(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 231 970 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
18.10.2017 Bulletin 2017/42

(51) Int Cl.:
E05B 83/12 *(2014.01)* ***E05B 77/46*** *(2014.01)*

(21) Application number: **17000562.3**

(22) Date of filing: **04.04.2017**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **12.04.2016 NL 1041813**

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(54) LOCKING SYSTEM FOR DOOR LEAVES OR WINDOW LEAVES OF A VEHICLE

(57) Vehicle comprising a system for locking the door leaf or window leaf, wherein the system comprises:
- a primary locking device 23 and a secondary locking device 40,
wherein the primary locking device 23 comprises a first locking member 31 and a second locking member 33 cooperating therewith, and wherein the secondary locking device 40 comprises a third locking member 41 and a fourth locking member 44 cooperating therewith, wherein the second locking member 33, the third locking member 41 and the secondary operation device 35,37,38,36,43 are arranged on the door leaf or window leaf and the first locking member 31 is placed such that in its displacement towards the locking position it engages onto the secondary operation device in order to activate the latter.

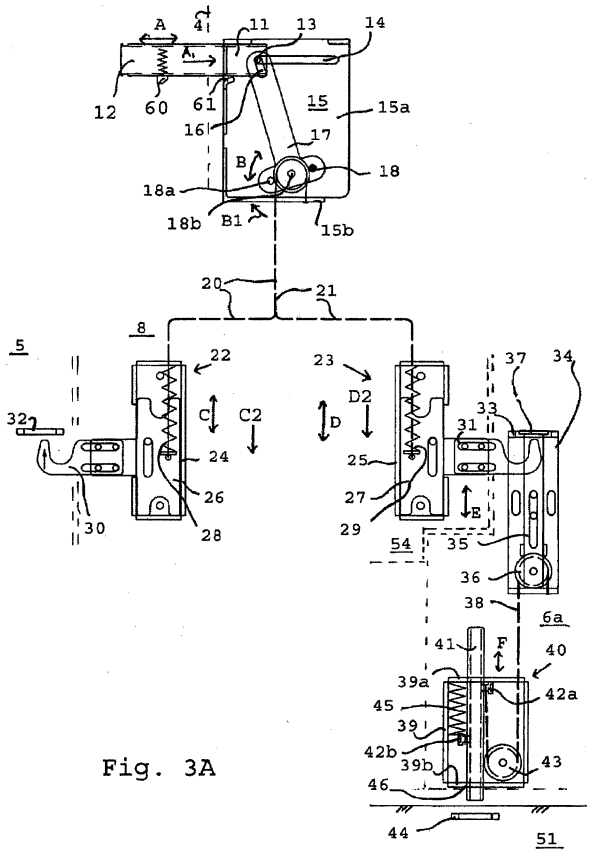


Fig. 3A

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Description

BACKGROUND OF THE INVENTION

[0001] The invention relates to a system for locking a door leaf or window leaf of a cargo space of a vehicle, in particular a door leaf or window leaf of a commercial vehicle. The invention further relates to a vehicle provided with such a system.

[0002] Commercial vehicles (including delivery vans) are often used in maintenance and installation jobs. The cargo space of such vehicles is accessible via at least one rear door, such as via a swing door having an overhead hinge or a single door or double doors provided with side hinges. Optionally a sliding door may have been provided on one side or both sides. In some cases, a window that can be opened has also been provided.

[0003] The cargo space is used for storage of tools, materials and other facilities that may be required for the job to be carried out. The tools and other objects in the cargo space can be rather valuable, and therefore potentially be the subject of theft. Burglars usually attempt to gain access to the car by forcing the side door or the rear door open. In order to prevent this, various types of locking systems have been designed.

[0004] In a known locking system, the locking of one or more doors is realised centrally, from the cabin of the vehicle. By operating a slide to be released by a lock, parallel cables can be pulled for operating respective locking hooks mounted to a casing member in question and movable by the cable between a release position and a locking position, engaging in a locking eye at the door leaf or window leaf in question. In that way, a locking hook for a side door and a locking hook for a rear door can for instance be operated simultaneously.

[0005] It may be desirable to lock a relatively large door leaf at several locations, such as at a lateral side and at a bottom side or a top side, depending on how the door or the window opens. In connection with limited space available in the casings surrounding the door or the window, it may then be required to incorporate the movable locking member in the door leaf or window leaf, in particular when it must be possible to lock the door leaf to a sill or lintel. For operating said locking member the cable will need to make a crossing from casing to door leaf. However, this can be troublesome to personnel. The cable can furthermore be prone to damage when loading or unloading tools and material or when closing the door or the window.

SUMMARY OF THE INVENTION

[0006] It is an object of the invention to provide a multiple locking system for a door or a window of a vehicle provided with a confined cargo space, in particular a commercial vehicle.

[0007] It is an object of the invention to provide a safe multiple locking system for a door or a window of a vehicle provided with a confined cargo space, in particular a commercial vehicle.

