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SWING SPOUT COMBINATION FAUCET

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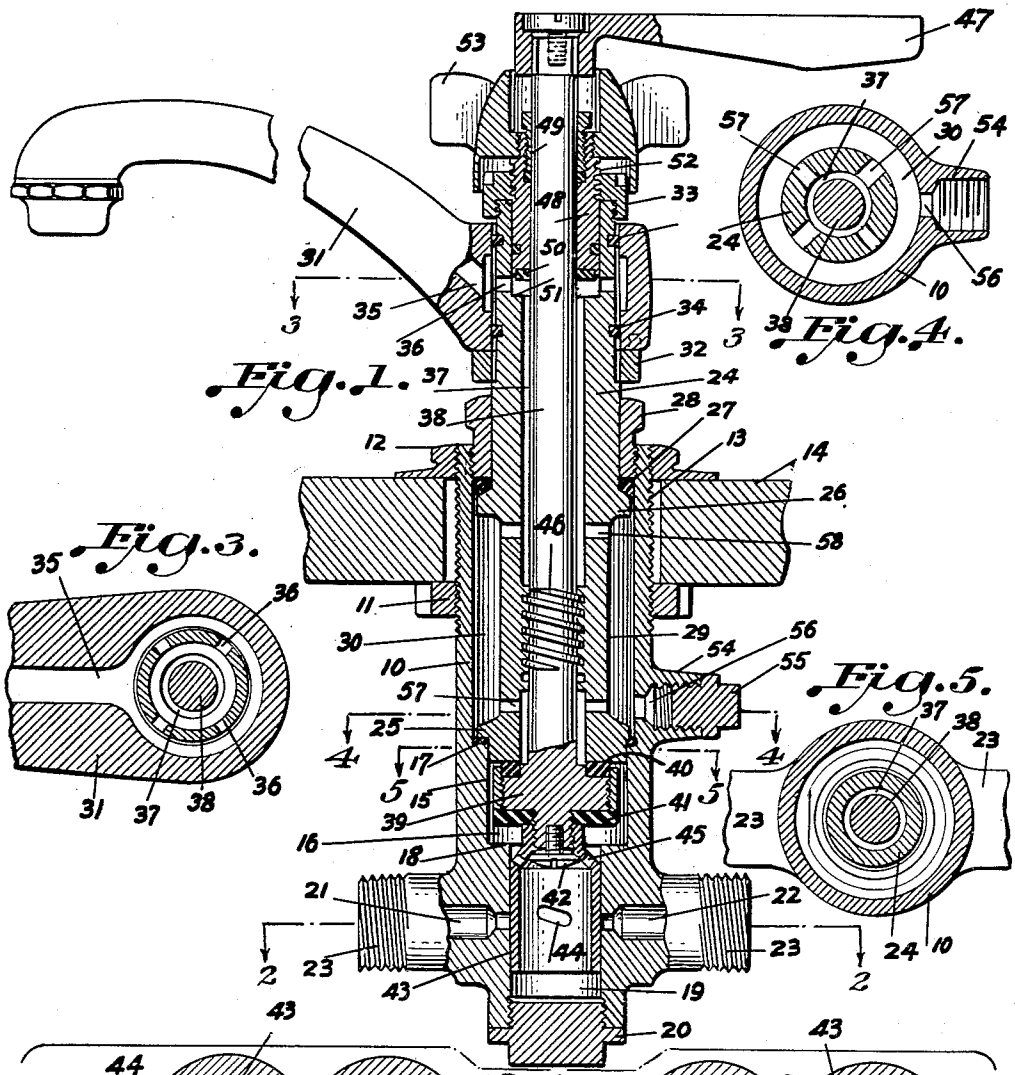


Fig. 1.



Fig. 3.



Fig. 4.



Fig. 5.

