(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 310 277 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.01.2024 Bulletin 2024/04

(21) Application number: **23025002.9**

(22) Date of filing: **18.07.2023**

(51) International Patent Classification (IPC):
E05B 13/00 *(2006.01)* ***E05B 15/00*** *(2006.01)*

(52) Cooperative Patent Classification (CPC):
E05B 13/005; E05B 15/0073; E05B 15/0093

(84) Designated Contracting States:
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 ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

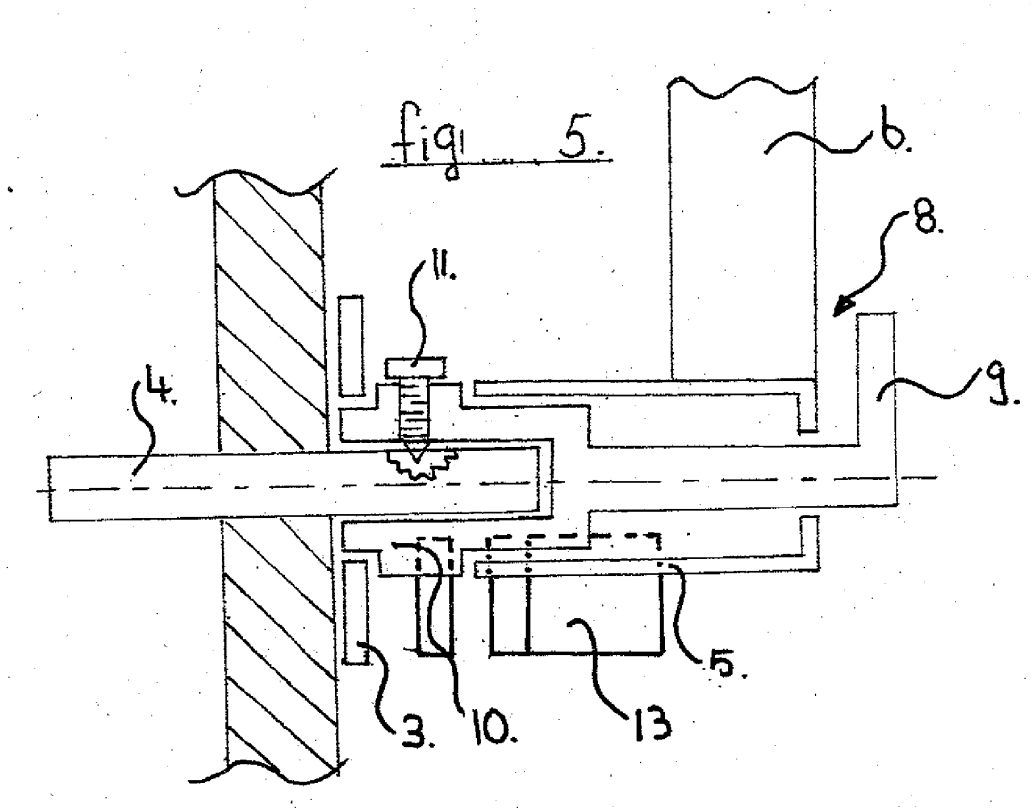
(30) Priority: **19.07.2022 NL 1044383**

(71) Applicant: **van Laerhoven, Peter**
5053 EH Goirle (NL)

(72) Inventor: **van Laerhoven, Peter**
5053 EH Goirle (NL)

(54) **HANDLE AND CLOSURE DEVICE FITTED WITH SUCH A HANDLE**

(57) A handle for a door or window comprises a core part, a grip part mounted around a rotational axis rotatable relative to that core part as well as coupling means between the core part and the grip part. The coupling means can be transferred between a release position and a coupling position, in which coupling position the core part and the grip part are coupled by the coupling means in the direction of rotation and in which release position they are released relative to each other in the direction of rotation. In order to force the grip part into a predetermined position, positioning devices in the form of a magnetic device are provided. At least one magnetic part of the magnetic device is attached to the grip part eccentrically with respect to the rotational axis.



EP 4 310 277 A1

Description

[0001] The invention relates to a handle for manually operating a closure mechanism, such as a door or window, comprising a core part to be attached to the closure mechanism, a grip part rotatably mounted in relation to that core part about a rotational axis, coupling means between the core part and the grip part, which coupling means can transfer between a release position and a coupling position, in which coupling condition the core part and the grip part are coupled to each other in a rotational direction by the coupling means and in which release condition the core part and the grip part are released with respect to each other in a rotational direction by the coupling means, as well as the positioning devices engaging the grip part for forcing the grip part into a predetermined position around the rotational axis.

[0002] Such a handle is known from WO 2007089135, WO 02/14634 as well as DE-203 05 870 and is used in those cases where it is undesirable that children, elderly persons suffering from dementia and pets can open doors, windows and the like provided with a closure device, because behind it there is a risk zone, such as a staircase or a busy street.

