Sept. 6, 1932. G. I. LOCKWOOD 1,875,622

CONCRETE AGITATOR

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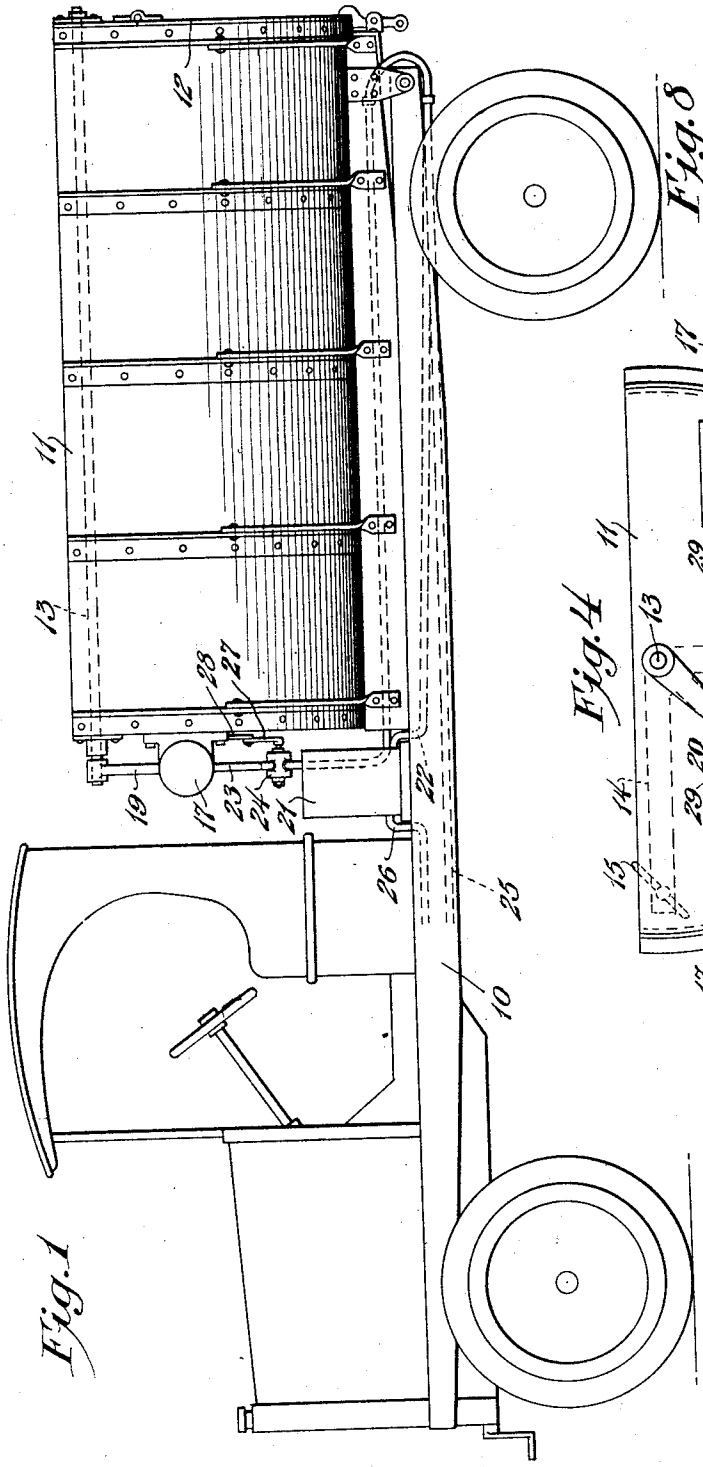


