

(19) **DANMARK**



Patent- og
Varemærkestyrelsen

(10) **DK/EP 2322729 T3**

(12) Oversættelse af
europæisk patentskrift

-
- (51) Int.Cl.: **E 03 C 1/23 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2016-03-21**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2016-01-06**
- (86) Europæisk ansøgning nr.: **10189068.9**
- (86) Europæisk indleveringsdag: **2010-10-27**
- (87) Den europæiske ansøgnings publiceringsdag: **2011-05-18**
- (30) Prioritet: **2009-11-17 DE 202009015538 U**
- (84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**
- (73) Patenthaver: **Viega GmbH & Co. KG, Viega Platz 1, 57439 Attendorn, Tyskland**
- (72) Opfinder: **Hennes, Frank, Serkenroder Str. 91, 57413, Finnentrop, Tyskland**
- (74) Fuldmægtig i Danmark: **Zacco Denmark A/S, Arne Jacobsens Allé 15, 2300 København S, Danmark**
- (54) Benævnelse: **Afløbs- og overløbsfitting, især til badekar**
- (56) Fremdragne publikationer:
EP-A1- 1 703 027
DE-A1- 2 813 088
DE-A1- 3 644 480
DE-C- 480 935
DE-U1-202007 012 241
US-A- 2 918 999

The invention relates to a drain and overflow fitting, in particular for bathtubs or sinks, comprising a drain housing, a valve body and a lever mechanism which is rotatably mounted in the drain housing for actuating the valve body, the lever
5 mechanism being coupled to an electric motor, and an overload protection device being provided.

Many embodiments of drain and overflow fittings for bathtubs or sinks are known. Conventional drain fittings and overflow
10 fittings are provided with a Bowden cable which can be manually actuated by means of a rotary rosette mounted on the overflow opening of the bathtub or by means of a push and pull button mounted on the sink.

15 In recent years, the ease of operation of sanitary devices has been developed, in particular in that water inlet valves have been equipped with programmable controllers or remote control devices. The programmable controllers or remote control devices enable for example the volume flow rate and
20 temperature of the inflowing water to be controlled. Furthermore, programmable controllers for bathtubs have already been developed which make it possible to input and store personalised user profiles.

25 In accordance with the preamble of claim 1, DE 20 2007 012 241 U1 describes an eccentric valve for closing and opening a sanitary drain fitting having a closure plug which is guided in a drain connection of the sanitary drain fitting so as to be able to be raised and lowered. The eccentric valve is
30 provided with an electric gear motor which is arranged in a motor housing together with a control unit. An eccentric pin is detachably connected to the gear motor, to which pin a

lever is assigned which can act on the closure plug.

Furthermore, the eccentric valve is provided with a safety device which switches off the gear motor after a predeterminable time when it is mechanically overloaded. In
5 this case, the safety device consists of an electronic safety device which is assigned to the control unit.

The object of the present invention is to provide a sanitary drain fitting and overflow fitting of the type mentioned at
10 the outset which provides greater ease of operation than conventional drain fittings and overflow fittings and does not function in a less reliable manner in the process.

This object is achieved by a drain and overflow fitting having
15 the features of claim 1.

A rotational movement can be transmitted to a lever of the lever mechanism via a shaft by means of the electric motor. The lever engages with the valve body and converts the
20 rotational movement into a raising or lowering movement of the valve body so that the drain valve is opened or closed.

The drain and overflow fitting according to the invention provides the option of particular ease of operation by means
25 of the electric motor. Therefore, the drain valve of the fitting can for example be automatically actuated by means of a programmable controller and/or electronically actuated by means of a remote control device. The mechanism, in particular the lever mechanism, and also the motor are protected in the
30 process against damage caused by overloading. A blockage of the valve body could be the cause of an overload. By using an overload protection device in accordance with the invention,

which device is arranged in the power transmission path from the electric motor to the valve body, reliable functioning of the motor-driven drain and overflow fitting is ensured.

5 According to the invention, the overload protection device is formed of a torsion spring arranged between the output shaft of the electric motor and the lever of the lever mechanism. The torsion spring ensures that only a predetermined maximum torque is transmitted to the electric motor. In the open valve
10 position, the valve body can be pressed downwards without the output shaft of the electric motor rotating as a result.

