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

Laderaum-Verriegelungsmechanismus für verschiedene Klappen

Mécanisme de verrouillage de compartiment à bagage pour une pluralité de volets

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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).
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.
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).
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).
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).
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).
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).
9. A locking mechanism as set forth in Claim 1 wherein said main driver (18), comprises slots (12) for connection with connection rods (24).

#### Patentansprüche

1. Verriegelungsmechanismus für Laderäume von Bussen zur Betätigung einer Vielzahl von Klappenverriegelungen (22), umfassend ein Gehäuse (30) mit einer Frontplatte (11), die mit einem Frontplattenhandgriff (14) verbunden ist, ein Übertragungselement (23), das mit besagtem Fronthandgriff (14) fest verbunden ist, um eine Verlagerung von besagtem Fronthandgriff (14) auf einen Rückplattenantriebsmechanismus zu übertragen, der einen Drehantrieb (18) umfasst, der eine Vielzahl von Verbindungsstangen (24) antreibt, die mit Klappenverriegelungen (22) verbunden sind, **dadurch gekennzeichnet, dass** besagter Betätigungsmechanismus ein Betätigungselement (15) umfasst, das mit Hilfsantriebsmechanismen (21) verbunden und zwischen besagtem Übertragungselement (23) und be-

sagtem Drehantrieb (18) installiert ist.

2. Verriegelungsmechanismus nach Anspruch 1, **dadurch gekennzeichnet, dass** besagtes Betätigungselement (15) mit besagten Hilfsantriebsmechanismen (21) über besagte Verbindungsstangen (24) an Verbindungsschlitzen (26) verbunden ist.
3. Verriegelungsmechanismus nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** besagtes Betätigungselement (15) zum Verschieben in der entgegengesetzten Richtung von besagtem Übertragungselement (23) gestaltet ist, um die Verbindungsstangen (24) nach unten zu ziehen.
4. Verriegelungsmechanismus nach Anspruch 3, **dadurch gekennzeichnet, dass** besagtes Betätigungselement (15) auf einem Paar Querführungsschienen (16) gleitfähig bewegbar ist.
5. Verriegelungsmechanismus nach Anspruch 4, **dadurch gekennzeichnet, dass** besagtes Betätigungselement (15) mit besagtem Hauptdrehantrieb (18) mittels eines Verbindungshebels (17) verbunden ist.
6. Verriegelungsmechanismus nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** besagter Hauptdrehantrieb (18) gegen die Kraft einer Rückstellfeder (31) von besagtem Verbindungshebel (17) gedreht wird.
7. Verriegelungsmechanismus nach Anspruch 1, **dadurch gekennzeichnet, dass** ein Anschlagelement (29) zum Blockieren einer Verlagerung von besagtem Übertragungselement (23) als Antwort auf einen sich in einem Schlüsselloch (25) drehenden Schlüssel gestaltet ist.
8. Verriegelungsmechanismus nach Anspruch 1, **dadurch gekennzeichnet, dass** besagter Betätigungsmechanismus ferner einen inneren Handgriff (20) umfasst, der mit besagtem Hauptantrieb (18) koaxial gekoppelt ist.
9. Verriegelungsmechanismus nach Anspruch 1, **dadurch gekennzeichnet, dass** besagter Hauptantrieb (18) Schlitze (12) zum Verbinden mit Verbindungsstangen (24) umfasst.

#### Revendications

1. Mécanisme de verrouillage pour des compartiments à bagages de bus destiné à actionner une pluralité de serrures de battant (22), comprenant un boîtier (30) présentant une plaque avant (11) associée à une poignée de plaque avant (14), un élément de

