

Dec. 8, 1936.

P. W. YETT

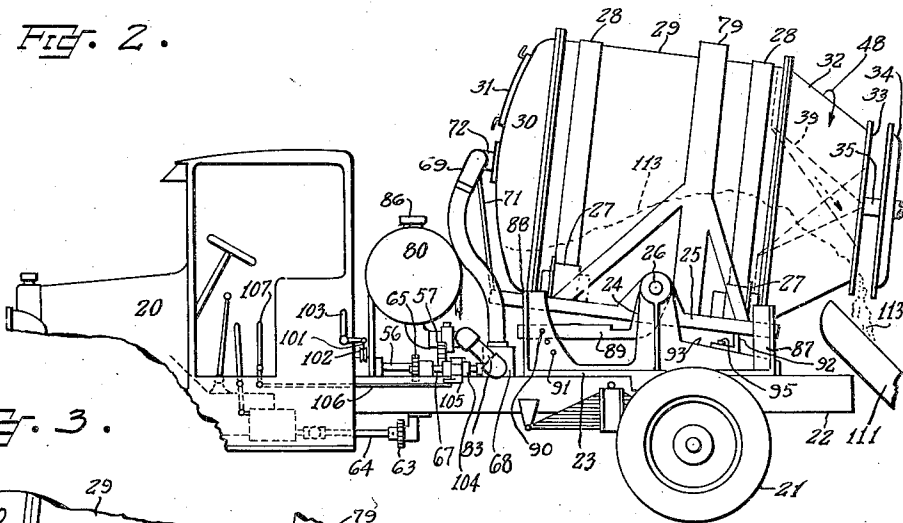
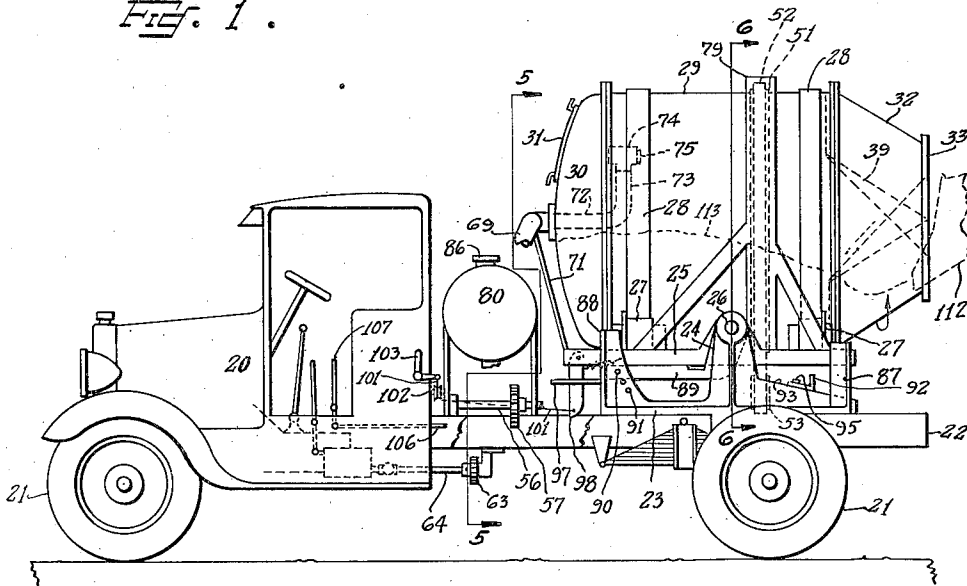
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SELF TILTING CONCRETE MIXER

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FIG. 1.



