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(54) Toilet hinge arrangement for releaseable fastening of toilet cover assembly

(57) Toilet hinge arrangement (1) for fastening of a toilet cover assembly (5) including a toilet seat (16) and/or a toilet cover (17) to a toilet bowl (18) so that the toilet cover assembly can pivot about a substantially horizontal hinge axis. The toilet hinge arrangement includes an upwardly extending shaft member and a transverse shaft member releasably connected to the upwardly extending shaft member. Via a radial opening (5) the first shaft member (7) is inserted into a cavity (4) in the second shaft member (8). The first shaft member (7) is retained in the cavity (4) by means of a U-shaped spring (19) which with a resilient leg (26) is arranged below a radial projection (28) on the first shaft member (7). The free end of the resilient leg (26) abuts a contact face (30). When pressure is exerted on the U-shaped spring, on abutting the contact face (30) the resilient leg (26) will be deflected away from the first shaft member (7), by this the first shaft member (7) can be released from the second shaft member (8).

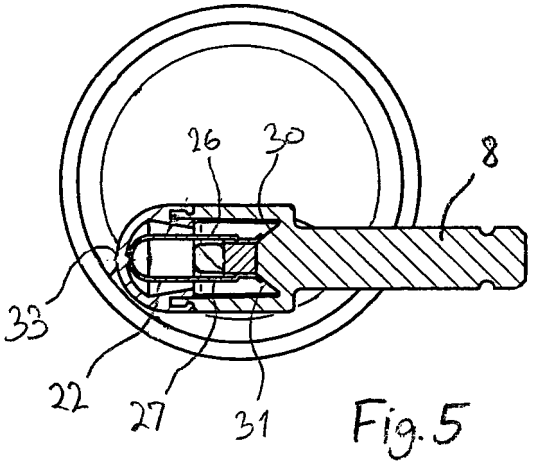

Fig. 5

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Description

[0001] The invention relates to a toilet hinge arrangement for releasable fastening of a toilet cover assembly including a toilet seat and/or a toilet cover to a toilet bowl according to the preamble to claim 1.

[0002] Usually such two arrangements are used for fastening the toilet cover assembly so that it is pivotal about a substantially horizontal hinge axis between an upright, open position and a lowered position in which the toilet cover assembly rests on the rim of the toilet bowl. Toilet bowls are usually equipped with two interspaced fastening holes with vertical hole axes to which an assembly bolt for the toilet hinge arrangement can be fastened. Cleaning around the hinges is often a problem when cleaning toilets. Thus over the yeats several proposals have been made for so-called "quick release" hinges making the removal of the toilet cover assembly handy and quick with a view to cleaning the bowl around the hinges and subsequently remounting the toilet cover assembly.

[0003] EP 0 853 916 B1 discloses a toilet hinge arrangement, wherein the shaft members extending upwardly from the member and provided with radial projections are received in cavities in a common transverse shaft and are secured herein by means of "slide bars", which are slideable on the transverse shaft between a locking position in which the slide bars engage the projections on the shaft members and a non-locking position in which the slide bars are placed distally in relation to the projections of the shaft members so that the transverse shaft can be removed with the toilet cover assembly. One drawback of this structure is that it requires a displacement of the slide bars on securing and releasing the cover assembly. Due to dirt or tolerance errors it can be difficult to displace the slide bars on the transverse shaft and there is no protection from releasing the toilet cover assembly unintentionally.

[0004] US 4.159.548 discloses a toilet hinge arrangement including a hinge block which can be secured to the toilet and a demountable hinge member with a transverse shaft pin. By means of resilient legs the hinge member snaps into engagement with an opening in the hinge block. One of the legs is accessible via an opening in the hinge block and by pushing the leg so that it bends the hinge member is snapped out of engagement with the hinge block. One drawback of this structure is that it includes a plurality of corners and recesses for dirt to gather in. Furthermore there is the risk of damaging the resilient legs on securing or when the toilet cover assembly is handled while released. If the toilet cover assembly with its protruding resilient legs lies on the floor, one might step of legs unintentionally and thus they might break.

[0005] US 6.643.851 B1 discloses a hinge arrangement including female clip members which are secured to the toilet bowl and male clip members connected to the hinge bodies which are connected to the toilet cover assembly. One drawback of this structure is that it requires two fingers to release each male clip member. Due to the design of the arrangement which includes several notches and recesses it is difficult to clean the hinge arrangement *per se* completely.

