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F. H. KNOWLTON

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SPRAY HEAD

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Fig. 1.

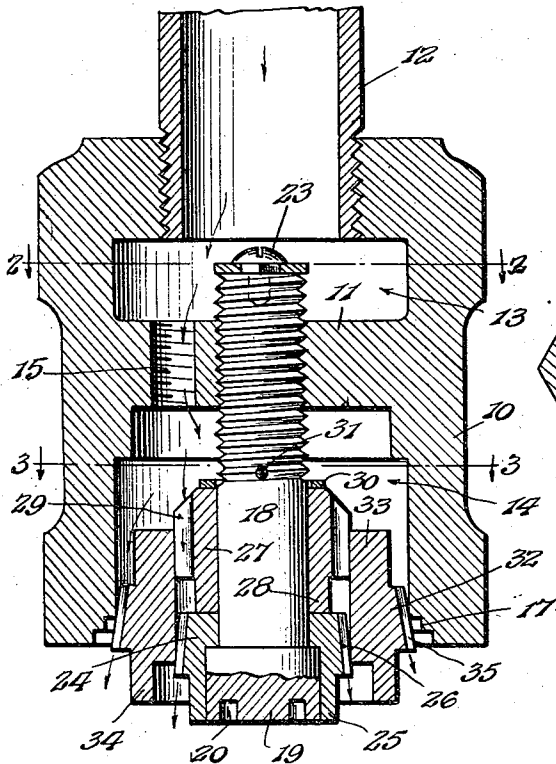


Fig. 2.

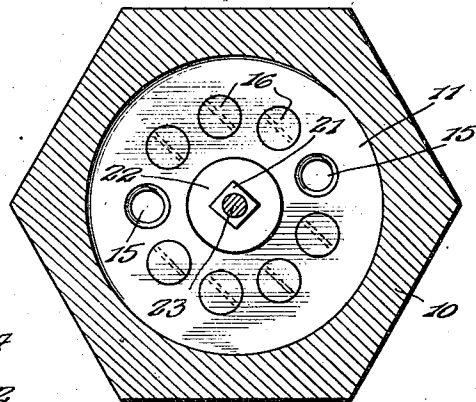


Fig. 3.

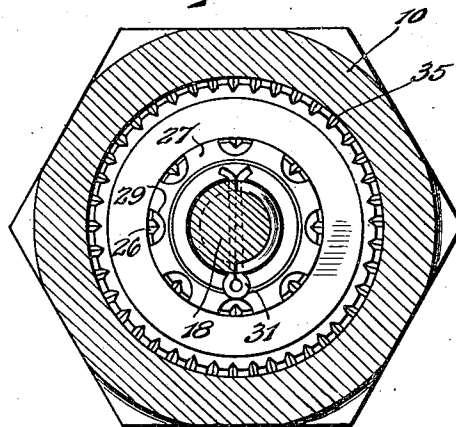
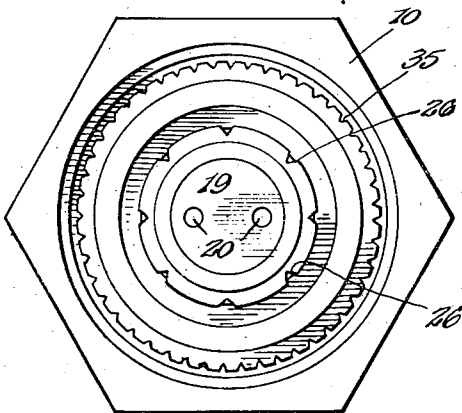


Fig. 4.



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SPRAY HEAD

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9 Claims. (Cl. 299-141)

This invention relates to an improved spray head especially designed for use in connection with shower baths or the like and seeks, among other objects, to provide a device of this character which will discharge concentric sprays of water each composed of a number of fine streams and wherein the size of the streams of the outer spray may be readily regulated.

The invention seeks, as a further object, to provide a device of this character wherein the volume of water discharged may, without the use of separate valves, be readily controlled.