Fig. 1

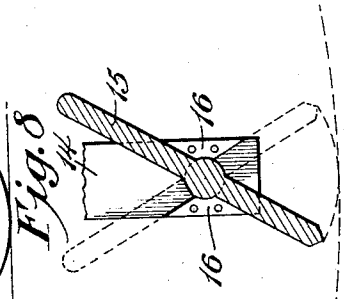


Fig. 8

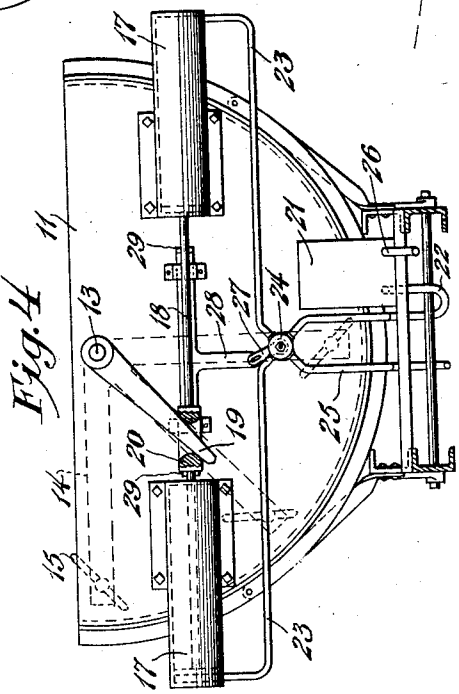


Fig. 4

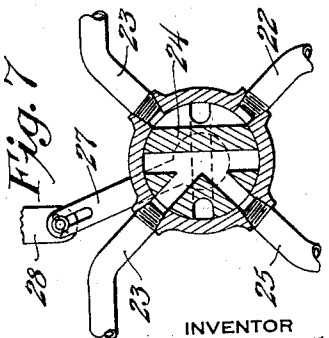


Fig. 7

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CONCRETE AGITATOR

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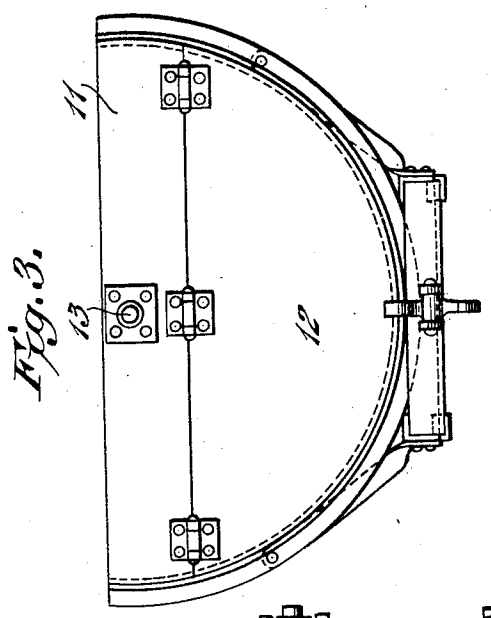


Fig. 3.

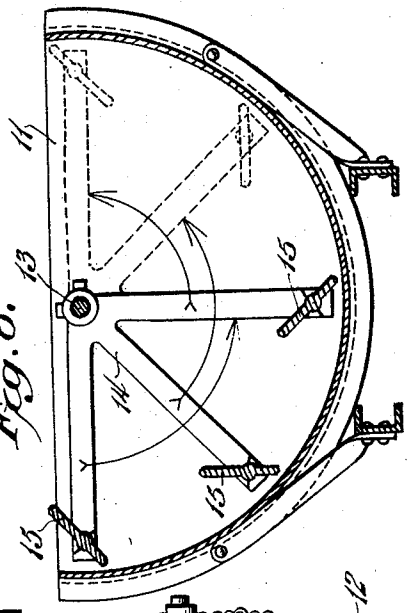


Fig. 6.

