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(54) **EASY TO INSTALL OVERHEAD DOOR**

(57) A description is given of a method of installing an overhead door by securing profiles at least provided with a spring packet around a doorway. Movable door panels which are pivotally attached to each other are situated between said profiles, after which the spring

packet already subjected to a tensile stress is coupled to the door panels which are subsequently moved upwards by means of the slackening spring packet, after which the overhead door is adjusted.

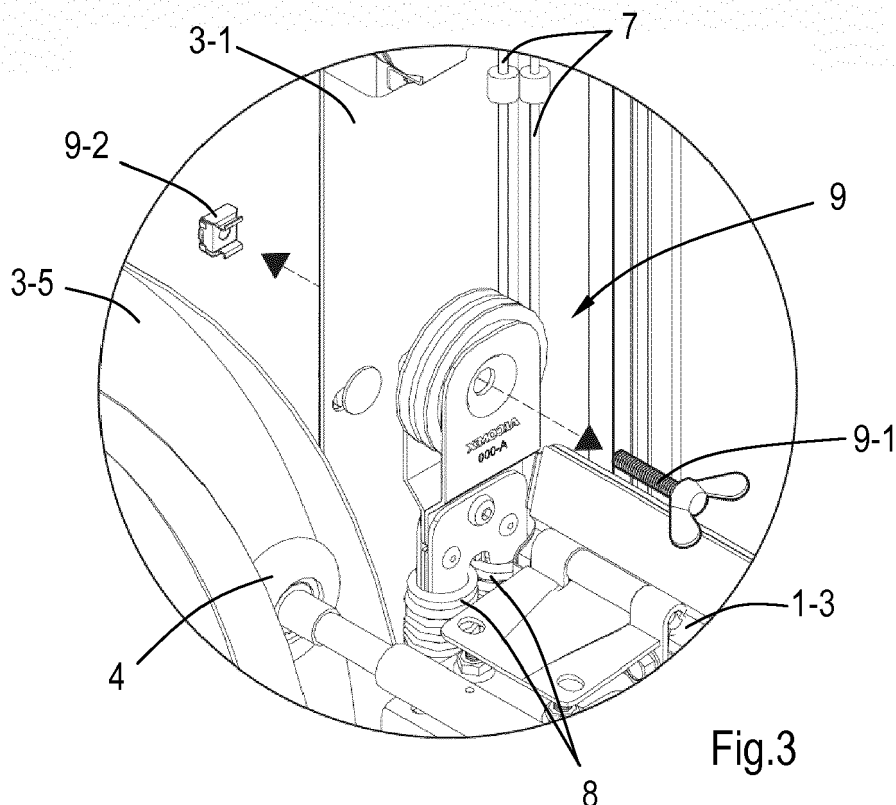


Fig.3

EP 3 243 988 A1

Description

[0001] The present invention relates to a method of installing an overhead door by securing profiles at least provided with a spring packet around a doorway, movable door panels which are pivotally attached to each other being arranged between said profiles, after which the spring packet is coupled to the door panels and the overhead door is adjusted.

[0002] The present invention also relates to a profile which is provided with a spring packet and which can suitably be used in the method.

[0003] Such a method is known from practice. According to this method, profiles are mounted around the doorway. Runner profiles provided with a spring packet on either side of the doorway are usually secured to said profiles. Between said profiles, door panels of the overhead door are pivotally attached to each other. The door panels, which are movable in runner profiles and which are connected to each other, are subsequently moved upwards, after which the spring packet is coupled, in unstressed state, to the door panels by means of ropes and pulleys present in the profile.

[0004] A drawback of the known method is that the interconnected door panels mounted between the profiles represent a considerable weight which has to be lifted by sometimes at least 3 or 4 persons in order to meet the safety regulations concerning the maximum acceptable lifting weight.

[0005] It is an object of the present invention to provide a safe method of installing an overhead door which can be carried out with fewer staff.

[0006] To achieve this, the method according to the invention is characterized in that the overhead door is installed by securing profiles at least provided with a spring packet around a doorway, movable door panels which are pivotally attached to each other being arranged between said profiles, after which the spring packet already subjected to a tensile stress is coupled to the door panels which are subsequently moved upwards by means of the relaxing spring packet, after which the overhead door is adjusted.

