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(72) Inventor: **Erkocak, Ertugrul,**
Makersan Otomotiv Sanayi Ticaret Ltd. Sti.
41490, Kocaeli (TR)

(74) Representative: **Sevinç, Erkan**
Istanbul Patent & Trademark Consultancy Ltd.
Plaza-33, Büyükdere cad. No: 33/16
Sisli
34381 Istanbul (TR)

(71) Applicant: **Makersan Makina Otomotiv Sanayi Ticaret Ltd.**
Kumtepe Mevkii Balcik Köyü, GEBZE
41490 Kocaeli (TR)

(54) **Bus door lock control mechanism**

(57) The present invention proposes a lock mechanism used in association with pneumatic bus doors so as to enable inside and outside control of the door. The mechanism is essentially comprised of an internal handle for effecting unlocking from inside, an external handle along with an axial locking slot for receiving a key and inner mechanisms arranged to receive and transmit rotary movement of handles to latching elements via control

rods. Linearly extending control rods are driven linearly through an adaptor region thereof, which is arranged to receive rotary movement of inner mechanisms and convert the same to linear movement without requiring additional bearing. A control rod may be connected to an adaptor mechanism for further driving additional control rods. Further, the adaptor mechanism itself may separately be controlled by a remote control.

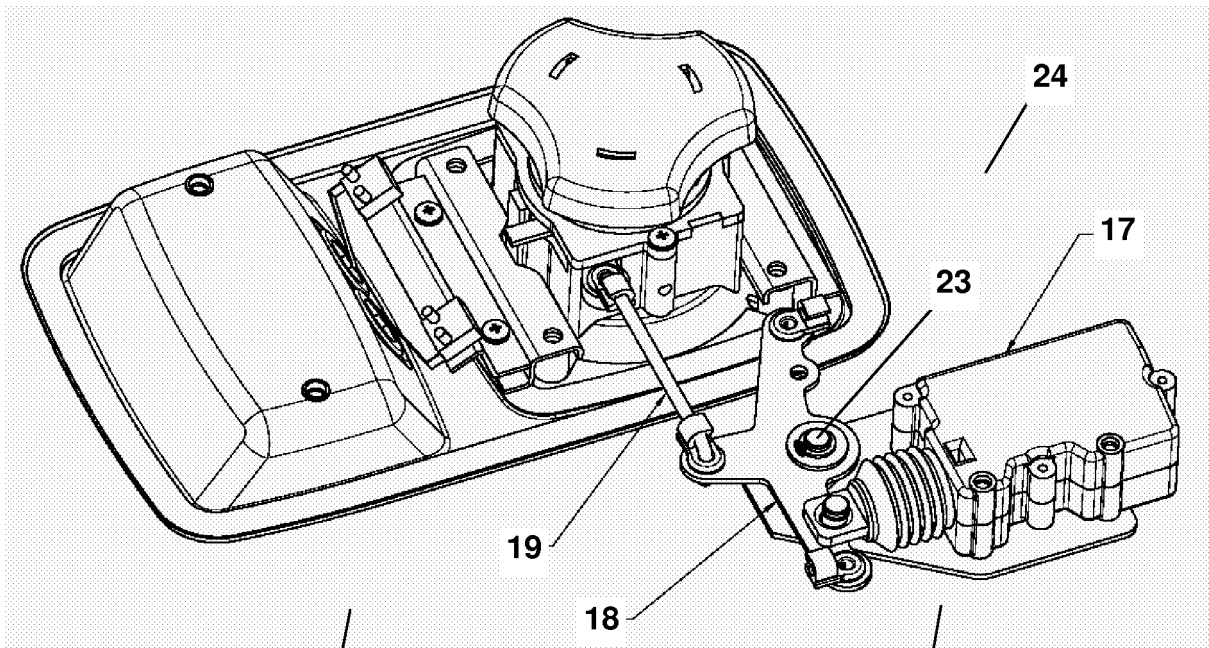


Fig. 4b

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Description

Technical Field of the Invention

[0001] The present invention relates to a lock mechanism used in passenger doors of buses and more particularly to locks enabling locking and unlocking from both inside and outside of a bus.

Background of the Invention

[0002] Passenger doors of buses are generally controlled by means of lock mechanisms enabling both inside and outside control. Such locks operate together with pneumatic bus doors and do generally have a common rotation axis on which an inner and an outer handle rotates to drive a latch back and forth in order for allowing pneumatic control once unlocked. Such lock mechanisms having a common rotation axis are well-known in the market for their reliability and are widely used to the extent that they came to appear as a standard product item in bus doors.

[0003] EP0416448 discloses a lock mechanism of the above type in which rotation of handles advances a plurality of inner mechanisms to effect locking. Rotational arrangement between inner and outer handles drives a central rotary element to which a pair of curvilinear rods is attached and displacements thereof are provided. A disadvantage of the arrangement appears in that it necessitates use of non-linear rods to effect locking. Non-linear rods should nevertheless produce a linear displacement, meaning that additional bearing is necessary. Due to curved structure of rods in this configuration, the lock mechanism and the door can not be set immediately adjacent to each other but must be arranged with a certain distance relative to each other to ensure proper functioning.

[0004] To this end, the present invention proposes an adaptor region in association with said rods to convert rotational movement of said central rotary element to linear movement allowing a closer interrelation between said lock mechanism and said door without requiring additional bearing. A closer configuration also allows more flexible and hence easier mounting.

[0005] The present invention proposes a lock mechanism enabling control both manually either from inside/outside the lock or from remote locations by a remote control. Design of the lock mechanism requiring no additional bearing and providing direct linear drive both occupies smaller space and eliminates mounting difficulties stemming from larger distance configuration of the lock relative to the door by way of shortening the distance between the same.

