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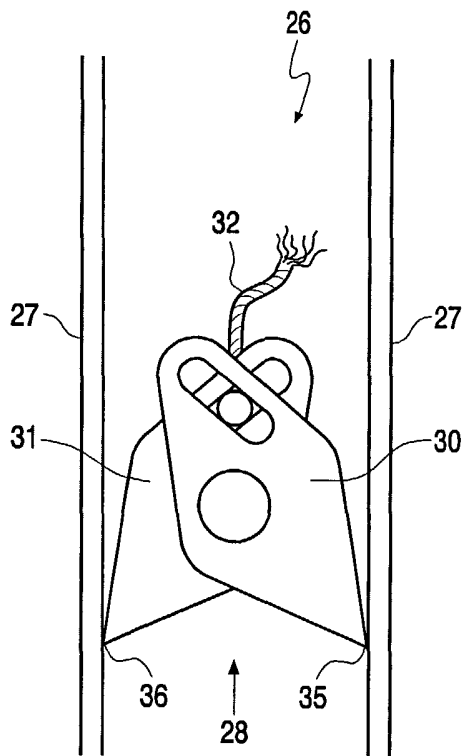
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(54) Title: BLOCKING DEVICE FOR A SLIDING DOOR, AND SLIDING DOOR PROVIDED WITH SUCH A BLOCKING
DEVICE



(57) Abstract: The invention relates to a blocking device for a sliding door, comprising a carrier structure, at least one blocking element connected pivotally to the carrier structure, which blocking element is provided with at least one coupling element adapted for coupling to hanging means supporting the rolling door, and biasing means positioned between the carrier structure and the blocking element. The invention also relates to a sliding door provided with such a blocking device.



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Blocking device for a sliding door, and sliding door provided with such a blocking device

5 The invention relates to a blocking device for a sliding door, comprising a carrier structure, at least one blocking element connected pivotally to the carrier structure, which blocking element is provided with at least one coupling element adapted for coupling to hanging means supporting the rolling door, and biasing means positioned between the blocking element and a part of the blocking device connected pivotally to the blocking element.

10 The invention also relates to a sliding door provided with such a blocking device, comprising a shielding element provided with guide means, at least one guide which is positioned on at least two sides close to the shielding element and which co-acts with the guide means, hanging means for supporting the shielding element and at least one blocking device positioned at least close to the guide and connected to the shielding
15 element.

Known from the prior art are (industrial) sliding doors, in particular vertical rolling doors, which are equipped with one or more blocking mechanisms. Such doors constructed from rigid segments are also referred to as sectional doors. The blocking
20 mechanism is mounted on the rolling door and is usually connected to a steel cable or chain supporting the rolling door. In the case the cable or chain breaks as a result of for instance wear, a blocking element forming part of the blocking mechanisms pivots outward relative to the rolling door such that the blocking element engages on an outer side of a guide bounding the rolling door. The blocking element engages under bias on
25 the guide, wherein the position of the blocking mechanism, and therefore also the position of the rolling door relative to the guide, remains fixed. Blocking of the rolling door as a consequence of cable or chain break is important with a view to preventing or countering accidents. The blocking mechanism known from the prior art has a number of drawbacks. As already described above, the blocking mechanism is adapted to
30 engage on the outer side of the guide of the rolling door. Such a positioning of the blocking mechanism means that the external contact side of the guide must be left clear, which results in a certain limitation if the freedom of design in respect of the mounting construction of a rolling door. In addition, such a blocking mechanism projects considerably relative to the rolling door, which can be disadvantageous from a practical
35 viewpoint as well as hazardous, for instance when goods are placed close to the rolling door. Another drawback of a blocking mechanism projecting relative to a sliding door is that this can result during use of the door in body parts of people being caught in the vicinity of the sliding door. In addition, the projecting position of the blocking

mechanism is susceptible to damage, whereby it is possible that critical components of the blocking mechanism do not function optimally.

5 The invention has for its object, while retaining the advantages of the prior art, of providing an improved blocking device without the above stated drawbacks.

