



(11) **EP 2 463 469 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.06.2012 Bulletin 2012/24

(51) Int Cl.:
E05F 1/08 (2006.01) E05F 5/00 (2006.01)

(21) Application number: **11425286.9**

(22) Date of filing: **28.11.2011**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME

(30) Priority: **07.12.2010 IT RM20100643**

(71) Applicant: **Scrigno Holding S.p.A.**
**47822 S.Ermete di Santarcangelo di Romagna
(RN) (IT)**

(72) Inventor: **Montanari, Andrea**
**47822 S. Ermete di Santarcangelo di Romagna
(RN) (IT)**

(74) Representative: **Tiburzi, Andrea et al**
Barzanò & Zanardo Roma S.p.A.
Via Piemonte 26
00187 Roma (IT)

(54) **Automatic closure system for a sliding door, and relevant installation method and kit**

(57) The present invention concerns an automatic closing system (1) of a door, said door comprising a sliding wing (70) having an upper edge (71), said system (1) comprising a sliding traverse (60) which is slidingly coupled with said wing (70), by sliding means, such as carriages (63, 64) and the like, so as to assume an opening configuration and a closing configuration, said automatic closing system (1) being characterized in that it further comprises a longitudinal frame (20), which interposes between said traverse (60) and said wing (70), said longitudinal frame (20) has a first (20') and a second end (20''), said wing (70) sliding from said first (20') to said

second (20'') end when it passes from said opening configuration to said closing configuration, returning means (40) of said wing (70), provided between said wing (70) and a point fixed with respect to the sliding of the wing (70), said returning means (40) being capable to move said wing (70) from said opening configuration to said closing configuration, and damping means (30) of the closing stroke of said wing (70) under the action of said returning means (40).

The present invention also concerns a door, a method for installing an automatic closing system and a kit.

EP 2 463 469 A1

Description

[0001] The present invention relates to an automatic closure system for a sliding door, and relevant installation method and kit.

[0002] More specifically, the invention concerns a system as above that can be applied to wings for sliding doors, which allows closing the wing in an automatically dampened way when it is opened.

[0003] As it is well known, currently sliding doors are very common, in particular disappearing sliding doors, which have principally a wing, a counterframe and wing sliding means.

[0004] The counterframe comprises mainly a box, which replaces with its own dimensions a portion of the wall on which said sliding door is installed and in which the wing can be inserted in the opening configuration. The box also includes a sliding traverse and an abutment upright of the wing.

[0005] The sliding means are capable to guide the wing of the door from an open configuration, wherein said wing is fully or partially inserted inside said box, to a closed configuration, wherein said wing is extracted from said box, closing the passage of said door.

[0006] The above sliding means are generally constituted of carriages, slidably coupled with an upper sliding track, or guide, fixed to said sliding traverse. An additional lower guide track can also be provided, to allow a guided movement of the wing.

[0007] When opened, the wing is usually in open configuration. In several situations, for example in case of doors that close certain environments such as kitchens, bathrooms and the like, it is appropriate that the door can close automatically, without the intervention of a person acting in this way.

[0008] Systems are also known that allow the automatic closing of the wing. A first solution of this type provides the use of a device comprising a return spring, arranged vertically within the box, one end of which is coupled with a fixed point of the box itself, while the second end is coupled with the sliding wing, and a braking device.

[0009] This solution has several calibration problems, so if the spring is not properly adjusted, the wing does not reach the abutment upright in closed configuration. Another typical problem of this solution derives from the progressive loss of elasticity of the spring that over the time can no longer provide the desired closing effect of the wing.

[0010] Another known solution, proposed by the same Applicant and described in European patent application no. EP 2189603 A1, provides a return mechanism for closing opened sliding wing, provided with a sliding weight on a cylinder and a valve-cylinder system, suitable to dampen the closing of the wing.

[0011] The above method has several functional advantages. However, in order to function properly, the weight has to be arranged vertically, which implies considerable space. In addition, its installation in doors with-

out a closing system, results to be rather complex.

[0012] In light of the above, it is object of the present invention to propose an easy to install automatic closure system for a sliding door.

5 **[0013]** Another object of the present invention is to provide a system that is compact.

[0014] These and other results are obtained according to the invention providing a compact automatic closure system for a sliding wing that can also be installed manually on the upper traverse of a counterframe, which comprises mainly elastic means, interposed between the wing and a fixed point, suitable to return the wing in the closure configuration once it is opened, and damping means, suitable to reduce the velocity of the wing.

10 **[0015]** It is therefore specific object of the present invention an automatic closing system of a door, said door comprising a sliding wing having an upper edge, said system comprising a sliding traverse which is slidably coupled with said wing, by sliding means, such as carriages and the like, so as to assume an opening configuration and a closing configuration, said automatic closing system being characterized in that it further comprises a longitudinal frame, which interposes between said traverse and said wing, said longitudinal frame has a first and a second end, said wing sliding from said first to said second end when it passes from said opening configuration to said closing configuration, returning means of said wing, provided between said wing and a point fixed with respect to the sliding of the wing, said returning means being capable to move said wing from said opening configuration to said closing configuration, and damping means of the closing stroke of said wing under the action of said returning means.

20 **[0016]** Always according to the invention, said system could comprise sliding and removable means for coupling said system to said sliding traverse.

25 **[0017]** Still according to the invention, said sliding and removable coupling means could comprise installation carriage insertable within said sliding traverse through a lower opening.

30 **[0018]** Further according to the invention, said installation carriage could be capable to rotate, preferably at least 90°, with respect to said longitudinal frame.

35 **[0019]** Advantageously according to the invention, said installation carriage could be rotatably coupled with said second end of said longitudinal frame by an arm.

40 **[0020]** Always according to the invention, said system could further comprises a member for coupling said longitudinal frame with said sliding traverse, arranged near said first end of said longitudinal frame.

