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MEANS FOR SUPPORTING AND DRIVING MIXER DRUMS

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2 Sheets-Sheet 1

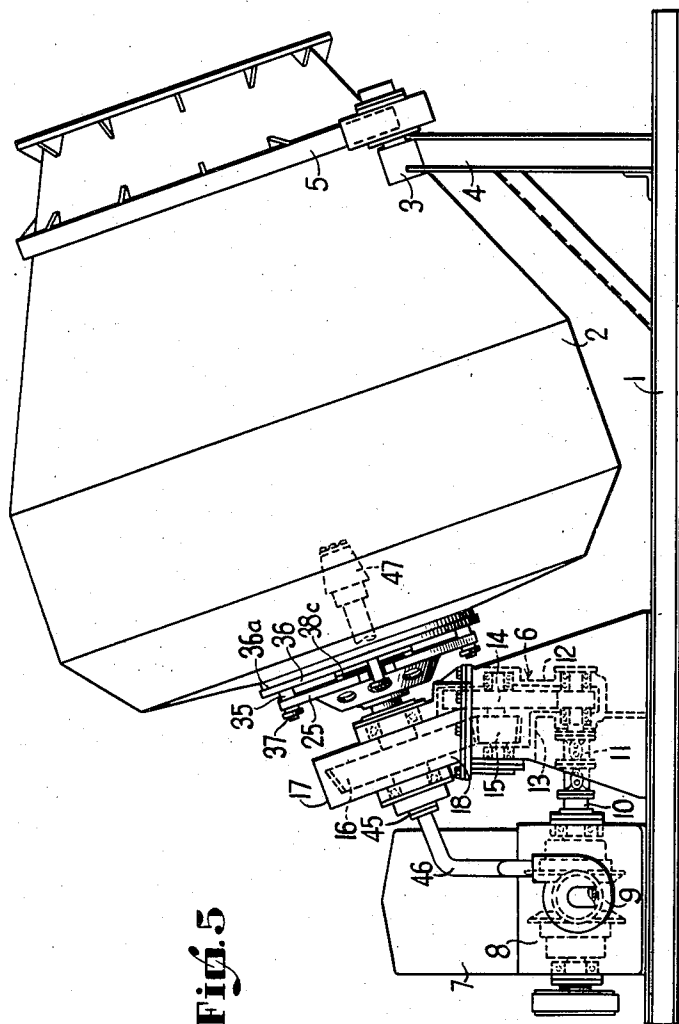
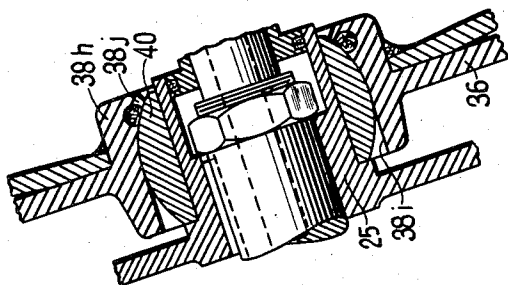


