May 15, 1962 J. J. FILLIUNG 3,034,138

MIXING VALVES

Filed Nov. 14, 1960 2 Sheets-Sheet 1

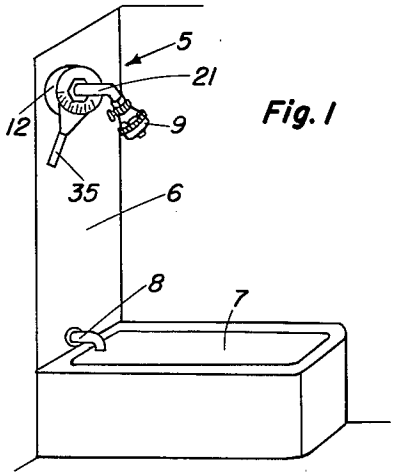

Fig. 1

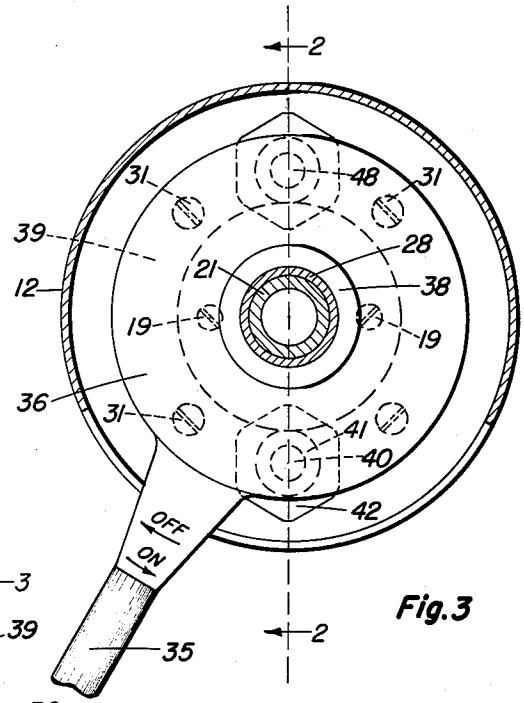

Fig. 3

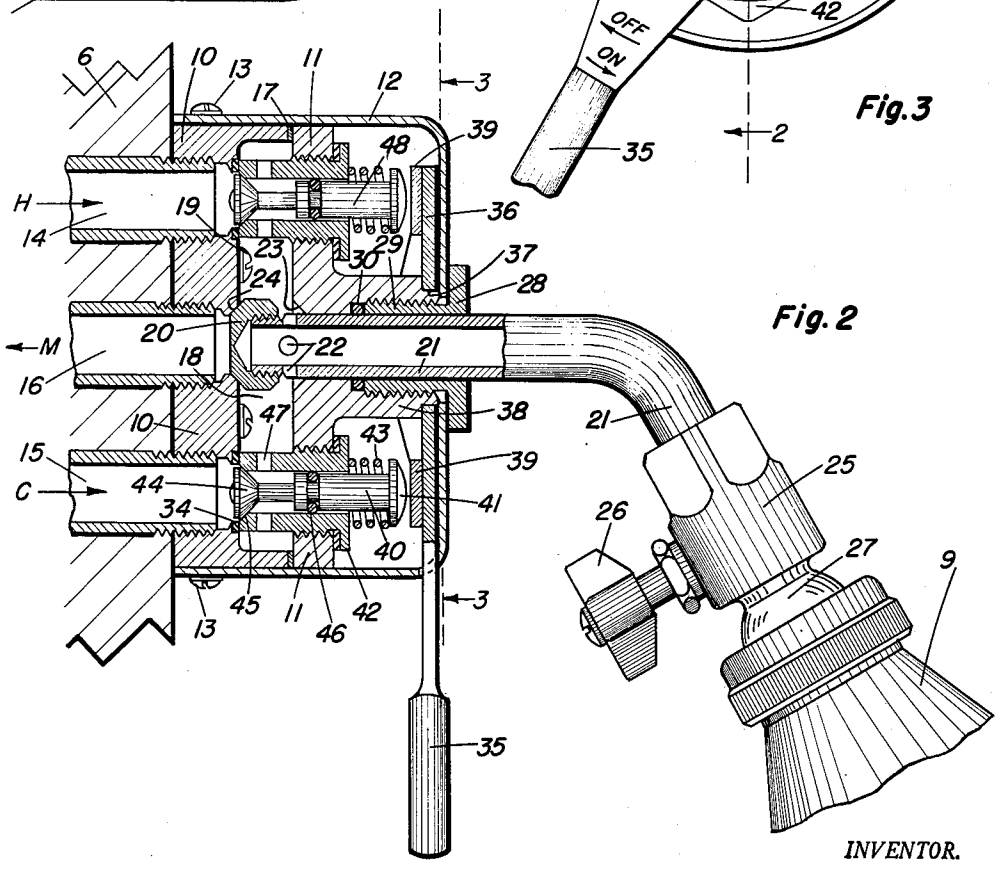

Fig. 2

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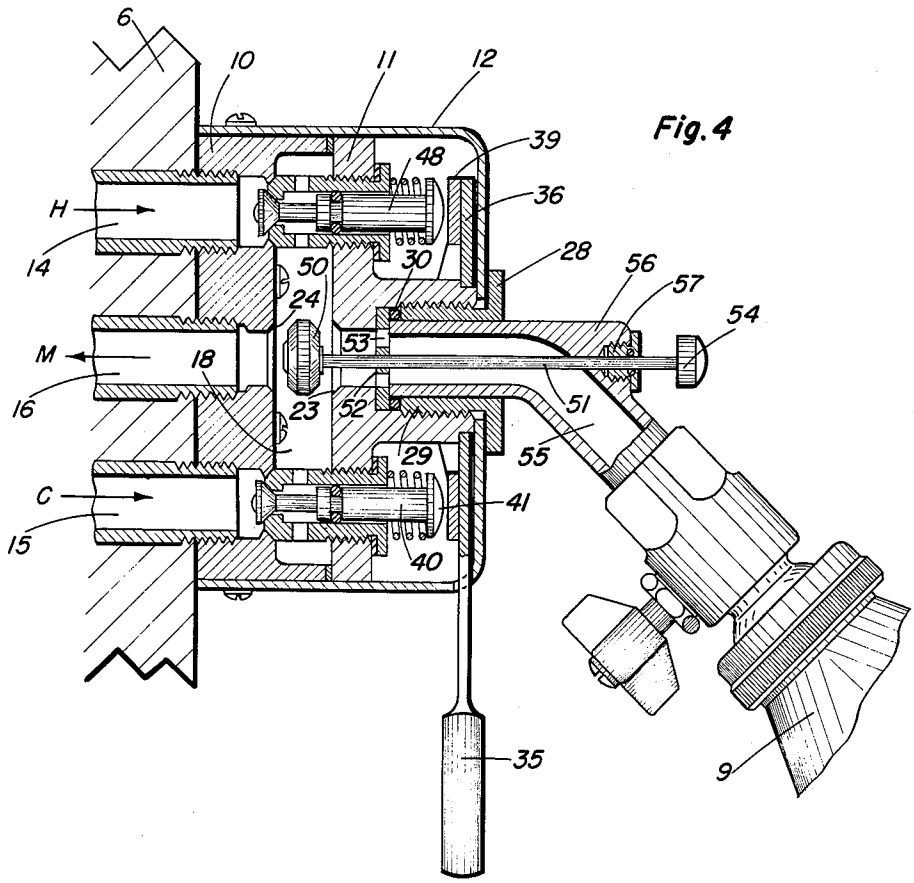
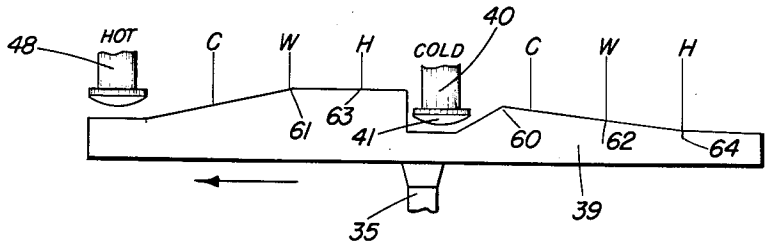


Fig. 4

Fig. 5



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MIXING VALVES

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This invention relates in general to mixing valves, but more particularly to mixing valves for delivering tempered water to bath tubs or showers, and the principal object of the invention is to design a new and improved mixing valve which together with the shower head, is located at a single position up on the bathroom wall.

Another object is to devise a new and improved mixing valve adapted to be located at a higher position above a bath tube than that in which mixing valves are customarily installed, so that children cannot reach it.

