Dec. 11, 1962 E. P. AGHNIDES 3,067,953

WATER AERATOR

Filed Nov. 14, 1960

FIG. 1.

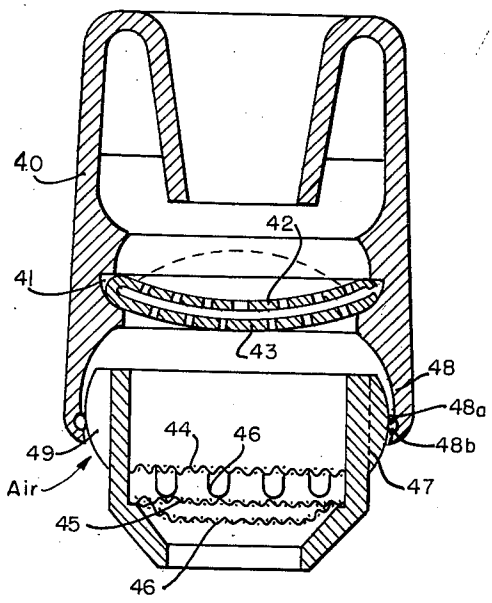


FIG. 1A.

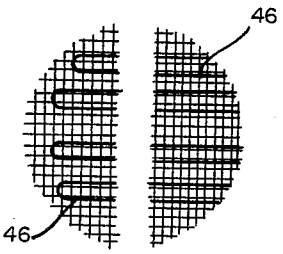
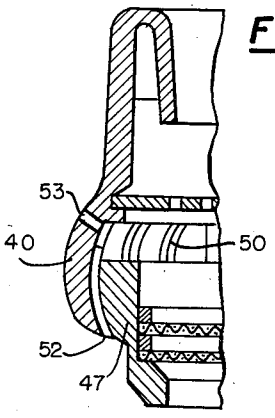


FIG. 2.



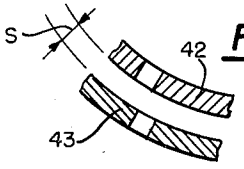


FIG. 1B.

INVENTOR

Elie P. Aghnides

BY Moore & Hare

ATTORNEYS

United States Patent Office 3,067,953 Patented Dec. 11, 1962

3,067,953

WATER AERATOR

Elie P. Aghnides, 46 W. 54th St., New York 19, N.Y.

Filed Nov. 14, 1960, Ser. No. 69,162
3 Claims. (Cl. 239—432)

This invention relates to water aerators and more particularly to aerators of the general type shown in my prior U.S. Patents No. 2,210,846, granted August 6, 1940, and No. 2,316,832, granted April 20, 1943. The aerators of the aforesaid prior patents comprise a diaphragm having one or more small orifices to deliver streamlets of water having substantial velocity and one or more wire mesh screens downstream said diaphragm, air being emitted through an orifice leading to a space between the diaphragm and the screen. The size of the opening or openings in the diaphragm is so related to the resistance of the screens that a large number of bubbles are entrained in the screen and a white coherent jet of aerated water emerges from the outlet of the aerator.

Aerators of the prior art usually project their aerated output in a stream of constant direction. It is an object of this invention to provide an aerator in which the stream may be moved and/or rotated in order that the user of the aerator may direct the bubbly stream anywhere in the sink and, if desired, move a part of the aerator so that the stream washes the surface of the entire sink.

Other objects and advantages of the invention will appear as this description proceeds.

The lower end of the aerator preferably employs a ball and socket arrangement whereby the aerated jet may be directed at any part of the sink by merely moving the lower part of the aerator.

This application is a continuation-in-part of my prior copending application Serial No. 673,017, filed July 19, 1957, entitled "Water Aerators" now abandoned.

In the drawings:

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

FIGURE 1A is a plan view of one of the screens of FIGURE 1.

FIGURE 1B is a side view of certain details of the upstream diaphragms of FIGURE 1.

FIGURE 2 is a cross-sectional view of a modified form of the invention.

FIGURE 1 illustrates the preferred form of the invention. It employs a rubber element for engaging the faucet in a manner similar to that shown in any aforesaid prior Patent 2,316,832. This rubber body **40** has an internal circular groove **41** into which a pair of dished upstream discs **42** and **43** are seated. The orifices in disc **42** are out of alignment with the orifices in disc **43** whereby water passing through the disc **43** moves laterally before it passes out of an orifice in disc **43**.

