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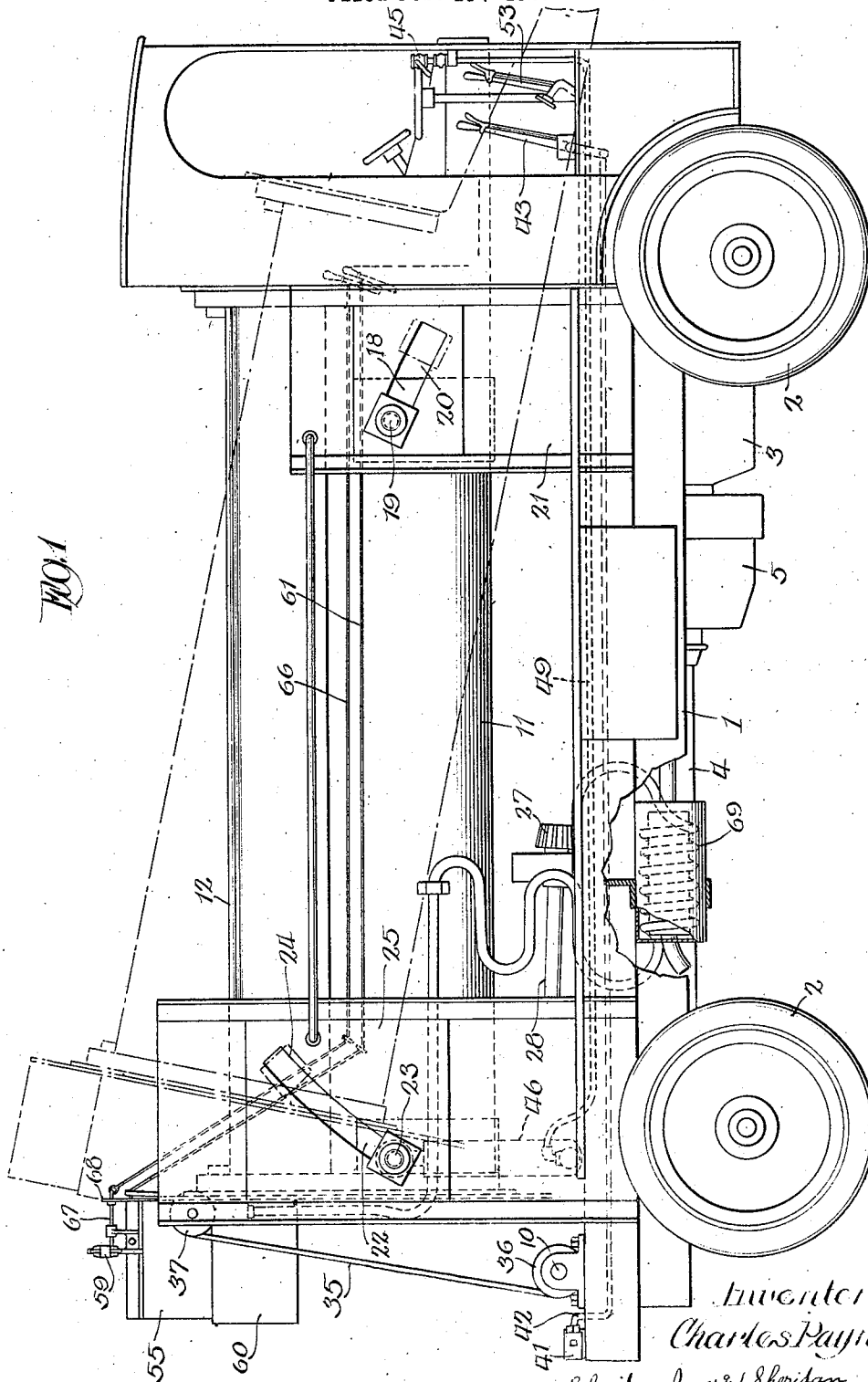
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C. PAYNE

COMBINATION TRUCK AND CONCRETE MIXER

Filed Feb. 19, 1923

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Inventor:
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(By) Sheridan, Jones & Sheridan Attys

Sept. 16, 1924.

