

Nov. 21, 1933.

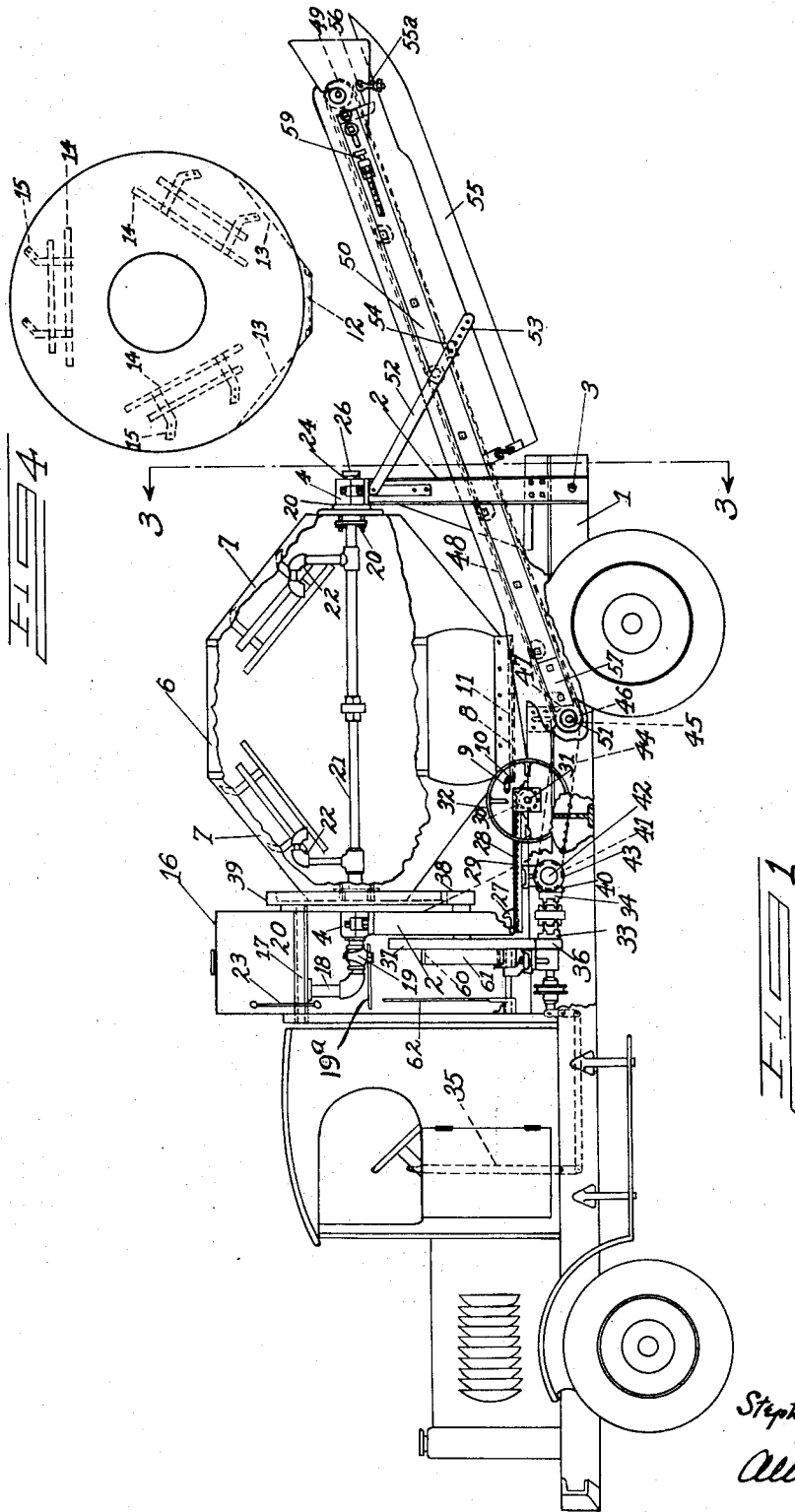
S. STEPANIAN

1,935,922

CONCRETE MIXING AND TRANSPORTING VEHICLE

Filed Dec. 21, 1928

4 Sheets-Sheet 1



INVENTOR.

Stephen Stepanian

Allen Allen

ATTORNEYS

Nov. 21, 1933.

