Sept. 13, 1955 G. N. PALIVOS 2,717,772

FLUID MIXER

Filed Nov. 22, 1952

Fig. 1

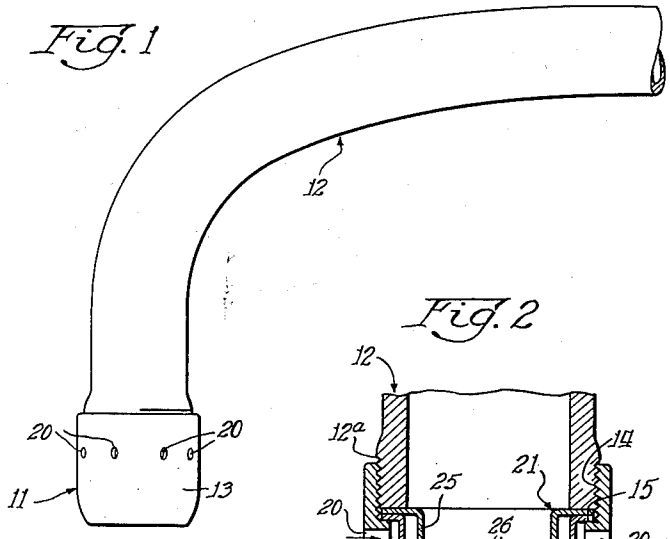


Fig. 2

Fig. 3

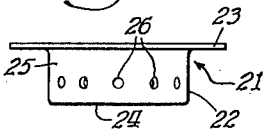


Fig. 4

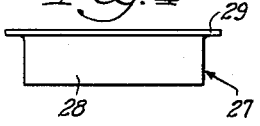


Fig. 5

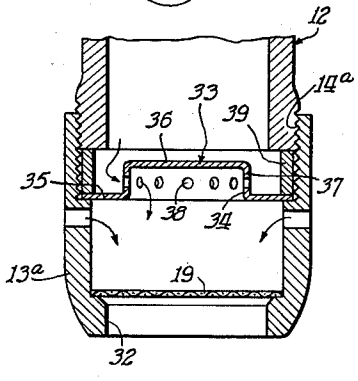


Fig. 6

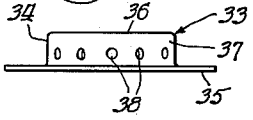
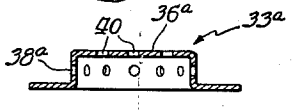


Fig. 7



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FLUID MIXER

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1 Claim. (Cl. 261—76)

This invention relates to a fluid mixer such as, for example, a device frequently known as a faucet aerator and commonly used in kitchens, laundries and the like for producing a jet of water containing air bubbles disseminated throughout so as to cause the jet to be somewhat whitish in appearance and soft and light to the touch.

Many advantages are present in such a jet which are not characteristic of ordinary water as discharged from a faucet, and among which are the minimizing of splashing and the saving of water and soap, inasmuch as such a jet will produce greater suds with a smaller amount of water and a smaller amount of soap. Such savings, under present day costs of both hot water and soap flakes, commonly used in kitchens, are of enhanced importance.

The present invention aims to provide a device of this character which is simple and inexpensive in construction and manufacture, and is relatively small and inconspicuous, and that is constructed to operate with enhanced efficiency and a fewer number of parts than devices of this class heretofore on the market.

These and other objects and advantages will be apparent from the following description, taken together with the accompanying drawings, of illustrative embodiments of the invention, and in which drawings—

Figure 1 shows a device of the present invention associated with a conventional faucet or the like;

Figure 2 is an axial cross-section of the structure of Fig. 1 on a slightly larger scale;

Figure 3 is a separated view of the cup-like dispersal member shown in Fig. 2;

Figure 4 is a separated view of the deflector member shown in Fig. 2;

Figure 5 is a view similar to Fig. 2 but showing a modification;

Figure 6 is a separated view of the dispersal member shown in Fig. 5; and

Figure 7 shows a further modification.

Referring in detail to the illustrations of the drawings, the numeral **11** refers in general to the fluid mixer device of the present invention, associated, for exemplification, with the faucet **12**, which may be a faucet such as is commonly found in household kitchen sinks or laundry tubs or the like and having at its outlet end, a male thread **12***a*.

Following the present invention, as here shown, the device **11** comprises a casing **13** which may be of any suitable material such as metal, or a plastic, and is here indicated to be of metal. The casing **13** at its upper end is internally threaded to mate with the thread **12***a* of the faucet, which extends into the casing approximately down to a shoulder **15** therein. Below the shoulder **15** the casing has a cylindrical wall **16** reduced at its outlet end as at **17** to form an internal shoulder **18** supporting a screen or wire gauze **19**. Disposed around the sides of the casing **13** are ports **20** for the entry of a fluid such as gas or air into the interior of the casing.

Further in accordance with the present invention and

turning first to the embodiment thereof shown in Figs. 2, 3 and 4, I show a dispersal element, for a fluid such as water, formed in the shape of a cup-like member **21** having a cup portion **22** and an annular flared rim or flange **23**. The cup portion **22** is formed by a central portion of reduced diameter providing a wall **24** spaced from but parallel with the flange **23** and joined thereto by an annular or cylindrical wall **25**. In accordance with the present invention, the annular wall **25** has the perforations **26** therein spaced about and around its periphery.

