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DRIVE MECHANISM FOR CONCRETE MIXERS

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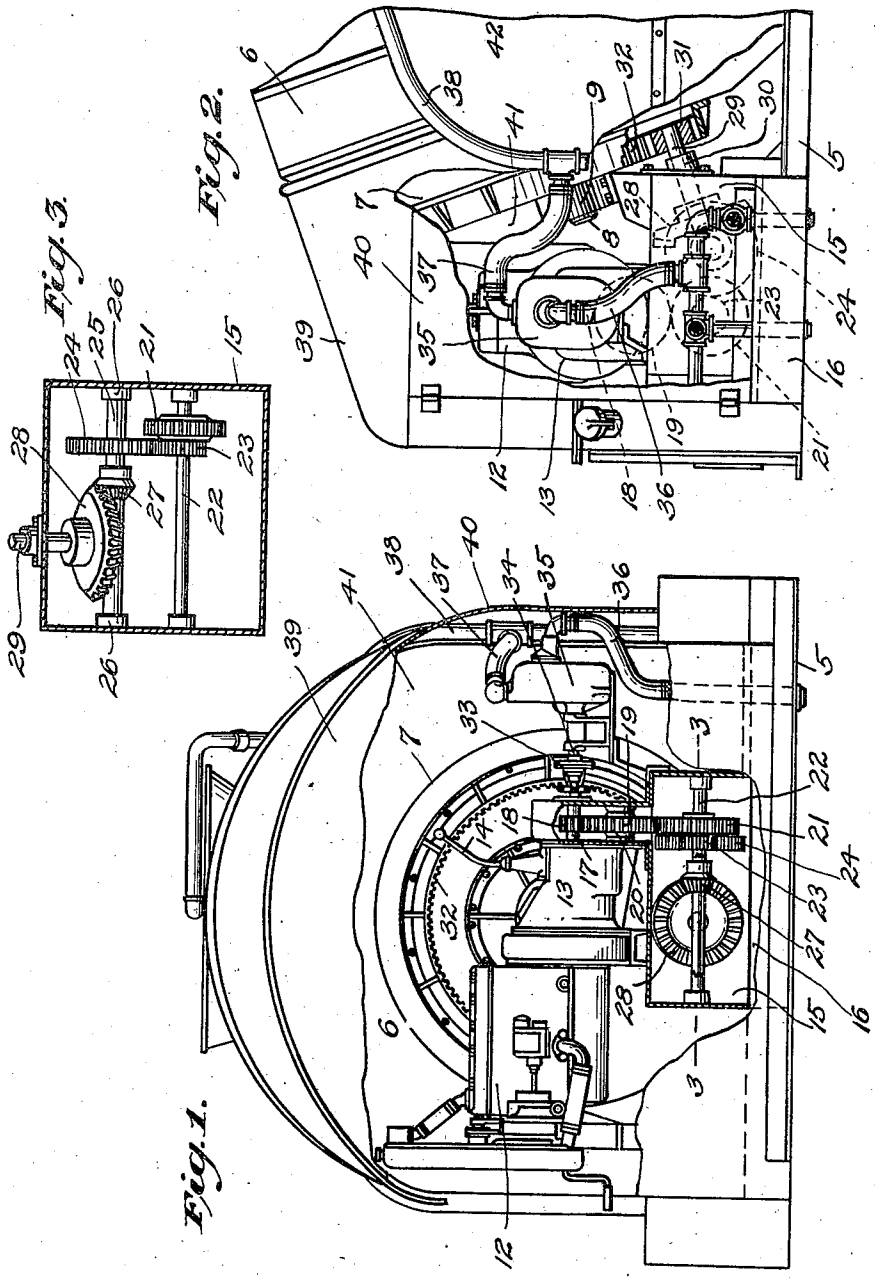


Fig. 3.

Fig. 2.

Fig. 1.

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DRIVE MECHANISM FOR CONCRETE MIXERS

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This invention relates to concrete mixers, having particular reference to an improved drive mechanism for imparting rotating power to the agitating drums of such mixers. While my invention is not so limited, it has practical application to concrete-mixing apparatus of the type mounted on automotive vehicles for mixing the concrete-forming materials during transit or other operational use of the vehicles.

It is an object of the invention to provide such a vehicle mounted concrete mixer with a rotatable mixing drum which is driven by an engine independent of the vehicle's propelling engine and disposed at the lower end of the drum on the vehicle frame.

