Jan. 20, 1942. J. H. FITZGERALD 2,270,628

CONCRETE MIXER

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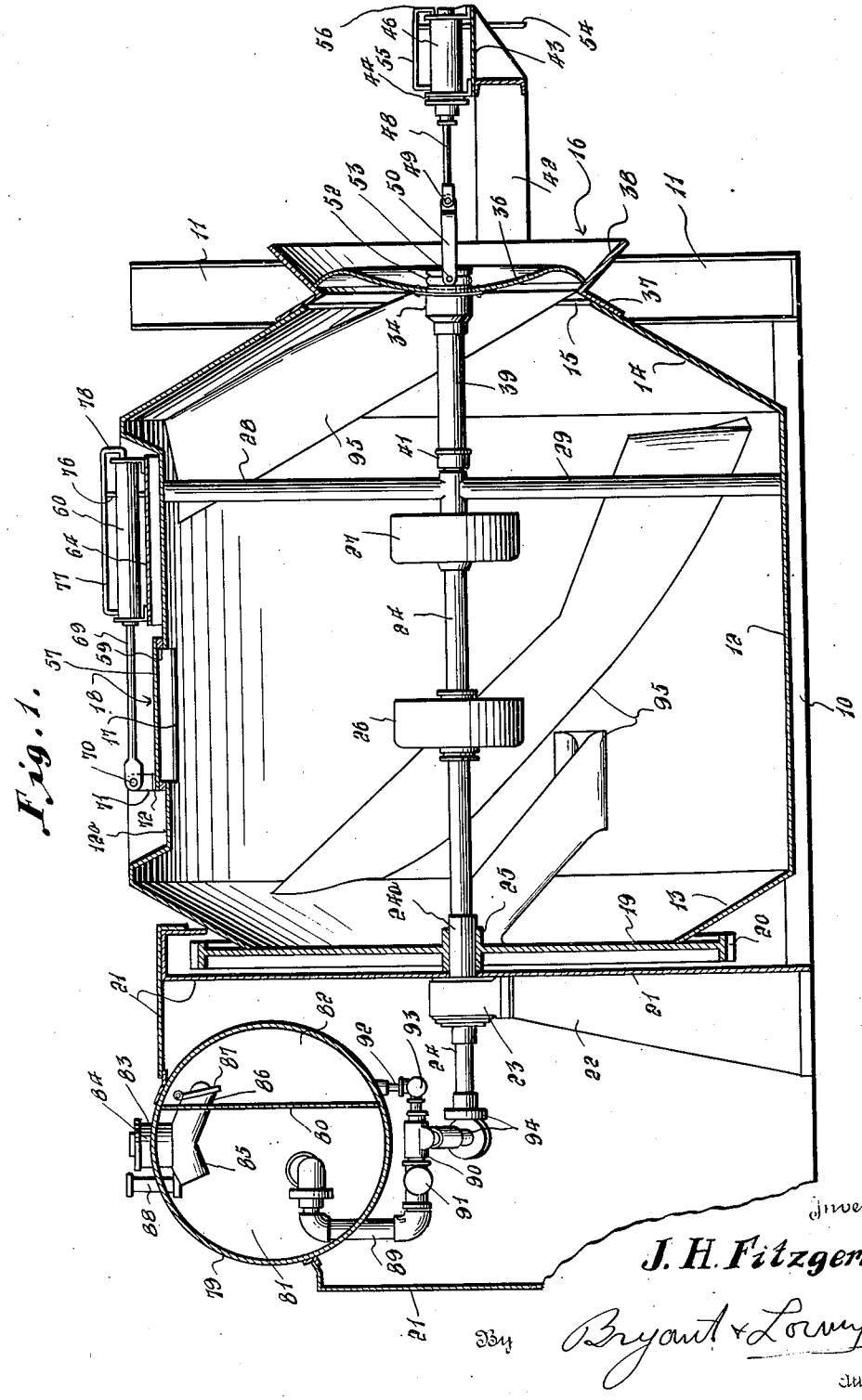

Fig. 1.

