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(54) **LOCK FOR MOTOR VEHICLES**

(57) Closing device adapted to close a door, tailgate, hatch, on one or more mutually distant closing points by actuating a retractable external handle forming a single block with the mechanism that converts the movement

of the handle into actuation commands of one or more closing blocks. The device has the feature of preventing the engagement of the safety lock when the door is open.

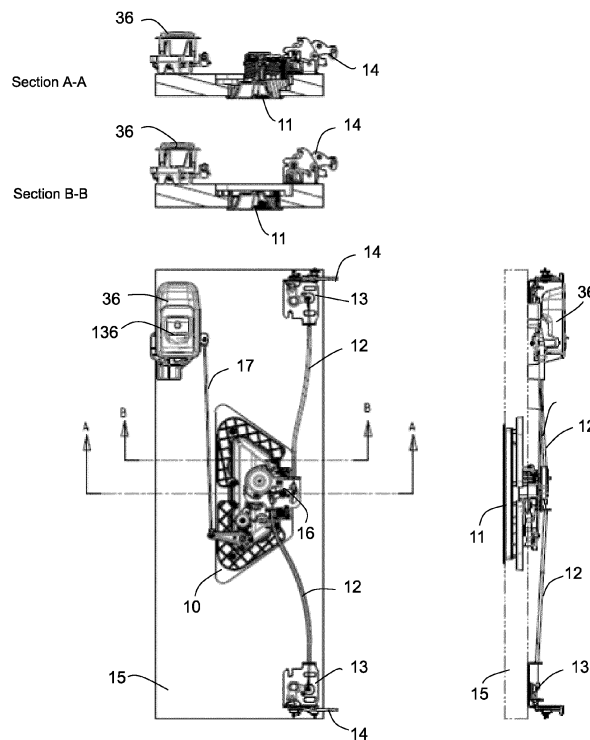


Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to the field of closing devices and safety locks for doors and hatches; in greater detail, the present invention relates to the technical field of locks for doors, tailgates, and hatches, in particular for motor vehicles, such as vans, caravans, motorhomes and the like, provided with one or more spaced apart closing points.

BACKGROUND ART

[0002] In the field of closing devices and safety locks for doors and hatches, devices are available in the market which generally comprise a lock body, or mechanism adapted drive two remote locks, integrally applied to the inner side of the door or hatch concerned, and an actuation handle mounted at the lock body or mechanism on the outer side of the door or hatch. The movement of the external handle is transmitted to the internal components which release the lock.

[0003] Said handle is further generally provided with a cylinder, or similar key locking means, which makes locking with a key possible.

[0004] It is an object of the present Patent Application to introduce a closing device for doors and hatches, with particular reference to the doors and hatches of motor vehicles such as vans, caravans, motorhomes, and the like, which has greater simplicity and practicality of use with respect to the known closing devices.

SUMMARY OF THE INVENTION

[0005] The invention achieves the object with a closing device comprising a handle block adapted to be integrally fastened on the outer side of a door, said handle block comprising a handle and a mechanism adapted to transform the motion of said handle into one or more translational motions for actuating one or more closing blocks. The mechanism comprises a first element for transferring the motion from said external handle to a control member of said closing blocks, which first motion transfer element is provided with three operating positions, in which:

the first operating position is a standby position in which the first motion transfer element is in such a position that said first motion transfer element may interfere with a thrust member associated with the external handle when said external handle is moved in the opening direction of the door so that the motion of said member may be transmitted to the first motion transfer element and said motion transfer element may be positioned in the second operating position thereof;

the second operating position is an opening position in which the first motion transfer element is in a po-

sition which corresponds to the driving in opening position of the closing blocks;

the third operating position is a secure position in which the first motion transfer element is in such a position that it may not interfere with the member associated with the external handle when said external handle is moved in the opening direction of the door.

[0006] Thereby, not only may be the motion of the handle transferred to one or more remote locking devices with respect to the handle itself, but it is also possible to use retractable handles forming a single block with the motion transformation mechanism and that rotate on an axis parallel to the plane of the door, thus also making the lock aesthetically pleasing in addition to more efficient and simpler to mount.

[0007] In a particularly advantageous embodiment, the handle block comprises an anchoring lever which may be actuated on the side opposite to the external handle when the lock is mounted on the door, for example by means of a rod or a tie rod associated with an internal handle and/or a key cylinder accessible from the outer side, and a second element for transferring the motion from the anchoring lever to the first motion transfer element, the anchoring lever being configured to take on three operating positions, in which:

the first operating position of the anchoring lever is a standby position in which the second motion transfer element is such as to ensure that the first motion transfer element is in the first operating position thereof;

the second operating position of the anchoring lever is an opening position in which the second motion transfer element holds the first motion transfer element in the second operating position thereof;

the third operating position of the anchoring lever is a secure position in which the second motion transfer element holds the first motion transfer element in the third operating position thereof.

[0008] By virtue of these contrivances, opening the door may be controlled also from the inside, by using a remote handle with respect to the handle block and engaging a safety lock that may or may not be deactivated from the outside by means of the key cylinder, thus further increasing the flexibility and security of use.