The invention provides for this purpose a blocking device for a sliding door of the type stated in the preamble, with the feature that the biasing means are adapted to urge apart a part of the blocking element and the part of the blocking device connected pivotally to the blocking element. This blocking device can be embodied very compactly and
10 mounted with only a limited construction height on a door. Due to the compact embodiment both the use and appearance of a rolling door provided with at least one such blocking device is more attractive. In addition, the compact blocking device according to the invention, when compared to blocking devices known from the prior art, results in a material saving and cost saving in the manufacture thereof. The critical
15 components of the blocking device, such as the pivotable blocking element and the biasing means, can also be better protected from the surrounding area.

The blocking element is preferably pivotable between an active position, in which a part of the blocking element lies at a distance from the carrier structure, and an inactive position, in which the blocking element lies a shorter distance from the carrier structure than in the active position. It will be apparent that in an active position the blocking device blocks the rolling door and that in an inactive position the blocking device leaves the rolling door clear. In a preferred embodiment the blocking element substantially
20 encloses an angle of 25° to 45°, preferably 35°, with the carrier structure in the active position. Tests have shown that the blocking device also functions effectively, although less than optimally, when the blocking element encloses an angle smaller than 25° with the carrier structure in the active position. The advantage of the blocking element according to the present invention is that the blocking element can be placed such that it
25 can clamp itself between the sliding door and a guide of the sliding door wherein the force of gravity of the sliding door enhances engagement of the blocking element. The maximum pivot angle of the blocking element relative to the carrier structure is preferably bounded by a stop. Under normal conditions the stop forms a safety device. Under normal conditions the blocking element pivots outward in the active position
30 until it makes contact with a guide and clamps itself between the sliding door and the guide, partly as a result of the force of gravity prevailing on the rolling door. In the case of extreme conditions, for instance when the blocking device disconnects from the sliding door, the maximum movement of the blocking element can be bounded.

In a preferred embodiment the blocking device is provided with two blocking elements, which has the advantage that the considerable force applied to the blocking device during clamping of the blocking element between sliding door and guide can be distributed over two blocking elements. The load per blocking element will, with correct operation, be significantly smaller than in the situation where only one blocking element is applied per blocking device. Another advantage of applying two blocking elements in a blocking device is that this provides extra safety. For this purpose the blocking elements must preferably be dimensioned such that a single blocking element can withstand the load of blocking a sliding door. The biasing means are preferably adapted to urge apart parts of the two blocking elements. During the displacement of the blocking elements from an inactive position not blocking the sliding door to an active position blocking the sliding door, the blocking elements pivot apart. In order to realize this preferred embodiment, both blocking elements can for instance be provided with a coupling element for coupling to hanging means supporting the rolling door.

In another preferred embodiment the free end of the blocking element is provided with a cutting edge. Owing to the cutting edge the blocking element will be better able to engage on a guide, among other reasons because of the relatively small contact surface of the blocking element. Owing to the high pressure present on the cutting edge during blocking of the sliding door the blocking will proceed rapidly, whereby the sliding door will block immediately.

The blocking element is preferably provided with a receiving space for coupling means connected to the hanging means. The receiving space can for instance be formed by an interruption of or opening in the blocking element. In addition, the coupling means can for instance be formed by a pin or hook-shaped element which, in the normal operating situation, are positioned at least partly in at least a part of the receiving space and engage on the blocking element.

In a preferred embodiment the carrier structure is formed at least substantially by a rod. The advantage of a rod is that it is relatively strong at a relatively compact volume. The blocking element is then pivotally connected to the rod. In the case a plurality of blocking elements, for instance two, are applied, all blocking elements can be connected in pivotable manner to the rod.

The invention also provides a sliding door of the type stated in the preamble, characterized in that the blocking element is positioned for engaging on contact sides of

the guide which are directed toward the guide means of the shielding element. It is important that at least a part of the shielding element is provided during use with a vertical component, whereby the shielding element is at least partly supported by the hanging means. As mentioned above, the blocking device is embodied such that the blocking element is positioned between the sliding door and the guide, whereby the blocking device can, among other things, take a more compact form and, partly due to the limited space in which it is situated and the orientation in which it can be placed, provides an improved blocking. Further advantages of the sliding door in combination with the blocking device have already been described above.

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In a preferred embodiment the biasing force of the biasing means is exerted substantially perpendicularly on the contact sides of the guide. The most effective clamping of the blocking element can take place in such an orientation, irrespective of the position of the guide relative to the sliding door.