[0008] It is an object of the invention to provide a multiple locking system for a door or a window of a vehicle provided with a confined cargo space, in particular a commercial vehicle, which system is not failure-prone.

[0009] According to one aspect the invention provides a vehicle, in particular a commercial vehicle, provided with a confined cargo space, having at least one door leaf or window leaf bounding the cargo space, the vehicle comprising a system for locking the door leaf or window leaf, wherein the system comprises:

- a primary locking device and a secondary locking device,

wherein the primary locking device comprises a first locking member and a second locking member cooperating therewith, wherein the first locking member can be displaced relative to the second locking member between a release position, in which the primary locking device does not impede opening the door leaf or window leaf, and a locking position, in which this is indeed impeded, and comprises a primary operation device for displacing the first locking member between the release position and the locking position, and

wherein the secondary locking device comprises a third locking member and a fourth locking member cooperating therewith, wherein the third locking member can be displaced relative to the fourth locking member between a release position, in which the secondary locking device does not impede opening the door leaf or window leaf, and a locking position, in which this is indeed impeded, and a secondary operation device for displacing the third locking member between the release position and the locking position,

wherein the second locking member, the third locking member and the secondary operation device are arranged on the door leaf or window leaf and the first locking member is placed such that in its displacement towards the locking position it engages onto the secondary operation device in order to activate the latter (for displacing the third locking member to the locking position).

[0010] The primary and the secondary operation device are therefore situated in series with each other. The first locking member, as it were, crosses the slit space between carriage work and door leaf or window leaf and forms part of the operation of the third lock, so that a cable crossing the said slit can be dispensed with.

[0011] In a simple embodiment, the secondary operation device comprises a stop extending into the path of the first locking member, which path is followed by the first locking member during its displacement towards its locking position, in order to be taken along in said displacement by it so as to displace the third locking member to its locking position.

[0012] The primary and/or secondary operation device may comprise a primary cable and a secondary cable,

respectively, or something similar. The cable in question may be a Bowden cable.

[0013] The secondary operation device may comprise one or more pulleys for the secondary cable, as a result of which the stroke for the third locking member can be increased relative to the stroke of the first locking member and play in the cable(s), in particular Bowden cable(s), does not cause a disadvantageous limitation in the displacement of the third locking member.

[0014] This may involve one of the pulleys being connected to the said stop in order to be displaced as a unit by the first locking member and/or one of the pulleys can be arranged on the door leaf or window leaf so as to be stationary.

[0015] The first and third locking members may each comprise a hook or a pin and the second and fourth locking members may comprise a lock accommodation for said hook or pin. In a simple embodiment, the first locking member and/or the third locking member can be displaced linearly between the release position in question and the locking position in question. The lock accommodation may be configured like a bowl or a ring.

[0016] The first locking member and/or the fourth locking member may be arranged on a casing surrounding the door leaf or window leaf in question.

[0017] The fourth locking member may be situated in a door casing or window casing (that means a horizontal member of the door casing or window casing), in particular the door sill or window sill. Said locking member is passive and requires little space.

[0018] The door leaf may be configured like a swing door having an overhead hinge, like a swing door having a bottom hinge, like a single door having a side hinge or like one of the doors of double doors having a side hinge.

[0019] According to a further aspect, the invention provides a locking system apparently suitable and intended to be built into a vehicle according to the invention.

[0020] The aspects and measures described in this description and the claims of the application and/or shown in the drawings of this application may where possible also be used individually. Said individual aspects may be the subject of divisional patent applications relating thereto. This particularly applies to the measures and aspects that are described per se in the sub claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The invention will be elucidated on the basis of an exemplary embodiment shown in the attached drawings, in which:

Figures 1A and 1B show a schematic side view of a commercial vehicle provided with an exemplary embodiment of a locking system according to the invention, in opened condition of a side door and a rear door and in a closed, locked condition of said doors;
Figures 2A and 2B provide a schematic view of the rear door of the commercial vehicle of figures 1A and 1 B; and
Figures 3A and 3B schematically show the rear door of figures 2A,B in the release position and in the locking position, respectively.

DETAILED DESCRIPTION OF THE DRAWINGS

[0022] The commercial vehicle 1 in figures 1A,B and 2A,B has a cabin 2 and a confined cargo space 3, separated from one another by a partition 4. The cargo space 3 is accessible via a sliding door 5 incorporated in the sidewall and via a pair or rear doors 6a,b. The rear doors 6a,b are connected to respective posts 52a,b (figure 2A) and 7a of rear door casing 7 so as to hinge about nearly vertical axes. The sliding door 5 and the rear doors 6a, b form door leaves and can be locked in the usual manner using door locks that are operated from the outside, which door locks are partially arranged on handles 55 and 56.

