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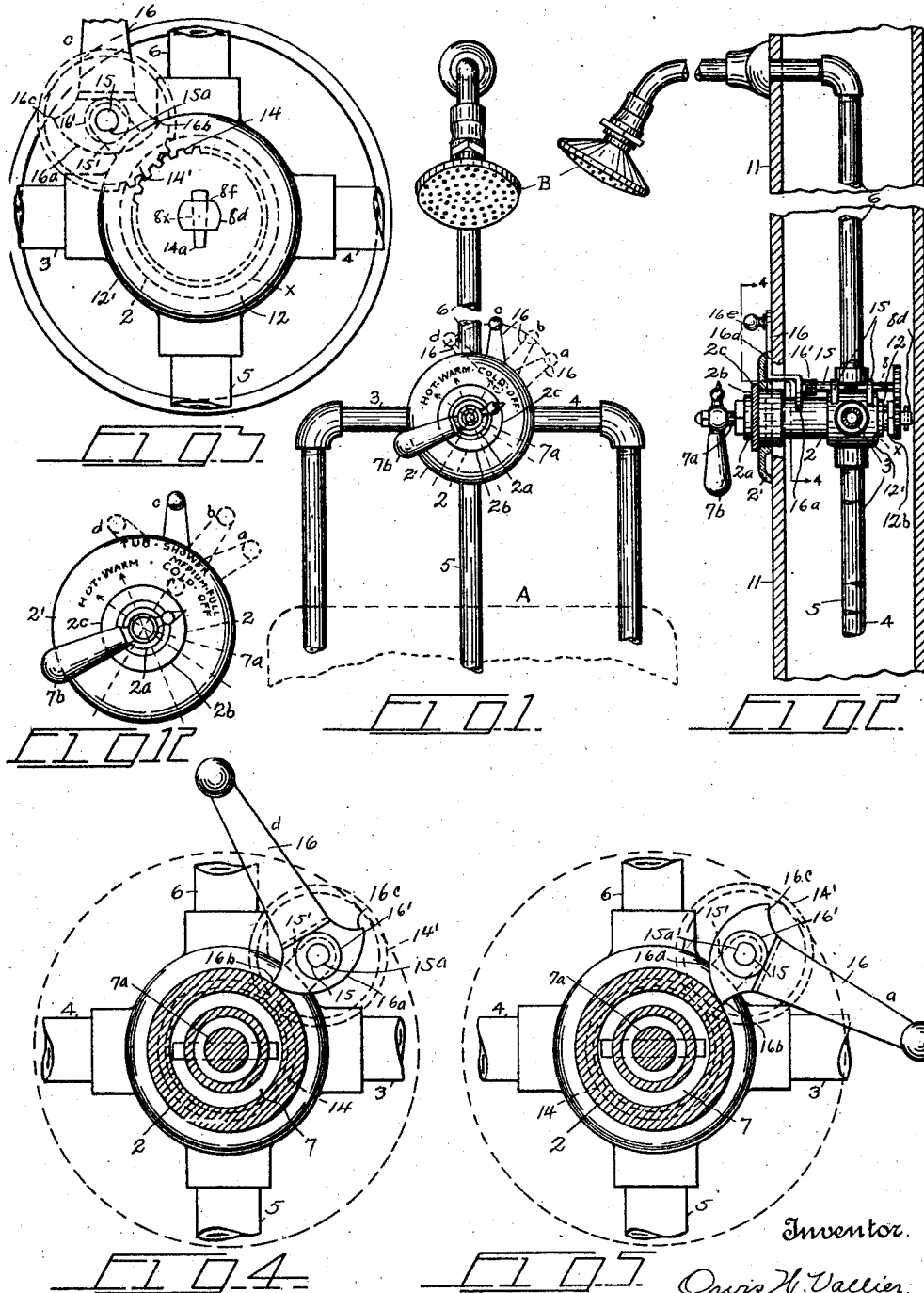
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MIXING AND DISTRIBUTING MECHANISM

