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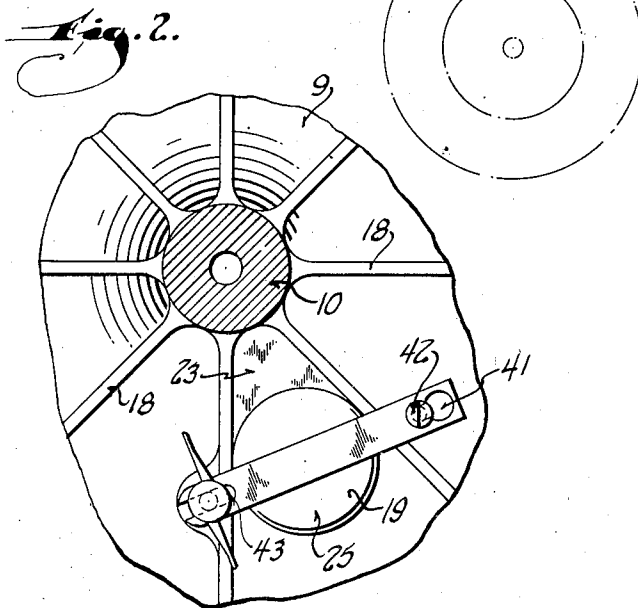
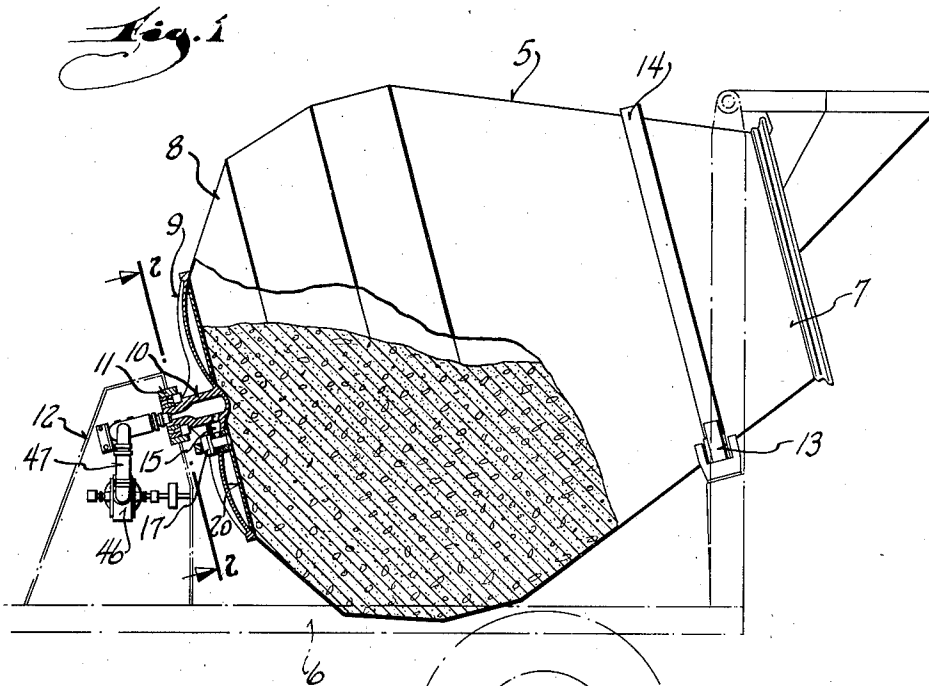
G. MAXON, JR

