

(19)



(11)

EP 3 141 686 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
15.03.2017 Bulletin 2017/11

(51) Int Cl.:
E05F 15/668 ^(2015.01) *E05D 13/00* ^(2006.01)

(21) Application number: **16188139.6**

(22) Date of filing: **09.09.2016**

(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
Designated Validation States:
MA MD

(71) Applicant: **Key Automation S.r.l.**
30020 Noventa di Piave (Venezia) (IT)

(72) Inventor: **MICHELIN, Nicola**
I-30020 Noventa di Piave (Venezia) (IT)

(74) Representative: **Buzzi, Franco**
Buzzi, Notaro & Antonielli d'Oulx
Via Maria Vittoria 18
10123 Torino (IT)

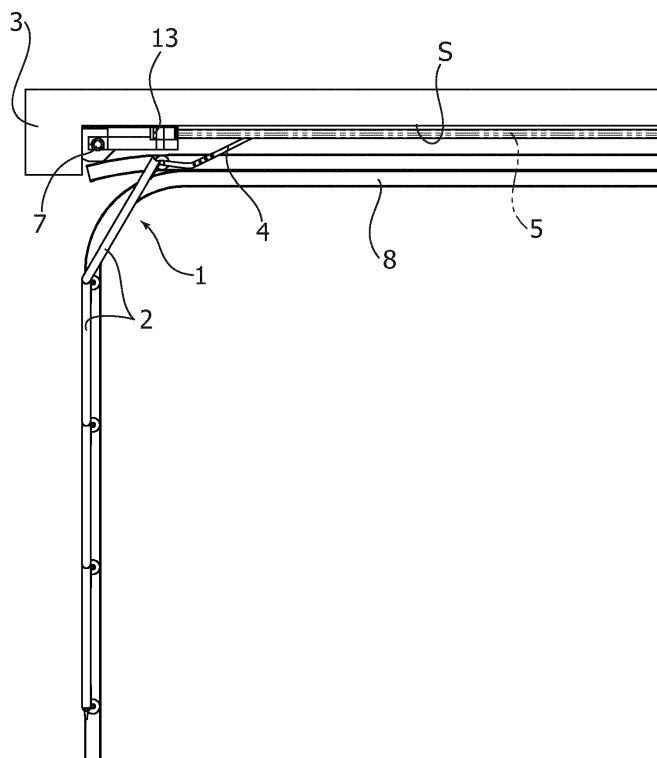
(30) Priority: **11.09.2015 IT UB20153562**

(54) OPERATING SYSTEM FOR A SECTIONAL DOOR

(57) Operating system for a sectional door (1) comprising a gear motor (6) housed in a box (13) with flattened configuration suitable to be positioned adjacent to the horizontal shaft (7) on which there are wound torsion springs for the balancing of the sectional door (1), substantially at the same level as such horizontal shaft (7).

The drive carrier (4) of the sectional door (1) may be configured to be connected to the upper panel (2) of the door selectively at one end thereof or at the opposite end, and the guide (5) of the carrier (4) can be installed in two mutually alternative positions rotated by 180°.

FIG. 3



EP 3 141 686 A1

Description

Field of the invention

[0001] The present invention generally refers to sectional doors comprising horizontal panels mutually articulated and slidable along lateral guides between a position for closing and a position for opening the door wherein the panels are arranged substantially horizontally above the area delimited by the doorway.

[0002] More in detail, the invention regards an operating system for the sectional door, conventionally comprising a horizontal shaft arranged above the doorway and bearing a pair of end drums for the winding of respective ropes for hoisting the door panels. Torsion helical springs are wound on the horizontal shaft to balance the weight of the door. The system further includes a substantially horizontal transversal metal guide which extends above behind the doorway and on which there is inserted a drive carrier connected at the centre-line of the upper panel of the door. The displacement of the drive carrier along the horizontal guide is carried out by a gear motor typically comprising a horizontal axis electric motor and a worm gear motor and a helical wheel carrying a vertical axis output shaft. As observable, the gear motor may be incorporated in the carrier.