[0006] DE 44 09 516 A1 discloses a toilet hinge arrangement according to the preamble of claim 1, After inserting the shaft member which extends upwardly from the base member into the cavity of the transverse shaft member, the two shaft members can be locked in relation to each other by means of a locking ring which is moveable between a locking position and a release position. One drawback of this structure is that the two shaft members do lock automatically when the first shaft member is inserted into the cavity of the second shaft member. Thus, if the cleaning staff forget to turn the locking ring after having remounted the toilet cover assembly, the toilet cover assembly risks getting loose while a user sits on the seat. This might result in the user being harmed or in the toilet hinge arrangement or the toilet cover assembly being damaged.

[0007] The object of the invention is to provide a new and improved toilet hinge arrangement enabling quick and secure mounting and demounting of the toilet cover assembly.

[0008] According to the invention the object is obtained in that the toilet hinge arrangement includes a substantially U-shaped spring, which is placed in the cavity and which includes a first and a second resilient leg extending from a connecting member, where at least the first leg is positioned in the locking position below the radial projection of the first shaft member and prevents the first shaft member from being removed, and where via an activation opening in the second shaft member the connecting member of the U-shaped spring is accessible to exterior pressure in the direction of the resilient legs as the cavity includes a contact face arranged in relation to the free end of the first leg so that the above pressure causes a movement of the U-shaped spring from the locking position to a release position, during this movement the free end of the first leg is deflecte away from the first shaft member on abutting the contact face so that the leg is moved radially away from the projection, hereby the first shaft member is released from the second shaft member. As a result by simply pressing on the connecting member of the U-shaped spring the first shaft member is quickly and easily releasable from the second shaft member, whereby the toilet cover assembly can be removed. When no pressure is exerted the U-shaped spring will be in the locking position. Thus, there is no risk of forgetting to lock the shaft members in relation to each other when the toilet cover assembly is remounted to the toilet bowl after cleaning.

[0009] According to one embodiment the first shaft member is the shaft member extending upwards from the base member and the second shaft member is the transverse shaft member.

[0010] According to an alternative embodiment the first shaft member is the transverse shaft member and the

second shaft member is the shaft member extending upwards from the base member.

[0011] According to a preferred embodiment the contact face is an inclined surface being inclined in relation to the longitudinal axis of the second shaft member. As a result less pressure is required to bring the U-shaped spring into the release position. The inclined surface will guide the legs of the spring away from the projection.

[0012] According to an embodiment the resilient legs of both U-shaped springs are in a locking position below a projection of the first shaft member. Hereby a more secure locking is obtained in the locking position.

[0013] According to an embodiment the cavity includes a first inclined contact face for the first leg of the U-shaped spring and a second inclined contact face for the second leg of the U-shaped spring.

[0014] According to a preferred embodiment the coupling end of the first shaft member tapers from the projection so that it can be entered between the resilient legs and push these outwards until the resilient legs spring back into the locking position. As a result the toilet cover assembly can be mounted without any pressure being required on the connecting member of the U-shaped spring.

[0015] According to another embodiment the first shaft member has a non-circular cross-section in the area of the projection and a seat to receive the shaft member in the cavity has a corresponding cross-section. As a result the second shaft member is secured against pivoting about the longitudinal axis of the first shaft member.

[0016] Preferably the activation opening is provided in the axial end surface of the second shaft member.

[0017] The activation opening is preferably covered by a movable button. The button is preferably made from flexible material, e.g. rubber. As a result a closed structure can easily be achieved in which the penetration of dirt is prevented from causing failure of the movable parts.

[0018] The U-shaped spring is preferably made from bent metal strip, preferably from spring steel. This ensures good resilient properties together with secure fastening.

[0019] Below the invention is explained in detail with reference to the drawings in which

fig. 1 shows a toilet coven assembly including a toilet seat and a toilet cover which by means of a toilet hinge arrangement according to the invention has been secured to a diagrammatically shown toilet bowl,

fig. 2 is a toilet hinge arrangement according to fig. 1 seen in a perspective view and with a horizontal cut through the transverse shaft member,

fig. 3 is a side view of a toilet hinge arrangement,

fig. 4 is a sectional view of a toilet hinge arrangement along line IV-IV in fig. 3,

fig. 5 is a sectional view of a toilet hinge arrangement along line V-V in fig. 3,

fig. 6 is a perspective view of the toilet hinge arrangement,

fig. 7 is a longitudinal sectional view of the transverse shaft member,

fig. 8 is a side view of the transverse shaft member,

fig. 9 is an end view of the transverse shaft member,

fig. 10 is a sectional view of the transverse shaft member along line X-X in fig. 8,

fig. 11 is a cross-sectional view of the transverse shaft member along line XI-XI in fig, 8,

fig. 12 is a perspective view of the U-shaped spring,

fig. 13 is a perspective view of the upwardly extending shaft member,

fig. 14 shows a button for activating the U-shaped spring, and

fig. 15 is a sectional view through the button in fig. 14,

[0020] Fig. 1 shows how a usual toilet cover assembly 15 including a toilet seat 16 and a toilet cover 17 by means of two toilet hinge arrangements 1 according to the invention is pivotal secured to all flange on a toilet bowl 18. Here the toilet bowl 18 is only shown diagrammatically as a rectangular plate for the sake of clarity. The seat 16 and the cover 17 are pivotal between the shown horizontal position in which the seat 16 rests on the toilet bowl and the cover 17 rests on the seat and the vertical position in which the cover 17 and optionally the seat 16 rest on a not-shown cistem or wall.

