

(19)



(11)

EP 2 803 787 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
17.05.2017 Bulletin 2017/20

(51) Int Cl.:
E05B 7/00 (2006.01) **E05B 63/04** (2006.01)
E05B 17/22 (2006.01)

(21) Application number: **14166127.2**

(22) Date of filing: **28.04.2014**

(54) **Door closer arrangement**

Türschließeranordnung

Dispositif de fermeture de porte

(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 MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **16.05.2013 FI 20135523**

(43) Date of publication of application:
19.11.2014 Bulletin 2014/47

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Description

Technical field

[0001] The invention relates to a door opening mechanism, by which a lock body is guided via a spindle. Mechanisms of this type are, for example, different push plate arrangements and panic boom arrangements. A panic boom arrangement is a horizontal push boom to be installed into a door, by the pushing of which the door is to be opened. A panic boom is used in connection with emergency exit doors.

Prior art

[0002] EP 749512 discloses a known push plate arrangement, in which a door is to be opened by pushing a push plate. The push plate is pivotally connected to the frame of the arrangement, which, in turn, is to be attached onto the surface of the door. The frame has a spindle junction, which is to be connected to a spindle, which, in turn, is in connection with the inside of the lock body. The frame has also a mechanism, which guides the force used in pushing the push plate into turning the spindle junction, wherein the spindle connected therein also turns. The spindle, in turn, turns the internal parts of the lock body, wherein the bolt of the lock body moves inside the lock body, allowing the door to be opened.

[0003] GB 2445948 discloses another known push plate arrangement. This arrangement can also be used in panic boom arrangements. The panic boom arrangement operates in a manner similar to that of a push plate arrangement. In a panic boom arrangement, instead of a push plate, a push boom is used, which is attached onto two frames to be attached onto the door. The spindle junction of the other installed frame is connected to the lock body via a spindle.

[0004] Furthermore, DE 3213668 discloses a door opening mechanism according to the preamble of claim 1.

[0005] Although known solutions are functional, using them it is possible to achieve a relatively small amount of different product versions.

Brief description of the invention

[0006] The object of the invention is to provide a door opening mechanism, by which it is possible to achieve a greater amount of different product versions than earlier. The object of the invention is achieved in the manner described in the independent claim. The dependent claims describe different embodiments of the invention.

[0007] The idea of the invention is to form such a mechanism, in which its manner of operation can be changed by turning or placing a given part or parts at another site. Additionally, to it can also be added a switch to indicate the state of the mechanism. A door opening mechanism according to the invention comprises a torsion spring,

which can be turned in the opposite direction. By turning the spring, the door opening mechanism operates either as a push plate or as a pull plate. The operation of the pull plate is similar to that of the push plate, but when using the pull plate, the door is to be opened by pulling the plate. The door opening mechanism according to the invention further comprises a plate, whose location can be changed to one side or the other of the spindle junction, which enables a right- or left-hand installation. The installation positions are thus also more diverse than in known solutions.

List of figures

[0008] In the following, the invention is described in more detail by means of the accompanying figures, in which

- Fig. 1 shows an example of a door opening mechanism according to the invention as an exploded view,
- Fig. 2 shows the example of Fig. 1 from another angle,
- Fig. 3 shows in more detail given parts of the door opening mechanism,
- Fig. 4 shows an example of the pivoting frame belonging to the door opening mechanism, and
- Fig. 5 shows the example of Fig. 4 from another angle.

Description of the invention

[0009] Fig. 1 shows an example of a door opening mechanism 1 according to the invention as an exploded view. Fig. 2 shows the same example as viewed from another direction. The door opening mechanism 1 comprises a user interface part 2, a frame part 4, a spindle junction part 7 and a stub axle 9. The user interface part 2 is pivotally connected into the frame part 4 via the stub axle 9. The door opening mechanism further comprises force transmission parts 3 between the user interface part 2 and the spindle junction part 7, as well as a torsion spring 8. The force transmission parts 3 comprise a bevel gear 7A, a bevel gear plate 6 and a pivoting frame 5, which has an axle hole 5A in its longitudinal direction.

[0010] The bevel gear 7A is an integral part of the spindle junction 7, and the bevel gear plate 6 comprises a through hole 6A in the opposite end of the plate in relation to the bevelled teeth 6B. The bevelled teeth 6B of the plate are against the teeth of the bevel gear 7A.

