

(19)



(11)

EP 4 265 870 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.10.2023 Bulletin 2023/43

(51) International Patent Classification (IPC):
E05B 47/02 ^(2006.01) **E05B 63/14** ^(2006.01)
E05B 65/00 ^(2006.01) **E05B 15/00** ^(2006.01)

(21) Application number: **22169008.4**

(52) Cooperative Patent Classification (CPC):
E05B 47/023; E05B 15/0086; E05B 63/14;
E05B 65/0007; E05B 2063/0039

(22) Date of filing: **20.04.2022**

(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
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(71) Applicant: **Locinox**
8790 Waregem (BE)

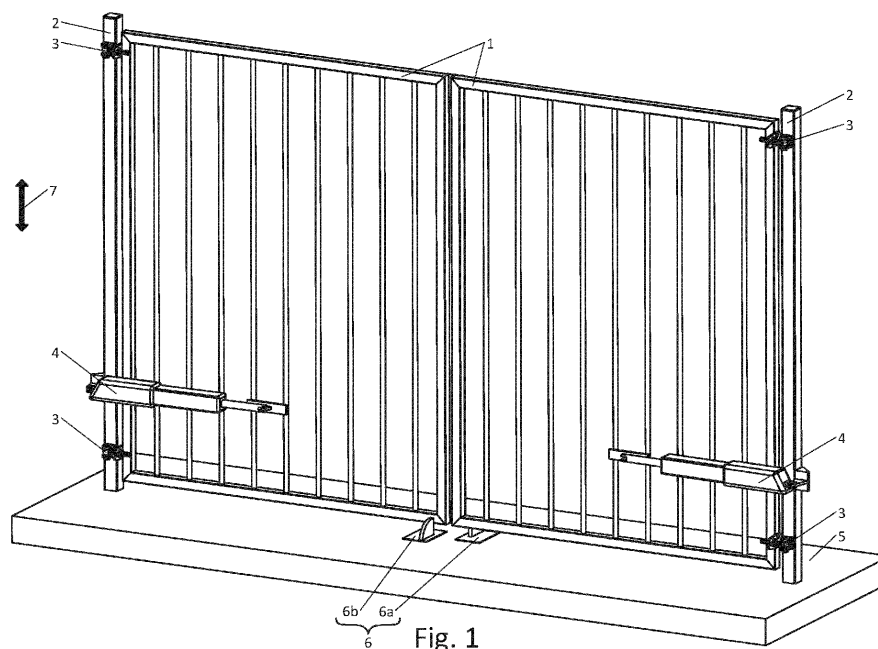
(72) Inventor: **TALPE, Joseph**
8551 Heestert-Zwevegem (BE)

(74) Representative: **Gevers Patents**
Intellectual Property House
Holidaystraat 5
1831 Diegem (BE)

(54) **A GROUND MOUNTED MOTOR-DRIVEN BLOCK SYSTEM AND A CLOSURE SYSTEM COMPRISING THE SAME**

(57) A ground mounted motor-driven block system (6) for a closure wing (1) comprises: a frame; a blocking member with a contact surface configured to be raised or lowered with respect to the frame and being formed by a leading surface of the blocking member when the blocking member rotates from a position in which the closure wing is free to move to a closure wing blocking position; a moveable actuation rod configured to rotate the blocking member; and a motorized drive mechanism

configured to move the moveable actuation rod. The blocking member forms a first order lever having a fulcrum, an effort arm providing said contact surface and a load arm cooperating with the moveable actuation rod. By having the contact surface formed by a leading edge of the blocking member, the contact surface moves closer to the closure wing the higher it goes with respect to the frame.

**Fig. 1****EP 4 265 870 A1**

Description

Technical field

[0001] The present invention relates to a ground mounted motor-driven block system for a closure wing. The present invention further relates to a closure system comprising the ground mounted motor-driven block system.

Background art

[0002] Ground mounted motor-driven block systems for blocking, preventing or hindering an opening motion of a pivotable closure wing are known. Known systems typically comprise a frame; a blocking member comprising a contact surface configured to be raised or lowered with respect to the frame, the blocking member being rotatably mounted on the frame about a pivot axis between a retracted position in which the contact surface does not hinder a pivoting motion of said closure wing and an extended position in which the contact surface hinders a pivoting motion of said closure wing; a moveable actuation rod mounted on the frame and configured to cooperate with the blocking member to rotate the blocking member between its retracted position and its extended position; and a motorized drive mechanism configured to move the moveable actuation rod.

[0003] Such a system is for example disclosed in US 2021/0277692 A1. The known system relies on a pivotable actuation rod which is pivotally connected to a frame on one end and is connected to the blocking member at its opposing end, in particular via a shaft extending through an elongated slot in the blocking member. The blocking member is pivotally fixed to the frame on one end and its opposing end forms the contact surface, i.e. the contact surface provided by the blocking member is formed by a tangential surface. A similar kind of blocking member is disclosed in WO 2021/089973 A1, albeit with a different actuation mechanism.

[0004] A downside of such a blocking member is the leeway it allows for closure wing movement. More specifically, since the contact surface is in essence tracing a circular path upwards, the contact surface moves farther away from the closure wing the higher it goes. As such, once in its extended position, there is room between the closure wing and the contact surface which is undesirable.

Disclosure of the invention

[0005] An object of the present invention is to provide an improved ground mounted motor-driven block systems.

[0006] To this object, the ground mounted motor-driven block systems according to the present invention is characterized in that the contact surface is formed by a leading surface of the blocking member when the block-

ing member rotates from its retracted position to its extended position, the contact surface being configured to rotate from an upwardly facing lying position to a closure wing facing upstanding position when the blocking member rotates from its retracted position to its extended position and vice versa, and in that the blocking member forms a first order lever having a fulcrum coinciding with the second pivot axis, an effort arm providing said contact surface and a load arm cooperating with the moveable actuation rod.

[0007] By having the contact surface formed by a leading edge of the blocking member, the contact surface moves closer to the closure wing the higher it goes with respect to the frame. As such, once in its extended position, any room between the closure wing and the contact surface can be fully avoided. Moreover, a first order lever, when compared to the third order levers used in the known block systems, allows for a more accurate force multiplication control.

