April 6, 1965 J. M. CANAVAN 3,176,924

BATHTUB FIXTURE HAVING DOUBLE-ACTING SHOWER HEAD

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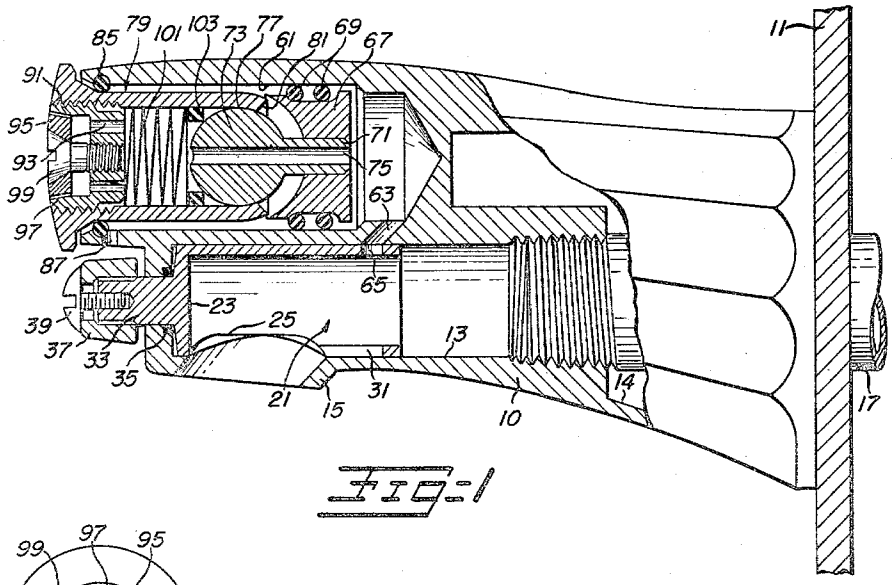


FIG-1

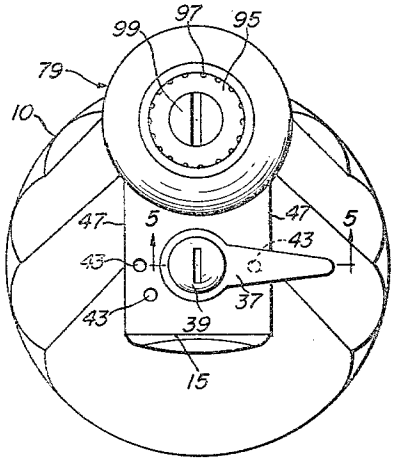


FIG-2

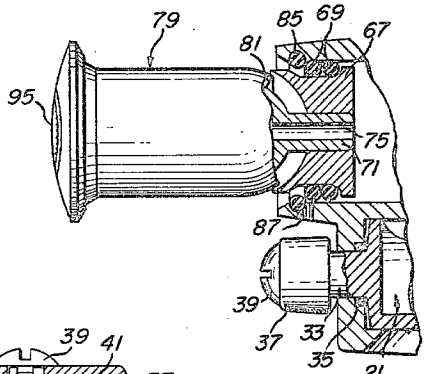


FIG-3

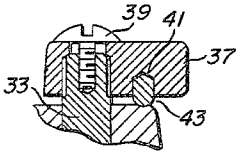


FIG-5

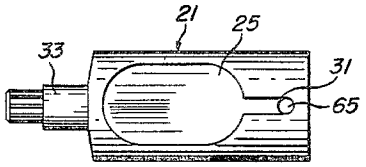


FIG-4

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BATHTUB FIXTURE HAVING DOUBLE-ACTING SHOWER HEAD

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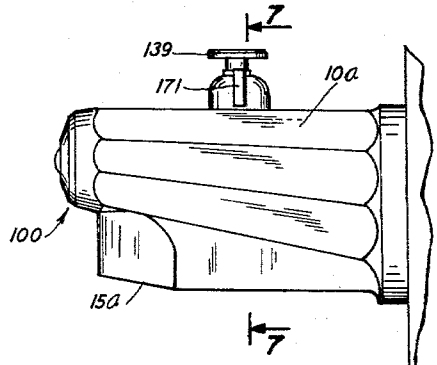


Fig.6

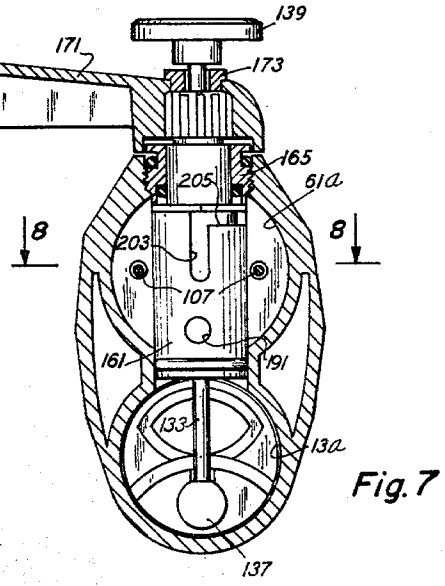
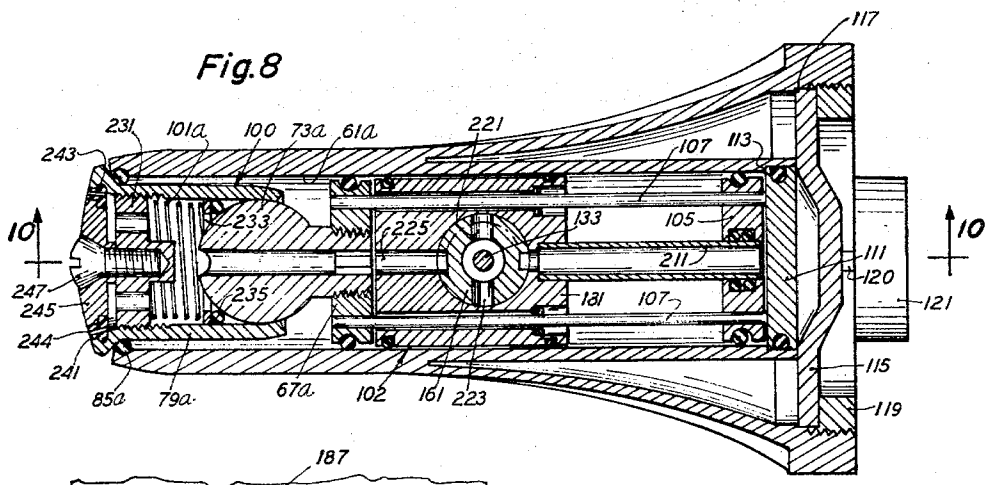


