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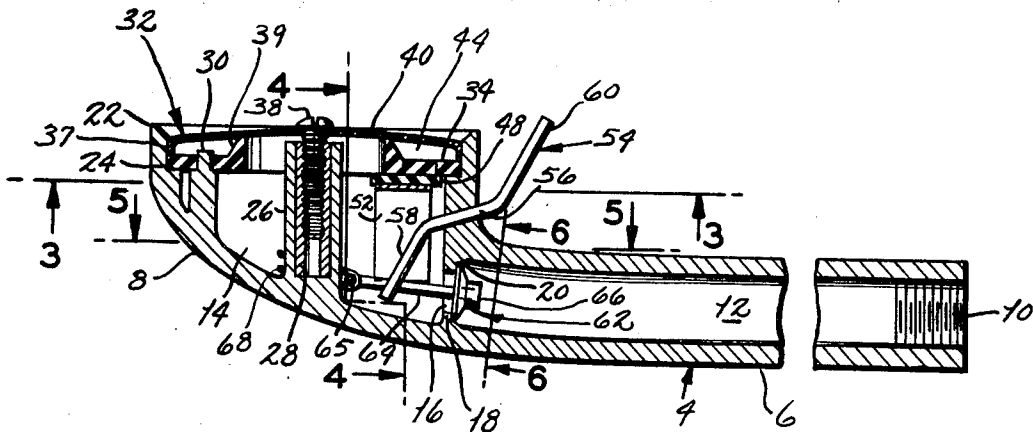
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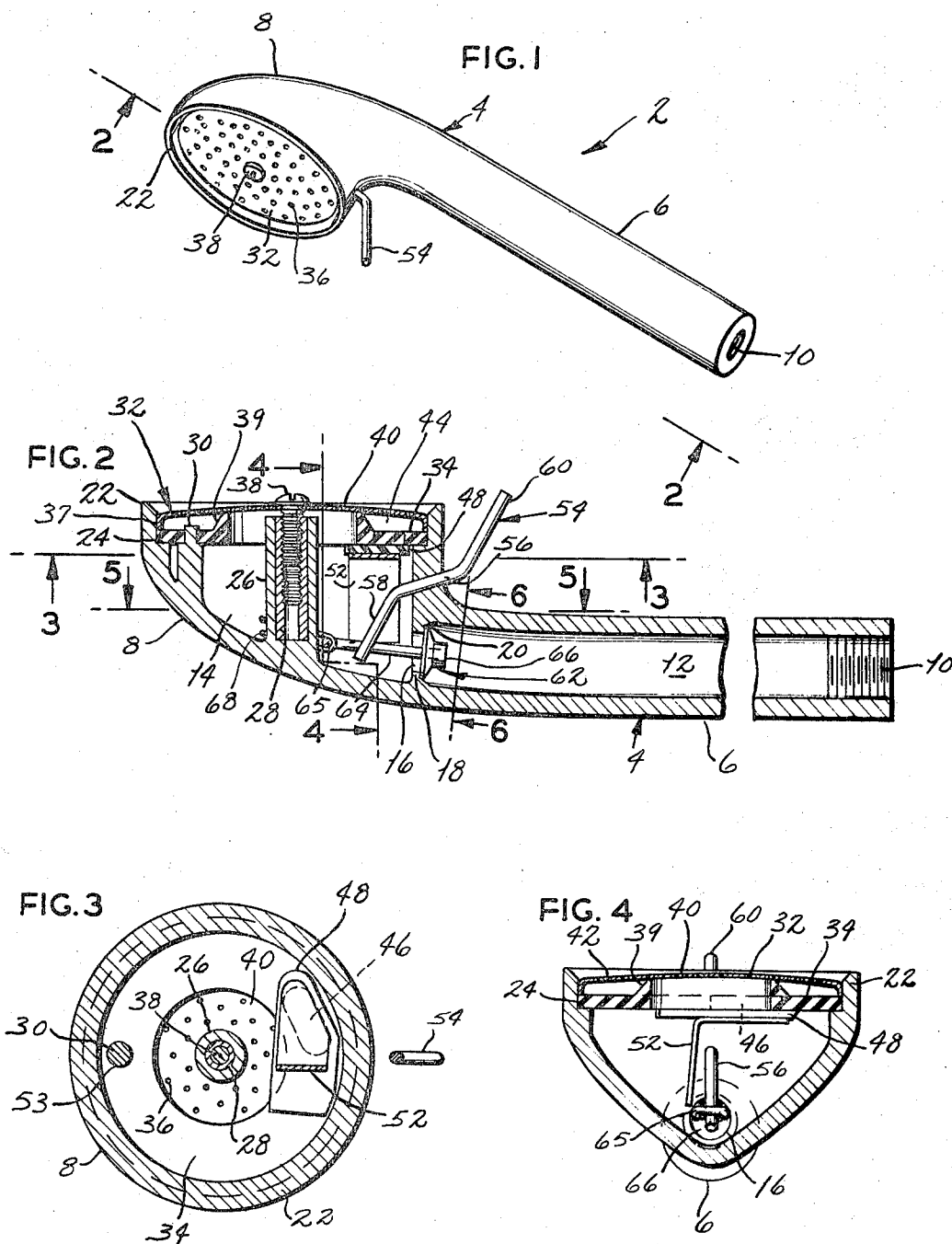
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[54] **SHOWER HEAD**
9 Claims, 8 Drawing Figs.