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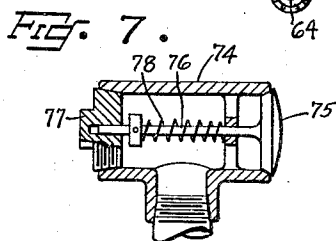
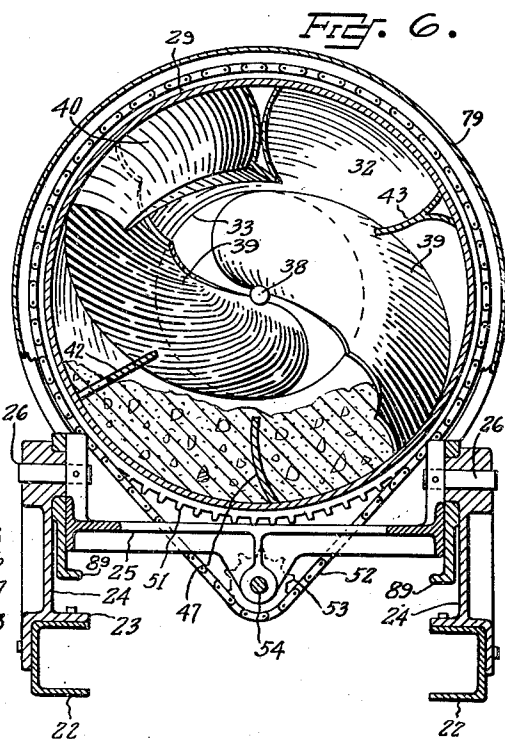
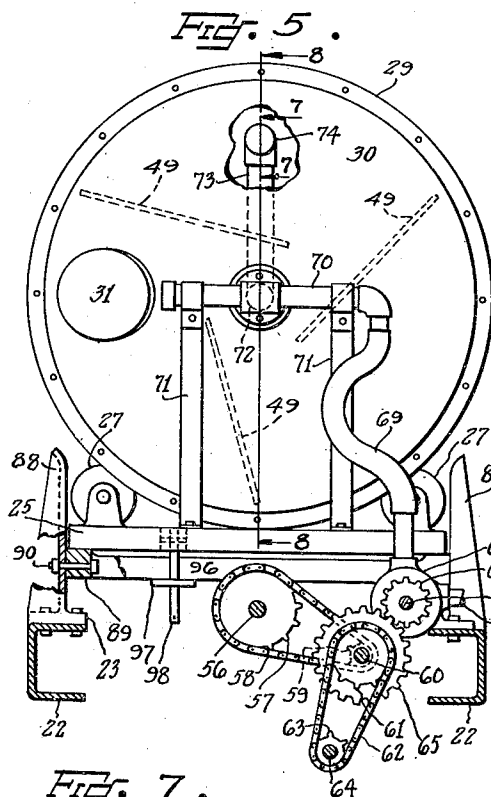
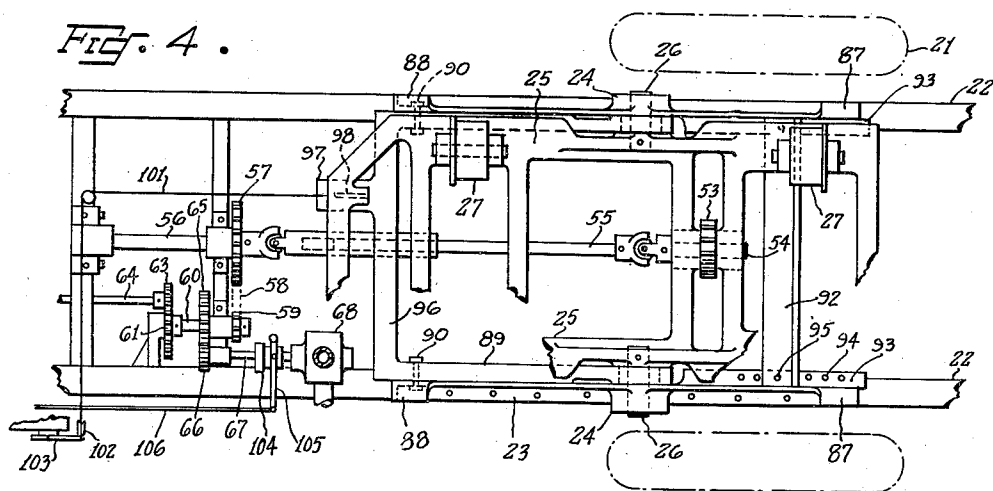
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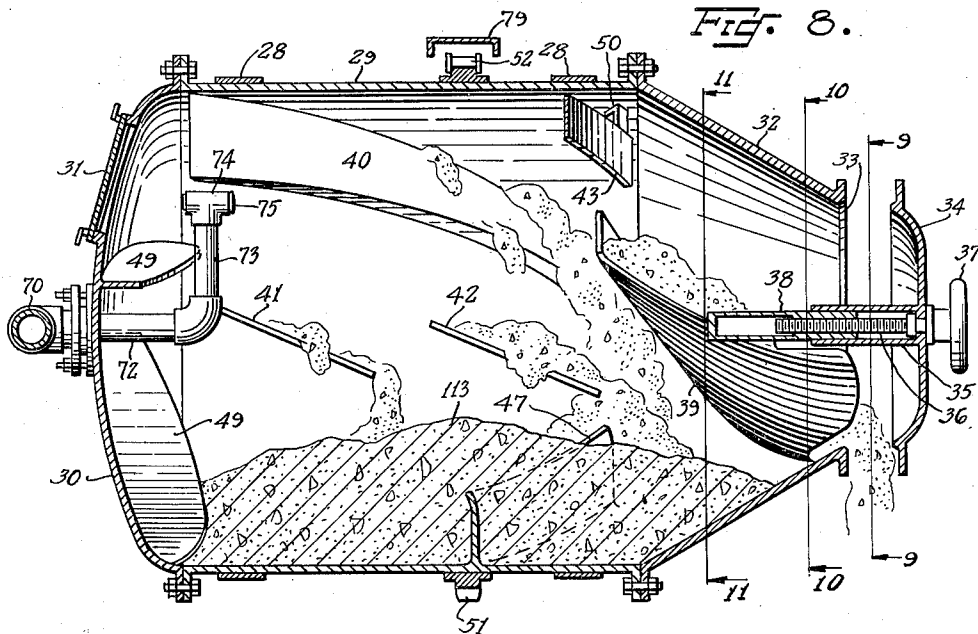