State of the art

[0003] The operating systems of the type outlined above normally provide for two alternative arrangements, schematically exemplified in figures 1 and 2. In such figures, the sectional door, generally indicated with 1, is represented in a partly opening (or partly closing) condition wherein the panels thereof 2 are arranged partly vertically in the doorway 3 and partly substantially horizontally behind the doorway 3, above the area it delimits. The initial panel 2 is connected, at the centre-line thereof, to the drive carrier 4 mobile along a central horizontal guide 5 and whose displacement corresponding to the opening of the sectional door 1 is controlled by the gear motor 6 through a flexible tension element (not represented). The horizontal shaft arranged transversely behind and above the doorway 3, bearing the end drums (not illustrated) for the winding of the hoisting ropes, as well as the torsion helical springs (not illustrated) for balancing the weight of the sectional door 1, is indicated with 7. Reference 8 is used to indicate one of the two curved lateral guides of the panels 2.

[0004] In the prior art arrangement represented in figure 1 the gear motor 6 is positioned at the end of the guide 5, at the opposite side with respect to the horizontal shaft 7, and it is fixed to the guide 5 in turn fixed to the ceiling of the area delimited by the doorway 3. This arrangement gives rise to complications as regards the electrical connections (power supplying the motor, photocells, light apparatus), as well as installation challenges.

[0005] In the case of the second prior art solution represented in figure 2, instead of being fixed, the gear motor 6 slides along the guide 5 and it is integrated with carrier 4. Also this solution gives rise to complications as regards power supplying the translating motor, besides being more expensive.

[0006] With both prior art solutions there also arises the problem regarding the fixing of the horizontal shaft 7 with the relative torsion springs, which - in some cases - must be supported by support brackets fixed on the architrave and which hinder the bending of the shaft at the centre.

[0007] Document US-2014/027391A1 describes an operating system for a sectional door, corresponding to the pre-characterising part of claim 1, in which the box of the gear motor can be positioned and installed not only at the end of the guide opposite to the horizontal shaft, but also possibly at the end adjacent to the horizontal shaft. This arrangement, as generally suggested in the document, is not practically applicable in cases where the vertical space available between the ceiling of the area to which the sectional door is applied and the upper panel/s of the door, when the latter is arranged in closing position, is limited.

Summary of the invention

[0008] The object of the present invention is to overcome the aforementioned drawbacks, and obtain an operating system for a sectional door of the type defined above capable of simplifying the installation thereof facilitating the mounting of the various components, including the horizontal shaft with the torsion springs.

[0009] According to the invention, this object is attained through an operating system as outlined in the pre-characterising part of claim 1, in which the box of the gear motor is suitable to be installed in proximity of the end of the guide adjacent to said horizontal shaft, characterised in that the box of the gear motor has a flattened configuration and it is suitable to be positioned substantially at the same level as the horizontal shaft.

[0010] Thanks to this solution idea, the assembly of the operating system of the sectional door is considerably simplified, even as regards the electrical connections which avoid possible passage of cables above or beside the horizontal guide, required to connect the electrical power or the connection of accessories installed outside the door, such as photocells or warning lights to the gear motor. This simplification is further accentuated in cases, provided for according to an embodiment of the invention, where the box of the gear motor is designed to be directly mounted on the horizontal shaft carrying the torsion springs. In this case, the box of the gear motor may be formed with projections traversing the horizontal shaft, and it can serve as a support for fixing such horizontal shaft with the ensuing stiffening of the structure of the spring-holder shaft, which should otherwise provide for further brackets so as to prevent the central bending

thereof.

[0011] Alternatively, the box of the gear motor may be fixed autonomously, i.e. independently from the horizontal shaft.

[0012] The box of the gear motor may be installed according to the conventional configuration represented in figure 1 due to the fact that, according to another distinctive characteristic of the invention, the carrier has a symmetrical configuration so as to enable connection thereof to the flexible transmission selectively at one or the other end thereof. Alternatively, the same result can be attained by making the horizontal guide along which the carrier is moved symmetrical.