[0021] Fig. 2 is a perspective view of a toilet hinge arrangement according to a preferred embodiment, a horizontal cut being inserted in the transverse shaft member 8.

[0022] Fig. 3 is a side view of the toilet hinge arrangement 1. The toilet hinge arrangement 1 includes a circular disc-shaped base member 2 and a shaft member 7 extending upwards therefrom. An upper coupling end 6 of the shaft member 7 is releasably secured in a coupling end 13 of a transverse shaft member 8.

[0023] Fig. 4 is a sectional view along line IV-IV in fig. 3. The base member 2 includes an oblong slot 10 by means of which the base member can be secured to the toilet bowl with a bolt, the head of which can be inserted into an expanded upper part of the slot 23. A casing 20 covers the slot and thus the head in the mounted stage

of the hinge when the lower face 3 of the base member abuts the surface of the toilet bowl. The upwardly extending shaft member 7 includes a base 24 which is received in a shaft hole 9 in the base member. The base 24 includes an upwardly facing contact face 12 and the shaft hole 9 includes a downwardly facing contact face 11. When mounted the shaft member 7 is retained such in the base member 2 that the contact faces 11, 12 prevent the shaft member 7 from being upwardly displaced and the toilet bowl prevents the shaft member 7 from being downwardly displaced. Furthermore the shaft member 7 is prevented from rotating in the shaft hole 9, the upwardly facing contact face 12 of the base 24 being provided with projections 14 (cf. fig. 13) and the downwardly facing contact face 11 of the shaft hole being provided with correspondingly shaped recesses (not shown). A plurality of recesses is provided along the circumferential, downwardly facing contact face 11 so that the pivotal position of the shaft member can be adjusted accurately set precisely. The combination of the oblong mounting slot 10 and the option for adjusting the pivotal position of the shaft member 7 make it possible to a just the toilet hinge arrangement accurately.

[0024] Fig. 5 is a partial sectional vie of the toilet hinge arrangement along line V-V in fig. 3. The cut extends through the transverse shaft member 8 about which the toilet cover assembly 15 can pivot. The transverse shaft member 8 is retained on the upper free end of the shaft member 7 by means of a U-shaped spring 22 which engages below projections of the shaft member 7 and which can be moved to the right in fig. 5 by pushing a rubber button 33 a explained in greater detail below.

[0025] Fig. 6 is a perspective view of the toilet hinge arrangement, the push button 23 being seen clearly, the shaft member 7 and the shaft member 8 being releasable from each other on activating the push button.

[0026] Fig. 7 is a longitudinal sections view through the transverse shaft member 8. At its first end the shaft member 8 is provided with a cavity 4, which is accessible via a radial opening 5 and in the axial end face 32 an axial activation opening 29.

[0027] Fig. 8 is a side view of the transverse shaft member 8. A circumferential recess 38 serves to secure the rubber button 33, as is explained in greater detail below.

[0028] Fig. 9 shows the transverse shaft member 8 from the coupling end 13. The guide passages 41, 42 serve to receive the resilient legs 26, 27 of the U-shaped spring 19 (cf. fig. 12). The inclined face 45 at the entrance to the guide slots 41, 42 ease the insertion of the resilient legs 26, 27 during assembly.

[0029] Fig. 10 is a sectional view of the transverse shaft member 8 along line X-X in fig. 8. As it can be seen, the guide passages 41 42 end in inclined contact faces 30 31 extending towards the outer face of the shaft member. The radial opening 5 extends into the shaft member 8 and has the cross section as shown in fig. 10.

[0030] Fig. 11 shows the transverse shaft member 8 along the sectional line XI-XI in fig. 8. As it can be seen, the radial opening 5 widens downwardly and tapers upwardly for reasons appearing from the below explanations.

[0031] Fig. 12 shows the U-shaped spring which serves to lock the coupling end 6 of the upwardly extending shaft member 7 in the cavity 4 of the transverse shaft member 8. The U-shaped spring 19 includes a curved connecting member 22 from which two resilient legs 26, 27 extend. The free ends of the resilient legs 26, 27 are bent so that they have inclined faces 43 inclining outwardly from the centre of the U-shaped spring. These inclined faces 43 partly serve to ease the insertion of the spring into the guide passages 41, 42 and partly they serve to ensure that the resilient legs 26, 27 slide more easily on the inclining contact faces 30, 31 at the bottom of the guide slots 41, 42. The legs 26, 27, however, do not need to bend at their free ends.

