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SHOWER HEAD

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1

The invention relates to a showerhead and more particularly to a valve device for regulating the spray of water from the hot and cold faucets of a shower bath. It has heretofore been proposed to provide a showerhead wherein the spray is regulated by a plurality of valve plugs each of which slidably fits in a seat member having a corresponding plurality of ports, each plug having one or more tapered slots in the surface thereof. The spray is varied by reciprocating the plugs to expose more or less of these tapered slots. In that case, the plugs are reciprocated as a unit by an eccentric drive which has a rotatable handle at the side of the showerhead.

The object of the present invention is to simplify and improve the type of showerhead above described, and particularly to avoid the use of the eccentric and the separate handle at the side of the showerhead, to regulate the plugs by means of the casing of the showerhead while making the parts in such a form that they can be manufactured on an automatic screw machine. Economy is thus obtained as the cost of parts made by an automatic screw machine is much less than the cost of castings or moldings, particularly as they necessitate additional machine operations.

For further details of the invention, reference may be made to the drawings wherein Fig. 1 is a side view in elevation of a showerhead according to the present invention.

Fig. 2 is an end view.

Fig. 3 is an enlarged sectional view of the showerhead of Figs. 1 and 2, showing the plugs in one position of adjustment, one of the plugs being shown in elevation.

Fig. 4 is a sectional view with parts broken away, showing the plugs in another position of adjustment.

Figs. 5 and 6 are sectional views on lines of the corresponding numbers in Fig. 3, looking in the direction of the arrows.

Referring in detail to the drawings, the showerhead 1 at its inner end is adapted to be mounted on the usual swivel coupling member 2, which is stationary, being fixed on a cap 3 having internal threads 4 for mounting the same on the outer end of a pipe 5 which forms the outlet from the hot and cold valves, not shown, of a shower bath.

The inner end of showerhead 1 has a relatively stationary casing 6 having at its inner end a shoulder 7 for a washer 8 which is held clamped against the front of the coupling 2 by a cap 9

2

having at its inner end a flange 10 which engages an inner portion of the spherical head 11 as indicated at 12. The inner end of casing 6 has external screw threads 16 which mate with the threads 17 in the cap 9, the latter being held in adjusted position by a set screw 13.

The outer casing 20 telescopes on the inner casing 6. The outer end of casing 6 has external threads 14 which mate with the internal threads 15 in the outer elongated casing member 20, so that rotation of casing 20 results in its movement lengthwise of casing 6. The threads 14 and 15 provide a rotary reciprocating coupling between casings 6 and 20. At the inner end of threads 14 is an annular groove 21 to removably receive an O ring 22 of rubber or rubber substitute material. Inwardly of the threads 15, the casing 20 has an enlarged bore 23, the distance between the inner surface 24 of bore 23 and the bottom 25 of groove 21 being less than the diameter of O ring 22, whereby O ring 22 is compressed to prevent leakage at the inner end of the casing 20. The bore surface 24 is smooth and the length of threads 15 is substantially shorter than the length of threads 14 so that casing 20 can be rotated to advance or retract the same while maintaining an effective seal at O ring 22 for all operative positions of adjustment of casing 20.

The outer end of casing 20 has a threaded bore 26 for the external threads 27 on a port plate 28 having four circular ports therethrough as indicated at 29, 30, 31, 32 in Fig. 2. Slidably fitting in and extending through each of the ports 29 to 32 is a plug valve head like 33 having around its outer surface an array of longitudinally extending tapered grooves like 38. Each plug like 33, inset from at its inner end, has a circular groove like 34 of uniform width and parallel side walls 35 and 36 removably carried by a header 37 which has four outwardly opening slots 40, 41, 42, 43, one for each of the plugs like 33. These slots like 40 are radial and have parallel side walls like 44 and 45 spaced apart slightly more than the reduced diameter 39 which forms the bottom of the groove 34. Also the header 37 is of uniform thickness which is slightly less than the width of the groove 34.

The header 37 has a central bearing aperture 50 carried on the outer end 51 of a stem 52, and held in position between a shoulder 53 and a lock ring 54. Stem 52 is at the axis of the coaxial cylindrical casings 6 and 20 and header 37 rotates on the common axis.

Stem 52, inset from its inner end has an

3

annular groove 55 of uniform width which is slightly greater than the width of the spider 56 at the outer end of casing 6. The spider 56 has a central bore 57, see Fig. 5, which has a diameter larger than the reduced diameter 58 at the groove 55. The bore 57 radially outwardly thereof has an enlarged opening 60, larger than the diameter of stem 52, for insertion or removal thereof.

The spider 56 has a number of ports like 61 for the passage of water therethrough, and header 37 has a number of ports like 62 for the passage of water to the chamber behind the port plate 28, the water flowing out through the grooves like 38, in the form of a spray which can be regulated by rotating the showerhead casing 20 to vary the effective opening of the grooves like 38.

