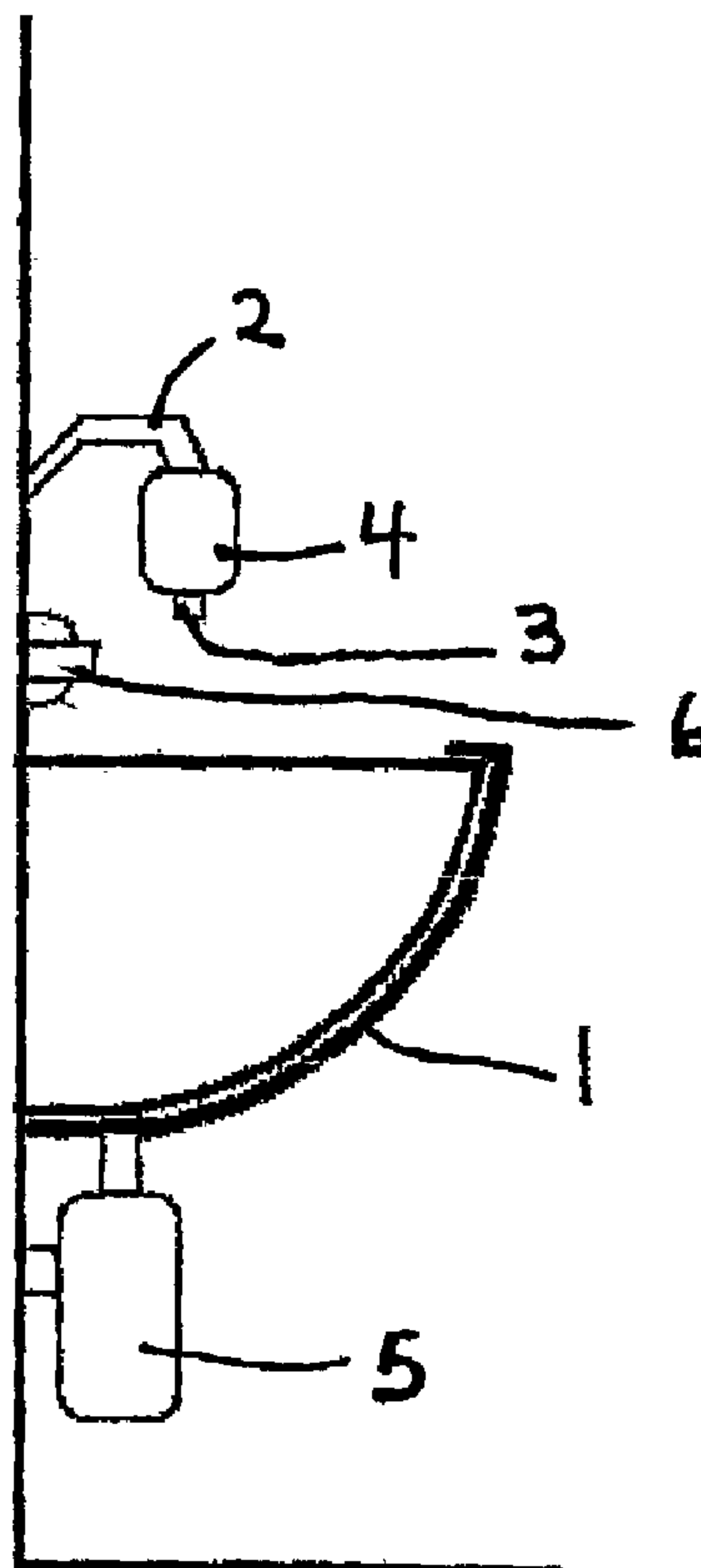




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(54) Title: SANITARY WASH AREA



(57) Abrégé/Abstract:

The invention relates to a sanitary wash area, consisting of a wash basin, a shower unit or a bath or birthing pool with a known construction (1). Said area comprises a water supply (2) and a water outlet (3), the supply (2) being equipped with a sterile filter with a known construction (4) and the water outlet (3) with a self-disinfecting siphon trap (5). The area can also be equipped with one or several UV lamps (6) for disinfecting the interior of the basin (1), the outflow of the sterile filter (4) and the entrance to the self-disinfecting siphon trap (5). The sanitary wash area can have a cover (8), which is removed when the basin etc. (1) is used.

