

June 26, 1928.

J. D. POWELL

1,674,989

CONCRETE TRANSPORTING VEHICLE

Filed May 18, 1927

2 Sheets-Sheet 1

Fig. 1

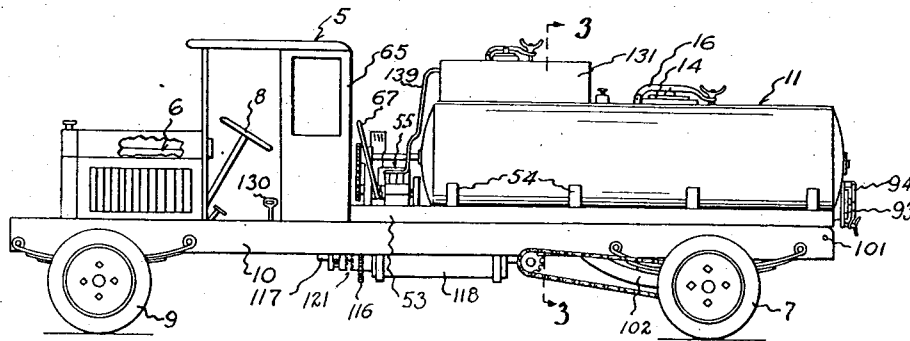


Fig. 2

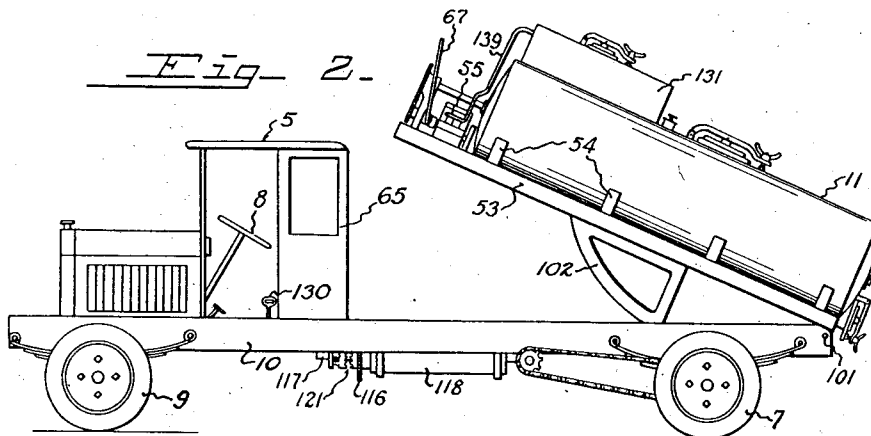
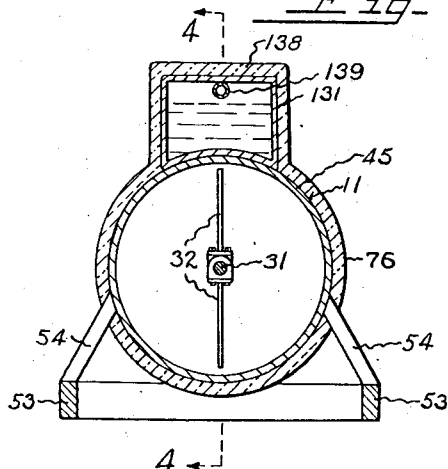


Fig. 3



INVENTOR.

John D. Powell,
by A. L. Sebold,
His Attorney.

June 26, 1928.