In terms of integrating the torsion spring, a further advantageous embodiment of the drain and overflow fitting
15 according to the invention consists in the fact that the lever mechanism has a split drive shaft, a portion on the motor side of the drive shaft being coupled via the torsion spring, in a torsionally resilient manner, to a second drive shaft portion, from which the lever protrudes radially. This embodiment is
20 advantageous in manufacturing and functional terms. This is because the torsion spring is able to be connected relatively easily to the drive shaft or the portions thereof because of said drive shaft being split and can also be enclosed in a tubular shaft bearing receiving the split drive shaft and can
25 therefore be housed in a protected manner.

As an alternative, the overload protection device is formed of a pressure spring integrated in a telescopic valve shaft connected to the valve body. This embodiment also ensures
30 reliable overload protection for the mechanism and also for the electric motor of the drain and overflow fitting. In this case, the pressure spring is preferably installed in a biased

manner. In this way it is ensured that no lifting is lost for the valve body when the drain valve is opened in the normal manner.

5 A compact and functionally reliable embodiment of the telescopic valve shaft is obtained if said valve shaft is formed of an outer pipe and an inner rod inserted therein, the inner rod having a radial protrusion as a support face for the lower end of the pressure spring, whilst the outer pipe has a
10 narrowing in the inside thereof which functions as a stop for the upper end of the pressure spring.

In order to facilitate relatively simple assembly of the pressure spring or the telescopic valve shaft, a further
15 embodiment of the invention provides that the upper end of the inner rod has a threaded hole with a screw screwed therein, the diameter of the screw head being larger than the diameter of the inner rod and the screw head being guided with clearance in the portion of the outer pipe extending above the
20 narrowing.

Further preferred and advantageous embodiments of the drain and overflow fitting according to the invention are provided in the dependent claims.

25

The invention is explained in greater detail below with reference to drawings, in which:

Fig. 1 is a perspective view of a drain and overflow fitting
30 having an electric motor for actuating the drain valve;

Fig. 2 is a side view of the drain and overflow fitting from Fig. 1 but without an overflow pipe and without a drain pipe bend;

5 Fig. 3 is a vertical sectional view of the drain and overflow fitting along the line A-A in Fig. 2;

Fig. 4 is a horizontal sectional view of the drain and overflow fitting along the line B-B in Fig. 3;

10

Fig. 5 is an enlarged side view of the valve body of the drain and overflow fitting from Fig. 1;

Fig. 6 is a vertical sectional view of the valve body from

15 Fig. 5;

Fig. 7 is a side view of the alternative drain and overflow fitting according to the invention, similar to Fig. 2;

20 Fig. 8 is a vertical sectional view of the drain and overflow fitting from Fig. 7 along the line A-A in Fig. 7;

Fig. 9 is a horizontal sectional view of the drain and overflow fitting along the line B-B in Fig. 8; and

25

Fig. 10 is a perspective view of a drive shaft having an integrated torsion spring.

30 Fig. 1 shows a drain and overflow fitting for bathtubs, shower trays, sinks and washbasins. Fig. 1 relates to the two alternatives according to the invention. The fitting comprises a drain housing 1 having an inlet opening 2. The inlet opening

2 is surrounded by an annular groove or an annular shoulder 3 of the drain housing. An annular seal 4 is inserted into the groove or the shoulder 3, by means of which seal the drain housing 1 can be fastened to an outlet opening in a tub or sink in a watertight manner. A trough-shaped or bowl-shaped valve upper part 5 is arranged inside the tub or sink, in the base of which part a central fastening hole for receiving a hollow screw 6 which can be screwed to the drain housing 1 is formed.

10

The drain housing 1 is provided with an integrally formed connection piece 1.1 for connecting an overflow pipe 8. For this purpose, and in a manner known per se, the connection piece 1.1 has an outer thread with a union nut 9 and has an inner surface 10 that widens conically towards its end as a force fit for a sealing ring 11 fitted onto the overflow pipe 8.

