



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.06.1997 Bulletin 1997/25

(51) Int Cl. 6: **E05D 13/00, E06B 9/84,
F16H 55/26, B21K 1/76,
B23P 15/14**

(21) Application number: **96850207.0**

(22) Date of filing: **10.12.1996**

(84) Designated Contracting States:
CH DE FR GB LI NL

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(30) Priority: **12.12.1995 SV 9504443**

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(54) **Guide track of U-shaped cross-section for a vertically movable door and method of producing the same**

(57) A method of manufacturing a U-section guide rail (3) for slidably receiving the edges (2) of a generally vertically movable shutter or door-like member (1), the guide rail including an engagement element (4) for coaction with a latching mechanism (5) intended for connection to a shutter hoist element, e.g. to a hoist line or a hoist belt, wherein the latching mechanism is adapted to be moved into and out of latching engagement with the engagement element (4) when the tension force acting on the latching mechanism (5) is removed therefrom or when a tension force is applied thereto, and wherein the method comprises the steps of

- extruding a U-section guide rail (3) with an undercut groove (6, 8) in its bottom wall;
- extruding a profiled element (15) having a tooth-like configuration in cross-section;
- separating from the profiled element (15) transversely thereto individual sections (13) that have a width which enables the sections to fit into the undercut groove (6, 8); and
- inserting the thus formed individual sections (13) into the undercut groove (6, 8) sequentially such as to form a continuous tooth-like configuration that faces towards an edge (2) of the movable shutter.

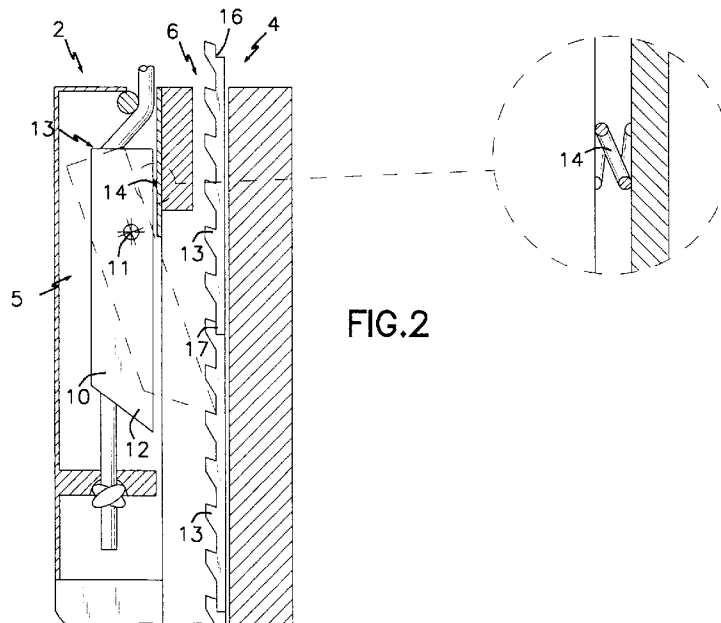


FIG.2

Description

The present invention relates to a method according to the preamble of Claim 1, and to apparatus according to the preamble of Claim 3.

The edges of a vertically movable shutter or door-like device, hereinafter referred generally as a shutter, are normally received slidably in essentially U-section guide rails, through the medium of hoist elements, e.g. hoist lines or belts. In order to prevent the shutter from falling unimpeded should one of these supportive lines break or if the load acting thereon falls beneath a given predetermined value, the U-section guide rail includes engagement means for coaction with a latching mechanism that is intended to be mounted between a shutter hoist element, e.g. a shutter lifting line or belt, and brought into and out of latching engagement with said engagement means when relieving the latching mechanism of tension force or when applying tension force to said latching mechanism, through the medium of the hoist elements.

Should one of the supportive lines break, the shutter is rendered safe, e.g., by virtue of the free outer end of a movable pawl in the latching mechanism moving into latching engagement with recesses or notches formed in the bottom of the U-section guide rail, or into latching engagement with an elongated latching profile having a tooth-like configuration in cross-section and screwed to the bottom of the guide rail or fastened thereto in some other suitable manner.

