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(54) **ACTUATING DEVICE FOR A DRAIN FITTING**

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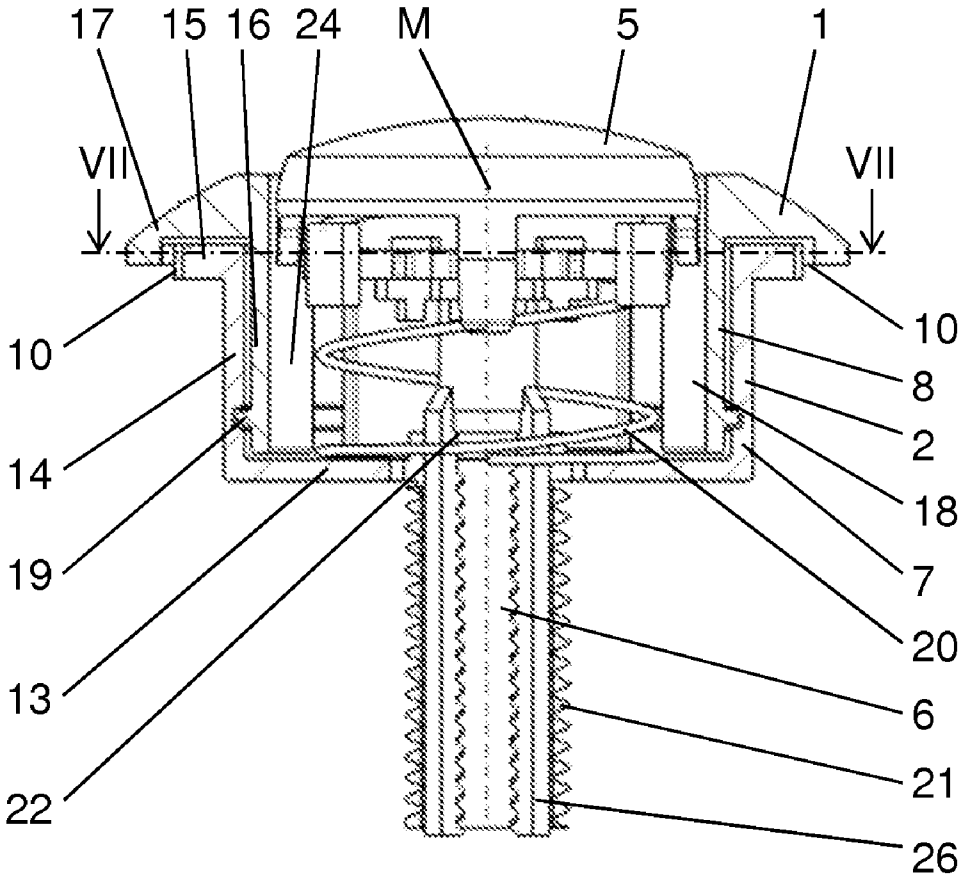
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(57) **ABSTRACT**

An actuating device (**1**) for a drain fitting (**9**) of a flushing cistern comprises a housing (**2**), which is insertable into an opening (**3**) of a cistern lid (**4**), at least one push button (**5**), which is mounted in said housing (**2**) so as to be movable along an axis (M) in relation to the housing (**2**), and a pusher element (**6**), which is movable towards the drain fitting (**9**) to trigger flushing by actuating the at least one push button (**5**). The housing (**2**) comprises an assembly housing (**7**) and a push-button housing (**8**), which is pivotably mounted in the assembly housing (**7**), the at least one push button (**5**) being mounted on the push-button housing (**8**).