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A free end of the blocking element is preferably substantially congruent to the adjacent contact side of the guide. Because the free ends of the blocking element and the contact sides of the guide are of substantially the same shape, the blocking element engages closely onto the guide. The contact surface between the blocking element and the guide can thus be maximized, whereby blocking of the sliding door can proceed more effectively (faster, with more certainty).

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In a preferred embodiment the blocking element is pivotable between an active position, in which a free end of the blocking element engages at least partially on the guide, and an inactive position in which the blocking element lies substantially clear of the guide. The blocking element is preferably coupled to the hanging element such that the force exerted on the blocking element by the hanging element in the line of action of the biasing means is opposed to and greater than the force exerted by the biasing means on the blocking element. In the described preferred embodiment the blocking element will thus be positioned in the inactive position in the situation suspended from the hanging element. If the hanging means are disconnected from the blocking element (for instance breakage of the hanging means), or if the hanging means exert no or hardly any force on the blocking element, the biasing means will pivot the blocking element in the direction of the guide such that the blocking element engages on the guide, whereby the sliding door blocks. The hanging means are preferably formed by a steel cable, chain or cord.

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The blocking device is preferably enclosed for at least a substantial part by the guide. Such an embodiment has the advantage that the blocking device, in particular the carrier structure, is or can be embodied in relatively compact and space-saving manner.

- 5 In a final preferred embodiment the sliding door is embodied as a rolling door. Rolling doors are commonly used in industry to screen off work areas. From a safety viewpoint, so as to prevent accidents, it is of great importance to equip such a rolling door with a blocking device according to the invention.
- 10 The invention will be elucidated with reference to the non-limitative embodiments shown in the following figures. Herein:
figure 1 shows a perspective view of a blocking device in an inactive position according to the invention,
figure 2 shows the perspective view of a blocking device as according to figure 1 in an
15 active position according to the invention,
figure 3a shows in top view a cross-section of a preferred embodiment of a rolling door provided with a blocking device in an inactive position,
figure 3b shows in top view the cross-section of the preferred embodiment of the rolling
door provided with the blocking device according to figure 3a in an active position,
20 figure 3c shows in top view and in cross-section a preferred embodiment of a sliding door provided with a blocking device according to the invention,
figure 3d shows in top view another preferred embodiment of a sliding door provided with a blocking device according to the present invention,
figure 4a shows a side view of an assembly of a guide for a rolling door and a blocking
25 device in a non-blocking position according to the invention, and
figure 4b is a side view of the assembly of figure 4a, wherein the blocking device is shown in a blocking position.

- Figure 1 shows a perspective view of a blocking device 1 in an inactive position
30 according to the invention. Blocking device 1 comprises a carrier structure 2, which carrier structure 2 is provided with a shaft 3. Blocking device 1 also comprises two blocking elements 4,5 pivotally connected to shaft 3. Carrier structure 2 is provided with a projecting, cable-guiding element 6 for guiding a cable (not shown) supporting the sliding door to a coupling element 7 forming part of the blocking element. Carrier
35 structure 2 is adapted for connection to a sliding door (supported by the cable) such that the projecting, cable-guiding element 6 directs a cable to coupling element 7. A spring (not shown) is positioned between blocking elements 4,5. This spring presses blocking elements 4,5 apart. The free end of blocking element 5 is formed such that it can engage

more or less closely onto a guide guiding the rolling door. If the cable is connected to coupling element 7, the blocking elements 4,5 are then urged toward each other as a result of the tensile force in the cable, which is equal to at least a part of the gravitational force prevailing on the rolling door. The force exerted by the cable on blocking elements 4,5 is in that case greater than the biasing force exerted by the spring on blocking elements 4,5, whereby in accordance with the configuration shown in figure 1 the blocking elements are situated in the inactive position. The sliding door will be freely displaceable along the guide and the blocking elements remain (during correct operation) clear of the guide, whereby blocking of the rolling door does not therefore occur.

Figure 2 shows a perspective view of blocking device 1 in an active position according to the invention. If the cable (not shown) connected to coupling element 7 is disconnected due to for instance the cable breaking, and/or if the tensile force on the cable is removed, the biasing force exerted by the spring will then move the blocking elements 4,5 apart. If blocking device 1 is connected to the sliding door, the free ends of blocking elements 4,5 will then engage on a guide guiding the sliding door. The orientation of blocking elements 4,5 relative to the guide results in clamping of blocking elements 4,5 between the sliding door and the guide, whereby the sliding door will block.