Brief description of the drawings

[0013] Further characteristics and advantages of the invention will be apparent from the following detailed description, with reference to the attached drawings provided by way of non-limiting example, wherein:

- figures 1 and 2 are lateral elevational schematic views representing the state of the art described previously,
- figure 3 is a view similar to figures 1 and 2 exemplifying a first embodiment of the operating system according to the invention,
- figure 4 shows, in larger scale and partly vertical section, a detail of figure 3,
- figure 5 is a perspective view, and in larger scale, of the detail of figure 4,
- figure 6 exemplifies the arrangement of the gear motor of the operating system according to the invention,
- figure 7 is a partial lateral elevational view, and in larger scale, of the horizontal guide in which a carrier is mobile according to a first distinctive embodiment of the carrier,
- figure 8 is a view analogous to figure 7 exemplifying an alternative embodiment of the carrier,
- figure 9 is a partial plan view of the horizontal guide according to a further alternative configuration of the invention,
- figure 10 shows an enlargement of figure 3, and
- figures 11 and 12 are views analogous to figure 10 exemplifying two further embodiments.

Detailed description of the invention

[0014] Figure 3, in which parts identical or similar to the ones described previously with reference to figures 1 and 2 are indicated with the same reference numbers, shows an embodiment of the invention and in particular the distinctive arrangement of the gear motor whose components are generally indicated with 6 in figure 6. The configuration is such that the gear motor may be advantageously installed in proximity of the guide 5 ad-

jacent to the horizontal shaft 7 carrying the torsion springs. In such arrangement, the electric motor, indicated with 9 and positioned horizontally, actuates - by means of a worm screw 10 - a vertical axis helical wheel 11 on which there is fitted a grooved output shaft 12 which controls the movement of the drive carrier 4 along the guide 5, through a flexible transmission (not represented in that conventional). The output shaft 12 projects slightly below the radial overall dimension of the electric motor 9.

[0015] The gear motor 6 is housed in a box 13 having a flattened configuration and a small vertical overall dimension, for example a maximum thickness of the order of about 70-90 mm., so as to allow the installation thereof in line with the horizontal shaft 7, i.e. at a level or height substantially corresponding to that of the horizontal shaft 7, near the latter as represented in figure 3 and in larger detail in figure 10. As observable hereinafter, the box of the gear motor 6 may be traversed or not traversed by the horizontal shaft 7. In any case, this configuration enables the installation of the gear motor 6 close to the horizontal shaft 7 even in cases where there is little vertical space C available between the ceiling of the area where the sectional door is applied, indicated with S, and the upper panel/s 2 of the sectional door 1 when the latter is arranged in closing position.

[0016] As better observable in the schematisation of figures 4 and 5 the box 13 is made up of a lower half-shell 14 and an upper half-shell 15, part of which was omitted in the illustration to show the electric motor 9 with the relative transformer 16. As observable, the output shaft 12 projects into a recess 17 of the upper half-shell 15, which also serves as a seat for the guide 5.

[0017] At the front part, the box 13 has a pair of appendages 18 carrying respective horizontal bushings 19 that can be opened by removing respective lower blocks 20. The bushings 19 have the function of enabling assembling the box 13, and thus the gear motor 6, directly on the horizontal shaft 7: it is sufficient to remove and then apply the lower boxes 20 to assemble.

[0018] With this assembly when installing the system, the box 13 may initially rotate on the horizontal shaft 7, so as to simplify the subsequent assembly of the guide 5. Thus, the box 13 may be fixed to the structure of the area delimited by the doorway 3, and this fixing may be such that the box 13 serves as a support for the horizontal shaft 7, which thus does not require further means for retention by means of brackets or the like, which may thus be eliminated. This makes the assembling of the system even simpler, thus reducing the costs thereof.

[0019] As already observed, the box of the gear motor may be installed in a space C autonomously, i.e. independently with respect to the horizontal shaft 7, but still at a level substantially corresponding to that of such horizontal shaft, for example as represented in figure 11 or in figure 12. In both cases, the box, indicated with 13A, does not have the appendages 18 with the bushings 19 and it simply projects frontwards to the horizontal shaft 7, at the level thereof as mentioned, but without being

traversed by it. The application of the box 13A is obtained in the case of figure 11 by means of at least one bracket 24 fixed to the architrave that delimits the doorway 3, and in the case of figure 12 through at least one attachment 25 fixed to the ceiling S.