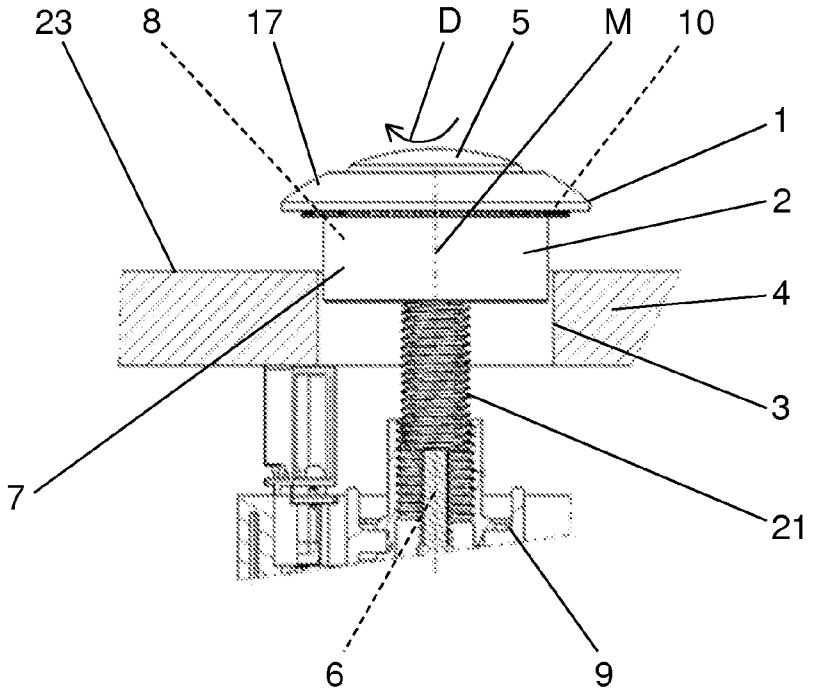


FIG. 1

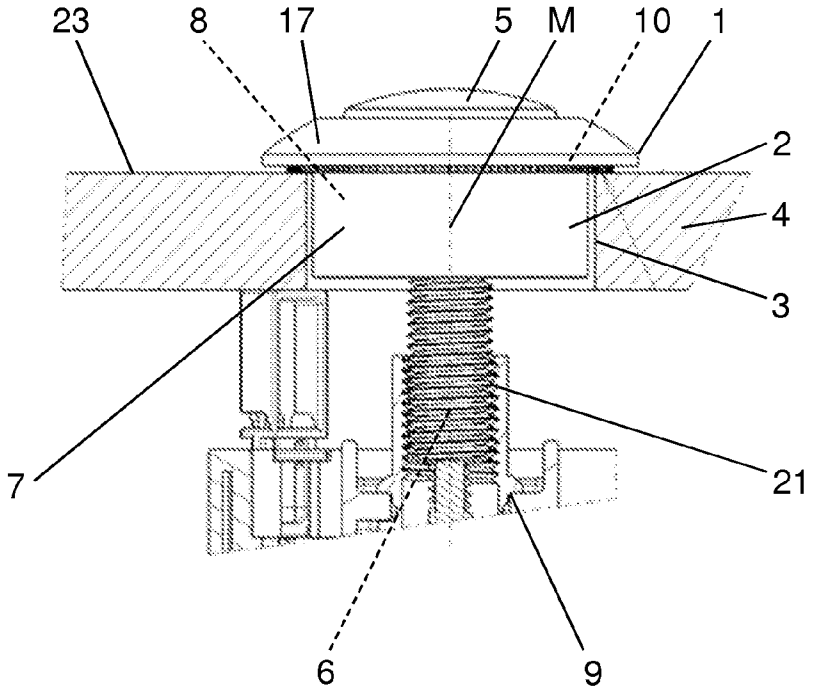


FIG. 2

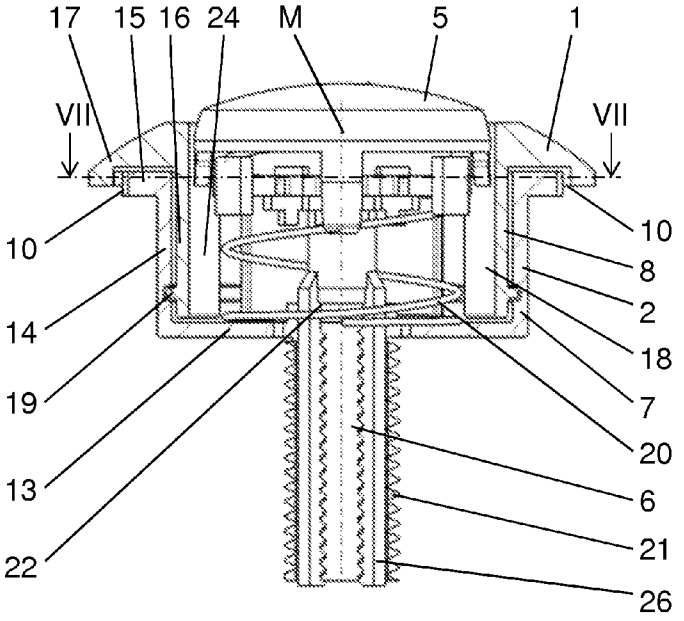


FIG. 3

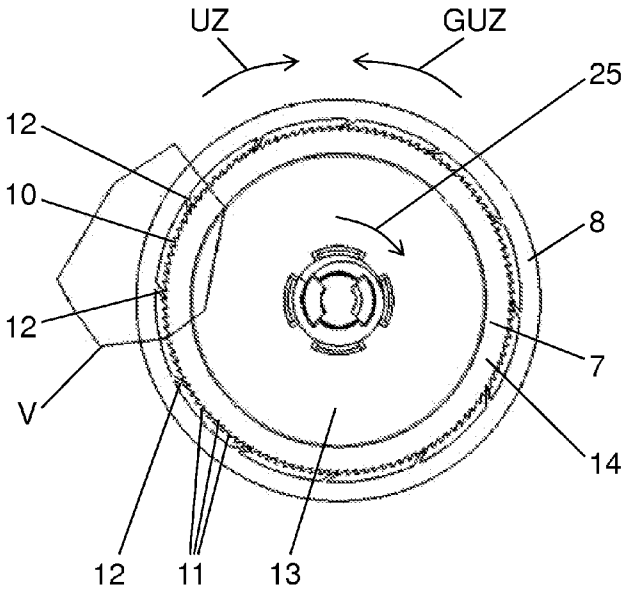


FIG. 4

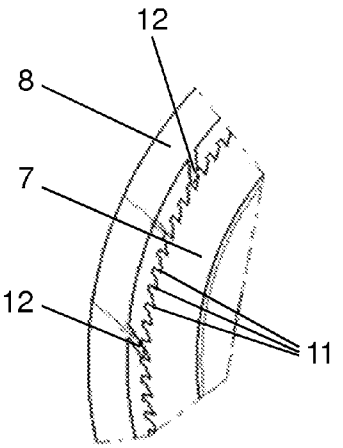


FIG. 5

ACTUATING DEVICE FOR A DRAIN FITTING

TECHNICAL FIELD

[0001] The present invention relates to an actuating device for a drain fitting according to the preamble of claim **1**.

PRIOR ART

[0002] EP 1 995 386 discloses an actuating device of the generic type for the actuation of a drain fitting in a flushing cistern. The actuating device has a push-button housing in which two push buttons are mounted. When flushing is triggered, the push buttons here are moved downwards, the drain fitting being actuated to trigger flushing by this movement.

[0003] Whereas exceptionally good results have been achieved with the actuating device according to EP 1 995 386, the requirement has arisen for the push buttons to be alignable in relation to the cistern lid, such that, for example, a logo printed on the push button can be aligned in relation to the cistern lid.

SUMMARY OF THE INVENTION

[0004] The present invention is based on the object of providing an actuating device, the push button of which is alignable in relation to a cistern lid in which the actuating device is installed.