Still another object of the invention is to provide a device eliminating the use of gaskets, wherein the device will tend to be self-cleaning but wherein, should for any reason the device become clogged the device may be readily cleaned.

And the invention seeks, as a still further object, to provide a device which will hold only a small quantity of water so that when the flow of water is cut off, there will be very little drip from the head.

With the foregoing and other objects in view, the invention consists in certain novel details of construction and combinations of parts herein-after fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing, Figure 1 is a vertical sectional view through my improved spray head,

Fig. 2 is a transverse sectional view on the line 2-2 of Fig. 1,

Fig. 3 is a transverse sectional view on the line 3-3 of Fig. 1,

Fig. 4 is a bottom plan view of the device.

In carrying the invention into effect, I employ a preferably cylindrical casing 10 which, as brought out in Figs. 2 and 3 of the drawing, is formed at its ends with hexagonal faces to accommodate a wrench and impart additional strength to the casing. Extending transversely within the casing, near the upper end thereof, is a partition 11, the casing being bored and tapped at its upper end to accommodate a water pipe, as conventionally illustrated at 12. As will be observed, the partition 11 divides the casing into an upper supply chamber 13 and a lower discharge chamber 14 and formed through said partition is a circular series of concentrically disposed feed passages 15. These passages are tapped to removably receive closure plugs 16

and in Fig. 2 of the drawing I have shown all of the passages closed except two at opposite sides of the chamber. As will be perceived, the volume of flow of water from the chamber 13 into the chamber 14 as well as the water pressure may be readily controlled by closing either a greater or lesser number of the passages 15 with the plugs 16. The greater the number of passages which are plugged, the less water pressure will be delivered to the interior of the head or casing. In reducing water pressure through the passages by inserting plugs, flow of water to the lower chamber is reduced and the volume discharged from the casing is also reduced. Therefore, when all plugs are removed a heavy stream will be delivered with extreme velocity but when all plugs except one or two are in place, a very fine and gentle spray is produced. It will thus be seen that by increasing or reducing the number of plugs used, I am able to produce many variations of spray without using extra valves which are costly to install and must be kept in proper condition. This arrangement also enables one building having heavy pressure on the water supply to deliver the same volume from a shower head as another building having a great deal lower pressure.

The chamber 14 is enlarged at its lower end portion while, at its mouth, said chamber is preferably stepped, as indicated at 17, and screwed through the partition 11, axially of said chamber, is a stem 18 having a cylindrical head 19. This head is formed with spaced sockets 20 to accommodate a suitable spanner wrench and formed on the stem at its opposite end, as particularly seen in Fig. 2, is a squared boss 21. Fitting over said boss is a stop washer 22 and screwed into the stem through said boss is a cap screw 23 removably securing the washer in position. The washer is, of course, adapted to coact with the partition 11 for limiting the stem 18 against downward displacement.

Removably fitting the stem 18 is an inner spray disk 24 chambered to snugly receive the head 19 of said stem and having its lower end cut away to form a hub flange 25 terminating flush with said head. This disk is of frusto-conical contour and formed in the periphery thereof is a series of circumferentially spaced downwardly flaring grooves 26 which extend in the direction of the axis of the disk and terminating at the hub flanges 25. As seen in Fig. 4, the grooves 26 are substantially V-shaped in cross section. Removably fitting the stem 18, above the disk 24, is a second inner spray disk 27 provided at its lower end with a hub flange

28 which rests upon the upper end of the disk 24 for spacing the disks apart, and formed in the periphery of the disk 27 is a series of circumferentially spaced grooves 29 extending parallel to the axis of the disk and terminating at the hub flanges 28. As seen in Fig. 3, the grooves 29 are substantially semi-cylindrical in cross section. Overlying the disk 27 is a washer 30 and extending through the stem 18, above the washer, is a key 31 locking the parts against upward displacement on the stem.

