



(11) Publication number : **0 579 581 A1**

(12)

EUROPEAN PATENT APPLICATION

(21) Application number : **93830227.0**

(51) Int. Cl.⁵ : **E03D 9/03**

(22) Date of filing : **26.05.93**

(30) Priority : **14.07.92 IT MI921698**

(43) Date of publication of application :
19.01.94 Bulletin 94/03

(84) Designated Contracting States :
BE CH DE ES FR GB LI NL PT

(71) Applicant : **Lenzetti, Gianpietro**
Via Montenero, 47
I-21040 Venegono Superiore (Varese) (IT)

(71) Applicant : **Magni, Mario Daniele**
Via F. Ili Kennedy, 7/B
I-21040 Venegono Superiore (Varese) (IT)

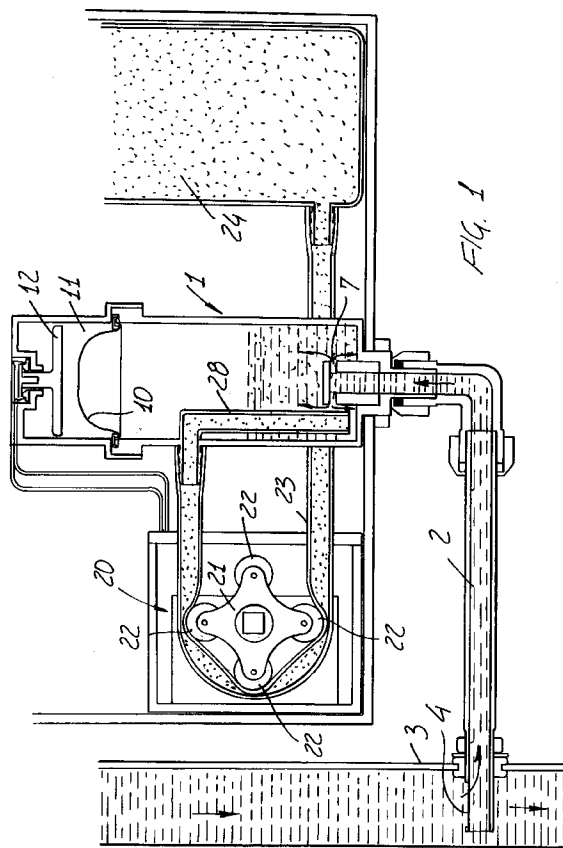
(72) Inventor : **Lenzetti, Gianpietro**
Via Montenero, 47
I-21040 Venegono Superiore (Varese) (IT)
Inventor : **Magni, Mario Daniele**
Via F. Ili Kennedy, 7/B
I-21040 Venegono Superiore (Varese) (IT)

(74) Representative : **Cicogna, Franco**
Ufficio Internazionale Brevetti Dott.Prof.
Franco Cicogna Via Visconti di Modrone, 14/A
I-20122 Milano (IT)

(54) **Electronic assembly for controllably delivering disinfectant liquids and the like in sanitary apparatus in general.**

(57) The present invention relates to an electronic assembly for controllably delivering disinfectant liquids and the like in sanitary apparatus in general, the main feature of which is that said assembly comprises a mixing chamber (1), at the bottom, communicating with a duct (3) for delivery water to a sanitary apparatus.

The mixing chamber (1) is closed, at the top thereof, by a resiliently deformable membrane (10) adapted to cooperate with an electric contact (12) for driving a metering pump (20), which pumps into the mixing chamber (1) a dose of a disinfectant, in particular a liquid disinfectant, which can be mixed with the water entering the mixing chamber as a further amount of water passes through the water delivery duct.



BACKGROUND OF THE INVENTION

The present invention relates to an electronic assembly for controllably delivering disinfectant liquid and the like into sanitary apparatus in general.

As is known, a very important requirement related to sanitary apparatus of bath room and the like, is that to introduce, possibly in a continuous manner, disinfectant or perfumed products into the water stream used for washing out sanitary bowls, basins and the like.

In order to solve the above problem there are already commercially available disinfectant products, usually of solid consistency, which are introduced into the sanitary bowls or basins and are dissolved upon contacting water.