45 **[0021]** Still according to the invention, said longitudinal frame could have a longitudinal groove through which said sliding means of said wing slide.

50 **[0022]** Further according to the invention, said damping means could comprise a first pulley, a second pulley, at least one damping device, preferably mechanical, capable to slow the rotation of at least one of said pulleys in a single direction of rotation of the same and a trans-

mission member, such as a toothed belt, engaged between said first and second pulley and coupled with at least one fixing point to said wing, so that:

- when said wing passes from said closing configuration to said opening configuration, said transmission member causes rotation of said first and second pulley in the direction of rotation opposite to that in which said damping means acting on at least one of these pulleys to slow it;
- when said wing passes from said opening configuration to said closing configuration, said transmission member causes rotation of said first and second pulley in the direction of rotation in which said damping means acting on at least one of these pulleys to slow it.

[0023] Advantageously according to the invention, said damping device could be installed on said first pulley, said first pulley being disposed near said first end.

[0024] Always according to the invention, said returning means could comprise elastic means connected with said upper edge of the said wing.

[0025] Still according to the invention, said returning means could comprise an anchoring body fixed with said upper edge of said wing, provided with a plurality of adjusting seats, and a third pulley, and said returning means could comprise an elastic band arranged on said third pulley and at least one of said adjusting seats.

[0026] It is further object of the present invention a door comprising a sliding traverse, a wing having an upper edge and coupled with said sliding traverse by sliding means, such as carriages and the like, so as to assume an opening configuration and a closing configuration, in which said wing is juxtaposed with an abutment upright, said door being characterized in that it comprises an automatic closing system as defined above and said sliding traverse has a lower opening, wherein said installation carriage can be inserted.

[0027] It is also object of the present invention a method for installing an automatic closing system as defined above, comprising the following steps:

- inserting said installation carriage through said opening of said sliding traverse
- sliding said installation carriage along said sliding traverse;
- arranging said system substantially parallel to said sliding traverse;
- blocking the system to said sliding traverse by said coupling member; and
- installing said returning means.

[0028] Always according to the invention, said step of installing said returning means further comprises the following steps:

- fixing said anchoring body to the upper edge of the

said wing; and

- installing said elastic band between said third pulley and one of said adjusting seats of said anchoring body.

[0029] It is also object of the present invention a kit of an automatic closing system as defined above, characterized in that it comprises:

- a longitudinal frame having an extension mainly longitudinal and including a first and a second element and;
- at least one installation carriage;
- damping means, comprising a first pulley, a second pulley, at least one damping device and a transmission member such as a toothed belt, and
- returning means comprising an anchoring body, a third pulley and an elastic band.

[0030] The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

figure 1 shows a perspective view of a an automatic closure system for a sliding door according to the present invention;

figure 2 shows an exploded view of the system according to figure 1;

figures 3 and 4 show the insertion of the system according to figure 1 in a sliding traverse;

figure 5 shows the arrangement of the system according to figure 1 along the sliding traverse;

figure 6 shows a detail of the installed system according to figure 1, and

figure 7 shows a partially in section view of an installed system according to figure 1.

[0031] In the various figures, similar parts will be indicated by the same reference numbers.

[0032] Referring to figures 1 and 2 an automatic closing system for a sliding door according to the invention can be seen, which is indicated generally by reference number 1.

[0033] Automatic closing system 1 comprises a longitudinal frame 20 having a first end 20' and a second end 20". Said longitudinal frame 20 comprises a first and a second element 21 and 22 arranged in parallel and suitable coupling members 23, for connecting said first and second elements 21 and 22.

[0034] Said first and second elements 21 and 22 realize a through longitudinal groove 24, obtained substantially along the extension of the longitudinal frame 20, which function will be described in greater detail below.

[0035] Said longitudinal frame 20 also includes a coupling member 25, whose operation will be better explained below.

[0036] Damping means 30 are provided within said

longitudinal frame 20, comprising a first pulley 31, arranged close to said first end 20' of said longitudinal frame 20, and a second pulley 32, arranged close to said second end 20" of said longitudinal frame 20, a toothed belt 33 and a mechanical friction damping device 34, preferably adjustable. Said damping device 34 is installed on said first pulley 31 and is able to exert a damping function on the toothed belt 33, when said first pulley 31 rotates in either direction of rotation.

[0037] The automatic closing system 1 also includes returning means 40 arranged within said longitudinal frame 20, which in their turn comprise a third grooved pulley 41, an elastic element 42, arranged around said third pulley 41 and fixed to an anchoring body (not shown in this figure), fixed on the upper edge of the wing to be closed automatically. System 1 also includes an installation carriage 50, rotatably coupled at, or near, said coupling members 23, and then arranged on said second ends 20" by means of an arm 51, so as to be able to rotate of about 90° according to the arrow A, shown in figure 2.

[0038] The installation and operation of the automatic closing system 1 is, referring to figures 3 to 7, as follows.

[0039] The door can provide a counterframe comprising a box and a sliding traverse 60, which is a section bar that defines a sliding guide 61 in which carriages 63 and 64 can slide in order the wing to slide. The sliding traverse has an opening 62 below.

[0040] In order to install an automatic closing system 1, the installation carriage 50 is initially inserted in the sliding guide 61 through the opening 62. The rotatably coupling of the installation carriage 50 by means of installing arm 51, allows simplifying installation for the installer.

[0041] Once inserted the installation carriage 50 in the sliding guide 61, the device slides in the direction indicated by the arrow indicated with B in figure 4.

[0042] Carriages 63 and 64 for the sliding of the door, each provided with respective coupling 63' and 64' and stem 63" and 64", are then inserted (see figure 5) in the sliding guide 61, also through the opening 62. System 1 is rotated by 90° degrees with respect to the sliding traverse 60, up to be arranged in parallel to it.