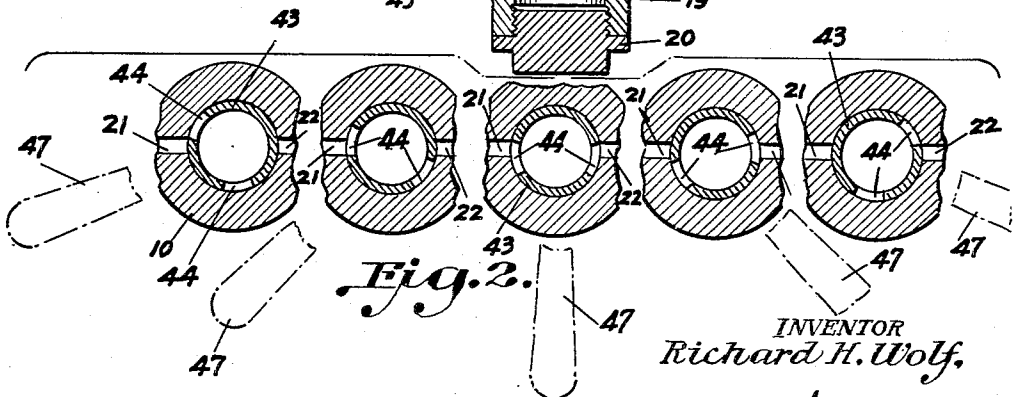


Fig. 2.

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# SWING SPOUT COMBINATION FAUCET

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9 Claims. (Cl. 137—625.41)

This invention is a swing spout combination faucet adapted primarily to be used in connection with hot and cold water lines providing means of novel construction in a single fixture to enable hot or cold water to pass therefrom or a desired mixture of waters of different temperatures to be drawn from the single fixture.

A further object of the invention is to provide a valve embodying a unitary structure provided with simple easily operated means whereby the temperature of liquid issuing from the spout may easily and accurately be determined.

A further object of the invention is to provide a valve structure of the character mentioned equipped with additional means whereby a spray head may be easily attached thereto and readily operated to discharge liquid at the desired temperature.

A still further object of the invention is to provide a valve structure capable of being easily and minutely operated to determine the temperature of the liquid within the valve as well as the pressure of flow, with additional means to determine the rate of flow or pressure in the discharge spout.

A still further object of the invention is to provide a valve structure embodying means whereby the rate of flow as well as the temperature of the mixture within the valve may be regulated and set, with additional means to determine the rate or pressure of flow from the spout at the temperature already determined by the initial regulating means.

A still further and particular object of the invention is to provide a unitary valve of the character generally set forth which is of extremely simple construction, which involves but few simple and readily assembled parts, which has its several parts so constructed and arranged as to insure proper operation at all times, and to minimize the opportunity for wear, breakage or derangement, which is positive in all of its several actions, and which will prove highly effective and efficient in practice.

With the foregoing objects in view, together with others which will appear as the description proceeds, the invention resides in the novel construction, combination and arrangement of parts, all as will be described more fully hereinafter, illustrated in the drawing, and particularly pointed out in the claims.

In the drawing:

Fig. 1 is a longitudinal sectional view taken through a swing spout combination faucet construction and arranged in accordance with the invention, the parts being in the position they will assume when the valve is entirely closed,

Fig. 2 is a transverse sectional view taken substantially upon line 2—2 of Fig. 1 and showing the various positions assumed by the measuring bell or cylinder in determining the rate of flow of liquid to the interior of the valve as well as the proportions of hot and cold water admitted to the inlet chamber,

Fig. 3 is a fragmentary transverse sectional view taken substantially upon line 3—3 of Fig. 1,



Fig. 4 is a similar view taken upon line 4—4 of Fig. 1, and

Fig. 5 is a similar view taken upon line 5—5 of Fig. 1.

The faucet of my invention may be used in connection with wash stands or other bathroom fixtures as well as with basins, kitchen sinks or other apparatus, with or without a spray head connection.

