Feb. 13, 1934. E. S. CORNELL, JR 1,947,407

SHOWER HEAD

Filed Jan. 7, 1933

Fig. 1.

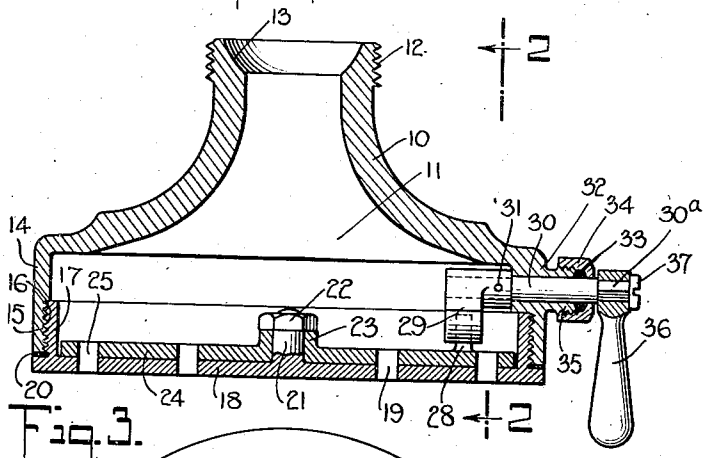



Fig. 2.

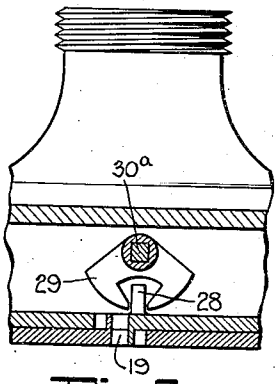



Fig. 3.

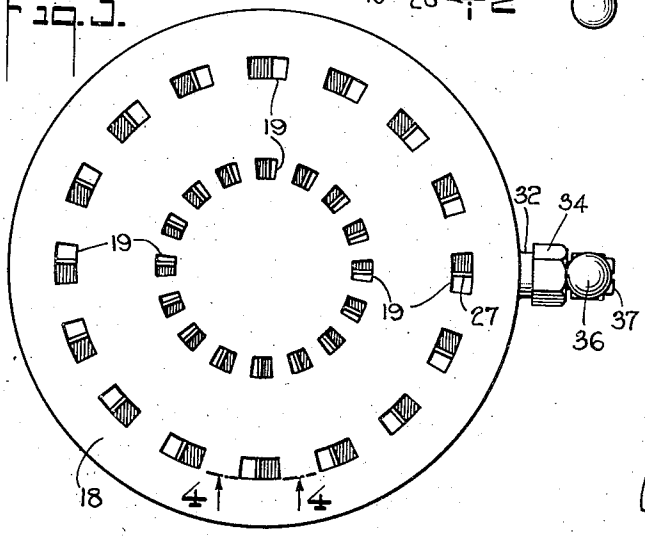



Fig. 5.

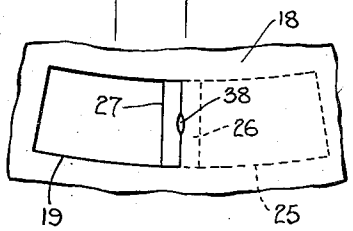



Fig. 6.

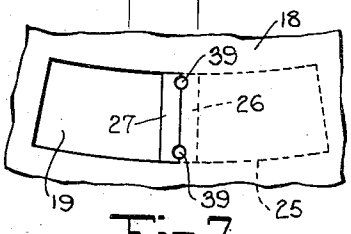



Fig. 7.

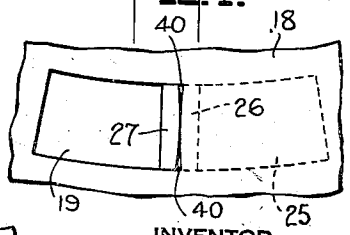



Fig. 4.

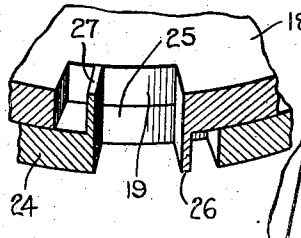
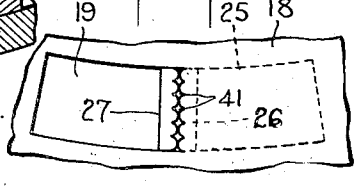



Fig. 8.