[0009] In another particularly advantageous embodiment, the engagement and/or disengagement of the safety lock may be electrically controlled through a motor integrated in the handle block.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Further objects, features and advantages of the present invention will become more apparent from the following detailed description, provided by way of a non-

limiting example and shown in the accompanying drawings, in which:

Figure 1 shows some views of a door with, applied, a closing device according to an embodiment of the present invention, comprising a handle block, two rods or cables and two closing blocks, in addition to an internal handle;

Figures 2 to 5 show a section according to a plane parallel to the door and a corresponding side sectional view of the handle block in Figure 1 in a standby position (Figure 2), in an opening position by the internal handle (Figure 3), in an opening position by the external handle (Figure 4), with engaged safety lock (Figure 5), respectively.

DETAILED DESCRIPTION OF THE INVENTION

[0011] With reference to Figure 1, a preferred embodiment of the present invention comprises:

a handle block 10 adapted to be integrally fastened to a door 15, said handle block 10 comprising an external handle 11 adapted to be positioned on the outside of door 15 when in mounted position and a mechanism adapted to transform the motion of said external handle 11 into one or more translational motions for actuating one or more closing blocks 13 between a closing position and an opening position by means of a control member 16;

one or more rods or cables 12 adapted to remotely transmit said translational motions, each of said rods or cables 12 being associated, at a first end, with the control member 16;

one or more closing blocks 13 adapted to be fastened to door 15 and each associated with a second end of a rod or cable 12, said closing blocks 13 comprising reversible engagement means 14 with the frame of door 15 which may be actuated by means of said rods or cables 12.

[0012] Said reversible engagement means 14 firmly remain anchored to the frame in the closing condition and pass into the opening condition by actuating the rods or the cables 12, while the inverse passage, i.e., from the opening position to the closing position of said reversible engagement means 14, is obtained by closing the door without needing to act on the handle.

[0013] In the version shown in Figure 1, there is further present an internal handle 36 connected to the handle block 10 by means of a rod or tie rod 17 so it also acts on the control member 16, as better detailed below.

[0014] In a preferred embodiment of the present invention, the reversible engagement means 14 of the closing blocks 13 comprise an abutment or a plate to promote the engagement of said door 15 with the frame.

[0015] In another preferred embodiment of the present invention, depicted in the accompanying drawings, there

are two of said rods or cables 12 and said closing blocks 13. The mechanism of the handle block 10 is therefore adapted to transform the motion of handle 11 into two translational motions having opposite directions, transmitted by said rods or cables 12. The handle block 10 is arranged centrally with respect to the height of door 15, close to the long side of door 15 itself. The two closing blocks 13 are placed on opposite sides with respect to the handle block 10. The rods or cables 12 are arranged parallel to the long side of door 15.

[0016] The external handle 11 preferably is of the retractable type and acts like a hinged lever so as to rotate on an axis parallel to the plane of door 15 so as to translate the thrust member on a plane parallel to the plane of door 15. The thrust member (shown in Figures 2 to 4) is depicted by an arm 18 provided with a transverse protrusion 19 adapted to interfere with a corresponding extension 20 of the release lever, indicated by 21 in the drawings.

[0017] Advantageously, the external handle 11 may consist of a single block with the motion transformation mechanism of the handle itself. This allows the handle to be mounted in conjunction with the handle block, with apparent greater assembly simplicity.

[0018] The handle block 10 may optionally comprise a key cylinder (not shown in the drawings) adapted to place the lock in secure status, as shown below.

[0019] The internal handle 36 comprises a gripping end 136 adapted to actuate a rod or a tie rod 17 according to methods known to those skilled in the art. An example of commercial product is represented by article 1130 - handle for "ghost" internal lock - in the Applicant's catalog.

[0020] The opening movement of the external handle 11 or the internal handle 36 actuates the control member 16 inside the handle block 10, which is fastened at a first end of the two rods or cables 12, which pushes the two rods or cables 12 to translate in opposite directions so as to act, by means of the second end thereof, on the closing blocks 13 and release the engagement members 14 from the frame of door 15.

[0021] More in detail and with reference to Figures 2 to 5, the internal handle 36 moves the anchoring lever 22 which is coupled by means of a gear transmission 23 to an arm 24 which acts like a crank. The release lever 21 has a slotted end 25 in which a pin 26 slides, associated with crank 24 so as to provide a connecting rod/crank coupling with travel of the connecting rod 21 released from the travel of crank 24 when the anchoring lever 22 is in the standby position shown in Figure 2. The standby position is a position in which the driving rods or cables 12 of the closing blocks 13 are positioned so that the engagement members 14 of the closing blocks 13 are engaged in door 15 in closing position. In this position, slot 25 in lever 21 ensures that the release lever 21 may translate both due to a rotation of crank 24 caused by the movement of the anchoring lever 22 from the standby position to the opening position, and due to a translation caused on extension 20 of the release lever 21 by the

abutment of the external handle 11 with the thrust member 19 when the external handle 11 is actuated to open.

