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(54) **Coupling hinge**

(57) A hinge (4) in particular for the connection between a fixed element (8), such as for example a wall (9) of a piece of furniture or a hygienic bowl, and an associable mobile element (11), such as for example a flap door (13) and a cover or seat (12) of a hygienic bowl (8) respectively. The hinge (4) comprises contrast means for controlling the relative motion of rotation between the fixed element (8) and the mobile element (11) and adjustment means (81) suitable for adjusting the restraining effect of said contrast means.

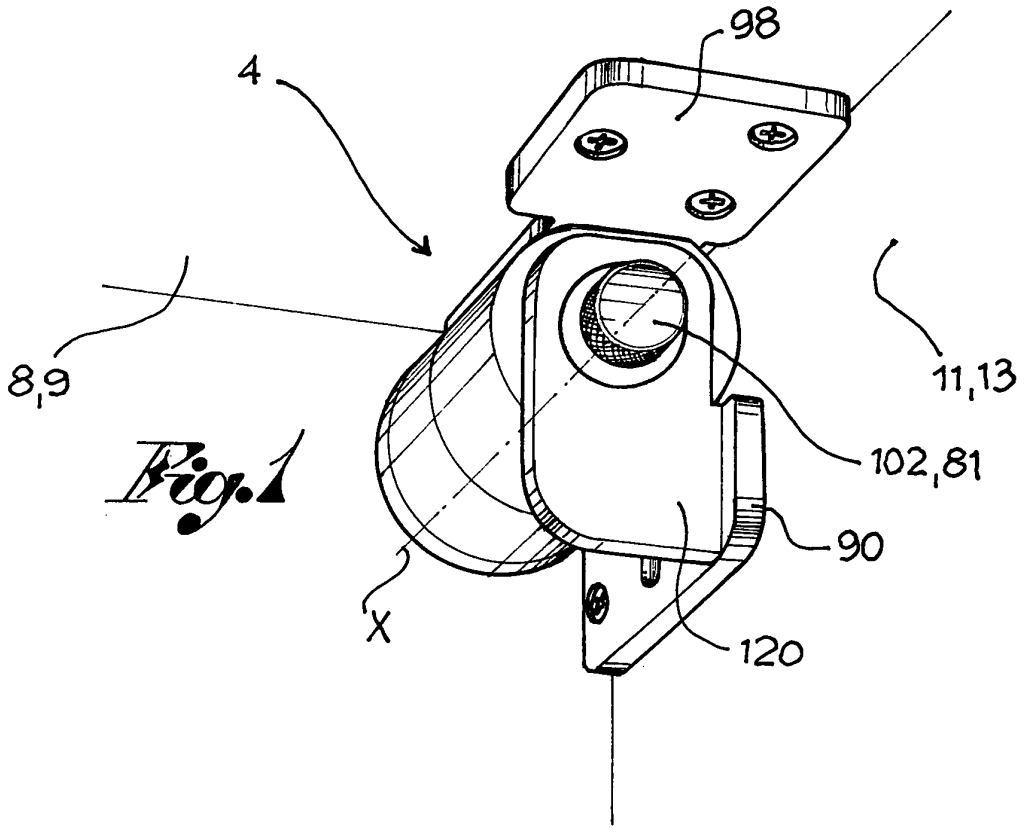

Fig.1

EP 2 092 868 A2

Description

[0001] The present invention relates to a coupling hinge and in particular a coupling hinge for furniture doors, preferably of the flap type, and for seats and covers of hygienic bowl.

[0002] As known, flap doors are hinged to the piece of furniture so as to move according to a movement substantially of the pivoting type. There is therefore the need of providing the doors with means suitable for keeping the door in open position, substantially in horizontal position, preventing accidental drops of the same that would damage the piece of furniture and constitute a danger for the user.

[0003] The movement of known flap doors is normally guided by a pair of stems that slide inside sleeves, for example charged with gas.

[0004] Such solutions are quite expensive and do not ensure reliability over time. Moreover, the stems are quite cumbersome and unaesthetic.

[0005] It is also known to provide the flap doors with hinges restrained by friction means. However, such devices are not reliable and are quite complex to calibrate due to the unavoidable construction tolerances, so some doors are too weak and thus, quite unsafe, whereas others are positively hard to open and therefore difficult to use.

[0006] A similar problem is felt in the field of hygienic bowls, wherein the seats and the relevant closing covers are hinged to the hygienic bowl by hinges that allow rotating the seat or cover relative to the bowl from a horizontal closed position, resting on a support surface of the bowl, to a substantially vertical open position, wherein the seat or cover forms an angle not smaller than 90 degrees with said support surface.

[0007] Seats and covers, when in vertical open position, abut at about 90 degrees relative to the support surface of the seat, usually against the wall the hygienic bowl is fit to. It is not infrequent that seat or cover, subsequent to small movements, may heavily fall on the bowl with the risk of damaging the bowl itself.

[0008] Prior art solutions of hinges are known, which envisage means for damping the movement of rotation of the seat or cover, so as to cushion the movement of fall back of the cover or seat on the bowl. Such prior art solutions envisage the use of friction hinges that, as in the case of flap doors, are very difficult to calibrate due to geometrical coupling tolerances. As a consequence, the prior art seats are often restrained in an insufficient or excessive manner.

[0009] Hinges are also known that comprise viscous liquids arranged inside the hinges for obtaining a damping effect.

[0010] However, such solutions of the prior art are cumbersome, complex and expensive to be manufactured as they envisage the use of special liquid containment chambers and relevant hydraulic seals. Moreover, such hinges are unavoidably subject to liquid leaks over time, with consequent soiling and inefficacy of the damping system.

[0011] The problem of the present invention is to provide a hinge which should solve the disadvantages mentioned with reference to the prior art.

[0012] Such disadvantages are solved with a hinge in accordance with claim 1.

[0013] Other embodiments of the hinge according to the invention are described in the subsequent claims.