Filed Aug. 30, 1926

2 Sheets-Sheet 1



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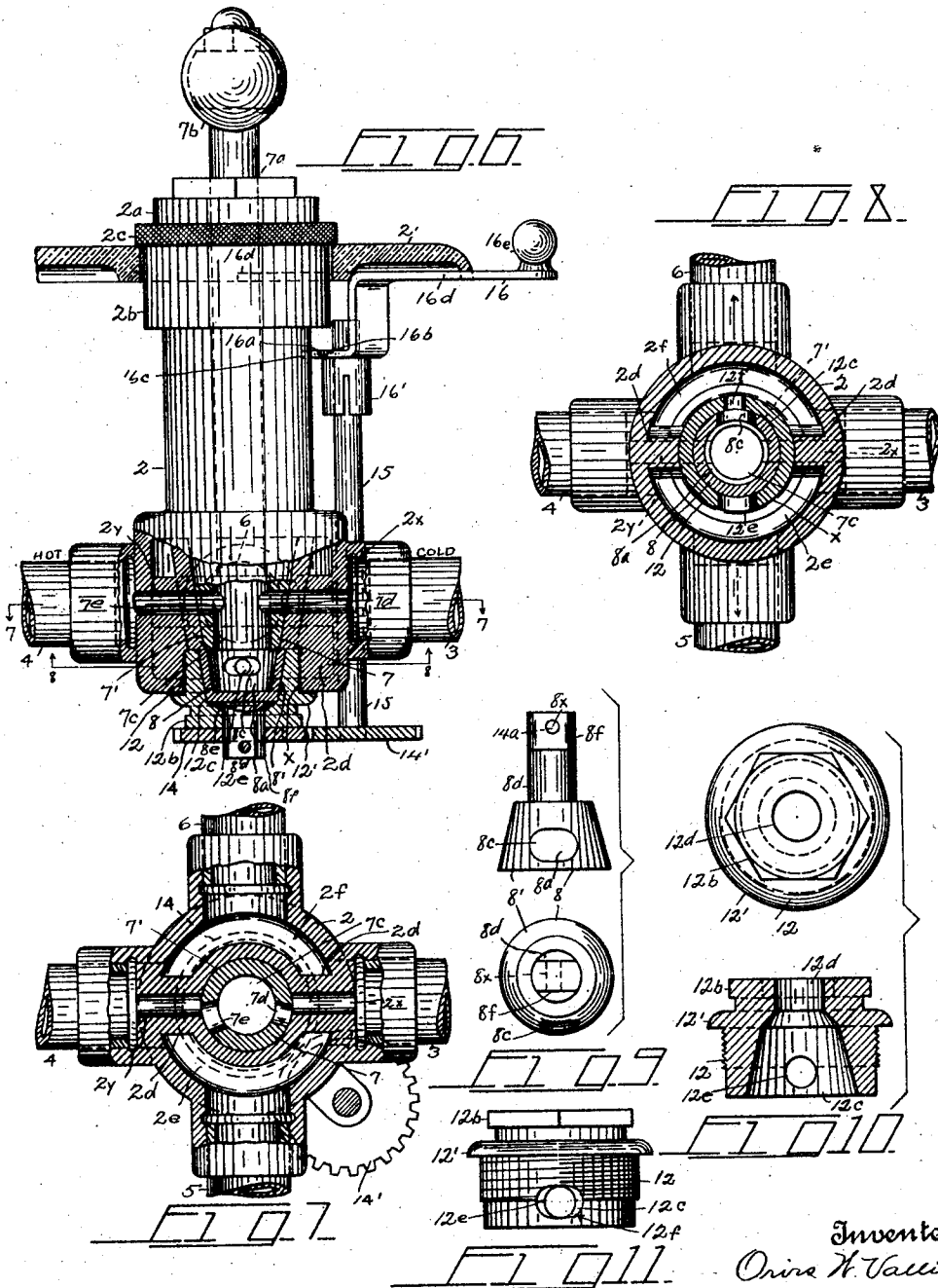
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MIXING AND DISTRIBUTING MECHANISM.

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This invention relates to improvements in mixing valves, designed particularly for use in connection with tub and shower baths, and has for its object to provide in one simple and compact fitting a complete mixing valve whereby water at any temperature may be drawn from the usual cold and hot water sources and a distributing mechanism by which the mixture may be directed towards the tub as well as to the shower nozzle, in any volume from a mere trickle to the full capacity of the system, by the manipulation of simple controlling members. A further object is to provide a four-way valve having separate cold and hot water receiving leads, which is arranged to separately draw either cold or hot water, or both cold and hot water in equal or different volumes and to discharge the water into a common chamber. A further object is to provide a novel distributing valve which is located in said chamber, the said valve being arranged to be seated mainly by the force of the water pressure for preventing leakage without requiring any special packing. A further object is to provide a train of gears for positively operating the distributing valve, said gears being controlled by a lever by which the mixture may be delivered to the tub and to the shower in any volume at a single throw. A further object is to provide means for indexing the movements of the distributing lever and for indicating the destination as well as the volume of water to be drawn from the mixing chamber. A further object is to provide means for positively stopping the distributing lever when the valve is positioned for delivering the greatest volume of water to either the tub or the shower. And a further object is to provide means for adjusting parts of the distributing mechanism to conform to a relatively wide range of variations in roughing-in measurements.