[0005] Such an object is achieved by the actuating device according to claim **1**. Accordingly, an actuating device for a drain fitting of a flushing cistern comprises a housing, which is insertable into an opening of a cistern lid, having at least one push button, which is mounted in said housing so as to be movable along an axis in relation to the housing, and a pusher element, which is movable towards the drain fitting to trigger flushing by actuating the at least one push button. The housing comprises an assembly housing, by which the actuating device can be connected to the drain fitting and/or the flushing cistern, and a push-button housing, which is adjustably, in particular pivotably or rotatably mounted on the assembly housing, the at least one push button being mounted on the push-button housing. The actuating device is mounted in the flushing cistern by the assembly housing. The push-button housing is, therefore, pivotably or rotatably mounted in relation to the assembly housing, on account of which the push button mounted in the push-button housing can be aligned.

[0006] On account of the adjustability between the push-button housing and the assembly housing, the push-button housing can be adjusted in relation to the assembly housing. As a result, the position of the push-button housing and of the push buttons in relation to the cistern lid can be adjusted. This is particularly advantageous when, for example, two push buttons are present or when an imprint or embossing which is located on the push button, for example the logo of the manufacturer of the actuating device, is to be aligned.

[0007] Preferably, the push-button housing is in contact with the flushing cistern or the drain fitting exclusively via the assembly housing.

[0008] Preferably, a clutch, in particular an overrunning clutch having a toothing and at least one blocking latch which engages in the toothing, is located between the assembly housing and the push-button housing. The overrunning clutch ensures that the relative movement between the push-button housing and the assembly housing can only take place in one direction. In the other direction, the relative movement between the assembly housing and the push-button housing is blocked, both the assembly housing and also the push-button housing being moved when a force acts in said other direction. The overrunning clutch may also be described as a one-way clutch.

[0009] Said blocking latch interacts with the toothing, the relative movement between the assembly housing and the push-button housing being enabled in an overrunning direction, in particular after overcoming a friction force provided by the clutch, and the relative movement between the assembly housing and the push-button housing being disabled in a blocking direction, which is opposite to the overrunning direction. The movement occurs preferably about said axis.

[0010] In the event of a movement in the blocking direction acting on the push button or the push-button housing, both the push-button housing and also the assembly housing are moved collectively. In the event of a movement acting in the overrunning direction, the push-button housing can move in relation to the assembly housing, in particular in the event that the latter is in a fixed position.

[0011] In other words, in the event of a movement acting on the push-button housing in the overrunning direction, the clutch permits the relative movement between the push-button housing and the assembly housing, and in the event of a movement acting on the push-button housing in the opposite direction, that is to say the blocking direction, the movement is blocked, the movement then being transmitted from the push-button housing to the assembly housing. On account of this, on the one hand the push-button housing can be aligned in relation to the assembly housing and, on the other hand, a rotation can also be applied to the assembly housing, said rotation being usable, for example, for the separation of the connection between the assembly housing and the drain fitting. For assembling, however, the clutch provides a friction force which ensures that a movement is transmitted from the push-button housing to the assembly housing also in the event of a movement in the overrunning direction. Once this friction force is overcome, said overrunning takes place.

[0012] Preferably, a multiplicity of blocking latches are located at uniform spacing along the circumference. The toothing comprises a multiplicity of teeth, which are likewise located at uniform spacing along the circumference. The number of teeth is preferably greater than the number of blocking latches.

[0013] Preferably, the toothing is located on the assembly housing and the at least one blocking latch is located on the push-button housing. The reverse arrangement is, however, also conceivable.

[0014] Preferably, the overrunning direction is a movement in the clockwise direction and the blocking direction is a movement in the anticlockwise direction. The direction of rotation is defined in the viewing direction from above along the axis onto the surface of the push button which is visible from the outside. Consequently, the push-button housing can thus be aligned in relation to the assembly housing in the event of a movement in the clockwise direction. In the event of a movement in the anticlockwise direction, the clutch is blocked and the movement is transmitted from the push-button housing to the assembly housing.

[0015] In a development of the invention, the assembly housing comprises a circular base plate and a side wall, which extends from the base plate along a central axis, the side wall terminating with an at least partially encircling flange. The flange preferably extends from the side wall towards the

outside. Preferably, the push-button housing comprises a cylindrical side wall having a collar portion, which projects from the side wall.

