June 13, 1961 V. C. V. NIELSEN 2,988,288

ARRANGEMENT IN LIQUID OUTLETS

Filed July 22, 1960

Fig. 2

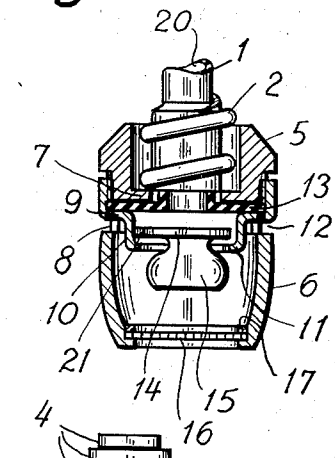


Fig. 3

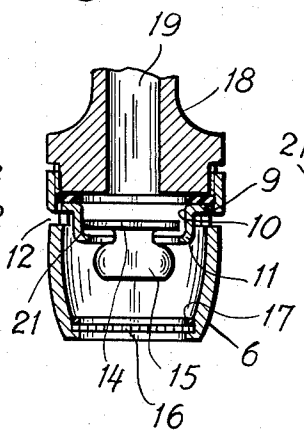


Fig. 4

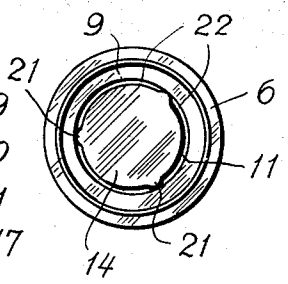


Fig. 1

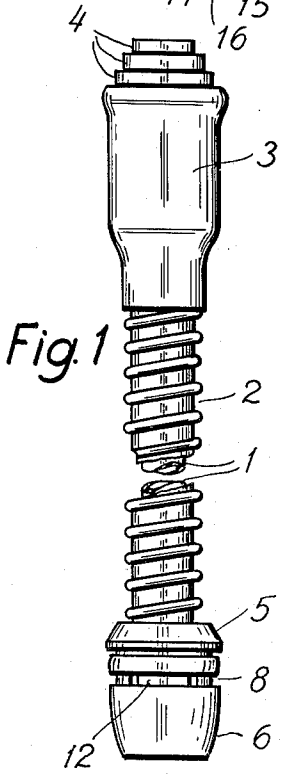


Fig. 5

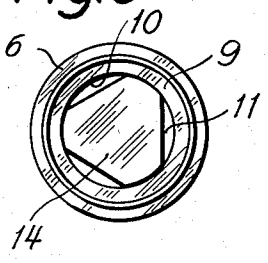


Fig. 6

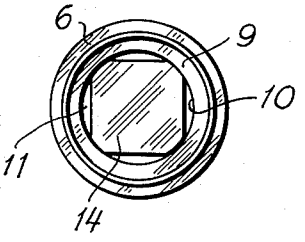


Fig. 7

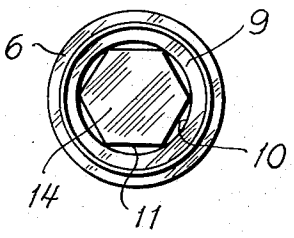
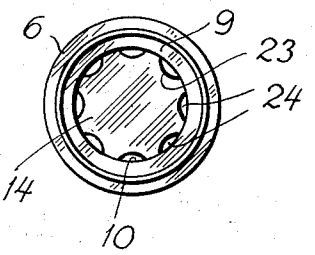


Fig. 8



Inventor

Villad Christian Villadsen Nielsen

United States Patent Office 2,988,288
Patented June 13, 1961

2,988,288

ARRANGEMENT IN LIQUID OUTLETS

Villads Christian Villadsen Nielsen, Villa Møllen, Hyldevej, Snekkersten, Denmark (Patentbureau Erik Larsen, Reventlowsgade 18, Copenhagen V, Denmark)

Filed July 22, 1960, Ser. No. 44,611
3 Claims. (Cl. 239—431)

The invention relates to an arrangement in liquid outlets, such as a tap branch or a liquid hose, having on the outlet end of the same an air-liquid mixing mouth piece with passage openings for the liquid and air intake openings for the admission of air which in the mouth piece is mixed with the liquid flowing through the same, which liquid will generally flow out from the mouth piece through a filter or wire netting at the extreme end of the same, to form an air-filled jet which will not splash liquid to the sides even if an object is held in under the jet close outside the mouth piece. This is very advantageous especially in connection with hand basins or sinks thus avoiding splashes on the same and the surroundings.

