June 22, 1965 R. A. STAAT ETAL 3,190,309

SINGLE LEVER FAUCET AND VALVING PLATE THEREFOR

Filed Aug. 14, 1962 2 Sheets-Sheet 1

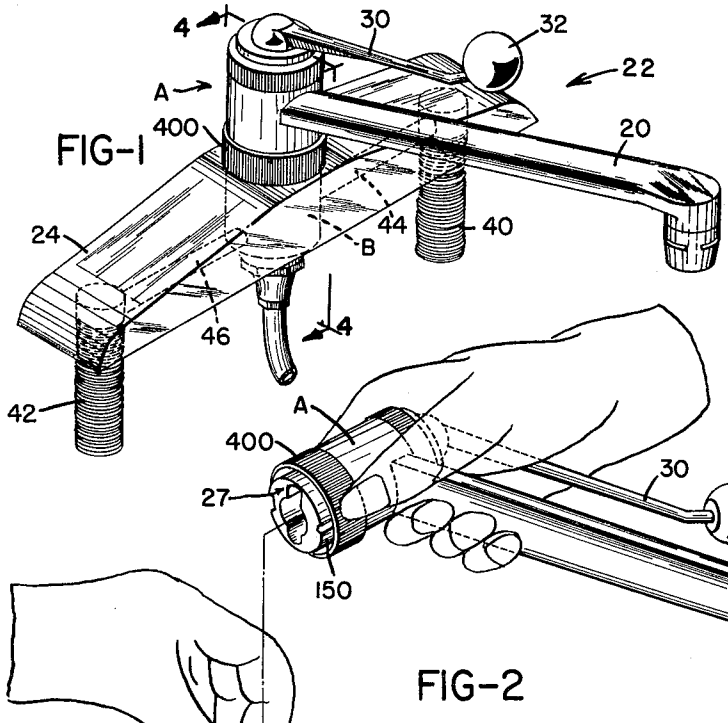
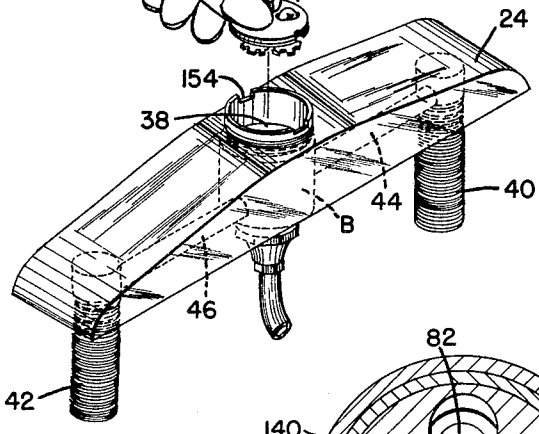