Fig.7

Fig.8



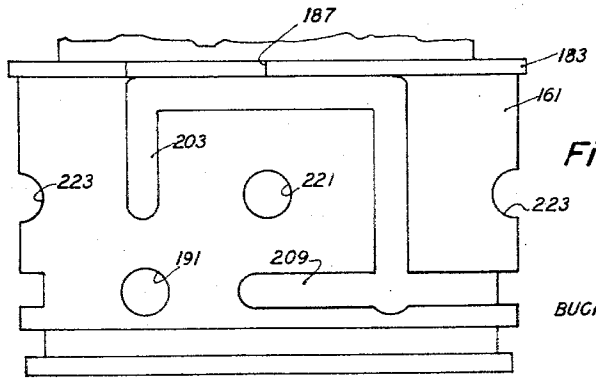


Fig.9

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Fig. 10

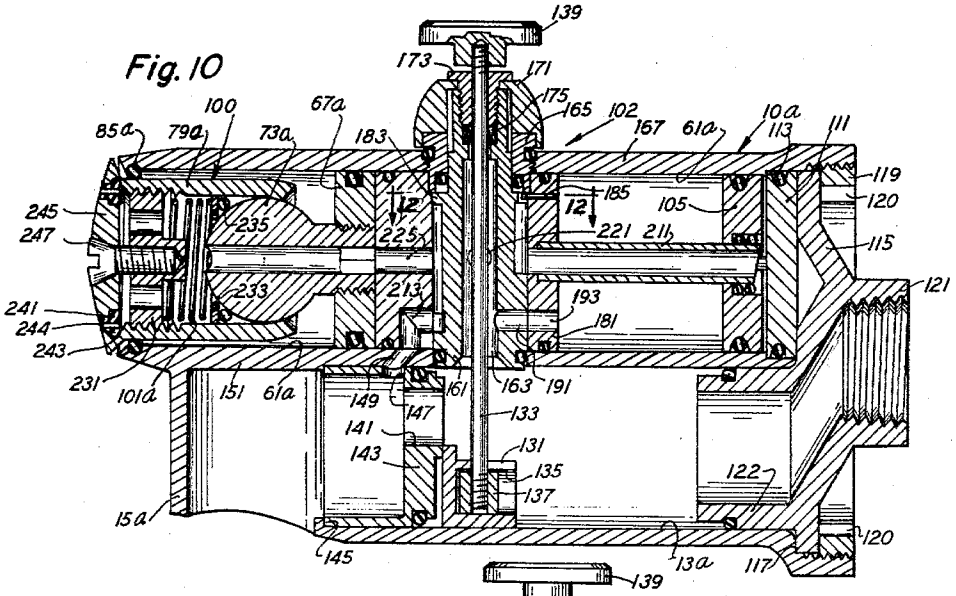


Fig. 11

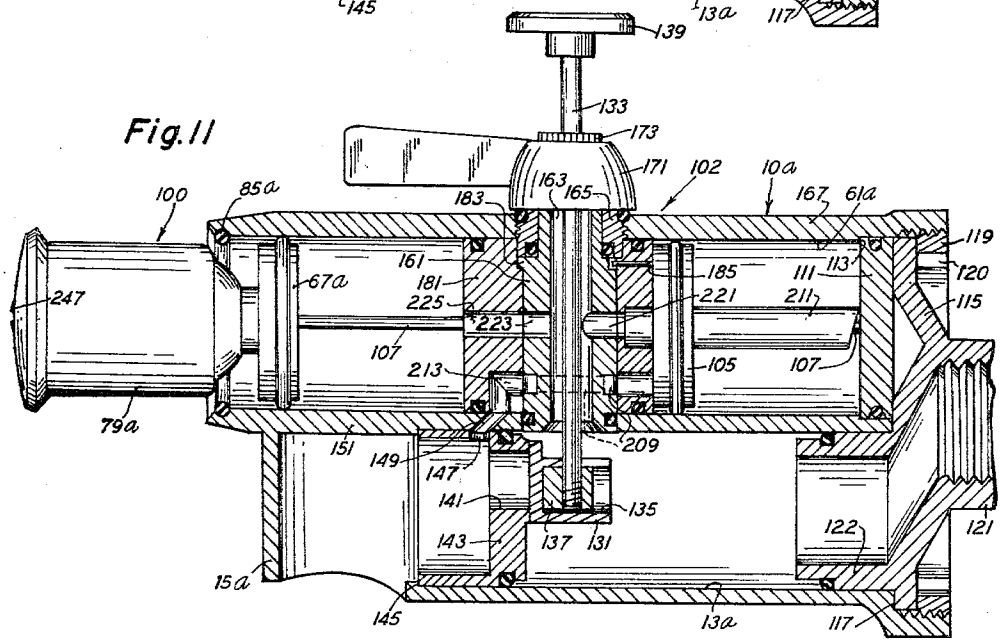
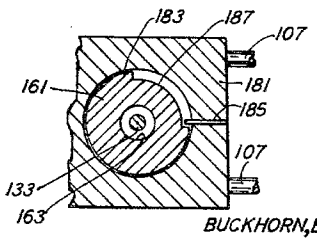


Fig. 12



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FIG. 13

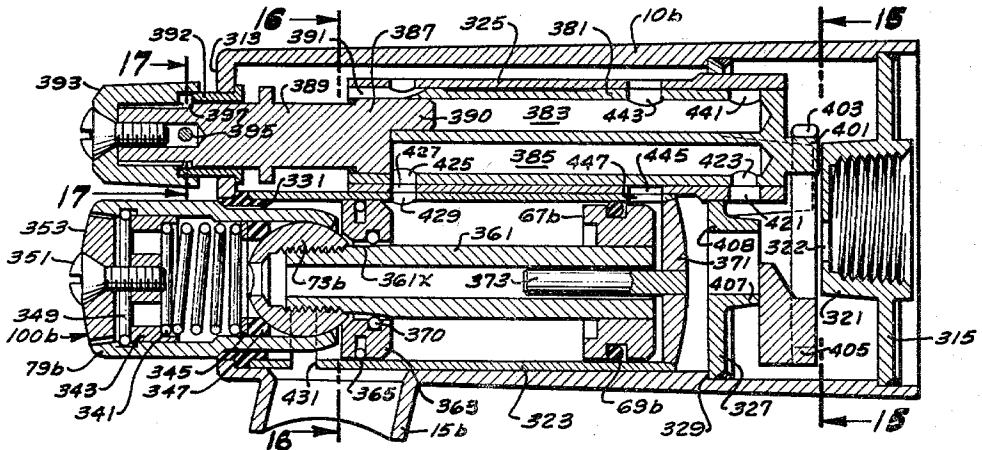


FIG. 14

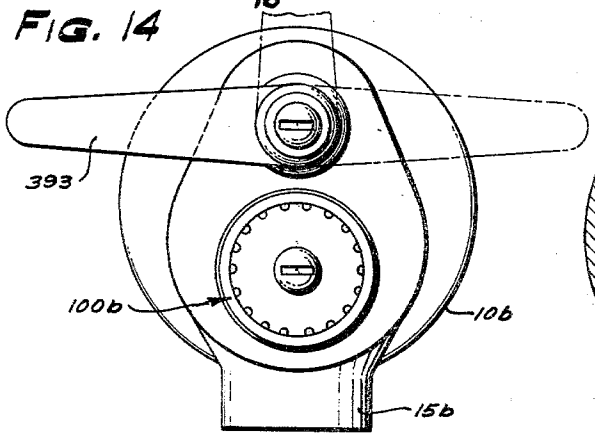


FIG. 15

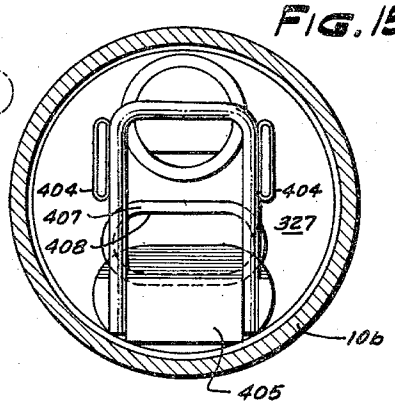


FIG. 16

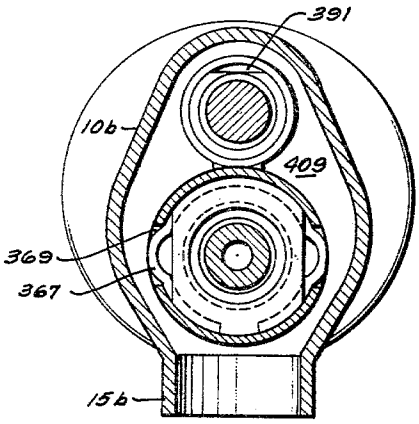
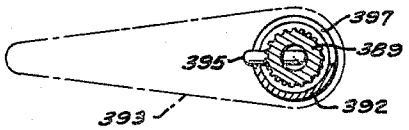