[0007] An advantage of the method according to the invention resides in that the tensile stress in the already pre-compressed spring packet is beneficially used as a released lifting force when the interconnected door panels are moved upwards by inter alia the springs. By virtue thereof, less lifting force and fewer staff during installation is required, while the relevant ergonomic regulations are still met. As a result, the risk of calamities such as the door panels getting stuck, warping or falling to the ground is reduced when the door panels are lifted using less manpower. In addition, the method according to the invention can be carried out with greater safety because the spring force exerted by the springs during lifting the interconnected door panels enables better control of the lifting operation. It should be borne in mind that the weight of overhead doors frequently exceeds 100 kilogram, and

if the panels, which are coupled to each other and which are in a raised position, fall during installation, they cannot be stopped, causing a considerable amount of kinetic energy to be released when they drop to the ground, possibly leading to substantial material and/or immaterial damage.

[0008] An embodiment of the method according to the invention is characterized in that the door panels rest on a rope frame engaging, with the spring packet, on either side of a removable locking element, and in that the spring packet subjected to a tensile stress and the interconnected door panels are coupled by removing said locking element.

[0009] Removing said locking element is easier if the abovementioned coupling operation is carried out when the forces exerted by the spring packet and the interconnected door panels at the location of the locking element are more equal to each other.

[0010] A further embodiment of the method according to the invention is characterized in that profiles are located on either side of the door, which profiles each comprise a pre-compressed spring packet.

[0011] In this practically preferable case, both sides of the interconnected door panels to be lifted are supported by the spring packet during installation of the door. As a result, the risk of warping of the panels when lifting them is negligibly small.

[0012] A further embodiment of the method according to the invention is characterized in that the interconnected door panels are subsequently moved downwards against the spring force of the spring packet and, if necessary, a next door panel is secured thereon.

[0013] The door panels can be readily moved downwards against the spring force of the spring packet and maintained in that position, therefore a next, possibly last door section- if it has not been fitted yet- can be readily provided.

[0014] The invention further relates to a profile which can suitably be used in the method described herein, and which is characterized in that the spring packet in the relevant profile comprises a plurality of pre-compressed extension springs. In practice, the pre-compressed spring packet is safely confined in the profile.

[0015] Further detailed, possible embodiments, which are set forth in the remaining claims, are mentioned together with the associated advantages in the following description.

[0016] The method and the relevant profile according to the present invention will now be explained in greater detail with reference to the figures mentioned below, in which corresponding components are indicated by the same reference numerals.

In the figures:

Figures 1a, 1b and the detail of fig. 1c show a first step in the implementation of the method according to the invention for mounting a first door panel between the profiles of an overhead door to be installed

around a doorway;

Figures 2a and 2b show the assembly of, respectively, a second and a third door panel as part of the implementation of the method according to the invention;

Figure 3 shows a possible embodiment of a locking element which in this case is a bolt end which can be readily removed when forces exerted in situ by a spring packet and the mass of interconnected door panels substantially reach a balance;

Figure 4 shows the lifted door panels maintained in said position close to the inventive profile provided with the initially pre-compressed spring packet; and Figure 5 shows the closed overhead door, after it has been installed in accordance with the method, comprising all the interconnected door panels.

[0017] Figures 1a and 1b show how in the first instance a door panel 1-1 forming part of an overhead door 2, which is also referred to as sectional door, is fitted between vertical profiles 3-1, 3-2. Normally, the overhead door 2, which can be raised, is fitted in and/or to a doorway. To achieve this, the profiles 3-1, 3-2 are attached to the doorway and part of the profiles 3-1, 3-2 comprise a track for wheels 4 shown in figure 1c, thereby allowing the door panels 1 to be coupled with said wheels to move within said track. As shown in figures 1a and 1b, the lower edge of the lowest door panel 1-1 is temporarily restrained in a position slightly above the bottom of the doorway. For this purpose, a stop 5 can be inserted into the respective vertical profile 3-1, 3-2, which precludes a downward movement of the panel 1-1. In addition, a space is thus created allowing one or more panels to be interconnected to be moved upwards at a later stage. In general, the panel 1-1 is attached at the angular points, not necessarily all four angular points however, to the relevant wheels 4. In general, the axle 6 of only the lowest wheels 4 is connected to a rope frame, which will be explained in more detail hereinafter, which includes the rope 7 which is rotatable about the axle 6, and which is duplicated in this case.