[0016] Particularly preferably, the collar portion extends over the flange, the overrunning clutch being located between the collar portion and the flange. The collar portion thus covers the flange portion, so that said flange portion is not visible from outside.

[0017] Preferably, the base plate and the side wall of the assembly housing provide an interior space, into which the push-button housing at least partially protrudes. Consequently, the push-button housing is thus mounted in the interior space of the assembly housing.

[0018] Preferably, the push-button housing is rotatably mounted in the assembly housing, a securing element, which prevents an axial displacement between the push-button housing and the assembly housing, being provided between the push-button housing and the assembly housing. The securing element may be configured in various ways. It is particularly preferably a groove-and-ridge connection, the ridge protruding into the groove.

[0019] Preferably, the at least one push button is held in the starting position by a restoring element, in particular a compression spring, the restoring element being mounted preferably between the base plate and the push button.

[0020] In a development of the invention, the assembly housing comprises a threaded portion having a thread, in particular having an external thread, with which the assembly housing is connectable to a drain fitting.

[0021] Preferably, the pitch direction of the thread of the threaded portion is identical to the overrunning direction of the clutch. In the case of a right-handed thread, the overrunning direction is clockwise and the blocking direction is anticlockwise. In the case of a left-handed thread, the reverse applies. This has the effect that, when the clutch blocks the relative movement between the assembly housing and the push-button housing, rotation applied to the two housings enables the separation of the thread and the drain fitting. The threaded portion can thus be unscrewed from the counterpart in the drain fitting. The further effect is that when the clutch permits the relative movement between the assembly housing and the push-button housing, assembling of the thread and the drain fitting can be carried out. During assembling, the force is transmitted from the push-button housing via the friction present in the clutch to the assembly housing and, as soon as the thread is screwed into the drain fitting, slippage occurs in the clutch, so that the position of the push-button housing in relation to the now stationary assembly housing can still be adjusted.

[0022] Further embodiments are provided in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Preferred embodiments of the invention are described in the following by means of the drawings, which are intended to be merely of a descriptive nature and not to be interpreted as limiting. In the drawings:

[0024] FIG. **1** shows a schematic view of an actuating device prior to installation in a cistern lid;

[0025] FIG. **2** shows a schematic view of an actuating device as in FIG. **1** in the installed state;

[0026] FIG. **3** shows a sectional illustration through the actuating device according to the preceding figures;

[0027] FIG. **4** shows a view along the arrow IV of FIG. **3**, the overrunning clutch of the actuating device being shown; and

[0028] FIG. **5** shows a detailed view of the detail V of FIG. **4**.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0029] In FIG. **1** an actuating device **1** for a drain fitting **9** of a flushing cistern is shown. The flushing cistern and the drain fitting **9** are substantially known from the prior art. By means of the actuating device **1**, a force or a movement can be applied to the drain fitting **9**, this subsequently leading to triggering of flushing. Upon triggering of flushing, a valve body of the drain fitting **9** is raised from a valve on the flushing cistern, and the water can flow out from the flushing cistern to a toilet or a urinal via said valve.

[0030] The actuating device **1** comprises a housing **2**, which is insertable into an opening **3** of a cistern lid **4**. The actuating device further comprises at least one push button **5**, which is mounted in said housing **2** so as to be movable along an axis M in relation to the housing **2**. Said movement to trigger flushing can be provided on the drain fitting **9** via the push button **5**. The user here moves the push button **5** by hand. In particularly preferred embodiments there are two push buttons, namely a partial-amount flushing push button and a full-amount flushing push button. The drain fitting **9** further comprises a pusher element **6**, which is movable in relation to the drain fitting **9** and in relation to the housing **2** to trigger flushing by actuating the at least one push button **5**. Flushing is triggered in a known manner by the drain fitting **9** via the pusher element **6**.

[0031] In FIG. **1**, the actuating device **1** is shown in an assembly position. By a rotation D about the central axis M, the actuating device **1** can be connected by the thread **21** to the drain fitting **9**. The thread is preferably a thread having a right-handed pitch **25**, so that the actuating device can be screwed in by a movement in the clockwise direction.