15

The drain housing 1 is also provided with an odour trap 12 to which a drain pipe bend 13 can be connected. The odour trap 12 is formed of a substantially U-shaped channel 12.1 which has, at its inlet, a connection piece 12.2 which can be locked to the drain housing 1 and has, at its outlet, a connection piece 12.4 which can be locked to a pipe elbow 12.3, the two locking connections enabling the U-shaped channel 12.1 to rotate relative to the drain housing 1 and the pipe elbow 12.3 to rotate relative to the U-shaped channel 12.1 about a substantially vertical axis in each case.

20

25

A valve plug as a valve body 14 is assigned to the valve upper part 5. The valve plug (valve body) 14 is provided with a valve shaft 14.1, which is inserted into the hollow screw 6.

30

The lower end of the valve shaft 14.1 is provided with a threaded hole and a screw (compensation or adjustment screw) 15 screwed therein. The screw 15 makes length compensation of the valve shaft 14.1 possible with respect to different wall thicknesses of the base of the tub or sink. The varying wall thickness is indicated in Fig. 3 by the reference sign X. The adjustment dimension, i.e. the adjustable length of the valve shaft 14.1 including the screw 15, is denoted by reference sign E in Fig. 5. Length compensation can occur by omitting the screw 15 or by screwing in a longer or shorter screw 15. To secure the set position of the screw head with respect to the disc-shaped valve body 14, the screw 15 can be provided with a counter nut 16 (not shown in Fig. 5; cf. Fig. 8).

A lever mechanism 17 which is rotatably mounted in the drain housing for actuating the valve body 14 is assigned to the lower end of the valve shaft 14.1 or to the head of the compensation or adjustment screw 15. The lever mechanism 17 comprises a drive shaft 17.1 to which a hook-shaped lever 17.2 is connected in an interlocking manner and for conjoint rotation.

Adjacent to the fastening hole, the base of the valve upper part 5 has a plurality of apertures, through which fluid can flow out of the tub or sink into the drain housing 1 when the valve body 14 is raised. For the sake of clarity, the valve body 14, which can be raised and lowered, is shown in a raised position but the lever 17.2 is shown in a lowered position.

The lever mechanism 17 is coupled to an electric motor 18. The electric motor 18 is a stepper motor having a reversible rotational direction. The electric motor 18 is arranged in a

fluid-tight motor housing 19. The housing 19 is designed to be in two parts and is mounted on the drain housing 1. In the alternative which is shown in Fig. 2 and 3, a shell-shaped part 19.1 of the motor housing is connected to the end of a
5 hollow cylindrical or tubular part 1.2 of the drain housing 1. For this purpose, a hollow cylindrical connection piece 19.2 is integrally formed on the rear of the housing part 19.1. The shell-shaped housing part 19.1 is provided with a detachable housing cover 19.2. The drive shaft 17.1 of the lever
10 mechanism is rotatably mounted in the hollow cylindrical or tubular part 1.2 of the drain housing 1. The end on the motor side of the drive shaft 17.1 is designed as a square head or polygonal head 17.3 and is connected to the output shaft of the motor 18 in an interlocking manner. The motor 18 is
15 arranged such that the rotational axis of the lever mechanism 17 and the output shaft of the motor 18 substantially align.

An overload protection device is arranged in the power transmission path from the motor 18 to the valve body 14. In
20 the embodiment shown in Fig. 2 to 6, the overload protection is implemented in that the valve shaft 14.1 connected to the valve body 14 is telescopic, a pressure spring 20 functioning as a force element in the valve shaft.

25 The valve shaft 14.1 is formed of an outer pipe 14.11 and an inner rod 14.12 inserted therein, as shown in Fig. 5 and 6. The inner rod 14.12 has a radial protrusion 14.13 as a support face for the lower end of the pressure spring 20, whilst the outer pipe 14.11 has a protruding shoulder or narrowing 14.14
30 in the inside thereof which functions as a stop for the upper end of the pressure spring 20. The outer pipe 14.11 is rigidly connected, preferably screwed, to the disc-shaped part 14.2 of

the valve body (valve plug) 14. The disc-shaped part 14.2 has a peripheral shoulder 14.21 or annular groove, which supports a sealing ring 14.3. The outer pipe 14.11 penetrates the disc-shaped part 14.2, a covering cap 21 being placed or screwed
5 onto the upper end of the pipe. Bar-shaped protrusions 21.1 are formed on the lower side of the covering cap 21, which protrusions fasten the sealing ring 14.3 to the shoulder 14.21 of the valve disc 14.2 or press said sealing ring onto the shoulder 14.21 when the covering cap 21 is installed.