[0018] Figure 2a schematically shows how the second door panel 1-2 comprising wheels 4 is movably fitted, in a similar manner, between the profiles 3-1 and 3-2 and has a hinged connection to the first door profile 1-1. In general, these wheels 4 are not connected to the rope frame.

[0019] Figure 2b shows how the third door panel 1-3 is mounted in the same manner as the second door panel 1-2. This figure also shows an example of the known upper structure comprising horizontal profiles 3-3, 3-4 which are also provided with a track in which the rollers or wheels 4 can travel. A bent profile 3-5 having a curved track is situated between the vertical and the horizontal profiles.

[0020] Figure 3 shows a spring packet 8, in this case at the level of the third, fitted, door panel 1-3, which spring packet is attached at the lower side to a respective ver-

tical profile 3-1, 3-2 and at the upper side, while being pre-compressed, to a locking element 9 which is also attached to the respective profile 3-1, 3-2. In this situation, the spring packet 8 is extended. In general, the relevant profiles 3-1, 3-2 accommodating the spring packet 8 will be pre-compressed at the factory, so that precompressing the spring packet 8 at the place of installation and assembly of the door 2, with all the associated disadvantages, is not necessary. However, the spring packet can be pre-compressed on site prior to the installation of the overhead door 2, while keeping a few briefly indicated advantages of the method explained herein.

[0021] The locking element 9, in this case a wing bolt 9-1 which can be readily manually released, and behind which there is a nut 9-2 which is a tight fit in an opening of the profile 3-1, 3-2, is surrounded by duplicate ropes 7 extending upwards in the profile 3-1, 3-2. These ropes are routed downwards to the abovementioned axle 6 via pulleys, not shown, in the said profiles. The idea is that at the location of the locking element 9, the weight of the fitted door panels 1-1, 1-2, 1-3 in combination with, if necessary, for example the force exerted by the foot of the installer, a balance is reached with respect to the force exerted by the spring packet 8 such that the locked state 9 can be readily cancelled, or that the wing bolt 9-1 can be safely removed.

[0022] By virtue thereof, when the installer no longer presses down the door 2, said door will have the tendency, due to the pre-compression, to move automatically upwards over an important first part of its track. The spring packet will then gradually become unstressed if first the third panel and subsequently the second panel move towards and inwards in the horizontal part of the wheel track. This can be done even by a single person without violating the legal requirements with respect to the maximum lifting weight.

[0023] Figure 4 shows the situation obtained after, in this case three, interconnected door panels 1-1, 1-2, 1-3 have been raised and maintained in the raised position, in this case temporarily by means of a gluing clamp 10, after which the necessary settings and adjustments for, inter alia, low-torsion and low-noise running of the wheels 4 in the track when opening and closing the door 1, and of the rope frame and/or of the then unstressed spring packet 8 can take place.

[0024] Figure 5 shows the final situation in which, subsequently, the in this case fourth and final so-termed upper door panel 1-4 is fitted.