In carrying out the invention, I provide an elongated housing of substantially hollow cylindrical form indicated at 10, the outer surface of which is provided with threads as shown to accommodate lower and upper clamping nuts 11 and 12, whereby the housing may be rigidly secured within an opening 13 in a wash basin or wash stand portion indicated at 14. This housing is of tubular formation, the inner wall of which is of reduced diameter as at 15 to provide a concentric mixing chamber 16 with an abrupt shoulder 17 at its upper end where it joins or communicates with the interior of the housing portion 10. The mixing chamber 16 is defined at its lower end by an annular shoulder 18 which provides a valve seat determining the upper end of a liquid supply inlet chamber 19 concentric with the housing and of less diameter than the mixing chamber 16. The lower end of the inlet chamber is closed by the screw plug 20. The inlet chamber communicates with hot and cold ports 21—22 within the nipples 23 projecting laterally in diametrically opposite directions from the lower end of the housing. It will be understood that these nipples will be connected to the hot and cold water pipes of the water system. Arranged concentrically within the housing thus defined is an inner housing, core or sleeve indicated generally at 24. This sleeve has its lower portion of substantially the same external diameter as the internal diameter of the mixing chamber 16, and is provided adjacent to its lower end with an outwardly extending flange 25 to seat upon a gasket resting upon the shoulder 17 within the housing 10. The sleeve 24 is also provided with a second annular flange 26 spaced from the flange 25 and which constitutes a seat for the reception of a gasket 27 to be engaged by the annular packing gland or nut indicated at 28 having external threads as shown to engage with similar threads upon the interior of the housing 10 at the upper end thereof. The exterior diameter of the core or sleeve 24 is substantially reduced between the flanges 25 and 26 as indicated at 29, whereby to provide an elongated water jacket 30 between the interior wall of the housing 10 and the exterior wall 29 of the sleeve 24.

The upper end of the sleeve or core 24 receives one end of the rotatable swing spout 31. This spout is of conventional form and is provided at its inner or attaching end with a circular opening to rotatably enclose the upper end of the sleeve 24, being maintained thereon between the spaced nuts 32 and 33 and is sealed against leakage by the spaced washers or gaskets indicated at 34. The opening 35 in the swing spout communicates with the interior of the core or sleeve 24 by spaced openings 36 radiating from the sleeve as shown.

Arranged concentrically within the longitudinal passage 37 in the sleeve or core 24 is a shaft 38 of smaller diameter than the internal diameter of the core, the said shaft having an enlarged circular head 39 on its lower end disposed within the mixing chamber 16. This head is of less diameter than the interior diameter of the mixing chamber, and has washers or gaskets 40 and 41 on its upper and lower ends to seat alternately, as the shaft 38 moves longitudinally, against the lower end of the core or sleeve 24 and the shoulder or valve seat 18 at the base of the mixing chamber 16 respectively. The extreme lower end of the shaft 38 has secured thereto as by the screw 42 the upper end of a bell cylinder 43 having its external surface snugly engaging the walls of

the inlet chamber **19**. The opposite sides of this cylinder are provided with openings **44** to communicate at predetermined times with the ports **21—22** constituting the hot and cold water inlets from the system, in a manner to be more fully described hereinafter. The upper or closed end of the bell cylinder **43** is provided with ports **45** which establish communication between the interior of the bell cylinder and the mixing chamber **16**.

Inwardly of its ends the shaft **38** is provided with a screw thread **46** to engage complementary threads upon the interior of the core or sleeve **24**, the pitch of these threads being such that limited rotary movement of the shaft will cause the latter to move the valve head **39** to either closed upper or lower positions or to intermediate open position within the mixing chamber **16**. This thread connection between the shaft and sleeve constitutes a liquid stop in the passage **37**.