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(54) Title: SANITARY WASH AREA

(54) Bezeichnung: HYGIENE-WASCHPLATZ

(57) Abstract: The invention relates to a sanitary wash area, consisting of a wash basin, a shower unit or a bath or birthing pool with a known construction (1). Said area comprises a water supply (2) and a water outlet (3), the supply (2) being equipped with a sterile filter with a known construction (4) and the water outlet (3) with a self-disinfecting siphon trap (5). The area can also be equipped with one or several UV lamps (6) for disinfecting the interior of the basin (1), the outflow of the sterile filter (4) and the entrance to the self-disinfecting siphon trap (5). The sanitary wash area can have a cover (8), which is removed when the basin etc. (1) is used.

(57) Zusammenfassung: Die Erfindung betrifft einen Hygiene - Waschplatz, bestehend aus einem Waschbecken, einem Duschbecken oder einer Bade - oder Gebärrwanne bekannter Bauart (1) mit einem Wasserzulauf (2) und einem Wasserablauf (3), wobei der Wasserzulauf (2) mit einem Sterilfilter bekannter Bauart (4) und der Wasserablauf (3) mit einem selbstdesinfizierenden Geruchsverschluß (5) ausgerüstet sind. Eine oder mehrere UV - Lampen (6) zur Desinfektion des Innenraumes des Beckens (1), des Auslaufes des Sterilfilters (4) und des Einlaufes des selbstdesinfizierenden Geruchsverschlusses (5) können vorhanden sein. Der Hygiene - Waschplatz kann eine Abdeckung (8) besitzen, die bei Gebrauch des Beckens (1) entfernt wird.

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Sanitary Wash Area

Description

The invention relates to a sanitary wash area.

Acquiring infectious diseases in hospitals, so-called nosocomial infections, represents a life-threatening situation, in particular, for patients with a limited effective immune system. The transmission of pathogenic and optionally pathogenic water germs, such as e.g. Legionnaire's and pseudomonas, acinetobacter and klebsiella types which are found in the area of wash basins or shower basins as well as in the bath tub or birthing tub is hereby especially important. These are the causes of the most important nosocomial infections (e.g. pneumonias, urinary tract infections).

Two ways of transmitting water germs to patients and nursing staff should be differentiated:

On the one hand, drinking water from water pipes may contain water germs, on the other hand, the siphon trap found under the water catch basin (wash basin, shower basin, bath tub) represents a very large exciter reservoir and infection potential. If tap water is used for nutritional purposes, the water germs contained therein reach into the body of the patient by taking in contaminated fluid.

When taking water from the water tap and draining water from the wash basin, water germs from the drinking water reach the body of nursing staff and patients.

While the transmission of germs by contaminated drinking water represents a fact which has been known for a long time and accepted in hospital hygiene, the emission of germs from the siphon trap first came to the fore of hospital hygiene by the works of DÖRING et al (1989) and SISSOKO et al (2004a and b and 2005). The emission of germs from the siphon trap was first subjected to a quantitative analysis by DÖRING and was then

placed on a broad statistic basis by SISSOKO.

Two different methods for preventing the primary germ transmission in a moist area (wash basin, bath tub, shower) result from the existence of two primary transmission paths for water germs.

It is known that the transmission of germs from contaminated drinking water is eliminated by sterile filtration of the drinking water coming out of the line by means of a water filter at the end. This drinking water sterilization by means of the so-called sterile filter at the end has been part of the prior art for a long time and introduced in high-risk areas of clinics. Preventing the transmission of germs from the siphon trap at the outlet of the wash basin, shower basin or bath tub first came to be of interest to hospital hygiene from the works of SISSOKO and colleagues (2004 and 2005).

