Nov. 29, 1960 E. P. AGHNIDES 2,962,225

AERATOR WITH UNITARY MOLDED INNER ASSEMBLY

Original Filed April 22, 1954

FIG. 1.

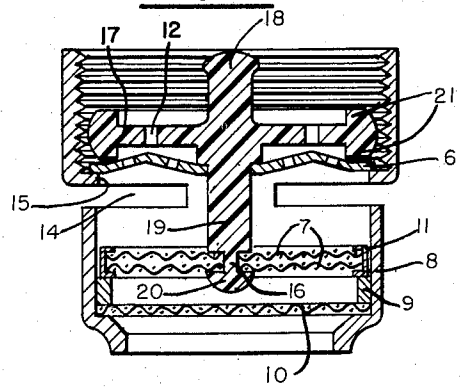


FIG. 2.

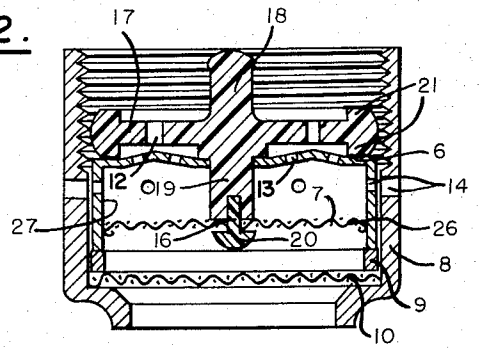
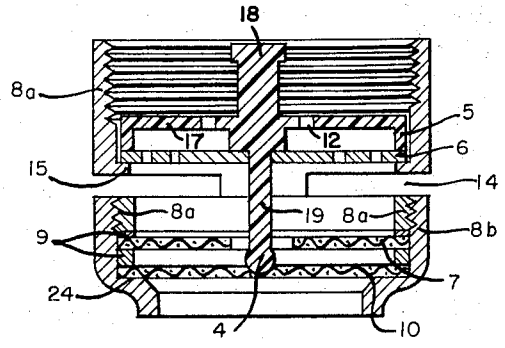


FIG. 3.



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AERATOR WITH UNITARY MOLDED INNER ASSEMBLY

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Original application Apr. 22, 1954, Ser. No. 424,982, now Patent No. 2,799,487, dated July 16, 1957. Divided and this application Jan. 30, 1957, Ser. No. 637,224

9 Claims. (Cl. 239—431)

This invention relates to aerators and more particularly to improvements in the construction thereof. This application is a division of Application Serial No. 424,982, filed April 22, 1954, for "Aerators With Unitary Molded Inner Assembly," now U.S. Patent 2,799,487 granted July 16, 1957 which in turn is a continuation-in-part of my prior copending applications as follows: Serial No. 333,773, filed January 28, 1953 entitled, "Gas and Liquid Mixing Device"; Serial No. 337,502, filed February 18, 1953, entitled, "Faucet Attachments" and granted April 2, 1957 as U.S. Patent No. 2,787,452; Serial No. 337,506, filed February 18, 1953, entitled, "Gas and Liquid Mixing Device," now Patent No. 2,770,446. All of the applications just mentioned are in turn a continuation-in-part of my prior copending application Serial No. 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 this description proceeds.

In brief the invention comprises a plastic rod carrying a perforated disc integral therewith also of 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 integral perforated disc has an enlarged periphery which eliminates the need for washers and spacers.

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 an additional 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 body **19**, 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 peripheral flange **21**. This enlarged flange **21** serves two purposes: first, since the plastic material is sufficiently soft that the enlarged flange **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. Because of the crimping of the disc **6**, the holes **13** tend to reduce the divergence of the streamlets emerging therefrom and to direct more accurately the streamlets onto the mixing screen **7**.

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

As originally molded, the tip end **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 body **19** and the screens **7** placed on the tip **16**, the lower tip end of the rod **16** is heated and upset to enlarge the latter and produced head **20** which holds the screens **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 slidable on rod **19** and may be moved away from disc **17** a sufficient distance to enable any dirt resting 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 disc **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**.

The device of Figure 2 is essentially the same as that of Figure 1, except that the disc **6** is in the form of a cup and rests on clamping ring **9** instead of upon ledge **15**. The tip **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 Figure 1.