The upper end of the shaft **38** has secured thereto the operating handle indicated at **47**. Rotatably mounted upon the shaft **38** near the upper end thereof is a valve member **48** attached thereto by the packing gland represented generally at **49**. This valve member snugly seats within the upper end of the core or sleeve **24** and has its lower end equipped with a gasket **50** to engage at predetermined times with a valve seat **51** formed in the inner walls of the core or sleeve **24** immediately below the laterally disposed ports **36** in the said sleeve or core. This valve member **48** has an external thread **52** which engages complementary threads in the gland member **33**, and the crown handle **53** encircling the shaft **38** is secured by threads, as shown, to the said valve member **48**. It is obvious from this construction that the valve member **48** is movable longitudinally upon the shaft **38** and independently of the said shaft so as to move the gasket **50** either downwardly in tight engagement with the seat **51** or reversely in an upward direction to disengage the seat and to establish communication between the internal opening **37** of the core **24** through the ports **36** with the opening **35** in the swing spout. The operations of the crown handle and the parts associated therewith are independent of any movement of the shaft **38**. In other words, the valve member **48** may be moved either to closed or open positions without disturbing the shaft **38** and, conversely, the shaft **38** may be rotated without in any way affecting the valve **48**.

Arranged within the side wall of the housing **10** is an outwardly extending nipple **54** shown in the present instance as closed by a plug **55**. This nipple communicates as by the opening **56** with the water jacket **30** within the housing **10**. This nipple is provided for the attachment of a spray connection if such is desired.

With reference now particularly to Fig. 2 of the drawing, it will be observed that with the handle **47** swung to the extreme left, the shaft **38** has been rotated to such degree that the openings **44** in the bell cylinder **43** are out of communication with both ports **21** and **22**, whereupon no liquid may enter the inlet chamber and the valve is closed. The next position shows the shaft **38** rotated to such extent that one of the ports or openings **44** is in communication with the inlet port **21** to permit full flow from that port while the opposite port **22** is closed. The next or intermediate position of the handle **47** shows the bell cylinder **43** moved to such position that the lateral openings **44** therein are in registry with both ports **21** and **22** where an equal quantity of liquid of both temperatures is being fully admitted. The next position shows the bell cylinder moved to close port **21** and to open port **22**, while the final position at the right shows the bell cylinder in such position that both of the inlet ports **21—22** are closed. It will be understood by manipulating the handle **47** the shaft **38** may be rotated to positions intermediate those shown in Fig. 2 in order to accurately determine the temperature in the water to be admitted to the inlet chamber as well as to govern the rate of flow.



It will be observed that the interior diameter of the sleeve or core **24** is greater than the external diameter of the shaft **38** enclosed by this sleeve which provides the channel **37** extending throughout the length of the said sleeve, interrupted only by the complementary threads upon the shaft and sleeve. The said sleeve near its lower end and below the threads is provided with laterally disposed ports or openings **57** through which liquid in the mixing chamber **16** passes into the water jacket **30** when the valve head **39** uncovers the seat **40**, and additional upper lateral ports or openings **58** are provided in the said core or sleeve **24** above the complementary threads to enable the liquid to pass from the water jacket **30** back into the channel **37**.

Assuming the nipples **23** to be connected respectively with hot and cold water lines, rotation of the shaft **38** by manipulation of the handle **47** will move the ports or openings **44** in the bell cylinder **43** into registry with either or both of the hot and cold water ports **21—22** depending upon the rotative movement of the shaft. As the shaft rotates to "open" or "flow" position, the upper end of the valve head **39** will be moved from the seat **40**, permitting the liquid in the inlet chamber to pass through ports **45** in the top of the bell cylinder and into the mixing chamber from whence it passes around the valve head and into the lower portion of the annular channel **37** surrounding the shaft **38**, laterally therefrom through the lower ports **57** into the water jacket **30**, back into the channel **37** through the upper ports **58**, thence through the ports **36** and into the spout head. With the valve head **48** in the position shown in Fig. 1, the liquid passing laterally through openings **36** is unrestricted. This flow may be regulated accurately, however, by rotating the crown handle **53** to cause the valve **48** to more or less approach the seat **51** as desired. Proper rotative adjustment of the shaft **38** will determine the degree of water pressure in the valve as well as the desired temperature of the water, however, the rate of flow from the faucet is governed by rotative movement of the crown handle **53**. This flow may thus be regulated or entirely cut off without operation of the handle **47** assuming the latter has been moved previously to "open" position of the valve head **39**.

