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(11)

**EP 1 950 367 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**30.07.2008 Bulletin 2008/31**

(51) Int Cl.:  
**E05B 65/20 (2006.01)**

(21) Application number: **07100988.0**

(22) Date of filing: **23.01.2007**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR**

Designated Extension States:  
**AL BA HR MK RS**

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**(54) Luggage compartment locking mechanism for a plurality of flaps**

(57) The present invention proposes a locking mechanism for luggage compartments of buses for operating a plurality of flap locks (32). The mechanism comprises a housing (30) having a front plate (11) associated with a front plate handle (14), a transmission element (23) that is rigidly joined to said front handle body (14) so as to transmit displacement of said front handle to a rear

plate driving mechanism. Said rear plate driving mechanism comprises a rotary driver (18) driving a plurality of connection rods (24) associated with flap locks (22). Said actuation mechanism further comprises an actuation member (15) being in association with auxiliary driver (21) mechanisms and installed between said transmission element (23) and said rotary driver (18).

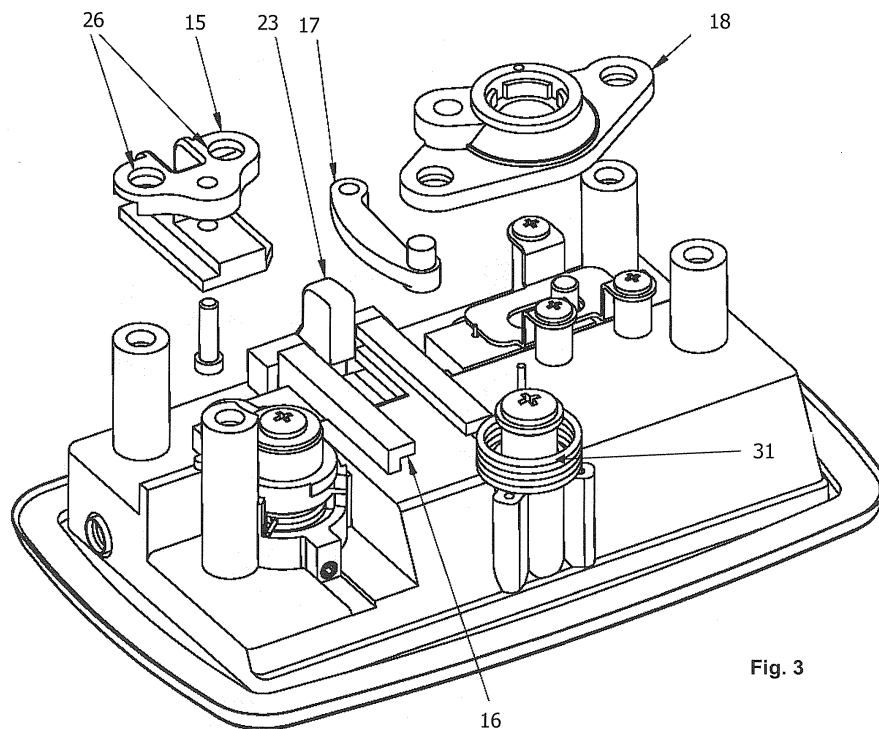


Fig. 3

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## Description

### Technical Field of the Invention

[0001] The present invention relates to a locking system operating a plurality of luggage compartment flap locks in buses.

### Background of the Invention

[0002] Devices for operating a plurality of luggage compartment flap locks in buses are known in the art. Those devices are designed in the manner to operate a plurality of locks at the same and to enable access to operate the mechanism from inside the compartment. This is desired as such compartments provide sleeping space for drivers.

[0003] There are a number of patents/patent applications in the present field. Among others, EP 0 798 437, disclosing a front plate handle mechanically connected to a first carrier plate, the latter being connected to a second carrier plate, can be referred to here. While the first carrier plate directly drives flap locks, the second carrier plate first drives an auxiliary driver, hard-material rods connecting main driver with auxiliary drivers. The system can be operated both from inside and outside the compartment.

