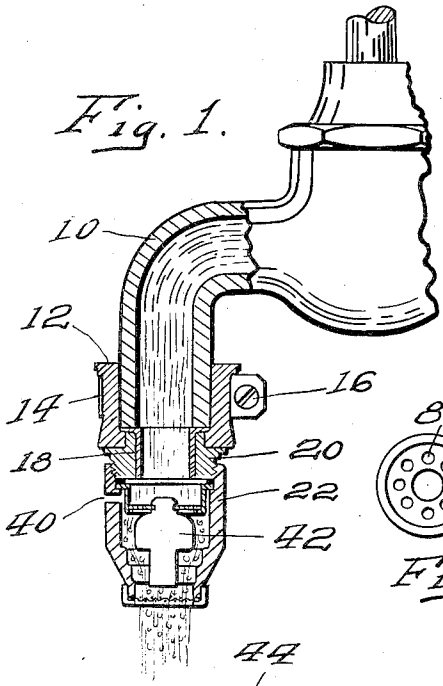
Aug. 28, 1951 J. J. GOODRIE 2,565,554

AERATING SHOWER HEAD

Filed April 30, 1949

Fig. 1.



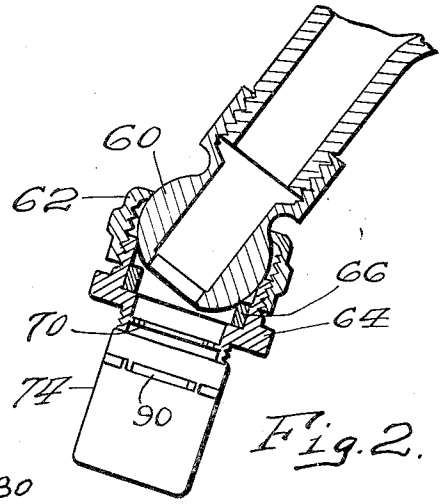


Fig. 2.

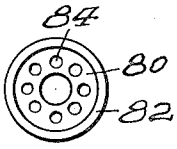


Fig. 5.

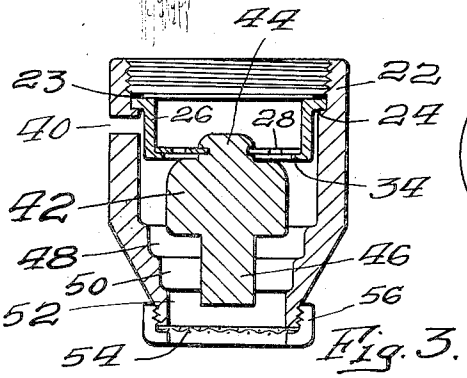


Fig. 3.

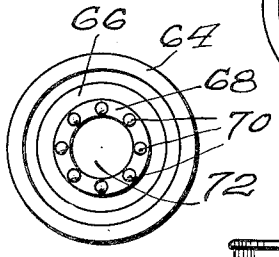


Fig. 6.

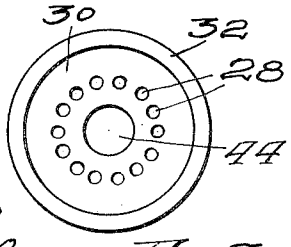


Fig. 7.

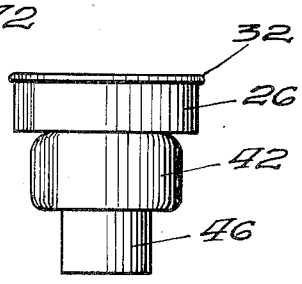


Fig. 8.

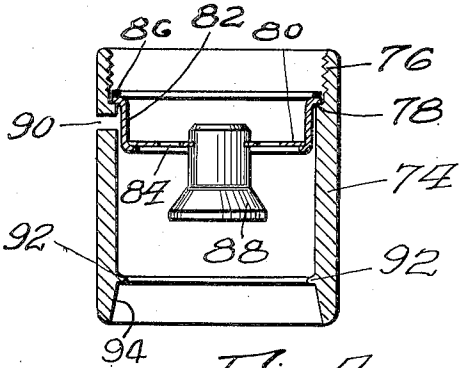


Fig. 4.

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2,565,554

AERATING SHOWER HEAD

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Application April 30, 1949, Serial No. 90,617

8 Claims. (Cl. 261—116)

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This invention relates to an improved shower head and this application for patent relates to an improvement of my prior patent entitled "Unitary Flush Valve Connection," granted October 25, 1938, No. 2,134,182.

This invention also comprises an improvement of my previous patent entitled "Water and Air Mixing Device," No. 2,510,395, dated June 6, 1950.