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Fig. 2.

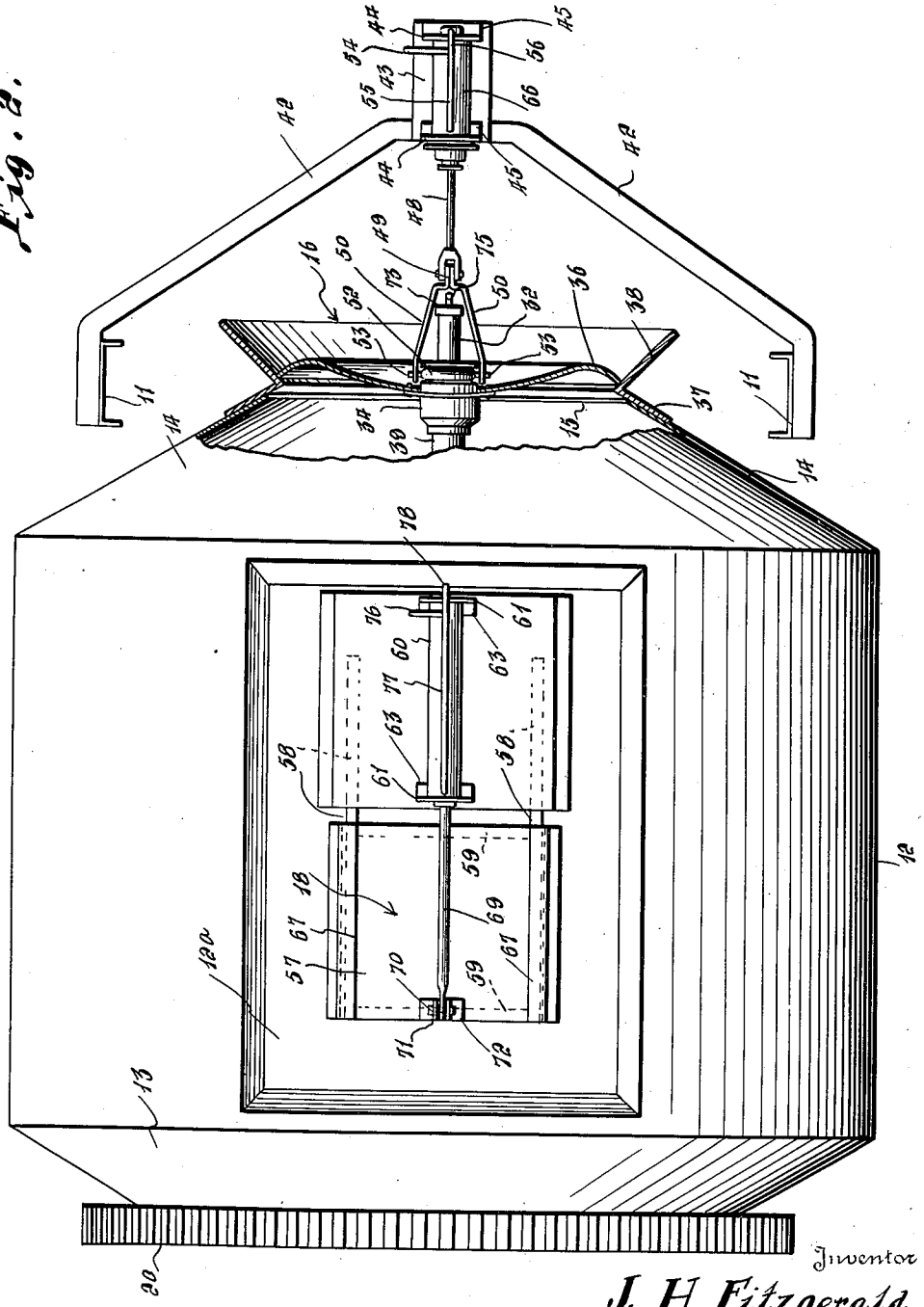

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Fig. 3.