FIG. 17



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FIG. 18

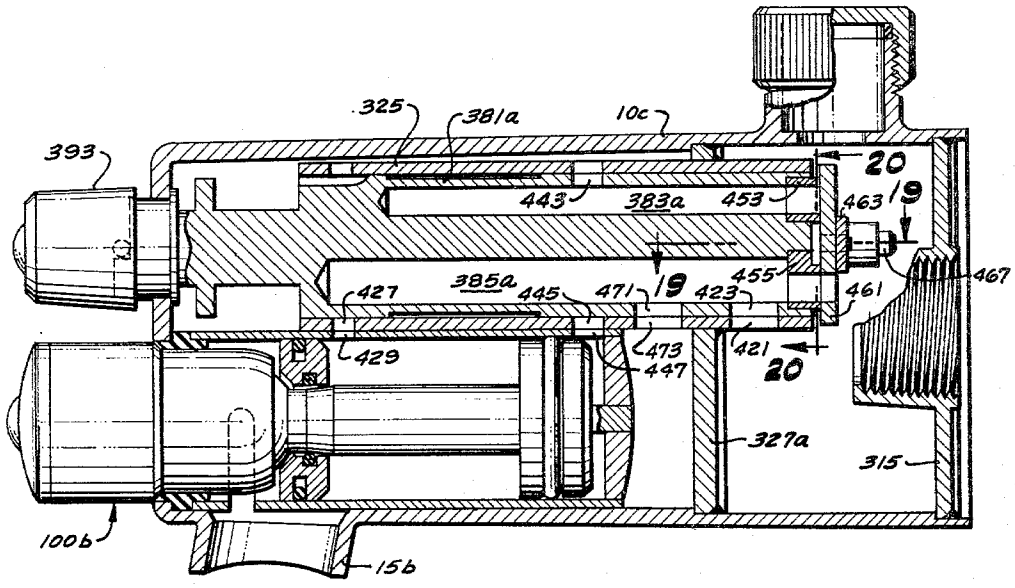


FIG. 19

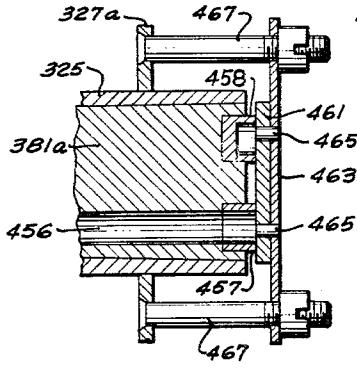
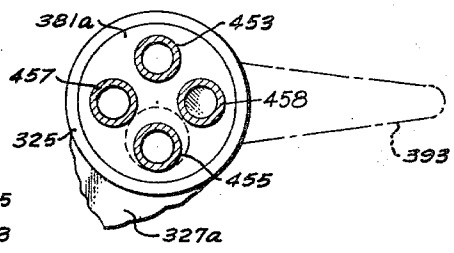


FIG. 20



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United States Patent Office

3,176,924

Patented Apr. 6, 1965

3,176,924

BATHTUB FIXTURE HAVING DOUBLE-ACTING SHOWER HEAD

Joseph M. Canavan, 370 Newport Ave., Hermiston, Oreg.

Filed July 25, 1962, Ser. No. 213,846
11 Claims. (Cl. 239—444)

This invention relates to tub fixtures and particularly to a tub fixture having a spray head. This application is a continuation-in-part of my prior application entitled Bathtub Fixture Having Double-Acting Shower Head, Serial No. 783,468, filed December 29, 1958, now abandoned. Such prior application is a continuation-in-part of my prior application entitled Bathtub Fixture Having Adjustable Spray Head, Serial No. 534,812, filed September 16, 1955, now abandoned.

Prior bathtub fixtures having adjustable shower or spray head units, other than the ones disclosed in my applications above identified, have been very cumbersome, bulky and unsightly.

It is a main object of the present invention to provide a very compact tub fixture having an adjustable spray head, and particularly such a fixture having a spray head which is normally substantially concealed, but which may be extended or projected to a position where it is adjustable for directing spray in various directions onto the tub or the occupant of the tub.

Another object of the present invention is to provide a tub fixture of the type just described in which the spray head attachment is automatically projected when water is supplied to the spray head.

Another object of the present invention is to provide a tub fixture having an adjustable spray head attachment which is simple and inexpensive in construction.

A further object of the present invention is to provide a tub fixture having an adjustable spray head, and equipped with a valve which permits substantially full flow of water to the outlet from the tub fixture in one position of the valve and in another position diverts water in restricted quantities to the spray head.

Another object of the invention is to provide a fixture of the character under consideration having valve means facilitating retraction of the spray head when desired.

The tub fixture of the present invention is characterized by including a fixture body or spout having a main passage for the flow of water from a supply pipe to a tub-filling spout, and a second passage communicating with the main passage in which a spray head unit is movable from an inward inoperative concealed position to a projected exposed position, where it is adjustable to spray water in various directions over the tub or on an occupant of the tub.

Various other objects of the present invention will be apparent from the following description taken in connection with the accompanying drawings, wherein:

FIG. 1 is a side view in elevation of a tub fixture embodying the concepts of the present invention, parts being broken away for convenience in illustration, the spray head unit being disposed in its concealed inoperative position;

FIG. 2 is a front view of the fixture;

FIG. 3 is a fragmentary view of the fixture disclosed in FIG. 1, showing the spray head unit in its projected operative position;

FIG. 4 is a side view of the valve of the fixture;

FIG. 5 is a sectional view taken along line 5—5 of FIG. 2, showing part of the construction of the valve operating handle of the fixture;

FIG. 6 is a side view of a modified form of the invention;

FIG. 7 is a vertical section on an enlarged scale taken along line 7—7 of FIG. 6;

FIG. 8 is a horizontal section taken along line 8—8 of FIG. 7;

FIG. 9 is a development of the surface of a valve element;

FIG. 10 is a vertical section taken along line 10—10 of FIG. 8;

FIG. 11 is a view similar to FIG. 10 but showing the parts in different positions of operation;

FIG. 12 is a horizontal section taken along line 12—12 of FIG. 10;

FIG. 13 is a vertical longitudinal midsectional view of the preferred form of fixture;

FIG. 14 is a front elevational view of the fixture;

FIG. 15 is a vertical section taken along line 15—15 of FIG. 13;

FIG. 16 is a vertical section taken along line 16—16 of FIG. 13;

FIG. 17 is a vertical section taken along line 17—17 of FIG. 13;

FIG. 18 is a vertical longitudinal midsectional view of a modified form of the invention;

FIG. 19 is a fragmentary horizontal section taken along line 19—19 of FIG. 18; and

FIG. 20 is a fragmentary vertical section taken along line 20—20 of FIG. 18.

