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(54) **ADAPTABLE DRAUGHT EXCLUDER FOR A FIXTURE AND METHOD OF ADAPTION AND FITTING OF SUCH DRAUGHT EXCLUDER**

(57) An adaptable draught-excluder (1) for a fixture hinged to a frame having a jamb (S), that can be automatically actuated by interaction with the jamb (S) and comprises an outer profile (2) adapted to be secured to a bottom edge of the fixture, a movable inner profile (3) slidably housed in the outer profile (2) and having a sealing member (6) designed to interact with a sill, actuation means (7) for the inner profile (3), which are designed to displace the sealing member (6) between a raised position and a lowered position relative to the sill, at least two guide elements (8, 8') interposed between the profiles (2, 3) for keeping them parallel as they move. The profiles

(2, 3) have the same length (l), encompassing all door widths, such length (l) being susceptible of being reduced by cutting an end portion, for the profiles (2, 3) to fit the actual width of the fixture upon which the device (1) is mounted. Connection means (9) are provided for securing one of the guide elements (8) to the profiles (2, 3) in an end position proximate to the jamb (S) and the other (8') in a safe position, at a distance from the end portion to be cut, to prevent the guide element (8') from being damaged upon cutting. A method of adapting and mounting a draught excluder device (1).

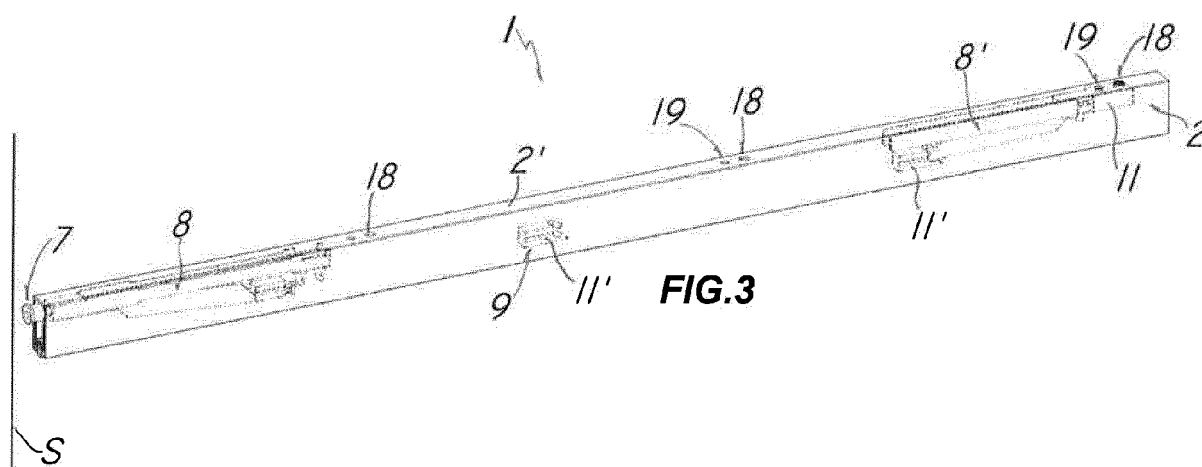


FIG.3

Description

Field of The Invention

[0001] The present invention generally finds application in the field of heat and sound insulating devices for doors and windows, and particularly relates to an adaptable draught-excluder device for use with fixtures of different lengths.

[0002] The invention also relates to a method of adapting and mounting an adaptable draught excluder device.

Background art

[0003] Draught excluder devices have been long known to be mounted to the bottom edge of fixtures to close the gap between the fixture and the sill, thereby limiting the passage of air and hence any heat exchange between the room and the outside environment.

[0004] These draught excluder devices may be provided in various designs, depending on how the gap is closed.

[0005] Generally, the draught excluder device has an elongate shape and is introduced into a seat that has been specially formed in the bottom edge of the fixture.

[0006] Furthermore, the device comprises a profile received in the door seat and a seal that can be automatically lowered by actuation means as the door is being closed.

[0007] For proper operation, the length of the device must coincide with the width of the door in which it is installed.

[0008] Various arrangements are known for adapting draught excluder devices to the actual width of the door or fixture upon which it is installed.

[0009] EP1033467 discloses a telescopic draught excluder device, which is adapted to be lengthened or shortened according to the dimensions of the doors or fixtures.

[0010] A first drawback of this arrangement is that the device can be lengthened or shortened within a predetermined range, and can be only installed on doors that fall within such range.

[0011] A further draught excluder device is known, similar to the one as described above, whose maximum length can be adjusted by cutting an end portion thereof to size.

[0012] A first drawback of this arrangement is that, when the installer cuts the device to size, he/she may damage the actuation mechanism and make the device unusable.

[0013] Furthermore, the seal driving mechanism cannot be moved or removed to afford a wide shortening range for the installer.

[0014] GB2516977 discloses a draught excluder device that can be adapted to the dimensions of the door upon which it is installed by cutting an end portion thereof in which there is no seal driving mechanism.

[0015] All the aforementioned arrangements suffer

from the drawback that the manufacturer of the device must keep devices of varying lengths on stock, to supply them upon request according to the varying dimensions of commercially available doors.

Technical Problem

[0016] In the light of the prior art, the technical problem addressed by the present invention is to provide a standard-length draught excluder device that can be easily adapted to doors or fixtures of different sizes within a wide range with no risk of damaging its actuation mechanisms.

Disclosure of the invention

[0017] The object of the present invention is to obviate the above drawback, by providing a draught excluder device that is highly efficient and relatively cost-effective.

[0018] A particular object of the present invention is to provide a device as described hereinbefore that affords simple and quick adjustment of its length.

[0019] A further object of the present invention is to provide a device as described hereinbefore that can be adapted to doors of different widths within a wide dimensional range.

[0020] A further object of the present invention is to provide a device as described hereinbefore that affords length adjustment without damaging the seal driving devices.

[0021] Another object of the present invention is to provide a method of adapting and mounting a draught excluder device that affords simple and quick adjustment of its length without damaging the actuation means.

[0022] These and other objects, as better explained hereafter, are fulfilled by an adaptable draught excluder device for a fixture, such as a door or a window, as defined in claim 1.

[0023] In a further aspect, the invention relates to a method of adapting and mounting a draught excluder device to a door of smaller width as defined in claim 11.

[0024] Advantageous embodiments of the invention are obtained in accordance with the dependent claims.

Brief Description of The Drawings

[0025] Further features and advantages of the invention will be more apparent from the detailed description of one or more preferred non-exclusive embodiments of an adaptable draught excluder device, which is described as a non-limiting example with the help of the annexed drawings, in which:

FIGS. 1 to 3 are front perspective views of the draught excluder device according to a first embodiment of the invention;

FIGS. 4 and 6 are perspective and lateral views of a detail of the draught excluder device of Figs. 1 to

3 respectively;

FIGS. 5 and 7 are perspective and sectional views of another detail of the device of the previous figures respectively;

FIGS. 8 and 9 are exploded views of the draught excluder device of the previous figures during length adaptation;

FIGS. 10 to 12 are front perspective views of the draught excluder device according to a second embodiment of the invention;

FIGS. 13 and 14 are sectional and perspective views of a detail of the draught excluder device of Figs. 10 to 12 respectively;

FIGS. 15 and 16 are exploded views of the draught excluder device of Figs. 10 to 12 during length adaptation;

FIGS. 17 to 19 are front perspective views of the draught excluder device according to a third embodiment of the invention;

FIGS. 20 and 21 are sectional and perspective views of a detail of the draught excluder device of Figs. 17 to 19 respectively;

FIGS. 22 and 23 are exploded views of the draught excluder device of Figs. 17 to 19 during length adaptation;

FIGS. 24 to 26 are front perspective views of the draught excluder device according to a fourth embodiment of the invention;

FIGS. 27 and 28 are sectional and perspective views of a detail of the draught excluder device of Figs. 24 to 26 respectively;

FIG. 29 is an exploded view of the draught excluder device of Figs. 14 to 16 during length adaptation.

