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(54) CLOSURE ASSEMBLY WITH SAFETY DEVICE FOR MANUAL UNLOCKING OF DOOR PANELS OR DRAWERS

(57) A locking assembly (100) for pieces of furniture (10), comprises:
a latch (2) suitable for sliding in order to lock drawers (11) or door panels (10) of the piece of furniture in closed position, an actuation arm (3) suitable for actuating the latch (2), a support (153) from where the actuation arm (3) projects, an electrical motor (M) comprising a shaft (M1) whereto the support (153) is fixed, a management and control unit (G), a box (7) suitable for sliding, which houses the electrical motor (M), a manual security device (8) connected to the box (7) to make the box (7) slide from a proximal position relative to the latch (2) to a distal position relative to the latch (2).

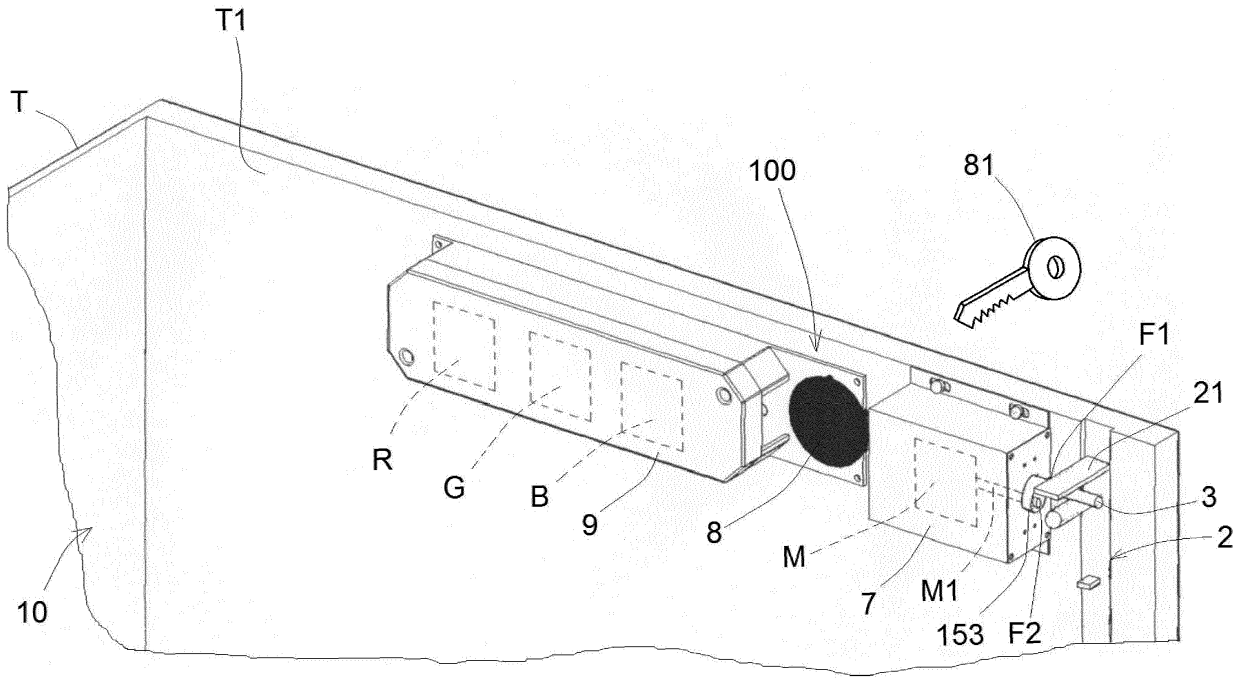

FIG. 4

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Description

[0001] The present patent application for industrial invention relates to a locking assembly with security device for the manual unlocking of door panels or drawers.

[0002] Although in the following description reference is made to a piece of furniture comprising a set of drawers that are slidingly mounted relative to a frame of the piece of furniture, it is understood that the locking assembly according to the invention can also be used for pieces of furniture with tilting or sliding panel doors.

[0003] For the sake of clarity, the description of the piece of furniture according to the prior art continues with reference to the following figures, wherein:

Fig.1 is an axonometric view of a piece of furniture according to the prior art, wherein a portion of said piece of furniture is omitted to show the interior of the piece of furniture;

Figs.2 and 3 are sectional views of a detail of the locking assembly of the piece of furniture according to the prior art, respectively in locking position and unlocking position.