[0011] Figs. 3 - 5 show the pivoting frame in more detail. The pivoting frame 5 has a first lateral recess 5B in the middle of the frame and second 5C and third 5D lateral recesses on both sides of the first lateral recess 5B. Next to the second lateral recess 5C is a fourth lateral recess 5E and, correspondingly, next to the third lateral recess 5D is a fifth lateral recess 5F. The five recesses are located one after the other in the direction of the longitudinal axis of the pivoting frame 5. The pivoting frame also has moment transmitting surfaces 53, 54.

[0012] The torsion spring 8 is disposed into the first lateral recess 5B such that the other end 8A of the torsion spring is against one or the other of the end sides 51, 52 of the first lateral recess.

[0013] The end of the bevel gear plate 6 on the side of the through hole 6B is disposed into either the second 5C or third 5D lateral recess such that the edges 6C of the bevel gear plate fit together with the end sides 51, 52 of the first lateral recess 5B. The end 6B on the side of the bevelled teeth forms a projection in relation to the pivoting frame 5.

[0014] The user interface part 2 has holes 2A for the stub axle 9 and alignment projections 2B, which are disposed into the fourth 5E and fifth 5F lateral recesses. The user interface part further has counter moment transmitting surfaces 210, 211, which are against the moment transmitting surfaces 53, 54.

[0015] The torsion spring 8, bevel gear plate 6, pivoting frame 5 and user interface part 2 are connected to each other via a stub axle 9. The stub axle is located in the hole channel formed by the holes 2A of the user interface part, the axle hole 5A of the pivoting frame, the through hole 6A of the bevel gear plate, the torsion spring 8 and the holes 4C in the frame part. In the presented embodiment, that the stub axle 9 remains in place is assured by an attachment plate 19, but other means of assurance can also be used. From the figures it is also observed that, in this embodiment, the holes 4C of the frame part are in the end projections 4A of the frame part, between which the force transmission parts 3 are disposed. Additionally, from the figures it is observed that the spindle junction part 7 is to be attached to the frame part 4 using bearing- and attachment rings 16.

[0016] The embodiment 5 of the pivoting frame shown in the figures comprises, in each of its ends in the direction of the longitudinal axis, wings 5G, which limit the turning area of the pivoting frame in relation to the frame part 4. The wings 5G are against the frame part 4 in the ends of the pivoting area of the pivoting frame. The pivoting area is therefore that area (sector), in which the pivoting frame and the therein connected user interface part 2 are free to pivot. The ends of the pivoting area (the ends of the sector) are extreme positions of the pivoting frame and the user interface part. Therefore, if it is desired to limit the movement of the user interface and the pivoting frame in the manner presented above, it can also be done by another prevention structure, for example, using separate movement limiting projections in the frame part. The door opening mechanism can, indeed, also be implemented without the movement limiting structures described above, but such embodiments are unlikely to be very user-friendly or popular.

[0017] The door opening mechanism can further comprise a micro switch 10, which is connected into the frame part 4. The pivoting frame 5 has a touch surface 5H, which is in operational connection with the micro switch 10 to indicate the position of the pivoting frame 5. When the user interface part 2, which operates as a push plate,

is pushed against the door, the touch surface 5H of the pivoting frame has pressed shut the micro switch. When the user interface part 2 is free, the micro switch is open. If the user interface part operates as a pull plate, the micro switch is open when the pull plate is pulled, and closed when the pull plate is free (is not pulled).

[0018] In order that the micro switch can handily be connected into the frame part, a separate attachment piece 11 can be used. The attachment piece has attachment shapes for the micro switch 10 and the frame part. In the embodiment of the figures, the micro switch is to be attached into the frame part 4 with screws 15. The micro switch can also be retrofitted into the door opening mechanism.

[0019] The door opening mechanism 1 can further comprise a bushing 12, which is around the stub axle 9, against the torsion spring 8, the bevel gear plate 6 and the pivoting frame 5. Use of a bushing 12 increases the usable life and ease of operation of the door opening mechanism in comparison to an embodiment, in which a bushing is not used.

[0020] By turning the torsion spring 8, the operation of the door opening mechanism is changed from push operation to pull operation and vice versa. In push operation, the user interface part is pushed to open the door. In pull operation, the user interface part is pulled to open the door. In order that the end 8A of the torsion spring would more assuredly remain in its place, both end sides 51, 52 of the first lateral recess 5B of the pivoting frame 5 comprise a recess 51A, 52A for the end 8A of the torsion spring. The other end 8B of the torsion spring is against the frame part 4. The frame part can have a projection 4B for the other end of the torsion spring. Additionally, both ends (or just one end) of the torsion spring can be bent as in the example of the figures.

