Aug. 20, 1935. E. S. CORNELL, JR 2,011,568

VARIABLE FLOW SHOWER HEAD

Filed April 12, 1933

Fig. 1.

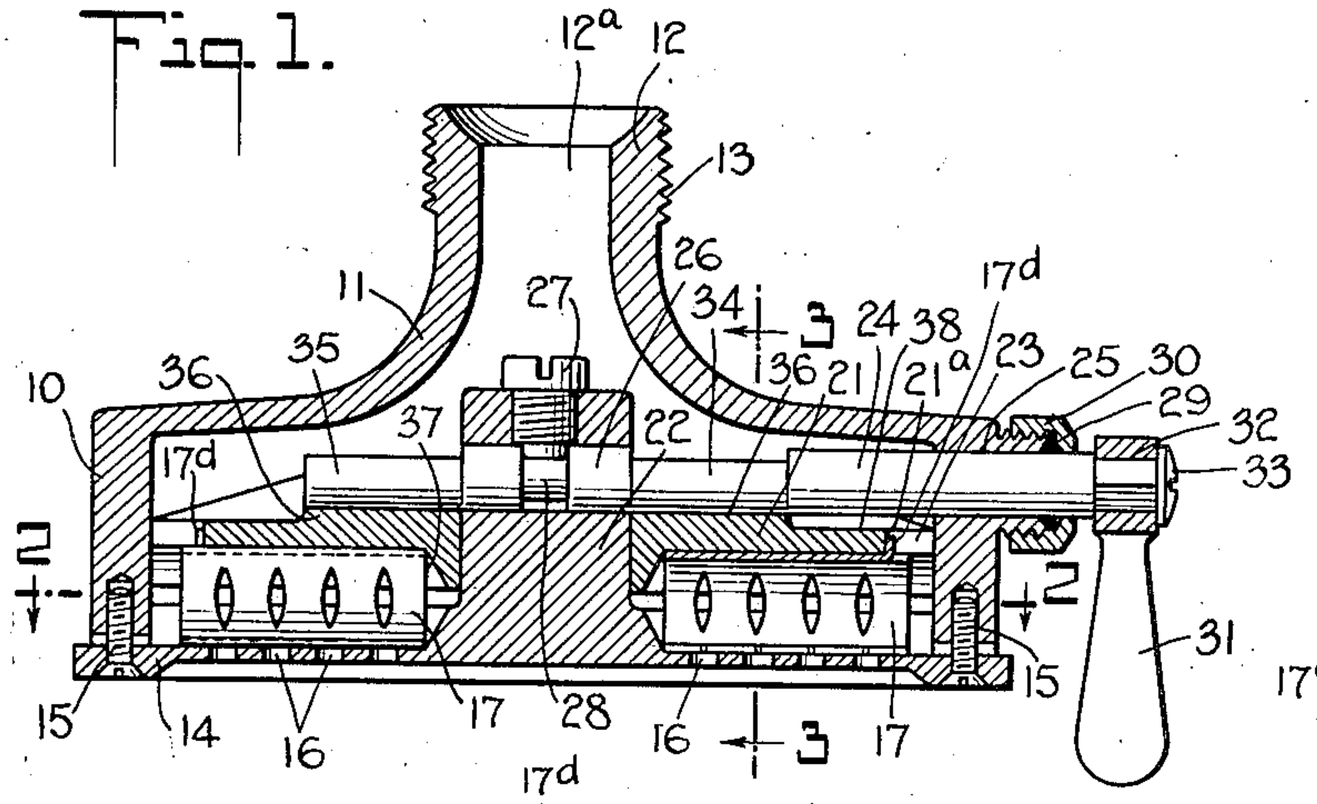


Fig. 3.