It is another object to provide the mixer-operating engine with an improved transmission for imparting controlled rotary motion to the mixing drum, and wherein the engine, transmission and rear end of the drum is housed in a vehicle-carried casing or shell which protects the mechanism enclosed thereby, as well as improving the external appearance of the apparatus.

It is a further object of the invention to provide a propelled concrete mixer with a compact and structurally simplified, engine driven, power-transmitting means for rotating the mixing drum and wherein the engine and power-transmitting means are disposed within the transverse measurements of the vehicle, so that parts projecting laterally from the sides of the vehicle are eliminated, whereby to make it feasible to enclose such parts in a protective casing.

Still, a further object is to provide a simple, compact and efficient drive mechanism for the rotary drum of a concrete mixer, and wherein one end of the drum is formed with an internal gear which is rotated by a spur pinion mounted on an engine-driven shaft.

For a further understanding of the invention, reference is to be had to the following description and the accompanying drawing, wherein:

Fig. 1 is a front elevational view of the improved drive mechanism for the rotary drum of a vehicle mounted concrete mixer, a portion of the casing surrounding the drive mechanism being broken away and shown in section to disclose internal structure;

Fig. 2 is a detail side elevational view, partly in vertical section, of said drive mechanism;

Fig. 3 is a horizontal sectional view taken on the plane indicated by the line 3—3 of Fig. 1.

Referring more particularly to the drawing, the numeral 5 designates the bed of a portable concrete mixer. The bed is adapted to be mounted on the chassis of an automotive truck, not shown, which may be of any standard type. The bed, as hereinafter more particularly defined, effects the support of a rotatable mixing drum 6. This drum has its longitudinal axis

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disposed at an acute angle with respect to the horizontal, having an elevated rear end in which the mix-forming materials are received and discharged. The forward or lower end of the drum is closed by the wall 7 and the interior of the drum is provided with the usual mix-agitating and conveying blades, not shown. The rear wall 7 in the longitudinal axis of the drum is provided with a supporting stud or trunnion 8, which is received in an antifriction, thrust-absorbing bearing 9, and, at its rear end, the drum is rotatably supported in any conventional manner.

Mounted on the bed 5 at the front of the drum 6, and extending transversely across the bed, is a drum-operating internal combustion engine 12, with which is unitarily associated a standard change-speed transmission embodying a casing 13 and a manually operated gear-changing lever 14. The rear of the engine 12 and the transmission casing 13 is supported on a second gear casing 15 stationarily mounted in connection with the bed 5, and below the casing 15 water-containing tanks 16 are arranged to form a part of the bed and on which the engine and transmissions are mounted. This arrangement is advantageous in that it saves considerable vertical space due to the elimination of structural members for carrying the engine and transmission, reduces the height of the apparatus and provides for a more compact grouping of necessary elements.

Within the transmission casing 13, there is provided an engine driven shaft 17, which carries a spur pinion 18. This pinion meshes with the teeth of a larger idler gear 19, rotatably supported as at 20 within the casing 13. The gear 19 meshes with a gear 21 mounted on a shaft 22 arranged within the casing 15. Rotatable with the gear 21 is a pinion 23, which meshes with a gear 24 secured to a second shaft 25, the latter being journaled as at 26 within the casing 15 in parallel relationship to the shaft 22.

Rotatable with the shaft 25 is a beveled toothed pinion 27, which meshes with a beveled gear 28. This gear is mounted on one end of an angularly extending shaft 29, the latter being journaled as at 30 in connection with the walls of the casing 15, the angularity of the shaft 29 being such as to cause it to be disposed in parallel relationship with the principal axis of the drum 6. The shaft 29 projects forwardly beyond the casing 15 and has fixed thereto a pinion 31, whose teeth are disposed in meshing engagement with an internally toothed bull gear 32, the latter being fixed to the rear wall of the drum 6.

By this arrangement, a compact drive mechanism is provided for rotating the mixing drum, the water-receiving tanks 16 and the gear casing 15 being disposed below the horizontal plane

of the engine 12 and its transmission 13. However, all parts are arranged within the confines of the standard width measurements of the bed 5. By the use of the internal gear drive for the mixing drum, I obtain the advantages of smaller diameter, better alignment and the elimination of the flexing stresses in undesirable directions. The principal advantage of the internal gear lies in the fact that for a given reduction, the diameter can be much smaller than conventional drives.