[0021] The door opening mechanism 1 can further comprise a base plate 13, onto which the frame part 4 is to be attached, and a casing 17 to cover the force transmission parts 3 and the base plate 13 of the frame part. The base plate has holes for the attachment screws and the spindle. The frame part is to be attached to the base plate with attachment screws 14. The spindle connects the lock body in the door and the spindle junction part 7 to each other. The spindle junction has a recess (not shown in the figures) for the spindle. The casing is to be attached onto the edge of the base plate 13 or onto the frame part, for example, with a so-called snap-in joint.

[0022] The user interface part 2 can comprise attachment screws 18, by which is assured the connection of the user interface into the pivoting frame 5 and other parts. The user interface part has holes 18a for the attachment screws. In the embodiment of the figures, the bushing 12 has grooves 12A, into which the ends of the attachment screws 18 are screwed.

[0023] The embodiment of the figures is shown as exploded views, from which can clearly be seen the different parts of the door opening mechanism and the relative placement of the parts. From the figures can also be

seen, how the parts are assembled together and how they can also be disassembled, if it is desired to change the door opening mechanism at a later time. The user interface part 2 can be changed for a unit of a different style. The user interface part can also be a panic boom, if into the door are installed two mechanisms. In this case, the second installed mechanism is connected into the lock body or into a spindle that is in connection with another locking mechanism. The torsion spring 8 can be turned 180 degrees in relation to the stub axle 9 in the transverse direction, in order that the head 8A of the spring can be placed against the desired end side 51, 52 of the first lateral recess 5B. By turning the torsion spring, the user interface part operates either as a push plate or a pull plate.

[0024] The handedness of the door opening mechanism can be changed, when the bevel gear plate 6 is moved from the second lateral recess 5C into the third lateral recess 5D or vice versa. The door opening mechanism can be installed into the door in several different positions. For practical reasons, there are three predominant installation positions: the free end of the user interface part downwards, towards the left or towards the right.

[0025] If there is a desire to add a locking option to the door opening mechanism or to change its locking option, there can also be an opening 70 in the spindle junction 7, into which can be placed a so-called bending iron connected into the lock cylinder. In this case, for example, in the place of the pivoting frame of the push plate is thus a lock cylinder.

[0026] The invention enables that the desired embodiment can be preassembled at the factory and, if necessary, it can later be changed into another embodiment, even without changing the parts. The amount of parts needed in storage is therefore comparatively small. The embodiment can further be changed by changing the user interface part 2 or by adding/removing the micro switch 10. Additionally, a structure according to the invention takes up comparatively little space, which saves on storage expenses and is perceived as pleasant in appearance.

[0027] In light of the examples presented above, it is obvious that the embodiment according to the invention can be achieved by many various solutions within the scope of the inventive idea.

Claims

1. A door opening mechanism (1), comprising a user interface part (2), a frame part (4), a spindle junction part (7) and a stub axle (9), which user interface part (2) is pivotally connected into the frame part (4) via the stub axle (9), and which door opening mechanism further comprises force transmission parts (3) between the user interface part (2) and the spindle junction part (7), the door opening mechanism comprising a torsion spring (8), and the force transmis-

sion parts (3) comprising a bevel gear (7A) and a bevel gear plate (6), **characterized in that**, the force transmission means further comprises a pivoting frame (5), which pivoting frame has an axle hole (5A) in the direction of its longitudinal axis,

which bevel gear (7A) is an integral part of the spindle junction (7), and the bevel gear plate (6) comprises a through hole (6A) in the opposite end in relation to the bevelled teeth (6B) of the plate, and the bevelled teeth (6B) of the plate are against the teeth of the bevel gear (7A),

and which pivoting frame (5) has a first lateral recess (5B) in the middle of the frame and second (5C) and third (5D) lateral recesses on both sides of the first lateral recess (5B), and next to which second lateral recess (5C) is a fourth lateral recess (5E) and, correspondingly, next to the third lateral recess (5D) is a fifth lateral recess (5F), which five recesses are located one after the other in the direction of the longitudinal axis of the pivoting frame (5), and the pivoting frame further has moment transmitting surfaces (53, 54),

which torsion spring (8) is disposed into the first lateral recess (5B) such that the other end (8A) of the torsion spring is against one or the other of the end sides (51, 52) of the first lateral recess,