A further object is to provide a new and improved mixing valve located at an elevated position above a bath tub in which a shower head is supported and mounted directly upon the mixing valve itself.

Another object of the invention is to design a new and improved mixing valve in which it is easier for a user to reach the operating controls and to test the water temperature without first getting wet.

An additional object is to provide a novel mixing valve having a diverter valve incorporated therein in which the diverter valve is controlled by a direct movement of the shower head supporting arm.

Another object of the invention is to provide a new and improved water mixing valve combined with a shower head in which all of the controls are located at one easy accessible position, so that adjustments can be readily made by a user without stooping, getting wet or scalded by hot water, and which are out of the reach of children as well.

Another object is to devise a new and novel mixing valve and shower head combined in a single unitary structure, so that all of the controls and adjustments are conveniently located at one place above a bath tub; said controls including the temperature adjusting lever, the diverter valve for switching between the shower head and tub spout, the ball joint on the shower head for directing the shower stream, and the throttle on the shower head for regulating the rate of flow emitted.

A further object is to provide a combined mixing valve and shower head in which piping and labor is saved, installation simplified, and repairs readily made.

It is common practice in bathrooms to install a shower head above the bath tub so that the user has the option of either filling the tub with water from the tub spout or using the shower head for bathing. It is also customary to provide a diverter valve associated with the hot and cold mixing valve to shift the tempered water to either the tub spout or the shower head. The separate hot and cold supply valves or the integral mixing valve in such cases, are always mounted on the bathroom wall directly above the location of the tub spout. In practice, the foregoing customary arrangement presents a number of disadvantages. For instance, children can reach up and play with the mixing valve or hot water valve and thereby injure or scald themselves and also could cause flooding of the tub with consequent damage in the bathroom. A person wishing to take a shower must stoop low over the tub to adjust the valves for the desired tempered water and thus may get wet before he steps into the tub; the diverter valve may or may not have been operated to the proper position at the time. The shower head, the mixing valve, and the diverter are each located at a different position on the wall above the bath tub, necessitating additional installation labor, and material such as elbows, pipes and nipples, thereby increasing the installation costs.

The foregoing objections and disadvantages of the conventional bath tub and shower installations have been eliminated by the present invention in which the shower head, mixing valve, and diverter are all assembled in a single unitary structure and located at an elevated position above the bath tub, that position preferably being the one occupied by the shower head itself in the regular installation or just above the average person's head. In this elevated position, children cannot reach the controls, it is much easier for a person to stand erect to adjust the desired temperature of the water with one hand while testing the same at the shower head with the other hand. All of the controls are located at one common central point easily accessible to a user. Installation costs are reduced and the bathroom wall is not cluttered up with a number of different handles and valves involving numerous elbows, piping and nipples behind the wall. A further advantage is that the tempered water selected at the mixing valve is immediately discharged from the shower head since it is mounted directly upon it.

With the foregoing and other objects in view, the invention consists in certain novel features of construction, operation and arrangement of the parts which will be hereinafter more fully described, claimed and illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of the combined mixing valve and shower head located above a bath tub;

FIG. 2 is a full size cross-sectional view of the device of the invention, taken along the line 2—2 of FIG. 3;

FIG. 3 is a front view taken along the line 3—3 of FIG. 2;

FIG. 4 is a view similar to FIG. 2 showing a modified form of a diverter valve; while

FIG. 5 is a development of a cam surface on the temperature adjusting lever to more clearly illustrate the operation thereof.

Referring now more specifically to the drawings, FIG. 1, the arrangement of the present invention, includes a manual mixing valve indicated at **5** mounted on the bathroom wall **6** above the bath tub **7** and a water spout **8** projecting from the wall above the bath tub. A shower head **9** is mounted directly upon the mixing valve **5** and projects outwardly from the center of the valve as shown. The combined mixing valve **5** and shower head **9** are mounted as a unit and are located high above the bath tub **7**, at the elevation that the shower head alone is usually mounted. The mixing valve has a brass casing formed of two parts **10** and **11** secured together by screws **31** (see FIG. 3), and enclosed by a cover or shell **12**. The screws **13** on the outside of the cover **12** fasten the cover to the body **10**. The body **10** is provided with three threaded openings at the rear side into which the hot and cold water supply pipes **14** and **15** are threaded, together with the mixed water outlet pipe **16** which is arranged between the other two pipes. Although the mixing valve is shown as surface mounted on wall **6**, it is readily understood that the body or casing **5** may be entirely recessed or concealed in the wall with the piping attached to the valve from the rear side, or if necessary, from the sides of the casing.