[0032] Fig. 13 is a perspective view of the upwardly extending shaft member 7. The shaft member 7 is cast together with the above base 24 provided with an upwardly facing contact face 12 with projections 14. As mentioned in connection with fig. 4, together with the not shown recesses of the downwardly facing contact face 11 of the shaft hole 9 these projections 14 serve to lock the shaft member 7 in an arbitrary pivotal position. The upper coupling end 6 of the shaft member 7 is non-rotational symmetrical, but has two parallel lateral faces. Upwards the shaft member 7 tapers by means of bevellings 9 extending upwards from two projections 28. Below the projections 28 the shaft member 7 has a narrowed area which is downwardly delimited by two inclined shoulders 44.

[0033] Fig. 14 is a perspective view of a rubber button 33 and fig. 15 is a vertical sectional view of the same. The button 3 has a hollow interior 35 to receive the connecting member 22 of the U-shaped spring 19. When mounted the button 33 is secured to the coupling end 13 of the transverse shaft member 8. For this purpose the button 33 has a circumferential recess 36 with a bead 37 which may engage with the circumferential recess 38 in the coupling end 13 of the transverse shaft member 8 (cf. fig. 8).

[0034] As regards the mode of operation of the toilet hinge arrangement in its assembled state, reference is particularly made to figs. 2, 5, 12 and 13. The resilient legs 26, 27 of the U-shaped spring 19 are arranged in the guide passages 41, 42 and grip around the narrowed area of the coupling end 6 of the upwardly extending shaft member 7. The resilient legs 26, 27 engage below the projections 28 of the shaft member 7 and prevent the shaft member 7 from being removed from the cavity 4 of the transverse shaft member 8. By pressing the rubber button 33 the U-shaped spring 22 is moved to the right in fig. 5. By this the resilient legs 26, 27 yield outwards as a result of their abutting the inclined contact faces 30, 31. As a result hereof the resilient legs 26, 27 move away from the narrowed area of the coupling end 6 of the shaft member 7. At a point the resilient legs 26, 27 have been

moved so far away from the shaft member 7 that they are no longer positioned below the projections 28 whereby the coupling end 6 of the shaft member 7 can be pulled out of the cavity 4 via the opening 5. When pressure is no longer applied, the U-shaped spring 19 moves to the left in fig. 5 due to the spring effect and adopts the locking position. When the toilet cover assembly with the tansverse shaft member 8 is to be refastened to the upwardly extending shaft member 7, the transverse shaft member 8 is simply led back down over the upwardly extending shaft member 7 until they click in engagement with each other. Hereby the bevellings 39 on the upwardly extending shaft member 7 spread the legs 26, 27 and at a point when the projections 28 have passed the legs 26, 27 they spring in below the projections 28.

[0035] In the embodiment shown, the inclined contact faces 30, 31 each define an angle of approx. 40° in relation to the longitudinal axis of the transverse shaft member 8. Hereby a "button movement" of approx. 3 - 5 mm is achieved before the release position is reached.

[0036] The U-shaped spring 19 is preferably made from spring steel. In the embodiment shown the distance between the resilient legs is approx. 5 mm. The legs 26, 27 and the connecting member 22 have a width of approx. 3.5 mm and a thickness of approx. 0.5 mm. The length of the spring is approx. 17.5 mm.

[0037] The invention is not limited to the embodiment shown here. The upwardly extending shaft member 7 and the transverse shaft member 8 can for example interchange positions so that the cavity 4 with the U-shaped spring 19 is positioned in the upwardly extending shaft member 7. In this case the button 33 points upwards.

[0038] In the embodiment shown both legs of the U-shaped spring are in locking engagement with projections 28. According to an alternative embodiment only one leg engages a projection 28.

[0039] The term "U-shape" is to be understood very broadly as the spring 19 may also be V-shaped or have any other shape whatsoever in which two resilient legs 26, 27 with free ends extend from a connecting member 22. The connecting member 22 can e.g. be straight and form right angles to the legs 26, 27.

[0040] The spring is preferably band-shaped with two wide lateral faces which are substantially parallel to the longitudinal axis of the upwardly extending shaft member 7. Thus the spring possesses great rigidity against bending in the direction of the upwardly extending shaft member 7 ensuring further locking. The U-shaped spring may, however, also be made from bent metal wire. Optionally the spring can be made from plastics.