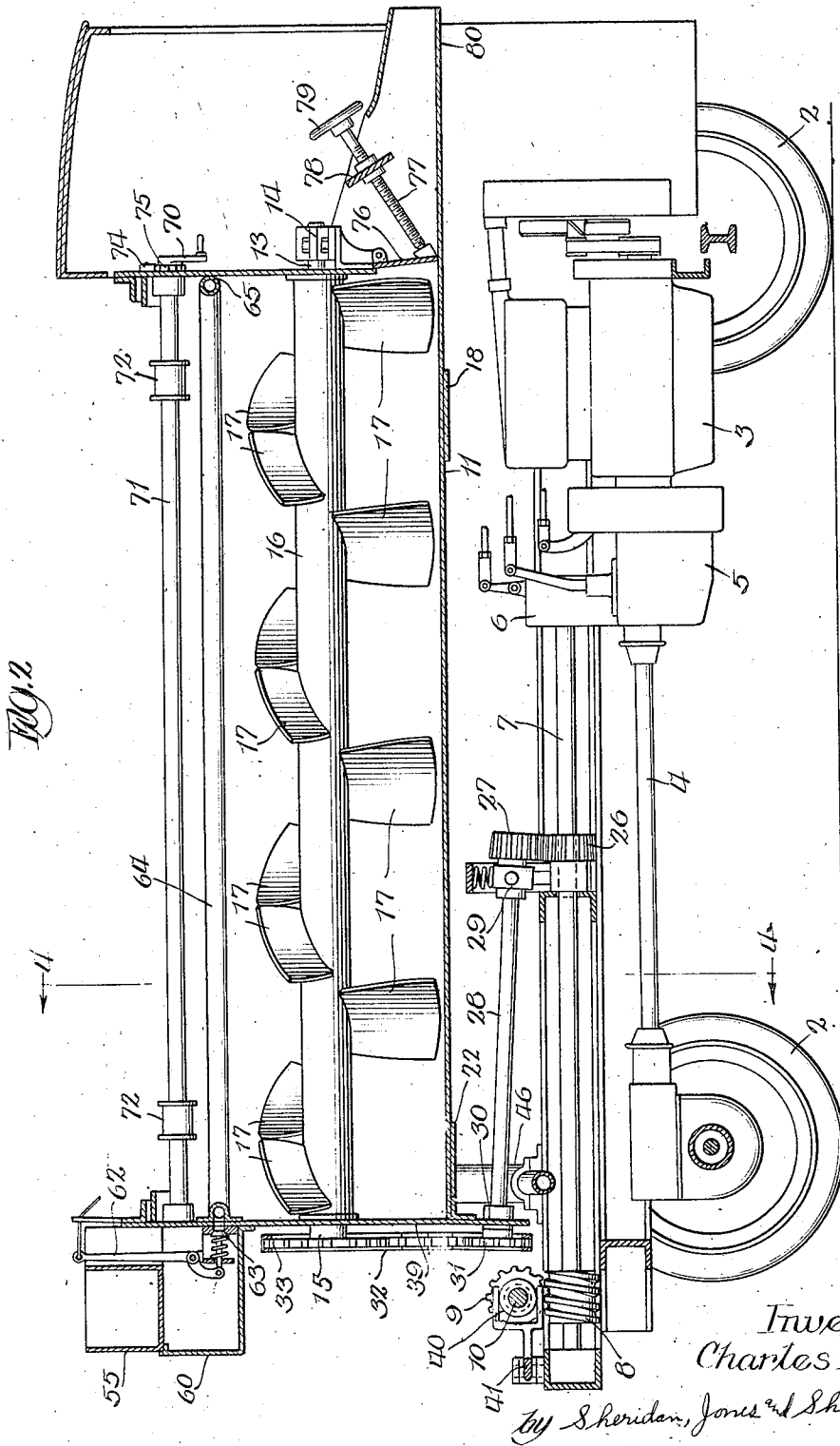
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FIG. 11