The various features and parts of the invention will be understood by the detailed description which follows, and by reference to the accompanying drawings, in which—

Figure 1 is a broken front elevation of a tub and shower bath fixture, to which my improvement is applied. Fig. 2 is a broken vertical section of a wall, in which the water supply pipes as well as the mixing and distributing valves are disposed, the exposed parts being the dial and the operating han-

dle and lever. Fig. 3 is an enlarged rear end elevation of the mixing and distributing mechanism, showing the distributing lever in the neutral position. Fig. 4 is an enlarged cross-section, taken on line 4—4 of Fig. 2, showing the distributing lever in position for discharging the full volume of water to the tub. Fig. 5 is a similar view, taken on line 4—4 Fig. 2, showing the distributing lever in position for discharging the contents of the mixing chamber toward the shower nozzle. Fig. 6 is a bottom side view and partial central longitudinal section, showing the mixing valve in position to produce warm water; also showing the distributing valve in position to supply the mixture to the shower nozzle. Fig. 7 is a transverse section, taken on line 7—7 of Fig. 6. Fig. 8 is a transverse section, taken on line 8—8 of Fig. 6. Fig. 9 is respectively a side elevation and an end view of the conical distributing valve. Fig. 10 is respectively an outer end view and a central longitudinal section of the body of the distributing valve. And Fig. 11 is a side elevation of the latter valve body. Fig. 12 is an enlarged face view of the dial inscribed with indicia for the operating handles.

In the drawings, Figs. 1 and 2 illustrate a combination tub and shower bath and water supply system, in which 2 represents the mixing-valve body, which receives the cold and hot water respectively through valveless conduits 3 and 4. The cold, warm, or hot water resulting from the operation of the valve is discharged respectively towards the bath-tub A and the shower-head B, by branch pipes 5 and 6, the said pipes being unobstructed, and together with the body 2 comprising an aligning conductor of the simplest construction. The water for the tub and also for the shower-head is selectively controlled by a mixing-valve 7, and by a distributing-valve 8. In the preferred arrangement the pipes 3, 4, 5 and 6, as well as the main portion of the body 2, are shown enclosed by a hollow wall 11, so that only the operating handles or members and the usual dial, as 2' are exposed. The pipe 6 extends through the wall into the bath-room and is fitted with the usual shower-head B (see Figs. 1 and 2).

The mixing-valve 7 comprises a tapered body, which is operatively disposed in a correspondingly tapered seat or chamber 7', and

is partially rotated by means of a stem 7^a, which extends outwardly beyond the dial 2', and is fitted with a handle 7^b, by which the valve may be operated manually. The valve 7 is preferably formed with a mixing chamber 7^c which communicates respectively with the cold and hot water pipes 3 and 4, by means of radial ports 7^d—7^e, as best seen in Figs. 6 and 7, in which the valve 7 is in position to draw water from both pipes 3 and 4 to be mixed in the chamber 7^c for producing warm water. It will be understood that rotating the valve 7 slightly in either direction from the position of Fig. 7 will effect the drawing of the cold or hot water alone, and that by continuing the said rotation still farther, the supply of water to chamber 7^c, may be entirely shut-off. The dial in Figs. 1 and 12 bear marks indicating the extreme movements of the valve 7, as well as the temperature of the water at different stages of the said operations. The exposed end of the body 2 is closed by a threaded cap 2^a, and this cap is telescoped loosely by a larger sleeve 2^b, which is also threaded to the body, and may be screwed in opposite directions without disturbing the cap. The sleeve 2^b has a flange 2^c, which engages the outer face of the dial 2', and is employed for adjustably clamping the dial to the walls (11) in case there are variations in the thickness of the walls. Below the mixing chamber 7^c, the body 2 is formed with a hollow portion, which is divided longitudinally by a wall 2^d, the central plane of which includes the axial line of the pipes 3 and 4, for providing separate chambers 2^e—2^f that collect the water for the tub and shower-head, the chambers 2^e—2^f having unrestricted communication respectively with the pipes 5 and 6. The water delivered by pipes 3 and 4 passes through ducts 2^g—2^h, which are formed in the wall 2^d (see Figs. 6, 7 and 8). The rear end of the body is formed with a relatively large threaded opening *a*, that normally communicates with both of the chambers 2^e—2^f (see Figs. 6 and 8).