Fig. 1

Fig. 5



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2 Sheets-Sheet 2

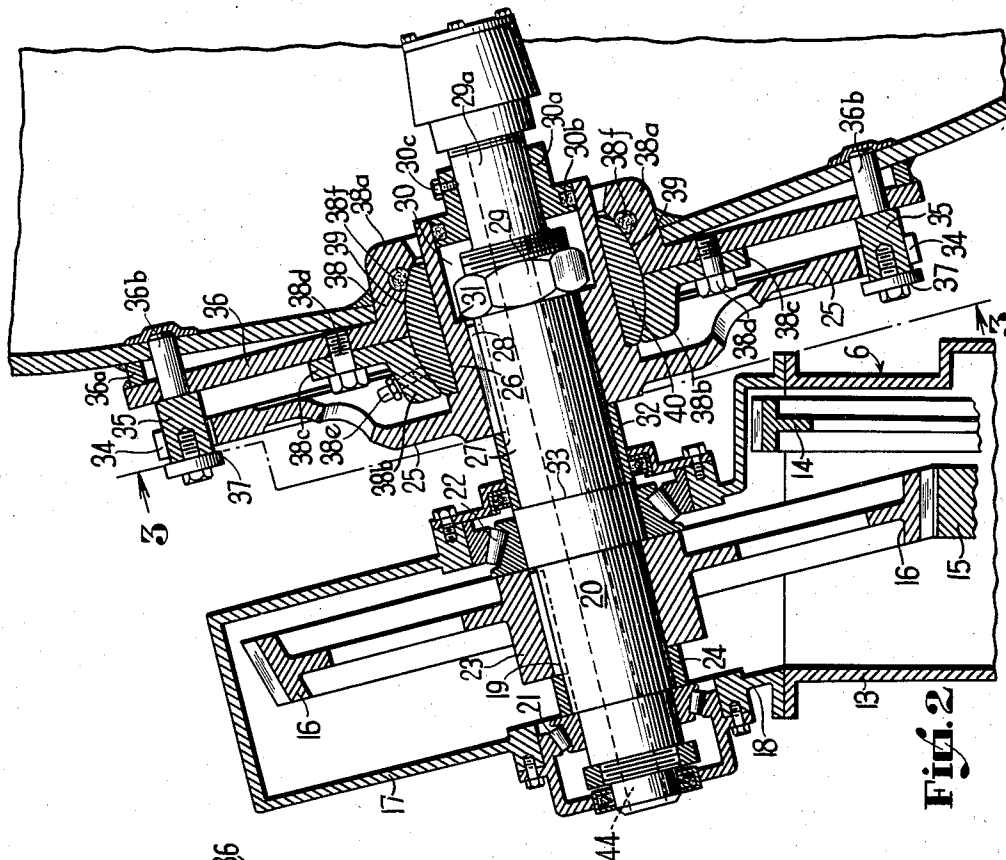
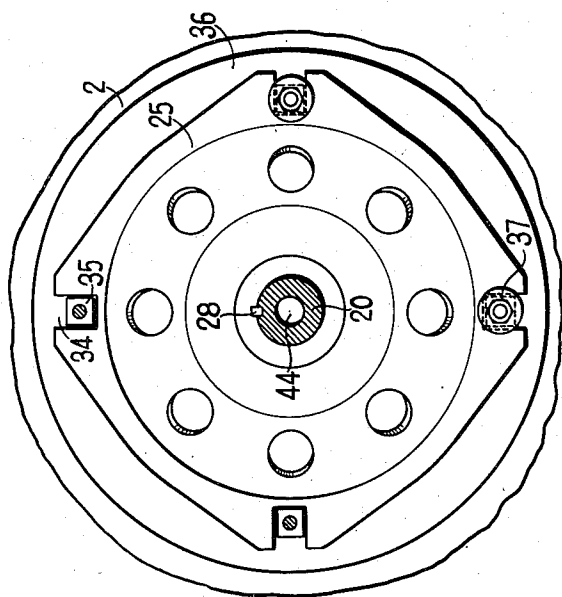
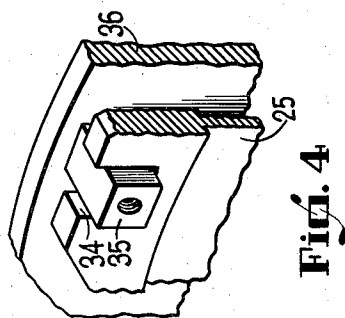


Fig. 3

Fig. 4

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MEANS FOR SUPPORTING AND DRIVING
MIXER DRUMSGebhard Jaeger, Columbus, Ohio, assignor to The
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5 Claims. (Cl. 259—161)

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My invention relates to means for supporting and driving a mixer drum. It relates, more particularly, to means for supporting and driving the mixer drum of a truck mixer, either of the horizontal drum type or of the inclined drum or high-dump type. The structure of my invention, however, is applicable to similar installations in connection with other types of equipment.

The main object of my invention is to provide a novel mounting for the driven end of the drum which permits initial proper alignment of the drum on its supporting structure and compensates for slight misalignment of the drum on its supporting structure that might occur during use of the mixer.

