Oct. 9, 1962 W. D. CORLETT, JR 3,057,561

SHOWER HEAD

Filed April 20, 1959

Fig. 1.

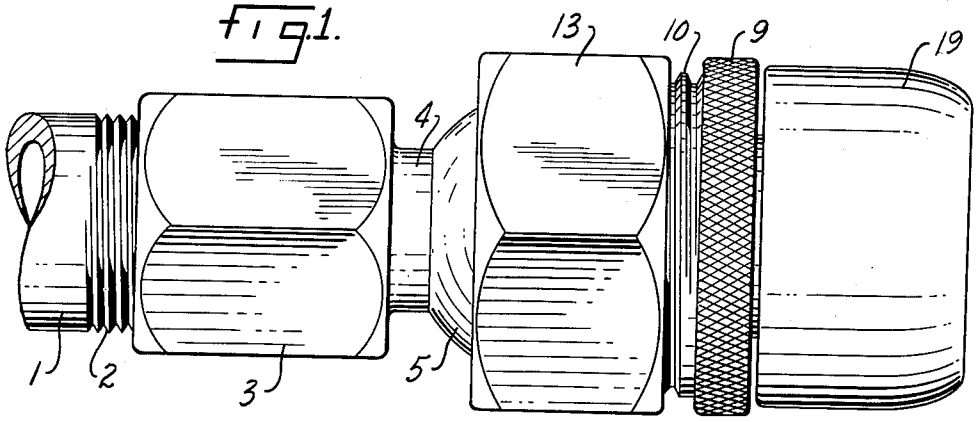
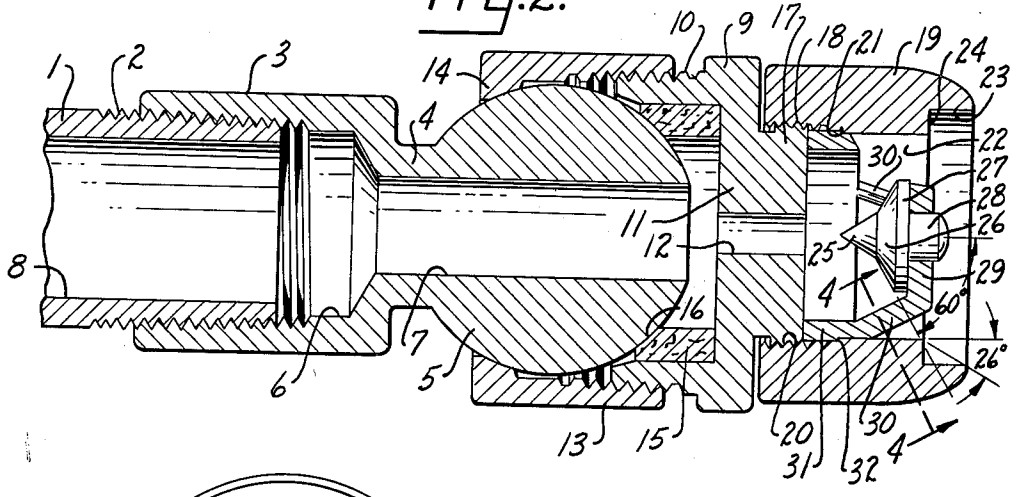


Fig. 2.



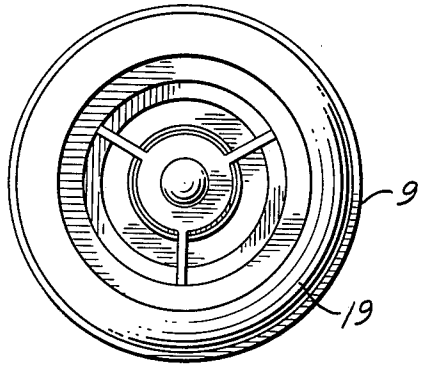


Fig. 3.

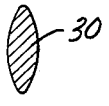


Fig. 4.

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SHOWER HEAD

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This invention relates to a shower head or water-spreading and -controlling means. It has for one object to provide means for application to a water discharge system, by means of which the discharge of water may be controlled and directed.

Another object is to provide a water discharge controlling means which will be self-cleaning.

A still further object is to provide a water discharge or shower head controlling means so arranged that foreign matter which can reach the head at all will inevitably be discharged from it and clogging will thus be avoided.

Other objects will appear from time to time throughout the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings wherein:

FIG. 1 is a side elevation of one form of the device;

FIG. 2 is a longitudinal cross section;

FIG. 3 is an end view as viewed from the right of FIG. 1; and

FIG. 4 is a transverse section taken on an enlarged scale at line 4—4 of FIG. 2.

Like parts are designated by like characters throughout the specification and drawings.