[0020] It should be observed that, thanks to the alternative characteristics, described hereinafter, of the carrier 4 or of the guide 5, the box 13 carrying the gear motor 6 could also be installed in a conventional fashion in the configuration corresponding to the prior art of figure 1, even though this implies losing most of the advantages deriving from the arrangement described previously.

[0021] In order to enable this possibility, the carrier 4 may be configured so as to enable the attachment of the flexible transmission, actuated by the gear motor 6 and connected to the upper panel 2 of the door 1, selectively on one side or on the opposite side. Figure 7 schematically shows this configuration, in which the carrier 4 (not visible in that contained in the guide 5) is provided - at the opposite ends thereof - with two appendages 21, 22 symmetrically arranged on opposite sides with respect to the centre-line of the carrier indicated with P. Depending on the selected assembly configuration, one or the other appendage 21, 22 may be connected to an arm 23 in turn connected to the flexible transmission.

[0022] Alternatively, the carrier 4 may be provided with a single appendage 21 removably fixed at one end thereof, as indicated with a solid line in figure 8, or at the opposite end as indicated with a dashed line in the same figure, for attachment to the arm 23 respectively on one side or the other of the carrier 4. Another alternative consists in making the carrier 4 disassemblable from the guide 5, so as to rotate it by 180° for engaging the arm 23 to the appendage 21 on one side or on the opposite side.

[0023] Figure 9 shows a further alternative solution according to which the guide 5 is obtained in a symmetrical fashion, so as to enable the assembly of the gear motor 6 indistinctly in the innovative position of fig. 3 (as represented on the right side of fig. 8) or also as in fig. 1 just like in the prior art solutions (as represented on the right side of fig. 8).

[0024] Obviously, the construction details and the embodiments may widely vary with respect to what has been described and illustrated, without departing from the scope of protection of the present invention as defined in the claims that follow.

Claims

1. Operating system of a sectional door (1) comprising horizontal panels (2) mutually articulated and slidable along lateral guides (8) between a position for opening and a position for closing a doorway (3), a horizontal shaft (7) extending above the doorway (3) and on which there are wound torsion helical springs for the balancing of the sectional door (1), a drive

carrier (4) connected at the centre-line of the upper panel (2) of the door and mobile along a transversal horizontal guide (5) extending above behind the doorway (3), and a gear motor (6) for displacing the drive carrier (4) along said horizontal guide (5), wherein said gear motor (6) is housed in a box (13; 13A) suitable to be installed in proximity of the end of said guide (5) adjacent to said horizontal shaft (7), **characterised in that** said box (13; 13A) of the gear motor (6) has a flattened configuration and it is suitable to be positioned substantially at the same level as said horizontal shaft (7).

2. System according to claim 1, **characterised in that** said box (13) can be fixed on said horizontal shaft (7).

3. System according to claim 1 or 2, **characterised in that** said box (13) is formed with projections (18) provided with bushings (19) that can be traversed by said horizontal shaft (7).

4. System according to claim 2 or 3, **characterised in that** said box (13) serves as a support for said horizontal shaft (7).

5. System according to claim 1, **characterised in that** said box (13A) can be independently fixed by said horizontal shaft (7).

6. System according to any one of the preceding claims, **characterised in that** said drive carrier (4) is configured so that it can be connected to the upper panel (2) of the door selectively at one end thereof or at the opposite end.

7. System according to any one of the preceding claims, **characterised in that** said guide (5) is symmetrical and can be installed in two mutually alternative positions rotated by 180°.