[0003] Children, elderly people with dementia and pets will not usually be able to manipulate such coupling means so that they cannot open the closure mechanism. The handle shown in the aforementioned publication DE-203 05 870 includes positioning devices in the form of a spring for bringing and keeping the handle in a user-friendly position. This spring is usually integrated in an accompanying cover plate. This cover plate must be screwed onto the door or window in place of an existing cover plate, a situation which is objectionable in itself.

[0004] The aforementioned positioning devices must be fitted with an end stop that limits the permissible rotation between handle and cover plate. If such an end stop is not present, the force exerted on the spring when the handle is turned may increase to such an extent that the spring is overloaded. As a result, the spring that provides positioning may lose its original shape and functionality. In extreme overloading, due to turning of the handle in relation to the cover plate, the spring may even detach from its fixing points. As a result, the positioning function of the spring is completely lost and the handle will no longer be forced into a user-friendly position where the coupling means can be coupled directly, preferably without turning the handle. If an end stop is present, it appears that a child or person suffering from dementia, if the handle is turned in relation to the cover plate to such an extent that this stop is reached, can still exert so much force on the handle that the cover plate, on which this end stop is located, can come loose from the door as a result.

[0005] Insofar as it appears from publication WO 2007089135 that the positioning of the handle can also be obtained by installing a spring that acts on the handle on the one hand and on the other hand on the operating device, an end stop applied to the cover plate has the same disadvantage with this device as in the aforementioned example of publication DE-203 05 870. In this case, the cover plate may come loose from the door. If the end stop is designed as described in claims 6 and 7 of publication WO 2007089135, the child is thus given the opportunity to open the door by turning the handle. This is an extremely undesirable property, which also reveals itself when a closure device as described in publication WO 2007089135 lacks the aforementioned end stop. Due to the force of the positioning device, which in publication WO 2007089135 is projected directly onto the drive device when turned to extended position, the child will still be able to open the door by itself. This is only different if the spring would become detached from the same engagement points between its engagement points when turned to an extended position. However, this causes the spring to lose its original preload and thus its positioning effect.

[0006] In the device as known from publication WO 02/14634 as well as NL 1039835, the aforementioned problem associated with using a spring as a positioning device is overcome. This is done by using positioning devices in the form of a tensioned ball and a notch cooperating with that ball. When the handle is placed in a user-friendly position by the user, the ball ensures that it stays in that specific position. However, the positioning device used in the aforementioned publications are objectionable in use because their purpose is not to return the handle to a user-friendly position after being pulled from a user-friendly to an unfriendly position by a child. For the optimal usability of a manually operated closure device, it is important to have a handle equipped with positioning devices for bringing and keeping the same handle in a user-friendly position, where the coupling means can preferably be coupled directly. However, with regard to the permissible angle of rotation between the engagement points of those same positioning devices, it is desirable that there be no limitation.

[0007] US2022/0081932 relates to a handle having a mechanism for selecting the resting position of a handle, namely a resting position in which the handle is directed to the left and a resting position in which the handle is directed to the right. The resting positions are achieved by a preload spring, which pushes the handle back to the selected resting position after being operated. The preload could also be achieved by magnets. Neither the magnets nor their placement are specified. This publication does not cover a childproof closure device.

[0008] Alternative ways of positioning are described in the literature, within classification E05B, including in publication EP 1746229 as well as DE 10 2014 111413. The aforementioned publications both contain positioning devices involving the use of magnets. However, it is not obvious that a study of publication EP 1746229 and DE 10 2014 111413 leads to the application of magnetism as a positioning means in operating handles as described in publication DE-20305870, WO 2007089135 as well as

WO 02/14634.

Object of the invention

[0009] The invention seeks to provide a closure device according to the introductory text which is characterised by the presence of two favourable features being:

- Active positioning of the handle from an unfriendly to a user-friendly position and
- Insensitivity to extended turning between the engagement points of the applied positioning device. That objective is achieved by the positioning devices comprising a magnetic device, by at least one part of the magnetic device being attached to the handle part and by at least one part of the magnetic device being eccentric with respect to the rotational axis. According to a preferred embodiment, at least one further part of the magnetic device may be attached to the core part; this further part of the magnetic device may also be eccentric with respect to the rotational axis.

[0010] As a result of the eccentric position of the magnetic part attached to the grip part, a moment arm is created with respect to the rotational axis, which facilitates the penetration of the grip part into the predetermined resting position.

[0011] At least one further part of the magnetic device is attached to the core part. This has the advantage that it allows for the simple replacement of the traditional handle, without the need for further modifications to the door or window and the like to which the handle is attached.

[0012] The moment action can be further improved if the at least one part and at least one further part of the magnetic device possess opposite polarity respectively are polarisable and in the predetermined position of the handle are directly opposite each other respectively enclose a gap.