[0008] In an embodiment of the present invention, the contact surface rotates over an angle of at least 60°, particularly at least 70° and more particularly at least 80° when the blocking member rotates between its retracted position and its extended position, said angle being at most 120°, particularly at most 110° and more particularly at most 100°, said angle being preferably about 90°. Such angles allow to fully retract the blocking member and still obtain a near-vertical contact surface when extended thus minimizing the risk that the blocking member damages a person or vehicle passing over it.

[0009] In an embodiment of the present invention, the contact surface extends substantially radially outwards with respect to said second pivot axis. In other words, the contact surface is substantially planar which is advantageous when retracted as there are no bumps and/or holes in the surface and is also advantageous when extended as the blocking member is then easy to use for different height differences between the frame and the closure wing.

[0010] In an embodiment of the present invention, the motorized drive mechanism is an electrically operated drive mechanism. This avoids the use of fuel and/or hydraulic systems reducing maintenance requirements and improving user convenience.

[0011] In an embodiment of the present invention, the system further comprises a drive rod which is rotatably mounted on the frame about a third pivot axis which is substantially parallel to the second pivot axis, the moveable actuation rod being interposed between the drive rod and the blocking member. In other words, the blocking member is actuated by a two-rod actuation mechanism. When compared to a single-rod actuation mechanism, this avoids leeway as each connection may be pivotal and no sliding elements are required to transfer a driving motion of the motor to the blocking member.

[0012] In an embodiment of the present invention, the moveable actuation rod and the drive rod are substantially parallel with one another when the blocking member

is in its extended position. The rods are thus in or near a dead point with respect to one another causing the blocking member to be maintained in the extended position without or with minimal force exerted on the motorized drive mechanism.

[0013] In an embodiment of the present invention, the moveable actuation rod has a first end which is pivotally connected to the drive rod and a second end which is pivotally connected to the blocking member. Thus no sliding parts are used in the actuation mechanism, which may become jammed due to dirt, snow, etc., especially in outdoors use.

[0014] In an embodiment of the present invention, the motorized drive mechanism comprises a drive shaft mounted to the frame, the drive rod being fixedly mounted on the drive shaft. The drive rod is thus directly driven by the motor reducing the number of parts required.

[0015] In an embodiment of the present invention, the blocking member comprises a circular sector, the circular sector having a central angle which is particularly between 60° and 120° and more particularly between 80° and 100°, the central angle being most particularly about 90°.

[0016] In an alternative embodiment of the present invention, the moveable actuation rod has a first end which is rotatably mounted on the frame about a third pivot axis which is substantially parallel to the second pivot axis and a second end which engages the blocking member. In other words, the blocking member is actuated by a single-rod actuation mechanism. This reduces the number of parts required.

[0017] In an embodiment of the present invention, the blocking member comprises an elongated slot extending between a first extremity and a second extremity, the first extremity being nearer the second pivot axis than the second extremity, the second end of the moveable actuation rod being connected to the blocking member at least by means of said elongated slot, wherein the elongated slot preferably extends radially outwards with respect to said second pivot axis. An elongated slot ensures that there is always a connection between the actuation rod and the blocking member and avoids that a biasing member would be needed to urge the blocking member back to its retracted position.

[0018] In an embodiment of the present invention, when the blocking member rotates between its retracted position and its extended position, the moveable actuation rod moves along said elongated slot, said movement preferably comprising a movement in a first direction during a first part of the rotation and in a second direction, which is opposite the first direction, during a second part of the rotation. Such a two-stage sliding movement allows an accurate control of the blocking member rotation.

[0019] In an embodiment of the present invention, the motorized drive mechanism comprises a drive shaft mounted to the frame, the moveable actuation rod being fixedly mounted on the drive shaft. The actuation rod is thus directly driven by the motor reducing the number of

parts required.

[0020] In an embodiment of the present invention, the contact surface and the elongated slot are located substantially opposite one another with respect to the second pivot axis.

[0021] In an embodiment of the present invention, a smallest angle between the load arm and the effort arm is at least 150°, particularly at least 160° and more particularly at least 170°, the smallest angle being preferably about 180°.

[0022] In an embodiment of the present invention, when the blocking member is in its extended position, the moveable actuation rod is oriented tangentially with respect to a circle about the second pivot axis. As such, a pushing force exerted on the contact surface causes no or only a minimal torque on the moveable actuation rod causing the blocking member to be maintained in the extended position without or with minimal force exerted on the motorized drive mechanism.

[0023] In an embodiment of the present invention, the contact surface is configured to rotate towards the closure wing when the blocking member rotates from its retracted position to its extended position.

[0024] In an embodiment of the present invention, the first pivot axis and the second pivot axis are substantially perpendicular to one another.

[0025] The object according to the present invention is also achieved with a closure system comprising a closure wing which is pivotable about a first pivot axis and a ground mounted motor-driven block system as described above for blocking said closure wing. Since the closure system includes the block system, the same advantages are realized.

[0026] In an embodiment of the present invention, the closure system comprises a further closure wing adjacent said closure wing and which is pivotable about a second pivot axis which is parallel to the first pivot axis, the closure system being moveable between an open position and a closed position, wherein the closure system further comprises a further ground mounted motor-driven block system as described above is provided for blocking said second closure wing, the ground mounted motor-driven block system being provided on one side of the closure system when the closure system is in its closed position and the further ground mounted motor-driven block system being provided on the other side of the closure system when the closure system is in its closed position. This provides a double swing gate with fully retractable blocking members.

Brief description of the drawings

[0027] Other particularities and advantages of the invention will become apparent from the following description of some particular embodiments of a mortice lock and of a keep according to the present invention. The reference numerals used in this description relate to the annexed drawings wherein:

Figure 1 shows a closure system having two closure wings with a ground mounted motor-driven block system according to the present invention being provided for each closure wing in the closed position.

Figure 2 shows the closure system of figure 1 in the open position.

Figures 3A to 3C show a first embodiment of a ground mounted motor-driven block system according to the present invention with the blocking member its retracted, an intermediate, its extended position respectively.

Figures 4A to 4C show a second embodiment of a ground mounted motor-driven block system according to the present invention with the blocking member its retracted, an intermediate, its extended position respectively.