[0022] Figures 3 and 4 show the lock in opening position following a movement of the internal handle (Figure 3) and of the external handle (Figure 4), respectively. As can be seen, the release lever 21 is in the same position in both cases. This position is kept so long as the door remains open and the engagement members 14 are released from the frame of door 15; indeed, with the door open, the engagement members 14 keep the cables or rods 12 in traction position and prevent the control member 16 from returning to the standby position. In the case of Figure 3, the passage from the standby position to the opening position is determined by the rotation of the anchoring lever 22 by the internal handle 36, which ensures the pin 26 of crank 24 drags the release lever 21 in movement up to reaching the situation indicated in Figure 3. In the case of Figure 4, it is the translation movement caused by the external handle 11 on the thrust member 19 and therefore, on extension 20, that causes the translation of the release lever 21 in the same direction by virtue of the presence of slot 25 which releases pin 26 from the release lever 21 up to reaching the position shown in Figure 4.

[0023] When the anchoring lever 22 is moved from the standby position (Figure 2) to the secure position (Figure 5), the pin 26 of crank 24 causes a rotation of the release lever 21 such as to prevent the abutment of the thrust member 19 of the external handle 11 with extension 20 of the release lever 21. Thereby, opening the lock from the outside is prevented and the external handle 11 idly moves.

[0024] The anchoring lever 22 may be moved into the secure position both by acting on the internal handle 36 and on the key cylinder, when present.

[0025] The release lever 21 advantageously has such a shape to interfere with a blocking element when caused to move from the opening position to the secure position so that the direct passage from the opening position to the secure position is prevented unless the standby position is taken on first. In the embodiment shown in the drawings, such a blocking element comprises a tooth 27 (shown in Figures 3 and 4). The release lever 21 has such a shape to interfere with said tooth 27 when the release lever 21 is caused to rotate from a stroke-end position for opening the lock into secure position.

[0026] With regards to the control member 16, it serves the function of transforming the motion of the release lever 21, from the standby position to the opening position and vice versa, into a translational motion of the driving rods or cables 12 of the closing blocks 13. Each rod or cable 12 is associated, at a first end, with the control member 16 so as to move from a position of maximum extension to a position of minimum extension, and vice versa.

[0027] In the configuration shown in the drawings, the control member comprises a centrally pivoted lever 16 with each of the two ends associated with a rod or tie rod

12 arranged at opposite sides of the handle block 10 so that both rods or cables 12 translate in the same direction, but with opposite orientation so as to control a pair of closing blocks 13 of the door when the handle block 10 is mounted in median position with respect to said closing blocks 13.

[0028] The release lever 21 is hinged to the pivoted lever 16 of the control member. Thereby, the motion of the release lever 21 is transferred to the control member and therefore, to the closing blocks by means of the rods or cables 12.

[0029] Overall, the operation of the lock according to the above-described embodiment is as follows.

[0030] The internal handle 36 moves the anchoring lever 22 which, through the transmission gears 23, actuates the release lever 21, which in turn rotates the control lever 16, also called cable lever in the present description. The pulling of the cables 12 moves the closing blocks which open the door (Figure 3).

[0031] The actuation of the external handle 11 moves lever 18, which drags the release lever 21, which in turn rotates the cable lever 16 (Figure 4).

[0032] If the internal handle 36 moves the anchoring lever 22 in the direction opposite to the opening one, this lever, through the transmission gears 23, rotates the release lever 21 on the pivot provided by the cable lever 16. The release lever 21 thus leaves the actuation range of the handle lever 18. In this condition, by acting on the external handle 11, the handle lever 18 does not engage the release lever 21 and the door is not opened (Figure 5).

[0033] Once opening is actuated, regardless of whether this happened from the internal side or from the external side, the release lever 21 and the cable lever 16 remain in the stroke-end position shown in Figures 3 and 4. In this configuration, the system may not enter secure status (Figure 5) because the rotation of the release lever 21 is prevented by the tooth 27 circled in Figure 3.

[0034] Indeed, the release lever 21 is designed to pass said tooth 27 only if it is in the standby position (Figure 2), which will occur again once door 15 is closed. This contrivance advantageously prevents the engagement of the safety lock when the door is open.

[0035] The description of the preferred embodiments of the invention above refers to the accompanying drawings. The same reference numbers in the various drawings identify the same elements or similar elements. The detailed description given above does not limit the scope of the disclosed invention because the scope of protection of the present invention is defined by the appended claims.

Claims

1. A closing device comprising a handle block (10) adapted to be integrally fastened to a door (15), said handle block (10) comprising an external handle (11) adapted to be positioned on the outside of the door

(15) when in mounted position and a mechanism adapted to transform the motion of said external handle (11) into one or more translation motions for actuating one or more closing blocks (13) between a closing position and an opening position, **characterized in that**

the mechanism comprises a first element 21 for transferring the motion from said external handle (11) to a control member (16) of said closing blocks (13), which first motion transfer element (21) is provided with three operating positions, wherein:

the first operating position is a standby position wherein the first motion transfer element (21) is in such a position that said first motion transfer element (21) may interfere with a thrust member (18) associated with the external handle (11) when said external handle (11) is moved in the opening direction of the door (15) so that the motion of said member (18) may be transmitted to the first motion transfer element (21) and said motion transfer element (21) may be positioned in the second operating position thereof;

the second operating position is an opening position wherein the first motion transfer element (21) is in a position which corresponds to the driving in opening position of the closing blocks (13);

the third operating position is a secure position wherein the first motion transfer element (21) is in such a position that it may not interfere with the member (18) associated with the external handle (11) when said external handle (11) is moved in the opening direction of the door.

