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O. MANNING

2,968,443

SHOWERHEAD

Filed Feb. 20, 1959

fig. 1

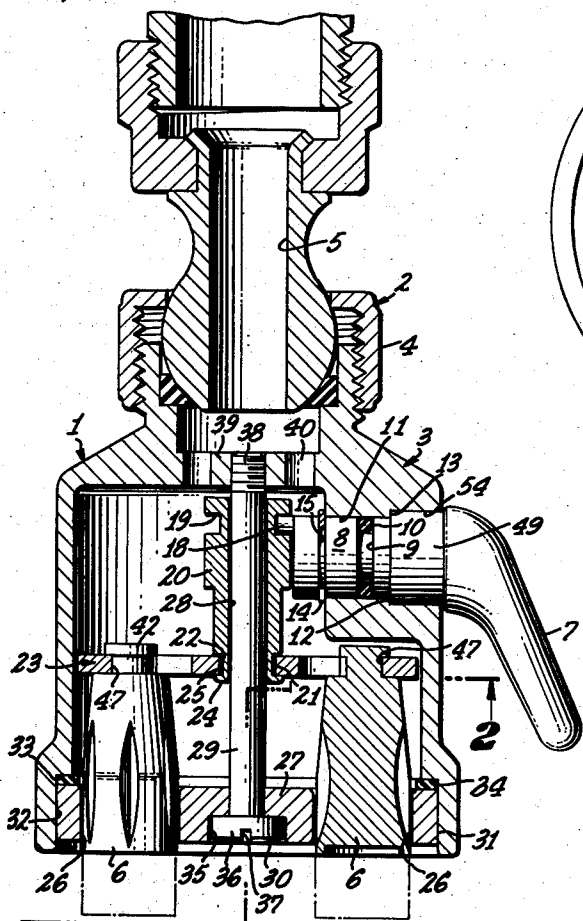


fig. 2

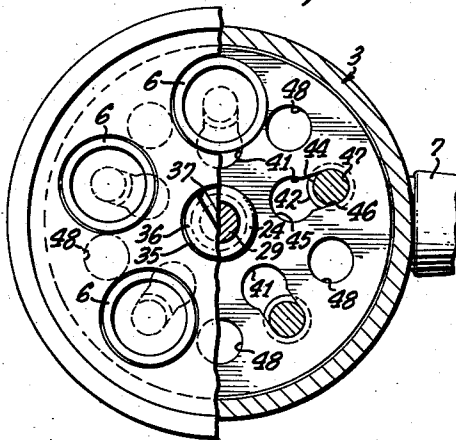
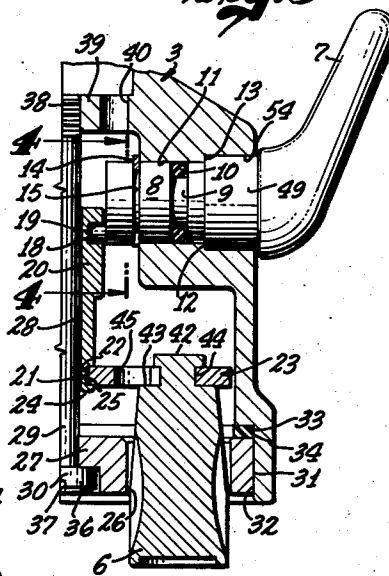


fig. 3



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fig. 5

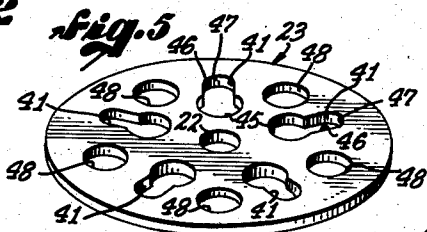


fig. 4

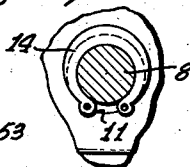
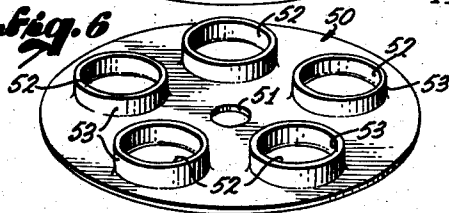


fig. 6



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2,968,443

SHOWERHEAD

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The present invention relates to a shower head wherein a handle is employed to operate plugs or valves to control the flow of water through a plurality of spray openings. More particularly, the present invention relates to improvements in the general type of showerheads shown in the following patents: 1,830,694; 2,448,792; 2,534,549.

Showerheads of the general type referred to above are in a field which is very competitive and due to this fact, it is important not only to provide a showerhead which will give satisfactory results but it is also necessary to provide a construction which is simple to make and assemble.

An object of the present invention is to improve and simplify the construction and assembly of the shower head with regard to the following features: (a) the rotary seal and mount for the stem of the handle, (b) the construction and support for the port plate and (c) the construction and assembly of the plugs with reference to their header.