This approach, however, is not completely satisfactory and safe, since the amount of product which is dissolved directly depends on the contacting time of water with the solid disinfectant product.

Thus, in the case of frequent uses, a very reduced disinfectant effect is obtained, whereas in the case of scarcely frequent uses, in the water are dissolved comparatively high amounts of the solid disinfectant product.

Other prior approaches for solving the above mentioned problem, on the other hand, have not been found satisfactory, since they do not afford the possibility of precisely metering the liquid disinfectant product.

In particular, there is also known an approach in which there is provided a mixing chamber into which there is introduced water supplied by a conduit having the port thereof at the delivery duct provided for delivering water into the sanitary apparatus.

The water, upon entering the mixing chamber, also enters a communicating compartment, where there is arranged a metering valve system which introduces into the water entering the mixing chamber a dose of liquid disinfectant.

As the delivery water flow ends, the water which is present in the mixing chamber, together with the disinfectant present therein, is sent to the sanitary apparatus.

This construction does not allow to perform a precise metering operation, since the disinfectant is mixed as water is introduced into the mixing chamber, thereby the metering operation can be affected by errors due to a surging in the water supplied to the mixing chamber.

Accordingly, the amount of disinfectant being introduced can not be accurately determined or controlled.

SUMMARY OF THE INVENTION

Thus, the aim of the present invention is that to solve the above mentioned problem, by providing an electronic assembly for controllably delivering disin-

fectant liquids and the like into sanitary apparatus in general, adapted to meter a preset amount of disinfectant liquid into a mixing chamber, said disinfectant liquid being mixed at the use time with a portion of water taken from a water delivery duct, thereby providing a water delivery to the sanitary apparatus as the water through the delivery duct ends.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such an electronic water delivery assembly which is able of metering, in a very precise and accurate manner, the amount of disinfectant liquid, independently from the water flow passage conditions.

Another object of the present invention is to provide such an electronic assembly for controllably delivering disinfectant and the like liquids which, owing to its constructional features, is very safe and reliable in operation.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by an electronic assembly for controllably delivering disinfectant liquids and the like into sanitary apparatus in general, characterized in that said assembly comprises a mixing chamber, at the bottom, communicating with a delivery duct for delivering water into a sanitary apparatus, said mixing chamber being closed at the top thereof by a resiliently deformable membrane, adapted to cooperate with an electric contact for driving a metering pump adapted to introduce into said mixing chamber a dose of said disinfectant liquid, to be mixed with the water entering said mixing chamber as a further amount of water passes through said water delivery duct.

BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment thereof, which is illustrated, by way of an indicative but not limitative example, in the figures of the accompanying drawings, where:

Figure 1 is a schematic view illustrating the electronic assembly according to the present invention during the raising step of the water in the mixing chamber;

Figure 2 illustrates an operation step in which the electric contact is operated or driven by the membrane;

Figure 3 illustrates a further operation step in which the metering pump is driven;

and

Figure 4 is a schematic side view illustrating the metering pump.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the number references of the figures of the drawings, the electronic assembly for controllably delivering disinfectant liquids into sanitary apparatus in general, according to the present invention, comprises a mixing chamber, indicated generally at the reference number 1, which communicates, at the bottom thereof, through a communicating duct 2, with the water delivery duct 3.

As shown, the communicating duct 2 is arranged so as to present a port 4 thereof facing the delivery water outflow direction, so as to take up a portion of this water and introduce it into the mixing chamber.

At the bottom of the mixing chamber, there is provided a water flow breaking element 6, which has a mixing chamber communicating port 7 arranged at a given distance from the bottom thereof.

The mixing chamber 1, in particular, is closed at the top thereof by a resiliently deformable membrane 10, which separates the mixing chamber 1 from an expansion compartment 11, communicating with the outside atmosphere, where an electric contact 12 is provided to be operated or driven, as it will become more apparent hereinafter, by the expansion of said membrane 10, as the water level inside the mixing chamber 1 is raised.

