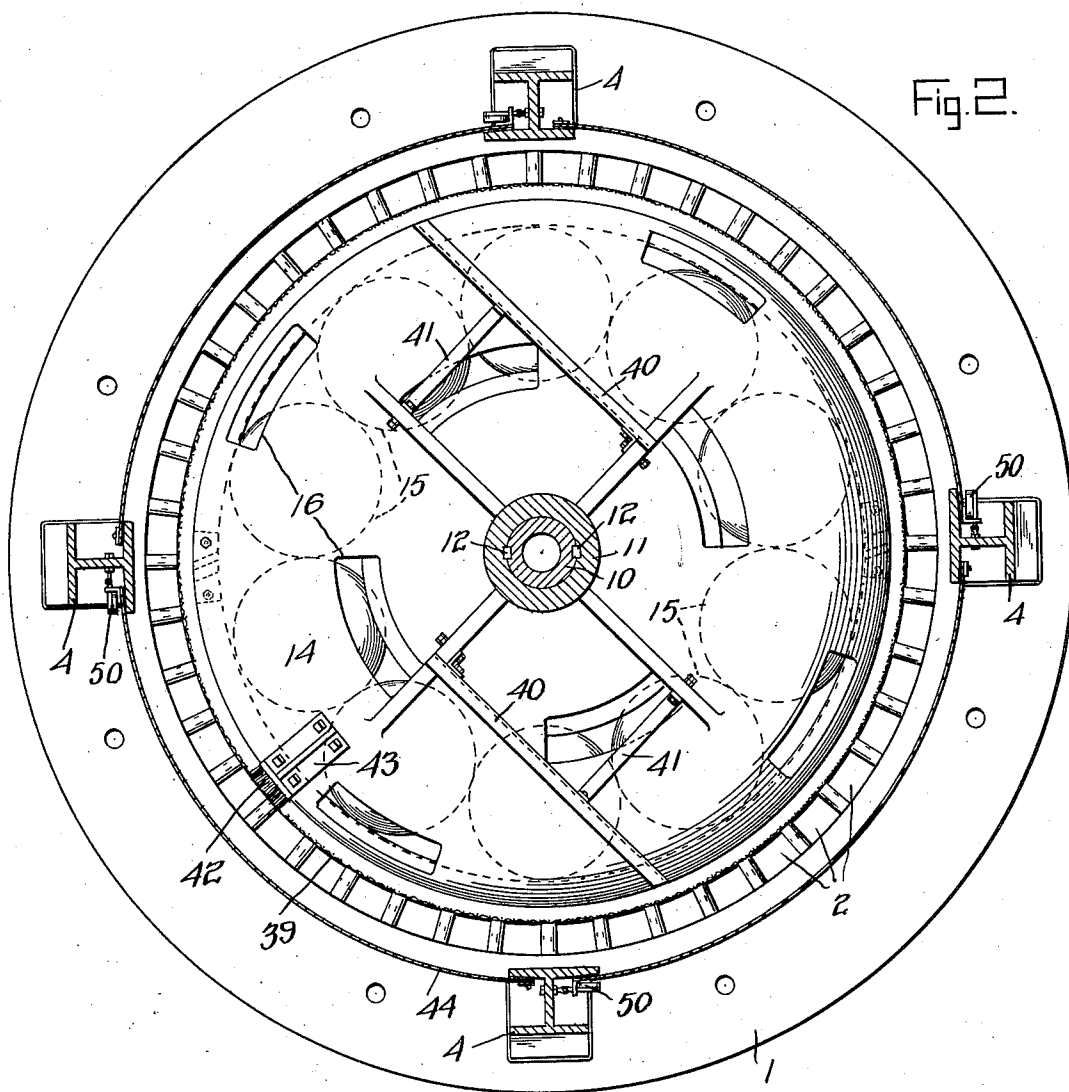


Fig. 2.

