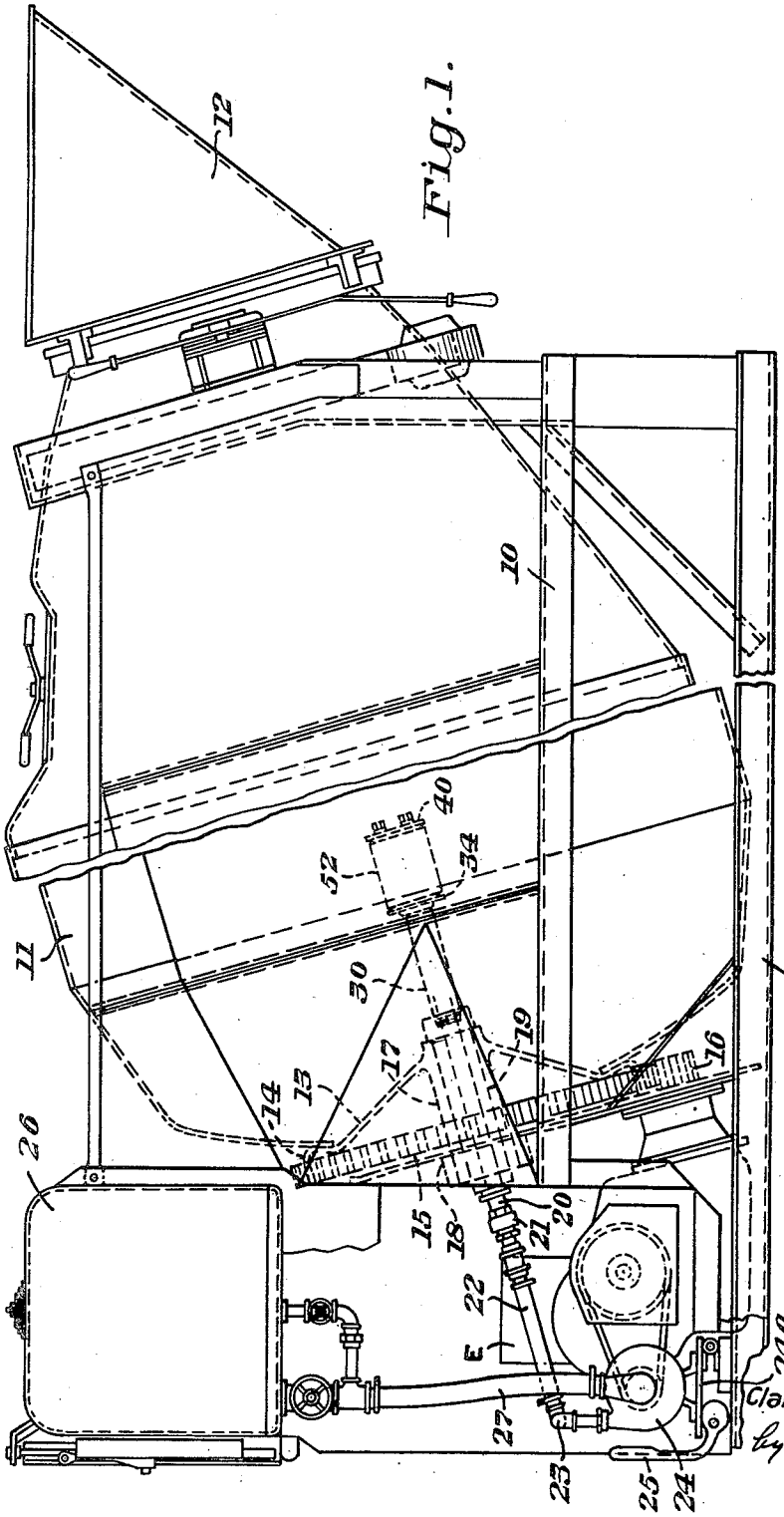
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WATER INLET NOZZLE FOR CONCRETE MIXERS OR THE LIKE

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Fig. 1.




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Fig. 3.