Water emerges from the disc **43** in the form of high velocity streamlets and impinges upon mixing means in the form of screen **44** where it is finely broken up and mixed with air, whereby the white coherent bubbly jet emerges from the outlet end of the aerator. Two screens **44** and **45** are shown. These screens are similar in construction and mode of operation and a typical one of them is shown in FIGURE 1A. The screen has a series of four lateral corrugations **46**. When the aerator is assembled, the corrugations **46** of screen **44** rest on the top surface of screen **45**. In order to secure maximum resistance, a corrugation of screen **45** may be perpendicular to the direction of the corrugations of screen **44**. As shown in the left side of FIGURE 1A, the corrugations may not extend clear to the edges of the screen or they may extend clear from one edge to the other, as shown

by the right half in FIGURE 1A. Therefore, the corrugations may terminate short of both edges of the screen or they may extend to both edges of the screen as desired. These screens are mounted in a part-spherical only ball **47** rotatable in a part-spherical only socket **48**. This enables the direction of the output jet to be varied at the selection of the user. If desired, the ball **47** may be rotated manually by continuous motion to direct the outlet stream throughout the sink and thus clean the entire sink surface. Groove **48***a*, in socket **48** contains a resilient open ring **48***b* which presses on and thereby retains ball **47** in socket **48**.

The ball **47** includes narrow grooves **49** projecting from the downstream end thereof between the main body of the ball **47** and the socket **48** whereby air may enter into the space between the diaphragm **43** and the screen **44**.

The particular arrangement of holes in the curves discs **42** and **43** are preferably such that the holes in the upper disc are out of alignment with the holes in the lower disc. Even better results are obtained by disposing the holes in the upper and lower discs so that a hole in the upper disc overlaps only a fraction of a hole in the lower disc; and this is especially the case when the spacing between the two discs is less than one millimeter. An example of this improvement feature is illustrated in FIGURE 1B wherein a portion of each of the two discs **42** and **43** and of typical holes in these two discs is illustrated. In the aforesaid arrangement of FIGURE 1B the space between discs **42** and **43** is flooded with water and no air enters therein, especially since the peripheries of the discs are sealed to the casing. The distance S is preferably in the order of 0.50 millimeter. While a great number of variants of the relationship and size of the holes of the two discs may give good results, one arrangement which will produce excellent results is as follows: Each of discs **42** and **43** has three circular rows of holes, with 20 holes in the outer row, 14 holes in the middle row and six holes in the inner row. The holes in the outer row of the upper diaphragm are preferably disposed in a circle 17.5 mm. in diameter; the holes in the middle row are disposed in a circle of 12 mm. in diameter; and the holes in the inner row are disposed in a circle of 6.5 mm. diameter. The holes in the upper disc are preferably 0.9 mm. diameter and the holes in the lower disc are preferably 0.8 mm. diameter.

The modified form of FIGURE 2 sets forth certain variations in the swivel means, and the upstream disc and the downstream screens are shown conventionally. Otherwise, the structure of FIGURE 2 is intended to be the same as FIGURE 1. The member **47** includes a number of ribs **50** projecting from a part-spherical portion thereof. The ribs **50** cover the intervening space between the casing **40** and the part-spherical member **47**, producing a universal joint allowing a swivel action, while permitting air to enter between the ribs **50**. In place of the downstream air inlet **52**, or in addition thereto, there may be air inlets **53** along the side wall of casing **40**.

In all of the aforesaid forms of the invention, the upstream diaphragms are so proportioned to the downstream screens that one or more jets of water from the upstream diaphragms impinge upon the downstream screens producing a coherent jet laden with numerous small bubbles. The resulting stream is whitish in color and non-splash in its characteristics, and is an improved version of the output stream described in my aforesaid prior patents.

I claim to have invented:

1. In a water aerator, a casing adapted to be connected to a faucet supplying water under pressure, means in said casing generally adjacent the end connected to said faucet for producing an increase in the velocity of the water admitted to said casing, said casing having a part-spherical

only socket element at its downstream end, a part-spherical only rotatable element mounted rotatably in said socket element and having a circular passageway therein for the discharge of said aerated stream, and mixing means positioned within said circular passageway, at least one of said elements providing at least one air passageway between said partly spherical socket element and said partly spherical rotatable element to provide for the admittance of air from the atmosphere to the space upstream of said mixing means, whereby said bubble-laden discharge stream of water may be directed as desired by rotation of said partly spherical member in said partly spherical socket.

2. In a water aerator as defined in claim 1, said socket elements defining said air passageway along the outer wall of the rotatable element and extending from the extreme downstream end of the socket element to said space.

3. In a water aerator as defined in claim 1, said socket

element defining a hole through its side wall upstream the rotatable element to provide said air passageway from the outside air through the hole and thereafter in the space between elements which is upstream the rotatable element.

References Cited in the file of this patent

UNITED STATES PATENTS

2,197,667	Shook	Apr. 16, 1940
2,244,280	Aghnides	June 3, 1941
2,316,832	Aghnides	Apr. 20, 1943
2,633,343	Aghnides	Mar. 31, 1953
2,641,365	Lundeen	June 9, 1953
2,770,446	Aghnides	Nov. 13, 1956
2,774,584	Aghnides	Dec. 18, 1956
2,787,452	Aghnides	Apr. 2, 1957
2,998,930	Aghnides	Sept. 5, 1961