[0013] The operation of the magnetic device is therefore also guaranteed in case the handle includes an elongated handle part, such as a lever, which handle part is eccentric with respect to the rotational axis. An eccentric handle part that protrudes radially from the rotation axis in this manner results in a certain imbalance. In this regard, the operation of the magnetic device is favourably affected by the fact that the grip part includes a balancing mass, such as the at least one part of the magnetic device, which balancing mass is eccentric with respect to the rotational axis and fully or partially balances out the mass distribution of the grip part around the longitudinal axis. The magnetic device can then reliably force the handle part into the predetermined position even at a relatively low reset moment action, i.e. in the state where the magnetic parts are still relatively far apart. In the state where the handle is mounted to a door, for example, this particularly concerns the horizontal position of the elongated handle part.

[0014] The coupling means can be biased under preload into the direction of the release position and can be manually brought into the coupling position against said preload.

[0015] According to a further possibility, the positioning devices are also designed for forcing the coupling means into the release position. To this end, the positioning devices may have been designed in various ways, for example with the known preload spring. In a very simple embodiment, however, the magnetic device may also function as a device for forcing the coupling means into the release position.

[0016] According to a preferred embodiment, the magnetic device comprises at least two parts which are longitudinally displaceable relative to each other, and preferably at least the two parts that are rotatable relative to each other in the rotational direction about the rotational axis are also displaceable in the longitudinal direction along the rotational axis. The magnetic device, for example with only two parts, in this case fulfils the dual function of forcing the grip part to the predetermined position, and at the same time forcing the coupling means to the release position. This results in a very effective, childproof closure device that is also relatively simple in construction given the positioning device consisting only of a magnetic device.

[0017] In the embodiment in which the coupling means comprise a operating device which is longitudinally displaceable along the longitudinal axis, the magnetic device can then force the operating device in the longitudinal direction such that the coupling means are in the release position. The operating device of the coupling means can be designed in various ways, for example with the known pen device with a longitudinal push-in pin. According to a first possibility, the grip part and the core part parallel to the rotational axis can be slid relative to each other between a resting position obtained under the influence of the preload provided by the magnetic device and a offset position obtained under the influence of an external force acting against the preload provided by the magnetic device, whereby in the resting position of the grip part and the core part, the coupling means are in the release position and in the offset position of the grip part and the core part, the coupling means are in the coupling position.

[0018] This embodiment has the advantage that the combined movement of the grip part in direction of rotation and sliding direction is difficult for a child, but feels natural for an adult. This ensures increased safety.

[0019] According to a further possibility, one of the grip part and core part may comprise a pressure surface while the other grip part and core part may comprise a grip surface directed opposite to the pressure surface, such that a user of the handle may press on the pressure surface with the thumb and pull on the pressure surface with other fingers to obtain the relative movement between the grip part and core part. The advantage of this embodiment is that the user can operate the handle with a

simple pinch of the hand. The operating force can thereby be chosen to be relatively high. This is no problem for adult users.

[0020] Coupling means can be designed in many different ways, following the principles of friction or similar. A practical embodiment in the latter category concerns a closure device in which the handle encloses a shaft part that is essentially concentric with respect to the longitudinal axis, which shaft part comprises a first coupling part, such as a spherical cylindrical coupling part, at its end that is turned away from the latch bolt, the core part extends through the shaft part via a hole in the first coupling part, and the core part includes at the end outside the shaft part a second coupling part, such as a hollow cylindrical coupling part, such that in the operating position the first and second coupling parts engage each other, in particular the sphere and hollow cylindrical parts engage.

[0021] An advantage of this embodiment is that the end of the core part located outside the shaft part can act as a button with a pressure surface, while the grip surface is located on the grip part.

[0022] The invention also relates to a closure device comprising a closure mechanism such as for a door or window, comprising a housing, a rotatable drive device as well as a latch device, such as a latch bolt, movable relative to the housing under the influence of turning of the drive device, as well as a handle according to one of the preceding claims, wherein the core part of the handle is attached to the drive device in direction of rotation.

[0023] Finally, the invention relates to a sash, such as a door or window, for the closing and opening of a correspondingly shaped opening in a building, provided with such a closure device.

[0024] The invention is further explained by means of a embodiment example shown in the figures.

Figure 1 shows a sectional top view of the handle for a closure mechanism of the present invention.

Figure 2 shows a front view of the handle showing the placement of the positioning device.

Figure 3 shows a section in side view of the handle including the positioning devices where the coupling means are in the release position.

Figure 4 shows a section in side view of the handle including the positioning devices where the coupling means are in the coupling position.

Figure 5 shows a section in top view of the handle for a closure mechanism of the present invention, wherein the core part is arranged such that a magnet, or a part engaging therewith, can be attached to the lower half thereof.

Figure 6 shows a section in side view of the handle as Figure 5 including the positioning device.