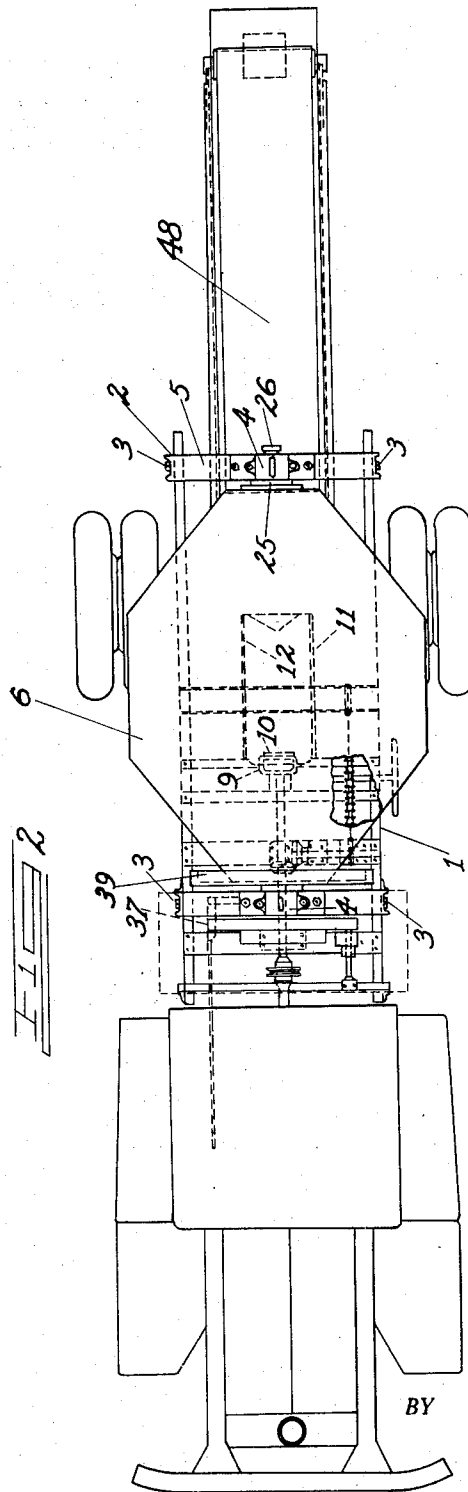
S. STEPANIAN

1,935,922

CONCRETE MIXING AND TRANSPORTING VEHICLE

Filed Dec. 21, 1928

4 Sheets-Sheet 2



INVENTOR.
Stephen Stepanian
BY
Allen Allen
ATTORNEYS

Nov. 21, 1933.

