J. E. KENNEDY.

CRUSHING AND PULVERIZING MACHINE.

APPLICATION FILED JAN. 20, 1909. RENEWED MAR. 4, 1912.

1,085,867. Patented Feb. 3, 1914.

Fig. 1.

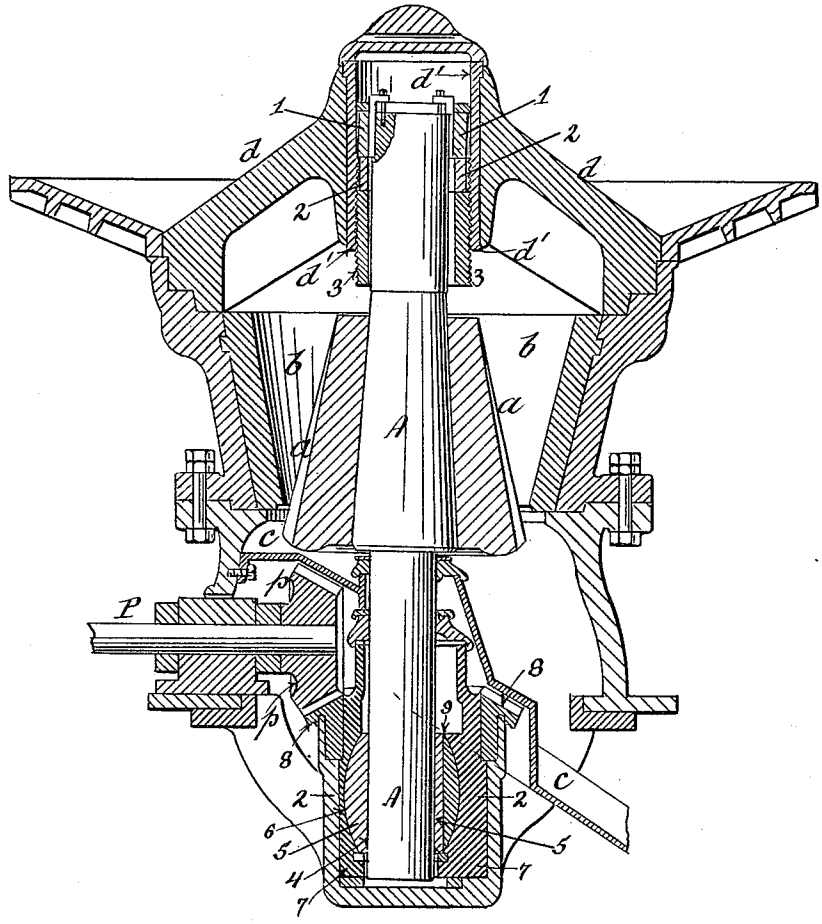


Fig. 2.

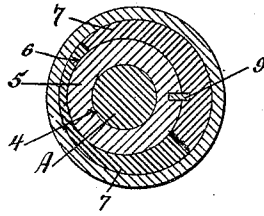
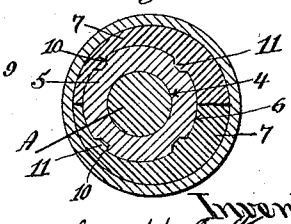


Fig. 3.



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CRUSHING AND PULVERIZING MACHINE.

1,085,867. Specification of Letters Patent. Patented Feb. 3, 1914.

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To all whom it may concern:

Be it known that I, JOSEPH E. KENNEDY, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Crushing and Pulverizing Machines, of which the following is a specification.