Objects of the Invention

[0006] One of the objects of the present invention is to provide a bus door lock mechanism enabling control both

manually either from inside/outside the lock or from remote locations by a remote control.

[0007] Another object of the present invention is to provide a bus door lock mechanism occupying smaller space and eliminating mounting difficulties stemming from larger distance configuration of the lock relative to the door as in prior art locks.

[0008] Another object of the present invention is to provide a bus door lock mechanism providing direct linear drive without additional bearing.

Summary of the Invention

[0009] The present invention proposes a lock mechanism used in association with pneumatic bus doors so as to enable inside and outside control of the door. The mechanism is essentially comprised of an internal handle for effecting unlocking from inside, an external handle along with an axial locking slot for receiving a key and inner mechanisms arranged to receive and transmit rotary movement of handles to latching elements via control rods. Linearly extending control rods are driven linearly through an adaptor region thereof, which is arranged to receive rotary movement of inner mechanisms and convert the same to linear movement without requiring additional bearing. A control rod may be connected to an adaptor mechanism for further driving additional control rods. Further, the adaptor mechanism itself may separately be controlled by a remote control.

Brief Description of the Figures

[0010] Accompanying drawings are given solely for the purpose of exemplifying a bus door locking system whose advantages over prior art were outlined above and will be explained in detail hereinafter:

Fig. 1 a demonstrates inner side view of the lock mechanism according to the present invention.

Fig. 1 b demonstrates outer side view of the lock mechanism according to the present invention.

Fig. 2 demonstrates a cross-sectional side view of the lock mechanism according to the present invention.

Fig. 3a demonstrates A-A cross-section of Fig. 2 according to the present invention.

Fig. 3b demonstrates B-B cross-section of Fig. 2 according to the present invention.

Fig. 4a demonstrates the lock mechanism together with the adaptor mechanism according to the present invention.

Fig. 4b demonstrates the lock mechanism and the

adaptor mechanism in mounted state.

Fig. 5 demonstrates an exploded perspective view of the lock mechanism seen from below.

Fig. 6 demonstrates the lock mechanism having two connections rods without an adaptor mechanism

Fig. 7 demonstrates a frame structure accommodating the lock mechanism and air door control buttons.

Fig. 8 demonstrates a perspective exploded view of the lock mechanism seen from above.

Detailed Description of the Invention

[0011] Referring now to the figures outlined above, the present invention proposes a lock mechanism comprising a central body (1) that receives inner and outer side elements, the latter being in connection with inner and outer handles.

[0012] Starting from the outer side elements of Fig 5, the lock mechanism comprises a locking slot body (25) for receiving a key. An outer handle body (2) receives said slot body (25) on which a slot carrier (9) is positioned. A further intermediate element (8) is arranged on said slot carrier (9) so as to fit in the outer handle body (2) for effecting locking from outside. Said intermediate element (8) is equipped with an eccentric protrusion (26) on its top to advance an outer handle blocking element (10) from its cavity back and forth along a lateral aperture (29) of said outer handle body (2). Said aperture (29) is aligned with a central body upper connection element (11) lower edge lateral aperture (30). Said outer handle blocking element (10) extending out from said apertures 29 and 30 will impede rotation of said outer handle body (2) and therefore nullify outside handle control.

[0013] Since position of said outer handle body (2) relative to said central body upper connection element (11) is continuously reset by a helical spring (12), as will be explained in the proceeding parts, said apertures 29 and 30 are normally aligned with each other and said blocking element (10) is free to extend out therefrom back and forth.

[0014] Referring back to Figures 5 or 8, said outer handle body (2) comprises two ear portions (3) at both sides, each having an upright protrusion (27). Referring now to Fig. 3a, when said outer handle body (2) is positioned in said central body (1), rotational movement of said upright protrusions (27) on said handle ears (3) advances a cam (4), the latter being in connection with an adaptor connection rod (19).

[0015] Said cam (4) comprises a rear region (5) which adapts said cam (4) to make linear displacement against rotational movement of said outer handle body (2). Said adaptor region (5) is designed in "H" form, the two cavities below and above the horizontal line respectively receiving said upright protrusions (27) on said handle ears (3)

and another group of protrusions (6) from the upper side in Fig. 5 or 8. Circular trajectories of said protrusions (6 and 27) extend within the surface delimited by the vertical lines of "H" form in both cavities thereof and advance said cam (4) back and forth so as to move said adaptor connection rod (19).

[0016] Starting from the inner side elements of Fig. 5, the locking device comprises an inner side handle (14), a spring carrier (13) and an inner control member (7). Said spring carrier (13) accommodates said spring (12) in the manner that two extremities (31) thereof extend outwardly from inside a circular channel at both sides of a lateral aperture (32) of said carrier (13). When said spring carrier (13) is fitted in said inner control member (7), said two extremities (31) of the helical spring (12) lean laterally against the outer edges of two inner channels (33) of said inner control member (7). Said central body upper connection element (11) also has a corresponding aperture (36) for receiving said two spring extremities (33). When said inner control member (7) is mounted in said central body upper connection element (11), said second group of vertical protrusions (6) enter in circular channels (28) of said upper connection element (11). Fig. 3b shows tip part of a second group protrusion (6) in an upper cavity of said "H" form of said adaptor region (5). Therefore since said upper connection element (11) is fixed on said central body (1), rotation of the inner handle (14) causes rotation of said inner control member (7) and each time said handle (14) is rotated, said spring (12) resets position of said inner control member (7).

[0017] According to the present invention, a protruding part (34) along an inner surface of the spring carrier (13) axial hole fits in a corresponding channel (35) of said outer handle body (2). Rotation of the outer handle body (2) is therefore also reset by said helical spring (12) since said handle body (2) is interconnected with said spring carrier (12). On the other hand, said inner control member (7) can still be rotated when rotation of said outer handle body (2) is blocked as inner and outer rotation mechanisms are independent from each other.