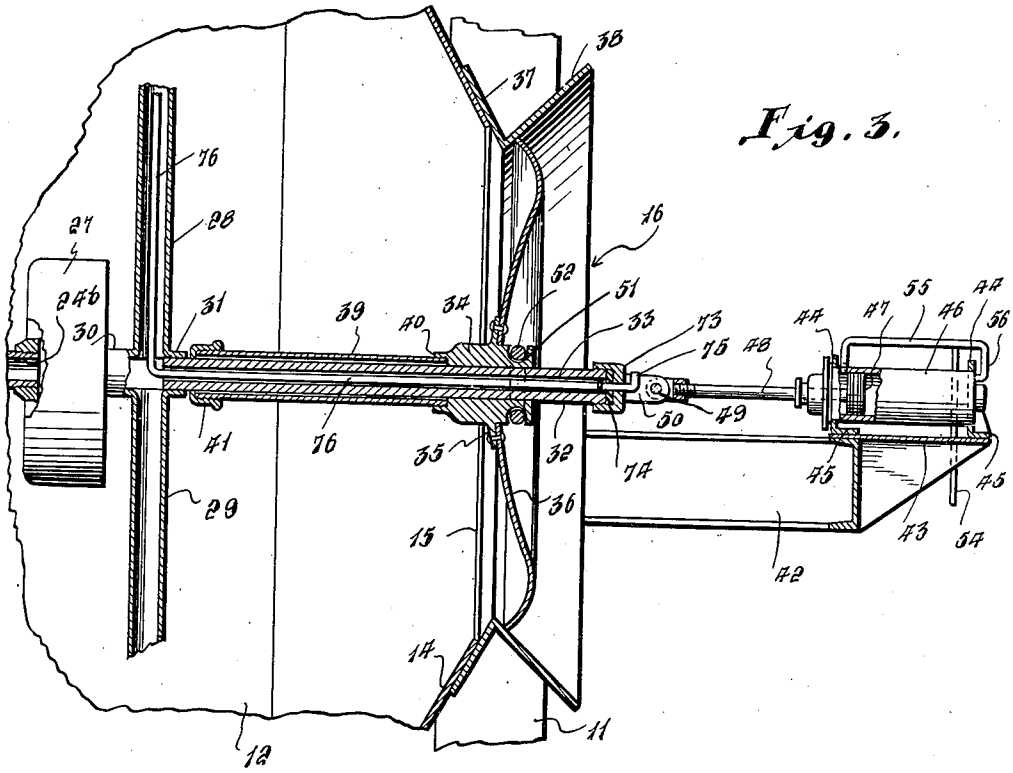


Fig. 4

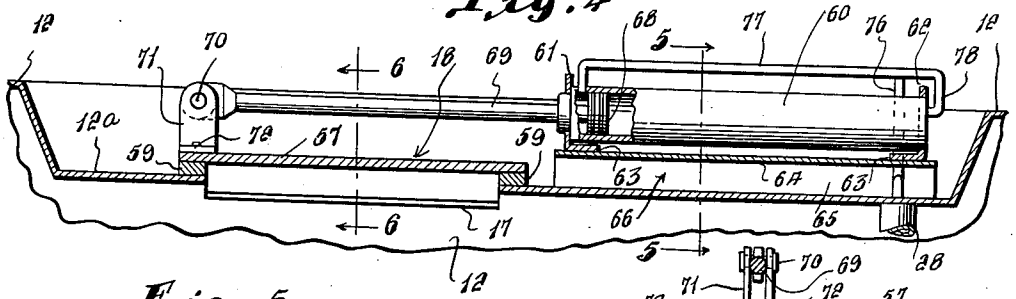
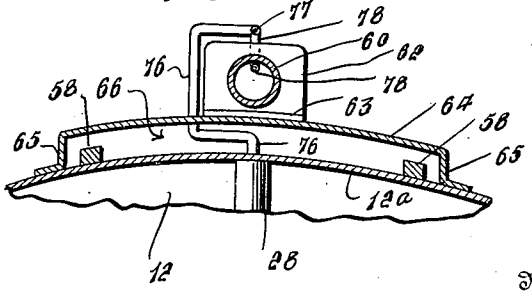


Fig. 5.



