June 20, 1944. J. S. JUDELL 2,351,819

SHOWER HEAD

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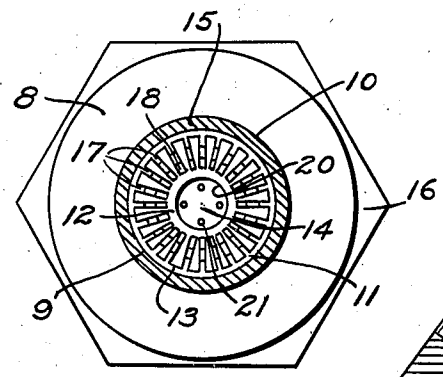



FIG. 2.

FIG. 1.







FIG. 3.

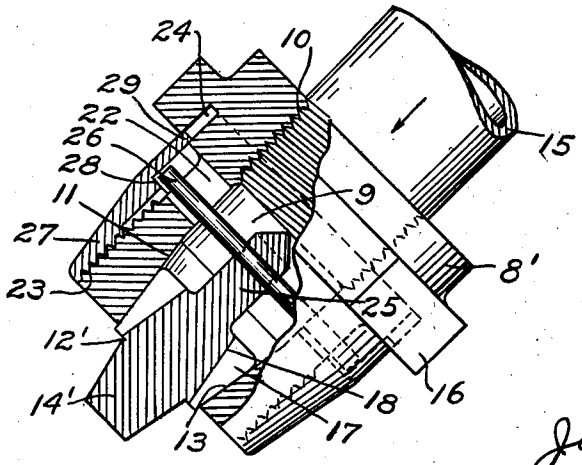



FIG. 4.

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## SHOWER HEAD

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1 Claim. (Cl. 299—141)

The present invention relates in general to improvements in spray producing devices, and relates more specifically to improvements in the construction and operation of shower heads or the like.

Generally defined, an object of the invention is to provide an improved shower head assemblage which is simple and compact in construction, and which is also highly efficient in operation.

Many different types of shower heads or nozzles for shower bath installations, have heretofore been proposed and extensively used; and while some of these prior spray producers have been comparatively successful and satisfactory in operation, present restrictions and curtailments as to the use of metals and other normally available materials, has made it quite impossible for manufacturers to produce these prior metallic spray heads. Aside from these manufacturing restrictions, most of the better functioning prior shower spray heads were relatively complicated in structure thus making them rather costly and also quite difficult to dismantle for cleaning purposes. Some of the prior spray nozzles would also function well for a while, but some of the jet orifices would soon clog thus resulting in the production of uneven spray; and others could not be readily constructed so as to produce sprays meeting various standard specifications and requirements.

It is therefore a more specific object of my present invention to provide a new and useful shower spray head which besides being extremely simple in structure and effective in use, may be manufactured from more available materials, and may also be readily cleaned and maintained in most efficient operating condition.

Another specific object of the invention is to provide a compact and durable spray nozzle adapted to be manufactured in different sizes so as to meet various standard specifications and at exceedingly moderate cost.

Still another specific object of this invention is to provide an improved plumbing fixture which may be quickly and conveniently converted from a spray producer into a more or less solid jet spout, or vice versa.

These and other specific objects and advantages of the invention will be apparent from the following detailed description.

A clear conception of the several features constituting my present improvement, and of the mode of constructing and of operating several types of shower heads embodying the invention, may be had by referring to the drawing accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a part sectional side elevation of one of the improved spray heads in normal use, the section having been taken along the vertical central plane thereof;

Fig. 2 is a top view of the spray head of Fig. 1, looking through the liquid supply pipe thereof, which is shown in section;

Fig. 3 is a bottom view of the spray head of Figs. 1 and 2; and

Fig. 4 is a part sectional side elevation of a modified type of the improved spray head, adapted to deliver either a spreading spray or a solid jet.

While the improvement has been shown and described herein in connection with a shower spray head especially adapted for use in shower bath installations, it is not my desire or intent to thereby unnecessarily restrict the invention or limit its application.

Referring to Figs. 1 to 3 inclusive of the drawing, the improved shower head assemblage shown therein comprises in general, an outer annular casing 8 having a central bore 9 provided at one end with internal screw threads 10, and at its opposite end with an outwardly diverging frustro-conical portion or taper 11; and a peripherally notched or radially grooved plug 12 having a similarly diverging frustro-conical or tapered peripheral surface 13 adapted to snugly fit the casing taper 11, and being provided with a central integral button projection 14 extending outwardly beyond the tapered bore of the casing 8.

The screw threads 10 which are located at the inlet end of the central bore 9 of the casing 8, serve as a means of attaching the casing to a liquid supply pipe 15, and this pipe 15 may be provided with the usual swing joint for permitting universal adjustment of the spray head, and with a liquid control valve for regulating the delivery of liquid to the casing bore 9. In order to facilitate attachment of the casing 8 to the threaded end of the pipe 15, the medial outer portion of the casing 8 may be provided with a hexagonal or otherwise polygonal portion 16. The tapered outlet portion 11 of the casing 8 which is located in axial alinement with the bore 9 and with the threaded inlet portion 10, should be accurately and smoothly bored; and the similarly tapered outer surface 13 of the grooved plug 12 should be formed to snugly and frictionally engage the taper 11 so that liquid flowing through the nozzle will automatically seat the plug 12 but the projecting button 14 may be pressed upwardly at any time so as to unseat the same.