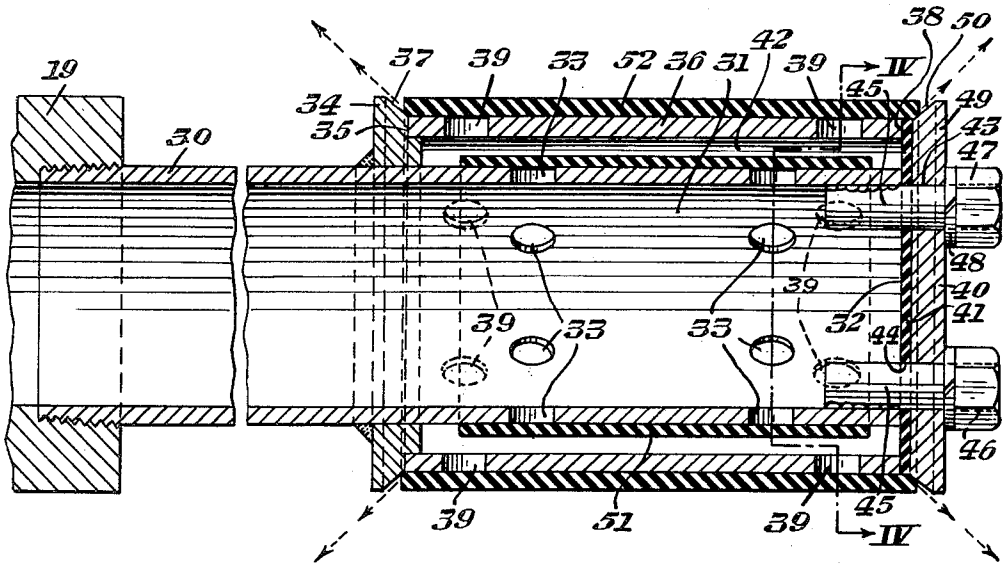



Fig. 2.

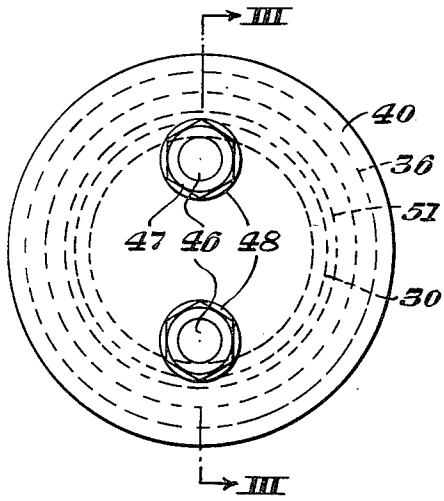
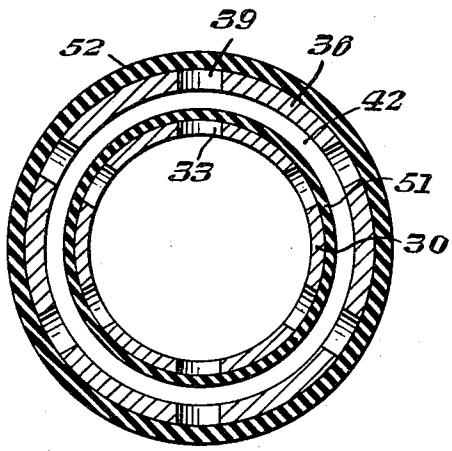



Fig. 4.




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# WATER INLET NOZZLE FOR CONCRETE MIXERS OR THE LIKE

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Application July 28, 1949, Serial No. 107,180

5 Claims. (Cl. 299—121)

This invention relates to nozzles adapted to periodically discharge liquids into closed spaces and to prevent passage of material from such spaces back into such nozzles between such discharge periods. More particularly, such invention pertains to water inlet nozzles projecting into and below the top of rotating drums on mobile and stationary concrete mixers or the like.

It is broadly old in the concrete mixer art, such as a high discharge truck mixer, to have a water inlet nozzle projecting into the rotating mixing drum to supply water for the mix in suitable quantity and at a suitable pressure in a backward direction by means of a flow-reversing cap to keep the material in the mixer from getting into the nozzle when the water is shut off. It is also old to insert a single check valve in the nozzle passage in the form of an annular diaphragm or flange. In practice, the flow-reversing cap even when used with the valve did not prevent material from flowing or working its way back into the nozzle with detrimental effect. The use of the valve was an improvement but it was subjected to severe wear by the gritty materials in the mixing drum and it offered large surfaces to back pressures which had to be resisted in substantial measure by the inherent stiffness of the valve itself. Moreover, there was no extensive surface contact between the valve and the zone being sealed with the result that it was easier for gritty material to work itself around the valve and into the nozzle. As a consequence, the user of the apparatus had to contend with the problem of cementitious material hardening on the various component parts of the nozzle, thereby changing the water delivery rate to the mixing drum if the nozzle remained operative at all. In addition, since the type of substantial pressure fast discharge pumps used for example on a truck mixer are generally located below the nozzle outlet, when gritty material such as sand and Portland cement got into the nozzle, it would work itself back into the pump parts and either quickly destroy or impair their operation.