In Figure 3 the plastic body **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 body **19** and has perforations **13** in circular rows. The lower end of the body **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 body **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 3 also indicates that body 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 a 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 a casing, means in the casing for breaking up the water into high velocity streamlets comprising a pair of adjacent superposed discs, an air inlet downstream said discs, at least one screen in the casing downstream the air inlet for finely breaking up the water and mixing it with air to form a coherent stream of aerated water containing bubbles, a central stud for removing the discs and at least one screen from the casing as a unit, one of said discs being slidable on said stud in order that the discs may be separated from each other when it is desired to clean the same and the other of said discs being integrally molded with said stud, the upper of said superposed discs having a row of apertures therein and the lower disc having a ridge extending upwardly with its apex immediately and directly below said row of apertures, the lower disc having apertures spaced from said ridge.

2. An aerator comprising a casing, an upstream perforated plastic disc in the casing, a molded plastic stud inner assembly member extending downstream from the disc, a second perforated disc downstream from the first one and slidable on said stud, an air inlet downstream the second disc, and means in the casing downstream the air inlet for finely breaking up the water and mixing it with air to form a coherent jet of aerated water containing bubbles, said stud and said upstream disc being integrally molded and the upstream disc having an enlargement around its periphery which acts as a washer and which also bears against said second perforated disc to thereby effectively seal the two discs at their peripheries and confine the flow of water through the perforations in the discs.

3. An aerator as defined by claim 2 in which the lower end of the stud carries means to prevent the second disc from being removed from the stud.

4. An aerator comprising a casing, an upstream perforated disc in the casing, a stud extending downstream of the disc, a second perforated disc slidable on the stud downstream of the position of the first disc, an air inlet downstream the second disc, screen means near the downstream end of the stud and carried thereby when the stud is removed from the casing, the screen means being of such mesh as to finely break up the water and mix it with air to produce a coherent jet of aerated water containing bubbles, said stud and said upstream disc being integrally molded of plastic material, said casing having threads for screwing the same to a faucet and said first and second discs extending adjacent to the inside wall of the casing so that when the casing is screwed onto a faucet the faucet will bear against the first disc and press it tightly against the second one to seal the two discs together at their peripheries.

5. An aerator comprising a casing having at least a ledge therein, a unitary assembly comprising all of the following parts: a central stud carrying an upstream disc, a second disc slidable on said stud downstream of the first disc, the second disc being of such size as to rest on the ledge when the unit is placed in the casing, and screen means carried by the lower end of the stud, one end of said stud comprising a handle, said central stud and said upstream disc being integral and composed of molded plastic, the lower disc being crimped to form a ridge that has its projecting part closely approaching the upstream disc, the upstream disc having an opening above the ridge and the second disc having perforations spaced from the ridge.

6. An aerator as defined in claim 5 in which the upstream disc is thicker adjacent its periphery than near its center and is composed of material soft enough to act as a washer.

7. An aerator comprising a casing, a molded plastic central stud having an integral upstream perforated disc carried thereby, said upstream disc being thicker near its periphery and the perforations being in the thinner portion thereof, a shoulder on the stud immediately below said disc, a second disc slidable on the stud and spaced from said first disc by said shoulder, said casing having a ledge for carrying said second disc, the casing having an air inlet downstream the ledge, the lower end of the stud having an enlarged head, and a screen located around the lower part of the stud and having a hole therethrough for the stud to pass, the enlarged head being larger than the hole in the screen and the screen being located below the air inlet.

8. An aerator comprising a casing adapted to be connected to a source of liquid under pressure, a pair of perforated adjacent elements near the upstream end of the casing, the upstream one of said members being composed of material soft enough to act as a washer, said casing having an air inlet downstream the elements, a stud slidable in one of said elements and integral with the other, screen means near the downstream end of said casing and having a hole therein through which the stud passes, the stud carrying the screen means with it when it is removed from the casing.

9. An aerator as defined in claim 8 in which the downstream one of said elements has a downstream projection which terminates at the screen means and limits the upstream motion of the latter, said stud being slidable in said projection.

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