FIG. 2

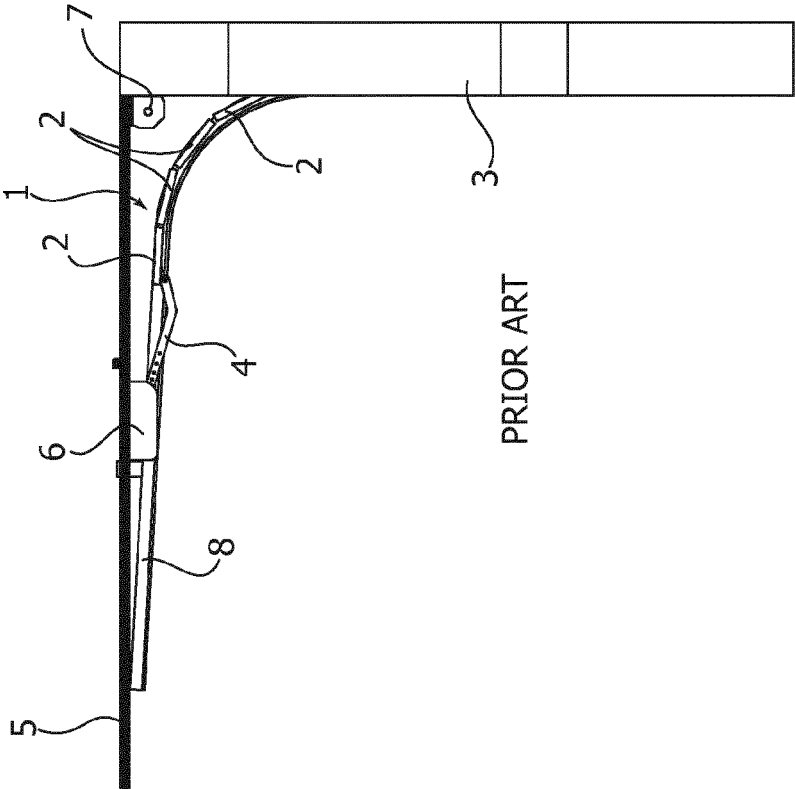


FIG. 1

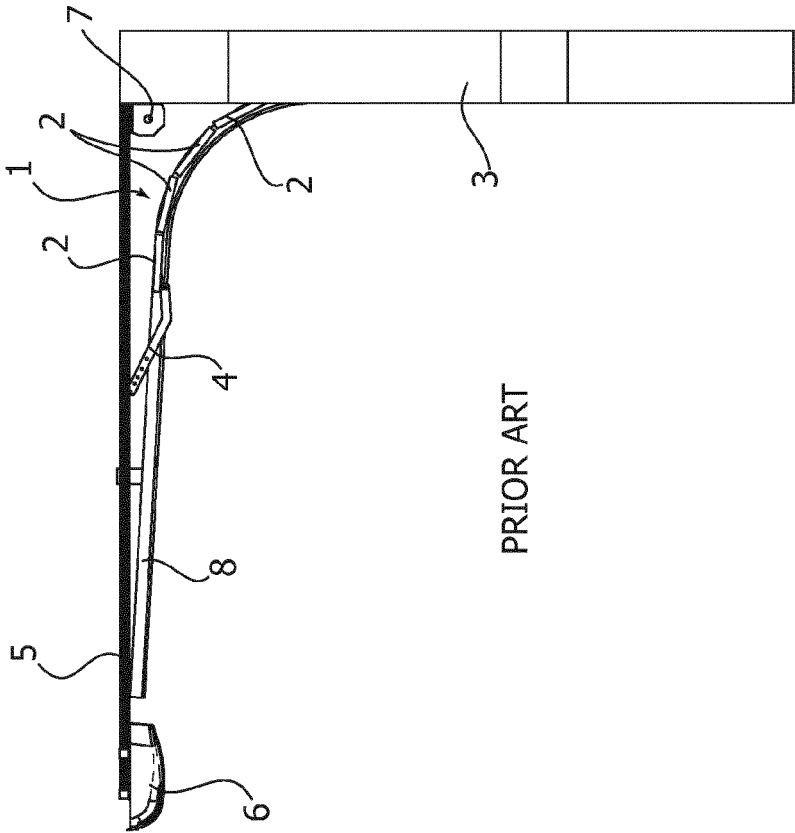