Surrounding the inner spray disks 24 and 27 is an outer frusto-conical spray disk 32 provided at its upper end with a relatively thick hub flange 33 snugly receiving the disk 27 while, at its lower end, the disk 32 fits snugly about the inclined periphery of the disk 24 to rest thereon. Referring to Figure 1, it will be seen that since the disk 27 is of cylindrical shape and is snugly received in the bore of the outer disk, this disk 27 will act as a guide for the lower inner disk 24 and cause the disk 24 to move vertically in a straight line through the lower portion of the outer disk. Therefore, the lower inner disk will be moved evenly into engagement with walls of the outer disk and grinding contact between the outer disk and lower inner disk. The outer disk will also be guided as it is drawn upwardly and will seat against walls of the body without grinding. Undesired wear upon the body and the spray disks will, therefore, be eliminated and the disks will always be accurately seated. It should also be noted that the upper inner disk constitutes a filler for preventing sediment from accumulating in the upper portion of the outer disk above the lower inner disk and quickly clogging grooves of the lower inner disk. Depending from the lower end of the disk 32 is an annular hub flange 34 somewhat thinner than the flange 33 and formed in the periphery of said disk is a series of circumferentially spaced downwardly flaring grooves 35 extending in the direction of the axis of the disk and terminating at the flange 34. As seen in Fig. 3, the grooves 35 are substantially V-shaped in cross section.

As will now be seen, water entering the supply chamber 13 of the casing 10 will flow through such of the passages 15 as are open to enter the discharge chamber 14 of the casing when some of the water will flow through the grooves 29 of the disk 27 and thence through the grooves 26 of the disk 24 to issue at the lower end of the head in an annular series of fine spray streams. At the same time, water in the chamber 14 will flow through the grooves 35 of the disk 32 to issue at the lower end of the head in an annular series of fine spray streams surrounding the spray streams issuing from the grooves 26. Thus, an inner and outer series of spray streams will be discharged from the head.

As the head 19 of the stem 18 is housed by the disk 24, access to said head with a pair of pliers or a pipe wrench cannot be had to molest the adjustment of said stem. Accordingly, tampering with the device, in the practical use thereof, will be forestalled. However, by engaging a proper spanner wrench in the sockets 20 of the head 19 of the stem, the stem may be turned in one direction for shifting the periphery of the disk 32 into engagement with the lower end of the annular wall of the chamber 14 of the casing 10, when flow of water through the grooves 35 will be correspondingly restricted, and by turning the stem in the opposite direction to lower the disk 32, an increased flow of water through

the grooves 35 will be permitted. The size of the streams of water issuing from these grooves may, accordingly, be readily regulated and a thorough cleaning of the grooves effected. By pressing upwardly against the lower end of the flange 34 during unscrewing of the stem the inner disks may be allowed to move downwardly through the outer disk before the outer disk drops and have their grooves 26 and 29 thoroughly cleaned, or, if so desired, the disks may be allowed to move downwardly together and the outer disk then thrust upwardly to permit cleaning of the grooves of the inner disks. To disassemble the device, it is first necessary to remove the casing 10 from the pipe 12 when the screw 23 and washer 22 are removed. The stem 18 may then be backed out through the partition 11 when the spray disks may be removed from said stem. I accordingly provide a particularly simple and effective device for the purpose set forth and in this connection attention is directed to the fact that when the stem is screwed downwardly so as to permit water to rush over and past the spray disks for cleaning said disks, no grinding action on said disks will be set up.

Having thus described the invention, I claim:

1. A spray head including a casing having a discharge chamber, a stem threaded in the casing and extending axially of said chamber, inner spray disks carried by said stem one above the other, and an outer spray disk fitting about the inner spray disks and supported thereby, the outer disk having a toothed marginal portion for wedging engagement with walls of the discharge chamber about the outlet thereof, the upper one of the inner disks being slidable through the outer disk and formed with fluid passages about its margin and the lower inner disk having a toothed marginal portion for wedging engagement with walls of the outer disk, said stem being adjustable for positively shifting said disks vertically.