and the end of the bevel gear plate (6) on the side of the through hole (6B) is disposed into either the second (5C) or third (5D) lateral recess such that the edges (6C) of the bevel gear plate fit together with the end sides (51, 52) of the first lateral recess (5B), and the end on the side of the bevelled teeth (6B) forms a projection in relation to the pivoting frame (5), which user interface part (2) has holes (2A) for the stub axle (9) and alignment projections (2B), which are disposed into the fourth (5E) and fifth (5F) lateral recesses, as well as counter moment transmitting surfaces (210, 211), which are against the moment transmitting surfaces (53, 34),

which torsion spring (8), bevel gear plate (6), pivoting frame (5) and user interface part (2) are connected to each other via the stub axle (9), the axle being located in the hole channel formed by the holes (2A) of the user interface part, the axle hole (5A) of the pivoting frame, the through hole (6A) of the bevel gear plate, the torsion spring (8) and the holes (4C) in the frame part.

2. A door opening mechanism 1 according to claim 1, **characterized in that** the pivoting frame (5) comprises, in each of its ends in the direction of the longitudinal axis, wings (5G), which limit the pivoting area of the pivoting frame in relation to the frame part (4), and which wings (5G) are against the frame part (4) at the ends of the pivoting area of the pivoting frame.

3. A door opening mechanism 1 according to claim 2,

characterized in that it comprises a micro switch (10), which is connected into the frame part (4), and the pivoting frame (5) has a touch surface (5H), which is in operational connection with the micro switch (10) to indicate the position of the pivoting frame (5).

4. A door opening mechanism 1 according to claim 2 or 3, **characterized in that** it comprises a bushing (12), which is around the stub axle (9), against the torsion spring (8), the bevel gear plate (6) and the pivoting frame (5).
5. A door opening mechanism 1 according to claim 4, **characterized in that** both end sides (51, 52) of the first lateral recess (5B) comprise a recess (51A), 52A for the end (8A) of the torsion spring, the other end (8B) of the torsion spring being against the frame part.
6. A door opening mechanism 1 according to any one of claims 1 - 5, **characterized in that** it comprises a base plate (13), onto which the frame part (4) is to be attached, and a casing (17) to cover the force transmission parts (3) and the base plate (13) of the frame part.
7. A door opening mechanism 1 according to claim 6, **characterized in that** the user interface part (2) comprises attachment screws (18).
8. A door opening mechanism 1 according to any one of claims 1 - 7, **characterized in that** the user interface part (2) comprises an opening (70) for the bending iron of the lock cylinder.

Patentansprüche

1. Türöffnungsmechanismus (1), der einen Benutzerschnittstellenteil (2), einen Rahmenteil (4), einen Spindelübergangsteil (7) und einen Achsstummel (9) umfasst, wobei die Benutzerschnittstelle (2) in dem Rahmenteil (4) über den Achsstummel (9) schwenkbar verbunden ist, und wobei der Türöffnungsmechanismus ferner Kraftübertragungsteile (3) zwischen dem Benutzerschnittstellenteil (2) und dem Spindelübergangsteil (7) umfasst, wobei der Türöffnungsmechanismus eine Torsionsfeder (8) umfasst, und wobei die Kraftübertragungsteile (3) ein Kegelrad (7A) und eine Kegelradplatte (6) umfassen, **dadurch gekennzeichnet, dass** die Kraftübertragungsmittel ferner einen Schwenkrahmen (5) umfassen, wobei der Schwenkrahmen in Der Richtung seiner Längsachse ein Achsloch (5A) aufweist, wobei das Kegelrad (7A) ein integraler Teil des Spindelübergangs (7) ist und die Kegelradplatte (6) in dem entgegengesetzten Ende in Bezug auf die an-