The device of this invention is intended for application to a discharge pipe or conduit 1 which may be threaded as at 2 to receive a fitting 3 which is correspondingly threaded interiorly and may be engaged upon the threaded portion 2 of the member 1. Integral with the member 3 is a reduced neck portion 4 which is joined to or integral with a ball member 5.

The member 3 is hollow and provided with a chamber 6 from which a passage 7 of reduced diameter leads to the end of the ball 5. The chamber 6 and the passage 7 are in communication with the interior 8 of the pipe or conduit 1.

A hollow fitting 9 which is threaded as at 10 and provided with a partially closing end portion 11 pierced by a passage 12 is held on the ball member 5 by a threaded collar 13 which engages the threads of the member 9. The collar 13 is provided with an inwardly directed flange 14 which contacts the exterior of the ball 5. If desired, a packing or sealing member 15 of generally annular shape may be positioned within the member 9 and may bear at one end against the partial closure 11. The packing 15 may be provided with an inclined surface 16 which bears against and seals with respect to the ball 5. The passage 12 is preferably of less diameter than the passage 7. Preferably integral with the portion 11 is a reduced necklike portion or extension 17 which may be exteriorly threaded at 18.

A nozzle member 19 is interiorly threaded at 20 for engagement with the threads 18 of the member 17. The nozzle member may be provided with a shoulder 21. It has an open end 22 and a skirt portion 23. The diameter of the passage within the skirt portion is greater than the diameter of the open end 22. Thus as water moves from the passage 12 to the open end portion 22 and finally through the skirt 23, it moves successively through passages or chambers of progressively increasing diameter and, hence, progressively increasing clearance. The skirt portion 23 provides, in effect, an extension of the nozzle 19 and provides a spray or water-controlling means, as described below. A shoulder 24 separates the passage within the member 22 from that within the member 23.

A spreading element or spreader is provided centrally of the discharge passage and comprises a conical member 25 which is integral with a conical portion 26, the inclination of the latter being less than that of the member 25. In the particular form shown the spreader includes an area 27 which is not inclined and a plug member 28. The member 28 is received in a boss 29 provided with a plurality of radial spokes or arms 30 which are integral with or attached to a cylindrical portion 31, shouldered at 32. The member 31 is positioned within the nozzle 19 and the shoulder 32 of the member 31 is received upon the shoulder 21 of the nozzle part 19. The spokes 30 are provided preferably with a cross section generally that shown in FIG. 4 of a more or less streamline section.

The conical area 26 preferably has an inclination of approximately 60 degrees from the central axis of the passage 12 and a line drawn in continuation of the area 26 will strike within the skirt portion 23. Preferably the angular relationship of the spreader and the nozzle portion, and particularly the skirt of the nozzle portion, will be that indicated in FIG. 2, although the invention is not necessarily limited to these particular structural and angular proportions.

Although an operative form of the device has been shown, the invention is not limited to the particular details shown. Many changes may be made in the form, shape and arrangement of parts without departing from the spirit of the invention.

The use and operation of the invention are as follows:

Water is discharged through the pipe 8 and the ball member 5 and through the passage 7 in the ball member. It reaches the passage 12 in the member 11 and the entire volume of water passes through this passage 12 and emerges from it in a fairly smooth stream. It is directed against the conical member 25, 26 and is spread into a more or less conical sheet by this spreader. The sheet passes through the spokes or arms 30 and impinges against the circular edge of the shoulder 24. The water at this point is broken into a spray and is directed outwardly through the skirt portion 23 which confines extraneous spray and controls the shape of the final conical spray which emerges from the entire spray head as a whole.

The passage 12 may be of various diameters but it is large enough to pass any foreign material which is likely to be present in the water supply and at the same time it is small enough to give a desired velocity to the stream. For current city water supplies satisfactory results will generally be achieved if the diameter of the passage 12 is $\frac{5}{32}$ of an inch.

The conical spreader 25, 26 should be close enough to the outlet or downstream end of the passage 12 to receive the water in a fairly solid stream, but far enough from it to permit any solid material which can pass through the passage 12 to pass between the spreader and adjacent parts and thus to be expelled fully from the shower head. As mentioned above, the angle of the lower portion 26 of the spreader element is approximately 60 degrees with respect to the center or axial line of the passage 12. The angle of the portion 25 should be steeper than that of the portion 26, but it may vary between rather considerable limits.

The spokes or arms 30 are positioned outwardly of the surface 26 of the spreader. Experience has shown that it is generally preferable that these members are out of contact with the spreader surface at the point at which the water leaves that surface. It is also preferable to have them spaced inwardly from the shoulder 24. By placing them inwardly experience has shown that the pattern or shape of the water leaving the head will be satisfactory. The inner edge of the shoulder 24 is preferably located so that the sheet of water leaving the spreader surface 26

strikes this edge. The angle is preferably 60 degrees with respect to the central axis of the passage **12**. If the angle of the surface **26** were modified, the position of the spreader would also be modified so that whatever the angle of the spreader, the sheet of water leaving the surface **26** would contact the inner edge of the shoulder **24**.

