(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 January 2010 (28.01.2010)

PCT

(10) International Publication Number
WO 2010/010232 A1

(51) International Patent Classification:
E04B 1/61 (2006.01) *E05C 1/00* (2006.01)
E04B 2/74 (2006.01) *E05C 7/04* (2006.01)
E05B 63/22 (2006.01) *F16B 5/00* (2006.01)

(21) International Application Number:
PCT/FI2009/050633

(22) International Filing Date:
17 July 2009 (17.07.2009)

(25) Filing Language: Finnish

(26) Publication Language: English

(30) Priority Data:
20085743 24 July 2008 (24.07.2008) FI

(71) Applicant and
(72) Inventor: **STIGZELIUS, Torsten** [FI/FI]; Hongikontie 7 A 1, FI-40200 Jyväskylä (FI).

(74) Agent: **KESPAT OY**; P.O.Box 601, FI-40101 Jyväskylä (FI).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

WO 2010/010232 A1

(54) Title: WALL ELEMENT SYSTEM AND A LOCKING DEVICE FOR IT

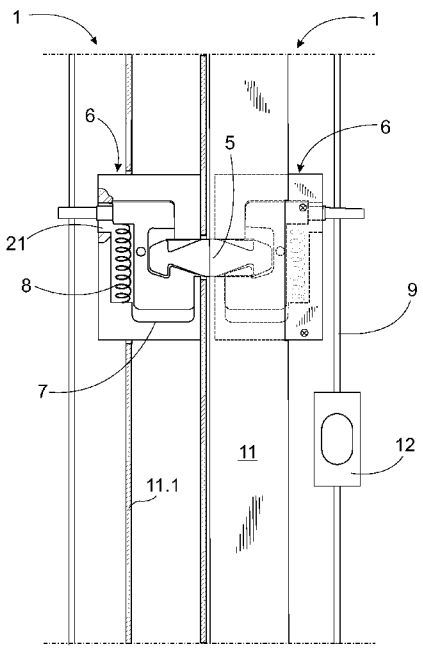

Fig. 4

(57) Abstract: The invention relates to locking mechanisms of a quick-release locked wall element system to be used in, for instance, exhibitions and offices. By connecting together various kinds of wall element (1, 2, 3a, 3b), various kinds of separations are constructed, as required. The solution according to the present invention is based on loose two-ended inserts (5), which lock into a catch mechanism (6) located in the ends of each element. This is formed of a case (6.1, 16) and a spring-loaded catch (7) located inside it. The catches are opened by a common operating member, for example, a rod (9), which is operated, for example, from the top of the element.

WALL ELEMENT SYSTEM AND A LOCKING DEVICE FOR IT

The present invention relates to a wall element system, such as is described in the preamble to Claim 1. The invention also relates to a locking device for the wall element system.

In the wall element system, two or more wall elements are attached to each other at their ends by connection means, which comprise catch mechanisms and inserts that secure the wall elements. Each wall element comprises a relatively thin shell structure, which has sides and narrow ends while in each wall element there are at least two catch mechanisms installed in the same end of the wall element.

A wall element system is usually constructed from parts, i.e. partitions, into a suitable form for, for example, exhibition stands, or around work-stations in a landscape office. The partitions can be free-standing and supported on various types of legs, but in that case the legs can get in the road and the structure of the wall element system will not be very sturdy. A better solution is to attach the partitions to each other, so that they will support each other and feet will not be needed while, in addition, the structure will become very sturdy. Attachment methods of this kind are known from, among others, German utility model DE 202 11 392 U 1 and French publication FR 2 850 989-A1. The former document discloses a solution, in which symmetrical toothed inserts sink into holes equipped with catches in the ends of the partitions. The inserts are released with the aid of release springs next to the end holes, which are pressed from the edges of the long sides of the panels.

In the solution disclosed in publication FR 2 850 989-A1, there are either latches or pins fitting into latches in the ends of the panels. The latches are controlled by a vertical control rod connecting the latches. In this solution, the

latches protrude from the ends of the panels and can be easily damaged during storage and transport. In addition, the latches can remain visible in the finished wall element system, which causes many different drawbacks. There are separate male and female sides in the elements, which interferes with ease of attachment. The end openings are large, which creates an aesthetic drawback, or else the element requires a separate end cover.

In the solution according to the utility model DE 202 11 392 U 1, the catch moves essentially linearly between the open and closed positions, at right angles to the surface of the panel. The large release lever of each catch device is visible on the surface of the panel and is thus not a good aesthetic solution when both sides of the element remain in view. In addition, each catch device must be opened separately, which is difficult, particularly in connection with large panels. The catch mechanisms cannot be combined while the flexible operating lever of the catch is quite large and visible.

EP publication 0507720A2 discloses a compact lock mechanism, in which a spring-loaded catch locks a locking latch, which is attached to the next element. Because the locking is not forced, the locking force remains limited so that such a lock mechanism cannot be satisfactorily applied in large and heavy wall elements. It is difficult to fit external control to a locking mechanism of this kind, because the catch has been made very small.

When used in an exhibition, the following requirements can be set for the elements:

- The elements should be quite large, in order to create a unified surface. The height of the elements is typically 2 - 3 metres, but they are relatively thin. When using large elements, even a large wall can be created rapidly.

- The elements should not have protruding connectors. Protruding connectors can easily be broken when transporting the elements.
- The elements should be freely attachable to each other. Male/female constructions should be avoided, as they limit the connectivity of the elements.
- The connection members of the elements to be attached to each other should have considerable durability, i.e. the connection members should have a large locking force, preferably forced locking.
- It should be possible to link the forced connection members on the same side in such a way as to allow them to all be opened together.
- The elements should preferably have a light-construction profile-bar frame, as well as surface boards to achieve a first-class surface on both sides.
- The elements should have neat and solid end surfaces, in which there are only small openings for the connection members. As the end surfaces of the outermost elements remain visible, they will then not need to be separately covered.

