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Shames et al.

[11] **3,722,800**

[45] **Mar. 27, 1973**

[54] **SHUTTLE-TYPE DIVERTER VALVE FOR USE WITH HANDLE-CONTROLLED SPRAY**

[75] Inventors: **Harold Shames,** Ardsley; **Sidney J. Shames,** Briarcliff Manor, both of N.Y.; **John F. Logan,** Pequannock, N.J.

[73] Assignee: **Melard Manufacturing Corp. by said Logan,** Bronx, N.Y.

[22] Filed: **May 27, 1971**

[21] Appl. No.: **147,323**

Related U.S. Application Data

[62] Division of Ser. No. 830,216, May 28, 1969, Pat. No. 3,637,143.

[52] **U.S. Cl.**.....**239/447,** 137/625.48

[51] **Int. Cl.**.....**B05b 11/00**

[58] **Field of Search**.....239/282, 285, 530, 534, 570, 239/535, 572, 576, 577, 442, 588, 444, 587, 447, 582, 529, 460; 251/240, 303; 137/625.48, 625.49

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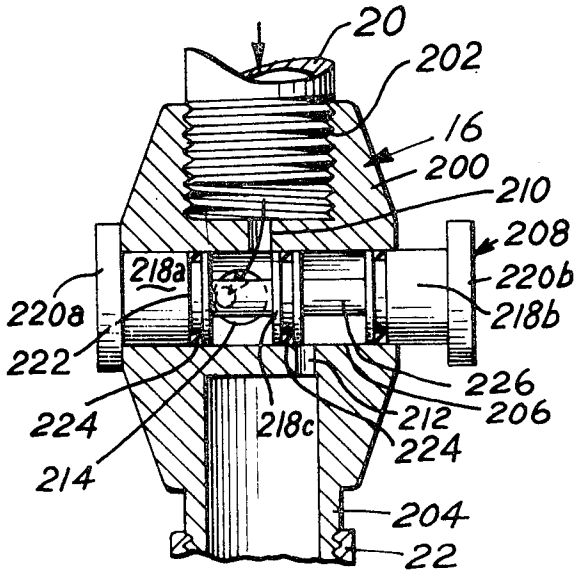
Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—John J. Love
Attorney—Norman Lettvin

[57] **ABSTRACT**

A handle-controlled spray that is normally in closed condition is provided in combination with a shuttle-type diverter valve that selectively provides flow along two paths one leading to the spray and the other to a shower head. The diverter valve controller is of a construction to cooperate with portions of the valve body to define two transfer flow chambers that insure discharge flow along desired paths depending upon the position of the controller.