The profiled sections used for the shutter-edge receiving guide rails, i.e. for forming slide guides which receive the edges of a mounted shutter, door or corresponding device, and also other components, for instance the profiled sections used as frame components for defining the shutter edges, are conveniently produced by extrusion, e.g. the extrusion of aluminium. One drawback with extruded profiled sections is that they can only be profiled in their longitudinal direction and not in their transverse direction, although this is necessary in order to provide the latching tooth-like configuration of the U-section guide rail. Neither can the aforesaid recesses or notches be formed in the U-section profile in conjunction with the extrusion process, but must be formed, e.g. punched, in the profile in a subsequent manufacturing stage, which involves much more work and therewith greater manufacturing costs.

It is not normally necessary for the engagement means, or pawl, to be active along the full length of the guide rail and it suffices for the pawl to be active over a limited part thereof. Consider, for instance, the case when the latching mechanism is positioned at the upper edge of the shutter. In this instance, it would be desirable to be able to vary the active length of the engagement means in a simple fashion.

Accordingly, the object of the present invention is to provide a method whereby a U-section guide rail can be produced by extrusion together with a rail-associated

toothed engagement element for coaction with a shutter latching mechanism whose active length can be readily varied.

This object is achieved with the method comprising the method steps set forth in the characterizing clause of Claim 1.

In accordance with the invention, the U-section guide profile and the engagement element can both be produced by extrusion, by extruding a U-section guide rail that has an undercut groove in the bottom wall of the rail, and by extruding an elongated profiled section that has a toothed-configuration in cross-section, and separating sections transversely from the profiled element with a width at which the separated sections can be fitted into, the undercut groove, and then inserting the thus formed individual sections sequentially in said undercut groove so as to form a continuous sequence of tooth-like engagement elements which face towards one edge of the movable shutter. The active length of the engagement element sequence can be easily adapted by appropriate selection of the number of sections inserted into the undercut groove and their positions in a vertical direction.

Other features of the invention and advantages afforded thereby will be evident from the following Claims and also from the following description of an exemplifying embodiment made with reference to the accompanying drawings, in which

Fig. 1 is a sectional view of a U-section guide rail for coaction with a vertically movable shutter;

Fig. 2 is a vertical sectioned view taken on the line II-II in Fig. 1; and

Fig. 3 is a perspective view of a profiled element and showing an individual section said element that has been separated from said element along a section line.

The reference numeral 1 in Fig. 1 designates generally a shutter or corresponding door-like member (not shown in detail) whose edges 2 are provided with respective strips or frame parts that are guided in essentially U-section guide rails 3, said guide rails preferably being extruded from aluminium. The upper part of the shutter 1 is suspended from a box-like housing which is mounted at the upper defining surface of the shutter opening and which includes a hoist mechanism including lines, belts or like devices connected to the shutter 1 and functioning to move the shutter up and down through the medium of the hoist mechanism, so as to open and close the shutter or door opening (not shown) respectively. The shutter edges 2 are received slidably in the guide rails in a manner to restrict lateral movement of the shutter 1 as it is moved axially, or vertically.

The U-section guide rail 3 includes an engagement element 4 which coacts with a latching mechanism 5