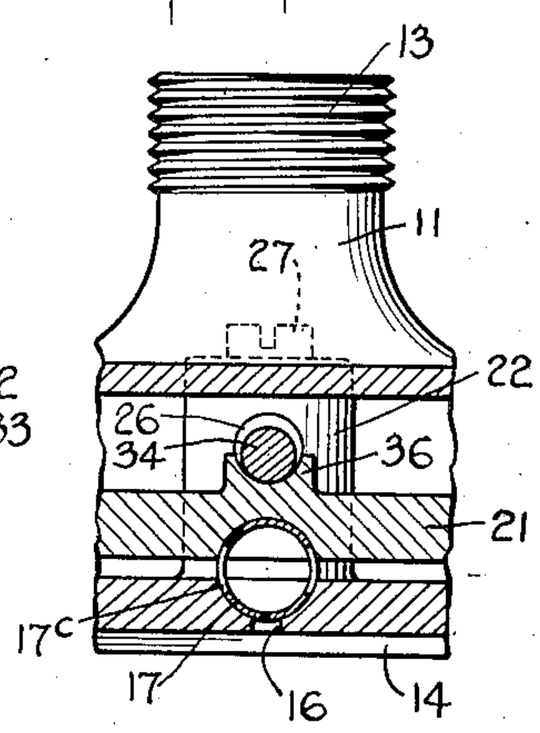


Fig. 2.

