

METHOD AND DEVICE FOR DETERMINING MAINTENANCE INTERVALS

The subject matter of the invention is a method for determining the point in time for the replacement of wearing parts and/or of blocking fluid and/or fragrance substances and cleaning substances, in dependence on the use of a sanitary apparatus, according to patent claim 1. The subject matter of the invention is further a device for carrying out the method, according to the preamble of patent claim 4.

With sanitary apparatus, e.g. waterless urinals, it is necessary to exchange the blocking fluid and/or wearing parts in the region of the siphon at a suitable point in time, in order to avoid unpleasant odours. Today, this is effected either according to discretion or as a result of an unpleasant development of smell or in a fixed cycle. All criteria however are neither reliable nor meaningful, since in particular in larger toilet installations, a multitude of urinals are arranged next to one another and according to experience not all are used as equally as often. For this reason, with regard to the odour development, it is not possible to realise which of the urinal or urinals is or are releasing unpleasant odours. On the other hand, it makes no sense to prematurely exchange valve parts and siphon parts which are essentially still intact, with the less used urinals.

The object of the present invention is the provision of a method for determining the point in time for the replacement of wearing parts and/or blocking fluid and/or fragrance substances and cleaning substances, in dependence on the use of a sanitary apparatus, as well as the provision of a device for carrying out the method.

These objects are achieved by a method according to the features of patent claim 1 as well as to a device according to the features of patent claim 4. Advantageous designs of the invention are described in the dependent claims.

By way of the physically and/or chemically attained visible change of an indicator element which is applied in the sanitary apparatus and which may be moistened with each use by way of fluid spray (urine), in the sole position and with a multitude of sanitary apparatus arranged next to one another, each individual one may be monitored, and the necessary actions may be carried out where necessary. This on the one hand, with regard to odour emission, means an early recognition, i.e. before first indications may be smelt, and on the other hand a replacement may be applied with a low effort with regard to time and expense, only where this is also really necessary. By way of a suitable chemical and/or physical composition of the indicator element, fragrance substances may also be additionally added to this, said fragrance substances replacing those which are usually arranged on the

walls of the sanitary rooms or are emitted by way of opening a door. Moreover, cleaning substances such as bacteria, enzymes tensides etc. may also be added to the indicator element, which keep the sanitary apparatus clean and smell-neutral in a chemical and/or biological way, and furthermore permit a care and cleaning of the functioning elements in the valve region and siphon region, as well as the subsequent discharge tubes.

The invention is explained in more detail by way of one embodiment example of a urinal. The single figure shows an axial section through the device. There are shown in:

- Figure 1 a vertical section through a waterless urinal,
- Figure 2 a longitudinal section through the elements of the valve of the waterless urinal,
- Figure 3 a perspective longitudinal section through the partly assembled valve,
- Figure 4 a vertical perspective longitudinal section through the assembled valve and
- Figure 5 a vertical section through the mushroom-like cap over the valve with a central and decentral opening.

The urinal 1 which is shown schematically in Figure 1 comprises a basin 3 with a base 22 which is directly or indirectly fastened on a wall 5. A valve 9 is inserted in a recess 7 on the base 22 of the basin 3. A discharge tube 11 (Figure 1), which leads into the wall 5, on which the urinal 1 is fastened, connects to the tubular recess 7.

The individual parts of one possible design of a valve 9 are represented in Figure 2. An adapter is indicated with the reference numeral 13, which may be inserted into the recess 7 of any urinal 1. The adapter 13 is inserted in a sealed manner in the discharge tube 11 by way of suitable sealing means which are not indicated in more detail. The adapter also bears sealingly on the recess 7, so that no urine may go downwards laterally of the run-in funnel 15. A valve 17 is screwed in the tubular inside of the adapter 13 or is held inserted by way of a bayonet-type closure. An odour-block 19 is inserted in the valve 17, as is for example described in 2004/059198. Of course, also a differently shaped odour-block, for example such as is described in WO 1999/57382, may be inserted. Alternatively, the odour-block may also be effected by way of a blocking fluid, as for example in the design described in CH 690917.

A cap 21 is arranged above the valve 17, which for example comprises a mushroom-like dome 23, on which feet 25 are integrally formed, with which the cap 21 may be fastened at a distance above the valve 17. Since all parts are manufactured of plastic, the connection between the cap 21 and the valve 17 may be effected by way of a snap mechanism, which is not shown in more detail. A key 27 is represented above the cap 21, with which key the valve 17 may be fastened in the adapter 17 and removed for exchange (Figures 2 and 3). The key 27 is not part of the device.