LIST OF REFERENCE NUMERALS

[0041]

1 toilet hinge arrangement
2 base member
3 lower side of base member
4 cavity
5 radial opening
6 coupling end of the upwardly extending shaft member
7 upwardly extending shaft member
8 transverse shaft member
9 shaft hole
10 mounting slot
11 downwardly extending contact face in shaft hole
12 upwardly extending contact face on shaft member
13 coupling end of transverse shaft member
14 projection
15 toilet cover assembly
16 toilet seat
17 toilet cover
18 toilet bowl
19 U-shaped spring
20 casing
21 upper side of base member
22 connecting member
23 upper part of mounting slot
24 base of shaft member
25 circumferential recess
26 first leg of U-shaped spring
27 second leg of U-shaped spring
28 radial projection
29 activation opening
30 contact face
31 contact face
32 axial end face of transverse shaft member
33 button
34 inner face of button
35 interior of button
36 circumferential recess
37 bead
38 circumferential recess
39 bevelling on shaft member
40 inclined faces in radial opening
41 guide passage for first leg
42 guide passage for second leg
43 inclined faces on resilient leg
44 inclined shoulder on shaft member
45 inclined faces

Claims

1. Toilet hinge arrangement (1) for releasable fastening of a toilet cover assembly (15) including a toilet seat (16) and/or a toilet cover (17) to a toilet bowl (18) so that the toilet cover assembly can pivot about a substantially horizontal hinge axis, said toilet hinge arrangement including a base member (2) with a lower side (3) adapted to abut the surface (19) of the toilet bowl, a first and a second shaft member in form of a shaft member (7) extending upwards from the base member and with an upper coupling end (6) and a transverse shaft member (8), defining a horizontal

hinge axis for the toilet cover assembly an having the coupling end (13) being releasably connected to the coupling end! (6) of the upwardly extending shaft member (7), said first shaft member (7) including at least one radial projection (28) at its coupling end (6) while the second shaft member (8) includes a cavity (4) with a radial opening (5) at its coupling end (13) where the coupling end (6) of the first shaft member (7) extends through the radial opening (5) and is releasably secured in a locking position in the cavity (4),
characterised in that

- a substantially U-shaped spring (19) is provided which is placed in the cavity (4) and which includes a first (26) and a second (27) resilient leg extending from a connecting member (22), where at least the first leg (26) in the locking position is positioned below the radial projection (28) of the first shaft member (7) and prevents a removal of said first shaft member,
- the connecting member (22) of the U-shaped spring (19) via an activation opening (29) in the second shaft member (8) is accessible to exterior pressure in direction of the resilient legs (26, 27),
- the cavity (4) includes a contact face (30) arranged in relation to the free end of the first leg (26) so that the above pressure causes the U-shaped spring (19) to move from a locking position to a release position, during this movement the free end of the first leg (26) is deflected away from the first shaft member (7) on abutting the contact face (30) so that the leg (26) is moved radially away from the projection (28) thus releasing the first shaft member (7) from the second shaft member (8).

2. Toilet hinge arrangement according to claim 1 **characterised in that** the first shaft member is the shaft member (7) extending upwards from the base member (2) and the second shaft member is the transverse shaft member (8).

3. Toilet hinge arrangement according to claim 1 **characterised in that** the first shaft member is the transverse shaft member (8) and the second shaft member is the shaft member (7) extending upwards from the base member (2).

4. Toilet hinge arrangement according to one of the preceding claims **characterised in that** the contact face is inclined surface (30) being inclined in relation to the longitudinal axis of the second shaft member (8).

5. Toilet hinge arrangement a cording to one of the preceding claims **characterised in that** in the locking position both the resilient legs (26, 27) of the U-shaped spring (19) are arranged below a projection (28) on the first shaft member (7).

6. Toilet hinge arrangement according to claim 5 **characterised in that** the cavity (4) includes a first inclined contact face (30) for the first leg (26) of the U-shaped spring (19) and an inclined contact face (31) for the second leg (27) of the U-shaped spring (19)

7. Toilet hinge arrangement according to one of the preceding claims **characterised in that** the coupling end (6) of the first shaft member (7) tapers from the projection (28) so that it can be inserted between the resilient legs (26, 27) and push these outwards until the resilient legs (26, 27) spring back into the locking position.

8. Toilet hinge arrangement according to one of the preceding claims **characterised in that** the first shaft member (7) has a non-circular cross section in the area of the projection (28), and that a seat (5) in the cavity (4) has a corresponding cross section.

9. Toilet hinge arrangement according to any one of the preceding claims **characterised in that** the activation opening (29) is provided in the axial end surface (32) of the second shaft member (8).