2,328,830

CONCRETE MIXER

Filed July 9, 1942

3 Sheets-Sheet 1



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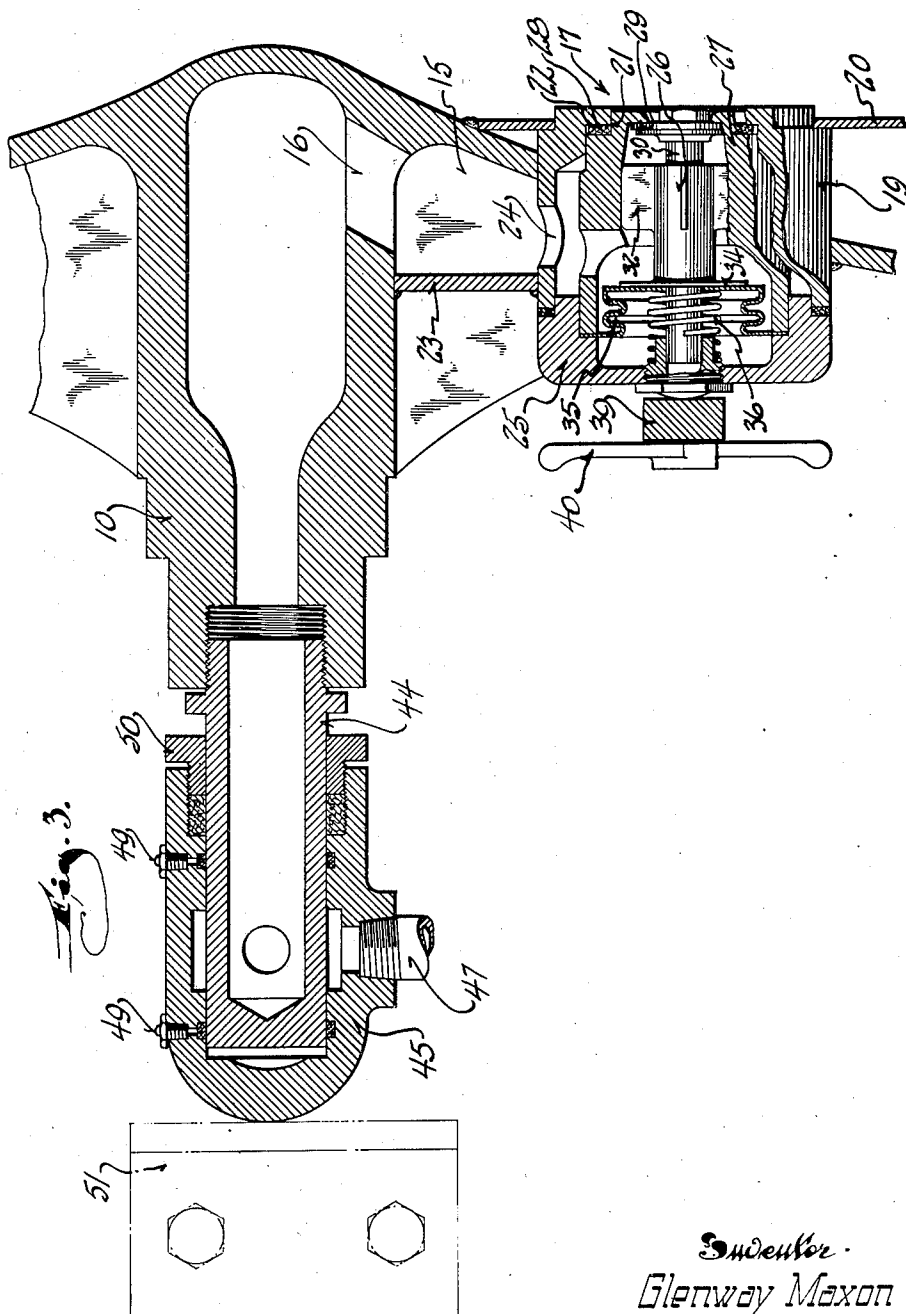
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CONCRETE MIXER