2 Claims, 13 Drawing Figures



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3 Sheets-Sheet 1

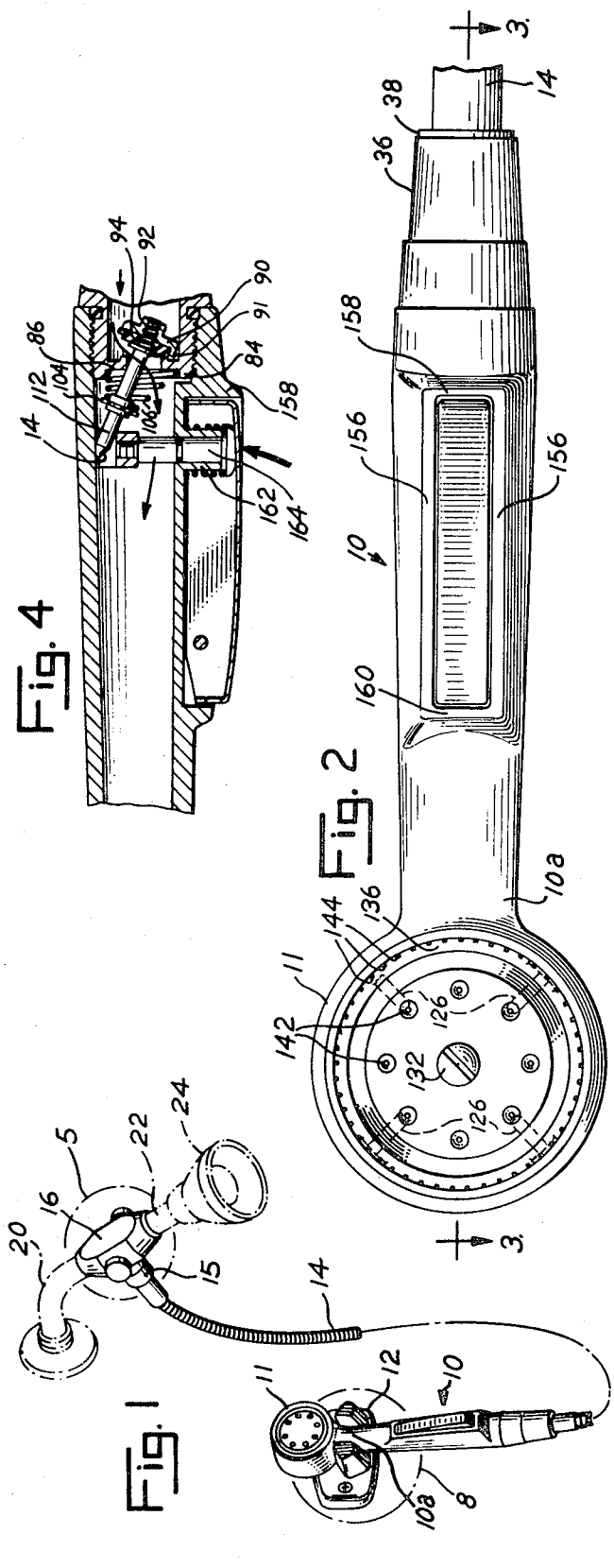


Fig. 1

Fig. 2

Fig. 3

Fig. 4

INVENTORS
HAROLD SHAMES
SIDNEY J. SHAMES &
JOHN LOGAN
BY
Lettvin and Gerstman
ATTORNEYS