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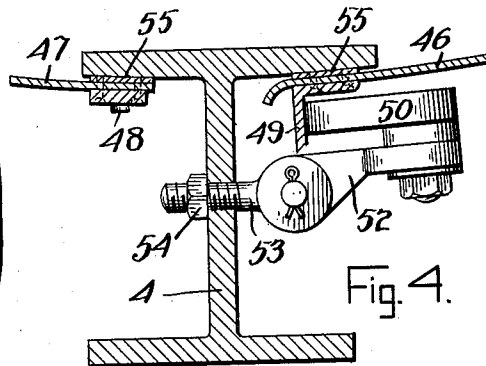
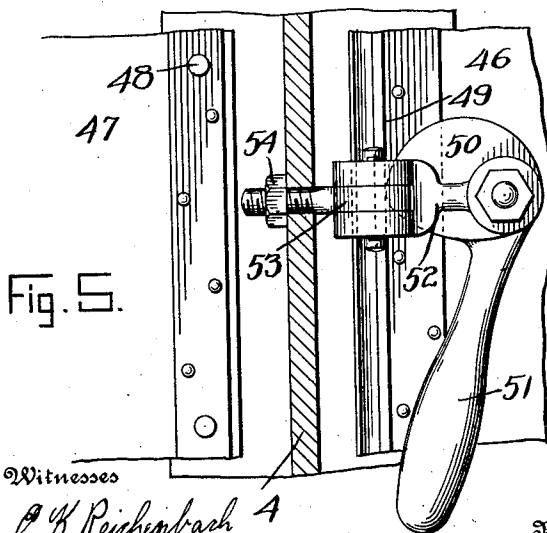
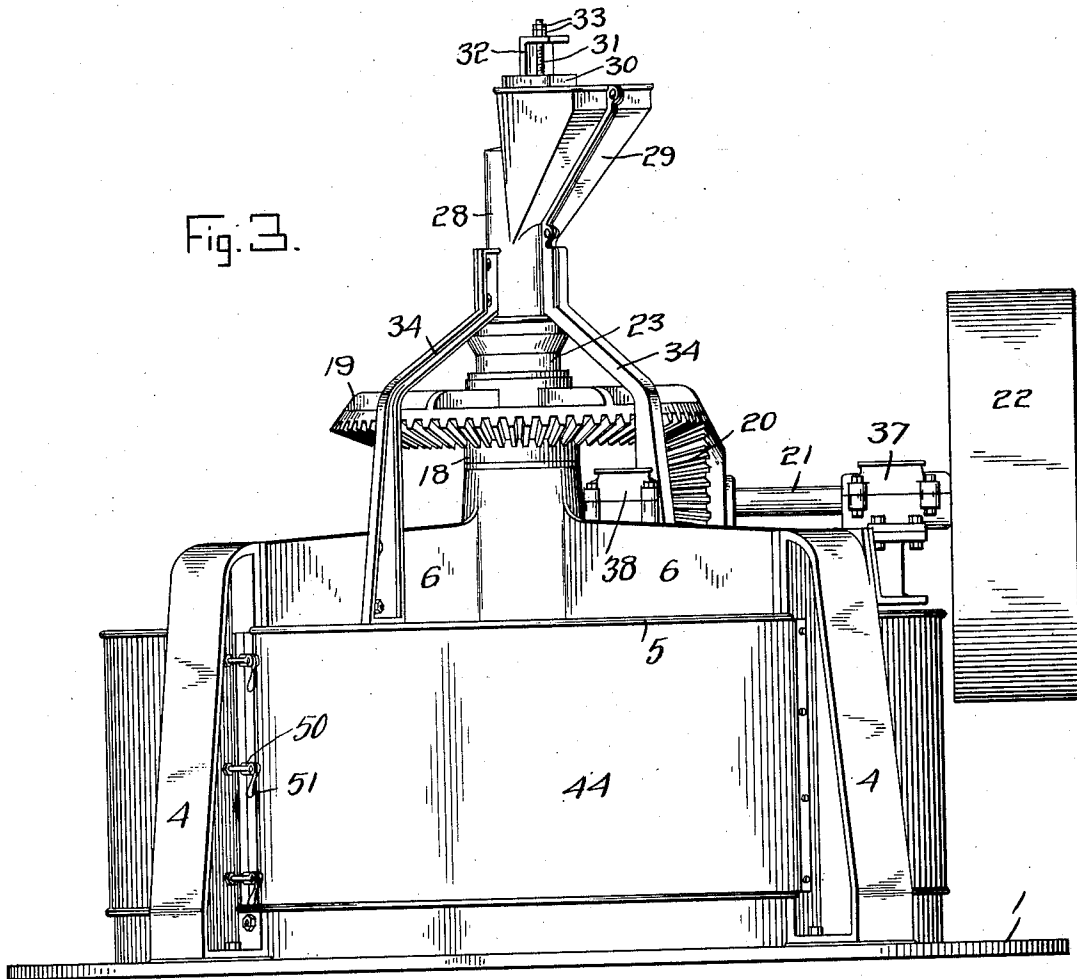