[0014] Further features and advantages of the present invention will appear more clearly from the following description of a preferred non-limiting embodiment, wherein:

[0015] figure 1 shows a perspective view of a hinge according to an embodiment of the present invention, in an assembled configuration;

[0016] figure 2 shows an exploded perspective view of the hinge of figure 1;

[0017] figure 3 shows a partly cutaway view of the hinge of figure 1;

[0018] - figures 4a and 4b show cutaway views of a detail of the hinge of figure 1, in different operating conditions;

[0019] figure 5 shows a perspective exploded view of a hinge according to a further embodiment of the present invention;

[0020] figure 6 shows an application of the hinge of figure 5 to a hygienic bowl in a first operating position;

[0021] figure 7 shows an application of the hinge of figure 5 to a hygienic bowl in a second operating position.

[0022] With reference to the above figures, reference numeral 4 generically denotes a coupling hinge suitable for obtaining a rotary coupling along a first axis of rotation (X-X) between a fixed element 8, such as for example a wall or shelf 9 of a piece of furniture (figure 1) or for example a hygienic bowl 10 (figures 6-7) and a mobile element 11 relative to the fixed element 8. The mobile element 11 may for example be a flap door 13, associated to said wall or shelf 9 of a piece of furniture, or a seat 12 or cover 14 turnably associated to said hygienic bowl 10.

[0023] In the case of a piece of furniture, the flap door 13 can rotate from a vertical closed position, wherein the door is substantially perpendicular to a support surface of the piece of furniture, to a horizontal open position, wherein the same door 13 is substantially parallel to the support surface of the piece of furniture.

[0024] In the case of application to a hygienic bowl 10, cover 14 or seat 12 may rotate from a closed position wherein they abut against a support surface 16 of the hygienic bowl 10 (figure 6) to an open position wherein said seat 12 or cover 14 form with the support surface 16 an angle not smaller than 90 degrees (figure 7).

[0025] According to an embodiment, hinge 4 comprises a first coupling element 20, suitable for being integrally constrained in rotation to the mobile element 11 so as to rotate therewith, and a second coupling element 24 suitable for being integrally constrained to the fixed element 8 so as to not rotate relative to said first axis of rotation

X-X.

[0026] According to an embodiment, hinge 4 comprises a guiding element 30 fixed relative to said first axis of rotation X-X, and having a guiding portion 34; preferably, said guiding portion 34 comprises a plurality of tabs 35, separate from one another by special notches 36.

[0027] Thanks to notches 36, tabs 35 can elastically bend in a radial direction, perpendicular to said axis of rotation X-X. According to a possible embodiment, said tabs 35 exhibit a cam profile, relative to a section plane perpendicular to the axis of rotation X-X.

[0028] The first coupling element 20 comprises a cup portion 42 at least partly fit on said guiding portion 34, in an assembled configuration of hinge 4, and comprising contrast means 46 suitable for abutting against said guiding portion and for following it in the movement of rotation of the first coupling element 20, so as to oppose the rotation of said first coupling element 20.

[0029] In other words, in an assembled configuration, the guiding portion 34 is inserted into the cup portion 42, so that tabs 35 can influence the contrast means 46, 50 radially outwards, that is, away from the axis of rotation X-X.

[0030] According to an embodiment, the cup portion 42 comprises at least one seat 48 suitable for turnably seating said contrast means 46 relative to a second axis of rotation Y-Y, parallel to said first axis of rotation X-X. Preferably, notches 36 are suitable for seating at least partly portions of said contrast means 46. In other words, the contrast means 46 are at least partly seated in seats 48 of the cup portion and based on the relative angular position between the guiding element 30 and the first coupling element 20, they are at least partly seated in said notches 36.

[0031] The contrast means 46 may comprise at least one roll 50, for example cylindrical, turnably seated in said seat 48 so as to protrude from said seat 48 radially, that is, relative to a direction incident with the second axis of rotation Y-Y and contained in a plane perpendicular to the second axis of rotation Y-Y, so as to abut against said guiding portion 34 and in particular against tabs 35.

[0032] Preferably, the cup portion 42 comprises three seats 48 and three corresponding rolls 50 arranged angularly at a pitch relative to said first axis of rotation; in other words, preferably rolls 50 and the respective seats 48 are arranged at 120 degrees relative to each other, relative to said first axis of rotation X-X.

[0033] The first coupling element 20 comprises, opposite said cup portion 42, a coupling head 54 suitable for being integrally connected in rotation to said mobile element 11.

[0034] Preferably, the coupling head 54 comprises at least one levelling 56 suitable for favouring the connection in rotation between the first coupling element 20 and the mobile element 11, as better described hereinafter.

[0035] According to an embodiment, the first coupling element 20 comprises a circular edge 70, arranged axially between the cup portion 42 and the coupling head 54. By axial direction it is meant a direction parallel to said axis of rotation X-X.

[0036] The guiding element 30 preferably comprises a shoulder 72, axially opposite the guiding portion 34, so as to stop the axial introduction of the cup portion 42 on the guiding portion 34.

[0037] Preferably, shoulder 72 is coaxial with said guiding portion 34 and with the axis of rotation X-X.

[0038] According to an embodiment, the guiding element 30 comprises, opposite shoulder 72 relative to the guiding portion 34, a pin 76 suitable for making a connection in rotation between the guiding element 30 and the second coupling element 24. For example, such connection may be made by a closing plate 77 provided with a hole 75, counter shaped relative to the pin so as to constrain in rotation the guiding element 30 and the closing plate 77. According to a possible embodiment, hole 75 can be arranged on a portion of said second coupling element 24.

[0039] Preferably, pin 76 is not circular, for example it is oval, so as to ensure the locking in rotation between the pin itself 76 and the relevant plate 77 and thus between pin 76 and the second coupling element 24. Plate 77 is integrally fixable to the second coupling element 24, for example by screw means (figures 2-3), or it can be integral with the second coupling element 24 (figure 5). The guiding element 30 is therefore locked in rotation with the second coupling element 24.

[0040] According to an embodiment, said hinge 4 comprises a collar 80, preferably elastic, suitable for being fitted coaxially to the first axis of rotation X-X, on the guiding portion 34 and on the cup portion 42, so as to arrange in contact with said contrast means 46, the contrast elements 46 being radially arranged between tabs 35 of the guiding element 30 and collar 80.