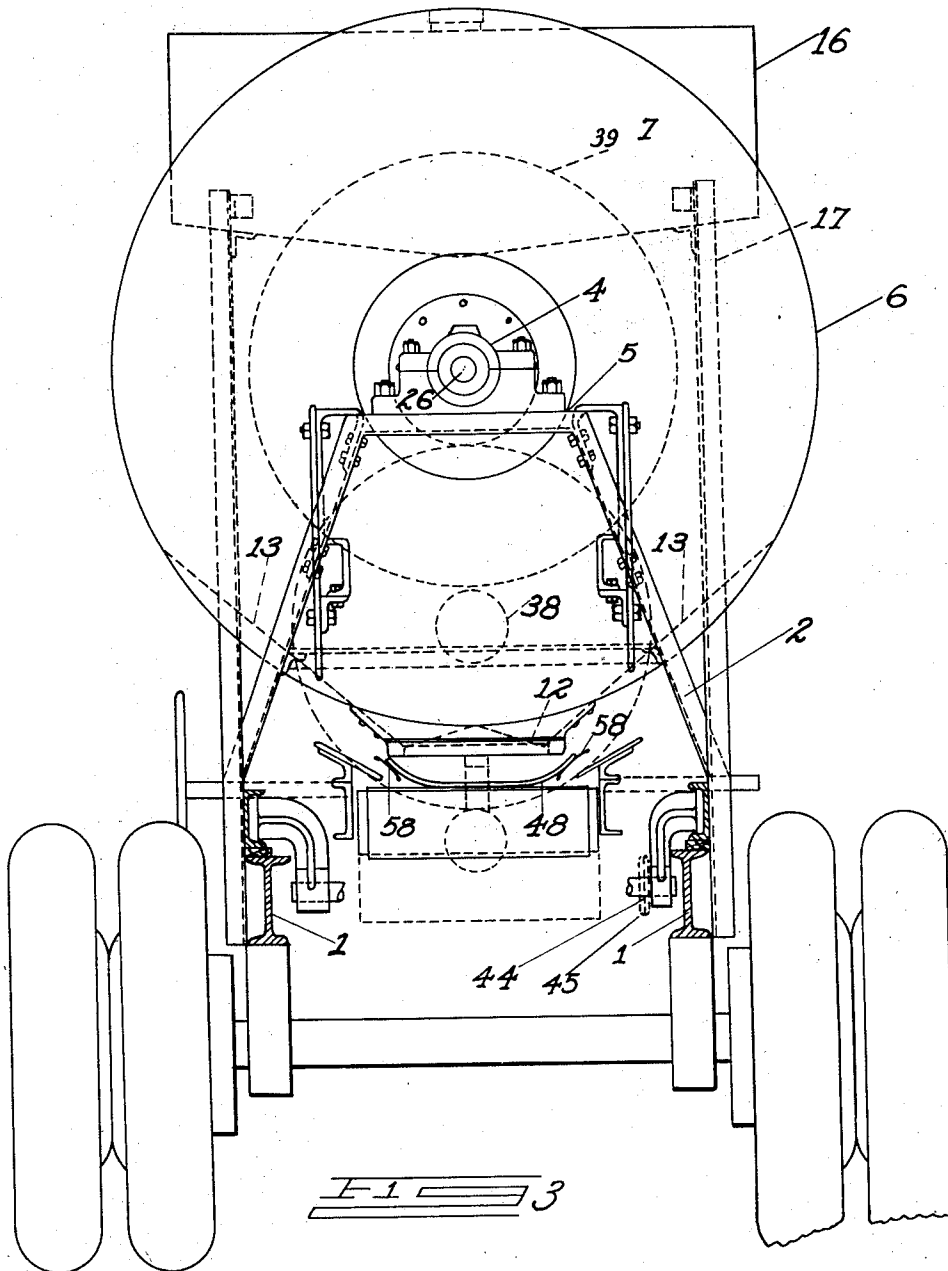
S. STEPANIAN

1,935,922

CONCRETE MIXING AND TRANSPORTING VEHICLE

Filed Dec. 21, 1928

4 Sheets-Sheet 3



INVENTOR.
Stephen Stepanian
BY
Allen Allen
ATTORNEYS.

Nov. 21, 1933.