The shaft 17 drives a coupling or clutch 33 which is connected to a pump shaft 34 of a pump 35. Water is drawn from the tanks 16 by way of a conduit 36 to the inlet side of the pump 35, and from the outlet side of this pump conduits 37 and 38 extend to the forwardly disposed material-receiving end of the drum 6. By directly coupling the pump shaft with the transmission shaft 17, a direct drive is thus provided to the pump, eliminating the need for belts or chains hitherto used in this capacity.

By reason of the compact drive mechanism thus provided, the front end of the drum 6, the engine 12 and associated parts driven thereby may be housed within an externally disposed protective casing 39. This casing constitutes a symmetrical continuation of the upper and rear portion of the drum 6, and while it serves to protect the mechanisms encased thereby, it also contributed in improving the external appearance of the apparatus, producing a so-called "streamline" effect. The casing may be provided with a hinged door 40 which provides convenient access to the compartment 41 in which the engine, transmission, and pump mechanisms are mounted. Also, cooperative with the casing 39 are stationary side panels 42, by which the external appearance of the apparatus is improved.

By so combining and compacting the drive mechanism, the present invention provides such an orderly grouping of the various parts of said mechanism as to enable the same to be disposed entirely within the marginal confines of the bed 5 on which they are mounted, avoiding expressly the use of parts which project laterally beyond the sides of the apparatus and which are not only unsightly but which are apt to form travel hazards.

Having thus described my invention, I claim:

1. In portable concrete mixing apparatus, a vehicle bed, a liquid-receiving tank forming a stationary component part of said bed and disposed in a horizontal plane at the rear end thereof, an internal combustion engine arranged transversely of said bed above said tank, a primary transmission driven by said engine disposed in longitudinal alignment therewith, a secondary transmission mounted on said tank and disposed below said primary transmission in power transmitting relationship with the latter, a rotatable mixing drum mounted on said bed with its principal axis extending longitudinally thereof, said drum having a closed forward end, an internal gear fixed to the forward end of said drum in concentric relation with its principal axis, and a pinion driven by said secondary transmission in mesh with the teeth of said internal gear.

2. In portable concrete mixing apparatus, a vehicle bed, a rotatable mixing drum mounted on said bed with its principal axis extending longitudinally of the bed, said drum having a closed forward end, an internal gear fixed to the closed end of said drum in concentric relation with its

principal axis, an internal combustion engine supported above said bed at the front of said drum, the principal axis of the engine extending transversely of said bed, a primary transmission arranged in alignment with said engine, a secondary transmission supported by said bed below said primary transmission and in power-transferring relationship therewith, a pinion driven by said secondary transmisson arranged in mesh with the internal gear of said drum, and a liquid-receiving tank structure forming a stationary component part of said bed and extending transversely thereof below said engine and transmissions.

3. In portable concrete mixing apparatus, a vehicle bed, a rotatable mixing drum mounted on said bed with its principal axis extending longitudinally of the bed, said drum having a closed end, an internal gear fixed to the closed end of said drum in concentric relation with its principal axis, an internal combustion engine supported above said bed at the rear of said drum, the principal axis of the engine extending transversely of said bed, a primary transmission arranged in alignment with said engine, a secondary transmission supported by said bed below said primary transmission and in power-transferring relationship therewith, a pinion driven by said secondary transmission arranged in mesh with the internal gear of said drum, a water tank structure forming an integral part of said bed and extending transversely thereof below said engine and transmissions, a pump arranged in alignment with said primary transmission and driven thereby, and a conduit extending from said tank to the inlet side of said pump.

4. In portable concrete mixing apparatus, a vehicle bed, a liquid-holding tank forming a stationary component part of said bed and extending transversely thereof in a horizontal plane, an internal combustion engine arranged transversely of said bed above said tank, a primary transmission driven by said engine disposed in longitudinal alignment therewith, a secondary transmission mounted on said tank and disposed below said primary transmission in power-transmitting relationship with the latter, a rotatable mixing drum mounted on said bed with its principal axis extending longitudinally thereof, said drum having a closed end, a gear ring fixed to the closed end of said drum in concentric relation with its principal axis, and a pinion driven by said secondary transmission in mesh with the teeth of said gear ring.

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