[0041] Preferably, collar 80 has such axial extension as to be fitted on both the guiding portion 34 and shoulder 72. Preferably, collar 80 axially inserts in abutment against the circular edge 70.

[0042] According to an embodiment, collar 80 is fitted with interference on the guiding portion 34.

[0043] According to an embodiment, the elastic collar 80 is of polymeric material.

[0044] Advantageously, hinge 4 comprises adjustment means 81 suitable for interacting with the guiding element 30 so as to regulate the thrust action exerted by the guiding portion 34 on the contrast means 46.

[0045] According to an embodiment, the adjustment means 81 comprise a pin 82 provided with a conical portion 83 having a diameter suitable for being inserted into the volume delimited by the guiding portion 34 and in particular by tabs 35, which thanks to notches 36, can elastically bend under the thrust action of the conical portion 83, so as to radially expand towards the associable cup portion 42, so as to modify the preload of radial thrust of the contrast means 46 on collar 80.

[0046] Advantageously, the adjustment means 81 are provided with a threaded portion 100, integral in rotation

with the conical portion 83, and turnable by a ring nut 102 accessible from outside hinge 4.

[0047] In particular, ring nut 102 comprises a nut screw 104 suitable for engaging with said threaded portion 100. The screwing and/or unscrewing of ring nut 102 causes the shifting of the conical portion 83 inside the guiding element 30 and thus a greater or smaller enlargement or spreading out of tabs 35. The consequence is an adjustment of the contrast effect on the contrast means 46, 50 which are radially pressed against collar 80 with variable strength, and thus an adjustment of the resistant torque exerted by hinge 4 itself.

[0048] According to an embodiment, the second coupling element 24 comprises a bush 84 suitable for seating collar 80, the guiding element 30, the cup portion 42. For example, a cylindrical insert 86, preferably of metal material, is inserted between an inner side wall 85 of bush 84 and collar 80.

[0049] According to a preferred embodiment, bush 84 comprises a clutch, for example obtained by the interposition of a series of rolls 87, arranged angularly at a pitch, suitable for allowing the rotation of the cylindrical insert 86 in only one predetermined direction of rotation, corresponding for example to the opening movement of the mobile element 11.

[0050] Advantageously, the cylindrical insert 86 comprises inside grooves or ribs 88 suitable for making the cylindrical insert 86 integral in rotation with collar 80.

[0051] In this way, during the opening movement of the mobile element 11, for example the flap door 13, the first coupling element 20 is pulled in rotation along with door 13; rolls 87 allow the rotation of the cylindrical insert 86 that pulls in rotation also collar 80. Thus, hinge 4 exerts a low restraining effect on the opening movement of the door which can be easily opened.

[0052] In the closing movement, the first coupling element 20 is always pulled in rotation along with door 13; rolls 87 do not allow the rotation of the cylindrical insert 86 which stops and at the same time stops the rotation of collar 80 too.

[0053] Hinge 4 therefore exerts a considerable restraining effect on the closing movement of door 13 which exhibits a controlled closing movement.

[0054] During the opening and/or closing movement, rolls 87 act on collar 80 radially compressing it; the elastic return action of collar 80 favours the rotation itself of the mobile element 11, so as to make the relevant movement of rotation as even as possible.

[0055] The second coupling element 24 may for example comprise a first fixing plate 90 suitable for allowing a solid fixing of the coupling element 24 to the fixed element 8, such as for example a wall 9. According to a further embodiment, the second coupling element 24 is fixed to a connecting foot 99 for the connection to a hygienic bowl 10.

[0056] According to an embodiment, the first coupling element 20 is integral in rotation with a rotating member 94, through a shape connection between the coupling head 54 and a corresponding counter shaped hole 96.

[0057] For example, a second fixing plate 98 is fixed to the rotating member 94, suitable for integrally fixing the rotating member as well as the first coupling element 20 to the mobile element 11.

[0058] Preferably, hinge 4 comprises a reinforcing plate 120, arranged for example perpendicular to the first fixing plate 90. The reinforcing plate transmits the rotation of the mobile element 11 to the first coupling element 20 and at the same time it stiffens the structure of hinge 4.

[0059] Preferably, a stopping device 110 is inserted between the rotating member 94 and bush 84, for example comprising a pin 112 and a relevant spring 114. Spring 114 is for example seated in a slot 116 arranged for example on the rotating member 94.

[0060] Pin 112 is seated in a half-circle recess or guide 118 arranged for example on bush 84, so as to axially face said pin 112.

[0061] Pin 112 has the function of making a snap at the achievement of the opening and closing positions of the mobile element 11; moreover, it constitutes a safety element as it prevents accidental falls of the mobile element 11.

[0062] As it can be understood from the description, the hinge according to the present invention allows overcoming the disadvantages of the hinges of the prior art.

[0063] In particular, the hinge according to the present invention is simple and inexpensive to manufacture, as well as reliable over time.

[0064] Moreover, the hinge of the present invention is not subject to any loss of inside liquids since it is provided with no hydraulic damping system of the movement of rotation of the door or cover.

[0065] Moreover, the hinge of the present invention exhibits limited overall dimensions and may be easily applied also to existing furniture or hygienic bowls, without requiring any modifications of the same.

[0066] The damping determined by friction by the present hinge allows the movement of fall back of the door, seat or cover to be perfectly controlled preventing any sudden fall.

[0067] Advantageously, thanks to the adjustment means it is possible to make the hinge without having to impose particularly strict dimensional tolerances; in this way, the costs of a component that by its nature and function must be limited, are contained.

[0068] In fact, thanks to the internal adjustment, it is possible to adapt the resistant load of the hinge to the door or cover, even if the hinge exhibits too strict or too wide construction tolerances.

[0069] Moreover, the adjustment system allows compensating the unavoidable wear the hinge is subject to over time. In fact, the wear and aging of materials make each hinge tend to limit its restraining effect over time.