Figure 3a shows in top view a cross-section through a preferred embodiment of a rolling door 8 provided with a blocking device 11 in an inactive position. Rolling door 8 is provided on a transverse side with guide means in the form of guide wheels 9 connected to the rolling door via shafts 8a. Guide wheels 9 are bounded multilaterally by a guide 10. Rolling door 8 is supported by a cable 12 positioned on a side of guide 10 directed toward rolling door 8. Blocking device 11 is provided with a blocking element 13. This latter is connected in figure 3a to the (tensioned) cable 12, with the result that blocking element 13 does not engage on the side of guide 10 directed toward rolling door 8.

Figure 3b shows in top view the cross-section of the preferred embodiment of rolling door 8 provided with blocking device 11 of figure 3a in an active position. Following a break of the cable not shown in this figure, or if the tension is removed from the cable, the position of blocking element 13 will change such that blocking element 11 engages on the side of the guide 10 directed toward rolling door 8, whereby rolling door 8 blocks. After reconnection to blocking element 13 of a (new) cable supporting rolling door 8, blocking element 13 will displace into the configuration shown in figure 3a.

Figure 3c shows in top view and cross-section a preferred embodiment of a sliding door 14 provided with a blocking device 18 according to the invention. Sliding door 14 is bounded on two sides by a guide 15. Sliding door 14 is provided with a cylindrical opening 16 in which a cable 17 supporting the sliding door 14 is positioned. In the shown figure cable 17 is connected to a blocking element 19 forming part of blocking device 18 such that blocking element 19 remains clear of guide 15. In the case the tension applied by cable 17 to blocking element 19 is substantially lost, blocking element 19 will displace in the direction of the side of the guide directed toward sliding door 14 such that blocking element 19 engages in fixed manner at one location on guide 19.

Figure 3d shows another preferred embodiment of a sliding door 20 provided with a blocking device 21. In the shown figure the sliding door 20 is bounded on three sides by a guide 22. Sliding door 20 is supported by a cable 23 located on a side of guide 22 remote from sliding door 20. Blocking device 21 is provided with two blocking elements 24,25 which in the shown figure do not engage on the side of guide 22 directed toward sliding door 20, since they are held at bias by the tensile force of cable 23 connected to blocking elements 24,25. In the case the cable 23 slackens, blocking elements 24,25 will displace such that they will engage in fixed manner at (at least) two locations on guide 22.

Figure 4a shows a side view of an assembly 26 of a guide 27 for a rolling door (not shown) and a blocking device 28 in a non-blocking position according to the invention. Blocking device 28 herein comprises a coupling rod 29 for coupling the blocking device 28 to the rolling door, and two blocking elements 30,31 connected pivotally to coupling rod 29. A draw spring (not shown) is positioned between blocking elements 30,31. Via the assembly 26 the rolling door is supported by two steel cables 32, one of which is now shown. Blocking elements 30,31 are both provided with a slot 33,34 adapted to receive a pin 37 connected to steel cable 32. Pin 37 is herein displaceable relative to slots 33,34 subject to the bias exerted by steel cable 32 on blocking device 28. Both blocking elements 30,31 are also provided with a cutting edge 35,36. In figure 4a the blocking device 28 is shown in a non-blocking position, whereby the rolling door can be freely displaced relative to guide 27. In the case steel cable 32 breaks, blocking device 28 will displace, as a result of the draw spring that is present, from a non-blocking position to a position blocking the rolling door.

Figure 4b shows a side view of assembly 26 of figure 4a, wherein blocking device 28 is shown - after steel cable 32 has broken - in a blocking position. Under the influence of