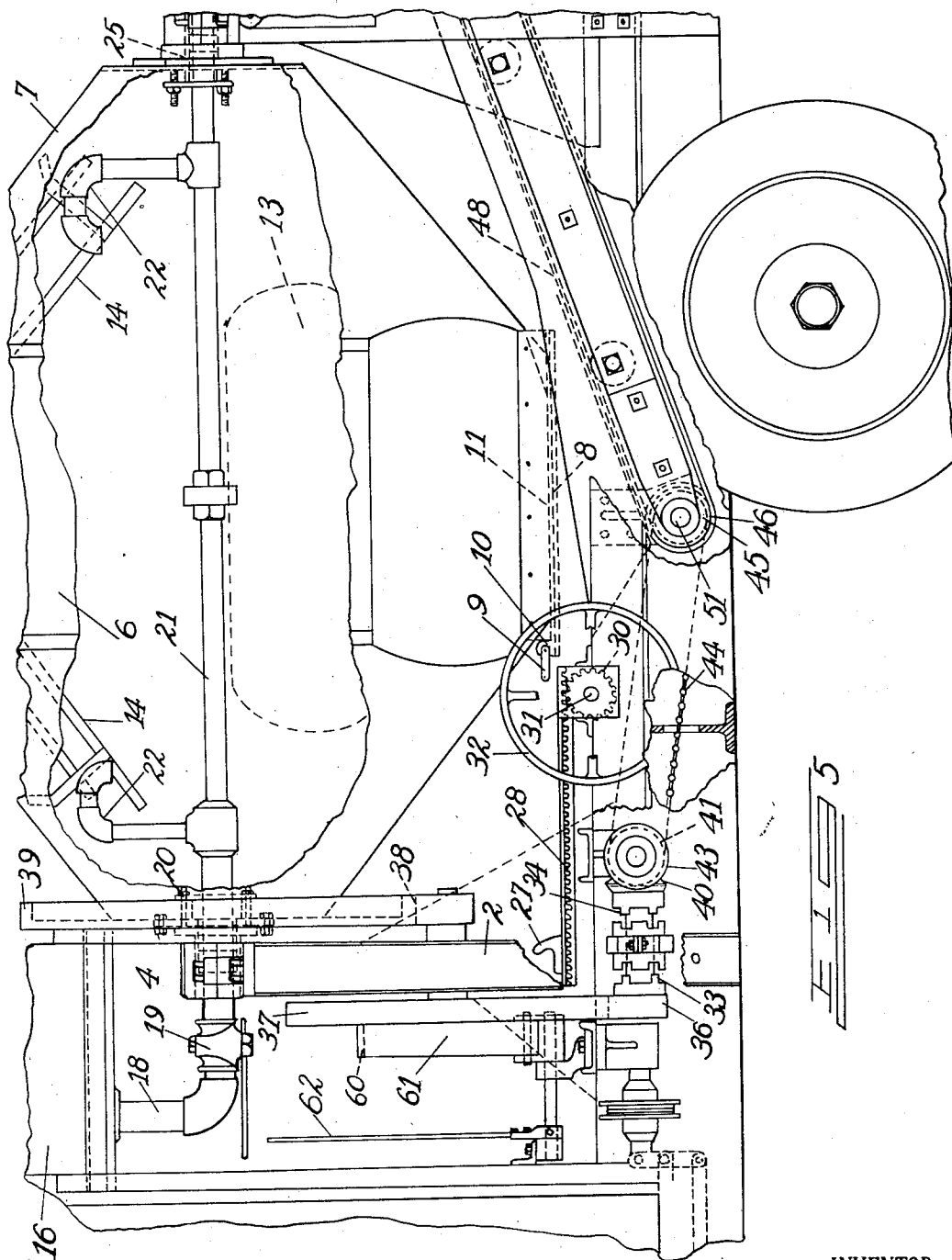
S. STEPANIAN

1,935,922

CONCRETE MIXING AND TRANSPORTING VEHICLE

Filed Dec. 21, 1928

4 Sheets-Sheet 4



INVENTOR.
Stephen Stepanian
BY
Allen Allen
ATTORNEYS.

UNITED STATES PATENT OFFICE

1,935,922

CONCRETE MIXING AND TRANSPORTING
VEHICLE

Stephen Stepanian, Columbus, Ohio, assignor of
one-sixth to William H. Hoagland and one-
sixth to Harold J. Kaufman, both of Columbus,
Ohio

Application December 21, 1928
Serial No. 327,681

14 Claims. (Cl. 83-73)

My invention relates to concrete mixers and concrete transporting vehicles.

In the art, there has been a quite extensive development of vehicles on which concrete mixers have been mounted which may be charged with the concrete mixture at a central plant and then transported to the job where water is added and the concrete, ready for pouring, may then be mixed and delivered. There has been some further development in the manufacture of vehicles for transporting ready mixed concrete. A still further development has been made in the provision of concrete vehicles in which concrete may be mixed during transportation but this latter development either requires a super-powered motor for the truck or it necessitates an undue strain on the motor in both driving the truck and operating the mixer.

My invention has as its object the provision of a vehicle in which, if the mixer is mounted on the truck, the truck engine need not be of sufficient power to drive both the truck and the mixer at the same time, and in which a conveyor is also incorporated with the mechanism which will enable the delivery of concrete at considerably spaced distances and at various elevations with respect to the discharge opening of the mixer.

It is further my object to incorporate in a cylindrical drum with frusto-conical ends, a series of agitators which, in discharging position of the mixer, will tend to direct the flow of concrete to the discharge opening and thus be self-cleaning. Another object is the provision of a concrete mixer having a unitary charging and discharging opening which may be effectively sealed, so as to provide a substantially water-tight, steam-tight and air-tight receptacle. A still further object is the provision of a mixer having flat areas so arranged within the mixer that a concrete mixture will be agitated by the uneven surface of the walls during the rotation of the mixer, and so that the flow of concrete will be directed toward the discharge opening and when at rest so that the drum tends to maintain a balanced equilibrium in the discharging position.

