United States Patent [19]

Mull

[11] **3,884,258**

[45] **May 20, 1975**

[54] **RETRACTABLE BATHROOM FIXTURE**

[76] Inventor: **Leonard E. Mull**, Rt. 3, Clover, S.C. 29710

[22] Filed: **Dec. 6, 1973**

[21] Appl. No.: **422,274**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 279,663, Aug. 10, 1972, abandoned.

[52] **U.S. Cl.** ..... **137/360;** 137/616.7; 137/801; 137/636; 236/12 R; 4/148; 4/192

[51] **Int. Cl.** **F16k 11/10**

[58] **Field of Search** ..... 4/145, 146, 148, 149, 191, 4/192, 194, 168, 169; 251/149.8, 349; 236/12 R; 137/636, 636.1, 615, 616.7, 360, 361, 801, 359

[56] **References Cited**

UNITED STATES PATENTS

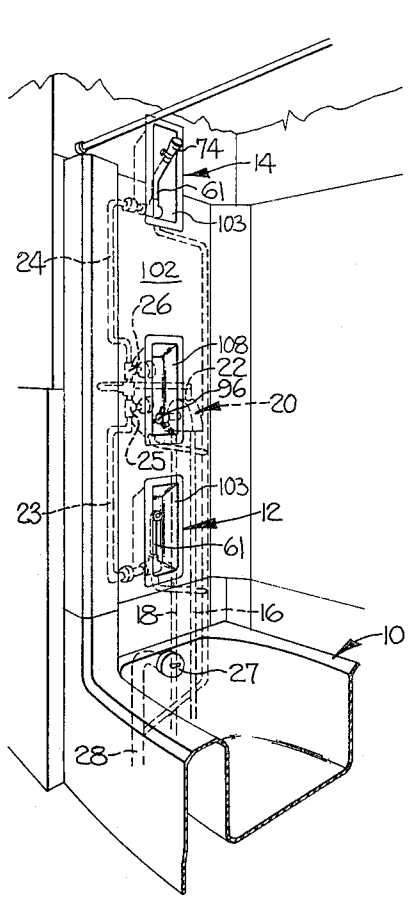
166,339	8/1875	Bussey	137/616.7
473,325	4/1892	Merrill	137/616.7 X
1,138,187	5/1915	Bridges	137/616.7
1,218,879	3/1917	Luzzi	137/616.7 X
1,996,330	4/1935	Goshaw	236/12 R
2,069,730	2/1937	Storck et al.	137/616.7 X
2,296,917	9/1942	Garrett et al.	236/12 R
2,650,427	9/1953	Mathiesen	137/616.7 X
3,067,943	12/1962	Renne	236/12 R
3,096,782	7/1963	Williams	137/360
3,493,977	2/1970	Green	4/191

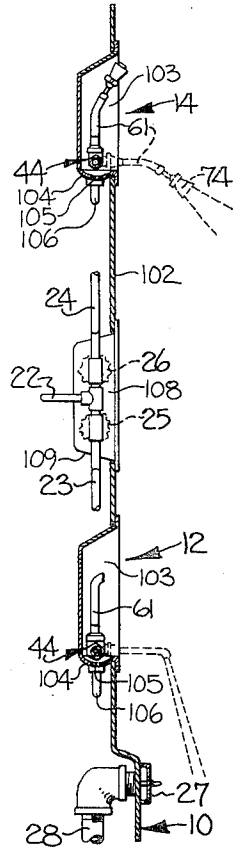
Primary Examiner—Henry T. Klinksiek
Attorney, Agent, or Firm—Parrott, Bell, Seltzer, Park & Gibson

[57] **ABSTRACT**

A bathroom fixture assembly for delivering water to a bathtub or the like at a predetermined temperature and wherein the assembly includes a delivery spout which is pivotally mounted for movement between a first outwardly extending position wherein water is delivered therethrough and a second retracted position wherein no water is delivered. The assembly includes a tubular member adapted to be connected to a water inlet line, the tubular member having an outlet opening in the side wall thereof. A sleeve surrounds the tubular member opening and includes an outlet opening in the wall thereof. A discharge spout extends outwardly from the opening of the sleeve, and the sleeve and spout are mounted for rotational movement about the tubular member so as to selectively align the two openings to permit flow of water therethrough when the discharge spout is directed outwardly, and to close the openings when the discharge spout is rotated to a retracted vertical position. Also, temperature control means is provided which is adapted to automatically adjust the relative quantities of water entering from hot and cold water lines to thereby maintain a preselected temperature.