In brief, these objects are accomplished as follows. With reference to item (a), the assembly and seal for the stem of the handle are improved by providing a ring seal which is mounted on and carried by the stem itself with a removable key in the form of a lock pin insertable on the inner end of the stem inside of the valve casing to hold the stem of the handle in rotary position against a shoulder in the casing.

With regard to item (b), a more satisfactory and simpler support for the port plate is provided by avoiding the need for screw threads at the periphery of this plate through the use of a central bolt mounted at one end in the port plate and at its opposite end in the casing. According to a further feature, this bolt serves the function of holding the port plate in sealing relation with the casing, and/or serving as a slide support for a stem extension of the header. Costs are reduced as this stem extension can be made on an automatic screw machine and the header can be a metal stamping, these two parts being clamped, riveted or otherwise fastened together. In a modification, the metal is struck up around the ports to provide a cylindrical seat for each plug valve.

With reference to item (c), the use of a header for the plugs wherein the slots in the header are open at their outer ends as in Patent 2,534,549 has the disadvantage that there is nothing to prevent the plugs from falling out of the header during assembly, requiring that caution be employed in the assembly. The other two patents provide a pin for each plug, with a round hole for the upper end of the plug extension, which has the disadvantage of requiring that the pins be individually applied to the plugs. According to the present invention, these disadvantages are overcome by providing a header wherein each plug is provided with a key slot, a radially inner portion of each slot being enlarged to pass the key head, the radially outer portion of each slot being narrower to prevent the plug from falling out. The narrow portion of the slot is extended enough in a radial direction to allow the plugs to adjust themselves in the ports in the port plate.

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For further details of the invention, reference may be made to the drawings wherein Fig. 1 is a vertical sectional view through the casing and associated parts of a shower head according to the present invention, some of the parts being shown in full lines. In Fig. 1, the handle is in position with the showerhead substantially closed.

Fig. 2 is a sectional view on the broken line 2—2 of Fig. 1.

Fig. 3 is a partial sectional view like Fig. 1 showing the handle in another position with the showerhead open.

Fig. 4 is a partial sectional view on line 4—4 of Fig. 3 showing a plan view of the key or lock pin on the stem of the handle.

Fig. 5 is a perspective view of the header.

Fig. 6 is a perspective view of a modified form of port plate.

While dimensions are a matter of choice, the drawing shows a casing 50% larger than a model which has been constructed and tested.

Referring in detail to the drawings, the showerhead 1 has the usual form of swivel coupling 2 so that the casing 3 can be tilted and locked in adjusted position by operating the sleeve 4. The coupling 2 has a fluid passage 5 which is connected to a suitable source of fluid pressure. The passage 5 communicates with the interior of casing 3 and fluid flow through the casing is controlled by handle 7 which operates a series of plug valves indicated at 6, five thereof being shown.

The handle 7 has an integral stub shaft 8 having an annular groove 9 for a ring seal 10. Ring seal 10 seals against outward fluid flow through the bore 11 and also serves the function of holding valve 7 in adjusted position due to the leakage fluid pressure acting on this ring seal. The casing 3 is provided with a bearing bore 11 in which the shaft 8 and the ring seal 10 rotatably fit.

The outer end of shaft 8 is enlarged as indicated at 49, providing an inwardly facing shoulder 12 which abuts outwardly facing shoulder 13 on the casing. Shoulder 13 is provided by the counter bore or enlarged bore 54 at the outer end of bore 11. Shoulders 12 and 13 are held in engagement with each other by an U shaped lock pin 14, see Figs. 1 and 4, which serves as a key and fits in an annular groove 15 in shaft 8 against the inner face 16 of the wall 17 of the casing. The inner end of shaft 8 has a crank pin 18 which fits in a circular groove 19 at the inner end of the stem 20 of the header. Rotation of handle 7 thus operates crank pin 18 to raise and lower stem 20 and the plug valves 6 carried thereby.

Stem 20 can be made on an automatic screw machine and its outer end has a terminal portion 21 which passes through a circular aperture 22 in the header 23. The terminal portion 21 at its outer end 24 is bent over and riveted to form a circular groove 25. Groove 25 is larger in a direction lengthwise of the axis of the casing than the thickness of header 23, to rotatably support the header so that the plug valves indicated at 6 adjust themselves to their respective ports like 26 in the port plate 27. The stem 20 has a cylindrical bore 28 which slidably fits on the shank 29 of a bolt 30.

According to the second item above described, the port plate 27 has a smooth cylindrical periphery 31 free from screw threads and it slidably fits in the cylindrical socket 32 at the outer end of casing 3. Socket 32 at its inner end has a shoulder 33 for an annular seal 34 which fits between that shoulder and the inner side of the port plate 27. Port plate 27, in the form shown in Fig. 1, has a central recess 35 in which fits the head 36 of bolt 30. Head 36 has a kerf 37 for a screw driver or the like. The inner end of bolt 30 has screw threads 38 for mating threads in a web 39 at the inlet end of the casing 3. Web 39 has ports like 40 forming fluid passages leading to the interior of the casing.