From the foregoing it is apparent that I have provided a faucet involving a unitary structure from which hot or cold liquid, or a desired mixture of both, may be delivered from the single spout. It is obvious from the description that great accuracy in the rate of flow as well as the water temperature in the mixing chamber is possible, and that regardless of the pressure admitted to the interior of the valve, the discharge flow through the spout may be accurately controlled or entirely shut off without the necessity of operating the control handle **47**.

In instances where a spray head is desired, the plug **55** will be removed and the spray hose connected to the nipple **54**. With the valve **39** in open position, closing of the valve **48** will result in the flow of liquid in the water jacket **30** through the port **56** and into the nipple **54** to which the spray head is connected.

With reference to Fig. 1 of the drawings, it will be observed that openings **44** diametrically opposite to one another in the side wall of the inverted bell **43** are so positioned with respect to the inlet ports **21—22** as to move out of registry with the latter ports when the shaft **38** has been moved to the limit of its downward position with the gasket **41** engaged with the seat **18**. This arrangement thus provides a double shut-off flow from the water system.

I claim:

1. In a valve structure, a hollow elongated housing having a liquid supply inlet chamber of reduced diameter communicating concentrically with one end thereof, a valve seat at the juncture of said housing with said cham-

ber, a hollow sleeve concentrically disposed within said housing and extending therefrom, that part of the sleeve disposed within said housing having an intermediate portion of its outer wall spaced from the inner wall of said housing whereby to provide a water jacket between said portion and said housing, the lower end of said sleeve spaced from said valve seat to provide a chamber, a shaft of less diameter than said sleeve portion rotatably and longitudinally arranged therein to provide a longitudinal passage in said sleeve portion, mating threads on said shaft and sleeve portion inwardly from the ends of the latter to provide a flow stop for said passage, a head on one end of said shaft disposed in said mixing chamber and having its sides spaced from the side walls thereof, said head adapted to seat against said sleeve end when moved to its limit in one direction and upon said valve seat when moved to its limit in the opposite direction, said hollow sleeve having openings therein on both sides of said threads establishing communication between said water jacket and the interior of said sleeve portion, a spout connected to said sleeve exteriorly of said housing and in communication with the interior of the latter, a valve in said sleeve to control the flow of liquid to said spout, a handle connected to said shaft for rotating the same, and means operable independently of said shaft for operating said spout valve.

2. In a valve structure, a hollow elongated housing having an inlet liquid supply chamber communicating with one end thereof, a valve seat at the juncture of said chamber with said housing, a hollow sleeve concentrically disposed within said housing and extending therefrom, that portion of the sleeve disposed within said housing having an intermediate portion of the outer wall of said portion spaced from the inner wall of said housing to provide a water jacket between the sleeve portion and housing, the lower end of said sleeve portion spaced from said valve seat to provide a chamber in said housing, a shaft of less diameter than said sleeve rotatably and longitudinally arranged in the latter to provide a longitudinal passage in said sleeve portion, mating threads on said shaft and the interior of said sleeve portion inwardly of the ends thereof to provide a liquid stop for said passage, said sleeve portion having lateral openings therein on both sides of said liquid stop establishing communication between said passage and said water jacket, a head affixed on one end of said shaft disposed in said mixing chamber and having its sides spaced from the side walls thereof, said head adapted to seat against said sleeve when moved to its limit in one direction and upon said valve seat when moved to its limit in the opposite direction, a hollow bell secured to said head and snugly fitting in said inlet supply chamber, said bell having ports therein establishing communication between the interior of said bell and said mixing chamber, said bell having openings in its side walls, and said housing having liquid inlets in its side walls to transversely align with said openings.

