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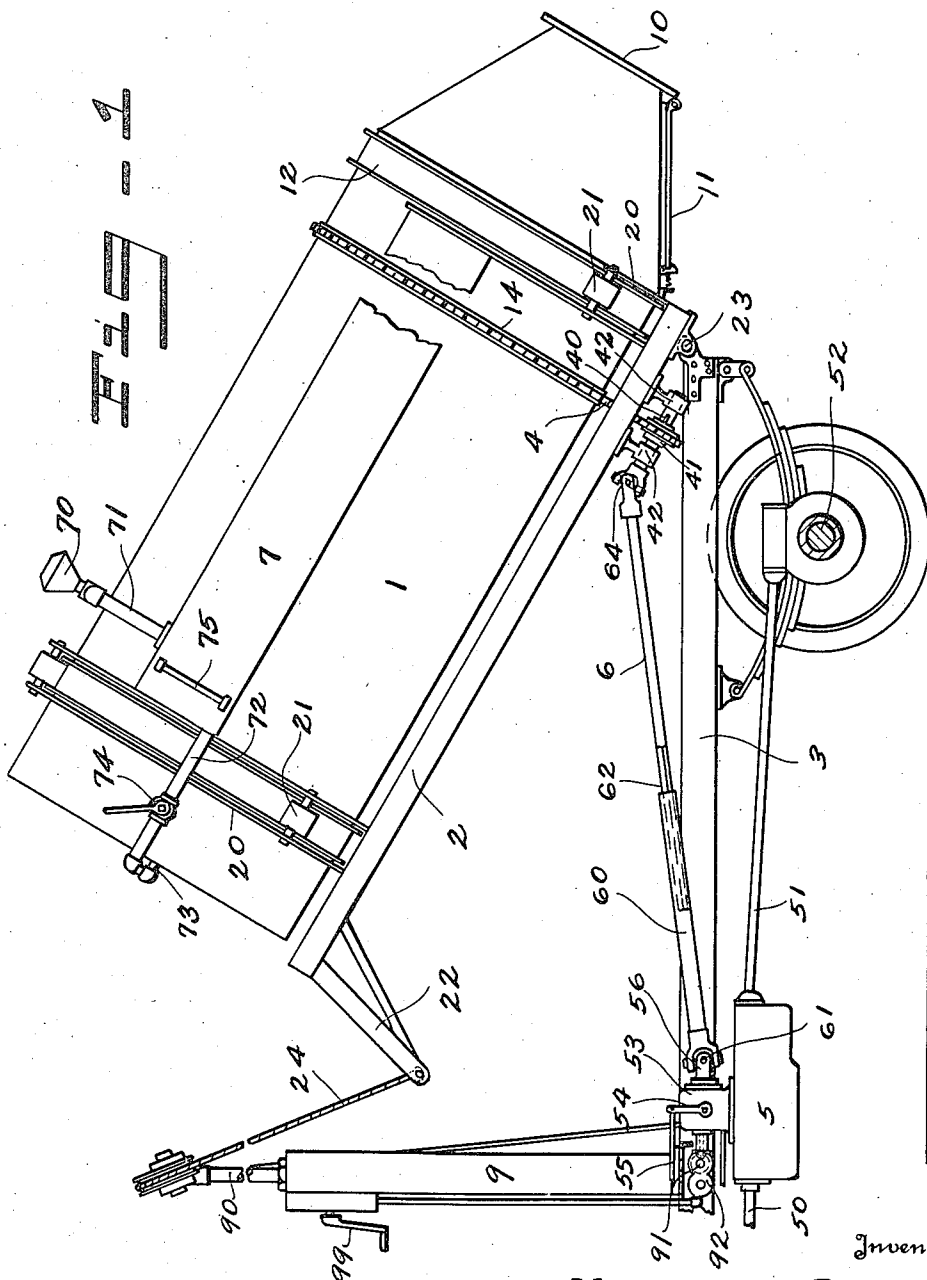
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2,013,359