FIG-1

FIG-2



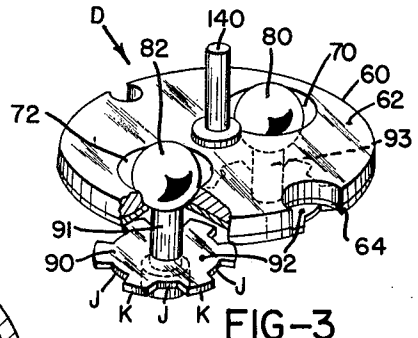


FIG-3

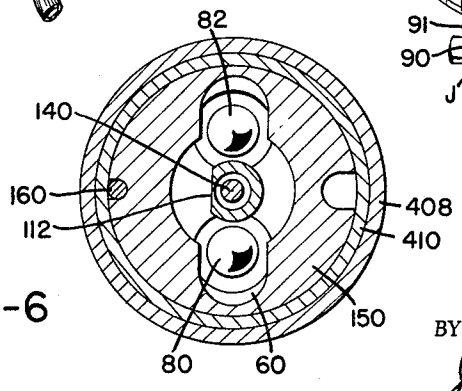


FIG-6

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SINGLE LEVER FAUCET AND VALVING PLATE THEREFOR

Filed Aug. 14, 1962 2 Sheets-Sheet 2

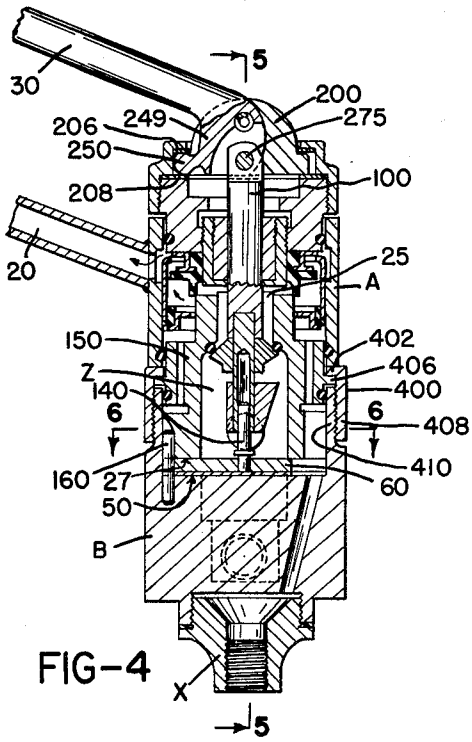


FIG-4

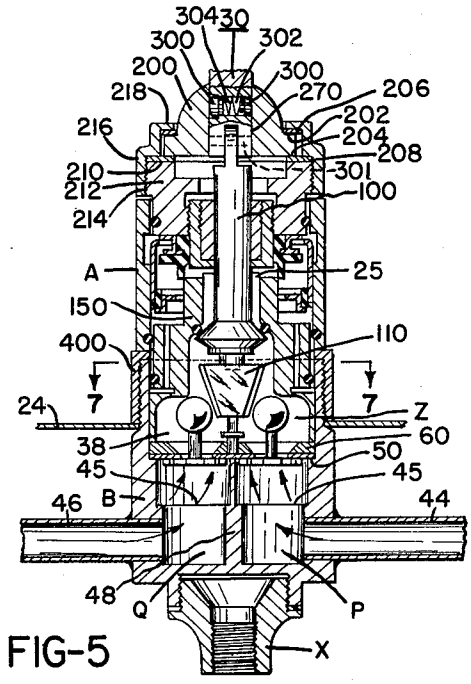


FIG-5

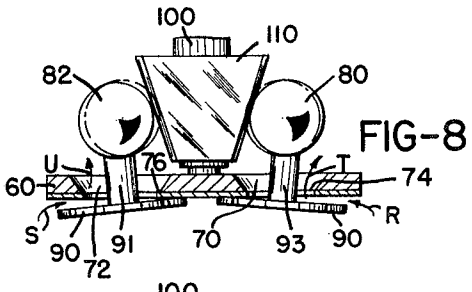


FIG-8

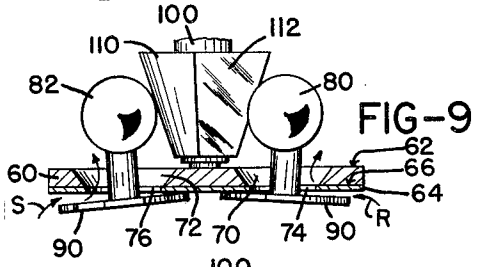


FIG-9

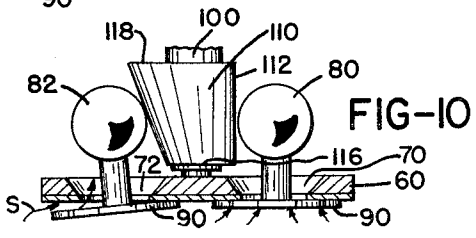


FIG-10

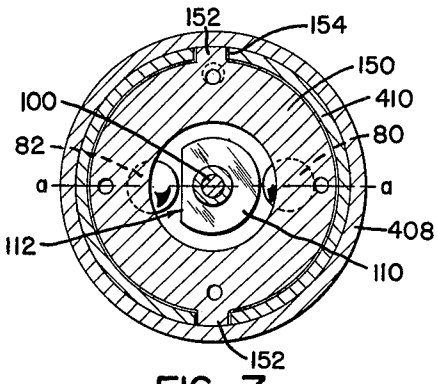


FIG-7

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United States Patent Office 3,190,309 Patented June 22, 1965

3,190,309

SINGLE LEVER FAUCET AND VALVING PLATE THEREFOR

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Filed Aug. 14, 1962, Ser. No. 216,835
21 Claims. (Cl. 137—454.6)

This invention relates to faucets, and in particular to unique valving means for a faucet of the single lever type.

Single lever type faucets are well known in the art, such as, by way of example, is disclosed in U.S. Patents Nos. 1,573,210; 2,205,684; 2,578,543; 2,624,586; 2,756,775; 2,866,478; 2,871,880 and 2,980,141; however, considerable difficulty and expense is entailed in servicing single lever faucets. As a general rule, servicing of all types of prior art single lever faucets of which we are aware has required the use of a trained technician or plumber to make even minor repairs such as, by way of example, the replacing of valve washers, and the like.

One of the prime objects of the present invention is to provide a valving plate having valving means operatively associated therewith in such a manner that the valving plate and associated valving means constitute a merchandisable item, per se, which may be readily removed from and/or associated with the interior of a faucet assembly without requiring the use of special tools and by persons having no skill or training in the plumbing art. In other words, the valving means of the subject faucet has been constructed in such a manner as to enable it to be replaced by the average housewife without the use of special tools or technical skill.

Another object of the invention is to provide a single lever faucet utilizing our unique valving plate for enabling a user to selectively control the mixing of two fluids in any proportion and of permitting one or the other of said fluids to be independently dispensed.