My improvements relate to crushing and pulverizing mechanism in which the lower portion of the gyratory shaft is journaled in a bearing which is free to adapt itself to the axial inclination of said shaft, as set forth in my concurrent application for Patent No. 387,067, filed August 5th, 1907, in which case an eccentric bearing is used,—*i. e.* the bore in which the lower portion of the shaft is journaled is formed in the bearing eccentric to the central axial line of rotation of said bearing, and the latter is seated centrally in a rotatable sleeve, whereas in the present case the axis of bore in which the lower portion of the shaft is journaled coincides with the central axis of the bearing, and the latter is seated eccentrically within the rotatable sleeve. In either case the result is practically the same, in that the bearing is free to adapt itself to the inclination of the longitudinal axis of the gyratory shaft, and I do not seek to cover herein broadly an axially yielding journal eccentric to the center of rotation,—the present invention consisting in the construction and arrangement of parts herein described and claimed specifically.

In the accompanying drawings, Figure 1, is a central vertical sectional elevation of a gyratory crusher embodying my invention; Fig. 2, is a horizontal section upon line 2—2—Fig. 1; Fig. 3, a view similar to Fig. 2, showing a modification.

I have herein shown my invention as applied to a gyratory shaft suspended upon an upper bearing, although this is not material, since my method of journaling the lower portion of the gyratory shaft may be resorted to where the gyratory shaft is otherwise supported in ways well known in the state of the art.

In the apparatus illustrated in the drawings the general arrangement and operation of parts is substantially the same as in others of this type, consisting essentially of a truncated conical crushing head *a*, rigidly secured to the shaft A and gyrated thereby in an oppositely inclined concave crushing chamber *b*, from the lower portion of which the reduced material drops into the chute chamber *c*, in the usual manner.

The shaft A is provided with an annular shoulder 1, keyed or otherwise rigidly secured to it,—said collar 1, resting upon an annular bearing 2, which in turn rests upon an adjustable support 3 mounted in the upper frame plate *d*. Any desired mechanical expedient may be resorted to in making the support 3 adjustable vertically, as by forming it with a peripheral male screw thread for engagement with a female screw thread on the upper frame plate *d*, or on the sleeve *d'*, inserted in the latter as shown in the drawings.

The lower portion of the shaft A is journaled in the bore 4 of the bearing 5. The axis of the bearing 5 is coincident with that of its bore 4, and peripherally it is preferably of convex form, uniformly curved in the arc of a circle. It is seated in a corresponding curved concavity 6, in the sleeve 7, to which the driving gear 8 is secured. The seat 6 for the bearing 5 is formed in the sleeve 7, eccentric to the central vertical axis of rotation of said sleeve, and the principle involved in this method of journaling the lower portion of the gyratory shaft A is essentially that of the ball and socket joint, although the changes in inclination of the longitudinal axis of the shaft A are so slight that it is not necessary in practice to resort to a spherical form of bearing which would be objectionable on account of the lateral space that would be required to accommodate it in the rotatable sleeve.

While free to adapt itself in the eccentric seat 6, to the inclination of the longitudinal axis of the shaft A, the bearing 5 is held against rotation within and independent of the sleeve 7 by one or more axially arranged keys 9, or equivalent expedients, by which the interlocking of said bearing and the rotatable sleeve is effected. Thus by way of illustration, in Fig. 3 the use of the key 9 may be dispensed with by making the periphery of the bearing 5 with recesses 10

parallel to its axis, into which fit correspondingly formed ribs or projections 11 in the eccentric seat 6. In either case the result is the same in that while the bearing is made to rotate positively with the sleeve 7, it also conforms instantly to any tendency to variations in the longitudinal axis of the shaft A, thereby obviating undue lateral strain on the parts.

The driving gear 8 is rotated by means of the pinion p, upon the power shaft P, and the apparatus is provided with the usual dust guards, &c.

The sleeve 7, is made in two or more parts to admit of the placing of the bearing 5 within the eccentric seat 6, the said parts of the sleeve 7 and the driving gear being rigidly secured together.

Having thus clearly differentiated my present structure from that disclosed in my concurrent application hereinbefore mentioned, what I claim as my invention and desire to secure by Letters Patent is,

1. In crushing mechanism of the character designated, the combination of a gyratory shaft, means for supporting the same, a sleeve, a bearing for the lower portion of said shaft seated eccentrically in said sleeve, means which insure the positive rotation of the bearing with the sleeve while permitting the bearing to adapt itself axially to the inclination of the shaft, and means for rotating the sleeve and eccentric.