such as to prevent the shutter 1 from falling unimpeded should one of the supportive lines break. The engagement element is received in an undercut groove 6 formed by two mutually opposing projections 7, 7' which extend along the rail bottom wall in mutually spaced relationship and each of which terminates at a distance from the other so as to form an opening 8 in the bottom wall of the U-section guide rail 3. The engagement element 4 includes latching teeth 9 which are accessible to a latching pawl 10 included in the latching mechanism. The pawl 10 is pivotally mounted on a pivot shaft or pin 11 and the lower free end 12 of the pawl is able to engage a tooth 9 as said free end swings outwards from the shutter 1, as shown in Fig. 2. The latching pawl is provided on one side thereof with a recess 13 through which the shutter supporting line passes. The latching pawl is provided on the opposite side, above the pivot pin 11, with a coil spring 14 which endeavours to swing the free end 12 of the pawl 10 into engagement with the teeth 9 on the element 4. However, the spring characteristic of the coil spring 14 is chosen so that the spring force will be balanced by the weight of the shutter, i.e. by virtue of the abutment of the hoist line with the latching pawl 10. If the hoist line should break, the latching pawl 20 will pivot in response to the spring force, so that the free end 12 of said pawl will engage the teeth 9 of the engagement element 4, as shown in chain lines in Fig. 2.

In order to enable the active length of the engagement element 4 to be adjusted, said element is constructed of a plurality of individual sections 13 which can be inserted sequentially into the undercut groove 6, 8 on the U-section guide rail 3. Thus, all that is required is securement of the first and the last sections 13 in the groove 6, 8 in the U-section guide rail 3 in some suitable manner, for instance with the aid of screws.

The engagement element 4 is conveniently fabricated by extruding a profile blank, preferably an aluminium blank, into an elongated profiled element 15 having a toothed-configuration in cross-section for receiving the free end 12 of the latching pawl 10 of the latching mechanism 5 (Fig. 3). End parts are separated from the profiled element transversely thereto such as to form the aforesaid individual sections 13 having a width such as to fit into the undercut groove 6, 8 on the bottom wall of the U-section guide rail 3.

These individual sections 13 are then inserted sequentially into the through-passing undercut groove 6, 8 with the teeth of said sections facing away from the bottom wall of the rail 3, i.e. such as to form a continuous tooth-like configuration which faces towards one edge of the shutter and which is accessible to the latching pawl 10 through the opening 8 extending along the groove 6.

The extruded profiled element 15 is provided with grooves or recesses 16 along one longitudinally extending edge part thereof and with tongues 17 along the other longitudinally extending edge part of said element,

these tongues and grooves being insertable into one another to assist in mutual connection of the individual sections 13 inserted into the groove 6; c.f. also Fig. 2.

It will be understood that the invention is not restricted to the described and illustrated exemplifying embodiments thereof and that this embodiment can be modified in several respects within the scope of the following Claims. For instance, the guide rail need not have a U-shaped cross-section, but may have any configuration suitable for receiving the edges of the vertically movable shutter or door-like member.

Claims

1. A method of manufacturing a U-section guide rail (3) for slidably receiving the edges (2) of a generally vertically movable shutter or door-like member (1), said guide rail including an engagement element (4) for coaction with a latching mechanism (5) intended for connection to a shutter hoist member, e.g. in the form of a hoist line or a hoist belt, wherein the latching mechanism is adapted to be moved into and out of latching engagement with the engagement element (4) when the tension force acting on the latching mechanism (5) is removed therefrom or when a tension force is applied thereto, and wherein the method comprises the steps of
 - extruding a U-section guide rail (3) having an undercut groove (6, 8) in its bottom wall;
 - extruding a profiled element (15) having a tooth-like configuration in cross-section;
 - separating from the profiled element (15) transversely thereto individual sections (13) that have a width which enables the sections to be fitted into the undercut groove (6, 8); and
 - inserting the thus formed individual sections (13) into the undercut groove (6, 8) sequentially, such as to form a continuous tooth-like configuration that faces towards an edge (2) of the movable shutter.
2. A method according to Claim 1, **characterized** by appropriately selecting the number of individual sections (13) inserted into the undercut groove (6, 8) so as to enable the length of the engagement element (4) to be adjusted; and establishing the vertical position of the engagement element by positionally fixing the individual section (13) located furthest down in the undercut groove.
3. A U-section guide rail (3) for slidably receiving the edges of a generally vertically movable shutter or door-like member (1), wherein the guide rail includes an engagement element (4) for coaction with a latching mechanism (5) intended for connection to a shutter hoist element, e.g. to a hoist line or belt,