[0004] A set of problems associated with the prior art can be delineated as follows: First of all, the capacity of prior art locking systems in the sense of operating a plurality of flap locks at the same time is limited. A plurality of locks can either be operated by an outer panel handle or by an inner panel handle. Total number of operable locks is very important in both cases as luggage compartment structure of different bus models can require different configurations. The locking mechanism of EP 0 798 437 from this point of view, is suitable for operating only two locks from the inside and four locks from the outside. The mechanism disclosed therein is therefore deficient in that it allows operation of only a limited number locks.

[0005] Furthermore, the mechanism of EP 0 798 437 is also unadvantageous in that the mechanism used for operating auxiliary rotary drivers requires that main rotary driver be connected to auxiliary drivers by means of hard-material connection rods. This necessity stems from the fact that auxiliary drivers are actuated by a pushing action by said main rotary driver. To this end, connection rods pushed to actuate auxiliary drivers may be subject to twisting and malfunction in time, considering the distance in between the main driver and auxiliary drivers. This can become a serious problem especially when wires are bent to fit into the inner surface profile of the compartment space.

[0006] The locking device according to the present invention, suitable for operating up to six locks from inside and outside the compartment respectively, provides a more flexible locking mechanism adaptable to a variety

of configurations required by different bus models.

[0007] The device according to the present invention is also advantageous in that it is designed to operate in the manner that auxiliary drivers are actuated by a pulling action instead of a pushing action of said main rotary driver, therefore eliminating possibility of twisting and malfunction of connection rods in time. This also signifies that the necessity to employ hard-material connection rods against twisting can be avoided and any suitable selection from a wider range of materials including cheaper materials can be preferred.

[0008] The device of the present invention is further advantageous in that it provides a more convenient and easily mountable inner handle structure capable of directly driving means for unlocking flap locks, therefore avoiding need for using additional connection elements. This also helps reducing overall costs. Since use of extra equipment such as wires to drive means for unlocking flap locks is avoided, parts such as connection slots that would otherwise used to connect the inner handle are used for connections to drive additional mechanisms.

### Objects of the Invention

[0009] One of the objects of the present invention is to provide a luggage compartment locking mechanism suitable for operating up to six locks from inside and outside the compartment respectively, ensuring a more flexible locking mechanism adaptable to a variety of configurations required by different bus models.

[0010] Another object of the present invention is to provide a luggage compartment locking mechanism eliminating possibility of twisting and in long term malfunction of connection rods that are installed in between main driver and auxiliary drivers.

[0011] Another object of the present invention is to provide a luggage compartment locking mechanism in which an easily mountable inner handle structure capable of directly driving means for unlocking flap locks is used.

[0012] Another object of the present invention is to provide a luggage compartment locking mechanism in which overall manufacturing costs are reduced.

### Summary of the Invention

[0013] The present invention proposes a front plate on a housing having a recess within which a front handle body extends in a manner to be movable on an axle parallel to said front plate. A transmission element extending vertical to the front plate plane is rigidly joined to said front handle body so as to drive a rear side actuation member which is slidably movable on a pair of transversal guiding rails and which is connected to a main rotary driver by means of a connection lever. Said main rotary driver is rotated by said connecting lever against the force of a restoring spring. It is connected to a plurality of flap locks. Said actuation member, on the other hand, drives a plurality of auxiliary drivers by means of connections

rods, which are in turn operating flap locks.

### Brief Description of the Figures

**[0014]** Accompanying drawings are given solely for the purpose of exemplifying a luggage compartment locking system whose advantages over prior art were outlined above and will be explained in detail hereinafter:

Fig. 1 demonstrates a perspective front view of the locking mechanism front panel according to the present invention.

Fig. 2.a demonstrates side view of the locking mechanism housing according to the present invention.

Fig. 2b demonstrates rear view of the locking mechanism housing according to the present invention.

Fig. 3 demonstrates a perspective rear view of the locking mechanism housing according to the present invention.

Fig. 4 demonstrates a partially dismantled perspective rear view of the locking mechanism housing according to the present invention.

Fig. 5 demonstrates the locking mechanism according to the present invention with connection rods, auxiliary drivers and flap locks.