- transmission (23) assemblé rigidement au corps de ladite poignée avant (14) afin de transmettre le déplacement de ladite poignée avant (14) à un mécanisme d'entraînement de plaque arrière comprenant un élément d'entraînement rotatif (18) entraînant une pluralité de tiges de raccordement (24) associées aux serrures de battant (22), **caractérisé en ce que** ledit mécanisme d'actionnement comprend un élément d'actionnement (15) en association avec des mécanismes d'entraînement auxiliaires (21) qui est installé entre ledit élément de transmission (23) et ledit élément d'entraînement rotatif (18). 5  
10
2. Mécanisme de verrouillage selon la revendication 1, dans lequel ledit élément d'actionnement (15) est relié auxdits mécanismes d'entraînement auxiliaires (21) par l'intermédiaire desdites tiges de raccordement (24) insérées dans des orifices de raccordement (26). 15  
20
3. Mécanisme de verrouillage selon la revendication 1 ou 2, dans lequel ledit élément d'actionnement (15) est conçu pour se déplacer dans la direction opposée audit élément de transmission (23) de manière à tirer les tiges de raccordement (24) vers le bas. 25
4. Mécanisme de verrouillage selon la revendication 3, dans lequel ledit élément d'actionnement (15) peut être déplacé de manière coulissante sur une paire de rails de guidage transversaux (16). 30
5. Mécanisme de verrouillage selon la revendication 4, dans lequel ledit élément d'actionnement (15) est relié audit élément d'entraînement rotatif principal (18) au moyen d'un levier de raccordement (17). 35
6. Mécanisme de verrouillage selon l'une quelconque des revendications précédentes, dans lequel ledit élément d'entraînement rotatif principal (18) est mis en rotation par ledit levier de raccordement (17) contre la force d'un ressort de rappel (31). 40
7. Mécanisme de verrouillage selon la revendication 1, dans lequel un élément de butée (29) est conçu pour bloquer le déplacement dudit élément de transmission (23) en réponse à une clé tournant dans le trou de la serrure (25). 45
8. Mécanisme de verrouillage selon la revendication 1, dans lequel ledit mécanisme d'actionnement comprend en outre une poignée intérieure (20) couplée coaxialement audit élément d'entraînement principal (18). 50
9. Mécanisme de verrouillage selon la revendication 1, dans lequel ledit élément d'entraînement principal (18) comprend des orifices (12) permettant de le relier aux tiges de raccordement (24). 55

