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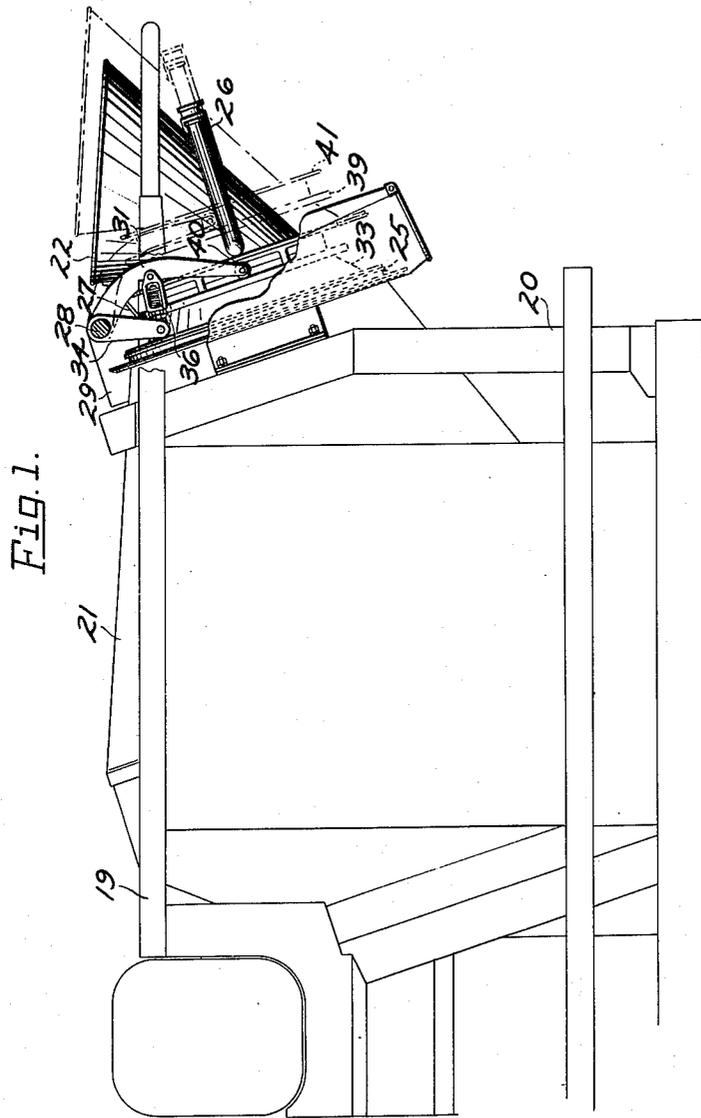
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2,544,083