Description of the invention

[0028] The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by the claims. The drawings described are only schematic and are non-limiting. In the drawings, the size of some of the elements may be exaggerated and not drawn on scale for illustrative purposes. The dimensions and the relative dimensions do not necessarily correspond to actual reductions to practice of the invention.

[0029] Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

[0030] Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

[0031] Furthermore, the various embodiments, although referred to as "preferred" are to be construed as exemplary manners in which the invention may be implemented rather than as limiting the scope of the invention.

[0032] The present invention generally relates to a ground mounted motor-driven block system for blocking a movement of a pivotable closure wing.

[0033] The term "blocking" should be interpreted broadly as resisting an opening movement of the closure wing with the aim of preventing the opening rotation of the closure wing during normal use. Naturally, when a sufficient force is exerted on a closure wing (e.g. when someone attempts a forced entry), it may occur that the closure wing opens despite the presence of a ground

mounted motor-driven block system.

[0034] The term "closure wing" (or a closure leaf) is used in the present specification to embrace all kinds of closure members such as doors (i.e. having a full panel), gates, etc. The closure wing is pivotally attached to a support (e.g. a post, a wall, another closure wing, etc.) and is pivotable about a first pivot axis. Typically, the first pivot axis is oriented vertically, but other inclined orientations are also possible.

[0035] In the following description, the ground mounted motor-driven block system will be described with reference to a double swing gate. However, the invention should not be considered as limited to only double gates and may also be used in the context of a closure system having only a single closure wing.

[0036] Figure 1 shows a closed closure system having two closure wings 1 with a ground mounted motor-driven block system 6 according to the present invention being provided for each closure wing 1. Each closure wing 1 is pivotally attached to a respective tubular support 2 by means of hinges 3. In other words, each closure wing 1 pivots about a hinge axis which is oriented along the vertical direction 7. Actuation means 4 are provided for opening or closing a respective closure wing 1. In the illustrated embodiment, use is made of motor-driven actuation means. However, in other embodiments, each closure wing 1 may be opened manually (e.g. by a user pushing against the closure wing 1) and a hydraulically damped actuator (e.g. as disclosed in WO 2018/228729 A1) may be provided to close each closure wing 1.

[0037] Figure 1 further illustrates a ground surface 5 in which the ground mounted motor-driven block system 6 is placed. The block system 6 is shown in its blocking position in figure 1 which means that the closure wings 1 are prevented from opening. The block system 6a is positioned on a first side of the closure system and acts as a stop for stopping a closing motion of the right-hand closure wing 1. The right-hand closure wing 1 is provided with a gate stop 8 for stopping a closing motion of the left-hand closure wing 1. A second block system 6b is provided on the other side of the closure system and blocks an opening movement of the left-hand closure wing 1.

[0038] The closure system is shown in its opened position in figure 2. In this position, both block systems 6a, 6b are in their unblocking position and do not (or only minimally) protrude with respect to the ground surface 5. As such, the block systems 6 do not hinder the opening or closing movements of the closure wings 1.

[0039] In order to transition from the closed position shown in figure 1 to the opened position in figure 2, the block system 6b is moved from its blocking position to its unblocking position thereby allowing to open the left-hand closure wing 1 and subsequently the right-hand closure wing. Although the ground mounted motor-driven block system 6a could also be replaced by a stationary block, the illustrated embodiment is advantageous since a stationary block remains protruding from the ground

surface 5 and may cause injury to unaware people or may damage a vehicle passing through the closure system. The block system 6a may be from its blocking position to its unblocking position at the same time as the block system 6b or it may occur at a later stage during opening of the closure wings 1 as desired.

[0040] In order to transition from the opened position shown in figure 2 to the closed position in figure 1, the block system 6a is moved to its blocking position and the right-hand closure wing 1 is closed. Both movements may occur simultaneously or sequentially as long as the block system 6a is in its blocking position when the right-hand closure wing 1 is nearing its closed position. The left-hand closure wing 1 is closed with some time delay after the right-hand closure wing 1. Once both closure wings 1 are closed, the block system 6b is moved to its blocking position.

[0041] It will be readily appreciated that either one of the closure wings 1 in the system shown in figures 1 and 2 may be replaced by a fixed wing.

[0042] In another embodiment, a double swing gate may be provided with two block systems on the same side and a stationary block on the opposing side against which each closure wing abuts when closed. This avoids having to provide the gate stop 8. In another embodiment, a double swing gate may be provided with four block systems, namely two on each side of the closure system. Other configurations are also possible.

[0043] A first embodiment of a ground mounted motor-driven block system 300 according to the present invention will be described by reference to figures 3A to 3C.

[0044] The block system 300 comprises a frame 302 having a cover plate 304 at its top. The cover plate 304 is meant to sit flush with the ground surface 5. An elongated slot 306 is provided in the cover plate 304 and is provided to allow a blocking member 308 to protrude therethrough. The blocking member 308 is generally pivotally mounted to the frame 302. In the illustrated embodiment, this is achieved by providing a shaft 310 on the blocking member 308 with mounting brackets 312 to fix the shaft 310 to the frame 302. Bearings may be provided between the mounting brackets 312 and the shaft 310. The shaft 310 thus forms the pivot axis of the blocking member 308. It will be readily appreciated that other mechanisms are possible to pivotally mount the blocking member on the frame.

[0045] The block system 300 according to the present invention further comprises an actuation mechanism to rotate the blocking member 308 about its pivot axis from its retracted position (shown in figure 3A) to its extended position (shown in figure 3C). In the first embodiment of the block system 300, the actuation mechanism comprises a drive rod 318 and an actuation rod 320.

[0046] The drive rod 318 is pivotally mounted to the frame 302. In the illustrated embodiment, this is achieved by providing a shaft 316 on (a first end of) the drive rod 318 with mounting brackets 314 to fix the shaft 316 on support elements 315 which are part of or are fixed to

the frame 302. Bearings may be provided between the mounting brackets 314 and the shaft 316. The shaft 316 thus forms the pivot axis of the drive rod 318. Shaft 316 preferably forms a drive shaft connected to a motor (not shown). It will be readily appreciated that other mechanisms are possible to pivotally mount the drive rod on the frame.