Another object of the invention is to provide a single lever faucet having a unique valving plate which is constructed in such a manner as to enable a housewife to remove, inspect and/or replace same without requiring the use of special tools or other equipment, other than conventional means such as, by way of example, a pair of pliers for loosening the escutcheon ring to effect separation of the upper portion of the faucet housing to be readily removed from the body or lower portion thereof for providing free and unrestricted access to the valving plate which, in the preferred embodiment of the invention, includes an upstanding stem or handle which may be readily grasped for effecting the bodily removal of the plate from the lower portion of the valve body. A duplicate valving plate may be then inserted, after which the upper portion of the faucet assembly may be reassociated with and secured to the body thereof by means of the escutcheon ring.

A further object of the invention is to provide a single lever valve having the hereinabove characteristics, which is characterized by long, trouble-free wear and wherein the various operating parts are maintained in alignment for simply though effectively precluding malfunction.

Still a further object of the invention is to provide a single lever valve with simple yet highly effective means for maintaining the operating handle or lever thereof in whatever position it is placed by the user of the device for maintaining the handle in that position against accidental or unintentional movement. Heretofore considerable annoyance has been encountered in single lever type faucets in those instances wherein the packing surrounding the stem actuator becomes worn, with the result that the handle would, unless held by an operator, gravitate or otherwise move from a pre-set "on" position to an "off" position by reason of the water pressure within the faucet. The structural details of the subject valve are such as to completely eliminate this undesirable feature.

These and other objects are attained by the means described herein and as disclosed in the accompanying drawings, in which:

FIG. 1 is a perspective view of a single lever valve embodying the teachings of the present invention.

FIG. 2 is a view similar to FIG. 1, showing the three main parts of the valve in disassociated relationship for facilitating replacement of the valving plate.

FIG. 3 is a perspective view of a valving plate embodying the teachings of the present invention.

FIG. 4 is a sectional view taken on line 4—4 of FIG. 1.

FIG. 5 is a view taken on line 5—5 of FIG. 4.

FIG. 6 is a sectional view taken on line 6—6 of FIG. 4.

FIG. 7 is a sectional view taken on line 7—7 of FIG. 5.

FIGS. 8, 9 and 10 are views, partly in section, illustrating the relationship of the camming means with respect to the cam followers of the valve elements of the valving plate.

With particular reference to the drawings, the numeral 20 denotes the discharge spout of a single lever faucet denoted generally by the numeral 22, which comprises an upper portion A, and a body portion B.

With particular reference to FIGS. 4 and 5, it will be noted that upper portion A comprises a first housing, or water outlet member 150 having a chamber Z therein with an outlet port or ports 25. That end of 150 remote from the outlet ports 25 terminates in an axial, lower face 27. The upper portion A also includes an actuating lever 30, the free outer end of which terminates in a knob 32 which may be grasped by an operator for elevating the lever from the fully lowered position illustrated in FIG. 1 for effecting a flow of fluid from chamber Z through spout 20 incident to actuation of valving elements, as will hereinafter be more fully explained.

Lever 30 may be swung or moved radially to the right or the left for determining the various proportions at which two fluids, controlled by the valve, will be dispensed through spout 20, said lever being movable to one position for dispensing but one of the liquids, to an intermediate position for dispensing each of two liquids in varying proportions, or to a further and remote position for dispensing only the second liquid.

The valve body or second housing includes a central chamber 38 and a pair of conduits 44 and 46 in communication with opposite sides thereof, as clearly illustrated in each of FIGS. 1, 2 and 5. In the preferred embodiment of the invention, each of conduits 44 and 46 is provided with and terminates in downwardly extending, externally threaded portions 40 and 42, which are adapted to be connected to independent sources of fluid media under pressure such as, by way of example, to the hot and cold water lines, respectively, of a household water system.

With particular reference now to FIG. 5, it will be noted that the lower portion of chamber 38 is internally subdivided by means of a central partition 48 for thereby defining two independent, separate chambers, P and Q, wherein chamber P is in open communication with conduit 44 and chamber Q is in open communication with conduit 46.

An annular shoulder 50 is provided interiorly of the second housing B at and in the plane of the upper ends of chambers P and Q for defining a peripheral ledge or seat which is engaged by and upon which the lower peripheral edge of the valving plate assembly, denoted generally by the letter D of FIG. 3 is received.

With particular reference now to FIG. 3, it will be noted that the valving plate assembly comprises a substantially circular plate **60** having upper and lower axial faces **62** and **66**, respectively, note FIG. 9. The numeral **64** denotes generally a sheet, coating or layer of gasket or sealing material such as, by way of example, but not of restriction, rubber, Teflon or other suitable material appropriately bonded to the lower axial face **66** of plate **60** by suitable means which form no part of the present invention.