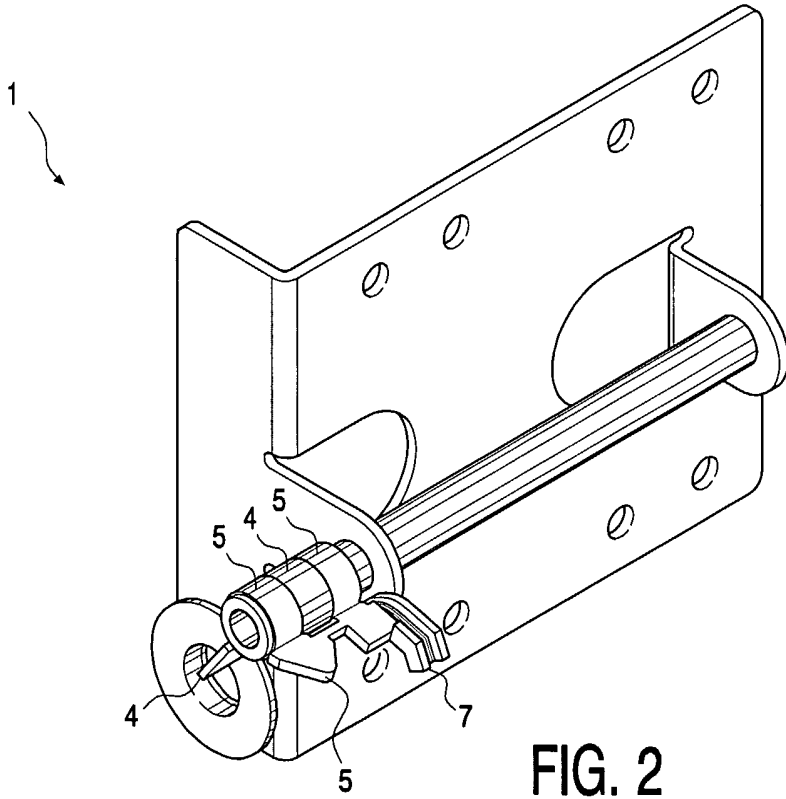
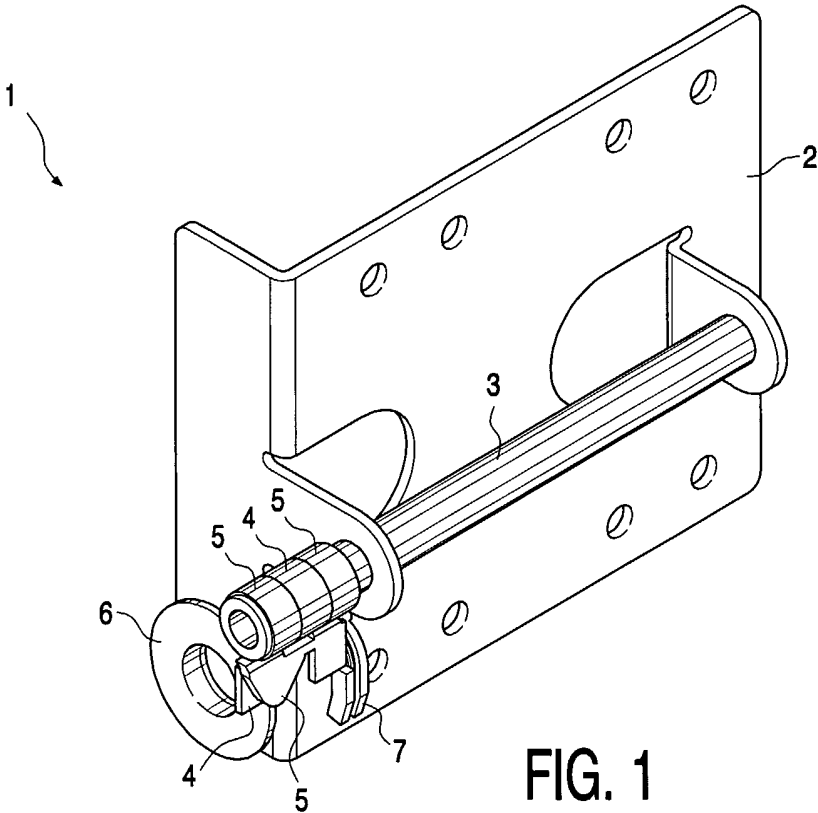
the load provided by the draw spring (not shown), both blocking elements 30,31 are urged apart such that cutting edges 35,36 of both blocking elements 30,31 engage in blocking manner on guide 27. A consequence of the blocking position of blocking device 28 is that the relative orientation of the rolling door, blocking device 28 and guide 27 is and remains at least substantially fixed under the present conditions. An advantage of this blocking action of blocking device 28 is that the rolling door will not displace further as a result of the force of gravity, but remains positioned at the position, or at least close to the position, where the cable break has occurred. Unsafe working situations can hereby be prevented or at least countered.