Fig. 8.

Fig. 9.

Fig. 11.

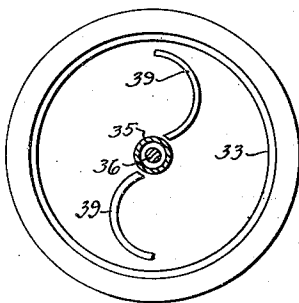
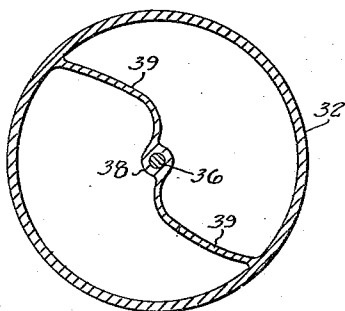
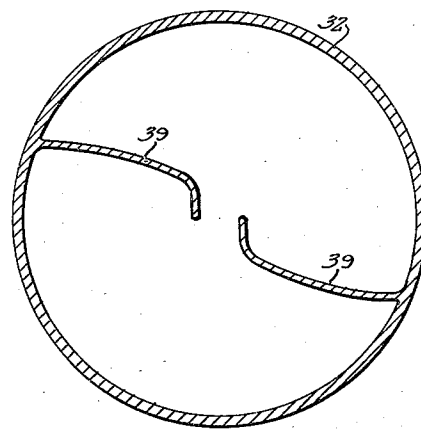


Fig. 10.



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FIG. 12.