The solution according to the present invention seeks to achieve all of the aforementioned objectives. The partitions according to the invention form a wall element system, which can be rapidly installed and can be detached from each other easily with a single hold. The characteristic features of the invention are stated in the accompanying Claim 1. Correspondingly, the characteristic features of the locking device according to the invention are stated in the accompanying Claim 12. The compact construction of the catch mechanism permits freer design of the element, as the mechanisms are in a small area in the element and are connected by a linearly moving rod, the operating means of which will remain nearly unnoticed in a large wall element, i.e. the panel. The catch mechanisms are simple in

construction, which is an obvious advantage in manufacturing technology.

In one embodiment, the opening of the catch mechanism takes place advantageously by pressing a button on top of the element, or, in high elements, by means of a finger or similar grip sunk into the side of the element. The catch and the rod operating it move linearly, so that the construction can be more easily fitted into a compact space.

The compact catch mechanism can be implemented either using a case comprising a bottom and wall together with a plate-like cover, or using a symmetrically split construction, in which case there will be no need to make openings separately, as they will be in the splitting plane.

A particularly compact construction will be obtained if the catch acts as a slide and the case frame as a guide.

Other preferred embodiments and advantages of the invention are examined hereinafter in connection with examples of applications.

In the following, the invention is described with the aid of examples and with reference to the accompanying drawings.

Figure 1 shows the wall element system assembled, seen at an angle from above.

Figure 2 shows the end of the wall element system and the catch mechanism in it.

Figure 3 shows the catch body with the catch and the insert, seen from the side.

Figure 4 shows the construction of the connected panels, at the catch body.

Figure 5 shows the interior of the catch body, seen at an angle from above, with the insert in the detached position.

Figure 6 shows the interior of the catch body, seen at an angle from above, with the insert attached.

Figure 7 shows a side view of a catch mechanism using an insert with a round cross-section.

Figure 8 shows an end view of the catch mechanism of Figure 7, without the insert.

Figure 9 shows the frames of higher wall elements according to the invention, seen at an angle from above.

Figure 10 shows the frames of lower wall elements according to the invention, seen at an angle from above.

In the example of Figure 1, there are several wall elements, i.e. partitions 1, 2, and 3b, which are relatively thin shell structures, connected to each other at their ends. In the partition 1, the opening mechanism is operated through the openings 14. In the other partitions, there are press-buttons 17 on top of the element. By pressing each button 17, the locks below it open and the corresponding partition can be detached. Here, the partition 1 depicts a large partition, which is also generally considerably higher than other partitions, so that press-buttons 17 could not be used, due to the great height.

The partitions 1, 2, 3a, and 3b can be different, for example, straight 1, curved 2, angle pieces 3a, and cross pieces 3b, Figure 1.

Figure 2 shows the face of the catch mechanism 6 and the opening 20 in it for the bolt. The catch mechanism 6 is constructed inside a separate case, which includes a body 6.1 and a planar cover 16. The plane of the split 6.2 can even be

in the centre, but usually it is preferable for the machining to be (mainly) in only one piece.

In Figure 3, the partition is shown without a surface board and the frame bar 11' of the frame 11 is cut open, making the catch mechanism visible (without its cover). The catch mechanism 6 is in the opened state, i.e. the catch 7 is depressed in the body 6'. The spring 8 tries to lift the catch 7, but it is used in the lower position by means of the rod 9. The catch 7 includes a pin 10 that protrudes from the opening 21, and which is attached to the rod 9. The insert 5 can now be pushed into the opening 20. A hole 23 is made in the frame bar 11.1 at the location of the opening 20. When the insert is pushed in, the tension in the rod 9 is released, when the spring 8 raises the catch. Naturally, the insert 5 can be pushed in with a small force, using an end bevel. The slanting corner surface pushes the catch 7 down, which then clicks shut once the insert 5 is in place.

In Figure 4, the opposing wall elements 1 are shown without the surface boards and in the second of them the frame bar 11' is cut away. In addition, the lefthand catch mechanism 6 is shown without its cover, in order to display the mechanism. The insert 5 and the catch mechanism 6 are adapted to each other so that the two partitions 1 are connected to each other with a very small gap, when the insert 5 secures the elements to each other.

When detaching the partitions from each other, the rod 9 is depressed, either from the press-button 17 at its upper end, or from the finger grip 12 through the hole 14 (Figure 1, large partitions), when the catches 7 open and the partitions separate from each other. The catches can also be made to open by pulling the rod 9 or similar operating member upwards (not shown). In that case, a wire can also act as the operating member.

In Figures 5 and 6, the catch mechanisms are again shown without their covers, for reasons of clarity. Thus, the catch mechanisms 6 are enclosed cases, which are formed of a cup-like body 6.1 and a cover 16. The body 6.1 comprises a bottom 13 and side walls 19. The cases can also be formed of two parts that are symmetrical to each other, if the cutting plane would then be in centre (not shown), in which case the openings 20 and 21 would not need to be machined or equipped with a core (see Figures 3 and 4 above).

According to Figure 5, there are recesses 5.2 in the square intermediate insert, preferably at all four corners, which form counter-surfaces 5.1 to an axial pull. A full-height fin ridge remains between the recesses 5.2. In the catch 7, there are a locking surface 7.1 corresponding to the counter-surface 5.1 and a surface 7.2 with the same shape as the recess. In Figure 6, the catch mechanism 6 has locked the insert into its body with the aid of a spring 8. The ridge 5.3 presses against the internal surface of the opening 20, on the opposite side relative to the counter-surfaces 7.1 and 7.2, when the insert 5 cannot rotate by the pressure of the catch 7. Except for the rod 9, the catch mechanism 6 is in a compact case, which is formed of a body 6.1 and a planar cover, which has been removed in the figure. In the body 6.1, there is a bottom 13 and walls 19, the internal surface of which forms a guide, with the catch 7 acting as a slide.

