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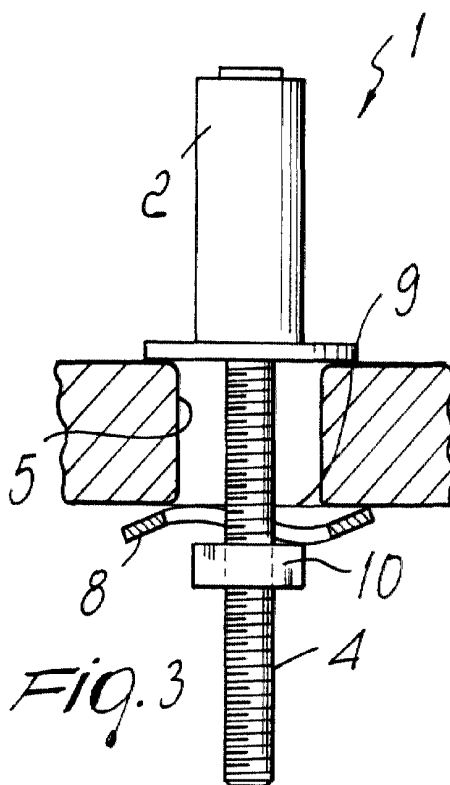
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(54) **Device for fixing the seat assembly of a toilet bowl**

(57) A device (1) for fixing the seat assembly of a toilet bowl, comprising a post element (2) which has a stem (4) which is suitable to engage a hole (5) of a bowl, the post element being in turn engageable with seat assembly supporting means. The device comprises an os-

cillating element (8, 108, 208, 308, 408, 508) which is associated with the stem (4) and has at least two active positions: an insertion position, in which the oscillating element and the stem can be inserted in the hole, and a locking position, in which the oscillating element prevents the stem from sliding out of the hole.



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Description

[0001] The present invention relates to a device for fixing the seat assembly of a toilet bowl.

[0002] It is known that the seat assembly of a toilet bowl is hinged by means of a fixing system comprising a pivot which is associated with the lid and the seat and is in turn associated, in different manners, with a post element which is fixed at the holes usually provided in the bowl. The post element is fixed from the lower face by means of a butterfly nut which engages the threaded stem that protrudes from the element.

[0003] In this kind of conventional embodiment, every operation for installing and removing the toilet seat assembly entails working in a very awkward manner and in a particularly uncomfortable position, since the space available is generally relatively confined and the distance from the ground is usually very low.

[0004] The aim of the present invention is to provide a device for fixing the seat assembly of a toilet bowl which allows to facilitate the operations for installing and removing the seat assembly.

[0005] An object of the invention is to provide a device for fixing the seat assembly of a toilet bowl which allows to act, for installing and removing the seat assembly, without having to gain access from the lower face of the toilet bowl.

[0006] A further object is to provide a device for fixing the seat assembly of a toilet bowl which is capable of giving the greatest assurances of reliability and safety in use.

[0007] A still further object of the present invention is to provide a device for fixing the seat assembly of a toilet bowl which can be easily obtained starting from commonly commercially available elements and materials and is also competitive from a merely economical point of view.

[0008] This aim and these and other objects which will become better apparent hereinafter are achieved by a device for fixing the seat assembly of a toilet bowl, comprising a post element having a stem which is suitable to engage a hole of a bowl, said post element being engageable with seat assembly supporting means, characterized in that it comprises an oscillating element which is associated with said stem and has at least two active positions: an insertion position, in which said oscillating element and said stem can be inserted in said hole, and a locking position, in which said oscillating element prevents said stem from sliding out of said hole.

[0009] Further characteristics and advantages of the present invention will become better apparent from the description of a preferred but not exclusive embodiment of the device according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic exploded perspective view of a quick-release coupling device provided with the

fixing device according to the invention;

Figure 2 is a sectional elevation view of the fixing device according to the invention, shown in the insertion position;

Figure 3 is a sectional elevation view of the fixing device according to the invention, shown in the locking position;

Figures 4 to 6 are perspective views of three embodiments of the oscillating element;

Figure 7 is a sectional elevation view of the fixing device according to a different embodiment of the invention, shown in the insertion position;

Figure 8 is a sectional elevation view of the fixing device according to another aspect of the invention, shown in the insertion position;

Figures 9 to 11 are perspective views of three further embodiments of the oscillating element;

Figure 12 is a sectional elevation view of a seat assembly coupling device, provided with the fixing device according to the invention, shown in the insertion position.

[0010] With reference to the figures, the fixing device according to the invention, generally designated by the reference numeral 1, comprises a post element 2 provided with a stem 4 which can be inserted in a hole 5 of a bowl 3 in order to fix the post element 2 to the bowl.

[0011] The post element 2 can engage supporting means, shown schematically in Figures 1 and 12 and respectively designated by the reference numerals 6 and 7, for supporting a seat assembly (not shown). The seat assembly supporting means can be of the conventional type or of the quick-release type, for example of the type shown schematically in Figure 1.