Lower face **27** of the first housing **150** is adapted to engage portions of the upper surface of the valving plate for securely though releasably disposing said plate in fluid tight relationship with the upper ends of chambers P and Q of the second housing.

As best illustrated in FIGS. 4 and 5, valving plate **60** is adapted to be received upon annular shoulder **50**, for thereby locating and positioning said plate between chamber Z of the first housing and each of chambers P and Q of the second housing.

Plate **60** is provided with a pair of ports or apertures **70** and **72**, wherein one of said apertures is in open communication with one of chambers P and Q, both of said apertures being in open communication with chamber Z.

As best illustrated in FIG. 3, valving means are associated with each of ports **70** and **72** of plate **60**, said valving means comprising a valve element **90** having a substantially flat, axial top surface **92**, a pair of substantially spherical cam followers **80** and **82**, each of which is fixedly secured to its respective valving element **90** by means of rigid members **91** and **93**, respectively.

As best illustrated in FIGS. 3, 8–10, port openings **74** and **76** are also provided through the resilient or sealing member **64**; and in the preferred embodiment of the invention these openings are somewhat smaller than the diameter of spherical cam followers **80** and **82**, whereby to normally and resiliently maintain said spherical cam followers in supported position as illustrated in FIG. 3, and to preclude the accidental or unintentional dissassociation of the valving means from the valve plate.

Each of the valve elements **90** is of such a dimension as to substantially span and loosely engage the side walls of at least the upper portions of their respective chambers P and Q. Annular ledges **45** may be provided interiorly of and intermediate of the height of each of chambers P and Q for defining a ledge engagable by peripheral portions of valve elements **90** for thereby limiting to a location above the respective inlet ports of said chambers the lowermost position which said valve elements could assume in the event that there should be a failure of water pressure in lines **44** and **46**.

In the preferred embodiment of the invention the peripheral contour of valve elements **90** is discontinuous as illustrated in FIG. 3, viz., provided with spaced, notched portions J which define a plurality of outwardly projecting portions K for augmenting the volume and rate of flow of water past said valve elements when in open position. It should, of course, be understood that the dimensions of notches J are such that the upper axial face **92** of each valve element is adapted to engage and seat against the lower face of seating member **64** incident to the application of water pressure against the under-surface of said elements in chambers P and Q for normally and yieldably disposing said members in their fully raised, seating and sealing position illustrated in FIG. 5. It will be noted that rigid members **91** and **93** extend through the respective port apertures **70** and **72** of plate **60** and through corresponding port apertures **74** and **76** of resilient sealing member **64**, thereby fixedly interconnecting and disposing valve elements **90** and their respective spherical cam followers **80** and **82** on opposite sides of plate **60**.

From the foregoing, and as best illustrated in FIG. 5, it will be noted that the entire pressure of the fluid within each of chambers P and Q is against the under-surface of each of valving elements **90** in such a manner as to effect a seal which will positively preclude the passage of water upwardly from chambers P and Q into the upper portions of the central chamber in which the spherical cam followers **80** and **82** are disposed.

The upper or first housing A is provided with a valve stem **100** which is suitably mounted, by means not pertinent to the present invention, for axial movement in a vertical direction, and for rotational movement being effected by means of lever **30**. The numeral **110** denotes generally camming means in the form of an actuator cam which, as best illustrated in FIGS. 6 through 10, comprises a truncated cone having a flattened surface **112** in parallelism with the axial center of said cam.

Those portions of the camming surface remote from flattened surface **112** are uniformly tapered outwardly from a minimum diameter at the lower end **116** of the cam to a maximum diameter at the upper end **118** thereof. With particular reference now to FIGS. 4 and 5, it will be noted that when the actuating lever **30** is in the lowered position illustrated in FIG. 1, the various surfaces of the actuator cam will be disposed above and out of contacting relationship with each of the spherical cam followers **80** and **82**. However, when lever **30** is elevated upwardly, stem **100** will be advanced downwardly for thereby introducing the camming surfaces of actuator cam **110** downwardly and into contacting relationship with adjacent portions of the spherical cam followers **80** and **82**. With particular reference now to FIG. 8, we have illustrated the condition which exists when the lever **30** is elevated to the neutral position from the position of FIG. 1; wherein the term "neutral position" refers to that position in which the actuator cam is disposed when its camming surfaces will engage both of the spherical cam followers equally. Under such circumstances, as illustrated in FIG. 8, each of the spherical cam followers **80** and **82** will be literally forced apart for thereby imparting an equal tilting action to the valving plates **90** by means of their respective rigid connector elements **91** and **93** which interconnect each of plates **90** with a spherical cam follower, as illustrated. It will be noted that as the valving plates are tilted, fluid from each of chambers P and Q will pass upwardly as indicated by the headed arrows R and S between the adjacent faces of the valving plates and sealing member **64**, thence upwardly as indicated by the headed arrows T and U through the ports **74–70** and **76–72** of sealing member **64** and plate **60**, respectively. From the foregoing, it will be noted that when the parts are disposed as illustrated in FIG. 8, a mixture of fluid from each of conduits **44** and **46** will flow upwardly into area Z of the central chamber **38** from which chamber the fluid will be discharged through spout **20**.