[0043] Said system 1 is then fixed to said sliding traverse 60 at the first end 20' by means of said coupling member 25. As it can be seen, carriage 50 is suitable to keep the automatic closing system 1 in suspension to sliding traverse 60.

[0044] Wing 70 to be coupled to the counterframe has two plates 72 and 73 placed on the upper edge 71. On said upper edge 71, the anchoring body 43 is also installed, which has a plurality of seats 43', in one of which said elastic element 42 is inserted.

[0045] The coupling of said sliding carriages 63 and 64 respectively to said plates 72 and 73 of said wing 70 is made by the couplings 63' and 64'. As it can be seen, stems 63" and 64" of the couplings as 63' and 64' pass through the longitudinal groove 24 of said longitudinal

frame 20.

[0046] After that wing 70 is coupled with the sliding carriages 63 and 64, elastic element 42 is inserted in one of said seats 43' of said anchoring body 43. The selection of the seat 43' wherein said elastic element 42 is positioned depends on how much to stretch said elastic element 42 is desired, thus allowing to adjust the returning force of said returning means 40. Finally, belt 33 is fixed to a fixing point.

[0047] When wing 70 is opened, carriages 63 and 64 slide within said sliding guide 61 of said sliding traverse 60. Toothed belt 33, driven by said door 70, as it is anchored to said fixing point, rotates first pulley 31 in the direction of rotation whereby said mechanical friction damping device 34 does not exercise its damping function. At the same time, the elastic element 42 stretches, accumulating potential energy.

[0048] When wing 70 is released, elastic element 42 is free to release the stored mechanical energy, contracting elastically, thus returning wing 70, bringing it automatically from opening configuration to closing configuration, without the need to be accompanied. To prevent the wing 70 to close too quickly and potentially to be a risk for the user, damping means 30 slow the closure. In particular, when the wing closes, first pulley 31 rotates in the direction of rotation whereby said mechanical friction damping device 34 exerts its damping function.

[0049] The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

Claims

1. Automatic closing system (1) of a door, said door comprising a sliding wing (70) having an upper edge (71), said system (1) comprising a sliding traverse (60) which is slidably coupled with said wing (70), by sliding means, such as carriages (63, 64) and the like, so as to assume an opening configuration and a closing configuration, said automatic closing system (1) being **characterized in that** it further comprises a longitudinal frame (20), which interposes between said traverse (60) and said wing (70), said longitudinal frame (20) has a first (20') and a second end (20"), said wing (70) sliding from said first (20') to said second (20") end when it passes from said opening configuration to said closing configuration, returning means (40) of said wing (70), provided between said wing (70) and a point fixed with respect to the sliding of the wing (70), said returning means (40) being capable to move said wing (70) from said opening configuration to said closing configuration, and

damping means (30) of the closing stroke of said wing (70) under the action of said returning means (40).

2. System (1) according to claim 1, **characterized in that** it comprises sliding and removable means (50) for coupling said system (1) to said sliding traverse (60). 5
3. System (1) according to claim 2, **characterized in that** said sliding and removable coupling means comprise installation carriage (50) insertable within said sliding traverse (60) through a lower opening (62). 10
4. System (1) according to claim 3, **characterized in that** said installation carriage (50) is capable to rotate, preferably at least 90°, with respect to said longitudinal frame (20). 15
5. System (1) according to claim 4, **characterized in that** said installation carriage (50) is rotatably coupled with said second end (20) of said longitudinal frame (20) by an arm (51). 20
6. System (1) according to anyone of the preceding claims, **characterized in that** it further comprises a member (25) for coupling said longitudinal frame (20) with said sliding traverse (60), arranged near said first end (20') of said longitudinal frame (20) 25
7. System (1) according to anyone of the preceding claims, **characterized in that** said longitudinal frame (20) has a longitudinal groove (24) through which said sliding means (60, 63, 64, 63', 64', 53", 64") of said wing (70) slide. 30
8. System (1) according to anyone of the preceding claims, **characterized in that** said damping means (30) comprise 35
 - a first pulley (31),
 - a second pulley (32),
 - at least one damping device (34), preferably mechanical, capable to slow the rotation of at least one of said pulleys in a single direction of rotation of the same and 40
 - a transmission member, such as a toothed belt (33), engaged between said first (31) and second pulley (32) and coupled with at least one fixing point to said wing (70), so that: 45
 - when said wing (70) passes from said closing configuration to said opening configuration, said transmission member (33) causes rotation of said first (31) and second (32) pulley in the direction of rotation opposite to that in which said damping means (30) acting on at least one of these pulleys (31, 32) to slow it; 50

- when said wing (70) passes from said opening configuration to said closing configuration, said transmission member (33) causes rotation of said first and second pulley (31, 32) in the direction of rotation in which said damping means (30) acting on at least one of these pulleys (31, 32) to slow it.

9. System (1) according to anyone of the preceding claims, **characterized in that** said damping device (34) is installed on said first pulley (31), said first pulley (31) being disposed near said first end (20').
10. System (1) according to anyone of the preceding claims, **characterized in that** said returning means (40) comprise elastic means connected with said upper edge (71) of the said wing (70). 15
11. System (1) according to claim 10, **characterized in that** said returning means (40) comprise an anchoring body (43) fixed with said upper edge (71) of said wing (70), provided with a plurality of adjusting seats (43'), and 20
 - a third pulley (41),
 - and **in that** said returning means comprise an elastic band (42) arranged on said third pulley (41) and at least one of said adjusting seats (43'). 25
12. Door comprising a sliding traverse (60), a wing (70) having an upper edge (71) and coupled with said sliding traverse (60) by sliding means, such as carriages (63, 64) and the like, so as to assume an opening configuration and a closing configuration, in which said wing (70) is juxtaposed with an abutment upright, said door being **characterized in that** it comprises an automatic closing system (1) as defined in claim 1 - 11 and said sliding traverse (60) has a lower opening (62), wherein said installation carriage (50) can be inserted. 30
13. Method for installing an automatic closing system (1) as defined in claims 1 to 11, comprising the following steps: 35
 - inserting said installation carriage (50) through said opening (62) of said sliding traverse (60);
 - sliding said installation carriage (50) along said sliding traverse (60);
 - arranging said system (1) substantially parallel to said sliding traverse (60);
 - blocking the system (1) to said sliding traverse (60) by said coupling member (25); and
 - installing said returning means (40). 40
14. Method according to claim 13, **characterized in that** said step of installing said returning means further comprises the following steps: 45