TRANSIT CONCRETE MIXER

Filed Sept. 2, 1927

5 Sheets-Sheet 1



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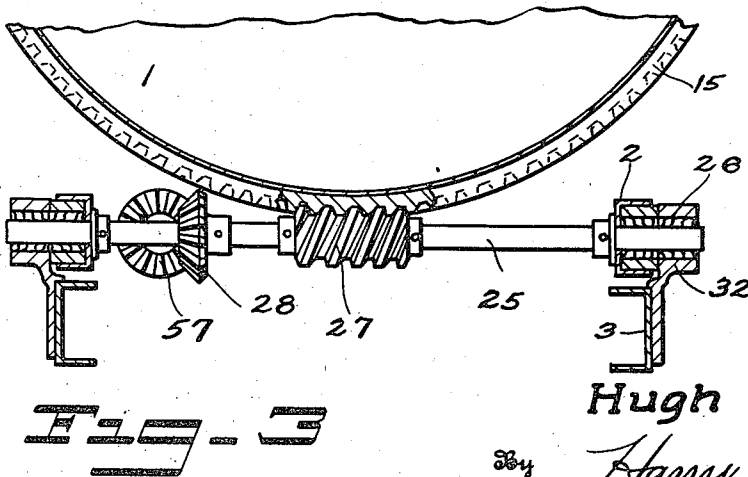
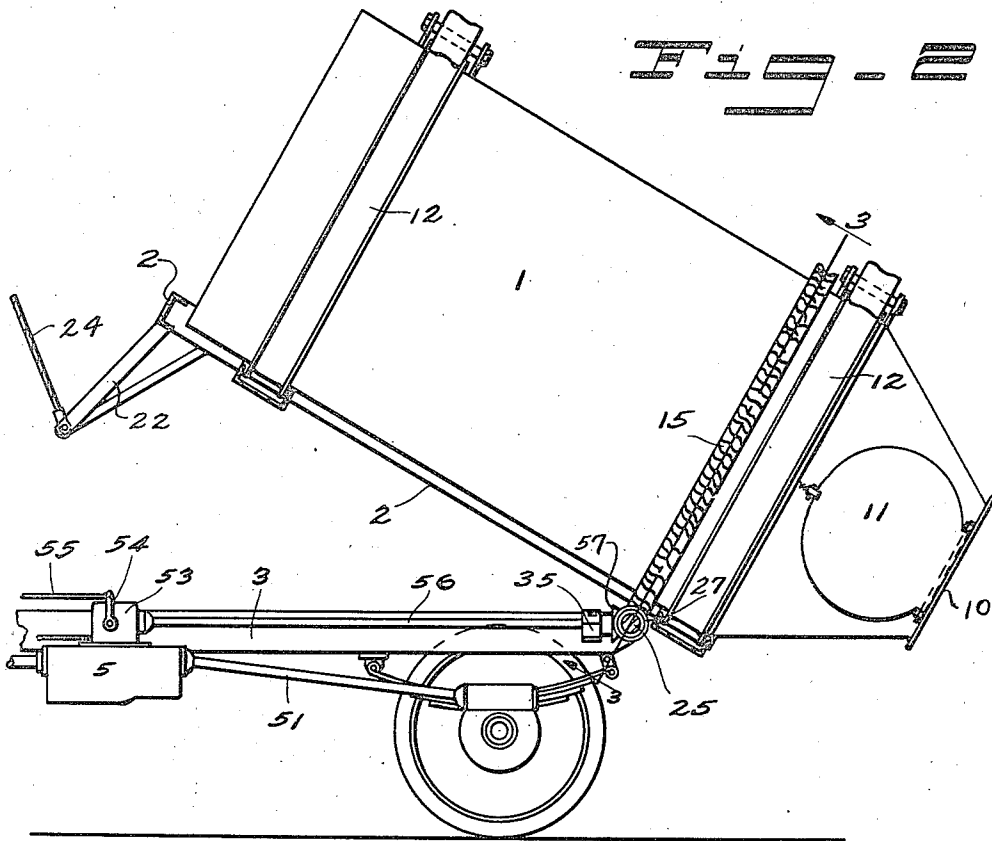
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TRANSIT CONCRETE MIXER