The electric contact 12 drives the operation of a roller metering pump 20, which comprises a pump impeller 21 provided, on its periphery, with a set number of rollers 22, evenly spaced, which operate to press a resilient hose or pipe 23 communicating with a disinfectant liquid holding tank 24 and leading, at the other end thereof and through a discharging duct 28, to the bottom of the mixing chamber 1.

Thus, the delivery water, or bowl washing water, conveyed through the communicating or fitting pipe 2, will enter the mixing chamber, thereby the water level therein will gradually rise.

During this entering step, the water held in the mixing chamber will upwardly press against the membrane 10 which, upon expanding, will enter the top chamber or expansion bowl which, as stated, communicates with the atmosphere.

Since any resistance against the resilient membrane is absent, said membrane will be so expanded or deformed as to perfectly fit to the inner walls of the expansion bowl.

At this time the inlet water will be caused to stop, since the sum of the water volume conveyed into said mixing chamber and the volume of the pressurized air will correspond to the inner volume of the membrane mixing chamber.

Thus, at this precise time, the pressure exerted by the resilient membrane in the top portion of the expansion bowl, will cause an electric contact to trip, so as to energize an electronic circuit controlling the op-

eration of the metering pump 20, which will simply a preset dose of disinfectant liquid, adapted to kill any bacteria in the sanitary apparatus.

As shown, the metering pump has a half-cylindrical shape and, in the bottom inner portion of its circumference there is defined a half-cylindrical portion which will firmly hold the resilient hose or pipe.

Through the latter there is caused to flow the disinfectant liquid sucked from the tank 24 and introduced into the mixing chamber 1.

The wheel impeller comprises a spider element having either two, three, four or more ends on which there is provided a respective roller pressing the resilient hose to cause the liquid to flow therethrough.

This impeller is rigid with the rotary shaft of the speed reducing unit which transmits the rotary drive through a pin element 30.

This pin element or reset pin 30 has the two functions of causing the wheel spider to turn and causing the pump to stop at the end of its operation.

During the operation, and at the start, inside the mixing chamber there is present a set amount of disinfectant liquid, preliminarily introduced or introduced at the end of the preceding operating cycle.

As the water delivery operation or step is started, a portion of this water will be sucked by the pipe 2 and supplied to the mixing chamber, so as to contact and admix with the disinfectant liquid.

In the meanwhile, as the solution inside the mixing chamber increases its level, the inner air is pressurized so as to deform or expand the above mentioned resilient membrane 10.

The delivered water will continuously flow to the sanitary apparatus and the pressurized air in the mixing chamber will cause the membrane to be further expanded so as to complete the mixing step and actuate the electric contact.

At the end of the delivery water flow, the solution held in the mixing chamber will flow to the sanitary apparatus thereby properly disinfecting the latter.

At the end of the water discharging step from the mixing chamber, disinfectant liquid is again introduced into said mixing chamber by the metering pump which is actuated to draw the disinfectant liquid into the flexible hose and deliver this disinfectant liquid to the bottom of the mixing chamber, ready for a further use.

From the above disclosure it should be apparent that the present invention fully achieves the intended aim and objects.

In particular, the fact is to be pointed out that a device has been provided which has a very simple and reliable construction and which affords the possibility of providing a very accurate metering of the disinfectant liquid, by supplying the latter to the mixing chamber before the introduction of water into said mixing chamber.

The invention as disclosed is susceptible to several modifications and variations, all of which will

come within the spirit and scope of the accompanying claims.

Moreover, all of the details can be replaced by other technically equivalent elements.

In practicing the invention, the used materials, as well as the contingent shapes and size can be any according to requirements. 5

Claims

10

1- An electronic assembly for controllably delivering disinfectant liquids and the like into sanitary apparatus in general, characterized in that said assembly comprises a mixing chamber, at the bottom, communicating with a delivery duct for delivering water into a sanitary apparatus, said mixing chamber being closed at the top thereof by a resiliently deformable membrane, adapted to cooperate with an electric contact for driving a metering pump to introduce into said mixing chamber a dose of said disinfectant liquid, to be mixed with water entering said mixing chamber as a further amount of water passes through said water delivery duct. 15 20