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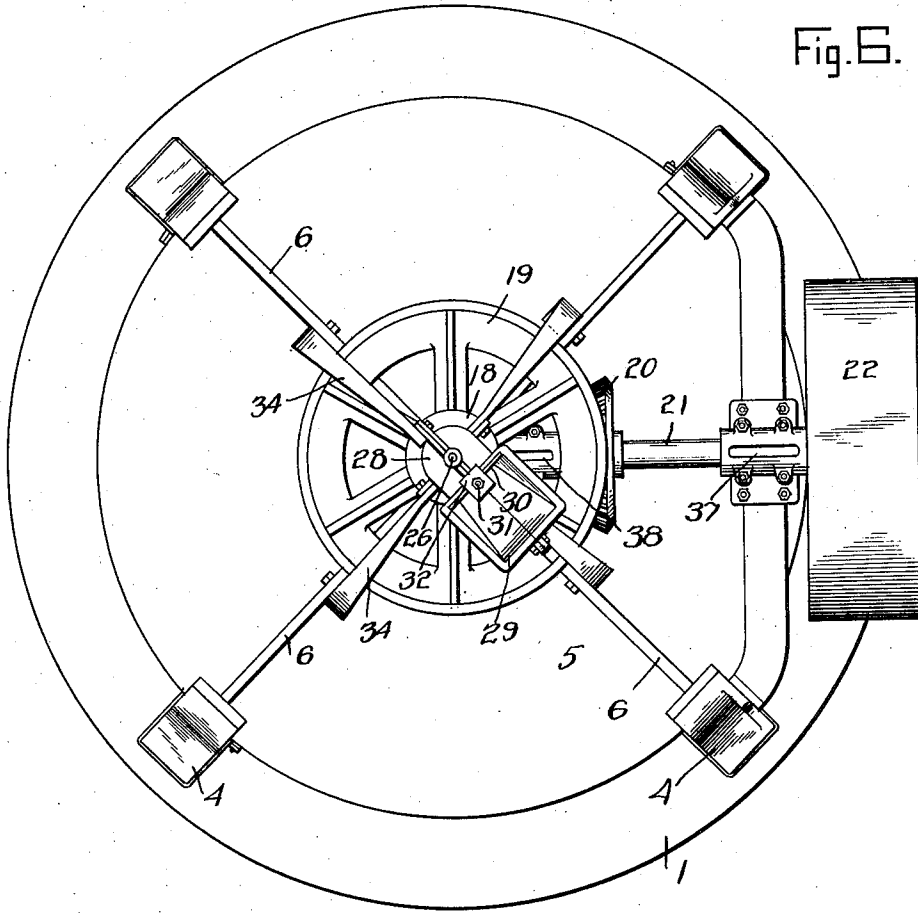
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UNITED STATES PATENT OFFICE.