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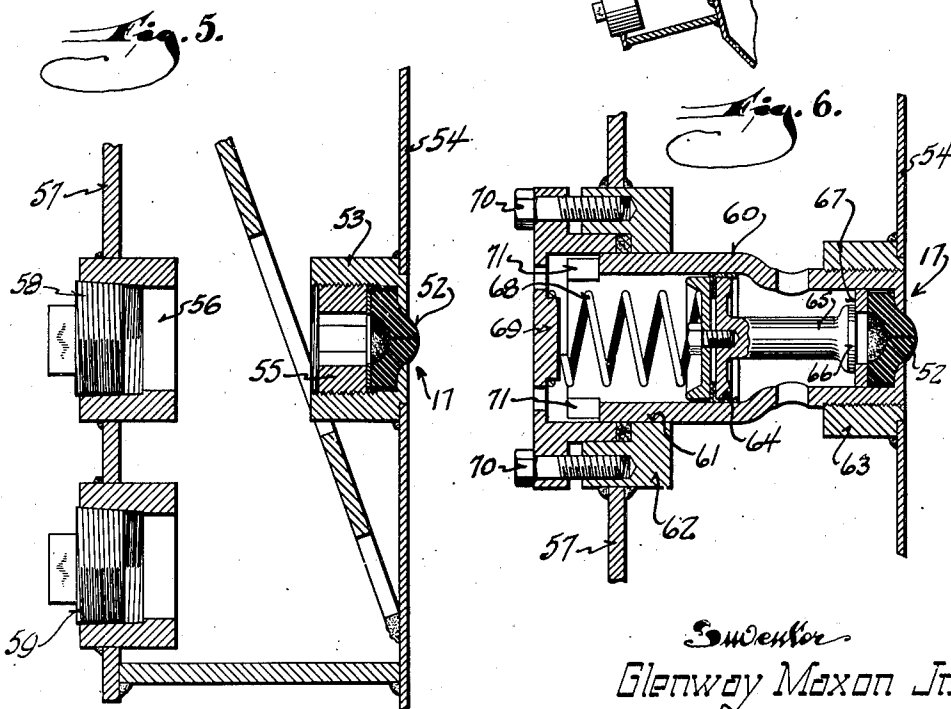
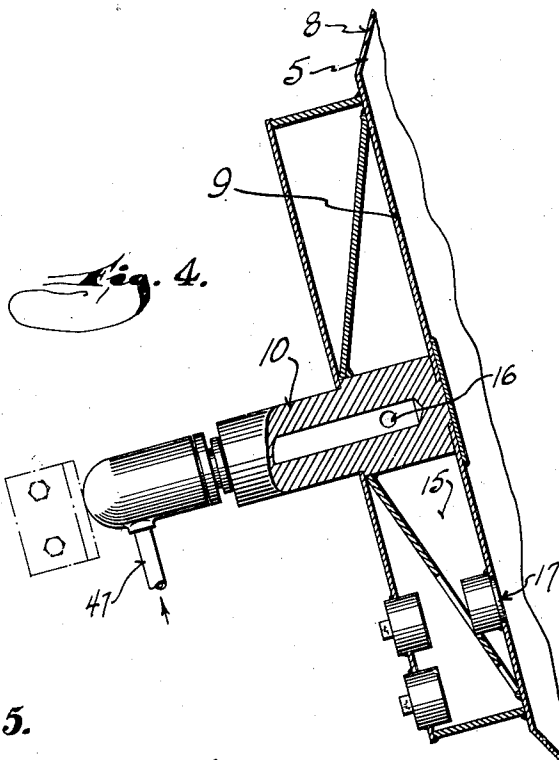
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CONCRETE MIXER

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,328,830

CONCRETE MIXER

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Application July 9, 1942, Serial No. 450,273

11 Claims. (Cl. 259—168)

This invention relates to concrete mixing apparatus and refers particularly to truck mixers of the type illustrated in the pending application of Harry C. Peters, Serial No. 313,710, filed January 13, 1940.

As in the Peters application, the primary consideration of this invention is the provision of an efficient and practical manner of introducing water into a mass of aggregates contained in the drum. Water injection has always presented a problem to the manufacturer of concrete mixers; and this problem is particularly difficult in high discharge type truck mixers, that is, truck mixers in which the drum revolves on an inclined axis with its raised end open to permit charging and discharging of the drum and its lower end closed.

The normal charge of aggregates in a mixer of this type substantially fills the closed front end of the drum; and where the mixing must be done on location, as many Federal, State and municipal public works specifications require, the drum is charged with the properly batched dry aggregates at a central batching plant and arrives on location with its contents very much compacted.

Experience has taught that efficient injection of water into this mass requires that the water be introduced so that it will bathe the end wall and create a wet zone at the closed front end of the drum.