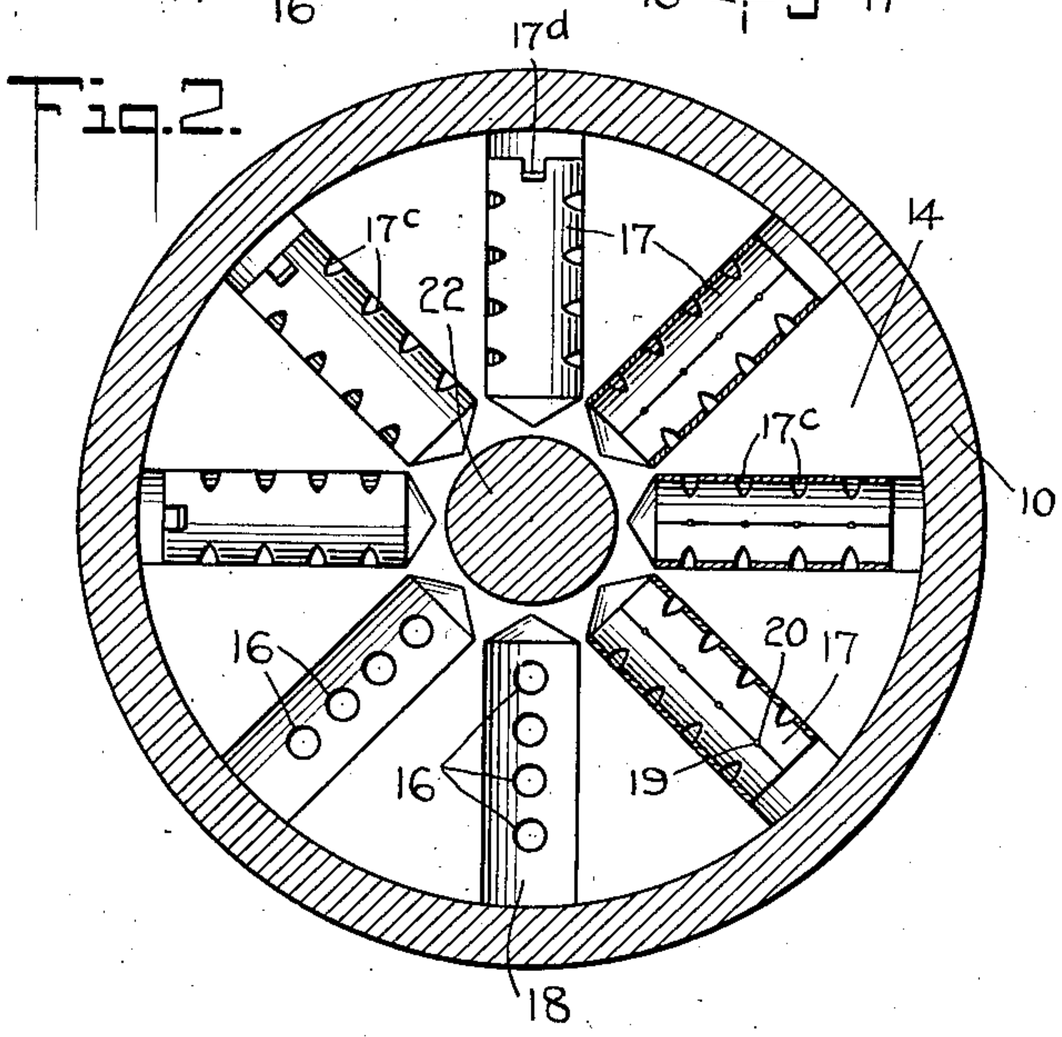


Fig. 4.

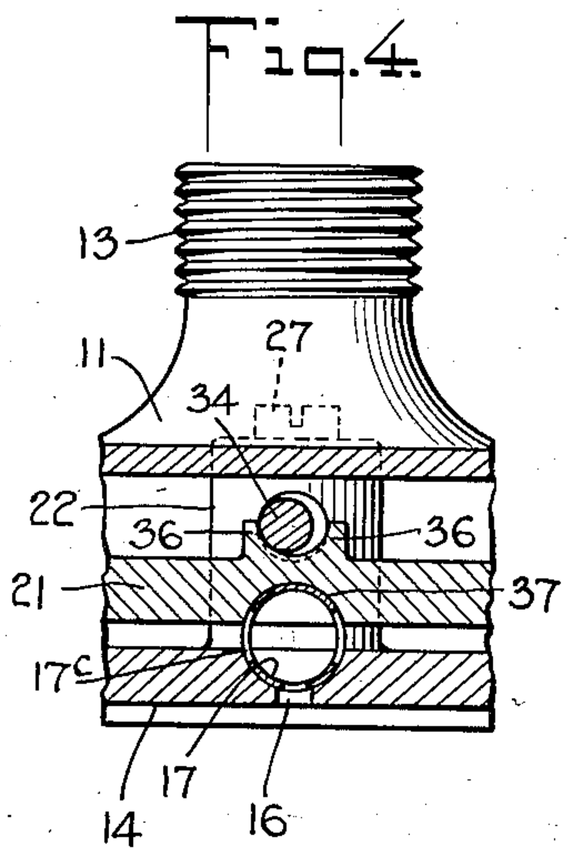
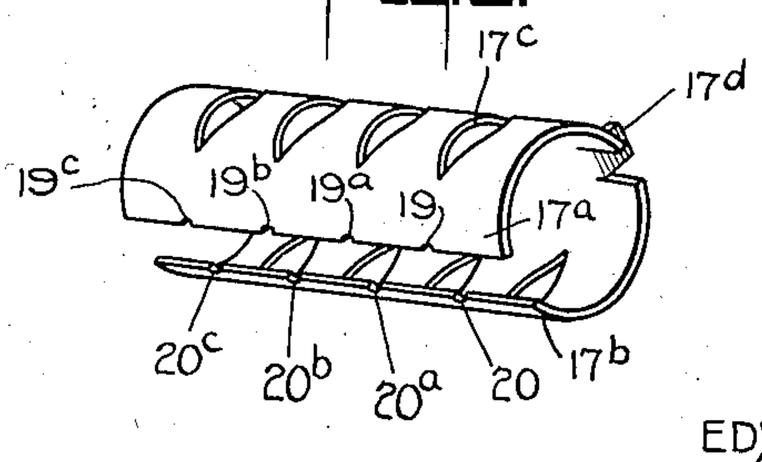


Fig. 5.



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VARIABLE FLOW SHOWER HEAD

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10 Claims. (Cl. 299—144)

This invention relates to variable flow shower heads.

More particularly, the invention is directed to a shower head comprising a hollow casing, a plurality of elements disposed in the casing, such elements including relatively displaceable portions provided with stream regulating orifices, and means for effecting displacement of such stream regulating portions to thereby regulate the extent of stream flow from fine spray to flood.