[0047] The actuation rod 320 is pivotally mounted to the blocking member 308. In the illustrated embodiment, this is achieved by providing a shaft 322 which extends through (a first end of) the actuation rod 320 and through the blocking member 308. Bearings may be provided about the shaft 322 and the actuation rod 320 and/or the blocking member 308. It will be readily appreciated that other mechanisms are possible to pivotally connect the actuation rod and the blocking member (e.g. providing protruding shaft-forming elements integrally on the blocking member).

[0048] The actuation rod 320 and the drive rod 318 are pivotally connected to one another, in particular these are connected at opposing ends with respect to their connection to either the blocking member 308 or the frame 302. In the illustrated embodiment, this is achieved by providing a shaft 324 which extends through (a second, opposite its first end, end of) the actuation rod 320 and through (a second, opposite its first end, end of) the drive rod 318. Bearings may be provided about the shaft 324 and the actuation rod 320 and/or the drive rod 318. It will be readily appreciated that other mechanisms are possible to pivotally connect the actuation rod and the drive rod (e.g. providing protruding shaft-forming elements integrally on either rod).

[0049] In the illustrated embodiments, all shafts 310, 316, 322, 324 are parallel to one another. This allows the rods 318, 320 and the blocking member 308 to rotate in a single plane. However, non-aligned shaft orientations are possible.

[0050] The illustrated actuation mechanism allows to rotate the blocking member 308 over about 90° to move between its retracted position (shown in figure 3A) and its extended position (shown in figure 3C). When the blocking member 308 is in its extended position it prevents a pivoting motion of the closure wing 1, in particular as the blocking member 308 provides a contact surface 326 against which the closure wing 1 abuts when pivoting. It will be readily appreciated that the blocking member 308 may rotate over other angles between its retracted position and its extended position.

[0051] According to the present invention, the contact surface 326 of the blocking member 308 is formed by a leading surface when the blocking member 308 rotates from its retracted position to its extended position. In this way, the contact surface 326 rotates from an upwardly facing lying position (shown in figure 3A) to a closure wing facing upstanding position (shown in figure 3C) when the blocking member 308 rotates from its retracted position to its extended position and vice versa.

[0052] In the first embodiment, the blocking member

308 is shaped as a quarter disc. However, other shapes are also possible and are mainly dependent on the configuration of the rods 318, 320.

[0053] In the illustrated embodiment, the contact surface 326 extends substantially radially outwards with respect to the shaft 310. More specifically, when considering the blocking member 308 as part of circle with a centre coinciding with shaft 310, the contact surface 326 is formed by a chord.

[0054] As shown in figure 3C, in the extended position of the blocking member 308, the rods 318, 320 form a straight rod, i.e. the rods 318, 320 are parallel to one another. In this way, the rods 318, 320 are in their dead point. As such, a pushing force exerted on the contact surface 326 does not cause a pivoting movement of the rods 318, 320.

[0055] A second embodiment of a ground mounted motor-driven block system 400 according to the present invention will be described by reference to figures 4A to 4C. Elements or components previously described with reference to figures 3A to 3C bear the same last two digits but preceded by '4'.

[0056] The block system 400 comprises a frame 402 having a cover plate 404 at its top. The cover plate 404 is meant to sit flush with the ground surface 5. An elongated slot 406 is provided in the cover plate 404 and is provided to allow a blocking member 408 to protrude therethrough. The blocking member 408 is generally pivotally mounted to the frame 402. In the illustrated embodiment, this is achieved by providing a shaft 410 on the blocking member 308 with mounting brackets 412 to fix the shaft 410 to the frame 402. Bearings may be provided between the mounting brackets 412 and the shaft 410. The shaft 410 thus forms the pivot axis of the blocking member 408. It will be readily appreciated that other mechanisms are possible to pivotally mount the blocking member on the frame.

[0057] The block system 400 according to the present invention further comprises an actuation mechanism to rotate the blocking member 408 about its pivot axis from its retracted position (shown in figure 4A) to its extended position (shown in figure 4C). In the second embodiment of the block system 400, the actuation mechanism comprises an actuation rod 430.

[0058] The actuation rod 430 is pivotally mounted to the frame 402. In the illustrated embodiment, this is achieved by providing a shaft 416 on (a first end of) the actuation rod 430 with mounting brackets 414 to fix the shaft 416 on support elements 415 which are part of or are fixed to the frame 402. Bearings may be provided between the mounting brackets 414 and the shaft 416. The shaft 416 thus forms the pivot axis of the actuation rod 430. Shaft 416 preferably forms a drive shaft connected to a motor (not shown). It will be readily appreciated that other mechanisms are possible to pivotally mount the drive rod on the frame.

[0059] The actuation rod 430 is further connected to the blocking member 408, in particular in a pivotal and

slideable fashion. In the illustrated embodiment, this is achieved by providing a shaft 432 which extends through (a second, opposite the first end, end of) the actuation rod 430 and through the blocking member 408, in particular through an elongated slot 434 provided in the blocking member 408. Bearings may be provided about the shaft 432 and the actuation rod 420. It will be readily appreciated that other mechanisms are possible to connect the actuation rod and the blocking member.

[0060] In the illustrated embodiments, all shafts 410, 416, 432 are parallel to one another. This allows the actuation rod 430 and the blocking member 408 to rotate in a single plane. However, non-aligned shaft orientations are possible.

[0061] In the illustrated embodiment, the elongated slot 434 is straight and advantageously extends radially outwards from the shaft 410. However, curved slots are also possible. As illustrated in figures 4A to 4C, when the blocking member 408 moves between its retracted position and its extended position, the shaft 432 performs a double sliding motion along the elongated slot 434. That is, in an initial stage of the movement, the shaft 432 slides from end of the slot 434 to the other end and in a subsequent stage of the movement, the shaft 432 slides from the other end of the slot 434 back to the original end. Concurrently, the actuation rod 430 is pivoting with respect to the shaft 432.

[0062] The illustrated actuation mechanism allows to rotate the blocking member 408 over about 90° to move between its retracted position (shown in figure 4A) and its extended position (shown in figure 4C). When the blocking member 408 is in its extended position it prevents a pivoting motion of the closure wing 1, in particular as the blocking member 408 provides a contact surface 426 against which the closure wing 1 abuts when pivoting. It will be readily appreciated that the blocking member 408 may rotate over other angles between its retracted position and its extended position.