### Detailed Description of the Invention

**[0015]** Referring now to the figures outlined above, the present invention proposes a front plate (11) on a housing (30) having a recess (13) within which a front handle body (14) extends in a manner to be outwardly movable on an axle parallel to said front plate (11). A transmission element (23) extending vertical to the front plate (11) plane is rigidly joined to said front handle body (14) so as to drive a rear side actuation member (15) which is slidably movable on a pair of transversal guiding rails (16) and which is connected to a main rotary driver (18) by means of a connection lever (17). Said main rotary driver (18) is rotated by said connecting lever (17) against the force of a restoring spring (31).

**[0016]** Said rear side actuation member (15), said guiding rails (16) and said connecting lever (17) constitute the guiding system (19) according to the present invention. Said actuation member (15) is advanced on said guiding rails (16) to displace said connecting lever (17), the latter rotating said main driver (18) by means of a pin (27). Said transmission element (23), integrally formed with said front handle body (14) pushes against said actuation member (15) on the rear face in response to outward pulling of said front handle body (14). Upon pulling said front handle body (14), rearmost extremity of said transmission element (23) engages in a notch

(28) located in between auxiliary driver connection pins of said actuation member (15), therefore pushing against said connection lever (17) and rotating said main driver (18).

**[0017]** The movement of the rearmost extremity of said transmission element (23), normally leaning against said actuation member (15), can be blocked by a stopper element (29) by means of an appropriate key that is rotated in the keyhole 25; the front handle body (14) can not be pulled on thereupon and access to operate the lock mechanism is restricted. When locked from outside, the mechanism can however still be operated from inside since said main driver (18) can be rotated although the transmission element (23) is blocked.

**[0018]** Said main rotary driver (18) according to the present invention, can either be rotated by said actuation member (15) or by an inner handle (20). The inner handle (20) is coaxially coupled to said main driver (18) so as to enable rotation of the same. Use of extra equipment such as wires to effect rotation of said main driver is therefore avoided.

**[0019]** Connection slots (12) placed around both sides of said inner handle (20) on said elliptical-like main driver (18), are used for connection with flap locks (22). Said main rotary driver (18) is therefore connected to a plurality of flap locks (22) by means of connections rods (24).

**[0020]** Connection with auxiliary drivers (21), which are also operating additional flap locks (22), is established by means of said actuation member (15). This latter is designed to comprise two slots (26) for accommodating auxiliary driver connection pins around both sides of said notch (28). The actuating member (15) is designed to displace on said guiding rails (16) in the manner to draw auxiliary driver (21) connection rods (24) downward. This drawing action ensures that connection rods (24) are not subject to twisting and malfunction in time. Further, in the case of control by said inner handle (20), rotation of the main driver (18) still ensures downward movement of said actuation member (15); therefore also providing a drawing action for said connection rods (24).

### Claims

1. A locking mechanism for luggage compartments of buses for operating a plurality of flap locks (22) comprising a housing (30) having a front plate (11) associated with a front plate handle (14), a transmission element (23) rigidly joined to said front handle body (14) to transmit displacement of said front handle (14) to a rear plate driving mechanism comprising a rotary driver (18) driving a plurality of connection rods (24) associated with flap locks (22) **characterized in that** said actuation mechanism comprises an actuation member (15) being in association with auxiliary driver mechanisms (21) and installed between said transmission element (23) and said rotary driver (18).