Referring to FIGS. 1 through 5, the tub fixture disclosed includes a fixture body in the form of a spout 10 having a base end for engagement with a wall 11. The spout is formed with a main passage 13 of circular cross section (not so shown in the drawings) which in the unmounted condition of the fixture communicates with a cavity 14 in the base end of the spout. The passage 13 terminates at the left-hand end thereof, as the parts are shown in FIG 1, in a tub-fitting spout outlet 15. The walls of the passage 13 are threaded at the rear portion thereof so that the spout may be connected to a water supply pipe 17 projecting from the wall 11.

Rotatably mounted in the passage 13 is a sleeve valve 21 having its rear or right-hand end (FIG. 1) open and its forward end closed by a disk-shaped portion 23. The side wall of the sleeve is formed with a large opening or port 25 which registers with the outlet 15 in one rotary position of the sleeve to allow water to pass through the valve to the outlet. The side wall of the sleeve valve 21 is also formed with a relatively narrow slot 31 for a purpose to presently appear. Slot 31 is shown as being an extension of port 25.

A stud 33 is formed as an integral axial extension of the sleeve valve and projects through an opening in the forward wall of the spout. On O-ring seal 35 is provided around the stud to prevent leakage between the stud and the body of the fixture. A valve operating handle 37 is secured to the free end of the stud 33 by screw 39 and is provided with an elastomer detent 41 (FIG. 5) which is adapted selectively to seat in one of three spaced recesses 43 formed in the front wall of the spout. More will presently be said about the detent and the recesses.

The fixture body preferably is formed with flat sides 47, see FIG. 2, so that a wrench may be applied to such flat surfaces in mounting the body on the supply pipe 17.

The spout or fixture body is formed with a second cylindrical passage 61 located above the first passage 13 and generally parallel thereto, and thus the passage 61 extends generally longitudinally of the spout or fixture body. Passage 61 is blind at its right-hand end, as the parts are shown in FIG. 1, but opens through the front wall of the spout. The rear or right-hand end of the passage 61 is connected to the main passage 13 by a small port 63, and the sleeve valve 21 is formed with a small opening 65 which is adapted to register with the port 63 when the sleeve valve is in the position shown in FIG. 1, that is, in position for allowing the discharge of water through the

outlet 15. The purpose of this small opening will presently be explained.

A spray head unit is mounted in passage 61 for movement from the inner substantially concealed position of FIG. 1 to the forward or outer exposed position of FIG. 3. The spray head unit includes a piston 67 having a pair of elastomer O-rings 69 fitting in an annular groove thereabout and against the wall of the passage 61 to form a seal therebetween.

The piston 67 is centrally apertured and fixed within this aperture is the shank 71 of a ball 73, the ball and shank being formed with a central passageway 75. Fitting onto the ball 73 is a socket 77 provided by the rear end of a generally cylindrical spray head housing 79. The right-hand end of the housing is formed with a circular opening 81 to enable the housing to have universal movement on the ball 73 when the spray head is moved outwardly to the FIG. 3 exposed position.

An O-ring 85 fits within an annular groove formed in the walls of passage 61 and slidably and sealingly engages the outer wall of the housing 79, and in addition serves as a guide for the housing. A relief hole 87 is formed in a forward projecting nose portion formed on the spout or tub fixture body and communicates with the space between the housing 79 and the walls of passage 61 to keep the chamber drained and also to enable air readily to be drawn into such space or expelled therefrom during movement of the piston 67 from an outward to an inward position and vice versa.

Threadedly fitting within the front end of the housing 79 is a spray forming assembly including a cup-shaped member 91 having a plurality of ports 93 formed in the base thereof and having the inner wall surface thereof formed with a frusto-conical portion against which an insert 95 fits. The insert is formed in its periphery with a plurality of equally spaced, axially extending grooves 97. The insert is held in place by a screw 99 and cooperates with the cup-shaped member so that the grooves 97 provide a plurality of fine water outlets which form the desired spray when water is supplied to the spray-forming assembly through the passageway 75 in the ball 73. A compression spring 101 is arranged between the cup-shaped member 91 and a washer 103 which bears against the ball 73.

With the parts in the positions shown in FIGS. 1 and 2, water supplied through the supply pipe 17 will flow through the sleeve valve 21 and out through the port or opening 25, in the valve, and through the outlet 15. It is pointed out that the special valve provided enables full flow of water through the outlet 15 because of the thinness of the walls of the sleeve valve. Water will not flow through the port 65 into passage 61 because, first the pressure of the water at this point is low and, secondly, the right-hand edge portion of the sleeve valve diverts the water inwardly and thus tends to create a void over the relief hole 65.

If it is desired to provide a spray, the handle 37 is swung from the position shown in FIG. 2, 180 degrees so that the detent 41 rests in the opposite recess 43 and the sleeve valve is positioned with its slot 31 in alignment with the port 63 and a wall portion in closed relation over the outlet 15. This action forces the water supplied from the pipe 17 into the port 63 and through the ball and socket joint to the spray-forming assembly to provide a spray. The parts are so dimensioned that a sufficient pressure is built up behind piston 67 to force the piston and thus the entire spray head unit outwardly to the position shown in FIG. 3. The left-hand O-ring 69 engages the O-ring 85 and limits outward movement of the spray head unit. The spray head unit and particularly the ball and socket device is exposed to permit housing 79 to be manipulated or adjusted to direct spray in various directions around the tub or on the occupant of the tub.

After the need for the spray has ceased, the handle 37 may be swung back to the FIG. 2 tub-filling position, and

the water from supply pipe 17 may be cut off by operation of the valves conventionally provided in association with the tub fixture.

The fixture of the present invention is also adapted to permit water to be conducted to an overhead shower arrangement if such an arrangement is provided. Assuming that one is provided, it would have a connection with the supply pipe 17 and water would normally be conducted to the overhead shower pipe by manual operation of a valve which is frequently provided on conventional tub spouts. In order to conduct water to an overhead shower pipe, it is only necessary, with the valve of the present invention, to swing the handle 37 to a position where the detent 41 registers with the middle recess 43. In this position, the outlet 15 is closed by the wall of the sleeve valve and the valve has not been turned quite enough to bring the slot 31 into register with the port 63, so that the entire spout is closed. Thus, water will be forced into the overhead shower pipe thus enabling the occupant to have the benefit of an overhead shower. However, if the occupant desires to wash his hair, clean the tub or bathe small children, he will find the spray head unit of the present invention more convenient. The structure described in the above paragraph is not shown in the drawings.

General description of modified form of invention

There are many O-ring seals in the modified form of the invention and for the sake of simplicity, reference numerals will not be applied to such O-rings. However, when the term "sealingly engages" or similar terminology is employed, this will imply the presence of an O-ring or O-rings.