3. In a valve structure, a hollow elongated housing having an axial liquid inlet chamber of reduced diameter communicating with one end thereof, a valve seat at the juncture of said housing with said chamber, said housing having laterally disposed ports communicating with said inlet chamber, a hollow sleeve having a portion thereof concentrically disposed within said housing with its outer wall for a substantial part of its length of reduced diameter and spaced from the inner wall of said housing to provide a water jacket therein, the lower end of said sleeve portion spaced from said inlet chamber to provide a mixing chamber between said end and said inlet chamber, a shaft rotatably and longitudinally movable in said sleeve portion, the diameter of said shaft being less than the interior diameter of said sleeve portion, a thread on said shaft engaging a complementary thread on the interior of said sleeve portion inwardly of the ends of the latter, a head on one end of said shaft disposed in said mixing chamber and having its sides spaced from the side walls of the latter, said head adapted to seat against the adjacent sleeve end when moved to its limit in one direction and to engage with said valve seat when moved to its limit in the opposite direction, said hollow sleeve portion having openings therein on both sides of said threads establishing communication between said water jacket and the interior of said sleeve portion, a spout connected to the outer end of said sleeve and in communication with the interior of the latter, a rotatable valve mounted upon the opposite end of said shaft and within said sleeve end, a valve seat in said sleeve adjacent to the communication thereof with the interior of said spout, a crown handle rotatably mounted upon said shaft and connected with said valve, and a handle connected to said shaft to rotate the latter.

4. In a valve structure, a hollow cylindrical housing having a liquid supply chamber of reduced diameter communicating concentrically with one end thereof, a valve seat at the juncture of said supply chamber with said housing, a hollow sleeve concentrically arranged in said housing, spaced apart outwardly directed flanges on the lower portion of said sleeve in sealed engagement with the inner walls of said housing, the portion of said sleeve between said flanges being of reduced diameter to provide a water jacket between said sleeve and said walls, the lower end of said sleeve spaced from said valve seat whereby to provide a mixing chamber in said housing between said seat and said sleeve end, a shaft mounted for reciprocatory movement within said sleeve and being of less diameter than the internal diameter of said sleeve whereby to provide a longitudinal passage in said sleeve, a head on the lower end of said shaft disposed in said mixing chamber and having its sides spaced from the side wall of said chamber, said head adapted to seat against the adjacent end of said sleeve when moved to its limit in one direction and against said valve seat when moved to its limit in the opposite direction, said sleeve having spaced apart upper and lower openings therein between said flanges establishing communication between said passage and said water jacket, liquid flow preventing means on said shaft and sleeve between said upper and lower openings, a spout connected to the opposite end of said sleeve and in communication with said passage, a valve in said sleeve to control the flow of liquid to said spout, and means operable from the exterior of said housing for moving said shaft.

5. In a valve structure, a hollow cylindrical housing having a liquid supply chamber of reduced diameter communicating concentrically with one end thereof, a valve seat at the juncture of said supply chamber with said housing, a hollow sleeve having a portion thereof affixed concentrically within said housing and having an external diameter less than the internal diameter of the housing to provide a water jacket within the latter, the lower end of said sleeve spaced from said valve seat whereby to provide a mixing chamber in said housing between said seat and said sleeve end, a shaft mounted for reciprocatory movement within said sleeve and being of less diameter than the internal diameter of said sleeve whereby to provide a longitudinal passage in said sleeve, a head on one end of said shaft disposed within said mixing chamber and having its sides spaced from the side walls of said chamber, said head adapted to seat against the adjacent sleeve end when moved to its limit in one direction and against said seat when moved to its limit in the opposite direction, said sleeve having spaced upper and lower openings therein establishing communication between said passage and said water jacket, cooperating liquid flow preventing means on said shaft and said sleeve between said spaced openings, a swing spout connected to the other end of said sleeve and in communication with said passage, a valve in said sleeve to control the flow of liquid to said spout, and means operable from the exterior of said housing for moving said shaft.