In the mixer of the aforesaid application, this is accomplished by means of a water line entering the interior of the drum through its open end and terminating in a discharge nozzle in close juxtaposition to the end wall. In another truck mixer the water is introduced through the center of the closed end wall and a valved port located within the drum reverses its direction of flow and discharges it against the head end of the drum.

While both of these expedients effect their purpose, access to the discharge nozzles is difficult. Needed inspection and cleaning of the nozzles is thus seldom attended to.

With this and other difficulties of past water injection schemes in mind, it is one of the primary objects of this invention to provide an improved water injection system for concrete mixers wherein the water introduced into the drum bathes the walls of the drum at its closed front end to form a wet zone, and which is so designed and constructed that the nozzle parts through which injection is effected may be readily removed from the exterior of the mixer drum for cleaning and replacing if necessary.

water injection system which incorporates a fluid pressure responsive valve held closed with a strong biasing force until the water pressure thereon exceeds a predetermined value so as to effectively exclude grout and aggregates from the water injection system.

Another object of this invention is to provide means for introducing water into a rotatable mixing drum which includes a hollow trunnion on the closed end of the drum through which the water passes and wherein an enlarged sediment chamber is carried by the end wall to accumulate sediment which might pass the valve and thus prevent such sediment from reaching the packed juncture between the hollow trunnion and its water supply bonnet.

Still another object of this invention is to provide an improved manner of introducing water into the mixing drum wherein the entire valve mechanism is quickly and easily removable and wherein upon such removal of the valve mechanism a port is provided leading to the interior of the drum at its closed end through which a hose may be inserted for washing the drum interior at the end of the day's work.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate several complete examples of the physical embodiment of the invention constructed in accordance with the best modes so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a side view (with parts broken away and in section) of a concrete mixer of the type to which this invention appertains;

Figure 2 is an enlarged fragmentary view of the closed front end of the drum illustrating particularly the manner in which the valve is removably held in place, said view being taken approximately on the plane of the line 2—2 in Figure 1;

Figure 3 is an enlarged sectional view taken on the same plane as Figure 1 and showing only the elements of the water injection system;

Figure 4 is a view similar to Figure 3 illustrating a slightly modified construction;

Figure 5 is a detail sectional view illustrating the type of valve and its manner of removal em-

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ployed in the construction shown in Figure 4; and

Figure 6 is a detail sectional view of another type of valve construction which may be used.

Referring now particularly to the accompanying drawings, in which like numerals indicate like parts, the numeral 5 designates a rotatable concrete mixing drum mounted on the truck chassis 6 for rotation about an inclined axis.

The raised end of the drum 7, which is at the rear of the truck, is open to enable charging and discharging of the drum in a manner well understood by those skilled in the art, and its lower front end 8 is closed by an end wall 9. This end wall 9 may be a casting, as illustrated in Figures 1 and 3, or it may be built up of plate; but in any event it has a hollow trunnion 10 projecting axially therefrom to be journaled in a bearing 11 carried by a suitable pedestal 12.

This bearing 11 cooperates with rollers 13 shown in Fig. 1, to rotatably mount the drum. The rollers 13 are supported on the rear end of the truck chassis in position to have a track 14 encircling the drum ride thereon.

Whether the end wall 9 is a casting or is built up of plate, it is constructed to have a water passage or chamber 15 communicating with the interior of the hollow trunnion through a port 16 and communicated with the interior of the drum through a valved outlet indicated generally by the numeral 17. Thus water supplied to the hollow trunnion may enter the drum through the passage or chamber 15.

In that embodiment of the invention illustrated in Figure 1, where the end wall 9 is a casting, radial ribs 18 provide segment-shaped pockets one of which has a valve housing 19 mounted therein. The valve housing 19 is substantially a cylinder having its inner end projecting through and secured to a plate 20 welded across the periphery of the end wall 9. This inner end of the valve housing has a bore 21 opening to the interior of the drum, and a counterbore 22.

Exteriorly of the wall 9 the segment in which the valve housing is located has a plate 23 welded across the substantially triangular space defined by the adjacent ribs 18 and the housing 19. The space thus enclosed forms the water passage or chamber 15 which communicates with the interior of the valve housing through a port 24.