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5 Sheets-Sheet 2



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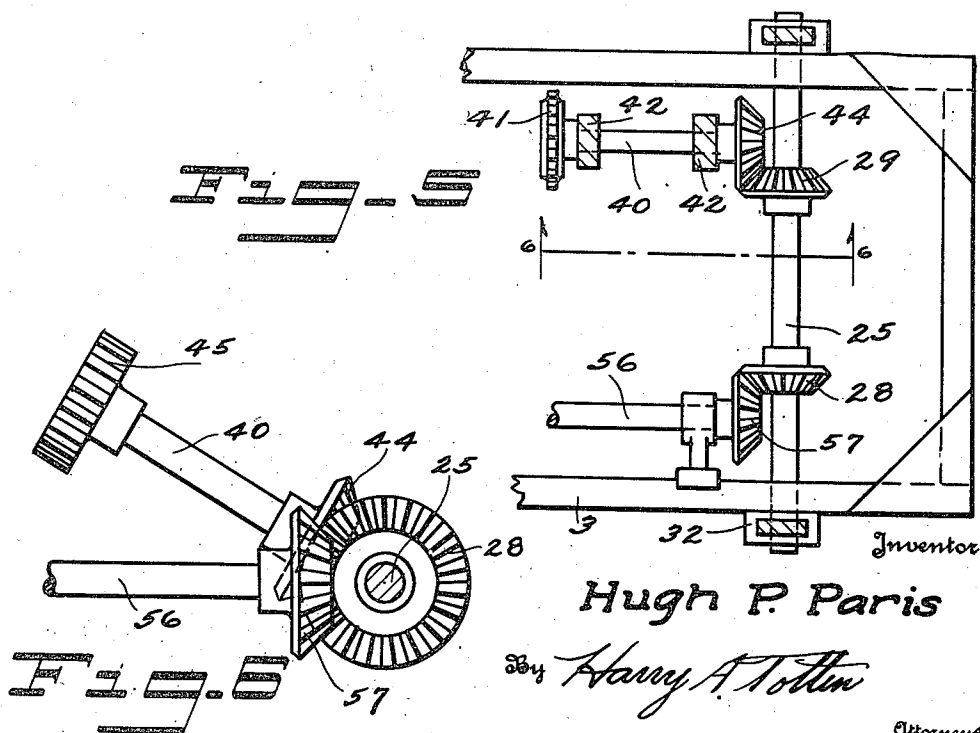
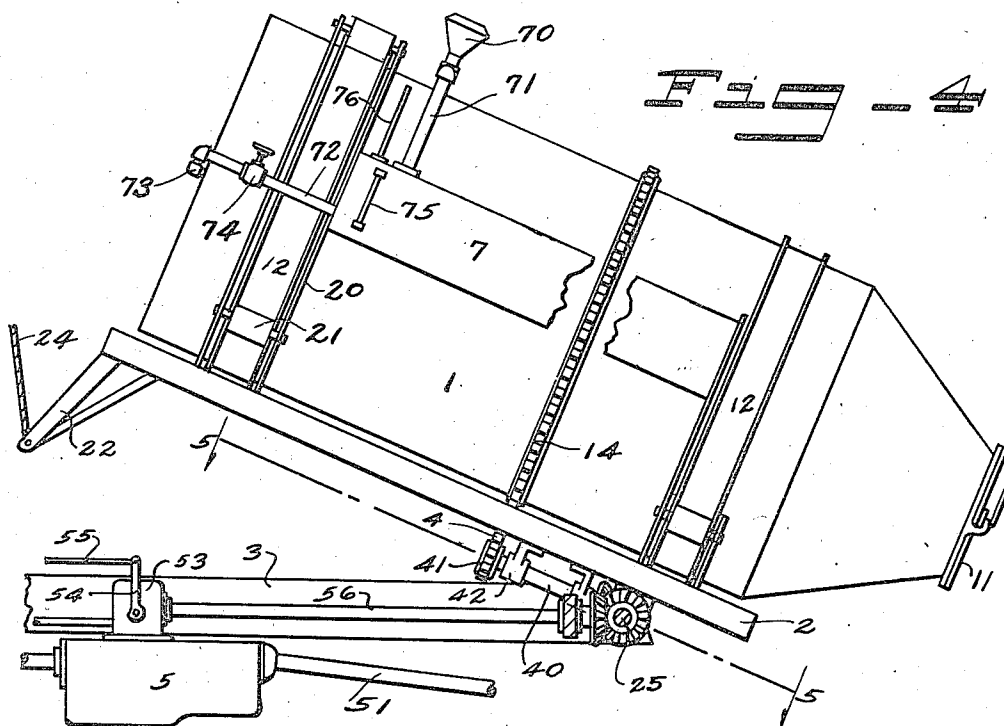
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TRANSIT CONCRETE MIXER