In the preferred embodiments of the invention, the elements are duplicates of one another, each element being of general cylindrical or other suitable arcuate shape, the edge portions being displaceable and functioning in complementary relation, and suitable pressure exerting means for effecting pressure upon the respective elements to adjust the extent of displacement of the complementary edge portions and thereby regulate the effective discharge from spray to flood and conversely. For fine spray discharge, the edge portions are provided with complementary recesses.

In the more preferred forms of the invention, the elements are formed of resilient material to thereby afford self-retractive movement of the complementary edge portions of each element relative to one another upon release of pressure.

The most preferred commercial embodiments of my invention comprise a hollow casing of general cylindrical form, the lower flat face of the casing being perforated by groups of perforations, the perforations of each group being arranged in radial alignment, a circularly bent element of resilient metal associated with each group of perforations, each element normally assuming a nearly full circumference, the complementary edge portions being preferably provided with openings, a pressure exerting plate disposed within the casing and displaceable toward and from the respective elements, and cam means provided with a finger piece for controlling the displacement of such plate whereby upon pressure exerting movement the plate effects closer and closer juxtaposition of the complementary edge portions in direction transverse to the direction of flow of the fluid through the perforated casing and therewith of the corresponding complementary openings thereat, and vice versa, whereby the water or other fluid supplied to the intake of the casing is regulated in its discharge through the respective groups of discharge perforations by the relative positions of the complementary edge portions to one another.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawing, in which

Fig. 1 is a central vertical sectional elevation of a preferred embodiment of the invention:

Fig. 2 is a horizontal sectional elevation on line 2—2 of Fig. 1;

Fig. 3 is a detail vertical sectional elevation on the line 3—3 of Fig. 1; in this view the shower head elements are set in spray stream status;

Fig. 4 is a detail elevation similar to Fig. 3, but showing the shower head elements in flood stream status; and

Fig. 5 is a perspective view of a typical shower head element.

Referring to the drawing, the casing comprises a hollow body 10, the head 11 of which may be arcuately convergently flared to form a terminal or nipple 12, which may be provided with threading 13 for engagement with a complementary threaded pipe or equivalent.

As shown in the drawing, the face plate 14 is secured to the flat annular face rim of the body 10 by screws 15.

The discharge perforations of the shower head may be as preferred. For simplicity of arrangement and facility of manufacture, the discharge perforations 16 are advantageously arranged in groups, the perforations of each group being aligned radially.

As illustrated in the drawing, each element 17 is indicated of circularly bent contour and formed of resilient sheet material such as wrought brass, spring aluminum alloy, etc. Each element is open at its opposite ends. In normal status, its complementary edges 17*a*, 17*b* are spaced from one another. To effectively locate the element 17 relative to the inner face of the face plate 14 I provide concave grooves 18 which may be milled, cast or otherwise formed, the contiguous edges 17*a*, 17*b* being located substantialiy centrally in downward position with respect to the groove 18.

At the respective edges 17*a*, 17*b*, I provide openings which function in complementary pairs, each pair of openings being located in register with its associated discharge perforation 16; advantageously, each opening may be in the form of a V notch. The openings at one edge portion 17*a* are designated 19, 19*a*, 19*b*, 19*c*, 19*d*, see Fig. 5, and the respective complementary openings at the other edge portion 17*b* are designated 20, 20*a*, 20*b*, 20*c*, the stated sets of complementary openings of the thus extended notched edges registering with the respective perforations of the perforated face of the hollow

casing and being of smaller effective extent of opening as compared with the respective stated perforations.

The pressure plate is designated 21. For convenience of mounting and stability of the parts in their several displaced positions, a boss 22 is provided, which may be integral centrally with the inner face of the face plate 14, or otherwise rigidly secured thereto. The pressure plate 21 is provided with a central opening dimensioned to make a fairly accurate fit about the boss 22.