[0070] Thanks to the adjustment means it is possible to restore and recalibrate the hinge with a simple adjustment that can be made directly by the user.

[0071] Of course, the use of such hinges in particular

for flap doors and/or covers and seats of hygienic bowls must not be considered in a reductive manner.

[0072] In fact, the hinge may be used for various further applications, whenever the movement of rotation of an object must be controlled.

[0073] Purely by way of an example, the hinge may be applied to doors or bonnets of motor vehicles in replacement of the common systems with shock absorbers, on furniture doors hinged relative to vertical axes of rotation, and so on.

[0074] A man skilled in the art may make several changes and adjustments to the hinges described above in order to meet specific and incidental needs, all falling within the scope of protection defined in the following claims.

Claims

1. A coupling hinge (4) for hygienic bowl, suitable for obtaining a rotary coupling along a first axis of rotation (X-X) between a fixed element (8, 9, 10) and a mobile element (11, 12, 13, 14) turnably associated to the fixed element (8, 9, 10) comprising
a first coupling element (20), suitable for being integrally constrained in rotation to said mobile element (11, 12, 13, 14),
a second coupling element (24) suitable for being constrained to said fixed element (8, 9, 10) so as to not rotate relative to the first axis of rotation (X-X),
the hinge (4) comprises a guiding element (30) fixed relative to said first axis of rotation (X-X), and having a guiding portion (34),
characterised in that
the first coupling element (20) comprises a cup portion (42) at least partly fit on said guiding portion (34) and comprising contrast means (46, 50) suitable for abutting against said guiding portion (34) and for following said guiding portion (34) in the movement of rotation of the first coupling element (20), so as to oppose the rotation of said first coupling element (20),
the hinge (4) comprises adjustment means (81), at least partly arranged between the contrast means (46, 50) and the guiding portion (34), suitable for interacting with the guiding element (30) so as to adjust a thrust action exerted by the guiding portion (34) on the contrast means (46, 50).

2. A hinge according to claim 1, wherein said cup portion (42) comprises at least one seat (48) suitable for turnably seating said contrast means (46.50) relative to a second axis of rotation (Y-Y), parallel to said first axis of rotation (X-X).

3. A hinge (4) according to claim 2, wherein said contrast means (46) comprise at least one roll (50) turnably seated in said seat (48) so as to protrude from said seat (48) radially, relative to a direction incident with the second axis of rotation (Y-Y) and contained in a plane perpendicular to the second axis of rotation (Y-Y), so as to abut against said guiding cam profile (38).

4. A hinge (4) according to any one of the previous claims, wherein said cup portion (42) comprises three seats (48) and three corresponding rolls (50) arranged angularly at a pitch relative to said first axis of rotation (X-X).

5. A hinge (4) according to claim 4, wherein the rolls (50) and the respective seats (48) are arranged at 120 degrees relative to said first axis of rotation (X-X).

6. A hinge (4) according to any one of the previous claims, wherein said first coupling element (20) comprises, opposite said cup portion (42), a coupling head (54) suitable for being integrally connected in rotation to said mobile element (11).

7. A hinge (4) according to claim 6, wherein said coupling head (54) comprises at least one levelling (56) suitable for favouring the connection in rotation between the first coupling element (20) and the seat or cover (12, 14).

8. A hinge according to any one of the previous claims, wherein said guiding portion (34) comprises a plurality of tabs (35) suitable for influencing said contrast means (46, 50) so as to elastically bend in a radial direction, perpendicular to said axis of rotation (X-X).

9. A hinge (4) according to claim 8, wherein said tabs (35) are separate from each other by notches (36).

10. A hinge (4) according to any one of the previous claims, wherein said hinge (4) comprises a collar (80), preferably elastic, suitable for being fitted coaxially to the first axis of rotation (X-X), on the guiding portion (34), so as to arrange in contact with said contrast means (46), the contrast means being arranged between the guiding element (30) and the collar (80).

11. A hinge (4) according to claims 17 or 18, wherein said collar (80) is fitted with interference on the guiding portion (34).

12. A hinge according to claim 10 or 11, wherein the elastic collar (80) is of polymeric material.

13. A hinge (4) according to any one of the previous claims, wherein the adjustment means (81) comprise a pin (82), provided with a conical portion (83) having a diameter suitable for being inserted into the

volume delimited by the guiding portion (34) so as to expand the guiding portion (34) radially towards the associable cup portion (42).

14. A hinge (4) according to claim 13, wherein the adjustment means (81) are provided with a threaded portion (100), integral in rotation with the conical portion (83), and turnable by a ring nut (102) accessible from outside the hinge (4), the screwing and/or unscrewing of the ring nut (102) causing the shifting of the conical portion (83) into the guiding element (30) and thus a greater or smaller enlargement or spreading out of the guiding portion (34).

15. A hinge (4) according to any one of claims 10 to 14, wherein the second coupling element (24) comprises a bush (84) suitable for seating the collar (80), and wherein a cylindrical insert (86) is inserted between an inner side wall (85) of the bush (84) and the collar (80).

16. A hinge (4) according to claim 15, wherein the bush (84) comprises a clutch comprising a series of rolls (87), suitable for allowing the rotation of the cylindrical insert (86) in only one predetermined direction of rotation, corresponding to the opening movement of the mobile element (11).

17. A hinge (4) according to claim 15 or 16, wherein the cylindrical insert (86) comprises inside grooves or ribs (88) suitable for making the cylindrical insert (86) integral in rotation with the collar (80).

18. A hinge (4) according to claim 10 or 11, wherein the first coupling element (20) is integral in rotation with a rotating member (94), through a shape connection between a coupling head (54) of the first coupling element (20) and a corresponding counter shaped hole (96).

19. A hinge (4) according to claim 18, wherein a stopping device (110) is inserted between the rotating member (94) and the bush (84) comprising a pin (112) and a relevant spring (114).

20. A hinge (4) according to claim 19, wherein the spring (114) is seated in a slot (116) arranged on the rotating member (94) and the pin (112) is seated in a half-circle recess or guide (118) arranged on the bush (84), so as to axially face said pin (112).