According to my invention, I provide a support for the mixer drum which includes the usual cradle structure for supporting the rear end of the drum. The forward end of the drum, however, is supported by a self-contained trunnion bearing and driving structure. This self-contained driving and supporting structure comprises a housing which contains the driving gears and which supports a rearwardly projecting output shaft or trunnion. The drum is supported on the trunnion by means of a driving member which is keyed to the trunnion that is, in turn, driven by the gears disposed in the housing. The driving member is provided with driving portions which engage with driving portions carried by a driven-supporting member secured to the forward end of the drum and carrying a drum-supporting sleeve. This sleeve cooperates with a bearing hub on the driving member to support the drum on the trunnion shaft. The sleeve is larger than the hub and I provide a special arrangement between the sleeve and bearing hub to permit initial proper alignment of the drum and to compensate for misalignment during use of the mixer. This arrangement comprises a ball and socket joint in the form of a separate bearing sleeve that fits on the hub of the driving member and that has a spherical outer surface which fits within a spherical socket formed within the drum-supporting sleeve by the driven member.

The preferred embodiment of my invention is illustrated in the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a side elevational view illustrating my invention applied to a mixing drum supported on an inclined axis.

Figure 2 is a vertical sectional view taken

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through the main part of my drum supporting and driving means.

Figure 3 is a transverse sectional view taken along line 3—3 of Figure 2.

5 Figure 4 is a detail in perspective of the driving connection between the driving member and the driven-supporting member on the drum.

Figure 5 is a sectional view of a modification of the ball and socket joint.

10 With reference to the drawings, I have illustrated in Figure 1 a supporting frame 1 which may be the frame of any suitable vehicle for carrying the mixing drum 2. For example, the frame 1 may be mounted on a truck chassis.

15 In this instance, the mixer drum 2 is on an inclined axis so that the truck mixer would be one of the high-dump type. The rear end of the inclined drum is supported by cradle rollers 3 which are carried by upstanding members 4 of the frame 1, the rollers 3 engaging a supporting band 5 carried by the drum. The forward end of the drum 2 is carried and driven by the unit which we shall indicate generally by the numeral 6.

25 The engine 7 supported at the forward end of the frame 1 will drive the conventional transmission 8 which is capable of forward and reverse drive and which may be provided with an output shaft for driving a centrifugal pump 9. The main output shaft 10 of the transmission will serve to drive the unit 6 through the medium of a universal drive 11 connected to an enclosed gear reduction unit 12.

30 The unit 12 is in the form of a pedestal which supports the unit 6. The unit 12 includes a housing 13 which encloses a group of gears 14 which are in proper ratio and properly arranged to obtain the desired reduction. The final driven gear 15 of the unit 12 meshes with the large driven gear 16 of the unit 6, as shown best in Figure 2.

35 It will be noted from Figure 2 that the unit 6 includes a housing 17, in which the main part of the gear 16 is disposed, this housing communicating at its lower side with the housing 13 and the gear 16 extending down into the housing 13. The housing 17 is mounted in forwardly tilted position on the upper end of the housing 13 by means of an intermediate housing portion 18 to which the lower end of housing 17 is bolted and the upper end of housing 13 is bolted. However, if the axis of the drum 2 is horizontal, a different intermediate housing portion is substituted for the portion 18 to bring the housing 40 portion 17 into vertical position.

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The gear 16 is keyed on a reduced portion 19 of a trunnion shaft 20. This shaft 20 is carried by the housing 17. For supporting the shaft on the housing 17, a roller bearing 21 is secured to the forward wall of the housing and a roller bearing 22 is secured to the rear wall of the housing. The inner race of the bearing 22 engages the hub 23 of the gear 16 at the rear side thereof while the forward side of the hub is engaged by a thrust collar or spacer 24 which is engaged by the inner race of the bearing 21. Thus, the shaft 20 is rotatably carried by the housing 17.