- fixing said anchoring body (43) to the upper edge (71) of the said wing (70); and
- installing said elastic band (42) between said third pulley (41) and one of said adjusting seats (43') of said anchoring body (43).

5

15. Kit of an automatic closing system (1) as defined in claims 1 to 11, **characterized in that** it comprises:

- a longitudinal frame (20) having an extension 10
manly longitudinal and including a first (21) and
a second (22) element and;
- at least one installation carriage (50);
- damping means (30), comprising a first pulley 15
(31), a second pulley (32), at least one damping
device (34) and a transmission member such as
a toothed belt (33), and
- returning means (40) comprising an anchoring
body (43), a third pulley (41) and an elastic band 20
(42).

25

30

35

40

45

50

55

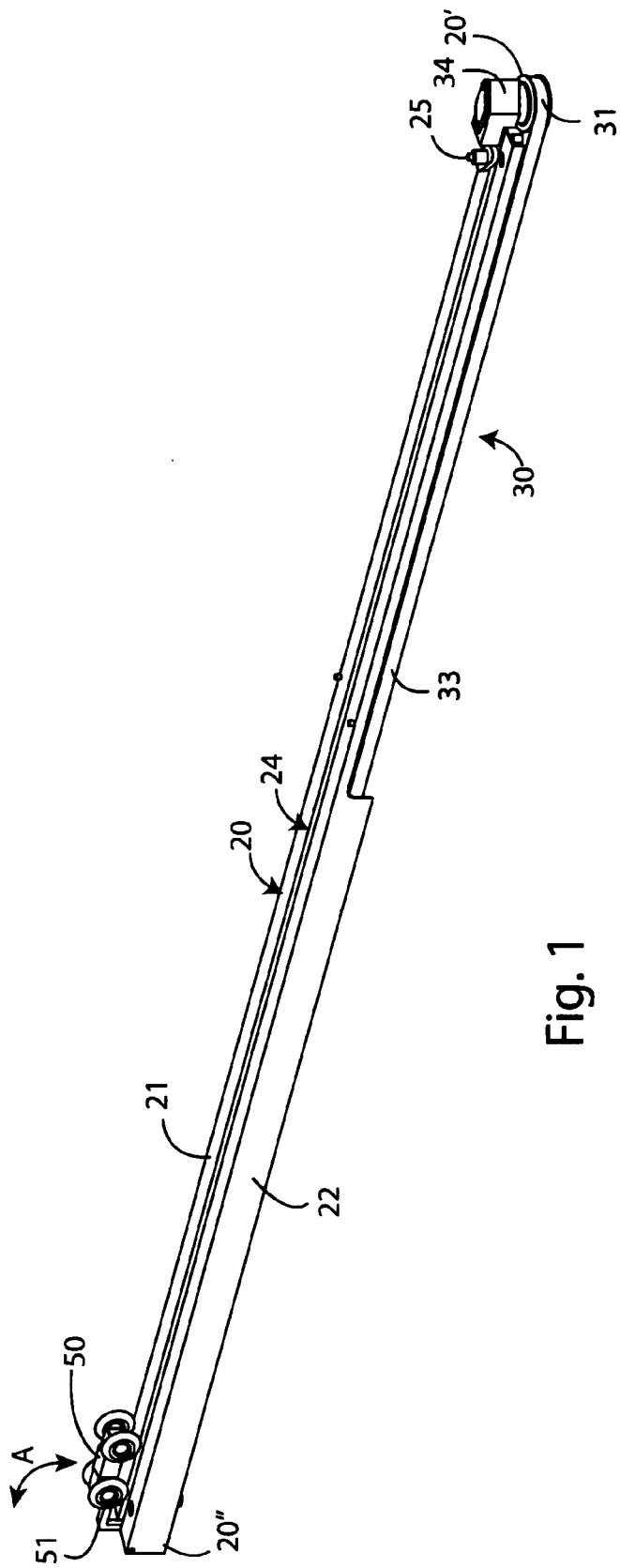


Fig. 1