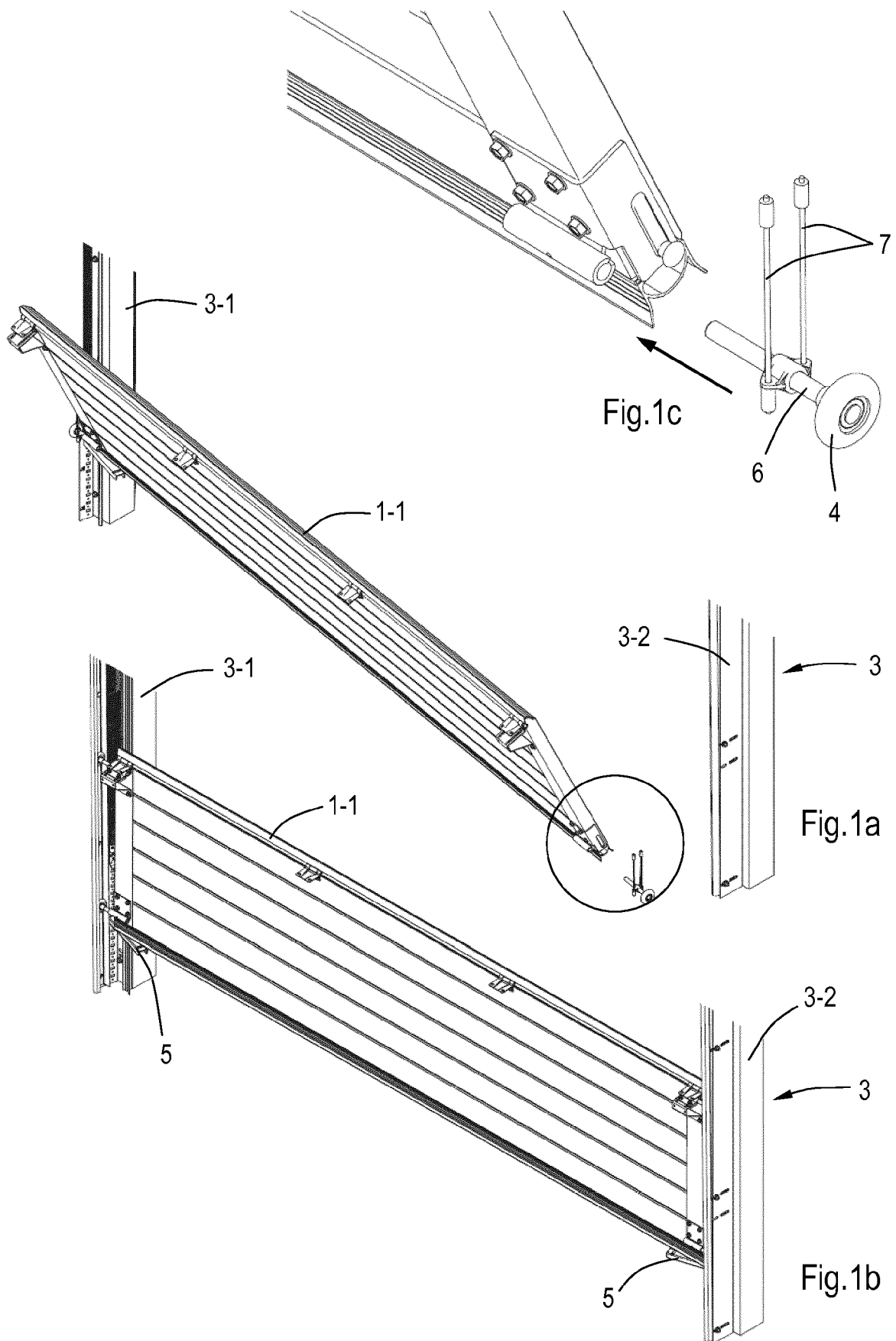
[0025] For safety reasons, the ropes and the extension springs in the spring packet 8 have been implemented in duplicate. As shown particularly in figure 3, the springs are implemented as double extension springs and arranged in parallel. For the same reason, the spring packet 8 comprises coaxial and hence nested, i.e., one embedded inside the other, extension springs.