APPARATUS FOR CHARGING AND DISCHARGING CONCRETE MIXERS

Filed Dec. 27, 1947

3 Sheets-Sheet 1



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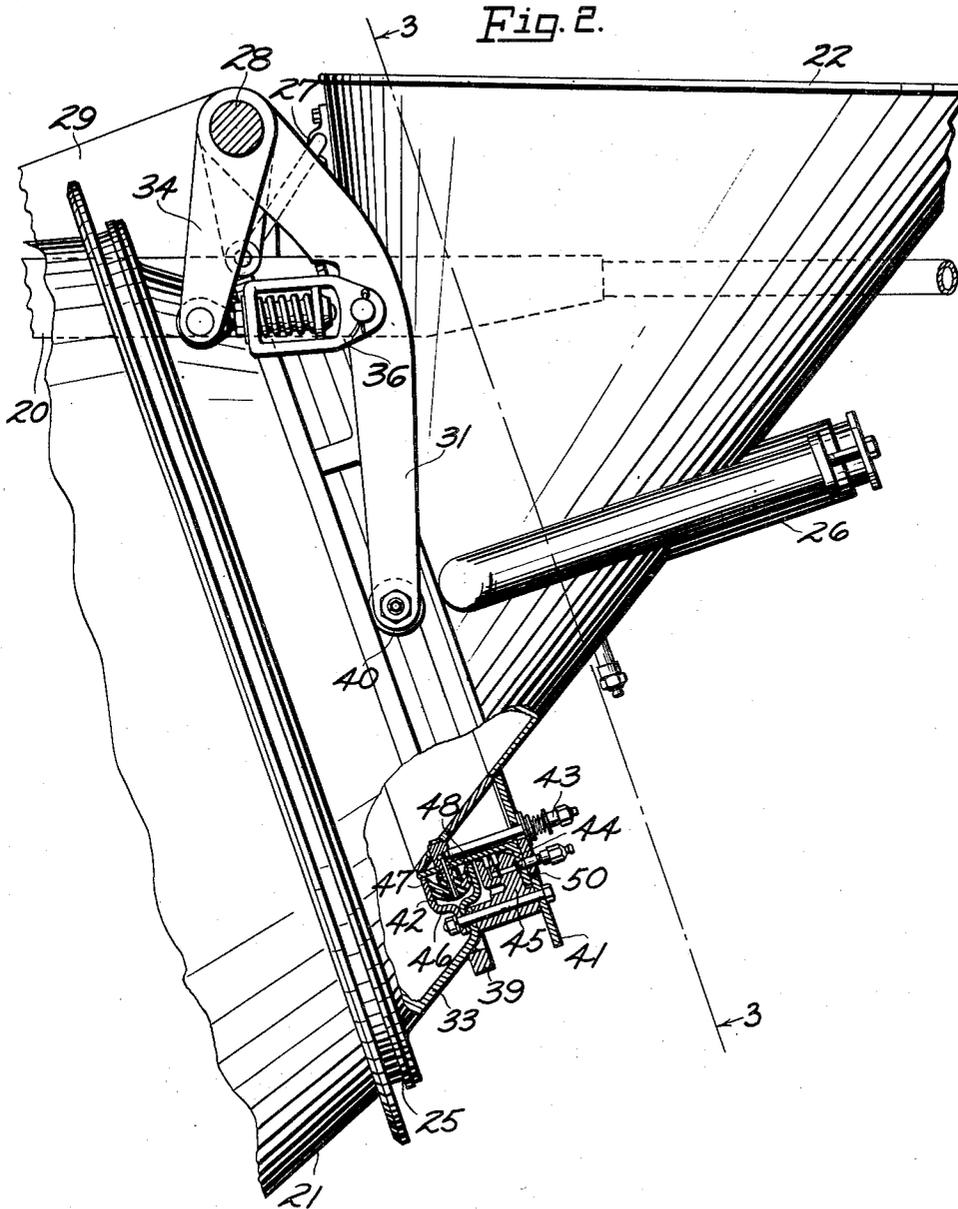
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3 Sheets-Sheet 3

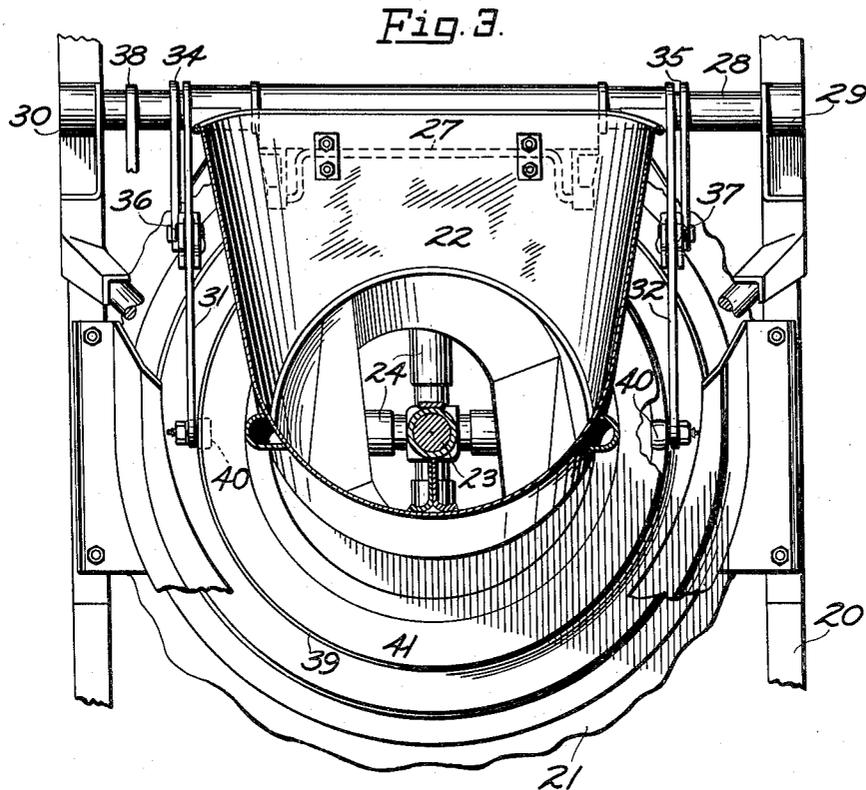
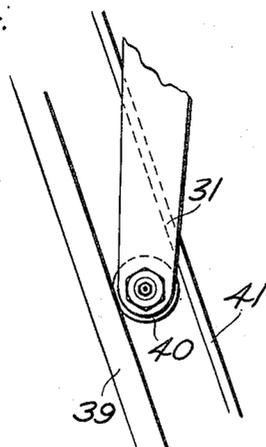


Fig. 4.