The flange **23** is of a diameter just sufficient to be received within the threads **14** of the casing and to rest upon the shoulder **15** to which it may be clamped to hold the dispersal member **21** in position in the casing by the faucet **12** when the device **11** is screwed thereon. As shown in Fig. 2, the dispersal member is disposed with its cup portion **22** extending downwardly in the casing or toward the outlet or downstream end thereof, and spaced from the wall **16** thereof opposite the ports **20**, the cup portion **22** being of substantially smaller diameter than the casing interior.

Still following the present invention, as shown in Fig. 2, disposed between the cup portion **22** of the dispersal member and the wall **16** of the casing, and spaced from both, is a deflector ring **27** having a cylindrical wall **28** and an annular flange **29**. The deflector ring **27** is here shown located in the casing by having its flange **29** clamped against the casing shoulder **15** by the flange **23** of the dispersal member **21** and the faucet outlet end. The deflector annular wall is between the ports **20** and the perforations **26** of the dispersal member but spaced from both.

So constructed and arranged, when the faucet **12** is turned on, water from the faucet passes into the interior of the cup portion **22** of the dispersal member **21** and passes laterally outwardly therefrom under pressure through the perforations **26**. These dispersed streams of enhanced velocity or jets strike the inner side of the deflector ring **27** where they are further dispersed or broken up and pass downwardly through the annular space **30** between the deflector ring and the cup at relatively high velocity. This annular space **30** being closely adjacent the similar annular space **31** between the deflector ring and the wall **16** of the casing draws or aspirates air into the casing through the ports **20** downwardly through the space **31**, and the dispersed water and aspirated air are thus intimately mixed in the casing with the air widely disseminated through the water in the form of air bubbles which gives to the combined stream issuing from the outlet **32** of the casing a soft and whitish appearance.

The entrapped air counteracts the normal effect of velocity of the stream which might otherwise be objectionable, and the lower part of the casing chamber together with screen **19** further contributes toward mixing of the water and air and the desirable result described.

Turning now to Figs. 5 and 6, the dispersal member **33** is similar to the dispersal member **21** in that it has a cup portion **34** and a flange **35**, the cup portion being formed by a wall portion **36** that is spaced from but parallel with the flange **35** and connected thereby by the annular wall **37** in which are located the perforations **38** spaced around the periphery thereof, but in this form of the invention the cup member is inverted, so that the cup portion **34** of the dispersal member **33** extends upwardly or away from the outlet end **32** of the casing **13***a*. In this form, the fluid or water from the faucet **12** passes laterally inwardly of the cup portion through the perforations **38**. Since the dispersed streams or jets passing inwardly through the perforations **38** are all centripetally directed, they impinge upon each other, thus

effecting a further dispersal of the water particles. These finely dispersed streams or jets of water moving under reduced pressure toward the outlet end **32** of the casing draw or aspirate air through the ports **20** of the casing, which air is disseminated throughout the water stream similarly to the operation already described with reference to Fig. 2 and to effect a similar purpose and result.

In the instances of the transverse walls **24** and **36**, these are shown imperforate, but, as shown in the further modification of Fig. 7, the transverse wall **36***a* of the dispersal member **33***a* may have perforations therein to further enhance the dispersal of the water stream more finely and cause the jets passing through the perforations **40** to impinge upon the jets passing centripetally through the perforations **38**, thus effecting further mixing.

I have found that with the arrangement of the dispersal members shown in Figs. 5, 6 and 7 the screen **19** may be frequently dispensed with and yet a satisfactory soft and whitish stream produced.

With the form of Fig. 5 for example, it may be desirable to prevent the casing **13***a* from being screwed onto the faucet too far, so as to insure a passage for water between the faucet outlet and the dispersal member **33**, and for this purpose I may provide a spacer ring **39** insertable between the flange **35** of the dispersal member **33** and the outlet end of the faucet. The casing **13***a* is similar to the casing **13** except that the internally threaded portion **14***a* is made longer to accommodate the spacer **39**.

I have thus disclosed a dispersal member for a device of this kind having a cup-like portion with perforations in the side thereof so that the dispersed streams of water or jets are directed laterally for enhanced dispersal thereof and dissemination of air therein. These laterally directed jets are then deflected or baffled either by a baffle ring or by impingement one upon another, in the latter case the discrete streams of water themselves acting as deflectors or baffles each for the other. So constructed, the usual central dispersal plug frequently used in devices of this class may be dispensed with, while at the same time enhancing the efficiency of the device and minimizing the number of parts and cost of manufacture.

The invention is not intended to be limited to details of construction shown for purposes of exemplification, and such changes may be made as fall within the scope of the appended claim without departing therefrom.

What is here claimed is:

In a water and air mixer device for faucets or the like, embodying a cylindrical casing having a downwardly extending through passageway therein and radially directed ports spaced about its lateral wall, that improvement therein comprising, a relatively shallow cup-like member supported in said casing adjacent the inlet end thereof, said member having a cup portion opposite said ports of smaller diameter than said passageway and of substantially greater diameter than depth, said cup portion having an upstanding lateral cylindrical wall spaced from said casing lateral wall and an imperforate bottom wall and having perforations spaced around its periphery in the upstanding lateral wall thereof, and a deflector ring having an imperforate cylindrical wall of substantially no greater depth than said cup portion adjacently disposed between said casing lateral wall and said cup portion lateral wall and between said ports and said perforations and spaced from both the casing lateral wall and the cup portion lateral wall.

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