8 Claims, 8 Drawing Figures





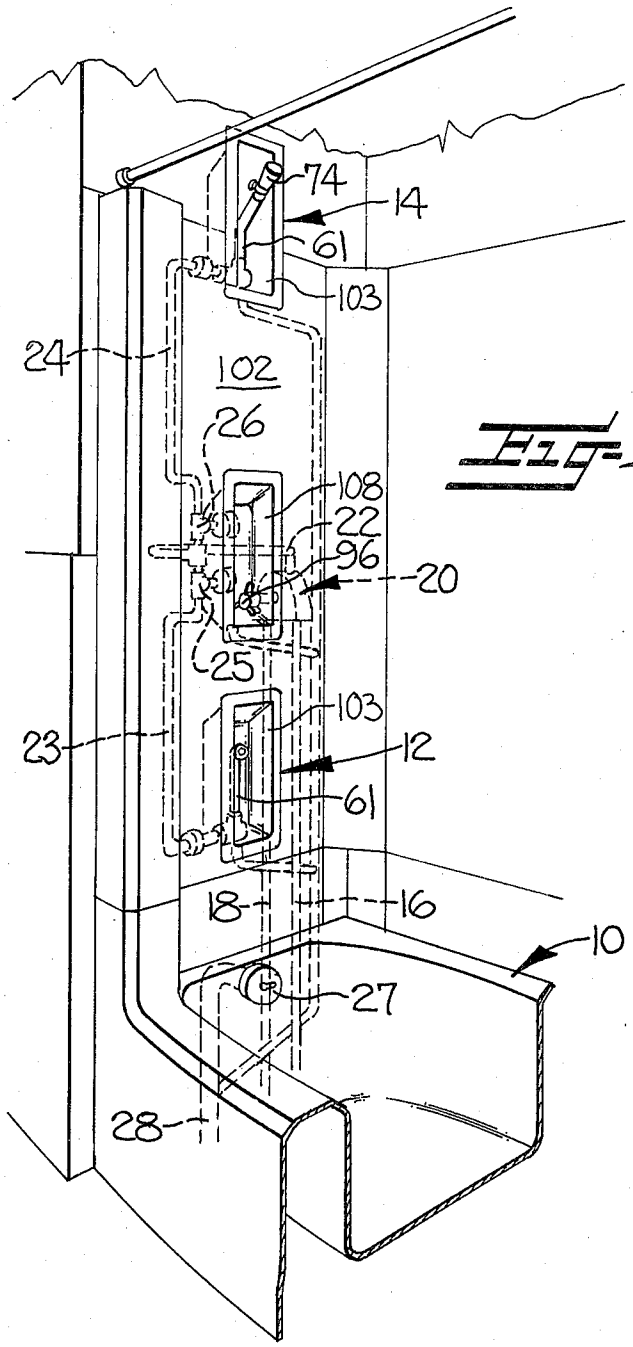


Fig-1

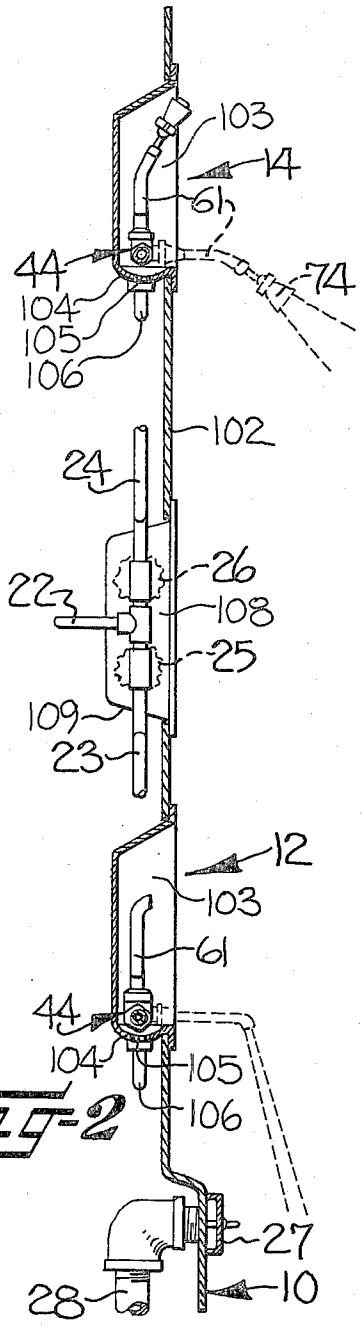


Fig-2

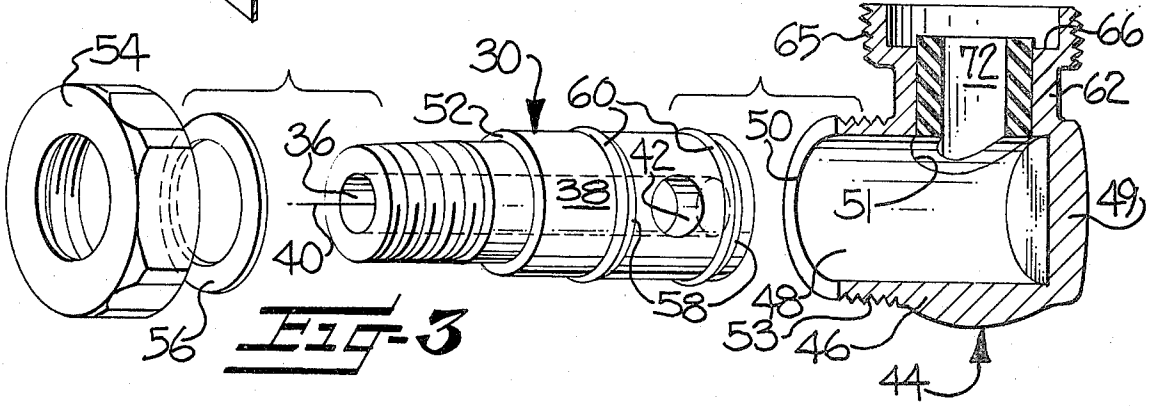


Fig-3

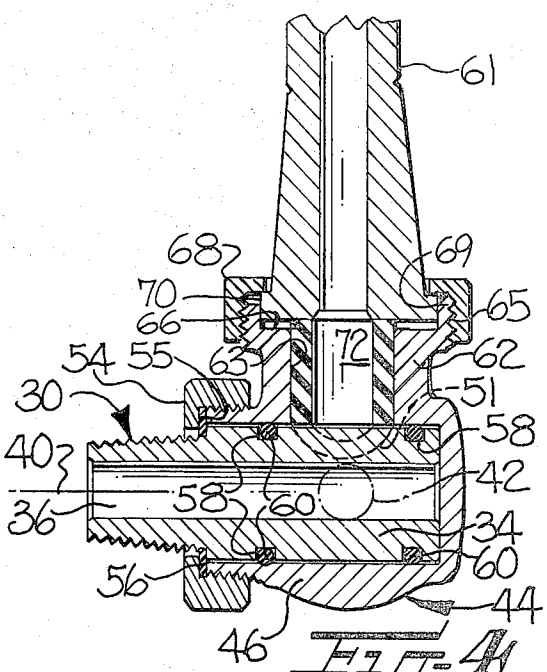


Fig-4

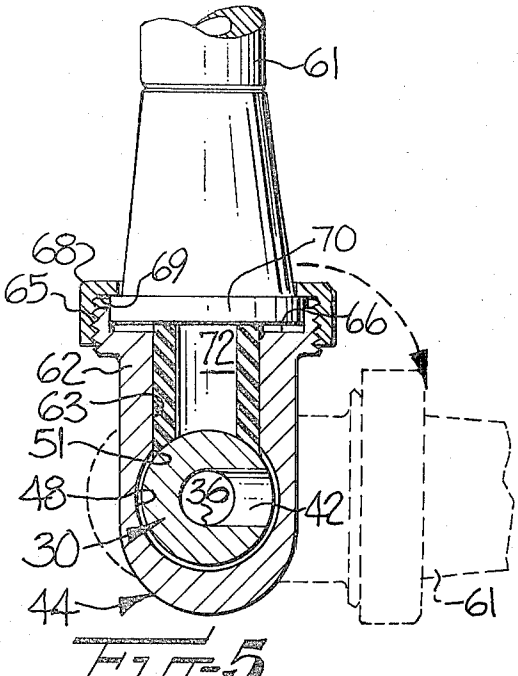


Fig-5

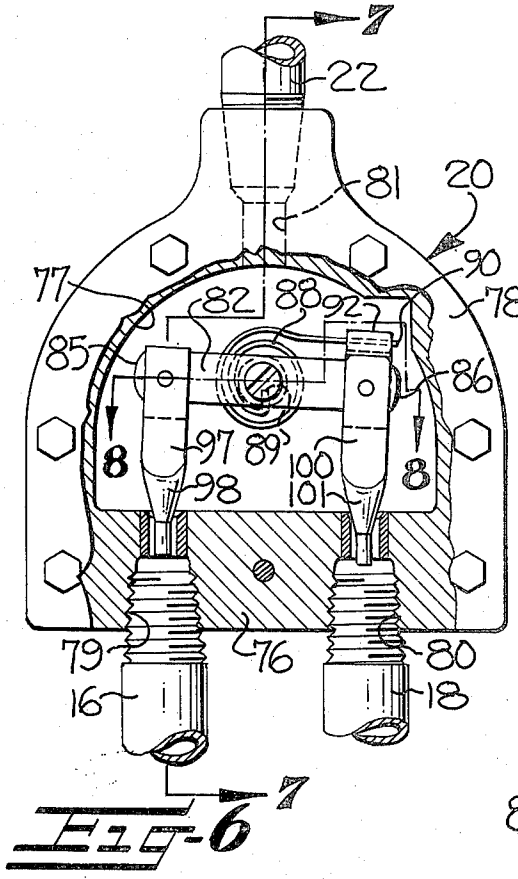
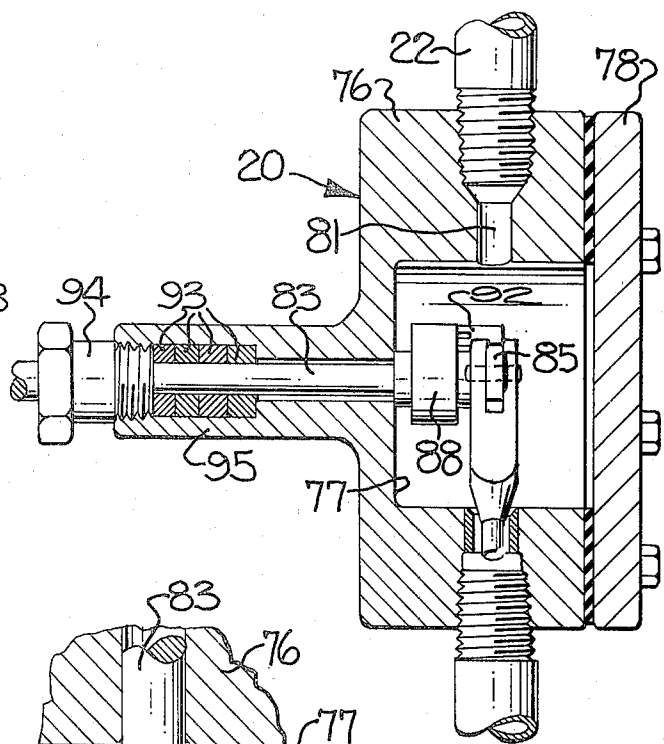


Fig-6



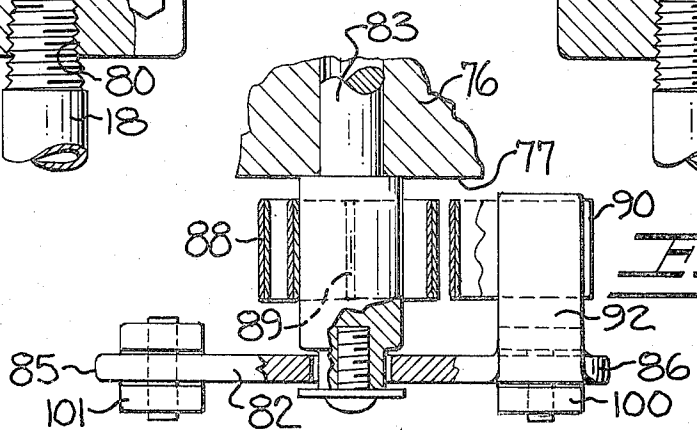


Fig-7

Fig-8

RETRACTABLE BATHROOM FIXTURE

The present application is a continuation-in-part of application Ser. No. 279,663, filed Aug. 10, 1972, now abandoned.

The present invention relates to a bathroom fixture assembly which is adapted to control the flow of water into a tub, shower or the like and which is designed to be retracted within a wall receptacle when in the "off" position and to be extended outwardly when in the "on" position.

In modern bathtub and shower arrangements, it is conventional to mount a shower outlet above the tub and to provide a suitable valve such that the water may be selectively delivered through the bathtub spout or the shower outlet. In such arrangements, the outwardly extending bathtub spout presents a substantial danger to the user of the shower, since he may easily slip and strike the spout during a fall.

To alleviate this danger, it has been proposed to mount the bathtub spout for pivotal movement so it may be retracted within the wall, and to include therein a valve arrangement wherein the valve is closed to prevent passage of water therethrough when the spout is pivoted upwardly to its retracted position. Thus in the retracted position, the water is prevented from flowing through the bathtub spout and is directed to the shower outlet. However, such prior retractable spouts as are known to the applicant are relatively complex in their structure, and incorporate a ball check valve and other cooperating components which substantially increase the price of the fixture. Also, such ball valves are prone to stick and otherwise malfunction to further limit the utility of the device.