[0063] According to the present invention, the contact surface 426 of the blocking member 408 is formed by a leading surface when the blocking member 408 rotates from its retracted position to its extended position. In this way, the contact surface 426 rotates from an upwardly facing lying position (shown in figure 4A) to a closure wing facing upstanding position (shown in figure 4C) when the blocking member 408 rotates from its retracted position to its extended position and vice versa.

[0064] In the first embodiment, the blocking member 308 is shaped as a quarter disc. However, other shapes are also possible and are mainly dependent on the configuration of the rods 318, 320.

[0065] In the illustrated embodiment, the contact surface 426 extends substantially radially outwards with respect to the shaft 410. More specifically, when considering the blocking member 408 as part of circle with a centre coinciding with shaft 4310, the contact surface 426 is formed by a chord.

[0066] As shown in figure 4C, in the extended position

of the blocking member 408, the actuation rod 430 is tangentially oriented with respect to a circle having shaft 410 as its centre. As such, a pushing force exerted on the contact surface 326 does not cause a pivoting movement of the actuation rod 430.

[0067] In both of the embodiments of the ground mounted motor-driven block system 300, 400, the blocking member 308, 408, when in its extended position, forms a first order lever having a fulcrum coinciding with the shaft 310, 410. The effort arm of the lever is extending from the fulcrum to an area on the contact surface 326, 426 and the load arm is extending from the fulcrum to the actuation rod 320, 430.

[0068] The ground mounted motor-driven block system 6, 300, 400 according to the present invention may be driven by different kinds of motors. However, an electrical motor is preferred both for user convenience and reliability when compared to a fuel-based motor or a hydraulic motor.

[0069] Although aspects of the present disclosure have been described with respect to specific embodiments, it will be readily appreciated that these aspects may be implemented in other forms within the scope of the invention as defined by the claims.

Claims

1. A ground mounted motor-driven block system (6, 300, 400) for a closure wing (1), the closure wing being pivotable about a first pivot axis between an opened position and a closed position, the system comprising:

- a frame (302, 402);
- a blocking member (308, 408) comprising a contact surface (326, 426) configured to be raised or lowered with respect to the frame, the blocking member being rotatably mounted on the frame about a second pivot axis between a retracted position in which the contact surface does not hinder a pivoting motion of said closure wing and an extended position in which the contact surface hinders a pivoting motion of said closure wing;
- a moveable actuation rod (320, 430) mounted on the frame and configured to cooperate with the blocking member to rotate the blocking member between its retracted position and its extended position; and
- a motorized drive mechanism configured to move the moveable actuation rod,

characterized in that the contact surface is formed by a leading surface of the blocking member when the blocking member rotates from its retracted position to its extended position, the contact surface being configured to rotate from an upwardly facing lying

position to a closure wing facing upstanding position when the blocking member rotates from its retracted position to its extended position and vice versa, and **in that** the blocking member forms a first order lever having a fulcrum coinciding with the second pivot axis, an effort arm providing said contact surface and a load arm cooperating with the moveable actuation rod.

2. The system according to claim 1, **characterized in that** the contact surface rotates over an angle of at least 60°, particularly at least 70° and more particularly at least 80° when the blocking member rotates between its retracted position and its extended position, said angle being at most 120°, particularly at most 110° and more particularly at most 100°, said angle being preferably about 90°.
3. The system according to claim 1 or 2, **characterized in that** the contact surface extends substantially radially outwards with respect to said second pivot axis.
4. The system (300) according to any one of claims 1 to 3, **characterized in that** the system further comprises a drive rod (318) which is rotatably mounted on the frame about a third pivot axis which is substantially parallel to the second pivot axis, the moveable actuation rod (320) being interposed between the drive rod and the blocking member.
5. The system according to claim 4, **characterized in that** the moveable actuation rod and the drive rod are substantially parallel with one another when the blocking member is in its extended position.
6. The system according to claim 4 or 5, **characterized in that** the moveable actuation rod has a first end which is pivotally connected to the drive rod and a second end which is pivotally connected to the blocking member.
7. The system according to any one of the claims 4 to 6, **characterized in that** the motorized drive mechanism comprises a drive shaft (316) mounted to the frame, the drive rod being fixedly mounted on the drive shaft.
8. The system according to any one of the claims 4 to 7, **characterized in that** the blocking member comprises a circular sector, the circular sector having a central angle which is particularly between 60° and 120° and more particularly between 80° and 100°, the central angle being most particularly about 90°.
9. The system (400) according to any one of claims 1 to 3, **characterized in that** the moveable actuation rod (430) has a first end which is rotatably mounted

on the frame about a third pivot axis which is substantially parallel to the second pivot axis and a second end which engages the blocking member.

being provided on the other side of the closure system when the closure system is in its closed position.

10. The system according to claim 9, **characterized in that** the blocking member comprises an elongated slot (434) extending between a first extremity and a second extremity, the first extremity being nearer the second pivot axis than the second extremity, the second end of the moveable actuation rod being connected to the blocking member at least by means of said elongated slot, wherein the elongated slot preferably extends radially outwards with respect to said second pivot axis.

5
10
15
11. The system according to claim 10, **characterized in that**, when the blocking member rotates between its retracted position and its extended position, the moveable actuation rod moves along said elongated slot, said movement preferably comprising a movement in a first direction during a first part of the rotation and in a second direction, which is opposite the first direction, during a second part of the rotation.

20
12. The system according to any one of the claims 9 to 11, **characterized in that** the motorized drive mechanism comprises a drive shaft (416) mounted to the frame, the moveable actuation rod being fixedly mounted on the drive shaft.

25
30
13. The system according to any one of the claims 9 to 12, **characterized in that**, when the blocking member is in its extended position, the moveable actuation rod is oriented tangentially with respect to a circle about the second pivot axis.

35
14. A closure system comprising a closure wing (1) which is pivotable about a first pivot axis, **characterized in that** the closure system further comprises a ground mounted motor-driven block system (6, 300, 400) according to any one of the preceding claims for blocking said closure wing.