10. Toilet hinge arrangement according to any one of the preceding claims **characterised in that** the activation opening (29) is covered by a movable button (33), preferably of rubber.

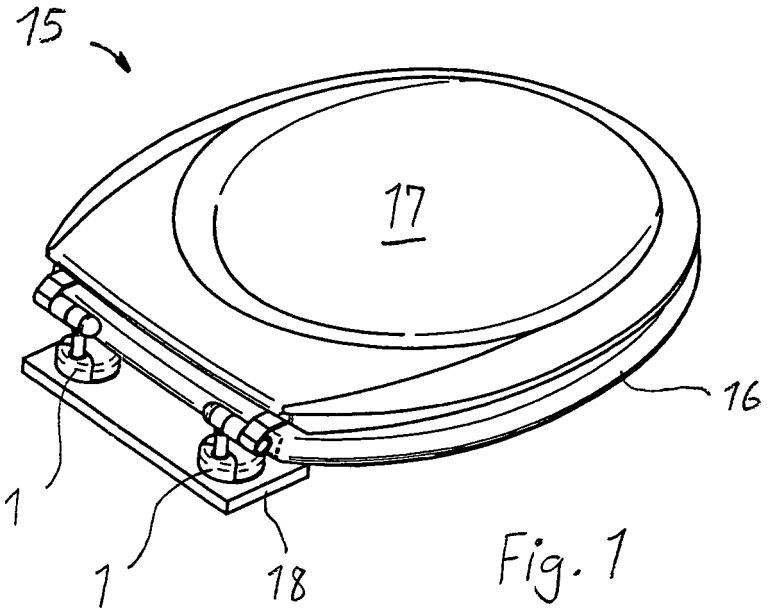

Fig. 1

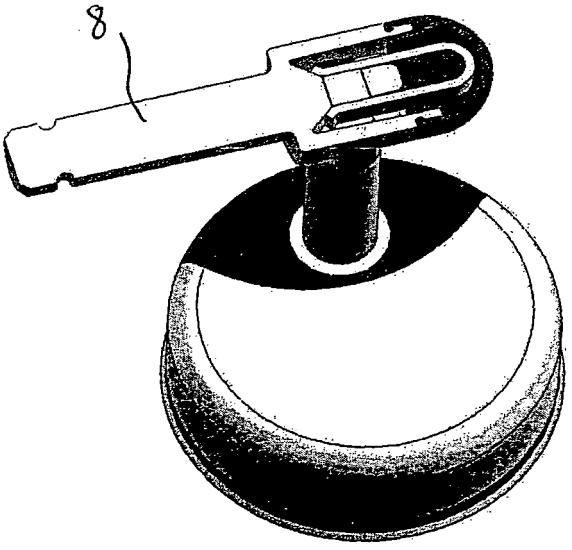

Fig. 2

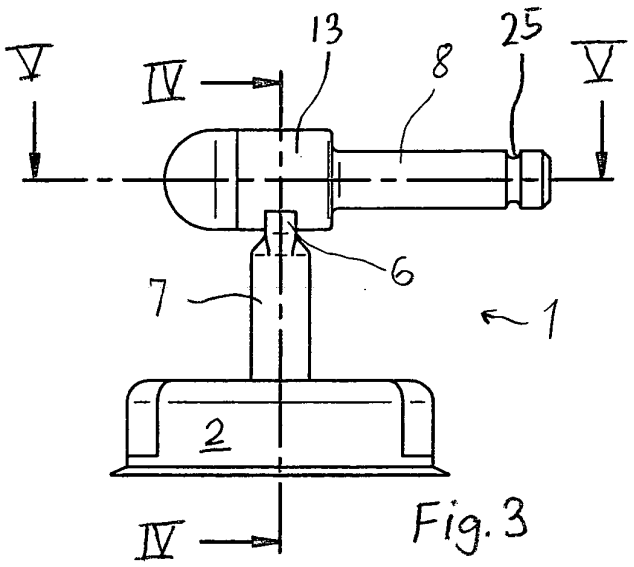