[0004] With reference to Figs. 1 to 3, a piece of furniture according to the prior art is disclosed, which is generally indicated with reference numeral (10).

[0005] The piece of furniture (10) comprises a frame (T) and drawers (11) that are slidingly mounted relative to the frame (T), in such a way to be disposed in open position and in closed position.

[0006] More precisely, the drawer (11) is provided with carriages (not shown in the figures) that are slidingly mounted on slides fixed to the lateral walls of the frame (T).

[0007] The piece of furniture (10) is provided with a locking assembly (1) for automatically and simultaneously locking/unlocking the drawers (11).

[0008] With reference to Fig.1, the locking assembly (1) comprises a latch (2) that is slidingly mounted relative to the frame (T) in order to travel along a sliding axis (Y) from a locking position, as shown in Fig. 2, wherein the latch (2) locks the drawers (11) in locking position, to an unlocking position, as shown in Fig. 3, wherein the latch (2) permits the free movement of the drawers (11).

[0009] The latch (2) comprises teeth (2a) suitable for being inserted into housings that are suitably obtained on the drawers (11) to lock the drawers (11) in closed position.

[0010] The locking assembly (1) comprises an actuation arm (3) with a longitudinal axis (X) that is orthogonal to the sliding axis (Y) of the latch. The actuation arm (3) cooperates with the latch (2) and moves the latch (2) between its two locking/unlocking positions. The latch (2) comprises a striking element (21) against which the actuation arm (3) is engaged.

[0011] The locking assembly (1) advantageously comprises two position sensors (not shown in the figures) suitable for detecting the locking/unlocking position of the latch (2).

[0012] The locking assembly (1) comprises an electrical motor (M) that is powered by means of power supply means (B), such as for example a battery, or directly from the electrical mains.

[0013] The locking assembly (1) comprises a support (153) connected to the electrical motor (M) on one side and to the actuation arm (3) on the other side. The actuation arm (3) is eccentrically fixed on the support (53), whereas the shaft of the electrical motor (M) is fixed at the center of the support (53).

[0014] The support (53) rotates in such a way that the actuation arm (3) can make revolutions, going from a raised position (as shown in Fig. 2), wherein the actuation arm (3) keeps the latch (2) in locking position, to a lowered position (as shown in Fig. 3), wherein the actuation arm (3) permits the free fall by gravity of the latch (2) to the unlocking position.

[0015] With reference to Fig. 1, the locking assembly (1) comprises a management and control unit (G) used to manage and control the electrical motor.

[0016] The locking assembly (1) advantageously comprises a receiver (R) connected to the management and control unit (G), as well as a remote control coupled with the receiver (R) in order to send a control signal to the receiver in wireless mode and actuate the electrical motor. Advantageously, the proximity between the remote control and the receiver (R) can be detected without the need for the user to activate the remote control manually.

[0017] When the management and control unit (G) receives an opening signal, the management and control unit (G) enables the power supply of the electrical motor (M), which transmits the motion to the support (53) for actuating the actuation arm (3), in such a way that the actuation arm (3) is brought to a lowered position. Consequently, the latch (2) falls by gravity to its unlocking position and opens the locks of the drawers (11).

[0018] The locking assemblies of the prior art are impaired by a first drawback, which consists in the fact that the drawers or the door panels cannot be opened in case of an electrical blackout or if the battery is dead.

[0019] Moreover, the locking assemblies of the prior art are impaired by a second drawback, which consists in the fact that, because of its disc-like shape, the support has a large volume in transverse direction (i.e. along an orthogonal direction relative to the axis of the actuation arm). Such a large volume of the support generates problems during the installation of the locking assembly especially when said locking assembly is to be installed on existing chests of drawers where the locking assembly is housed in a very small space.

[0020] US4633688 discloses a lock device comprising an electrically operable lock unit having an electric lock. The lock unit is arranged displacably within a surrounding casing, together with a manually and key operable lock mechanism. The electrically operable lock unit can be moved between two positions in relation to the casing:

in a first position, the lock unit permits the lock bolts to be electrically moved relative to a striking plate and in a second position the lock unit prevents the lock bolts from being engaged with the striking plate.

[0021] The purpose of the present invention is to overcome the drawbacks of the prior art by disclosing a locking assembly that can be unlocked also in case of a power failure.

[0022] Another purpose is to disclose a locking assembly with a reduced volume in transverse direction, which is inexpensive, reliable and easy to make and use.

[0023] An additional purpose of the present invention is to disclose a piece of furniture comprising said locking assembly and comprising drawers or door panels, which can be opened also in case of a power failure.