[0032] In FIG. **2**, the actuating device **1** is shown in the fitted position. Here the actuating device **1** lies in the opening **3** of the cistern lid **4** and is additionally in contact with the surface **23** of the cistern lid **4**. With a collar portion **17**, the actuating device projects above the opening **3** and in this manner secures the cistern lid **4** in relation to the flushing cistern.

[0033] In FIG. **3**, a sectional illustration through the central axis M of the actuating device **1** is shown. It is readily visible here that the housing **2** comprises an assembly housing **7** and a push-button housing **8**. The actuating device **1** is connected to the drain fitting **9** or the cistern lid **4** by the assembly housing **7**. The assembly housing **7** is thus in contact with the cistern lid **4** or the drain fitting **9**. The push-button housing **8** is adjustably mounted on or in the assembly housing **7**. In the present embodiment, the push-button housing **8** is pivotable or rotatable about the central axis M in relation to the assembly housing **7**. The at least one push button **5** is mounted on the push-button housing **8**.

[0034] A clutch **10** is present between the assembly housing **7** and the push-button housing **8**. The clutch **10** is preferably an overrunning clutch **10** having a toothing **11** and having at least one blocking latch **12**, which engages in the toothing **11**. The overrunning clutch **10** may also be described as a one-way clutch.

[0035] The toothing **11** and the blocking latch **12** are correspondingly shown in FIGS. **4** and **5**. The clutch has the function of permitting the relative movement between the push-button housing **8** and the assembly housing **7** when a movement acts on the push-button housing **8** in a first direction or overrunning direction, here in the clockwise direction UZ. The relative movement is in particular permitted after overcoming the friction force which is made available by the toothing **11** and the blocking latch **12**. The actual overrunning thus only commences when a sufficiently great force acts between the push-button housing **8** and the assembly housing **7**, and the blocking latch **12** is moved out of the toothing **11**. Consequently, the fitter can adjust the position of the push-button housing **8** in relation to the assembly housing **7** with a rotation in the overrunning direction. In the event that a movement acts on the push-button housing **8** in a second direction opposite to the first direction, here indicated by GUZ, the relative movement between the push-button housing **8** and the assembly housing **7** is not permitted, or is blocked. The second direction here may be described as the blocking direction. Consequently, the movement is correspondingly transmitted from the push-button housing **8** to the assembly housing **7**.

[0036] It can be seen from FIG. **4** that a multiplicity of blocking latches **12** are located at uniform spacing along the circumference. Twelve blocking latches **12** are located in the present embodiment. It is, however, also conceivable to locate fewer or more than twelve blocking latches **12**. The toothing **11** has a multiplicity of teeth, which are also located at regular spacing along the circumference of the assembly housing **7**. The finer the pitch of the teeth of the toothing **11**, the more precisely the position of the push button **5** or the push-button housing **8** can be adjusted in relation to the assembly housing **7**.

[0037] The toothing **11** is thus preferably located on the assembly housing **7**, and the at least one blocking latch **12** is preferably located on the push-button housing **8**. The arrangement may, however, also be reversed.

[0038] The overrunning direction UZ is preferably a movement in the clockwise direction, and the blocking direction GUZ is preferably a movement in the anticlockwise direction. The movements may, however, also be in the opposite sense.

[0039] It can be seen from FIG. **3** that the assembly housing **7** comprises a circular base plate **13** and a side wall **14** which extends from the base plate **13** along a central axis M. The side wall **14** here terminates with a flange **15**, which is located so that it at least partially encircles the central axis M. Preferably, the flange **15** completely encircles the central axis M. The base plate **13** and the side wall **14** define an interior space **18**.