Referring to FIGS. 6 through 12, the fixture shown includes a body 10*a* formed with a lower passage 13*a* and an upper passage 61*a*. The lower passage 13*a* terminates in downwardly directed spout outlet 15*a*. A spray head unit generally entitled 100 is mounted on a piston 67*a* which slidably and sealingly engages the walls of the passage 61*a* for movement of the spray head unit from an inner substantially concealed position, as shown in FIG. 10, to an outer exposed position, as shown in FIG. 11. This projecting movement is accomplished by proper operation of a valve assembly generally entitled 102. By such operation of the valve assembly, water under pressure can be directed rearwardly behind the rear face of a second piston 105 which is connected to the first piston 67*a* by a pair of rods 107 which are best shown in FIG. 8. Also by proper manipulation of the valve assembly 102, the piston will cause the spray head unit to be retracted.

Specific description

The passage 61*a* is a through passage, and the rear end of this passage is closed by a disk 111 sealingly fitting within the passageway 61*a* against a shoulder 113 formed in the passageway. The disk is retained in place by a circular fitting 115 which fits within a large circular opening formed in the base end of the body 10*a* and against a shoulder 117 in this opening. A retaining ring 119 with appropriate tool slots 120 threads into the rear end of the body 10*a* to hold the fitting 115 in place. The fitting is provided with a rearwardly projecting internally threaded portion 121 for mounting on a water supply pipe, not shown.

The fitting also has a lower forwardly projecting tubular portion 122 sealingly extending into the rear end of the passage 13*a* so that water from the supply pipe is directed into the passage 13*a*.

The valve assembly 102 includes a movable valve element 131 of generally ovate shape, as is apparent from FIG. 7. A valve stem 133 projects into a cylindrical bore 135 formed in the valve element and threads into a cylindrical nut 137 fitting in the bore 135. The stem is provided with a knob 139 at its upper end by which the valve

element may be raised from its lower position in FIG. 10 to its raised position in FIG. 11 to dispose the valve element in register with a generally ovate opening 141 formed in a seat member 143 to close the opening. The seat member sealingly fits within the passageway 13*a* against a shoulder 145 formed at the forward end of the passage.

The seat member is provided with a drain hole 147 which is disposed in register with a drain hole 149 formed in a wall 151 of the body 10*a*. This wall 151 separates the passages 61*a* and 13*a*. Further mention of the drain holes will be made later.

The valve assembly further includes a second valve element 161 of cylindrical form which is provided with a vertical bore 163 of larger diameter than the stem 133 and through which the stem extends. The valve element 161 is mounted for turning movement about its vertical axis, and to this end, the lower portion of the valve element sealingly projects into an opening formed in the wall 151, and the upper portion of the valve element is reduced and rotatably projects through a mounting nut 165. The mounting nut threadedly fits within a hole formed in a top wall 167 of the body 10*a* in sealing engagement with this wall and also with the upper reduced portion of the valve element 161.

The base of a handle 171 is formed with a recess to fit over the nut 165 and also over the upper end of the valve element 161. A packing nut 173 threadedly fits into a threaded recess formed in the upper end of the valve elements 161 and presses packing 175 into engagement with the stem 133 to form a seal therewith. The packing nut also has an upper flange which holds the handle 171 in place in slight spaced relation with respect to the body 10*a* and also the nut 165. The handle facilitates turning the valve element 161 about its vertical axis.

The valve element 161 rotatably fits within a vertical bore formed in a valve body 181 which is of cylindrical form to cooperatively fit in sealing relation within the passage 61*a* with the axis of the valve body coinciding with the axis of the passage.

Referring to FIGS. 10 and 12, the valve element 161 has a flange 183 adjacent the upper end of the valve element which rests on a shoulder formed on the interior of the body 181 to support the valve element 161.

A stop pin 185 on the body 181 projects into an arcuate recess 187 formed in the flange 183 as is apparent from FIG. 12. The recess has an arcuate length of 90 degrees plus the diameter of the pin, so that the valve element may be swung 90 degrees from the position shown in FIG. 10 to the position shown in FIG. 11.

The valve element 161 is formed with a port 191, best shown in FIG. 10, which communicates with the bore 163 of the valve element and also with a port 193 formed in the valve body 181, when the valve element is disposed in its FIG. 10 position. It is apparent that water under pressure can pass upwardly into the bore 163 and rearwardly through the ports 191 and 193 to be effective against the piston 105, when the valve element 161 is in its FIG. 10 position.

Referring to FIGS. 9 and 10, the valve element 161 is also formed on its exterior surface with an irregular groove including an upwardly extending vertical portion 203, a circumferential portion 205, and a downwardly extending vertical portion 207, which is located 180 degrees from the vertical portion 203. The groove also includes a circumferential portion 209 extending in opposite directions an arcuate extent of 90 degrees from the lower end of the vertical groove portion 207. In other words, the circumferential portion 209 has an arcuate length of 180 degrees.

As is evident from FIG. 10, the lower end of the groove portion 203 communicates with the interior of a tube 211 which fits within an appropriate bore formed in the valve body 181. The tube sealingly and slidably projects through the piston 105 and has an oblique right-hand end face next to the disk 111 for a purpose to be described presently.

It is further apparent from FIG. 10 that the valve element groove extends around the valve and then downwardly so that the lower end of the groove portion 207 is placed in communication with an angular port 213 formed in the valve body 181, the angular port communicating with the drain holes 149 and 147, previously mentioned.

When the valve element 161 is turned 90 degrees to its FIG. 11 position, a port 221 formed in the valve element communicates with the interior of the tube 211, and a port 223 communicates with a port 225 formed in the valve body. The port 225 communicates with the interior of the forward portion of the passage 61*a*. The forward portion of the passage is, of course, in communication with the interior of the shower head unit as is apparent from FIG. 10.

With the valve element disposed in its FIG. 11 position, the port 193 is in communication with one end of the circumferential groove 209, the other end of which is in communication with the angular port 213.

As previously mentioned, the rods 107 connect the pistons 67*a* and 105. These rods slidably and sealingly project through appropriate bores formed in the valve body 181 as is apparent from FIG. 8.

The shower head unit 100 includes a ball member 73*a* threadedly mounted on the piston 67*a* and having a central bore for the passage of fluid therethrough. There is a socket member 79*a* disposed in sealing engagement with an O-ring 85*a* on the body 10*a*. A perforated disk 231 threads into the socket member 79*a* and compresses a spring 101*a* against a washer 233 which presses an O-ring 235 against the ball member 73*a*.

An annular molded rubber or plastic insert 241 has an outwardly projecting flange fitting within a groove 243 formed in the interior of the socket member 79*a*. The insert is formed with a plurality of spray holes 244 so that water passing through the insert is broken up into a spray. A retaining disk 245 is held by a screw 247 against the perforated disk 231 to retain the insert 241 in place. The insert prevents minerals in hot water from clogging the spray openings.

In operation, it may be assumed that the parts are disposed in the positions they occupy as shown in FIG. 10. If it is desirable to provide a spray and also to project the spray head so that the socket member 79*a* may be turned to direct the spray as desired, the valve element 131 is raised and the valve element 161 is turned 90 degrees to its FIG. 11 position. This means that water under pressure in passage 13*a* passes upwardly into the bore 163 of the valve element 161 and passes rearwardly through port 221 and tube 211 to apply pressure against the rear face of the piston 105. The oblique rear face of the tube 211 permits the ready exit of water from the rear end of the tube 211 into the passage 61*a*.