I further have as my object the provision of an improved slide valve and mechanism for operating it and also the incorporation with the mixer of a delivery belt adjustable to various elevations. It is also my object to incorporate with the mixing mechanism a braking element by which the speed of rotation of the mixer may be controlled.

The above and sundry other objects and improvements to which further reference will be made during the ensuing disclosure I accomplish

by that certain combination and arrangement of parts of which I have shown a preferred embodiment.

Referring to the drawings:—

Figure 1 is a side elevation of a preferred type of automotive vehicle with parts broken away to reveal the inner construction.

Figure 2 is a plan view of the vehicle.

Figure 3 is a sectional view of the vehicle on a slightly enlarged scale taken along the lines 3—3 in Figure 1.

Figure 4 is a diagrammatic end elevation of the mixer.

Figure 5 is an enlarged detail view of the clutch and gate valve operating mechanism.

The particular modification which I have illustrated is mounted on a five ton truck chassis. It is, however, within the scope of my invention to mount the mixer on a different sized truck or to mount the mixer on a truck, or on a trailer equipped with an engine for running the mixer. The truck has the usual chassis frame 1 onto which the entire mechanism for mixing and delivering concrete may be mounted by means of a supporting frame 2 secured to the chassis frame as with bolts 3. A power take-off unit is operated from the transmission of the vehicle. I have not illustrated the power take-off specifically, as it forms no part of my invention. The power take-off may be controlled by means of any suitable lever or shifting rod.

Suitably journaled, as indicated at 4, in cross frame members 5, I have mounted the concrete mixer, the construction of which forms an important element of my invention. The mixer has a cylindrical central portion 6 with frusto-conical ends 7. Within the cylindrical portion of the mixer I have mounted a slide valve. The slide valve consists of a plate 8 having a handle or link 9 pivoted in bosses 10. The gate is secured in channels 11 rigidly secured to the drum and an opening 12 in the drum serves for both the charging and discharging of the mixer.

Sloping towards the opening 12 I have secured within the drum the flat plates 13 which tend to guide material to the opening when the drum is in discharging position and which also prevent the slipping of material, without agitation, around the cylindrical walls.

Blades 14 are mounted within the drum to serve as agitators. The blades are supported on brackets 15 secured to the walls of the drum and they are so arranged on opposite sides of the opening, and they are so curved, that when the drum is in discharging position any concrete ad-

hering to the blades will be directed into the discharge opening.

A liquid tank 16 preferably is mounted on frame members 17 at one end of the tank, and a pipe 18 with a control valve 19 extends from the tank to the inner side of the drum. The control valve as clearly shown in Figure 1, has a shifting lever 19a accessible from the driver's seat. The pipe 18 is packed as indicated with a stuffing box 20 so that no leakage will occur. Water passing through the pipe 18 is distributed within the drum through a pipe 21 having goose neck discharge pipes 22 with L's on their ends so as to prevent the concrete mixture blocking the pipe. A gauge glass 23 mounted on the tank is so arranged that the driver of the truck, by turning in his seat, may observe the water level within the tank.

Preferably at the end of the drum opposite the tank the pipe 21 has an extension 24 made watertight, air-tight and steam-tight by the stuffing box 20. I have shown the extension 24 as closed by a cap 26, but it will be obvious that a valve might be used in place of the cap. The pipe 24 communicating with the interior of the drum will provide a convenient way for introducing steam, as from a steam hose, or heated air into the drum so that the concrete mixture may be heated in winter. I may further introduce the hot exhaust from the engine for heating the mix.

The gate to the tank is opened by means of a lug 27 mounted on a rack member 28 mounted in guide channels 29. The rack may be moved forwardly and back by a pinion 30 mounted on a shaft 31. A hand wheel 32 mounted on the shaft 31 provides a convenient way for operating the shaft 31. When the lug 27 is moved sufficiently far back it engages the pivoted link 9 and when the rack is moved forwardly, it pulls the gate valve closure with it. In closing the gate, the lug 27 bears against the boss which mounts the pivoted link and pushes the gate back into sealing position. By lubricating the slides of the gate, the drum can always be readily discharged and the pulverulent cement forms an effective seal which prevents leakage during operation of the drum.