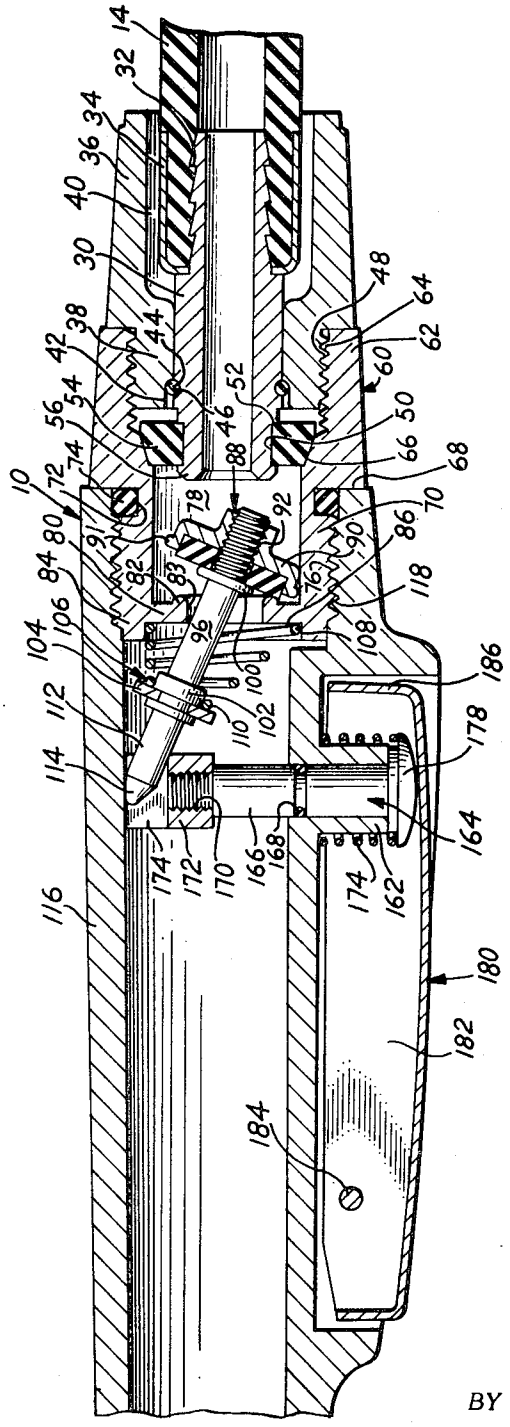


Fig. 4A

INVENTORS
HAROLD SHAMES
SIDNEY J. SHAMES &
JOHN LOGAN

BY Lefkowitz and Gerstman
ATTORNEYS

Fig. 5

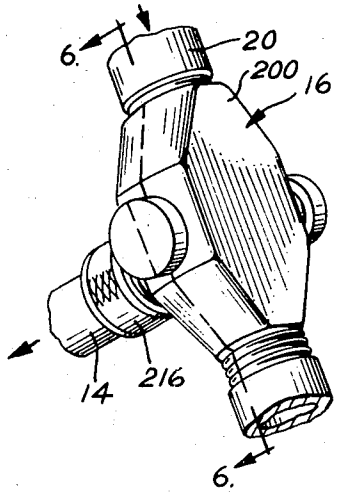


Fig. 6

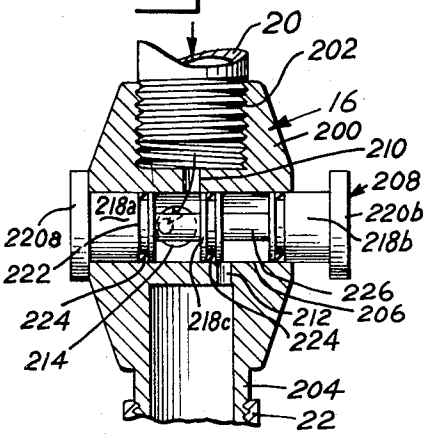


Fig. 7

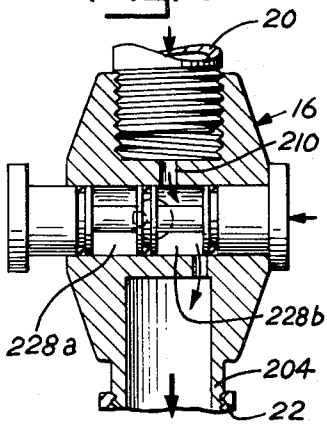


Fig. 8

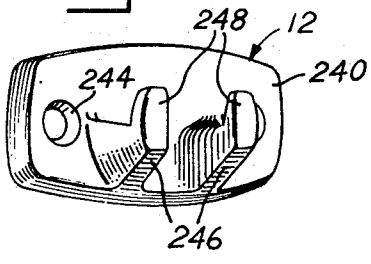


Fig. 9

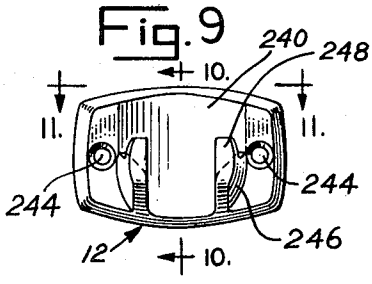
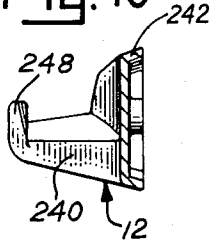