2- An electronic assembly according to claim 1, characterized in that said mixing chamber communicates with said delivery duct through a communication pipe leading to said delivery duct and having a port portion facing the water flow direction. 25

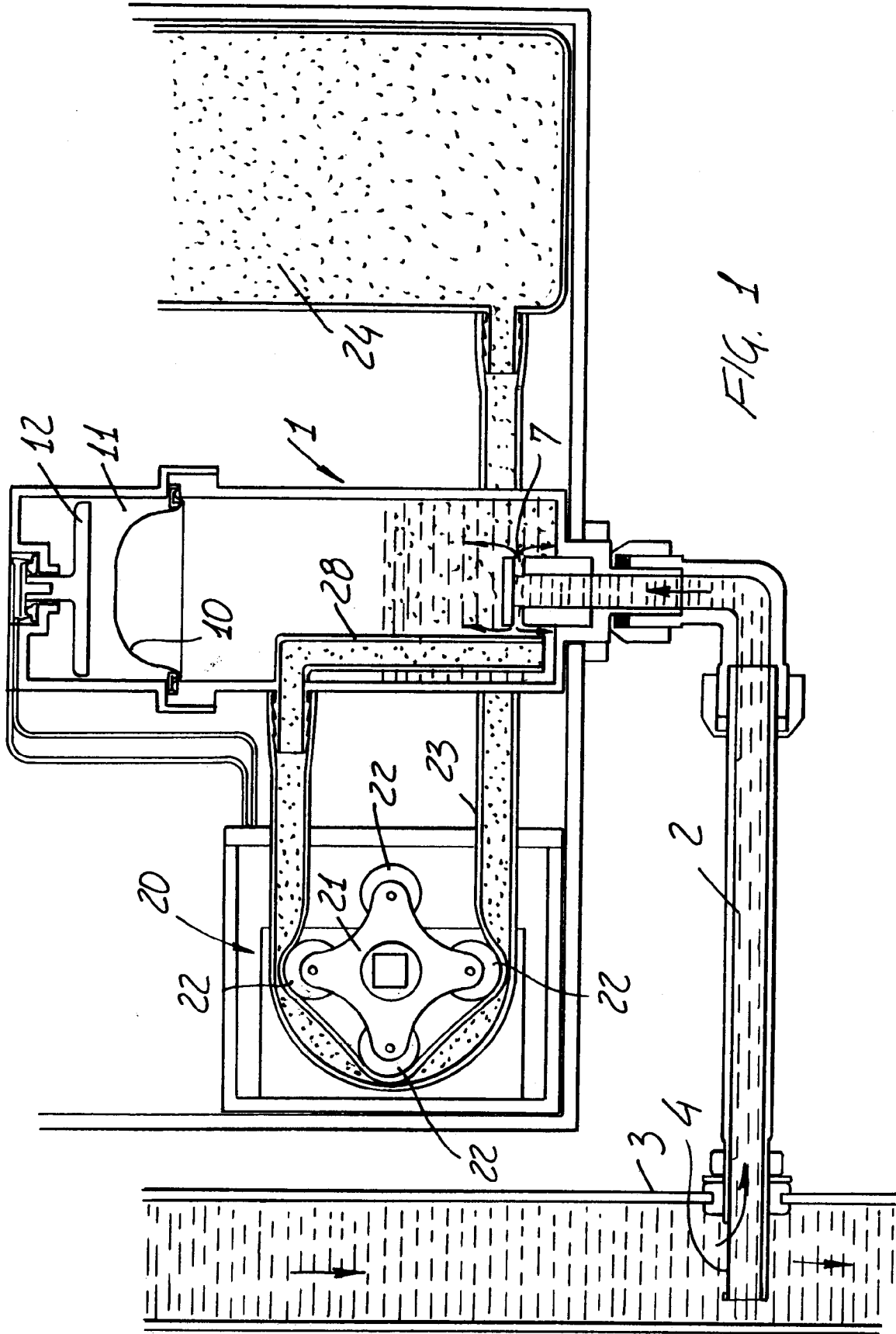
3- An electronic assembly according to claims 1 and 2, characterized in that said assembly further comprises, on the bottom of said mixing chamber, at a portion thereof where said communication pipe ends, a water flow breaking element including a communication port arranged at a level higher than the bottom of the mixing chamber. 30 35