Detailed description of a preferred exemplary embodiment

[0026] The figures particularly show an adaptable draught excluder device, generally designated by numeral 1, which can be secured within a seat formed in the bottom edge of a fixture, such as a door or a window, not shown.

[0027] The fixture may be hinged to a fixed frame with a jamb S, to rotate about hinges having a substantially vertical axis, also not shown.

[0028] The draught excluder device 1 can be automatically actuated by interaction with the jamb S and comprises an outer profile 2 adapted to be secured to a bottom edge of the fixture and a movable inner profile 3 which is slidingly housed in the outer profile 2.

[0029] Advantageously the inner profile 3 and the outer profile 2 have substantially U-shaped opposite cross-sections with side walls 4, 4' joined together by mutually facing bottom walls 5, 5', when the device 1 is in the operating position.

[0030] The inner profile 3 may also include a sealing member 6 made of a yielding material whose function is to interact with the door sill to sealingly block the passage

of air.

[0031] The outer profile 2, the inner profile 3 and the sealing member 6 have substantially the same initial maximum length *l*, whose value encompasses all possible door widths, or at least in a very wide range, e.g. from 600 to 2000 mm.

[0032] Conveniently, the initial maximum length *l* can be reduced by cutting an end portion of the profiles 2, 3 and the sealing member 6 using a suitable tool T, to adapt the device 1 to the actual width of the door or fixture upon it is mounted.

[0033] Actuation means 7 of the inner profile 3 are provided, which are designed to automatically displace the sealing member 6 between a raised position relative to the sill and a lowered position in contact with the sill and vice versa upon interaction with the jamb.

[0034] These actuation means 7 are known per se and comprise a button 7' that projects out of the edge of the device 1 to interact with the jamb S and a motion conversion mechanism 7'' for converting motion from parallel to perpendicular to the sill, such that the sealing member 6 will be displaced in the vertical direction.

[0035] Furthermore, the device 1 comprises two guide elements 8, 8' interposed between the outer profile 2 and the inner profile 3 to keep with the latter substantially parallel to the outer profile 2 as it moves in the vertical direction.

[0036] In a peculiar aspect of the invention, the device 1 comprises connection means 9 for securing one of the two guide elements 8 to the profiles 2, 3 in an end position proximate to the jamb S and the other 8' in a safe position, far enough from the end portion to be cut, thereby avoiding damages thereto upon cutting.

[0037] Each of the two guide elements 8, 8' comprises a connecting rod 10 which is attached at its ends proximate to two hinge points of a pair of supports 11, 11'.

[0038] The supports 11, 11' are each defined by a pivot portion 12 which is adapted to be attached to the end of the connecting rod 10 and an anchor portion 13 for removable fixation to one of the profiles 2 and 3 between the respective side walls 4.

[0039] Conveniently, the coupling between the connecting rod 10 and the support 11 is obtained by means of an articulated pin 14 which can be fitted by snap engagement into a corresponding cylindrical seat 15 formed in the pivot portion 12 of each support 11, 11'.

[0040] Furthermore, the anchor portion 13 is fixed to each of the profiles 2, 3 by means of screw or pin connection members 16, which fit into corresponding through holes 17 of the supports 11, 11'.

[0041] The above described supports 11, 11' are adapted to be removably secured to the outer 2 and inner 3 profiles in longitudinal positions selected by the user.

[0042] Thus, a user may very easily act upon the connection members 16 to adjust the anchoring position thereof on the profiles 2 and 3 using standard tools, such as a screwdriver.

[0043] In the first embodiment of the device 1 as shown

in FIGS. 1 to 9, the connection members 16 are of screw type, for anchorage with the outer profile 2 and of pin type for anchorage with the inner profile 3.

[0044] In this embodiment, the connection members 16 are both perpendicular to the bottom walls 5, 5' of the profiles 2, 3 and interact with the latter by friction.

[0045] As shown in FIG. 8, in order to act upon the connection members 16, the outer profile 2 has a plurality of holes 18 longitudinally arranged at equal distances d_1 from each other, for receiving a screw which is designed to lock the position of the support 11 adapted to be secured to the outer profile 2.

[0046] Furthermore, the outer profile 2 may have additional alignment control holes 19 for controlling the alignment of the support 11 and the outer profile 2 and facilitating quick screwing of the connection member 16.

[0047] In this embodiment, the inner profile 3 has a plurality of supports 11' which are stably secured to the inner profile 3 in longitudinally equally spaced positions, at a distance d_1 from each other.

[0048] These supports 11' allow the connecting rod 10 to be pivoted at safe positions, far enough from the end portion to be cut, according to the desired length of the device 1.

[0049] For this purpose, the user may translate one of the two guide elements 8 and secure it to a support 11' at a distance from the cut end portion, thereby adapting the device 1 to the actual width of the door upon which it is mounted, as shown in FIG. 9.

[0050] In the second embodiment of the device 1 as shown in FIGS. 10 to 16, the connection members 16 are of screw type, for anchorage of the supports 11, 11' both to the outer profile 2 and to the inner profile 3.

[0051] In this embodiment, the connection members 16 are both perpendicular to the bottom walls 5, 5' of the profiles 2, 3 and interact with the latter by friction.

[0052] As shown in FIGS. 12 and 15, in order to act upon the connection members 16, the outer profile 2 has a plurality of holes 18 longitudinally arranged at a distance d_2 from each other and formed on its upper wall 2'.

[0053] The holes 18 have the purpose of allowing the passage of a screwdriver or a similar tool to drive a connection screw 16 for connecting the support 11' adapted to be secured to the inner profile 3 and the passage of a connecting screw 16 for holding the support 11 adapted to be secured to the outer profile 2 in position, as shown in FIG. 15.

[0054] As shown in FIG. 16, in this embodiment, the user can easily translate the guide element 8' by aligning the connection members 16 with the holes 18 formed on the outer profile 2 and in the safe position, far enough from the end portion to be cut.

[0055] For this purpose, the user may translate one of the two guide elements 8' and secure it at a distance from the end portion to be cut, thereby adapting the device 1 to the actual width of the door upon which it is mounted.

[0056] Therefore, in the first two embodiments of the draught excluder device 1, before cutting the latter for

adjusting its length l , the guide element 8' may be longitudinally displaced and locked through discrete steps according to the length of the end portion to be cut.

[0057] In the third and fourth embodiments of the device 1, as shown in FIGS. 17 to 23 and FIGS. 24 to 29 respectively, the connection members 16 are of the screw type for anchorage with both the outer 2 and inner 3 profiles.

[0058] Advantageously, both supports 11, 11' of the guide element 8' have elongate appendages 20 extending in the same direction and whose ends are placed flush with each other and with the ends of the profiles 2 and 3.

[0059] In the third embodiment, the connection members 16 are both perpendicular to the bottom walls 5, 5' of the profiles 2, 3 and interact with the latter by friction.

[0060] In addition, as best shown in FIGS. 20 and 21, the connection members 16 for connection of the supports 11, 11' to the inner 3 and outer 2 profiles will be accessible to be driven from the bottom and from the top respectively.