[52] U.S. Cl. 239/449,
239/577, 239/590.3
[51] Int. Cl. B05b 1/30
[50] Field of Search 239/443,
444, 445, 446, 448, 449, 577, 578, 582, 590.3

ABSTRACT: A shower head having a body provided with an outwardly opening cavity across which a perforated disk extends. The disk is divided into inner and outer segments by an underlying diaphragm element which further creates a chamber inwardly from the second segment. A valve is provided for optionally admitting fluid into the second chamber from the cavity and another valve is provided for admitting fluid into the cavity. Both valves are operable by a single control lever.





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FIG. 5

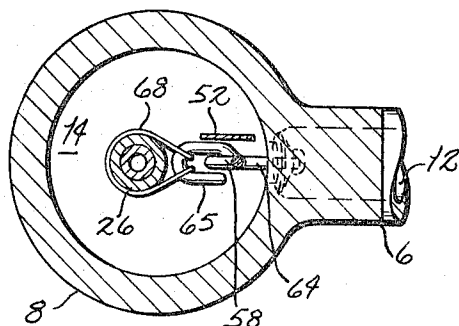


FIG. 6

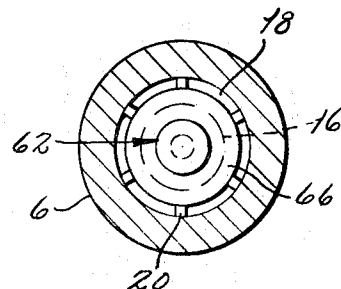


FIG. 7

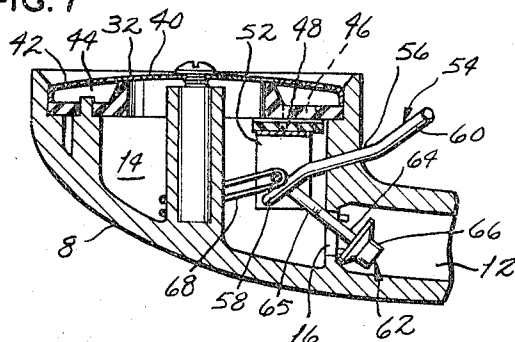
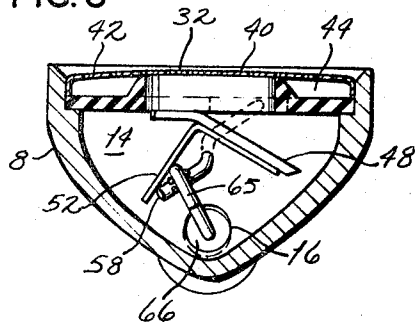


FIG. 8



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SHOWER HEAD

This invention relates in general to fluid spraying devices and, more particularly, to shower heads.