10

The outer pipe 14.11 of the telescopic valve shaft 14.1 is axially movably guided in the hollow screw 6, which connects the valve upper part 5 to the drain housing 1. The upper end of the inner rod 14.12 of the valve shaft 14.1 has a threaded
15 hole into which a screw 14.15 is screwed.

In this case, the diameter of the screw head 14.16 is larger than the diameter of the inner rod 14.12, and therefore the screw head 14.16 and the inwardly protruding shoulder
20 (narrowing) 14.14 of the outer pipe 14.11 form reciprocal stops. In this case, the screw head 14.16 is guided with clearance in the portion of the outer pipe 14.11 extending above the narrowing 14.14.

25 The pressure spring 20 is installed in a biased manner so that no lifting is lost for the valve body 14 when the drain valve is opened.

If the electric motor 18 is actuated in order to open the
30 drain valve by rotating the lever mechanism 17, and if the valve body 14 is blocked in the process, for example because a bathing person is sitting on the valve body 14 or the covering

cap 21, the lever 17.2 pushes the inner rod 14.12 upwards against the force of the pressure spring 20, the inner rod 14.12 retracting into the outer pipe 14.11. The valve body 14 can likewise be pushed downwards when the drain valve is open, for example if a person steps on the covering cap 21, without the lever 17.2 having to yield to the pressure in the process, which would force the drive shaft 17.1 or the motor shaft to rotate. The mechanism and the motor 18 are each therefore protected against overloading in a reliable manner.

Fig. 7 to 10 show the drain and overflow fitting according to the invention, the overload protection device in this case being formed of a torsion spring 22 arranged between the output shaft of the electric motor 18 and the rotatable lever 17.2.

The drive shaft 17.1, which supports the lever 17.2 for conjoint rotation, is split between the motor 18 and the lever 17.2, the shaft portion 17.11 on the motor side being coupled via the torsion spring 22, in a torsionally resilient manner, to the divided shaft portion 17.12. The torsion spring 22, together with the split drive shaft 17.1, is received in the hollow cylindrical part 1.2 of the drain housing 1. The end on the motor side of the drive shaft is also designed as a square head or polygonal head 17.3 and is connected to the motor shaft in an interlocking manner. The motor shaft and the drive shaft align with one another.

A further support 23 is provided between the drain housing 1 and the shell-shaped part 19.1 of the motor housing 19, in parallel with the hollow cylindrical or tubular part 1.2 of

the drain housing 1, in which the split drive shaft 17.1 is rotatably mounted.

The valve shaft 14.1 of the disc-shaped valve body 14 is
5 designed as a sleeve or rod which is formed in one piece in the embodiment according to Fig. 8, the lower end of which sleeve or rod has an internal thread for a compensation screw (adjustment screw) 15. The upper end of the rod or sleeve 14.1 penetrates the disc-shaped valve body 14. Furthermore, the
10 valve body 14 and the valve upper part 5 are designed as is shown in Fig. 2 to 6.

If the electric motor 18 is actuated in order to open the drain valve, and if the valve body 14 is blocked, the torsion
15 spring 22 ensures that only a predetermined torque is transmitted. The valve body 14 can also be pushed downwards when the drain valve is open, the lever 17.2 yielding to the pressure at the same time and rotating the drive shaft portion 17.12 connected thereto for conjoint rotation; however, the
20 motor 18 must not yield in the process because of the torsion spring 22. Therefore, the mechanism 17 and the motor 18 are protected against overloading in a reliable manner in this embodiment too.