Between the two casing parts **10** and **11** of the mixing valve there is a sealing gasket **17** to seal off the water mixing chamber **18** formed between the two parts. The screws **19** in the bottom of mixing chamber **18** serve to support the bottom casing part **10** directly upon the wall **6** in addition to the support provided by the piping **14**, **15** and **16**. A diverter valve member **20** is arranged within mixing chamber **18** and is attached to the end of the shower head pipe or arm **21** by being threaded thereon. The end of arm **21** has a series of water passages **22** there-

in adjacent the diverter valve member 20. Diverter valve 20 is adapted to be seated upon either valve seat 23 or valve seat 24 located opposite one another in the mixing chamber 18. With the diverter valve 20 seated upon seat 24 as shown, water from mixing chamber 18 can flow through passages 22 into the shower head pipe 21. With diverter 20 closed upon valve seat 23, the water flow from the mixing chamber 18 to the shower head pipe 21 is shut off, and water flow is then permitted to take place from the mixing chamber 18 outward into tub spout pipe 16. The valve seats 23 and 24 may have rubber seating surfaces instead of metal as is well understood.

The shower head 9 is supported by a coupling member 25 attached to the end of arm 21 and is equipped with a throttle valve 26 for regulating the rate of water flow emitted by the shower head 9, and a ball joint connection 27 for directing the shower head 9 in any desired direction. The shower head 9 with its pipe or arm 21 is adapted to be grasped by a user and pushed inward or pulled outward to shift the diverter valve 20 to the desired position depending upon whether the user wishes to take a shower or a tub bath. The shower arm 21 is longitudinally slidable within casing 11 and is guided in place by a nut 28 having a threaded shank 29 extending into the casing. An O-ring seal 30 held in place by shank 29 seals the shower arm 21 and casing 11 from leakage outward from the mixing chamber 18.

A temperature adjusting arm and handle 35 extends downwardly from the mixing valve through a slot in the cover 12 and is adapted to be shifted in a short rotary movement about the axis of the shower arm from an "off" position to a "hot" position with intermediate temperature ranges between these two extreme positions. Suitable indicia (not shown) on the cover 12 and the adjusting arm 35 may be provided to help the user select the desired temperature condition. Adjusting arm 35 is formed with and extends outwardly from a supporting and bearing plate 36 of circular shape and rotates at its inner edge 37 in a groove formed in the projecting center portion 38 of casing 11. Any movement of adjusting arm 35 will cause a corresponding rotation of supporting plate 36 about the axis of the shower arm 21 and part 38. Suitably secured to the supporting plate 36 adjacent its outer portion is a circular cam surface 39, the contour of which is more clearly illustrated diagrammatically in FIG. 5, to be further explained hereafter. Bushing 28 holds all the foregoing parts in assembled relationship on the center portion 38 of casing 11 as shown.

The cold water valve member 40 and the hot water valve member 48 are of identical construction and therefore only one will be described in detail. Valve member 40 has a nose or operating head portion 41 which is normally slightly spaced from and is adapted to be contacted by the cam surface 39 and thereby be forced inward. The valve member 40 has its stem portion guided in the bushing 42 which is threaded into casing 11. A restoring spring 43 around the stem of valve member 40 and between bushing 42 and head 41 holds the valve closed upon its seat assisted by the water pressure in the supply pipe lines. The opposite end of the stem of valve 40 is provided with a valve member or head 44 normally seated upon valve seat 45 formed in the bottom end of bushing 42. The opening of the valve member 44 from its seat 45 admits cold water from pipe 15 into bushing 42 and then through passages 47 around bushing 42, into the mixing chamber 18. An O-ring 46 around the stem of valve member 40 prevents leakage outward through the valve stem. The valve member 44 may be made of rubber and arranged to be renewable. A seal 34 is preferably placed between the bottom of bushing 42 and casing 10 adjacent the valve member 44, to seal off the mixing chamber 18 from the inlet supply pipes 14 and 15. Check valves may be inserted in the hot and cold water pipes if desired to prevent cross flow as is customarily done.