2. In crushing mechanism of the character designated, the combination of a gyratory shaft, means for supporting said shaft and adjusting it on its longitudinal axis, a sleeve, a bearing for the lower portion of said shaft seated eccentrically in said sleeve, means which insure the positive rotation of the bearing with the sleeve while permitting the bearing to adapt itself axially to the inclination of the shaft, and means for rotating the sleeve and eccentric.

3. In crushing mechanism of the character designated, the combination of a gyratory shaft, means for supporting the shaft and adjusting it longitudinally, an axially convex bearing for the lower portion of said shaft, a rotatable sleeve formed with an eccentrically arranged concavity in which said axially convex bearing is seated, said bearing and said eccentric seat being formed with axially arranged interlocking parts which insure the rotation of the bearing with the sleeve while allowing the bearing to adapt itself to the axial inclination of the shaft for the purpose described.

4. In crushing mechanism of the character designated, the combination of a gyratory shaft, an upper bearing on which said shaft is suspended, a sleeve, a bearing for the lower portion of the shaft seated eccentrically in said sleeve, means which insure the positive rotation of the bearing with the sleeve while permitting the bearing to adapt itself axially to the inclination of the shaft, and means for rotating the sleeve and eccentric.

5. In crushing mechanism of the character designated, the combination of a gyratory shaft, an upper bearing on which said shaft is suspended, means for adjusting said upper bearing vertically, a sleeve, a bearing for the lower portion of the shaft seated eccentrically in said sleeve, means which insure the positive rotation of the bearing with the sleeve while permitting the bearing to adapt itself axially to the inclination of the shaft, and means for rotating the sleeve and eccentric.

6. In crushing mechanism of the character designated, the combination of a gyratory shaft, a bearing for the upper portion of said shaft, a sleeve, a bearing for the lower portion of said shaft seated eccentrically in said sleeve, means which insure the positive rotation of the bearing with the sleeve while permitting the sleeve to adapt itself axially to the inclination of the shaft, and means for rotating the sleeve and eccentric.

7. In crushing mechanism of the character designated, the combination of a gyratory shaft, means for supporting the same, a sleeve, a bearing for the lower portion of said shaft seated eccentrically in said sleeve, means which insure its positive rotation therewith while permitting the bearing to adapt itself axially to the inclination of the shaft, said sleeve formed of a plurality of parts each containing a section of the eccentric seat for said shaft bearing, means for securing said parts of the sleeve together and around the shaft bearing, and means for rotating said sleeve.

8. In crushing mechanism of the character designated, the combination of a gyratory shaft, means for supporting the same, a sleeve, a bearing for the lower portion of said shaft seated eccentrically in said sleeve, said bearing and said eccentric seat being formed with interlocking parts parallel to the longitudinal axis of the shaft to insure the rotation of the bearing while permitting it to adapt itself to the inclination of said shaft, and means for rotating the sleeve and eccentric.

9. In crushing mechanism of the character designated, the combination of a gyratory shaft, a sleeve, a bearing for the lower portion of said shaft seated eccentrically in said sleeve, means which insure the positive rotation of the bearing with the sleeve while permitting the bearing to adapt itself axially to the inclination of the shaft, and means for rotating the sleeve and eccentric.

10. In crushing mechanism of the character designated, the combination of a gyratory shaft, a sleeve, a bearing for the lower

portion of said shaft seated eccentrically in said sleeve, means which insure its positive rotation therewith while permitting the bearing to adapt itself axially to the inclination of the shaft, said sleeve formed of a plurality of parts each containing a section of the eccentric seat for said shaft bearing, means for securing said parts of the sleeve together and around the shaft bearing, and means for rotating said sleeve.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."