Claims

1. Blocking device for a sliding door, comprising:
 - a carrier structure,
 - 5 - at least one blocking element connected pivotally to the carrier structure, which blocking element is provided with at least one coupling element adapted for coupling to hanging means supporting the rolling door, and
 - biasing means positioned between the blocking element and a part of the blocking device connected pivotally to the blocking element,
 - 10 characterized in that
 - the biasing means are adapted to urge apart a part of the blocking element and the part of the blocking device connected pivotally to the blocking element.
2. Blocking device as claimed in claim 1, characterized in that the blocking
15 element is pivotable between an active position, in which a part of the blocking element lies at a distance from the carrier structure, and an inactive position, in which the blocking element lies a shorter distance from the carrier structure than in the active position.
- 20 3. Blocking device as claimed in claim 2, characterized in that in the active position the blocking element substantially encloses an angle of 25° to 45°, preferably 35°, with the carrier structure.
4. Blocking device as claimed in any of the foregoing claims, characterized in that
25 the maximum pivot angle of the blocking element relative to the carrier structure is bounded by a stop.
5. Blocking device as claimed in any of the foregoing claims, characterized in that the blocking device is provided with two pivotable blocking elements.
- 30 6. Blocking device as claimed in claim 5, characterized in that the biasing means are adapted to urge apart parts of the two blocking elements.
7. Blocking device as claimed in any of the foregoing claims, characterized in that
35 a free end of the blocking element is provided with a cutting edge.

8. Blocking device as claimed in any of the foregoing claims, characterized in that the blocking element is provided with a receiving space for coupling means connected to the hanging means.
- 5 9. Blocking device as claimed in any of the foregoing claims, characterized in that the carrier structure is formed at least substantially by a rod.
10. Sliding door provided with a blocking device as claimed in any of the foregoing claims, comprising:
- 10 - a shielding element provided with guide means,
- at least one guide which is positioned on at least two sides close to the shielding element and which co-acts with the guide means,
- hanging means for supporting the shielding element, and
- at least one blocking device positioned at least close to the guide and connected to the
15 shielding element,
characterized in that
the blocking element is positioned for engaging on contact sides of the guide which are directed toward the guide means of the shielding element.
- 20 11. Sliding door as claimed in claim 10, characterized in that the biasing force of the biasing means is exerted substantially perpendicularly on the contact sides of the guide.
12. Sliding door as claimed in either of the claims 10 or 11, characterized in that a
25 free end of the blocking element is substantially congruent to the adjacent contact sides of the guide.
13. Sliding door as claimed in any of the claims 10-12, characterized in that the blocking element is pivotable between an active position, in which a free end of the blocking element engages at least partially on the guide, and an inactive position in
30 which the blocking element lies substantially clear of the guide.
14. Sliding door as claimed in claim 13, characterized in that the blocking element is coupled to the hanging element such that the force exerted on the blocking element by the hanging element in the line of action of the biasing means is opposed to and greater
35 than the forced exerted by the biasing means.
15. Sliding door as claimed in any of the claims 10-14, characterized in that the blocking device is enclosed for at least a substantial part by the guide.

16. Sliding door as claimed in any of the claims 10-15, characterized in that the hanging element is formed by a steel cable.
- 5 17. Sliding door as claimed in any of the claims 10-16, characterized in that the sliding door is embodied as a rolling door.