[0025] The closure mechanism according to the invention is intended for cooperation with a closure device not shown in detail here. Such a closure device, as used for example in doors, windows and the like is generally known and includes a housing attached to door or window. By operating the closure device, a latch bolt can be extended or retracted. The frame in which the door or window is located contains a strike box into which the protruding latch bolt lap falls to seal the door or window. To that end, the closure device is operated by operating handle 1, which comprises handle 2, cover plate 3 and drive device 4. Drive device 4 has a square cross-section at its left end shown in Figure 1 and thus engages in this embodiment in a square hole of the known closure device. Handle 2 is shown here as a door handle and has shaft part 5 and grip part 6. Shaft part 5 extends in the direction of the rotational axis 7, around which drive device 4 is rotatable. Grip part 6 extends transversely to shaft part 5 and can be grasped by hand for turning shaft part 5 and thus drive device 4. However, drive device 4 is thereby driven only if coupling means 8 are engaged. When these coupling means 8 are not engaged, handle 2 can rotate freely around drive device 4, so that the lock cannot be operated in that state. These coupling means 8 include, on the one hand, a hollow formed shell part 9 at the core part and a spherical formed shell part 9 at shaft part 5. The hollow-formed shell part 9 is immovably connected to drive device 4 by means of core part 10 and a screw 11. The inside of shell part 9 has the same radius as the outside of grip part 6. Core part 10 is contained in a central bore 12 in shaft part 5. Shaft part 5 of operating handle 1 is freely slidable over core part 10 in the direction of rotational axis 7. Furthermore, the aforementioned shaft part 5 of operating handle 1 is also rotatable around core part 10.

Positioning devices 13 are located on the underside of handle 2.

[0026] Figures 3 and 4 show the operation of the operating handle.

Figures 3 and 4 show positioning devices 13 in the form of a magnet 14, as in this example mounted to the lower half of shaft part 5, and a magnetic part 15 mounted in cover plate 3 on which magnet 14 engages. Part 15 on which magnet 14 engages could logically include a magnet itself.

[0027] Figure 4 shows the operation of the coupling and positioning devices.

As soon as, when gripping grip part 6, the user puts his thumb on shell part 9 and pulls grip part 6, against the pull of magnet 14, into shell part 9, shell part 9 becomes immovably connected to grip part 6.

[0028] After establishing the aforementioned coupling, the lock can be opened normally. Pulling the handle to establish a coupling is a very natural and easy-to-perform action. However, it is not easy for children and, for instance, pets to pull handle 2 forcefully towards rotational axis 7 against the mutual magnetic force of positioning device 13 in such a way that a proper coupling between the shell part 9 and the grip part 6 is established. Furthermore, the action of gravity and the pull of magnet 14 ensures that handle 2 is always actively positioned to its

intended resting position. In this connection, it is pointed out that magnet 14 of positioning devices 13 has a certain mass. Because of the action of gravity on that magnet, if it is suitably positioned, the positioning action can be further favourably influenced. Magnet 14 is then preferably located on the underside of shaft part 5, and in the even more favourable case also on the opposite side of rotational axis 7 with respect to grip part 6.

[0029] The aforementioned positioning also occurs after a child pulls operating handle 1, when attempting to open the door, from a predominantly horizontal to a vertical position.

[0030] The embodiment shown in Figures 5 and 6 is prepared for otherwise implemented positioning devices. In this embodiment, core part 10 is adapted to serve as a point of engagement when positioning handle 2.

[0031] Figure 6 shows that magnet 14 is positioned such that it engages with a magnetic part 15 which in this example is connected to core part 10. This core part 10 is immovable attached to drive device 4 by means of the screw 11, from Figure 5. Thus, positioning of handle 2 can be obtained without using a cover plate 3. Thus, also in this example, handle 2 is positioned with magnet 14. In the embodiment described above, positioning is obtained without replacing the cover plate. Thus, the positioning device is integrated into handle 2 so that the device can be applied to a standard closure device provided with a standard cover plate. In this embodiment, coupling means 8 are applied in a similar manner as in Figure 3. Handle 2 is thereby also provided with a balance mass 16 placed in line with magnet 14 at the lower half of shaft section 5, further supporting the positioning force of magnet 14 by the gravity acting on the balance mass. Such a balance mass can of course also be applied in the variant of Figures 1-4. Also for this balance mass, the favourable position on the underside of shaft part 5, possibly on the opposite side of rotational axis 7 with respect to grip part 6, applies.

Claims

1. Handle for manual operation of a closure mechanism, such as of a door or window, comprising a core part (10) to be attached to the closure mechanism, a grip part (2) mounted rotatably about a rotational axis (7) relative to that core part, coupling means (8) between the core part and the grip part, which coupling means are transferable between a release position and a coupling position, in which coupling position the core part (10) and the grip part (2) are coupled to each other in rotational direction by the coupling means (8) and in which release position the core part (10) and the grip part (2) are released relative to each other in rotational direction by the coupling means (8), as well as a positioning device (13) acting on the grip part for forcing the grip part (2) into a predetermined position about the rotational axis, **characterised in that** the positioning device (13) comprises a magnetic device (14, 15), that at least one part (14) of the magnetic device is attached to the grip part (2) and that the at least one part (14) of the magnetic device is eccentric with respect to the rotational axis (7).

2. Handle according to claim 1, wherein at least one further part (15) of the magnetic device (14, 15) is attached to the core part (10).

3. Handle according to claim 1 or 2, wherein at least the further part (15) of the magnetic device (14, 15) is eccentric with respect to the rotational axis (7).

