Nov. 29, 1949 R. R. SHAFTER 2,489,936

SEAL ASSEMBLY FOR GYRATORY CRUSHERS

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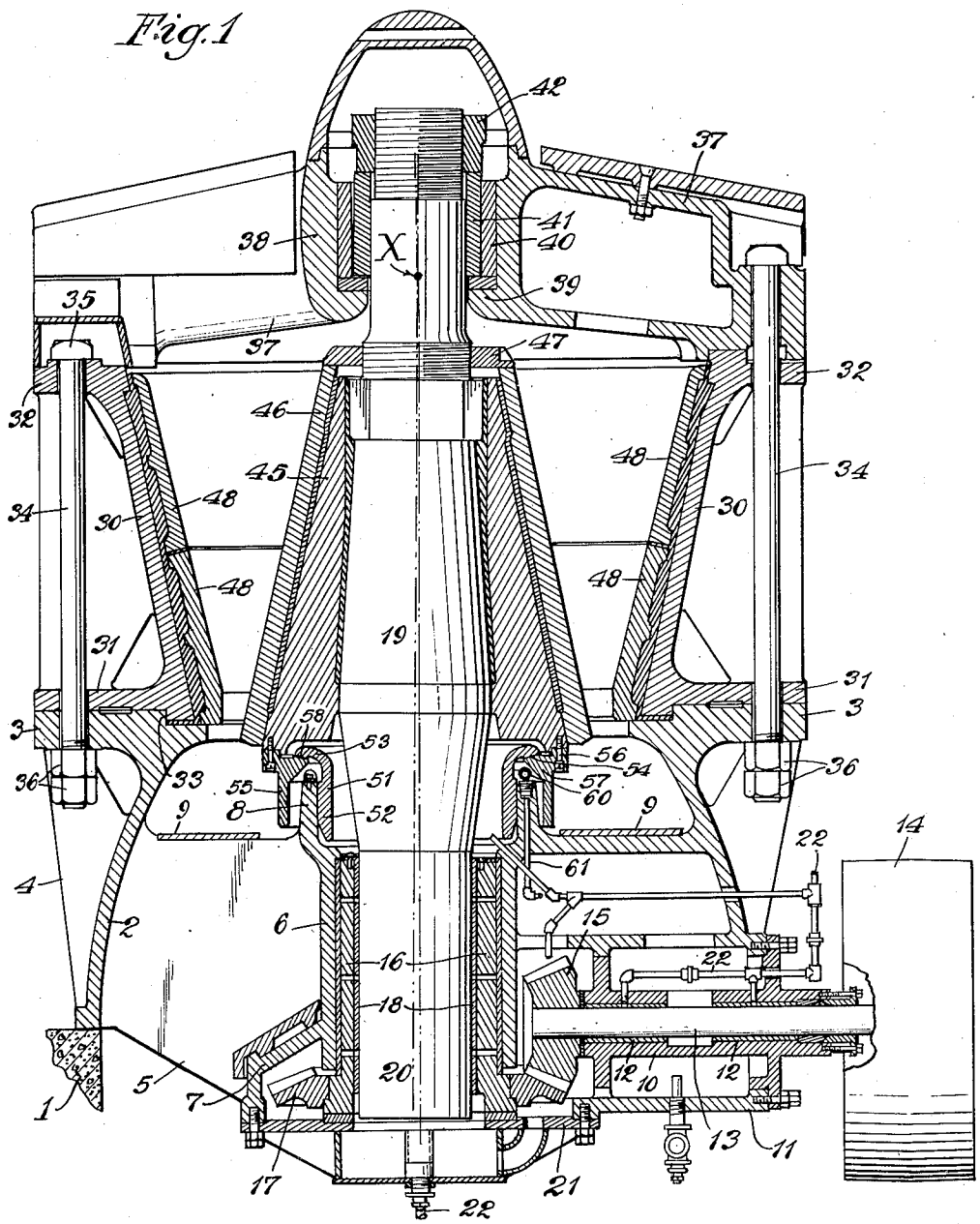
Fig. 1