2. A locking mechanism as set forth in Claim 1 wherein said actuation member (15) is connected to said auxiliary driver mechanisms (21) via said connection rods (24) on connection slots (26).  
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3. A locking mechanism as set forth in Claim 1 or 2 wherein said actuation member (15) is adapted to displace in the opposite direction of said transmission element (23) so as to draw connection rods (24) downward.  
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4. A locking mechanism as set forth in Claim 3 wherein said actuation member (15) is slidably movable on a pair of transversal guiding rails (16).  
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5. A locking mechanism as set forth in Claims 4 wherein said actuation member (15) is connected to said main rotary driver (18) by means of a connection lever (17).  
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6. A locking mechanism as set forth in any of the preceding Claims wherein said main rotary driver (18) is rotated by said connecting lever (17) against the force of a restoring spring (31).  
25
7. A locking mechanism as set forth in Claim 1 wherein a stopper element (29) is adapted to block displacement of said transmission element (23) in response to a key rotating in keyhole (25).  
30
8. A locking mechanism as set forth in Claim 1 wherein said actuation mechanism further comprises an inner handle (20) coaxially coupled to said main driver (18).  
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9. A locking mechanism as set forth in Claim 1 wherein said main driver (18), comprises slots (12) for connection with connection rods (24).  
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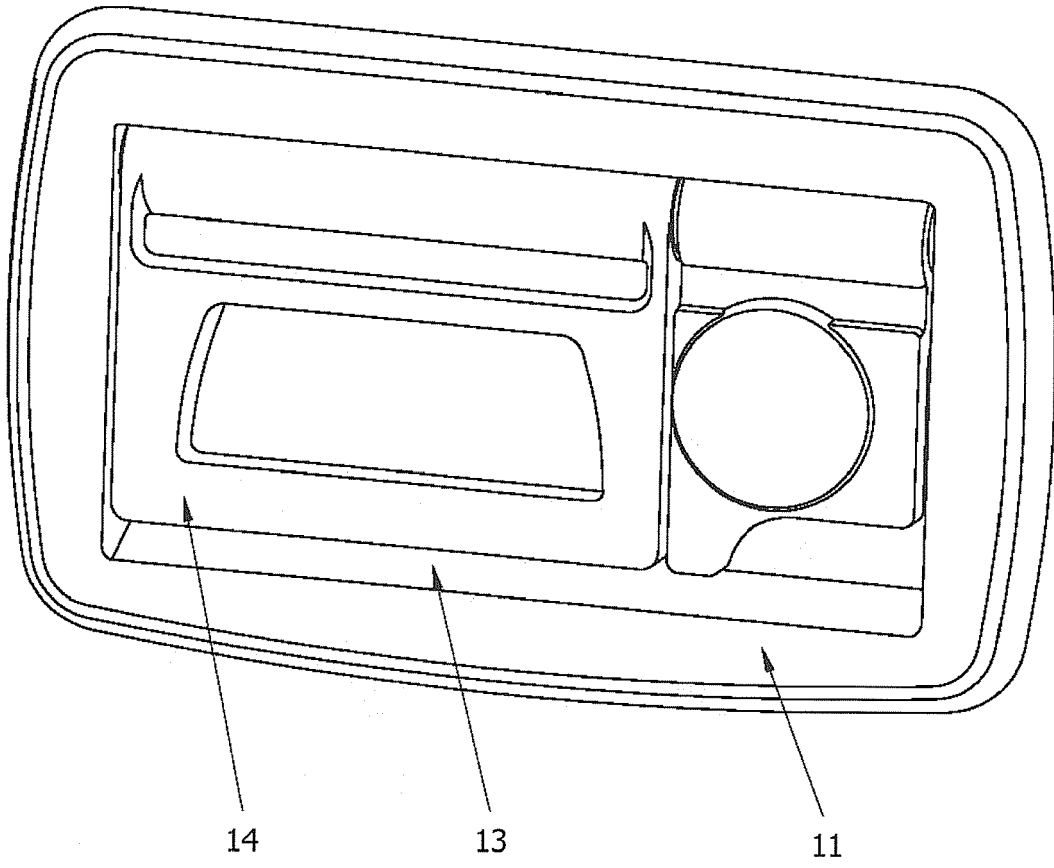