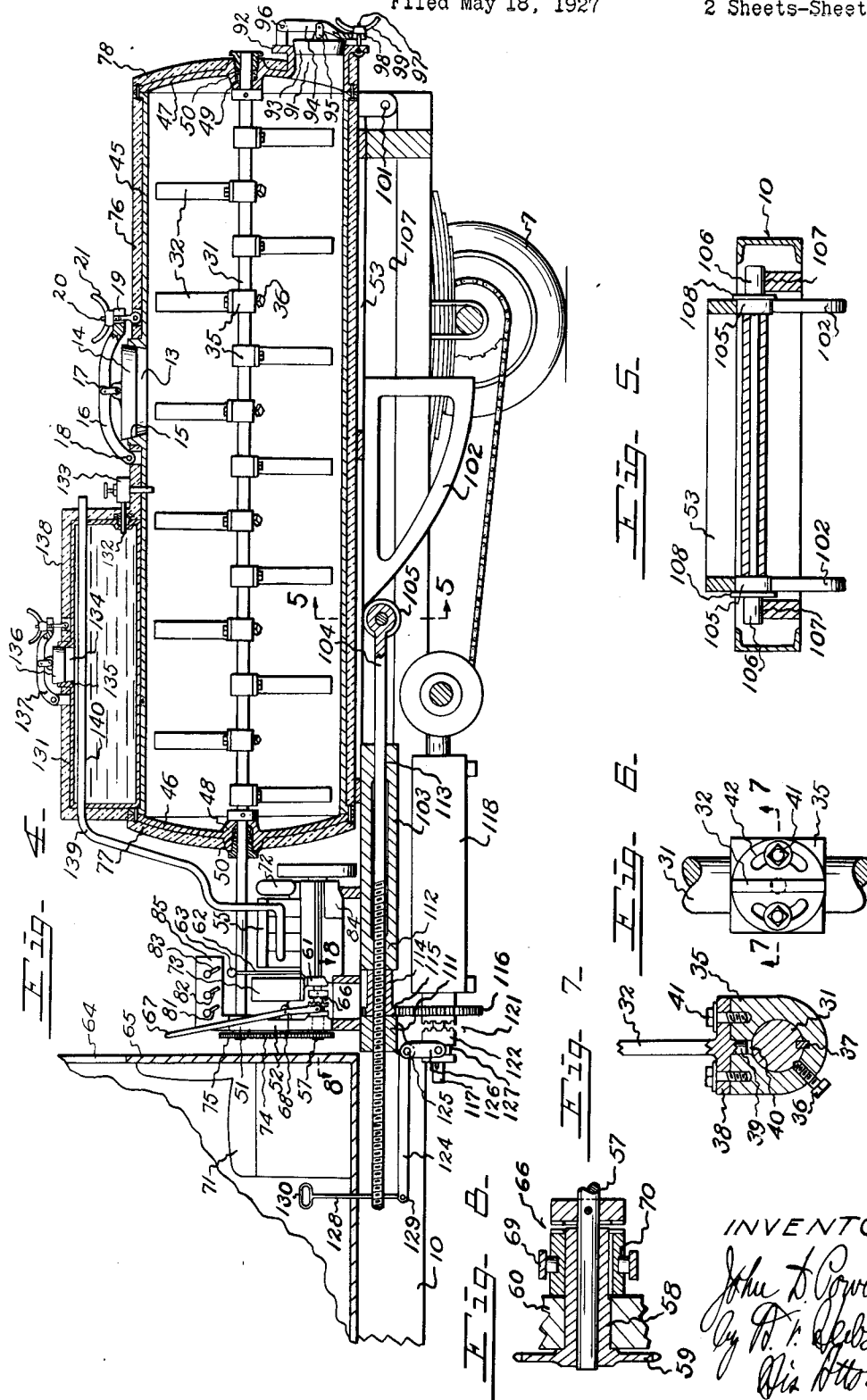
J. D. POWELL

1,674,989

CONCRETE TRANSPORTING VEHICLE

Filed May 18, 1927

2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE.

JOHN D. POWELL, OF CINCINNATI, OHIO.

CONCRETE-TRANSPORTING VEHICLE.

Original application filed October 25, 1926, Serial No. 144,044. Divided and this application filed May 18, 1927. Serial No. 192,275.

My invention relates to a vehicle for transporting concrete in batches from one locality to another distanced therefrom, as from a locality at which the ingredients, for instance aggregate, sand, cement and water, are supplied to the tank, which locality may be a stationary mixing plant, and transporting the concrete to another location, which may be distant from said first-named locality, at which the concrete is to be used, the concrete during its travel being maintained in wet flowable condition throughout its travel, which travel may be throughout a considerable distance and extend over a number of miles, for instance, when performing a method such as shown, described and claimed in my application for United States patent on method for concrete mixtures, filed by me in the United States Patent Office October 25, 1926, Serial No. 144,044, of which the present application is a division.

I do not herein claim the method of mixing and of transporting and conditioning herein shown and described, having shown, described and claimed the same in my aforesaid application Serial No. 144,044.

It is the object of my invention to provide novel means whereby concrete is transported and is maintained in wet flowable condition during transportation; further, to provide novel means for transporting and agitating the concrete mixture; further, to provide novel means whereby the concrete agitating means and motor therefor are mounted on a traveling vehicle and so related and associated with the vehicle, as to permit continuous agitation of the mixture throughout travel of the vehicle and during periods when the vehicle is not in motion; further, to provide novel association of means for driving the vehicle, for agitating the mixture, and for discharging said mixture from its containing tank as to provide a compact and conveniently operated mechanism; and, further, to provide novel means for heating the mixture.

The invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Fig. 1 is a side elevation of my improved device, showing the agitator tank in normal position.

Fig. 2 is a side elevation of the same, with

the agitator tank shown in tilted or dumping position.

Fig. 3 is a vertical cross-section of the same, taken on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal section of the same, taken in the plane of the line 4—4 of Fig. 3.

Fig. 5 is a detail view in cross-section, taken in the plane of the line 5—5 of Fig. 4.

Fig. 6 is a plan view of one of the stirrer blades, the shaft for the same being partly broken away.

Fig. 7 is a cross-section of the same, taken on the line 7—7 of Fig. 6; and,

Fig. 8 is a detail of the control means for the agitator motor, shown in axial section on the line 8—8 of Fig. 4.

In the employment of my invention it is contemplated that a concrete or other mixture be made at a stationary mixing plant, the mixture being charged in mixed and wet condition into the tank of my improved device, and by it conveyed in batches to the site at which the mixture is to be used, the mixture, during such travel, being maintained in agitated condition for maintaining the mixture freely flowable and for further conditioning the same for use upon discharge of the same from the tank, all as more fully shown, described and claimed in my aforesaid copending application Serial No. 144,044. My improved device may also be employed in other relations and for other uses.

The vehicle is exemplified as a motor truck 5, the propelling means of which may be a suitable usual internal combustion engine 6, or other suitable propelling means, having suitable operative connections with the rear wheels 7 for rotating the same, and provided with usual suitable clutch, brake and speed changing gearing. The motor truck is further provided with usual suitable clutch operating and brake operating means, speed control means, and other usual control means for the engine, as well as steering means, the latter exemplified by the steering wheel 8, for steering the front wheels 9 of the truck, such operating, control and steering means constructed in usual manner and located, as is usual, in the driver's cab of the truck. Usual springs are interposed between the axles of the wheels and the chassis 10 of the truck in usual manner. The driving motor 6 is located

over the front wheels 9, the driver's cab being located on the chassis in rear of the motor 6.

A traveling container, shown as a tank 11, is mounted on the truck, and is provided with agitating means for agitating the mixture. This agitation of the mixture during conveyance of the same causes the mixture to be thoroughly mixed even if the ingredients have not been previously mixed, and to be stirred and thoroughly blended and conditioned, and prevents the setting of the same.

The container on the truck is provided with a charging opening 13, normally closed by a closure 14, shown as a plug having frusto-conical connection with a closure ring 15 on the tank. This closure plug has articulating connection with a closure strap 16, as by means of links 17, articulated with said strap and said plug. The strap is pivoted at 18 to the tank at one of its ends, and is provided with a fork 19 at its other end, in which a screw 20 is received. The screw is pivoted to the tank and is arranged to be releasably received in the fork. A wing nut 21 is received about the screw for clamping the strap and the closure plug toward the closure ring.

Sufficient space is left in the tank under all loaded conditions to permit proper agitation of the mixture during transportation.

The agitating of the mixture in the tank is shown accomplished by means of a stirrer-shaft 31, extending lengthwise of the tank, from which stirrer blades 32 extend. These stirrer blades are preferably of greater width than thickness, and are preferably adjustable on the shaft, so that their paths through the material may be wider or narrower as desired, and so that further they may be presented at different inclinations in their paths of travel for imparting endwise movements to the mixtures; furthermore, the blades may be adjusted to opposite angles so that some of the blades will present one of their faces as an advancing face and the other blades will present the other of their faces as advancing faces, and thereby move the materials in opposite directions.

The adjustment of the blades may be accomplished by providing hubs 35, which are secured to the shafts at suitable points, as by bolts 36. The hubs may be adjusted lengthwise of the shaft, suitable spline groove and key connections 37 being between the hubs and the shaft. Each of the blades is provided with a flange 38, and a stem 39 received in a centering hole 40 in the hub. Bolts 41 are received through arcuate slots 42 in the flange 38, and are threaded into the hub, for clamping the flange to a coacting face on the hub at the desired inclination.

Adjustments of the blades may be made

by a man entering the tank through the charging opening 13, which serves as a man-hole.