4. Handle according to claim 2 or 3, wherein the at least one part (14) and the at least one further part (15) of the magnetic device (14, 15) possess opposite polarity and are in the predetermined position of the grip part (2) directly opposite each other respectively enclose a gap.

5. Handle according to any one of the preceding claims, wherein the grip part (2) is elongated (6), such as a lever, which grip part is eccentric with respect to the rotational axis (7), and the grip part comprises a balancing mass (14, 16) in the form of the at least one part (14) of the magnetic device (14, 15), which balancing mass (14, 16) fully or partially balances out the mass distribution of the grip part (2) around the rotational axis (7).

6. Handle according to any one of the preceding claims, wherein coupling means (8) are urged towards the release position under preload and are manually movable against the preload into the coupling position and wherein the magnetic device (14, 15) also provides the preload for urging the coupling means (8) into the release position.

7. Handle according to claim 6, wherein the magnetic device comprises at least two parts movable parallel to the rotational axis (27) relative to each other, and preferably the two parts (14, 15) that are rotatable relative to each other in the direction of rotation about the rotational axis are also movable parallel to the rotational axis.

8. Handle according to claim 6 or 7, wherein the grip part (2) and the core part (10) for operating the coupling means (8) are movable parallel to the rotational axis relative to each other between a resting position obtained under the influence of the preload provided by the magnetic device (14, 15) and a resting position obtained under the influence of an external force acting against the preload provided by the magnetic device (14, 15), wherein in the resting position of the grip part (2) and the core part (10) the coupling

means (8) are in the release position and in the offset position of the grip part (2) and the core part (10) the coupling means (8) are in the coupling position.

9. Handle according to claim 8, wherein one of the grip part (2) and the core part (10) comprises a pressure surface and the other of the grip part and the core part comprises a grip surface oppositely directed with respect to the pressure surface, such that a user of the handle can press with the thumb on the pressure surface and can pull with at least one finger on the grip surface to slide the grip part and core part with respect to each other parallel to the rotational axis and against the preload provided by the magnetic device (14, 15).

10. Handle according to claim 9, wherein the grip part comprises a shaft part (5) that is substantially concentric with respect to the rotational axis, which shaft part (5) at the end facing away from the core part (10) comprises a spherical cylindrical part (9'), the core part (10) extends through the shaft part (5) through a hole in the partially spherical cylindrical part thereof, and the core part (10) at the end located outside the shaft part (5) includes a hollow cylindrical part (9), such that in the displaced position of the grip part (2) and the core part (10) the spherical and hollow cylindrical parts interlock.

11. Handle according to claims 9 and 10, wherein the end of the core part located outside the shaft part comprises a button with a pressure surface and the gripping surface is located at the grip part.

12. Closure device comprising a closure mechanism such as for a door or window, comprising a housing, a rotatable drive device as well as a latch device, such as a latch bolt, movable relative to the housing under the influence of turning of the drive device, as well as a handle according to one of the preceding claims, wherein the core part of the handle is attached to the drive device in the direction of rotation.

13. Sash, such as a door or window, for closing or opening of a correspondingly shaped opening in a building, provided with a closure device according to claim 12.

fig 1.