2. A device according to claim 1, wherein the external handle (11) and the mechanism adapted to transform the motion of said external handle (11) into one or more translation actuation motions form a single block.
3. A device according to claim 1 or 2, wherein there is an anchoring lever (22) which may be actuated on the side opposite to the external handle (11) when the lock is mounted on the door (15), for example by means of a rod or a tie rod (17) associated with an internal handle (36), and a second element (23, 24, 26) for transferring the motion from the anchoring lever (22) to the first motion transfer element (21), the anchoring lever (22) being configured to take on three operating positions, wherein:

the first operating position of the anchoring lever (22) is a standby position wherein the second motion transfer element (23, 24, 26) is such as to ensure that the first motion transfer element (21) is in the first operating position thereof; the second operating position of the anchoring

lever (22) is an opening position wherein the second motion transfer element (23, 24, 26) holds the first motion transfer element (21) in the second operating position thereof;

the third operating position of the anchoring lever (22) is a secure position wherein the second motion transfer element (23, 24, 26) holds the first motion transfer element (21) in the third operating position thereof.

4. A device according to one or more of the preceding claims, wherein the anchoring lever (22) is coupled, by means of a gear transmission (23), to an arm (24) which acts like a crank, the first motion transfer element (21) having the shape of a release lever with a slotted end (25) in which a pin (26) associated with the crank (24) slides so as to provide a connecting rod/crank coupling with travel of the connecting rod (21) released from the travel of the crank (24) when the anchoring lever (22) is in a standby position so that the release lever (21) may translate due both to a rotation of the crank (24) caused by the movement of the anchoring lever (22) from the standby position to the opening position and due to a translation caused on an extension (20) of the release lever (21) from the abutment of the external handle (11) with the thrust member (18) when the external handle (11) is actuated to open.
5. A device according to claim 4, wherein when the anchoring lever (22) is moved from the standby position to the secure position, the pin (26) of the crank (24) interferes with the wall of the slot (25) of the release lever (21) so as to cause a rotation of the release lever (21) such as to prevent the abutment of the thrust member (19) of the external handle (11) with the extension (20) of the release lever (21).
6. A device according to one or more of the preceding claims, wherein the external handle (11) is of the retractable type which acts in the manner of hinged lever so as to rotate on an axis parallel to the plane of the door (15) so as to translate the thrust member (18) on a plane parallel to the plane of the door. (15)
7. A device according to one or more of the preceding claims, wherein the first motion transfer element (21) has such a shape as to interfere with a blocking element (27) when caused to move from the second operating position to the third operating position so that the direct passage from the second operating position to the third operating position is prevented if the standby position is not taken on beforehand.
8. A device according to claim 7, wherein the blocking element comprises a tooth (27), the release lever (21) having such a shape as to interfere with said tooth (27) when the release lever (21) is caused to

rotate in secure position from a stroke-end position for opening the lock.

9. A device according to one or more of the preceding claims, wherein the control member (16) is provided to transform the motion of the first motion transfer element (21) from the first operating position to the second operating position and vice versa into a translational motion, there being at least one rod or cable (12) adapted to remotely transmit said translational motion, said rod or cable (12) being associated, at a first end, with said control member (16) so as to move from a position of maximum extension to a position of minimum extension and vice versa. 5
10. A device according to claim 9, wherein there is at least one closing block (13) adapted to be fastened to said door (15) and associated with a second end of the rod or cable (12), said closing block (13) comprising reversible engagement means (14) with the frame of said door (15) which may be actuated by means of said rod or cable (12). 10
11. A device according to claim 10, wherein the reversible engagement means (14) are configured to keep the rod or cable (12) in a traction position when the door (15) is open, thus preventing the control member (16) from returning to the standby position. 15
12. A device according to one or more of the preceding claims, wherein the control member comprises a pivoted lever (16) with at least one end associated with a rod or tie rod (12). 20
13. A device according to claim 12, wherein the lever (16) is centrally pivoted with each of the two ends associated with a rod or tie rod (12) arranged at opposite sides of the handle block (10) so that both rods or cables (12) translate in the same direction, but with opposite orientation so as to control a pair of closing blocks (13) of the door (15) when the handle block (10) is mounted in median position with respect to said closing blocks (13). 25
14. A device according to claim 13, wherein the release lever (21) is hinged to the pivoted lever (16) of the control member. 30
15. A device according to one or more of the preceding claims, **characterized in that** the external handle (11) comprises a cylinder lock adapted to control the anchoring lever (22) in the secure position into which secure position the external handle (11) idly moves due to the effect of the failed abutment of the first motion transfer element (21) with the member (12) associated with the external handle (11). 35
16. A device according to one or more of the preceding 40

claims, **characterized in that** it comprises an electric motor integrated in the handle block and adapted to control the engagement and/or disengagement of the safety lock. 45

17. A door (15) comprising a closing device according to one or more of the preceding claims, with external handle (11) mounted on the outer face of the door, a pair of closing blocks (13) mounted on the inner side of the door at opposite ends with respect to the handle block (10) and each controlled by a rod or cable (12) connected to the control member (16) of the handle block (10), an internal handle (36) mounted on the inner face of the door and adapted to generate a translational motion when actuated, said translational motion being transmitted to the anchoring lever (22) of the handle block (10) by means of a rod or tie rod (17). 50