geschrägte Verzahnung (6B) der Platte eine Durchgangsöffnung (6A) umfasst, und wobei die angeschrägte Verzahnung (6B) der Platte entgegen der Verzahnung des Kegelrads (7A) ist, und wobei der Schwenkrahmen (5) eine erste laterale Ausnehmung (5B) in der Mitte des Rahmens und eine zweite (5C) und dritte (5D) laterale Ausnehmung auf beiden Seiten der ersten lateralen Ausnehmungen (5B) aufweist, und wobei neben der zweiten lateralen Ausnehmung (5C) eine vierte laterale Ausnehmung (5E) ist und, dementsprechend, neben der dritten lateralen Ausnehmung (5D) eine fünfte laterale Ausnehmung (5F) ist, wobei die fünf Ausnehmungen in der Richtung der Längsachse des Schwenkrahmens (5) aufeinanderfolgend angeordnet sind, und wobei der Schwenkrahmen ferner momentübertragende Flächen (53, 54) aufweist, wobei die Torsionsfeder (8) derart innerhalb der ersten lateralen Ausnehmung (5B) angeordnet ist, dass das andere Ende (8A) der Torsionsfeder entgegen der einen oder der anderen der Endseiten (51, 52) der ersten lateralen Ausnehmung ist, und wobei das Ende der Kegelradplatte (6) auf der Seite der Durchgangsöffnung (6B) entweder in der zweiten (5C) oder dritten (5D) lateralen Ausnehmung derart angeordnet ist, dass die Ränder (6C) der Kegelradplatte mit den Endseiten (51, 52) der ersten lateralen Ausnehmung (5B) zusammenpassen und das Ende auf der Seite der angeschrägten Verzahnung (6B) in Bezug auf den Schwenkrahmen (5) einen Vorsprung bildet, wobei der Benutzerschnittstellenteil (2) Löcher (2A) für den Achsstummel (9) und Ausrichtungsvorsprünge (2B), die in der vierten (5E) und fünften (5F) lateralen Ausnehmung angeordnet sind, sowie Gegenmomentübertragungsflächen (210, 211), die entgegen den Momentübertragungsflächen (53, 54) sind, aufweist, wobei Torsionsfeder (8), Kegelradplatte (6), Schwenkrahmen (5) und Benutzerschnittstellenteil (2) über den Achsstummel (9) miteinander verbunden sind, wobei die Achse in dem Lochkanal angeordnet ist, der von den Löchern (2A) des Benutzerschnittstellenteils, dem Achsloch (5A) des Schwenkrahmens, der Durchgangsöffnung (6A) der Kegelradplatte, der Torsionsfeder (8) und den Löchern (4C) in dem Rahmenteil gebildet wird.

2. Türöffnungsmechanismus 1 nach Anspruch 1, **dadurch gekennzeichnet, dass** der Schwenkrahmen (5), an jedem seiner Enden in der Richtung der Längsachse, Flügel (5G) umfasst, die den Schwenkbereich des Schwenkrahmens in Bezug auf den Rahmenteil (4) beschränken, und wobei die Flügel (5G) an den Enden des Schwenkbereichs des Schwenkrahmens entgegen dem Rahmenteil (4) sind.

3. Türöffnungsmechanismus 1 nach Anspruch 2, **dadurch gekennzeichnet, dass** er einen Mikroschalter (10) umfasst, der mit dem Rahmenteil (4) verbunden ist, und wobei der Schwenkrahmen (5) eine Tastfläche (5H) aufweist, die in operativer Verbindung mit dem Mikroschalter (10) ist, um die Position des Schwenkrahmens (5) anzuzeigen.
4. Türöffnungsmechanismus 1 nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** er eine Buchse (12), die um den Achsstummel (9) herum entgegen der Torsionsfeder (8), der Kegelradplatte (6) und dem Schwenkrahmen (5) ist, umfasst.
5. Türöffnungsmechanismus 1 nach Anspruch 4, **dadurch gekennzeichnet, dass** beide Endseiten (51, 52) der ersten lateralen Ausnehmung (5B) eine Ausnehmung (51A, 52A) für das Ende (8A) der Torsionsfeder umfassen, wobei das andere Ende (8B) der Torsionsfeder entgegen dem Rahmenteil ist.
6. Türöffnungsmechanismus 1 nach einem der Ansprüche 1-5, **dadurch gekennzeichnet, dass** er eine Basisplatte (13), auf der der Rahmenteil (4) zu befestigen ist, und eine Verkleidung (17) zum Verdecken der Kraftübertragungsteile (3) und der Basisplatte (13) des Rahmenelements umfasst.
7. Türöffnungsmechanismus 1 nach Anspruch 6, **dadurch gekennzeichnet, dass** der Benutzerschnittstellenteil (2) Befestigungsschrauben (18) umfasst.
8. Türöffnungsmechanismus 1 nach einem der Ansprüche 1-7, **dadurch gekennzeichnet, dass** der Benutzerschnittstellenteil (2) eine Öffnung (70) für das Biegeeisen des Schließzylinders umfasst.