Water in the bore 163 also passes forwardly through the ports 223 and 225 through the spray head unit. As the piston 105 moves forwardly from its FIG. 10 to its FIG. 11 position to project the spray head, water in the portion of the passageway 61*a* between the piston 105 and the valve body 181 exhausts through the port 193 in the valve body and through the groove in the valve element 161, and specifically through the lower circumferential groove portion 209 which communicates with the angular drain port 213.

To retract the head, the valve element 161 is turned to its FIG. 10 position so that water under pressure in passageway 13*a* now passes through ports 191 and 193 against the front face of the piston 105 to urge the spray head to retract. Water disposed within the portion of the passage 61*a* between the rear face of the piston 105 and the disk 111 may pass through the tube 211 and thence upwardly through portion 203, around in groove portion 205, downwardly in groove portion 207 and out through the drain port 213 and the drain holes 149 and 147. Water which

happens to be contained within the forward portion of the passage **61***a* between the piston **67***a* and the valve body **181** can, of course, exit through the front of the spray head or downwardly through the groove portion **207** into the drain ports **213**.

FIGS. 13–17 show the preferred form of fixture having a hollow elongate body **10***b* which is open at the back but closed at the front by a front wall **313**. The body has a depending spout **15***b* at its front end for the discharge of water into a tub therebeneath. A base plug **315** (FIG. 13) fits in the rear end of the body against a shoulder and is secured in place such as by solder. The base plug has a central threaded portion **321** to thread on a supply pipe, such as the outlet water pipe of a tub. The base plug has a laterally ovate opening **322** for the passage of water therethrough. However, prior to the base plug **315** being installed, a main assembly is inserted into the body. This assembly includes a double-barreled unit comprising a cylinder **323** and a tubular valve chamber member **325** of smaller diameter than the cylinder and of approximately the same length but secured to the cylinder in offset relation to the front end of the cylinder. The rear portion of the chamber member **325** thus projects beyond the rear end of the cylinder and such rear portion is of enlarged outer diameter and projects through and fits in a hole in a disk **327**. The disk fits against a shoulder **329** on the body and is secured in place such as by solder.

The front end of the cylinder carries a seal **331** which abuts against the front wall **313** and fits in an opening formed in the front wall. Slidably received by the seal **331** is a spray head housing **79***b* of a spray head unit generally indicated by the reference numeral **100***b*. The housing **79***b* has a socket formed at its rear end fitting on a hollow ball **73***b*. The socket and ball are maintained in engagement by a compression spring **341** which bears at its front end against a retainer disk **343** and at its rear end against a washer **345**. The washer presses a seal **347** against the ball **73***b*. The retainer disk **343** is formed with suitable flow openings and is held in place by a snap ring **349**. A screw **351** holds a spray disk **353** in the front end of the housing **79***b*.

The ball **73***b* threads onto the front end of a tubular piston rod **361** which fits at its rear end into a piston **67***b* and is secured thereto. The piston has an O-ring seal **69***b* engaging the interior of the cylinder **323**.

Forward movement of the piston is limited by a piston stop disk **363** having a snap ring **365**. The ring is provided with ears **367** (FIG. 16) to fit within slots **369** formed in the cylinder **323**.

The tubular piston rod **361** extends through a hole in the stop disk, and the major portion of the rod is of such a diameter as to form a seal with an O-ring **370** provided on the interior of the stop disk. However, the forward portion **361***x* of the rod is of reduced diameter to provide space between the rod and the O-ring when the rod is in its fully retracted position. The purpose of this space will be presently explained.

Fitting in the rear end of the cylinder **323** is the head **371** of a flow restricting member having a shank portion **373** projecting into the rear end portion of the piston rod. The shank portion is of lesser diameter than that of the bore of the rod to provide an annular space between the shank and bore. The purpose of the flow restricting member will be explained presently.

A valve means is provided for the fixture for the purposes of (1) cutting off flow of water to the spray head and the tub spout **15***b*, (2) providing for flow of water to the tub spout without flow to the spray head, or (3) providing for flow of water to the spray head without flow to the tub spout. This valve means includes the tubular valve chamber member **325** (previously mentioned) which rotatably supports a cylindrical valve element **381** having two parallel co-extensive bores **383** and **385** which are blind at their rearward or right-hand ends.

Any suitable sealing arrangement may be provided between the valve element **381** and the chamber member **325**. For instance, the rear ends of the element and member may be tapered as shown, or the element and member may be machined to close tolerances, or other sealing means may be used.

The front or left-hand end of the valve element is formed with a short cylindrical bore of a diameter equal to the distance between the remote wall portions of the bores **383** and **385**. Secured in the front end of the valve element **381** in such bore is the rear cylindrical portion **387** of a valve element extension member **389**. The member **389** has a rearwardly projecting plug portion **390** of a size to fit in bore **385** to close off communication of the forward portion of such bore with the exterior of the valve element via a notch **391** which is formed in the wall of the valve element **381** for a purpose to appear presently.

The extension member **389** extends forwardly through a bushing **392** fixed in the front wall **313** of the body **10***b*, and has a handle **393** secured thereto, as shown. Suitable sealing means in the form of a collar is provided on the valve stem member to prevent leakage around the valve stem in the bushing **392**. A stop pin **395** (FIG. 17) projects laterally from the extension member and fits into a recess **397** cut in the outer end wall of the bushing **392**. The recess is of such a circumferential length that the handle **393** can be swung an arcuate distance of 180 degrees.

The rear end of the valve element **381** has a lug **401** disposed eccentric to the axis of the valve element **381** and fitting under a valve lifter **403** of inverted U-shape (FIG. 15). The depending legs of the lifter **403** are guided by guide lugs **404** projecting rearwardly from the disk **327**. The legs fit in slots formed in a secondary valve element **405** and are secured to such element. The secondary valve element is of generally oval shape in end elevation as is apparent from FIG. 15. The secondary valve element **405** cooperates with an oval valve seat **407** which is formed on the disk **327** and which defines a flow opening **408**. When the secondary valve element is in register with the seat **407** it cuts off the supply of water to the spout **15***b*. However, when the parts are in the position shown in FIG. 13, which corresponds to the full line horizontal position of the handle **393** in FIG. 14, the opening **408** is open. Under these circumstances water flows through spaces **409** (FIG. 16) located between the exterior of the cylinder **323** and the interior of the body **10***b*, and then passes out the spout **15***b*.

When the handle **393** is turned 90° from its FIG. 14 full line horizontal position to the vertical broken line position, the lug **401** (FIG. 15), which is elongated in a direction transverse to the length of the valve element **381** will raise the auxiliary valve element **405** upwardly sufficiently to close the opening **408**. Once the auxiliary valve element **405** is raised, the water pressure against the rear face of the element will force it against its seat **407** with sufficient force to hold it in its raised position despite lowering movement of the lug **401**.