[0018] Said cam (4) is kept in correct position between said upper connection element (11) and said central body (1) by means of a ball (15) and a spring (16).

[0019] As will be seen in Fig. 4a and 4b, the lock mechanism (20) moves an adaptor connection rod (19) back and forth, said rod (19) being suitably secured to said cam (4). Said adaptor mechanism (21) comprises a joint member (18) having a pivotal bearing (23) so as to drive two arms thereof in opposite directions, i.e. rotation around said pivotal bearing (23) causes displacement of said arms in opposite directions. Said adaptor mechanism (21) further comprises an electrical actuator (17) for driving said joint member (18) independent from said lock mechanism (20). Said adaptor mechanism (21) can separately be controlled by a remote control. An IC is typically embedded to receive remote signals for actuating said joint member (18). Said latching arms (22) are

linearly driven back and forth to provide locking and un-locking.

[0020] The lock mechanism (20) according to the present invention may be set in a frame housing (37) as seen in Fig. 7. Said housing (37) may comprise separate buttons to control pneumatic doors and/or reflectors.

Claims

1. A locking system (24) to be used especially in pneumatic passenger doors of buses comprising an outer side handle body (2), an inner side handle body (14), a central body (1) in communication with said outer and inner handle bodies (2, 14), at least one cam (4) secured in said central body (1) for transmitting rotational movement of said outer and inner handle bodies (2, 14) to an outer adaptor drive mechanism (21) wherein said cam (4) comprises a rear region (5) having two laterally delimited cavities for receiving protrusions (27, 6) being in communication with respectively said outer and inner handle bodies (2, 14) whereby said rear region (5) adapts said cam (4) to make linear displacement against rotational movement of said outer and inner handle bodies (2, 14).
2. A locking system (24) as set forth in Claim 1 wherein said lock mechanism (20) comprises a resetting spring (12) having two extremities (31) extending outwardly from a spring carrier (13) fitted in an inner control member (7) rotated by said inner handle body (14), said extremities (31) leaning against outer edges of a corresponding aperture (36) of a central body upper connection element (11) fixed on said central body (1) whereby upon rotation of said handle (14), said spring (12) resets position of said cam (4) by returning said inner control member (7).
3. A locking system (24) as set forth in Claim 2 wherein said two extremities (31) of said spring (12) extend outwardly from inside a circular channel at both sides of a lateral aperture (32) of said spring carrier (13).
4. A locking system (24) as set forth in Claim 2 or 3 wherein said extremities (31) lean against outer edges of two inner channels (33) of said inner control member (7) in which said spring carrier (13) is fitted.
5. A locking system (24) as set forth in Claim 1 and 4 wherein said protrusions (27, 6) are located respectively on said inner control member (7) and said outer handle body (2).
6. A locking system (24) as set forth in Claim 2 or 5 wherein said adaptor region (5) is in H form whereby said two cavities at both side of the horizontal line receive said protrusions (27, 6) from respectively outer and inner sides.
7. A locking system (24) as set forth in Claim 6 wherein said outer handle body (2) is interconnected with said spring carrier (12) such that a protruding part (34) along an inner surface of said spring carrier (13) axial hole fits in a channel (35) of said outer handle body (2) whereby rotation of said outer handle body (2) too is reset by said spring (12).
8. A locking system (24) as set forth in any preceding Claims wherein said adaptor mechanism (21) comprises a joint member (18) having a pivotal bearing (23) so as to drive a plurality of arms thereof whereby advancement of said cam (4) back and forth rotates said joint member (18) around said pivotal bearing (23) by means of an adaptor connection rod (19) to drive latching arms (22).
9. A locking system (24) as set forth in Claim 8 wherein said adaptor mechanism (21) comprises an electrical actuator (17) for driving said joint member (18) independent from said lock mechanism (20).
10. A locking system (24) as set forth in Claim 9 wherein said electrical actuator (17) is driven by an IC for receiving remote signals and allowing control by a remote control.
11. A locking system (24) as set forth in Claim 10 wherein said locking mechanism (20) is set in a frame housing (37) comprising at least one button for controlling pneumatic doors and at least one reflector.

