Dec. 10, 1940. O. C. GRUENDER ET AL 2,224,542

PROTECTING DEVICE FOR CRUSHER BEARINGS

Filed June 11, 1938 2 Sheets-Sheet 1

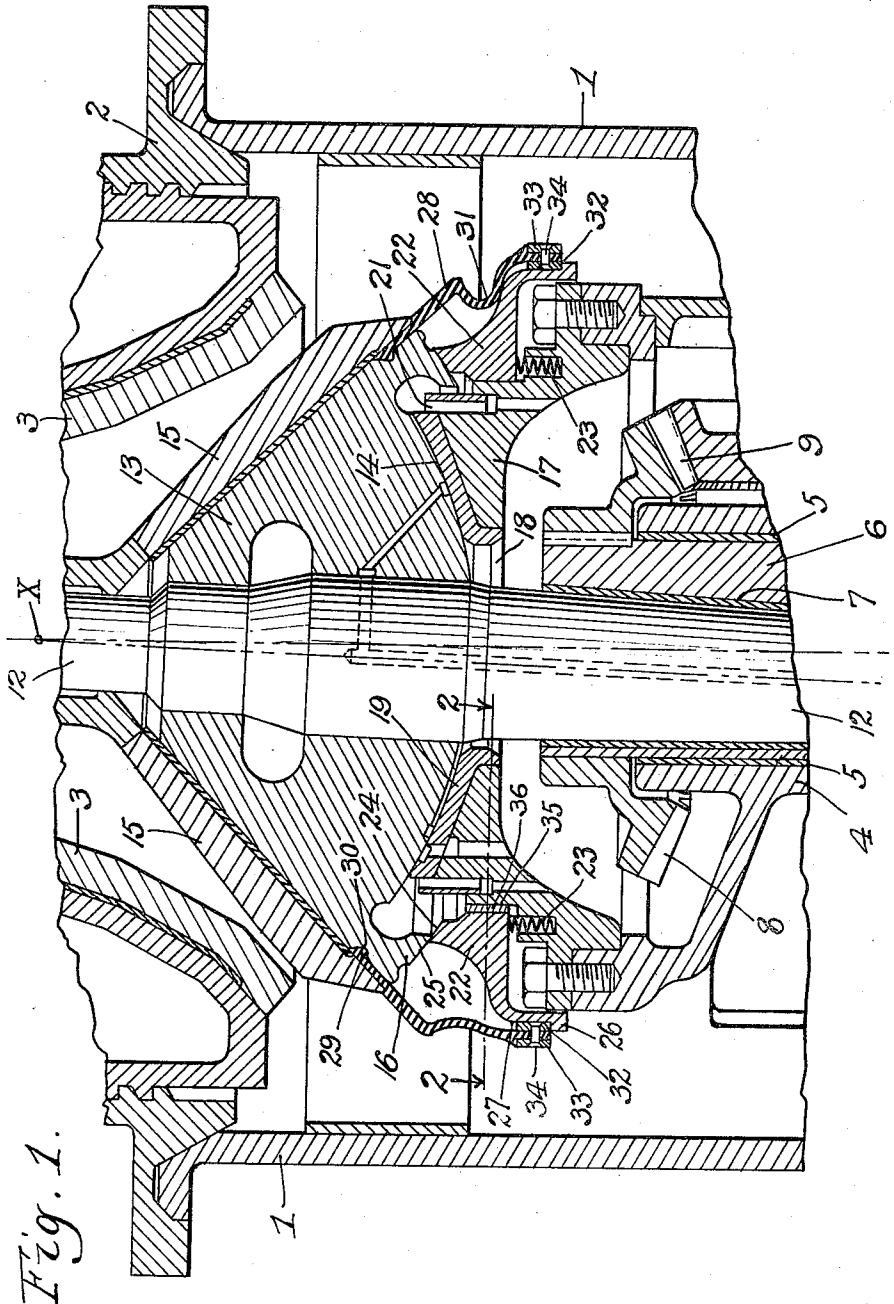


Fig. 1.

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Fig. 3.

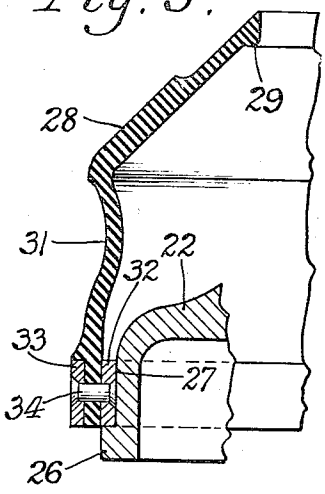


Fig. 2.