[0061] In the fourth embodiment of the device 1, as shown in FIGS. 24 and 25, the connection members 16 are of screw type and are both substantially parallel to the bottom walls 5, 5' of the profiles 2, 3 to lock one of the supports 11 by friction with respect to one of the side walls 4 of the outer profile 2 and the other support 11' with respect to the bottom wall 5' of the inner profile 3.

[0062] Thus, in both of these embodiments, the user may easily position the guide element 8' by aligning the ends of the elongate appendages 20 of the supports 11, 11' with the ends of the profiles 2, 3 whose length has been previously reduced, as shown in FIGS. 23 to 29.

[0063] According to a further aspect, the invention relates to a method of adapting and mounting a draft excluder device 1 as described hereinbefore for a fixture hinged to a frame and automatically actuated by interaction with a jamb S of the frame.

[0064] The method includes a step of a) providing an outer profile 2 adapted to be secured to a bottom edge of the fixture and a movable inner profile 3 slidably housed in the outer profile 2 and having a sealing member 6 designed to interact with a sill.

[0065] The outer profile 2, the inner profile 3 and the sealing member 6 are selected with substantially the same initial maximum length l encompassing all possible door widths.

[0066] Then, a step is provided of b) providing actuation means 7 of the movable inner profile 3, which are designed to automatically displace the sealing member 6 between a raised position relative to the sill and a lowered position in contact with the sill and vice versa by interaction with the jamb.

[0067] The method includes a step of c) interposing at least two guide elements 8, 8' between the outer profile 2 and the inner profile 3, for maintaining the inner profile 3 substantially parallel to the outer profile 2 as it moves.

[0068] A step is further provided of d) cutting an end

portion of the profiles 2, 3 and the sealing member 6 to fit the actual width of the door upon which the device 1 is mounted.

[0069] The method comprises a step of e) providing connection means 9 for securing one of the guide elements 8 to the profiles in an end position proximate to the jamb, and the other of the guide elements 8' in a safe position, far enough from the end portion to be cut, to prevent it from being damaged upon cutting.

[0070] It will be apparent from the foregoing that the draught excluder device and the method of adapting and mounting the same fulfills the intended objects and particularly affords reduction of its length while preventing damage of the parts therein.

[0071] The draught excluder device and method of adapting and mounting the same according to the invention are susceptible to a number of changes or variants, within the inventive concept disclosed in the annexed claims.

[0072] All the details thereof may be replaced by other technically equivalent parts as needed, without departure from the scope of the invention.

[0073] While the device has been described with particular reference to the accompanying figures, the numerals referred to in the disclosure and claims are only used for the sake of a better intelligibility of the invention and shall not be intended to limit the claimed scope in any manner.

Industrial Applicability

[0074] The present invention may find application in industry, because it can be produced on an industrial scale in factories for production of sealing elements for doors and windows and may be used for various applications, e.g. for commercial, industrial and private purposes.

Claims

1. An adaptable draught-excluder (1) for a fixture, such as a door or a window, wherein the fixture is hinged to a frame having a jamb (S), which device (1) is adapted to be automatically actuated by interaction with the jamb (S) and comprises:

- an outer profile (2) adapted to be secured to a bottom edge of the fixture;
- a movable inner profile (3) slidably housed in said outer profile (2) and having a sealing member (6) designed to interact with a sill;
- actuation means (7) of said movable inner profile (3), designed for automatically displacing said sealing member (6) between a raised position relative to the sill and a lowered position in contact with the sill and vice versa upon interaction with the jamb;

- at least one first (8) and one second (8') guide elements interposed between said outer profile (2) and said inner profile (3) to keep said inner profile (3) substantially parallel to said outer profile (2) during movement thereof;

wherein said outer profile (2) and said inner profile (3) have substantially the same initial maximum length (l), encompassing all possible fixture widths, said initial maximum length (l) being susceptible of being reduced by cutting an end portion of said profiles (2, 3) and said sealing member (6) to fit the actual width of the fixture upon which the device (1) is mounted;

characterized by comprising connection means (9) for securing one of said guide elements (8) to said profiles (2, 3) at an end position proximate to the jamb (S) and the other of said guide elements (8') in a safe position, which is far enough from said cut end portion, to prevent said guide element (8') from being damaged upon cutting.

2. A device as claimed in claim 1, **characterized in that** each of said guide elements (8, 8') comprises a connecting rod (10), said connection means (9) having at least one pair of supports (11, 11') attached to the ends of said connecting rod (10) proximate to two hinge points and being adapted to be removably secured to said outer profile (2) and said inner profile (3) respectively in longitudinal positions selected by the user.
3. A device as claimed in claim 2, **characterized in that** said inner (3) and outer (2) profiles have substantially U-shaped opposite cross-sections with side walls (4, 4') joined together by mutually facing bottom walls (5, 5').
4. A device as claimed in claim 3, **characterized in that** each of said supports (11, 11') comprises a pivot portion (12) for one end of said connecting rod (10) and an anchor portion (13) for removable fixation to one of said inner (3) and outer (2) profiles between the respective side walls (4, 4') thereof.
5. A device as claimed in claim 3, **characterized in that** said anchor portion (13) is fixed to each of said inner (3) and outer (2) profiles by means of connection members (16) of screw or pin type, inserted into corresponding through holes (17) of said supports (11, 11').
6. A device as claimed in claim 3, **characterized in that** said screw or pin connection members (16) are substantially perpendicular to said bottom walls (5, 5') of said inner (3) and outer (2) profiles to interact with such walls and lock their respective supports (11, 11') by friction.

7. A device as claimed in claim 6, **characterized in that** said outer profile (2) has a plurality of longitudinally equally spaced holes (18), for the passage of a screwdriver which is designed to drive a connection screw (16) for connecting one of said supports (11') on said inner profile (3), and for the passage of a screw for holding one of said supports (11) with said outer profile (2) in position. 5
8. A device as claimed in claim 5, **characterized in that** said screw or pin connection members (16) are substantially parallel to said bottom walls (5, 5') of said inner (3) and outer (2) profiles for locking one of said supports (11) relative to one of the side walls (4) of said outer profile (2) and the other of said supports (11') relative to the bottom wall (5') of said inner profile (3). 10 15
9. A device as claimed in claim 5, **characterized in that** it comprises a plurality of said supports (11') that are stably secured to said inner profile (3) in longitudinally equally spaced positions for pivoting a respective connecting rod (10) in one of said supports (11') in a position that is far enough from said safety position. 20 25
10. A device as claimed in any of the preceding claims, **characterized in that** each connecting rod (10) has a pair of articulated pins (14) at its longitudinal ends, which are adapted for snap fit engagement into corresponding cylindrical seats (15) formed in the pivot portions (12) of each support (11, 11'). 30
11. A method of adapting and mounting a draught excluder device (1) as claimed in one or more of the preceding claims, for a fixture, such as a door or a window, hinged to a frame with a jamb (S) and adapted to be automatically actuated by interaction with said jamb (S), which method comprises the steps of: 35 40
- a) providing an outer profile (2) adapted to be secured to a bottom edge of the fixture and a movable inner profile (3) slidably housed in said outer profile (2) and having a sealing member (6) designed to interact with a sill, wherein said outer profile (2), said inner profile (3) and said sealing member (6) are selected substantially with the same initial maximum length (l), encompassing all possible fixture widths; 45
 - b) providing actuation means (7) of said movable inner profile (3), designed to automatically displace said sealing member (6) between a raised position relative to the sill and a lowered position in contact with the sill and vice versa by interaction with the jamb; 50 55
 - c) interposing at least one first (8) and one second (8') guide elements between said outer profile (2) and said inner profile (3) to keep said

inner profile (3) substantially parallel to said outer profile (2) as it moves;

d) cutting an end portion of said profiles (2, 3) and said sealing member (6) to fit the actual width of the door upon which the device (1) is mounted;

e) providing connection means (9) for securing one of said guide elements (8) to said profiles (2, 3) in an end position proximate to the jamb (S) and the other of said guide elements (8') in a safe position, which is far enough from said end portion to be cut, to prevent said guide element (8') from being damaged upon cutting.