Due to the lack of experimental data, the significance of the siphon trap as a germ and infection reservoir was disputed by experts to such a degree that the methods for disinfecting siphon traps which have been proposed for several decades (US 2,452,387, US 3,175,567, US 4,192,988, US 4,502,164, US 4,893,361, US 5,940,894, 6,491,814, DE 2747882, DE 4025078, DE 4206901, DE 4224445, DE 29509210, GB 1417711) were not applied in an effective system prior to the self-disinfecting siphon trap (US 6,666,986, EP 1 159 493).

The sealing liquid of the siphon trap was well known and accepted as a residence for germs. However, it was assumed that germs escape through an aerosol only when a water jet from the water pipes directly impacts the surface of the sealing liquid in the siphon trap. This knowledge is reflected in the corresponding hygiene regulations ("*Richtlinie Krankenhaushygiene*" [Hospital Hygiene Guidelines], Elsevier, Urban & Fischer, Munich). These regulations are still in force today. A siphon trap in which the water jet from the tap does not directly hit this opening was deemed hygienically safe until the year 2004. Avoiding that the water jet from the tap directly hits the outlet opening was

considered to be generally recognized prior art when preventing the emission of germs from the siphon trap.

However, the results of the studies of DÖRING and colleagues (1989 and 1991) and SISSOKO and colleagues (2004 and 2005) showed that germs were emitted each time the siphon trap was used, independent thereof whether the water jet from the tap directly hit the basin outlet or the water flows slowly via the bottom of the basin into the siphon trap under the outlet.

The reason for this is the high content of germs in the sealing liquid of the siphon trap which, in turn, is caused by the presence of the generally known slimy coating of the so-called biofilm (SISSOKO et al, 2005).

The quantity of germs released by aerosol formation from the siphon trap correlates with the germ density in the sealing liquid of the siphon trap (SISSOKO et al; 2005). A study in several clinics in Germany showed that germs were emitted from more than 73% of all siphon traps in hospitals (SISSOKO et al; 2005).

The self-disinfecting siphon trap (US 6,666,966; EP 1 159 493) prevents the formation of this biofilm and kills germs in the sealing liquid. Consequently, the emission of water germs during use of the self-disinfecting siphon trap is prevented (SISSOKO et al, 2005).

Clinical studies for the colonization of patients by water germs and the formation of infections before and after replacing traditional siphon traps with the self-disinfecting siphon trap in an interdisciplinary intensive care unit (SISSOKO et al, 2004) showed that both the germ colonization of patients with water germs and the occurrence of nosocomial infections were reduced when the siphon trap was eliminated as a source of germs. With this, it was proven for the first time that the siphon trap is not only a residence for pathogenic water germs, but also an active source of infections.

It is known that using only one of the two preventive measures

for reducing germ transmission from the wash basin area has considerable disadvantages. In practice, the disadvantages of using only one preventive measure practised to date is so massive that the spread of both methods, required from a hygienic point of view, is prevented in clinics.

If, in fact, the two known preventive methods are used separately (sterile filtration of the tap water without the self-disinfecting siphon trap or the self-disinfecting siphon trap without the sterile filtration of the tap water), then only one way for the germ transmission is interrupted in each case, while the respectively other way remains active. This has serious consequences: The removal and use of germ-free and pyrogen-free tap water from a perfectly functioning sterile filter paradoxically takes place in an aerosol cloud of bacteria from the siphon trap (SISSOKO et al, 2004).

Furthermore, the validation of sterile filters on the end, i.e. the proof of efficiency under all given conditions which is required in clinical practice, is only given for very limited periods due to the so-called retrograde germ-contamination of the sterile filter. As a result, it is then necessary to change the filter often. The duration of use of disposable sterile filters (service life is usually only 5 to 7 days) is slight and the costs are consequently very high. The reason for these short service lives is not the quick saturation of the filter by the retention of microorganisms, as intended, but the microbiological contamination (described as retrograde contamination) of the open outlet of the filter, as intended. When the outlet of the sterile filter is sufficiently contaminated, when the sterile-filtered drinking water passes from the sterile filter, it is again loaded with germs which can lead to a "sterile" water that contains substantially more germs than the drinking water prior to the sterilization.