WILLIAM K. NIX, JR., OF ATLANTA, GEORGIA.

PULVERIZING-MACHINE.

935,161.

Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed January 19, 1909. Serial No. 473,195.

To all whom it may concern:

Be it known that I, WILLIAM K. NIX, JR., a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Pulverizing-Machines; 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 improvements in pulverizing machines, and has to do particularly with that type of machine which is employed for reducing rock, stone or other material to a finely divided condition, after it has first been broken by a crusher of any suitable form.

The object of my invention is to provide a machine of the character described which shall afford simplicity, durability, and at once, efficiency of operation.

With these several objects in view, my improved machine, in its preferred form, includes the combination and arrangement of parts now about to be described in detail, and which are pointed out more fully in the appended claims, and disclosed in the accompanying drawings which should be read in connection with the specification hereinafter.

In the drawings, Figure 1 is a vertical section of a machine embodying my several improvements; Fig. 2 is a horizontal section on the line B B of Fig. 1. Fig. 3 is a view in side elevation; Figs. 4 and 5 are detail views showing the novel means which I employ for fastening together the sections of the outside casing; and Fig. 6 is a top plan view of the machine.

Referring more particularly to the drawings, in which like reference characters refer to corresponding parts in the several views, 1 designates the base of the machine, which is provided with a plurality of openings 2 for a purpose to be mentioned presently. Bolted or otherwise secured to the base 1 is a cone-shaped casting 3, the upper surface of which is roughened in any suitable manner, and preferably corrugated after the fashion of a mill-stone.

4 designates the legs which are positioned upon and secured to the base 1 by bolts or other suitable fastening devices, and to which in turn is bolted the cover-plate 5. The cover-plate 5 carries a series of ver-

tically arranged webs 6 and a centrally arranged sleeve 7, within which is positioned a brass bushing 8.

9 designates openings in the cover-plate 60 adjacent the sleeve 7, and arranged between the aforementioned webs 6.

Mounted centrally of the cover-plate 5, and within the bushing 8, is a hollow shaft 10, which carries at its lower end the table 11. It is to be noted that the table 11 is attached to the shaft 10 by means of feather keys 12, so as to permit vertical movement of the table 11 relative to the shaft 10, during rotation of these parts together. Attached to the underside of the table 11 are a series of segmental plates 13, made of chrome steel or other hard substance, and these plates 13 cooperate with the previously described casting 3 to constitute a cone-shaped grinding surface. The plates 13 are roughened or corrugated, and movable independently of one another, being secured to the table 11 by means of bolts or other fastening means.

Formed integral with the table 11 are the curved extensions 14 which constitute seats or recesses for the balls 15, constructed of any suitable but very heavy material. Openings 16 are provided in the extensions 14 for a purpose about to be mentioned. Secured at the outside, to the table 11 are plows 17.

Mounted upon the shaft 10 is the hub 18 of a gear-wheel 19, which is arranged to engage with an additional gear-wheel 20 mounted on the horizontal shaft 21, and driven by a pulley 22.

23 is a circular hollow casting positioned above the hub 18 and secured thereto.

24 is a rectangular plate which is attached to shoulders provided within the casting 23. Mounted upon the plate 24, and formed integrally therewith, is a squared socket 25 which is adapted to receive the squared end of the shaft 26. The other end of said shaft is formed round, and rotates within a bearing 27, formed in the casing 28. The casing 28 is formed with a hopper 29, within which is mounted a gate 30 for controlling the feed of the material to the machine. Secured to the gate 30 is a screw-threaded stem 31 which passes through a bracket 32, and is adjusted by means of the nuts 33. The bracket 32 is fastened to a part of the casing 28 constituting a side of the hopper. Mounted upon the shaft 26 are a series of flights, so as to

form a feed conveyer for the material to be pulverized.