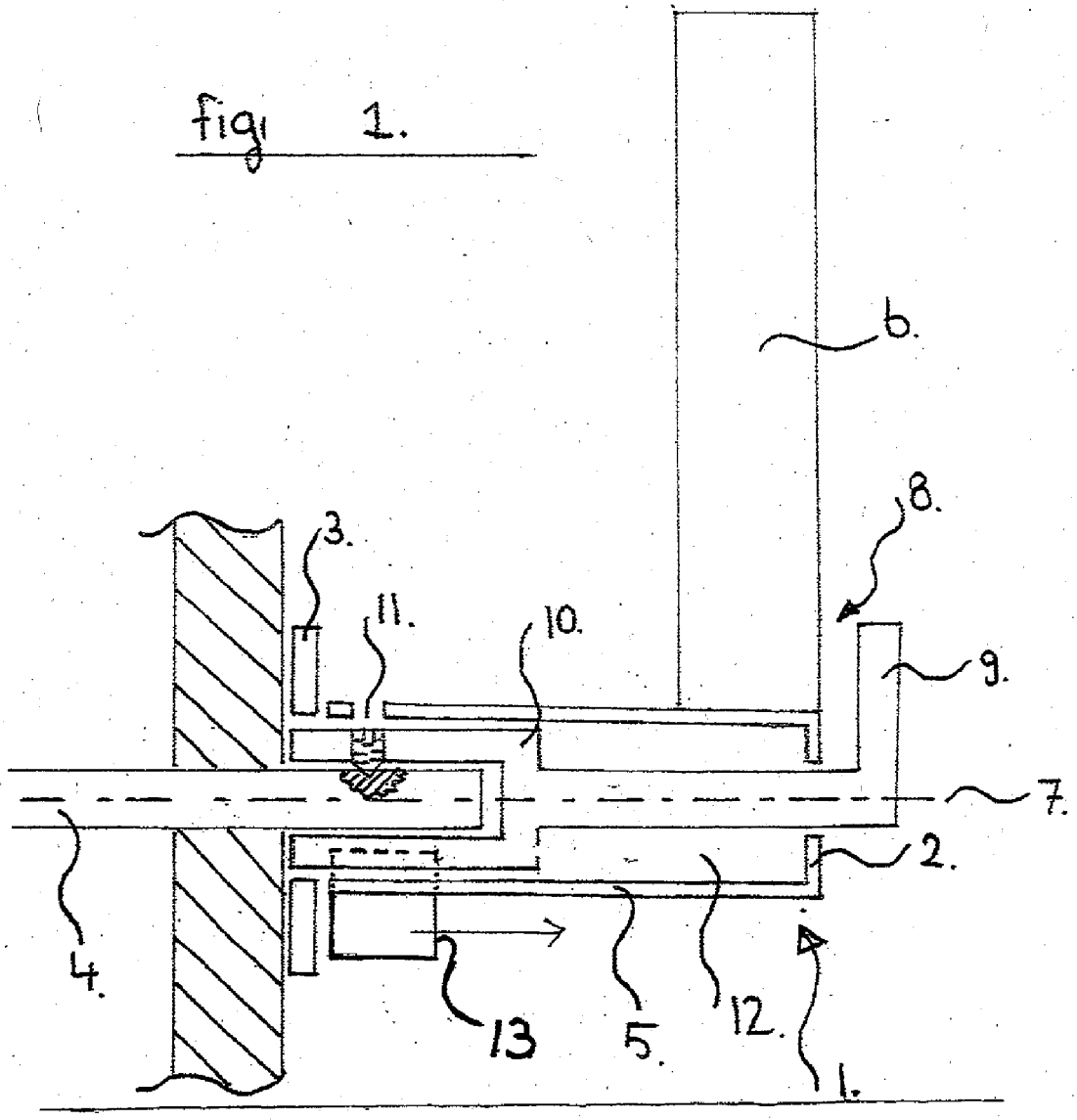


fig 2.

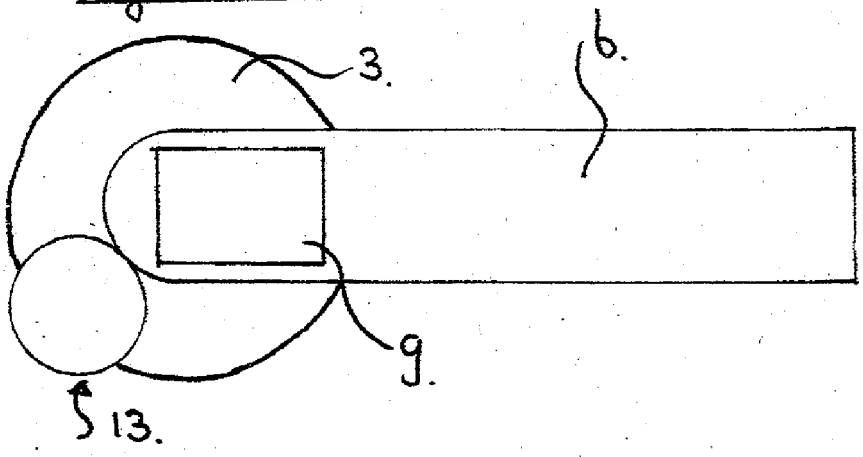


fig 3.