If the retrograde contamination is disregarded, then the end sterile filtration has a very high efficiency in relation to the separation of germs from the contaminated drinking water in the

necessary and useful practical application.

In spite of the application of the end sterile filter, however, the number of nosocomial infections due to water germs from the moist area remains unsatisfactorily high in the everyday routine of the clinic.

As a significant reason for this, it has just very recently been discovered that the removal and use of germ-free tap water from a perfectly functioning sterile filter takes place in an aerosol with bacteria from the siphon trap (SISSOKO, et al, 2004).

When removing sterile water with simultaneous water outlet in the siphon trap from said outlet, a fine droplet mist (aerosol) is released from the sealing liquid inside the siphon trap which contains the entire spectrum of germs that are found in the sealing liquid. The aerosol can thereby contain a multiple of the number of germs which are held back by the filtration of the tap water. This is so dangerous because the user of the water-removal device is not aware of this danger and thus continues to feel safe, however, this does not *de facto* exist until the emission of germs from the siphon trap is also eliminated.

Cases are known from clinical practice in which, in immuno-suppressed patients, infections that prove fatal are produced by water germs (e.g. *pseudomonas aeruginosa*, *klebsiella pneumoniae*, *acinetobacter spezies*) from the siphon trap of shower basins, although the shower water from the shower head was subjected to a sterile filtration.

Since - as these practice cases show - ostensible safety is more dangerous than a recognized insecurity, from the point of view of hygiene safety, a problematic situation arises after installation of a sterile filter on a water tap over a siphon trap without a disinfecting device. However, this realization is only being accepted nowadays and very slowly in hygiene practice.

However, the aerosol cloud from the siphon trap not only reaches the hands of the nursing staff or patient found in the basin for

washing and disinfection, but also the outlet of the sterile filter. As a result, it is inoculated with water germs which find very good reproduction conditions there, the so-called retrograde contamination of the sterile filter begins.

Prior to the development of and the very hesitant practical introduction of the continuous disinfection of the siphon trap since 1997 (US 6,666,966, EP 1 159 493), the contact of the outlet of the sterile filter with ambient air and spray water, which occurs when water is removed or when washing the hands or when showering under the sterile filter and directly hits or as aerosol hits the outlet of the sterile filter, was considered the sole cause for the retrograde contamination. The affect of the siphon trap (siphon) found under the wash basin outlet on the retrograde microbial colonization of the end water filter was fully unknown and unforeseen until the year 2004.

Only the evidence of a permanent massive germ emission from the siphon trap (SISSOKO et al, 2004) led to the realization that the retrograde contamination of the sterile filter was caused for the most part by the aerosols escaping from the siphon trap.

Therefore, both the validation and the desired extension of the life of sterile filters make the elimination of the siphon trap as an active germ source and cause of the retrograde contamination necessary.

In contrast to the thusfar prevalent teachings that bacteria which are found in the siphon trap are only emitted from them under certain conditions and thus also contrary to all hygiene practice currently practised in clinics, the ultimate evidence of the permanent germ emission from the siphon trap and its promoting effective in the retrograde colonization of the water filter was provided by SISSOKO and colleagues (2004 and 2005) by systematic broad studies.

The results of extensive microbiological and epidemic studies show that the solution to the problem can only be obtained by the combination of both devices. This variant represents great progress in equipment technology in hospital hygiene and is fully adequate for most practical applications. However, the clinical