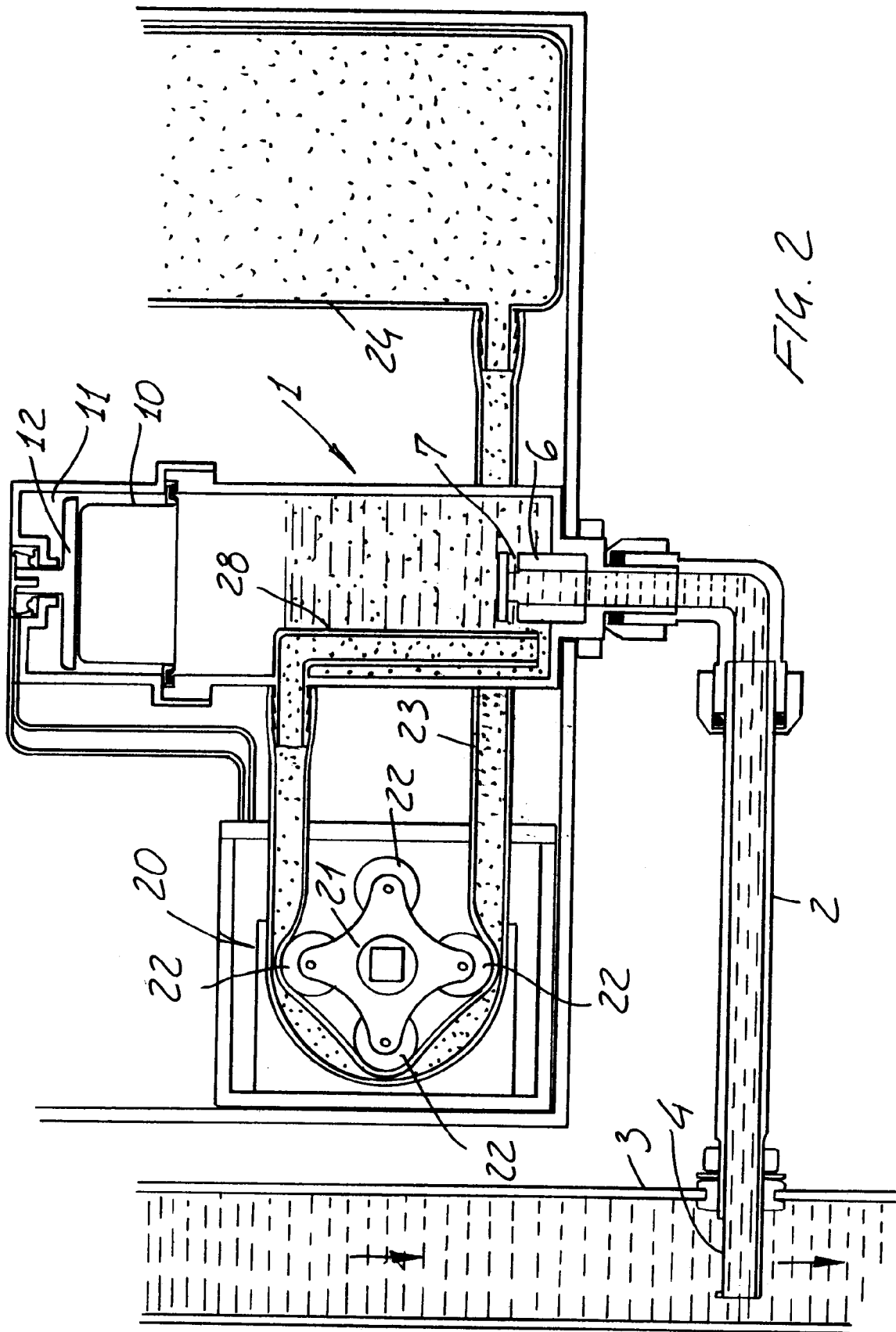
4- An electronic assembly, according to claim 3, characterized in that said metering pump comprises a pump body including therein a roller impeller affecting a resiliently deformable hose. 40