When the partitions, i.e. panels, are joined together, the inserts 5 with the recesses are pushed into the catch mechanism 6 of the second panel and more precisely its catch body, where they lock. After that, the second partition is pressed against the first, in such a way that the inserts 5 press into the catch mechanism 6 of the second partition. The panels then lock to each other.

For storage, the inserts 5 can be detached from the partitions and stored separately.

According to Figures 7 and 8, the insert 5 can also have a round cross-section. The same reference numbers as above are used for components that are functionally similar. In a round insert 5, there is a counter-surface 5.1 for axial locking, which is connected to a conical support surface 5.2. In this version, the side facing the locking surface of the catch 7 of the opening 20 extends as far as the end of the locked insert 5, so that it supports in from the opposite side to the locking surface and the insert cannot rotate.

The partitions are preferably manufactured, according to Figures 9 and 10, as cellular structures, from which the surface boards have been removed. The frame is formed by bars 11, which are attached at their ends to corner pieces 18 that secure them. Figure 10 shows an opening mechanism operated by a press-button 17. In Figure 11, each rod 9 is operated by a finger grip 12, which is located at a height such that a normal person can easily reach it.

The bars 11 can be of aluminium, reinforced fibre composite, or simply of plastic. The surface boards are of plastic, plywood, MDF, or some other furnishing material. Wood can also be considered.

The inserts are preferably of aluminium. The catch mechanism 6 is preferably manufactured as a moulded piece of composite plastic. The shells of the body are, for example, of moulded plastic or aluminium. Spaces for the components of the catch mechanism can easily be machined into a solid wooden framework.

Claims

1. Wall element system, comprising two or more wall elements (1, 2, 3a, 3b) attached to each other at their ends, the attachment means comprising catch mechanisms and inserts,

- each wall element (1, 2, 3a, 3b) comprises a relatively thin shell structure, which has sides and narrow ends, and in which
- in each wall element (1, 2, 3a, 3b) there are at least two catch mechanisms (6) installed in the same end of the wall element, and in which
- each catch mechanism (6) is arranged to receive a toothed two-ended insert (5) in a direction at right angles to the end, and to lock its end forcibly, when the opposite end of the insert (5) is arranged to be locked into the next wall element by means of a catch mechanism (6) for connecting the wall elements to each other, and in which
- the catch mechanism (6) comprises a body (6') receiving the insert (5), in which there is a linearly moving catch (7) loaded by a spring (8), as well as operating members for opening the catch,

characterized in that

- the movement of the catch (7) is set on the plane of the wall element (1, 2, 3a, 3b), and
- in each wall element there is a common rod (9) and a finger grip (12, 17) in it, for operating two or more catch mechanisms (6) in the same end (1, 2, 3a, 3b) of the wall element, and
- each catch mechanism (6) is formed as a compact unit, comprising a case (6.1, 16), which surrounds the said body (6') and catch (7), and
- the said operating members for opening the catch comprise the said rod (9) and a pin (20), which extends from the catch (7) to the said rod (9) outside the case (6.1, 16).

2. Wall element system according to Claim 1, characterized in that, in the case (6.1, 16) of the catch mechanism (6), there is a splitting plane (6.2) parallel to the surface of the wall element (1, 2, 3a, 3b).

3. Wall element system according to Claim 2, characterized in that the case (6.1, 16) comprises a cup-like body (6.1) and a planar cover (16), and in which there are a bottom (13) and walls (19) in the body (6.1).

4. Wall element system according to Claim 3, characterized in that the finger grip comprises a press-button (17) fitted to the upper end of the rod (9).

5. Wall element system according to Claim 4, characterized in that the finger grip of the operating member is fitted to a finger support (12), which is attached to the said rod (9), through an opening (14) in the side surface of the element.

6. Wall element system according to any of Claims 1 - 5, characterized in that each wall element (1, 2, 3a, 3b) includes an element frame (11) consisting of profile bars (11') and surface boards attached to it, and in which the body (6.1, 16) of the catch mechanism (6) is at least partly inside, and attached to a profile bar.

7. Wall element system according to Claim 6, characterized in that the case (6.1, 16) is fitted to the wall on the side of the end of the profile bar (11'), in which a hole (23) is created at the location of the opening (20) in the case (6.1, 16).

8. Wall element system according to any of Claims 1 - 7, characterized in that the catch (7) is formed as the slide itself, the body (6.1) forming a guide for it.

9. Wall element system according to any of Claims 1 - 8, characterized in that the insert (5) is square.

10. Wall element system according to any of Claims 1 - 8, characterized in that the insert (5) is round.

11. Wall element system according to any of Claims 1 - 10, characterized in that a spring (8) loading the catch (7) in the locking direction is fitted inside the case (6.1, 16).

12. Locking device for connecting wall elements to each other, which includes

- a case (6.1, 16), comprising a body (6') equipped with guides, as well as a first opening (20) for an insert (5) to be pushed inside, and
- a catch (7) operating as a slide in the said guides, which is arranged in one position to forcibly lock the toothed end of the insert (5) and in the opposite position to permit the axial movement of the insert in and out,
- a spring (8) located in the case, arranged to press the catch (7) into the said locking position,

characterized in that

- the locking device includes in addition a pin (20), which extends from the catch (7) to outside the case (6.1, 16) through the second opening (21), being arranged to be connected to an opening member, and that
- in the case (6.1, 16), there is a splitting plane (6.2) parallel to the common plane of the movements of the catch and insert, and that
- the case (6.1, 16) comprises a cup-like body (6.1) and a planar cover (16), and in which body (6.1)there are a bottom (13) and walls (19).