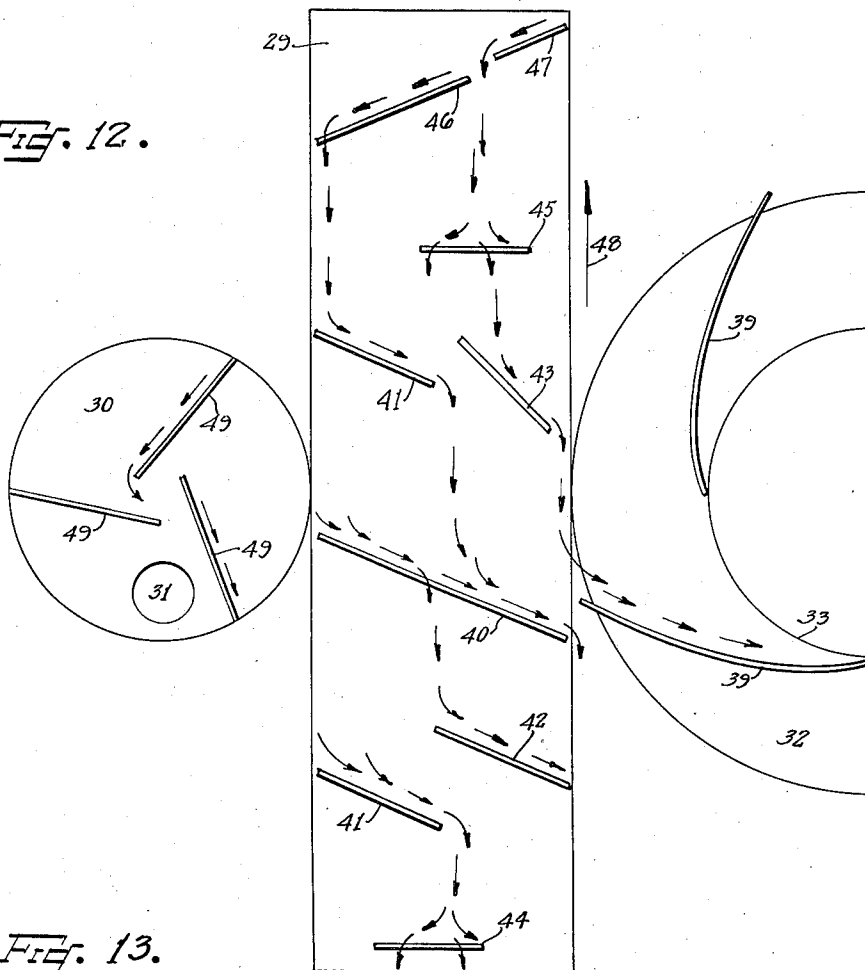
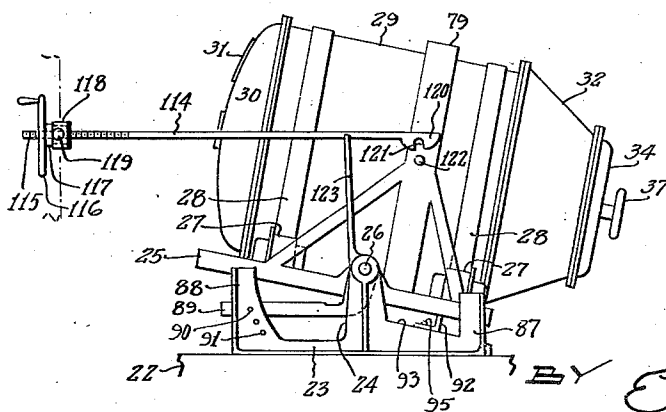


FIG. 13.



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Fig. 14.