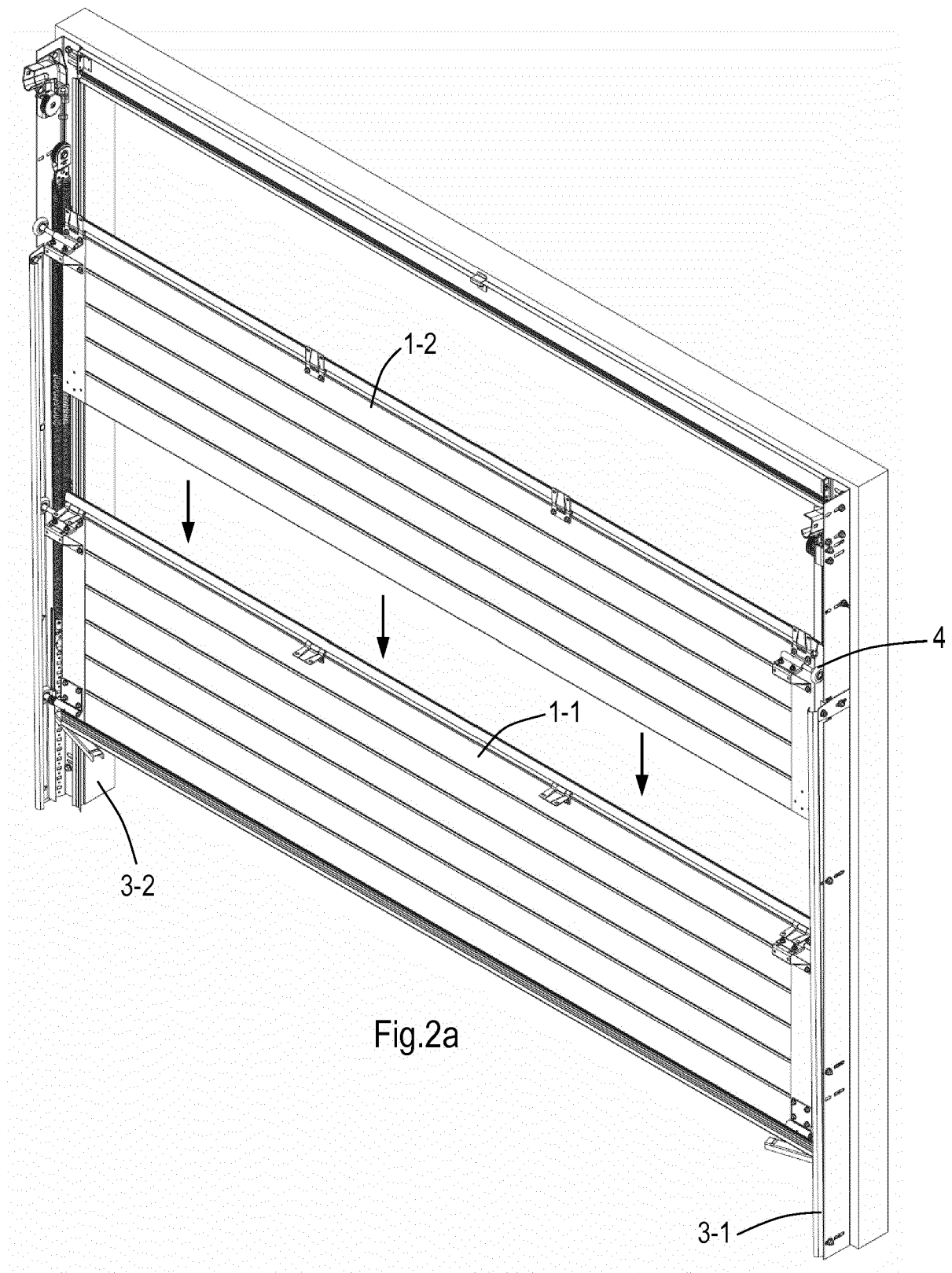
[0026] Of course, the door 2 can comprise a desired number of door panels 1, in which a well-known wicket door may or may not be fitted.