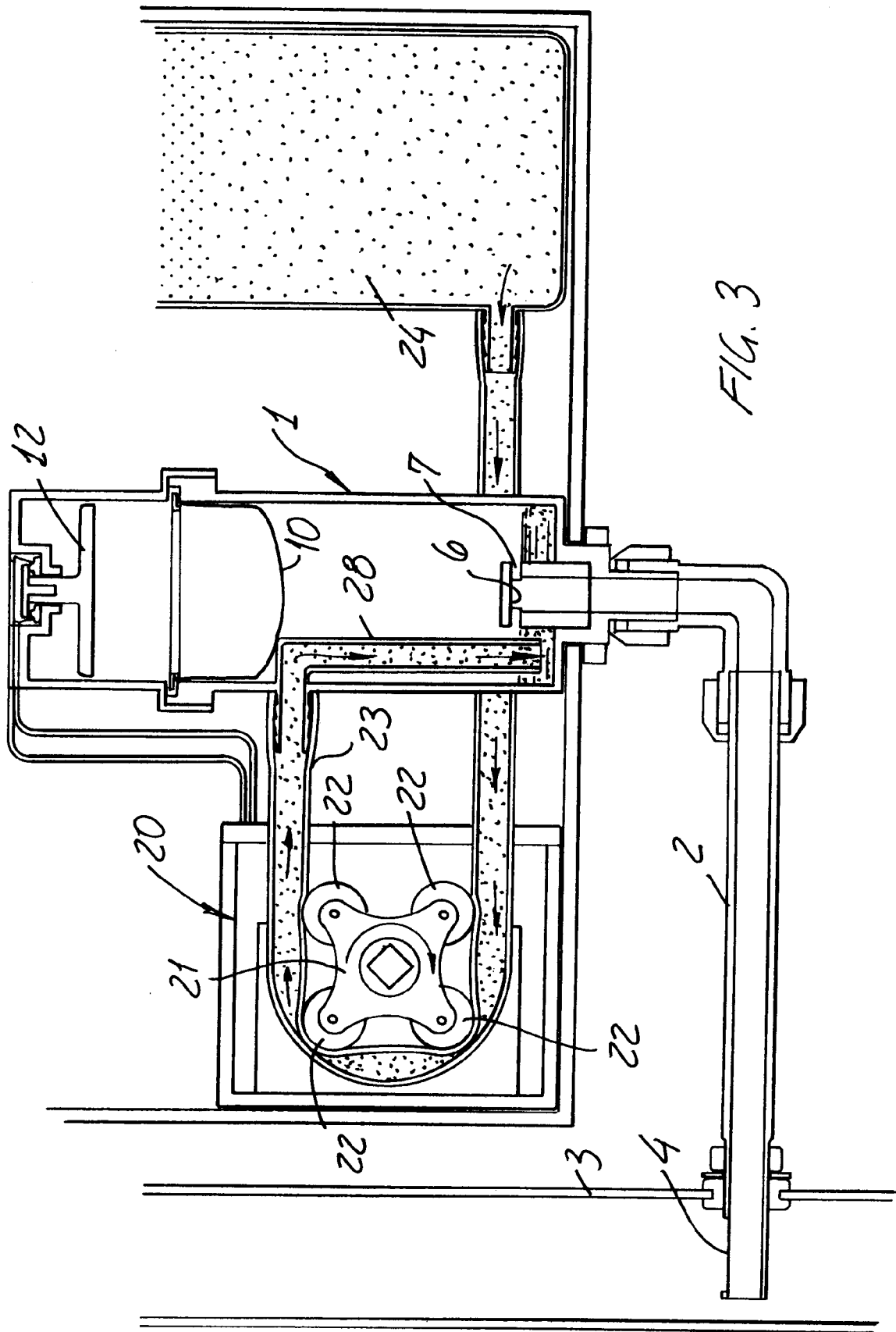
5- An electronic assembly, according to one or more of the preceding claims, characterized in that said resiliently deformable hose communicates, at one end thereof, with a disinfectant liquid tank and, at the other end thereof, with a discharging duct leading to the bottom of said mixing chamber. 45