Fig. 10



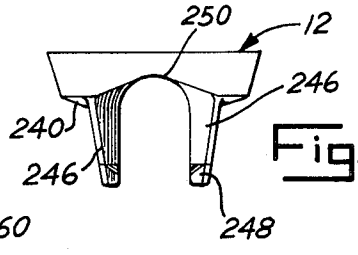


Fig. 11

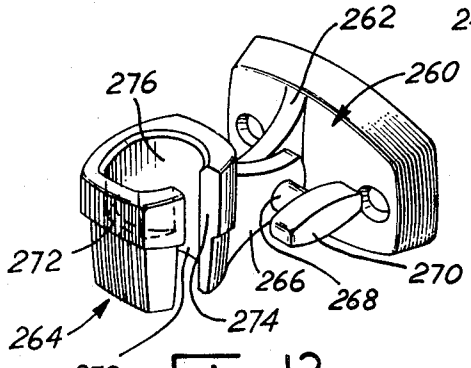


Fig. 12

INVENTORS
HAROLD SHAMES,
SIDNEY J. SHAMES &
JOHN LOGAN
BY
Lothrop and Gaston
ATTORNEYS

SHUTTLE-TYPE DIVERTER VALVE FOR USE WITH HANDLE-CONTROLLED SPRAY

This application is a division of co-pending application Ser. No. 830,216, filed May 28, 1969, now U.S. Pat. No. 3,637,143.

SUMMARY OF THE INVENTION

Handle-controlled sprays have been used heretofore in kitchens and bathrooms. Prior constructions have lacked appeal for use in bathrooms or as shower units either because of lack of a convenient control, inflexibility of adaptability to existing systems, tendency to leak from the spray head, or lack of simplicity, ease or reliability where control was attempted.

It is the purpose of this invention to provide a handle-controlled spray that avoids the aforesaid problems and which provides spray flow therefrom upon exercise of simple and convenient squeeze-type pressure.

Another object of this invention is to provide a handle-controlled spray that is characterized by simplicity and inexpensiveness of construction, and by efficiency of operation.

A further object of this invention is to provide the combination of a handle-controlled spray with diverter valve and support accessories which facilitate the use of such a spray in shower-type facilities.

Further objects and advantages of this invention will become apparent as the following description proceeds and the features of novelty which characterize this invention will be pointed out with particularity in the claims annexed to and forming part of this specification.

A preferred embodiment of the invention is shown in the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a fragmentary perspective view showing usage of the handle-controlled spray in a shower-type installation;

FIG. **2** is an enlarged elevational view of the handle-controlled spray taken looking at the spray face of the device;

FIG. **3** is an axial cross-sectional view of the spray device taken on line **3—3** of FIG. **2** and showing the control valve closed;

FIG. **4** is a fragmentary view similar to a portion of FIG. **3** but showing the control valve fully open;

FIG. **4***a* is similar to FIG. **4** but greatly enlarged;

FIG. **5** is an enlarged perspective view of the diverter valve shown located in the circle numbered **5** in the installation of FIG. **1**;

FIG. **6** is an axially cross-sectional view taken on line **6—6** of FIG. **5** showing the valve at one of its two alternate positions, namely the one for directing flow to the spray of FIGS. **1–4**;

FIG. **7** is a view similar to FIG. **6** but showing the valve in the other of its two alternate positions, namely the one for directing flow to the shower head shown in FIG. **1**;

FIG. **8** is an enlarged view of the spray holder shown located in the circle numbered **8** in the installation of FIG. **1**;

FIG. **9** is a front elevational view of the holder shown in FIG. **8**;

FIG. **10** is a cross-sectional view taken on line **10—10** of FIG. **9**;

FIG. **11** is a top plan view taken on line **11—11** of FIG. **9**, and

FIG. **12** is a perspective view of an adjustable holder for the spray which is operable to keep the valve of the spray open without being held and thus permits use of the spray as a shower.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, FIG. **1** illustrates a spray **10** that is being supported in a non-use position by a wall-mounted bracket **12** whose details are more fully disclosed in FIGS. **8–11**. The spray **10** is supplied by a supply hose **14** of a length to permit desired operations and which connects at its upstream end to a diverter valve **16** whose details are shown in FIGS. **5–7**.

In the installation of FIG. **1**, water is supplied from an elevated wall-mounted type of conduit **20** to one end of the elongated diverter valve **16**. A tubular stud **22** extends from the other end of diverter valve **16** and supplies water to a shower head **24**. The supply hose **14** connects to the diverter valve **16** intermediate its ends through a tubular stud **15** that extends transversely of the length of the valve **16**. The downstream end of hose **14** connects to the upstream end of spray **10**. The downstream end of spray **10** has a spray head **11** that is diametrically enlarged relative to the adjacent neck **10***a* of spray **10**, and which head **11** engages and is supported by spaced support fingers of a wall-mounted spray-support bracket **12**.