[0024] These purposes are achieved according to the invention with the characteristics of the appended independent claim 1.

[0025] Advantageous embodiments appear from the dependent claims.

[0026] The locking assembly of the invention is defined by the independent claim 1.

[0027] The advantages of the locking assembly according to the invention are manifest because the box is slidingly mounted relative to the frame and the provision of the manual security device permits to unlock the latch when the electrical motor cannot be actuated because of a power failure.

[0028] For the sake of clarity, the description of the locking assembly and of the piece of furniture provided with a locking assembly according to the invention continues with reference to the appended drawings, which have a merely illustrative, not limiting value, wherein:

Fig. 1 is an axonometric view of a piece of furniture according to the prior art, wherein a portion of said piece of furniture is omitted to show the interior of the piece of furniture;

Figs. 2 and 3 are sectional views of a detail of the locking assembly of the piece of furniture according to the prior art, respectively in locking position and unlocking position;

Fig. 4 is an axonometric view of the locking assembly according to the invention;

Fig. 5 is an axonometric view of a portion of the locking assembly of Fig. 4 seen from a different angle.

[0029] In the following description the parts that are identical or correspond to the parts described above are identified with the same numerals, omitting their detailed description.

[0030] With reference to Figs. 4 and 5, the locking assembly according to the invention is disclosed, which is generally indicated with reference numeral (100).

[0031] The locking assembly (100) comprises a box (7) with parallelepiped shape, which houses the electrical motor (M) used to actuate the actuation arm (3). The box (7) is slidingly mounted to the same side (T1) of the box (T) of the piece of furniture where the latch (2) is mounted. A support (153) is connected to the shaft (M1) of the electrical motor (M). The support (153) and the actuation arm (3) that are connected to the support (153) project from the box (7) towards the latch (2).

[0032] The electrical motor (M) is fixed to the box (7). Moreover, the support (153) is integral with the shaft (M1) of the electrical motor (M) and the actuation arm (3) is integral with the support (153). In view of the above, the assembly formed by the electrical motor (M), by the support (153) and by the actuation arm (3) translates integrally with the box (7).

[0033] More precisely, the box (7) comprises one or more slots (70) with a longitudinal axis that is parallel to the axis (X) of the actuation arm (3). The box (7) is connected to the side (T1) of the frame (T) by means of screws (V) disposed inside the slots (70). In view of the above, the box (7) can translate along an axis that is parallel to the axis of the actuation arm (3), going from a proximal position relative to the latch (2), wherein the actuation arm (3) can cooperate with the latch (2) and move the latch (2), to a distal position, wherein the actuation arm (3) cannot cooperate with the latch (2).

[0034] In ordinary operating conditions, the box (7) is firmly held in the proximal position, in such a way that the actuation arm (3) can interact with the striking element (21) of the latch (2) and move the latch (2) in order to permit/prohibit the opening of the drawers or of the door panels.

[0035] The locking assembly (100) comprises a manual security device (8) connected to the box (7), which makes the box (7) translate from the proximal position to the distal position.

[0036] The manual security device (8) comprises a lock (80) of known type, which can be actuated by means of a key (81). The lock (80) is fixed on the same side (T1) where the box (7) is connected. More precisely, the lock (80) is mounted on the interior of said side (T1), where a through hole is provided, in such a way that a keyhole of the lock (80), which is suitable for receiving the key (81), is faced towards the exterior of the side (T1) of the frame (T).

[0037] The lock (80) comprises a latch (82) that slides along an axis parallel to the axis (X) of the actuation arm (3).

[0038] The security device (8) comprises a connection coupling (83) between the latch (82) and the box (7). Preferably, said connection coupling (83) consists in an "L"-shaped bracket, having a first side fixed to the latch (82) of the lock (80), and a second side fixed to the wall of the box (7).

[0039] Advantageously, the connection coupling (83) is fixed to the box (7) and to the latch (82) of the lock (80) by means of screws (V1). In view of the above, by actuating the lock (80) with the key (81), the latch (82) of the lock (80) slides and makes the box (7) slide from the proximal position to the distal position. When the actuation arm (3) is brought to the distal position relative to the

latch (2), the latch (2) tends to move to the unlocking position by gravity, thus permitting the free opening of the door panels or of the drawers (11).

[0040] It must be noted that the box (7) is firmly maintained in its two end-of-travel positions by the latch (82) of the lock (80), which is ejected or retracted by the retention means contained in the lock (80), which interact with the key (81) of the lock (80).