[0023] For additional security against theft from the cargo space 3, a locking system 10 is mounted in the commercial vehicle 1. The locking system 10, further shown in figure 3A, comprises an operation slide 11 having a cylinder lock 12 that is provided with a spring-loaded bolt 60. The operation slide 11 can be reciprocally moved in directions A and is slidably accommodated in those directions in a guide bush of hardened steel, which guide bush is attached to the partition and extends through it, and is not shown here. At the other end, the operation slide 11 is provided with a transverse pin 13 which with its ends can be shifted in slots 14 in two walls 15a of a case 15 mounted on the partition 4. The transverse pin 13 extends in a slot 16 of a lever 17 which at the location of a pivot pin 18 is attached to the walls 15 so as to be rotatable in directions B. Near the pivot pin 18 a pulley 19 is arranged at the lever 17, around which pulley two Bowden cables 20 and 21 have been placed, in a parallel manner. With their outer ends, the cables 20 and 21 are attached to a bottom plate 15b of the case 15. Alternatively, instead of using a pulley 19 and attaching the cables 20, 21 to the bottom plate 15b, it can be opted for to attach the cables 20, 21 directly to the lever 17, spaced apart from the pivot pin 18, such as at locations 18a, or 18b, depending on the wanted travel for the cable in question. The case 15 is furthermore provided with a fixed bolt stop 61.

[0024] Along the interior of the carriage work, the cables 20 and 21 have been passed to locking device 22 and (primary) locking device 23, for the sliding door 5 and the rear door 6a, respectively. The locking devices 22 and 23 each comprise a case 24, 25, that are attached in sliding door post 8 and in lintel 54, respectively. Slides 26, 27 are accommodated in the cases 24, 25, which slides are capable of reciprocally sliding in there in directions C,D. Compression springs 28, 29 are active between the cases and the slides 26, 27 and bias the slides 26, 27 in directions C2,D2 into a release position. Locking hooks 30, 31 are attached to the slides 26, 27, which locking hooks in the locking position engage into ring-

shaped or bowl-shaped locking members 32, 33 so as to lock the door, which locking members are attached in the door leaf 5, 6a in question so as to be stationary. The locking hook 31 forms a first locking member and the locking member 33 forms a second locking member. The operation slide 11, the lever 17, the cable 21 and the slide 25 are part of a primary operation device for the primary locking device 23.

[0025] As can be seen in figures 2A,B the casing further comprises sill 51 and lintel 54. The usual bumper 53 is situated behind (in the drawing in front of) the sill 51. It can be seen that the cable 21 runs from the right-hand side of the casing 7 along the inside of the lintel 54 towards the case 25 attached to the inside of the lintel 54. Opposite the case 25 the locking ring 33 is attached to the closing side of the door 6a. It is noted that the drawings are schematic, for reasons of clarity the case 25 is depicted vertically in figures 1A and 1B.

[0026] Referring to figure 3A, the part of the locking system accommodated in the door 6a will now be elucidated. The locking ring 33 active as second locking member, forms one unity with a plate 34 attached in the door 6, on which plate a slide 35 is mounted that can be reciprocally shifted along the plate 34 in directions E. At one end (the upper end as seen in figure 3A) the slide 35 has a stop (plate) 37, which has such a shape and such dimensions that it is capable of moving through the opening of the locking ring 33. The stop 37 is situated in the movement path of the outer end of the locking hook 31, when, in the closed position of the door 6a, it extends over the slit between door 6a and lintel 54. At the other end the slide 35 supports a pulley 36 for a Bowden cable 38, an outer end of which is attached to the other end of the plate 35. The cable 38 turns about the pulley 38, over 180 degrees.

[0027] As can be seen in figure 2A the cable 38 in the door 6 runs downwards, towards a (secondary) locking device 40. It comprises a case 39, also see figure 3A, mounted in the door 6 near the bottom edge thereof. In the case 39, a pulley 43 for the cable 38 is attached in a manner so as to be stationary with the door 6a. The cable 38 turns over 180 degrees about the pulley 43 and with the outer end is attached, for instance by a screw bolt 42a, to a locking pin 41 (third locking member) accommodated in the case 40, so as to be moveable up and down (directions F). At the location of 42b a draw spring 45 is attached to the locking pin 41, which draw spring 45 is attached to an upper wall 39a of the case 39. The locking pin 41 extends in a fitting manner through a hole 46 in a bottom wall 39b of the case 39, in line with and above a locking ring (fourth locking member) 44 that is attached in the sill 51 so as to be stationary. The slide 35 including stop 37, cable 38 and pulleys 36 and 43 are part of a secondary operation device for the secondary locking device 40.

[0028] When it is desired to lock the doors 5 and 6a (and therewith also door 6b), the operator in the cabin 2 pushes the slide 11 in the direction A1, see figure 3B. This results in the transverse pin 13 also being moved in the direction A1, due to which the lever 17 is rotated in the direction B1 about pin 18. As a result the cables 20 and 21 are being tightened, and the slides 26 and 27 in the cases 24 and 25 are being pulled upwards, directions C1,D1, counter the action of the compression springs 28, 29. As a result, the hooks of the locking hooks 30, 31 enter the openings of the locking rings 32, 33.