It is accordingly an object of the present invention to provide a retractable bathroom fixture which is simple in design and foolproof in operation.

It is a further object of the present invention to provide a retractable bathroom fixture which is adapted to deliver water to a bathtub or the like when in its outwardly directed position, and which is adapted to turn off the water when pivotally moved to its retracted position.

It is another object of the present invention to provide a bathroom fixture assembly which includes temperature control means for automatically adjusting the temperature of the water entering the discharge spout so as to maintain a preselected temperature regardless of a change in pressure in one of the hot and cold water lines.

These and other objects and advantages of the present invention are achieved in the embodiment illustrated herein by the provision of a bathroom fixture assembly which includes a tubular inner member adapted to be connected to an inlet water line, and which defines a cylindrical outer surface having a radial outlet opening extending therethrough. A tubular sleeve closely surrounds the tubular member and is pivotally movable in relation thereto, the sleeve having a second radial opening which is adapted to be selectively positioned to overlie the opening of the tubular member. Thus by pivotally moving the sleeve, the two outlet openings may be aligned to permit passage of water therethrough, or separated to preclude passage of the water. A delivery spout is carried by the sleeve and communicates with the sleeve outlet opening to carry the water to a desired point of discharge, the spout

serving as a convenient means for pivotally moving the sleeve between its two positions. A temperature control or mixing valve is connected to the inlet water line for supplying water thereto at a preselected temperature. Also a flow control valve may be interposed between the mixing valve and the tubular inner member to control the volume of water flowing outwardly from the spount.

Some of the objects and advantages of the invention having been stated, others will appear as the description proceeds, when taken in connection with the accompanying drawings, in which

FIG. 1 is a perspective view, partly sectioned, of a bathtub and shower arrangement incorporating the features of the present invention;

FIG. 2 is a fragmentary vertical sectional view of the bathtub and shower arrangement shown in FIG. 1;

FIG. 3 is an exploded isometric view of the valve portion of the bathroom fixture as shown in FIG. 1;

FIG. 4 is a vertical section view of the valve portion of the bathroom fixture in assembled form;

FIG. 5 is a vertical section view of the valve portion of the bathroom fixture and taken at right angles to the view shown in FIG. 4;

FIG. 6 is a partly sectioned elevation view of the temperature control or mixing valve of the present invention;

FIG. 7 is a sectional view taken substantially along the line 7—7 of FIG. 6, and

FIG. 8 is an enlarged fragmentary plan view of the temperature control lever of the mixer valve.

Referring more specifically to the drawings, FIG. 1 illustrates the manner in which the present invention may be employed in a bathtub and shower arrangement. Specifically, the bathtub 10 includes a lower bathtub fixture 12 which is adapted to deliver water to the tub, and an upper shower fixture 14.

The water delivery system is shown in dotted lines in FIG. 1 and includes a hot water line 16, a cold water line 18, a temperature control or mixing valve 20 connected to the hot and cold lines, and a delivery line 22 which branches into the lines 23, 24 for delivering the proportioned quantities of hot and cold water to the fixtures 12 and 14 respectively. A conventional flow control valve is disposed in each of the lines 23, 24, the valve 25 being disposed in line 23 and the valve 26 being in line 24. As shown in FIG. 2, the tub 10 includes an overflow drain opening 27 which communicates with a drain line 28.

The lower fixture 12 for delivering water to the tub is adapted to be pivotally moved between a first outwardly extending position (shown in dashed lines in FIG. 2) wherein water may be delivered therethrough when the valve 25 is open, and a second retracted or vertically directed position (shown in solid lines in FIGS. 1 and 2) wherein water is not delivered therethrough even though the valve 25 remains open. In this latter configuration, water will be directed upwardly through the delivery line 24 to the shower outlet 14, assuming the same is in the outwardly directed position as shown in dashed lines in FIG. 2 and the valve 26 is open. If both fixtures 12 and 14 are retracted, no water will be delivered even though the valves 25 and 26 remain open. Thus, in accordance with the present invention, the water may be shut off with the valves 25 and 26 remaining open at a preselected position to provide a desired volume of flow. Upon reopening one of the

fixtures, the delivered water will automatically be of the desired flow volume, and such volume may of course be controlled by manually adjusting the appropriate one of the valves **25** and **26.**