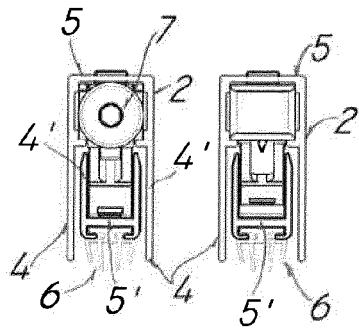


FIG. 1

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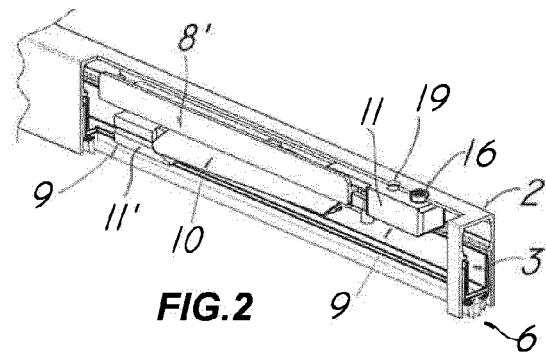


FIG. 2

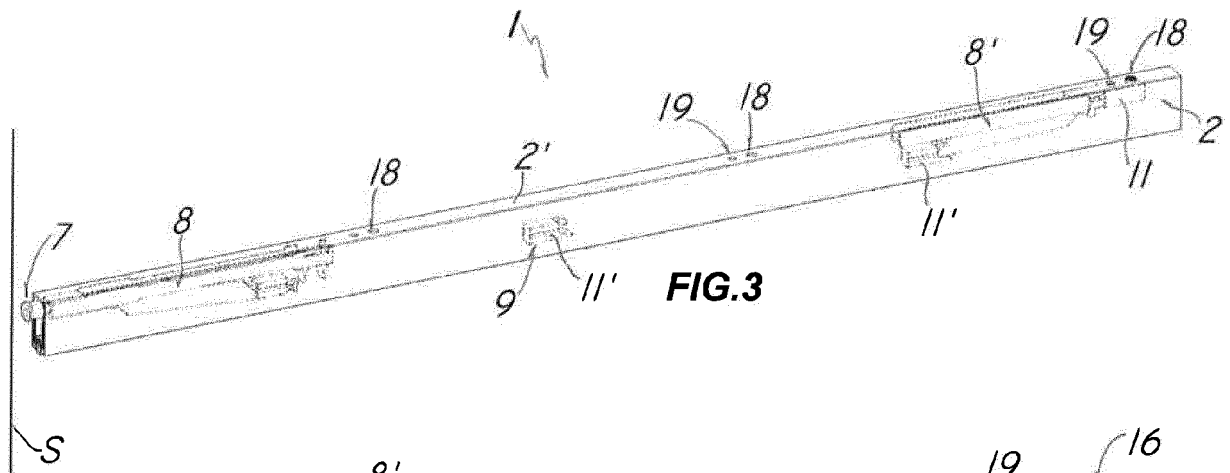


FIG. 3

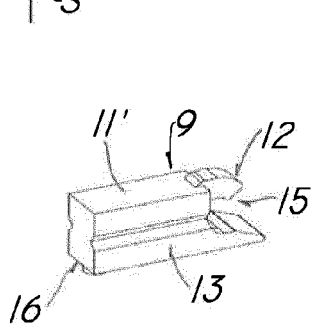