6. In a valve structure, a cylindrical housing having at one end a concentric liquid supply chamber communi-

cating therewith, a valve seat at the juncture of said chamber with said housing, an elongated sleeve having one end portion of less diameter than the interior of said housing affixed within said housing with its inner extremity spaced from said valve seat whereby to provide a mixing chamber, a rotatable shaft extending through said sleeve of less diameter than the interior of the latter whereby to provide an annular passage within said sleeve, mating threads on said shaft and sleeve portion inwardly from the ends of the reduced diameter portion of the latter to provide a liquid stop for said passage as well as means for longitudinally moving said shaft, said reduced portion of said sleeve having lateral openings therein on both sides of said threads whereby communication between said passage and said jacket is constant, a head on the inner end of said shaft disposed within said mixing chamber and of a diameter less than the diameter of said chamber, said head adapted to close the adjacent end of said sleeve passage when moved to its limit in one direction and to engage said seat when moved to its limit in the opposite direction and to permit flow of liquid from said mixing chamber to said passage when in intermediate position, a spout on the opposite end of said sleeve in communication with said passage, an outlet valve on the outer end of said sleeve to control the liquid flow from said passage to said spout, a handle on the outer end of said shaft for rotating the same, and means in said housing to supply liquid to said fluid supply chamber.

7. The structure of claim 6 including a hollow cylinder affixed to the head end of said shaft fitting snugly within said inlet chamber, having ports in its side to establish communication between said inlet chamber and said cylinder, and provided in its upper end with openings establishing communication between the interior of said cylinder and said mixing chamber.

8. In a valve structure, a cylindrical housing having at one end thereof a liquid supply chamber of reduced diameter communicating concentrically therewith, a valve seat at the juncture of said chamber with said housing, a hollow sleeve having a portion thereof affixed concentrically within said housing and having an external diameter of less diameter than the interior diameter of said housing whereby to provide a water jacket between said sleeve portion and said housing, the lower end of said sleeve spaced from said valve seat to provide a mixing chamber between said seat and said sleeve end, a shaft having its diameter less than the internal diameter of said sleeve mounted for reciprocatory movement concentrically therein to provide a liquid passage between said shaft and said sleeve, flow stopping means on said shaft



inwardly of the ends thereof, a head on one end of said shaft disposed within said mixing chamber and having its sides spaced from the side walls of the latter, said head adapted to seat against the adjacent sleeve end when the shaft is moved to its limit in one direction and against said valve seat when moved to its limit in the opposite direction, said sleeve having openings therein on both sides of said flow stopping means establishing communication between said passage and said water jacket, a swing spout connected to said sleeve beyond said housing and in communication with said passage on one side of said flow stopping means, a valve in said sleeve to control the flow of liquid to said spout, and means for moving said shaft.

9. In a valve structure, a cylindrical housing having at one end a liquid supply chamber of reduced diameter communicating concentrically therewith, a valve seat at the juncture of said chamber with said housing, a hollow sleeve having a portion thereof affixed concentrically within said housing and having an external diameter of less diameter than the internal diameter of said housing whereby to provide a water jacket between said sleeve portion and said housing, the lower end of said sleeve spaced from said valve seat to provide a mixing chamber between said seat and said sleeve end, a shaft having its diameter less than the internal diameter of said sleeve mounted for reciprocatory movement concentrically therein to provide a liquid passage between said shaft and said sleeve, mating threads on said shaft and on the interior of said sleeve inwardly from the ends of the latter, a head on one end of said shaft disposed within said mixing chamber and having its sides spaced from the side walls of the latter, said head adapted to seat against the adjacent sleeve end when the shaft is moved to its limit in one direction and against said valve seat when moved to its limit in the opposite direction, said sleeve having openings therein on both sides of said mating threads establishing communication between said passage and said water jacket, a swing spout connected to said sleeve beyond said housing and in communication with said passage on one side of said threads, a valve in said sleeve to control the flow of liquid to said spout, and means operable from the exterior of said housing for rotating said shaft.

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