Revendications

1. Mécanisme d'ouverture de porte (1), comprenant une pièce d'interface utilisateur (2), une pièce de cadre (4), une pièce de jonction de broche (7) et un axe à ergot (9), laquelle pièce d'interface utilisateur (2) est connectée en pivotement à l'intérieur de la pièce de cadre (4) par le biais de l'axe à ergot (9), et lequel mécanisme d'ouverture de porte comprend en outre des pièces de transmission de force (3) entre la pièce d'interface utilisateur (2) et la pièce de jonction de broche (7), le mécanisme d'ouverture de porte comprenant un ressort de torsion (8) et les pièces de transmission de force (3) comprenant un engrenage conique (7A) et un plateau d'engrenage conique (6), **caractérisé en ce que** le moyen de transmission de force comprend en outre un cadre pivotant (5), lequel cadre pivotant présente un orifice

d'axe (5A) dans la direction de son axe longitudinal, lequel engrenage conique (7A) fait partie intégrante de la jonction de broche (7), et le plateau d'engrenage conique (6) comprend un orifice traversant (6A) dans l'extrémité opposée par rapport à la denture conique (6B) du plateau, et la denture conique (6B) du plateau est contre la denture de l'engrenage conique

et lequel cadre pivotant (5) présente un premier creux latéral (5B) au centre du cadre et des deuxième (5C) et troisième (5D) creux latéraux sur les deux côtés du premier creux latéral (5B) et près duquel deuxième creux latéral (5C) est placé un quatrième creux latéral (5E), et par correspondance, près du troisième creux latéral (5D) est placé un cinquième creux latéral (5F), lesquels cinq creux sont situés l'un après l'autre dans la direction de l'axe longitudinal du cadre pivotant (5) et le cadre pivotant a en outre des surfaces de transmission de moment (53, 54),

lequel ressort de torsion (8) est disposé dans le premier creux latéral (5B) de telle sorte que l'autre extrémité (8A) du ressort de torsion est contre l'un ou l'autre des côtés d'extrémité (51, 52) du premier creux latéral,

et l'extrémité du plateau d'engrenage conique (6) sur le côté de l'orifice traversant (6B) est disposée soit dans le deuxième (5C), soit dans le troisième (5D) creux latéral de telle sorte que les bords (6C) du plateau d'engrenage conique (6) s'ajustent conjointement avec les côtés d'extrémité (51, 52) du premier creux latéral (5B), et l'extrémité sur le côté de la denture conique (6B) forme une saillie par rapport au cadre pivotant (5),

laquelle pièce d'interface utilisateur (2) présente des orifices (2A) pour l'axe à ergot (9) et des saillies d'alignement (2B) qui sont disposées dans les quatrième (5E) et cinquième (5F) creux latéraux ainsi que des surfaces de transmission de contre-moment (210, 211) qui sont contre les surfaces de transmission de moment (53, 54),

lesquels ressort de torsion (8), plateau d'engrenage conique (6), cadre pivotant (5) et pièce d'interface utilisateur (2) sont reliés l'un à l'autre par le biais de l'axe à ergot (9), l'axe étant situé dans le canal d'orifice formé par les orifices (2A) de la pièce d'interface utilisateur, le trou d'axe (5A) du cadre pivotant, l'orifice traversant (6A) du plateau d'engrenage conique, le ressort de torsion (8) et les orifices (4C) dans la pièce de cadre.

2. Mécanisme d'ouverture de porte (1) selon la revendication 1, **caractérisé en ce que** le cadre pivotant (5) comprend, dans chacune de ses extrémités dans la direction de l'axe longitudinal, des ailes (5G) qui limitent l'aire de pivotement du cadre pivotant par rapport à la pièce de cadre (4), et lesquelles ailes (5G) sont contre la pièce de cadre (4) aux extrémités

de l'aire de pivotement du cadre pivotant.

3. Mécanisme d'ouverture de porte (1) selon la revendication 2, **caractérisé en ce qu'il** comprend un micro-rupteur (10) qui est connecté dans la pièce de cadre (4), et le cadre pivotant (5) présente une surface tactile (5H) qui est en connexion opérationnelle avec le micro-rupteur (10) pour indiquer la position du cadre pivotant (5). 5
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4. Mécanisme d'ouverture de porte (1) selon la revendication 2 ou 3, **caractérisé en ce qu'il** comprend une douille (12) qui est autour de l'axe à ergot (9), contre le ressort de torsion (8), le plateau d'engrenage conique (6) et le cadre pivotant (5). 15
5. Mécanisme d'ouverture de porte (1) selon la revendication 4, **caractérisé en ce que** les deux côtés d'extrémité (51, 52) du premier creux latéral (5B) comprennent un creux (51A, 52A) pour l'extrémité (8A) du ressort de torsion, l'autre extrémité (8B) du ressort de torsion étant contre la pièce de cadre. 20
6. Mécanisme d'ouverture de porte (1) selon l'une quelconque des revendications 1 - 5, **caractérisé en ce qu'il** comprend une plaque de base (13) sur laquelle la pièce de cadre (4) doit être fixée, et un boîtier (17) pour couvrir les pièces de transmission de force (3) et la plaque de base (13) de la pièce de cadre. 25
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7. Mécanisme d'ouverture de porte (1) selon la revendication 6, **caractérisé en ce que** la pièce d'interface utilisateur (2) comprend des vis de fixation (18). 35
8. Mécanisme d'ouverture de porte (1) selon l'une quelconque des revendications 1 - 7, **caractérisé en ce que** la pièce d'interface utilisateur (2) comprend une ouverture (70) pour la ferrure courbe du barillet de serrure. 40