[0041] Because of the fact that the box (7) is slidingly mounted relative to the frame (T) and because of the provision of the manual security device, the latch (2) can be unlocked also when the electrical motor (M) cannot be actuated because of a power failure.

[0042] Advantageously, with reference to Fig. 4, the locking assembly (100) comprises an additional box (9) fixed to the side (T1) of the frame (T), which houses the power supply means (B), the management and control unit (G) and the receiver (R).

[0043] Finally, it must be noted that according to the improved locking assembly (100) of the invention, the support (153) is an elliptical plate, where the actuation arm (3) is disposed in projecting position. The support (153) shaped like an elliptical plate is mounted at the end of the shaft (M1) of the electrical motor (M). More precisely, the actuation arm (3) is mounted in one focus (F1) of the elliptical support (153), whereas the elliptical support (153) is coupled with the shaft (M1) in the other focus (F2). The provision of such a constructive solution permits to reduce the volume in transverse direction (along a direction that is orthogonal to the axis of the actuation arm (Y)) of the locking assembly formed by the support (153) and the actuation arm (3). Such a volume reduction is extremely useful when the locking assembly (100) is to be installed in existing pieces of furniture, where the locking assembly (100) is to be housed in a small space.

[0044] Although it is not shown in the figures, the locking assembly (100) can advantageously comprise signaling devices to signal the status of the locking assembly. For example, the signaling devices can be LEDs that indicate the locking/unlocking position of the latch or the charge level of the power supply means (B).

[0045] Alternatively to the key, the lock can be actuated with other non-electric manual actuation means, such as a button.

[0046] Numerous variations and modifications can be made to the present embodiment of the invention, which are within the reach of an expert of the field, falling in any case within the scope of the invention as disclosed by the appended claims.

Claims

1. Locking assembly (100) for pieces of furniture (10), comprising:

- a latch (2) used to lock drawers (11) or panel doors of the piece of furniture (10) in closed position; said latch (2) being suitable for being slidingly mounted on one side (T1) of a frame (T) of the piece of furniture (10);
- an actuation arm (3) suitable for being engaged against a striking element (21) of the latch (2) in order to actuate the latch (2), in such a way that said latch (2) is in a locking position, wherein it locks the drawers (11) or the door panels in closed position, and in an unlocking position, wherein it permits the free movement of the drawers (11) or door panels;
- a support (153) from where the actuation arm (3), which is integral with the support (153), projects;
- an electrical motor (M) comprising a shaft (M1) to which the support (153) is fixed, in such a way that said support (153) is integral with the shaft (M1) of the electrical motor (M);
- a management and control unit (G) for managing and controlling the electrical motor (M);
- a box (7) that houses the electrical motor (M), in such a way that the electrical motor (M) is integral with the box (7); said box (7) being suitable for being slidingly mounted in the interior of the side (T1) of the frame (T) of the piece of furniture;
- a manual security device (8) connected to the box (7) to make the box (7) slide;

characterized in that:

the actuation arm (3) projects from the box (7) towards the latch (2);
the manual security device (8) is configured in such a way to make the box (7) slide from a proximal position relative to the latch (2) to a distal position relative to the latch (2).

2. The locking assembly (100) of claim 1, wherein the security device (8) comprises a lock (80) comprising a latch (82) connected to the box (7) and sliding along an axis parallel to the axis (X) of the actuation arm (3).

3. The locking assembly (100) of claim 2, wherein the security device (8) comprises a connection coupling (83) between the latch (82) of the lock (80) and the box (7).

4. The locking assembly (100) of claim 3, wherein said connection coupling (83) consists in an "L"-shaped bracket, having a first side fixed to the latch (82) of the lock (80), and a second side fixed to the wall of the box (7).

5. The locking assembly (100) of claim 3 or 4, wherein the connection coupling (83) is fixed to the box (7) and to the latch (82) of the lock (80) by means of screws (V1).

6. The locking assembly (100) of any one of claims 2 to 4, wherein said lock (80) comprises a keyhole directed towards the exterior of the side (T1) of the frame (T), which is suitable for receiving a key (81).

7. The locking assembly (100) of any one of the preceding claims, wherein the box (7) comprises one or more slots (70) having a longitudinal axis that is parallel to the axis (X) of the actuation arm (3); said box (7) being suitable for being connected to the side (T1) of the frame (T) by means of screws (V) disposed inside the slots (70).