The foregoing difficulties are overcome by the prior invention set forth in United States application Serial No. 67,881, filed December 29, 1948, in the name of Louis J. Sarosdy, now Patent No. 2,655,178. In the invention in that application, a plurality of resilient valves is provided, the outer one of which comprises an elastic tube or sleeve operated by radial expansion thereof during discharge from the nozzle. However, in the nozzle of that invention the outer valve is held in valving position. Further, obtaining access to the inner valve therein involves the removal of a number of relatively small parts with some possibility of difficulty arising especially if these parts have become rusted together to any extent. Still further, in the preferred embodiment shown in the invention of the aforesaid invention Serial No. 67,881 the discharge therefrom is relatively inflexible in so far as any directional control is concerned.

In the present invention a dual valve water nozzle is provided in which the parts are relatively few in number and regular in configuration. Hence, the task of assembly and disassembly is materially facilitated. Further, the valves do not require such precise fitting in the nozzle as in the case of the invention in the aforesaid application. In addition, in the present invention there is directional control of the effluent liquid discharged from the nozzle so that, if desired, substantially all of the dry material contents in the surrounding mixing chamber will be sprayed so that there are no relatively dry and wet zones therein. In prior devices the introduction of liquid



substantially into one small relatively localized space left it up to the flights in such mixing chamber to distribute the liquid through the dry material mixture. While such flights will perform such distribution, the use of a water nozzle to achieve that effect directly may result in either better mixing or shorter mixing time.

Other objects and advantages of this invention will be apparent from the following description and from the drawings, in which,

Figure 1 is a schematic view of a preferred embodiment of a nozzle made in accordance with this invention assembled in the body of a high discharge concrete truck mixer with part of the engine housing removed to show the water pump and its connections;

Figure 2 is an end view of the nozzle of this invention shown in Figure 1;

Figure 3 is a view in cross section taken along line III—III of Figure 2; and

Figure 4 is a view in cross section taken along line IV—IV of Figure 3.

In Figure 1 frame members 10 of a truck mixer suitably support a mixing drum 11 with the rotational axis thereof in an inclined position parallel to the sides of the truck. A charging and discharging chute 12 is provided at the upper end of the drum. The lower end of the drum is welded to a conical web 13 which completes the dished lower end of mixing drum 11. Web 13 has a peripheral flange 14 thereon outside said drum. Flange 14 has affixed thereto a driven gear 15 by means of which drum 11 is rotated. A pinion 16 meshing with gear 15 is rotated at a suitable speed by means of a conventional clutch and gearing connections to an engine E mounted on frame 10.

Web 13 also has a rearwardly projecting hub 17 which is rotatably supported against a thrust bearing 18 mounted on the frame of the truck. A hollow shaft 19 fits into hub 17 and is keyed thereto. The lowermost portion of shaft 19 constitutes a reduced neck portion 20 of a male character which cooperates with a rotary pipe joint 21 connected to the upper end of a water delivery hose 22. Pipe 22 is connected through a connection 23 to the outlet of a fast discharge type of centrifugal pump 24 which is operated whenever water is required in drum 11 through the medium of a V-belt and pulley drive powered by the engines E through its transmission. The pump 24 is mounted on a hinged bracket 24*a* to be tiltable on operation of cam lever 25, to slacken or tighten the V-belt and by this means to throw the pump into or out of operative engagement with the power unit for driving it. A water tank 26 supplies water to pump 24 through a hose line 27. All of these parts and their operation are conventional in this type of equipment.

The inlet nozzle of this invention comprises an inlet pipe 30 threadably engaging a corresponding tap in the upper end of shaft 19 and forming a continuation of the liquid passage from the outlet of pump 24 through connection 23, line 22, joint 21 and the center of shaft 19 which rotates as drum 11 turns. As shaft 19 revolves, pipe 30 and the other parts of the nozzle of this invention also revolve.

Inlet 30 has an outlet or discharge end 31 which terminates at edge 32 which is in a plane normal to the axis of the inlet. A plurality of radial discharge openings 33 are drilled through inlet pipe 30 at the discharge end. These openings 33 generally will extend circumferentially around the surface of inlet 30 at its discharge end 31.