The exterior of the spray producing plug 12 is provided with a multiplicity of equally spaced radial slots or grooves 17 the bottoms of all of which lie in a frustro-conical surface 18 which is divergingly tapered to conform with the direction of delivery of the jet 19 as shown in Fig. 1; and the center 20 of the plug 12 may be bored or recessed and provided with a series of aux-

iliary jet delivery orifices 21. Both the casing 8 and the plug 12 may be formed in any suitable manner of metal or of non-metallic material such as plastic capable of resisting hot liquid without undesirable distortion, and it is to be noted that the spray head of Figs. 1, 2 and 3 comprises only two relatively simple and readily constructable parts.

While the simplified spray head assemblage of Figs. 1 to 3 inclusive is entirely suitable and satisfactory for ordinary shower use, it is sometimes desirable especially in connection with plumbing fixtures such as covered by my prior Patents Nos. 2,011,446 and 2,024,930, to be able to convert the nozzle fitting from a spray head into a jet spout, and vice versa; and in Fig. 4 I have shown a relatively simple and compact assemblage for effecting such conversion. In this modified assemblage, the convertible spray-spout fitting again comprises an annular main casing 8' having a central bore 9 provided at its inlet end with screw threads 10 adapted for attachment to a liquid supply pipe 15, and having a converging outlet end taper 11 at its opposite end; and a tapered plug 12' provided with a similarly converging tapered peripheral surface 13 fitting the taper 11, and having therein a multiplicity of radial slots or grooves 17 terminating in a divergingly tapered surface 18. In the assemblage of Fig. 4, the modified casing 8' is additionally provided with a pair of diametrically opposite slots 22 and with external screw threads 23 and an annular groove 24 in the polygonal portion 16 radially outward from the slots 22; and the modified plug 12' has a convergingly tapered push button 14' and is additionally provided with a central stem 25 having a transverse opening for receiving a pin 26 which extends through and beyond, and is slidable along the opposed slots 22. An adjusting collar 27 is provided with an annular medial abutment surface 28 adapted to coact with the projecting outer ends of the pin 26, and has internal screw threads at one end adapted for coaction with the external threads 23 of the casing 8', and also has an annular opposite end 29 which is slidable within the casing groove 24.

This modified convertible fitting is obviously so formed and constructed that when the parts are assembled and disposed as shown in Fig. 4, liquid delivered from the pipe 15 to the bore will be delivered in the form of an annular spray jet 19 the same as in Fig. 1; but when the collar 27 is rotated so as to cause the abutment surface 28 to engage the ends of the pin 26 and to thereby lift the plug periphery 13 away from the tapered bore 11, an annular discharge orifice will be produced and the liquid will be more freely delivered from the nozzle in the form of a solid annular jet which will merge into a relatively solid cylindrical jet beyond the smaller end of the button 14'.

During normal use and operation of the improved spray head, and assuming the parts of the device illustrated in Fig. 4 to be positioned as shown therein, the casing 8, 8' may be disposed in any desired position and liquid may be admitted to the upper inlet end of the casing in regulated quantities with the aid of an ordinary control valve in the usual manner. The liquid admitted to the bore 9 will be retarded from flowing freely through the outlet end of the tapered bore 11 by the plug 12, 12' and will tend to seat this plug firmly within the taper 11, thus providing an annular series of relatively small rectangular orifices at the outlet end of the nozzle through which an annular series of spray jets 19 will be projected. These jets will assume a direction substantially corresponding to the direction of extent of the diverging frustro-conical surface 18 of the plug 12, 12' and normally this annular spray jet should spread to a diameter of approximately two feet in a distance of six feet. Additional liquid may be delivered through the central recess 20 and orifices 21 of the plug 12, although the use of these orifices is not necessary. If for any reason some of the slots or grooves 17 should become clogged the obstruction can be readily released by merely pushing against the button projection 14, 14' and thus causing the plug to move away from the taper 11 and into the larger portion of the bore 9. Such displacement of the plug will permit the liquid to momentarily flow in greater abundance around the periphery of the plug and will thereby permit obstructing particles to be washed away. When the liquid has been shut off, the grooved plug may also be lifted away from its seating so as to permit convenient cleaning of the parts, but as soon as the liquid is again admitted to the nozzle, the plug will be quickly seated and a spray jet will result. With the modified nozzle of Fig. 4, the plug 12' may also be readily lifted from its seating with the aid of the adjustable collar 27, and when thus lifted the plug will be permanently retracted from the tapered surface 11 and a solid jet will result.

From the foregoing detailed description it will be apparent that my present invention provides an improved spray head which is extremely simple and compact in construction and which may be manufactured of any suitable material and at minimum cost. The improved assemblage besides being extremely simple may be quickly assembled without the use of tools, and has parts which are conveniently manipulable so as to eliminate obstructions and to effect cleaning. The improved nozzle assemblage may moreover be readily provided with simple and effective means for permitting conversion of the spray into a solid jet as shown in Fig. 4, and any slight leakage of liquid which may result when the modified nozzle is in use, would not be objectionable since such leakage would be insignificant compared to the liquid escaping past the central plug 12'. The invention has proven highly successful in actual commercial use, and obviates practically all of the objectionable features which are inherent in many of the more complicated prior spray head assemblages.

It should be understood that it is not desired to limit this invention to the exact details of construction or to the precise mode of use, herein shown and described, for various modifications within the scope of the claim may occur to persons skilled in the art.

I claim:

In a spray head, an annular casing having a liquid inlet at one end and a convergingly tapered outlet at its opposite end, and a similarly tapered peripherally grooved plug loosely fitting the taper of said casing outlet and pressed thereagainst only by the liquid admitted to said casing inlet, the peripheral grooves of said plug being of uniform transverse width throughout their lengths but having larger cross-sectional area at their inlet ends than at the outlet ends thereof.

JULIUS S. JUDELL.