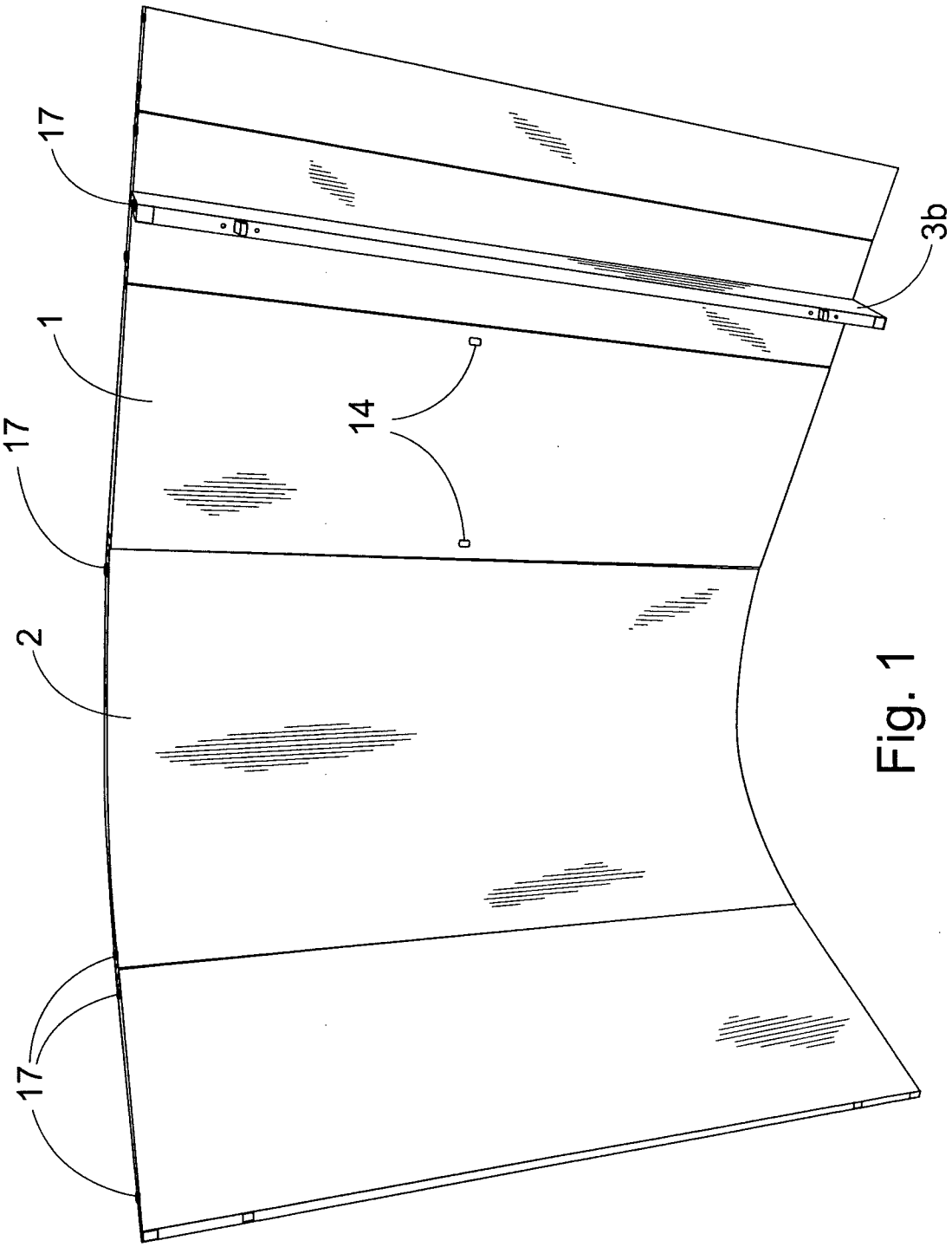

Fig. 1

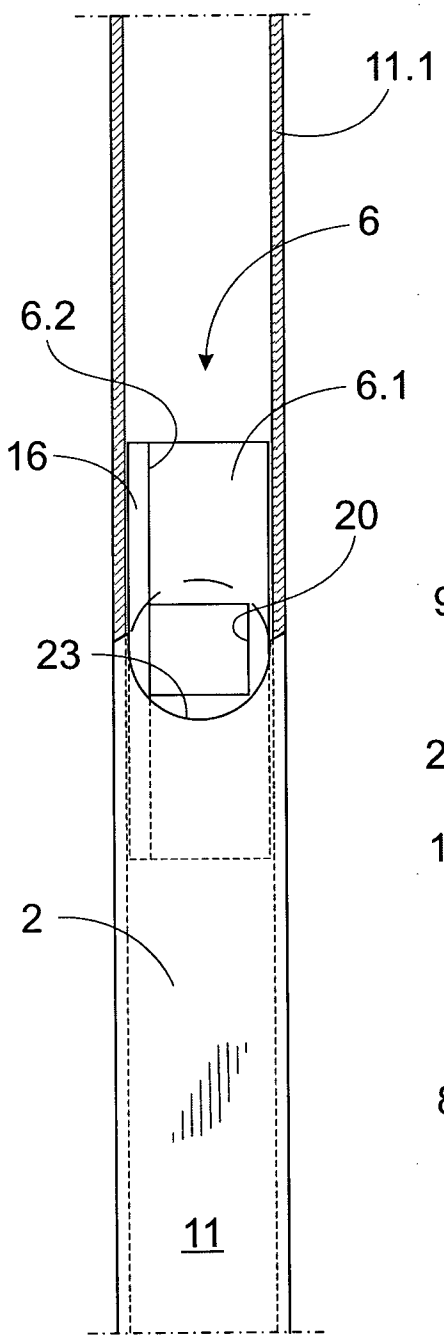

Fig. 2

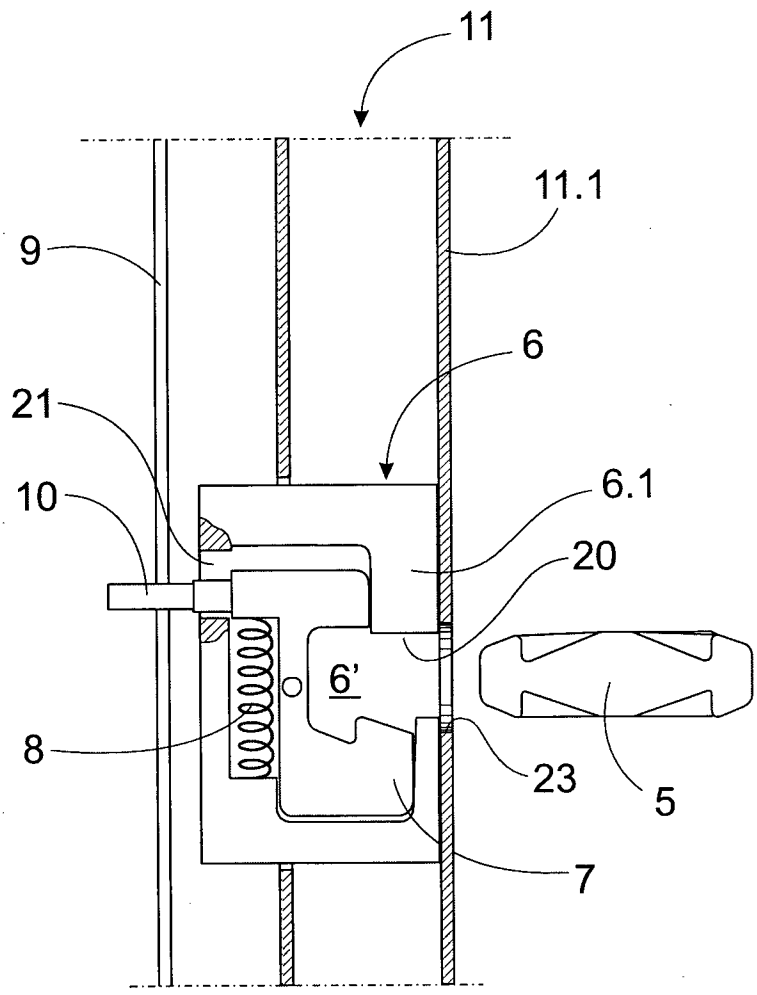