34 are standards secured to the casing 28, and mounted upon the cover-plate 5. These standards 34 constitute the support for the feeding-mechanism.

35 is a lubricating cup which connects by means of a pipe 36 with the bushing 8, and serves to keep the shaft 10 and other parts properly oiled.

In order to lubricate the horizontal shaft 21, I provide ring oiling boxes 37 and 38 respectively, the outer of which is secured to one of the legs 4, the inner one being fastened to one of the webs 6 of the cover-plate 5.

The material having first been broken in a rock crusher, it is fed into the hopper 29 at the top of the machine, from which it passes to the vertical conveyer in the casing 28. As already stated, the amount of material admitted to the conveyer is controlled by adjustment of the sliding gate 30. The material then passes down through the conveyer and into the hollow shaft 10, from which it falls onto the cone-shaped casting 3, being ground between such casting and the grinding surfaces 13. The direction of rotation of the grinding table 11 is indicated by the arrows in Fig. 2. The action of the cone formed by the casting 3 and the surfaces 13 prepares the material for the final grinding which takes place between the lower part of the casting 3 and the heavy balls 15, which pass over the material as it reaches the bottom of the grinding cone. Any material which may stick to the balls is ground between them and the table 11 which carries them, and comes out in the form of a dust sufficiently fine to pass out through a wire screen 39, which surrounds the grinding table 11, and extends from the base 1 to the cover-plate 5. A part of the ground material passes out at the bottom of the grinding table, while a portion of it comes out through the openings 16 already mentioned. Any material which passes the balls 15, and is not fine enough to go through the screen 39, is thrown back by the plows 17 already described, and is ground sufficiently.

The sliding connection already explained, is provided between the hollow shaft 10 and the grinding table 11, so that in the event that the material passing down through the shaft 10 is very large, or too hard to be ground immediately, the table may raise slightly on the shaft (by means of the feather keys herein), and thus prevent possible damage or breakage to any of the parts.

After the finely ground material is passed through the screen 39, it falls through the openings 2 in the base and into a hopper which takes it to a suitable conveyer and elevator.

Fans 40 are provided, being supported by brackets 41 which are secured to the grinding table 11, said fans serving to create a draft through the openings 9, and thereby throw the finely ground material against the screen 39, as it comes from beneath the grinding table 11. A brush 42 is secured to the grinding table by means of a bracket 43 and engages the screen 39, so that if the material is moist and has a tendency to clog up the openings in the screen, it will, at each revolution of the table, pass over the screen and remove any such material.

44 designates the casing surrounding the screen 39, to prevent escape of any of the ground material. The casing 44 is made preferably in four parts and is fastened to the legs 4 by the attaching device shown fully in Figs. 4 and 5. 46 and 47 are the ends of two casing sections respectively, the other ends of said sections being secured in the reverse manner. The end 47 is held in position by engagement with the pin 48. The end 46 of the other casing section has secured thereto an angle iron 49, which is adapted to be engaged by a cam 50. The cam 50 is provided with a hand-lever 51, and is pivotally mounted upon a link 52. The bottom portion of the link 52 is bifurcated and arranged at right-angles to the part which carries the cam 50. 53 is an eye-bolt mounted upon the web of the leg 4, and adjustable by means of the nut 54. The link 52 is pivoted to the eye-bolt 53 by means of the bifurcated portion already mentioned, and is thus mounted so as to have a horizontal movement away from the casing sections 46 and 47, when it is desired to remove them. 55 is rubber, felt, or other suitable material positioned between the casing sections and the flanges of the legs 4, and along the recesses in the base 1 and cover-plate 5, for the purpose of securing dust-proof connections throughout.

The construction which I have here described embodies only one form of my machine, but I desire it to be understood that various modifications may be adopted, and other arrangements of the cooperating parts may be had without departing from the spirit and essential features of my improvement.