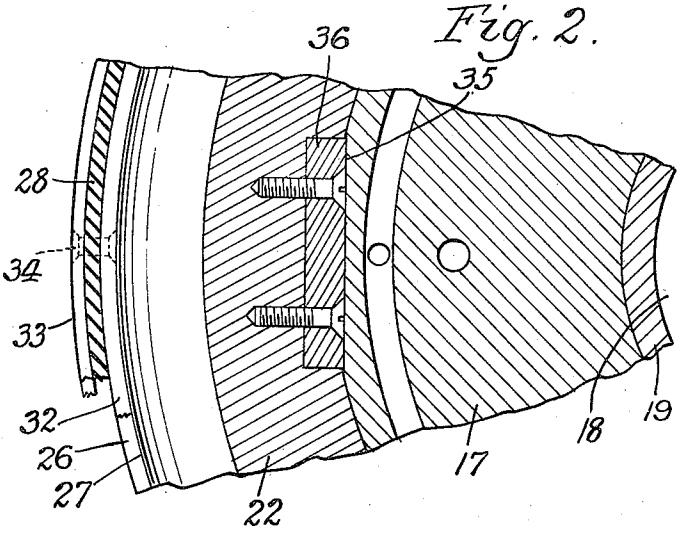
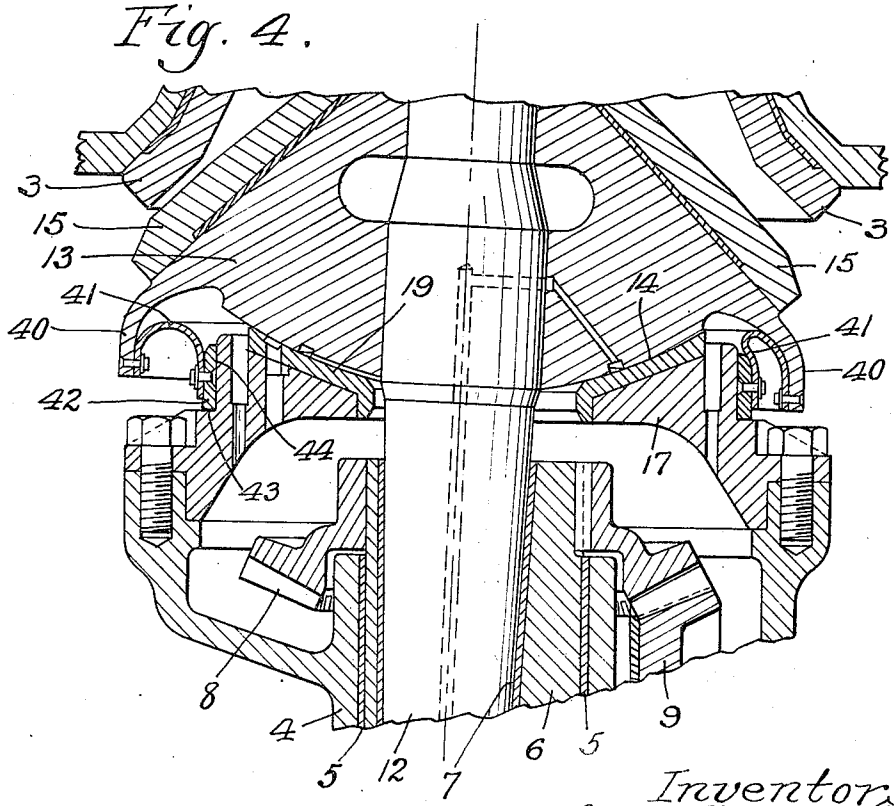


Fig. 4.



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UNITED STATES PATENT OFFICE

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PROTECTING DEVICE FOR CRUSHER BEARINGS

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Application June 11, 1938, Serial No. 213,194

3 Claims. (Cl. 83—10)

Our invention relates to an improvement in sealing means for bearings and is particularly applicable to the protection of the bearings of a gyratory crusher.

One purpose is the provision of means associated with the head of a gyratory crusher for protecting the bearings for the head or crusher shaft.

Another purpose is the provision of a flexible protecting element for sealing the bearings beneath the head, which flexible member shall serve as a seal at all positions of the head.

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

We illustrate our invention more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is a vertical axial section through a gyratory cone crusher;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a partial vertical section; and

Figure 4 is a vertical axial section through a variant form of the device.

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

Referring first to Figure 1, 1 generally indicates an outer frame member, on which is mounted an adjustable upper member 2, to which is secured a bowl liner 3. 4 is an inner sleeve, forming part of the frame and provided with a bearing 5 in which rotates the member 6 with the eccentric inner aperture 7. 8 is a gear at the top of the member 6, in mesh with a pinion 9 on any suitable drive shaft, whereby the member 6 is rotated from any suitable power source, motor or the like.