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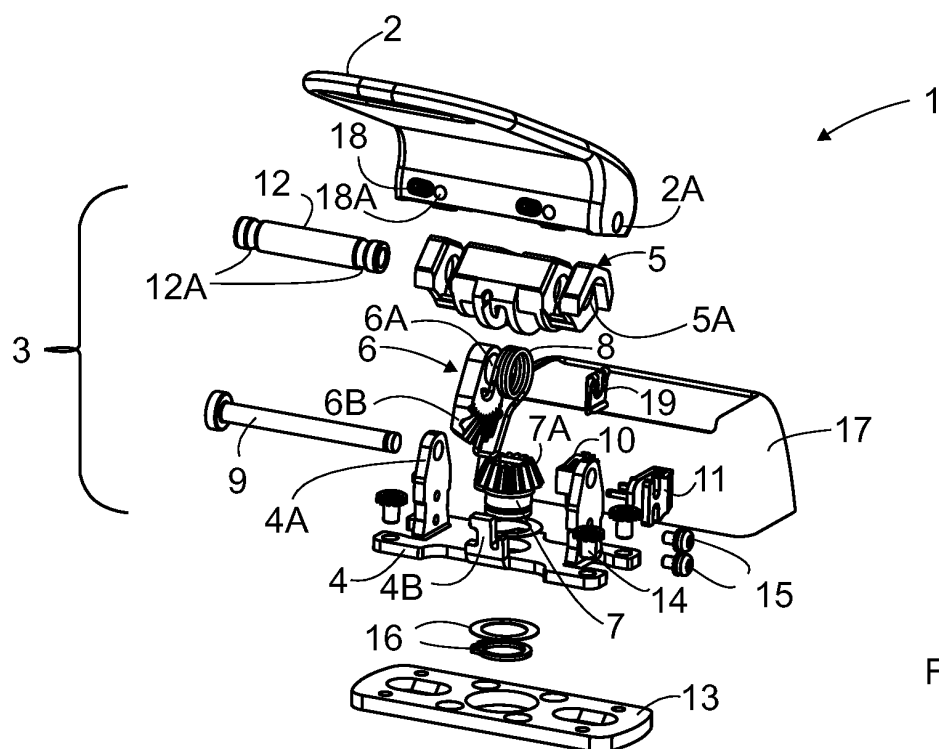