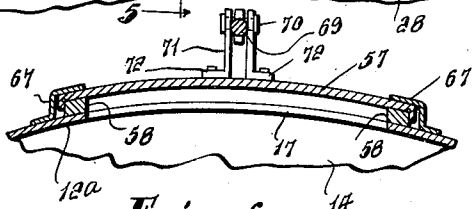


Fig. 6

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2,270,628

CONCRETE MIXER

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Application April 2, 1941, Serial No. 386,543

9 Claims. (Cl. 259—161)

This invention relates to certain new and useful improvements in concrete mixers.

In concrete mixers of the general character disclosed in this application, the mixer per se comprises a rotatable drum usually mounted upon a truck and the mixing of the concrete is accomplished during the travel of the truck to a delivery point.

In such types of truck-carried concrete mixers, there is provided an entrance or charging door in the cylindrical side wall of the mixer drum for the aggregate and such charging door is manually shifted from an open to a closed position.

Also in such types of concrete mixers the discharge door is manually operated and necessitates the operator of the mixer to mount the truck frame or chassis to gain access to the usual hand wheel for the operation of the discharge door.

In the type of concrete mixer in use at the present time the revolving drum is charged with the dry aggregate and a water tank carried by the truck is usually provided with two compartments, one compartment containing the greater quantity of water for controlled delivery to the aggregate in the drum for mixing therewith, while the other smaller compartment contains rinse water controllably fed to the drum for cleaning the latter after discharge of the mixed concrete. In such types of water tanks there is usually provided an independent filling opening for each compartment thereof and under usual working conditions, the operator filling the water tank by means of a hose extending from a distant supply point finds it difficult to shift the hose from the filling opening of one compartment to the filling opening of another without an unusual splashing of the water and drenching of his garments.

It is therefore the primary object of the present invention to improve the construction and operation of both the charging and discharging doors for the drum of the concrete mixer and to improve the water charging facilities for the two compartments of the water tank that delivers water to the drum.

A further and important object of the invention is to provide pneumatic, hydraulic or vacuum devices for the operation of the charging and discharging doors for the mixer drum with said doors operable from remote points, thereby eliminating the necessity of an operator climbing over the frame of the truck carrying the drum to gain access to the doors.

A further and important object of the invention is to improve the water charging facilities for the two compartments of the water tank whereby a single filling opening is provided with branch means for delivering water simultaneously to the mixing and rinse water compartments of the tank together with a telltale device or indicator to show when the two compartments of the water tank have been charged with the proper amount of water so that a signal may be given by the operator filling the tank to shut off the water supply.

With the above and other objects in view, the invention consists in general of certain novel details of construction and combination of parts hereinafter more fully described, illustrated in the accompanying drawings and specifically claimed.

In the accompanying drawings:

Fig. 1 is a vertical longitudinal sectional view of a concrete mixer constructed in accordance with the present invention, a part of the frame structure of the carrying truck for the concrete mixer drum being fragmentarily illustrated, showing the ram operated charging and discharging doors and the improved water tank filling means.

Fig. 2 is a fragmentary top plan view, partly broken away and shown in section, to illustrate the clevis bars carried by the ram for the operation of the discharge door.

Fig. 3 is an enlarged fragmentary vertical longitudinal sectional view showing the conduit means for the pneumatic, hydraulic or vacuum power devices extending through the mixer drum for communication with the ram-operated charging door,

Fig. 4 is an enlarged fragmentary longitudinal sectional view showing the ram-operated charging door in its closed position and the motive supply means communicating with the cylinder of the ram.

Fig. 5 is a cross sectional view taken on line 5—5 of Fig. 4, showing the elevated plate carrying the ram providing a chamber for the reception of the charging door when in open position, and

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 4.