Returning for a moment to the position of the parts in FIG. 13 (the tub filling position), water not only passes directly to the tub spout in this position of the parts, but water also passes through a port **421** in the valve chamber member **325** and through a port **423** in the valve element **381** into the bore **385**. This water passes through the bore **385** and to and through aligned ports **425**, **427** and **429** formed, respectively, in the valve element **381**, valve chamber member **325** and cylinder **323**. This water flows past the reduced portion **361***x* and out through a slot **431** formed in the cylinder **323**. Slot **431** is in registry with the spout **15***b*. This water washes off the spray head to insure that no soap is left on it to annoy the next occupant of the shower, and keeps that section of the cylinder clean.

Operation

To commence any water supply operation through the fixture, the main hot and cold water supply handles (not shown, but conventionally provided above the tub fixture)

are opened to supply water at the desired temperature to the fixture. Part of the operation of the fixture has been previously explained. However, in brief review, at the start, when the handle 393 is in its FIG. 14 horizontal full line tub filling position, the parts are disposed as shown in FIG. 13 so that water from the supply pipe flows through opening 322 in the base plug 315 and thence through the opening 408 in disk 327, around cylinder 323 and out of the tub spout 15*b*. Water also flows through the bore 385 and thence downwardly and around the spray head 79*b* to wash it and then flows out the spout 15*b*.

To stop the flow of water to the tub, the handle 393 is swung 90° clockwise to its FIG. 14 vertical broken line closed position, so that the lug 401 raises the auxiliary valve element 405 to close opening 408 and thus cut off flow of water to the spout 15*b* via opening 408. Turning the valve element 381 90° moves port 423 of the valve element 381 out of register with port 421 of the chamber member 325 to cut off flow of water to the tub spout 15*b* via the passage 385.

When it is desired to provide a shower, the handle 393 is swung 90° farther clockwise to its FIG. 14 horizontal broken line shower position. As a consequence, the lug 401 is moved to a horizontal position somewhat like that in FIG. 15 but above the axis of the valve element rather than below the axis. However, this has no effect on the auxiliary valve element 405, because, although the lug retreats from the midportion of the lifter 403, the lifter remains raised since the frictional contact of the auxiliary valve element 405 against its seat 407 (caused by the water pressure behind the seat) will retain the auxiliary valve element and its lifter in their raised positions.

Movement of the handle 393 to its FIG. 14 horizontal broken line position also brings a port 441 in the valve element 381 into register with the port 421 so that water passes into the bore 383 (which now occupies the position of the bore 385 in FIG. 13). This water passes through a port 443 in the valve element and through ports 445 and 447, formed, respectively, in the chamber member 325 and the cylinder 323, into the rear end of the cylinder behind the piston 67*b*. Because of the flow restricting member 371, 373, water pressure builds up behind the piston to provide sufficient pressure to overcome the static friction of the spray head unit and move the piston and unit forwardly. The extent of travel of the piston 67*b* is such that it moves beyond the shank 373 to fully open the bore of the piston rod 361. Thus, the spray head is ejected from the body 10*b* to a position in which it can be turned to a desired position by the user, and water is supplied to the spray head to provide an appropriate spray of water. Despite the fact that the bore of the rod 361 is fully open when the spray head is ejected, there is still sufficient pressure behind the auxiliary valve element 405 to hold it in its elevated closed position.

While the piston 67*b* is advancing to the left, water in the cylinder to the left of the piston can escape through the ports 425 and 427 and the notch 391 and pass out through the tub spout 15*b*.

If it is desired to temporarily discontinue showering, the handle 393 is turned counterclockwise 60° (as parts are shown in FIG. 14) to stop the supply of water to the spray head.

To retract the spray head unit, the handle 393 is swung counterclockwise back to its FIG. 14 full line position so that the parts assume the positions shown in FIG. 13 (with the exception of auxiliary valve element 405, which remains closed). Water now passes into the bore 385 and into the cylinder in front of the piston 67*b*. This forces the piston rearwardly, and the small amount of water trapped behind the piston merely escapes through the piston rod and drains out the head.

Now that the showering and/or tub filling operations are over, the main water supply handles can be turned off, and the resulting drop in pressure behind the auxiliary valve element 405 decreases the pressure of contact of such element against its seat 407 to permit the element to drop to its lower FIG. 13 position. This conditions the fixture for subsequent operations.

The flow restricting member 371, 373 is particularly useful in areas of low water pressure, and in any event causes faster ejection of the spray head. However, if high or adequate water pressure is available, the restricting member can be eliminated and the rear end of the cylinder merely closed off.

FIGS. 18–20 show a modified form of the invention which in overall structure resembles the preferred form of the invention. It includes a body 10*c* closed at its rear by a base plug 315. Within the body is a double-barreled unit including a cylinder 323 and a valve chamber member 325, the latter projecting through a disk 327*a*.

A valve element 381*a* is rotatably supported by the chamber member 325 and operated by a handle 393. The element has bores 383*a* and 385*a* which are blind at their left-hand ends. The bore 385*a* has a port 423 in register with a port 421 in the chamber member in the tub filling position of the ports as shown in FIG. 18. The rear end of the bore 383*a* has inserted therein a seat 453 whereas the rear end of the bore 385*a* has inserted therein a seat 455.

The valve element 381*a* has a third bore 456 (FIG. 19) located 90° from the bores 383*a* and 385*a*. There is a seat 457 in the rear end of the bore 456. There is also a blank 458 or false seat 180° from seat 457 as is apparent from FIG. 20 to keep member 461 in alignment.

In sealing contact with the seats is a circular valve member 461 which is pressed against the seats by a spring strip 463 to which it is secured by pins 465. The spring strip is mounted on a pair of posts 467 which are mounted on the disk 327*a*. The valve member has a single port 469 (FIG. 18).

Operation

The FIG. 18 position of the ports is the tub filling position. In such position, the port 469 registers with the seat 455 to supply water to the bore 385*a* which through ports 471 and 473 communicates with the space rearwardly of the cylinder 323. Water flows from such space along both sides of the cylinder to the spout 15*b*.

To eject the spray head and provide a shower, the valve element 381*a* is rotated 180° so that seat 453 now registers with the port 469. Water passes into the bore 383*a* (which is now lowermost) and passes through a port 443 in the valve element and ports 445 and 447 into the rear of the cylinder to push the piston to the left and supply water to the spray head.

To retract the spray head, the valve element 381*a* is rotated 90° to bring the seat 457 into register with the port 469. Water now passes through the third bore 456 and out through a port 477 and then through ports 427 and 429 to push the piston to the right to retract the spray head.

It is apparent that the only time that water is supplied to the tub spout 15*b* is when the seat 455 is in register with the port 469. It is further apparent that when the valve element is rotated so that the seats 453 and 457 flank the port 469 all the seats are now closed, and since port 423 is not now in register with port 421, water is cut off from both the spray head and the tub spout.

Having described the invention in what is considered to be the preferred embodiment thereof, it is desired that it be understood that the invention is not to be limited other than by the provisions of the following claims.