FIG. 4

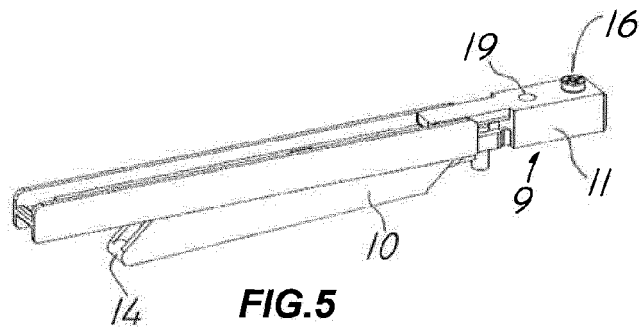


FIG. 5

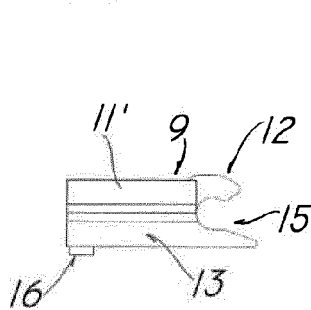


FIG. 6

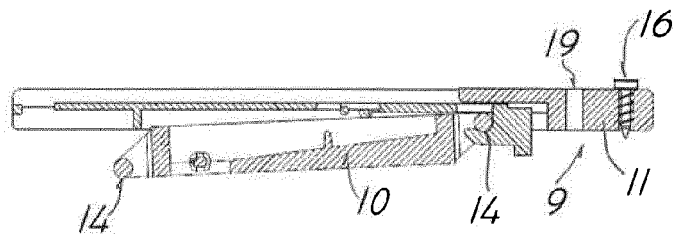
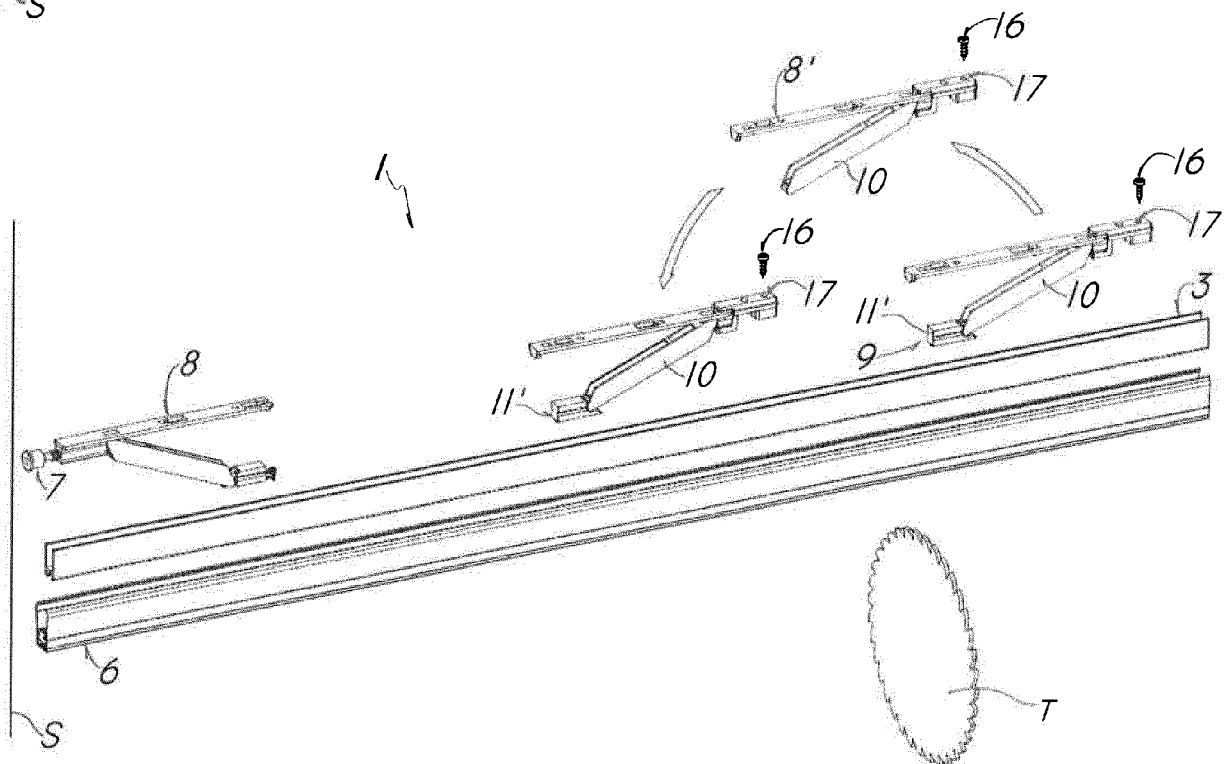
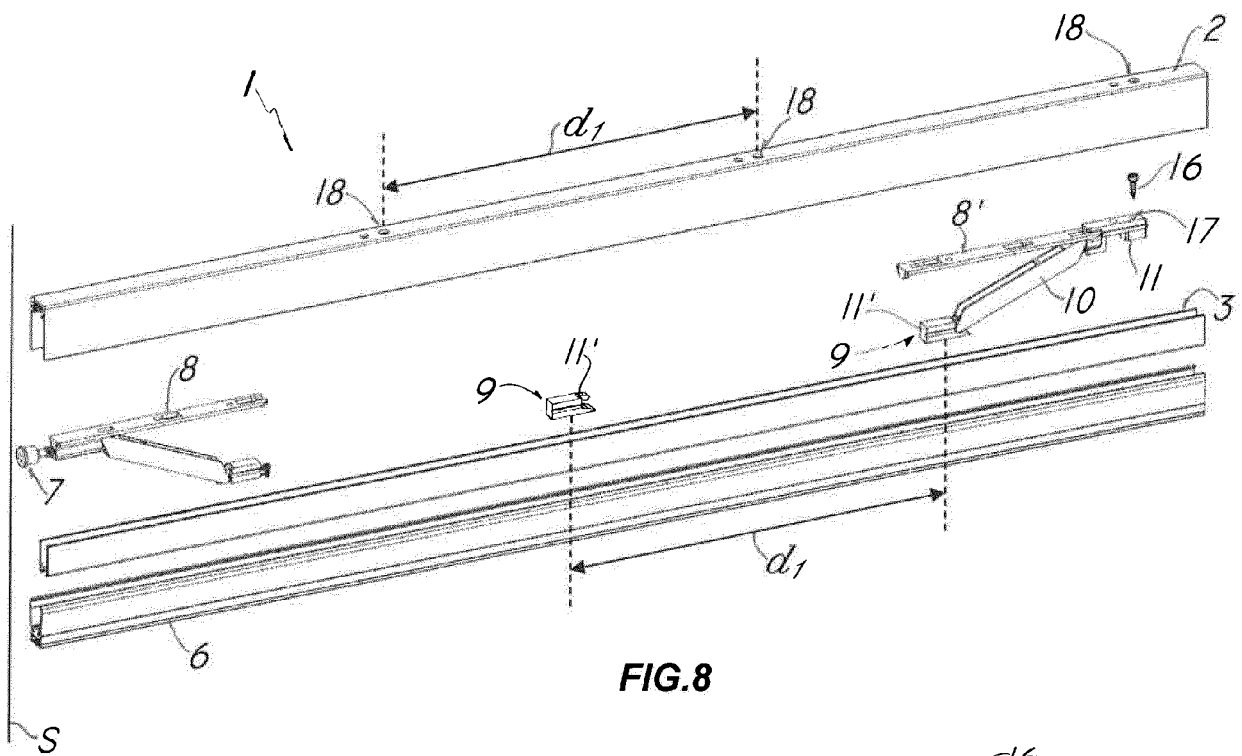