FIG. 3

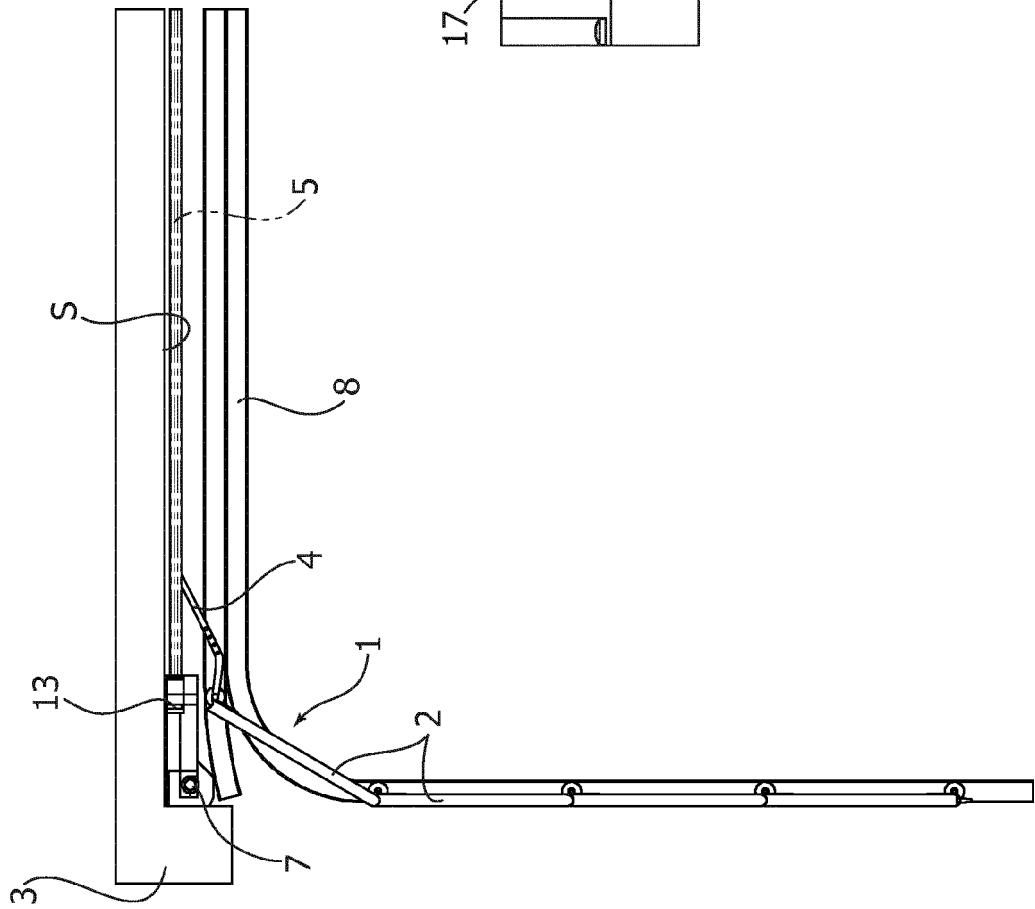


FIG. 4