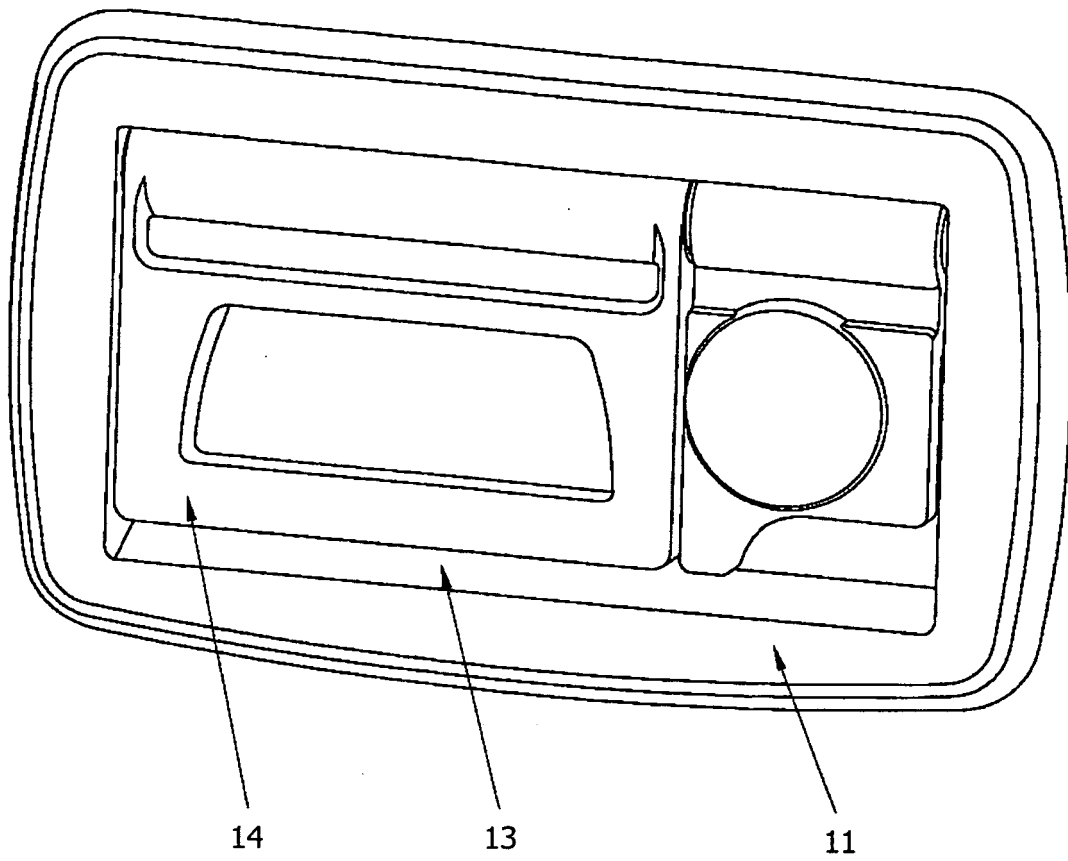


Fig. 1

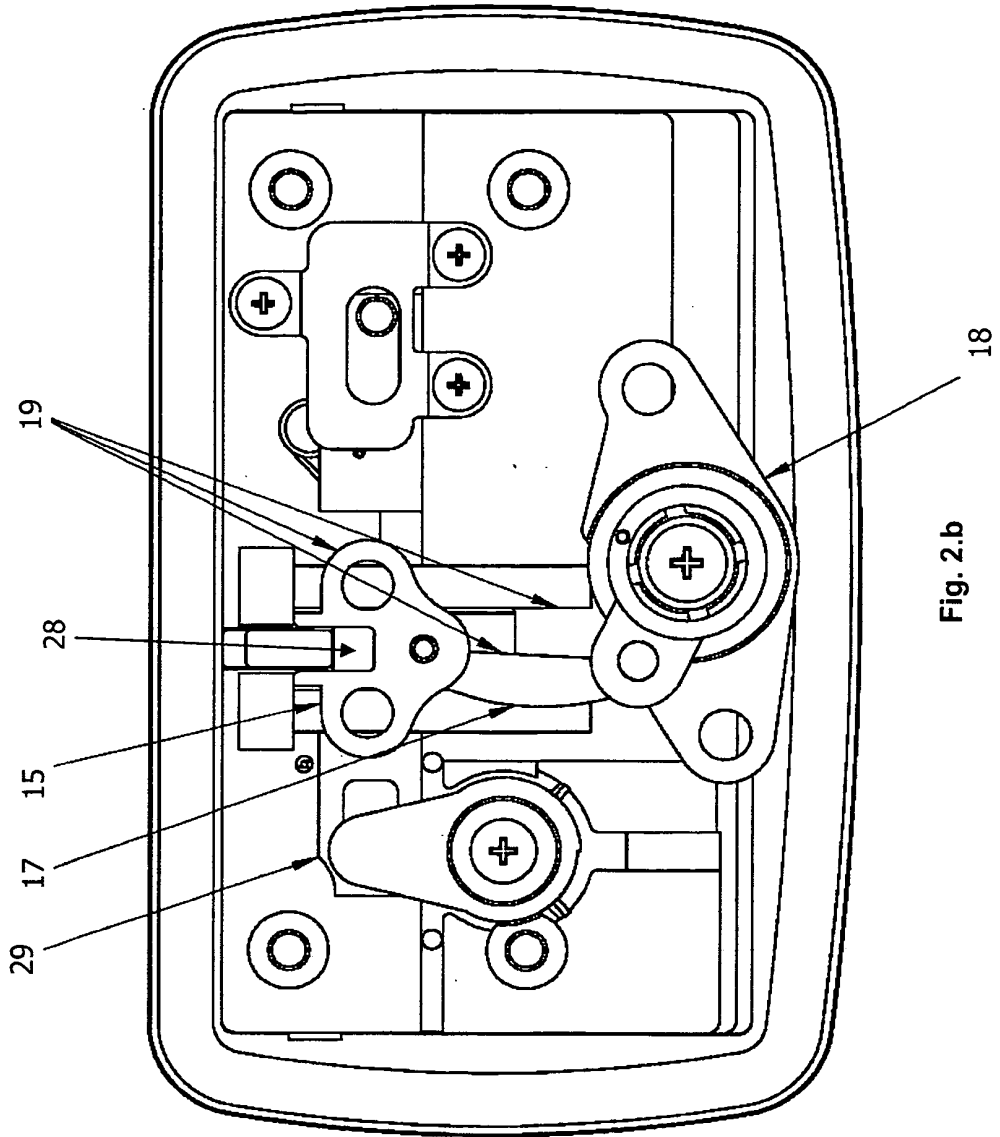


Fig. 2.b

