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MECHANISM FOR INTRODUCING WATER INTO CONCRETE MIXERS

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FIG. 1.

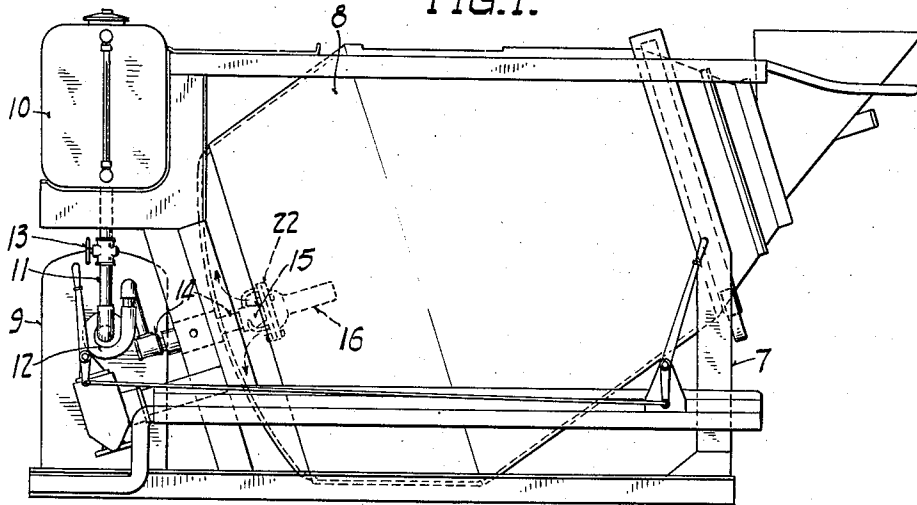


FIG. 2.

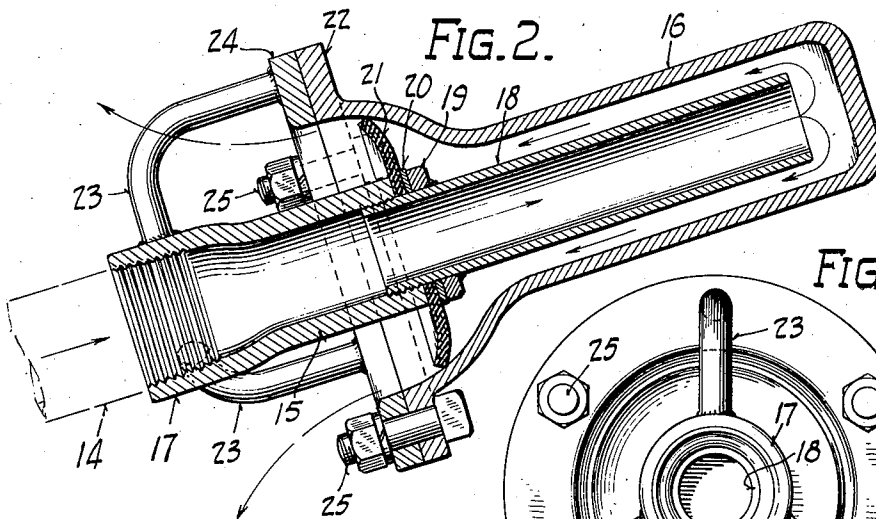
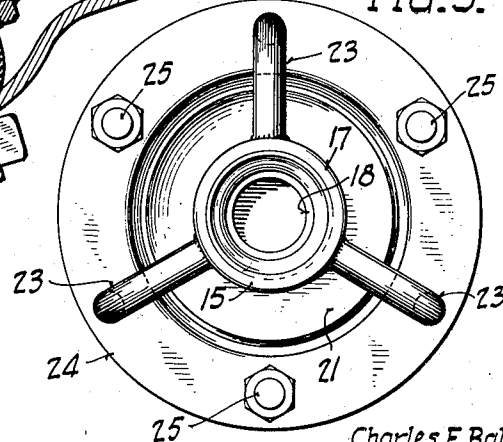


FIG. 3.



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MECHANISM FOR INTRODUCING WATER
INTO CONCRETE MIXERSCharles F. Ball, Wauwatosa, Wis., assignor to
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1 Claim. (Cl. 259-168)

This invention relates to concrete mixers and mechanism for introducing water therein. More particularly the invention finds application in concrete mixers of the truck mounted type in which concrete forming ingredients are loaded into the drum to a relatively high level. With the recent emphasis on truck mixer drums, which are mounted on an inclined axis to provide discharge at the higher end, the problem of water introduction into the drum has become more accentuated, largely due to the piling up of material in such drums at the lower end where water may be most advantageously introduced.

Not only is it more difficult to inject the water beneath the mass of concrete forming materials within reasonably satisfactory time-limits, but it is also more difficult to disperse the water through the materials to thereby enable production of a uniform concrete, and once concrete is formed, there is more opportunity for the opening to become clogged with concrete which, after setting, will prevent the addition of water to subsequent batches.

It is an object of the present invention to provide improved mechanism for introducing water into mixer drums which will require less time for water discharge, which will facilitate faster and improved mixing by the dispersion of water through the materials, and which will not become clogged by the formation and setting of concrete within the discharge orifice.