and wherein the latching mechanism is adapted for engagement with and disengagement from the engagement element (4) in response to removing a tension force from or applying a tension force to the latching mechanism (5) through the medium of the hoist elements, **characterized** in that the bottom wall of the U-section guide rail (3) includes an undercut groove (6, 8); and in that the engagement element (4) is comprised of a plurality of individual sections that are insertable sequentially in the undercut groove (6) such as to enable the length of the engagement element (4) to be adapted to the intended length of the guide rail, wherein the individual sections are obtained by separating said sections (13) transversely from an elongated, extruded profiled element (15) having a tooth-like configuration in cross-section, wherein the width of said individual sections (13) is such as to enable the sections to fit into the undercut groove (6, 8) so as to form said engagement element (4) in the form of a continuous tooth-like configuration which faces towards an edge (2) of the movable shutter and which is accessible to the latching mechanism (5) through the opening of the undercut groove (6, 8).

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4. A guide rail according to Claim 3, **characterized** in that one edge of the extruded profiled element (14) includes grooves or recesses (16) and the other edge of the element (14) includes tongues (17), said tongues and grooves functioning to couple one end of an individual section (13) with the opposing end of a preceding or following adjacent individual section (13) when inserting said individual sections into the undercut groove (6, 8).

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5. A guide rail according to any one of Claims 3-4, **characterized** in that the through-passing undercut groove (6, 8) which receives the individual sections (13) is defined by two mutually opposing projections (7, 7') extending in spaced relationship with the bottom wall of said rail (3).

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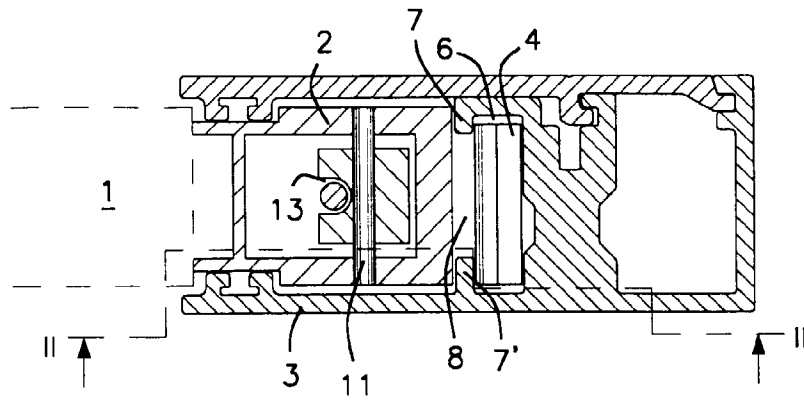