Removably positioned in the housing 19 and centered therein by the counterbore 22 and a removable cap 25 is a valve unit 26. This valve unit comprises a cylindrical valve body 27, the inner end of which snugly fits the counterbore 22 and projects into the bore 21 with a packing 28 forming a fluid-tight seal between the valve body and the housing at this point. A valve seat 29 on this inner end of the valve body cooperates with a valve 30 to control the admission of water into the drum. The stem of the valve has spider arms 32 projecting therefrom to support and guide the valve for axial movement in the body.

The outer end of the valve stem 30 has a disc 34 fixed thereto to which one end of a Sylphon bellows 35 is secured, the outer end thereof being clamped between the adjacent end of the valve body and the cap 25. The Sylphon bellows thus closes the outer end of the valve body and provides means by which water pressure on the disc 34 may unseat the valve 29. It is to be understood, of course, that the disc 34 has greater area than the valve 30. Hence, in the operation of the device, the valve 30 remains closed until the water pressure acting against the inherent resiliency of the Sylphon bellows and a compression spring

36 lifts the valve off its seat. The spring 36 reacts against the cover cap 25.

The cover cap 25 is readily removably held in place by a clamping bar 39 and a hand screw 40. To facilitate removal of the cover cap and enable quick withdrawal of the entire valve mechanism for inspection and cleaning and to afford access to the interior of the drum, the clamping bar has a keyhole opening 41 in one end thereof to engage an anchor screw 42 and its opposite end has a slot 43 to embrace the hand screw. Thus, upon loosening of the hand screw, the clamping bar may be slid longitudinally to disengage the same from the screws 42 and 40 thereupon freeing the cover cap 25 for removal. Inasmuch as the port which the cover cap 25 closes provides access to the interior of the water passage besides providing the opening through which the valve is withdrawn it may be considered as an access port in an outer wall of the water passage.

The hollow trunnion 10 has a hollow shaft 44 fixed thereto and extending outwardly beyond the bearing 11. A bonnet 45 mounted on the hollow shaft and connected with a water pump 46 through a pipe 47 supplies water under pressure to the hollow shaft. The bonnet 45 is non-rotatable, while the shaft 44 revolves within it, and while any means may be employed to hold the bonnet against turning, the water inlet pipe 47 is adequate for this purpose.

Grease is supplied to the joint between the bonnet and the hollow shaft through nipples 49; and a packing gland or stuffing box 50 provides a liquid-tight junction between the bonnet and the shaft.

Attention is directed to the fact that the stuffing box or packing gland 50 is removed a substantial distance from the water passage or chamber 15. Hence, there is small likelihood of sediment, which might pass the valve, being carried back to the stuffing box. Such sediment which does pass the valve accumulates in the chamber 15 or in the interior of the valve housing, from where it can be readily removed.

The manner of joining the bonnet 45 and the hollow shaft 44 makes no provision for securing the bonnet against displacement from the shaft by the water pressure. For this purpose the end of the bonnet is rounded and abuts against a suitable support 51 removably secured to the pedestal or other adjacent structure. In this manner the bonnet is held against displacement without in anywise interfering with possible wobble occasioned by misalignment between the bearing 11 and the rollers 13.

In such an event the end of the bonnet, being a substantial distance from the bearing 11, would not revolve about a fixed axis. To further accommodate such wobble the water inlet pipe 47 has a section thereof formed as a rubber hose.

The embodiment of the invention illustrated in Figures 4, 5 and 6 is substantially like that described, except as to the specific construction of the valve. In this case a self-sealing rubber valve tip 52 is employed. This valve tip is a thick walled rubber cup with an annular flange on its edge and with slits through the bottom of the cup which open upon the application of pressure on the inside of the cup.

In the construction shown in Figures 4 and 5, one such rubber valve tip is removably secured in the bottom of a cylindrical socket 53 welded to the inner wall 54 of the passage or chamber 15 and which also forms one wall of the drum. The bottom of this socket has an opening to

accommodate the valve plug which protrudes therethrough into the drum interior.