With the foregoing object in view, the invention resides in the novel combination and arrangement of parts as hereinafter described and pointed out in the appended claim.

One embodiment of the invention is illustrated in the accompanying drawing, in which:

Figure 1 is a side elevational view of a concrete mixer drum showing the relation of the water supply system thereto;

Figure 2 is an enlarged longitudinal sectional view of the water discharge mechanism as positioned within the drum; and

Figure 3 is an end elevation of the device viewed from the left of Figure 2.

In the drawing, the numeral 7 designates the mixer frame upon which is mounted for rotation on an inclined axis the mixing drum 8. Rotation of the drum is preferably effected through a chain drive entrained around the lower head of the drum, the driving sprocket being connected through a suitable transmission with a source of power such as engine 9. Disposed above the engine is a water tank 10 adapted to hold

sufficient water for at least one complete batch of concrete and preferably enough additional water to act as a wash subsequent to discharge of the batch. A discharge pipe 11 leading from the bottom of the tank 10 communicates with a centrifugal pump 12 driven by the engine 9, and a valve 13 is interposed in the line between the pump and the tank. Communicating with the discharge side of pump 12 through a suitable duct is a pipe 14 which extends axially through the lower head of drum 8 and onto which is threaded the water fitting 15 shown in detail in Figures 2 and 3. It will be appreciated that suitable packing is provided around the pipe at the point where the latter extends through the drum head and the lower bearing, since the drum revolves while the pipe is stationary.

Although not as shown in the drawing, it will be understood that the engine and pump may be enclosed so that the heat of the engine can be used to maintain the water supply conduit free from the ill effects of freezing.

Fitting 15 comprises essentially a central duct member forming a continuation of the water supply conduit, which extends a substantial distance axially within the drum, and a body or cap 16 mounted concentrically of the conduit and enclosing the end and a portion of the conduit. For purposes of assembly, the conduit is made in two parts. One part comprises a short pipe section 17 threaded at both ends, one end engaging the threaded end of pipe 14, while the other end engages a tube 18 which forms the terminus of the water conduit. Welded to the outside of tube 18, a short distance from its threaded end, and forming a shoulder thereon, is a disc 19. Interposed between the pipe section 17 and the shoulder, and mounted on tube 18 are washer 20 and disc 21, the latter being of yieldable material such as rubber, the purpose of which will be hereinafter described.

Body member 16 is closed at the end adjacent the discharge end of the tube and is slightly larger than and concentric with the tube to afford a return passageway of water therebetween. The lower portion of body 16 is belled, with a flange 22 disposed radially of the drum axis at the outer periphery of the bell. For supporting cap 16, a plurality of bent rods 23 are welded to the outside of pipe section 17, thereby forming a spider to which is secured a flange 24 arranged to register with flange 22 in order that the parts may be joined by bolt assemblies 25. It will be noted that this mounting of the cap external to the conduit affords no obstruction to the passage of water

through the conduit and out of the cap, except for the slight obstruction caused by the spider which is spaced from the water discharge opening in order to minimize this obstruction.

Disc 21 is disposed to completely shut off the passage of water between the cap and the conduit, the disc being cup shaped when in contact with the belled portion of the cap thereby exerting a pressure which is sufficient not only to maintain this disc valve closed but also to prevent leakage of water against small head pressures in the conduit. Leakage of water is especially difficult when there is concrete in the drum because of the pressure created by the concrete against the valve.

Due to the incline of the conduit 17 and 18 axially of the inclined drum, the end of the conduit is disposed above the water outlet with the result that water may be maintained in this portion of the conduit. Consequently, should any concrete work its way back past the valve into the conduit it will be suspended as a weak solution and cannot set or clog the opening.

When it is desired to introduce the water into the batch, valve 13 is opened and the pump 12 is put in operation. Under the pressure created, water escapes past the flexible disc valve 21 and flows through the opening. The stream is directed against the drum head, and hence diverted around the sides of the drum and into the materials. Preferably, the drum is rotated in such a direction that the blades may move material toward the elevated discharge end of the drum during mixing. Even with this method of mix-

ing, the water orifice, with normal batches of material, will be completely submerged in the concrete. As mixing progresses, water works its way through the materials and along the shell and the blades, and finally, some of it comes up to the higher end of the drums. Once a plastic mixture between water and cement is formed, internal mixing beneath the concrete mass is possible and production of finished concrete proceeds rapidly.

The invention having been described what is claimed is:

In a concrete mixer of the type comprising a rotatable mixing drum closed at one end and having a material transfer opening at the other end; means for introducing water into the drum and effecting rapid hydration of the concrete forming ingredients during rotation of the drum comprising a conduit arranged to extend axially through the closed end of the drum, a distance into the interior thereof, a bell shaped member enclosing the end of said conduit and directing the flow of liquid away from the open end of the drum, a flexible diaphragm disposed between said member and said conduit with its outer periphery adapted to seat against said bell shaped member, a hub disposed adjacent the open end of said member, a spider rigidly connecting said hub to said conduit at a distance removed from the opening of said bell and means mounting said bell on said hub to provide concentric passageways for reversing the direction of flow of water within said bell.

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