With reference to the third item described above, as shown in Fig. 5, the header 23 is provided with a series of slots like 41, each slot extending radially of the axis of header 23, one such slot being provided for each such plug valve like 6 and each such plug valve having an enlarged head 42, see Fig. 3 and a shoulder 43 providing a groove 44 in which the rim of any one of the slots like 41 fits. The radially inner portion of each slot, as indicated at 45 in Fig. 5, is enlarged so that the head 42 will pass through it, while the radially outer portion of each slot like 46 is closed at its outer end 47 and narrow enough to fit within the groove 44 so that the heads like 42 will support the plug valves in position on the header.

In the modification shown in Fig. 6, the modified port plate 50 is a metal stamping having a circular hole 51 for the shank 29 of bolt 30 and having ports like 52 wherein a cylindrical seat 53 is provided for each plug by stamping the cylindrical portion 53 from the body of the metal blank from which the header is stamped. Fig. 6 shows the form resulting from one stamping operation, with all five cylindrical seats like 53 arising from the body or plane of the circular stamping.

As shown in Fig. 5, interspersed with the slots 41 is an array of apertures indicated at 48, five being shown, to provide fluid passages through the header.

In Fig. 3, the handle 7 is shown rotated to a position wherein the crank pin 18 operates the plug valves 6 to extend them through the port plate 27 to open position.

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

I claim:

1. A showerhead comprising a hollow casing having an inlet at one end thereof, a port plate at the other end of said casing, said other end of said casing having a socket into which said port plate fits with rectilinear non-rotary movement, said socket having a shoulder facing outwardly of the axis of said casing, a seal between said shoulder and the inner side of said port plate, said port plate having a central hole, a post fitting said hole, said post having an outer end in supporting relation with said port plate, said post acting to hold said port plate in sealing relation with said seal and said socket, said post having an inner end fixed to said casing, said port plate having a plurality of ports, plug valve members slidable in said ports respectively, and means for operating said plug valve members.

2. A showerhead according to claim 1, the periphery of said port plate and the adjoining wall of said socket being smooth and free from screw threads.

3. A showerhead according to claim 1, said post comprising a bolt having an outer end having a head and having an inner end having threads, said port plate having a central counterbore receiving said bolt and forming an abutment for said head, said inlet end of said casing having a web having a threaded socket for said bolt threads.

4. A showerhead according to claim 1, said operating means comprising a header for said plug valve members, said header having a sliding support on said post.

5. A showerhead according to claim 4, said header having key slots for heads on said plug valve members respectively, said sliding support comprising a stem in the form of a cylindrical member having an axial bore slidably fitting said post, said stem having an outer end fixed to said header.

6. In a showerhead for plug valve members having an operating means, said operating means comprising a header for the plug valve members, said header having an array of key slots for the plug valve members, said slots each having an enlarged radially inner portion and a narrow closed radially outer portion, each of said plug valve members having a stem head fitting through the radially inner slot portion and having a stem neck slidably fitting the radially outer closed slot portion.

7. A showerhead comprising a casing having an inlet and an outlet having a port plate and plug valves, a header for said valves, said header having an array of radial slots for said plug valves, a stem having one end fixed to said header, said stem having an axial bore, said stem having an opposite end having a recess, an operating handle having a rotary bearing support in a side wall of said casing, said handle having a crank pin fitting said recess, and a central post in said casing, said post having opposite ends mounted respectively in a central opening in said port plate and fixed to said casing, said axial bore of said stem slidably fitting said post.

8. A showerhead according to claim 7, said port plate having a smooth cylindrical periphery fitting a cylindrical socket in the outlet end of said casing and a seal in said socket between said port plate and said casing.

9. A showerhead according to claim 7, said post comprising a bolt, said bolt slidably fitting a central hole in said port plate, one end of said bolt having a head supporting said port plate and arranged in a recess in said port plate, said casing having therein a web between said rotary bearing support and said inlet, said web having a port, and a threaded connection between the other end of said bolt and said web.

10. In a showerhead, a valve casing having a side wall having a bearing bore extending therethrough, said bore being of reduced diameter at its inner end providing a shoulder facing outwardly of said casing, an operating member having a handle terminating in a laterally extending shaft, said shaft having an outer portion projecting into said casing and an inner portion rotatably fitting said bore, said outer portion having a circumferential groove having a ring seal, said inner shaft portion being of larger diameter than said outer shaft portion and terminating at its inner end in an outwardly facing shoulder rotatably fitting said first mentioned shoulder, said outer shaft portion having an extension inwardly of said casing beyond said side wall, said extension having a crank, said extension having a peripheral groove and a substantially U shaped lock pin therein mounted on said extension and fitting against the inner face of said side wall for holding said inner shaft portion of said operating member in position in said bearing bore with said shoulders fitting together.

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