FIG. 1

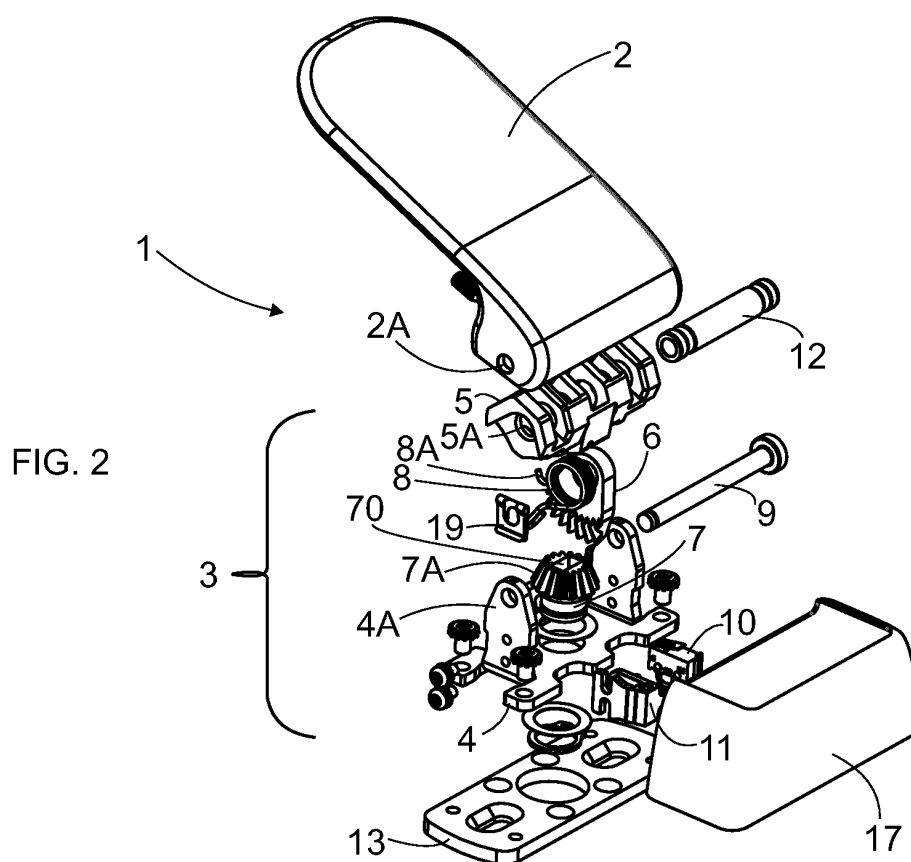


FIG. 2

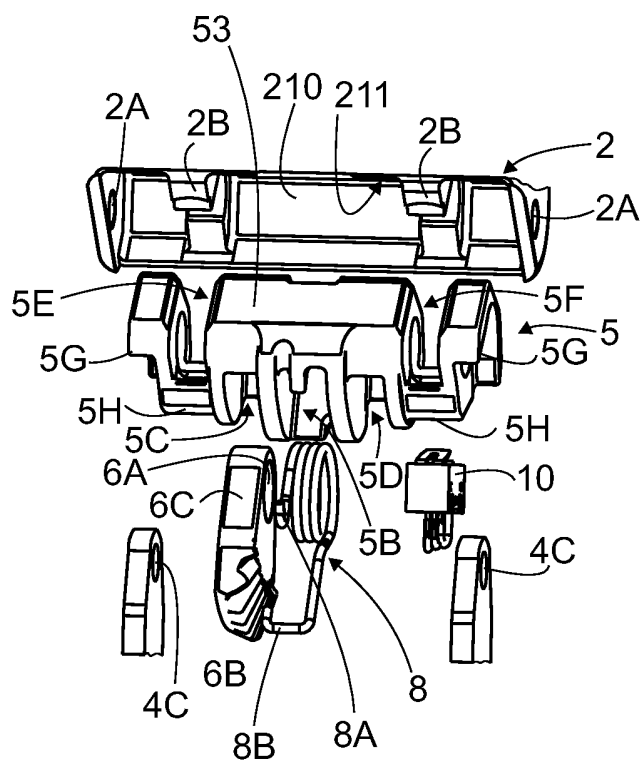


FIG. 3

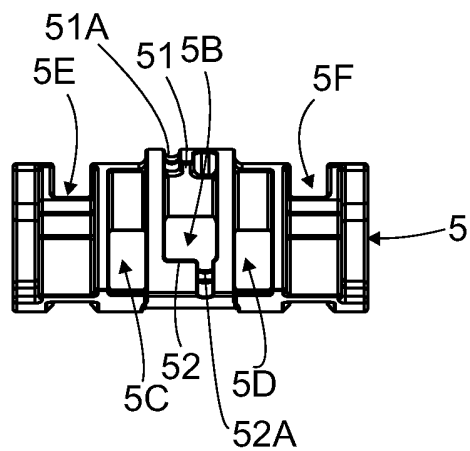


FIG. 4

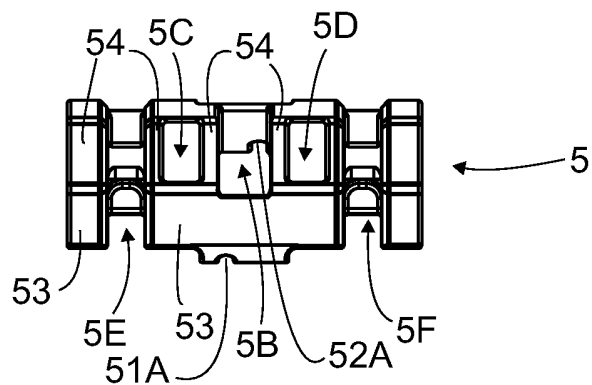


FIG. 5

REFERENCES CITED IN THE DESCRIPTION

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