Referring more in detail to the accompanying drawings, it being understood that only those parts of the motor truck are illustrated as providing supporting elements for certain parts of the present invention, the truck parts illustrated include base rails 10 from the rear ends of which rise perpendicular channel irons 11. The mixer

drum comprises a cylindrical wall 12 having front and rear tapering end wall portions 13 and 14, respectively, the tapering end wall portion 14 being of frusto-conical form and providing a discharge opening 15 adapted to be closed by the door designated in general by the reference character 16. The cylindrical wall 12 of the drum has a charging door opening 17 adapted to be closed by the charging door designated in general by the reference character 18. In mixer drums of this general character there is usually provided at the forward end thereof, such as in continuation of the forward tapering end wall portion 13, a straight end wall 19 extending beyond the forward portion of the tapering end wall 13 and fashioned as a gear wheel 20 adapted for engagement with the usual drive pinion of the truck mechanism.

As shown in Fig. 1 a part of the frame structure 21 encloses the end wall 19 and gear 20 of the mixer drum and within said frame structure 21 there is provided a standard or base support 22 having a shaft bearing 23 at its upper end for the support of a shaft that extends through the drum and upon which the latter is rotatably mounted.

A hollow shaft 24 extends axially of the mixer drum 12, the forward end 24a of the shaft being annularly enlarged and having a support in the bearing 25 carried axially of the forward end wall 19 of the drum, the rear end 24b of the tubular shaft 24 terminating adjacent the rear end of the cylindrical wall 12 of the mixer drum. A pair of water bells 26 and 27 are carried by and are in communication with the tubular shaft 24, the water bell 27 being secured to the rear terminal end 24b of the shaft 24, the water bell 26 being mounted on the shaft between the ends thereof. The support for the rear end of the shaft 24 within the drum 12 comprises a tubular shaft having end leg portions 28 and 29 connected at their outer ends to the cylindrical wall 12 of the mixer drum, the inner ends of the leg portions 28 and 29 terminating in proximity of the longitudinal axis of the mixer drum and carrying a forwardly directed fitting 30 secured to the outer bell 27 and a rearwardly directed nipple fitting 31 for purposes presently to appear.

The mounting for the discharge door 16 comprises a shaft 32 arranged coaxially with the tubular shaft 24, the forward end of the shaft 32 being rigidly secured to the nipple fitting 31 as shown in Fig. 3 and being of a length to extend outwardly through the discharge door opening 15, said shaft 32 having an axial bore 33 extending therethrough, with the bore communicating with the legs 28 and 29 of the transversely extending tubular shaft that supports the rear end of the shaft 24. A bearing collar 34 rotatable with and slidable upon the shaft 32 carries a peripheral flange 35 to which the central portion of the web 36 of the discharge door 16 is connected, the discharge door 16 comprising said web 36 that carries at its peripheral edge a V-shaped flange including flange walls 37 and 38, the flange wall 37 being located for engagement with the outer face of the tapering rear wall portion 14 of the mixer drum outwardly of the discharge door opening 15 to form a closure for said opening. To facilitate sliding movement of the bearing collar 34 upon the shaft 32, an elongated sleeve 39 surrounding the shaft 32 has one end secured as at 40 to the forward end of the bearing collar 34, while the other end of said sleeve is provided with a cap 41 in proximity of the nipple fitting 31 and so disposed when the discharge door 16 is in its closed position.

