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

(11) **EP 4 053 062 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
07.09.2022 Bulletin 2022/36

(21) Application number: **22382039.0**

(22) Date of filing: **21.01.2022**

(51) International Patent Classification (IPC):
B66B 5/22 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B66B 5/22

(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:
KH MA MD TN

(30) Priority: **25.02.2021 ES 202130157**

(71) Applicant: **ORONA, S. COOP.**
20120 Hernani (Guipuzcoa) (ES)

(72) Inventors:
- **ALONSO RÁMILA, Raúl**
  20120 HERNANI (Guipúzcoa) (ES)
- **GARCÍA ZALACAIN, Oier**
  20120 HERNANI (Guipúzcoa) (ES)

(74) Representative: **Herrero & Asociados, S.L.**
Cedaceros, 1
28014 Madrid (ES)

(54) SAFETY GEAR FOR ELEVATING DEVICES, ELEVATING DEVICES AND PROCEDURE FOR ACTIVATING SAID DEVICE

(57) Safety gear comprising a wedging block (1), comprising a catch element (2) and a braking element (3), and a rolling element (4) housed in a longitudinal guide (6) located on a support plate (7) and actuated by elastic pushing means (8) that keep the rolling element (4) in contact, with the possibility of rolling, with the guide (A), wherein all relative linear movement between the rolling (4) and braking (3) elements is prevented, the device comprising a friction element (5) that can contact the rolling element (4), so that the transition from the rest position to the wedging position occurs when the friction element (5) contacts the rolling element (4) and there is relative movement between the support plate (7) and the guide (A).

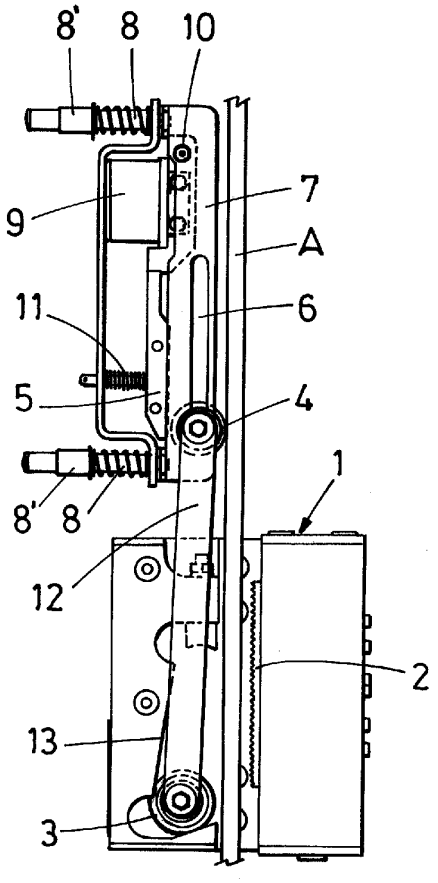

FIG.1

EP 4 053 062 A1

Description

TECHNICAL FIELD OF THE INVENTION

[0001] A first aspect of the present invention refers to a parachute device for elevating devices, which is applied in the elevating device industry, and more specifically in the field of safety devices that act in emergency situations, allowing achieving a device involving low energy consumption, high reliability and very compact dimensions.

[0002] A second aspect of the invention refers to an elevating device comprising said device and a third aspect refers to a method for activating said device.

BACKGROUND OF THE INVENTION

[0003] At present, elevating devices include emergency braking devices that are used to reduce the speed until the car of the elevating device is immobilized in emergency situations in which said car reaches speeds above predetermined values during its normal operation.

[0004] Among the emergency braking devices are those known as parachutes that prevent the free fall or uncontrolled movement of the car by immobilizing it on the guides through which it moves. Thus, the parachute, also commonly referred to in the sector as wedging, causes the car to stop by means of a friction force exerted by it when acting on the car guides, stopping it and keeping it immobilized on the guides.

