

Dec. 30, 1952

G. FRIEDMANN

2,623,474

INJECTION MIXER

Filed Dec. 30, 1949

Fig. 1.

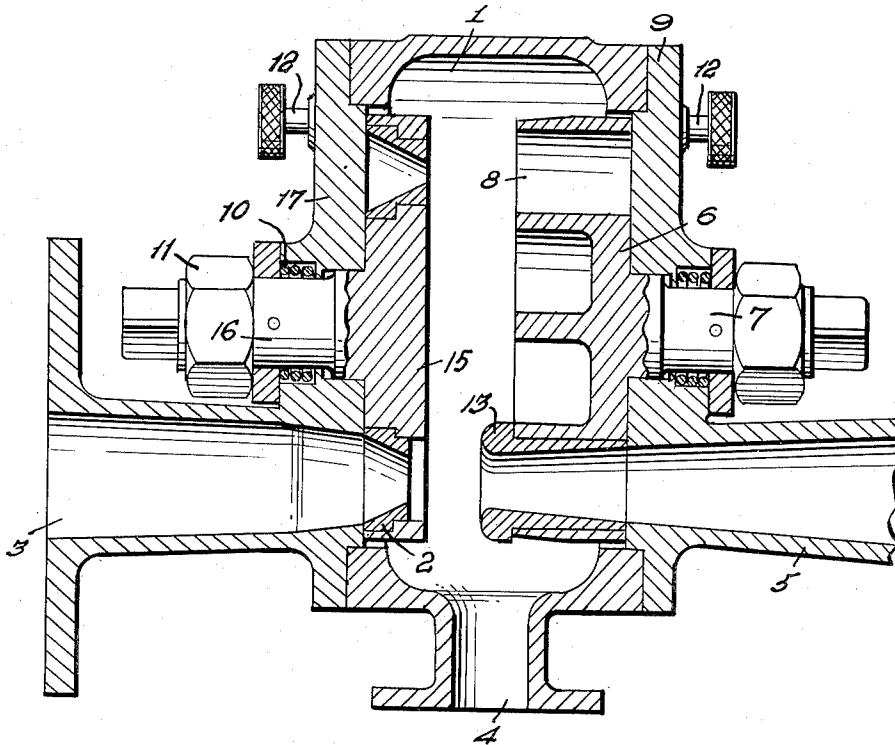


Fig. 2.

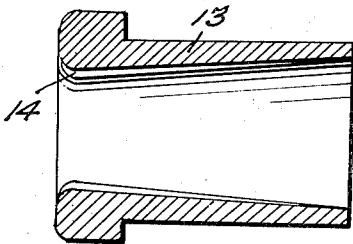
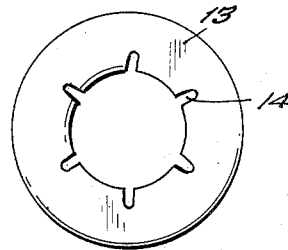


Fig. 3.



INVENTOR.

Giovanni Friedmann

BY

Glenn Downing Nichols
Attorneys.

UNITED STATES PATENT OFFICE

2,623,474

INJECTION MIXER

Giovanni Friedmann, Milan, Italy

Application December 30, 1949, Serial No. 136,130

In Italy December 31, 1948

1 Claim. (Cl. 103—271)

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It is the object of the present invention to provide a mixer for preparing solutions at different dilutions in high pressure water pipings. The mixer is composed of a chamber into which open a converging nozzle connected with the supply water pipe, a suction pipe for the liquid to be admixed to water, and a diffuser connected with the delivery pipe, before the mouth of which a support is rotatably mounted in said chamber and carrying a plurality of mouthpieces, which support can be fixed in different positions in each of which one of said mouthpieces is arranged coaxial with said diffuser. The mouthpieces have different diameters so as to effect different aspirating conditions in the chamber and if very high dilutions are to be obtained, one or more of said mouthpieces may be provided with grooves directed along generating lines in such a manner as to reduce the diameter of the mouthpiece to become nearly equal to the smallest diameter of the nozzle without causing any irregularity in mixing in a much diluted condition and diminishing the loss of pressure in passing through the device.

In particular the said mobile support may advantageously be constituted by a disc capable of rotation about its own axis, wherein the individual mouthpieces are provided in such a manner as to have all their axes arranged on a cylinder coaxial with the axis of rotation. In this way, by effect of disc rotations by convenient angles, the individual mouthpieces come successively to face the diffuser, each mouthpiece being provided for a different dilution of the solution delivered by the mixer. Whether the support is constituted by a rotary disc or by any other mobile member, there will be provided means for easy fastening of the support in its various positions in front of the diffuser in such a manner that the latter comes at any time to be coaxial with the successive mouthpieces. In lieu of a single nozzle there may be provided a number of nozzles, which also are mounted on a support rotatable or displaceable in any manner in front of the supply piping. A preferred embodiment of the present invention is illustrated merely by way of example in the accompanying drawing, in which

Fig. 1 represents in section a mixer.