In FIG. 9 the actuator cam **110** is in the process of being rotated for the purpose of bringing flat face **112** into engagement with spherical cam follower **80**, with the result that the valving plate to the right is starting to close and the valving plate to the left will be tilted to a greater degree for permitting an increase of flow of fluid upwardly from chamber Q.

In FIG. 10 the relationship of the actuator cam with respect to the spherical cam followers **80** and **82** is such that surface **112** of the actuator cam **110** is entirely out of engagement with spherical member **80** with the result that the valving plate **90** will be disposed in sealing relationship with corresponding portions of the resilient under-surface of the flat valving plate for thereby precluding the passage of fluid upwardly from chamber P into chamber Z.

In the preferred embodiment of the invention, valve plate **60** is provided with a centrally disposed, upwardly extending axial pin **140** which serves the dual function of providing readily graspable handle-like means for enabling the valving plate to be bodily lifted from shoulder

50; said pin also serving as an elongate rigid axial guide for and upon which actuator cam 110 may be moved. It will be noted that in this manner movement of the actuator cam is restricted to axial movement in alignment with stem 100. Pin 140 also serves as a center about which the actuator cam will be rotated incident to movement of lever 30 in a radial direction relative to stem 100.

As illustrated in FIG. 7, the conical camming surfaces of cam 110 are off-center relative to the axial center of valve stem 100 and pin 140 of the valve plate. Uniformly satisfactory results have been obtained in those instances wherein the center of the radius of those portions of the camming surface remote from flat face 112 has been displaced .022 to the right with reference to the axial center of said cam, along line *a*—*a* which is normal to face 112.

It will be noted that we have thus provided simple yet highly effective means for utilizing a single lever for controlling the flow of each of two fluids through a common spout and wherein movement of an actuator lever will enable an operator to select one or the other of the two fluids, or any relative proportion of said fluids, and that the rate of discharge of the fluids, whether individual or mixed, is controlled by elevating the same lever about its fulcrum.

With reference now to FIG. 7, it will be noted that the first housing or water outlet member 150 is provided with outwardly projecting tongues 152 which are receivable within pockets 154 located in the upper periphery of the central chamber 38. The inter-relationship of tangues 152 with pockets 154 will insure that the parts will be assembled in proper relationship. As best illustrated in FIG. 4, a pin 160 is provided in chamber member 38, and a pin-receptive opening is provided in the lower surface of water outlet element 150 for the reception of said pin, which will insure that the parts can be assembled only in a predetermined relationship.

With further reference now to FIG. 5, the numeral 200 denotes a dome-shaped lever support having upper and lower surfaces 202 and 204 which abuttingly engage stainless steel rings 206 and 208, respectively. Ring 208 is adapted to be received on the upper end of the upper surface 210 of adapter 212, which is externally threaded as at 214 for the reception of top cap 216 having an inturned surface 218 against which the upper axial surface of ring 206 abuts when the parts are fully assembled as in FIGS. 4 and 5. The foregoing construction permits the dome-shaped lever support to be freely rotated about the axis of stem 100.

As further illustrated in FIG. 4, lever 30 terminates in a terminal end or head 249 defined by a pair of laterally spaced axial walls which are spanned by a pair of spaced, parallel axial bores 301 and 302 (FIGS. 4 and 5). The terminal end of lever 30 also includes an outwardly projecting fulcrum 250 which is disposed between rings 206 and 208 within the confines of a slot 270 having parallel, spaced axial faces provided in the dome-shaped lever support 200. As handle 30 (FIG. 4) is lifted upwardly in a clockwise direction, fulcrum 250 will be maintained in relative position by rings 206 and 208 with the result that stem 100, which is pivotally secured to terminal end 249, as at 275 by a pin or the like received in bore 301, will be shifted axially downwardly for advancing actuator cam 110 toward and into engaging relationship with the spherical cam followers 80 and 82.

In the preferred embodiment of the invention, a pair of wear resistant bearing members in the form of tips 300 (FIG. 5) are received within bore 302 through terminal end 249 of lever 30, said tips being yieldingly urged apart by means of a compression spring 304 whereby the outer surfaces of said tips will be maintained, under positive pressure, against the axial faces of slot 270. In this manner we have provided simple yet highly effective means for maintaining lever 30 in adjusted position.

It should be understood that the present invention is neither concerned with nor directed to the structural details of the device by which fluid is delivered to bottom cap X for providing fluid to a spray nozzle or the like; nor is the invention directed to the means by which water from chamber Z will be diverted to bottom cap X, it being understood that such means is old and well known to the art.