40
15. The closure system according to claim 14, **characterized in that** the closure system comprises a further closure wing (1) adjacent said closure wing and which is pivotable about a second pivot axis which is parallel to the first pivot axis, the closure system being moveable between an open position and a closed position,

45
50

 wherein the closure system further comprises a further ground mounted motor-driven block system (6, 300, 400) according to any one of the claims 1 to 13 is provided for blocking said second closure wing, the ground mounted motor-driven block system being provided on one side of the closure system when the closure system is in its closed position and the further ground mounted motor-driven block system

55

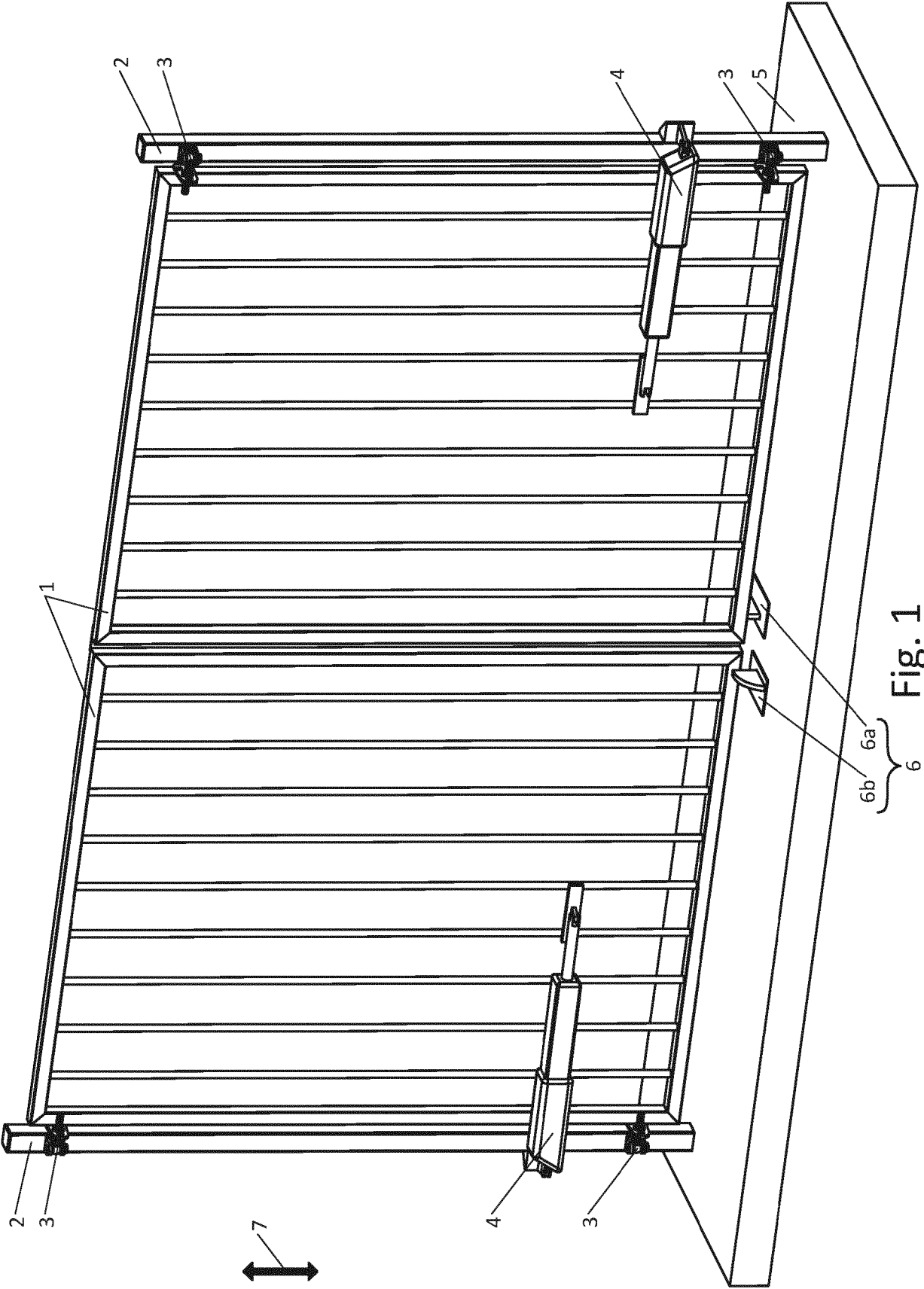


Fig. 1

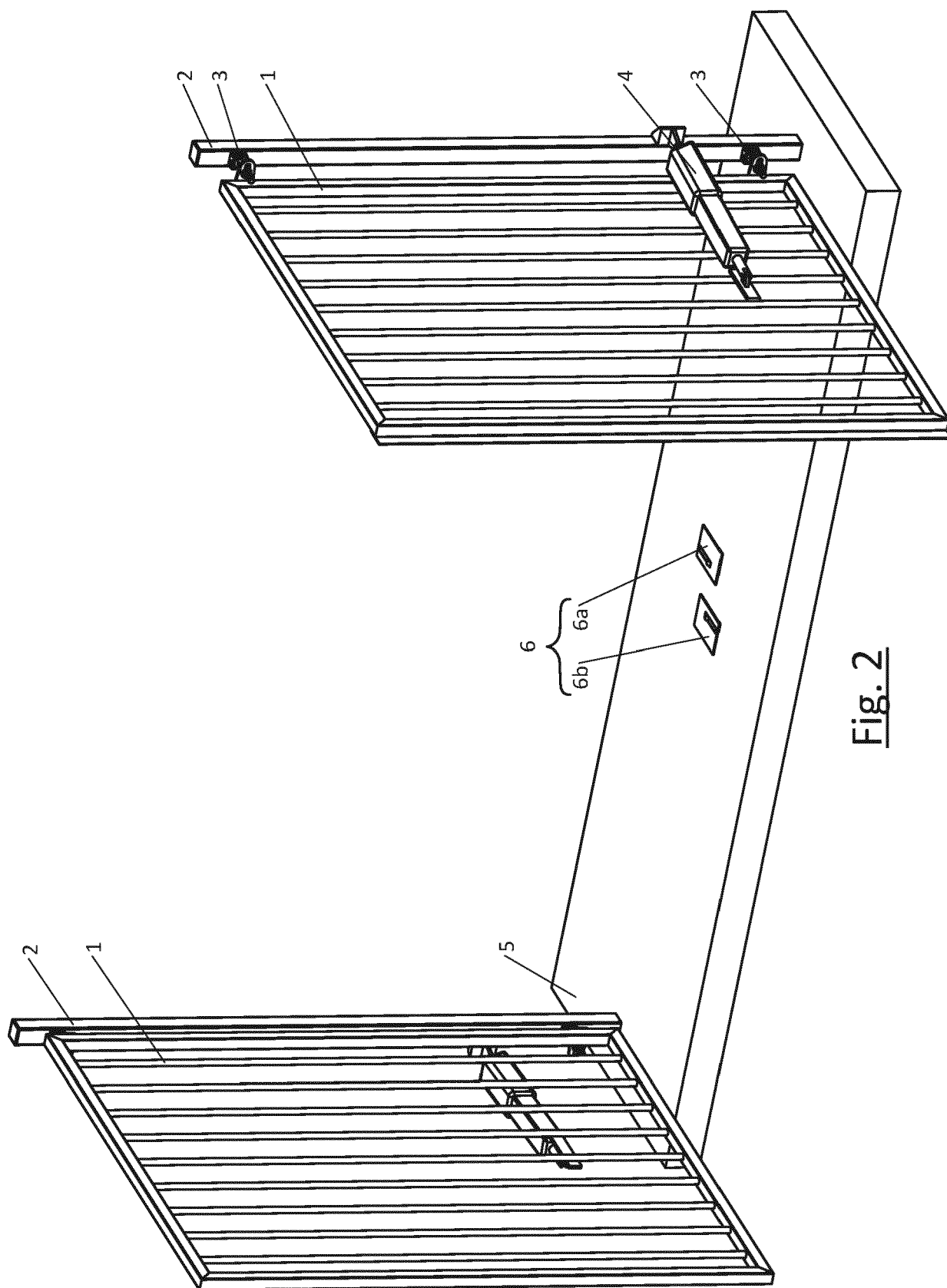
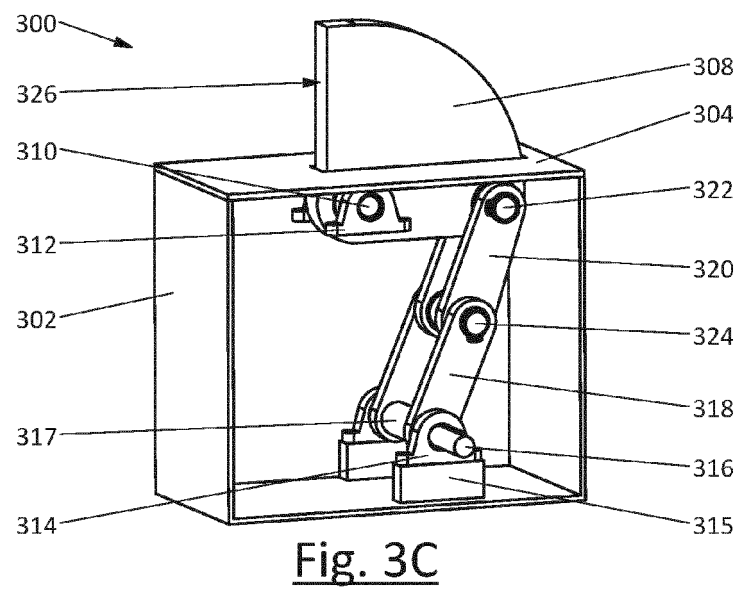
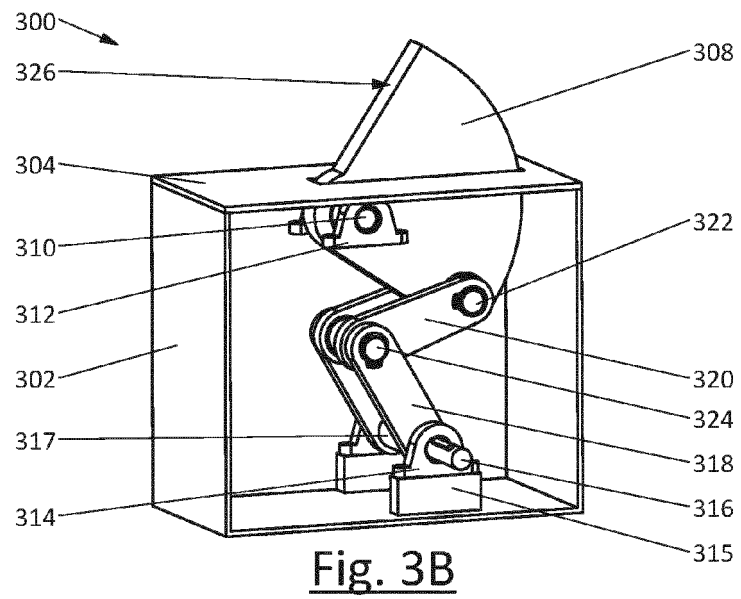
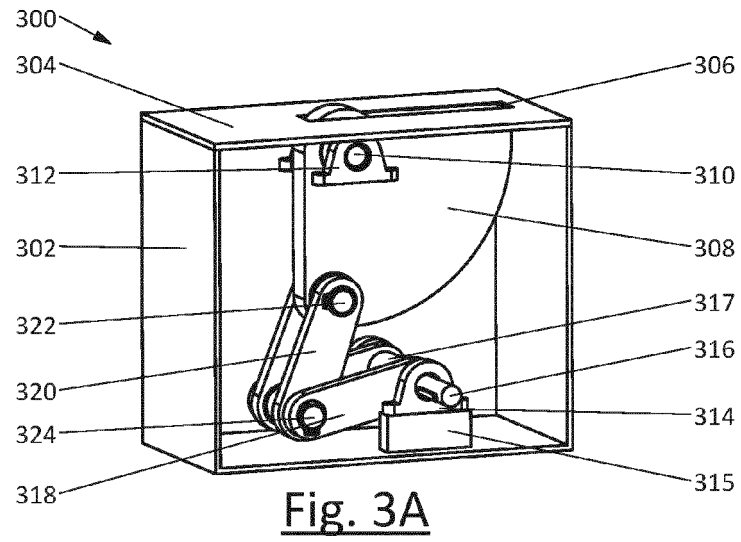