The drive for the drum and conveyor is provided by clutches 33, 34 which may be shifted from the driver's seat by the shifting rod 35. When the clutch 33 is engaged a pinion 36 drives a gear 37 which in turn drives a pinion 38 which meshes with and drives a gear 39 suitably connected with the drum.

By shifting the shifting rod 35 the clutch 33 will be disengaged and the clutch 34 may be driven. The clutch 34 drives a bevel gear 40 which drives another bevel gear 41 mounted on a shaft 42 carrying a sprocket 43. A chain 44 engages the sprocket 43 and thereby drives a sprocket 45. The sprocket 45 is mounted on a shaft 46 which carries a pulley 47 which forms the drive for the conveyor belt 48.

The conveyor belt 48 passes over a pulley 49 journaled in a frame 50 which is pivoted at 51 and may be raised or lowered to a desired angle held in position by a pivoted link 52 secured in the supporting frame. The link 52 has a series of apertures 53 through which a bolt 54 secured in the frame 50 may be extended.

At the discharge end, the conveyor discharges into a removable suspended swivel chute 55 preferably supported on a swivel 55a so that the chute may be revolved to desired position for discharging. A wiper 56 keeps the outer surface

of the conveyor or belt clean. A triangular guard 57 mounted so as to engage the inner side of the belt prevents material falling from the conveyor from being carried in under the driving pulley. The conveyor or belt 48 may be of desired flexible material and it is guided by guard plates 58 which cause it to assume a concave shape laterally so that the mixed concrete will not tend to run off at the sides and so that the drive will be along the center line of the belt. The pulley 49 is journaled in sliding blocks so that the belt may be tightened by adjusting screws 59.

On the shaft carrying the gear 37 I have mounted a brake drum 60 which may be engaged by a brake band 61 controlled by a lever 62 and the operator of the truck may operate the brake by turning in his seat and pulling the lever 62. The brake enables the operator to slow down the rotation of the mixer and thus more readily control the position.

The operation of the mixer and vehicle will be apparent. The gravel, sand and cement to be mixed is charged into the drum with the gate valve opened and in its uppermost position. The valve is then closed and heated air or steam or hot exhaust may then be introduced into the drum. If the mix is heated with exhaust this may be introduced during transportation. After arriving at the destination where the material is to be poured, water may be run into the mixer as desired. The mixer is then rotated. Before discharging the drum is rotated until the gate valve is in position to be opened by the rack mechanism. It is a feature of my construction that the mechanism for operating the drum and the mechanism for operating the conveyor cannot both be set in operation at the same time. Thus the power required is conserved and an additional safety prevention mechanism is provided.

The long conveyor enables sufficient elevation of the discharge end of the conveyor to discharge into a hopper of sufficient capacity to hold the entire contents of the mixer. The truck may further be backed into the curb of a street and concrete may be delivered direct to forms at considerable distance from the truck.

While the ordinary use of my mixer vehicle will be for mixing concrete at the job, it may, with or without the water tank, be used for transporting premixed concrete from a central mixing plant to the place where the concrete is to be poured.

Modifications in the particular structure disclosed will readily occur to those skilled in the art, but insofar as such modifications incorporate the inventive principle involved, I consider them within the scope of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In combination with an automotive vehicle having concrete mixing apparatus mounted thereon comprising a rotatable drum mounted lengthwise of the vehicle, said drum being sealed and having a single gate valve for charging and discharging, a belt conveyor mounted so as to receive the discharge from said gate valve, said conveyor having a horizontally pivoted driving member operatively connected with the vehicle motor and being of such length as to extend and permit the discharge of material a substantial distance from said vehicle and means for guiding said belt in a concave formation laterally with relation to said belt.
2. In combination with an automotive vehicle

80

85

90

95

100

105

110

115

120

125

130

135

140

145

150

having concrete mixing apparatus mounted thereon comprising a rotatable drum mounted lengthwise of the vehicle, said drum being sealed and having a single gate valve for charging and discharging, a belt conveyor mounted so as to receive the discharge from said gate valve, said conveyor having a horizontally pivoted driving member operatively connected with the vehicle motor and being of such length as to extend and permit the discharge of material a substantial distance from said vehicle and means for guiding said belt in a concave formation laterally with relation to said belt and means for scraping material carried beyond the discharging position from the outer surface of said belt.