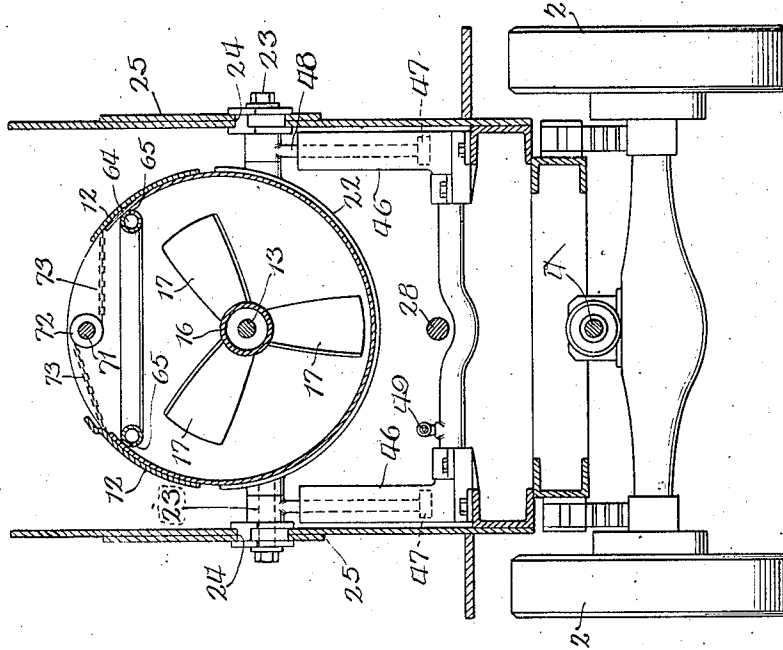
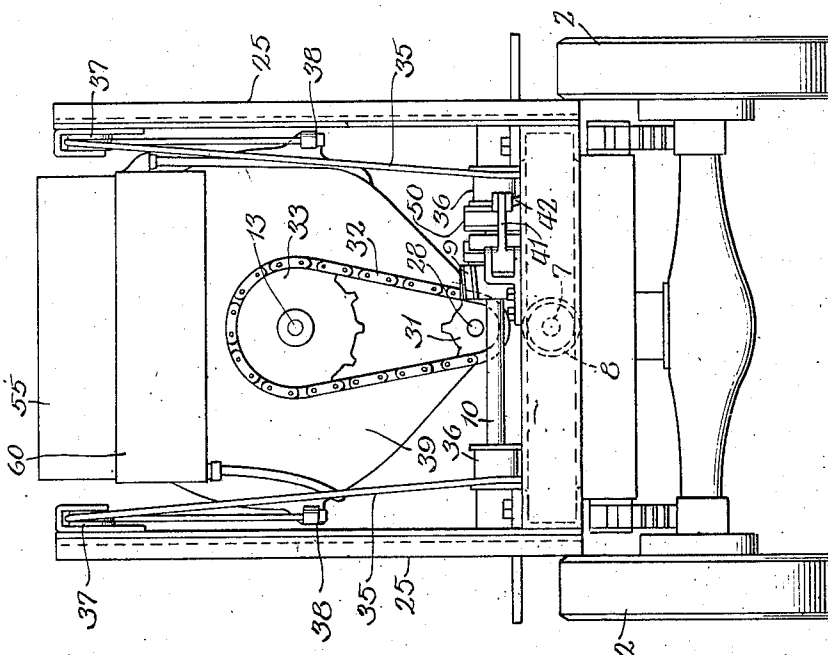