Referring now to FIG. 5 which indicates diagrammatically the development or contour surface of cam member 39, rotated by adjusting lever 35, the cold valve member 40 and the hot valve member 48 are normally held closed against their seats 45 by spring 43 but there is a slight gap normally between the head 41 and the cam surface 39. When the adjusting handle 35 is therefor rotated, the cam surface 39 is so arranged that the cold water valve 40 will be relatively quickly opened until the point 60 is reached in which position of the handle the cold water flows at its maximum. The cold water is preferably first admitted to the mixing chamber 18 before any hot water is, as is customarily done. During this movement the hot water valve 48 is gradually opened until the point 61 is reached on the cam 39 which is the maximum opening position of valve 48 for the hot water. When point 61 is reached by the cam and hot water valve 48, the cold water valve 40 will have engaged point 62, gradually closing off and thereby tempering the hot water flow a certain amount. When the respective valves and cam reach points 63 and 64, the cold water valve 40 will be completely closed while the hot water valve 48 will be wide open. It will therefore be seen that by the selective position of the handle 35, mixed water of any temperature desired may be secured between the two extreme positions of hot and cold water valves. The hot and cold waters enter the mixing chamber 18 from their respective supply pipes 14 and 15 and openings 47 where they are thoroughly mixed to the selected temperatures, and then pass outward to either the pipe 16 and the tub spout 8, or into shower arm 21 into the shower head 9, depending upon the position of the diverter valve 20.

From the foregoing arrangement and construction, it will be clear that all of the controls and devices necessary for taking a bath or shower are located at one place in the bathroom wall and all are readily accessible to a user. If a bath is desired, the shower arm 21 is grasped and simply pulled outward and the temperature selecting lever 35 is moved to the desired tempered water position. If a shower bath is desired, the shower arm is first pushed inward and the lever 35 then rotated to the temperature of water selected by the used. By operating the lever 35 with one hand and testing for the wanted temperature of water with the other hand under the shower head 9, the user does not have to stoop down or get his head or body wet. The shower head throttle 26 can also be easily manipulated at the same location to give the rate of flow desired, while the ball-joint 27 enables the shower head 9 to be pointed in the direction desired by the bather. All controls being located at the elevation of the shower head, children cannot ordinarily reach them and become endangered by scalding.

In addition to the foregoing advantages, fewer piping connections are required and the bathroom wall has less devices mounted upon it. Repairs are easily made from the front of the mixing valve by first removing the cover 12, the bushing 28, and the shower head 9. The valve bushings 42 can then be screwed out of mounting plate 11 and the valve seats can be renewed or repaired if necessary. It will be noted that the valve members such as 44 are closed, with the supply line pressure upon the valve seat 45, thereby assisting the spring 43 in the closing movement of the valve.

Since the shower head is located directly upon the mixing valve, any change in the water temperature is immediately manifested as it is discharged from the shower head. There is no long delay for the water to flow as formerly from the mixing valve located low down on the wall up to the shower head high above the same. This is a distinct advantage.

In the modification shown in FIG. 4, the diverter valve has been arranged as a separate control from the shower head arm shown in FIG. 2. The diverter valve member

50 in mixing chamber 18 is adapted to close or open upon its valve seats 23 and 24 to divert the mixed temperature water into either the pipe 16 leading to the tub spout 8 or into the shower arm leading into the shower head 9. An operating rod 51 is attached at one end to the diverter valve member 50 and is guided by a washer 52 having water passages 53 therein. The other end of rod 51 has a knob 54 attached thereto for manipuating the diverter valve 50, and the shower arm 55 has an enlarged portion 56 for accommodating the leakproof bushing 57 and for guiding the stem 51 at that end. The remaining parts and operation of the mixing valve are similar to those disclosed in FIG. 2.

While the invention has been illustrated and described in its preferred form and a modification thereof, it will be understood that it may be capable of other modifications to those skilled in the art, and it is therefore desired not to limit the invention to the precise constructions shown, but only to the extent of the appended claims.

What is claimed is:

1. In a shower and bath tub arrangement, a mixing valve and a shower head, a common supporting casing for said mixing valve and said shower head, said casing being located at the same elevation that said shower head is located above said bath tub, said shower head supported axially from the front of said casing and said mixing valve, an adjusting lever for said mixing valve projecting from the side of said casing and movable concentrically of said shower head to effect an adjustment of said mixing valve, a diverter valve in said casing, a tub spout located above the rim of said bath tub and below said mixing valve casing and connected therewith, said diverter valve effective to selectively control water flow either to said shower head or said tub spout.