21. A furnishing element comprising a hinge according to any one of claims 1 to 20.

22. A hygienic bowl comprising a hinge according to any one of claims 1 to 20.

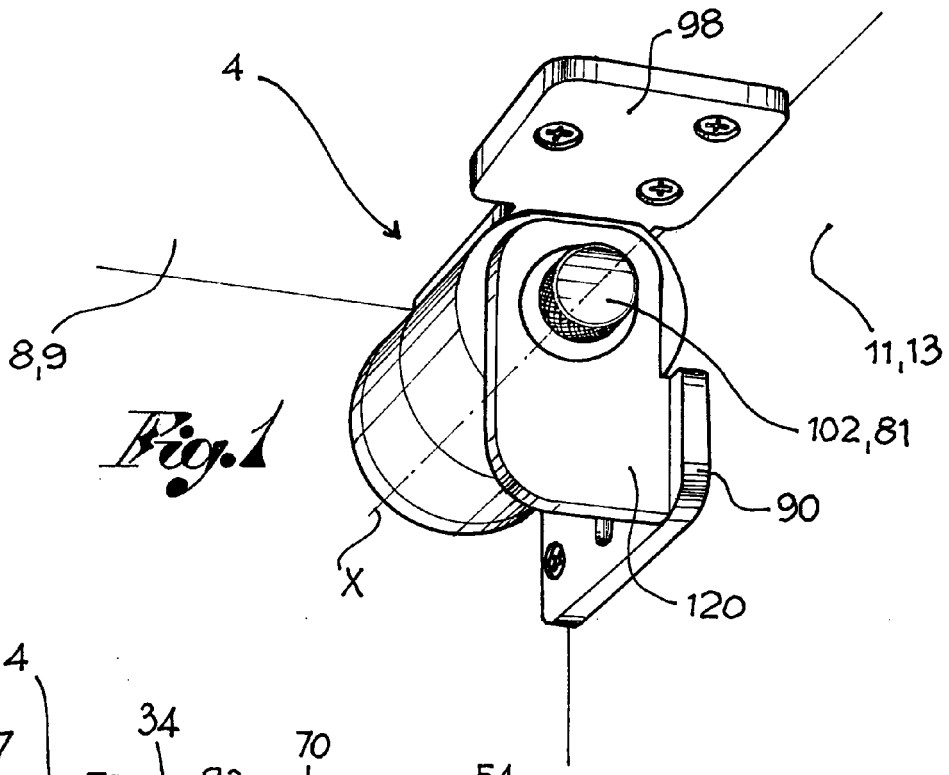
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Fig.1

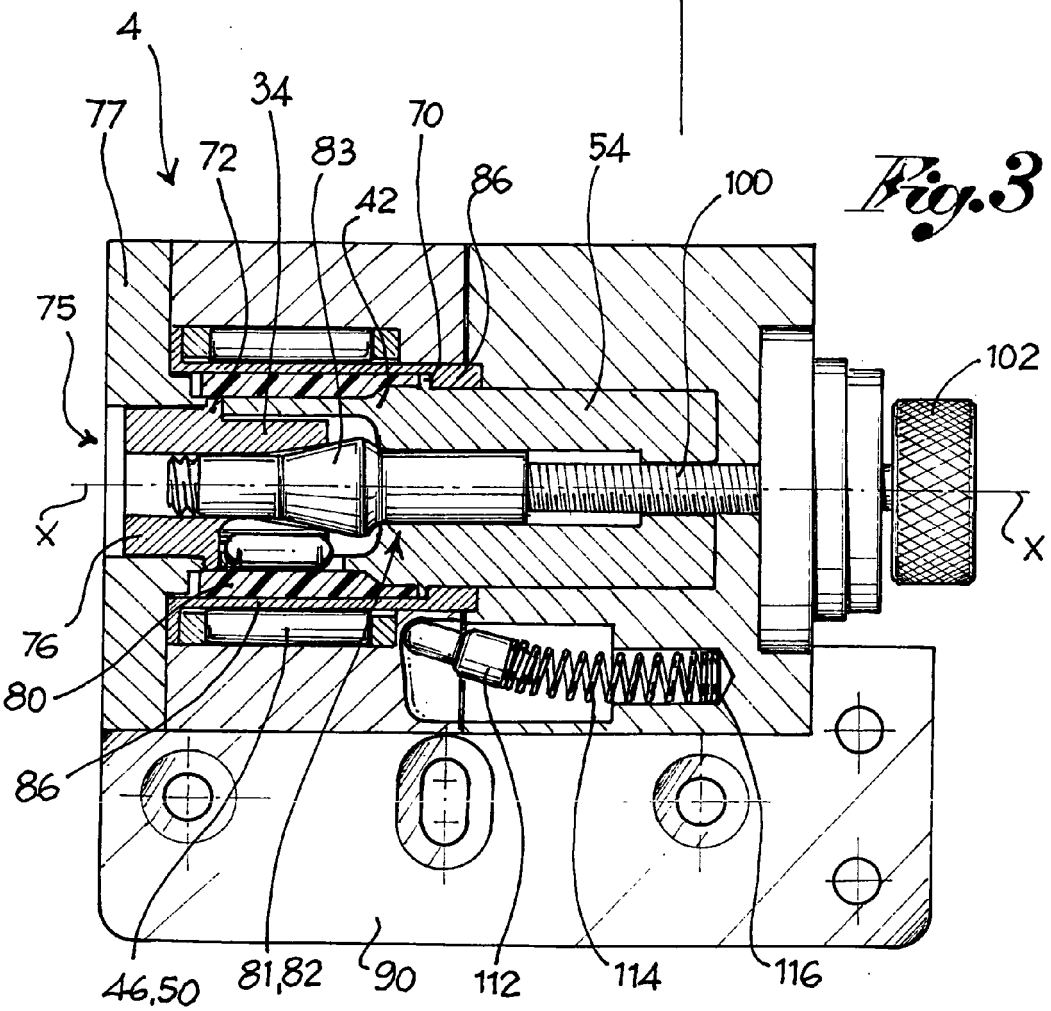
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Fig.3