In the sectioned representation according to Figure 4, all elements are represented joined together and are connected to one another with the key 27 on the adapter 13. For a better overview, the space below the dome 23 is represented empty in this figure. The dome 23 or the cap 21 protects the run-in region 29 of the valve 17 from blockage, for example due to cigarette butts, paper shreds etc. In the enlarged schematic representation of the cap 21 in Figure 5, it is evident that according to the invention, the space 31 enclosed by the dome 23 is completely or partly filled with an indicator element 33. The indicator element 33, which in a pasty, liquid or other form has been brought into the cap 21, apart from a forming matrix, comprises enzymes and/or tensides and/or bacteria and/or cleaning substances and/or dyes. These substances are moistened by urine droplets 37 which spray off with each use of the urinal 1. Thereby, the moistening is effected on the one hand from below by urine droplets 37 which come from the jet of urine which hits the base 22 of the urinal 1 outside the cap 21, and on the other hand by way of urine which, through a central opening 35 formed in the cap 21, if such is present, hits the base 22 and is partly reflected. The indicator element 33 is chemically/physically set in a manner such that after a predefined number of wettings of the urinal, i.e. by droplet-wise wetting, it is either completely decomposed and/or that it changes its colour at least in the contact region with the dome 23, which has been manufactured from a transparent material. This change, be it by decomposition of the indicator or colour change, is then visible from the outside without further aids. A maintenance team which periodically visits the urinal for cleaning and maintenance of the urinal 1, may then recognise without further ado, also from a larger number of urinals 1 arranged next to one another 1, as are set up for example in railway stations, in restaurants, airports etc., which of the valves 17 and/or indicator elements 33 need to be exchanged or where blocking fluid must be refilled. The life duration of the indicator element 33 is matched to a safe usage duration of the valve 17 or the blocking fluid, and ensures that the latter in this time period is not defect and thus fragrances may get into the sanitary room. Depending on the chemical composition of the indicator element 33, this apart from the cleaning substances which keeps the valve 17 clean from siltation, also contain enzymes and bacteria which permit a biological breakdown of urine siltation in the conduits and the prevent the buildup of urine scale, and specifically in the valve 17 as well as in the subsequent waste water conduits 11. Of course, a fragrance

substance may also be added to the indicator element 33. This is dispensed depending on the user. A main component however is at all events a substance, which in the course of use, whose duration is defined, changes with regard to colour.

Alternatively, the indicator element 33 may also consist of a border layer 32 of an indicator which is incorporated in the roof of the dome, and a mass arranged therebelow which may be broken down. The layer 32 which changes colour thus comes into contact with the urine spray and urine droplets only when the decomposable indicator element 33 lying therebelow is decomposed. The indicator element 33 thus does not have to undergo a colour change.

Patent claims

1. A method for determining and fixing the point in time for the replacement of wearing parts and/or blocking fluid and/or fragrance substances and cleaning substances, in dependence on the use of a sanitary appliance (1),
characterised by an optically recognisable, chemical or physical conversion of an indicator element (33) arranged in the run-out region of the sanitary apparatus, after a settable number of wettings with the use of the sanitary apparatus (1).
2. A method according to claim 1, characterised in that the indicator element (33) by way of each individual droplet-wise wetting, changes somewhat with regard to colour in a permanent manner and/or is decomposed or dissolved, or a coloured change of a border layer (32) on the indicator element (33) arises.
3. A method according to one of the claims 1 or 2, characterised in that the indicator element (33) on wetting, simultaneously releases fragrant substances and/or cleaning substances.
4. A device for carrying out the method according to claim 1, characterised in that the indicator element (33) is arranged below a watertight, mushroom-like cap (21) and at a vertical distance above the discharge opening in the sanitary apparatus (1).
5. A device according to claim 4, characterised in that the mushroom-like cap (21) encloses the indicator element (33) to the top and laterally, and protects it from moisture.
6. A device according to one of the claims 4 or 5, characterised in that the mushroom-like cap (21) comprises several feet (25), which keep its lower side at a distance to the discharge opening.
7. A device according to one of the claims 4 to 6, characterised in that the cap (21) at least partly is manufactured of a transparent plastic.
8. A device according to one of the claims 4 to 7, characterised in that the indicator element (33), as an indicator element (33), comprises a paste which may be set in its hardness and/or decomposability.

9. A device according to one of the claims 4 to 8, characterised in that the mushroom-like cap (21) and the indicator element (33), in the centre or decentrally, comprise a vertically running through-opening (35).
10. A device according to one of the claims 4 to 9, characterised in that the indicator element (33) contains biologically degradable cleaning substances and dyes such as bacteria and/or enzymes for the user-dependent, self-active cleaning performance.
11. A device according to one of the claims 4 to 10, characterised in that the indicator element (33) as a thin layer (32) is arranged directly in the roof of the dome (23).