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W. S. WESTON

GYRATORY CRUSHER

Filed Feb. 23. 1926

1,667,337

~~FIG. 1.~~

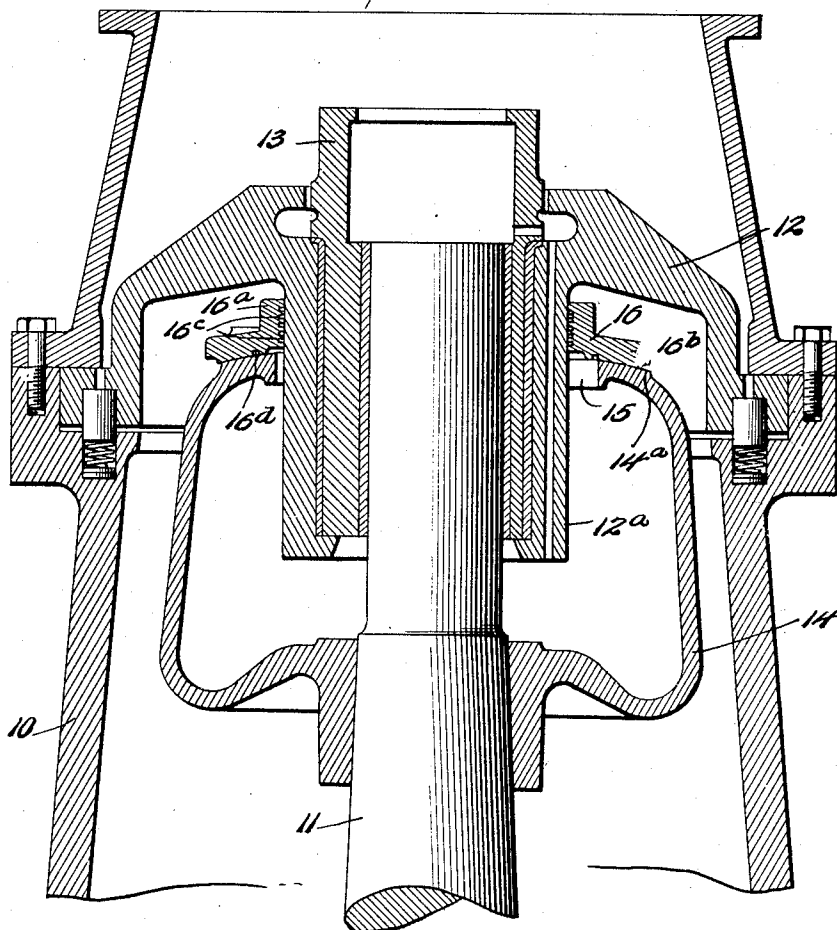
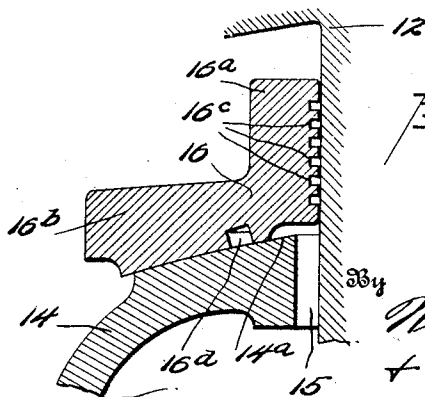


Fig. 2.



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GYRATORY CRUSHER.

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The present invention relates to gyratory crushing machines, and particularly to machines of the type illustrated in Patent No. 1,528,741, issued to me March 3, 1925.

5 In that patent a gyratory crushing machine is described and illustrated in which the eccentric is mounted in a bearing at the top of the frame and is lubricated by means of oil from a receptacle mounted on the shaft. The receptacle gyrates with the shaft and there is a natural tendency for the oil to be thrown out. A dust cap rests upon the upper edge of the oil receptacle for the purpose of preventing the entrance of dirt and dust therein and the escape of oil from the receptacle by splashing. In accordance with the present invention, an improved type of dust cap is provided which is designed and constructed to offer increased resistance to the escape of oil from the receptacle while at the same time thoroughly shielding the oil chamber from the dust and flying particles of grit which are constantly present when the crusher is in operation.

25 The invention may have various forms, depending upon the type of crusher to which it is applied, and in the accompanying drawings one form thereof is illustrated. It will be understood, however, that this embodiment is advanced by way of example only and that in applying the invention it may be embodied in other and differently designed structures without departure from the spirit and scope thereof.

35 In the drawings:

Figure 1 is an axial section through the upper end of a gyratory crushing machine in which the invention has been incorporated; and

40 Figure 2 is a section through the dust cap, on a larger scale.

Many portions of the crusher are not illustrated, such as the lower portion of the frame, the crushing cone, etc., and these parts may be of conventional type, or that portion of the crusher which is not illustrated may be formed as shown in my prior patent above referred to. The upper end of the frame is indicated at 10, the gyratory shaft at 11, the bearing at 12, and the eccentric sleeve at 13. The bearing includes a cylindrical portion 12^a which is coaxial with the frame and within which the eccentric 13 is rotatably mounted. Rigidly supported upon the shaft is the oil recep-

tacle 14, the substantially cylindrical wall of this receptacle extending for a considerable distance above the lower end of the cylindrical portion 12^a of the bearing and being inturned as shown leaving, however, a central circular aperture 15 the margin of which encircles the cylindrical portion 12^a of the bearing and is coaxial with the shaft 11.