The discharge door 16 with its bearing collar 34 is slidable longitudinally of the shaft 32 when moving from open to closed positions relative to the discharge opening 15 in the mixer drum and said discharge door may be pneumatically or hydraulically operated, or operated in the presence of vacuum, and as illustrated and for purposes of clarity only, the operating means for the discharge door will be referred to as pneumatically operating means. As shown in Figures 1 to 3, an angular and transversely extending channel iron 42 is connected at its ends to the upright channel iron 11 and occupies a position slightly below the alined shafts 24 and 32, the channel iron 42 being positioned rearwardly of the discharge door and its opening and carrying intermediate the ends thereof a platform 43 for the support of a ram. A pair of angle brackets comprising upright legs 44 with base flanges 45 are respectively secured in spaced relation to the front and rear edges of the platform 43, the vertical legs 44 of the brackets providing a support for the cylinder 46 of the ram. The cylinder 46 of the ram houses a reciprocating piston 47 that carries a piston rod 48 extending through the forward end of the cylinder 46, the forward end of the piston rod 48 having a forked pivotal connection 49 with a pair of divergent clevis arms 50. As shown more clearly in Fig. 3, that portion of the bearing collar 34 projecting rearwardly of the web 36 of the discharge door 16 is provided with an annular groove 51 in which groove is freely mounted a collar or ring 52 carrying diametrically opposite radially projecting pins 53 received in pivot openings formed in the forward ends of the clevis arms 50.

The supply of air to the cylinder 46 of the ram for the operation of the piston 47 includes a pipe line 54 extending from a controlled source of energy, the pipe line 54 as illustrated in Figs. 1 to 3 being in communication with a transversely extending pipe line having leg portions 55 and 56, the leg portion 56 of the pipe line being in communication with the outer end of the ram cylinder 46, while the leg 55 of the pipe line is in communication with the side of the cylinder 46 adjacent its forward end as illustrated.

It will be understood that the mixer drum 12 is rotatably supported upon a carrying truck and that the shafts 24 and 32, the tubular shaft support comprising legs 28 and 29 and the discharge door 16, rotate as a unit while the ram device and its associated clevis remain stationary by reason of the ring connection 52 with the collar 34 carried by the discharge door.

The charging door opening 17 and its associated charging door 18 are set into the depressed wall portion 12a of the cylindrical drum 12 and a ram for the operation of the charging door 18 is also supported on said depressed wall portion. The charging door and the operating means therefor comprise a charging door 57 supported at its side edges and slidable upon a pair of rails 58 carried by the wall portion 12a at opposite sides of the opening 17, the guide rails 58 extending a considerable distance rearwardly of said charging opening 17 for the support of the door 57 when in its open position. Also a pair of cross rails 59 extend transversely of the charging opening 17 at the front and rear edges thereof and are mounted upon the depressed wall portion 12a. The operating means for the charging

door 57 comprises a ram similar in construction and operation to the ram for the operation of the discharging door, the ram for operating the charging door 57 comprising a cylinder 60 supported at its ends in the vertical legs 61 and 62 of angle brackets, the base flanges 63 of the angle brackets being mounted upon and secured to the front and rear ends respectively of a raised plate 64 having depending side flanges 65 anchored to the depressed wall portion 12a of the mixer drum as clearly shown in Figs. 4 and 5, this arrangement of the raised plate 64 providing a chamber 66 for the reception of the charging door 57 when in its retracted open position. From an inspection of Fig. 6 it will be noted that a pair of longitudinally extending guide flanges 67 are carried by the wall portion 12a at opposite sides of the door opening 17 that overlie opposite side edges of the charging door 57 for holding the same tightly engaged with the track rails 58 when the charging door is in its closed position.

The cylinder 60 of the ram for operating the charging door houses a reciprocating piston 68 and said piston carries a forwardly extending piston rod 69 that has a pivotal connection 70 at its forward end with a pair of upstanding lugs 71 that are secured at their lower ends as at 72 to the forward end of the charging door 57. It will be understood from an inspection of Fig. 4 that when the piston 68 moves rearwardly in the cylinder 60 of the ram, the door 57 will be retracted into its open position relative to the charging opening 17 and be received in the chamber 66 afforded by the raised plate 64.