Referring now to the spray whose features are shown in FIGS. **2–4**, the supply hose **14** is shown as being provided at its downstream end with an elongated tubular stud or shank **30** having on the outer periphery thereof a series of annular downstream facing barbs **32**. The downstream end of hose **14** is clamped between the barbed portion of tubular stud and a ferrule **34** in a manner well known in the art. An axially elongated nut **36** with a radially reduced portion **38** is arranged to be rotatably mounted on the shank **30**. The upstream end of nut **36** has an enlarged bore portion **40** that operates to shield ferrule **34**. The downstream end of the nut **36** is provided with a recess **42** which receives or fits over a snap-ring **44** held in a groove **46** defined on the tubular stud **30**. The nut is provided with exterior threads **48**. The downstream end of stud **30** has a reduced portion **50** to provide an upstream shoulder **52**, and a sealing washer **54** is positioned on reduced portion **50** against shoulder **52**. The terminal end of stud **30** is flared at **56** for retaining the sealing washer **54** in position.

The nut **36** connects to a valve-mounting insert generally indicated at **60** which is provided with an upstream annular portion **62** having threads **64** for cooperation with threads **48** on the nut. A frusto-conical sealing surface **66** is provided facing generally upstream and against which the sealing washer **54** abuts. The insert **60** is provided with an outer annular abutment shoulder **68** and a downstream annular portion **70** having defined therein an annular recess **72** into which is fitted an O-ring **74** for purposes of sealing. The downstream portion **70** has attachment thread **76** thereon for connection to the upstream end of the spray. The insert **60** thus defines a flow chamber **78** that is bounded at its downstream end by an annular

web **80** having an upstream facing valve seat **82** defined thereon with a central flow passageway **83** therethrough. Downstream of the web **80** there is an annular axially extending flange **84** that surrounds the annular spring seat **86**. The valve-mounting insert **60** carries a valve member **88** having a cup-shaped valve head **90** with a plurality of outwardly extending spaced ribs **91** which limit the head **90** from engaging the inner wall of the insert **60**. The valve head **90** has an internally threaded central boss **92** and head **90** carries an annular valve seal **94**. An elongated assembly stem **96** is threaded in boss **92** and extends through flow passageway **83** into the interior of the spray member. The assembly stem **96** carries a seal-retaining flange **100** of smaller dimension than the flow passageway **83**. A downstream portion of stem **96** has a cylindrical enlargement **102** that is grooved to receive and retain snap-ring **104**. A helical spring **106** of frusto-conical shape is positioned between the snap-ring **104** and the spring seat **86**, with the largest loop **108** engaging seat **86** and the retainer flange **84**, and the smallest loop **110** being centered on enlargement **102** and engaging snap-ring **104**. Downstream of the snap-ring **104** the stem has a cylindrical engagement stud **112** that terminates in a conical tip **114**.

The hollow spray body **116** is formed of plastic and has an upstream end internally threaded at **118**. The downstream end of the spray body **116** is shaped to define a circular spray head **11**. Spray head **11** has a central tubular threaded boss **120**. There is also provided an annular cylindrical sealing surface **122**. The spray-forming cylindrical surface **124** is provided downstream of sealing surface **122**. A plurality of spacing ribs **126** extending generally radially of boss **120** extend inwardly of the wall of the spray. A spray-forming face plate **128** is mounted by means of bolt **130** having a head **132** that sealingly engages the underside of transverse wall **134** of plate **128**. Plate **128** has a cylindrical wall **136** and a sealing surface **138**. The upstream side of plate **128** has a circular rib **140** and the plurality of spray bores **142** are provided through the plate **128**. There are many more peripheral grooves **144** in wall **136** which cooperate with wall **124** in order to provide a circularly-arranged series of outer spray openings. A molded seal member **146** of rubber or similar material and provided with a groove **148** for mounting on rib **140** is provided. The seal member **146** carries outwardly biased sealing lips **150** and **152** which respectively are adapted to engage sealing surfaces **122** and **138** in order to cut off drip of water after the flow of pressurized water has ceased. When the pressure of water is higher than the bias of the sealing lips, then the water is forced through the spray apertures to provide a series of concentric spray streams issuing from the spray head.