[0005] An example of these parachute devices is found in the German utility model application no. DE-202019105584-U1, wherein a parachute device is described comprising a wheel that is linked to a roller in such a way that the movement of the wheel drags the roller of a wedging block to reach a braking position. The movement of the wheel that activates the movement of the roller is achieved by means of a friction surface that, being selectively actuated by electronic activation means, contacts the wheel causing it to begin to roll between a guide of the elevating device and the friction surface itself, which ultimately causes wedging.

[0006] Among the disadvantages of this device, it is worth mentioning that the space occupied by the device is considerable and that it requires a large number of parts and moving elements. For example, the wheel is not kept in contact at all times rolling on the guide, so in addition to the movement of the friction surface, it is necessary to have mobile elements that allow the wheel to move along a certain path, for this reason, the device comprises a movable inclined element which is the one that brings the wheel into contact with the friction surface, wherein the necessary force is achieved to cause the dragging of the wedging roller. Additionally, its energy consumption is considerable.

DESCRIPTION OF THE INVENTION

[0007] A first aspect of the present invention refers to a parachute device for elevating devices, as defined in claim 1, which makes it possible to achieve a more compact device than those currently available, which is simpler as it requires fewer moving parts and elements, and whose energy consumption is reduced.

[0008] The device that the invention proposes comprises a wedging block that is fixed to the car of the elevating device. The wedging block in turn comprises a catch element, usually at least one shoe, located on a first side of a guide (A) of the elevating device, and a braking element, usually called a braking roller, located at a second side, opposite the first side, of the guide (A).

[0009] In a resting position of the device the guide (A) is not in contact with the braking and catch elements, while in a wedging position the braking element exerts a force on the guide (A) that keeps it immobilized in contact with the catch element.

[0010] According to the invention, the parachute device comprises a rolling element, which can be embodied as a roller or wheel, housed in a longitudinal guide located, with orientation parallel to the guide (A), on a support plate. In turn, the support plate is actuated by elastic pusher means that keep the rolling element in contact, with the possibility of rolling, with the guide (A). The rolling element is linked to the braking element so that all linear relative movement between the rolling and braking elements is prevented. Likewise, the device comprises a friction element that can contact the rolling element, so that the passage from the rest position to the wedging position occurs when the friction element contacts the rolling element and there is relative movement between the support plate and the guide (A), forcing the movement of the rolling element along the longitudinal guide of the support plate while the rolling element rolls on the friction surface and the guide (A) itself.

[0011] Therefore, the parachute device is activated by the rolling element, so that if the friction element is in contact with the rolling element and there is a relative movement between the car, to which the support plate is attached, usually by means of elastic means, and the guide, the parachute reaches the wedging position. The braking element is linked to the rolling element in such a way that there is no relative linear movement between both of them, basically it can be said that the vertical movement of both of them is synchronized.

[0012] Unlike the state of the art, the rolling element is kept in contact at all times rolling on the guide. The main advantage is that the entire device is much more compact, occupying less space, and simple, thereby significantly reducing the number of parts and moving elements in the device to perform its function.

[0013] Another difference is that, in the state of the art, a mobile inclined element is used, which is the one that brings the wheel into contact with the friction surface, wherein the necessary force is achieved to cause the

wedging roller to drag.

[0014] The possibility that the device comprises activation means that act on the friction element is contemplated. In this way, the passage between the rest position and the wedging position is carried out by means of the activation means.

[0015] Starting from the rest position, the activation sequence is as follows.

[0016] In the rest position, the car can be moved normally to carry out rides. The elastic pushing means keep the support plate, and therefore the rolling element that is housed in its longitudinal guide, in contact with the guide, so as to ensure the rolling of the rolling element on the guide itself. The activation means keep the friction element separate from the rolling element.

[0017] The activation of the device is carried out by means of the activation means, according to an embodiment that will be explained later, in the case of an electromagnet, the electrical supply is interrupted, which causes the friction element to contact the rolling element. At this point, the wedge can be reset in the absence of movement by the car, so that by powering the electromagnet again, it returns to the rest position.