2. In a shower bath arrangement for a bath tub, the combination of a shower head and a mixing valve in which the shower head is supported directly from the center of the mixing valve and in which the mixing valve is located at an elevation above said bath tub at which the shower head is customarily arranged, a manual temperature adjusting lever extending laterally from said mixing valve and adjustable concentrically of said mixing valve and said shower head, and a diverter valve in said mixing valve for directing water flow selectively into said shower head or said bath tub.

3. In a shower bath arrangement, the combination of a shower head and a mixing valve mounted together on a wall, a common supporting casing for both said shower head and mixing valve, said shower head extending axially of said common supporting casing, a temperature adjusting handle for said mixing valve extending radially from said casing and operable about the axis of said shower head, and a diverter valve in said casing controlled by said shower head.

4. In a mixing valve for a bath tub and shower, a casing mounted on a wall surface, a mixing chamber inside said casing arranged between the front and rear surfaces of said casing, an axial outlet opening extending from the rear of said casing into said mixing chamber and a second axial outlet opening extending from the front of said casing into said mixing chamber, said casing having cold and hot inlet openings extending into said mixing chamber from the rear side thereof and concentric of said rear inlet opening, a hot and a cold valve member in said mixing chamber controlling water flow from said inlets to said outlets, a diverter valve in said mixing chamber for selectively directing water flow into either of said outlets, and an adjusting handle on said casing for controlling said hot and cold valves.

5. In a mixing valve for controlling the temperature of the water leading to an outlet in the mixing valve, a shower head supported on said mixing valve, and means controlled by said shower head for selectively diverting the mixed water from said mixing valve into said outlet or into said shower head.

6. The combination of a mixing valve and a shower head, said shower head being supported directly upon said mixing valve, a temperature adjusting lever for said mixing valve, said mixing valve having a hot water and a cold water inlet and two outlets, one leading into said shower head, a diverter valve in said mixing valve for opening or closing either of said two outlets, and means directly operated by said shower head for controlling said diverter valve.

7. In a mixing valve having a water mixing chamber therein with an outlet leading to a tub spout and another outlet leading to a shower head, said shower head being supported directly upon said mixing valve, a diverter valve in said mixing valve controlling the passage of water from said mixing chamber into either said tub spout or said shower head, and connecting means between said diverter valve and said shower head whereby said shower head controls the operation of said diverter valve.

8. In a mixing valve, a casing having a hot water inlet valve and a cold water inlet therein, said casing also having a water mixing chamber with a tub spout outlet and a shower head outlet leading therefrom, a temperature adjusting lever projecting from said casing and controlling the water flow from said inlets to said mixing chamber, a diverter valve in said mixing chamber controlling the water flow from said mixing chamber to either said tub spout outlet or said shower head outlet, a shower head supporting arm mounted on said casing and connected on one end to said diverter valve, and a shower head mounted on the other end of said supporting arm.

9. In a mixing valve, a casing having hot and cold water inlets leading into a mixing chamber, said mixing chamber having a tub spout outlet and a shower head outlet, a temperature lever for controlling water flow from said inlets into said mixing chamber, a diverter valve in said mixing chamber for controlling water flow from said mixing chamber into either said tub spout outlet or said shower head outlet, a supporting tube on said casing extending through said shower head outlet and into said mixing chamber, said diverter valve being supported in one end of said supporting tube, and a shower head supported on the other end of said supporting tube, said supporting tube adapted to be manually shifted inward or outward from said casing to close or open said diverter valve on either of said outlets.

10. In a shower bath arrangement, a mixing valve arranged on a wall at an elevation at which a shower head is usually located, a shower head supported directly upon said mixing valve and projecting axially therefrom, a mixing chamber in said mixing valve, a hot and a cold water inlet connection extending into said mixing chamber from the rear of said mixing valve, an outlet connection extending from the rear of said mixing chamber, a second outlet connection extending from the front of said mixing chamber and leading into said shower head, a diverting valve in said casing for selectively directing water flow from said mixing chamber into either of said outlet connections, a hot and a cold water control valve in said mixing chamber for controlling water flow from said inlets into said mixing chamber, and an adjusting lever extending radially of said mixing valve and shower head for controlling said hot and cold water valves.

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