Fig. 3

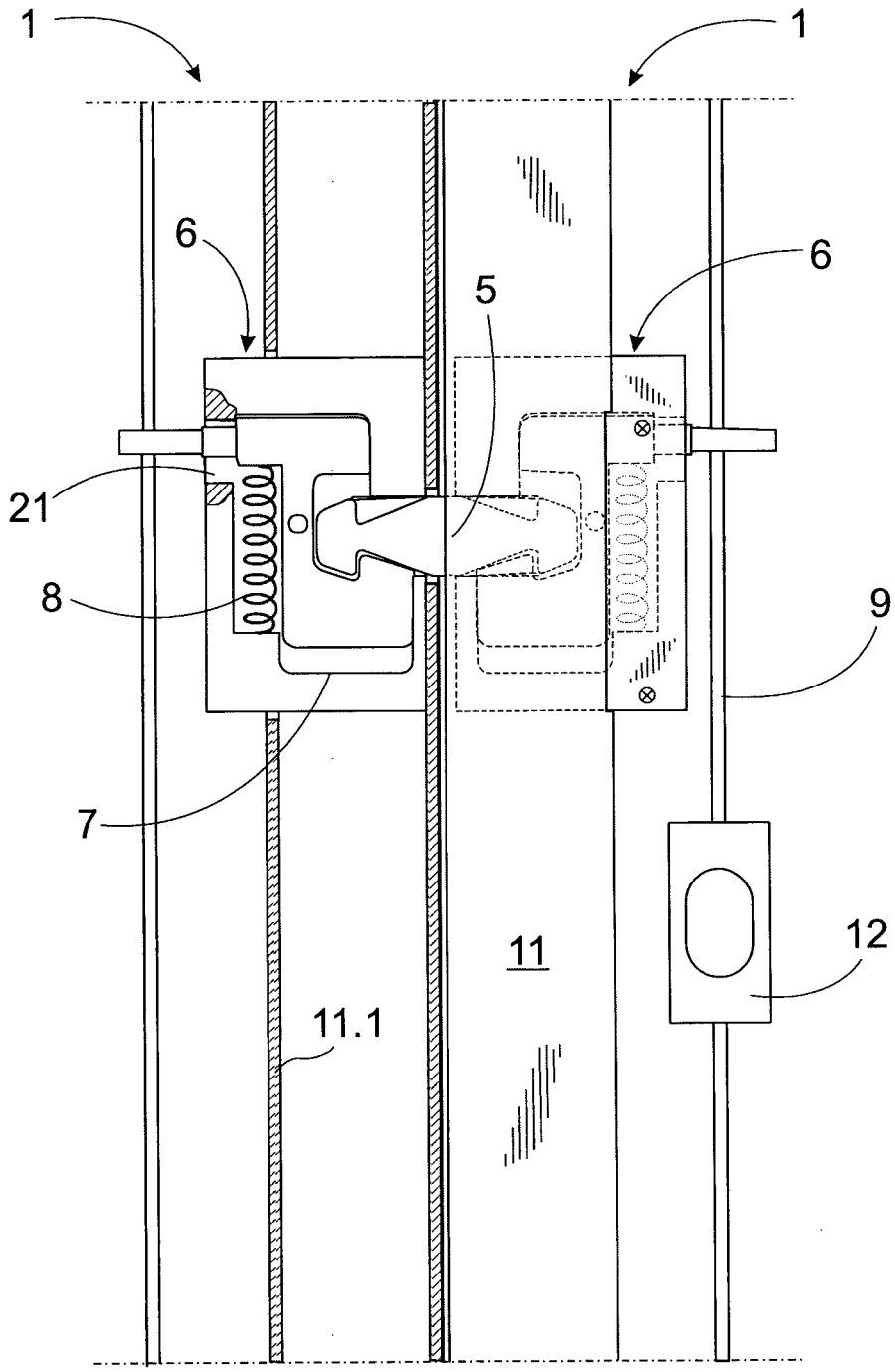

Fig. 4

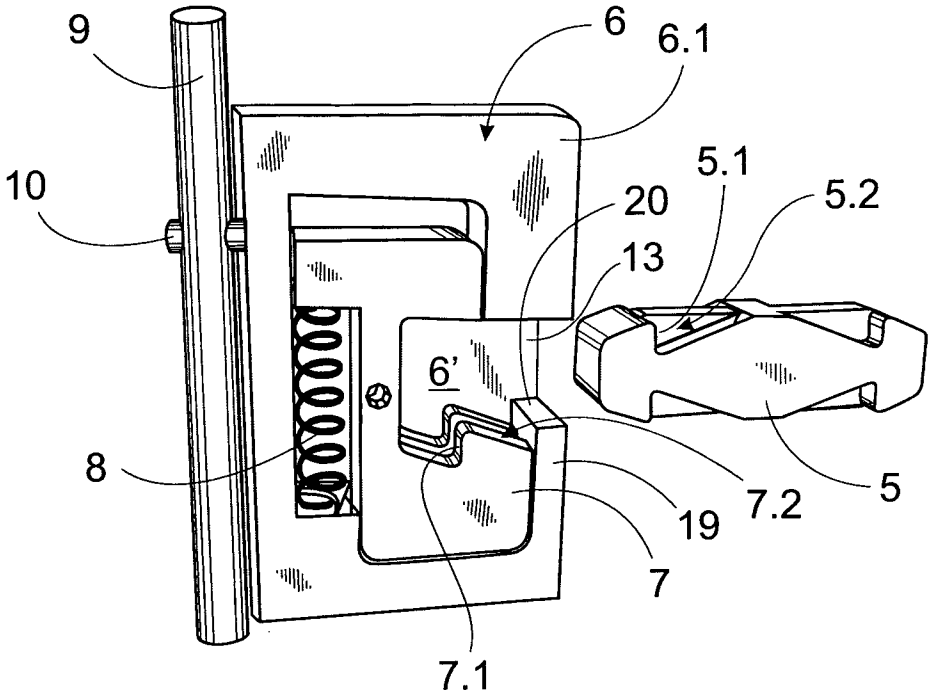

Fig. 5