FIG. 13



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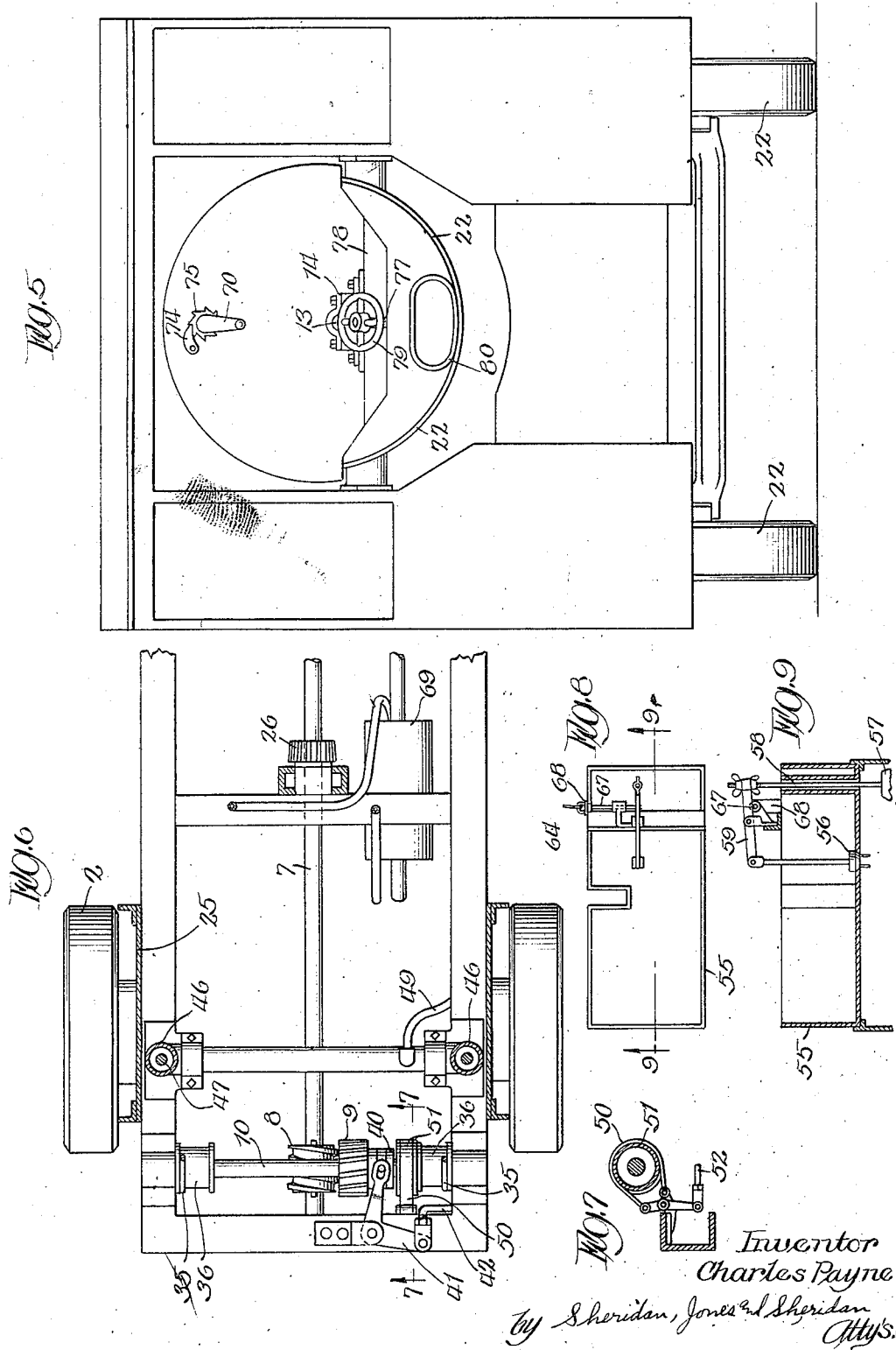
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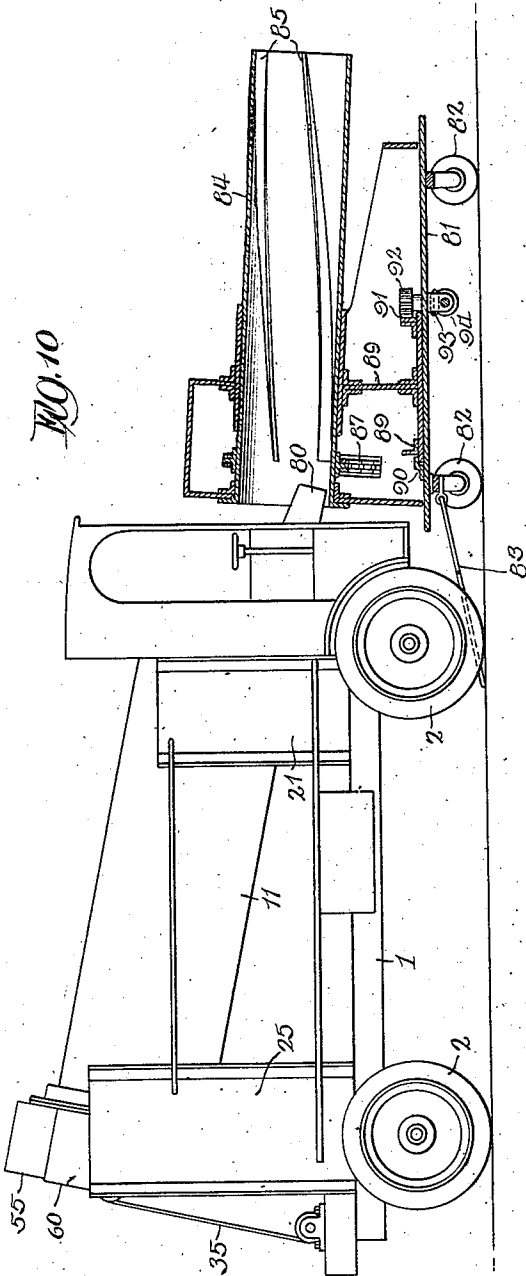
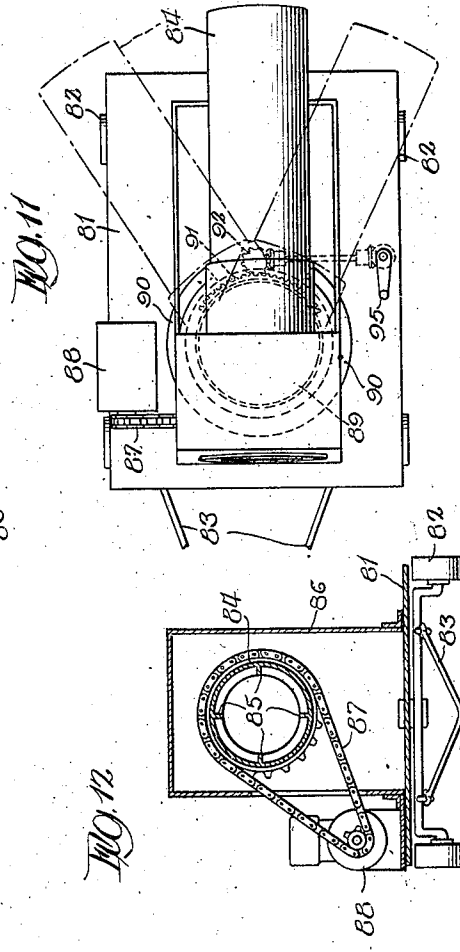
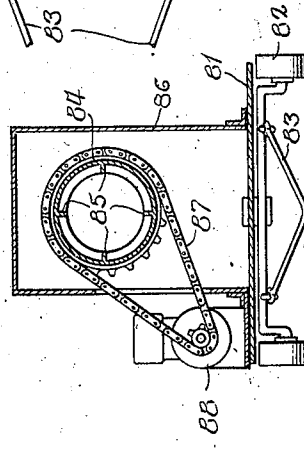