Fig. 2 is a sectional view of an individual mouthpiece, and

Fig. 3 is an end elevation of an individual mouthpiece.

The mixer is essentially constituted by a chamber 1, into which opens a pipe 3, through

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which water is supplied under pressure. On the plate 17 forming a wall of the chamber 1, to which the piping 3 is connected, there is mounted a disc support 15, which is rotatable within chamber 1 about the pin 16, about an axis parallel to the axis of pipe 3. In this support there are fixed nozzles 2 having different diameters and the axes of which can be made to coincide with the axis of pipe 3 by rotating the support 15 about the pin 16, in such a manner as to form spouts of different delivery.

Into the chamber 1 opens also a pipe 4 through which is sucked the liquid to be mixed with water, due to the pressure drop formed during operation in the said chamber 1. At the wall opposite the nozzle 2 there is provided a diffuser 5 coaxial therewith and connected to a pipe through which the mixed liquid is delivered.

In front of said diffuser there is mounted the disc support 6 for the mouthpieces, which is rotatable in the chamber 1 about the pin 7, viz. about an axis parallel to the common axis of the nozzles 2 and diffuser 5. In the said disc there are provided cylindrical seats 8, the axes of which can be made successively to come in registry with the common axis of the nozzle and diffuser, by rotating the disc. In these seats 8 there can be fixed the mouthpieces 13 having different diameters provided with grooves directed along generating lines in the case of mouthpieces designed to deliver very diluted solutions and having diameters little different from the diameter of the nozzle or in any event such as to be able to deliver different solutions in accordance with their respective calibrations.

The various nozzles and the various mouthpieces can be replaced in their seats in order to vary the delivery and characteristics of the solutions delivered by the mixer and to replace the pieces if worn. The discs 6 and 15 and the plates 9 and 17 of the casing, to which the said discs are fastened, are respectively in contact with each other on planar surfaces, so as to ensure perfectly tight seal.

In order to prevent granules of sand or other impurities from being introduced between the said surfaces, the latter are kept pressed against each other by means of springs 10 for maintaining contact even if the bolts are unscrewed to move the discs to a different position. A stop device, for example a pin 12 engaging with notches arranged along the periphery of the disc, is provided to fix each time the disc in the accurate position. As shown in Fig. 1, the bore of both the supply conduit and the diffuser pro-

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gressively diminishes toward the small end thereof and terminates in a cross section corresponding to the cross section of the larger end of the nozzles and mouthpieces respectively.

The form of embodiment as described with reference to the drawing may of course be widely varied by replacing the various structural details with other equivalent ones within the scope of the principle of the present invention. In particular, the mobile supports might be made for example in the shape of plates displaceable by rectilinear translatory movement, wherein the seats for the various nozzles or mouthpieces are aligned parallel to the direction of slide. The method of fastening, the stop members, the shape of the mixer chamber will of course vary accordingly. Also the mouthpiece may assume shapes and dimensions most convenient in the various cases: they might for example be smooth and with diameters different from one another or, especially in the case of mouthpieces with diameters little different from the nozzle diameter, they may be grooved along generating lines or with helical grooves.

Fig. 2 illustrates for example a mouthpiece with grooves 14 according to generating lines, which grooves decrease in depth toward the wider end of the mouthpiece. The cross section of the grooves as well as their number may of course vary with respect to those illustrated.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

A mixer for preparing diluted solutions of a liquid in water comprising casing means defining

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a chamber, a supply conduit in communication with the chamber, a diffuser in communication with the chamber diametrically opposite the supply conduit, means for directing the liquid into the chamber in a path perpendicular to the supply conduit and the diffuser, two diametrically opposed independently rotatable discs supported by the casing means within the said chamber, one of the discs carrying a plurality of nozzles selectively movable into a position in registry with the supply conduit, means cooperating with the casing means and the said disc to secure the disc in the desired position, the other of said discs having a plurality of diffuser mouthpieces thereon, with said mouthpieces facing said nozzles and further means cooperating with the said casing means and said last named disc to secure the last named disc in the desired position, the center line of said supply conduit and diffuser coinciding with the center line of one of said nozzles and one of said mouthpieces.

GIOVANNI FRIEDMANN.

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