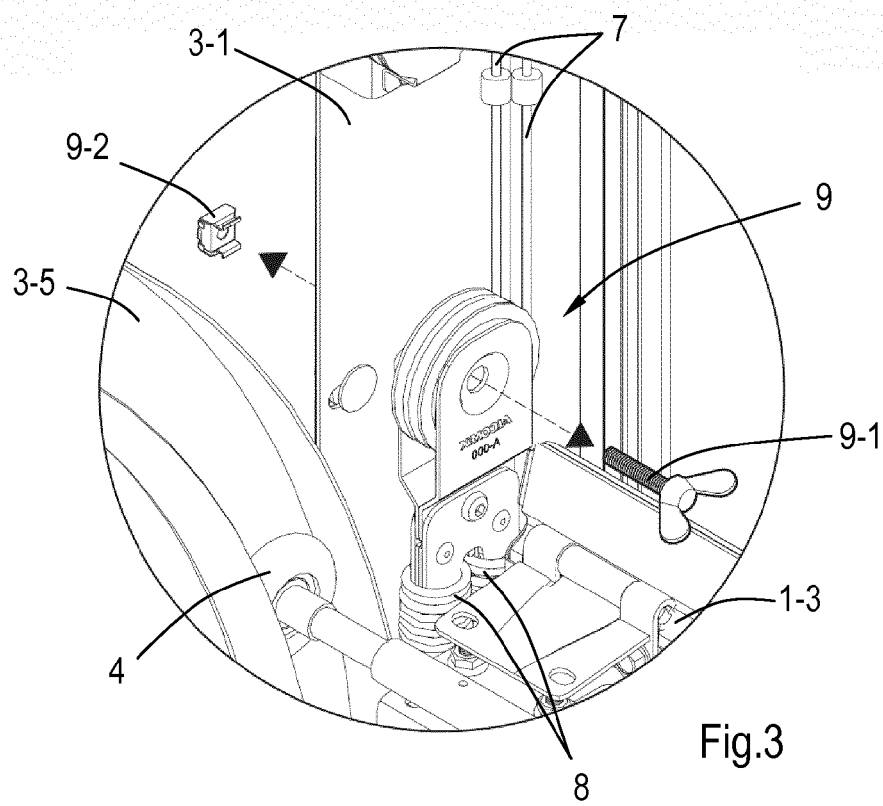
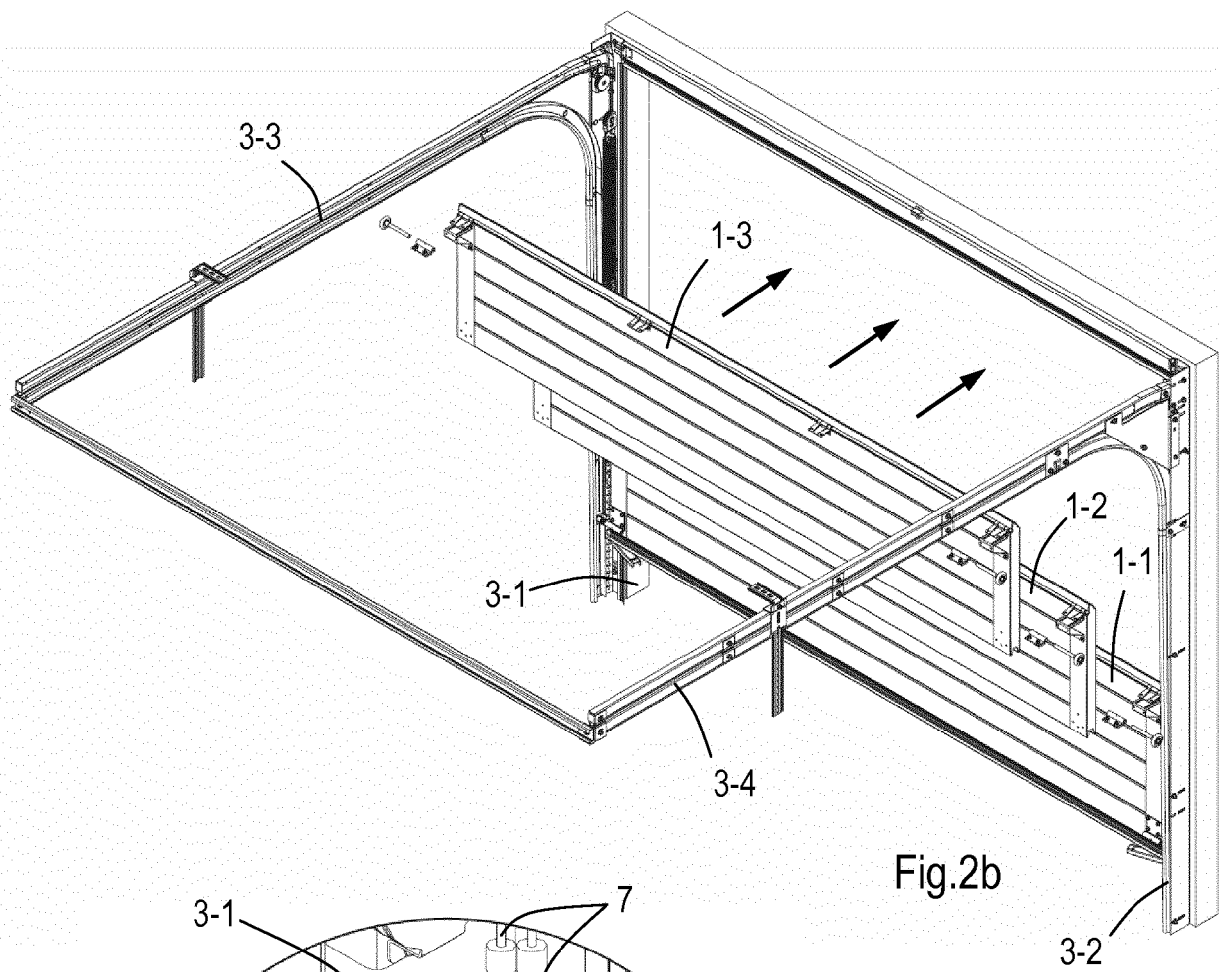
Claims