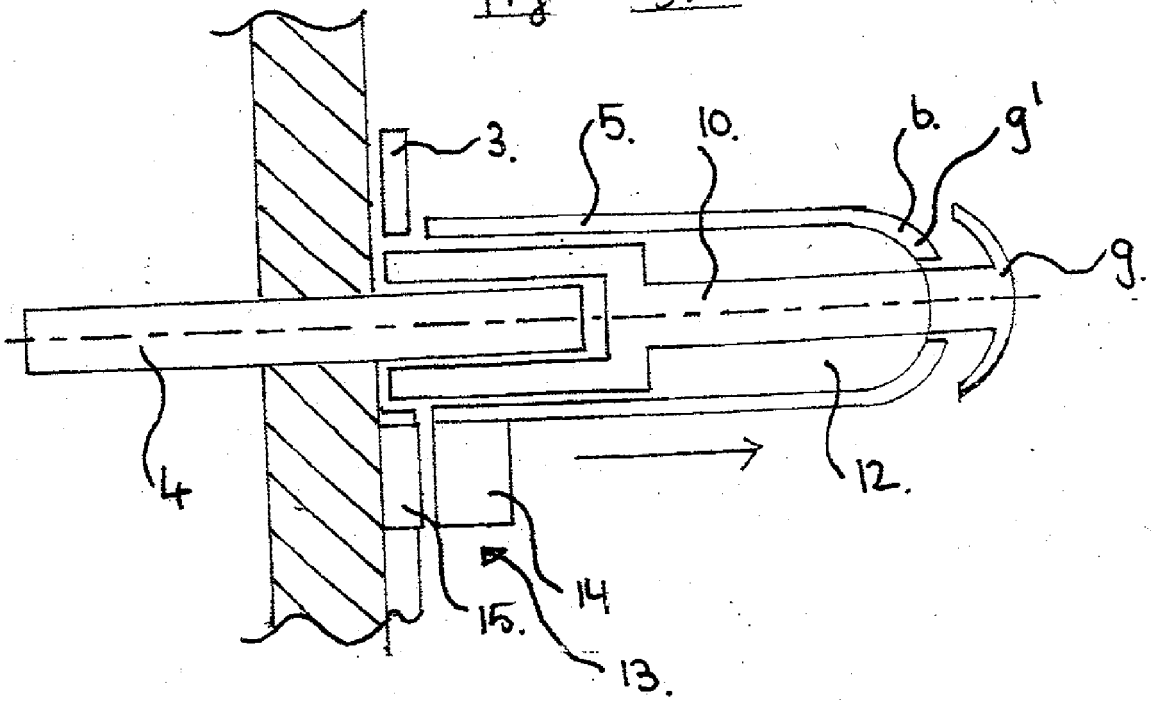


fig 4.

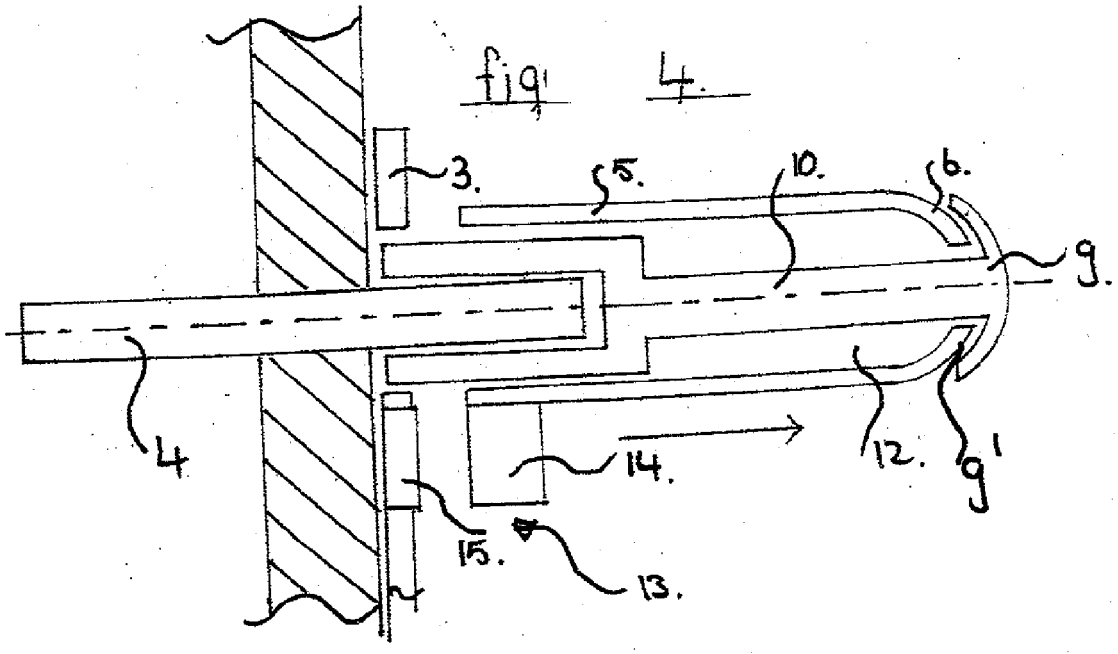


fig 5.