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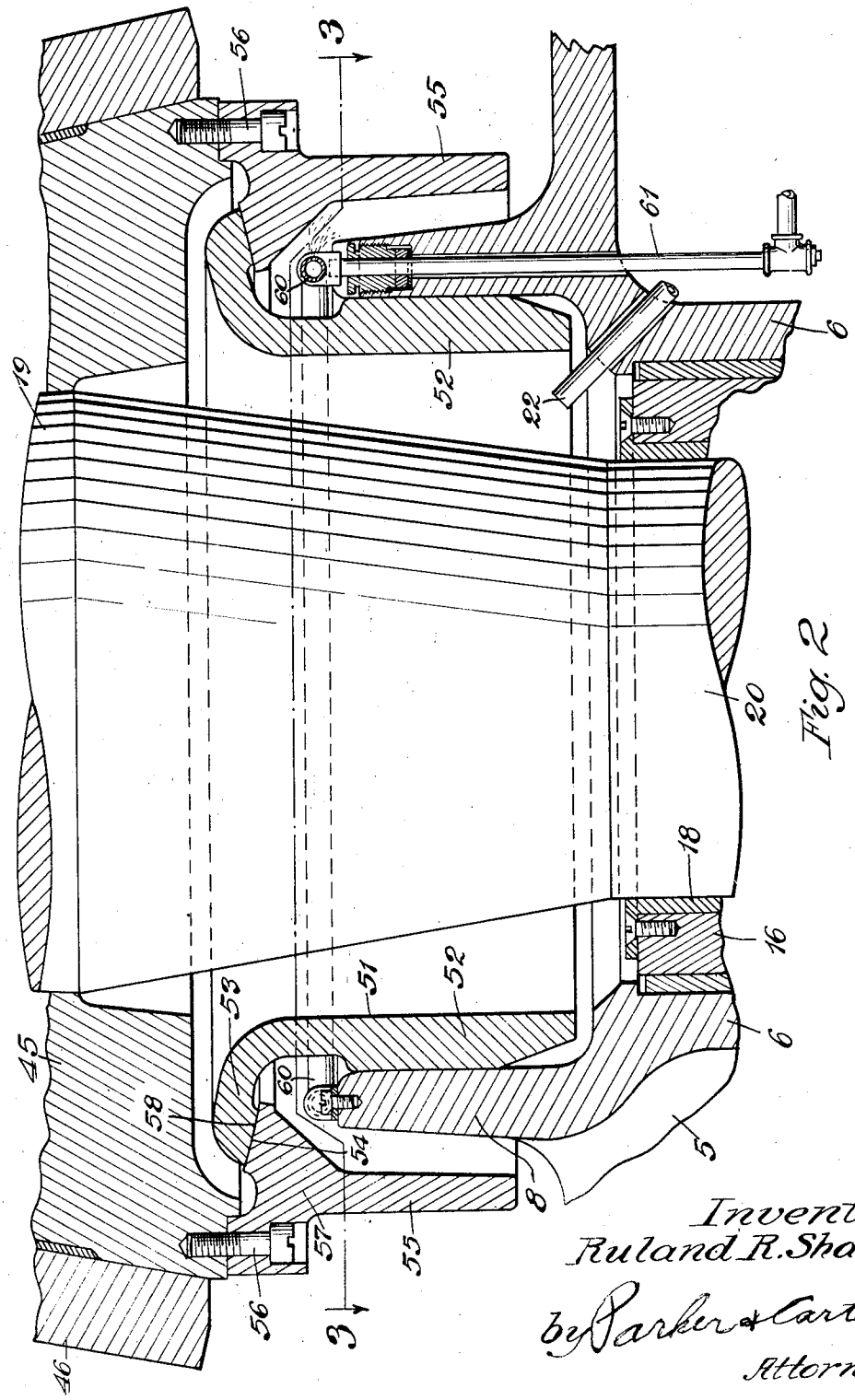