[0018] Once the device is activated, in the event that the car continues to move, the rolling element continues to roll between the guide and the friction element, so that the rolling element begins to move within the longitudinal guide. In the operation intended for the device, the car is lowered by the effect of gravity, so that the relative movement of the guide with respect to the device, which is attached to the car, is upward, so that it produces an ascent of the rolling element, since it is rolling between the guide and the friction element.

[0019] Said movement of the rolling element along the longitudinal guide ends when the wedging position is reached, in which the braking element has moved to the position causing the maximum braking force of the wedging block. Thus, using the device of the invention, wear of the rolling element is avoided, since in the extreme position it can continue to roll with respect to the guide without the friction surface forcing the rolling element to slide, which can cause wear.

[0020] Thus, the braking element of the wedging block is dragged, given the connection between the rolling element and the braking element, which in one embodiment is connected by means of a plate, platen or a bar.

[0021] Starting from the wedging position, to return to the rest position, the movements of the elements and the sequence described above is reversed, with the difference that the device shall first be unwedged. The actuating means is first caused to move the friction element so that it does not contact the rolling element. Afterwards, the rolling element is free from its contact with the friction element and its descent occurs along the longitudinal guide under the effect of gravity.

[0022] The possibility of the friction element being pivotally mounted, at a pivot point, on the support plate is contemplated, thereby reducing movements and ensuring contact at the same point. The friction element can be constituted as a friction plate that is hinged to the top of the support plate at the pivot point.

[0023] It is contemplated that the activation means comprise an electromagnet and elastic compression means, also referred to as an activator spring. In this way, as noted above, in the rest position the electromagnet is kept powered, in turn, the friction element is actuated at all times by the elastic compression means, whose effect is counteracted by the activation means, so that when the activation means are deactivated the elastic compression means push the friction element against the rolling element.

[0024] A second aspect of the present invention refers to an elevating device comprising a parachute device as described above.

[0025] A third aspect of the present invention refers to a method for activating a parachute device as described above, comprising:

- starting from the rest position,
- actuating on the friction element until it contacts the rolling element,
- maintaining contact between the friction element and the rolling element while said rolling element moves along the longitudinal guide until,
- reaching a wedging position in which the braking element is in the wedging position.

[0026] Also, alternatively, the method of the invention comprises:

- starting from the wedging position,
- releasing the braking element of the wedging block from the catch element,
- actuating on the friction element so that it stops contacting the rolling element, so that as a result of the gravitational force said rolling element descends along the longitudinal guide until,
- reaching a rest position.

DESCRIPTION OF THE DRAWINGS

[0027] To complement the description that is being made and in order to help a better understanding of the features of the invention, according to a preferred example of a practical embodiment thereof, a set of drawings is attached as an integral part of said description. For illustrative and non-limiting purposes, the following has been represented:

Figures 1-4.- They show four cross sections that represent the activation sequence of the device, starting from a rest position represented in figure 1, showing the contact of the friction element with the rolling element, in figure 2, the subsequent movement of said rolling element in figure 3 and the wedging position in figure 4..

PREFERRED EMBODIMENT OF THE INVENTION

[0028] In view of the figures outlined, it can be seen how, in one of the possible embodiments of the invention, the parachute device that the invention proposes comprises a wedging block (1) that is fixed to the car, not shown, of the elevating device. The wedging block (1) in turn comprises a catch element (2) located on a first side of a guide (A) of the elevating device, and a braking element (3) located on a second side, opposite to the first side, of the guide (A).

[0029] In a resting position of the device, the guide (A) is not in contact with the braking (3) and catch (2) elements, while in a wedging position the braking element (3) exerts a force on the guide (A) that keeps it in contact with the catch element (2).