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# UNITED STATES PATENT OFFICE

2,544,083

## APPARATUS FOR CHARGING AND DISCHARGING CONCRETE MIXERS

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1 Claim. (Cl. 259—161)

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This invention relates to concrete mixers and particularly to the transit variety which are mounted on motor trucks.

In high discharge truck mixers it is now conventional practice to load the mixer through a nonrotatable hopper and to discharge the same from the mouth of a drum opening which is normally sealed by a rotatable closure ring mounted on the hopper. The use of the rotatable closure ring is now widespread and in a large measure makes possible the arrangement whereby hopper loading is accomplished. However, the use of the rotatable closure ring has brought problems of sealing the same and of thrust assemblies interposed between the hopper and rotatable closure ring. Since a concrete mix is by and large a highly abrasive substance, it can be realized that radial and thrust bearing surfaces must be well sealed, otherwise the grouts of the mix would quickly destroy their usefulness. Accordingly, seals have been provided which have greatly minimized these problems, but they have not eliminated them, for in the normal wear and use of a conventional mixer the thrust instrumentalities have become so abraded as to displace the sealing means, allowing infiltration of grouts into said assemblies whereby the effectiveness of the thrust and sealing means were seriously impaired. This necessitated expensive repair and in many instances replacements of the entire hopper arrangement.

In conventional concrete mixers the force necessary to bring the rotatable closure ring into sealing relationship with the revolving mixing drum is exerted through a movable hopper, thence through thrust faces, thence to the rotatable closure ring itself; as this force is considerable it goes without saying that great pressure is necessarily exerted through the hopper onto the thrust faces and this causes great wear at said thrust faces, particularly when fine grouts infiltrate between the seals and become lodged therebetween.

Accordingly, it is the object of this invention to provide charging means for concrete mixers which will exert the force necessary to seal the rotatable closure ring on the mouth of the mixing drum through or directly upon said rotatable closure ring.

Another object of this invention is to provide apparatus for charging transit concrete mixers of the high discharge type having a movably mounted hopper for directing materials into the drum, the means for so movably mounting the hopper also exerting force necessary to seal the same against the mouth of the drum opening through the rotatable closure ring.

These are the broad objects of this invention and other objects will appear to those skilled in

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the art in the reading of the following description and claims.

Referring to the figures,

Fig. 1 represents a side elevation of a conventional truck mixer with the improved charging device mounted thereon.

Fig. 2 represents an enlarged side elevation of the charging and discharging device for transit concrete mixers.

Fig. 3 represents an end elevation partly in section, along the lines 3—3 of Fig. 2 and partly broken away, further showing details of the invention.

Fig. 4 is an enlarged broken away view of the trackway on the rotatable closure ring with the lever mounted roller in registry therewith.

Referring more specifically to Fig. 1 and the other figures, a high discharge truck mixer 19 which may readily be mounted on a motor truck is shown. Said mixer comprises a frame 20, in which a rotatable mixing drum 21 is mounted. The hopper 22 shown in this view is mounted for axial movement as respects to drum 21 on a shaft 23 which is attached to spider members 24 within the mixing drum 21. This is shown in Fig. 3. The hopper 22 is moved axially toward and away from the mouth of the drum opening 25 and is supported by said shaft 23 which is in registry with a bushing member 26 mounted on the hopper 22. Rotational movement of said hopper is restrained by means of a pivoted bail 27 which is pivotally affixed to the frame 20 of the mixer and to the hopper. The apparatus for moving the hopper 22 toward and away from the mouth of the drum opening 25 is comprehended by references to Figs. 2, 3 and 4. This apparatus includes a rock shaft 28 which is pivotally mounted to the frame of the mixer as at 29 and 30. Pivotaly attached to said rock shaft are the lever members 31 and 32. These are the members which induce axial movement to the hopper 22 and rotatable closure member 33. Affixed to the rock shaft 28 in nonmovable relationship, are the levers 34 and 35; these are linked to the levers 31 and 32 by means of resilient members 36 and 37. The rock shaft 28 is rocked by means of a lever connection 38 which may be attached to conventional worm gear and crank mechanisms (not shown) in order to bring about the desired movement of shaft 28 or rocked by other well known expedients.

Mounted on the rotatable closure ring 33 is the track member 39 on which the rollers 40, which are attached to the levers 31 and 32 ride when the hopper and rotatable closure ring are brought up into engagement with the mouth of the mixing drum 25. The track member 41 is arranged in spaced parallel relationship with the track member 39 so as to permit the roller 40 to

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engage its face when the hopper and rotatable closure ring are moved away from the mouth of the mixing drum 25, as when the contents of the mixing drum 21 are discharged. The members 40 and 41 therefore constitute a trackway in which the trust elements 40 operate.