Conventional shower heads, whether they are of the fixed or hand-held variety, contain numerous parts, most of which are metal. Many of these parts are machined to relatively precise tolerances and, as a result, conventional shower heads are not only heavy, but also quite expensive. While excessive weight is not significant in the case of fixed shower heads, it is as far as the more versatile hand-held variety is concerned. Indeed, it is desirable to have hand-held shower heads as light as possible, not only to afford easy manipulation of the spray issuing therefrom, but also to prevent the head from damaging the shower stall, drain basin, or other facility in which it is used, should it inadvertently be dropped.

A principal object of the present invention is to provide a compact lightweight shower head suitable for attachment to a flexible hose so that it can be hand-held. Another object is to provide a shower head in which the intensity and flow rate of the spray can be varied and the water supply can be cutoff completely through the manipulation of a single control lever. A further object is to provide a shower head which is simple in construction and economical to manufacture.

These and other objects and advantages will become apparent hereinafter.

The present invention is embodied in a shower head having a body provided with a cavity which is traversed by a perforated member. A dividing element engages the perforated member, dividing it into first and second segments, and further creates a chamber underlying the second segment. A valve is associated with the chamber for admitting fluid to it from the cavity, and another valve admits fluid to the cavity itself. These valves are operated by control means carried by the body.

The invention also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed. In the accompanying drawings which form part of the specification and wherein like numerals and letters refer to like parts wherever they occur:

FIG. 1 is a perspective view of a shower head constructed in accordance with and embodying the present invention;

FIG. 2 is a longitudinal sectional view of the shower head;

FIGS. 3, 4, 5 and 6 are sectional views taken along lines 3-3, 4-4, 5-5 and 6-6, respectively, of FIG. 2;

FIG. 7 is a fragmentary longitudinal sectional view similar to FIG. 2, but showing the valve flap and valve element in their open positions; and

FIG. 8 is a transverse sectional view similar to FIG. 4, but showing the valve flap and valve element in their open positions.

Referring now to the drawings in detail, 2 designates a shower head including a body 4 which is preferably molded from a durable plastic as an integral unit and has an elongated handle 6 which merges at its one end into a cup-shaped mouth portion 8. At its opposite end the handle 6 is provided with a threaded bore 10 adapted to receive a fitting (not shown) on the end of a flexible hose (not shown). The bore 10 opens into an inlet channel 12 within the handle 6, and the channel 12, in turn, opens into a cavity 14 within the cup-shaped mouth portion 8 through an aperture 16 located in a partition web 18 formed integral with the body 4 at the juncture of the handle 6 and the mouth portion 8. The partition web 18 separates the inlet channel 12 from the cavity 14 and includes a plurality of guide ribs 20 arranged circumferentially about the aperture 16 in spaced relation to its periphery. The ribs 20 project into the channel 12 and in so doing taper outwardly away from the aperture 16.

The cavity 14 opens outwardly from the mouth portion 8 at an annular rim 22 which inwardly terminates at an annular shoulder 24. Projecting into cavity 14 and also forming part of the mouth portion 8 is a mounting post 26 which is fitted with a threaded metal bushing 28 disposed coaxially with respect to the rim 22 and the shoulder 24. Finally, the mouth portion 8

integrally includes locating boss 30 which also projects into the cavity 14, but is offset radially from the mounting post 26.