FIG. 12



Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES PAYNE, OF WAUKEGAN, ILLINOIS.

COMBINATION TRUCK AND CONCRETE MIXER.

Application filed February 19, 1923. Serial No. 619,799.

To all whom it may concern:

Be it known that I, CHARLES PAYNE, a citizen of the United States, residing at Waukegan, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Combination Truck and Concrete Mixers, of which the following is a specification.

My invention relates to improvements in concrete mixers of the kind that are mounted on an automobile truck chassis, so as to be self-propelling and to enable power to be taken from the engine for rotating the mixer.

One of the objects of the invention is to provide an improved self-propelling mixer.

Another object is to provide a mixer of this type which may be readily tilted to discharge the concrete therefrom.

A further object is to provide means whereby the driver, from his seat, may control the amount of water used in mixing the batch of concrete.

Other objects and advantages will be apparent from the following description and the accompanying drawings, in which—

Figure 1 is a side elevation of the apparatus;

Fig. 2 is a central sectional elevation thereof;

Fig. 3 is a rear elevation;

Fig. 4 is a section taken on the line 4—4 of Fig. 2;

Fig. 5 is a front elevation;

Fig. 6 is a plan view of the rear part of the chassis;

Fig. 7 is a section taken on the line 7—7 of Fig. 6;

Fig. 8 is a plan view of the water tank;

Fig. 9 is a section taken on the line 9—9 of Fig. 8;

Fig. 10 is an elevation of the mixer in tilting position and of a revoluble concrete distributor associated therewith, the latter being shown in section;

Fig. 11 is a top plan view of said distributor; and

Fig. 12 is an end elevation thereof, partly in section.

The mixer may be mounted on any suitable automobile truck chassis, one form of which comprises side frame members 1 mounted on the wheels 2 in a conventional manner. The engine 3 drives a power shaft

4 through a suitable gear shift located in a housing 5, the latter having an extension housing 6, from which an auxiliary drive shaft 7 issues and is extended rearwardly and provided with a worm and gear connection 8, 9, in order that the transverse shaft 10 may be rotated at will. This is the shaft which actuates the tilting mechanism for the mixer, as hereinafter described.

The mixer comprises a long cylindrical chamber 11, having a pair of doors 12 near the top thereof, as shown in Fig. 4, which doors may be caused to slide together or slide apart along the arc of a circle, as hereinafter described. The mixer is provided with a longitudinal driving shaft 13, mounted in bearings 14 and 15 at the front and rear (Fig. 2) of the apparatus. A tubular member 16 rotates with the shaft 13 (Fig. 4) and carries a series of propeller blades 17, the effect of which is to provide a screw conveyor whereby the ingredients are fed from the rear toward the front of said truck or vice versa, as in mixing, rotation in either direction of the shaft 13 and propeller blades 17 being possible due to the power being derived through the transmission mechanism of the vehicle.