A hollow plug 55 threaded into the socket removably holds the valve plug in place. Removal of the valve plug is effected by the insertion of a tool through a port 56 in the outer wall 57 of the water chamber or passage 15 to engage the hollow plug 55. The port 56 is normally closed by a plug 58.

In this construction it is desirable to employ an additional plug 59 close to the outer side wall of the chamber 15 to facilitate sediment removal.

The construction illustrated in Figure 6 combines the rubber valve plug 52 with a fluid pressure actuated valve. In this instance, a valve body 60, inserted through a port 61 formed by the bore of a collar 62 welded in the outer wall 57, is threaded in a socket 63 secured to the inner wall 54. A piston 64 fixed to the stem 65 of a valve 66 and larger in diameter than the valve is subjected to the pressure of water entering the valve body through ports therein located between the piston 64 and the valve 66 to unseat the valve from a seat 67 against the resistance of a compression spring 68. The spring 68 is confined between the piston 64 and a removable cap 69 held seated in a counterbore in the collar 62 by cap screws 70.

To enable the valve body 60 to be threaded into and out of its socket its larger outer end has notches 71 therein for the reception of a spanner wrench or other suitable tool.

From the foregoing description, taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art that this invention provides a new and improved manner of introducing water into a concrete mixing drum and that it enables the valve means, required to prevent grout and sediment from passing into the water passages and eventually clogging them, to be readily removed for inspection, cleaning and replacement.

It will also be apparent that inasmuch as the valved water inlet is near the axis of the drum, it is submerged by the drum contents at least for the major portion of each rotation of the drum, and that when the drum is loaded, as it generally is, to the extent where the end wall or head of the drum is covered, the water admission is beneath the surface of the aggregates throughout the entire mixing action.

It is also to be noted that while only one inlet has been shown in each of the three modifications illustrated, two or more arranged about the axis of the drum may be supplied from the hollow trunnion without deviating from the invention.

What I claim as my invention is:

1. Means for introducing water into a rotatable concrete mixing drum having an end wall extending across the axis of rotation of the drum, comprising: a water passage built into the end wall and extending from the center of the wall a distance spaced radially from the axis of rotation, said passage having inner and outer walls, the former having a discharge opening leading to the interior of the drum at a point spaced radially from the drum axis and the latter having a port opening to the exterior of the drum; a removable fluid pressure responsive valve for controlling the admission of water into the drum through the discharge opening; means mounting said valve for ready removal through said port; a readily detachable closure for the port; and a water supply line connecting with

the water passage on the axis of rotation for supplying water under pressure to the water passage.

2. In a concrete mixer of the type having a rotatable mixing drum open at one end and having an end wall closing its opposite end: a hollow axle for the drum projecting out from said end wall; means on the end wall defining a water passage leading from the interior of the hollow axle through a discharge opening in said end wall at one side of the hollow axle to the interior of the drum; a valve for closing said discharge opening; and means mounting said valve for ready removability from the exterior of the drum.

3. In a concrete mixer having a rotatable mixing drum: an end wall closing one end of the drum, said wall having an opening therethrough spaced radially from the drum axis; a valve chamber on the end wall in line with said opening; a removable fluid pressure responsive valve removably mounted in the valve chamber for controlling the admission of water into the drum through said opening; a hollow trunnion on the end wall by which one end of the drum is rotatably mounted in its supports; means defining a water passage connecting the hollow trunnion with the valve chamber; said valve chamber opening to the exterior of the drum through a port large enough for the removable valve to pass through; a readily detachable closure for said port; and means for supplying water under pressure to the hollow trunnion.

4. In a concrete mixer having a rotatable mixing drum: an end wall closing one end of the drum; means on said end wall defining a water passage having spaced inner and outer walls with an outlet in the inner wall leading to the interior of the drum; a removable fluid pressure responsive valve for controlling the discharge of water through the outlet; the outer wall of the passage having a port through which the valve is removable from the exterior of the drum; readily removable means for closing said port and for holding the valve in place; and means for supplying water under pressure to the water passage.