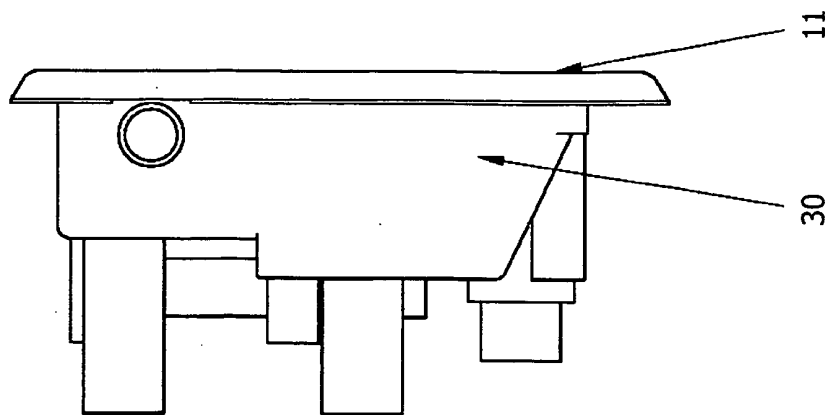


Fig. 2.a

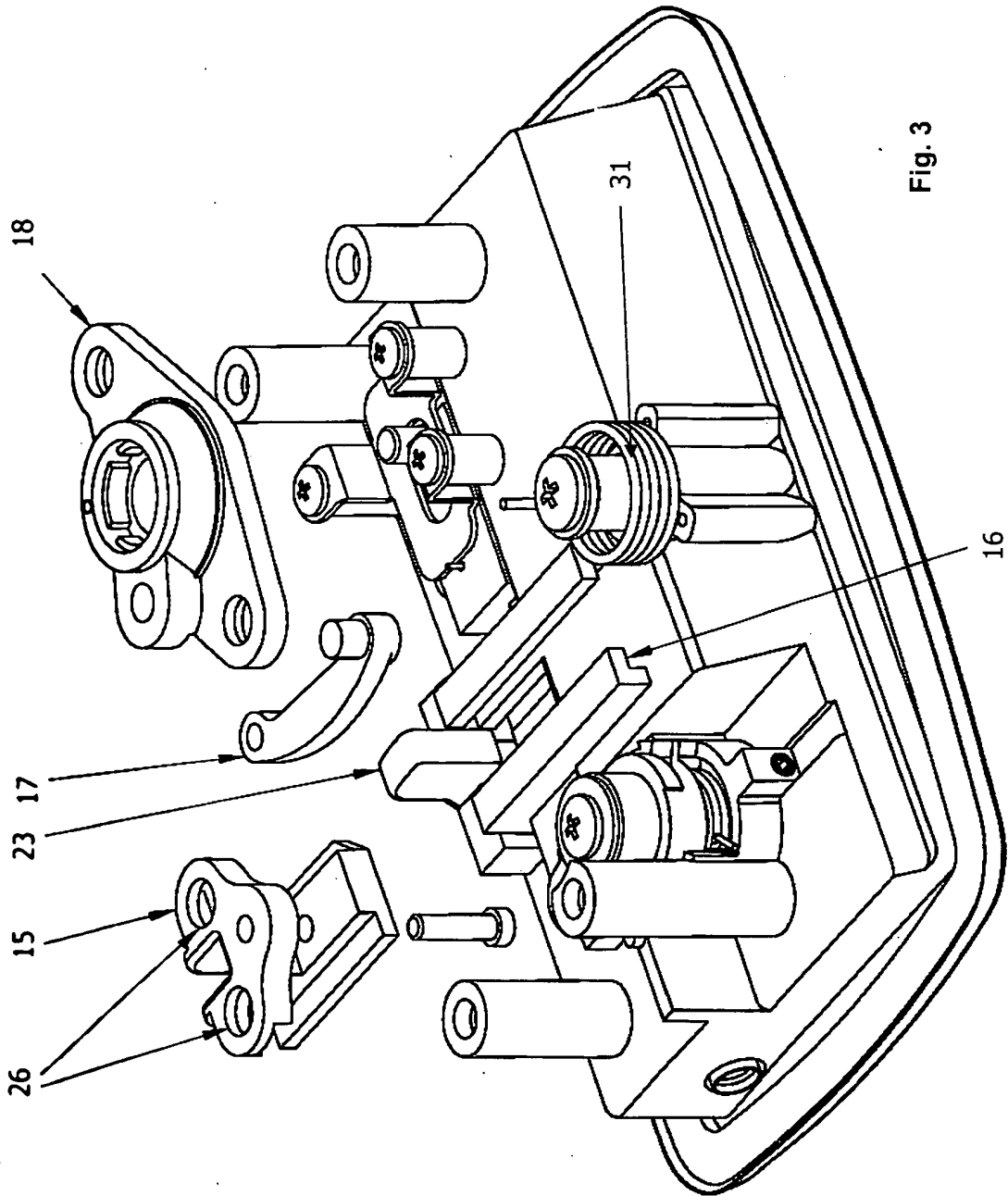


Fig. 3