[0030] Likewise, the parachute device comprises a rolling element (4) housed in a longitudinal guide (6) located, oriented parallel to the guide (A), on a support plate (7) that is actuated by elastic pushing means (8), which in the embodiment shown are pushing springs, which keep the rolling element (4) in contact, with the possibility of rolling, with the guide (A). The rolling element (4) is linked to the braking element (3) so that any linear relative movement between the rolling (4) and braking (3) elements is prevented. The pushing springs (8) are arranged in fixed bushings (8'), superiorly and inferiorly, and act permanently against the support plate (7), making the rolling element (4) be at all times in contact with the guide (A), since said rolling element (4) is housed in the longitudinal guide (6).

[0031] Additionally, the device comprises a friction element (5) that can contact the rolling element (4), so that the transition from the rest position to the wedging position occurs when the friction element (5) contacts the rolling element (4) and there is relative movement between the support plate (7) and the guide (A), forcing the movement of the rolling element (4) along the longitudinal guide (6) of the support plate (7) while the rolling element (4) rolls on the friction surface (5) and the guide (A) itself.

[0032] In the embodiment represented, the device comprises activation means (9) that actuate on the friction element (5). In this way, the passage between the rest position and the wedging position is carried out by means of the activation means.

[0033] The device is activated by means of the activation means which, in the embodiment shown, comprise an electromagnet and elastic compression means (11), for which the electrical supply is interrupted. In this way, the action of elastic compression means (11) acting on the friction element (5) is no longer counteracted, which makes the friction element contact the rolling element. At this point, the wedge can be reset in the absence of movement by the car, so that by powering the electromagnet again, it returns to the rest position. The electromagnet is arranged in proximity to the friction element so that the consumption of the electromagnet, and therefore the energy required for resetting, are very low.

[0034] Starting from the wedging position, to return to the rest position, the movements of the elements and the sequence is reversed, when the wedging block locking is deactivated by separating the braking element from the guide, which results in little energy being needed to separate said friction element from the rolling element in its resetting given the proximity between both. Afterwards, the rolling element is free from its contact with the friction element and its descent occurs along the longitudinal guide under the effect of gravity.

[0035] The friction element (5) is pivotally mounted, at a pivot point (10), on the support plate (7).

[0036] For its part, as can be seen in the figures, the rolling element (4) is linked to the braking element (3) by means of a connecting plate (12).

[0037] The wedging block (1) comprises an inclined surface (13) with which it can contact the braking element (3) from rest position to the wedging position.

[0038] In view of this description and set of figures, the person skilled in the art will understand that the embodiments of the invention that have been described can be combined in multiple ways within the object of the invention. The invention has been described according to some preferred embodiments thereof, but it will be apparent to those skilled in the art that multiple variations can be introduced in said preferred embodiments without exceeding the object of the claimed invention.

Claims

1. Parachute device for elevating devices comprising a wedging block (1) which in turn comprises a catch element (2), located on a first side of a guide (A) of the elevating device, and a braking element (3), located on a second side, opposite the first side, of the guide (A), so that in a rest position the guide (A) is not in contact with the braking (3) and catch (2) elements, while in a wedging position the braking element (3) exerts a force on the guide (A) that keeps it in contact with the catch element (2),
characterized in that the parachute device comprises a rolling element (4) housed in a longitudinal guide (6) located, oriented parallel to the guide (A), on a support plate (7) which in turn is actuated by means elastic pushing elements (8) that keep the rolling element (4) in contact, with the possibility of rolling, with the guide (A), wherein said rolling element (4) is linked to the braking element (3) so that every linear relative movement between the rolling (4) and braking (3) elements is prevented, wherein the device comprises a friction element (5) that can contact the rolling element (4), so that the passage from the rest position to the wedging position occurs when the friction element (5) contacts the rolling element (4) and there is relative movement between the support plate (7) and the guide (A), forcing the movement of the rolling element (4) along the longi-

tudinal guide (6) of the support plate (7) while the rolling element (4) rolls on the friction surface (5) and the guide (A) itself.

2. Device according to claim 1, comprising activation means (9) that act on the friction element (5).

3. Device according to any one of the preceding claims, wherein the friction element (5) is pivotally mounted on the support plate (7).