[0029] When urging the locking hook 31 in direction D1, the tip of the hook contacts the stop 37 at slide 35, and when urging the locking hook onwards in direction D1 the tip of the hook will displace the stop 37 through locking ring 33 and as a consequence take along the slide 35 and as a consequence the pulley 36 as well. In that way, the part of the cable 38 between the cable end attached to the slide 35 and the pulley 36 is extended. This also goes for the cable part between the pulleys 36 and 43, so that displacement of said cable part is twice as long as the displacement of the slide 35. Said double displacement distance is imposed to the locking pin 41 by the cable 38, which locking pin is urged downwards in the direction F1, counter the operation of the spring 45, in order to cross the slit between door leaf 6 and sill 51 and extend in the locking ring 44.

[0030] The pushed in position of the slide 11 (figure 3B) is blocked by the (spring-loaded) bolt 60 ejecting behind the bolt stop 61, as a result of which the position of the slides 26, 27 is secured as well and, as a consequence, so is the locking position of the locking hooks 30, 31. Due to the secured position of the locking hook 31 the position of the slide 35 is also secured, and via the cable 38 the locking pin 41 is retained in the locking ring 44.

[0031] When the operator wants to end the locking again, he operates the lock 12 by turning the key in order to retract the bolt 60, counter the spring action, and for thus enabling the slide 11 to return (direction A2). The tension in the cables 20, 21 is released so that the lever 17 is able to rotate back again about pivot pin 18 in direction B2 and the slides 26 and 27 are able to move back again, assisted by the springs 28, 29, in order to free the locking hooks 30, 31 again from the locking rings 32, 33. As a consequence the slide 35 is also able to move to the initial position and the locking pin 41 can be retracted again, assisted by draw spring 45, in order to free the locking pin 41 from the locking ring 44.

[0032] It can be seen that the door (in the example door 6a) is locked at two locations (additionally relative to the door lock 56), invisible from the outside. The primary and secondary locking devices (in the example 23 and 40) are positioned in series and the locking member (in the example locking hook 31) of the primary locking device is part of the operation of the third locking member (in the example locking pin 41) of the secondary locking device. The cable ensuring the operation of the third locking member remains outside of the transition between door and casing, as is clearly shown in figure 1A.

[0033] The invention is/inventions are not at all limited

to the embodiments discussed in the description and shown in the drawings. The above description is included to illustrate the operation of preferred embodiments of the invention and not to limit the scope of the invention. Starting from the above explanation many variations that fall within the spirit and scope of the present invention will be evident to an expert. Variations of the parts described in the description and shown in the drawings are possible. They can be used individually in other embodiments of the invention(s). Parts of the various examples given can be combined.

Claims

1. Vehicle, in particular a commercial vehicle, having a confined cargo space and at least one door leaf or window leaf bounding the cargo space, the vehicle comprising a system for locking the door leaf or window leaf, wherein the system comprises:

   - a primary locking device and a secondary locking device,

   wherein the primary locking device comprises a first locking member and a second locking member cooperating therewith, wherein the first locking member can be displaced relative to the second locking member between a release position, in which the primary locking device does not impede opening the door leaf or window leaf, and a locking position, in which this is indeed impeded, and comprises a primary operation device for displacing the first locking member between the release position and the locking position, and
   wherein the secondary locking device comprises a third locking member and a fourth locking member cooperating therewith, wherein the third locking member can be displaced relative to the fourth locking member between a release position, in which the secondary locking device does not impede opening the door leaf or window leaf, and a locking position, in which this is indeed impeded, and comprises a secondary operation device for displacing the third locking member between the release position and the locking position,
   wherein the second locking member, the third locking member and the secondary operation device are arranged on the door leaf or window leaf and the first locking member is placed such that in its displacement towards the locking position it engages onto the secondary operation device in order to activate the latter.

2. Vehicle according to claim 1, wherein the secondary operation device comprises a stop extending into the path of the first locking member, which path is followed by the first locking member during its displacement towards its locking position, in order to be taken along in said displacement by it.

3. Vehicle according to claim 1 or 2, wherein the secondary operation device comprises a secondary cable or something similar.

4. Vehicle according to claim 3, wherein the secondary operation device comprises one or more pulleys for the secondary cable.

5. Vehicle according to claim 2 and claim 4, wherein one of the pulleys is connected to the stop in order to be displaced as a unit therewith by the first locking member.

6. Vehicle according to claim 4 or 5, wherein one of the pulleys is arranged on the door leaf or window leaf so as to be stationary.

7. Vehicle according to any one of the preceding claims, wherein the first locking member comprises a hook or a pin and the second locking member comprises a lock accommodation for the hook or pin.

8. Vehicle according to any one of the preceding claims, wherein the third locking member comprises a hook or a pin and the fourth locking member comprises a lock accommodation for the hook or pin.

9. Vehicle according to any one of the preceding claims, wherein the first locking member and/or the fourth locking member are arranged on a casing surrounding the door leaf or window leaf in question.