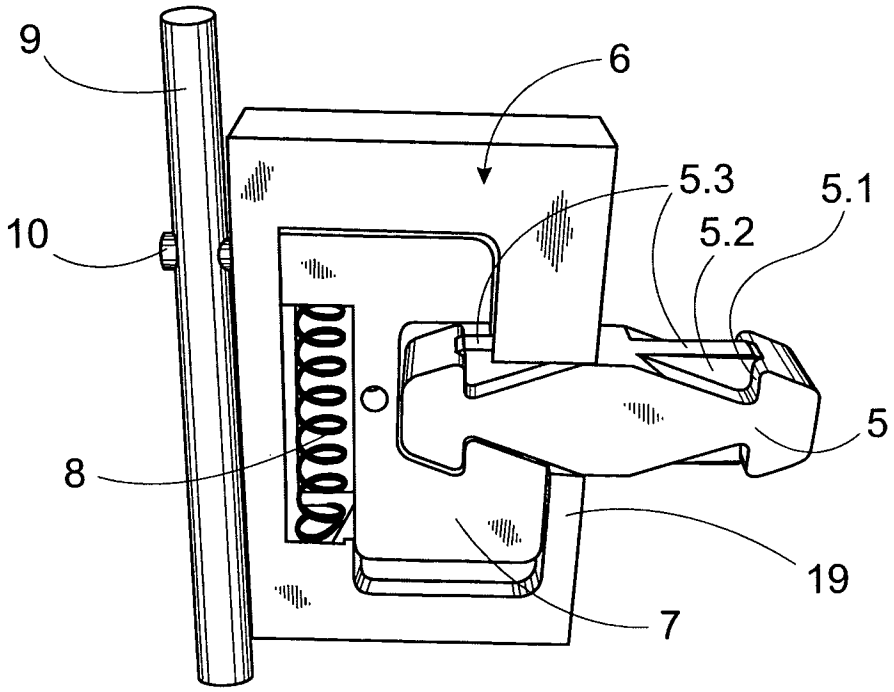

Fig. 6

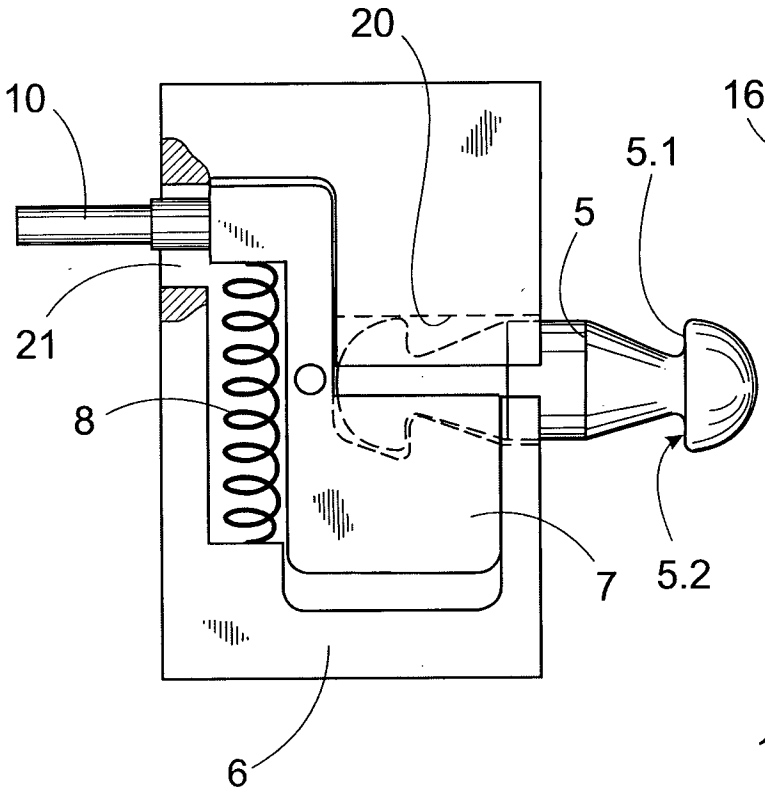

Fig. 7

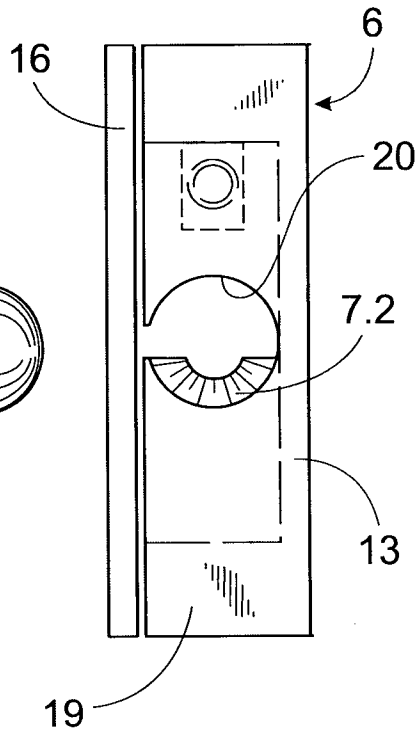