Provided on the handle at an attitude facing in the direction of the spray face **11**, there is provided a handle recess generally indicated at **154** which is elongated axially of the spray body **116**. The handle recess **154** is bounded by spaced longitudinal flanges **156** and by an upstream transverse flange **158** and a downstream transverse flange **160**. Within the recess **154** there is a tubular stud **162** that is closer to the upstream flange **158**. A headed plunger **164** is provided for movement through the tubular stud **162**. The plunger **164** has a shank **166** that is grooved to receive an O-ring **168** that sealingly cooperates with the inner wall of tubular stud **162**. The extended tip of plunger **164** is threaded at **170** to cooperate with the guide block **172** shaped at its innermost end to provide a saddle recess **174** for receiving thereinto the extended end of **112** of the assembly stem **96**. A spring **174** is slip-fit over tubular stud **162** and is of a length to engage the head **178** of the plunger **164**. A squeeze control **180** is formed of sheet metal and shaped to provide spaced longitudinal flanges **182** that lie closely adjacent and inwardly of longitudinal flanges **156** of the handle recess **154**. A pivot pin **184** extends through the longitudinal flanges **156** and the longitudinal flanges **182** to provide for pivoting of the squeeze control **180** about the axis of pivot pin **184**. An abutment flange **186** at the upstream end of the squeeze control is provided for limiting pivoting of the squeeze control to the position seen in FIG. **3**.

From what has been described, the operation of the device should be readily understandable. By squeezing the control **180** inwardly, the plunger **164** is depressed tipping the valve stem **96** and its attached valve member **88**, and the flow of water then passes through the spray handle for discharge from the nozzles defined at the downstream end of the spray. Because of the shape and arrangement of the control **180**, only squeeze pressure of the hand is required, as contrasted to finger or thumb pressure required by other controls. It has been found that such an arrangement is less fatiguing for a person using the spray. The flow of water and pressure therefrom depresses the sealing lips **150** and **152** and a full spray is achieved. Upon release of the squeeze control, the spring **176** and the pressure on the upstream side of the valve member **88** operates to cut off flow because the valve member **88** closes with the pressure of the incoming liquid and the tipping valve is restored from the flow position of FIG. **4** to the non-flow position as seen in FIG. **3**. With flow cut off, the resilience of lips **150** and **152** restores them to their normal sealing position so that there is no drip from the spray head. Thus the spray provides for precision control thereof.

Referring now to the diverter valve **16** whose details are illustrated in FIGS. **5–7**, said diverter valve **16** has an elongated body **200** with a female threaded recess **202** at its upstream end for connection to conduit **20**. The opposite end of body **200** carries a tubular stud **204** threaded for connection to stud **22**. A transverse cylindrical bore **206** extends through the body **200**. A controller **208** is positioned in the transverse bore **206**. The valve body defines an entry passageway **210** and there is a first outlet passageway **212** which leads to stud **204** and a second outlet passageway **214** which leads to a transverse stud **216** which is adapted for connection to the upstream end of supply hose **14**.

Controller **208** is of the shuttle type, whose terminal positions establish the selected operations, and has two spaced large diameter shaft portions **218***a* and **218***b* which are bounded at their respective outer ends by flanges **220***a* and **220***b*. The inner ends of shaft portions **218** each have a groove **222** for an O-ring seal **224**. Between shaft portions **218** extends a reduced shaft **226** with an enlarged grooved portion **218**c centrally thereof carrying an O-ring seal **224**. The annular spaces surrounding each section of reduced shaft **226** and

positioned between spaced shaft portions provide transfer flow chambers **228**.