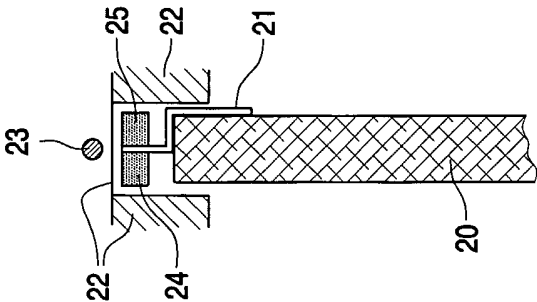


FIG. 3d

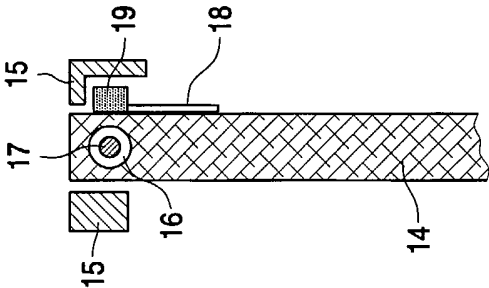


FIG. 3c

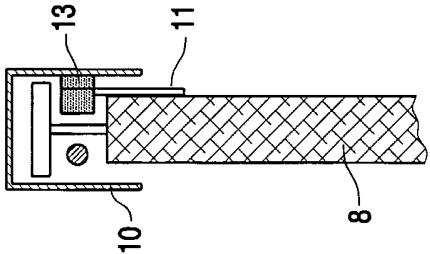


FIG. 3b

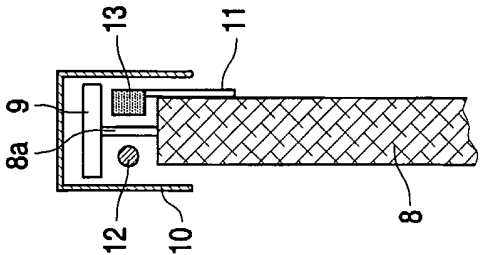


FIG. 3a

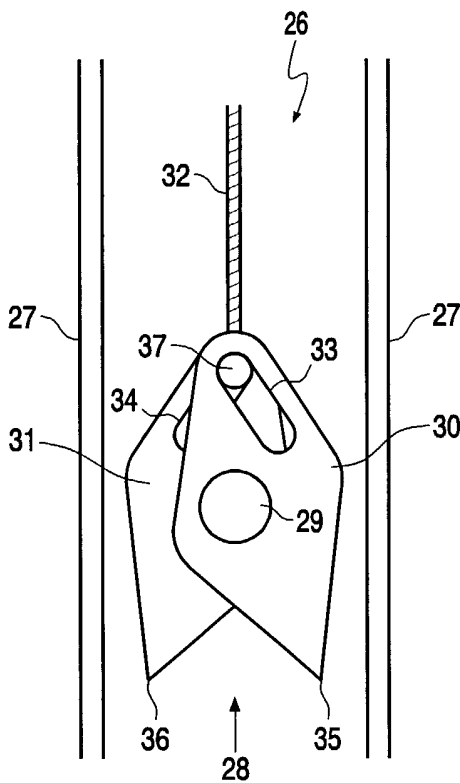


FIG. 4A

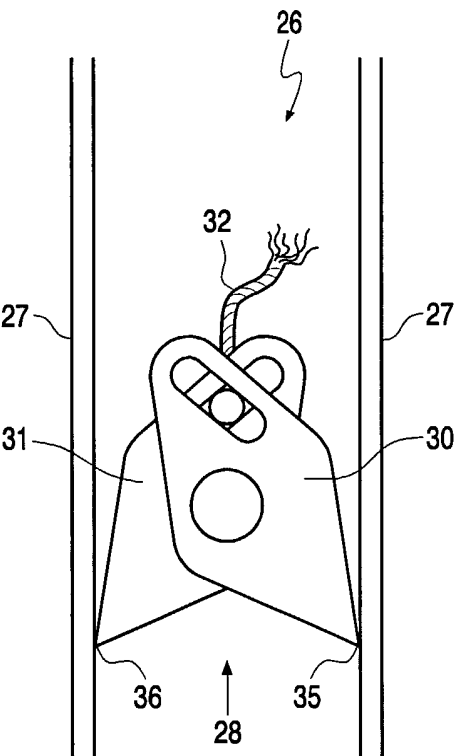


FIG. 4B

INTERNATIONAL SEARCH REPORT

PCT/NL 02/00530

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E05D13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 702 462 A (HANS KISSLING) 9 April 1931 (1931-04-09) page 1, line 41 -page 2, line 69; figures 1-6 ---	1-16
X	DE 38 00 789 A (EINWICH GEORG) 27 July 1989 (1989-07-27) column 3, line 13 -column 4, line 48; figures 1,2 -----	1-4,7-17

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Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 702462	A	09-04-1931	NONE
DE 3800789	A	27-07-1989	DE 3800789 A1 27-07-1989
			AT 397123 B 25-02-1994
			AT 4589 A 15-06-1993
			CH 677809 A5 28-06-1991
			DE 8816419 U1 03-08-1989