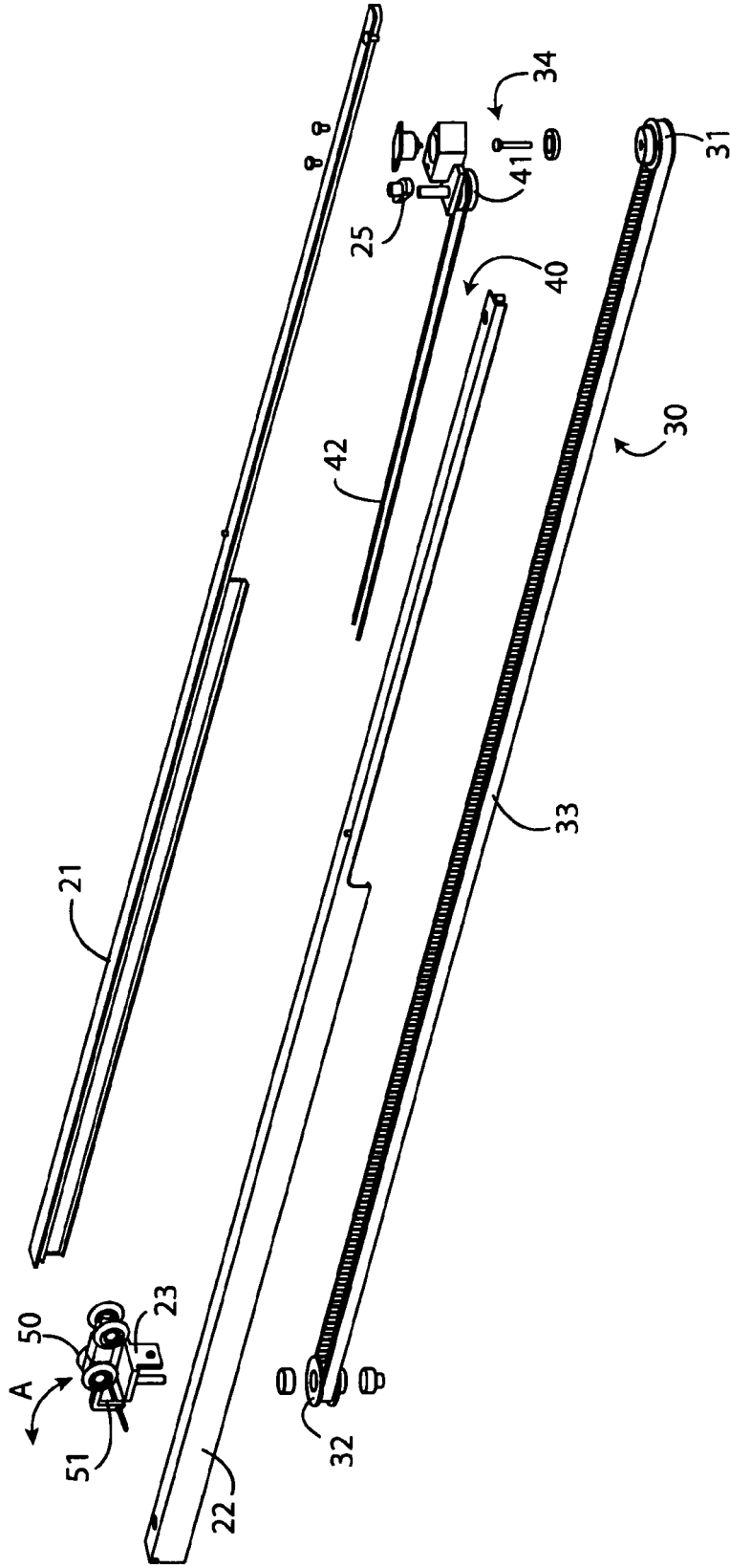


Fig. 2

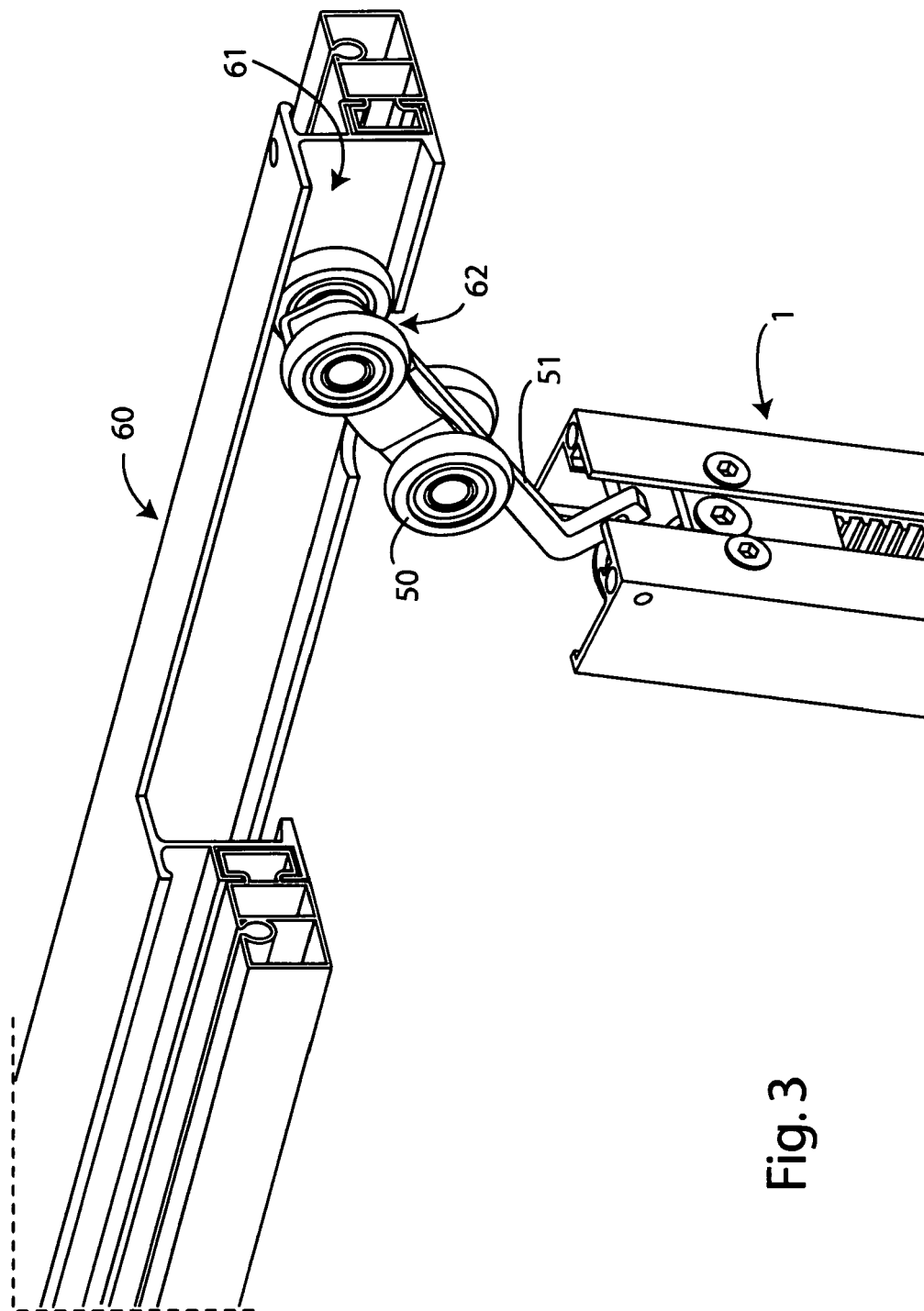


Fig. 3

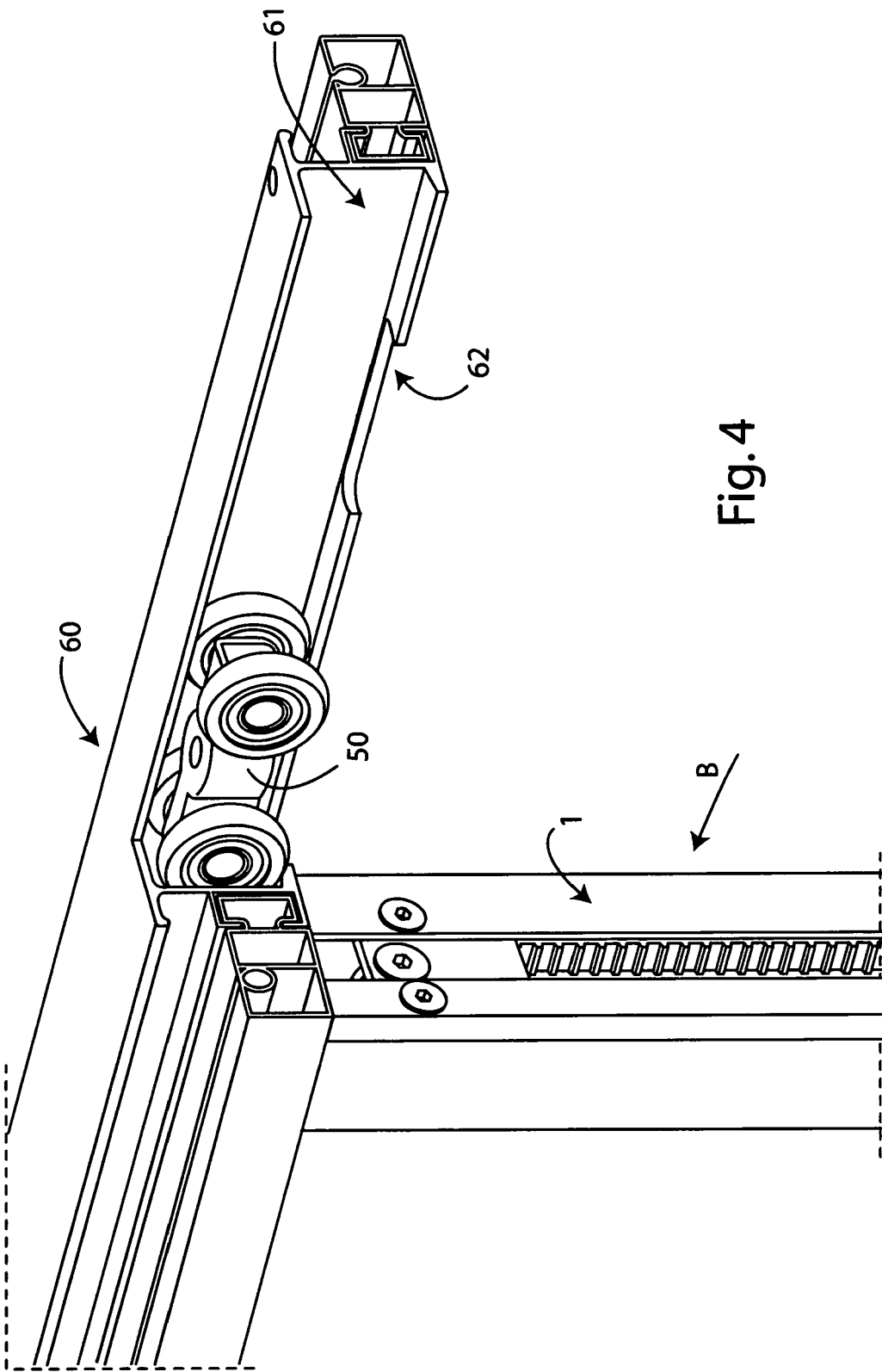


Fig. 4

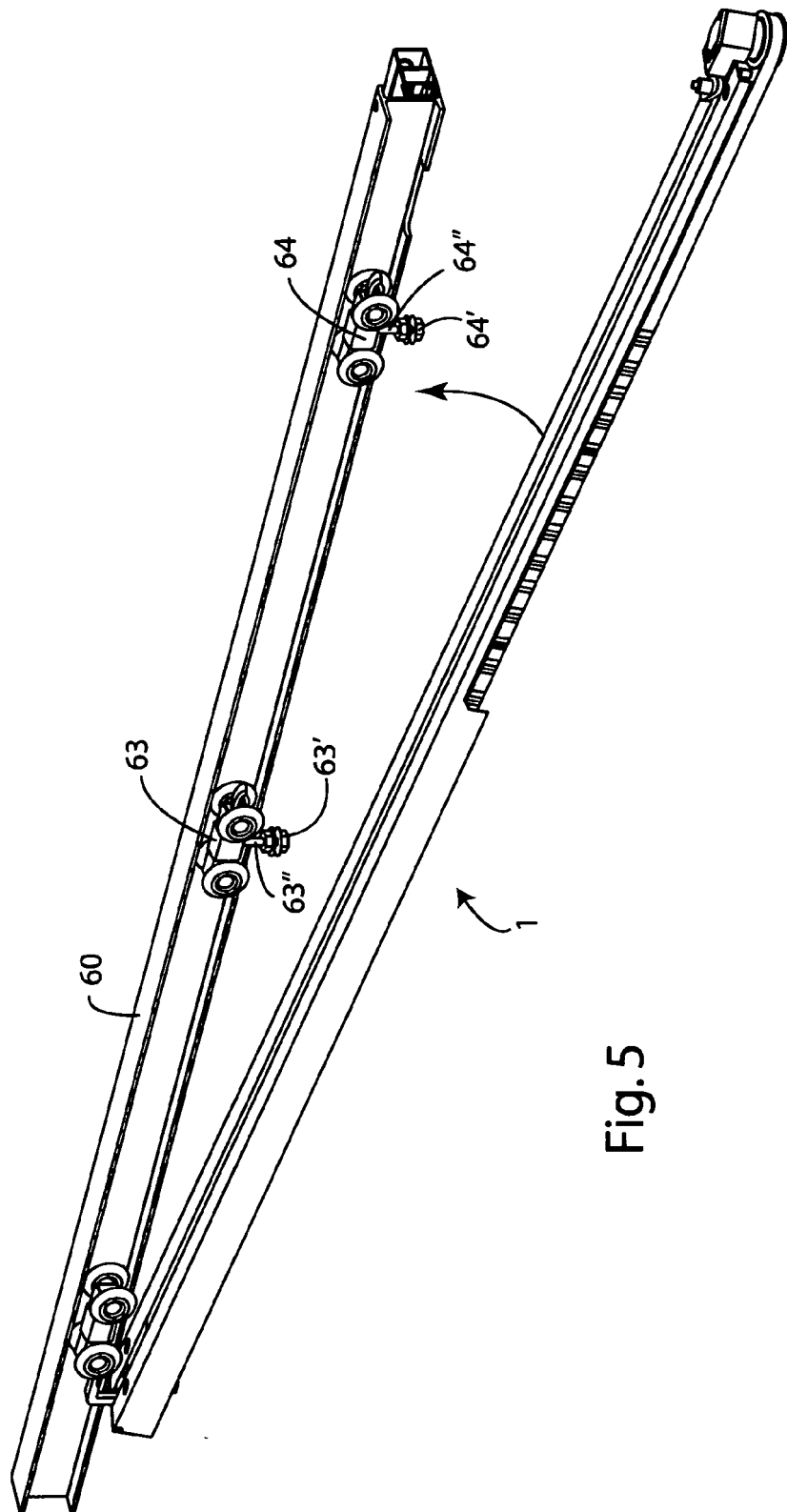


Fig. 5

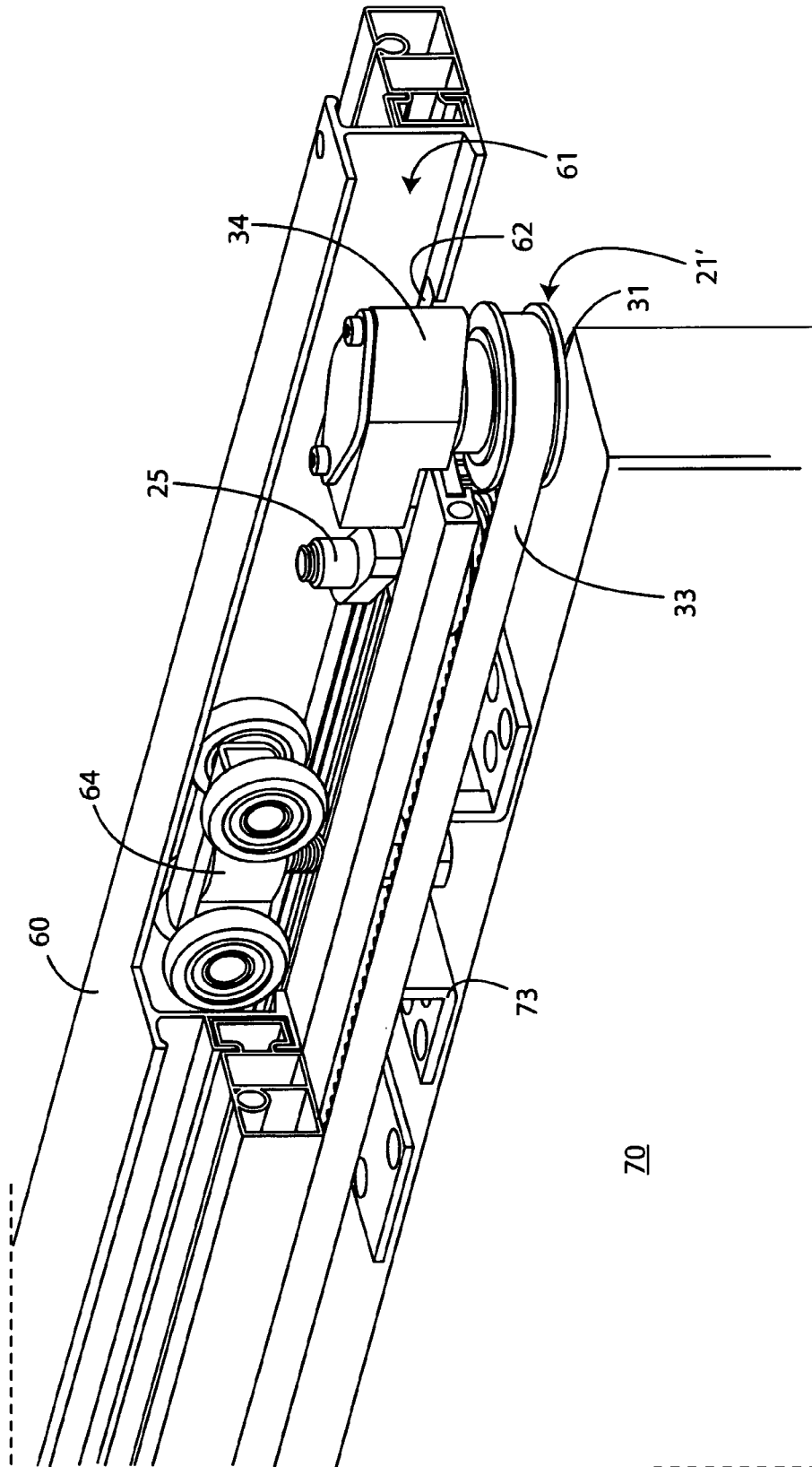


Fig. 6

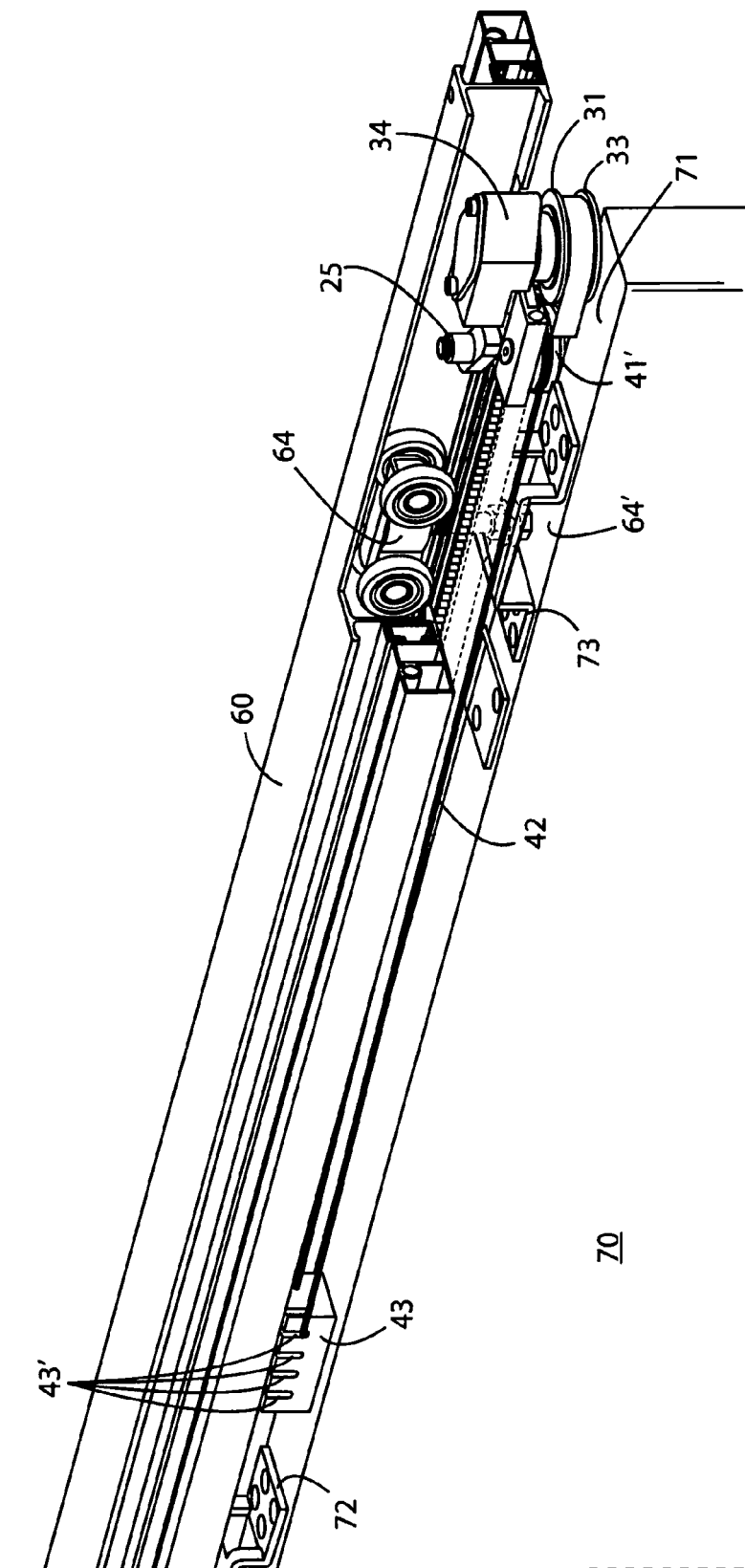


Fig. 7



EUROPEAN SEARCH REPORT

Application Number
EP 11 42 5286

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X,D	DE 20 2009 000616 U1 (HETTICH HEINZE GMBH & CO KG [DE]) 27 May 2010 (2010-05-27)	1,6,7,10	INV.
A	* paragraphs [0001], [0004], [0025] - [0029] *	2-5,8,9,11-15	E05F1/08
	* figures 1,3-7,10 *		E05F5/00

A	EP 2 189 603 A1 (SCRIGNO S P A [IT]) 26 May 2010 (2010-05-26)	1	
	* paragraphs [0015] - [0020] *		

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E05F E05D
2	Place of search	Date of completion of the search	Examiner
	The Hague	9 February 2012	Klemke, Beate
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 42 5286

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-02-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202009000616 U1	27-05-2010	DE 202009000616 U1	27-05-2010
		EP 2376732 A1	19-10-2011
		KR 20110116171 A	25-10-2011
		WO 2010081567 A1	22-07-2010

EP 2189603 A1	26-05-2010	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 2189603 A1 [0010]