Fig. 1

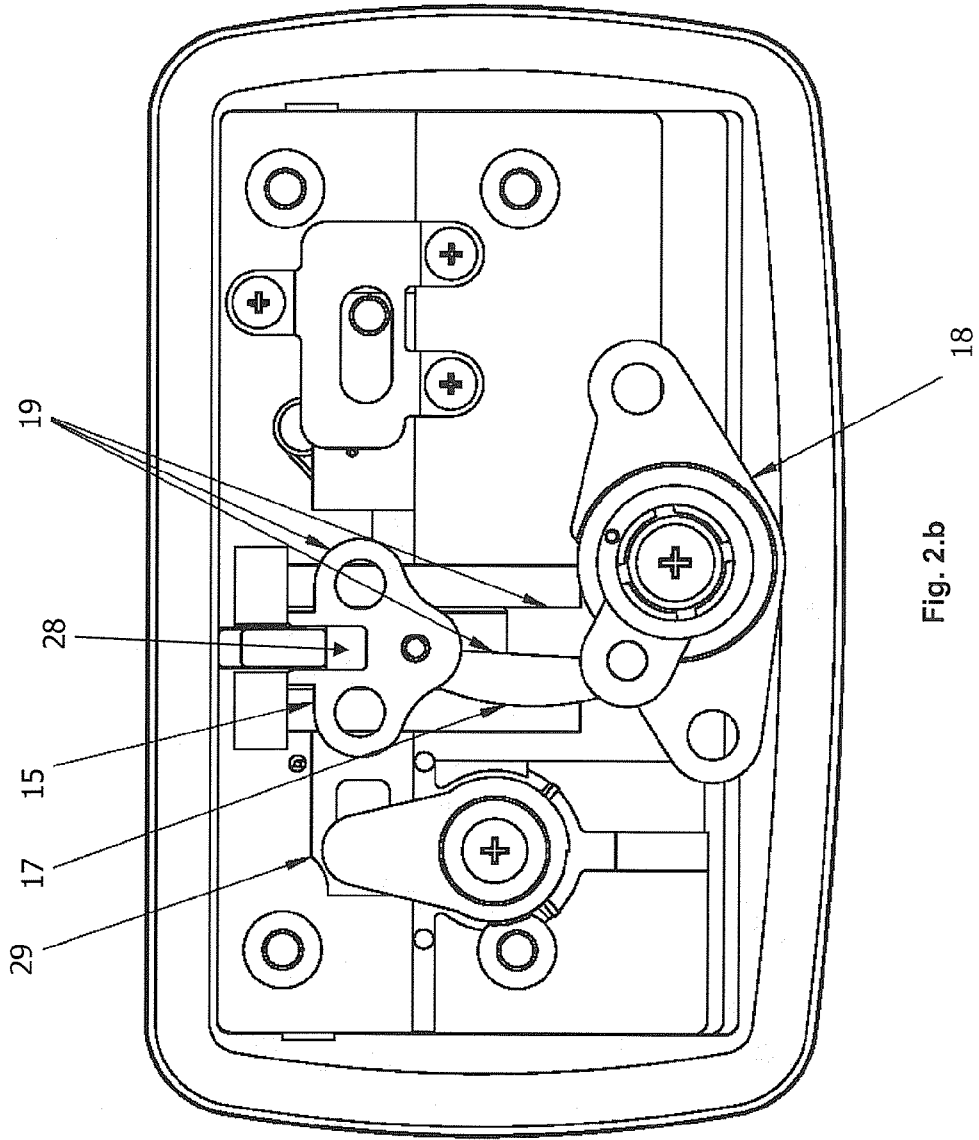


Fig. 2.b

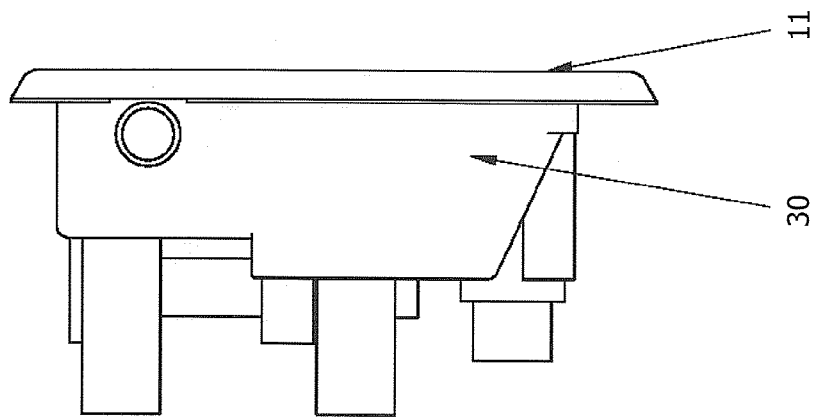


Fig. 2.a

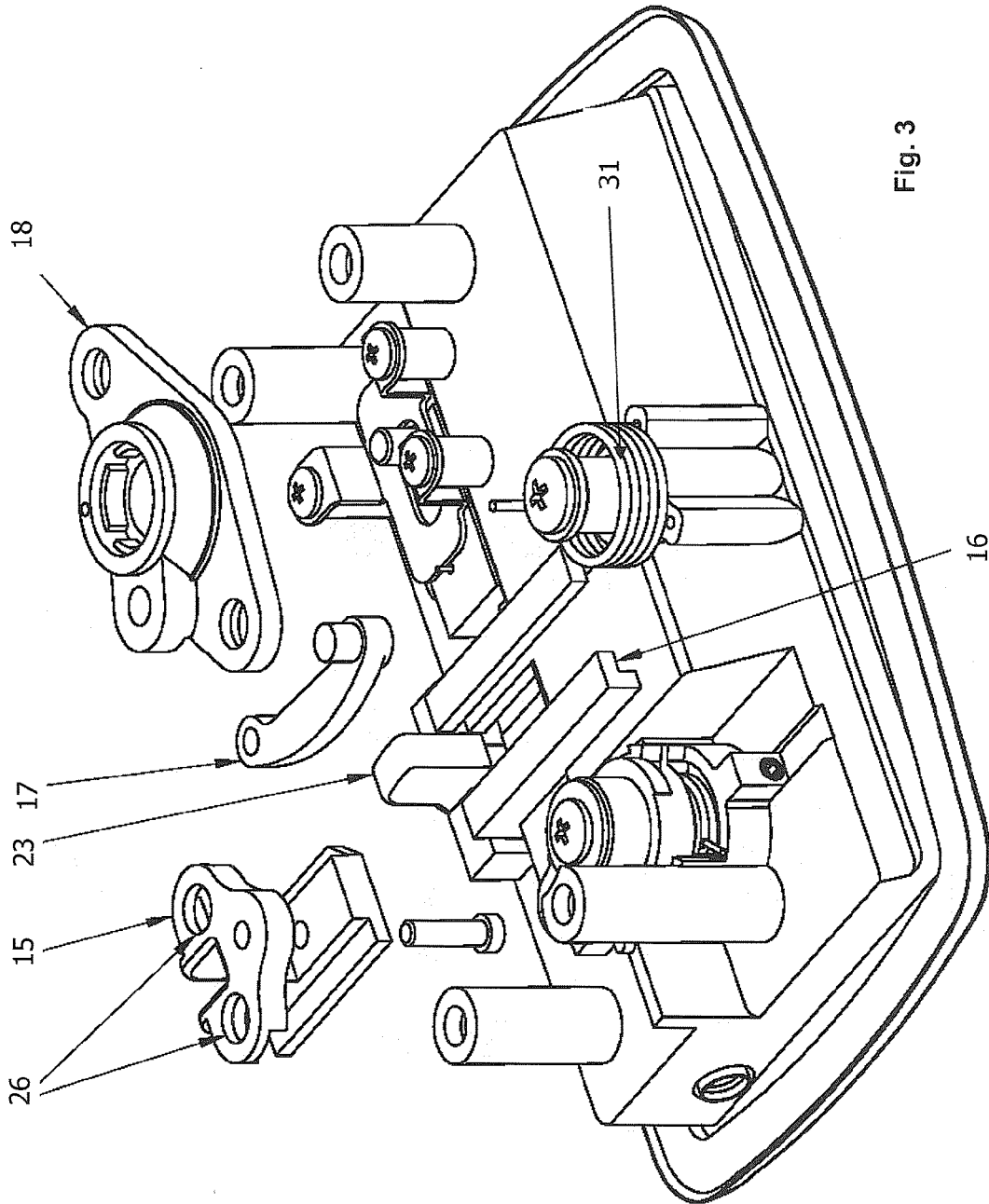


Fig. 3

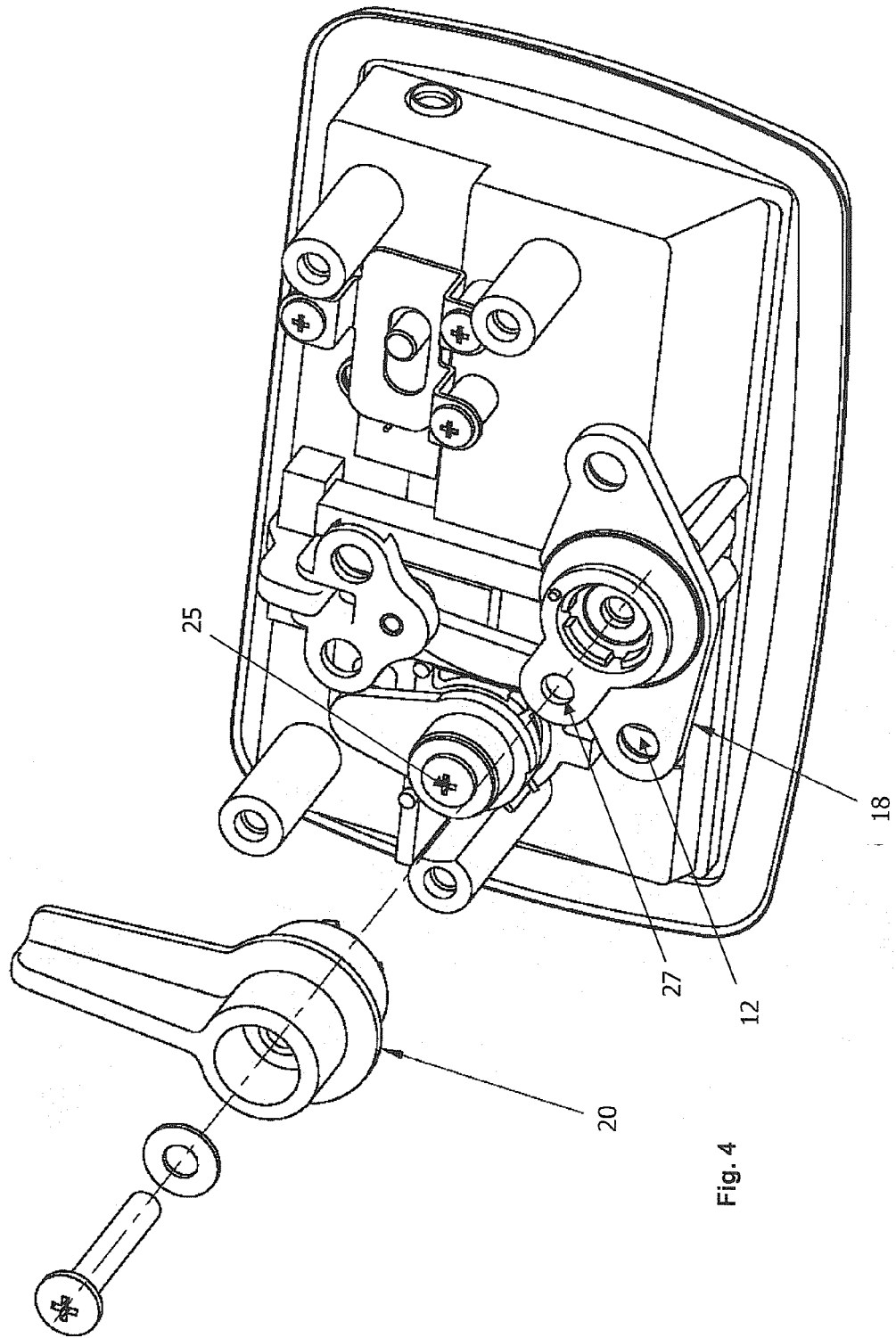