The outer edge of the pressure plate 21, see 21*a*, is dimensioned materially less than the inner diameter of the hollow casing 10, to provide for a clearance of general annular formation, see 23, between the edge 21*a* and the inner face of the casing 10; the clearance 23 affords passage for water or other fluid supplied to the head orifice 12*a*.

The pressure plate 21 is regulated in pressure exerting relation to stream flow control elements 17 in any suitable manner.

Conveniently, the displacement of the pressure plate 21 in pressure exerting relation to the stream flow controlling elements 17 is had by cam movement to impart progressive displacement of the plate 21 toward the front plate 14, and the resiliency of the material of the stream flow control elements 17 relied upon for the return movement of the pressure plate 21. In such arrangement, and as is illustrated in the drawing, the cam may be formed on a rod 24 which is rotatably mounted in suitable bearings, such as a bearing opening 25 formed at one side in the annular wall 10 of the casing, the opposite end of the rod 24 being journaled in the bearing opening 26 formed in the head of the boss 22. The set screw 27 cooperates with the groove 28 formed about the rod 24 to retain the cam rod 24 in position. A gasket 29 and retaining ring 30 are provided for the exterior end of the rod 24. The rod 24 is manipulated by a handle 31, attached to its exterior end by a square or other noncircular fit, see 32, and retaining screw 33.

Cams are conveniently formed on the rod 24 by reduction of its contour as is indicated at 34, 35, shown formed on opposite sides of the rod 24 journalled within the boss 22; these cam portions are preferably formed symmetrically to thereby impart substantially uniform pressure upon the pressure plate 21 and therewith uniformly transmit pressure to the individual stream flow controlling elements 17. The cams 34, 35, are rotatively received within elevated concave formations 36, 36 on the upper face of the pressure plate 21.

For further retention of the individual stream flow control elements 17, I counterbore the under face of the pressure plate 21, as is indicated at 37, preferably substantially circularly conforming generally to the outer contour of the individual stream control elements 17. As is apparent, the stream flow control elements 17, and particularly their extended notched edges are located at all stages of displacement, for attaining spray to flood streams and vice versa, wholly without the plane of the perforated face of the hollow casing.

As viewed in Figs. 1 and 3, the cams 34, 35 are respectively in maximum pressure exerting position. Upon turning the handle 31 the cams 34, 35 are gradually moved toward and to the position of minimum or nil pressure. As illustrated in Fig. 4 the cam 34, (and correspondingly the cam 35) is in an intermediate pressure exerting position.

It will be observed that the elevation of the respective concave formations 36, 36 provides for the clearance, see 38, between the full round of the rod 24 and the upper face of the pressure plate 21, to afford free rotation of the full diameter of the rod 24 in the rotation of the cams 34, 35.

It is advantageous to provide a limit lug 17*d* to engage the peripheral edge 21*a* of the pressure plate 21 as a gauge in properly positioning the individual elements 17, i. e., to locate their respective complementary recesses 19, 20, etc. with respect to the associated perforations 16 of the front plate 14. Such lug 17*d* may be formed by slotting an edge portion of an element 17, see Fig. 5, and bending back the same.

The above stated construction permits of ready assembly, namely, upon placing the individual stream control flow elements 17 within the countersunk spaces 18 on the under face plate 14, with their edge portions 17*a*, 17*b*, positioned downwardly, and the complementary openings 19, 20, etc. in proximate relation to the perforations 16 of the casing; then the pressure plate 21 is passed about the boss 22 to locate the counterbore areas 37 on the under face of the pressure plate 21 about the respective stream flow control elements 17. The thus assembled parts are placed within the head of the casing, then the rod 31 is passed through the outer bearing opening 25, thence through the concave formations 35, 36 and through the boss-bearing opening 26. The set screw 27 may then be tightened in position by access through the nipple opening 12; the gasket 29 and its retaining ring 30, and the handle 34 may then be assembled. The face plate 14 is then or previously secured by its screws 15.