It will be understood that escutcheon ring 400 includes an upper inwardly turned lip 402 which engages the axial face of a rib 405 of the upper housing, said ring also including a depending portion 408 which is internally threaded whereby to engage the upwardly, externally threaded portion 410 of the second or lower housing. It will be noted that the escutcheon ring 400 is the sole means by which the first and second housings are secured relative to one another; and that when ring 400 has been removed as in FIG. 2, an operator will have free access to the interior of chamber 38 and valve plate 60.

It should be understood that if desired the upper surface of the valve elements 90 may be provided with a suitable sealing means either to engage with the sealing member 64; or if desired, the undersurface of the valving plate may be devoid of a resilient sealing member provided that a sealing member is provided on the upper surface of the valving plates.

Uniformly satisfactory results have been obtained in those instances wherein the spherical cam followers 80 and 82 have been fabricated from nylon, however, any other material may be used.

What is claimed is:

1. A water faucet comprising: a first housing having a fluid chamber therein and an outlet port; a second housing having a pair of fluid chambers and a separate inlet port for each of said chambers; a valving plate including a pair of ports each having an individual, independently mounted tiltable valving member associated therewith; means releasably interconnecting said housings for fixedly securing said valving plate between the chamber of said first housing and the chambers of the second housing for disposing the chamber of the first housing in selective, variable fluid receiving relationship with the chambers of the second housing via said valving plate ports and their respective valving means members, and means on said first housing operable for controlling and selectively actuating each of said valving members.

2. A water faucet comprising: a first housing having a fluid chamber therein and an outlet port; a second housing having a pair of fluid chambers and a separate inlet port for each chamber; a valving plate including and carrying plural valving means; valving plate support means in the second housing, means releasably interconnecting said housings for seating said valving plate on said support means with the chamber of the first housing on one side of the valving plate and the chambers of the second housing on the other side thereof, said valving means being arranged to be normally closed by water pressure in the chambers of the second housing, means in the first housing operable for selectively actuating said valving means for discharging water from one or both of the chambers of the second housing into the chamber of the first housing, and means projecting from said first housing for actuating said operable means.

3. A water faucet comprising: a first housing having a fluid chamber therein and an outlet port; a second housing having a pair of fluid chambers and a separate inlet port for each chamber; a valving plate including a pair of ports one for registration with each of the fluid chambers of the second housing, each of said ports having an individual, independently mounted tiltable valving member associated therewith, each of said valving members being individually movable to open and close a port of the valving plate, valving plate support means in the second housing, means releasably interconnecting said housings for seating said valving plate on said support means with the chamber of the first hous-

ing on one side thereof and the chambers of the second housing on the other side thereof, said valving plate and its associated valving members being removable as a unit from the second housing incident to separation of said housings upon release of said interconnecting means.

4. A valving plate for association with and between the chambers of a pair of separable housings, said plate having a pair of substantially flat axial surfaces and a pair of fluid ports extending therethrough; valving means associated with said ports including a pair of valve elements each having a substantially flat axial surface, a cam follower, and a rigid member extending through one of said ports interconnecting a valve element and an associated cam follower on opposite sides of said plate, the flat surfaces of said valve elements adapted to seat against adjacent flat surfaces of said plate to close the ports with the rigid members projecting through the ports for disposing the cam followers spaced from the other surface of said plate, and resilient sealing means interposed between adjacent faces of said plate and valve elements.

5. A water faucet comprising: a first housing having a fluid chamber therein and an outlet port; a second housing having a pair of fluid chambers and a separate inlet port for each chamber; a valving plate; valving plate support means in the second housing; means releasably interconnecting said housings for seating and securing said valving plate on said support means with the chamber of the first housing on one side thereof and the chambers of the second housing on the other side thereof, said valving plate having a pair of fluid ports therethrough one in open communication with each of the chambers of the second housing, and both in open communication with the chamber of the first housing, valving means associated with each of said last mentioned ports, said valving means arranged to be normally and individually closed by water pressure in the chambers of the second housing; single lever means secured to, carried by and projecting from said first housing; camming means within the chamber of the first housing mounted for selective axial and rotational movement incident to movement of said lever, means carried by said valving means positioned for selective engagement by said camming means to actuate said valving means for discharging water from one or both of the chambers of the second housing into the chamber of the first housing; and an elongate rigid guide member for and in engagement with said camming means secured to, carried by and projecting axially from said valving plate into the chamber of the first housing, said guide member also constituting a handle for and by which said valving plate may be bodily removed from the second housing upon separation of the first housing therefrom.