I claim:

1. A tub fixture comprising a fixture body having a base end adapted to be mounted on a water supply pipe, said body being formed with a main passage having a first passage portion for conducting water from said supply pipe to a second passage portion which is angularly

related to said first passage portion and which provides an outlet for the discharge of water from said first passage portion, said outlet being located in the opposite end of said body, said body being formed with a second passage parallel to said first passage portion and opening outwardly of said body at said opposite end at a place forwardly of the forward end of said first passage portion, said second passage being connected to said main passage, a spray head unit slidably mounted in said second passage for movement from an inner concealed position to an outer exposed position and being adjustable in said latter position to spray water in various directions, and a sleeve valve movably mounted within said main passage for selectively controlling the flow of water from said main passage to said second passage and from said main passage to said outlet, said valve having a flow passage approximately of the size of said main passage and communicating therewith and a port of approximately the size of said outlet and registering therewith in a given position of said valve, said valve having a stem projecting through the front wall of said body, and a handle on said stem disposed beneath the forward portion of second passage so as not to interfere with the adjustment of said spray head unit.

2. A tub fixture for mounting on the horizontal water supply pipe of a tub, said fixture comprising an elongated fixture body having a forward end and rearwardly located base end, means for mounting said body in an axial horizontal position on the water supply pipe with said forward end projecting away from said pipe, said body being formed with a first horizontal passage for conducting water from said supply pipe to a laterally extending downwardly directed outlet formed in the forward end of said body, said body being formed with a second horizontal passage opening outwardly of said body at the forward end face thereof, said second passage being connected to said first passage, and a spray head unit movably mounted in said second passage for movement from an inner substantially concealed position to an outer exposed position, said spray head unit including a first part slidably arranged in said second passage and a second part carrying a forwardly directed spray head, a pivotal joint connecting said parts and being disposed at the outer end of said second passage in the outer position of said unit and providing for adjustment of said spray head from a horizontal position to a downward position generally in the same direction as that of said outlet and also to other positions, and a valve for controlling the flow of water from said first passage to said second passage.

3. A tub fixture comprising a fixture body having a base end adapted to be mounted on a water supply pipe, said body being formed with a main passage for conducting water from said supply pipe to an outlet formed in the opposite end of said body, said body being formed with a second passage opening outwardly of said body at said opposite end, said second passage being connected to said main passage, and a spray head unit mounted in said second passage for movement from an inner concealed position to an outer exposed position, said unit including a piston slidably arranged in said second passage, said unit also including a tubular spray head adjustably connected to said piston so that when exposed it may be moved to different positions angularly related to the axis of said unit, said head in such angularly related positions projecting laterally beyond the confines of the geometric extension of said second passage so that said head slidably engages the wall of said second passage when said unit is retracted so that said head is automatically caused to assume an axial position within said second passage, and valve means for optionally directing the flow of water through said main passage or to said second passage and behind said piston so as to cause said spray head to project from said body.

4. A tub fixture comprising an elongate fixture body having a base end adapted to be mounted in a horizontal position on a water supply pipe, said body being formed with a generally axial main passage for conducting water from said supply pipe to an outlet formed in the opposite end of said body, said body being formed with a second passage parallel with said main passage and opening outwardly of said body at said opposite end, said second passage being connected to said main passage, and a spray head unit mounted in said second passage for movement from an inner concealed position to an outer exposed position and being adjustable in said latter position to spray water in various directions, and a valve for controlling the flow of water from said main passage to said second passage, sealing means between said spray head unit and the wall of said second passage to prevent the escape of water between the spray head unit and the wall of the second passage and confine the water to flow through the spray head unit.

5. A tub fixture comprising a fixture body having a base end adapted to be mounted on a water supply pipe, said body being formed with a main passage for conducting water from said supply pipe to an outlet formed in the opposite end of said body, said body being formed with a second passage opening outwardly of said body at said opposite end, said second passage being connected to said main passage, and a spray head unit mounted in said second passage for movement from an inner concealed position to an outer exposed position, said unit including piston means slidably arranged in said second passage, said unit also including a tubular spray head and a ball-and-socket joint connecting said piston means and said head, said spray head having cylindrical walls having an exterior diameter approximating that of the interior diameter of said second passage, annular sealing means at the outer end of said second passage forming a seal between the walls of said second passage and the exterior surface of said spray head and slidably engaging said spray head so that said spray head is guided accordingly, and valve means for directing the flow of water to said main passage or to said second passage.

6. A tub fixture as set forth in claim 2 in which said second part is slidably received within said second passage so that said second part is automatically returned to an axial position when it is retracted.

7. A tub fixture as set forth in claim 2 in which said first part comprises a piston and in which said second passage is connected to said first passage at a place rearwardly of said piston so that water pressure behind said piston can project said spray head unit from its concealed position.

8. A tub fixture as set forth in claim 7 in which said second part is slidably received within said second passage so that it is automatically turned to an axial position when said second part is retracted.

9. A tub fixture comprising a fixture body having a base end adapted to be mounted on a water supply pipe, said body being formed with a main passage for conducting water from said supply pipe to an outlet formed in the opposite end of said body, said body being formed with a second passage opening outwardly of said body at said opposite end, and a spray head unit mounted in said second passage for movement from an inner concealed position to an outer exposed position, said unit including piston means slidably arranged in said second passage, said unit also including a tubular spray head and a ball-and-socket joint connecting said piston means and said head, said spray head having cylindrical walls having an exterior diameter approximating that of the interior diameter of said second passage, annular sealing means at the outer end of said second passage forming a seal between the walls of said second passage and the exterior surface of said spray head and slidably engaging said spray head so that said spray head is guided accordingly, and valve means for closing off the flow of water through said outlet and for establishing communication

between said first passage and said piston means at a face of said piston means rearwardly of said tubular spray head.

10. A tub fixture comprising a fixture body having a base end adapted to be mounted on a water supply pipe, said body being formed with a main passage for conducting water from said supply pipe to an outlet formed in the opposite end of said body, said body being formed with a second passage opening outwardly of said body at said opposite end, said second passage being connected to said main passage, and a spray head unit mounted in said second passage for movement from an inner concealed position to an outer exposed position, said unit including a piston slidably arranged in said second passage and operable when water pressure acts on one face thereof to move said unit to its exposed position, said unit also including a tubular spray head and a ball-and-socket joint connecting said piston and said head, said spray head having cylindrical walls having an exterior diameter approximating that of the exterior diameter of said second passage, annular sealing means at the outer end of said second passage forming a seal between the walls of said second passage and the exterior surface of said spray head and slidably engaging said spray head so that said spray head is guided accordingly, and valve means for directing the flow of water to said main passage or to said second passage to said one face of said piston, and also being operable to control the flow of water to a second piston for retracting said spray head unit from its exposed position.

11. A water fixture comprising,

a fixture body,

said body being formed with a water inlet and a first water outlet in spaced relation to one another,

a water discharge unit providing a second water outlet,

said water discharge unit being mounted in said body

for movement from a retracted position to a projecting position,

piston means within said body and connected to said unit for projecting and retracting the same,

passageway means in said body for conducting water from said inlet to both of said outlets through said body, and to both sides of said piston means,

a single handle movable to any of three positions,

and valve means actuated by said single handle, and operable when said handle is in one position to cut off communication between said inlet and both said outlets, and operable when said handle is in another of its positions to place said inlet in communication with said first outlet and with the side of said piston means which causes retraction of said discharge unit, but cut off communication with said second outlet, and operable when said handle is moved to still another of its positions to place said inlet in communication with said piston means in a manner to project said water discharge unit and supply water to said second outlet but to cut off communication between said inlet and said first outlet.

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