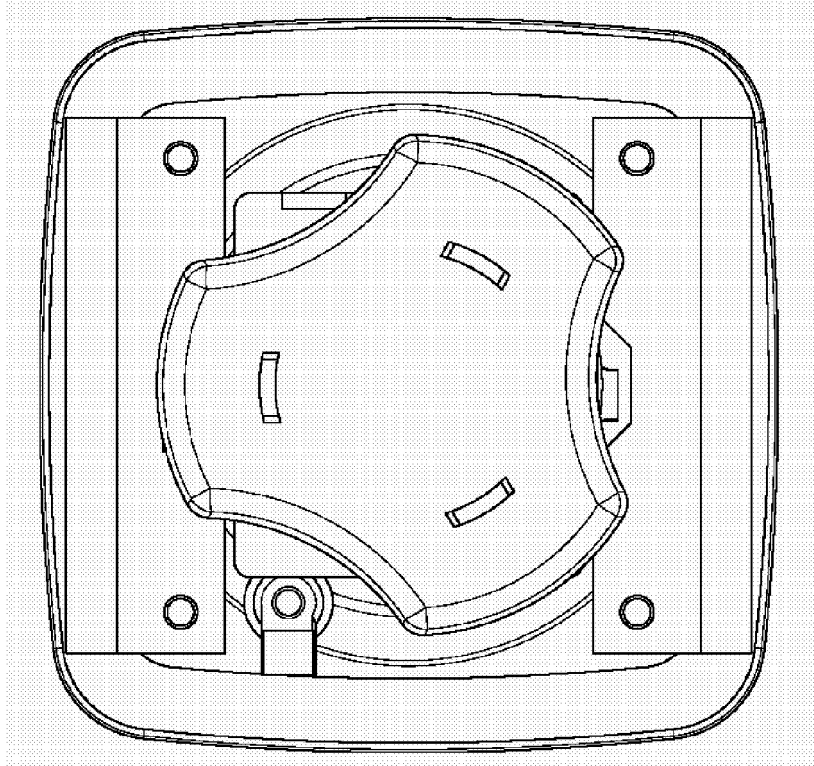


Fig. 1a

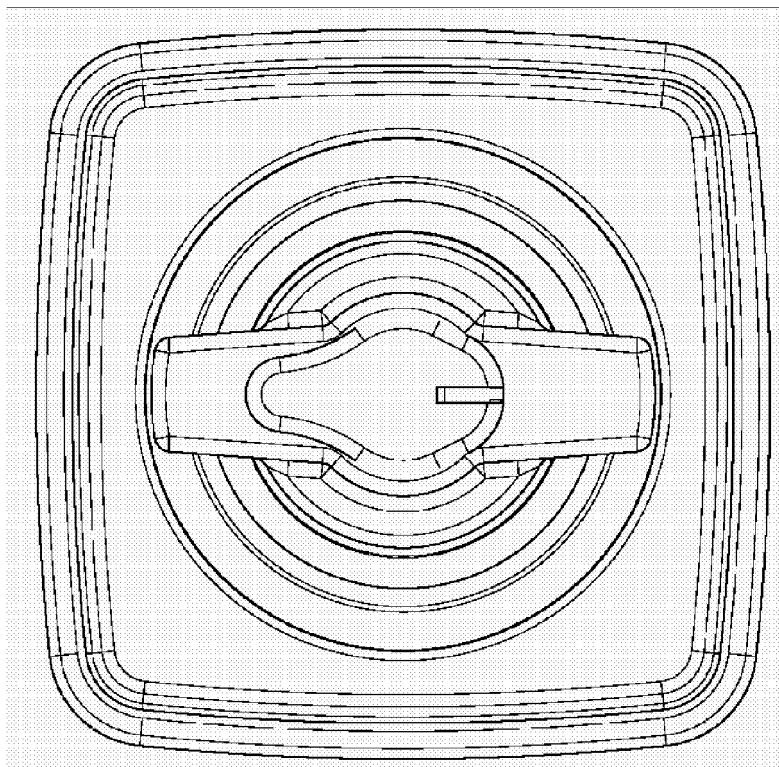


Fig. 1b

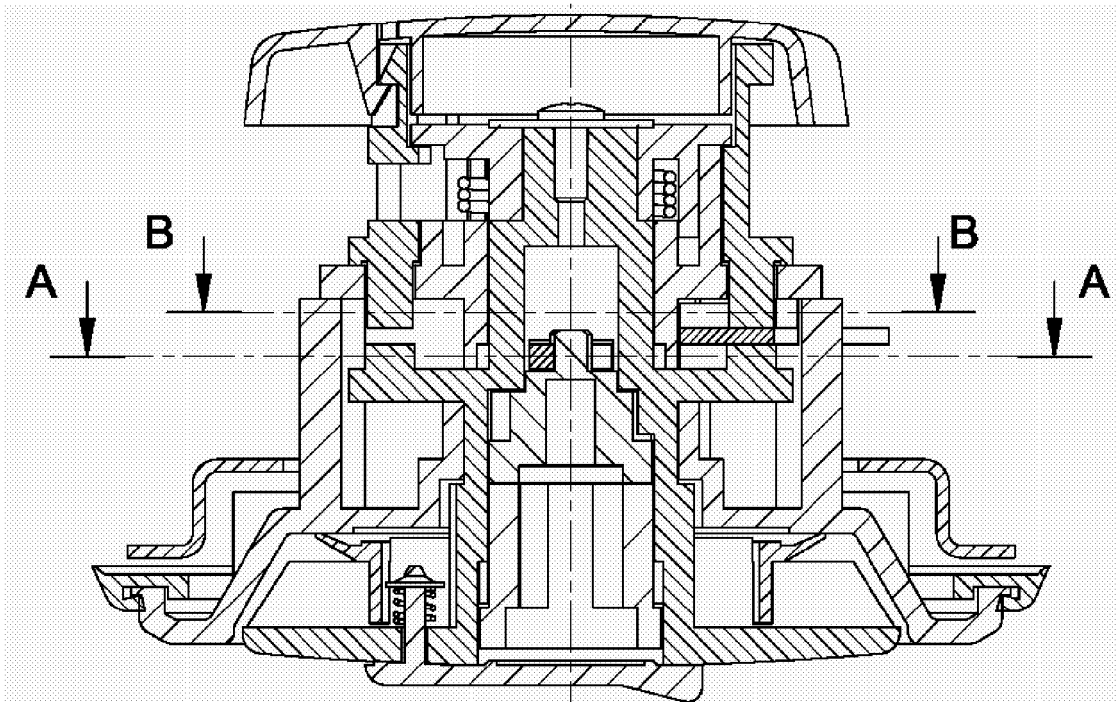


Fig. 2

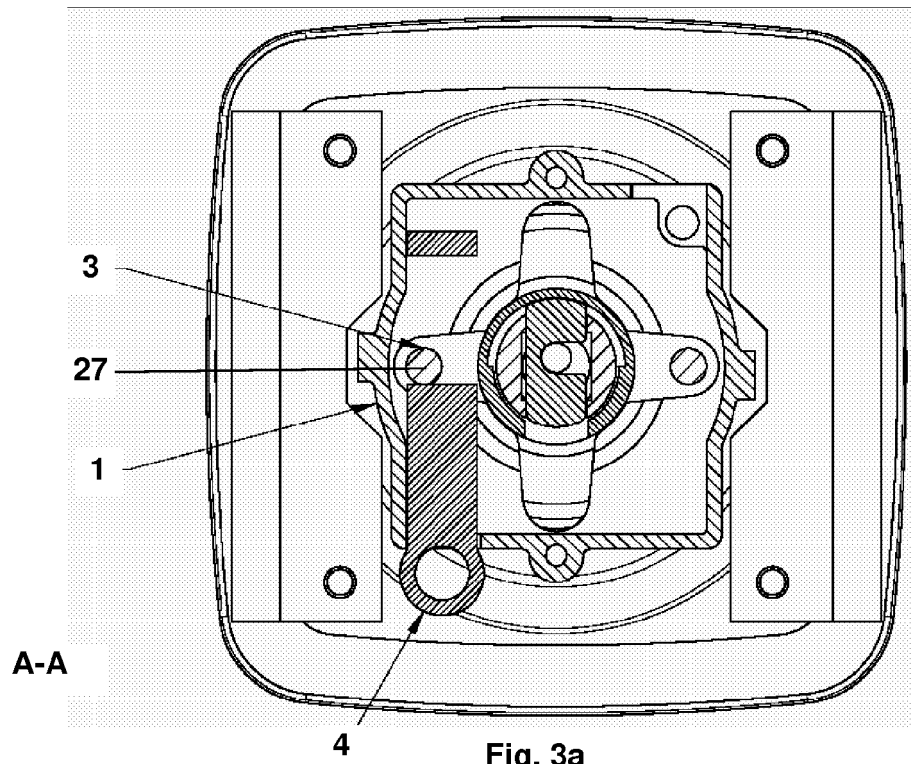


Fig. 3a

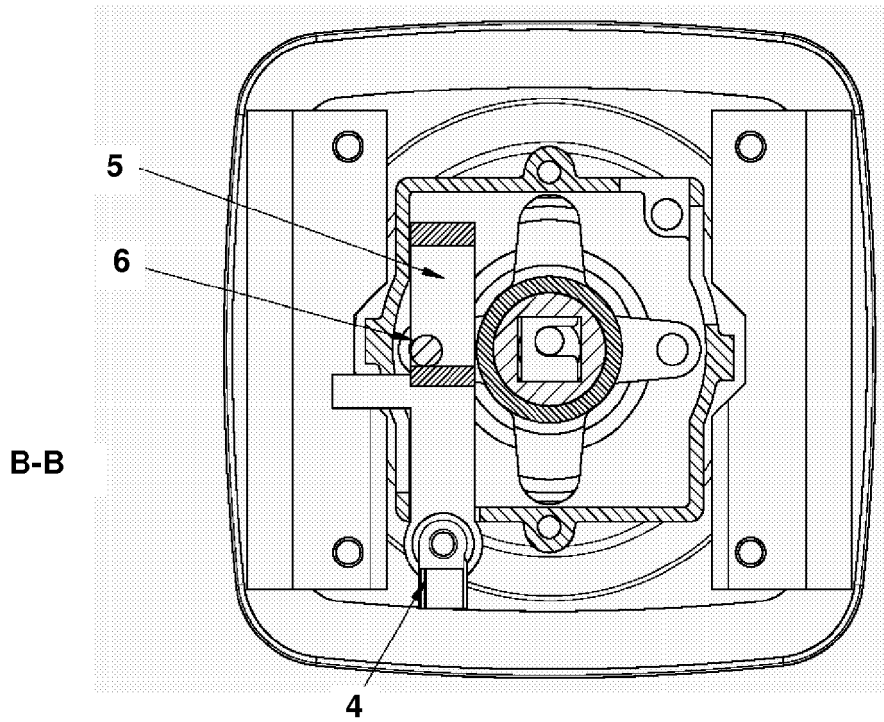


Fig. 3b

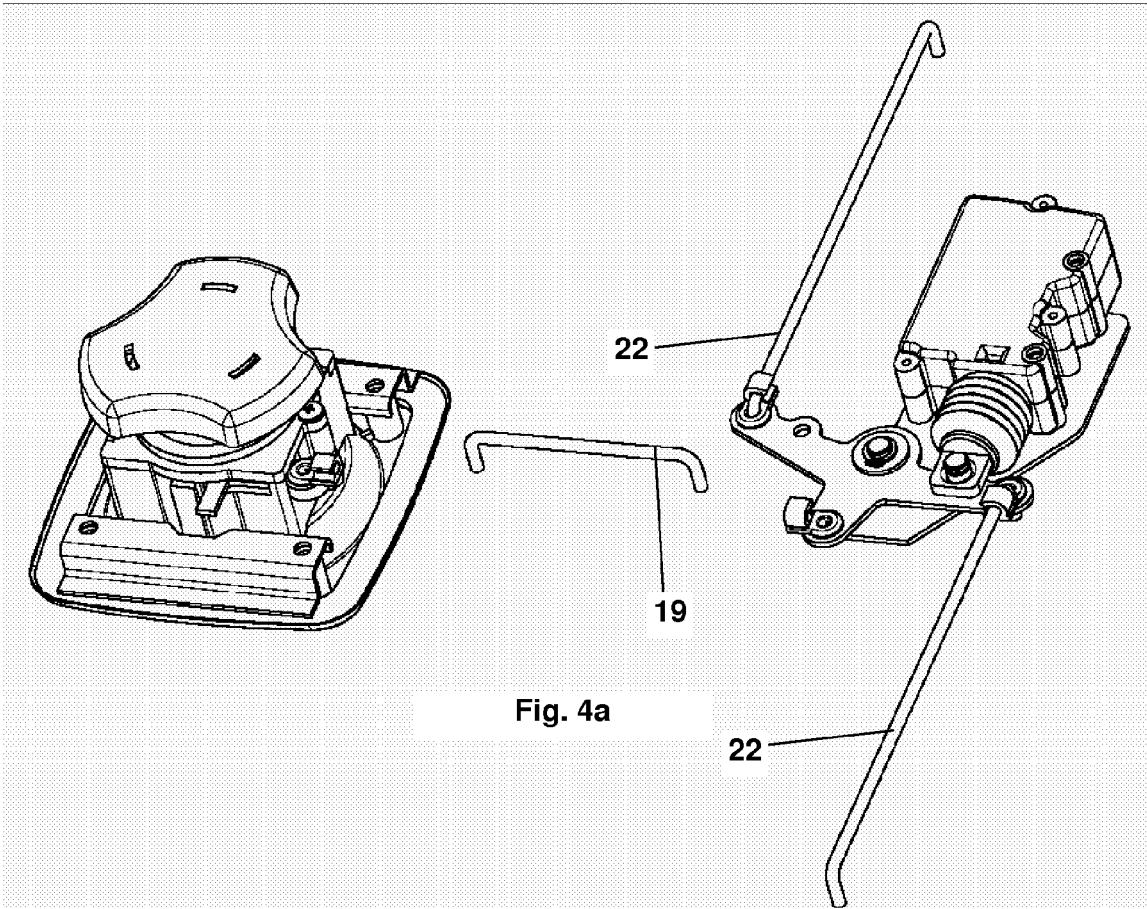


Fig. 4a

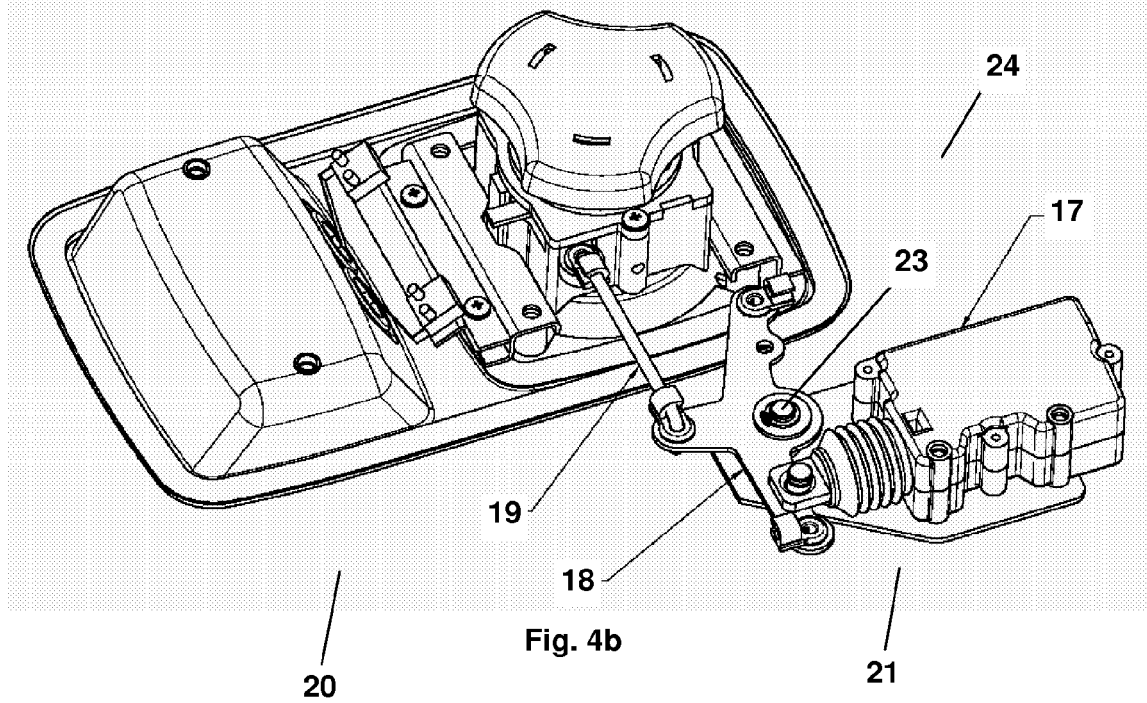


Fig. 4b

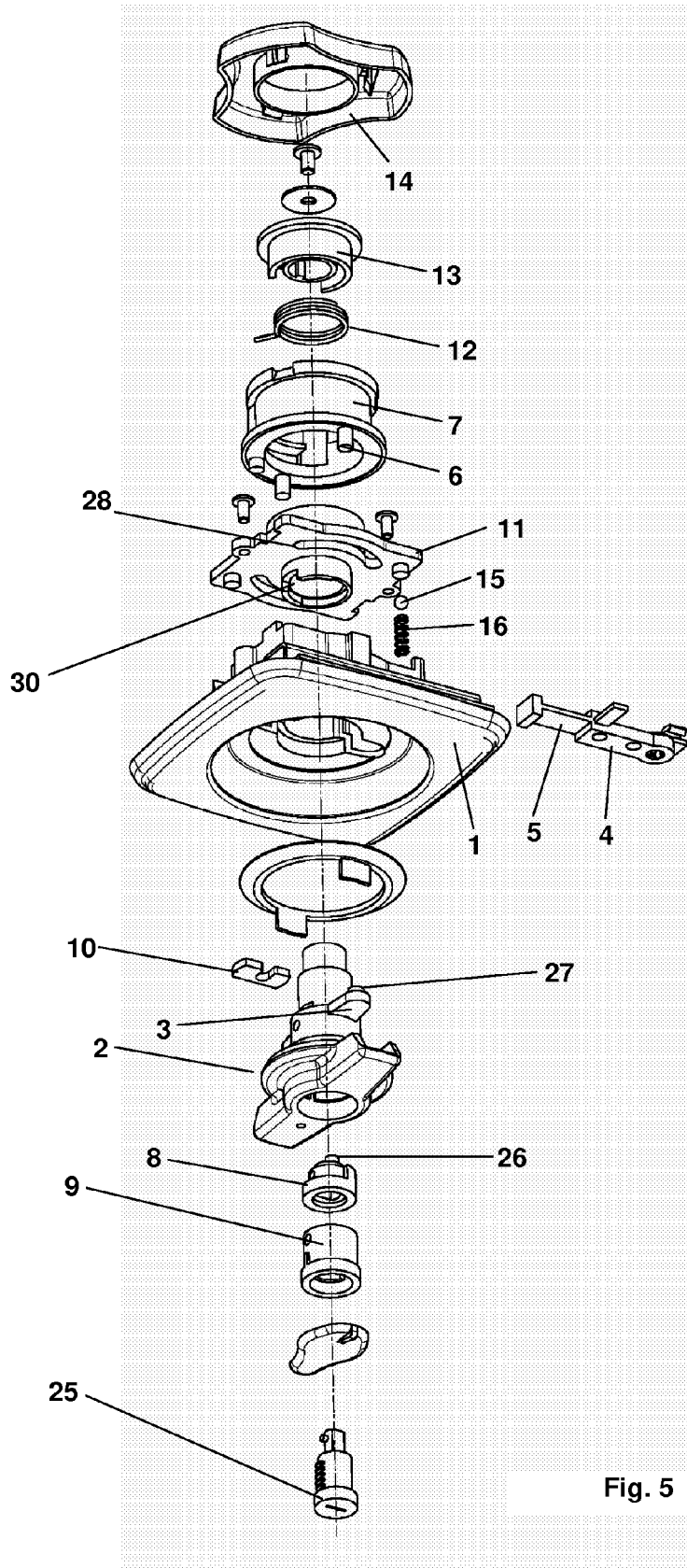


Fig. 5

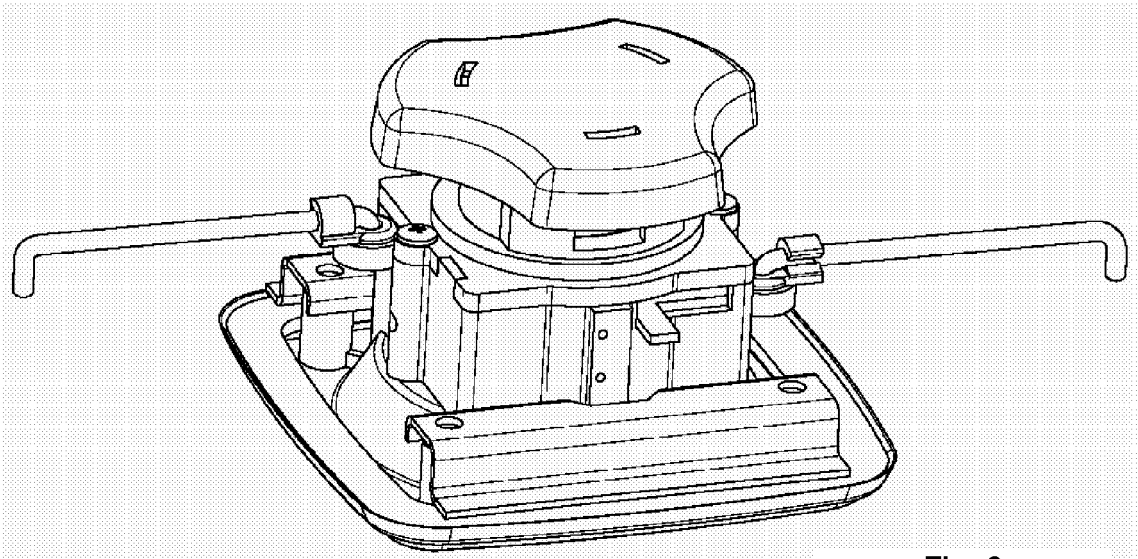