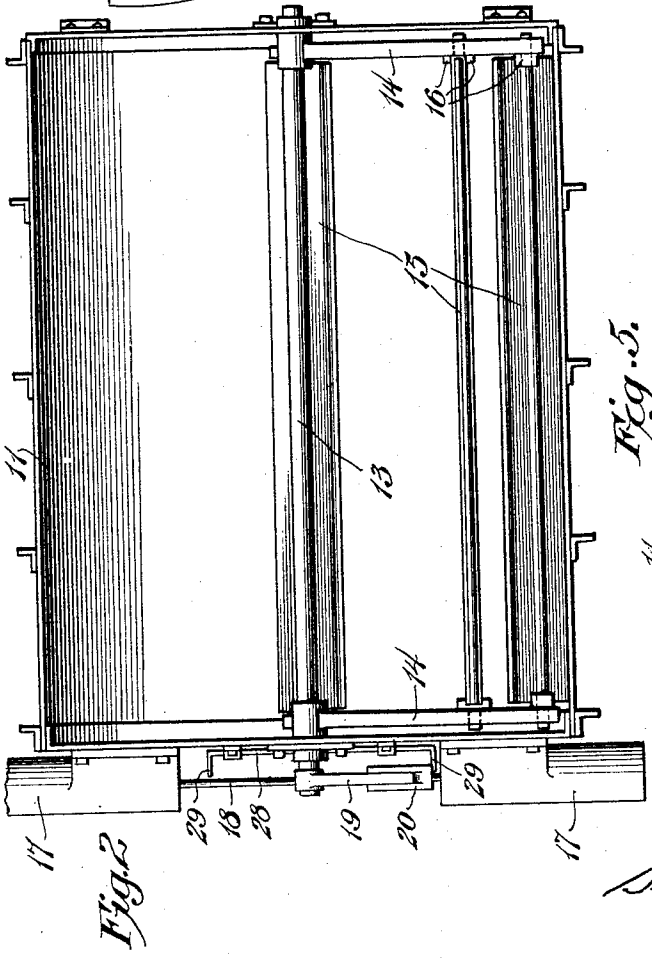


Fig. 2

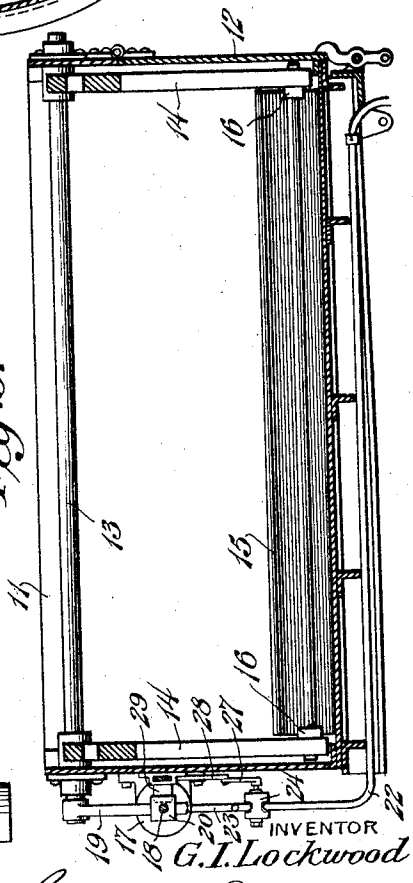


Fig. 5.

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UNITED STATES PATENT OFFICE

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CONCRETE AGITATOR

Application filed January 7, 1930. Serial No. 419,079.

This invention relates to power driven agitators adapted to be associated with motor trucks and the like in order to keep the material in a state of agitation while it is being transported from a central point to the place of use. More specifically, the main idea is to provide an improved, relatively simple, powerful and efficient hydraulic attachment for agitating concrete and maintaining the proper consistency while it is being transported in tank trucks and the like to a point of use.

Referring to the accompanying drawings, in which one illustrative embodiment of the invention is shown:

Fig. 1 is a side elevation showing an illustrative form of the improvements mounted on a motor truck of conventional design, the latter being shown merely in general outline;

Fig. 2 is a top plan view of the mixing mechanism;

Fig. 3 is a rear end elevation of the mixing tank;

Fig. 4 is a front end elevation of the tank;

Fig. 5 is a longitudinal sectional view of the tank;

Fig. 6 is a transverse sectional view of the tank shown in Fig. 1;

Fig. 7 is a fragmentary elevation partly in section, showing a valve for the hydraulic mechanism; and

Fig. 8 is a fragmentary sectional view through a paddle employed in the illustrated form of the invention.

The modern method of handling concrete, especially in large cities is to mix the same at a central or stationary plant and transport it to the point of use. Heretofore many types of tank wagons and motor trucks have been employed for this purpose. Also, various types of mechanically driven or operated stirrers have been used in the tanks to keep the mixture properly stirred and thereby maintain a more or less uniform consistency. Otherwise, the heavy aggregate would settle to the bottom and the lighter constituents would rise to the surface. The most common type of stirrers now employed are driven by power take-off mechanism connected to the motor truck engine and this necessitates a more or less complex arrangement of gears and other connections. Moreover, such mechanically driven stirrers are subject to very great wear and experience has demonstrated that they waste a great deal of power. This invention, therefore, aims to provide a very powerful, smooth operating, efficient and durable hydraulic stirrer that is not subject to the foregoing objections.