12 is a crusher shaft in the aperture 7, depending from the crusher head or cone 13, which head has the lower convex spherical bearing surface 14. 15 is any suitable wear taking mantle. The head is formed with an outer depending apron 16, shown as integral, but which may be separately formed, if desirable. It is shown as inwardly recurved, for convenience.

17 is a frame closure member which serves to house the gear 8, but which is centrally apertured as at 18, to permit the passage of the shaft 12. It is shown as having an upper bearing member 19, the upper surface of which conforms to the spherical surface 14 of the head 13. As the member or eccentric 6 is rotated, the shaft 12 and head 13 are gyrated about the center indicated at X, above the top of the head.

If dust or grit penetrates to any of the above mentioned bearing surfaces, the crusher can readily be put out of action. Hence, the protection of said bearings is a matter of vital importance. Any suitable means, not herein shown in detail, may be employed to circulate oil to and from the bearings. 21 is a circumferential sump which forms part of the lubricating system.

22 indicates a sealing ring upwardly thrust as by springs 23 and provided with a bearing surface or wiping surface 24 opposed to a corresponding surface 25 on the apron member 16. 26 is an outer circumferential ledge on the member 22 and 27 indicates a cylindrical bearing surface thereabove. 28 generally indicates a flexible apron herein shown as having an inward ridge 29 about its upper inner edge which is received in a notch 30 in the head 13, the parts being held compressed by an overhanging portion of the mantle 15. The member 28 has a downward inwardly curved or deformed portion 31 adapted for ready flexure and terminates at the bottom in a slip ring or bearing member including an inner ring 32 and an outer ring 33 which may be riveted together by rivets 34 which pass through the lower edge of the apron 28.

It will be understood that the inner slip ring 32 conforms to the cylindrical bearing surface 27 and normally rests by gravity upon the ledge 26. A certain amount of oil may leak outwardly past the surfaces 24 and 25 and downwardly to the bearing surface 27. This oil serves to trap whatever fine particles of dust might tend to work in. It also serves to lubricate the connection between the bearing 27 and the slip ring 32. In practice, the protection thus afforded is efficient and complete.

In order to prevent unintended rotation of the member 22, we may provide a flattened portion 35 on the member 17 which is opposed by a flat key 36 which may be applied to or inset in the member 22.

Referring to the form of Figure 4, we illustrate a downwardly curved and more or less elongated apron or extension 40 from the head 13 which has riveted or otherwise secured to its inner face a flexible apron 41 which in turn is secured to a slip ring 42 resting upon a ledge 43 on the member 17. 44 constitutes a bearing surface on the member 17 against which the slip ring 42 bears. This form of shield is more thoroughly housed or protected by the apron 40.

It will be realized that whereas we 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 our invention. We therefore wish the description and drawings to be taken as in a broad sense illustrative and diagrammatic rather than as limiting us to our precise showing.

We claim:

1. In combination, in a gyratory crusher having a head and means for gyrating it, and a base on which said head is supported, a bearing member on said base, a wiping member in slidable contact with said bearing member, a flexible shield secured to said wiping member, a mantle mounted on said head, said flexible shield including a portion adapted to penetrate and be gripped between said head and mantle, and means for holding said mantle against movement in relation to said head whereby, when said mantle is mounted upon and secured to said head, said flexible shield is secured in relation to said head and mantle.

2. In combination, in a gyratory crusher having a head and means for gyrating it, and a base on which said head is supported, a bearing member on said base, a wiping member in slidable contact with said bearing member, a flexible shield secured to said wiping member, a mantle mounted on said head, said flexible shield including a portion adapted to penetrate and be gripped between said head and mantle, and means for holding said mantle against movement in relation to said head whereby, when said mantle is mounted upon and secured to said head, said flexible shield is secured in relation to said head and mantle, said head and mantle being generally conic, said flexible shield including an upper conic portion and a lower inwardly curved portion adapted for ready flexure in response to the gyration of the head.

3. In combination, in a gyratory crusher having a head and means for gyrating it, a base upon which said head is supported, and a mantle mounted on said head, a flexible shield, including an edge portion penetrating between said head and mantle, and a portion extending downwardly from said head, a fixed wiping member mounted on said base and including a generally cylindrical vertical portion and an outwardly extending ledge therebelow, a wiping ring surrounding said cylindrical vertical portion and gravitally resting upon said ledge, at all positions of the head, said ring being secured to an outer portion of the flexible shield, and means for locking the mantle in relation to the head and for thereby securing the upper edge of said shield in relation to head and mantle.

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