10. Vehicle according to claim 9, wherein the fourth locking member is situated in a horizontal member of the door casing or window casing, in particular the door sill or window sill.

11. Vehicle according to any one of the preceding claims, wherein the primary operation device comprises a primary cable or something similar, wherein, preferably, the primary operation device comprises one or more pulleys for the primary cable.

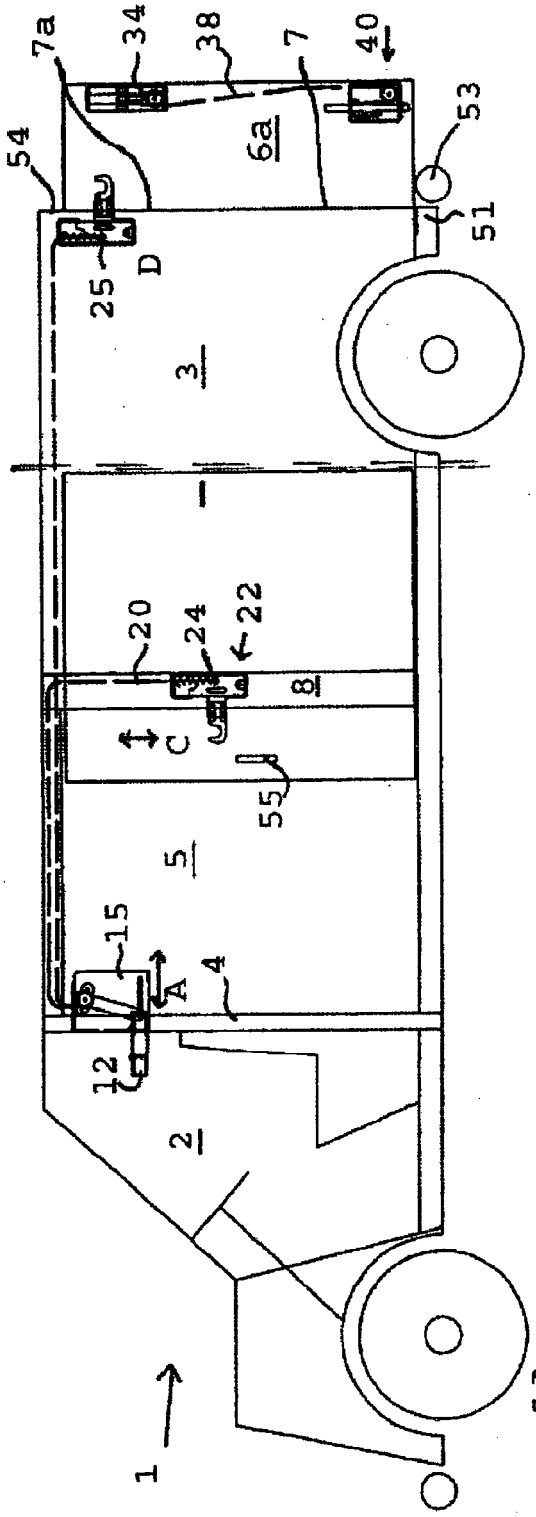
12. Vehicle according to any one of the preceding claims, wherein the locking system is intended for locking a door leaf that is capable of hinging about a horizontal hinge axis situated overhead.

13. Vehicle according to any one of the preceding claims, wherein the primary operation device is configured for a linear displacement of the first locking member.

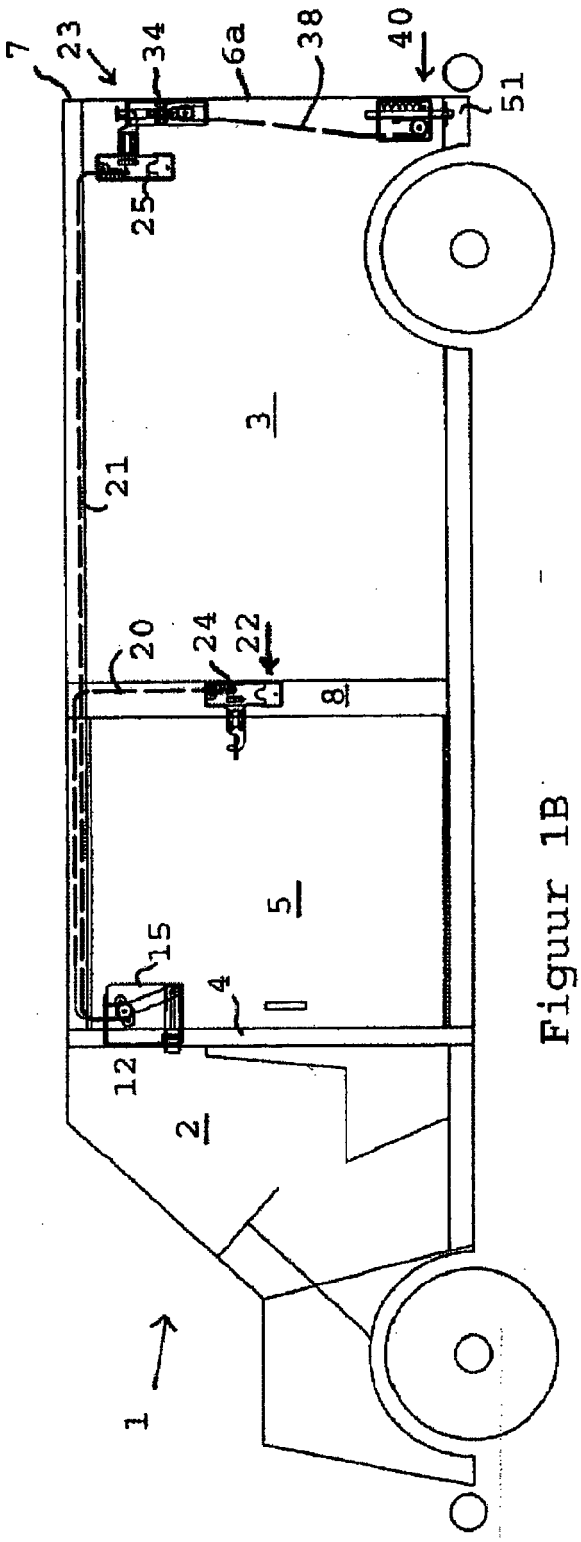
14. Vehicle according to any one of the preceding claims, wherein the secondary operation device is