Referring particularly to the accompanying drawings, the illustrated form of the improvements is shown as being applied to a motor truck 10 which is shown in Fig. 1 merely in outline for the sake of illustration. Such trucks are often provided with a pump for operating a hydraulic body dumping mechanism. In this example, the hydraulic mechanism illustrated is adapted to be operated by a pump of this type or a separate pump not shown, the pump being eliminated because it may be of conventional design and, hence, forms no part of the present invention.

In accordance with this invention, there is shown a tank 11 pivotally mounted on the rear end of the chassis frame of the truck. This tank may be of various shapes, but in this instance, it is shown as having a substantially semi-cylindrical bottom to accommodate the stirring mechanism later to be described. The rear end of the tank is conveniently closed by a hinged gate 12 adapted to be latched in closed position so as to prevent the mixture from escaping in transit and this gate may be opened for dumping the mixture, it being understood that any ordinary dumping mechanism is adapted to be employed for tilting the tank. Illustration of such mechanism is unnecessary in this example.

Referring to Figs. 1, 2 and 5, a stirring shaft 13 is shown as being journaled in the end walls of the tank and coaxial thereof, one end projecting beyond the forward end wall of the tank. On this shaft within the tank there are shown two paddle-carrying members 14 conveniently arranged near the opposite ends of the tank and each having a plurality of arms between opposite ones of which paddle members 15 are journaled so as to oscillate with the arms. These paddles are

preferably so constructed and arranged to be reversed and scrape the bottom of the tank when the arms are rocked in either direction.

In Figs. 6 and 8, an example of suitable bearings for the paddles is shown at the ends of the radial paddle arms. In this instance, bearing blocks 16 are secured on opposite sides of each arm and terminals of the paddles are journaled between them. As will be seen in Fig. 8, each block 16 presents beveled faces providing abutments for the sides of the paddles, the arrangement being such that the paddles may swing from one side to the other or be reversed as indicated in dotted lines in Fig. 8. The upper portions of the paddle blades are longer than the lower portions so that, when the movement of the paddle arms is reversed the resistance offered by the concrete mixture will be greater above the pivot points of the paddles than it will below the pivot points and thereby cause them to swing against the other beveled face of the abutment blocks. It will be understood that there is sufficient clearance between the ends of the paddles and the wall of the tank to permit the paddles to swing through an arc of 30° or more. The idea of reversing the paddles is to get the maximum stirring action on both strokes and to utilize all of the power delivered to them, thereby increasing the mechanical efficiency.

It will be noted that the paddle shaft 13 is arranged to be rocked back and forth in the tank through about 90°. Instead of employing any gearing and power take-off mechanism for oscillating the shaft, power is herein delivered directly to it through one or more hydraulic cylinders. In this instance, a double acting drive is shown, there being two horizontally alined hydraulic cylinders 17 secured to the front wall of the tank. Referring to Figs. 1, 2 and 4, a piston rod 18 projects from the hydraulic cylinders and is engaged by a rocker arm 19 secured to the stirrer shaft 13. The arms is here shown as projecting through a slotted coupling member 20 on the piston rod (Fig. 4).

Oil or other liquid is preferably admitted to and exhausted from the outer ends of the cylinders. Herein, a storage reservoir 21 for the oil under pressure is mounted on the chassis frame and a conduit 22 extending to the hinged end of the tank and back to the front is connected to deliver the liquid to a cylinder through one of the branch conduits 23 through a four-way valve and an exhaust conduit 25 which extends to the hinged end of the mixing tank and back to the intake of the hydraulic pump (not shown), on the truck. The exhausted liquid is pumped back into the storage reservoir through a conduit 26. The conduits 22 and 25 are preferably flexible at the rear end of the chassis so that they can swing with the tank as it is being dumped by the usual hydraulic dumping mechanism (not shown) thus, enabling the stirring mechanism to work while the material is being discharged. Of course, the conduits may be flexible throughout their lengths or they may have swivel joints.