6. In a device of the class described, an actuator lever one end of which terminates in a pair of laterally spaced substantially parallel walls and having a pair of spaced, parallel bores normal to and spanning said walls, a lever support including a slot having parallel, spaced faces opposing said walls, means extending through one of said bores pivotally securing said lever end in said slot with the walls of said lever between and paralleling the said faces of said slot for swinging in a substantially vertical plane, separable bearing members in the other of said bores, and means between said members yieldingly urging them apart into frictional engagement with the said wall opposing faces of said slot.

7. An actuating lever construction for control of a single-lever water mixing faucet, said lever having a handle end and a butt end, the butt end comprising a substantially flat head having a pair of spaced parallel side walls spanned transversely therethrough by a pair of spaced parallel bores, and a fulcrum element on the head remote from the bores, a stationary lever support body having a slot therein presenting side walls spaced apart a distance slightly greater than the thickness of the head, and loosely accommodating the head between the walls of the lever support body, means on the lever support body pivotally supporting the lever fulcrum upon the support body with opposite faces of the head contiguous to corresponding faces of the lever support slot, opposed friction elements slidably mounted in opposite ends of one of the head bores, and yielding means within said one of the head bores for constantly urging the friction elements outwardly into frictional contact with the said faces of the lever support slot, to yieldingly oppose rotation of the lever head about the fulcrum thereof.

8. The combination as set forth in claim 7, wherein is included a valve actuating stem having an end pivoted upon the head a pivot pin engaged at its ends in the second head bore remote from the fulcrum.

9. A single-lever water mixing faucet comprising in combination, an upper elongate housing having an axial bore and an upper end, a valve actuating stem, and means within the housing bore supporting said stem for axial and rotational movements, a lever for moving the stem, said lever having a handle end and a butt end, the butt end comprising a substantially flat head having a pair of spaced parallel side walls, a fulcrum on the head, a lever support member having a slot therein presenting side walls spaced apart a distance slightly greater than the thickness of the head and loosely accommodating the head between the walls of the support member, means on said support member pivotally supporting the lever fulcrum, with said parallel side walls of the head contiguous to corresponding faces of the lever support member slot, means at the upper end of the housing supporting the lever support member for rotation axially of the housing, means pivoting one end of the valve actuating stem upon the lever head, and means yieldingly opposing movement of the lever about the fulcrum thereof.

10. A single-lever water mixing faucet comprising in combination, an upper elongate housing having an axial bore and an upper end, an elongate valve actuating stem, and means within the housing bore supporting said stem for axial and rotational movements, a lever for moving the stem, said lever having a handle end and a butt end, the butt end comprising a substantially flat head having a pair of spaced parallel side walls and having spaced apart bores transversely therethrough, a fulcrum on the head remote from the bores, a lever support member having a slot therein presenting side walls spaced apart a distance slightly greater than the thickness of the head and loosely accommodating the head between the walls of the support member, means on said support member pivotally supporting the lever fulcrum, with the surfaces of said spaced parallel side walls of the head contiguous to corresponding surfaces of the lever support member slot, means at the upper end of the housing supporting the lever support member for rotation axially of the housing, pivot means engaged in one of the said bores of the head and connecting an end of the valve stem thereto, opposed friction elements slidably mounted in opposite ends of the other one of the lever head bores, and yielding means within said other one of the bores for constantly urging the friction elements outwardly into frictional contact with the said surfaces of the lever support member slot, to yieldingly oppose rotation of the lever head about the fulcrum thereof.

11. The device as set forth in claim 10, wherein the combination includes a pair of inlet valves for delivering hot and cold water to the upper housing, and means responsive to axial and rotational movements of the valve actuating stem for varying the rate of flow through said inlet valves.

12. A water faucet comprising in combination: a first housing having a fluid chamber therein, an outlet port, and an axial valve stem bore; a stem supported in said bore for axial and rotational movement; a second housing having a pair of fluid chambers separated for receiving and conveying hot and cold water; means for detachably mounting the first housing upon the second housing

for separation of the housings; a valving plate disposed transversely of the housings and having a pair of port openings to coincide with the chambers of the second housing, and a pair of valves carried by the plate for opening and closing the port openings individually; means on the housings for clamping the valving plate therebetween whereby to isolate the chamber of the first housing from the chambers of the second housing upon closing of the valves, the valving plate and the valves carried thereby being accessible and removable as a unit upon separation of the housings at the mounting means aforesaid; means carried by the first housing for selectively rotating and reciprocating the valve stem; and means connected with said stem for actuating the valves both individually and in unison.

13. The combination as set forth in claim 12, wherein the means last mentioned includes a cam on the valve stem, and a cam follower operatively connected with each valve located for engagement by said cam upon reciprocation of the valve stem in one direction.