The mouth or open end of the cavity 14 is covered by spray disc 32 and an annular elastomeric diaphragm 34, the former of which urges the latter against the shoulder 24 within the confines of the rim 22. More specifically, the spray disc 32 is provided with a multiplicity of apertures 36, and along its periphery it turns inwardly in the provision of a peripheral lip 37 which is forced against that portion of the diaphragm 34 located at the shoulder 24 by a machine screw 38 threaded into the bushing 28. Accordingly, a fluidtight seal is formed between the diaphragm 34 and the lip 37 on the one hand and between the diaphragm 34 and the shoulder 24 on the other so that water discharges from the cavity 14 only through the apertures 36. The inner margin of the diaphragm 34 is spaced inwardly from the mounting post 26, and at that margin the diaphragm 34 is provided with an outwardly projecting annular lip 39 which bears against and forms a seal with the inwardly presented face of the spray disc 32. The lip 39, in effect, divides the spray disc 32 into a circular inner segment 40 and an annular outer segment 42, the latter of which overlies an annular chamber 44 which is separated from the cavity 14 by the diaphragm 34. Adjacent to the juncture of the handle 6 and the end portion 8 the diaphragm 34 is provided with an elongated aperture 46 (FIG. 3) which is normally covered by a valve flap 48 also formed from an elastomeric material. The valve flap 48 is either vulcanized to or formed integral with the diaphragm 34 at one end of the aperture 46 so that it can swing from open position wherein it is folded outwardly away from the aperture 46 (FIG. 8) to a closed position in which it bears against the inwardly presented surface of the diaphragm 34 (FIG. 4) in surrounding relation to the aperture 46. When in the latter position, water is precluded from flowing from cavity 14 into the annular chamber 44. The valve flap 48 further carries a rigid actuating tab 52 which is adhesively or otherwise securely bonded to it and projects into the cavity 14. Finally, the diaphragm 34 is provided with an aperture 53 which aligns with and accepts the outer end of the locating boss 30 to facilitate assembly of the shower head 2 with the elongated aperture 46 in the correct position. The aperture 30 further prevents the diaphragm from rotating within the rim 22 and consequently the elongated aperture 46 remains precisely positioned once installed.

The actuating tab 52 is shifted by means of a control lever 54 having an intermediate portion 56 journaled within the mouth portion 8 and an actuator arm 58 disposed at an angle with respect to the intermediate portion 54 and presented within the cavity 14 adjacent to the tab 52. At its outer end the control lever 54 is provided with a selector arm 60 which is also presented at an angle with respect to the intermediate portion 56, but is located outwardly from the mouth portion 8 adjacent to the handle 6 for convenient digital manipulation. Accordingly, when the selector arm 60 is moved clockwise when viewed from beyond the end of the mouth portion 8 (FIG. 4), the actuator arm 58 will engage the actuating tab 52 and shift it laterally, thereby causing the valve flap 48 to swing away from the elongated aperture 46 and expose the chamber 44 to the cavity 14 (FIG. 3).

The control lever 54 further operates a valve element 62 which normally blocks the aperture 16 and prevents water from flowing into the cavity 14 from the inlet channel 12. More particularly, the valve element 62 includes a valve stem 64 having a looped or hooked end 65 which receives the inner end of the actuator arm 58 on the control lever 54. The other end of the stem 64 extends through the aperture 16, beyond which it is secured to an enlarged valve disc 66 which, when the actuator arm 58 is presented in front of the aperture 16, bears against the partition web 18 between the guide ribs 20 and forms a fluidtight seal therewith around the aperture 16. When the actuator arm 58 is moved laterally in either direction, the hooked end 65 rides across its surface and causes the stem 64 to move from a position in which it is presented coaxially with respect to the axial center line of the

aperture 16 to positions wherein it is askew to the axial center line of the aperture 16. In the latter position, the end face of the valve disc 66 is located at an angle with respect to the partition web 18 and water can pass from the inlet channel 12 through the aperture 16 and into the cavity 14.

The valve element 62 is biased toward its closed position by an elastomeric band 68 which is looped around the mounting post 26 as well as the hooked end 65 of the valve stem 64.