[0040] The push-button housing **8** in the present embodiment comprises a cylindrical side wall **16** having a collar portion **17** which projects from the side wall **16**. The side wall **16** delimits an interior space **24**, in which the push button **5** is mounted. The push button **5** is mounted in the interior space so that it is movable along the central axis M. Furthermore, the push button **5** is rotationally fixed in relation to the push-button housing **8**. A rotation of the push button **5** thus has the effect of a rotation of the push-button housing **8**. To this end, the push button **5** is in connection with the push-button housing **8** by suitable means, such as guide elements.

[0041] It can be seen from FIG. **3** that the collar portion **17** of the push-button housing **8** extends over the flange **15** of the assembly housing **7**. Said clutch **10**, in particular the overrunning clutch **10**, is located here between the collar portion **17** and the flange **15**. In other embodiments, the clutch may, however, also be located in other places. Here, the toothing **11** is located on the outer side of the flange **15**, and the blocking latches **12** are located on the inner side of the collar portion **17**.

[0042] As a result of the flange **15** being covered by the collar portion **17**, the flange **15** cannot be recognized from the outside, as is shown in FIG. **2**. From the outside, the user only sees the collar portion **17** and the push button **5**.

[0043] The push-button housing **8** at least partially protrudes into the interior space **18** of the assembly housing **7**. In other words, it may be said that the push-button housing **8** is mounted in the assembly housing **7**. The mounting here is rotatably or pivotably configured, so that the push-button housing **8** can be rotated or pivoted about the central axis in relation to the assembly housing. A securing element **19**, which prevents an axial displacement between the push-button housing **8** and the assembly housing **7**, is provided between the push-button housing **8** and the assembly housing **7** in the present embodiment. The securing element **19** here has the form of a groove-and-ridge connection, the groove extending into the side wall **14** of the assembly housing **7** and the ridge extending away from the side wall **16** of the push-button housing **8**. Other types of connection are of course also conceivable.

[0044] The present embodiment of the actuating device **1** additionally comprises a restoring element **20**, by which the at least one push button **5** is held in the starting position or returned again from the flushing position to the starting position. The restoring element **20** is preferably located between the base plate **13** and the push button **5**. Here, the restoring element **20** has the form of a compression spring.

[0045] The assembly housing **7** further comprises a threaded portion **21** having a thread, which threaded portion **21** here extends away from the base plate **13** of the assembly housing **7** along the central axis M in relation to the interior space **18**. The threaded portion **21** comprises an external thread and an opening **26** extending along the central axis in which the pusher element **6** is movably mounted. The assembly housing **7** can be connected to the drain fitting **9** by the threaded portion **21**, as this is shown in FIGS. **1** and **2**. To this end, the drain fitting **9** likewise has a matching thread.

[0046] The thread **25** has a pitch direction which is oriented identically to the overrunning direction. In the case of a right-handed thread, the overrunning direction is in the clockwise direction and the blocking direction is in the anticlockwise direction. Assembling will thus take place in the case of a rotation in the clockwise direction, the rotational movement being transmitted via the push-button housing **8** to the assembly housing **7** until said friction force of the clutch **10** is overcome.

[0047] In the context of disassembling this means that, when the clutch **10** blocks the relative movement between the assembly housing **7** and the push-button housing **8**, a rotation of the two housings **7**, **8** enables a separation between thread **21** and drain fitting **9**. In the case of a left-handed thread, which can likewise be used, the rotational directions are correspondingly reversed.

[0048] The push button **5** is in connection with the pusher element **6** via a contact face **22**. The contact face **22** here is oriented perpendicularly to the central axis M, so that the push button **5** can be moved in relation to the pusher element **6** during the adjustment of the position of the push button **5**.

