AERATOR WITH UNITARY MOLDED INNER ASSEMBLY

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This invention relates to aerators and more particularly to improvements in the construction thereof. This application is a continuation-in-part of my prior copending applications as follows: S. N. 33,733, filed January 28, 1953, entitled "Gas and Liquid Mixing Device"; S. N. 337,502, filed February 18, 1953, entitled "Faucet Attachments"; S. N. 337,506, filed February 18, 1953, entitled "Gas and Liquid Mixing Device." All of the applications just mentioned are in turn a continuation-in-part of my prior copending application S. N. 63,110, filed December 2, 1948, entitled "Gas and Liquid Mixing Device," now U. S. Patent No. 2,633,343, granted March 31, 1953.

The present invention has for its object the provision of an aerator of improved construction. A further object resides in the provision of an aerator that may be produced at a much lower cost than heretofore. Other objects and advantages of the invention will appear as the description proceeds.

Briefly speaking, the invention involves a plastic rod carrying a perforated disc integral therewith or a rod carrying friction-tight a perforated disc in plastic. This perforated disc constitutes one of the upstream discs of the aerator. A second upstream disc may be slipped on to the rod and will rest just under the first disc. The mixing screens may be slipped onto the lower end of the rod after which the tip end thereof is enlarged by heat or by other means, causing the screens to be retained at the lower end of the rod.

The aforesaid construction is much lower in cost than prior art devices, and moreover enables the aerator to be cleaned much more readily than has heretofore been possible. In addition, it is not possible for the housewife to lose any of the parts or assemble them incorrectly when she cleans the working parts of the aerator.

In the drawings:

Figure 1 is a cross sectional view of one form of the invention.

Figure 2 is a cross sectional view of another form of the invention.

Figure 3 is a cross sectional view of still another form of the invention.

Figure 4 is a cross sectional view of a further form of the invention, in which the aerator is placed inside the outlet end of the faucet.

Figure 5 is a cross sectional view of yet another form of the invention.

In Figure 1 the aerator casing 8 has internal threads at the top thereof in order that the aerator may be screwed to the faucet. The casing has a ledge 15 upon which perforated disc 6 rests. There is an integral plastic element comprising all of the following parts: a handle 18, a plastic disc 17, a small tip end 16 and a head 20. The disc 17 has enlargements 21 and holes 12.

In order to avoid the necessity of washers or gaskets in the aerator, the upstream disc 17 of polyethylene semi-hard rubber or the like, is provided with an enlarged head 21 around the periphery thereof. This enlarged head serves two purposes: first, since the plastic material is sufficiently soft that the enlarged head 21 will act as a washer or gasket, the latter maintains the connection between the aerator casing 8 and the faucet watertight; and secondly, the head 21 insures that the lower end of the faucet does not cover holes 12. When the holes 12 are not close to the periphery, the enlargement 21 at the upstream side is not necessary.

It has been found in connection with aerators that it is desirable to have two upstream perforated discs, and consequently I provide disc 17 with holes 12 and another adjacent disc 6 with holes 13 therein. It is noted that the present invention is an improvement over the earlier aerators in that the holes 12 are intentionally out of alignment with the holes 13 in disc 6. The disc 6 is crimped and has two circular rows of holes. Due to the crimping of the disc 6 the holes 13 tend to reduce the divergence of the streamlets emerging therefrom and to more accurately direct the streamlets onto the mixing screen 7.

The disc 6 is arranged to loosely slide upon the rod 19 and may therefore be placed on that rod during the assembly of the aerator and prior to the placing of the screen 7 onto the rod 16.

As originally molded, the rod 16 is of uniform diameter and greater length than shown and hence does not include head 20. After the disc 6 has been placed on the rod 19 and the screens 7 placed on the smaller rod 16, the lower tip end of the rod 16 is heated to enlarge the latter and produce head 20 which holds the screen 7 in place. These screens may be held together by a suitable frame 11 and spaced from each other in any suitable way. An additional screen 10 may be employed and held in place by a clamping ring 9.

In event the housewife desires to remove the aerator for the purposes of cleaning the same, all that is necessary is to unscrew the casing 8 from the faucet and lift the internal parts from the casing by use of the handle 18. The disc 6 is then freely slideable on rod 19 and may be moved away from disc 17 a sufficient distance to enable any dirt residue between the discs 6 and 17 to be removed. Then the disc 6 may be moved upwards against the head 21 to provide an enlarged space between discs 6 and screen 7 whereby the latter may be cleaned. While the internal parts are removed, water may be passed across screen 10 to clean it. When it is desired to reassemble the aerator it is merely necessary to hold the unit by handle 18 and drop it into the casing until disc 6 rests on ledge 15.