8. The locking assembly (100) of any one of the preceding claims, wherein the support (153) is an elliptical plate; said actuation arm (3) being mounted in a focus (F1) of the elliptical support (153); said shaft (M1) of the electrical motor (M) being coupled to the support (153) in the other focus (F2).

9. Piece of furniture (10) comprising:

- a frame (T) comprising one side (T1);
- panel doors or drawers (11) connected to the frame (T1);
- a locking assembly (100) according to any one of the preceding claims for automatically and simultaneously locking/unlocking the door panels or drawers (11); said latch (2) being slidingly mounted in the interior of the side (T1) of the frame (T) of the piece of furniture (10) and comprising teeth (2a) suitable for being inserted into housings that are suitably obtained on the drawers (11) to lock the drawers (11) in closed position; said box (7) being slidingly mounted on the side (T1) of the frame (T).

10. The piece of furniture (10) of claim 9, wherein said security device (8) is provided with a lock (80) that can be operated by means of a key (81); said lock (80) being mounted on the interior of said side (T1), whereon a through hole is provided, in such a way that a keyhole of the lock (80), which is suitable for receiving the key (81), is faced towards the exterior of the side (T1) of the frame (T).

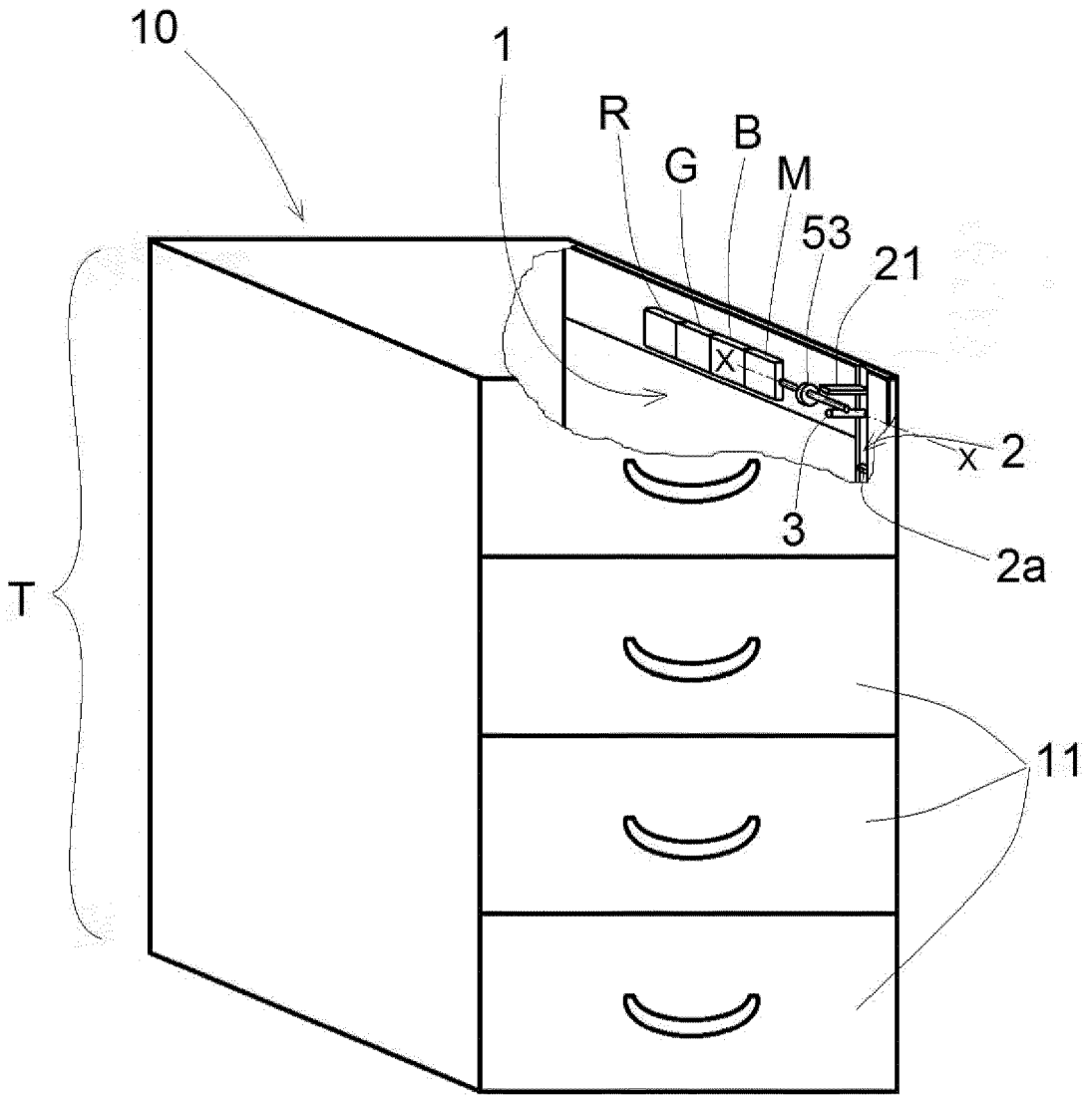

FIG. 1
PRIOR ART

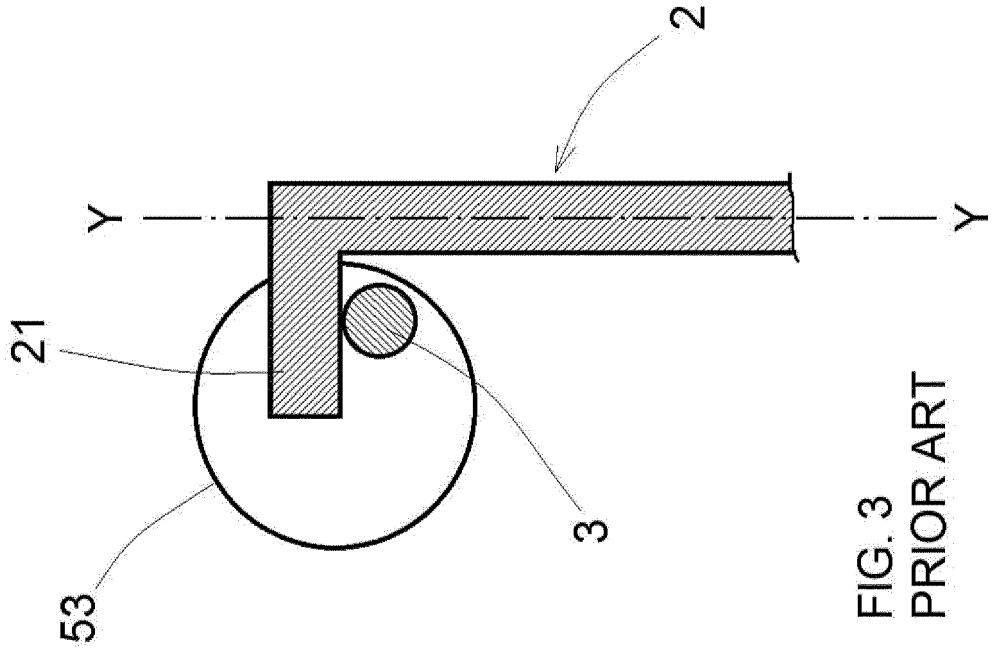

FIG. 3
PRIOR ART

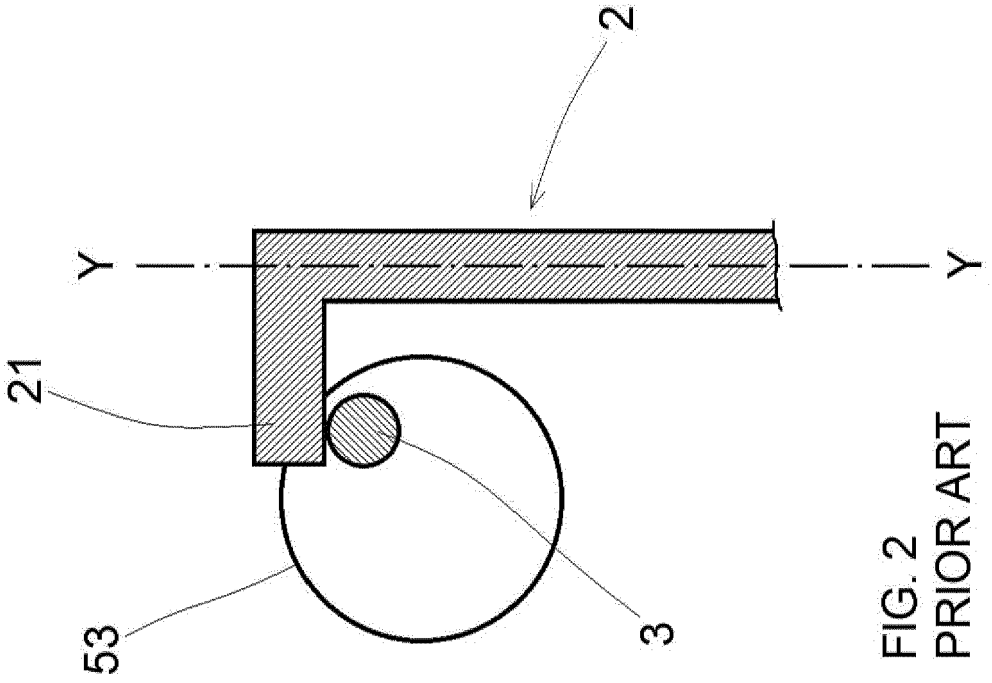

FIG. 2
PRIOR ART

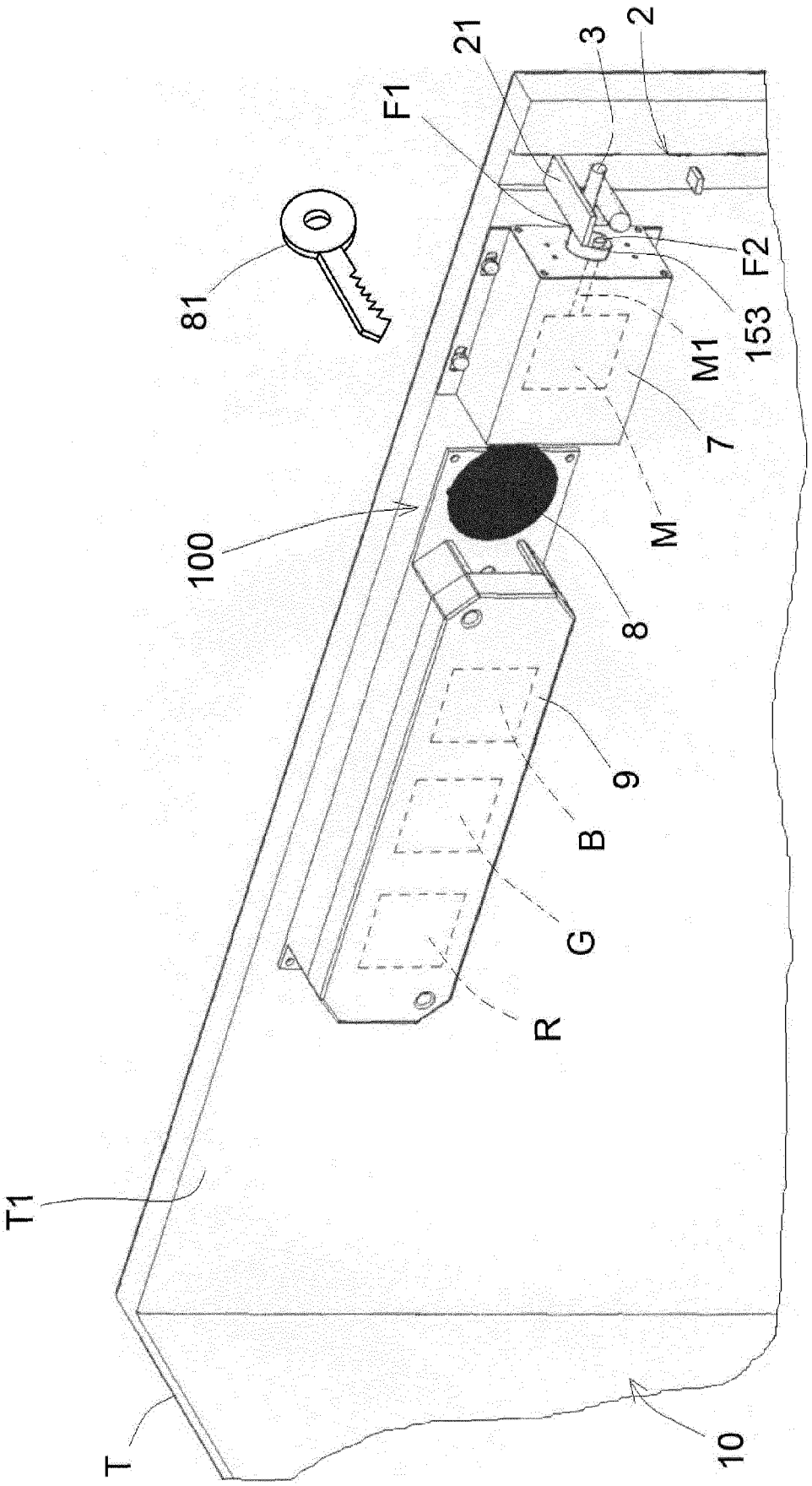