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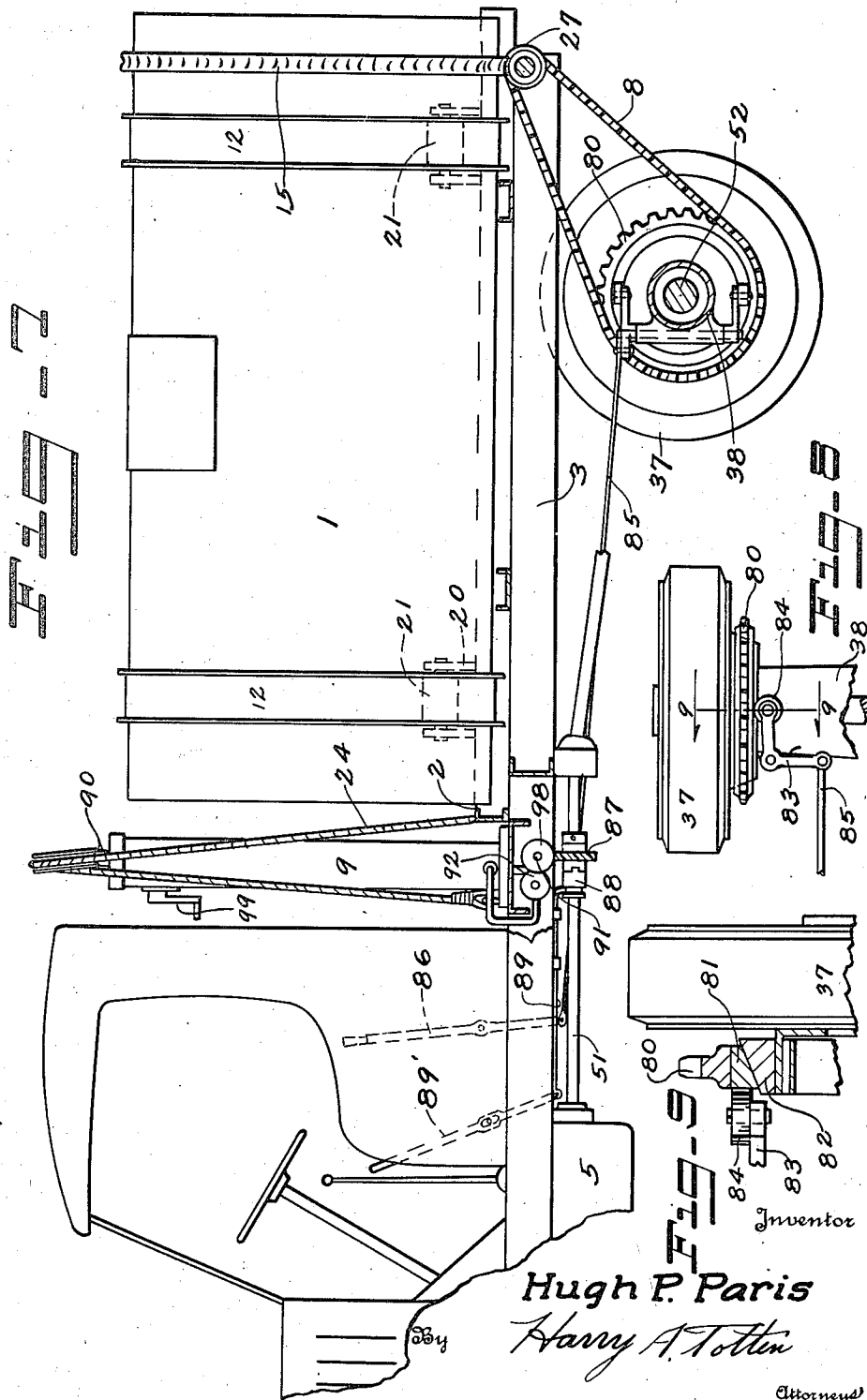
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TRANSIT CONCRETE MIXER