Fig. 3

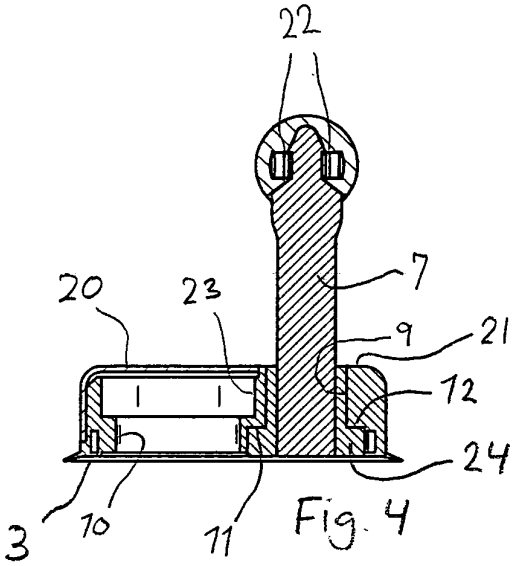

Fig. 4

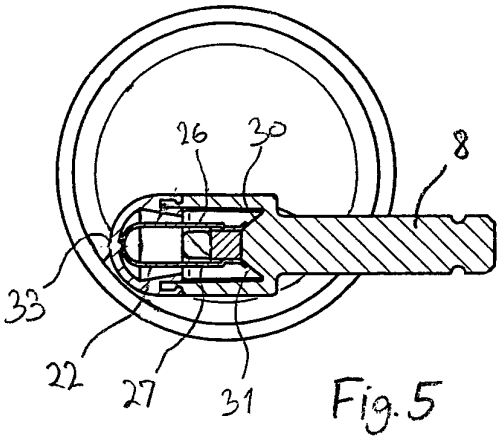

Fig. 5

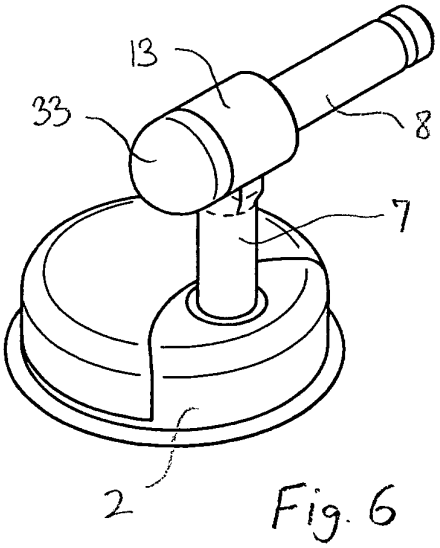

Fig. 6

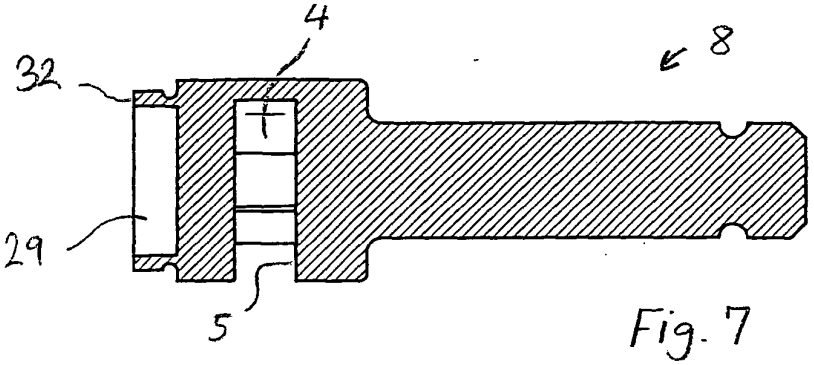

Fig. 7

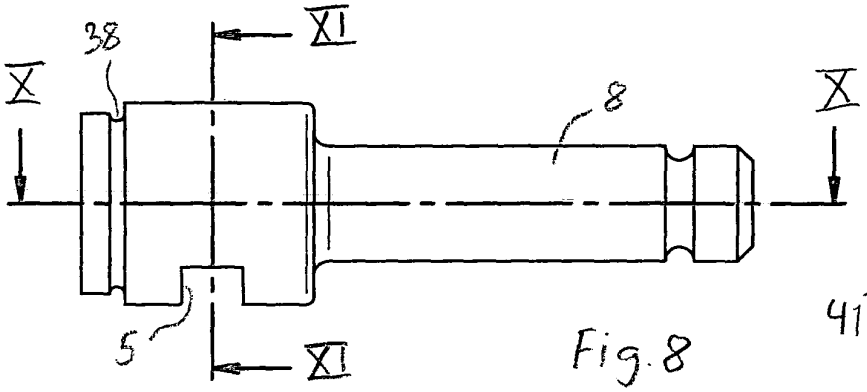

Fig. 8

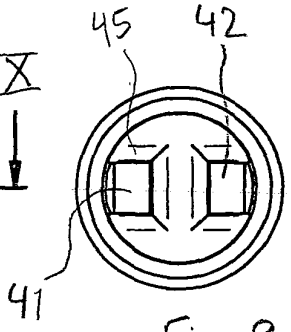