4. Device according to any of claims 2 and 3, wherein the activation means (9) comprise an electromagnet and elastic compression means (11).

5. Device according to any of the preceding claims, wherein the rolling element (4) is linked to the braking element (3) by means of a connecting plate (12).

6. Elevating device comprising a parachute device according to any one of the preceding claims.

7. Procedure for activating a parachute device according to any of claims 1 to 5, comprising:

- starting from the rest position,
- actuating on the friction element (5) until it contacts the rolling element (4),
- maintaining contact between the friction element (5) and the rolling element (4) while said rolling element (4) moves along the longitudinal guide (6) until,
- reaching a wedging position in which the braking element (3) is in the wedging position.

8. Procedure for unwedging a parachute device according to any of claims 1 to 5, comprising:

- starting from the wedging position,
- releasing the braking element (3) from the wedging block (1) with respect to the catch element (2),
- actuating on the friction element (5) so that it stops contacting the rolling element (4), so that due to the gravitational force said rolling element (4) descends along the longitudinal guide (6) until,
- reaching a rest position.

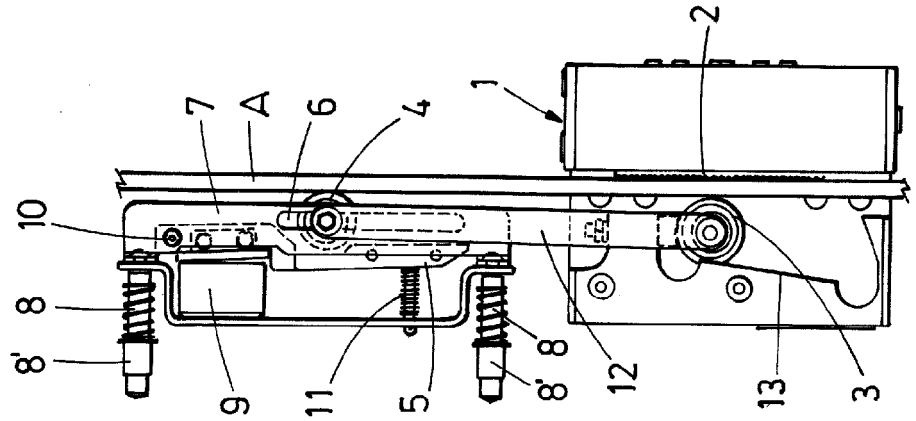

FIG.4

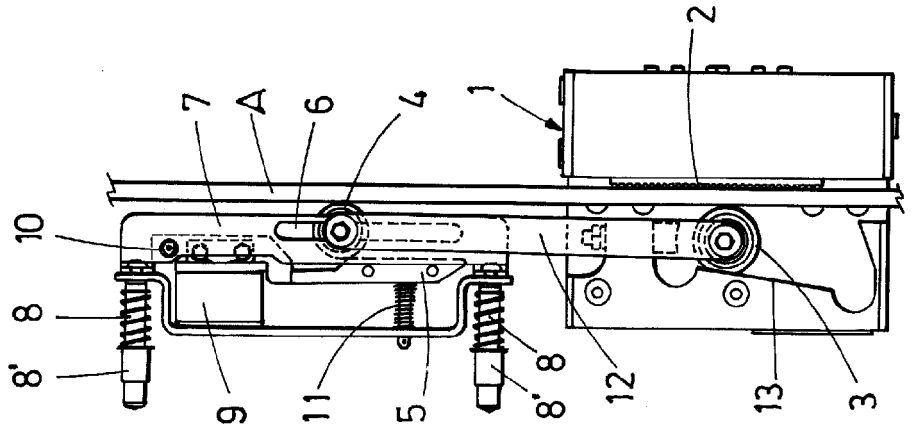

FIG.3