Fig. 2



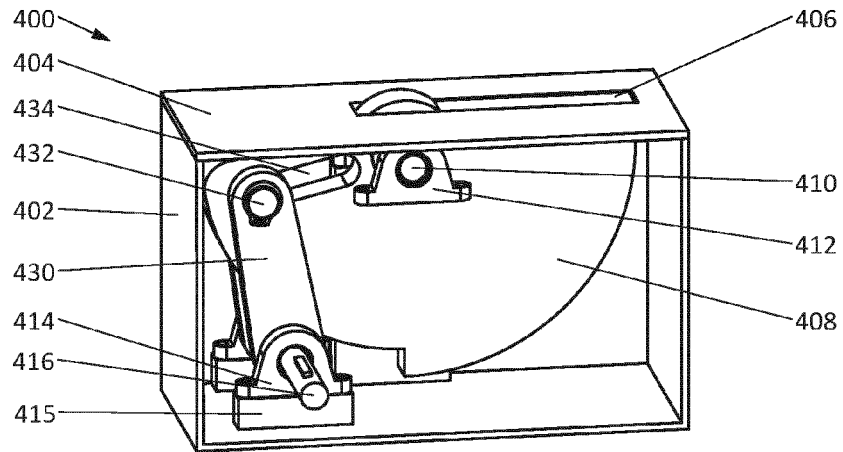


Fig. 4A

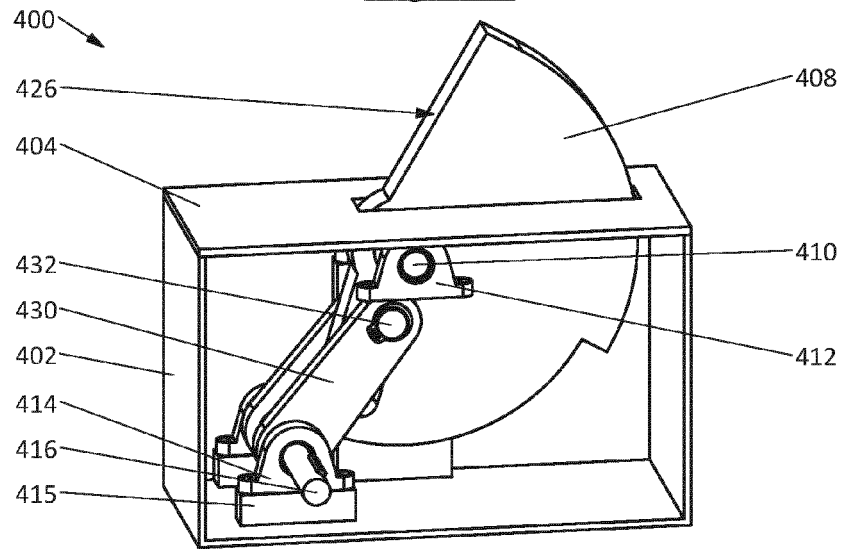


Fig. 4B

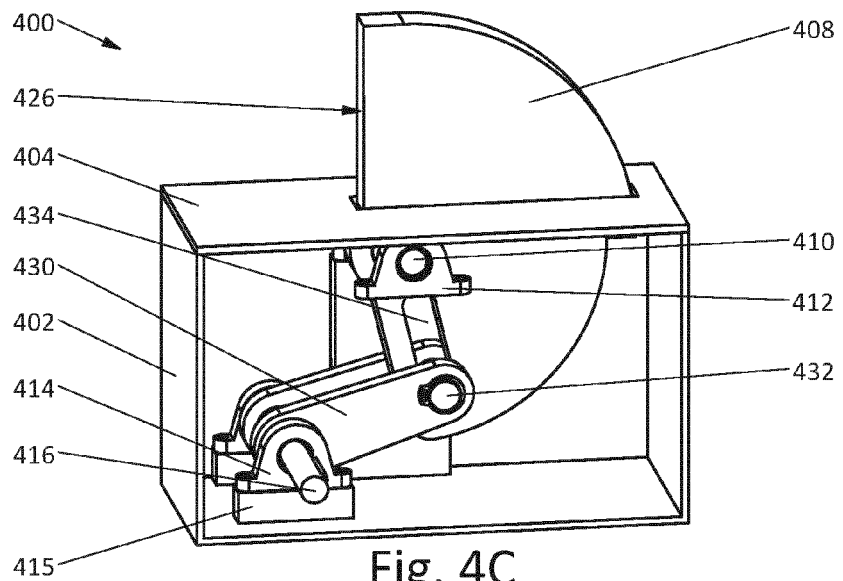


Fig. 4C



EUROPEAN SEARCH REPORT

Application Number

EP 22 16 9008

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

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 2021/089973 A1 (THIRKETTLE GRAEME ANDREW [GB]; GROUT IAN MICHAEL [GB]) 14 May 2021 (2021-05-14) * the whole document *	1-15	INV. E05B47/02 E05B63/14 E05B65/00 E05B15/00
A	DE 20 2017 105264 U1 (GRETSCH-UNITAS GMBH BAUBESCHLÄGE [DE]) 18 September 2017 (2017-09-18) * the whole document *	1-15	
A	US 5 755 582 A (CHARLTON JOHN [CA]) 26 May 1998 (1998-05-26) * the whole document *	1-15	
A	FR 2 714 925 A1 (HUET MARC [FR]) 13 July 1995 (1995-07-13) * the whole document *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 September 2022	Examiner Geerts, Arnold
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	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 16 9008

5

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.

29-09-2022

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2021089973 A1	14-05-2021	GB 2588688 A	05-05-2021
		WO 2021089973 A1	14-05-2021
DE 202017105264 U1	18-09-2017	DE 202017105264 U1	18-09-2017
		EP 3375962 A1	19-09-2018
		PL 3375962 T3	30-08-2019
US 5755582 A	26-05-1998	US 5755582 A	26-05-1998
		US 5775746 A	07-07-1998
FR 2714925 A1	13-07-1995	NONE	

15

20

25

30

35

40

45

50

55

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

- US 20210277692 A1 [0003]
- WO 2021089973 A1 [0003]
- WO 2018228729 A1 [0036]