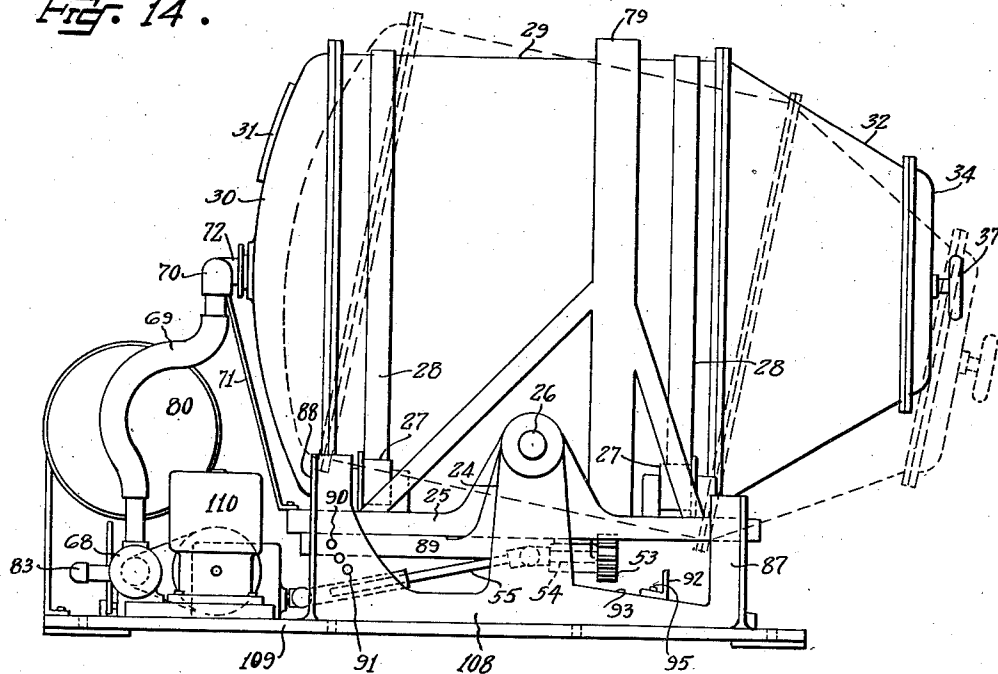
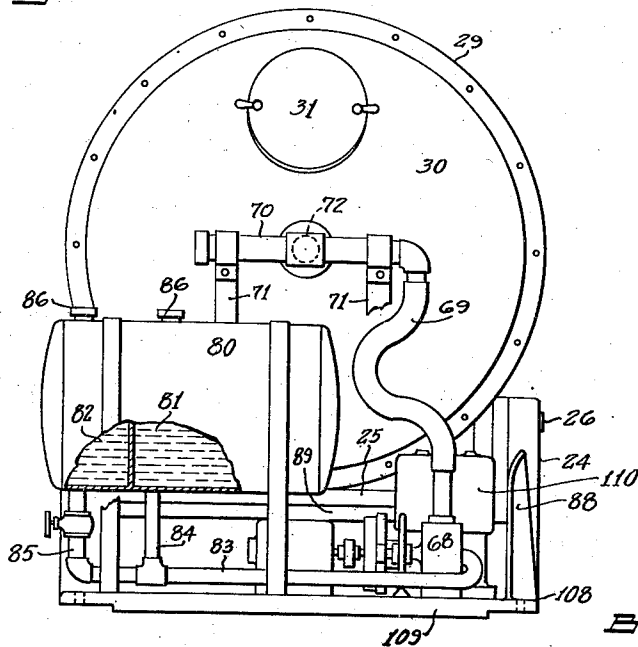


Fig. 15.



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SELF-TILTING CONCRETE MIXER

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Application October 7, 1932, Serial No. 636,636

5 Claims. (Cl. 83-73)

This invention relates generally to concrete mixing and transporting apparatus with particular reference to the tilting type of mixer capable of use on vehicles or for stationary set-ups.

The main object of this invention is to provide a concrete mixing and transporting machine of the type above described which will be so simple to manufacture and operate, so light in weight and inexpensive to maintain as to place it within the reach of almost anyone engaged in the production of monolithic structures.

The second object is to produce a special form of mixing drum and support therefor which will provide a satisfactory mixing action, and at the same time be capable of easy loading and unloading with a minimum amount of tilting of the drum.

The third object is to eliminate the necessity of employing a hoist for tilting the mixer under all ordinary conditions.

The fourth object is to provide a mixing drum having an improved form of discharge throat and discharge vanes, and also one which will provide a complete shoveling and re-shoveling action for the concrete which will furnish a desirable intermingling of all of the materials in the batch in order that the delivered concrete may be perfectly uniform as to the proportion of ingredients and consistency.

The fifth object is to provide a form of mixer peculiarly adapted to use on a stationary machine or capable of being transported on a trailer or truck.

The sixth object is to construct a mixing drum which will be tilted by the materials it is mixing and in either direction depending upon the direction in which it is rotating, and also that any portion of or all of the materials may be discharged therefrom under the easy control of the operator.

These, and other objects, will become more apparent from the specification following as illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation showing the drum in a loading position with parts broken away to show the latch mechanism.

Fig. 2 is a side elevation showing the drum in a discharging position.

Fig. 3 is a fragmentary side elevation showing the unlatching position.

Fig. 4 is a plan view showing the drum removed and parts broken away to disclose the frame structure.

Fig. 5 is a section along the line 5-5 in Fig. 1.

Fig. 6 is a section along the line 6-6 in Fig. 1.

Fig. 7 is a section along the line 7-7 in Fig. 5.