The tank comprises a shell 45, which is preferably cylindrical in cross-section, and is provided with heads 46, 47, which may be made releasable from the shell.

The stirrer-shaft 31 is journaled in bearings 48, 49, in the heads. These bearings include stuffing boxes 50, to prevent leakage between the shaft and its bearings. The shaft is also journaled in a bearing 51 on a stand 52 extending rigidly from a platform 53. The platform is provided with brackets 54, by means of which the tank is fixed to the platform. The tank is fixedly held endwise to the platform and also to prevent its rotation on the platform.

An agitating motor is mounted on the platform and is exemplified as an internal combustion gasoline engine 55.

A driven shaft 57 is journaled on the engine frame and in the hub 58 of a sprocket wheel 59 journaled in a bearing 60 of the stand 52. This driven shaft is driven at suitable speeds from the crank shaft of the engine as by means of speed changing mechanism in a suitable gear box 61, from which a usual suitable wiggle stick 62 extends for changing the speed relation and direction of rotation in the gearing. This wiggle stick is provided with a handle 63 which may be operated by the driver through the rear opening 64 in the cap 65 of the vehicle.

One of the clutch collars of a suitable clutch 66 is fixed to said shaft. The other collar of said clutch is slidable axially on the hub 58 for engagement or release of the teeth of said clutch, this latter collar having spline groove and key connection with said hub. A lever 67 is pivoted at 68 to the stand 52 and is provided with a fork 69 provided with suitable pins received in an annular groove 70 in the movable clutch collar for engagement and disengagement of the clutch. This lever is readily operable through said rear opening 64, the lever being readily reached by the driver of the vehicle on the driver's seat 71.

A gasoline or other fuel tank 72 and a water tank 73 may also be mounted on and be movable with the platform and have suitable connections with the engine 55.

A chain-belt 74 is received over the sprocket-wheel 59 and a sprocket wheel 75 fixed to the agitator shaft 31 for driving the agitator shaft from the engine 55. The agitator shaft is held in endwise relation in its bearings.

When the mixture has been charged into the tank, the tank is closed by the closing of the door plug 14 and clamping of the same in position, it being understood that the outlet opening has been previously closed prior to charging.

In order to retain the heat of the mixture, during cold weather, the tank 11 is insulated, as by surrounding the same with a heat insulating jacket 76, and providing its heads with heat insulating layers 77, 78.

The engine 55 is provided with suitable usual controls for insuring its continuous proper operation, indicated by levers 81, 82, 83, for instance, controlling the starter 84, the ignition, and the gas supply, which controls are accessible to the driver of the vehicle while situated in the cab 65, as by reaching through the rear opening 64 in said cab.

These levers may be mounted on an instrument board 85 extending from the stand 52. The levers 81 and 82 respectively control suitable usual electric connections in the starting and ignition devices for the engine 55, and the lever 83 has usual operative connection with the usual fuel controls of an internal combustion engine.

The mixture is conveyed to the site of use while being stirred or agitated, and at the site of the use the mixture is dumped in homogeneous and live condition for uses for which it may be put in the building or other operation for which it is intended. For conveniently delivering the mixture, the tank is provided with an outlet opening 91 at the lower portion of its rear end, which outlet opening is preferably in the head 47.

The head is provided with a door ring 92 at said opening. A closing plug 93, which preferably has a frusto-conical closing joint with said door ring, is arranged to close said opening. It is articulated with a clamping strap 94 by means of links 95 articulated with said strap and said plug. The strap is hinged by a hinge 96 to the tank. A screw 97 is pivoted to the tank and is arranged to be received in a fork 98 at the other end of said strap. A wing nut 99 is threaded over said screw for clamping the strap and the plug toward the door ring.

For convenience in dumping, suitable tilting means are provided for the tank, preferably operated by the vehicle engine. The rear end of the tank is preferably hinged to the chassis 10 of the truck, as by means of hinges 101 between the rear ends of the platform 53 and said chassis, at the respective sides of said platform and chassis.

The platform is provided with a depending arc piece 102 at each side thereof. These arc pieces are rigidly fixed to the platform. A housing 103 extends crosswise of the chassis and has a screw rod 104 extending from its middle. Wheels 105 at the respective ends of said housing are received about a shaft 100 which forms part of said housing. These wheels coact with the arcuate faces of the respective arc pieces depending from the platform.