LIST OF REFERENCE SIGNS

[0049] **1** Actuating device
[0050] **2** Housing
[0051] **3** Opening
[0052] **4** Cistern lid
[0053] **5** Push button
[0054] **6** Pusher element
[0055] **7** Assembly housing
[0056] **8** Push-button housing
[0057] **9** Drain fitting
[0058] **10** Overrunning clutch
[0059] **11** Toothing
[0060] **12** Blocking latch
[0061] **13** Base plate
[0062] **14** Side wall
[0063] **15** Flange
[0064] **16** Side wall
[0065] **17** Collar portion
[0066] **18** Interior space
[0067] **19** Securing element
[0068] **20** Restoring element
[0069] **21** Threaded portion
[0070] **22** Contact face
[0071] **23** Surface
[0072] **24** Interior space
[0073] **25** Pitch direction
[0074] **26** Opening
[0075] M Central axis
[0076] GUZ Blocking direction
[0077] UZ Overrunning direction

1-15. (canceled)

16. Actuating device for a drain fitting of a flushing cistern, comprising

a housing, which is insertable into an opening of a cistern lid,

at least one push button, which is mounted in said housing so as to be movable along an axis in relation to the housing, and

a pusher element, which is movable towards the drain fitting to trigger flushing by actuating the at least one push button, wherein

the housing comprises an assembly housing, with which the actuating device is mounted in the cistern lid, and a push-button housing, which is adjustably mounted in the assembly housing in relation to said assembly housing, wherein the at least one push button being mounted on the push-button housing.

17. Actuating device according to claim **16**, wherein said push-button housing is in relation to said assembly housing pivotably or rotatably mounted in the assembly housing.

18. Actuating device according to claim **16**, wherein a clutch, in particular an overrunning clutch having a toothing and at least one blocking latch which engages in the toothing, is located between the assembly housing and the push-button housing.

19. Actuating device according to claim **16**, wherein the blocking latch interacts with the toothing, the relative movement between the assembly housing and the push-button housing being enabled in an overrunning direction, in particular after overcoming a friction force made available by the clutch, and the relative movement between the assembly housing and the push-button housing being disabled in a blocking direction, which is opposite to the overrunning direction.

20. Actuating device according to claim **16**, wherein in the event of a movement in the blocking direction acting on the push button or the push-button housing, both the push-button housing and also the assembly housing are moved.

21. Actuating device according to claim **16**, wherein a multiplicity of blocking latches are located at uniform spacing along the circumference and/or wherein the toothing has a multiplicity of teeth, which are located at uniform spacing along the circumference, and/or wherein the toothing is located on the assembly housing and the at least one blocking latch is located on the push-button housing.

22. Actuating device according to claim **16**, wherein the blocking direction is a movement in the anticlockwise direction and the overrunning direction is a movement in the clockwise direction.

23. Actuating device according to claim **16**, wherein the assembly housing comprises a circular base plate and a side wall, which extends from the base plate along a central axis, the side wall terminating with an at least partially encircling flange.

24. Actuating device according to claim **16**, wherein the push-button housing comprises a cylindrical side wall having a collar portion, which projects from the side wall.

25. Actuating device according to claim **24**, characterized in that the collar portion extends over the flange, the clutch being located between the collar portion and the flange.

26. Actuating device according to claim **23**, wherein the base plate and the side wall of the assembly housing make available an interior space, into which the push-button housing at least partially protrudes.

27. Actuating device according to claim **16**, wherein the push-button housing is rotatably mounted in the assembly housing, a securing element, which prevents an axial displacement between the push-button housing and the assembly housing, being provided between the push-button housing and the assembly housing.

28. Actuating device according claim **16**, wherein the at least one push-button is held in the starting position by a restoring element, in particular a compression spring, the restoring element being mounted preferably between the base plate and the push button.

29. Actuating device according to claim **16**, wherein the assembly housing comprises a threaded portion having a thread, in particular having an external thread, with which the assembly housing is connectable to a drain fitting.

30. Actuating device according to claim **29**, wherein the pitch direction of the thread of the threaded portion is identical to the overrunning direction.

31. Actuating device according to claim **16**, wherein the at least one push button is mounted in the push-button housing in a rotationally fixed and axially movable manner.

32. Actuating device according to claim **16**, wherein the pusher element is mounted in the assembly housing so that it is movable along the central axis.

33. Actuating device according to claim **16**, wherein the push button and the pusher element each comprise a contact face, the push button and the pusher element being in connection with one another via said contact face.

* * * * *