25 It is not structurally possible to bias the torsion spring 22 in the alternative which is shown in Fig. 7 to 10. However, in order to enable the drain valve to open and close in a reliable manner, the motor 18 rotates in an angular range that is greater than would actually be necessary for moving the
30 lever 17.2. In this way, the torsion spring 22 is tensioned by the motor 18 when the drain valve is in the open or closed position. Furthermore, process tolerances of the torsion

spring 22, for example with respect to the angular position of the ends of the spring, can be compensated for in this way.

Patentkrav

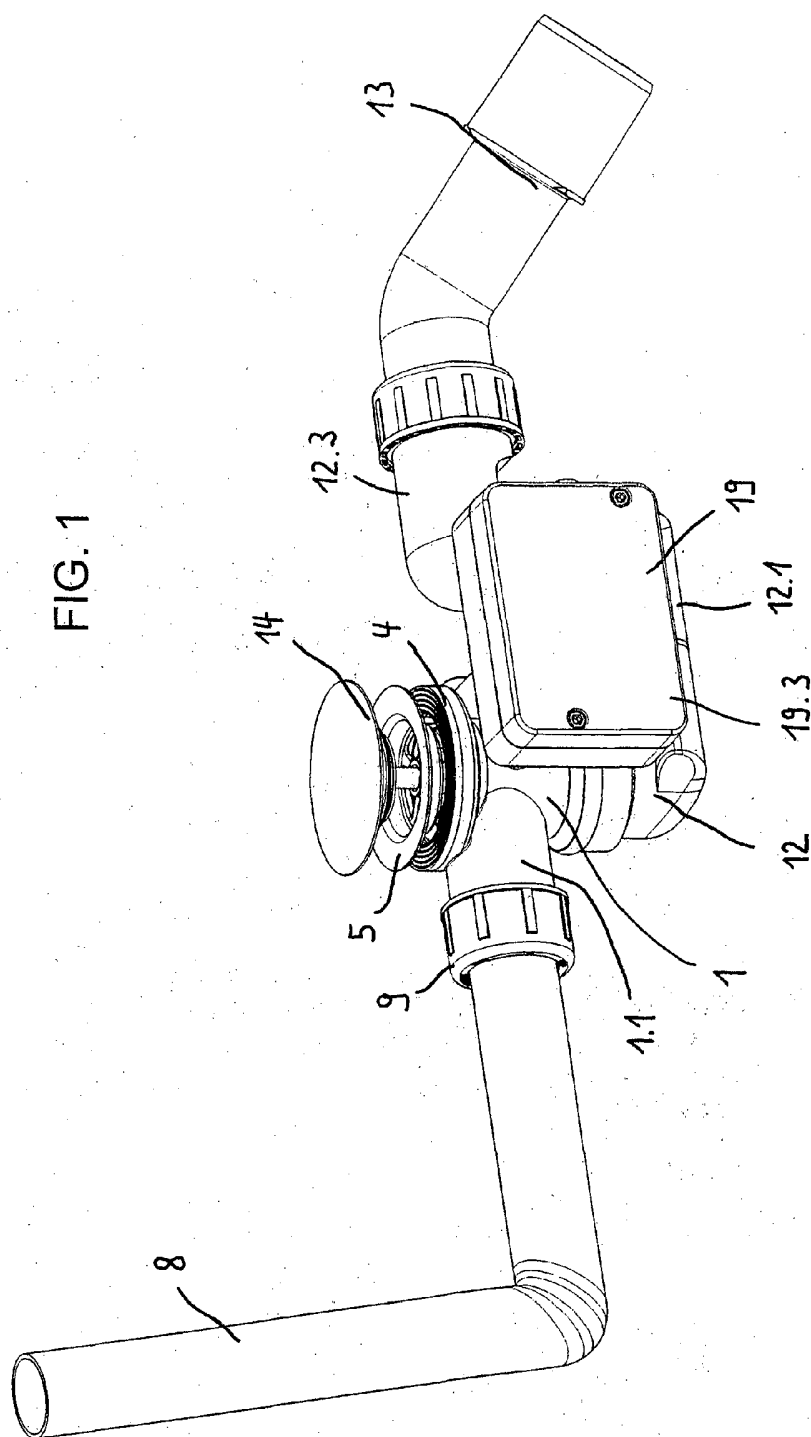
1. Afløbs- og overløbsfitting, især til badekar eller håndvaske, med et afløbs-
hus (1), et ventillegeme (14) og en armmekanisme (17), der er monteret dre-
jeligt i afløbshuset, til betjening af ventillegemet (14), hvor armmekanismen
(17) er koblet sammen med en elektromotor (18), og hvor der er tilvejebragt
en overbelastningsbeskyttelsesindretning (20; 22), **kendetegnet ved, at**
overbelastningsbeskyttelsesindretningen (20; 22) er anbragt i kraftoverfø-
ringsvejen fra elektromotoren (18) til ventillegemet (14), hvor overbelast-
ningsbeskyttelsesindretningen er dannet af en torsionsfjeder (22), der er an-
bragt mellem elektromotorens (18) udgangsaksel og armmekanismens (17)
arm (17.2), eller af en trykfjeder (20), der er integreret i et teleskoplignende