In order to obtain said advantageous liquid jet with fine air bubbles arrangements with liquid outlets with mixing mouth pieces of the type referred to have hitherto been provided with very fine passage openings for the liquid flowing through the mouth piece and also passage openings the total cross sectional area of which were essentially smaller than the cross sectional area of the liquid channel in the liquid outlet leading to the mixing mouth piece. Seeing that it is generally liquid under pressure that flows out through the liquid outlet and the mouth piece a considerable liquid pressure will thus arise in the mouth piece on account of the clogging of the pressure liquids in the same, and thus considerable trouble will arise in keeping the seams in the mouth piece or between the latter and the liquid outlet tight so that liquid will easily be splashed out at undesired places inside the mouth piece just as it is often difficult to make the mouth piece sit properly on or in a liquid outlet such as a branch pipe. Especially if the mixing mouth piece is fastened on the extreme end of a hose the inner end of which is fastened to an outlet branch it is difficult to make the hose sit properly on said branch on account of the liquid pressure in the mouth piece and consequently in the hose which the liquid pressure will try to press off the branch.

Similarly impurities, such as sludge or lime, will easily deposit in the fine passage openings so that the liquid will be still more clogged by the same, the pressure in the mouth piece and possibly in the hose will become still greater and the inconveniences thus still greater. Under certain conditions these fine passage openings may be completely clogged by the impurities so that no jet at all will come out of the mouth piece as desired before the liquid passage openings of the same has been cleaned of impurities which may be very troublesome.

The object of the invention is to provide an arrangement in liquid outlets having an air-liquid mixing mouth piece of the type referred to arranged on the outlet end, in which the said drawbacks have been eliminated or essentially reduced, and which will afford an arrangement better suited for the purpose than the hitherto known arrangements of the same or similar type.

This is obtained, according to the invention, first and foremost in the manner that the liquid passage openings of the air-liquid mixing mouth piece are of a size or magnitude allowing an approximately free unhampered passage of liquid through the mouth piece without any essential liquid pressure in the same, i.e. without any clogging effect worth mentioning on the liquid through the holes or inside the same.

Consequently, according to the invention, it is also

of importance that the liquid passage openings in the air-liquid mixing mouth piece have together a cross sectional area or passage area which is at least half as big or at most twice as big as the cross sectional area or the passage area of the liquid supply to the mouth piece.

It is also, according to the invention, advantageous that the liquid passage openings of the mixing mouth piece are constructed to constitute a substantially circular slot concentric with the axis of the mouth piece and adjacent its peripheral air intake openings which will give a very advantageous carrying along of air from the air intake openings with the tubular liquid jet in the mouth piece. The liquid passage openings of the latter may also, according to the invention, be formed between a tube and a polygonal cross disc in the mouth piece, and the edges of said cross disc may be inwardly bent.

In the arrangement, according to the invention, there is also sufficient liquid in the emitted air-filled liquid jet to allow the jet to serve as rinsing jet for dinner-sets or the like things without splashing. Such rinsing cannot be undertaken with the weak jets coming from the hitherto known arrangements of the like type.

Other objects and advantages of the invention will become apparent from the subsequent detailed description taken in conjunction with the accompanying drawing, wherein:

FIG. 1 shows an embodiment of the arrangement, according to the invention, with a water hose with a mixing mouth piece, in side elevation,

FIG. 2 is the lower part of the hose with the mouth piece, seen partly in vertical section, and on a larger scale,

FIG. 3 is the mouth piece fastened on a pipe branch and seen in vertical longitudinal section, and

FIGS. 4–8 shows a lower part of the mouth piece in top view and with different constructions for its liquid passage openings.