FIG. 7



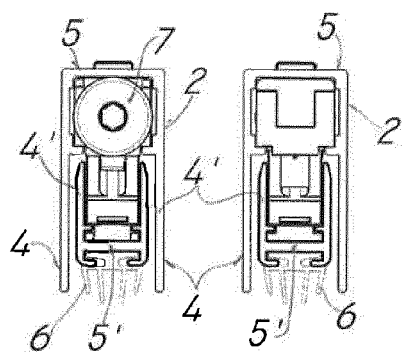


FIG. 10

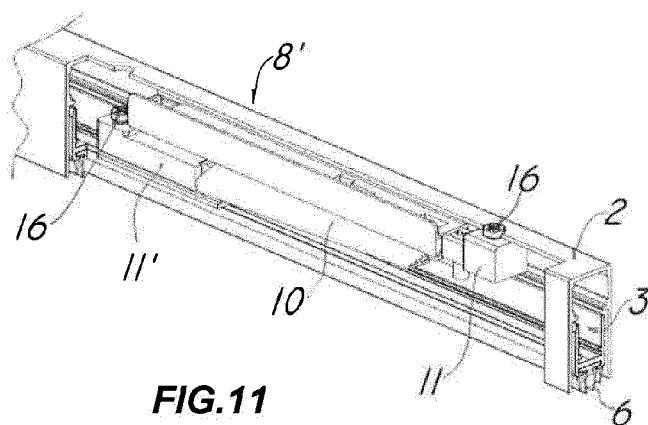


FIG. 11

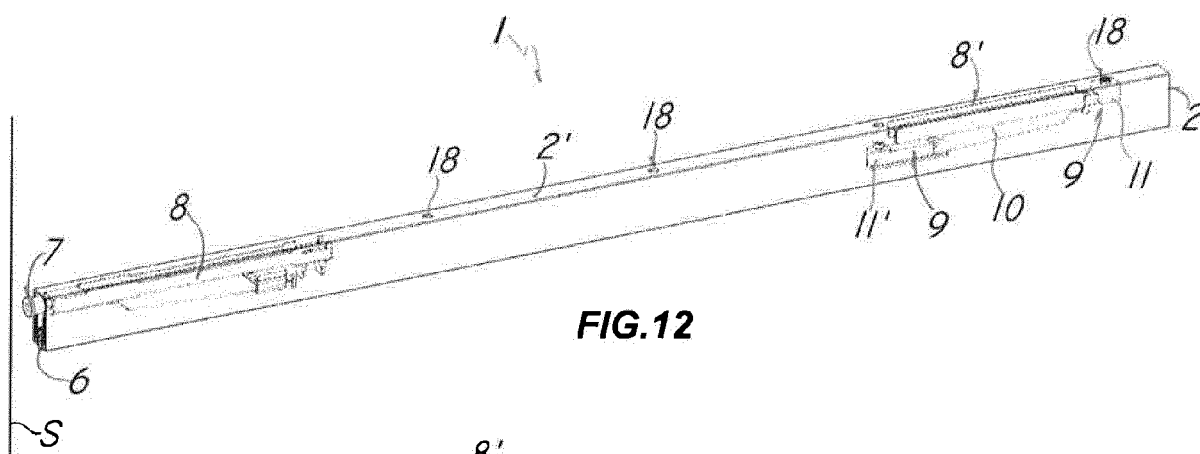


FIG. 12

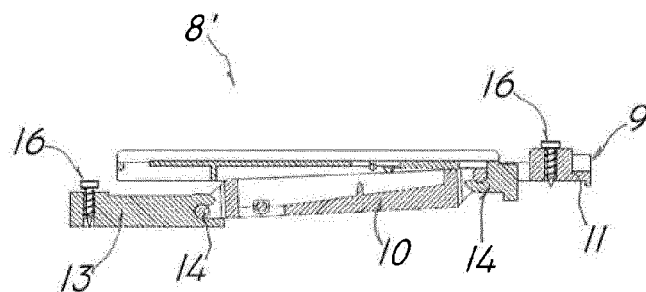


FIG. 13

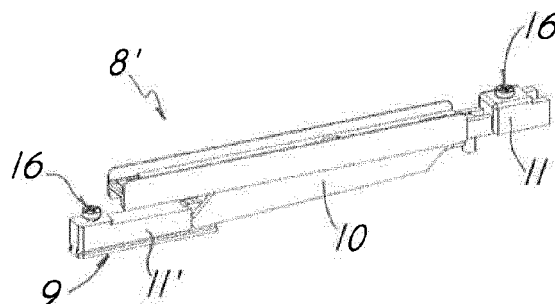
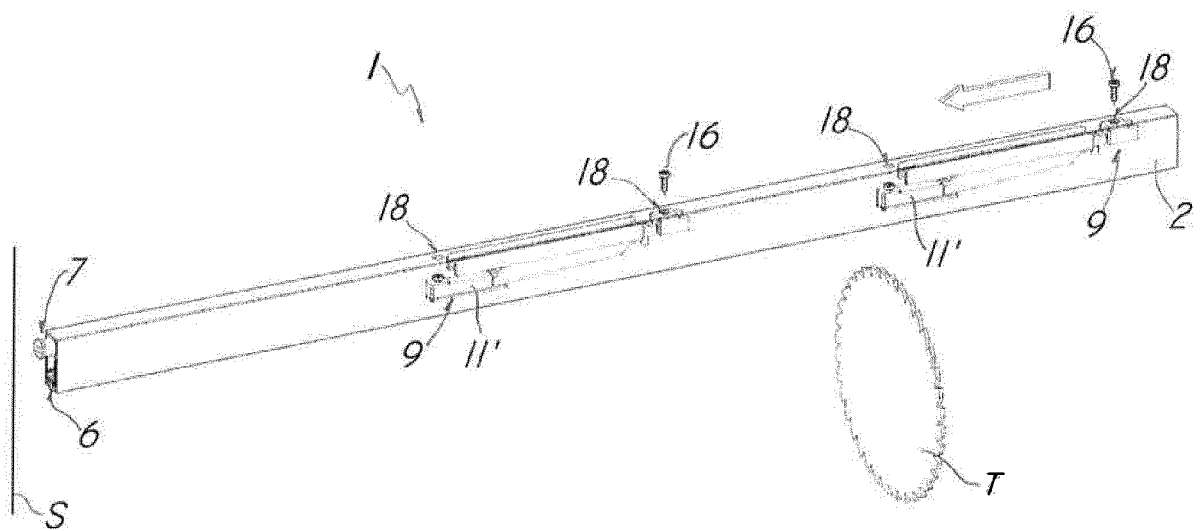
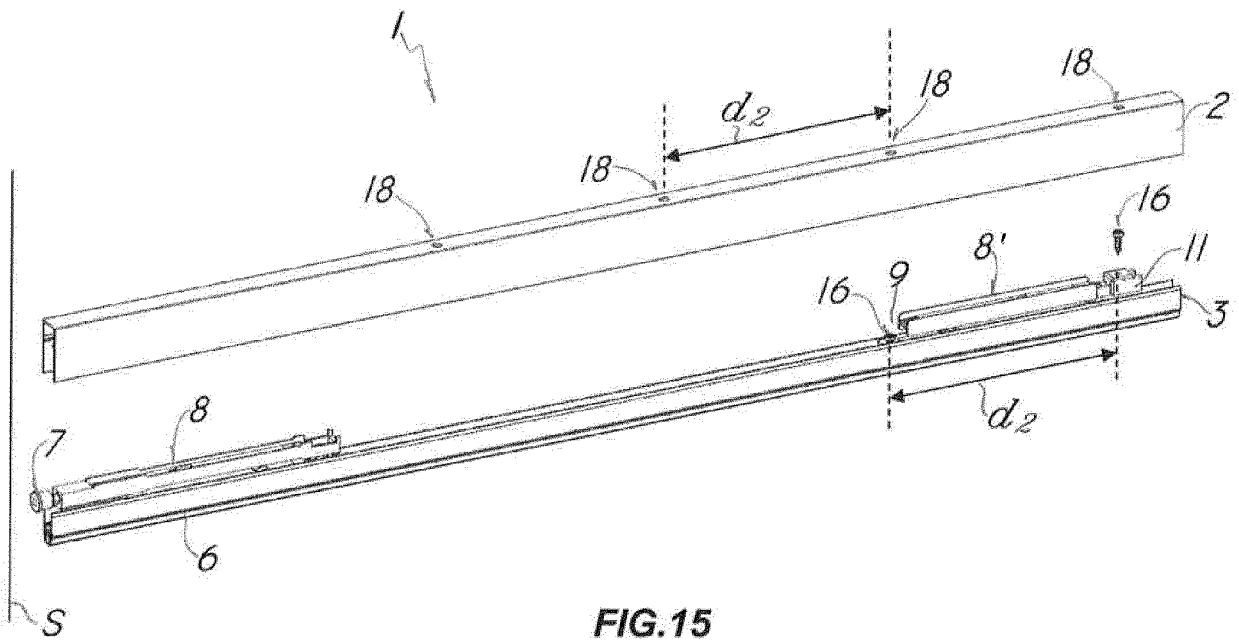