configured for a linear displacement of the third locking member.

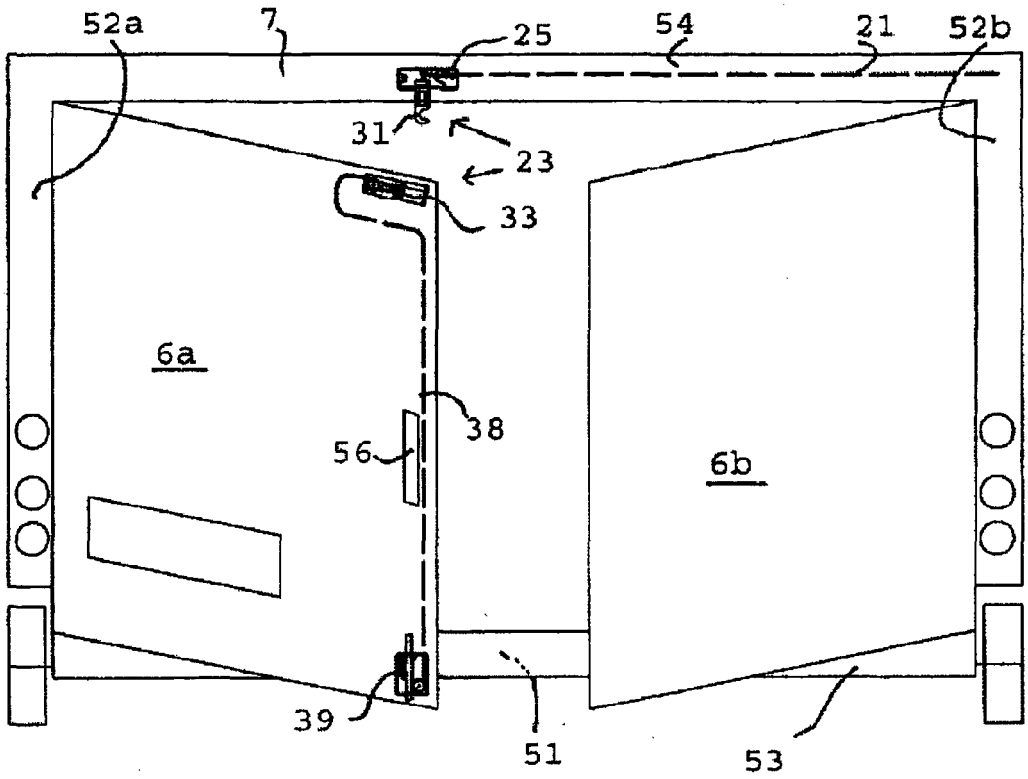
15. Locking system apparently suitable and intended for being built into a vehicle according to any one of the preceding claims.