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# UNITED STATES PATENT OFFICE

1,947,407

## SHOWER HEAD

Edward S. Cornell, Jr., Larchmont, N. Y.

Application January 7, 1933. Serial No. 650,708

6 Claims. (Cl. 299—144)

My present invention relates to bath devices and more particularly to an improved spray head.

Heretofore, spray heads have been constituted of a body member attached to a supply pipe and provided with a diaphragm in which is arranged a plurality of perforations through which the water or other fluid is forced under pressure. In such structures, the adjustment of the amount of water or other fluid permitted to flow through the perforations necessarily has been performed by a valve or equivalent structure located in the fluid supply line. Latterly, it has been attempted to make a spray head in which the amount of water or other fluid and the nature of the stream of such water or other fluid are adjusted at the spray head itself, and in accomplishing this object, it has been usual to arrange the diaphragm in the form of two members, each provided with perforations and one of which members is rotatable so as to bring the perforations of the two members into registry so as to vary the size of the apertures through which the water or other fluid may flow under pressure. Such an arrangement, however, has been extremely unsatisfactory, due primarily to the fact that the various streams of water or other fluid issuing through the perforations are broken up because of the irregular shape of the resulting combined perforation, that is, the water or other fluid flowing through the perforations in the innermost diaphragm or plate member impinges on the side walls of the perforations of the outermost diaphragm member and are thus broken up and the character of the stream delivered is destroyed. Various attempts have been made to overcome this difficulty, none of which has been successful until the present development.

The present invention is designed to overcome objections to prior apparatus of this type, and in carrying out my invention, I have provided a spray head consisting essentially of a hollow body in which may be retained a considerable volume of water or other fluid, and forming a closure for the hollow body member is a perforated diaphragm provided with adjustable perforations which may be increased or decreased in cross sectional area to regulate the amount of water or other fluid delivered therethrough and which perforations are provided with straight walls for all positions of adjustment.

I accomplish this desirable feature by associating with the perforated diaphragm, above referred to, a second and innermost diaphragm having elements which project through the perforations in the outermost diaphragm and the projecting members constitute part of the delivery perforations of the outermost diaphragm.

By such means, the streams of water delivered through the perforations retain their characteristics regardless of the cross sectional area of the perforations for all positions of adjustment of the size thereof.

An object of my invention, therefore, is an improved spray head.

Another object of my invention is an improved adjustable perforation spray head.

Other objects and novel features of the construction and arrangement of parts comprising my device will appear as the description of the invention progresses.

In the accompanying drawing,

Fig. 1 is a central sectional elevation through one embodiment of my device;

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

Fig. 3 is a bottom plan view of Fig. 1;

Fig. 4 is a sectional elevation on the line 4—4 of Fig. 3;

Fig. 5 is a partial bottom plan view of another embodiment of my invention, showing a modified form of adjustable perforation or orifice;

Fig. 6 is a bottom plan view similar to Fig. 5 of still another embodiment of my invention;

Fig. 7 is a partial bottom plan view similar to Figs. 5 and 6, showing a still further embodiment of my invention; and

Fig. 8 is a partial bottom plan view similar to Figs. 5, 6 and 7, showing a still further embodiment of my invention.

Referring to the drawing and particularly to Figs. 1, 2, 3 and 4, 10 designates a body member provided on its interior with a chamber 11 of sufficient size to hold a considerable volume of water or other fluid, and having arranged at one end exterior threads 12 and by means of which the body 10 may be attached to a source of water or other fluid supply.

In some installations, it is desirable that the body member be adjustable to the water supply, such as by a universal joint and for this purpose, I have arranged a cup-shaped depression 13 in the end of the body member 10 to cooperate with complementary members on the water supply line.

The end of the body member 10, remote from the threaded portion 12, is enlarged, as indicated at 14, and is preferably cylindrical and of relatively considerable diameter and the outer open

end of such cylindrical portion is internally threaded, as indicated at 15, to receive the external threads 16 of a cylindrical member 17, which has formed integral therewith and on the outer end thereof a circular disk 18, provided with circular rows of perforations 19, which in the figures indicated, are shown as rectangular, but which obviously may be of any desired form.

