

Aug. 11, 1959

P. DOMBRE
MIXING VALVES

2,898,938

Filed Sept. 16, 1957

3 Sheets-Sheet 1

Fig. 1.

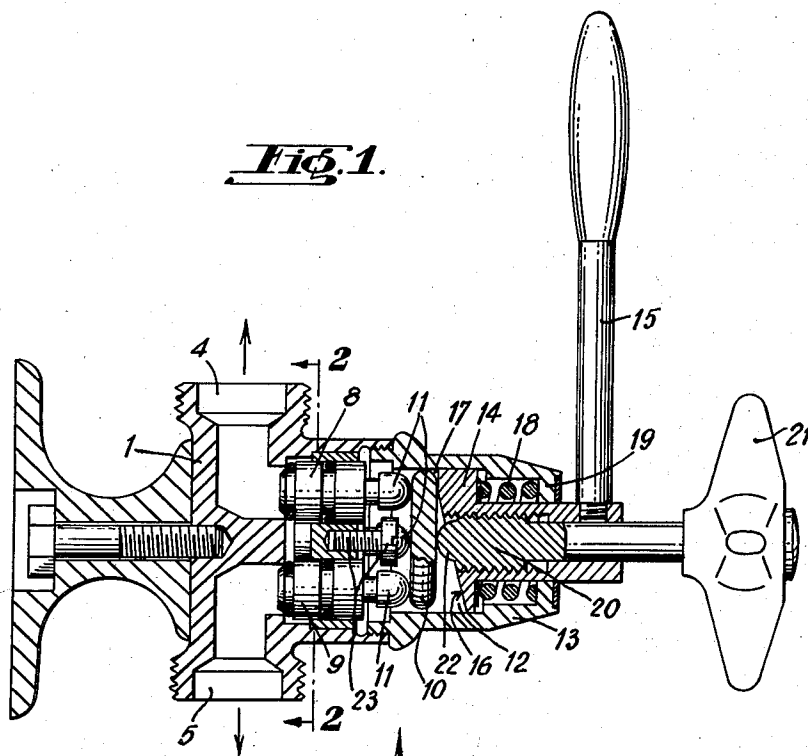
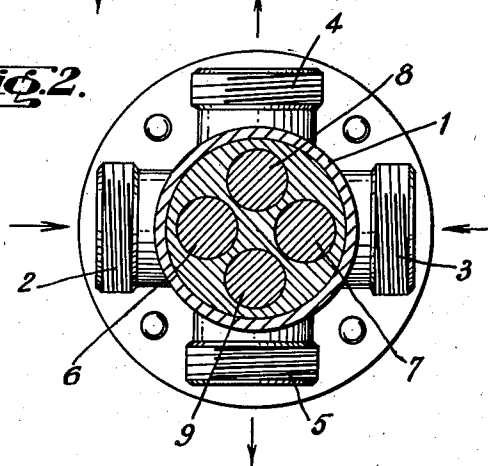


Fig. 2.



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Fig. 3.