Fig. 2

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Fig. 3

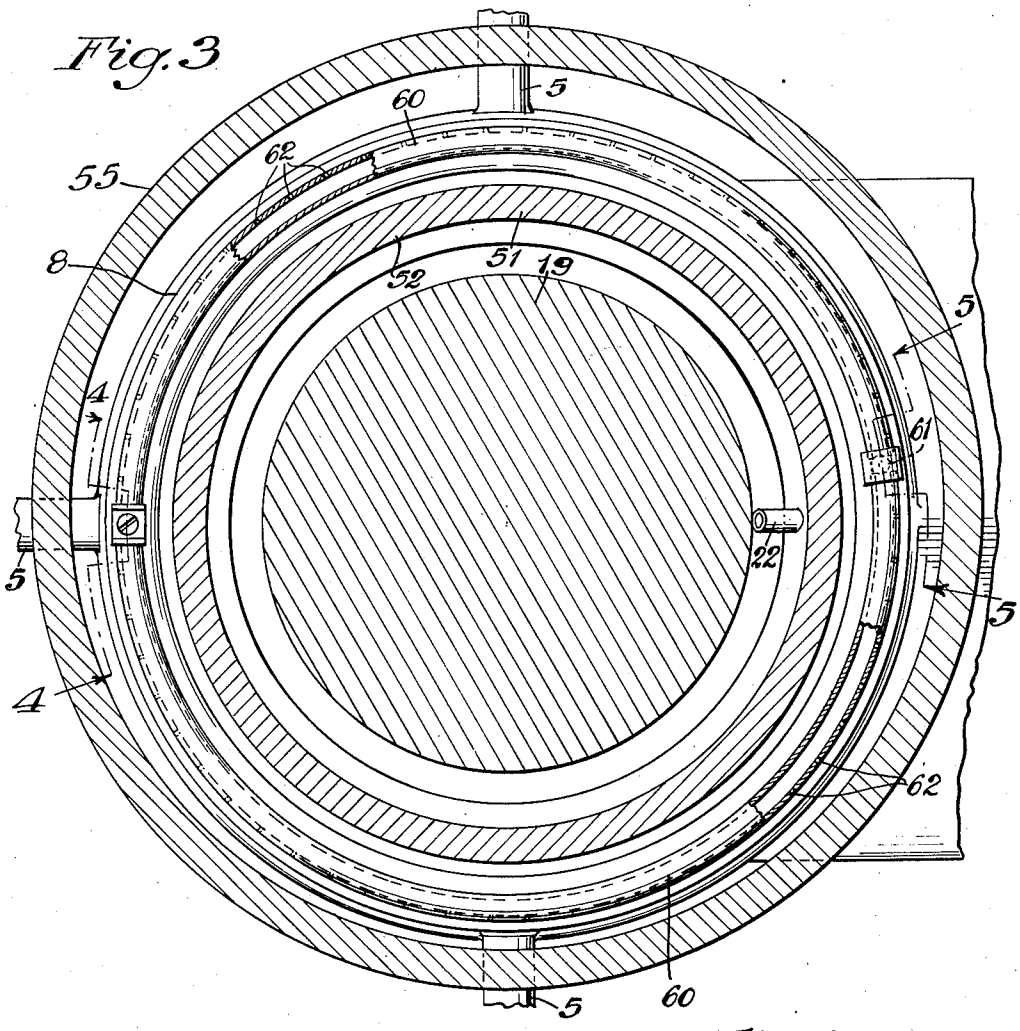


Fig. 5

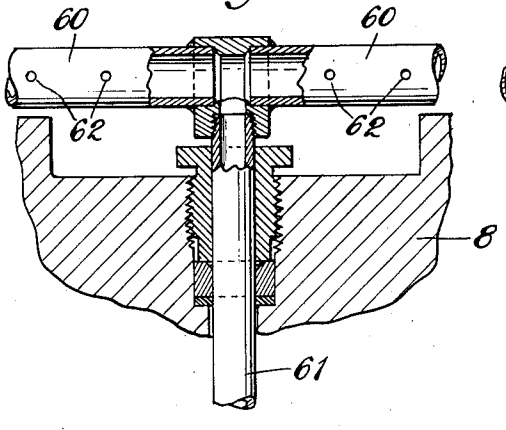
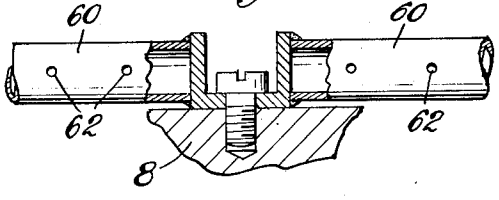


Fig. 4



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UNITED STATES PATENT OFFICE

2,489,936

SEAL ASSEMBLY FOR GYRATORY CRUSHERS

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Application June 9, 1947, Serial No. 753,466

1 Claim. (Cl. 241—216)

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My invention relates to an improvement in gyratory crushers and has for one purpose to provide a gyratory crusher of simple and efficient structure.

Another purpose is to provide improved sealing and humidifying means for use in connection with a gyratory crusher.

Another purpose is to provide improved means for protecting the bearings of a gyratory crusher.

Another purpose is to provide an improved dust seal between the crushing space and the main shaft bearing.

Another purpose is to provide improved humidifying means for laying the dust created by the crushing action.

Other purposes will appear from time to time in the course of the specification and claim.

I illustrate my invention more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is a vertical axial section;

Figure 2 is a partial vertical section on an enlarged scale;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is an enlarged section taken on line 4—4 of Figure 3; and

Figure 5 is an enlarged section taken on line 5—5 of Figure 3.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, 1 diagrammatically illustrates the top of the foundation upon which the crusher rests. 2 indicates the lower shell, shown as including a circumferential wall which may for convenience be in the form of a truncated dome. It is provided with an upper outwardly extending flange 3 and outwardly extending reinforcing ribs 4. 5 indicates any suitable rib structure adapted to center and support the inner bearing shell sleeve, or tube 6 which surrounds the below described eccentric. It is shown as having a bottom outwardly extending eaves portion 7 and an upper circumferential and generally cylindrical flange 8. Any suitable removable wear plates 9 may be used to protect the spider. 10 is any suitable bearing sleeve within an outer shaft housing 11. Rotatable in bearings 12 is the drive shaft 13 with its outer pulley 14 and bevel pinion 15. 16 is an eccentrically apertured sleeve rotatable within the sleeve or tube 6 and carrying at its lower end the bevel gear 17 meshing with the pinion 15. Thus rotation of the shaft 13 is effective to rotate the eccentric 16 within the sleeve or tube 6.