The inturned upper edge of receptacle 14 is provided with a spherical bearing surface 14^a, centered about the center of gyration of shaft 11, and the dust cap 16 is provided with a similarly formed surface which rests thereon. This dust cap is of annular form and is L-shaped in cross section, having a cylindrical portion 16^a which fits closely around the outer wall of the cylindrical bearing 12^a, and a laterally extending flange portion 16^b which rests upon the upper edge of the oil receptacle, as set forth above.

In the normal operation of the crusher, the oil receptacle gyrates with the shaft while the dust cap 16 remains stationary, being held against movement by the bearing portion 12^a. The oil within the receptacle is rendered turbulent by the movement of the receptacle and tends to splash out. There are two possible ways of escape for the oil; the first being between the cylindrical portion 16^a of the dust cap and the cylindrical portion 12^a of the bearing, and the second being between the mutually abutting spherical faces of the dust cap and the upper edge of the oil receptacle. I have discovered that by internally grooving the cylindrical portion of the dust cap as indicated at 16^c, escape of oil between the dust cap and bearing is practically prevented. Oil splashing from the receptacle into the narrow space between the bearing and dust cap flows into the grooves and does not shoot through this space to the outside of the dust cap, and from the grooves drains back into the receptacle.

Oil which makes its way in between the mutually abutting spherical surfaces of the oil receptacle and dust cap is collected in a groove 16^d formed in the under surface of the dust cap and is brought back into the receptacle by a "scraping" action. In the operation of the crusher the dust cap remains stationary, as before explained, while the oil receptacle moves in a circular path about the axis of the machine, although it does not rotate. All portions of the groove 16^d are,

therefore, successively brought into register with the open mouth of the oil receptacle, and the oil which is contained in such portion drops downwardly to join the body of oil in the receptacle. While any one portion of this groove is in register with the mouth of the oil receptacle, the remaining portions are acting to gather, by scraping action, the oil which is penetrating between the receptacle and dust cap and to collect it in the groove ready to be discharged back into the oil receptacle. This action is continuous so long as the crusher is in operation and as a result practically no oil is allowed to escape beyond the dust cap.

The eccentric 13 may be driven by any suitable source of power (not illustrated) and the other portions of the machine, as before mentioned, may be of conventional type. I contemplate also that the dust cap and the oil collecting and returning means may be formed in various ways without departing from the invention.

While I have described the dust cap 16 as remaining "stationary" during the operation of the machine this is not exactly the case inasmuch as this cap has a very slow "creeping" movement of rotation about the axis of the bearing due to the gyratory action of the oil receptacle. This creeping motion however is immaterial from the standpoint of the present invention, the dust cap being, for present purposes, "stationary" as before set forth.

Having thus described my invention, what I claim as new and desired to be secured by Letters Patent is:

1. A gyratory crusher comprising, in combination, a shaft supported at one end for a gyratory motion about a point, a rotatable eccentric sleeve for imparting gyratory motion to said shaft, a bearing for said sleeve, and means for lubricating said eccentric sleeve including an oil receptacle fixed on the shaft and having an open mouth, said receptacle having a cover resting on the edge thereof, the bearing surface of the cover being a portion of a sphere having the center of gyration of the shaft as a center, and said surface having an annular groove formed therein, centered about

the axis of the bearing, for the purpose set forth.

2. A gyratory crusher comprising, in combination, a shaft supported at one end for gyratory motion about a point, a rotatable eccentric sleeve for imparting gyratory motion to said shaft, a bearing for said sleeve, and means for lubricating said eccentric sleeve including an oil receptacle fixed on the shaft and having an open mouth, a dust cap having a portion bearing on the edge of the receptacle and having a cylindrical portion fitting closely around the sleeve supporting portion of the bearing, and oil retaining grooves formed in the inner wall of said cylindrical portion.

3. The combination set forth in claim 1 but in which the diameter of the annular groove is slightly greater than the diameter of the mouth of the oil receptacle.

4. In a gyratory crushing machine, the combination with a frame, a bearing mounted in the frame and having a central cylindrical portion surrounding the gyratory shaft, an open mouthed oil receptacle mounted upon the gyratory shaft and movable therewith, and means for preventing escape of oil from the mouth of the receptacle as the shaft gyrates including an annular lid having a cylindrical central portion fitting around the cylindrical portion of the bearing, and a peripheral flange projecting outwardly therefrom, the lower surface of which rests upon the upper edge of the oil receptacle, said lower surface and the inner surface of the cylindrical central portion being concentrically grooved, for the purpose set forth.

5. The combination set forth in claim 4 in which the lower surface of the peripheral flange of the lid is formed as a spherical surface centered about the axis of gyration of the shaft and the top edge of the oil receptacle comprises a mating spherical surface, a circular groove being formed in the spherical surface of the lid the diameter of which is slightly greater than the diameter of the open mouth of the oil receptacle.

In testimony whereof I hereunto affix my signature.

WILLIAM S. WESTON.