Fig. 8 is a section along the line 8-8 in Fig. 5.

Fig. 9 is a section along the line 9-9 in Fig. 8.

Fig. 10 is a section along the line 10-10 in Fig. 8.

Fig. 11 is a section along the line 11-11 in Fig. 8.

Fig. 12 is a developed view of the drum interior showing the materials traveling in a discharging direction.

Fig. 13 is a side elevation of an alternative form of the device showing a power means for tipping the drum in either direction.

Fig. 14 is a side elevation of the mixer unit itself mounted on its own frame and associated with a power plant independent of any other source of power such as that of an automobile.

Fig. 15 is an end elevation of Fig. 14 showing a portion of the two compartment water tank broken away.

Similar numbers of reference refer to similar parts throughout the several views.

Referring in detail to the drawings, there is shown a truck 20 whose wheels 21 support the usual truck frame 22. On the frame 22 is mounted a base 23 on whose upright standards 24 is pivotally mounted a rocker frame 25 by means of the trunnions 26. On the frame 25 are mounted the rollers 27 which engage the encircling bands 28 of the cylindrical mixing drum 29.

The drum 29 has a convex forward end 30 which is provided with a door 31 for charging purposes under certain conditions. The rearward end 32 of the drum 29 converges to form a circular opening 33 which is normally closed by a circular closure 34. The closure 34 has a tubular center 35 along the axis thereof, inside of which is a rotatable screw 36 which is operated by the hand wheel 37 from the outside of the closure 34. The screw 36 is threaded into a tubular guide 38 upon which the member 35 is free to turn and slide. To the member 38 are secured two spiral blades 39 which extend part way onto the cylindrical portion of the drum 29.

The cylindrical portion of the drum 29 is provided with a plurality of blades 40, 41, 42, 43, 44, 45, 46 and 47, the purposes of which may be best understood by an inspection of Fig. 12, in which the relationship of these blades is shown on a developed surface, from which it can be seen that the material is first moved forward—that is to the left part—by flowing between the blades 46 and 47 against the blade 44, and the remainder flowing around the end of the blade 46 toward the blade 41. From the blade 41 the material flows

against the blade 43 from whence it is picked up by the blades 39. The material from the blade 41 falls on the blade 40 from which a portion of it passes over to the blades 39, and another portion passes on to the blade 42 and then on to the blade 39. Some of the material from the blade 40 falls on to the second blade 41, thence on to the blade 44 and then on to the blade 46 and blade 47 thus completing the cycle.

It will be remembered that this is the action which takes place during the discharge as occasioned by the rotation of the drum in the direction of the arrow 48.

The end 30 is provided with three blades 49 which discharge their materials on to the blades 40 and 41. In other words, the rotation of the drum as indicated in Fig. 12 will move the materials toward the rear or open end of the mixer, while a rotation in the opposite direction will cause the materials to move toward the foremost end (as shown in Fig. 2).

It will be understood that certain of the blades 40 to 47 may be held a short distance away from the cylindrical surface by means of angle bars 50 (as shown in Fig. 8).

Surrounding the cylindrical portion of the drum 29 is a sprocket wheel 51 around which passes a chain 52 which engages the sprocket 53 on the shaft 54, which latter is driven through a spline shaft 55 from the shaft 56 on which is mounted a sprocket 57 which is driven by the chain 58 from the pinion 59 on the countershaft 60. The countershaft 60 is provided with a sprocket 61 whose chain 62 passes around the pinion 63 on the power take-off shaft 64. On the countershaft 60 is also a gear 65 which meshes with a pinion 66 on the shaft 67 of a pump 68 which discharges through a hose 69 into a horizontal pipe 70, which pipe is carried by the standards 71 mounted on the frame 25.

The pipe 70 has branching therefrom a pipe 72 which passes through the center of the closed end 30 along the axis of the drum 29. The pipe 72 is provided with a vertical riser 73 on the upper end of which is provided a T 74 in which is mounted a poppet valve 75 whose stem 76 guides in the plug end 77.

A spring 78 urges the valve 75 toward a closed position and its purpose is to prevent the clogging of the outlet by particles of cement, and at the same time form a very desirable spraying stream which discharges against the inner walls and blades of the mixer. It is desirable to provide a guard 79 around the chain 52.