The four-way valve is adapted to be operated by the piston rod coupling 20 automatically to control the admission and exhaust of liquid. Herein, a crank arm 27 is fixed on the valve stem and is connected to be oscillated by a T-shaped member 28 slidably mounted on the front end wall of the tank behind the piston rod and presenting forwardly bent ears or projections 29 in the path of the coupling member 20. The design is such that the valve is shifted as each piston nears the end of its stroke in much the same fashion as an engine valve. Of course, the valve actuating means may be widely varied.

It will be understood that the tank is filled with ready mixed concrete while the stirrer is idle, the operation of the hydraulic pump being controlled in the usual manner or like such pumps are controlled for hydraulically operated dump bodies. As soon as the tank is filled the stirring mechanism may be set in operation by starting the pump and the apparatus requires no further attention until the load is dumped. The stirrers are adapted to operate while the material is being dumped after the tank is tilted. The hydraulic mechanism delivers ample power to rock the paddle shaft without any excess wear and the paddles operate to stir the contents of the tank in both directions. In short, the mechanism is so designed as to utilize a minimum of power to produce maximum stirring.

From the foregoing description, it will be seen that the installation can be made at a relatively low cost. There are no delicate parts that are apt to get out of order or to require quick replacement. The installation requires no special chassis design.

Obviously, the present invention is not restricted to the particular embodiment thereof herein shown and described. Moreover, it is not indispensable that all the features of the invention be used conjointly, since they may be employed advantageously in various combinations and sub-combinations.

What I claim is:

1. In a vehicle for transporting concrete and the like, a substantially semi-cylindrical tank mounted on the vehicle chassis; a stirrer shaft journaled in the opposite ends of the tank; stirrer arms secured to the shaft; reversible paddles journaled between the stirrer arms; and hydraulic means for oscillating said stirrer shaft.

2. In a vehicle for transporting concrete and the like, a substantially semi-cylindrical tank mounted on the chassis thereof; an oscillatable stirrer within the tank; a shaft

carrying said stirrer and projecting through one wall of the tank; a rocker arm secured to said shaft; a pair of hydraulic cylinders having pistons arranged on opposite sides of said shaft and contacting with said rocker arm; and automatic valve means to control the operation of said pistons so as to oscillate said stirrer.

3. In combination with a vehicle of the character described, a tank having a substantially semi-cylindrical bottom; a stirrer shaft journaled in the opposite ends of said tank substantially coaxially thereof; a plurality of radial stirrer arms connected to said shaft adjacent to the opposite ends of the tank; reversible paddles pivotally connected to opposed pairs of said arms; a rocker arm connected to the forward end of said shaft; a pair of hydraulic cylinders below said rocker arm each having a piston connected to actuate said arm; a liquid supply tank; a conduit connecting said tank to each of said cylinders; a multi-way valve in said conduit; and automatic means to operate said valve so as to admit liquid to one cylinder and exhaust liquid from the other.

4. In a vehicle for transporting concrete and the like, a substantially semi-cylindrical tank mounted on the chassis frame thereof; a shaft journaled in the end walls of said tank and arranged substantially coaxially thereof; paddle arms carried by said shaft; a plurality of paddles pivotally mounted on said arms; a rocker arm connected to said shaft upon the forward end of said tank; a pair of horizontal hydraulic cylinders mounted on the front end of the tank and having pistons coacting with said rocker arm; a piston rod connecting both of said pistons; valved conduits for admitting and discharging liquid to and from said cylinders; and valve operating mechanism including a slidable member on the tank operable by the piston rod; and a crank arm on the valve whereby to admit liquid to one cylinder while liquid is being exhausted from the other cylinder and thereby oscillate said paddles continuously and automatically in said tank.

5. In a vehicle for transporting mixed concrete and the like, a tank tiltably mounted on the chassis frame; an oscillatable agitator in the tank having a shaft projecting through one end wall; a rocker arm on the shaft; hydraulic operating means secured to the tank wall and connected to said rocker arm; a pressure tank on the chassis frame connected to supply liquid to said hydraulic mechanism.

6. In combination with a tank vehicle for transporting mixed concrete and the like, an oscillating stirrer comprising a shaft having radial arms; reversible paddles journaled between said arms; and bearing blocks for said paddles presenting beveled faces forming abutments for the paddles, the widths of said paddles above their pivotal axes being greater than that below their axes whereby to cause the resistance offered by the mixture automatically to reverse the paddles when their direction of movement is reversed.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature.

GEORGE I. LOCKWOOD.