The valve portion of the fixture **12** is shown in detail in FIGS. **3–5** and includes a tubular inner inlet member **30** which is fixedly connected at one end to the water line **23** by means of the tapered threads **32** in a conventional manner. The member **30** comprises a peripheral wall **34** which defines an internal passageway **36** for receiving the water from the line **23,** and a cylindrical outer surface **38** which defines a central axis **40.** An outlet opening **42** extends radially through the wall **34** and communicates with the internal passageway **36.**

A tubular sleeve **44** surrounds the member **30** and comprises a peripheral wall **46** which defines a cylindrical inner surface **48** which is coaxially disposed about the central axis **40** and closely overlies the surface **38** of the member **30.** The sleeve **44** includes a closed end **49** and an opposite open end **50** such that the tubular member may be assembled with the sleeve by inserting the tubular member through the open end **50.** Also, the sleeve is pivotally movable for limited rotation about the tubular member **30** in the manner hereinafter further explained, and includes an outlet opening **51** extending radially through the sleeve wall **46.** As seen in FIG. **4,** the opening **51** is aligned with the opening **42** along the axis **40** when the two members are assembled.

To maintain the assembly of the sleeve **44** and tubular member **30,** the member **30** is provided with a rearwardly facing circumferential shoulder **52,** and the sleeve is provided with external threads **53.** A female threaded member or nut **54** is adapted to mate with the threads **53,** and includes a forwardly facing internal shoulder **55** as best seen in FIG. **4.** A washer **56** may be interposed between the shoulders **52** and **55,** such that when the nut **54** is assembled on the sleeve **44,** the tubular member **30** will be maintained at a fixed axial location between the end wall **49** and shoulder **55.**

As noted above, the inner cylindrical surface **48** of the sleeve **44** closely overlies the cylindrical surface **38** of the tubular member **30,** and this relationship serves to prevent water from passing through the opening **42** and moving axially between the two cylindrical surfaces. To further guard against such leakage, there may be provided a pair of circumferential channels **58** in the surface **38** of the tubular member, with a resilient O-ring **60** mounted in each channel to sealably engage the two members.

To direct the water from the outlet opening **51** of the sleeve to the desired point of discharge over the tub **10,** there is provided a delivery spout **61** fixedly carried by the sleeve **44** so as to be rotatable therewith. By design, when the spount **61** of the fixture **12** is outwardly directed as shown in dashed lines in FIGS. **2** and **5,** the sleeve outlet opening **51** is aligned with the opening **42** of the member **30** to permit passage of the water therethrough, and when the spout is directed upwardly, the outlet opening **51** is non-aligned with the opening **42** such that no water may pass therethrough.

To mount the spout **61** to the sleeve **44,** the sleeve is provided with an integral radially directed tubular extension **62** to form a T-joint, the extension **62** defining a cylindrical bore **63** which communicates coaxially with the opening **51** in the wall **46,** and the free end portion of the extension includes the external threads **65.** An upwardly directed circumferential shoulder **66** is positioned in the bore **63** for engaging the lower end of the spout **61,** and an internally threaded nut **68** is designed to threadedly engage the threads **65,** the nut **68** including a downwardly directed shoulder **69** for engaging a cooperating shoulder **70** on the delivery spout to thereby maintain the assembly of the spout to the tubular sleeve. A resilient, saddle-shaped, hollow sealing member **72** is positioned within the bore **63** and extends between the lower end of the spout **61** and the surface **38** to enhance the effectiveness of the seal between the surface **38** and surface **48** of the tubular sleeve when the spout is rotated to the upward position as shown in FIGS. **2** and **5.**

While the above description relates particularly to the bathtub spout **12,** it will be understood that the shower outlet **24** is of a similar construction, except that the shower outlet **14** mounts a conventional nozzle or spray head **74** at the end of the delivery spout **61.**

The structural details of the temperature control or mixing valve **20** are shown in FIGS. **6–8.** In the illustrated embodiment, the valve includes a housing **76** defining an enclosed chamber **77,** a face plate **78** attached to the housing for sealably enclosing the chamber **77,** a first entry port **79** for connecting the enclosed chamber to the hot water line **16,** a second entry port **80** for connecting the enclosed chamber to the cold water line **18,** and a discharge port **81** for connecting the enclosed chamber to the delivery line **22.**

A lever arm **82** is mounted within the enclosed chamber of the housing for pivotal movement about a horizontal axis defined by the rod **83,** the lever arm being rotatably attached to the rod as best seen in FIG. **8** and so as to be freely rotatable with respect to the rod. The lever arm **82** is positioned to define a first end **85** positioned above the first entry port **78,** and a second end **86** positioned above the second entry port **80.**