My distributing mechanism will now be described: 12 represents an externally threaded bushing which screws into the opening *a* of the body, the bushing having a flange 12' that overlaps the said opening. The bushing 12 preferably seats tightly against the bottom margin of the valve chamber 7' that surrounds the bottom end of the mixing valve 7 (see Fig. 6). Beyond the flange 12' the bushing is formed with a hexagonal portion 12^b to receive a wrench. The inner end of the bushing 12 is formed with a conical socket 12^c and beyond the said socket is a smaller bore 12^d. The bushing 12 is formed with diametric ports 12^e—12^f, which respectively communicate with the chambers 2^e—2^f. The distributing valve 8, comprises a bell-shaped portion 8'

having a taper to closely fit the socket 12^c of the bushing. The bell 8' is formed with a concentric cavity 8^a, which aligns axially with the mixing chamber 7^c, and therefore receives the mixture directly from the said chamber. The bell portion of the valve 8 is formed with a single elongated circumferential port 8^c, by which the water is discharged into chambers 2^e—2^f when the valve is rotated. Beyond the bell 8', the valve 8 is formed with an integral stem 8^d, which journals in the bore 12^d of the bushing, and surrounding the base of said stem is preferably disposed a packing ring 8^e, for supplementing the normal metallic seal of the bell portion with the bushing. The free end of the stem 8^d is preferably flattened at 8^f, and this portion is also perforated as at 8^g. The valve 8 is operated a partial revolution for dispensing the water toward the tub and shower-head by means of a pair of gears 14—14'. The gear 14 is formed with a slotted opening to receive the flattened end of the stem 8^f, and is held in place thereon by means of a pin 14^a. This peculiar arrangement enables gear 14 to drive the valve 8. The gear 14' is rigidly mounted upon one end of a shaft 15, the latter being journaled in bearing-lugs 15', which may be integral with the body 2, as shown in Figs. 2, 3, 5 and 7. The shaft 15 extends forwardly parallel to the barrel of the body 2, and upon its forward end is slidably mounted a sleeve 16' which supports an operating lever 16, by which the distributing valve is manipulated. The lever and sleeve 16' may be made integral by drawing the sleeve, and the shaft 15 is preferably flattened as at 15^a, as shown in Figs. 3, 4, and 5, for enabling the sleeve to drive the shaft. It is important that the valve 8 be stopped when it reaches the positions where the greatest volume of water may be delivered to the tub and shower-head. To this end, the sleeve 16' is formed with a substantially semicircular flange 16^a whose radii as measured from the axis of the sleeve to its extremities 16^b—16^c are greater than the radial distance from the axis of the sleeve to the periphery of the casing 2. By this arrangement the lever 16 is allowed definite strokes in opposite directions and is positively stopped by the engagement of the points 16^b—16^c with the barrel of the body 2 (see Figs. 4 and 5), when the port 8^c is moved into registry with the ports 12^e—12^f of the bushing 12, which means that the discharge of the water from the valve 8 is at its greatest volume. This will be understood by reference to Fig. 8, wherein the full lines show the port 8^c in full registry with the port 12^f. The extreme positions of the valve 8 correspond to the positions of the lever 16 indicated at *a* and *d* in Figs. 1 and 12. The intermediate positions *b* and

c indicate respectively the medium discharge to the shower and the neutral or closed position of the valve 8, as shown in Fig. 3. In order to provide clearance for the lever 16, between the dial 2' and the wall 11, the flange of the dial is cut away, as at 16^a (see Fig. 6).

From the foregoing it will be understood that the operator first manipulates the handle 7^b, for drawing either cold, warm or hot water by the swinging of the handle 7^b so as to point to the corresponding marks on the dial. The handle may then be left in said position. The operator next manipulates lever 16 in the proper direction for supplying either the tub or the shower-head, as explained. At the end of the bathing exercise the operator should swing the lever 16 to the neutral position *c*. The handle 7^b may then be swung to the "off" position, which relieves the valve 8 of the pressure, and provides a double safe-guard against leakage while the bath fixture is not in use.