I have also a further patent entitled "Aerating Device," No. 2,510,396, dated June 6, 1950, and regarding which the present invention comprises an additional improvement.

One of the important new objects of this invention is to provide a spout-end aerator for faucets which has a rubber adapter whereby it can be conveniently fastened to an ordinary sink faucet or the like without the use of plumbing tools.

Another improvement resides in the provision of a more efficient aerator structure which can be economically produced in considerable quantities.

A still further important object resides in the provision of a shower head wherein the water openings discharge below the air intake ports and which includes an improved nozzle whereby a better mixing of air with water results.

Other and further important objects of the invention will be apparent from the disclosures in the accompanying drawings and following specification.

The invention, in a preferred form, is illustrated in the drawings and hereinafter more fully described.

In the drawings:

Figure 1 is an elevation, partly in section, showing the improved aerating device of my invention applied to an ordinary faucet.

Figure 2 is a detail view, partly in section, illustrating the preferred type of shower head.

Figure 3 is an enlarged sectional view of the spout-end aerator without the adapter.

Figure 4 is an enlarged sectional view of the main portion of the shower head.

Figure 5 is a top plan view of the perforated disk used in the spout of the shower head and which serves to finally break up the water stream and also to produce and aspirating effect. This view is taken from the top of Figure 4 looking down thereon.

Figure 6 is a plan view of a portion of the shower head construction, this showing that portion which forms part of the ball and socket connection.

Figure 7 is a top plan view of the perforated

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stamping or disk which serves to preliminarily break up the water stream entering the spout-end aerator and this view is taken from the top of Figure 3 looking down thereon.

Figure 8 illustrates the assembly of the perforated supporting disk illustrated in Figure 7 and the associated plug, whereby the final desired mixture of air and water is accomplished.

As shown in the drawings:

The reference numeral 10 indicates generally a conventional water faucet or the like to which the improved spout-end aerator of my invention is applied. This application is preferably made by means of a cylinder composed of rubber or rather similar material, as illustrated at 12, and which is tightened on the end of the faucet 10 by means of a restricting metal band or the like 14, the tightening and fastening operation being accomplished by means of a bolt or screw 16 operating in flared ends of the band 14 in the usual accepted manner.

A flared metal sleeve 18 is mounted inside the rubber cylinder 12 and is positioned upon an integral annular shoulder in the sleeve, as best shown in Figure 1. This sleeve is preferably of brass or some other relatively soft material.

A screw threaded cylinder of steel or some metal harder than the sleeve 18 surrounds the sleeve, as indicated at 20, and this also has a shoulder upon which the lower face of the rubber cylinder 12 is positioned. These elements, namely, the cylinder 12, its constricting band 14, the adjusting and fastening screws or bolts 16, the brass sleeve 18 and the screw threaded element 20 comprise an integral portion of the complete unit and to which the other parts of the aerator can be removably fastened.

The remaining portions comprise essentially a sleeve 22 which is internally screw threaded at its upper end so as to be removably mounted on the end of the correspondingly screw threaded cylinder 20. This sleeve is provided with an internal annular shoulder 24 upon which is loosely positioned a stamping or the like 26, shaped as best shown in Figure 3, and which has a plurality of openings 28 circularly disposed about its center. This stamping can be made of one or two pieces and in the drawing is shown as of two pieces with the perforated disk 30 shown as separate from its sustaining ring 26.

The sustaining ring 26 is somewhat cylindrical, as shown in Figures 3 and 8, with an upper outturned flange 32 and a lower inwardly turned flange 34 upon which the disk 30 is seated. The cylindrical structure 26—32—34 is of a depth suf-

ficient for its lower edge to extend well below air inlet ports 40 which are formed in the sleeve or cylinder 22.

The action of the water passing through the openings 28 in the disk 30 produces an aspirating effect which draws in air through the ports 40, these ports being of sufficient size and number to allow the desired quantity of air to enter the interior of the structure and to be mixed with the water, as both air and water pass through the lower end of the sleeve 22 and between its inner face and the outer faces of a plug 42, which plug is fastened to the disk 30, preferably by having the head therefor fitted into a central opening in the disk and then riveted into position, as shown at 44.

The plug 42 is shaped as shown in Figures 1, 3 and 8, this shape having been found by experiment to produce a highly efficient and most desirable mixture of air and water.

It will be noted that the plug has an integral depending restricted portion 46 which is adjacent a series of correspondingly and gradually restricted interior ledges or shoulders in the sleeve or casing 22. These can be two, three or more in number and are indicated by the reference numerals 48, 50 and 52 in Figure 3.

A screen, or other perforated element 54, is fitted onto the end of the spout or casing 22 by means of an internally screw threaded securing ring or the like 56.