Fig. 6

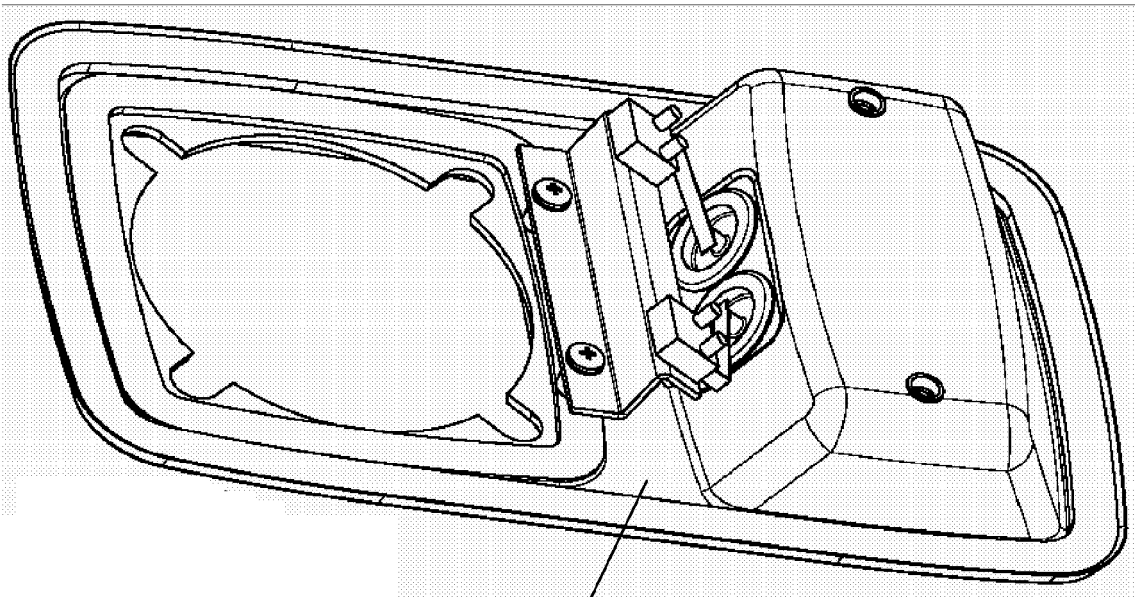


Fig. 7

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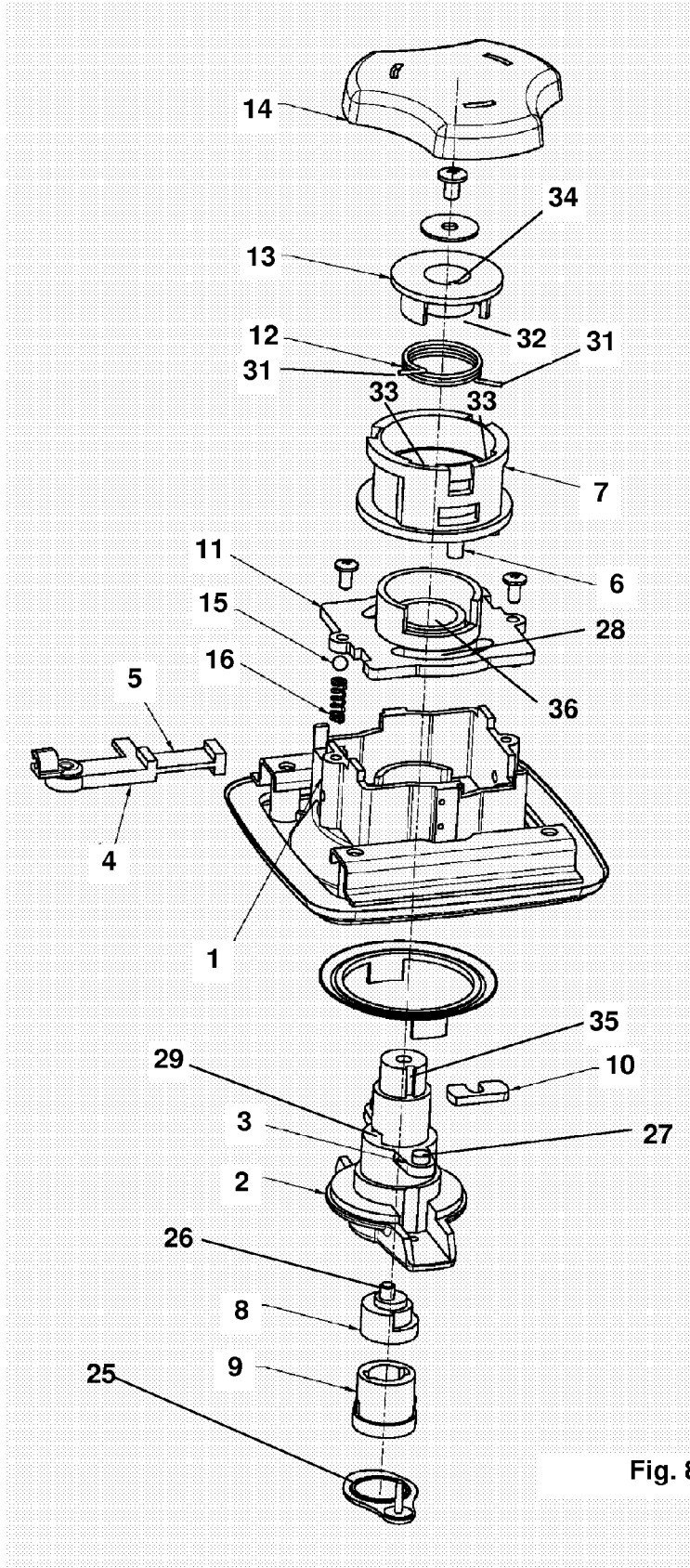


Fig. 8



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 3 815 390 A (STOIA H) 11 June 1974 (1974-06-11) * column 2, line 4 - column 4, line 59; figures 1-10 *	1	INV. E05B65/12 E05B63/16 E05B47/00 E05C9/04