There is also provided a water supply tank 80 which is divided into the main supply compartment 81 and the flushing compartment 82. The intake pipe 83 of the pump 68 connects by means of a pipe 84 with the compartment 81, and by means of the valved pipe 85 with the compartment 82. Water is admitted to the tank 80 by means of the filler openings 86.

The purpose of this arrangement is to permit the vehicle to start on its way with a tank full of water and when it is desired to wet mix the mass the pump is started and water is drawn from the compartment 81, the pipe 85 remaining closed by means of its respective valve. The water in the compartment 82 is used only for flushing purposes after all of the aggregates have been discharged in a manner to be described later.

Turning again to the base 23, it will be noted that it has a pair of rearmost corner posts 87 and a foremost corner post 88 between which the frame 25 can rock. Hingedly mounted on the

axis of the trunnions 26 is a stop arm 89 which may be held in one of several positions by means of a bolt 90 which passes through each corner post 88. Each post 88 is provided with a series of holes 91 into any one of which the bolt 90 may be placed.

It will be seen that the arms 89 limit the downward tilting movement of the forward end of the drum 29. An angle bar 92 rests upon the inclined surfaces 93 which are provided with the holes 94 for the bolts 95, permitting an adjustment of the fore and aft position of the bar 92. The arms 89 are joined by a cross bar 96 from which projects a plate 97 through which passes a latching bar 98 provided with a slot 99 which can engage the plate 97.

The latching bar 98 is hingedly attached to the frame 25 and is urged by means of a spring 100 toward a latching position with relation to the plate 97. The bar 98 may be released by a pull on the cable 101 which passes around a shaft 102 and is actuated by a bell crank latch lever 103.

It is desirable to provide a friction clutch 104 in the shaft 67, the clutch being operated by a lever 105 through the rod 106 from the hand lever 107.

In the form of the device shown in Figs. 14 and 15 the parts are identical with those previously described, except that the water tank 80 is mounted directly on the base 108, which is identical with the base 23 except for the extension 109 which carries the tank 80 and a prime mover 110, preferably in the form of a small internal combustion engine.

The pump 68 is also mounted on the extension 109 and the spline shaft 55 receives power directly from the internal combustion engine 110 instead of from the prime mover of the motor vehicle.

In using the apparatus the customary chute 111 or its equivalent is employed for conveying the mix from the drum to the forms.

The operation of the device is as follows: Assuming that the desired proportions of aggregates have been inserted in the drum 29 by means of a filling chute 112 (as shown in Fig. 1) while the drum is being rotated in the manner indicated, and that the closure 34 is now securely fastened in position, the mix is now ready for the water.

When the operator wishes to deliver a quantity of wet mix concrete he first admits a measured quantity of water from the compartment 81 to the drum 29 by operating the pump 68 which causes the water to be sprayed past the valve 75 and to be taken up by the aggregates as the drum continues to rotate.

It will be understood that during this period the latching bar 98 has engaged the plate 97 holding the drum 29 to the position shown in Fig. 1. It will be noted that the bulk of the materials is now in front of the trunnions 26. If, however the direction of rotation of the drum 29 is reversed (as shown in Fig. 2) the materials will be worked to the rearward end of the drum, but no change will occur in the angular position of the drum until the operator releases the latch 98 permitting the drum to tip (as shown in Fig. 2) and, depending upon the opening between the closure 34 and the discharge opening 33 of the drum 29, the aggregates will flow to the chute 111.

When the materials are all discharged the operator opens the valve 85 permitting the water from the compartment 82 to be pumped into the drum 29 for flushing purposes. As stated, the

spraying action provided by the valve 75 is for cleansing the interior of the drum that no accumulation of concrete is formed therein.

If the operator desires to restore the drum 29 to a level position with relation to the vehicle he merely drives the truck forwardly a short distance and stops it somewhat abruptly, whereby the inertia of the drum 29 causes it to move forward and re-latch the drum in position against the stop 89. The tilting or discharging position is always determined by the angle bar 82 and the latching position is always determined by the setting of the arms 89.