An annular, radially extending flange 34 is welded around the outside of pipe 30 so that openings 33 are between flange 34 and edge surface 32. A shouldered recess 35 is provided in flange 34 for the leak proof seating of an outer wall member 36 which may be a section of a pipe of larger diameter than inlet pipe 30. A beveled surface 37 which may act as a guiding face is also machined around flange 34.

Outer wall 36 may be provided with a resilient or plastic seal around its contact edges with recess 35. Further, the axial length of wall member 36 of the nozzle of this invention is such that when so seated its other end edge surface 38 lies in the same plane as edge surface 32. A plurality of radially extending openings 39 are drilled through wall 36. These openings 39 are usually

spaced so as to be between the nearest openings 33 and the adjacent end of wall member 36.

A flat cap plate 40 forms a sealing closure with a gasket 41 for the end of inlet pipe 30 and also closes the annular space 42 forming an outer discharge chamber between outlet end 31 of pipe 30 and wall member 36. Plate 40 and gasket 41 are provided respectively with registering openings 43 and 44 therethrough which fit over studs 45. Studs 45 are welded to the interior of pipe 30 and are threaded at their outermost ends 46 so as to be engaged by the nuts 47 and lock washers 48 which hold closure members 40 and 41 in assembled, sealed, leak proof position. Gasket 41 may be made of rubber or other suitable gasket material, and abuts in sealing relation against the end surfaces 32 and 38 of the pipe 30 and cylinder 36 respectively.

The outermost circumferential edge 49 of plate 40 forms a flange generally similar to flange 34. Flange 49 is provided with a beveled guiding face 50 which taken with guiding face 37 diverge outwardly away from the axis of the nozzle of this invention. It is evident that by radially extending the respective flanges 34 and 49 and changing the angular relationship of the faces 37 and 50, a predetermined angular relation between the spray or liquid discharge at each end of the nozzle can be provided which is suited to coverage of the particular dimensions of the mixing chamber within which the nozzle is used. Further, although these parts are shown in Figure 3 as being symmetrical they may be made asymmetrical if desired.

A cylindrical inner valve 51 fits around the discharge end 31 of pipe 30 and overlies openings 33. This valve is of uniform tubular cross section in the embodiment shown and may be made of rubber or other resilient or elastic material suited to the purpose. The axial length of valve 51 is such that irrespective of any creeping which may occur either toward flange 34 or toward flange 49, all of the openings 33 will still be covered even though the valve abuts against one of the said flanges, which in the case of flange 49 would mean abutment against gasket 41. Moreover, the fit between valve 51 around discharge end 31 need not be tight in the sense of being a stretched fit but may be a comparatively easy fit because there are no angularities and no non-uniform tensionings in the valve seating surface. It will thus be seen that valve 51 is an outwardly acting check valve which permits liquid to flow through openings 33 out of inlet 30 into outer discharge chamber 42, but upon any change in the direction of flow valve 51 reseats itself and closes openings 33 preventing any material from moving into pipe 30.

An outer cylindrical valve 52 fits around the outside of outer nozzle wall 36, overlies openings 39, and extends between flanges 34 and 49. Valve 52 may be made of the same material as inner valve 51 and functions in the same manner except that outer valve 52 may be of such length and so surfaced that it may also seat against the respective guiding faces 37 and 50. Thus valve 52 comprises an outwardly acting check valve for openings 39 permitting discharge from outer discharge chamber 42 away from the axis of the nozzle in a generally radial direction. Upon the cessation of the flow of liquid through inlet 30 valve 52, as does valve 51, closes sealing the nozzle of this invention against the admission of any gritty or other material which might impair the operation of the nozzle and the associated parts.

In the event that either of the valves requires replacement closure members 40 and 41 may be easily removed without any likelihood of the unscrewing of inlet pipe 30 out of its shaft 19. When the closure members are removed, any replacement of the valves is simple and may be rapidly performed especially since there are no particular valve clamps or non-uniform stretching of the valves involved.

Although I have illustrated and described a preferred practice and embodiment of this invention, it will be understood that changes may be made therein without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A water inlet nozzle for concrete mixers or the like, comprising in combination, an axial inlet pipe of uniform diameter having a discharge end, a closure for the end of said pipe, said inlet pipe having generally radial discharge openings in said discharge end, radially extending circumferential flanges around said inlet pipe on opposite sides of said openings and adjacent thereto, a tubular valve of resilient material fitting around said discharge end and overlying said openings, a cylindrical outer wall member of uniform diameter extending between said flanges and radially spaced from said inlet pipe, said outer wall member having generally radial discharge openings therein, and a tubular valve of resilient material fitting around said outer wall member and overlying said openings, said flanges extending discoidally outwardly relative to the ends of said last-mentioned tubular valve, whereby water may be discharged in a predetermined manner throughout said mixer without material within said mixer being able to work back into said inlet pipe.