My combined mixing and distributing mechanism is extremely simple, and eliminates a number of shut-off and other valves and parts which have heretofore been employed for controlling the supply of water to the tubs and shower-heads. The present mechanism reduces the selective operations of the water supply to the simplest terms. The mechanism may be produced at relatively small cost, and its installation may be effected in less time and at less expense than any fitting of the class known to me. When the mixing and distributing device is once properly installed it needs no attention or care, and neither of the valves require any adjusting or packing.

Having thus described my invention, what I claim, is—

1. The combination with a hollow body having a valve chamber receiving cold and hot water, a valve in said chamber for selectively drawing and mixing the water, and means for operating said valve, of a valve receiving the mixed water and selectively dispensing the water toward a tub and shower-head, gears for rotating the dispensing valve, a rocking lever for operating said gears, and means on the lever engageable with the body at points spaced from the water receiving and dispensing points for stopping said lever when the dispensing valve is in position to supply the greatest volume of the water.

2. The combination with a hollow body having a valve chamber receiving cold and hot water and having separate chambers that communicate with a bath-tub and a shower-head, and a valve in said valve chamber adapted to selectively draw and mix the cold and hot water, of a hollow valve adapted to receive the mixture from the first valve and to dispense the mixture toward said

separate chambers, a lever for operating the second valve, and means on the lever engageable with the body at points spaced from the water receiving and dispensing points for stopping the movements of said lever when the second valve is in position to dispense the greatest volume of the mixture.

3. A hollow body formed with a valve chamber communicating with cold and hot water inlets and having separate chambers communicating with a bath-tub and a shower-head, said body having an opening in one end communicating with the separate chambers, a valve in the valve chamber adapted to draw and mix the water received from said inlets, a valve interposed between the valve chamber and said separate chambers for controlling the flow of the water toward the tub and shower-head, means for operating the mixing valve, means for rocking said second valve for charging the separate chambers with the mixture during the final movements of said valve, and means for stopping the second valve when the flow of water to the tub and shower-head reaches the maximum volume including means on the rocking means of the second valve engageable with the body at points spaced from the water receiving and dispensing points.

4. The combination with a valve body having cold and hot water inlets and having separate chambers communicating with a bath-tub and a shower-head, of a valve adapted to be adjusted for selectively drawing water of different temperatures through said inlets, a valve interposed between the first valve and the separate chambers adapted to be rocked in opposite directions for directing the mixture received from the first valve alternately toward the separate chambers, a lever for rocking the second valve, and means carried by said lever adapted to engage said body at points spaced from the water receiving and dispensing points for limiting the rocking movements of said second valves.

5. In a device of the type set forth, a body provided with hot and cold water inlets and with separate outlets, said body having a mixing chamber and a hollow part therebelow, a diametrical wall dividing the hollow part to provide a pair of separate chambers, which latter communicate with the respective separate outlets, said wall having ports communicating with the water inlets, and each of which ports enters the mixing chamber, a hollow valve in the mixing chamber interposed between the wall ports and having ports for registry with the wall ports, a second hollow valve below the first valve having a port for registry with the outlets, and separate means for operating the valves.

6. In combination with a body having a mixing chamber provided with hot and cold

water inlets and having separate outlets, a valve in said chamber for controlling the inlets, a distributing valve for controlling the outlets, and means to operate the distributing valve including a lever, and means carried by the lever and engageable with the body at points spaced from said inlets and outlets to limit throw of the lever in both directions.

10 7. In combination with a body having a mixing chamber provided with hot and cold water inlets and having separate outlets, a valve in said chamber for controlling the inlets, a distributing valve for controlling the outlets, and means to operate the distributing valve including a lever, and a member carried by the lever and having spaced

pointed ends engageable with the body to limit movement of the lever in both directions.

8. In combination with a body having a mixing chamber provided with hot and cold water inlets and having separate outlets, a valve to control the inlets, a distributing valve for controlling the outlets, a dial on the body, means to actuate the distributing valve, including a shaft, a lever having a sleeve mounted on an end of the shaft and arranged to the rear of the dial and closely adjacent thereto, and a flange on the sleeve having parts engageable with the body to limit movement of the lever.

In testimony whereof I affix my signature.
 ORVIS W. VALLIER.