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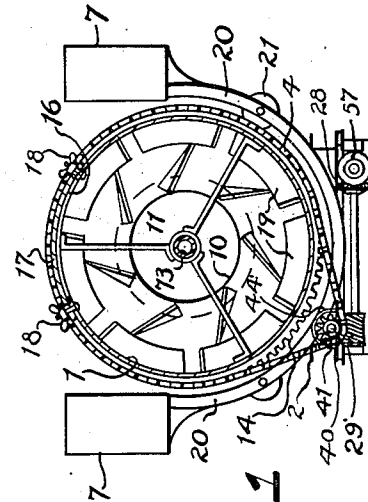
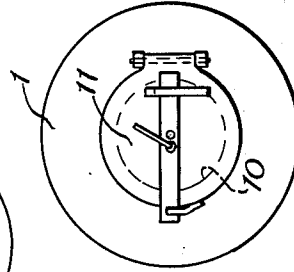
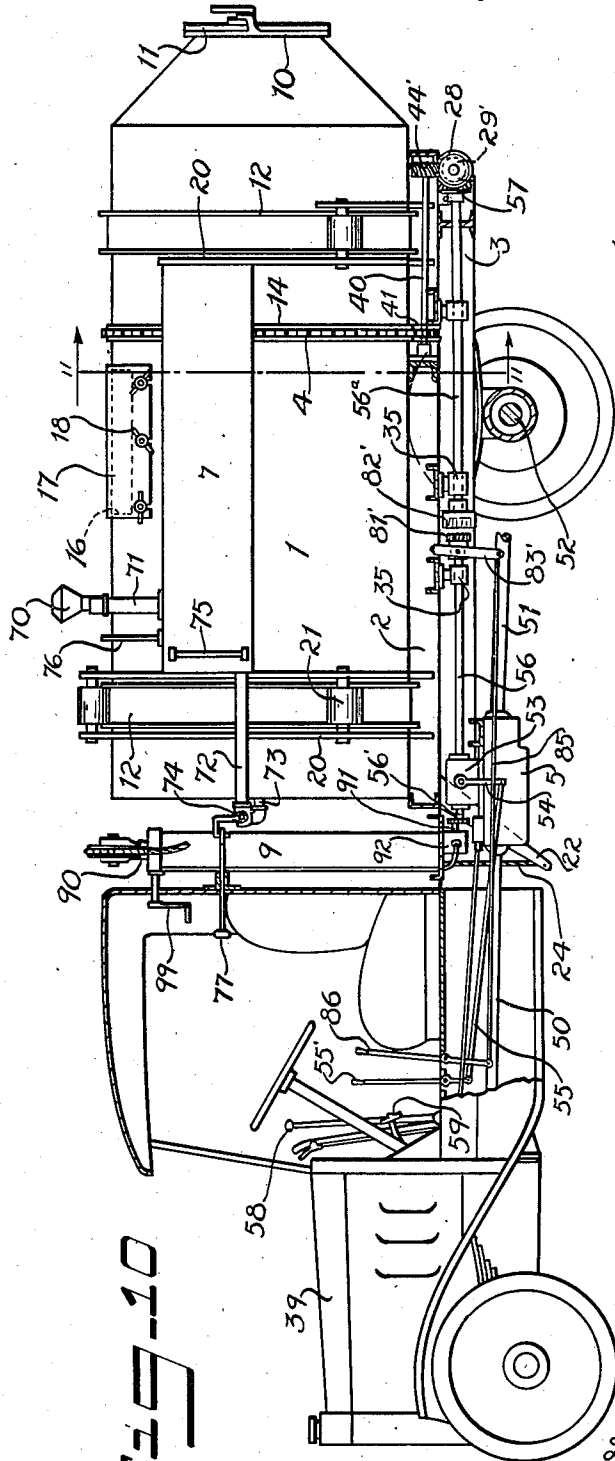
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TRANSIT CONCRETE MIXER

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UNITED STATES PATENT OFFICE

2,013,359

TRANSIT CONCRETE MIXER

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Application September 2, 1927, Serial No. 217,245

1 Claim. (Cl. 83—73)

My invention is concerned with transit concrete mixers of the general type shown in my co-pending application, Serial Number 67,128, filed November 5, 1925, and this application is particularly directed to a drive means for such transit concrete mixers, by the use of which it is possible to drive the mixer element, mounted upon a tilting sub-frame, from the power plant of the truck while in tilted or dumping position. In other words, while in my application referred to above it was necessary to disconnect the power drive means to permit dumping of the load, it is my intention in the present embodiment to maintain the power drive means in connection at all times with the mixer element, to the end that the mixer element may be driven whatever position the subframe, carrying it, may assume.