Fig. 9

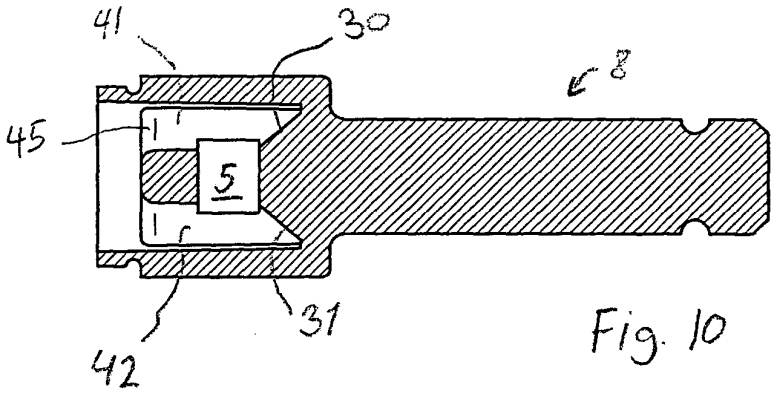

Fig. 10

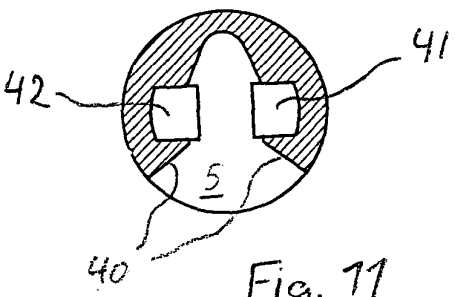

Fig. 11

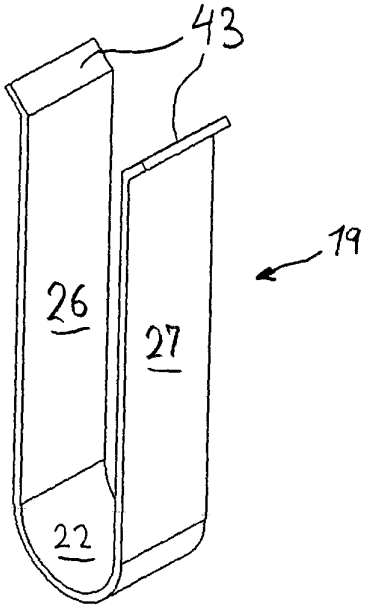

Fig. 12

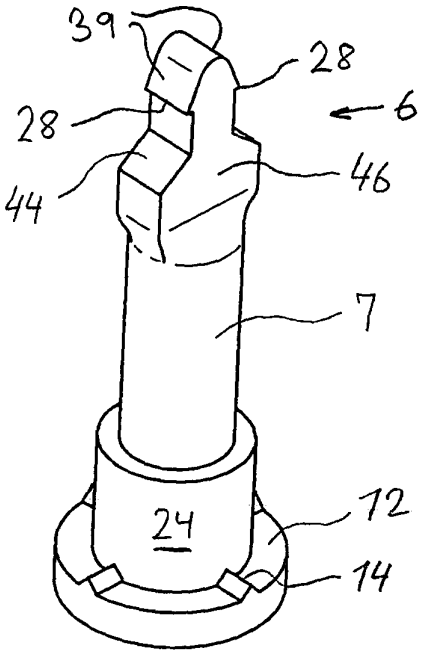

Fig. 13

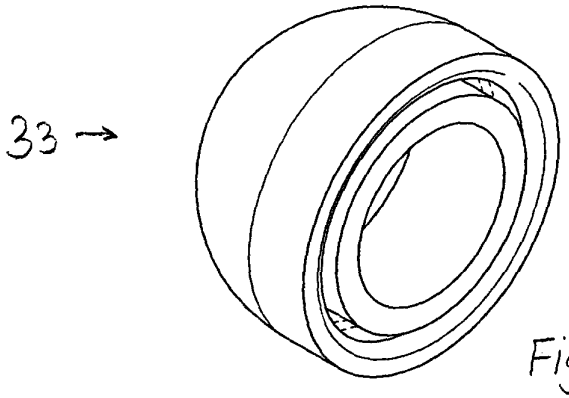

Fig. 14

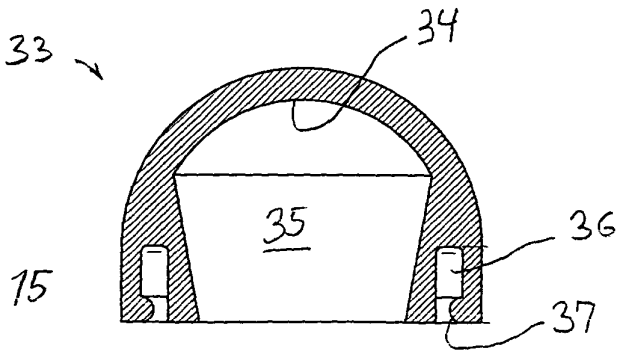

Fig. 15