A helical bimetallic flat spring **88** is operatively connected between the lever arm **82** and rod **83** such that any rotational movement of the rod is translated through the spring to rotate the lever arm. More particularly, one end **89** of the spring is fixedly connected in a slot in the lower surface of the rod **83,** while the opposite end **90** of the spring is positioned within the horizontally disposed fork **92,** the fork being integrally connected to the second end **86** of the lever arm **82.**

The left end of the rod **83** as seen in FIG. **7** extends through a plurality of sealing rings **93** and plug **94** carried within the extension **95** of the housing **76,** and the end is operatively connected to an external knob **96** (FIG. **1**) by which the user is able to rotate the rod **83** and thereby control the temperature of the water flowing through the mixing valve **20** as hereinafter further explained. A first plug **97** is pivotally carried at the first end **85** of the lever arm, the plug **97** being generally cylindrical and including a conical lower end portion **98** which extends downwardly into the first entry port **79** such that the plug **97** acts to increasingly close the first entry port upon being lowered thereinto.

A second plug **100** is pivotally carried at the second end **86** of the lever arm, the second plug also being generally cylindrical and including a conical end portion **101** which extends downwardly into the second entry port **80** such that the second plug acts to increasingly close the second port upon being lowered thereinto. From the above description, it will be apparent that upon the user rotating the knob **96** and thus the rod **83,**

the lever arm **82** may be pivoted such that one of the first and second plugs is lowered into the associated entry port while the other plug is lifted from its entry port. By this arrangement, the user may manually adjust the relative quantities of water entering through the first and second ports **79** and **80.**

The bimetallic spring **88** is designed to radially expand upon an increase in the temperature thereof. Thus in the event that the temperature within the enclosure **77** should rise above a predetermined level, the expansion of the spring will act to rotate the lever arm counterclockwise as seen in FIG. **6** to partially further close the inlet port **79** and partially further open the inlet port **80.** Thus less hot water would be admitted into the enclosure, and more cold water would be received. Accordingly, the temperature of the water exiting through the discharge port **81** would be automatically lowered to the proper level.

Under normal circumstances, the pressure in both of the hot and cold water lines **16** and **18** will remain stable. However, in the event the pressure in one of the lines should decrease, the temperature of the water exiting through the discharge port **81** would necessarily change. For example, should a water closet within the home be flushed, the pressure in the cold water line would be reduced so as to reduce the amount of cold water entering the enclosure **77.** Thus the temperature of the water within the enclosure **77** and exiting from the port **81** of the mixing valve **20** would increase. However, upon such rise in temperature, the bimetallic spring **88** will automatically act to partially further close the hot water line and partially further open the cold water line to thereby maintain the desired temperature. Thus the mixing valve **20** is adapted to maintain a preselected temperature for the water delivered therefrom, regardless of a change in pressure in one of the hot and cold water lines. As will be apparent, the same automatic adjustment would occur if there were a change in the temperature of the water in one of the hot and cold water lines.

The flow control valves **25** and **26** provide an alternative means of cutting off the flow of water through one of the fixtures **12** and **14.** Thus for example, the shower fixture **14** may if desired be shut off while leaving it in its outwardly directed or open position. Also, the flow control valve **26** is particularly useful in controlling the pressure of the water exiting from the shower fixture **14** so that the user may receive a "soft" shower. Still further, the valves **25** and **26** are desirable in the event one of the fixtures **12** or **14** should develop a leak.

To mount the fixtures **12** and **14** within a wall **102** such as shown in FIG. **1,** there is provided a wall receptacle for each fixture in the form of a rectangular box **103** having an open front side. The open front side of the receptacle box **103** may be provided with a suitable cover (not shown) if desired. The fixture is mounted within the box in the manner best seen in FIG. **2,** such that the delivery spout is adapted to extend through the open front side. The box further includes a bottom wall **104** having a port **105** connected to a line **106** for carrying any water received in the box **103** to the drain **28.** This feature serves to prevent water received in the box from draining onto and possibly staining the surface of the wall **102.**

A housing **108** which is generally similar to the boxes **10** is provided for mounting the knobs of the valves **20,** 25 and **26** within the wall **102.** The housing **108** however includes a tapered bottom wall **109** to facilitate cleaning and drainage of water therefrom.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed is:

1. A bathroom fixture assembly having provision for selectively delivering water to a bathtub, shower, or the like at two separate spaced locations and at a predetermined temperature, and comprising

a shower head comprising

a. a tubular member comprising a peripheral wall defining an internal passageway and an outer cylindrical surface, and an outlet opening extending radially through said peripheral wall and communicating with said internal passageway,

b. delivery spout means carried by said tubular member and comprising a tubular sleeve surrounding said tubular member and including a peripheral wall defining an inner cylindrical surface coaxially disposed about and closely overlying said outer cylindrical surface of said tubular member, an outlet opening extending radially through said sleeve wall, and a radially directed delivery spout fixedly connected to said tubular sleeve and communicating with said sleeve outlet opening, whereby said delivery spout means may be selectively rotated about said tubular member between a first position wherein said sleeve outlet opening is aligned with said tubular member outlet opening to permit passage of water therethrough and a second position wherein said sleeve inner surface overlies said tubular member outlet opening to preclude passage of water therethrough, and

a tub faucet comprising

a. a tubular member comprising a peripheral wall defining an internal passageway and an outer cylindrical surface, and an outlet opening extending radially through said peripheral wall and communicating with said internal passageway,

b. delivery spout means carried by said tubular member and comprising a tubular sleeve surrounding said tubular member and including a peripheral wall defining an inner cylindrical surface coaxially disposed about and closely overlying said outer cylindrical surface of said tubular member, an outlet opening extending radially through said sleeve wall, and a radially directed delivery spout fixedly connected to said tubular sleeve and communicating with said sleeve outlet opening, whereby said delivery spout means may be selectively rotated about said tubular member between a first position wherein said sleeve outlet opening is aligned with said tubular member outlet opening to permit passage of water therethrough and a second position wherein said sleeve inner surface overlies said tubular member outlet opening to preclude passage of water therethrough,

temperature control means for receiving predetermined relative quantities of water from a hot and cold water line and for delivering such water into said internal passageway of each of said shower head and tub faucet, said temperature control

means including means for manually adjusting the relative quantities of water received from said hot and cold water lines to thereby permit the user to adjust the temperature of the water delivered from said delivery spout means of either said shower head or tub faucet, and temperature responsive means for automatically adjusting the relative quantities of water received from the hot and cold water lines so as to maintain a preselected temperature for the water delivered from said delivery spout means regardless of a change in pressure in one of the hot and cold water lines, and

receptacle means for mounting each of said shower head and tub faucet within a wall such that said delivery spout of said shower and tub faucet does not protrude beyond the front surface of the wall when such delivery spout means is in said second position.

2. The bathroom fixture assembly as defined in claim 1 further comprising independently operable flow control valve means positioned between said temperature control means and said internal passageway of each of said shower head and tub faucet for controlling the volume of water entering the internal passageway thereof.

3. The bathroom fixture assembly as defined in claim 1 wherein said receptacle means comprises a first rectangular box for mounting said shower head, and a second rectangular box for mounting said tub fixture, each of said first and second rectangular boxes including a bottom wall and port means extending through said bottom wall for carrying any water received in the box to a drain.

4. The bathroom fixture assembly as defined in claim 1 wherein said means for manually adjusting the relative quantities of water received from said hot and cold water lines includes

a housing including a first entry port for connection to the hot water line, and a second entry port for connection to the cold water line,

a lever arm pivotally mounted within said housing and defining a first end positioned above said first entry port and a second end positioned above said second entry port,

first plug means carried at said first end of said lever arm and extending downwardly into said first entry port such that said first plug means acts to increasingly close said first entry port upon being lowered thereinto,

second plug means carried at said second end of said lever arm and extending downwardly into said second entry port such that said second plug means acts to increasingly close said second entry port upon being lowered thereinto, and

manually operable control means mounted externally of said housing for pivoting said lever arm such that one of said first and second plug means is lowered into the associated entry port while the other of said first and second plug means is lifted from the associated entry port to thereby permit manual adjustment of the relative quantities of water entering through said first and second entry ports.

5. The bathroom fixture assembly as defined in claim 4 wherein said temperature responsive means includes means positioned within said housing for pivoting said lever arm upon a change in temperature of the water therein to thereby automatically adjust the relative quantities of water entering through said first and second entry ports and thereby substantially maintain a preselected temperature regardless of a change in pressure in one of the hot and cold water lines.

6. The bathroom fixture assembly as defined in claim 5 wherein said means for pivoting said lever arm includes a helical bimetallic spring operatively connected between said manually operable control means and said lever arm, said spring being adapted to pivot said lever arm upon a change in temperature thereof.

7. The bathroom fixture assembly as defined in claim 1 wherein each of said shower head and tub faucet includes sealing means disposed intermediate the associated tubular member outer surface and sleeve inner surface for precluding passage of the water axially therebetween.

8. The bathroom fixture assembly as defined in claim 7 wherein said tubular sleeve of each of said shower head and tub faucet includes a closed end and an open end such that said tubular member may be assembled thereinto by inserting the same through said open end, and means for maintaining said tubular member associated within said tubular sleeve.

* * * * *