The general object of my present invention is indicated above; an associated object is the provision of drive means for the mixer and for the hoist which may operate either to hoist or to operate the mixer. Another object is the provision of such a transit mixer in which the various controls are within the reach of the driver in his seat; so that the various operations, such as the admission of water, the commencing or stopping of the mixing, the disengagement of any clutch members that may be inserted in the mixer or truck drive lines, and the control of hoisting operations may all be controlled from the driver's seat, and such as are feasible for commencement during the movement of the truck may be commenced without the necessity of stopping, or the driver's leaving his seat. Other objects, particularly as related to structural details, may be ascertained from a study of this specification, the drawings attached hereto, and the claim which terminates the specification, except that I may add that an additional object is the mounting of water tanks upon a sub-frame in such manner as to render it convenient to fill them as the mixer is being discharged, and to discharge them into the mixer from the driver's seat.

My invention comprises the novel parts and the novel assembly of elements into a transit concrete mixer organization, as shown in the accompanying drawings, described in this specification, and particularly defined by the claim.

In the accompanying drawings, I have shown my invention embodied in a number of forms, all of which include the underlying idea that the mixer element is connected at all times and in all positions to the power drive means.

Figure 1 is a side elevation of the transit mixer,

shown in dumping position, and illustrating a simple form of drive means for the mixer element.

Figure 2 is a part section and part side elevation of a second form of drive connection, also showing the mixer element in dumping position.

Figure 3 is a transverse sectional view substantially on the line 3—3 of Figure 2.

Figure 4 is a view similar to Figures 1 and 2, showing a further development of the type of drive means illustrated in Figure 2.

Figure 5 is a view substantially on the line 5—5 of Figure 4.

Figure 6 is a detail taken substantially on the line 6—6 of Figure 5, but illustrating a very slight modification over the form shown in Figure 5.

Figure 7 is a side elevation, the chassis being in section, of a modified form of unit.

Figure 8 is a plan view of a detail of the control for this modified unit.

Figure 9 is a detail section, on line 9—9 of Figure 8.

Figure 10 is a part side elevation and part section, showing a complete unit, with all its controls located within reach of the driver, for manipulation while in transit.

Figure 11 is a section on line 11—11 of Figure 10, and

Figure 12 is an end view of the mixer shell.

As in my application referred to above, the invention includes a mixer element, as, for example, the revoluble drum 1, having its forward end closed and having an open rear end 10 adapted to be closed by a head 11, this drum being cradled upon rollers 21 supported in stanchions 20, carried by a sub-frame 2. Any other type of mixer proper, such as are common in the mixer art, may be substituted for the drum which I have shown. I have adopted a drum as most suitable for the work, and as typical of a mixer element, and for the reason, also, that a drum generally must be turned or otherwise agitated to clear it of the wet concrete, which tends to cling to its walls.

The drum may be provided with circular tracks 12, with which rollers 21 contact, and is driven by a member carried upon the sub-frame 2, as, for example, as shown in Figure 1, by means of a chain 4 passing over a large sprocket 14, secured upon the drum 1, and a drive sprocket 41 keyed upon a shaft 40 journaled at 42 upon the sub-frame 2.

The sub-frame is mounted upon the chassis 3 of an automobile truck in such a manner that it may be tilted to dump a load from the drum 1. Such a mounting is illustrated by the pivot 23 at 55

the rear end of the chassis 3. The sub-frame may be raised in any suitable manner, and as shown; cables 24 may be attached to depending arms 22 at the forward end of the sub-frame, these cables being operatively connected to the plunger 90 of a vertical hydraulic hoist. Such arrangements are common in dump trucks and their use in this connection is in every way analogous to their use in connection with dump trucks, and for these reasons I have not deemed it necessary to illustrate these means in detail, other than in Figure 10. However, it may be understood that a shaft 91 is suitably driven from a live shaft as an extension of the shaft 56, and that this shaft carries one of the gears of a gear pump 92, by means of which the hydraulic hoist 9 is operated. The hoist is suitably controlled, as by a lever 99 placed conveniently for the driver in his cab.