2. A spray head including a casing having a discharge chamber provided with an outlet at its bottom, a stem threaded in the casing and extending through the outlet axially of the chamber and outlet, inner spray disks carried by said stem one above another, an outer spray disk disposed concentric with the inner spray disks and having wedging engagement with walls of the casing about the outlet, the lower one of the inner spray disks having wedging fit within the outer disk, said stem when turned being moved vertically to positively move the disks relative to the outlet of said chamber, and means for limiting downward movement of said stem.

3. A spray head including a casing having a discharge chamber formed with an outlet in its bottom, a stem threaded in the casing and extending axially of the chamber with its lower portion projecting through the outlet, an inner spray disk carried by said stem, a second inner spray disk disposed above and supported upon the first spray disk, and an outer spray disk surrounding both inner spray disks with the first mentioned inner disk wedged into the outer spray disk, the outer spray disk having wedging engagement with walls of the outlet of said chamber, marginal portions of the disks being formed with grooves defining passages, said stem being adjustable to positively move the disks vertically of the casing and support them in adjusted position.

4. A spray head including a casing having a discharge chamber, a stem threaded in said casing and mounted axially of the chamber, an inner spray disk carried by said stem, a second inner

spray disk disposed above and supported by the first mentioned disk, and an outer spray disk surrounding both inner spray disks and having sliding fit about the upper inner disk and wedging fit about the lower inner disk, all of said disks being provided with vertically extending peripheral grooves constituting water passages and terminating in spaced relation to lower ends of the disks and the lower portion of the outer disk being extended downwardly below the grooves of the lower inner disk in radial spaced relation to the lower end portion of the said lower inner disk, said stem when adjusted serving to positively move the disks relative to the outlet of said chamber and support the disks in an adjusted position.

5. A spray head including a casing having a partition defining a supply chamber and a discharge chamber, there being openings in the partition for establishing communication between the chambers, means for selectively closing one or more of said openings and thereby regulate the volume of flow through the chambers, spray disks mounted in the outlet of the discharge chamber, and means for positively adjusting the disks relative to the outlet of the discharge chamber and holding the disks in adjusted position.

6. A spray head including a casing having a transverse partition integral therewith and dividing the casing into an upper supply chamber and a lower discharge chamber, the partition being formed with a plurality of openings communicating with said chambers, removable means for selectively closing one or more of said openings to regulate the volume of flow through said chambers, and a spray disk mounted in the mouth of the discharge chamber.

7. A spray head including a casing having a transverse partition forming upper and lower chambers, one chamber being provided with a discharge opening, there being a plurality of threaded openings formed in said partition and establishing communication between the chambers, concentric frusto-conical spray disks mounted in the lower chamber and provided with peripheral

passages to permit the discharge of fluid therethrough, means for admitting fluid to the upper chamber, and threaded plugs adapted to be screwed into said openings for selectively closing one or more of the openings and regulate the flow of fluid from the upper chamber into the lower chamber.

8. A spray head including a casing having a chamber provided with a discharge opening, the walls of said opening being stepped, a stem threaded in the casing and extending within the chamber and through the outlet axially thereof, inner and outer substantially frusto-conical spray disks carried by said stem one about the other and provided with peripheral passages to permit discharge of fluid therethrough, and means for admitting fluid into said chamber, said stem being adjustable vertically in said casing to shift the disks vertically and move the outer spray disk into and out of engagement with the stepped walls of the discharge opening.

9. A spray head including a casing having a chamber provided with a discharge opening in its bottom, a stem disposed vertically within said chamber and provided with an enlarged head at its lower end extending through the discharge opening, a frusto-conical inner spray disk having its lower portion cut away to form a flange adapted to fit snugly about the head of the stem, and an outer frusto-conical spray disk having its lower portion cut away to form a depending annular flange surrounding the flange of the inner disk in radial spaced relation thereto, the walls of both of said disks being provided with external grooves to permit passage of fluid therethrough, said grooves extending vertically with their lower ends terminating at the upper ends of the flanges, and walls of the outlet opening being spaced radially from lower portions of the grooves of the outer disk, said stem being adjustable vertically through the discharge opening and when shifted downwardly permitting flooding of the parts for cleaning purposes.

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