The cylindrical mixer body is supported adjacent its forward and rear ends by means of yokes 18 and 22, of semicircular form, partially surrounding the circular body of the mixer, the yoke 18 being provided with bolts 19, which constitute trunnions and pass through slots 20 in a vertical supporting member 21 constituting part of the automobile.

In order to empty the mixer, the rear end thereof is elevated, causing the front end to pivot about said trunnions 19, the latter sliding forward in the slots 20 as the rear end is being raised. The rear yoke 22 is also provided with trunnions 23 which pass through arc-shaped slots 24 in upright supporting members 25 at the rear of said truck. Each slot comprises the arc of a circle, the center of which is substantially at the point of contact between the two bevel gears 26 and 27 (Fig. 2). Any other suitable driving elements may be employed. The gear 26 is mounted on the shaft 7, and the gear 27 is mounted on an auxiliary shaft 28, said shaft being supported at its

forward end in a bearing 29, and at its rear end in a bearing 30 mounted in the rear plate of the mixer. A sprocket wheel 31, on the end of the auxiliary shaft, drives a chain 32, thereby rotating a sprocket wheel 33 on the rear end of the central shaft 13 in the mixing chamber and rotating the screw conveyor.

The rear end of said mixer is lifted by cables 35 (Figs. 1, 3, and 10), said cables being secured to rollers 36 on the transverse shaft 10 and passing over pulleys 37 mounted near the upper end of the upright supports 25, thence downwardly to a point 38, where they may be secured to the plate 39, constituting the rear of the mixer.

In order to rotate the auxiliary shaft 10 and rollers 36, and thereby tilt the mixer, a clutch 40 is provided at the rear end of the supporting frame, said clutch comprising a bell crank lever 41, one end of which is connected, by means of a rod 42, with an operating lever 43 near the driver's seat in the front of the vehicle. When the lever is actuated the gear 9 is slid back and forth transversely, to engage or disengage the worm 8. The mixer is thus tilted by power taken from the automobile engine and delivered to the bevel gears 26, 27, and shaft 28, these gears permitting the rear end to be elevated without disturbing the driving engagement thereof. The upward movement is limited, by removing some of the teeth of the gear 9 to limit the rotation of the gear to less than one revolution.

To lower the rear end of the mixer, the driver turns a release valve 45, releasing air from a pair of cylinders 46 at the rear of the frame and thereby allowing the pistons 47 to descend rapidly or slowly at the will of the driver. Said pistons are connected to piston rods 48, the upper ends of which encircle the trunnions 23, previously described. During the upward movement of the pistons, the air is drawn in through a one-way valve in the release valve housing 45, said valve housing and pistons being connected by a suitable air line 49 carried by the frame of the truck.

A brake for the auxiliary shaft 10 is also provided, as shown in Figs. 6 and 7, and comprises a brake band 50 surrounding a brake drum 51, controlled by suitable links actuated by a brake rod 52, said rod extending to a brake lever 53 near the driver's seat.

The crushed stone, sand, and cement for a batch of concrete are simply dumped into the mixer through the open top thereof; water, in measured quantities, being supplied in the following manner: A reservoir 55 is mounted on the upper rear part of the truck and is supplied with water by a hose or stand pipe, for example. This reservoir, as shown in Figs. 8 and 9, has a valve 56

in the bottom thereof, which is normally open, said valve being counterbalanced by a float 57 at the lower end of a rod 58 extending downwardly through a tube in the reservoir, the movable parts being suspended from a pivoted link 59. Water from the reservoir flows past the valve 56 into the measuring tank 60, and fills the same until the float 57 is lifted, thereby closing the valve. By adjusting the position of the float a predetermined volume of water may be permitted to flow into the measuring tank. In order to discharge said water into the mixer chamber, the operator simply pulls a cord 61, the front end of which is accessible to him and the rear end of which is secured to a pivoted lever 62, the lower end of which actuates a valve 63, withdrawing the same from its seat, as shown in Fig. 2, thereby allowing the water to flow past the same into a pipe 64, which has a rectangular form and extends completely around the sides of the mixing chamber, that is to say, across the ends and along the sides thereof, as shown in Figs. 2 and 4. The water issues from a series of perforations 65 in this pipe, as shown in Fig. 4, and is directed against the sides of the mixer, flowing downwardly against the walls thereof and preventing excessive deposits of concrete thereon. When said cord is released the valve reseats itself and the operator, by pulling the second cord 66, withdraws a pin 67 (Figs. 8 and 9), thereby releasing the pivoted link 59 and the float 57, so that the latter may descend of its own weight, again opening the valve 56. The pin 67 is impelled inwardly by a leaf spring 68, and snaps under the link 59 when the float is raised, in order to hold the same in raised position, as shown in Fig. 9. In order to heat the water in cold weather, a coiled pipe 69 (Figs. 1 and 6) is arranged around the exhaust or muffler and connected so that the incoming supply of water is heated before reaching the reservoir and the tank.