The shaft also has wheels 106 thereon at

its respective ends which coact with tracks 107 extending lengthwise of the chassis at the respective sides of the latter and rigidly fixed to the chassis. The wheels 105 and 106 have flanges 108 therebetween for locating said wheels endwise.

The screw rod is slidable endwise in bearings 111, 112, 113, fixed to the chassis. A nut 114 is threaded to the screw rod and is held endwise between the bearings 111, 112. The nut is provided with a pinion 115 which is arranged to be driven by a gear 116 meshing therewith. This pinion is normally loose on a driven shaft 117 extending from the usual transmission case 118 of the truck, and driven selectively at various speeds and in reverse directions by the gearing therein, which is in turn driven by the truck engine 6.

A clutch 121 is located between said gear 116 and an endwise shiftable clutch collar 122. This clutch collar has spline groove and key connection with the shaft 117.

An operating lever 124 is pivoted at 125 to the chassis, and has a fork 126 provided with pins received in an annular groove 127 of the shiftable clutch collar. An operating rod 128 has articulation 129 with said clutch lever, and is provided with a handle 130, located in the truck cab at the driver's position for being readily operated by the driver seated in the truck cab.

During dumping of the contents of the tank, the rotation of the agitator blades is preferably continued, for full discharge of the contents of the tank, these contents being especially fluid due to its continued and long agitation during travel, the hermetically sealed tank also preventing evaporation of moisture from the tank. After discharge of the mixture, the tank is again lowered into horizontal position.

In order to prevent the formations of a film of set concrete upon the inner face of the wall of the tank or upon the blades, the shaft, and the operative parts in the tank, I prefer to provide the tank with a charge of water, and to continue the movements of the blades in the tank during the return travel of the truck to the mixing plant, where the water in the tank may be discharged and, if desired, used in making subsequent mixtures.

In order that there may be a supply of water continuously ready for use as soon as the mixture has been discharged from the tank, I provide a supplemental tank 131 on the main tank 11, the same being suitably fixed thereto. A passage 132, which includes a valve 133, is between the supplemental tank and the main tank, for charging the water from the supplemental tank into the main tank.

The supplemental tank is provided with a charging opening 134, comprising a closing

ring 135 arranged to be closed by a closing plug 136, hingedly pivoted to a clamping strap 137, which is hinged and releasably secured to the supplemental tank in manner similar to the hinging and securing of the closing straps 16, 94, with relation to the main tank. The supplemental tank is preferably provided with heat insulation 138 thereabout. The bottom of the supplemental tank preferably impinges directly on the top of the agitator tank, for transferring heat from the supplemental tank to the agitator tank. The heat insulation 138 at the top and sides of the supplemental tank preferably merges with the heat insulating jacket 76 surrounding the agitating tank.

The supplemental tank is arranged to be charged with water prior to departure of the truck from the charging station, and this water will in cold weather be heated water, which is retained heated by the heat insulation about the supplementary tank.

The exhaust pipe 139 from the engine may be caused to pass through the supplemental tank, as shown at 140, for aiding in heating said water or maintaining the same in heated condition. The exposure of the bottom of the supplemental tank to the top of the agitating tank permits transfer of heat from the heated water in the supplemental tank to the contents of the agitating tank and to the interior of the agitating tank for preventing freezing of the contents of the agitating tank, or for heating said contents.

This water is charged into the main tank by the opening of the valve 133 after the concrete mixture has been discharged from the main tank and the discharging opening thereof has been closed. There is sufficient water charged into the main tank in this manner to cause splashing of the entire interior and operating parts in the main tank during return of the main tank to the charging station.

I prefer to drive the stirrers in the agitator tank by an independent engine, independent of the engine which drives the truck, so as to relieve the truck engine of this duty, and to further provide for rotating the agitators or stirrers in convenient manner regardless of the positions of the agitator tank.

The delivered mixed batches at the points distanced from the charging plant may be poured directly from the agitator tank into the forms for receiving the concrete, or into a chute communicating with elevating mechanism for conveying the mixture to suitable gravity chutes or forms, as may be desired, for immediate use. A sufficient number of trucks may be employed so that the supply of concrete is substantially continuous and in greater quantity than is possible by individual temporary mixing plants, and with the assurance that the concrete produced by

my invention and supplied in accordance therewith is of better quality with the same ingredients compared with the concrete supplied by the usual temporary stationary mixing plants now in general use, and with the further assurance that the mixtures are homogeneous and thoroughly stirred and that the strength of the mixtures has been improved by the agitation during their travel to the site of use, and that the mixtures set on the job with maximum solidity and tenacity.