It is also understood that the ram for the operation of the charging door 18 may be pneumatically or hydraulically operated or operated in the presence of a vacuum and pneumatic means for the operation of the ram only will be described. As shown in Fig. 3 the rearwardly projecting end of the pipe 32 that supports the discharge door 16 has an axial bore 33 therein covered by an end cap 73 with a gasket 74 interposed between the end of the shaft 32 and said cap 73, there being axial openings in the cap and gasket for the passage of a stationary nipple 75 that is adapted to be placed in communication with a source of motive fluid. The stationary nipple 75 terminates slightly beyond the gasket 74 and is in communication with a relatively small fluid pipe line 76 extending through the bore 33 of the shaft 32 and being rotatable with said shaft. The forward end of the pipe line 76 is bent at right angles and extends through the supporting leg 28 of the strut for the support of the rear end of the tubular shaft 24, said pipe line 76 passing outwardly of the mixer drum through the depressed wall portion 12a as shown in Figs. 4 and 5 for communication with a transversely extending pipe line having pipe line leg portions 77 and 78, the leg portion 77 communicating with the cylinder 60 of the ram through the side wall thereof adjacent the forward end, while the leg portion 78 communicates with the rear end of the cylinder 60. The placement of the pipe line 76 in the axial bore of the shaft 32 and in the tubular supporting leg 28 for the shaft 24 protects the pipe line from the excessive weight and impact of the aggregate material within the mixer drum.

The water tank for the concrete mixer is illustrated in Fig. 1 and is in communication with the tubular shaft 24 for supplying mixing water to the water bells 26 and 27 within the mixer drum. The water tank 79 is supported on the frame structure 21 forwardly of the mixer drum and at an elevation above the tubular pipe 24 for the gravitational flow of water to said pipe, but it is to be understood that a pump may be interposed in the water supply line if desired. A partition 80 is arranged in the tank 79 to provide a relatively large compartment 81 for mix water to be delivered to the drum 12 and a relatively small compartment 82 for rinse water for delivery to the mixer drum for cleaning the latter. It has heretofore been the practice to provide separate water charging openings for the mixing and rinse water compartments of a water tank, but to overcome the serious objections to such practice, the present invention provides a single water charging opening for the tank with means for directing the water into both compartments. A single water filling neck 83 rises from the tank 79 above the mixing water compartment 81 to be closed by a cap 84, the lower end of the water filling neck 83 within the mixing water compartment 81 having branch outlets 85 and 86, the outlet 85 discharging into the mixing water compartment 81, while outlet 86 extends through the partition 80 and is provided at its discharge end with a gravitationally closing valve 87. Water delivered to the tank 79 through the single neck opening 83 flows into both compartments 81 and 82, the latter compartment when filled having the supply thereto cut off by the gravitationally closing valve 87 and when the mixing water compartment 81 has been filled to the desired level, the telltale device or float indicator 88 will rise above the tank 79 so that the supply of water to the tank may be cut off. For the controlled delivery of the water from the compartments 81 and 82 of the tank 79 to the tubular shaft 24 and water bells 26 and 27, there is provided a pipe connection 89 between the compartment 81 of the tank and the T-fitting 90 with a control valve 91 in the pipe connection 89, while a pipe connection 92 with a control valve 93 therein is in communication with the other end of the T-fitting 90. A flexible tubular connection 94 is formed between the T-fitting 90 and the tubular shaft 24.

As hereinbefore stated, it has been necessary with the present type of concrete mixers for operators thereof to climb over the machine for access to and operation of the charging and discharging doors of the mixer drum, but with the present invention the operator may remotely control the discharging and charging door either pneumatically, hydraulically, or in the presence of vacuum. It is the usual practice to rotate the drum 12 during the delivery of the concrete to a point of discharge and to supply the water from the water mixing compartment 81 to the drum during the transporting of the material so that the concrete is thoroughly mixed when the machine arrives at its destination. The mixer drum during normal operation rotates in a clockwise direction and the internal vanes 95 upon the inner wall of the drum in addition to agitating the aggregate tend to move the same away from the discharge door opening 15. When the material is to be discharged and the discharging door 16 opened by the ram, the drum is rotated in a counter-clockwise direction and the internal vanes or ribs 95 effect the discharge of the mixed concrete to the discharging opening 15.