[0012] The fixing device according to the invention comprises an oscillating element, designated by the reference numerals 8, 108, 208, 308, 408, 508 respectively in its different embodiments, which is constituted by an elongated body, for example a metal strip, which is provided with a slot 9 and with a contrast element suitable to prevent the rotation of a nut 10 which engages the threaded stem 4 when the oscillating element is in the locking position, as described in detail hereinafter.

[0013] The oscillating element and its contrast element can assume various configurations, according to requirements, as described hereinafter with reference to some examples of embodiments thereof.

[0014] The oscillating element 8, shown in Figure 11, applied to the embodiment shown in Figures 1 to 3, comprises an S-shaped elongated plate having contrast elements which are suitable to contrast the rotation of the nut 10 and are constituted for example by studs.

[0015] The oscillating element 108, shown in Figure 5, comprises a flat elongated plate having a single folded edge 111 which is suitable to contrast the rotation of the nut 10.

[0016] The oscillating element 208, shown in Figures 6 and 7, comprises an elongated flat plate having one

or more studs 211 which are suitable to contrast the rotation of the nut 10.

[0017] The oscillating element 308, shown in Figures 8 and 9, comprises an elongated plate which is folded at its ends and is provided with contrast elements which are suitable to contrast the rotation of the nut 10 and are constituted for example by studs (not shown).

[0018] The oscillating element 408, shown in Figure 10, comprises an elongated plate which is folded at its ends and is provided with a longitudinal fold 411 which is suitable to contrast the rotation of the nut 10.

[0019] The oscillating element 508, shown in Figure 4, comprises an elongated flat plate which has two folded edges 511 which are suitable to contrast the rotation of the nut 10.

[0020] The described embodiments are of course mere examples and the oscillating element can be provided in different manners without altering the inventive concept. For example, the contrast element can also be constituted by countersinks or ridges formed by drawing.

[0021] The operation of the device according to the invention is as follows. As shown schematically in Figures 2, 7, 8 and 12, the post element 2 can be applied to each of the two holes 5 usually provided in a bowl, simply by inserting the threaded stem 4 while the oscillating element is arranged in the insertion position, which is substantially longitudinal with respect to said stem. In this manner, the assembly formed by the stem, the oscillating element and the nut can be inserted in the hole 5, and once it has passed through the hole the oscillating element slides downward and arranges itself substantially at right angles to the stem, in a locking position which is shown in dashed lines in Figures 2 and 12. At this point it is sufficient to turn the stem, for example by acting from above on said post element, in order to screw the nut onto the stem until the oscillating element is locked onto the lower surface of the bowl 3, as shown schematically in Figures 1 and 3.

[0022] The contrast element provided on the oscillating element prevents the rotation of the nut, allowing to both tighten and loosen the grip for subsequent disassembly of the fixing device; all this is accomplished by acting exclusively from a single face of the bowl. It is noted that if it is necessary, for any reason, to act from the lower face instead of from above, therefore in an inverted position with respect to the illustrated examples, a light spring is inserted coaxially to the stem, said spring being suitable to push upward the oscillating element, in contrast with the nut, and so that it remains substantially parallel to the stem, in order to allow the insertion of the assembly constituted by the stem, the oscillating element and the nut in the hole 5. Then, once the hole has been passed, the post element is "pulled" in contrast with the spring so as to arrange the oscillating element substantially at right angles to the stem, in the locking position.

[0023] In practice it has been found that the invention

achieves the intended aim and objects, a fixing device having been provided which allows to act always and exclusively from a single face of the toilet bowl, facilitating fitting and removal operations.

[0024] The device according to the invention is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may further be replaced with other technically equivalent elements.

[0025] The materials used, as well as the dimensions, may of course be any according to requirements and to the state of the art.

[0026] The disclosures in Italian Patent Application No. MI2000A001801 from which this application claims priority are incorporated herein by reference.

[0027] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for fixing the seat assembly of a toilet bowl, comprising a post element having a stem which is suitable to engage a hole of a bowl, said post element being engageable with seat assembly supporting means, **characterized in that** it comprises an oscillating element which is associated with said stem and has at least two active positions: an insertion position, in which said oscillating element and said stem can be inserted in said hole, and a locking position, in which said oscillating element prevents said stem from sliding out of said hole.
2. The device according to claim 1, **characterized in that** said stem is threaded and can be engaged by a nut, and **in that** said oscillating element comprises an elongated body provided with a slot which is engaged by the stem and a contrast element which is suitable to prevent the rotation of the nut at least when the oscillating element is in the locking position.
3. The device according to claim 1 or 2, **characterized in that** said oscillating element is constituted by an elongated flat plate.
4. The device according to one or more of the preceding claims, **characterized in that** said oscillating element is constituted by an elongated plate which is folded at its ends.
5. The device according to one or more of the preceding claims, **characterized in that** said oscillating el-

ement is constituted by an S-shaped elongated plate.

6. The device according to one or more of the preceding claims, **characterized in that** said contrast element is constituted by at least one longitudinal folded edge. 5
7. The device according to one or more of the preceding claims, **characterized in that** said contrast element is constituted by two longitudinal folded edges. 10
8. The device according to one or more of the preceding claims, **characterized in that** said contrast element is constituted by one or more studs. 15
9. The device according to one or more of the preceding claims, **characterized in that** said contrast element is constituted by ridges formed by drawing. 20

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