2. A liquid inlet nozzle for mixing chambers or the like, comprising in combination, an inlet pipe having a discharge end, a closure for the end of said pipe, generally radial discharge openings in said discharge end, radially extending circumferential flanges around said inlet pipe on opposite sides of said openings, a cylindrical outer wall member extending between said flanges and radially spaced from said openings, a tubular valve of resilient material fitting around said discharge end and overlying said openings, said valve being of sufficient length to overlie said openings if either end of said valve should abut one of said flanges, said outer wall member having generally radial discharge openings therein, said flanges extending discoidally outwardly relative to said outer wall member, and an outer valve of resilient material fitting around said outer wall member and overlying said openings therein, said outer valve being of sufficient length so as to continue to overlie said openings if either end thereof abuts one of said flanges, said flanges respectively having guiding faces thereon, whereby the discharge of liquid through said nozzle is directed in a predetermined manner to the material in said mixing chamber.

3. In a water inlet nozzle for concrete mixers or the like, in combination, an open-ended discharge member, said member having radial discharge openings through said member and circumferentially around the same, a radially extending flange connected to the said member adjacent the end thereof away from its open end, a closure for the open end of said member, a flange extending radially beyond said member at its open end in opposed relation to said first-mentioned flange, an outer wall member extending between said flanges in concentric relation to said first-mentioned member to provide an annular space between said members, said annular space being closed at its respective ends by said flanges, said outer wall member having radial discharge openings therethrough and circumferentially around the same, and a separate resilient cylindrical valve surrounding each of said members to overlie their respective radial discharge openings, said valves being respectively and substantially between said opposed flanges.

4. In a water inlet nozzle for concrete mixers or the like, in combination, an open-ended discharge member, said member having radial discharge openings through said member and circumferentially around the same, a radially extending flange connected to the said member adjacent the end thereof away from its open end, a cap plate closing the open end of said member and extending radially beyond said member to provide a flange in opposed relation to said first-mentioned flange, an outer wall member supportably engaged between said flanges in concentric relation to said member to provide an annular space between said members, said annular space being closed at its respective ends by said flanges, said outer wall member having radial discharge openings therethrough and circumferentially around the same, and inner and outer resilient cylindrical valves surrounding said members to overlie their respective radial discharge openings, said valves being respectively and substantially between said opposed flanges, at least one of said flanges having a beveled guiding surface facing the adjacent end of said outer cylindrical valve.

5. In a water inlet nozzle for concrete mixers or the like, in combination, an open-ended discharge member, said member having radial discharge openings through said member and circumferentially around the same adjacent the ends thereof, axially extending stud and nut assemblies connected to the open end of said member and extending beyond said end, a radially extending flange connected to said member spaced away from said end on the other side of said openings, a cap plate closing the open end of said member, said cap plate having

openings for said studs and extending radially beyond said member to provide a flange in opposed relation to said first-mentioned flange, an outer wall member supportably engaged between said flanges in concentric relation to said first-mentioned member to provide an annular space between said members, said outer wall member having radial discharge openings therethrough and circumferentially around the same adjacent the ends thereof, said last-mentioned openings being nearer to said flanges than said first-mentioned openings, and a separate resilient cylindrical valve surrounding each of said members to overlie their respective radial discharge openings, said valves being respectively and substantially between said opposed flanges.



**References Cited** in the file of this patent

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 85,510 | Critchlow | Jan. 5, 1869 |
| 384,306 | Bourdil | June 12, 1880 |
| 1,326,445 | Fewlass | Dec. 30, 1919 |
| 1,342,719 | Rodriguez | June 8, 1920 |
| 1,368,315 | Wygodsky | Feb. 15, 1921 |
| 2,275,937 | Baker | Mar. 10, 1942 |
| 2,413,488 | Draeger | Dec. 31, 1946 |
| 2,533,191 | Jaeger | Dec. 5, 1950 |
| 2,556,537 | Harvey | June 12, 1951 |

FOREIGN PATENTS

| Number | Country | Date |
|---|---|---|
| 112,701 | Australia | Mar. 10, 1941 |