In my improved device the parts are compactly arranged for manipulation and for economic construction and distribution of weight on the traveling vehicle, and the motors are respectively located in front of and to rear of the driver's cab and are both under his control while the vehicle is traveling and while the vehicle is at rest.

My improved device further provides means whereby extremely uniform mixtures are produced and whereby economical handling of the mixture is effected.

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

1. In a device of the character described, the combination with a self-propelled vehicle comprising a chassis, an engine thereon for driving the vehicle, and a driver's cab on said chassis in rear of said engine, of a platform in rear of said driver's cab, the rear portion of said platform pivoted to the rear portion of said chassis for tiltingly mounting said platform on said chassis, said platform extending forwardly along said chassis approximately to said driver's cab and wholly supported by said chassis, an agitator tank fixed to said platform in rear of and spaced from said driver's cab, a second engine mounted on said platform in said space between said agitator tank and said driver's cab, an agitator shaft provided with agitator blades rotatable in said tank, driving means between said second-named engine and said shaft, control means in said driver's cab for said first-named engine, control means for said second-named engine and said driving means adjacent to said driver's cab, said driver's cab provided with an opening close to said second-named control means, a driver's seat in said driver's cab, said first-named control means and said second-named control means located close to said driver's seat within manual reach from said driver's seat, tilting means for tilting said platform, driving means between said first-named engine and said tilting means for operating said tilting means, and control means in said cab for said tilting means.

2. In a device of the character described, the combination with a self-propelled vehicle comprising a chassis and an engine

thereon for driving the vehicle, of a platform pivoted at its rear portion to the rear portion of said chassis and wholly supported by said chassis, an agitator tank fixed on said platform, an internal combustion engine independent of said first-named engine mounted on and movable with said platform, an agitator shaft provided with agitator blades rotatable in said tank, driving means between said second-named engine and said shaft, a water-tank mounted on said first-named tank, regulatable feeding means between said tanks for feeding the water from said water-tank into said first-named tank, an exhaust pipe from said second-named engine passing through said water-tank and conveying the hot exhaust from said second-named engine through said water-tank for heating the water in said water tank during travel of said vehicle, and means for tilting said platform on said chassis whereby to tilt said agitator tank, said agitator shaft, said water tank, said second-named engine and said exhaust pipe with said platform for maintaining operative relations therebetween.

3. In a device of the character described, the combination of a self-propelled vehicle comprising a chassis, an engine thereon for driving the vehicle, a driver's cab on said chassis, a platform in rear of said driver's cab pivoted at its rear portion to the rear portion of said chassis and wholly supported by said chassis, an agitator tank fixed on said platform in rear of said driver's cab, an agitator engine mounted on said platform between the forward end of said agitator tank and said driver's cab, an agitator shaft provided with agitator blades rotatable in said tank, driving means between said second-named engine and said agitator shaft, control means for said vehicle engine, said control means located in said driver's cab, control means for said agitator engine, said control means for said agitator engine located on the forward end of said platform

close to said driver's cab, said driver's cab provided with a rear opening at said last-named control means, and a driver's seat in said driver's cab between said two-named control means closely related to both said control means for manual manipulation of both said control means from said driver's seat.

4. In a concrete transporting vehicle, the combination with a vehicle comprising a chassis and front wheels and rear wheels thereunder, of a platform whose rear portion is pivoted to the rear portion of said chassis in rear of said rear wheels and extending forwardly along said chassis to a position substantially midway between said front wheels and said rear wheels, said platform wholly supported by said chassis, an agitator tank on said platform, a vehicle motor mounted on the forward end of said chassis, an agitator motor mounted on the forward end of said platform, a driver's cab on said chassis between said motors, control means for said vehicle motor in said driver's cab, control means on the forward end of said platform close to said driver's cab for said agitator motor, said driver's cab provided with a rear opening adjacent to said last-named control means, a driver's seat in said driver's cab between said two-named control means, said two-named control means closely related to said driver's seat and within manual reach from said driver's seat, said agitator tank and said second-named motor tiltable with said platform, tilting means on said chassis between said front wheels and said rear wheels for tilting said platform, and power driven gearing for said tilting means, said power driven gearing located under said agitator motor and having operative connection with said vehicle motor for being driven by said vehicle motor.

In testimony whereof, I have hereunto signed my name.

JOHN D. POWELL.