When the controller is in the FIG. **6** position, flow from conduit **20** enters chamber **228***a* and is directed solely to outlet passageway **214** which supplies water to the spray **10**. When the controller is in the FIG. **7** position, flow passes to chamber **228***b* and through both passageway **214** and **212** to supply both the spray **10** and the shower head **24**. Abutment of flanges **220***a* or **220***b* against the sides of body **200** operates to properly locate shaft portion **218***c* to direct the liquid flow as desired.

The support bracket **12** of FIGS. **8–11** includes an upright plate **240** formed with a rearwardly-extending, wall-engaging peripheral flange **242** and mounting apertures **244** for receiving countersunk wall-mounting screws. Extending forwardly of plate **240** are spaced fingers **246** having upwardly-extending retainer tips **248**. The shape of plate **240** and the adjacent ends of fingers **246** cooperate to define an arcuate saddle, or recess, **250** between the fingers for accommodating the rounded handle portion of spray **10** when the spray head **11** is seated on fingers **246** between plate **240** and retainer tips **248** as seen in FIG. **1**.

In the shower attachment shown in FIG. **12**, there is a support bracket **260** for wall mounting with an outwardly extending flange **262**. An adjustable spray-holder **264** is shown including a flange **266** arranged in facing relation to flange **262** and arranged for pivoting about the axis of shouldered stem **268** of a finger-actuated, friction-type retainer whose head is indicated at **270**. The remainder of spray-holder **264** includes a sleeve **272** with an open lateral segment **274**, and an inner periphery that defines an enlarged upper recess **276** and a lower smaller recess **278**. The open lateral segment is large enough to pass supply hose **14** therethrough. The upper recess **276** will receive the spray handle **116** and the control **180** when the latter is in the valve-open flow position of FIG. **4**, and the lower recess **278** will receive therein the portion of handle **116** upstream of transverse flange **158**. Thus, when the spray **10** is in position on holder **264**, the control **180** is maintained depressed and a shower-like spray emanates from head **11**, with adjustable holder **264** directing the attitude of the spray.

While there has been shown and described a particular embodiment of this invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and, therefore, it is intended in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What we claim as new and desire to secure by Letters Patent of the United States is:

1. In a manual-selection diverter valve for use in a plumbing installation where the diverter valve is to be interposed between a liquid supply conduit and two alternative discharge devices such as a shower head and a handled spray device, and wherein the diverter valve provides for three connections consisting of an entry from a supply conduit, a first outlet to the shower head and a second outlet to the handled spray device, the improvement comprising, in combination: a shuttle-type diverter valve comprising an elongated valve body having axially aligned cylindrical bores at opposite ends each adapted for screw connection respectively to an inlet conduit and to one of the outlets, an elongated tubular stud on the body projecting transversely of the longitudinal axis of the body, said tubular stud defining the second outlet passageway that is located within a planar projection defined by the maximum width of said aligned bores, an elongated transverse bore extending through the body and positioned transversely of said plane in which are positioned said inlet and two outlets, an elongated controller of a length greater than the length of the transverse bore positioned in said transverse bore with both ends of the controller extending outwardly of the body to permit of selective manual shuttling of the controller between two flow positions in which flow is directed to one or the other of the two outlets, and flow passageway means consisting of three bores communicating one each with the inlet and outlets and being of reduced size relative to the respective inlet and outlets to which they connect for interconnecting the inlet and two outlets to the transverse bore at positions offset from each other along the length of the transverse bore.

2. A device as in claim **1** wherein the elongated controller is provided with three axially spaced, slidable, seal means arranged for engagement and cooperation with the transverse bore, the portions of the controller between each pair of seal means being reduced to provide in combination with the transverse bore, two spaced transfer flow chambers, and means on the controller arranged for cooperation with the valve body to limit the range of movement of the middle of the three seal means, during shuttle movement of the controller, to within the width of the planar projection of said aligned bores.

* * * * *