FIG. 14



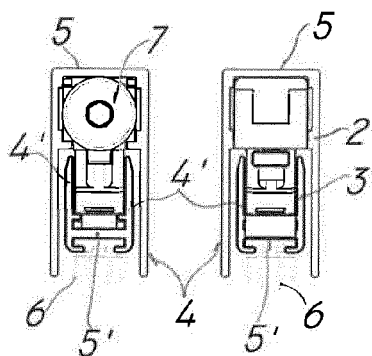


FIG. 17

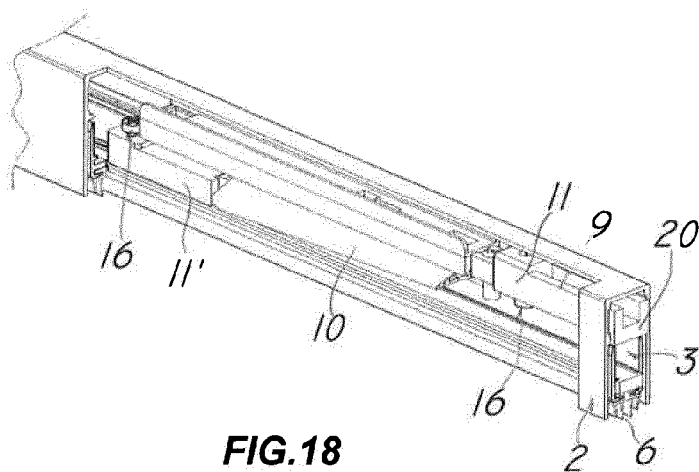


FIG. 18

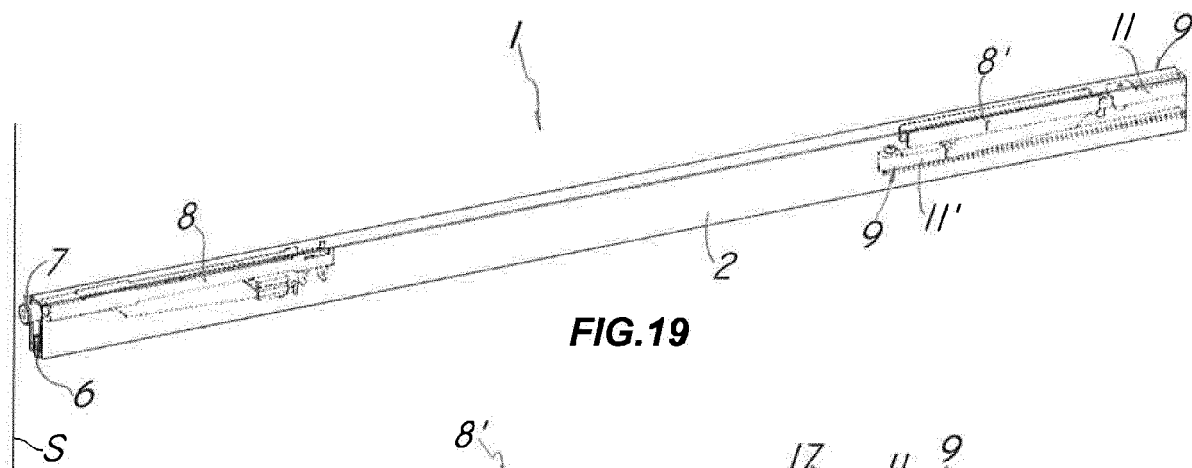


FIG. 19

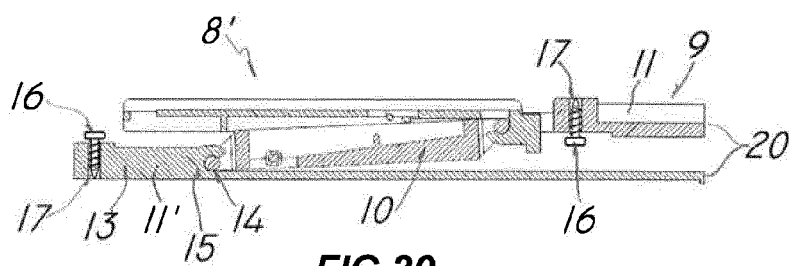


FIG. 20

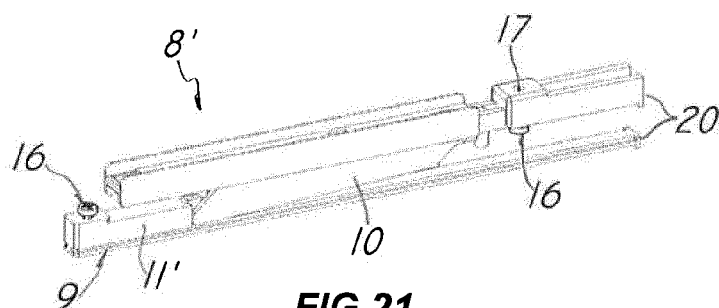
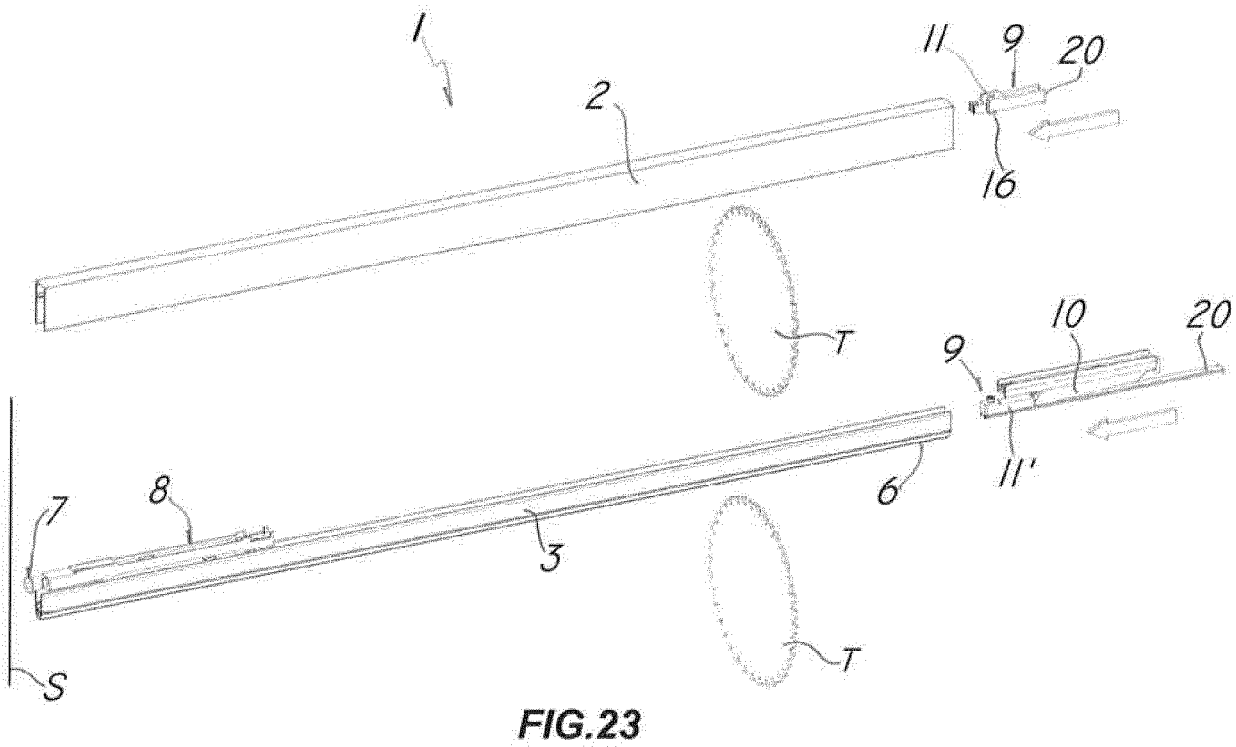
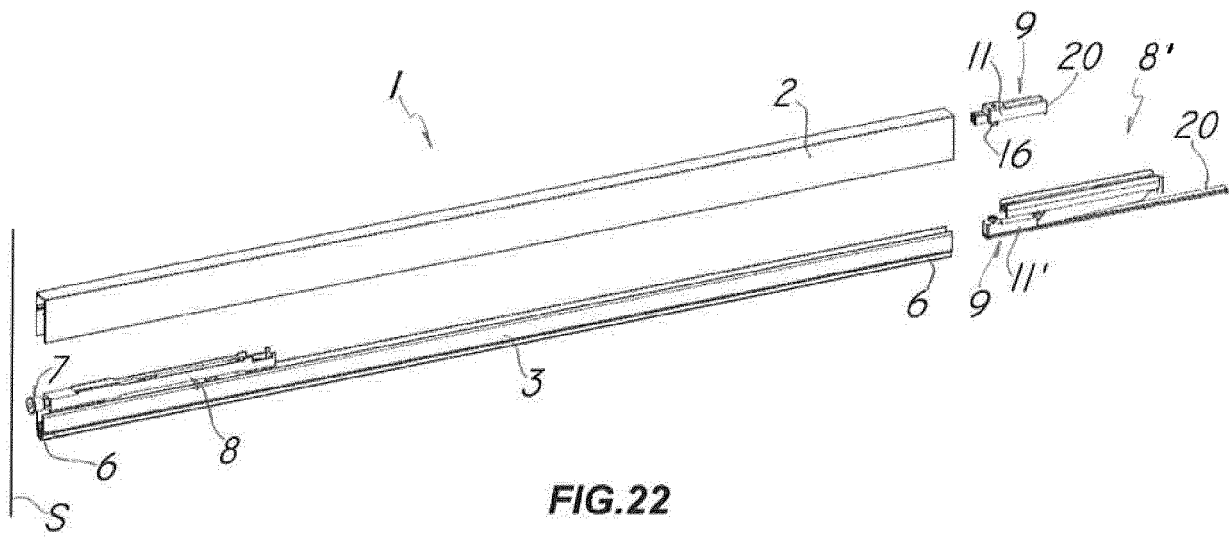