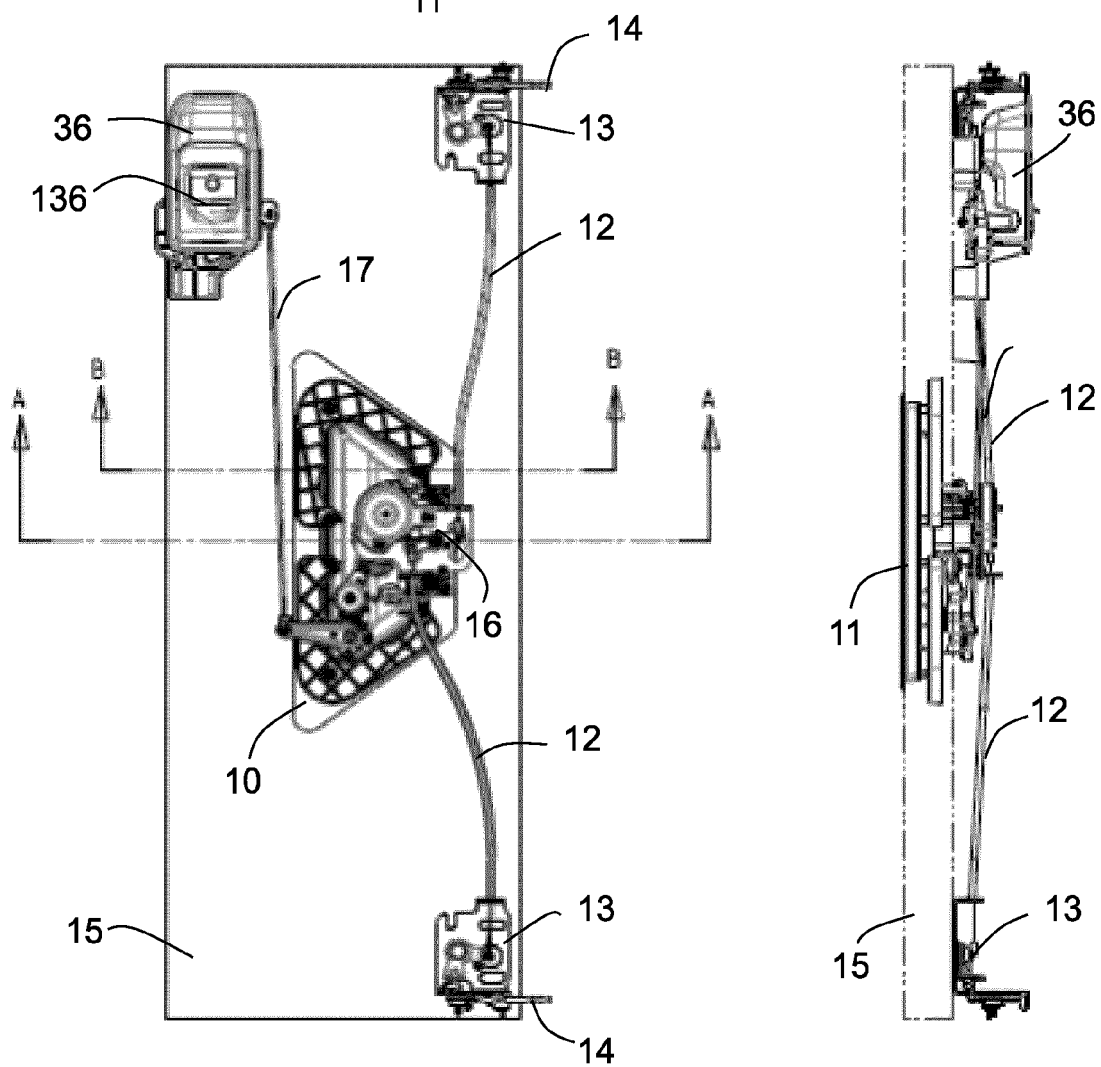
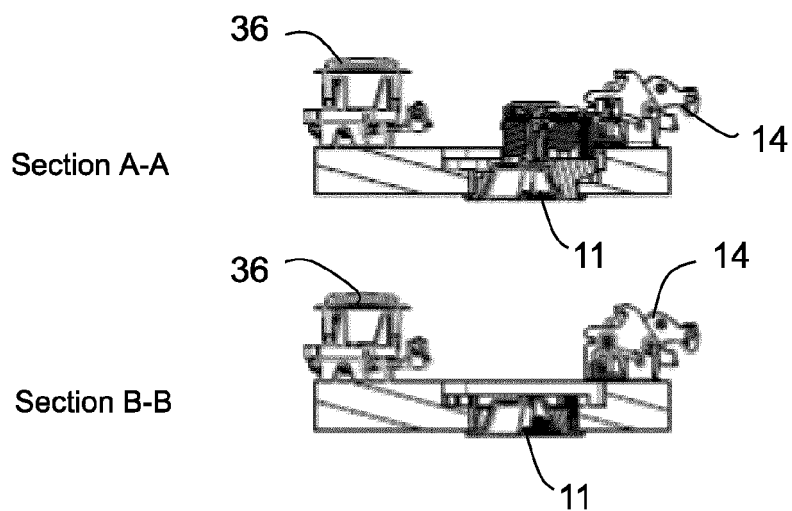