The fluid flow through the shower head will be understood from the foregoing. The stream flow control elements 17, as will be observed, are open to fluid passage from the annular clearance 23, i. e., between the peripheral edge 21*a* of the pressure plate 21 and the inner face of the casing 10, by access into the opposite open ends of the elements 17. Access is also afforded between the front plate 14 and the pressure plate 21 by the provision of the inflow openings 17*c*, see Figs. 2 and 5, formed at the opposite lateral sides of each element 17. Preferably, these openings 17*c* are formed in alignment at each lateral side; the sets of openings 17*c* are symmetrical to the edge portions 17*a*, 17*b*, thereby to enhance the resiliency of the material of each element 17.

From the above it is apparent that my invention comprises a combination of a casing having a perforated face, combined with stream flow controlling elements comprising complementary portions displaceable relatively to one another in direction wholly transverse to the direction of the flow of the fluid through the perforated face of the casing, and means for effecting displacement to and fro of such complementary portions to thereby adjust the resulting stream from spray to flood status and vice versa.

Preferably, such complementary displaceable elements embody coacting notched edges whereby the control of the stream is primarily effected by the relationship of the coacting notches.

Most preferably, the stream flow controlling elements embody resilient material and displacement effecting means operated by pressure engagement with such resilient stream flow con-

trolling elements, thus affording regulatable exertion of the pressure to thereby adjust the resulting stream.

Commercial embodiments of my invention particularly for multi-stream devices have the perforations of the face of the casing arranged in groups, and a set of stream flow controlling elements respectively controlling such groups of perforations, and displacement effecting means comprising a plate engaging under pressure such stream flow controlling elements in common, cam or equivalent means engaging such plate to thereby control in common the displacement of the complementary displaceable elements, to effect the desired change of the stream through the casing.

Whereas I have described my invention by reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of the invention.

I claim:

1. A shower head providing for spray to flood streams and vice versa comprising, in combination, a hollow casing having a face provided with relatively large outflow perforations, stream flow controlling elements each comprising complementary portions having extended notched edges forming relatively smaller openings registering respectively with said perforations and displaceable relatively towards and from one another wholly transversely of the direction of flow of the fluid through the perforations in the face of the casing, each of said elements being disposed at all times wholly without the plane of said face, and means for effecting displacement to and fro of said complementary displaceable elements thereby to adjust the resulting stream from spray of flood status and vice versa.

2. A shower head providing for spray to flood streams and vice versa comprising, in combination, a hollow casing having a face provided with relatively large outflow perforations, a plurality of hollow, cylindrically formed, stream flow controlling elements each split longitudinally along one side to provide extended adjacent edges, the adjacent edges being provided with notches thereby to form relatively small perforations, said elements being arranged to register their respective relatively small openings with the perforations in the perforated face of the casing, said notched edges being displaceable relatively to one another wholly transversely of the direction of flow of the fluid through the perforations in the face of the casing; and means for effecting displacement to and fro of said complementary displaceable elements thereby to adjust the resulting streams through the perforations.

3. A shower head providing for spray to flood streams and vice versa comprising, in combination, a casing having a face provided with groups of relatively large outflow perforations; a set of stream flow elements for controlling the flow of fluid through said groups of perforations respectively, each of said flow controlling elements including extended coacting notched edge portions forming relatively smaller openings registering with said perforations respectively and displaceable relatively to one another in a direction transverse to the direction of flow through the perforations and arranged to regulate the flow therethrough; and means for effecting displacement of said displaceable coacting portions uniformly in common whereby the resulting stream is adjusted uniformly from stage to stage as desired.

4. A shower head providing for spray to flood streams and vice versa comprising, in combination, a casing having a face provided with groups of relatively large outflow perforations; a set of stream flow elements for controlling the flow of fluid through said perforations respectively, each element of said set comprising a hollow cylindrical tube split longitudinally to form extended adjacent edges, the adjacent edges being notched to provide relatively small perforations and displaceable relatively to one another in a direction wholly transverse of the direction of fluid flow through the perforations of the face and arranged in position to regulate the flow therethrough; and means for effecting displacement of said coacting edges uniformly in common whereby the resulting streams are adjusted uniformly from stage to stage as desired.