Y A	FR 2 629 508 A (HERVOUET GASTON; HERVOUET JACQUELINE) 6 October 1989 (1989-10-06) * page 3, line 9 - page 4, line 10; figure 1 *	1 8	
D,A	EP 0 416 448 A (GEBR. HAPPICH GMBH) 13 March 1991 (1991-03-13) * the whole document *	1,2	
A	US 3 844 592 A (GERVIS M ET AL) 29 October 1974 (1974-10-29) * column 5, line 25 - column 6, line 22; figure 9 *	1,6	
A	DE 24 59 038 A1 (GKN STENMAN AB) 16 June 1976 (1976-06-16) * page 6, line 22 - page 9, line 12; figures 1-3 *	1	
A	GB 2 287 751 A (HENDERSON EDWARD WILLIAM) 27 September 1995 (1995-09-27) * page 6, line 13 - page 9, line 20; figures 1-5 *	1,8	TECHNICAL FIELDS SEARCHED (IPC) E05C E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22-02-2008	Examiner PEREZ MENDEZ, J
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	

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

EP 07 11 1556

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
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22-02-2008

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3815390	A	11-06-1974	NONE	
FR 2629508	A	06-10-1989	NONE	
EP 0416448	A	13-03-1991	DE 3929324 A1	07-03-1991
			ES 2047783 T3	01-03-1994
			FI 93479 B	30-12-1994
			HU 58852 A2	30-03-1992
US 3844592	A	29-10-1974	NONE	
DE 2459038	A1	16-06-1976	NONE	
GB 2287751	A	27-09-1995	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0416448 A [0003]