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The sleeve 16 is eccentrically apertured as at 18 to receive the lower end 20 of the crusher shaft 19. 21 is any suitable closure plate, the details of which do not form part of the present invention. It will be understood that any suitable lubricating means may be employed, for example, including the ducts variously indicated at 22. However, the oil system does not of itself form part of the present invention and will not be further described.

Positioned upon and above the lower shell 2 is an upper shell structure generally indicated as 30 which includes an outwardly extending lower flange 31 and an outwardly extending top flange 32. It may interlock with the upper flange portion 3 of the lower shell, as at 33, whereby the upper shell structure is centered on the lower shell structure. The two shells may be held together by the tension rods or bolts 34, upwardly headed as at 35 and extending downwardly through the flange 3. They are provided with any suitable locking nuts 36. Any suitable spider structure, not herein shown in detail but indicated at 37, carries a central knuckle or hub 38 with a lower ledge 39 and a bearing plate or plates 40 adapted to receive any suitable supporting sleeve 41, secured to the upper end of the shaft 19 by any suitable nut 42. Thus the shaft 19 is suspended at its upper end from the spider, its lower end 20 extending into and being gyrated by the eccentrically apertured sleeve 16. The supporting connection, including the plate 21, permits gyration of the shaft about a center adjacent the upper end of the shaft and indicated at X.

Mounted on the shaft 19 is any suitable head 45, upon which is positioned any suitable mantle 46, held in position by the top washer or thrust member 47. Within the shell structure 30 are positioned any suitable bowl concaves 48. It will be understood that both the liner and the mantle structure may be made either as a single piece or in a plurality of pieces, depending upon the size of the crusher and the desire of the operator.

It is vitally important to prevent the penetration of dust to the bearing surfaces between the tube 6 and the eccentric 16, and between the eccentric 16 and the shaft portion 20. I provide a simple and efficient sealing structure which includes a sealing component 51 having a lower portion 52 extending within the top flange or housing portion 8. It also includes an upwardly and outwardly extending portion 53 having a downwardly convex spherical bearing or sealing

surface 54 which is concentric with the center X about which the head gyrates.

Extending downwardly from the head is an apron 55 which may be secured to the head, for example, by securing screws 56. It has an inwardly extending portion 57 provided with an upwardly concave surface 58 which conforms to and engages the downwardly convex surface 54. It will be noticed that the apron 55 extends downwardly a substantial distance about the top flange 8 of the sleeve 6. Between the two members there is a downwardly open space which constitutes a protecting area with which the outer junction of the surfaces 54 and 58 communicates. I find it advantageous to position on the upper end of the flange 8 an annular spray ring 60 which may be supplied with water through any suitable duct 61. Thus water, or any other suitable liquid, is sprayed into a restricted space surrounding the exterior junction of the opposed spherical sealing surfaces. Thus the relatively small amount of dust which penetrates in the space within the apron 55 in intercepted by the spray and flows downwardly, with the discharged water, thus giving substantial protection to the inner and outer bearings of the eccentric sleeve 16. The spray member 60 may be provided with a plurality of spray apertures 62. These may be arranged, if desired, to direct spray generally downwardly and outwardly into the space surrounded by the apron 55. Thus the spray is directed across the space through which the dust would have to rise to penetrate the sealing surfaces.

It will be realized that, whereas, I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and

drawings to be taken as in a broad sense illustrative or diagrammatic rather than as limiting me to my precise showing.

I claim:

Sealing means for crushing machines and the like, including concave and convex annular sealing members having opposed sealing surfaces in contact with one another, concentric spaced walls extending downwardly one from each sealing member defining an annular chamber, below, concentric with, and closed at its top by said members, means including one of said walls for also defining a relatively narrow annular passage, extending downwardly from the chamber and decreasing in width downwardly, one wall of the chamber being upwardly and inwardly inclined to overlie the passage and being located below the sealing surfaces, a spray pipe located in and extending about the entire angular extent of the chamber, concentric therewith and located above the passage and below the sealing surfaces, means for supplying fluid under pressure to the pipe, the pipe being apertured to direct a spray sheet outwardly across the upper end of the passage, below the sealing surfaces to impinge against the inclined wall.

RULAND R. SHAFTER.

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