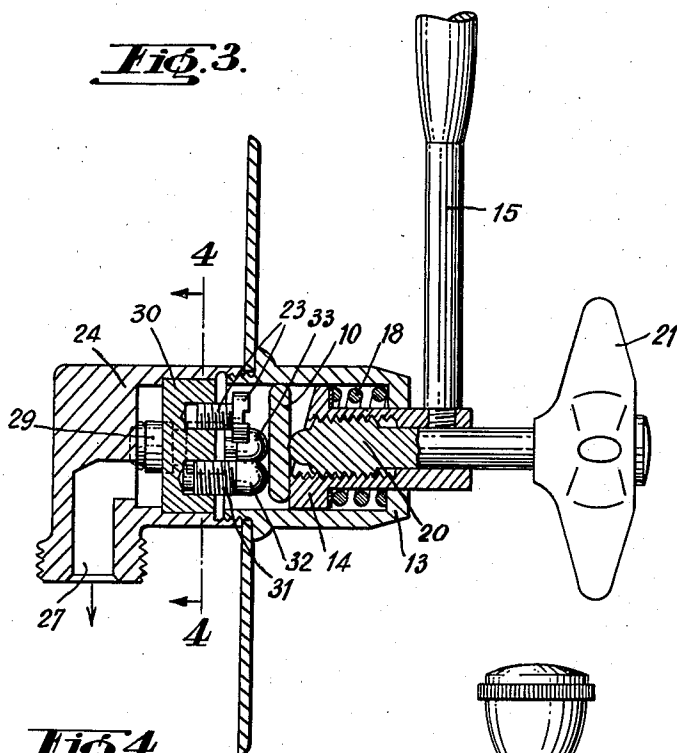


Fig. 4.

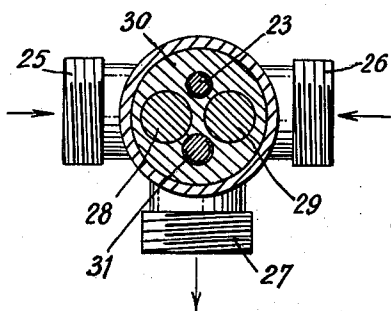
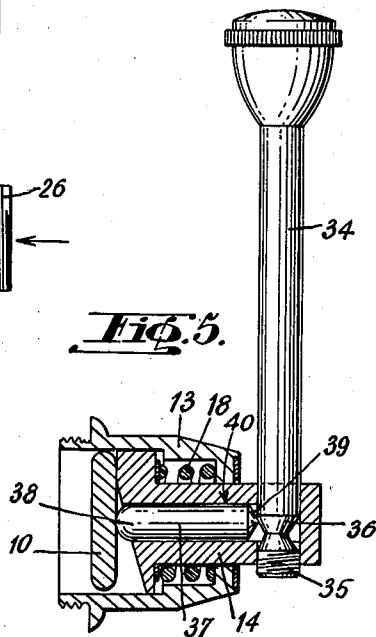


Fig. 5.



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Fig. 6.

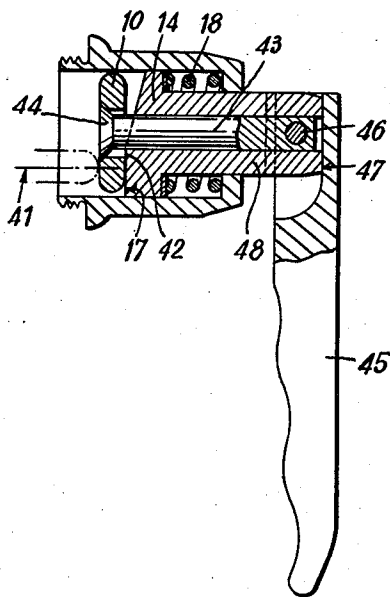


Fig. 7.

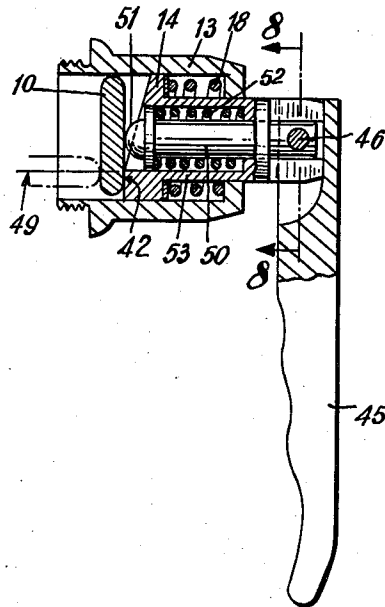
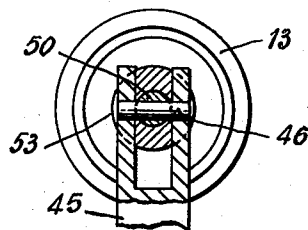


Fig. 8.



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MIXING VALVES

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Application September 16, 1957, Serial No. 684,120

Claims priority, application Switzerland
September 25, 1956

5 Claims. (Cl. 137—635)

This invention relates to mixing valves. An object of the present invention is to provide an improved mixing valve, of the type provided with at least two inlets and at least one outlet and comprising, in addition, valve members which are mobile in parallel directions and selectively control the inlets, in order to regulate the mixture and the delivery independently from one another.