In use, the shower head 2 is connected to a flexible hose (not shown) at the threaded bore 10, and that hose in turn is connected to a pressurized source of water. If the selector arm 60 is unobstructed, the elastomeric band 68 will draw the hooked end 65 of the valve stem 64 toward the mounting post 26 and thereby urge the valve disc 66 toward the partition web 18 in surrounding relation to the aperture 16 so that the aperture 16 is blocked and water cannot flow into the cavity 14. The pressure of the water within the inlet channel 12 amplifies the force exerted on the valve disc 66 by the band 68, and, as a result, the disc 66 is urged snugly against the partition web 18. The hooked end portion 65, being looped around the control lever 54, will maintain the selector arm 60 in a centered or neutral position.

When the selector lever is rotated counterclockwise as viewed from beyond the end portion 8 (FIG. 4), the actuator arm 62 rotates in the same direction away from the tab 52 within the cavity 14. As the actuator arm 62 moves away from its center position, the hooked end 65 of the valve stem 64 follows it laterally and tips the valve disc 66 on the partition web 18 (FIG. 7) so that the end face of the disc 66 moves away from the aperture 16 and allows water to pass through the aperture 16. Continued rotation of the actuator arm 58 causes the hooked end portion 65 to ride across the arm 58 toward the intermediate portion 56 and thereby tip the valve disc 66 even further. In such positions water flows through the aperture 16 at a greater flow rate. The water from the inlet channel 12 enters the cavity 14 and surges against the valve flap 58, urging it tightly against the inner side of the diaphragm 34 around the elongated aperture 46 so that a fluidtight seal is thereby formed. Accordingly, the water does not flow into the annular chamber 44, but passes along the mounting post 26 and the inner faces of the lip 39 on the diaphragm 34 and discharges from the cavity 14 through the apertures 36 in the circular inner segment 40 of the spray disc 32. Since the flow is confined to a reduced area on the spray disc 32, the velocity of the individual streams of water issuing from the apertures 36 in the inner segment 40 is quite high. Accordingly, when a high intensity spray is desired, the selector arm 60 is moved such that the actuator arm 58 moves away from the actuating tab 52 on the valve actuator 50.

When a softer spray at a substantially equivalent flow rate is desired, the selector arm 60 is rotated in the opposite direction, that is clockwise as viewed from beyond the end portion 8 (FIG. 8). When this occurs, the hooked end portion 65 of the valve stem 64 again follows the actuator arm 58 and tips the valve disc 66 off of its seat on the partition web 18 (FIG. 7), thereby permitting water to flow through the aperture 16 and into the cavity 14. At the same time, the actuator arm 58 engages the actuating tab 52 and moves the valve flap 48 away from elongated aperture 46 so that the surge of water into the cavity 16 does not force the flap 48 against the inner side of the annular diaphragm 34. Consequently, some of the water flows through the elongated aperture 46 into the annular chamber 44 from which it is discharged through the apertures 36 in the annular outer segment 42 of the spray disc 32. The rest of the flow discharges through the apertures 36 in the circular inner segment 40 of the spray disc 32. Since the water is discharged from both the inner and outer segments 40 and 42, respectively, the velocity of the water jet issuing from each aperture will be considerably lower, yet the flow rate through the spray disc 32 will be substantially the same as in the case of the high intensity spray from only the inner segment 40.

When the selector arm 60 is moved to the centered position, the elastomeric band 68 as well as the momentum of the water

flowing against the upstream side of the valve disc 66 will carry the valve elements 62 toward its closed position, and as it moves to this position, the valve disc 66 will be guided into a centered disposition with respect to the aperture 16 by the tapered guide ribs 20 extending from the partition web 18.