In Figure 2 the clamping ring 9 and the screen 10 have been omitted and replaced by an additional screen located on the rod 19. The middle screens only may be framed as at 23, as shown, or screens having the peripheral edge bent, as screen 7 in Figure 3, may be used instead of a framed unit (as shown in Figure 1). The screens are supported by a ledge 24 at the lower end of the casing and kept in position by the lower end 25 of the rod 19. Moreover, the metal rod 19 is mounted friction-tight with the plastic disc 17 so that the several screens 7 and 22 are slideable on rod 19 when it is pushed down. This enables the screens to be more readily cleaned. Moreover, screens with the peripheral edge bent in are less expensive.

The device of Figure 3 is essentially the same as that of Figures 1 and 2, except that the disc 6 is in the form of a cup and rests on clamping ring 9 instead of upon ledge 15. The rigid rod 16 is removable and is friction-fit and carries one screen 7, the outer edge of which is bent inward at 26 to avoid the sharp edges being exposed. Air inlet holes 14 are provided, the same as air inlet holes 14 of Figures 1 and 2.
The device of Figure 4 is essentially the same as those of Figures 1 to 3, except that the device is arranged to be mounted within the faucet instead of in a casing that is screwed to the faucet. The faucet has a ledge 30 against which the upstream disc 17 rests supported by its depending peripheral flanging 31. The rod 19 in this case has enlarged tip ends 28 and 29 to prevent the several parts from leaving the rod. The disc 17 makes a tight fit on rod 19 but nevertheless is slidable along the rod. The friction is sufficient that after the disc 17 has been moved to a new position, it will remain there notwithstanding the force of the water and the force of gravity acting on the rod 19. The inverted cup 6 with its perforated depending positioning flange 27 may be moved to any desired position for the purposes of cleaning and then moved back when it is desired to assemble the aerator. The lower screens 7 have a common frame 9 and are suitably spaced from each other by any well known means. The entire aerator is then slipped into the outlet end of the faucet until disc 17 bears on ledge 30, wheresupon the threaded outlet member 29 is screwed onto the threads at the lower outlet end of the faucet.

The device of Figure 4 may be suitably removed for purposes of cleaning by removing element 29 and sliding the several parts 17, 6 and 7 away from each other as far as possible along the rod 19, and then cleaning the parts individually. After they are cleaned they may be slid back to the positions shown in the drawing and the device reassembled in the faucet. The screen or screens to be used in the construction shown by Figure 4 could be either all attached to metal rod 19 or some of them carried by metal rod 19 and some by element 29. Alternatively all of the screens may be carried by element 29 which may have recesses in which the screens are carried.

In Figure 5 the plastic rod 19 has an integral handle 18 as well as the integral disc 17. The latter has perforations 12 near the center of the device. The disc 6 is slidable on rod 19 and has perforations 13 in circular rows. The lower end of the rod 19 has a head 4 which is enlarged after the disc 6 has been put into place in order to hold the latter as part of the unit. Clamping rings 9 hold screens 10 and 7 in place. The central hole in screen 7 is larger than the head 4 of rod 19 to permit the removal of dirt which may accumulate between the two screens. The casing is in two parts, the upper part 8A of which has internal threads for the purpose of screwing the same to the faucet. The upper part 8A extends below the air inlet holes 14 and the lower part 8B is threaded thereto. The screens 7 and 10, as well as the clamping rings 9, are therefore clamped between the lower edge of the upper part 8A and the ledge 24 on casing 8B. The disc 6 may be a press-fit in upper part 8A or it may be loose. The spacing between the two discs is preferably one or two millimeters. Figure 5 also indicates that rod 19 can be long enough to reach the screen 10 and keep it in position when said screen or screens are not held permanently in position by means of a press-fit ring 9 which may be omitted.

While I have shown a single row of holes in the upstream disc, it is obvious that plurality of rows can be provided in the upstream disc in combination with one or more rows of holes in the downstream disc.

I claim to have invented:

1. An aerator comprising means adapted for connection to a source of water under pressure and which discharges a coherent jet of aerated water and includes an aerating device removable as a unit from said means, said aerating device comprising a central stud of polyethylene, rubber or like material having an upstream disc integral therewith and an extension, the disc having its thickest portion at its rim and being perforated in the thinner portion, and at least one downstream screen having a hole therethrough through which the extension of said stud passes, the downstream end of the stud extension being enlarged to a size larger than the hole in the screen, the first-named means permitting air to enter between the disc and the screen.

2. An aerator as defined in claim 1 in which the screen is slidable along the lower portion of the stud extension.

3. An aerator as defined in claim 1 in which the lower portion of the stud has a shoulder, the screen being clamped between the shoulder and the enlarged head.

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