From the above detail description of the invention, it is believed that the construction and operation thereof will at once be apparent, and

while there is herein shown and described the preferred embodiment thereof, it is to be understood that minor changes may be made in the details of construction, such as will fall within the scope of the invention as claimed.

I claim:

1. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having filling and discharging openings therein, a slidably mounted closure door for each opening, a ram for operating each door and a plate mounted in spaced relation to the wall of the drum for the support of the ram for operating the filling opening closure door and laterally of said filling opening, said ram having a piston rod attached at its forward end to the forward end of the filling opening closure door with the latter when in open position slidable into the space between the wall of the drum and the plate supporting the ram.

2. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having filling and discharging openings therein, a slidably mounted closure door for each opening, a ram for operating each door, a plate mounted in spaced relation to the wall of the drum for the support of the ram for operating the filling opening closure door and laterally of said filling opening, said ram having a piston rod attached at its forward end to the forward end of the filling opening closure door with the latter when in open position slidable into the space between the wall of the drum and the plate supporting the ram and the wall of the drum supporting the filling opening closure door and operating ram therefor being countersunk to substantially maintain the overall radial dimensions of the drum.

3. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having filling and discharging openings therein, a closure door for the discharge opening, a slidably mounted closure door for the filling opening, a ram for operating the filling opening closure door, a hollow shaft in said drum for the support of water bells, said shaft being supported at its forward end in the front end of the drum, a tubular strut extending transversely of the drum and providing a support for the rear end of the hollow shaft and an operating fluid supply conduit for the ram extending through said tubular strut.

4. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having filling and discharging openings therein, a closure door for the discharge opening, a slidably mounted closure door for the filling opening, a ram for operating the filling opening closure door, a hollow shaft in said drum for the support of water bells, said shaft being supported at its forward end in the front end of the drum, a tubular strut extending transversely of the drum and providing a support for the rear end of the hollow shaft, an operating fluid supply conduit for the ram extending through said tubular strut, an axial shaft at the rear end of the drum upon which the discharge door is mounted and being supported at its forward end on the tubular strut and said fluid supply conduit extending through said axial shaft and exteriorly of the drum for communication with a source of energy.

5. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having filling and discharge openings therein, a slidably mounted closure door for each opening, an axial shaft in the drum projecting through the discharge opening for the slidable support of the discharge door, a ram for operating each door and the shaft for the support of the discharge closure door forming a part of a conduit for the supply of operating fluid to the ram for operating the filling opening closure door.

6. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having a discharge opening therein, a slidably mounted closure door for said opening, an axial shaft in the drum projecting through said opening for the slidable support of the door, a ram supporting frame rearwardly of the drum, and a ram on the supporting frame operatively attached to said door.

7. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having a discharge opening therein, a slidably mounted closure door for said opening, an axial shaft in the drum projecting through said opening for the slidable support of the door, a ram supporting frame rearwardly of the drum, and a ram on the supporting frame axially alined with said shaft and operatively attached to said door.

8. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having filling and discharge openings therein, a slidably mounted closure door for each opening, an axial shaft in the drum projecting through the discharge opening for the slidable support of the discharge door, a ram for operating each door and the shaft for the support of the discharge closure door forming a part of a conduit for the supply of operating fluid to the ram for operating the filling opening closure door and a frame structure rearwardly of the mixer drum for the support of the closure door operating ram with the ram axially alined with said shaft.

9. In a truck mixer for concrete and the like, a rotatable mixer drum, said drum having filling and discharge openings therein, a slidably mounted closure door for each opening, an axial shaft in the drum projecting through the discharge opening for the slidable support of the discharge door, a ram for operating each door and the shaft for the support of the discharge closure door forming a part of a conduit for the supply of operating fluid to the ram for operating the filling opening closure door, and said drum having a countersunk portion in the side wall thereof for the mounting of the ram and closure door for the filling opening.

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