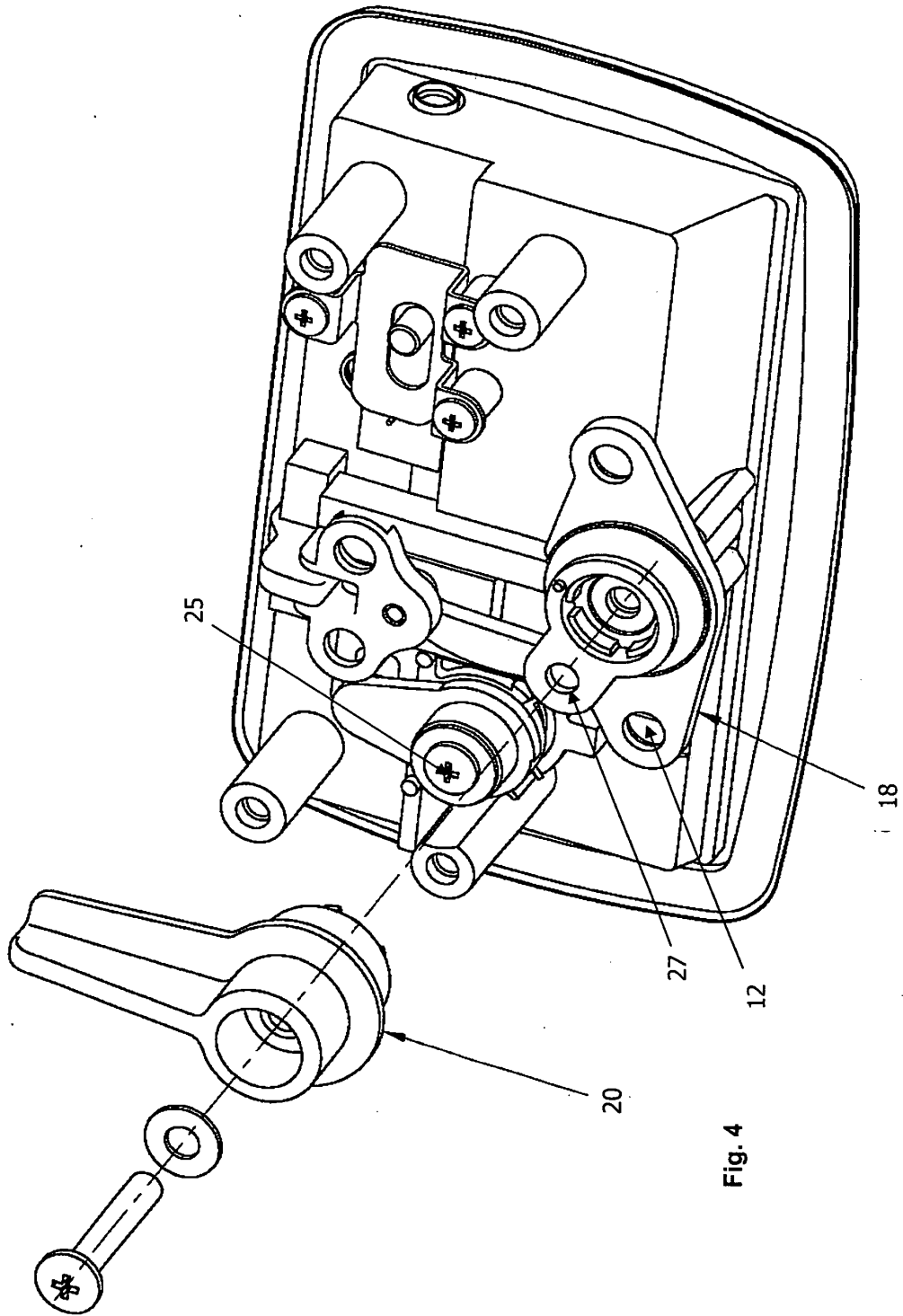


Fig. 4

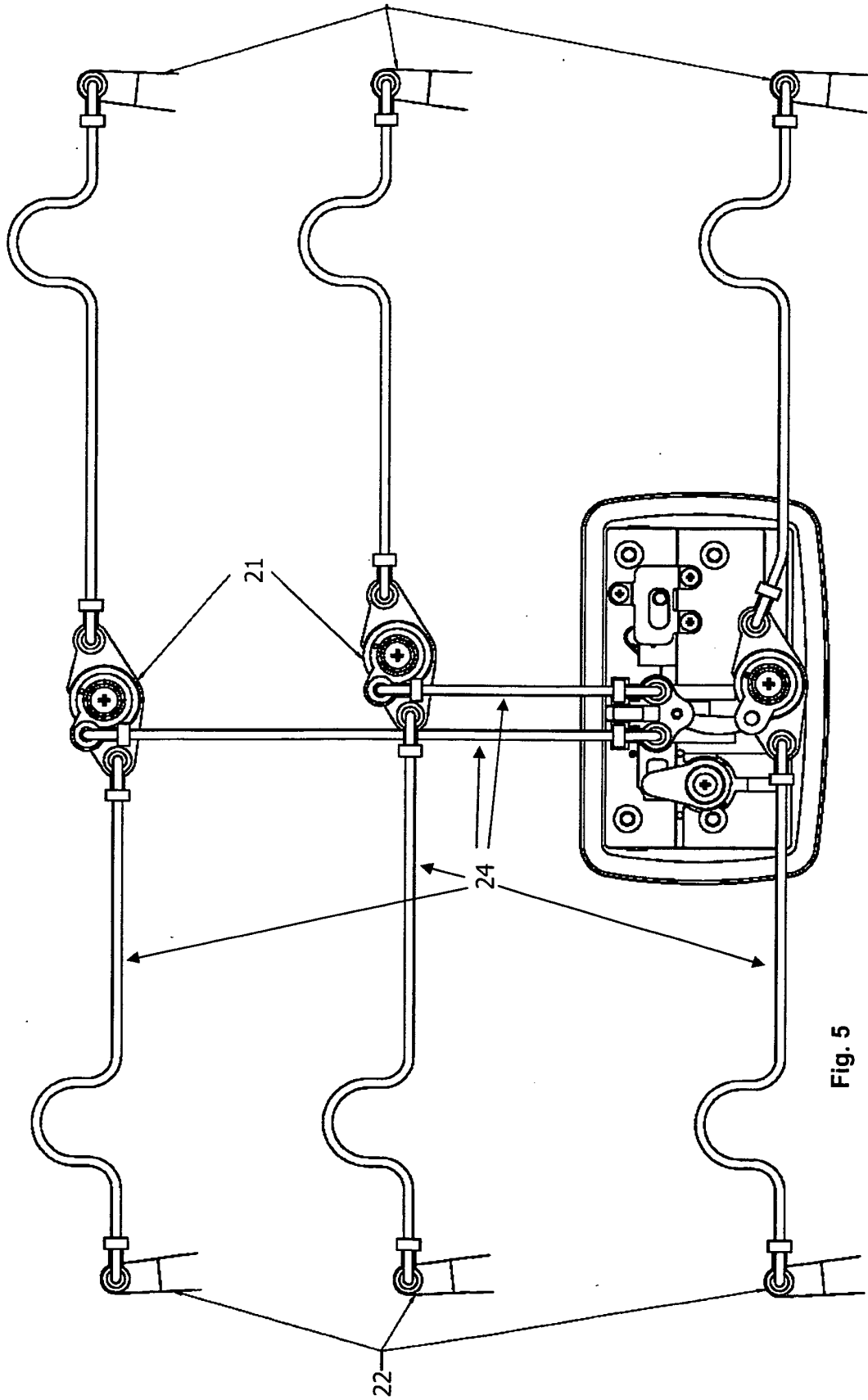


Fig. 5

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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