Round a water hose **1**, FIGS. 1 and 2, of an elastic plastic material, the so-called artificial India rubber, is arranged a known movable metal hose **2**. One end of the latter is in known manner inserted into and soldered in a pipe socket **3** in which the similarly shaped end of the hose **1** and elastic hose pieces **4** of varying thickness are closely mounted inside each other. This end of the hose may in a manner known per se be fitted tightly on an outlet branch (not shown) for liquid, such as water under pressure.

The other end of the metal hose **2** is inserted into a substantially tubular lid **5** for a likewise substantially tubular mouth piece **6**. The lid has an inwardly projecting flange **7** at the end of the metal tube **2** and has an external thread fitting into an internal thread of the adjacent part of the mouth piece **6**. The latter has a circumferential pressed in portion **8** with slotted openings **12** for the air. On the pressed in portion **8** can rest an outwardly projecting collar **9** on a short pipe **10** having an obliquely inwardly projecting collar **11** at the other end. The hose **1** has at the bottom a thin flange **13** forming the sealing between the screwed together parts **5** and **6**.

On the collar **11** can rest corners of a disc **14** having a substantially ball-shaped member **15** centrally positioned under the lower side of the disc. At the extreme end of the mouth piece is secured a wire netting **16** by means of a ring **17**.

According to FIG. 3 the mouth piece **6** is screwed fast on the lowermost external end of a pipe branch **18** having a longitudinally extending hole **19** or liquid outlet of substantially the same cross sectional area as the longitudinally extending hole **20** in the hose **1**, FIG. 2.

In the embodiment shown in FIG. 4 the disc is provided with flaps to rest on the conical collar **11**. Between

the tube **10** and the disc **14** there are liquid passage openings **22** substantially having the shape of a circular slot and with a total horizontal cross sectional area substantially equal to the cross sectional area of the liquid outlet or the hole **19** or **20** in the branch **18** or in the hose **1**.

Liquid passage openings having a total horizontal cross sectional area of substantially the same size are obtained by the embodiments illustrated in FIGS. 5–8 in the manner that the disc **14** is constructed as a polygon resting with its corners on the collar **11**.

In the octagonal embodiment shown in FIG. 8 the edges **23** are, however, bent inwardly in order to like the other embodiments to give sufficiently big passage openings **24** with a total cross sectional area substantially equal to the cross sectional area of the hole **19** or **20** and so big that impurities do not easily deposit in the openings **24** but are washed away with the liquid.

Liquid, which possibly under pressure flows through the shown mouth pieces, will carry along air from the interior of the mouth piece and from the openings **12** and will intimately be mixed with said air at the extreme end of the mouth piece and will from the latter flow out as an air-filled liquid jet that will not splash.

The several parts of the mixing mouth piece may be constructed in manners other than the one shown or described, for instance in the way that the mouth piece may be fastened to liquid outlets other than the ones shown, and the liquid passage openings of the mouth piece may be constructed in manners other than the one shown and described, e.g. in other parts of the mouth piece than the disc **14**. The liquid passage may, according to the invention, together have a flow or cross

sectional area which is at least half as big or at most twice as big as the flow or cross sectional area of the liquid outlet inside the mouth piece. There may be more than one liquid outlet for the mouth piece, e.g. a hot and a cold liquid respectively which also may be mixed in the mouth piece at the same time as the mixing with the air. In a big size the mixing mouth piece may be used for the oxidation of water for aquariums and corfs.

Having thus shown and described my invention I claim:

1. Arrangement in liquid outlets having on the outlet end of the same an air-liquid mixing mouth piece with means with passage openings for the liquid supply from the liquid outlet to the mixing mouth piece which have peripheral intake openings for air to be mixed with the liquid flowing from the said liquid passage openings, these liquid passage openings having together a flow passage which is at least half the size of the flow passage of the said liquid outlet.

2. The arrangement of claim 1 further characterized in that the liquid passage openings in the air-liquid mixing mouth piece have together a flow passage which is at most twice as big as the flow passage of the liquid outlet.

3. The arrangement of claim 1 further characterized in that the air-liquid mixing mouth piece has only few, rather big, liquid passage openings.

References Cited in the file of this patent

UNITED STATES PATENTS

2,754,097	Hjulian	July 10, 1956
2,896,863	Shames et al.	July 28, 1959