3. In combination with an automotive vehicle having concrete mixing apparatus mounted thereon comprising a rotatable drum mounted lengthwise of the vehicle, said drum being sealed and having a single gate valve for charging and discharging, a belt conveyor mounted so as to receive the discharge from said gate valve, said conveyor having a horizontally pivoted driving member operatively connected with the vehicle motor and being of such length as to extend and permit the discharge of material a substantial distance from said vehicle, and diverting guides for scraping excess material from the under surface of said belt.

4. In combination with an automotive vehicle having concrete mixing apparatus mounted thereon comprising a sealed drum rotatable with the automotive power of the vehicle and mounted longitudinally with relation to said vehicle, said drum having a charging and discharging opening with a sliding gate for closing said opening, a belt conveyor for delivering material from said opening, said conveyor being operable with the automotive power of said vehicle.

5. In combination with an automotive vehicle having concrete mixing apparatus mounted thereon comprising a sealed drum rotatable with the automotive power of the vehicle and mounted longitudinally with relation to said vehicle, said drum having a charging and discharging opening with a sliding gate for closing said opening, a belt conveyor for delivering material from said opening, said conveyor being operable with the automotive power of said vehicle, the connection from the automotive power being such that only the drum or the conveyor may be operated at the same time.

6. In combination with an automotive truck having a concrete mixing drum with driving connections from the automobile engine, a delivery conveyor also having driving connections with the automobile engine and a control for said driving connections having one position in which the drum will be driven and the conveyor inhibited and another position in which the conveyor will be driven and the drum inhibited.

7. In combination with an automotive truck, a concrete mixing drum with driving connections from the automobile engine and a delivery conveyor also having driving connections with the automobile engine, said drum being sealed and

means through which a heating medium may be introduced into said drum.

8. In combination with an automotive truck, a concrete mixing drum with driving connections from the automobile engine, a delivery conveyor also having driving connections with the automobile engine, and said mixing drum having a discharge opening with baffles within said drum sloping toward said opening.

9. Concrete mixing apparatus comprising a rotatable drum of cylindrical shape with frustro-conical ends and a cylindrical body portion with flat portions within said drum to prevent the slippage, without agitation, of material within said drum around the inner walls.

10. Concrete mixing apparatus comprising a rotatable drum of cylindrical shape with frustro-conical ends and a cylindrical body portion with flat portions within said drum to prevent the slippage, without agitation, of material within said drum around the inner walls, said drum having a gate valve in the cylindrical portion thereof and the flat portions sloping one on each side to said gate valve.

11. Concrete mixing apparatus comprising a rotatable drum of cylindrical shape with frustro-conical ends and a cylindrical body portion with flat portions within said drum to prevent the slippage, without agitation, of material within said drum around the inner walls, said drum having a gate valve in the cylindrical portion thereof and the flat portions sloping one on each side to said gate valve, said flat portions providing means to stabilize the balance of said drum in discharging position.

12. In combination with an automotive truck having a concrete mixing drum with driving connections from the automobile engine, a delivery conveyor also having driving connections with the automobile engine, said conveyor mounted in a frame and a delivery chute detachably mounted on said frame.

13. In combination with a motor vehicle of standard design characterized by a forward location of its motor and rearward extension from the motor of the mechanism for connecting the motor for vehicle driving, a concrete mixing machine mounted for operation on the vehicle, to the rear of the motor thereof and a material distance forward from the rear end of the vehicle, for stable support by the vehicle during rapid transportation thereon, and having a middle discharge opening, a conveyor running from under said discharge opening out past the rear end of the vehicle, means for operatively connecting the forward part of said mixing machine to said vehicle driving mechanism, and means for operatively connecting the conveyor to said mechanism.

14. In combination with a vehicle having a frame with an open end, a concrete mixing drum operatively mounted on the frame with a discharge opening a material distance from said end, and a delivery conveyor running from said opening out past said open end of the frame and movable up and down therein.

STEPHEN STEPANIAN.