5. In a concrete mixer having a rotatable mixing drum: an end wall closing one end of the drum; means on said end wall defining a water passage, said means including spaced inner and outer walls the former being exposed to the interior of the drum and the latter being exposed to the exterior of the drum, said walls having aligned openings through which access may be had to the interior of the drum from the interior of the water passage and from the exterior of the drum; a valve for closing the opening in the inner wall, said valve being removable through the opening in the outer wall; readily removable means closing the opening in the outer wall; and means for supplying water under pressure to said passage.

6. In a concrete mixer having a rotatable mixing drum: means defining a water passage in one wall of the drum, said means having spaced inner and outer walls provided with aligned openings, the opening in the inner wall providing a discharge for said water passage leading into the drum; a fluid pressure responsive valve for closing the opening in the inner wall, said valve being removable through the opening in the outer wall; readily removable cover means closing the opening in the outer wall; and means for supplying water under pressure to said passage.

7. In a concrete mixer: a rotatable mixing drum; an end wall closing one end of the drum; a hollow trunnion on said end wall adapted to be journaled in a bearing to rotatably mount said end of the drum; means on said end wall defining a water passage in open communication with the interior of the hollow trunnion and having inner and outer walls, said inner and outer walls having aligned holes, the hole in the inner wall providing an outlet for the water passage through which water enters the interior of the drum; a fluid pressure responsive valve for closing the hole in the inner wall, said valve being removable through the hole in the outer wall; a removable cover for the hole in the outer wall; and means for supplying water under pressure to the interior of the hollow trunnion.

8. In a concrete mixer having a rotatable mixing drum: means for introducing water into the interior of the drum including a hollow trunnion adapted to be journaled in a bearing to rotatably support one end of the drum, said hollow trunnion terminating in a smooth hollow shaft portion; a bonnet fitted on the end of said hollow shaft; a water supply duct connected to said bonnet for supplying water under pressure thereto, said bonnet being held against rotation while the hollow shaft turns therein; and means for supporting the bonnet against being displaced from the shaft by the water pressure, said last named means enabling the bonnet to wobble with the hollow shaft.

9. In a concrete mixer: a rotatable mixing drum; an end wall closing one end of the drum; a hollow trunnion on said end wall adapted to be journaled in a bearing to rotatably support said end of the drum and terminating in a hollow shaft; means for supplying water under pressure to the interior of the hollow trunnion through said hollow shaft including a nonrotatable bonnet fitted to the hollow shaft with a fluid-tight junction; means on said end wall forming a water passage in open communication with the hollow trunnion, said water passage having substantial volume so as to provide a sediment chamber removed a substantial distance from the fluid-tight connection between the hollow shaft and the nonrotatable bonnet; a discharge port leading from

the water passage to the interior of the drum; a fluid pressure responsive valve for closing said port; and a drain plug in an exterior wall of said chamber through which sediment which passes the valve and accumulates in said chamber may be removed.

10. In a concrete mixer of the type having a revoluble mixing drum closed at one end and open at the other: a hollow trunnion on the closed end of the drum; means on the closed end of the drum adjacent to said hollow trunnion forming a water passage communicating with the interior of the hollow trunnion and having a discharge opening spaced radially from the trunnion and leading to the interior of the drum and an access port in an exterior wall of the passage; a removable cover for said port; means for supplying water under pressure to the interior of the hollow trunnion and consequently to said water passage which communicates therewith; a fluid pressure responsive valve closing the discharge opening of said passage for controlling the admission of water into the drum, said valve being arranged to discharge water into the closed end of the drum close to one of the walls thereof; and means mounting said valve for ready removal from the exterior of the drum through said access port.

11. In a concrete mixer of the type having a rotatable mixing drum closed at one end and open at the other: a hollow trunnion for the drum mounted on the closed end thereof; means for supplying water under pressure to the hollow trunnion; means defining a water passage leading from the interior of the hollow trunnion and extending to a point spaced radially from the trunnion, said passage having inner and outer walls, the former having a discharge opening leading to the interior of the drum and the latter having a port opening to the exterior of the drum at a distance spaced radially from the trunnion; a removable fluid pressure responsive valve in the water passage for controlling admission of water to the drum interior through the discharge opening, said valve being removable from the exterior of the drum through said port; and readily removable means for closing said port, and for holding the valve in place.

GLENWAY MAXON, JR.