Fig. 8

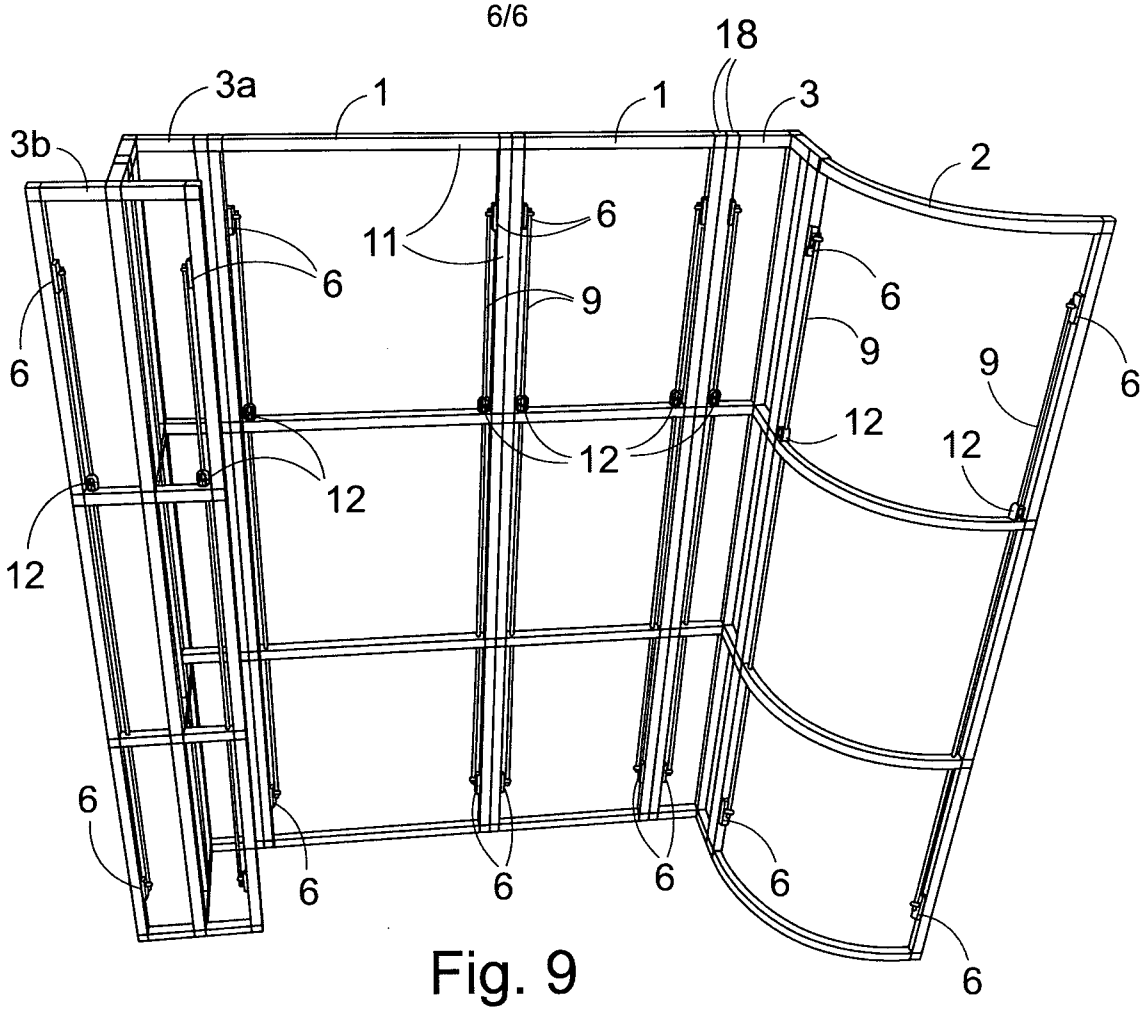
18
3a
1
1
3
3b
2
11
6
6
6
9
6
9
9
6
12
12
12
12
6
6
6
6
6
6