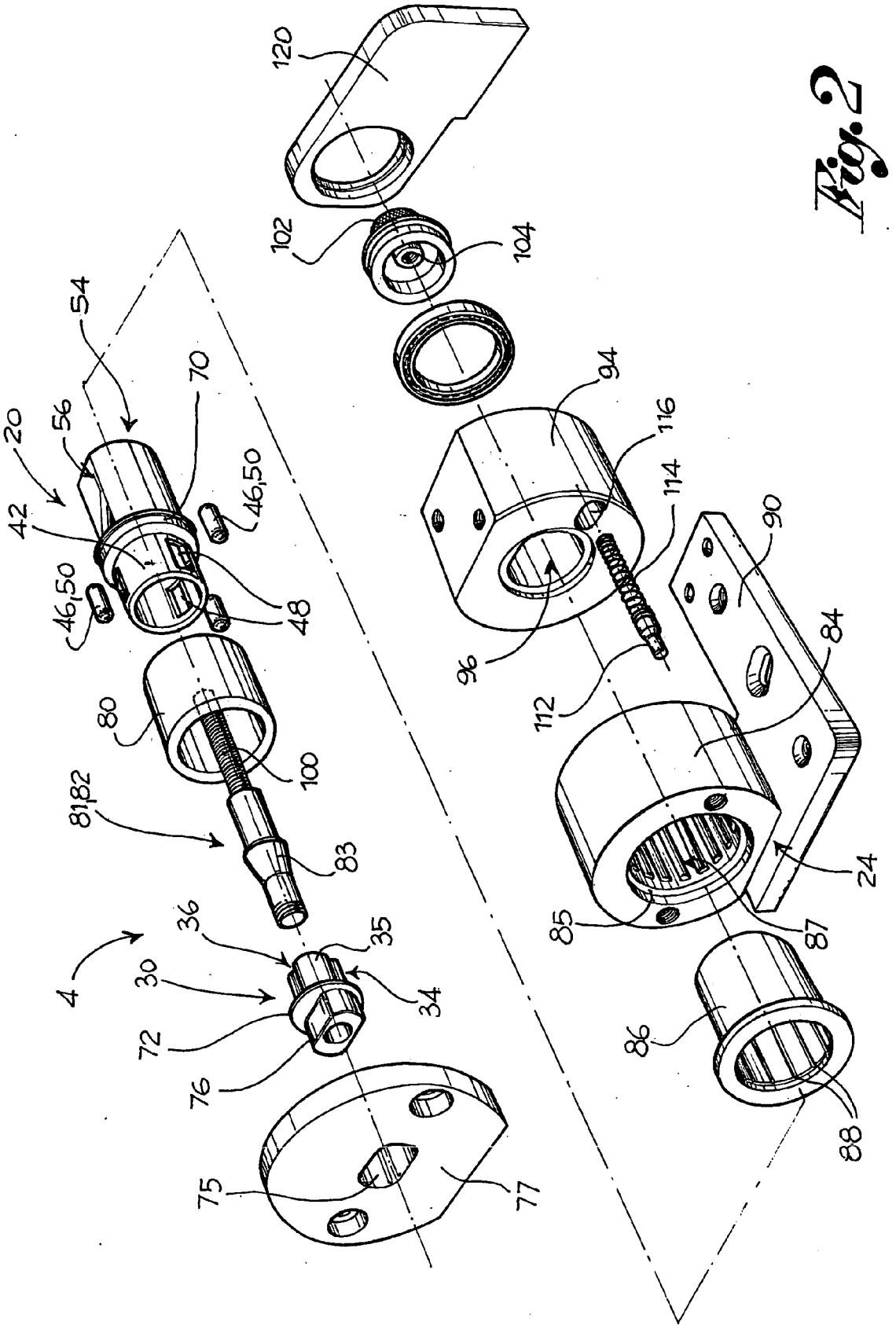
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Fig. 2