application situations are very different. Thus, the occurrence and quantity of spray water and the aerosol produced from the spray water when filling basins and tubs and in the use of shower tubs differ substantially from the "normal" wash basin situation in the sense of a sink for hand washing. The result of this is that the portion of spray water and aerosols from the spray water in the retrograde contamination differ. When filling receptacles in which the distance between water supply and receptacle bottom is greater than in hand-washing basins (bath tubs, birthing tubs), the spray water portion and also the aerosol formation resulting therefrom is greater than in relatively flat sinks. The spray water formation is especially greater when showering. Therefore, the retrograde contamination of the outlet of the end sterile filter by spray water or contact can, of course, not be eliminated by the self-disinfecting siphon trap. For this reason, in situations in which spray water and aerosol formation due to spray water are an important cause of retrograde contamination, maximum sanitary safety and validation, which cannot be exceeded by any other apparatus, are created by the addition of a UV disinfection. The disinfection of the inner inlet area of the self-disinfecting siphon trap by means of ultraviolet radiation is known (US 6,666,966 B1, EP 1 159 493 B1 and WO 00/53857). DE 92 02 902 U1 describes the use of thermal disinfection in slack water and the destruction of germs by UV rays in the upper area of the slack water and the inlet area of a siphon trap found above the slack water.

The sterilization of water which flows through a sanitary device by means of UV radiation is also known (DE 198 03 071 A1). A shower facility with a central disinfecting unit into which UV light is introduced into the flowing water for the sterilization by means of a light conductor is described in DE 197 01 847 C2.

The object of the invention is to create a germ-free sanitary wash area. This object is solved with the features of claim 1. The installation according to the invention, which is described as a sanitary wash area, consists, in its simplest form, of a

wash basin or a shower basin or bath or birthing tubs (1), whose water supplies (2) are provided with sterile filters (4) for sterilizing tap water and whose water outlets (3) are furnished with self-disinfecting siphon traps (5). In addition, the sanitary wash area may be furnished with one or more UV lamps (6), which emit ultraviolet light, for the surface disinfection of the outlet of the sterile filter (7) and the outer area of the inlet of the self-disinfecting siphon trap (5) as well as for the intensive sterilization of the sink or tub surface. A device for the spatial separation of the wash area from the surroundings, for example, a removable or fold-away basin cover (8) ensures that no UV radiation reaches the surroundings. Both the sterile filter (4) and the self-disinfecting siphon trap (5) are continuously in operation. The UV lamps (6) only work when the wash area is not in use, optionally, only when the basin cover (8) is closed.

The invention will now be described with reference to several examples of embodiments.

Embodiment Example 1

The simple embodiment of the invention consists of a wash basin (1) in which the water supply (2) is furnished with a sterile filter (4) and the water outlet (3) with a self-disinfecting siphon trap (5). This embodiment is shown in Figure 1 (Fig. 1).

Embodiment Example 2

The further embodiment of the invention consists of a wash basin (1) in which the water supply (2) is furnished with a sterile filter (4) and the water outlet (3) with a self-disinfecting siphon trap (5). A UV lamp (6) is attached between sterile filter (4) and water outlet (3) in such a way that the inside of the wash basin (1), the outlet of the sterile filter (7) and the outer inlet area of the water outlet (3) are radiated. This variant is especially suitable for laboratories and for rooms which are not used, e.g. during the night, because the room air

above the wash basin is simultaneously sterilized with the operation of the UV lamp (6). This embodiment is shown in Figure 2 (Fig. 2).

Embodiment Example 3

A further embodiment of the invention consists of a wash basin (1) in which the water supply (2) is furnished with an end sterile filter (4) and the water outlet (3) with a self-disinfecting siphon trap (5). A UV lamp (6) is attached between sterile filter (4) and water outlet (3) in such a way that the inside of the wash basin (1), the outlet of the sterile filter (7) and the outer inlet area of the water outlet (3) are radiated. The UV radiation only takes place when the basin cover (8) is closed. If the wash basin is being used, the basin cover (8) is removed. This embodiment is shown in Figure 3 (Fig. 3).

Embodiment Example 4

Embodiment 4 relates to a shower cabinet with a shower basin (1) in which the water supply (2) is furnished with an end sterile filter (4) and the water outlet (3) with a self-disinfecting siphon trap (5). The water supply (2) is in the form of a shower head and provided with a sterile filter (4). A UV lamp (6) is attached between sterile filter (4) and water outlet (3) in such a way that the inside of the shower cabinet, the outlet of the sterile filter (7) and the shower basin (1) with the water outlet (3) are radiated with UV light. The shower area is provided with a partition which is impermeable to UV rays (e.g. shower curtain or mobile partition).