Between the inner face of the disk member 18 and the outer rim of the circular member 14 is arranged a gasket 20 for the purpose of obtaining a fluid-tight joint between the body member 10 and the disk member 18. Formed integral with the disk 18 and on the inner face thereof is a bearing stud 21 the inner or free end of which is threaded to receive a clamping nut 22.

Rotatably mounted on the stud 21 is a cylindrical member 23 formed integral with a disk 24 which disk has one face thereof in sliding engagement with the inner face of the disk 18. The disk 24 is also provided with circular rows of perforations 25 similar in shape and dimension to the circular rows of perforations 19, above described as being formed in the outer disk 18.

Referring to Figs. 2 and 4, it will be noted that the disk 18 is provided on its inner face with inwardly projecting members 26, which members are of any desired thickness and of a width substantially equal to the width of the perforations or orifices 25 in the disk 24, such members 26 being, however, suitably positioned to allow a free movement of the disk 24 on the disk 18. Also, and referring to Figs. 2 and 4, it will be noted that the disk 24 is provided on its outer face or on the face in engagement with the inner face of the outer disk 18, with members 27, which extend through the perforations or orifices 19, these members 27 being of any desired thickness and of a width substantially equal to the width of the perforations or orifices 19.

Referring specifically to Fig. 4, it will be apparent therefore, that each set of complementary perforations 19 and 25 in the inner and outer disks 18 and 24, respectively, together with the members 26 and 27, define an effective passage having straight or parallel walls and that regardless of the distance apart of each set of members 26 and 27, the parallelism of the effective walls of each passage is maintained.

Also, it will be apparent from Fig. 4, taken in connection with Fig. 1, that if a body of water or other fluid is under pressure, that a stream of water will pass through each set of complementary perforations or orifices 19 and 25 and that the character or shape of such stream of water issuing through such orifices or perforations will be maintained regardless of the cross sectional area thereof. Therefore, it will be apparent that the aligned perforations or orifices 19 and 25 may be regulated upon relative rotative movement of the disks 18 and 24 to deliver from the body member 10 water or other fluid by a plurality of streams of uniformly defined form, and the breaking up of the various streams of water, which is inherent in prior devices, is totally absent in the present device.

Also, it is apparent that if the disks 18 and 24 are rotated relative to each other so as to bring the members 26 and 27 into substantially the same plane, that the flow of water from the body member 10 may be entirely shut off.

For the purpose of rotating the disk 24 relative to the disk 18, I have provided a projection 28 formed integral with and extending upwardly or inwardly from the inner face of the disk 24, which projection is engaged in the forked member 29 secured to a shaft 30 by pin 31 and such shaft is rotatably mounted in a bearing 32 formed integral with the body member 10 or in the cylindrical portion 14 thereof.

Also, I have provided a gland in which is arranged packing material 33 held in position by a packing nut 34, engaging threads 35 formed on the bearing member 32. The shaft 30 extends upwardly through the body member 10 or the cylindrical member 14 formed integral therewith and the outer end is non-circular as indicated at 30a to receive a handle member 36, such member being held in position on the shaft 30 by a screw 37 or in any other suitable manner.

By properly rotating the shaft 30, therefore, it will be apparent that limited rotative movement in either direction about the shaft 31 may be imparted to the inner disk 24 to thereby regulate the size of the perforations or orifices 19.

It may sometimes be desirable to provide a spray such as a needle spray when water or other fluid under pressure is in the chamber 11 of the body member 10 and the cross sectional form of such needle spray may be of any desired form. For example, in Fig. 5 there is shown a non-circular spray orifice 38 which remains always open, as for example when the member 27 on the inner disk 24 is in engagement with one end of the perforation 19 in the disk 18, such orifice 38 being formed by channelling out perforations 19 and 25 in the respective members 26 and 27.

In Fig. 6 there is shown another modification of the needle spray, this form being of circular shape as indicated by the reference numeral 39.

In Fig. 7 there is shown a still further form of needle spray formed by grinding the exposed end faces of the members 26 and 27, resulting in a substantially triangular perforation 40 at each end of the members 26 and 27.

In Fig. 8 there is shown a still further form of needle spray resulting from forming a plurality of grooves in the faces of the members 26 and 27, this form of spray resulting in the plurality of substantially non-circular perforations 41. Any other form desired may be readily attained as will be apparent to those skilled in the art, and as stated above, in these various forms of needle spray it is not desired that the entire flow of water or other fluid may be shut off from the body member 10 while water or other fluid is present therein under pressure. Any suitable cock or equivalent means may be provided for the water pipe line to effect complete shutting off of the fluid flow.