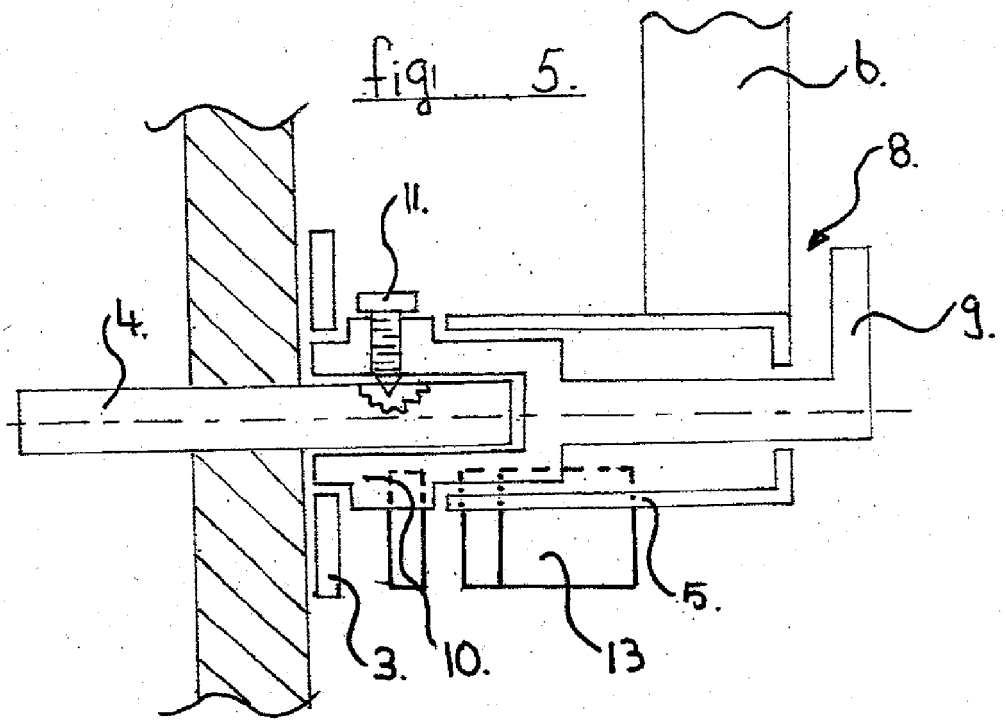
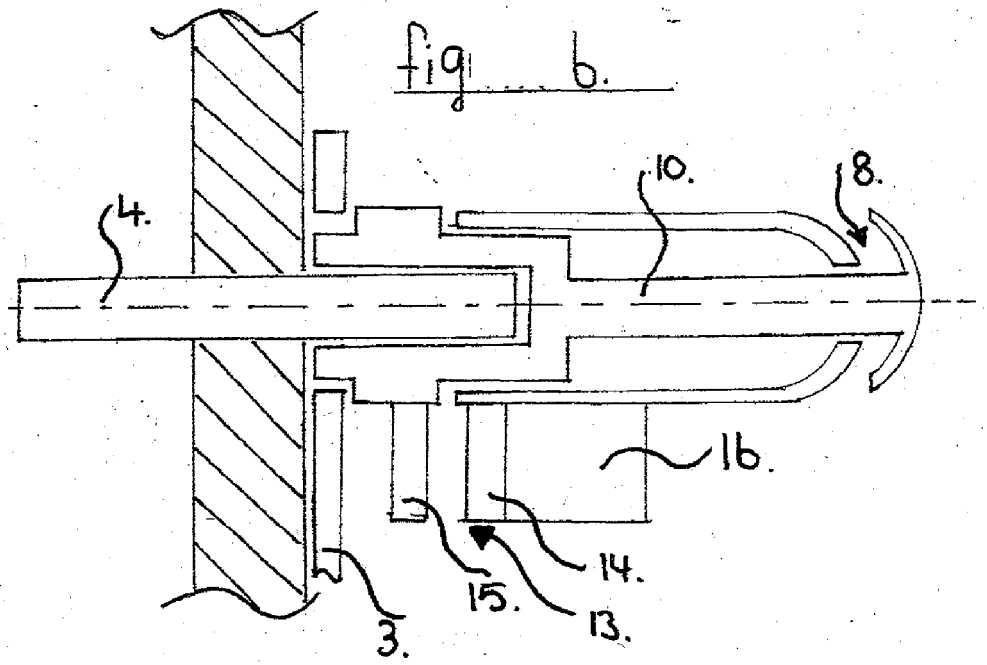


fig 6.



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 23 02 5002

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	WO 2007/089135 A1 (LAERHOVEN BART VAN [NL]; VAN LAERHOVEN KOEN MARIA DYONI [NL]) 9 August 2007 (2007-08-09) * the whole document *	1-13	INV. E05B13/00 E05B15/00
A,D	US 2022/081932 A1 (VARADARAJU NAGESH [IN] ET AL) 17 March 2022 (2022-03-17) * paragraphs [0026], [0029]; figures 5, 6 *	1-13	
A	CN 114 016 815 A (GUANGDONG HAOTAITAI SMART HOME CO LTD) 8 February 2022 (2022-02-08) * the whole document *	1-13	
A,D	EP 1 746 229 A2 (ASSA AB [SE]) 24 January 2007 (2007-01-24) * paragraphs [0013], [0014]; figure 2 *	1-13	
A,D	DE 203 05 870 U1 (SENFT THOMAS [DE]) 10 July 2003 (2003-07-10) * the whole document *	1-13	TECHNICAL FIELDS SEARCHED (IPC) E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	17 October 2023	Westin, Kenneth

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 02 5002

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-10-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007089135 A1	09-08-2007	EP 1979562 A1	15-10-2008
		NL 1031055 C2	14-08-2007
		WO 2007089135 A1	09-08-2007
US 2022081932 A1	17-03-2022	NONE	
CN 114016815 A	08-02-2022	NONE	
EP 1746229 A2	24-01-2007	AT 502176 T	15-04-2011
		EP 1746229 A2	24-01-2007
		NO 340070 B1	06-03-2017
		SE 527651 C2	02-05-2006
DE 20305870 U1	10-07-2003	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- WO 2007089135 A **[0002] [0005] [0008]**
- WO 0214634 A **[0002] [0006] [0008]**
- DE 20305870 **[0002] [0003] [0005] [0008]**
- NL 1039835 **[0006]**
- US 20220081932 A **[0007]**
- EP 1746229 A **[0008]**
- DE 102014111413 **[0008]**