List of Drawings

Figure 1

Sanitary wash area in a simple embodiment with end sterile filters (4) and self-disinfecting siphon trap (5).

Figure 2

Sanitary wash area in the embodiment with an end sterile filter (4), self-disinfecting siphon trap (5) and UV lamp (6) as well as a basin cover (8) in disinfecting position. The basin cover (8) is closed, the UV lamp (6) is in operation.

Figure 3

Sanitary wash area in the embodiment with an end sterile filter (4), self-disinfecting siphon trap (5) and UV lamp (6) as well as a basin cover (8) in operating position. The basin cover (8) is removed, the UV lamp (6) is turned off and removed from the work area.

In another embodiment, sanitary wash area as a shower cabinet with a shower basin (1) in which the water supply (2) is furnished with an end sterile filter (4) and the water outlet (3) with a self-disinfecting siphon trap (5). In this case, the sterile filter (4) is in the form of a shower head. A UV lamp (6) is attached between sterile filter (4) and water outlet (3) in such a way that the inside of the shower cabinet, the outlet of the sterile filter (7) and the shower basin (1) with the water outlet (3) are radiated with UV light. The shower area is provided with a partition which is impermeable to UV rays (e.g. shower curtain or mobile partition).

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A sanitary washing area, consisting of a washbasin, a shower tray or a bath or birthing tub with a water infeed and a water outlet, wherein the water infeed is equipped with an end-position sterile filter and the water outlet is equipped with a self-disinfecting air trap.
2. A sanitary washing area according to claim 1, wherein one or more UV lamps for disinfecting the interior of the basin is present in or above the basin, tray or tub with the outlet of the sterile filter and the inlet of the self-disinfecting air trap.
3. A sanitary washing area according to claim 1 or 2, that has a covering means which is removed when the basin is used.