FIG. 1

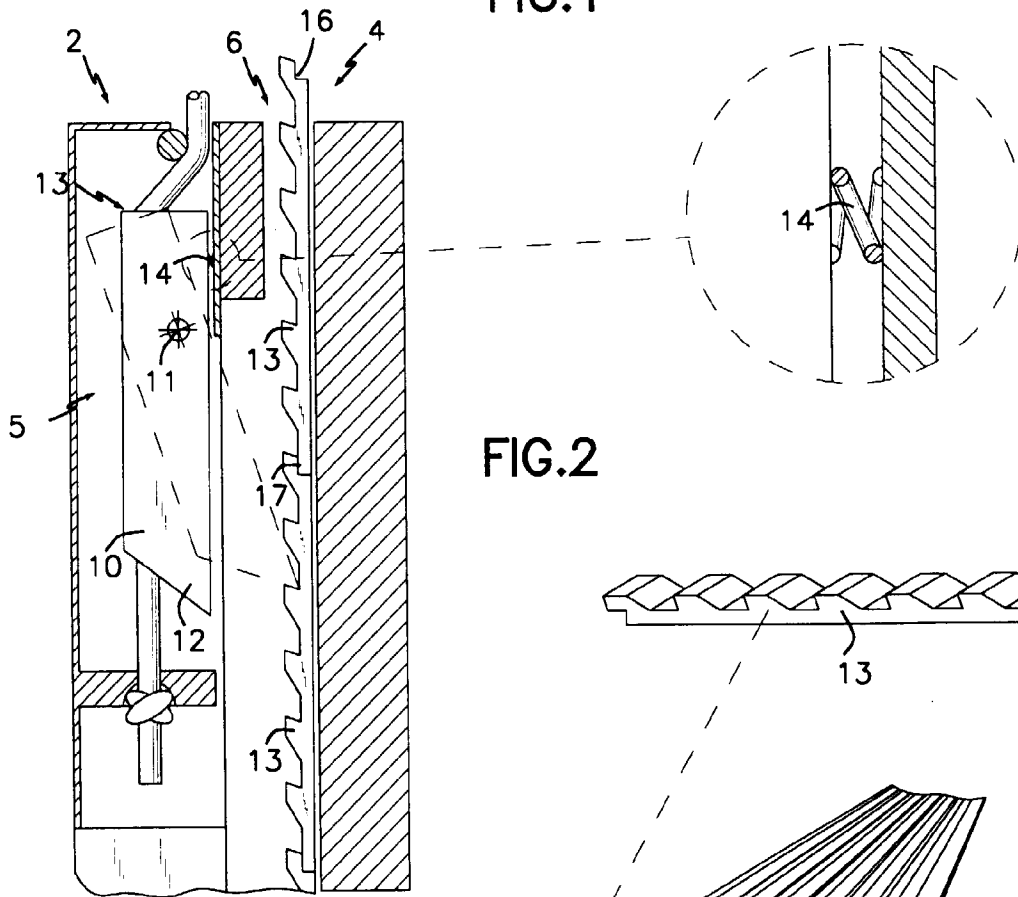


FIG. 2

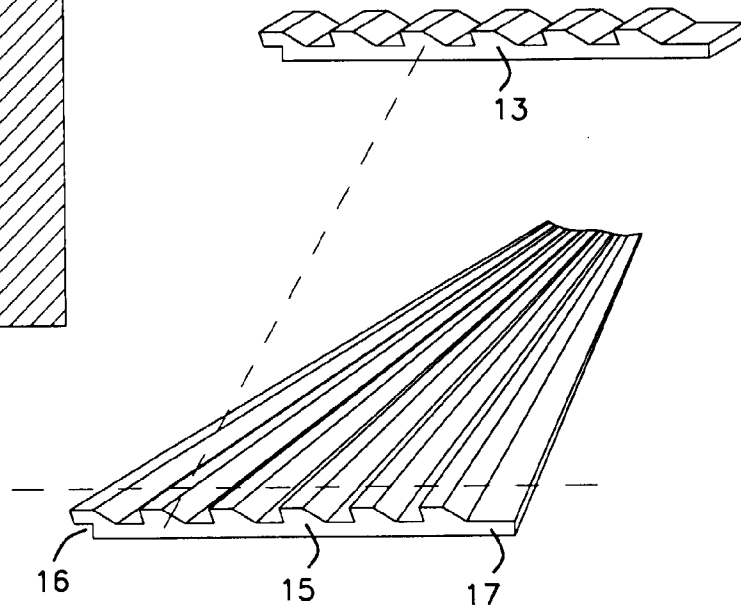


FIG. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 85 0207

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE 34 13 236 A (HÖRMANN) * page 12, last paragraph - page 13, paragraph 2; figures * ---	1,3,5	E05D13/00 E06B9/84 F16H55/26 B21K1/76 B23P15/14
A	DE 10 25 756 B (MÜHLEISSEN) * column 3, line 47 - line 50; figures * ---	1,3	
A	EP 0 558 973 A (MARANTEC) * column 4, line 39 - column 6; figures * -----	1,3-5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 24 March 1997	Examiner Van Kessel, J
CATEGORY OF CITED DOCUMENTS		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	
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