udformet ventilskaft (14.1), der er forbundet med ventillegemet (14).
2. Afløbs- og overløbsfitting ifølge krav 1, **kendetegnet ved, at** armme-
kismen (17) har en delt drivaksel (17.1), hvor et afsnit (17.11) af drivakslen
på motorsiden via torsionsfjederen (22) er sammenkoblet drejeelastisk med
et andet drivakselafsnit (17.12), som en arm (17.2) rager radialet ud fra.
3. Afløbs- og overløbsfitting ifølge krav 1 eller 2, **kendetegnet ved, at** ventils-
skaftet (14.1) er dannet af et yderrør (14.11) og en inderstang (14.12), der er
indført deri, hvor inderstangen (14.12) har et radialet fremspring (14.13) som
understøtningsflade til den nedre ende af trykfjederen (20), mens yderrøret
(14.11) inden i har en indsnævring (14.14), der fungerer som anslag for den
øvre ende af trykfjederen (20).
4. Afløbs- og overløbsfitting ifølge krav 3, **kendetegnet ved, at** inderstangen
(14.12) i sin øvre ende har en gevindboring med en deri indskruet skrue
(14.15), hvor skruehovedets (14.16) diameter er større end inderstangens
(14.12) diameter, og hvor skruehovedet (14.16) er ført med spil i yderrørets
(14.11) afsnit, der strækker sig over indsnævringen (14.14).
5. Afløbs- og overløbsfitting ifølge krav 3 eller 4, **kendetegnet ved, at** inder-
stangen (14.12) i sin nedre ende har en gevindboring med en deri indskruet
skrue (15) til længdeudligning.