It will be noted that the shaft 40, being journaled upon the sub-frame, will be tilted as the sub-frame is tilted with respect to the chassis 3. It becomes necessary, therefore, to devise a drive means for this shaft, whereby it may be driven, in any position it may assume, from the power plant of the truck. The truck motor is not shown, it being understood that it lies beneath the hood 39, and that it is customary to provide a gear casing 5 within which are gears driven by a shaft 50, which is connected to the motor, a shaft 51 extending from the gear casing 5 to an operative connection with the rear axle 52 of the truck. It is also customary to attach a power take-off in the form of gears within a casing 53, secured upon the gear casing 5, this also customarily including a clutch or control operated by an arm 54, to which may be connected a link 55, controlled by a lever 55' in the driver's cab (see Figure 10). Inasmuch as like devices are common in the art, I have not illustrated these members in detail, and it will be understood that the shaft 56, emerging from the power take-off 53, may be rotated in either direction, or may be held without rotation in accordance with the position of the control arm 54, controlling the engagement of gears within the casing 53.

To connect this shaft 56 with the shaft 40, I may employ a number of expedients. As shown in Figure 1, a shaft, comprising the members 6 and 60, is connected through universal joints 61 and 64 with the shafts 56 and 40, respectively. The shaft sections 6 and 60 are provided with a sliding, telescoping engagement, as indicated at 62, whereby the shaft 6, 60 may be elongated as the distance between the universal joints 61 and 64 increases, but so that the section 60 will continue at all times to rotate the section 6, and so that, therefore, the shaft 40 will be driven continuously from the shaft end 56. The universal joints accommodate the difference in angle between the shafts 56 and 40. Thus, at all times, the shaft 40, and, consequently, the drum 1, is in operative connection with the drive shaft 50 from the engine of the truck, and the drum 1 may be rotated while in any position.

It may be stated that the drum 1 is typical of any mixer element which it may be desired to employ, and I do not wish to be understood as limiting myself to the use of a revolvable drum only. The principle of connecting a mixer element, mounted upon a tilting sub-frame, to the power plant of the truck, is the same whether this be of the revolvable drum type, as shown, or some other desired type.

It is possible to eliminate the extension shaft

6, 60 and the universal joints 56 and 64 by an arrangement such as is shown in Figures 2 to 6, inclusive, and in Figures 10 and 11, wherein the drive is through a member co-incident with or co-axial with the pivot axis of the sub-frame. For example, in Figures 2 and 3, the pivot of the sub-frame upon the chassis 3 is indicated as a shaft 25, which is journaled at 26 in a bracket 32 secured upon the chassis 3. Upon the shaft 25 is secured a worm pinion 27, which meshes at all times with a worm gear 15, which replaces the sprocket wheel 14 of the form shown in Figure 1. These gears will remain in mesh whatever angular position the sub-frame 2 and the drum 1 may assume. To drive the shaft 25, the shaft 56 is extended rearwardly and is journaled at 35 upon the chassis 3, and carries at its rear end a beveled gear 57, which meshes with a beveled gear 28, secured upon the transverse shaft 25. By these or any equivalent means, the shaft 25 may be rotated, when desired, directly from the truck engine, and, in consequence of its rotation, the drum 1 is rotated through the meshing gears 27 and 15.

As a variation of the drive illustrated in Figures 2 and 3 and just described, the transverse shaft may have secured to it, in lieu of the worm 27, a beveled gear 29, which meshes with a beveled gear 44, secured upon the shaft 40, which it will be remembered is journaled at 42 upon the sub-frame 2. By such means the shaft 40 is connected directly with the power plant of the truck through the shaft 25, which extends along the pivot axis of the sub-frame, and, consequently, the sprocket wheel 41 is always in direct communication with the power of the truck. This drive is illustrated in Figures 4 and 5.

If it is desired to utilize a more direct drive than the chain drive of Figures 1, 4 and 5, a spur gear 45 may be substituted for the sprocket wheel 41 on the shaft 40, as illustrated in Figure 6, and the drum may then be provided with a suitable spur gear or bull gear, meshing directly with the spur gear 45.

In Figure 7, I have shown the drum 1 as driven from the rear axle 52 of the truck, through the chain 8 passing over a sprocket wheel (not shown), on the shaft 27, and over a drive sprocket 80 journaled on the rear axle housing 38. This drive will operate only as the rear axle is rotating to drive the truck, or when the truck's wheel carrying the sprocket is jacked up. However, it can be thrown out of operation by disconnecting the clutch member 81, secured to the sprocket wheel 90, from the complementary member 82, secured to the traction wheel 37. This clutching action is suitably controlled, as by the bell-crank lever 83, carrying contact rollers 84, and moved by a rod 85, connecting with a lever 86, placed conveniently for the driver.