What I claim and desire to secure by Letters-Patent is:

1. A pulverizing machine of the character described including a base having a cone-shaped grinding surface, a hollow rotating shaft fixed against vertical movement, a table keyed to said shaft and having vertical movement thereon, a series of segmental grinding sections attached to the table, an extension adjacent said grinding sections, and a plurality of grinding balls supported for movement within said extension.

2. A pulverizing machine of the character

described including a base having a cone-shaped grinding surface, a hollow rotating shaft, a table keyed to said shaft and having vertical movement thereon, a plurality of
 5 segmental grinding sections attached to said table, an extension on the table adjacent said grinding sections, a series of grinding balls arranged for movement in said extension, and plows secured to the table at points ex-
 10 terior to the grinding balls.

3. A pulverizing machine of the character described including a base having a cone-shaped grinding surface, a hollow rotating shaft, a table keyed to said shaft and having
 15 vertical movement thereon, a series of segmental grinding sections attached to said table, an extension adjacent said grinding sections and provided with a series of openings, a plurality of balls mounted for move-
 20 ment in said extension and under the afore-said openings, and plows attached to the table at points exterior to the grinding balls.

4. A pulverizing machine of the character described including a base, a grinding table, a cover-plate above the grinding table, legs
 25 secured to the base and supporting said cover-plate, a sectional casing surrounding the grinding table, and instrumentalities for securing the sections of said casing to the
 30 aforementioned legs, the same consisting of means for attaching one end of a section, an angle-iron attached to the other end of the section, and instrumentalities for holding
 35 said angle-iron in engagement with its respective leg.

5. A pulverizing machine of the character described including a base, a grinding table, a cover-plate above the grinding table, legs
 40 secured to the base and supporting said cover-plate, a sectional casing surrounding the grinding table, and instrumentalities for securing the sections of said casing to the
 45 aforementioned legs, the same consisting of means for attaching one end of a section, an angle-iron attached to the other end of the section, and cam-operative means for draw-
 ing said angle-iron against its respective leg.

6. A pulverizing machine of the character described including a base having a cone-

shaped grinding surface, a hollow rotating shaft, a grinding table keyed to said shaft and movable vertically thereon, a casing above the shaft, a conveyer arranged within the casing and adapted to rotate with the shaft, a hopper connected with the casing,
 55 and a vertically sliding adjustable gate for controlling the feed from the hopper.

7. A pulverizing machine of the character described including a base having a cone-shaped grinding surface, a hollow rotating
 60 shaft, a table keyed to said shaft and movable vertically thereon, a casting attached to the upper end of said hollow shaft, a rectangular bar carried by said casting and having a squared socket, a shaft mounted in said
 65 socket, a conveyer carried by said shaft, a casing inclosing the conveyer and provided with a hopper leading thereto, and a vertically sliding adjustable gate for controlling
 70 the feed from the hopper.

8. A pulverizing machine of the character described including a base, a grinding table rotatably mounted thereon, a cover-plate positioned above the grinding table, legs connect-
 75 ing the cover-plate and said base, a sectional casing surrounding the grinding table, and instrumentalities for securing the sections of the casing to said legs, such instrumentalities including a pin secured to the
 80 leg, an eye-bolt adjustably attached to the web of the leg, a link pivotally secured to said eye-bolt, and a cam operatively connected to said link.

9. A pulverizing machine of the character described including a casing section, an angle-iron attached to said casing section, a leg,
 85 an eye-bolt adjustably attached to the web of said leg, a link pivotally secured to the eye-bolt, a cam operatively attached to said link and arranged to engage the aforemen-
 90 tioned angle-iron, and a hand-lever carried by said cam.

In testimony whereof, I affix my signature, in the presence of two subscribing witnesses.

WILLIAM K. NIX, Jr.

Witnesses:

J. H. D. BRUNING,

TRACY G. HUNTER.