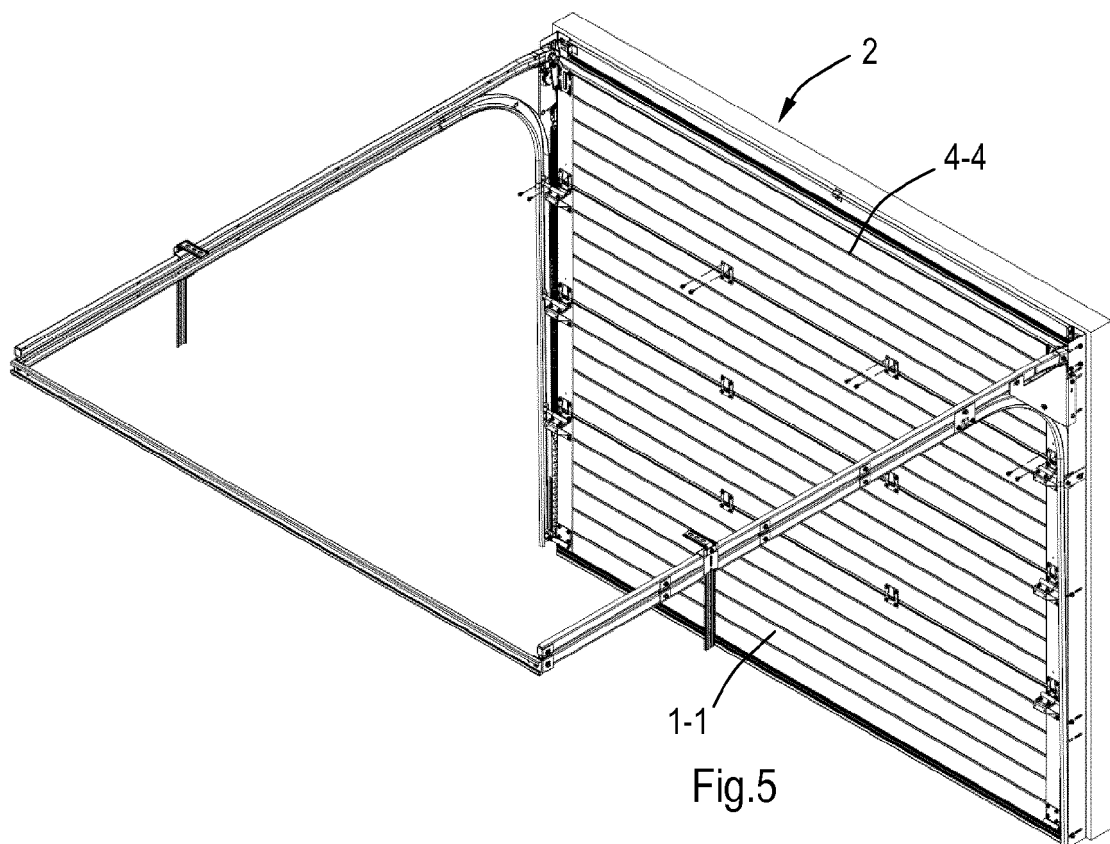
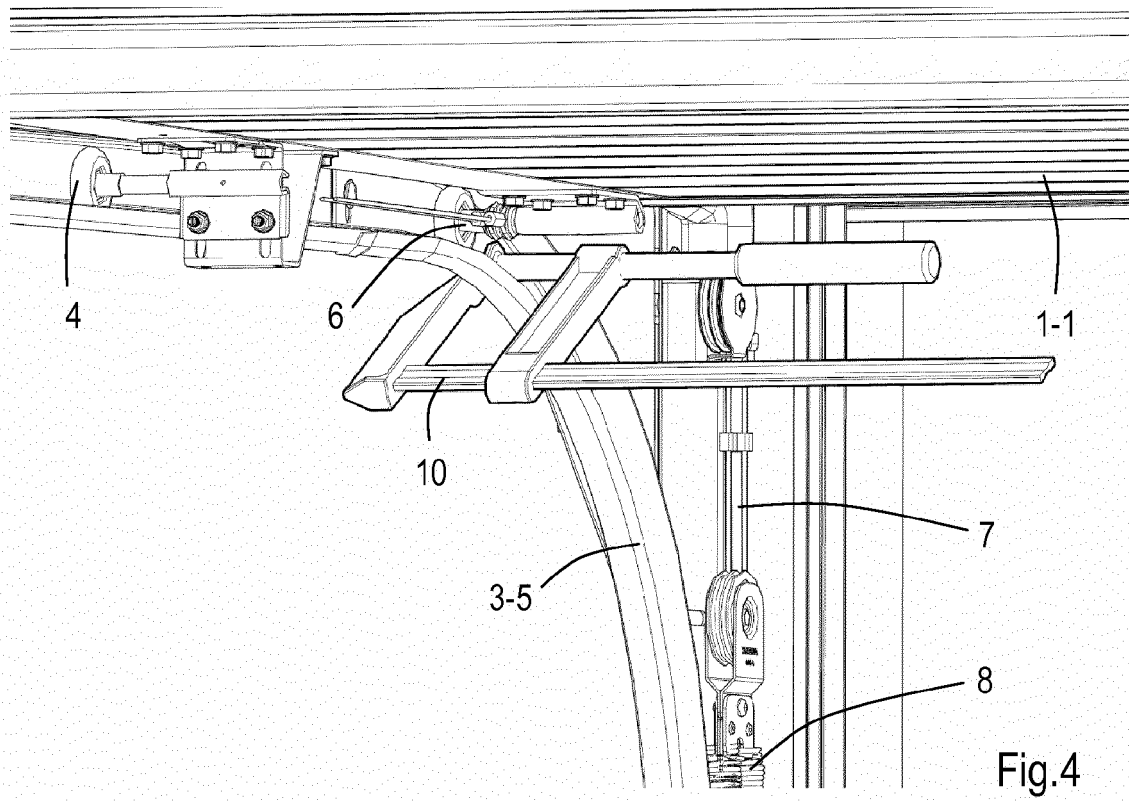
1. A method of installing an overhead door by securing profiles at least provided with a spring packet around a doorway, movable door panels which are pivotally attached to each other being arranged between said profiles, after which the spring packet already subjected to a tensile stress is coupled to the door panels which are subsequently moved upwards by means of the slackening spring packet, after which the overhead door is adjusted. 5
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2. The method according to claim 1, **characterized in that** the door panels rest on a rope frame engaging, with the spring packet, on either side of a removable locking element, and **in that** the spring packet subjected to a tensile stress and the interconnected door panels are coupled by removing said locking element. 15
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3. The method according to claim 2, **characterized in that** the abovementioned coupling operation is carried out when the forces exerted by the spring packet and the interconnected door panels at the location of the locking element substantially balance each other out. 25
4. The method according to any one of claims 1 to 3, **characterized in that** profiles are located on either side of the door, which profiles each comprise a pre-compressed spring packet. 30
5. The method according to any one of claims 1 to 4, **characterized in that** the interconnected door panels are subsequently moved downwards against the spring force of the spring packet and, if necessary, a next door panel is secured thereon. 35
6. The method according to any one of claims 1 to 5, **characterized in that** the relevant profile accommodating the spring packet is pre-compressed already at the factory. 40
7. The method according to any one of claims 1 to 6, **characterized in that**, when the door is being installed, the profiles accommodating the spring packet are secured substantially vertically in the doorway. 45
8. A profile which can suitably be used in the method according to any one of claims 1 to 7, **characterized in that** the spring packet in the relevant profile comprises one or more pre-compressed extension springs. 50
9. The profile according to claim 8, **characterized in that** the extension springs comprise parallel-arranged extension springs. 55

10. The profile according to claim 8 or 9, **characterized in that** the extension springs comprise coaxial extension springs.











EUROPEAN SEARCH REPORT

Application Number
EP 17 16 9881

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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 July 2017	Examiner Hellberg, Jan
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 17 16 9881

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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