6- An electronic assembly, according to one or more of the preceding claims, characterized in that said disinfectant liquid is supplied to the bottom of said mixing chamber after the water discharging step, and that said disinfectant liquid is mixed with the water entering said mixing chamber. 50

55







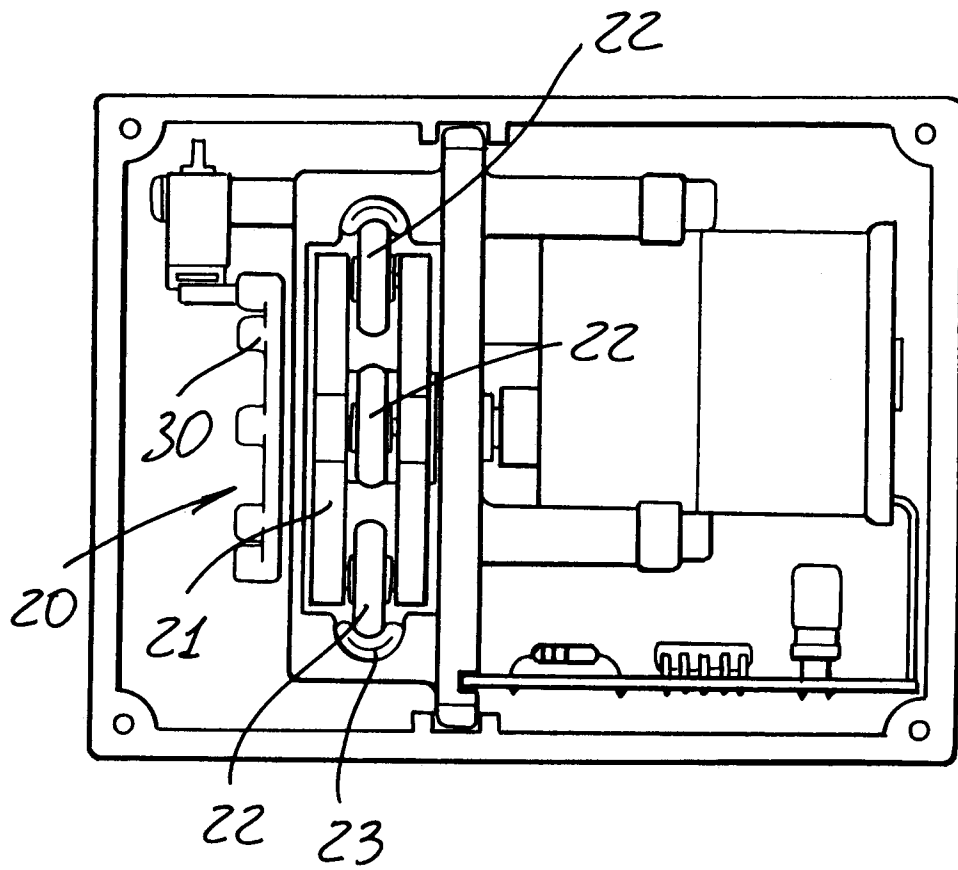


FIG. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 93 83 0227

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 338 825 (THE WELLCOME FOUNDATION LIMITED) * column 2, line 59 - column 3, line 24 * * column 3, line 40 - line 65 * * column 4, line 56 - line 64; figures 1,3,10 *	1,2,4,5	E03D9/03
A	WO-A-8 301 974 (THE WELLCOME FOUNDATION LIMITED) * page 3, paragraph 4 * * page 3, paragraph 6 - page 4, paragraph 2; figures 4-7 *	1-3,6	
A	DE-A-2 100 795 (HANS GROHE KG) * page 10 - page 11, paragraph 1; figure 1 *	1-3,6	
A	EP-A-0 285 475 (ETS. POMPES GUINARD) * abstract; figure 1 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E03D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19 OCTOBER 1993	Examiner DE COENE P.J.S.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			