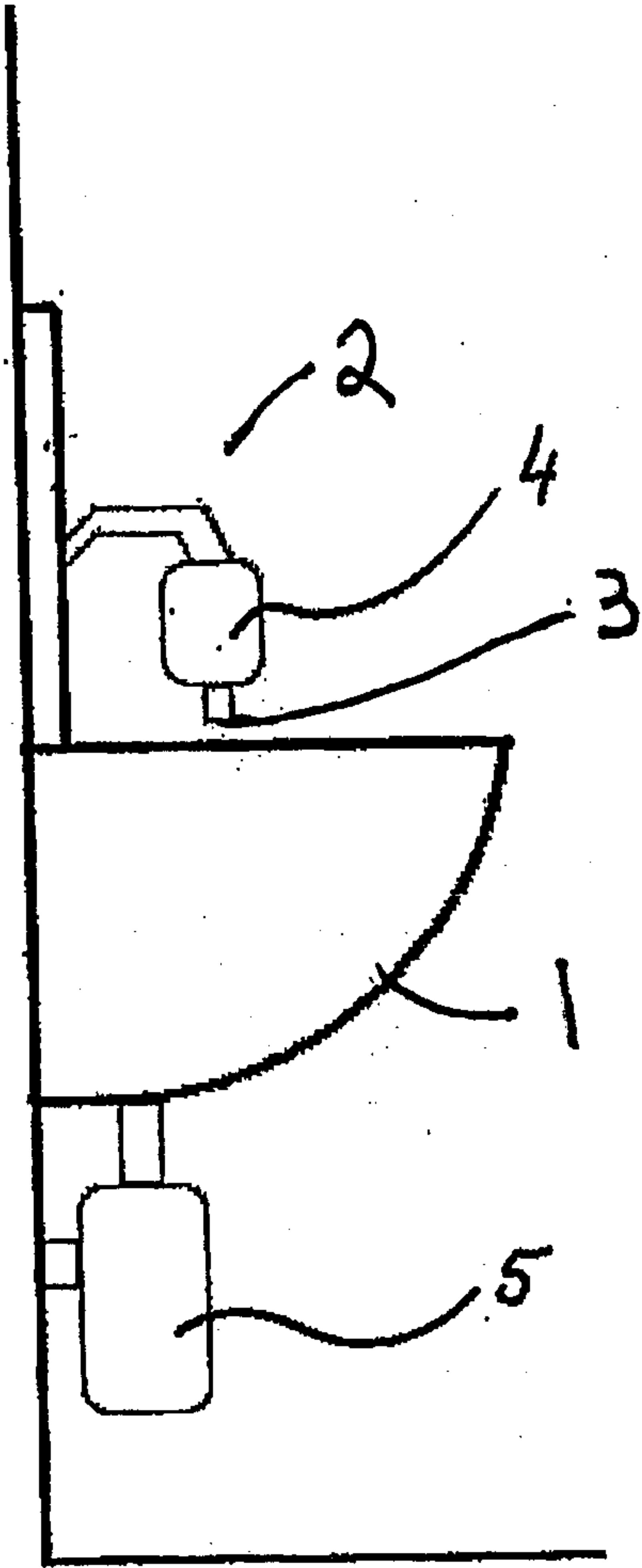


Fig. 1

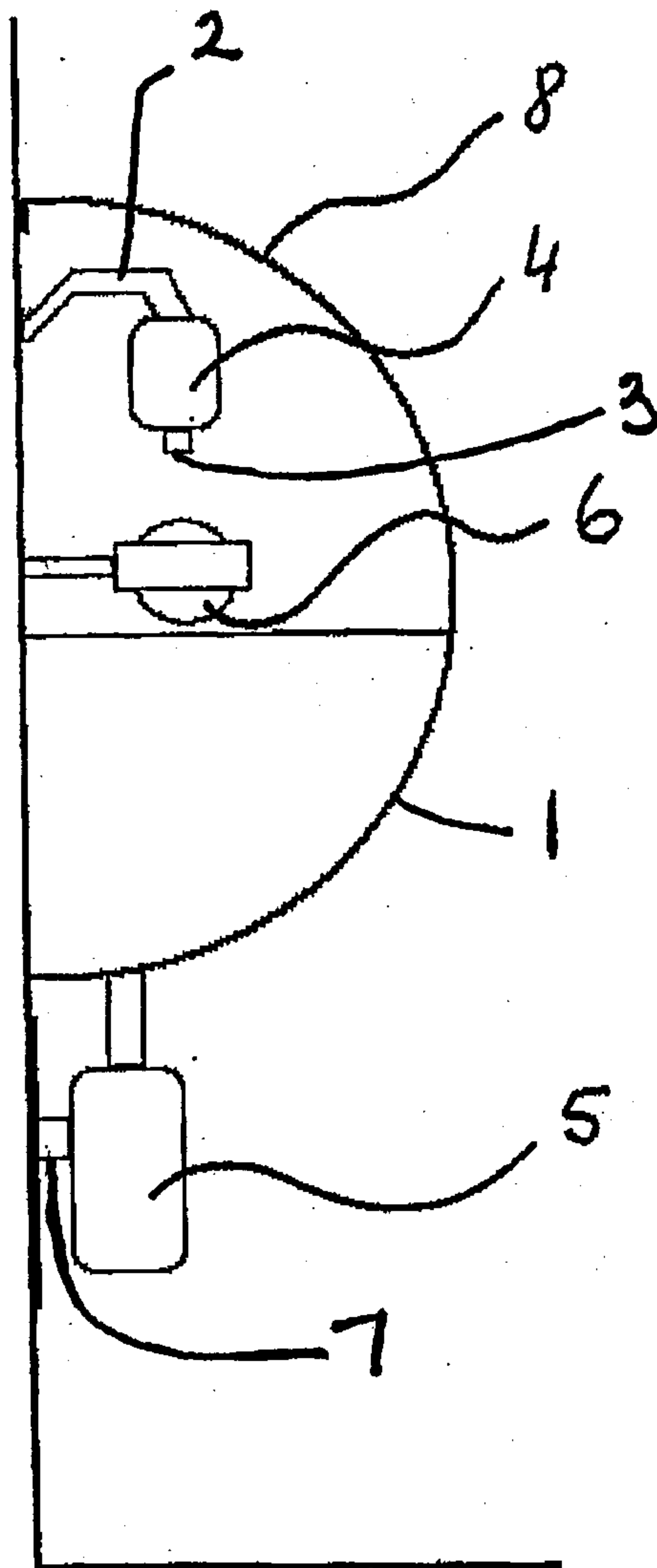


Fig. 2