The shaft 20 extends rearwardly through the rear wall of the housing 17. The projecting portion of this trunnion shaft, which is the output shaft of the unit 6, carries a drum driving member 25 which is illustrated best in Figures 3 and 4. The member 25 is provided with a hub 26 into which the reduced rear end 27 of shaft 20 projects and which is keyed to the shaft by means of a key 28. The rear reduced extremity 29a of the shaft 20 is threaded to receive a nut 29 which fits into a cup 30 at the rear side of the hub 26. This nut engages the shoulder 31 on the hub and keeps the spider hub 26 in contact with a spacer sleeve 32 disposed between the hub and a shoulder 33 at the forward end of reduced shaft section 27. A collar 30a which carries a sealing ring 30b is provided on reduced shaft portion 29a and fits within the cup 30 to close it, the collar being held in fixed position by set-screw 30c. Thus, the driving member 25 will be maintained in a position spaced behind the housing 17 on the shaft 20.

The driving member 25 is provided with four driving notches 34 (Figures 3 and 4) formed in its edge at 90° intervals. Each of these driving notches 34 is adapted to engage a forwardly projecting lug 35 carried by a driven member in the form of a bearing support 36 which is secured to the forward end of the drum 2 by means of a ring 36a welded between member 36 and the front wall of drum 2 and pins 36b which extend through aligning openings in such wall and member 36 and are welded in position. The notches 34 receive the driving lugs 35 when the drum 2 is positioned on the frame and bolts and collar units 37 (Figure 2) prevent pulling of the lugs 35 forwardly from the notches 34. It will be apparent that although I have indicated that four sets of notches 34 and lugs 35 are provided, it is to be understood that any desired number of such units may be provided.

The member 36 carries at its center portion a two-part sleeve 38 which is provided with a socket 39. This sleeve is formed by providing a hub portion 38a, which is integral with member 36 and welded to the drum wall, and a collar portion 38b which is provided with flange 38c that is bolted to the forward side of driven member 36 by bolts 38d. The socket 39 surrounds the hub 26 of the member 25 and is of considerably larger diameter than the hub so that it can receive a separate bearing sleeve, preferably a metal sleeve 40. The bearing sleeve 40 closely surrounds the hub 26 of driven member 25 and is provided with an exterior surface of spherical form. The inner wall of the socket 39, formed by members 38a and 38b, is of complementary spherical form as shown in Figure 2. Thus a ball and socket effect is obtained. Lubricant may be forced into socket 39 by means of fitting 38e in collar 38b. A lubricant-retaining ring seal 38f is provided in hub 38a and engages the outer surface of bearing sleeve 40.

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Sufficient play is provided between the notches 34 and the lugs 35 to permit relative movement between members 36 and 25 due to misalignment, and bearing sleeve 38 can turn and rock on bearing sleeve 40 when necessary to obtain initial alignment and permit limited misalignment subsequently, due to the ball and socket effect. It will be noted that an annular space 39g is provided between hub 38a and hub 26 to permit rocking of bearing sleeve 38 on bearing sleeve 39.

In mounting the drum on the frame, the bearing sleeve 40 is first positioned within socket 39. Then after the unit 6 is properly positioned, it is merely necessary to support the drum 2 on the cradle rollers and then slide it forwardly until the lugs 35 of member 36 slip into the notches 34 of member 25 and the sleeve 40 slips over the hub 26. Then the bolt units 37 are mounted on the lugs 35 to prevent accidental removal of the lugs from the notches. Because of the provision of the sleeve 40 and the notches 34 and lugs 35, misalignment of the drum on the frame will merely produce slight relative movement between the members 36 and 25, this being facilitated by the ball and socket structure. The drum can be easily removed, if necessary, merely by removing bolts 37 and moving the drum rearwardly to slide the lugs 35 from the notches 34, the driving member 25 staying in position on the shaft 20. Thus, in removing the drum, it is not necessary to dismantle the trunnion bearing. Due to the provision of the ball and socket bearing, the drum can be aligned initially relative to the unit 6 without using shims, and subsequently any slight misalignment, which might be caused during operation of the truck by flexing of the frame, will be permitted.