The operator is enabled to close the top of the mixer without leaving his seat, by turning the handle 70, thereby rotating the shaft 71, on which are mounted two wide pulleys or spools 72, on which chains 73 are wound—see Fig. 4. Said chains are attached to the sliding doors 12 and draw said doors together. They are held against return movement by a pawl and ratchet 74, 75, at the front end of the shaft—see Fig. 5.

The plastic concrete flows from the front end of the mixer when the latter is tilted, being controlled by a door 76 hinged at the top and controlled by a screw-threaded rod 77 passing through a cross piece 78 and actuated by a handle 79 (Fig. 1). The issuing concrete flows through a short extension

or trough 80, and may be discharged directly onto the road under construction, or into wheelbarrows, or handled in various other ways. I prefer, however, to discharge it into a rotatable distributor, such as shown in Figs. 10 and 11. This distributor is portable, comprising a body 81 mounted on wheels 82 provided with a handle 83, whereby it may be moved about by workmen or connected to the automobile truck and transported from one place to another. It has mounted thereon an inclined chute 84 with helical ribs 85 therein, making a rifled tube, whereby, as said tube rotates, the concrete not only flows toward the lower end, but is being continually elevated and dropped back upon itself, to keep it properly mixed and prevent possible separation of the cement from the aggregate. Said tube is freely rotatable in a suitable supporting structure 86, and is driven by a chain 87, which may derive its power from an independent gasoline engine or motor 88, or which may have an attachment permitting it to take power from the engine on the mixer truck. The supporting structure is mounted to swivel on the supporting base 81, having an enlarged pedestal 89 turning within guides 90. Said pedestal may be provided with a rack and pinion 91, 92, whereby the upper part of the structure may be turned to swing it through a considerable angle, as indicated in Fig. 11, and this operation may be further facilitated by bevel gears 93, 94, and an operating crank 95, if desired.

The advantage of the complete apparatus thus far described is that the truck may travel under its own power to the loading points and receive a charge of crushed stone, sand, cement, and water. On its return trip to the point of discharge in the case of road-making, for example, the truck driver admits the necessary water to the batch and the mixing proceeds while the truck is moving. The distributor is left at the point where the work is being performed and is advanced by the workmen from time to time as the work progresses. The truck driver drives up to the distributor, stops the truck with the discharge spout of the mixer pointing into the rotatable barrel of the distributor and, by merely operating the lever, tilts the mixer, thereby discharging its contents, after which the truck returns for another load.

Another advantage of the present mixer is that a thorough mix is obtainable regardless of the point at which the sand, stone and cement are charged into the mixing chamber through the top thereof, this being due to the blades 17 being rotatable in either direction as previously described. This is an improvement over similarly arranged mixing chambers heretofore designed in that in such machines the material

must be charged in at one end and is fed toward the other end in the mixing operation, the mixing elements always rotating in the same direction.

I claim:

1. Apparatus of the class described comprising a motor vehicle having a cylindrical mixing drum longitudinally arranged thereon in substantially horizontal position and open at its top throughout its length, said drum having a discharge opening at one end thereof, a screw conveyor inside said drum, means connected to the engine of said vehicle for rotating said conveyor in either direction to mix the contents of said drum whereby a thorough mix may be obtained regardless of the point at which the material is charged into said drum, said drum being pivotally mounted near one end thereof and means for raising the other end to discharge the contents through said opening.

2. In apparatus of the class described, an elongated cylindrical mixing drum having trunnions at the sides thereof near one end of said drum, and supports for said drum having slots to receive said trunnions.