6. Afløbs- og overløbsfitting ifølge et af kravene 1 til 5, **kendetegnet ved, at** trykfjederen (20) er indbygget forspændt.

5 7. Afløbs- og overløbsfitting ifølge et af kravene 1 til 6, **kendetegnet ved, at** elektromotoren (18) er anbragt i et motorhus (19), der er monteret ved afløbshuset (1).

10 8. Afløbs- og overløbsfitting ifølge et af kravene 1 til 7, **kendetegnet ved, at** armmekanismens (17) rotationsakse og elektromotorens (18) udgangsaksel i det væsentlige flugter med hinanden.

FIG. 1



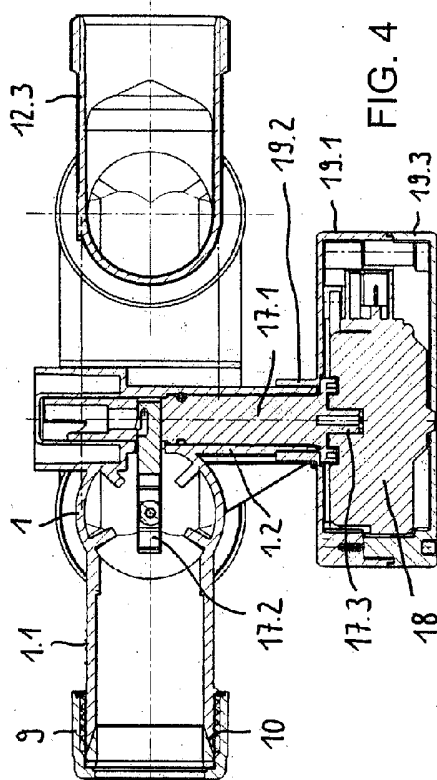
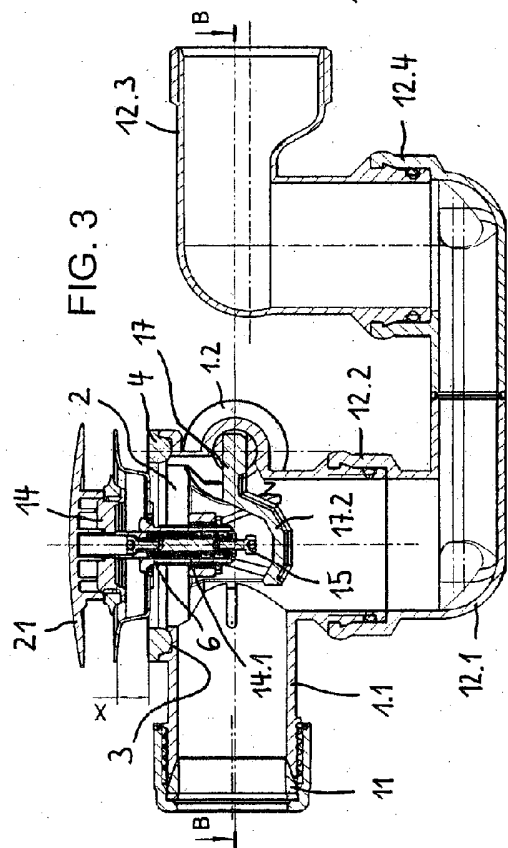
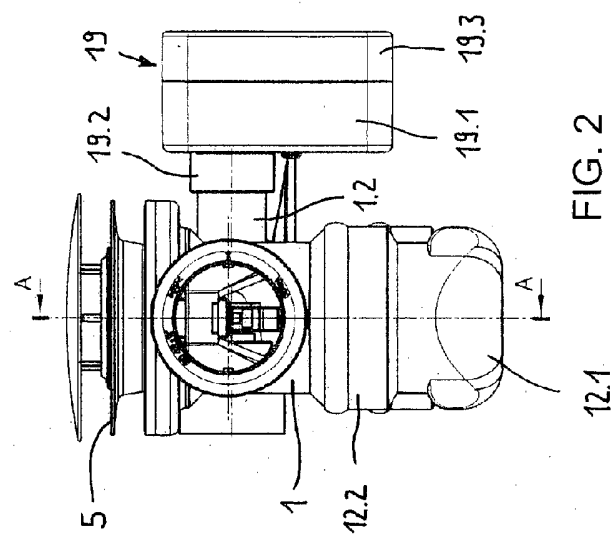


FIG. 5

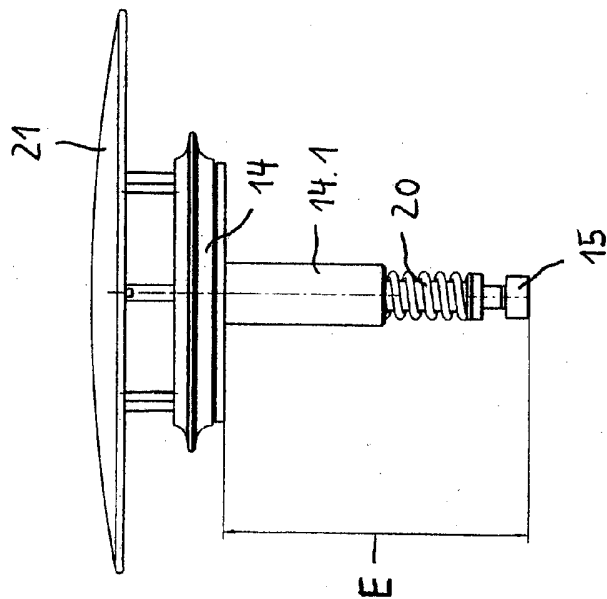


FIG. 6