14. A water faucet comprising in combination, a lower housing having a pair of fluid chambers separated for conveying hot and cold water, an annular seat within said housing circumscribing said chambers, a removable circular valving plate having a circumferential margin adapted to rest upon said seat to cover the chambers, said plate having a pair of port openings each communicating with one only of said chambers of the housing, a pair of individual, independently mounted tiltable valve members carried by the plate for opening and closing the port openings individually, an elongate upper housing having a fluid chamber and an axial valve stem bore, a valve actuating stem in said bore, an annular surface on the upper housing, and means for releasably securing the upper housing to the lower housing with said annular surface clamping the valving plate stationarily against the annular seat of the lower housing, the valving plate so clamped serving to isolate the fluid chamber of the upper housing from the fluid chambers of the lower housing when the valve members of the valving plate are closed, said valving plate and the valve members carried thereby being bodily removable as a unit from the annular seat of the lower housing, upon manipulation of the releasable securing means to free the upper housing for displacement from the lower housing.

15. A water faucet comprising in combination, a lower housing having a pair of fluid chambers separated for conveying hot and cold water, an annular seat within said housing circumscribing said chambers, a removable circular valving plate having a circumferential margin adapted to rest upon said seat to cover the chambers, said plate having a pair of port openings each communicating with a chamber of the housing, a pair of valves carried by the plate for opening and closing the port openings individually, an elongate upper housing having a fluid chamber and an axial valve stem bore, a valve stem in the bore, and means on the upper housing for reciprocating and rotating said stem, a cam on the valve stem, and a cam follower carried by each valve and located for engagement by said cam upon reciprocation of the valve stem in one direction, means on the housings for releasably clamping the valving plate upon the annular seat of the lower housing, with said plate isolating the chamber of the upper housing from the chambers of the lower housing when the plate valves are closed, said valving plate and the valves carried thereby being bodily removable as a unit from the annular seat of the lower housing, upon manipulation of the releasable clamping means to free the upper housing for displacement from the lower housing.

16. The device as set forth in claim 15, wherein the valving plate is provided with a central upstanding pin serving as a handle to remove the plate, and the valve stem is made hollow at one end to slidably accommodate said pin as the stem is reciprocated thereon.

17. A water faucet comprising in combination, a first housing having a fluid chamber therein and an outlet port, a second housing having a pair of separate fluid chambers to be supplied with hot and cold water individually, a valving plate including a pair of ports, each of said ports having an individual, independently mounted tiltable valving member associated therewith, one of said ports and its associated valving member being in communication with each of said separate fluid chambers of the second housing, said plate in the closed condition of its valve members constituting a barrier between the chamber of the first housing and the chambers of the second housing, a separable connecting means between said housings, whereby one housing may be displaced relative to the other for exposing the valving plate for bodily removal along with its valving members as a unit, from the barrier position, and means carried by the first housing, rendered operative incident to connecting the housings, for selectively actuating the valve members independently of one another.

18. The device as set forth in claim 17, wherein the actuating means for the valve members comprises a single movable cam operative directly upon portions of said individually operable valve members, and displaceable therefrom concurrently with displacement of the housings one from the other.

19. A water mixing faucet structure, comprising a lower housing body and an upper portion, said lower housing body having a central chamber formed to removably receive a lower part of said upper portion, said lower part of the upper portion having an axial lower end face, said lower part of the upper portion having a fluid mixing chamber therein opening through said axial lower end face, said lower housing body having a pair of upwardly opening fluid receiving chambers having open top ends communicating with said central chamber, said open top ends lying in a common plane extending transversely of and below the top of the lower housing body, the lower housing body chamber having an annular wall shoulder lying in said plane, means forming a fluid inlet for each of said fluid receiving chambers, a valving plate having two ports therethrough and removably peripherally supported on said wall shoulder and said axial lower face of said upper portion bearing upon and holding said plate on the shoulder with said ports each forming a fluid passage from a fluid receiving chamber to said mixing chamber, a free moving valve element underlying each of said ports and carrying a rigid member extending upwardly through the overlying port, a cam follower upon each rigid member and located in the mixing chamber, an axially reciprocable and rotatable valve stem in said upper portion and extending into the mixing chamber, camming means upon the lower end of said stem for engaging said followers, and lever means operatively connected with said valve stem for effecting rotation and reciprocation of the latter and the camming means for selective engagement and actuation of said valve elements.

20. A water mixing faucet structure according to claim 19, with a pin member carried by said plate and extending axially upwardly in the mixing chamber and coupled with and forming a guide for said valve stem, and said pin member also forming a grasping means for facilitating lifting and removal of the plate and valve elements as a unit from the central chamber upon removal of said lower part of the upper portion from said central chamber.

21. A water mixing faucet structure according to claim 19, wherein each of said cam followers consists of a spherical body, and said camming means consists of an inverted conical body movable downwardly between the spherical bodies with a portion of the conical surface thereof cut away to provide a flat face substantially paralleling the stem, the conical surface portion of the body functioning in one operative position of the body to en-

gage both spherical bodies to open both valves and in another position to open a selected one only of the valves.

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