5. A shower head providing for spray to flood streams and vice versa comprising, in combination, a casing having groups of relatively large outflow perforations; a set of hollow, cylindrically formed, stream flow elements for controlling the flow of fluid through said groups of perforations respectively, each of said elements being split longitudinally along one side to provide extended adjacent edges, said edges being notched to provide relatively small perforations in the meeting edges which are displaceable relatively to one another in a direction wholly transverse to the direction of fluid flow through the perforations of the casing and arranged in position to regulate the flow therethrough; and means for effecting displacement of said displaceable coacting portions uniformly in common thereby to adjust the resulting streams uniformly from stage to stage as desired.

6. A shower head providing for spray to flood streams and vice versa comprising, in combination, a casing having groups of relatively large outflow perforations in one face; a set of hollow, cylindrically formed, stream flow elements, one for each group of perforations, each element being split longitudinally along one side to provide extended adjacent edges and provided with notches in the adjacent edges to form relatively small perforations when the edges are in substantial contact, said flow controlling elements being of resilient material whereby the adjacent edges are displaceable relatively to one another in a direction wholly transverse to the direction of fluid flow through the perforations of the face and in position to regulate the flow therethrough; and means for effecting displacement of such edges uniformly in common whereby the resulting stream is adjusted uniformly from stage to stage as desired.

7. A shower head providing for spray to flood streams and vice versa comprising, in combination, a casing having one face provided with radially disposed groups of relatively large outflow perforations; a set of cylindrically formed, stream flow elements one for each group for controlling the flow of fluid through the groups respectively, each of said elements comprising a cylindrically formed tube of resilient material split longitudinally along one side to form extended adjacent edges, the adjacent edges being notched to provide relatively smaller perforations registering with the perforations in said face, said adjacent edges being displaceable relatively to one another in a direction wholly transverse to the direction of fluid flow through the per-

forations of the face; and a single means for effecting displacement of said adjacent edges uniformly in common whereby all of the resulting streams are adjusted uniformly from stage to stage as desired.

8. A shower head providing for spray to flood streams and vice versa comprising, in combination, a hollow casing having a face provided with relatively large outflow perforations, a plurality of hollow, cylindrically formed, stream flow controlling elements each split longitudinally along one side to provide extended adjacent edges, the adjacent edges being provided with notches thereby to form relatively small perforations, said elements being arranged to register their respective relatively small openings with the perforations in the perforated face of the casing, said notched edges being displaceable relatively to one another wholly transversely of the direction of flow of the fluid through the perforations in the face of the casing, each of said elements being disposed at all times wholly without the plane of said face; and means for effecting displacement to and fro of said complementary displaceable elements thereby to adjust the resulting streams through the perforations.

9. A shower head providing for spray to flood streams and vice versa comprising, in combination, a casing having a face provided with groups of relatively large outflow perforations; a set of stream flow elements for controlling the flow of fluid through said groups of perforations respectively, each of said flow controlling elements including extended coacting notched edge portions forming relatively smaller openings registering with said perforations respectively and displaceable relatively to one another in a direction transverse to the direction of flow through the perforations and arranged to regulate the flow therethrough, each of said elements being disposed at all times wholly without the plane of said face; and means for effecting displacement of said displaceable coacting portions uniformly in common whereby the resulting stream is adjusted uniformly from stage to stage as desired.

10. A shower head providing for spray to flood streams and vice versa comprising, in combination, a casing having a face provided with groups of relatively large outflow perforations; a set of stream flow elements for controlling the flow of fluid through said perforations respectively, each element of said set comprising a hollow cylindrical tube split longitudinally to form extended adjacent edges, the adjacent edges being notched to provide relatively small perforations and displaceable relatively to one another in a direction wholly transverse of the direction of fluid flow through the perforations of the face and arranged in position to regulate the flow therethrough, each of said elements being disposed at all times wholly without the plane of said face; and means for effecting displacement of said coacting edges uniformly in common whereby the resulting streams are adjusted uniformly from stage to stage as desired.

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