From the above, it appears that my invention provides for a spray head comprising a nozzle inclusive of a discharge member having a plurality of discharge passages, and means associated with such discharge member for regulating the effective extents of opening of the respective discharge passages whereby the facial wall area of these passages is maintained substantially uniform for varied extents of opening of these passages.

It also appears that my invention provides for a spray head comprising a nozzle inclusive of a discharge member having a plurality of discharge passages, and means associated with such discharge member for regulating the effective extents of opening of the discharge passages whereby the axis of the area of opening in the direction of fluid flow of each regulated passage is maintained substantially fixed.

Whereas I have described my invention by ref-

erence 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 spray head comprising a nozzle provided with a discharge member having a plurality of discharge passages, a member associated in relative rotative relation with said discharge member, said second-named member being provided with discharge passages correspondingly disposed relative to said plurality of discharge passages of said discharge member to form sets of complementary discharge passages, certain of the walls of each of said sets of discharge passages being in substantial alignment with one another, and projecting elements extending from said discharge member and said second-named member in opposing directions through the discharge passages of each of said sets, said elements having faces extending planarly within each said discharge passage and means for effecting relative rotation between said second-named member and said discharge member.

2. A spray head comprising a nozzle provided with a discharge member having a plurality of discharge passages, a member associated in relative rotative relation with said discharge member, said second-named member being provided with discharge passages correspondingly disposed relative to said plurality of discharge passages of said discharge member to form sets of complementary discharge passages, certain of the walls of each of said sets of discharge passages being in substantial alignment with one another, and projecting elements extending from said discharge member and said second-named member in opposing directions through the discharge passages of each of said sets, said elements having faces extending planarly and substantially parallel to one another within each said discharge passage and means for effecting relative rotation between said second-named member and said discharge member.

3. A spray head comprising a nozzle provided with a disk discharge member having a plurality of discharge passages, a member associated in relative rotative relation with said discharge member, said second-named member being provided with discharge passages correspondingly disposed relative to said plurality of discharge passages of said discharge member to form sets of complementary discharge passages, certain of the walls of each of said sets of discharge passages being in substantial alignment with one another, and projecting elements extending from said discharge member and said second-named member in opposing directions through the discharge passages of each of said sets, said elements having faces extending planarly within each said discharge passage and means for effecting relative rotation between said second-named member and said discharge member.

4. A spray head comprising a nozzle provided with a disk discharge member having a plurality of discharge passages, a member associated in relative rotative relation with said discharge member, said second-named member being provided with discharge passages correspondingly disposed relative to said plurality of discharge passages of said discharge member to form sets of complementary discharge passages, certain of the walls of each of said sets of discharge passages being in substantial alignment with one another, and projecting elements extending from said discharge member and said second-named member in opposing directions through the discharge passages of each of said sets, said elements having faces extending planarly and substantially parallel to one another within each said discharge passage and means for effecting relative rotation between said second-named member and said discharge member.

5. A spray head comprising a nozzle provided with a fixed disk discharge member having a plurality of discharge passages, a member associated in relative rotative relation with said discharge member, said second-named member being provided with discharge passages correspondingly disposed relative to said plurality of discharge passages of said discharge member to form sets of complementary discharge passages, certain of the walls of each of said sets of discharge passages being in substantial alignment with one another, and projecting elements extending from said discharge member and said second-named member in opposing directions through the discharge passages of each of said sets, said elements having faces extending planarly within each said discharge passage and means for rotating said second-named member relative to said fixed disk member.

6. A spray head comprising a nozzle provided with a fixed disk discharge member having a plurality of discharge passages, a member associated in relative rotative relation with said discharge member, said second-named member being provided with discharge passages correspondingly disposed relative to said plurality of discharge passages of said discharge member to form sets of complementary discharge passages, certain of the walls of each of said sets of discharge passages being in substantial alignment with one another, and projecting elements extending from said discharge member and said second-named member in opposing directions through the discharge passages of each of said sets, said elements having faces extending planarly and substantially parallel to one another within each said discharge passage and means for rotating said second-named member relative to said fixed disk member.

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