In other words, there is provided a concrete mixing machine of the tilting type which is self-tilting under the action of gravity, and in which the relative position of its load is determined by the direction of rotation of the drum, so that for all ordinary purposes no hoisting means of any kind is required in order to control the tilting movements of the drum.

However, in Fig. 13 is shown a slight modification in which there is added a means for starting the tipping action in abnormal cases where the truck stands on a very steep incline. This consists of a rod 114 with a threaded end 115 on which is mounted a hand wheel 116. The hand wheel 116 has its hub 117 held within a journal 118 which is capable of rocking on the horizontal trunnions 19. The opposite end 120 is flattened and provided with a slot 121 which can engage the pin 122 on the guard 79.

The rod 114 is normally held in an inoperative position by resting same in a notch in the upper end of an upright post 123, and it is only in unusual conditions when it is desired to tilt the drum 29 when it is beyond the control of the normal tilting action—that is, when it is impossible to rotate the drum for one reason or another, or when the angle of the roadway opposes the normal action of the device.

It will be noted that the rod 114 is so constructed as to permit tilting movement in either direction.

It is a well understood fact that numerous devices have been constructed in the past in which the tilting action of the mixing drum for discharge purposes is normally obtained by some form of power device, I therefore do not claim such devices broadly but I do intend to cover all such forms and modifications thereof as fall fairly within the appended claims.

I claim:

1. A self-tilting concrete machine having in combination a trunnion frame, a rocker frame mounted on said trunnion frame, a reversible cylindrical mixing drum having spiral flights therein tiltably mounted on said trunnion frame, adjustable stop arms mounted on said trunnion frame for limiting the downward movement at one end of said drum, latch means for holding said rocker frame against said stop means and adjustable stop means on said trunnion frame for limiting the tipping movement of said drum in the opposite direction.

2. A self-tilting concrete mixing machine having in combination a tiltable frame having a transverse tilting axis, a mixing drum rotatably mounted in said frame, a reversible drive for said

drum, said drum having spiral blades mounted around the interior thereof whereby materials will be moved to one end of the drum under one direction of rotation and to the opposite end of said drum under the opposite direction of rotation for the purpose of utilizing an unbalanced drum condition to produce a tipping action thereof, said machine being characterized by having the mixing drum free to pivot about the transverse axis of said tiltable frame intermediate its ends and in which the sole means for tilting the drum to a discharge position comprises the reversible drive and the spiral blades which cause the concrete to be moved to the discharge end of the drum to unbalance it and thereby cause it to tip same to a discharge position.

3. A self-tilting concrete machine having in combination a frame tiltably mounted on transverse pivots, a mixing drum rotatably mounted on said frame, means for reversibly driving said drum said drum having spirally disposed blades mounted around the interior thereof whereby materials may be moved to one end of the drum in one direction of rotation and to the opposite end of said drum under the opposite direction of rotation, thereby producing an unbalanced condition therein and means for latching said drum in a substantially horizontal position whereby said drum may be held responsive or unresponsive to an unbalanced condition set up by said blades and by the direction of rotation of said drum, said frame being characterized by having its transverse pivotal mountings intermediate its ends and by the utilization of an unbalanced drum condition produced by the direction of rotation of the drum and the position of the blades therein to tip said drum to a discharge position.

4. A self-tilting concrete machine having in combination a support provided with a pair of transverse bearings, a rocker frame having trunnions mounted in said bearings, a mixing drum rotatably mounted on said rocker frame, means for reversibly driving said mixing drum, said drum having spiral mixing blades therein adapted to convey materials to one end or the other of said drum depending on the direction of rotation, the sole means for tilting said machine constituting the reversible drive and the spiral mixing blades and means for supplying water to the interior of said drum above its center of rotation.

5. A self-tilting concrete mixer having in combination a supporting frame including a pair of transverse bearings, a rocker frame having trunnions mounted in said bearings, means for limiting the tilting action of said rocker frame in one direction and for latching said rocker frame in a horizontal position in the opposite direction, a mixing drum rotatably mounted on said rocker frame having means for reversibly driving same and having one end thereof closed and having one end tapered, said drum having a loading and discharge opening in its tapered end, said opening being provided with a closure, said reversible drum and spiral blades constituting the sole means for producing a tipping action of the drum on its axis.

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