3. A concrete mixer having a base with a horizontal cylindrical body mounted thereon, rotatable agitator blades therein, means for driving said blades, additional means for elevating one end of said cylinder, said driving means receiving power from a point at the center of an arc along which the end of said cylinder travels when elevated.

4. A concrete mixer having a base with a horizontal mixing body mounted thereon pivotally supported near the forward end thereof, upright supports at the rear end thereof having arc-shaped slots therein, trunnions on the rear of said cylindrical body projecting through said slots, means for elevating said rear end, and means for checking the descent thereof.

5. In combination, a motor vehicle having an engine and an exhaust pipe, a concrete mixer mounted thereon having a mixing element, means for driving said element from said engine, a water tank for said mixer, and means associated with said exhaust for heating the water supplied to said tank.

6. A concrete mixing apparatus, comprising a mixing drum open at the top, a pair of sliding doors for closing said top, arc-shaped guides for controlling the movement of said doors, a rotatable shaft arranged near the top of said cylinder, means thereon operable at the front for rotating the same and flexible connections from said shafts to said doors to move said doors toward and away from each other simultaneously to close and open said opening.

7. In combination, a motor vehicle, a pair of auxiliary shafts having bevel gears there-

on engaging each other, one of said shafts being pivotally mounted at its bevel gear, a driving connection from the engine to said bevel gears, a concrete mixer on said vehicle, means operated by one of said shafts for tilting such mixer, and means operated by the other of said shafts for mixing the contents of said cylinder.

8. A concrete mixer comprising a motor vehicle having a cylindrical body thereon, a shaft arranged centrally thereof with a series of propeller blades thereon, and a pipe extending around the interior of said cylinder in close proximity to the sides thereof and having openings for directing streams of water against said sides.

9. A portable mixer of the class described comprising a supporting structure, a tiltable elongated horizontally disposed mixing drum positioned longitudinally thereon mixing elements in said drum, oppositely directed trunnions carried by said drum adjacent its opposite ends, and upright supporting members mounted on said structure, one on each side of said drum, said members having openings therein for receiving said trunnions.

10. A portable mixer of the class described comprising a supporting structure, an elongated horizontally disposed mixing drum positioned longitudinally thereon mixing elements in said drum, oppositely directed trunnions carried by said drum adjacent its opposite ends, and upright supporting members mounted on said structure, one on each side of said drum, said members having openings therein for receiving said trunnions, one pair of said openings being in the form of slots to permit of the corresponding end of said drum being raised and lowered.

11. A portable mixer of the class described comprising a supporting structure, an elongated horizontally disposed mixing drum positioned longitudinally thereon mixing elements in said drum, oppositely directed trunnions carried by said drum adjacent its opposite ends, and upright supporting members mounted on said structure, one on each side of said drum, said members having openings therein for receiving said trunnions, all of said openings being in the form of slots, the latter being formed and arranged in such wise as to permit of said drum being simultaneously tilted and moved forward.

12. A portable mixer of the class described comprising a supporting structure, an elongated horizontally disposed mixing drum positioned longitudinally thereon mixing elements in said drum, oppositely directed trunnions carried by said drum adjacent its opposite ends, and upright members mounted on said structure, one on each side of said drum, said members having openings therein for receiving said trunnions, one pair of said openings being in the form of slots to permit of the corresponding end of said drum being raised, means for raising the end of said drum, and cushioning means for controlling the return movement of said drum.

13. A portable mixer of the class described comprising a supporting structure, a tiltable mixing drum positioned thereon, means for raising one end of said drum, and cushioning means for controlling the return movement of said drum, said last named means comprising an air cylinder, a piston carried by said mixing drum and engaging said cylinder, a one-way valve for admitting air to said cylinder upon upward movement of said piston, and means at the control of the operator for releasing such air.

14. In mixing apparatus of the class described, a supporting structure, a mixing drum mounted thereon, and means for simultaneously tilting and sliding said drum forwardly of said structure.

15. In mixing apparatus of the class described, a supporting structure, including upright spaced apart side members having arcuate openings therein, and a mixing drum positioned between said side members and provided with a pair of trunnions at each end engaging said openings.

16. In mixing apparatus of the class described, a supporting structure, including upright spaced apart side members, the latter having openings therein, a drum having mixing elements therein and positioned between said side members, and trunnions carried by said drum and engaging said openings, said openings being in the form of slots, one pair thereof being angularly disposed with relation to the other to permit of a simultaneous tilting and forward motion being imparted to said drum.

In testimony whereof, I have subscribed my name.

CHARLES PAYNE.