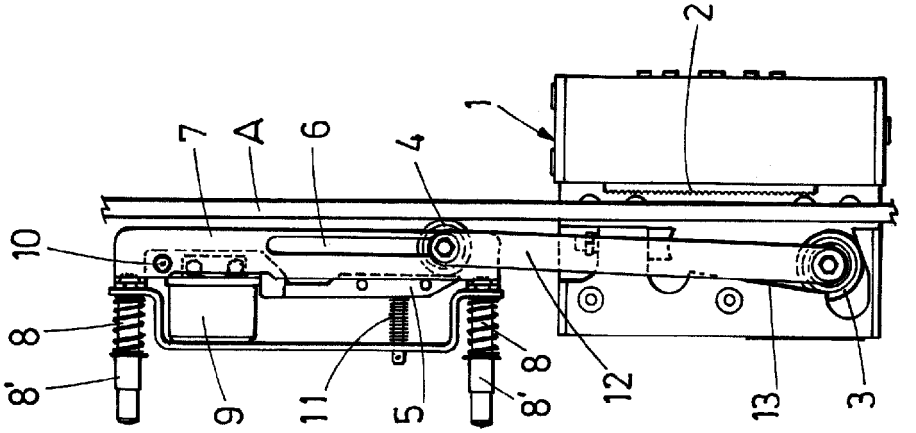

FIG.2

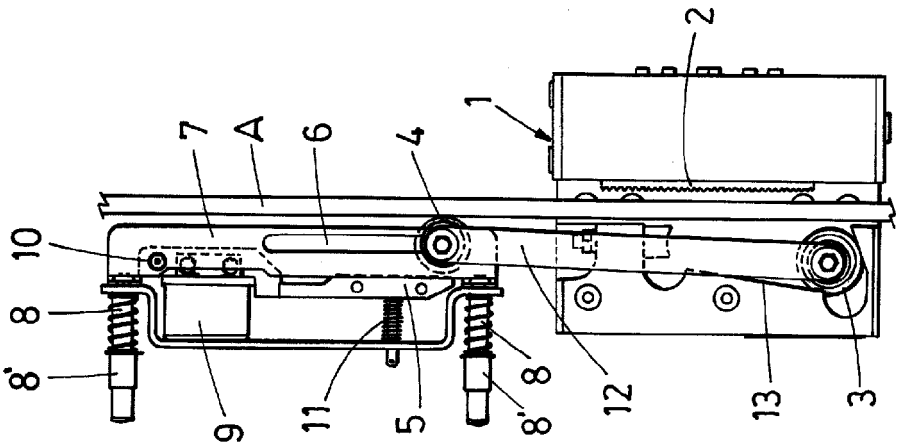

FIG.1

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 22 38 2039

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 20 2019 105584 U1 (WITTUR HOLDING GMBH) 22 October 2019 (2019-10-22) * the whole document *	1-8	INV. B66B5/22
A	EP 2 837 592 A1 (APLICACIONES ELECTROMECANICAS GERVALL S A) 18 February 2015 (2015-02-18) * the whole document *	1-8	
A	US 2011/088983 A1 (SIRIGU GERARD ET AL.) 21 April 2011 (2011-04-21) * the whole document *	1-8	
			TECHNICAL FIELDS SEARCHED (IPC) B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	20 July 2022	Dogantan, Umut 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
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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 38 2039

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-07-2022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202019105584 U1	22-10-2019	DE 202019105584 U1	22-10-2019
		EP 4041666 A1	17-08-2022
		WO 2021069739 A1	15-04-2021
EP 2837592 A1	18-02-2015	NONE	
US 2011088983 A1	21-04-2011	AT 504532 T	15-04-2011
		CN 101535163 A	16-09-2009
		EP 2084095 A1	05-08-2009
		ES 2363443 T3	04-08-2011
		HK 1137720 A1	06-08-2010
		JP 5350263 B2	27-11-2013
		JP 2010509159 A	25-03-2010
		US 2011088983 A1	21-04-2011
		WO 2008057116 A1	15-05-2008

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 202019105584 U1 **[0005]**