Fig. 1

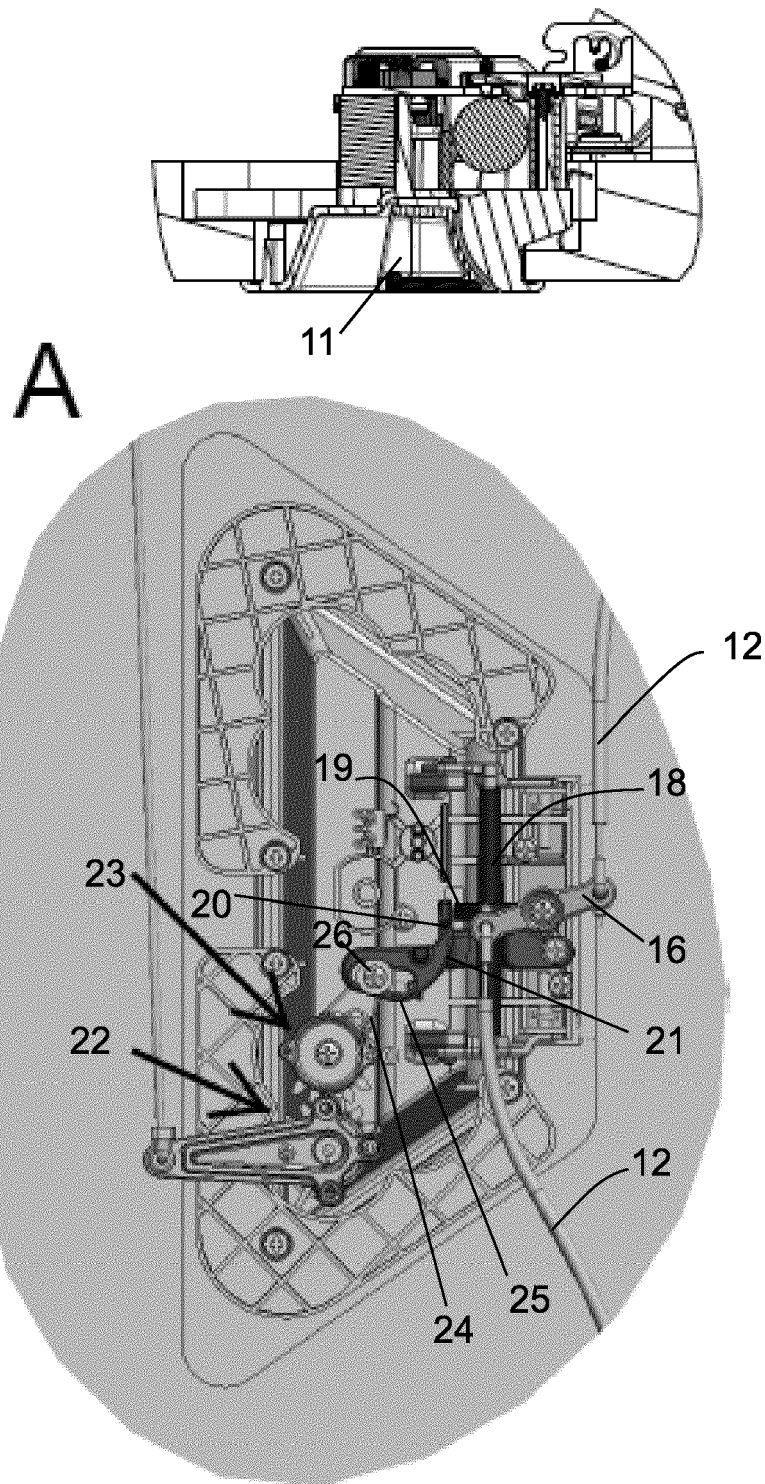


Fig. 2

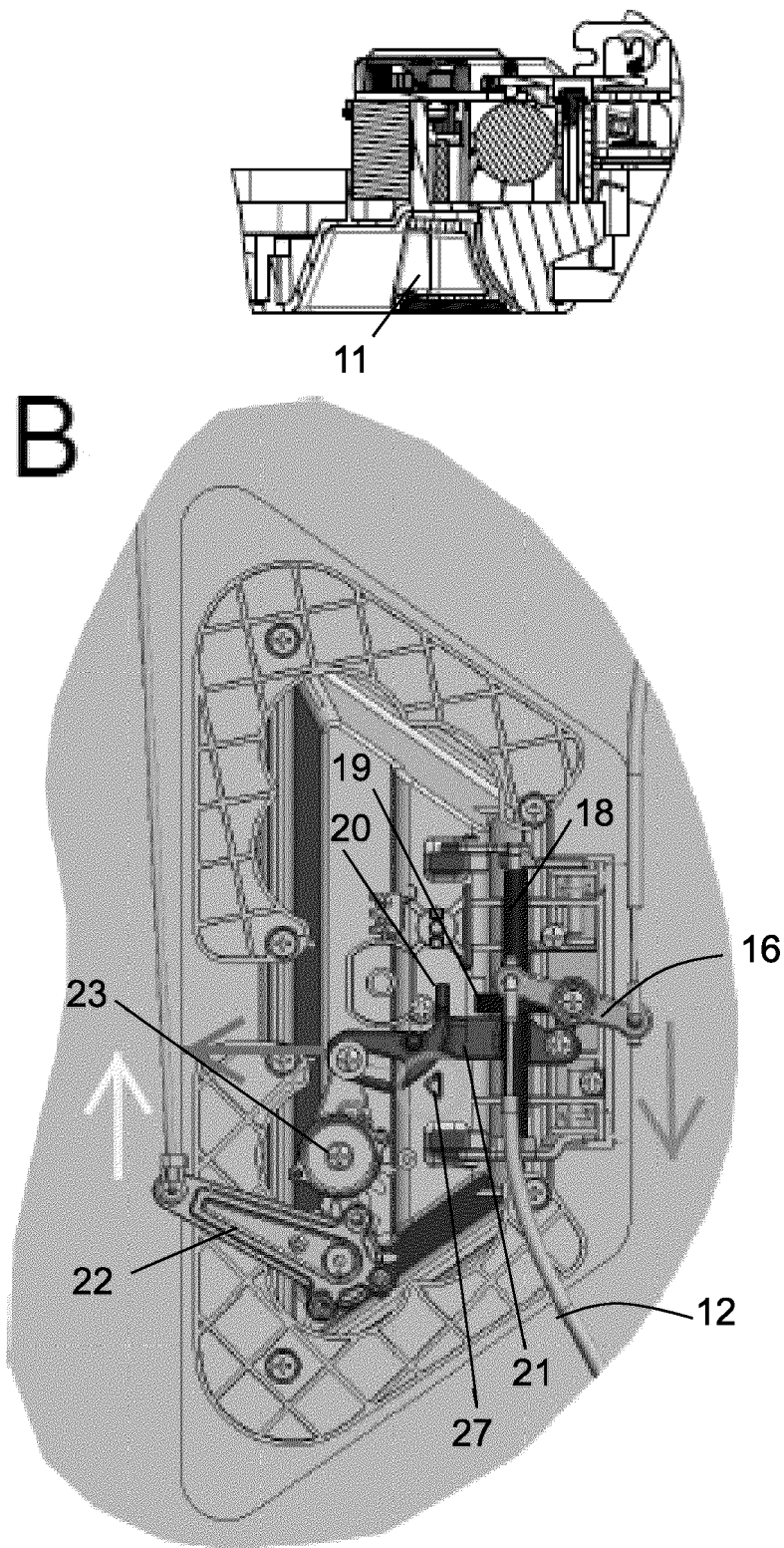


Fig. 3

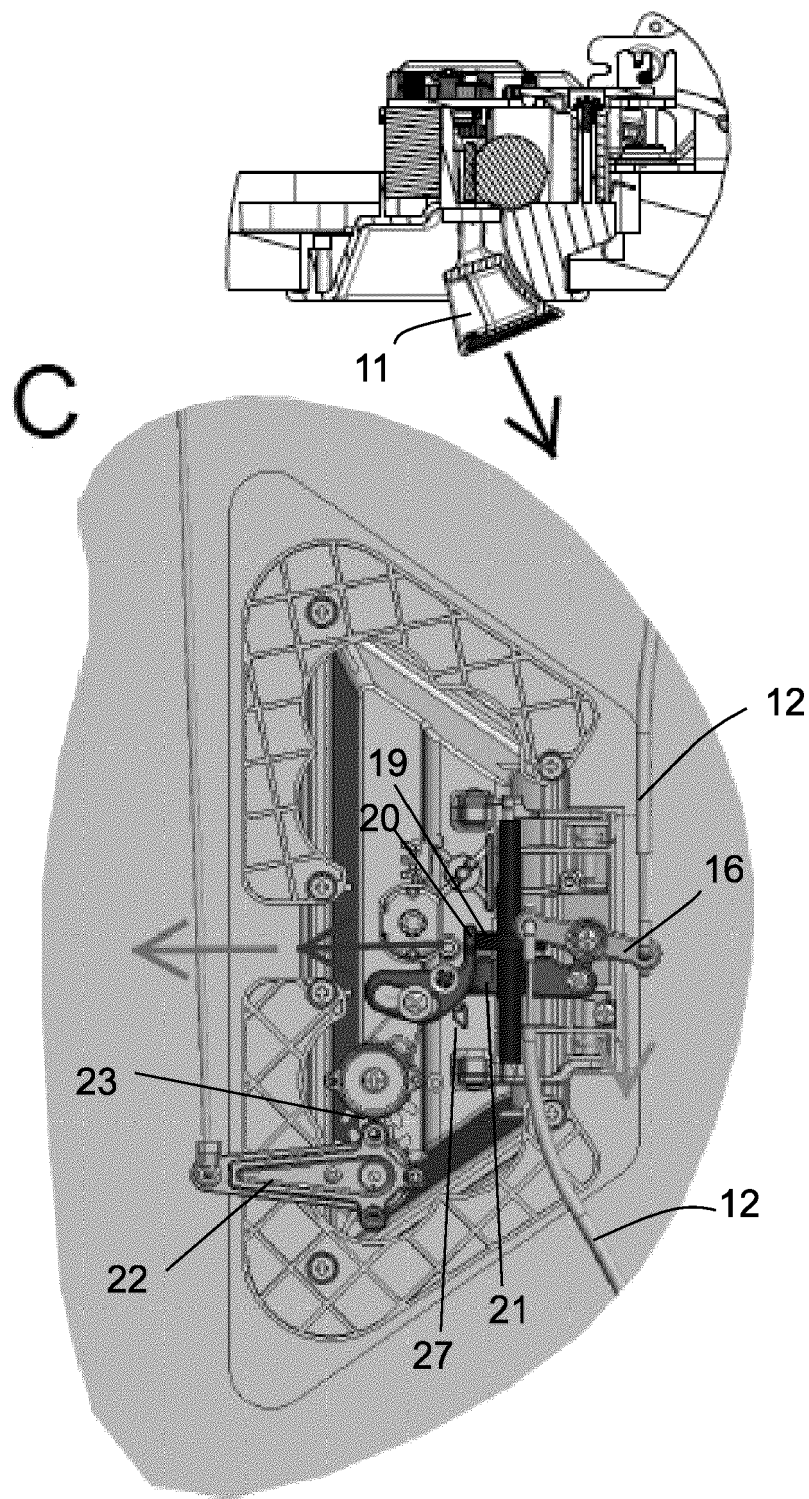


Fig. 4

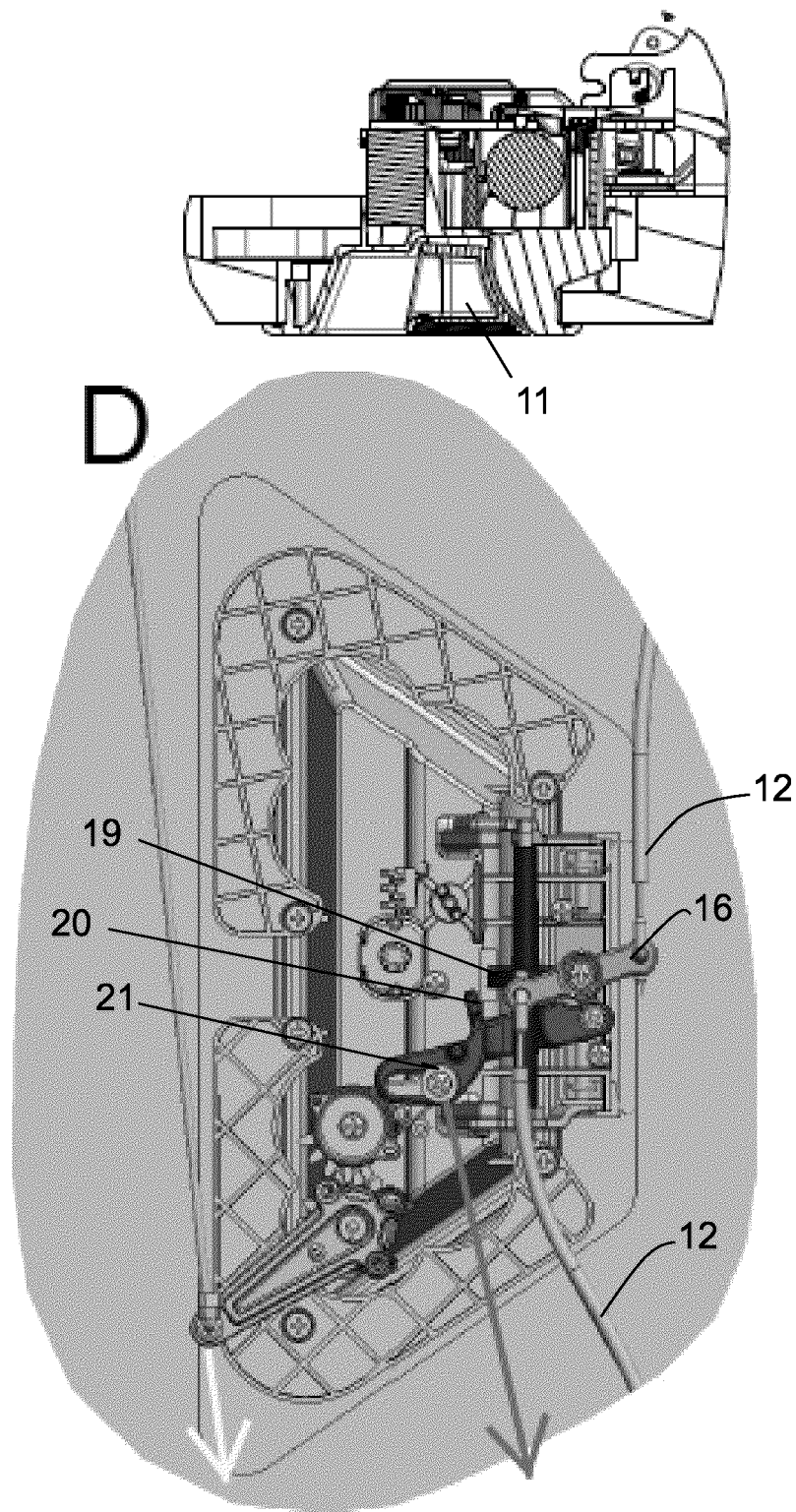


Fig. 5



EUROPEAN SEARCH REPORT

Application Number

EP 22 17 0056

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The present search report has been drawn up for all claims			

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EPO FORM 1503 03:82 (P04C01)

Place of search

The Hague

Date of completion of the search

18 August 2022

Examiner

Ansel, Yannick

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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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.

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