FIG. 4

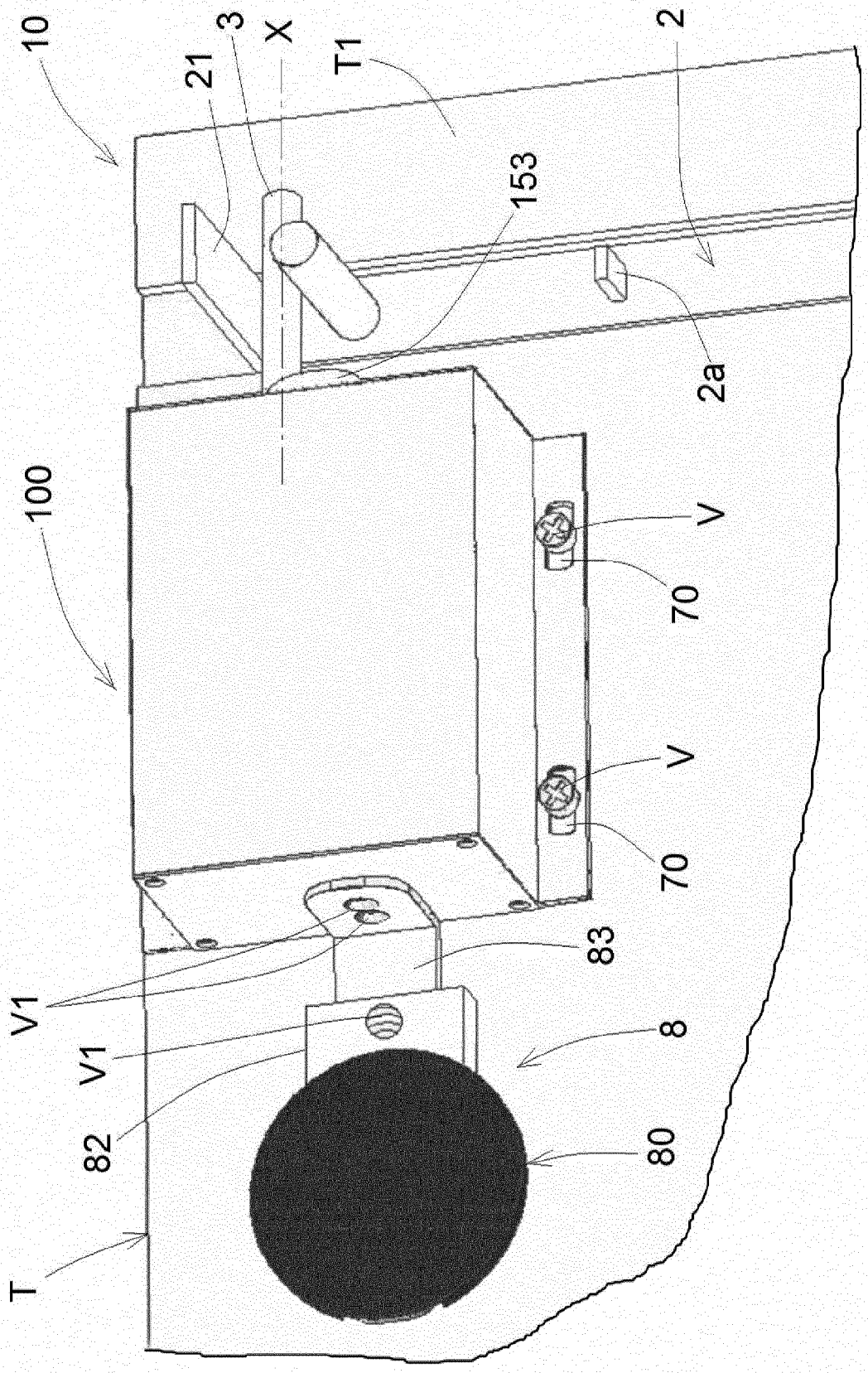

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 July 2019	Antonov, Ventseslav

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EUROPEAN SEARCH REPORT

Application Number
EP 19 15 9961

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Place of search	Date of completion of the search	Examiner
The Hague	12 July 2019	Antonov, Ventseslav

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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