In assembling the device, the plugs like 33 are slidably mounted in their respective slots 40 to 43, and with the port plate 28 out of position, the inner end of stem 52 can be inserted into the enlarged opening 60 and then shifted laterally into the central bore 57 whereby the stem 52 is rotatably supported by the spider 56, but held against movement in an axial direction. The bore 57 and opening 60 act as a key slot to lock or unlock the stem 52. Then the port plate 28 is fitted onto the plugs like 33 and screwed into position, shown in Fig. 3. When port plate 28 is in position, the stem 52 is thereby held in its axial position, preventing its entry into the opening 60 and thereby preventing its disassembly from spider 56, while causing the plugs 33 to rotate with the casing 20, to effect relative sliding movement of the port plate 28 and the plugs like 33. The port plate 28 also retains plugs like 33 at the inner end of their slots 40 to 43 in the header 37. The assembly of the remaining parts is obvious from the drawings.

The outward movement of the casing 20, for example, to a position where the grooves like 38 are closed by the port plate 28, as shown in Fig. 4, is limited by the internal shoulder 63 of casing 20 striking the inner side of header 37 as shown in Fig. 4.

For example, while the threads 14, 15 may have any suitable pitch, coarse pitch such as nine threads to the inch is preferred so that sediment or deposit from the water does not clog these threads and so that a large relative movement of the plug and ports is obtained by rotating the casing 20.

Various other modifications may be made in the invention without departing from the spirit of the following claims.

I claim:

1. A spray head comprising telescoping casing parts, one of said parts having a port plate thereon, said port plate having a plurality of laterally spaced ports, a thread coupling between said casing parts, a plurality of flow controlling plugs each extending through one of said ports in said port plate and means on said other casing part for supporting said plugs for non-reciprocating rotation with said port plate on rotary reciprocation of said one casing part, said means comprising a rotary support and means preventing reciprocation of said rotary support.

2. A spray head comprising coaxial inner and outer casing parts, said inner casing part having an external thread, said outer casing part having an internal thread rotatably coupling with said external thread for relative rotation of said casing parts, said inner casing part having a

4

groove at the inner external end of its said thread, an O ring in said groove, said external casing part inwardly beyond its said thread having a rearwardly extending elongated sleeve overlying and forming a sealing contact with said O ring during relative rotation of said casing parts, and an adjustable spray device having valve parts associated with said casing parts respectively and controlled by relative rotation of said casing parts.

3. A spray head comprising inner and outer coaxial casing parts having a rotatable thread coupling therebetween, means for connecting said inner casing part to a supply pipe, said inner casing part at its outer end having a wall having ports therethrough and a key slot therein, said key slot having a central bearing opening into an enlarged aperture at one side thereof, a rotatable stem having an inner end having a head smaller than said aperture and having a recess fitting in and axially over said bearing, a header on the outer end of said stem, a plurality of plug valves carried by said header spaced from the axis of said casing parts, a port plate, and means removably supporting said port plate on said outer casing part, said port plate having ports each surrounding one of said valves, said bearing supporting said valves for rotation with said port plate and said outer casing part, said port plate restricting lateral movement of said valves and header to thereby maintain said head in said key slot.

4. A spray head comprising telescoping coaxial casing parts having a rotatable thread coupling therebetween, means for securing one of said casing parts to a supply pipe, said one casing part having an outer end having a wall having a port therethrough and having a bearing having a key slot, a stem removably insertable through said key slot into said bearing and embracing said bearing for rotation of said stem without longitudinal movement thereof, said stem having an outer end, a plurality of plug valves carried by said stem, said other casing part having a removable port plate having ports each surrounding one of said valves, the relative position of said valves and their respective ports and the valve opening thereof being under control of rotation of said other casing part by operating of said thread coupling.

5. A spray head comprising a relatively stationary inner cylindrical casing part, a coaxial relatively movable outer cylindrical casing part, a rotary reciprocating coupling between said casing parts, a port plate fixed to the outer end of said outer casing part, said port plate having laterally spaced ports, valve plugs slidably fitting in said ports respectively and rotatable with said port plate on rotation of said outer casing part, said inner casing part having an outer end having a spider, a rotary support for said plugs carried by said spider coaxial with said casings, said rotary support having abutment means preventing reciprocation of said plugs on rotary reciprocation of said outer casing part.

6. A spray head comprising a relatively stationary inner cylindrical casing part, a coaxial relatively movable outer cylindrical casing part, a rotary reciprocating coupling between said casing parts, a port plate fixed to the outer end of said outer casing part, said port plate having laterally spaced ports, valve plugs slidably fitting in said ports respectively and rotatable with said port plate on rotation of said outer casing part, said inner casing part having an outer end having a

5

spider, a rotary support supporting said plugs for rotation about the axis of said casings, said support comprising an axial stem on said spider and a header for said plugs on said stem, said rotary support having abutment means preventing reciprocation of said plugs on rotary reciprocation of said outer casing part.

7. A spray head comprising a relatively stationary inner cylindrical casing part, a coaxial relatively movable outer cylindrical casing part, means coupling said casing parts for longitudinal movement of said outer casing part on rotation of said outer casing part, a port plate fixed to the outer end of said outer casing part, said port plate having laterally spaced ports, valve plugs slidably fitting in said ports respectively and rotatable with said port plate on rotation of said outer casing part, said inner casing part having an outer end having a spider, a rotary support for said plugs carried by said spider coaxial with said

6

casings, said rotary support having abutment means preventing reciprocation of said plugs on rotary reciprocation of said outer casing part, said inner casing part inwardly of said coupling means having an external groove and a sealing ring therein, said outer casing part having an interior cylindrical wall in sealing contact with said sealing ring.

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