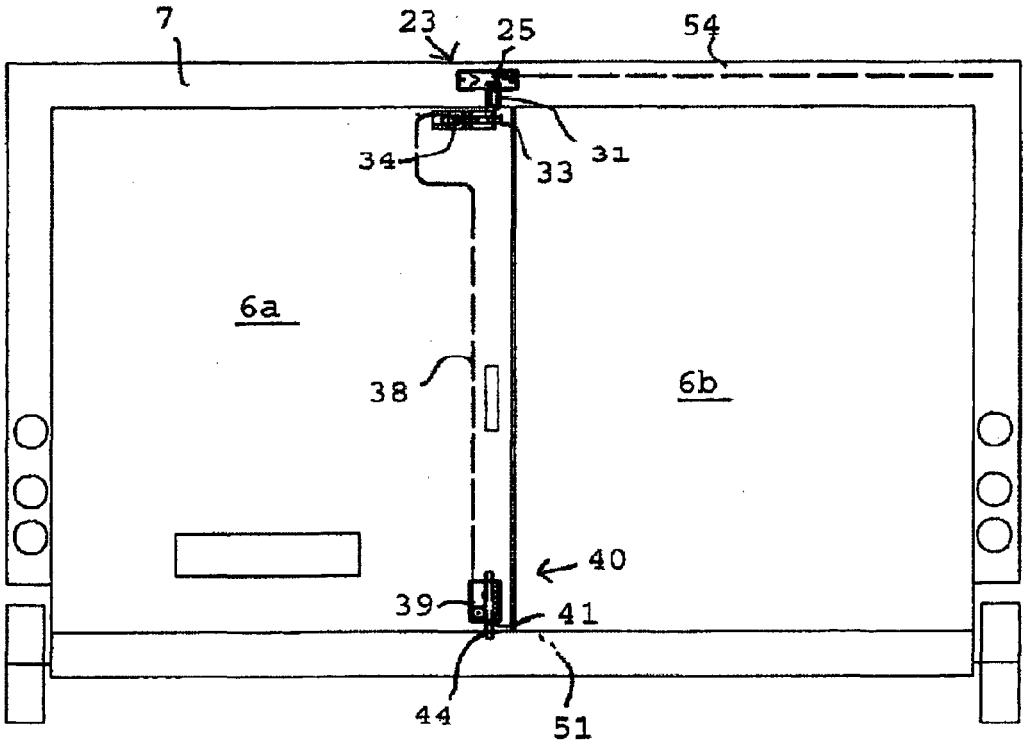
Figuur 1A



Figuur 1B



Figuur 2A



Figuur 2B

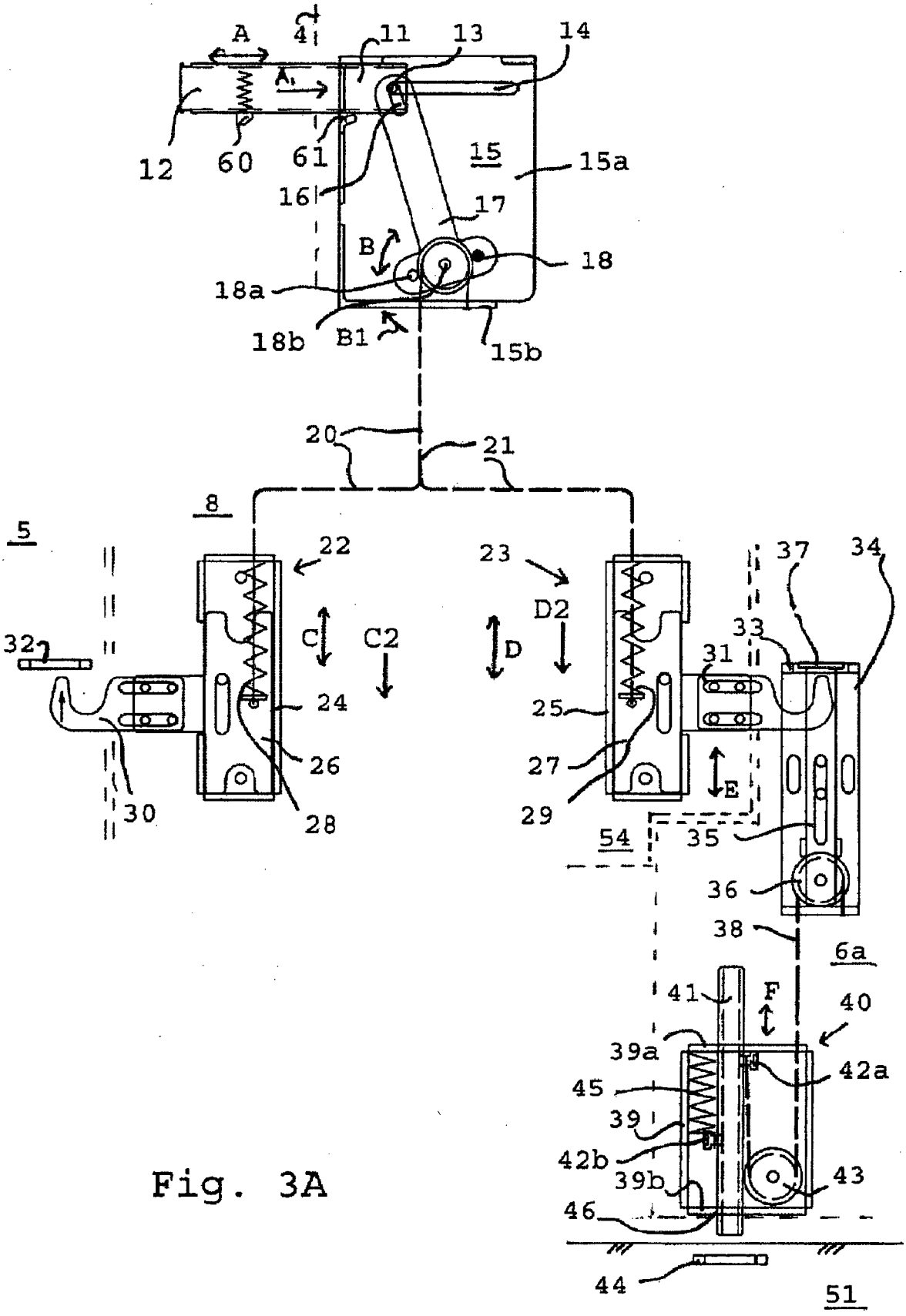
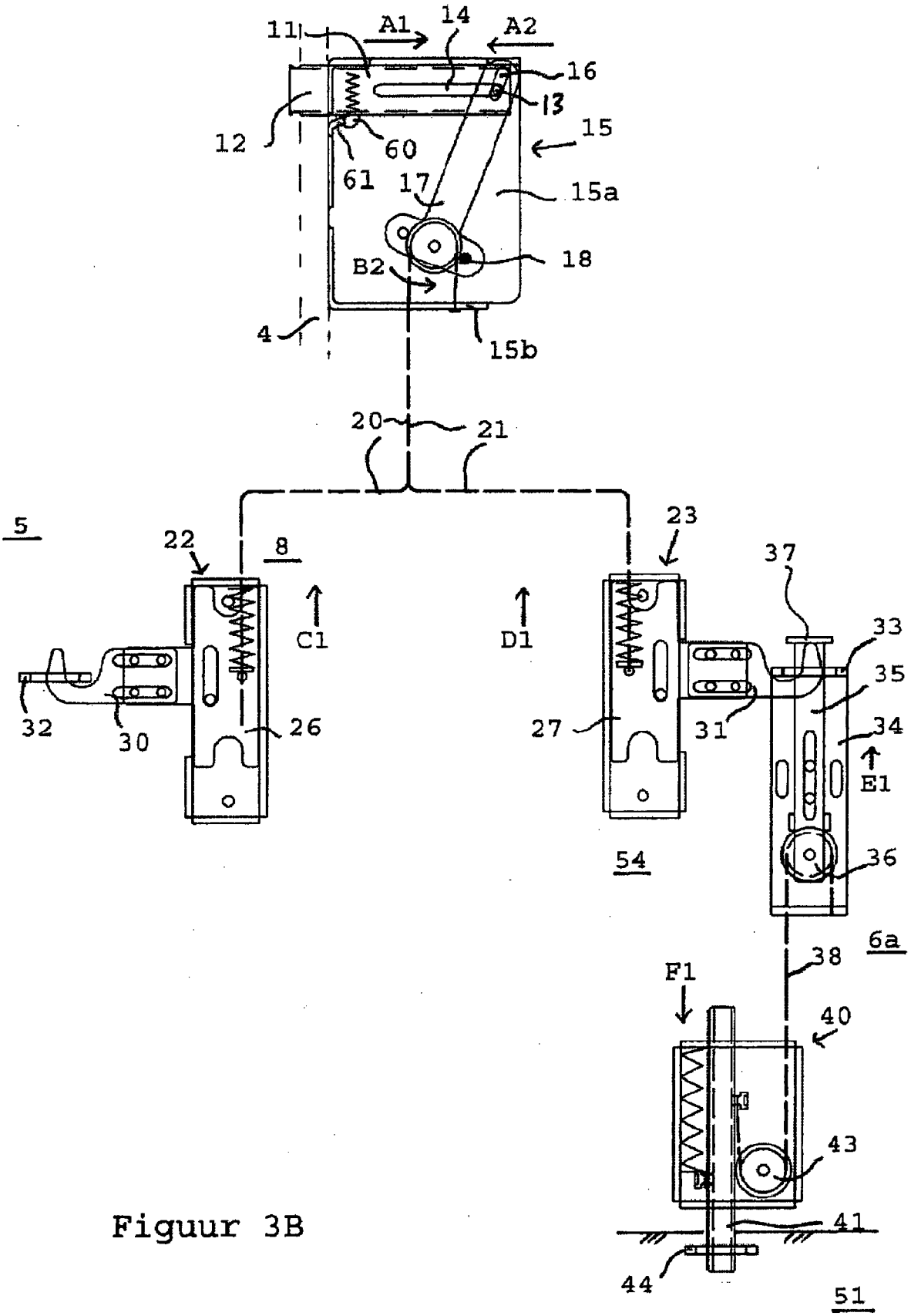

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Fig. 3A


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Figuur 3B

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EUROPEAN SEARCH REPORT

Application Number
EP 17 00 0562

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A	* the whole document *	1	
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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
Berlin	6 September 2017	Tamme, H

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
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 00 0562

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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06-09-2017

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