FIG. 21



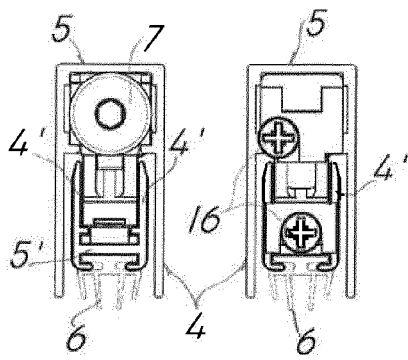


FIG. 24

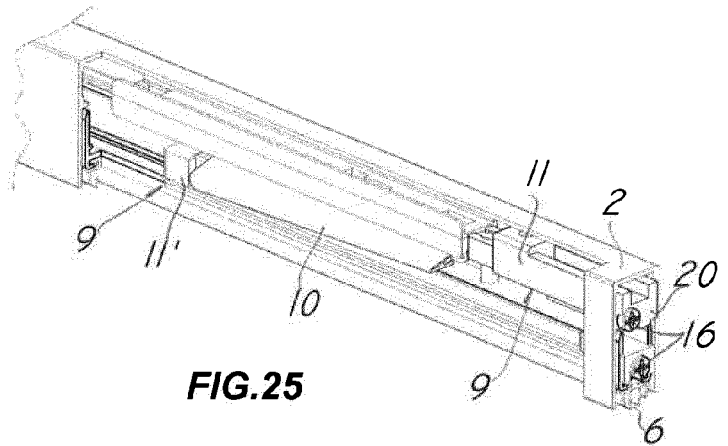


FIG. 25

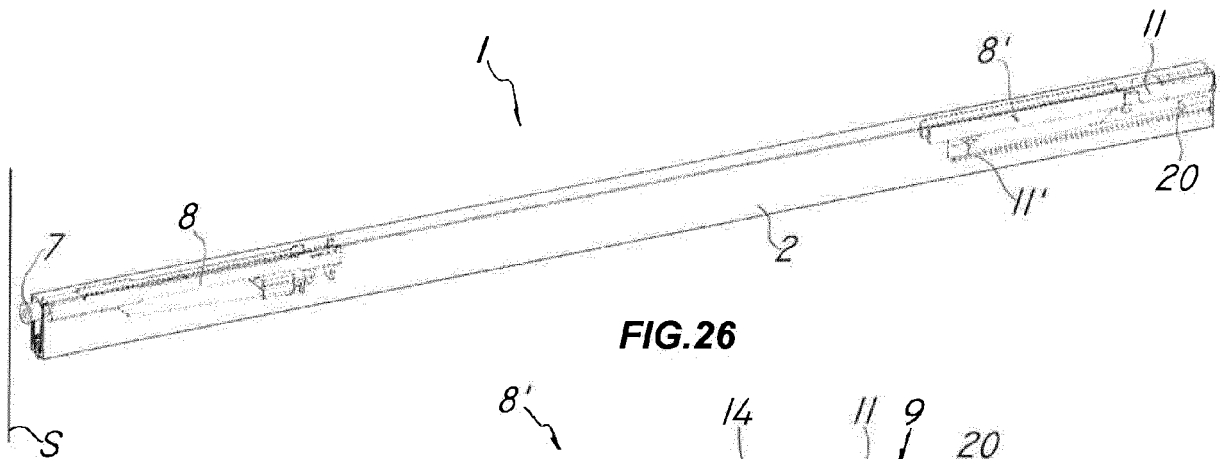


FIG. 26

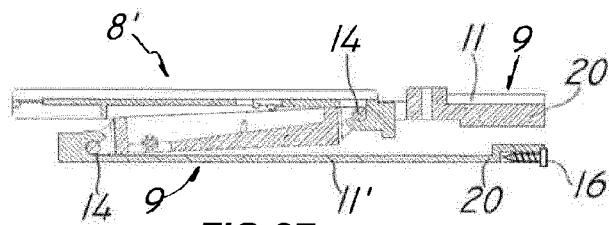


FIG. 27

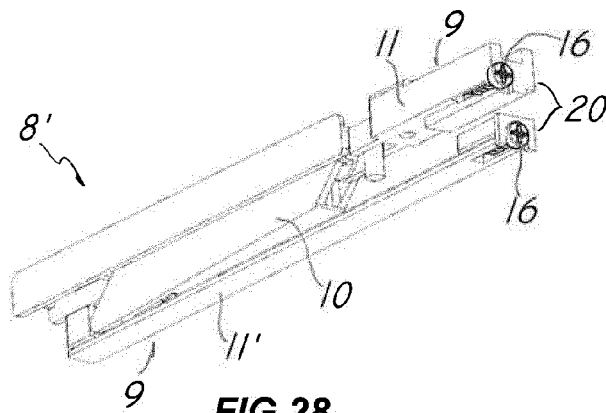


FIG. 28

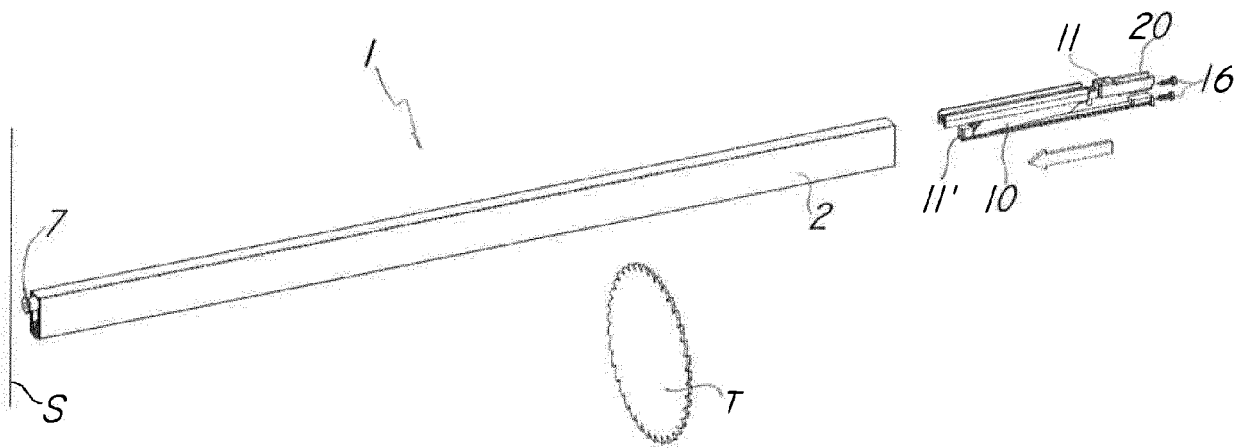


FIG.29



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Place of search Munich		Date of completion of the search 31 May 2018	Examiner Bourgoin, J
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