Fig. 9

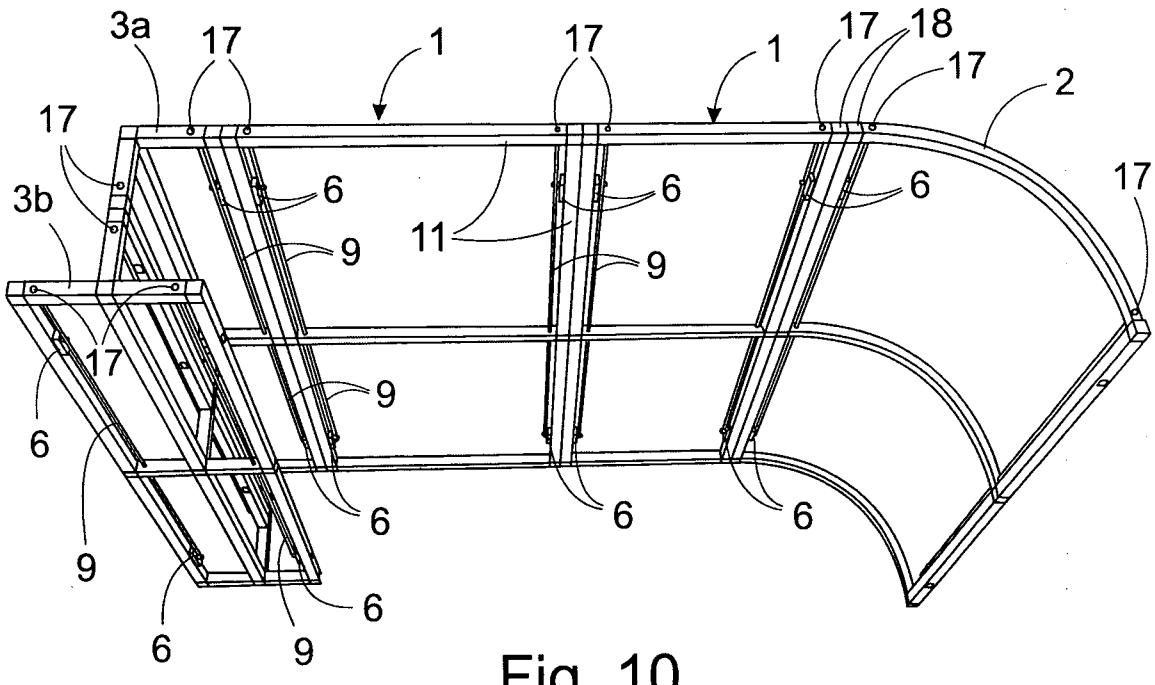
3a
17
1
17
1
17
18
17
2
17
17
3b
6
6
6
11
9
9
6
17
9
9
6
6
6
6
9
6
6
9

Fig. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2009/050633

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
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: E04B, E05B, E05C, F16B

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

SE,DK,FI,NO classes as above

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

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 20211392 U1 (ROMMERSBACH, C.), 5 December 2002 (05.12.2002), page 3, line 7 - page 5, line 8, figures 1,2, abstract ---	1-12
A	FR 2850989 A1 (LAPEYRE), 13 August 2004 (13.08.2004), page 4, line 32 - page 5, line 15; page 9, line 9 - page 11, line 14, figures 1-8, abstract ---	1-12
A	US 5524941 A (P.D. FLEMING), 11 June 1996 (11.06.1996), figures 1-4, abstract ---	1-12

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 October 2009	23.10.2009
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Ingemar Hedlund / MRo Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2009/050633

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0032789 A1 (KELLY, E.W.J.), 29 July 1981 (29.07.1981), figures 1-6, abstract ---	1-12
A	GB 2168748 A (M.L. SMITH), 25 June 1986 (25.06.1986), figures 1-9, abstract --- --------	1-12

International patent classification (IPC)

E04B 1/61 (2006.01)
E04B 2/74 (2006.01)
E05B 63/22 (2006.01)
E05C 1/00 (2006.01)
E05C 7/04 (2006.01)
F16B 5/00 (2006.01)

Download your patent documents at www.prv.se
The cited patent documents can be downloaded:

- From "Cited documents" found under our online services at www.prv.se (English version)
- From "Anförda dokument" found under "e-tjänster" at www.prv.se (Swedish version)

Use the application number as username. The password is **QNJLJEVKOX**.

Paper copies can be ordered at a cost of 50 SEK per copy from PRV InterPat (telephone number 08-782 28 85).

Cited literature, if any, will be enclosed in paper form.

DE	20211392	U1	05/12/2002	NONE		
FR	2850989	A1	13/08/2004	NONE		
US	5524941	A	11/06/1996	NONE		
EP	0032789	A1	29/07/1981	IE	800047 L	10/07/1981
GB	2168748	A	25/06/1986	NONE		