An annular sealing member 42 is mounted on the hopper 22, and is accommodated within a channel 46 mounted on the closure ring 33. Lubricant is fed into the space between the seal 42 and the channel 46 by the pipe communicating with the grease fitting 43. The aforesaid seal construction forms the subject matter of U. S. Patent 2,439,250 issued April 6, 1948 on an application of my co-worker, Louis G. Hilkemeier. Likewise mounted on the discharge end of the charging hopper is an annular element 44 providing an annular surface on which the closure ring is journalled. Riding on this surface is the element 45 which is rigidly connected to the closure member 33. The element 44 is actually L-shaped in cross section, as shown in Fig. 2, and the radial portion thereof is disposed between the inwardly extending portion of the element 45 and the inner edge of the track plate 41 so that upon movement of the closure ring by the thrust elements 40, the element 44 and the charging hopper are correspondingly moved therewith. The charging hopper 22, as previously pointed out, is arranged to slide on the shaft 23, and since the axis of the drum and the shaft 23 are inclined from the horizontal, the weight of the charging hopper tends to keep it in charging position so that there is very little pressure between the inner end of the trackway 41 and the radial flange of the L-shaped element 44. When the hopper is moved to non-charging position, or to the right as shown in Fig. 2, the rollers 40 cooperate with the track 41 and some force is necessarily transmitted from the element 45 to the element 44, but this force is of small magnitude because the only work accomplished is the translation of the hopper on the inclined shaft 23 and there is no rotating friction between the closure ring and the hopper as soon as the closure ring is disengaged from the drum. When moving the charging hopper into charging position, action is initiated by rocking the shaft 23 by means of the worm and crank mechanism. Thrust is exerted by the rollers 40 on the track member 39, first to translate the closure ring to closed position and thereafter to exert such pressure through the closure ring against the mouth of the drum that the closure ring will rotate with the rotating drum. The hopper merely moves along with the closure ring as previously described.

In the past the lever arm 31 was permanently affixed to the hopper 22 thereby causing wear between the element 45 and the element 44 as all the force necessary to seal the drum was exerted through this assembly. As this wear progressed the sealing member 42 became worn as at 47, leaving a gap between the seal and face 48. When the hopper and the rotatable closure ring were moved toward and away from the mouth of the mixing drum grouts infiltrated between the worn seal at 47, passed the seal and face 48, into the thrust assembly and lodged between the wearing surfaces provided by the juxtaposed position of these members. The foregoing described action shortened the life of the thrust and sealing assemblies and necessitated costly repair and inevitably replacement of the

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entire assemblies. Since the thrust according to the present invention is transmitted directly to the closure ring, the spatial relationship between the seal and the members 44, 45 and 50 is substantially unaffected, and the seal functions over a longer period of time with considerably less trouble.

The hopper 22 in this embodiment of the invention is mounted on the shaft 23 for movement axially of the drum 21; while the levers 31 and 32 are mounted on the shaft 23 for pivotal movement relative thereto. Hence, the movement of the levers 31 and 32 is not constant as regards to diametrical, or near diametrical, positions of the same during opening and closing operations, on the track members 39 and 41. In other words while the rollers 40 may be oppositely positioned on the diameter of the annular groove when the drum opening 25 is closed, they are above said diameter when the mouth of the drum is open by reason of movement aforesaid of the rotatable closure member and hopper away from said opening. This is accommodated by the provision of the roller 40 attached to the lever 31. When the drum is opened the lever 31 is free to ride up on the track member 41; as the hopper is moved toward the mouth of the drum to close it, the roller may move down on the track member 39. Also, since it is frequently impossible, due to distortion in loading of the mixer, to maintain concentricity of the mouth of the drum 25 with the face of the rotatable closure ring, the above track and roller structure accommodates such erratic movement of these two faces when they are mated together.

The invention is not to be limited to precise details of its chosen embodiment herein described but is to be limited only by the clear import of the following claim.

I claim:

Charging apparatus for a rotatable mixing drum having an annular, axial opening at one end and comprising a movable charging hopper having an annular surface at its discharge end, means holding the hopper against rotation during charging operations, means supporting the charging hopper enabling movement toward and away from the drum, an annular closure member journalled on the annular surface of the charging hopper arranged to engage the drum opening and to rotate with the drum when the hopper is in charging position, said closure member having an annular track on its external surface, thrust elements engaging said track on either side of the hopper, and means for actuating the thrust elements to force the closure member into engagement with the drum and to provoke rotation of the closure member when the closure member is in engagement with the rotating drum.

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