A mixing valve provided in accordance with the invention is characterized in that it comprises an oscillating plate which is permanently in contact with all the valve members; a first control member, which is rotatable, is operated by hand and cooperates with this plate to form a hinge for the oscillation of the said plate, which hinge rotates with the first control member; and a second control member which is axially mobile in a direction which is parallel to the axes of the valve members, this second control member acting on the oscillating plate in order to adjust its inclination around the said hinge, and therefore the position of the valve members.

The accompanying drawing illustrates, by way of examples, five embodiments of the invention.

Fig. 1 is an axial cross-sectional view of the first embodiment.

Fig. 2 is a transversal cross-sectional view along line 2—2 in Fig. 1.

Fig. 3 is an axial cross-section of the second embodiment.

Fig. 4 is a transversal cross-sectional view along line 4—4 in Fig. 3.

Figs. 5, 6, and 7 each illustrate axial cross-sections of three other embodiments.

Fig. 8 is a transversal cross-sectional view along line 8—8 in Fig. 7.

The mixing valve illustrated in Figs. 1 and 2 comprises a body 1, provided with two inlets 2, 3, respectively for hot water and for cold water, and two outlets 4, 5, leading for instance to the bath tub inlet (bath) and to the shower. This valve comprises four valve members 6, 7, 8, 9 which are mobile along parallel directions and each control one of the inlets or one of the outlets. The valve members 6, 7, 8, and 9 respectively correspond to elements 2, 3, 4, 5. The valve members are provided, as will be seen in the following, to control independently from one another the mixing of the fluids arriving at 2 and 3 and the flowing off of this mixture through 4 or 5. The valve also comprises an oscillating plate 10 which is permanently in contact with the four valve members, or more precisely with the hemispherical head 11 with which each one of them is provided at one extremity.

This plate is disposed within a chamber 12, which is limited on the exterior by a cap 13 screwed on the body 1. Inside this cap 13 is also disposed a first control member 14, secured to a handle 15 enabling it to be rotated about the axis of the valve. The face of the member 14 which is turned towards the plate 10 is plane and inclined, as may be seen in the form of face 16. A segment 17, which is situated in a plane which is perpendicular to the axis of rotation of the member 14, is provided on the edge of this face 16. A compression spring 18, resting against the bottom 19 of the cap 13, acts on the member 14 and tends to apply it constantly against the heads 11 of the valve members.

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The mixing valve also comprises a second control member 20, axially screwed inside the member 14 and secured to a cross-shaped handle 21, enabling actuation of the second control by hand. The extremity of the member 20 which is opposite to the cross-shaped handle 21 is situated inside the chamber 12, and as may be seen in the drawing in the form of face 22 is hemispherical. This extremity is always in contact with the oscillating plate 10, because the water pressure constantly pushes the valve members towards the right in Fig. 1, and consequently obliges the plate 10 to occupy a position for which it is clamped on the one hand between the four heads 11 and, on the other hand, between the edge separating the surfaces 16 and 17 and the extremity 22 of the member 20.

The operation of the illustrated mixing valve is as follows:

Supposing the components are in the position shown in the drawing: If the handle 15 is turned by hand, the surface 17 is moved around the axis of the valve. If the cross-shaped handle 21 is turned, the extremity 22 of the member 20 moves forward or rearward, which causes the plate 10 to oscillate around the edge formed by the intersection of the surfaces 16 and 17. This intersection thus forms a hinge or pivot for the oscillation of the said plate, and this hinge can turn round the axis of the valve when the handle 15 is actuated. When the hinge is situated in the upper half of Fig. 1, i.e., when the handle 15 is situated above the axis of the valve in this same figure, the valve member is held in the closed position by the plate 10 under the action of the spring 18 whatever the position of the second control member 20 may be. When the handle 15, and consequently the aforementioned hinge are in the lower half of Fig. 1, it is the valve member 9 which is held in the closed position for any position of the second control member 20. According to the angular position of the handle 15 and consequently of the hinge in question, the valve members 6 and 7 are each situated in a well defined position for each position of the second control member 20. By adjusting the inclination of the handle 15, the proportion in which the fluids arriving via 2 and 3 are admitted inside the valve in order to reach one of the outlets 4, 5 is adjusted. In other words, the angular position of the handle 15 determines the proportions of the mixture of the two fluids. For any given position of this handle 15, the actuation of the cross-shaped handle 21 enables the delivery to be adjusted whilst retaining the proportions of the mixture determined by the position of the handle 15. The described construction thus allows the mixture and the delivery or volume to be adjusted independently from one another in a very simple manner, whilst causing the mixture to run out at will through 4 or 5. A screw 23 is also provided inside the chamber 12 and is screwed into a part secured to the body 1. The head of this screw serves to limit the travel of the valve members towards the right, that is to retain them in position according to the fluid pressure acting on them when the valve is opened and the cap 13 is removed.

In the embodiment according to Figs. 3 and 4, the body of the valve is visible at 24. It is provided with two inlets 25, 26 and with a single outlet 27; there are only two valve members 28, 29 respectively controlling inlets 25, 26. The valve members are parallel to one another and move axially in holes provided in a part 30 secured to the body 24. A stop 31 is fixed to the part 30. It is provided with a hemispherical head 32, the shape of which is identical with that of the hemispherical heads 33 of the two valve members 28, 29. It merely serves, as will be seen further on, to furnish a third fulcrum for the oscillating plate 10, which plays a role

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identical to that of the plate 10 of the first embodiment. The other two fulcrums are furnished by the hemispherical heads of the two valve members 28, 29. The angular position and the inclination of the plate 10 are controlled, as in the first embodiment, on the one hand by a first control member 14, and on the other hand by a second control member 20, respectively actuated by a handle 15 and by a cross-shaped handle 21. A screw 23 serves, as in the first embodiment, to limit the opening travel of the valve members and to retain them in place when the cap 13 is removed. The operation of this second embodiment is substantially similar to that of the first.

The only difference is that the useful travel of the handle 15 is limited to the upper half-circle in the drawing, since there is only one outlet 27. As in the first case the position of the handle 15 determines the proportions of the mixture of the fluids arriving via inlets 25 and 26, and the delivery of this mixture is regulated by acting on the cross-shaped handle 21.

The variant according to Fig. 5 solely concerns the way in which the two control members acting on the plate 10 are actuated. Instead of having a handle 15 and a cross-shaped handle 21 which are distinct, there is in this case a single handle 34, provided with a screw thread 35. This handle is provided with a groove 36 formed by two truncated conical surfaces, as may be seen in the drawing. The screw thread 35 cooperates with a tapped hole of the control member 14. It is easy to see that when the handle is rotated round its own axis it is displaced axially owing to the screw thread 35. When it is rotated round the axis of the valve, the member 14 is rotated round this axis as in the preceding embodiments. An axial hole 40 is provided inside the member 14 and in this is placed a plunger 37 terminated by a hemispherical head 38 which plays the same role as the extremity 22 in Fig. 1. At its other extremity, the plunger 37 is provided with a conical surface 39, destined to cooperate with the sides of the groove 36. It is easy to see that by rotating the handle 34 round its axis it is caused to move axially, thus forcing the plunger 37 to move longitudinally. This is due to the fact that the plate 10 exerts a pressure on the head 38, owing to the thrust exerted on this plate by the valve members caused by the pressure of the fluids inside the valve. Thus, the single handle 34 allows the simultaneous adjustment of the proportions of the mixture by adjusting the angular position of this handle around the axis of the valve and of the delivery by rotating this handle on its own axis. This variant according to Fig. 5 can be applied to the first embodiment as well as to the second embodiment.