Fig. 4

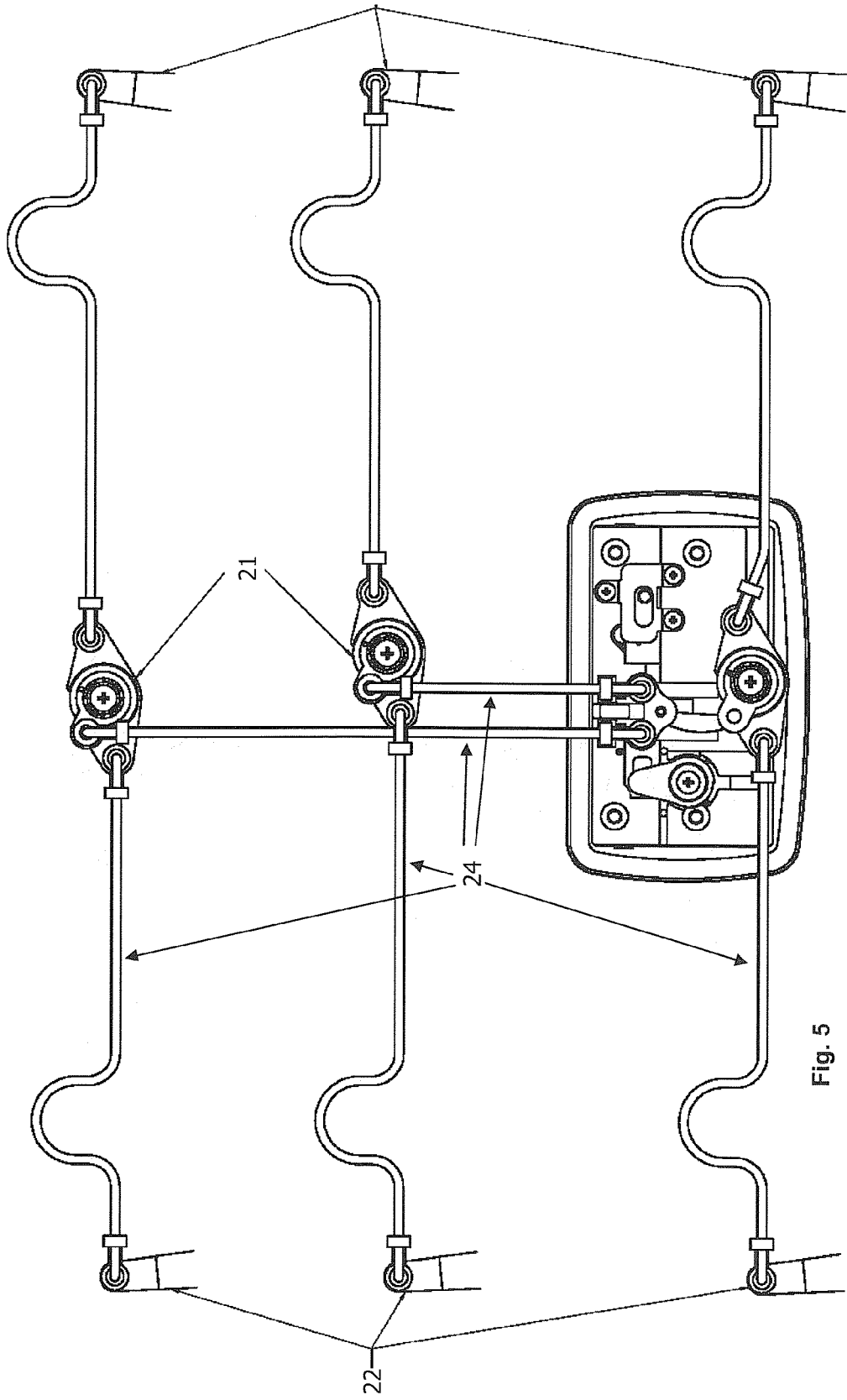


Fig. 5



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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search		Date of completion of the search	Examiner
Munich		25 October 2007	Friedrich, Albert
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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EPC FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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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  
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