Experience has shown that it is preferable to locate the inner edge of the shoulder **24** with respect to the outer edge of the skirt portion **23** so that a sheet of water striking or just clearing the inner edge of the shoulder **24** would definitely strike the inner surface of the skirt **23** and would not pass outwardly from the nozzle without having struck the inner surface of the skirt **23**. In the particular form shown a line drawn as illustrated striking the inner edge of the shoulder **24** and the outer edge of the skirt **23** will lie along an angle of 26 degrees with respect to the central axis of the passage **12**. Under these conditions a satisfactory spray will be produced. If the proportions indicated generally are substantially followed, a satisfactory spray is produced. If the spacing and dimensioning of the parts is changed in one direction the spray will be too narrowly dispersed and will tend to converge upon itself, and if the proportions and dimensions are increased in the other direction the skirt **23** will have no spray-confining or -defining effect. Whatever the relative position of the parts may be, the space between the largest diameter of the spreader—that is to say, between the edge portion **27** and the inner edge of the shoulder **24**—must be large enough to pass the largest piece of foreign matter which can pass through the passage **12**. Although the surfaces **23** and **24** as shown are smooth, either or both could be provided with serrations or grooves.

I claim:

1. In combination in a shower head, a hollow housing, an orifice-forming member secured thereto and provided with an orifice, means for securing said member to a water supply conduit, said housing provided with a passage therethrough of one diameter and a downstream portion of enlarged diameter, comprising a skirt-like member, the said two portions being separated by a shoulder, a fixed spreader member spaced from the orifice and positioned within said housing, said spreader comprising an upstream conical portion having a substantially smooth surface and a downstream conical portion having a substantially smooth surface of reduced slope, and a final downstream generally straight-sided portion, and means for supporting said spreader comprising at least one arm engaging said spreader downstream of said conical portions and supported by said housing.

2. In combination in a shower head, a hollow housing, an orifice-forming member secured thereto and provided with an orifice, means for securing said member to a water supply conduit, said housing provided with a passage therethrough of one diameter and a downstream portion of enlarged diameter, comprising a skirtlike member, the said two portions being separated by a shoulder, a fixed spreader member spaced from the orifice and positioned within said housing upstream of said shoulder, said spreader comprising an upstream conical portion having a substantially smooth surface and a downstream conical portion having a substantially smooth surface of reduced slope, and a final downstream generally straight-sided portion, and means for supporting said spreader comprising at least one arm engaging said spreader downstream of said conical portions and supported by said housing.

3. In combination in a shower head, a hollow housing, an orifice-forming member secured thereto and provided with an orifice, means for securing said member to a water supply conduit, said housing provided with a passage therethrough of one diameter and a downstream portion of enlarged diameter, comprising a skirtlike member, the said two portions being separated by a shoulder terminating at its inner portion in a sharp edge, a fixed spreader member positioned within said housing upstream of said shoulder, said spreader comprising an upstream conical portion and a downstream conical portion, the upstream portion being of greater angularity with respect to the axis of the orifice formed in said orifice member than the downstream conical portion, and a final downstream generally straight-sided portion, and means for supporting said spreader comprising at least one arm engaging said spreader downstream of said conical portions and downstream of said straight-sided portion and supported by said housing.

4. A shower head assembly for attachment to a water conduit terminating in a ball joint conduit member, said shower head comprising a hollow connector, a connector nut adapted to embrace a ball joint and to hold the nut in position thereon, said connector comprising an orifice member having a passage therethrough, a housing secured to the connector, said housing being hollow and formed with a plurality of internal diameters, the portion of greatest diameter being positioned at the downstream end of said housing and comprising a skirt-forming member, said housing formed with a shoulder intermediate said skirt and the next upstream portion, a fixed spreader positioned within said housing, said spreader comprising a plurality of conical portions positioned progressively from an upstream to a downstream position, the upstream portion being of greater angularity with respect to the axis of the orifice formed in said orifice member than the downstream conical portion, and spreader support means secured to said spreader and supported by said housing.

5. A shower head assembly for attachment to a water conduit terminating in a ball joint conduit member, said shower head comprising a hollow connector, a connector nut adapted to embrace a ball joint and to hold the nut in position thereon, said connector comprising an orifice member having a passage therethrough, a housing secured to the connector, said housing being hollow and formed with a plurality of internal diameters, the portion of greatest diameter being positioned at the downstream end of said housing and comprising a skirt-forming member, said housing formed with a shoulder intermediate said skirt and the next upstream portion, said shoulder terminating in a sharp inner edge, a spreader positioned within said housing, said spreader comprising a plurality of conical portions positioned progressively from an upstream to a downstream position, the upstream portion being of greater angularity with respect to the axis of the orifice formed in said orifice member than the downstream conical portion, and spreader support means secured to said spreader and supported by said housing.