The construction of the shower head is best illustrated in Figures 2 and 4 and this includes a ball and socket joint comprising a ball 60 and a corresponding socket member 62. Removably fitted into the socket member or annulus 62 is a cooperating ring or annulus 64 provided with an internal gasket 66. Just below the gasket 66 and formed in an interior flange 69 of the annulus 64 is a series of perforations 70. This perforated flange 68 defines a central opening 72 in the annulus 64 (Figure 6). The central opening 72 allows a greater portion of the water to flow therethrough, while the perforations 70 carry a lesser portion of the stream by breaking up the same in a preliminary fashion.

A nozzle head 74, which is substantially cylindrical in shape as best shown in Figures 2 and 4, is removably fitted onto the annulus 64 by interior upper screw threads 76 and this nozzle head is provided with an interior annular shoulder 78, upon which is positioned a combination perforated disk 80 and flanged cylindrical holder 82 similar to the combination disk and holder identified by the reference numerals 26 and 30 and previously described in connection with the spout-end aerator construction.

The disk 80 is also provided with a series of circularly disposed openings 84 which are usually less in number than the openings 28 in the disk 30, these openings, disk and supporting element being best illustrated in Figures 4 and 5. A gasket 86 is provided to fit against the upper outwardly turned flange of the cylindrical disk support 82, this being similar to the gasket 23 shown in Figure 3.

A plug 88 is centrally mounted in the disk 80, this plug having a function similar to that of the plug 42—46 previously described, but is of a different shape as shown. Water flowing through the openings 84 in the disk 80 impinges against the outwardly flared lower end of the plug 88 and the aspirating effect of this water draws in air through the ports 90 in the housing 74. These ports are similar to the ports 40 in the spout-end

construction. The water and air are thoroughly mixed at this stage.

The mixed air and water impinges against the inner walls of the nozzle head 74 and thence, and at least partially, against an annular integral shoulder 92 formed in the inner face of the nozzle head. This shoulder 92 is spaced a slight distance above the lower extremity of the nozzle head, which is interiorly tapered as illustrated at 94, this taper being preferably at a diverging angle of about eight degrees from the inner straight walls of the sleeve or nozzle head 74. Obviously, this angular divergence can be varied to a considerable extent but it has been found that an angle of eight degrees provides a discharge of a great number of streams of water thoroughly mixed with air in a perfect pattern for a shower when the remaining parts are all assembled, as illustrated in Figures 2 and 4.

It will be evident that herein is provided a spout-end aerator which can be used in connection with practically any faucet or other water discharge device on the market and which will produce a perfectly aerated and coherent stream.

The shower head is simple of construction, has a relatively small number of parts and produces a perfectly aerated and coherent stream, which comprises a distinct departure in this field. With this unit the saving of water is considerable.

I am aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the principles of this invention, and I therefore do not propose limiting the patent granted hereon otherwise than as necessitated by the prior art.

I claim as my invention:

1. An aerating shower head including a sleeve, a ball and socket joint for adjustably connecting the sleeve to a water inlet connection, a disk having a relatively large central opening and a series of circularly disposed smaller openings, said disk being adjacent the water inlet, the sleeve being provided with lateral air inlet ports below said disk, a shoulder in the sleeve below the perforated disk, an interior skirt positioned on said shoulder and depending below the air inlet openings, a second perforated disk mounted in the skirt, and a water and air mixing body centrally positioned in the second disk.

2. An aerating shower head as defined in claim 1 wherein the body has an enlarged shoulder spaced below the perforations in its supporting disk.

3. An aerating shower head as defined in claim 2, wherein the shoulder of the body is frusto-conical.

4. An aerating shower head as defined in claim 1 wherein the skirt is provided with integral flanges, one for supporting the perforated disk with its water and air mixing body in the skirt, and the other for supporting the skirt in the sleeve.

5. An aerating shower head as defined in claim 1 wherein the sleeve is provided with an integral annulus in its inner face beyond the lower end of the body and adjacent the end of the sleeve.

6. An aerating shower head as defined in claim 5 wherein that portion of the end of the sleeve beyond the annulus is angularly outwardly flared.

7. An aerating shower head as defined in claim 6 wherein the angle of such outward flare is approximately eight degrees from the inner wall of the sleeve.

8. An aerating shower head as defined in claim 1, wherein jets of water passing through the perforations in the second disk impinge upon the water and air mixing body.

JOSEPH J. GOODRIE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,134,182	Goodrie	Oct. 25, 1938
2,210,846	Aghnides	Aug. 6, 1940
2,316,135	Turek et al.	Apr. 6, 1943
2,316,832	Aghnides	Apr. 20 1943