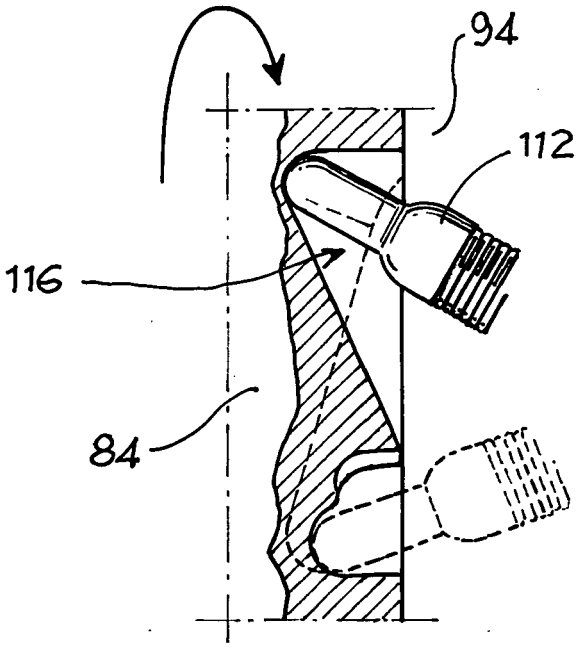


Fig. 4a

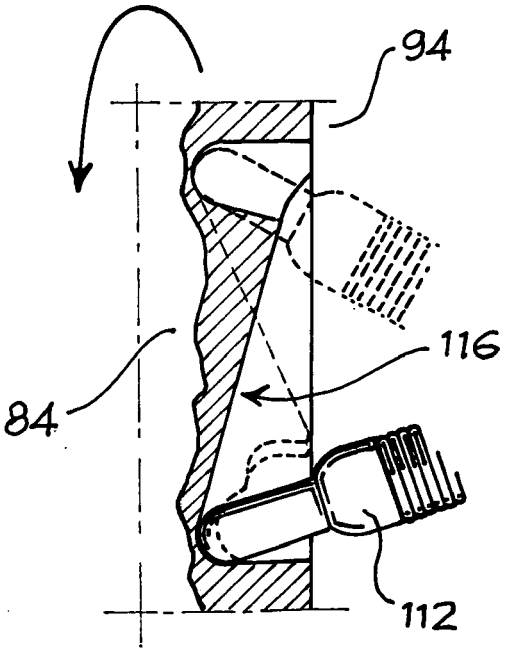
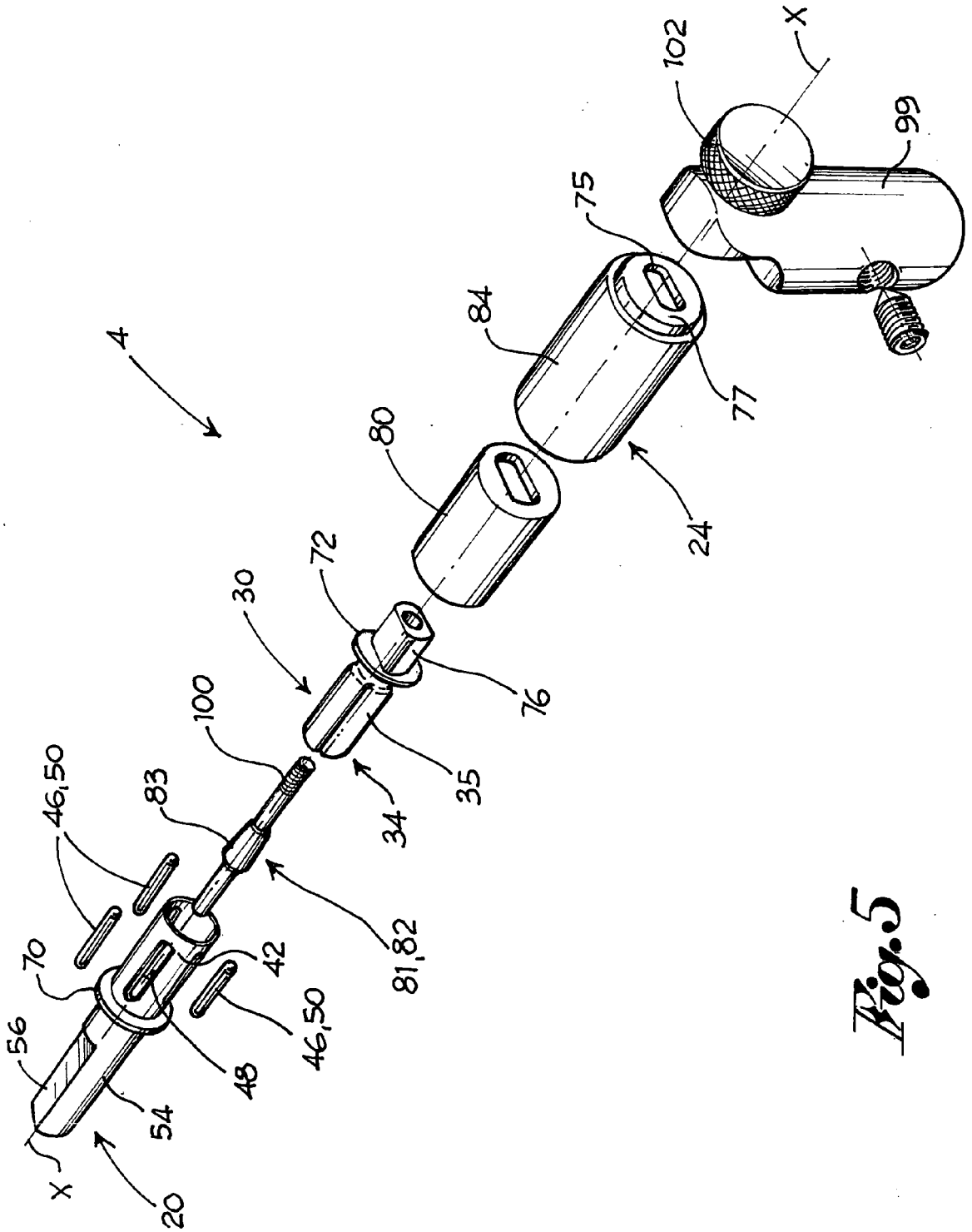