It must be understood that in the various preceding embodiments, the spring 18 must be strong enough to compensate the pressure acting on the valve members and tending to open them. In addition the axis of the hinge, that is the intersection of the surfaces 16 and 17, is tangent to a cylinder the radius of which must be at least equal to that of a cylinder containing the axes of the valve members 6, 7, 8, 9, or 28, 29. In the embodiments described, the rotation of the oscillating plate 10 is independent of the control members serving to adjust its inclination.

In the embodiment according to Fig. 6, the axis of the valve members (only one of which is visible in 41) is situated at a radius which is greater than that of the circle to which the oscillation hinge (visible in 42) is tangent. The water pressure acting on the valve members thrusts these against the plate 10, but in this construction, the oscillation of this plate can only take place if the spring 18 gives slightly. Now this spring must be strong enough to resist the thrust of the valve members constantly. In this case it is therefore not enough to have a control rod terminating in a head 22 (Fig. 1) or 38 (Fig. 5) resting against the plate 10. The control rod 43 is terminated by a conical head due to which, when the handle 45 is actuated, the rod 43 forces the

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plates 10 to oscillate on the hinge 17, thus forcing the spring 18 to give the amount which is necessary for the oscillation to be effected.

The handle 45 pivots on pin 46 on the rod 43. The opening is effected when the handle, being inclined in one direction or the other (from the closed position shown in Fig. 6) and using the extremity 47 of a cylindrical part 48 secured to the first control member 14 as a fulcrum, forces the rod 43 to move towards the right in the drawing for an amount depending on the inclination of this handle.

In Fig. 7, the axis of the valve members one of which is visible in 49 is at a radius equal (it could be less) to that of the cylinder to which the oscillation hinge 42 is tangent. The control rod 50 is terminated by a hemispherical head 51 in contact with the oscillating plate 10. A compression spring 52 mounted inside the cylindrical part 53 secured to part 14 causes the head 51 to be thrust constantly against the plate 10. The handle 45 acts on the control rod in the same manner as in Fig. 6, but here it is the thrust of the valve members which produces the oscillation of the plate 10 when the rod 50 is moved towards the right.

In the case of the Figs. 6 and 7, when the handle 45 is rotated around the axis of the rod 43 or 50, the proportions of the mixture are adjusted, as in the preceding embodiments. These two last embodiments close automatically as soon as one ceases to act on the handle 45.

A mixing valve provided with three inlets could be obtained by modifying the construction according to Figs. 1 and 2 in the following manner: The valve member 9 would be omitted. The interior of the mixer would thus be in constant communication with the outlet 5. The valve members 6, 7, and 8, instead of being spaced 90° apart, would be spaced 120° apart. At 2 one would have for instance a hot water inlet, at 4 an inlet for water at a normal temperature, and at 3 an inlet for iced water. It would thus be possible to obtain all the mixtures possible ranging from the maximum temperature corresponding to opening the hot water only, to the minimum corresponding to opening the iced water only. In this case there would be evidently only one outlet at 5.

What I claim is:

1. A fluid mixing valve comprising a body provided with at least two inlets and at least one outlet, valve members on said body and mobile in parallel directions selectively to control at least the inlets to regulate the fluid mixture and the volume thereof independently from one another, an oscillating plate, means urging the plate into contact with all of the valve members, a first control member which is rotatable and adapted to be operated by hand and which defines a hinge for the oscillation of said plate, and a second control member axially mobile in a direction which is parallel to the axes of the valve members, said second control member acting on the oscillating plate to adjust its inclination around said hinge, and therefore the position of the valve members.

2. A valve according to claim 1 wherein said means comprising a spring applying a force to the plate at the hinge with a force which is sufficient to compensate for the pressure of the fluid on the valve members which tends to open them.

3. A valve according to claim 1 wherein the hinge defines an axis tangent to an imaginary cylinder the radius of which is at least equal to that of a concentric imaginary cylinder containing axes defined by the valve members.

4. A valve according to claim 1, wherein the oscillating plate is rotationally independent of the control members.

5. A valve according to claim 1 further comprising a stop member on the body limiting the opening travel of the valve members, the position of this member being itself adjustable to a position corresponding to the closed position of the valve members.

No references cited.