6. A shower head assembly for attachment to a water conduit terminating in a ball joint conduit member, said shower head comprising a hollow connector, a connector nut adapted to embrace a ball joint and to hold the nut in position thereon, said connector comprising an orifice member having a passage therethrough, a housing secured to the connector, said housing being hollow and formed with a plurality of internal diameters, the portion of greatest diameter of said housing being positioned at the downstream end of said housing and comprising a skirt-forming member, the passage through said connector nut being of less diameter than the passage through said ball joint conduit and smaller than the passage through said housing, said housing formed with a shoulder intermediate said skirt and the next upstream portion, a spreader positioned within said housing, said spreader comprising a plurality of conical portions positioned progressively from an upstream to a downstream position, the upstream portion being of greater angularity with respect to the axis of the orifice formed in said orifice member than the downstream conical portion, and a generally straight-sided cylindrical portion downstream of the last conical portion, and spreader support means secured to said spreader downstream of said straight-sided portion and supported by said housing.

7. A shower head assembly for attachment to a water conduit terminating in a ball joint conduit member, said

shower head comprising a hollow connector, a connector nut adapted to embrace a hollow connector, a connector nut adapted to embrace a ball joint and to hold the nut in position thereon, said connector comprising an orifice member having a central passage therethrough, a housing secured to the connector, said housing being hollow and formed with a plurality of internal diameters, the portion of greatest diameter of said housing being positioned at the downstream end of said housing and comprising a skirt-forming member, the passage through said connector nut being of less diameter than the passage through said ball joint conduit and smaller than the passage through said housing, said housing formed with a shoulder intermediate said skirt and the next upstream portion, a spreader positioned centrally within said housing, said spreader comprising a plurality of conical portions positioned progressively from an upstream to a downstream position, the upstream portion being of greater angularity with respect to the axis of the orifice formed in said orifice member than the downstream conical portion, and spreader support means secured to said spreader and supported by said housing.

8. A shower head assembly for attachment to a water conduit terminating in a ball joint conduit member, said shower head comprising a hollow connector, a connector nut adapted to embrace a ball joint and to hold the nut in adjusted position thereon, said connector comprising an orifice member having a central passage therethrough, a housing removably secured to the connector, said housing being hollow and formed with a plurality of internal diameters, the portion of greatest diameter being positioned at the downstream end of said housing and comprising a skirt-forming member, said housing formed with a shoulder intermediate said skirt and the next upstream portion, a spreader positioned centrally within said housing, said spreader comprising a plurality of conical portions positioned progressively from an upstream to a downstream position, the upstream portion being of greater angularity with respect to the axis of the orifice formed in said orifice member than the downstream conical portion, and spreader support means secured to said spreader and supported by said housing.

9. In combination in a shower head, a hollow housing, an orifice-forming member secured thereto and provided with an orifice, means for securing said member to a water supply conduit, said housing provided with a passage therethrough of one diameter and a downstream portion of substantially enlarged diameter, comprising a skirtlike member, the said two portions of said skirtlike member being separated by a shoulder, a fixed spreader member positioned within said housing, said spreader comprising an upstream conical portion and a downstream conical portion of reduced slope, and a final downstream generally straight-sided portion, said portion of reduced slope positioned at an angle of approximately 60 degrees with respect to the longitudinal axis of the shower head as a whole, and means for supporting said spreader comprising at least one arm engaging said spreader downstream of said conical portions and downstream of said straight-sided portion and supported by said housing, and in the path of water as it moves past said spreader.

10. In combination in a shower head, a hollow housing, an orifice-forming member secured thereto and provided with an orifice, means for securing said member to a water supply conduit, said housing provided with a passage therethrough of one diameter and a downstream portion of substantially enlarged diameter, comprising a skirtlike member, the said two portions of said skirtlike member being separated by a shoulder, a fixed spreader member positioned within said housing, said spreader comprising an upstream conical portion and a downstream conical portion of reduced slope, and a final downstream generally straight-sided portion, and said portion of reduced slope being positioned at an angle of approximately 60 degrees to the longitudinal axis of said shower head and so disposed that a line drawn radially across its face will strike at approximately the outer edge of the smaller diameter of the straight-sided portion, and means for supporting said spreader comprising at least one arm engaging said spreader downstream of said conical portions and downstream of said straight-sided portion and supported by said housing, and in the path of water as it moves past said spreader.

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