Since the tilt of the valve disc 66 with respect to the partition web 18 controls the rate at which water passes into the cavity 16, the flow rate through either the circular inner segment 40 or through both the inner segment 40 and the annular outer segment 42 can be varied through the manipulation of the selector arm 60 on the control lever 54, the flow rate, of course, being dependent on the amount the selector arm 60 is displaced from its centered position.

From the foregoing, it is obvious that shower head 2 is relatively simple in construction, yet offers a wide selection of sprays, varying both in flow rate and intensity.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

I claim:

1. A shower head comprising a body having a outwardly opening cavity and an inlet channel communicating with the cavity for admitting fluid to the cavity, a perforated member extending across the cavity, dividing means forming a chamber between a portion of the perforated member and the cavity whereby the perforated member is divided into a first segment overlying the cavity and a second segment overlying the chamber, a valve associated with the dividing means for optionally admitting fluid to the chamber, and control means for operating the valve whereby the intensity of the spray issuing from the perforated member is variable.

2. A shower head according to claim 1 wherein the perforated member is a disc and the dividing means is a diaphragm having an outwardly projecting lip which engages the face of the disc presented inwardly toward the cavity.

3. A shower head according to claim 1 wherein the dividing means is provided with a first aperture and the valve means comprises a flap attached to the dividing means and adapted to move from a closed position wherein the flap overlies the first aperture to open positions wherein the flap is presented within the cavity away from the aperture, and a rigid actuating tab connected to the flap and engageable with the control means.

4. A shower head according to claim 3 wherein the control means is an operating lever having a portion journaled within the body, and an actuator arm on and presented at an angle with respect to the journaled portion for movement within the cavity when the journaled portion is rotated, the actuator arm being engageable with the actuating tab.

5. A shower head according to claim 1 wherein the body is provided with a second aperture through which the inlet channel communicates with the cavity, and wherein a valve element is provided for optionally admitting fluid through the second aperture, the valve element being operable by the control means.

6. A shower head according to claim 4 wherein the body is provided with a second aperture through which the inlet channel communicates with the cavity, wherein a valve element is provided for optionally admitting fluid through the second aperture and includes a valve disc for engaging the body in surrounding relation to the second aperture upstream from the second aperture and a valve stem rigidly connected to the valve disc and extending through the second aperture into the cavity where the stem engages the actuator arm, and wherein the actuator arm moves from a central position in which the valve flap is free to overlie the first aperture and the valve disc blocks the second aperture to first and second open positions, the actuator arm shifting both the actuator tab and the valve stem when moved to the first open positions whereby fluid is admitted to the cavity and to the chamber and is discharged through both the first and second segments of the perforated member, the actuator arm shifting only the valve stem when

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moved to the second open positions whereby fluid is admitted to the cavity and is discharged therefrom through only the first segment of the perforated member.

7. A shower head according to claim 6 wherein the body includes a mouth portion in which the cavity is located and a handle portion extending from the mouth portion and containing the inlet channel, wherein the journaled portion of the control lever extends through the mouth portion, and wherein the control lever further includes a selector arm attached to the opposite end of the journaled portion and presented adjacent to the handle portion.

8. A shower head comprising a body having an outwardly opening cavity and an aperture through which fluid is admitted to the cavity, a valve element including a valve disc for engaging the body in surrounding relation to the aperture on the upstream side of the aperture, the valve element further including a stem rigidly connected to the valve disc and ex-

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tending through the aperture into the cavity, the stem having a looped portion located within the cavity, and an operating lever having a portion journaled within the body and an actuator arm on and presented at an angle with respect to the journaled portion for movement in the cavity when the journaled portion is rotated, the actuator arm extending into the looped portion of the stem on the valve element, whereby the looped portion will move with the actuator arm so as to tilt the valve disc away from the aperture when operating lever is rotated.

9. A shower head according to claim 8 wherein the body includes a mouth portion in which the cavity is located and a handle portion extending from the mouth portion and having an inlet channel, the inlet channel communicating with the cavity through the aperture which is located in a web-like partition at the juncture of the mouth and handle portions.

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