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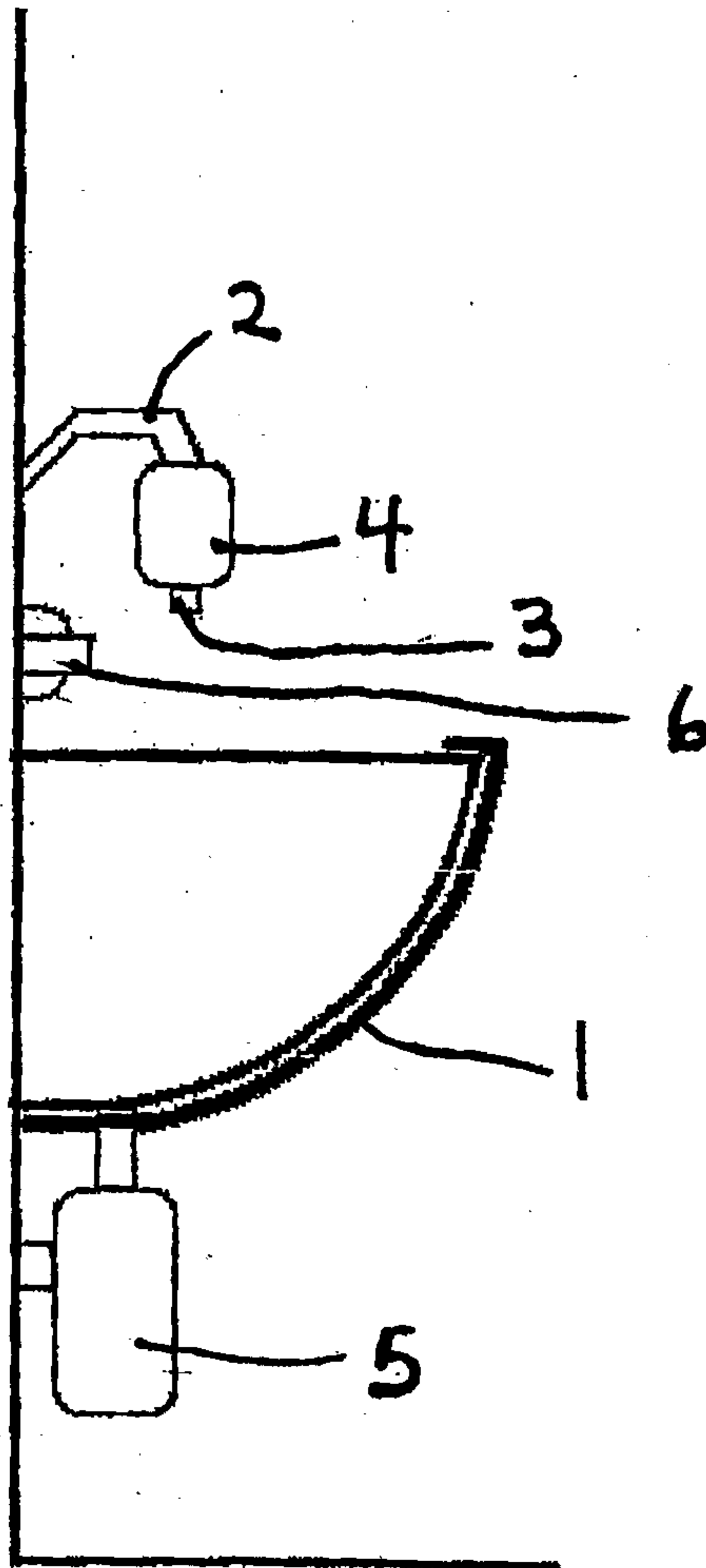


Fig. 3