Fig. 4b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X
20

Fig.5

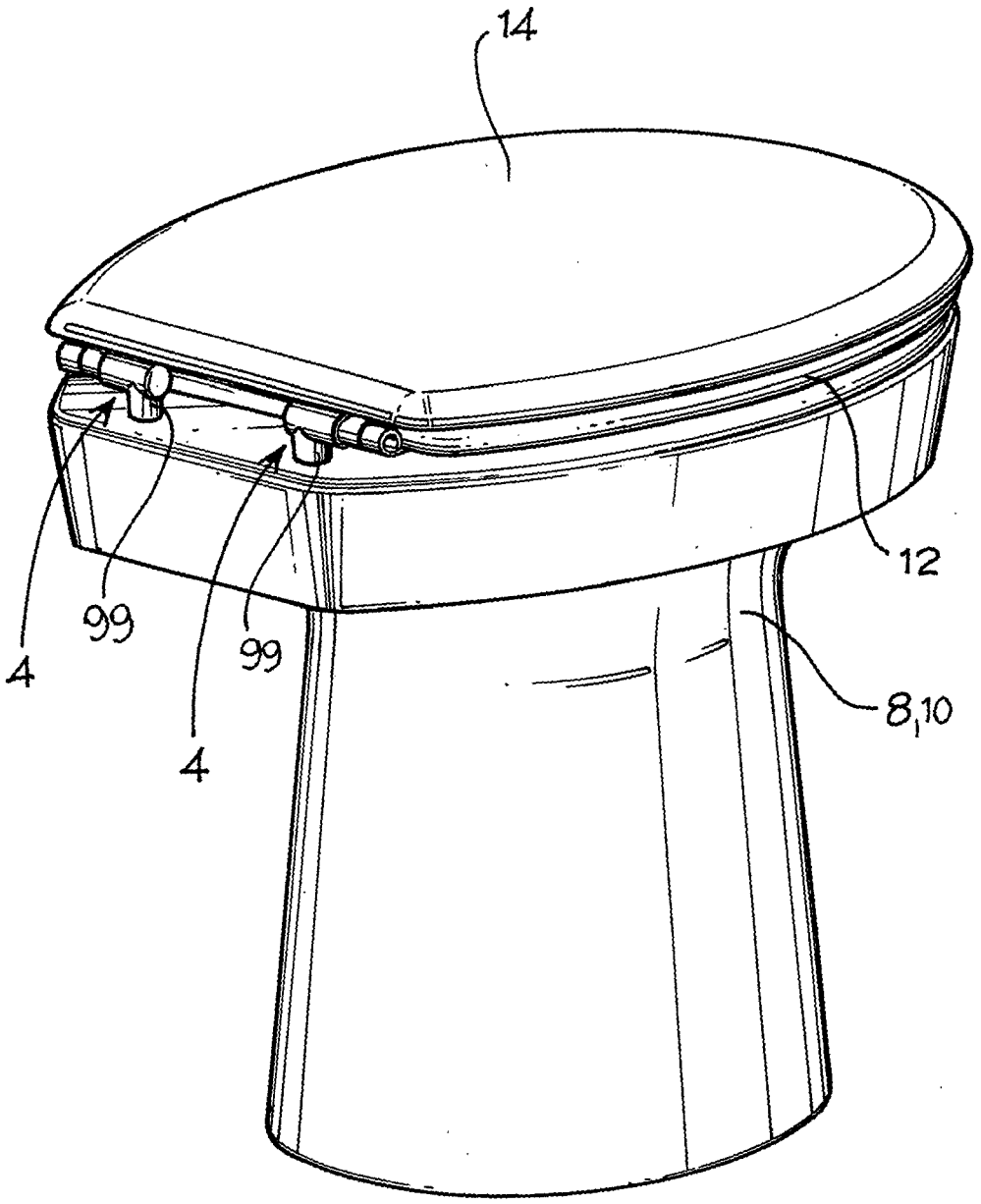

Fig.6

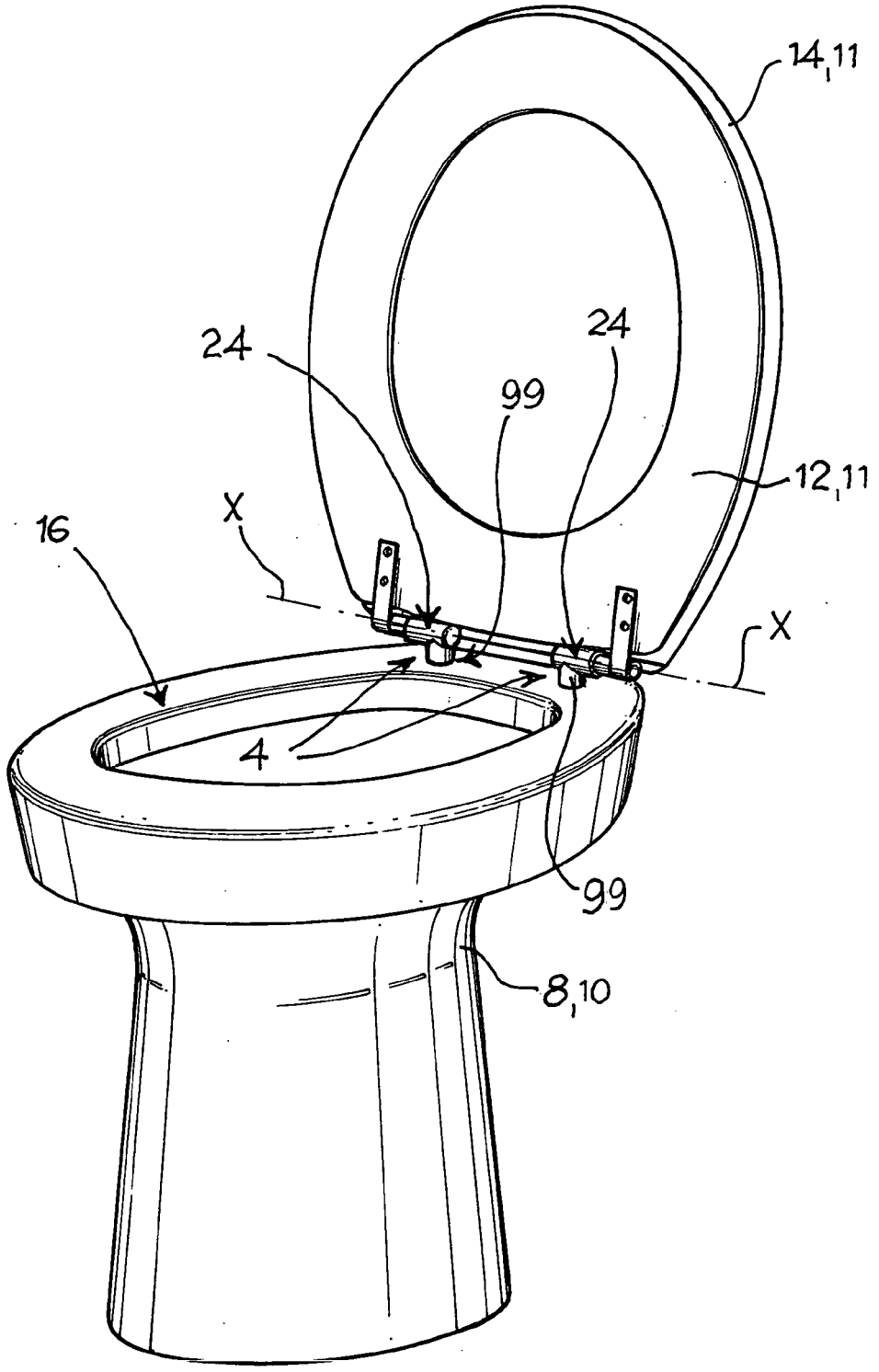

Fig.7