The trunnion shaft 20 is preferably hollow so that a water passageway 44 extends completely therethrough. The forward end of this passageway, as shown in Figure 1, is connected by a suitable swivel coupling 45 to a water pipe 46 leading from the pump 9. The rear threaded end of the shaft 20 has a water distributing bell 47 mounted thereon disposed within the mixer drum 2.

As previously indicated, the driving and supporting unit of my invention can be used either with a horizontally disposed drum or an inclined drum. When the drum is horizontally disposed, as previously indicated, the housing 17 will be vertical. Therefore, the driven gear 16 will be vertical and a beveled gear need not be used as in the structure shown in Figure 2.

In Figure 5, I have illustrated a different arrangement of the ball and socket structure. In this instance, the spherical bearing sleeve 40 is exactly as before. However, the sleeve 38h which slips over the sleeve 40, and is carried by driven member 36, is made in one part instead of two parts. The mouth of the sleeve is widened, as at 38i, so that it can slip forwardly over sleeve 40 and is provided with a stop lip 38j at its rear side to limit this forward movement. The inclination of the drum will be relied upon to keep the sleeve 38h forwardly in place on the sleeve 40.

It will be apparent from the above description that I have provided a novel mixer drum supporting and driving mechanism. A number of advantages of this structure have been discussed and others will be apparent.

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Having thus described my invention, what I claim is:

1. Apparatus for supporting and driving a rotatable mixer drum or the like comprising a supporting frame, rollers on said frame for providing a cradle for supporting one end of the drum and means on the frame for supporting the other end of the drum, said means comprising a trunnion shaft supported on said frame and projecting towards the end of the drum, means for driving said shaft, a driving member having a hub keyed on said shaft, said member being provided with a plurality of driving notches in its periphery, a driven bearing support carried by the adjacent end of the drum and disposed adjacent the driving member at the inner side thereof, said support having a bearing sleeve surrounding the hub of said driving member and having a plurality of lugs spaced outwardly from its axis which extend in an axial direction into said notches of the driving member, the sleeve of the driven bearing member having a socket of larger diameter than the hub of the driving member which it receives, and a bearing sleeve of non-compressible material disposed in said socket in surrounding relationship to said hub, said second bearing sleeve having an outer spherical surface and said socket having its wall formed of non-compressible material and being of concave complementary form so as to bear directly against said spherical surface and to support the weight of the end of the drum, sufficient play being provided between said lugs and notches to permit said first bearing sleeve to move on said second bearing sleeve to compensate for axial misalignment between the mixer drum and the trunnion shaft.

2. Apparatus according to claim 1 wherein said sleeve of the driven bearing member is formed in two parts, one part comprising a hub portion on said member and the other part comprising a collar portion fastened to said driven member in cooperative relationship with said hub portion.

3. Apparatus for supporting and driving a rotatable mixer drum or the like comprising a supporting frame, means on said frame for supporting one end of the mixer drum to permit slight lateral movement of the axis of the drum, means on the frame for supporting the other

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end of the drum, said means comprising a trunnion shaft supported on said frame and projecting towards the end of the drum, means for driving said shaft, a driving member keyed on said shaft and a driven member carried by the adjacent end of the drum and disposed adjacent the driving member, said driving member and said driven member having interfitting driving portions, said driven member having a bearing sleeve which surrounds a hub on said driving member, said sleeve having a socket of larger diameter than said hub, and a bearing sleeve of non-compressible material disposed in said socket in surrounding relationship to said hub, said second bearing sleeve having a curved outer surface which cooperates with a complementally curved surface of said socket which is formed of incompressible material and bears directly against said curved outer surface of said second bearing sleeve so as to support the weight of the one end of said drum, sufficient play being provided between the interfitting portions of said driving and driven member to permit said first bearing sleeve to move on said second bearing sleeve to compensate for axial misalignment between the mixer drum and the trunnion shaft.

4. Apparatus according to claim 3 wherein said first bearing sleeve includes a removable collar to facilitate insertion of the second bearing sleeve in said socket.

5. Apparatus according to claim 1 wherein the hub of the driven member is spaced from the hub of the driving member at its end which is towards said supporting rollers to permit rocking of the first bearing sleeve on the second bearing sleeve.

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