The hydraulic hoist 9, in Figure 7, is driven directly from the drive shaft 51, through spiral gears 87 and 98, the gear 87 being loose on the shaft 51, and being connectible thereto by a slidable, keyed-on jaw clutch member 88, cooperating with a complementary member on the gear 87, and operable through a shifter 89 connected to a lever 89'.

Figure 10 is a rather complete showing of the entire mixer and its drive means. I have illustrated the gear casing 5 as having the power take-off 53 previously disclosed, this being controllable through an arm 54 to drive either the forward extension 56' or the rear extension 56. The movement of the arm 54 is controlled

through the rod 55 and lever 55', the latter located in the driver's cab. The forward extension 56' is suitably connected to drive the gear pump 92, which operates the hoist 9, through the shaft 91, and the rearward extension 56 is connected to drive the mixer shell 1.

This drive for the mixer shell may take the forms heretofore described and, in substance, comprises the drive shown in Figures 4 and 5, except that I have shown a worm gear 29' in place of the beveled gear 29 of Figure 5, this meshing with a worm 44' on the shaft 40, this shaft 40 carrying a sprocket wheel 41 around which the chain 4 passes. In addition, I have broken the rearward extension 56, the rearmost portion 56^a being arranged to be disconnected from the section 56, when desired, by means of complementary clutch elements 81' and 82'. The section 81' mounted on the shaft 56 is controlled by a pivoted arm 83' for engagement with the member 82', and movement of the arm 83' is obtained through a rod 85 extending to a control lever 86 in the driver's cab.

In Figure 10 it will be observed that the several controls for the truck and for the mixer are centered in the driver's cab. The gear shift lever 58 and the clutch pedal 59 are located there, as is customary. In addition, the lever 55' controls the selective drive of either the hoist pump 92 or the mixer shell 1, though the drive of the mixer shell is additionally controlled by the lever 86. Likewise, the operation of the hoist is controlled in addition by the control handle 99. All of these are located in the driver's cab convenient to his reach at any time. Likewise the control rod 77, by means of which water may be admitted from the tanks 7 to the inlet pipe 73, is located within the driver's cab.

In this form of mixer I have illustrated a charging opening 16 in the periphery of the shell, this having a door 17 which may be removed and which is secured in place by suitable means, such as the thumb nuts 18. Thus, in some instances it may be found more convenient to charge the mixer by means of the opening 16, it being understood of course that the door 17 will be secured in place during the operation of mixing, and that the material will be discharged through the end opening 10, the front end being closed. However, in some instances it may be found desirable to omit the opening 16, making the shell solid and without openings other than the end open-

ing 10, through which the material is admitted and through which it is discharged. In such instances, interior vanes 19 will serve to feed the material entering through the opening 10 toward the forward end, the shell being rotated during the charging operation.

The water tank may conveniently be located directly upon the sub-frame, whereby upon tilting of the sub-frame there will be no tendency for any water remaining in the tanks to drain therefrom, and so that the control for the water is conveniently within reach of the driver. Thus, in Figures 1 and 4, the water tank 7 has been shown as supported between the stanchions 20. Preferably, two such tanks are employed, one on each side of the drum 1. A divided pipe 71 connects the respective tanks with a funnel 70, which is adapted for connection to a source of water supply, whereby the tanks may be charged. A drainage pipe 72, connected to the forward end at the bottom of the tanks 7, leads to a common connection 73, which leads to the interior of the drum 1, through the center of its forward end. A control valve 74, located in each of the drain pipes 72, is within easy reach of the driver, or, as shown in Figure 10, is arranged to be engaged by an eye at the end of a rod 77 extending into the cab, and permits the water to be let into the mixer drum as and when required and in the amounts required. Generally the amount of water is metered. A gauge or metering glass 75 may be employed, if desired, to indicate the level of the water in the tanks, and a vent pipe 76 at the forward end of the tank permits discharge of water when the tank is level, but prevents overflowing when the tank is tilted.

What I claim as my invention is:

In a concrete mixer, in combination with an automobile truck chassis and propelling mechanism, a sub-frame pivotally mounted upon the chassis, a mixer element revolvably cradled upon said sub-frame, and power transmission means operatively connecting the propelling mechanism on the chassis with the mixer element on the sub-frame through the pivot axis of the latter, said transmission means including a sprocket wheel adjacent one of the truck wheels and a clutch for connecting the sprocket wheel to the adjacent truck wheel whereby the mixer element may be rotated when the truck is in transit.

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