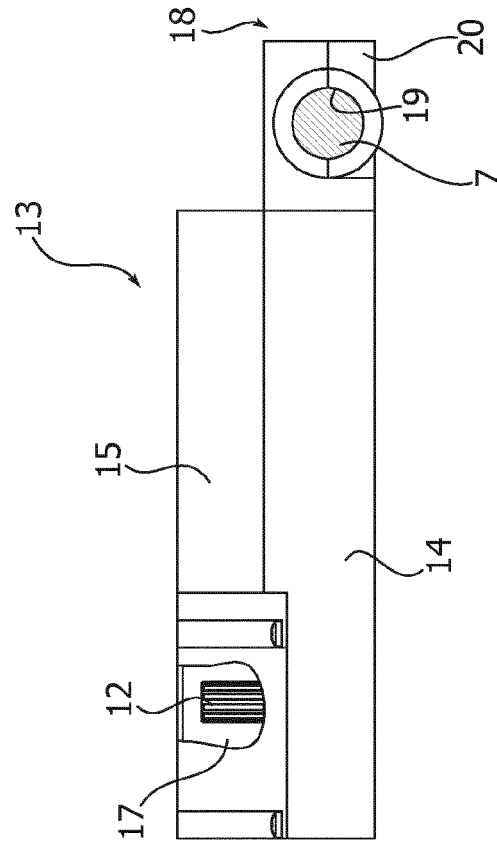


FIG. 5

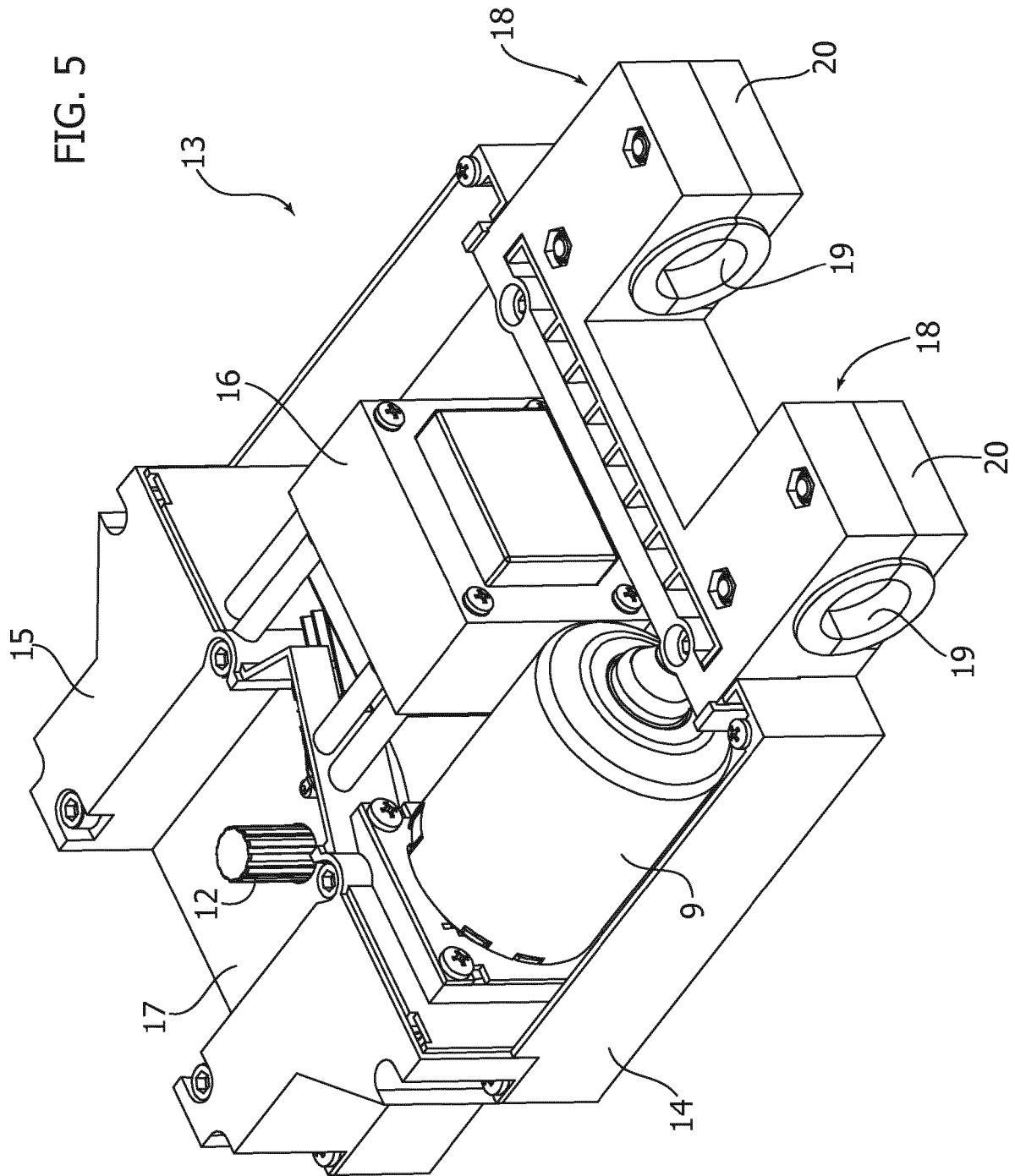


FIG. 6

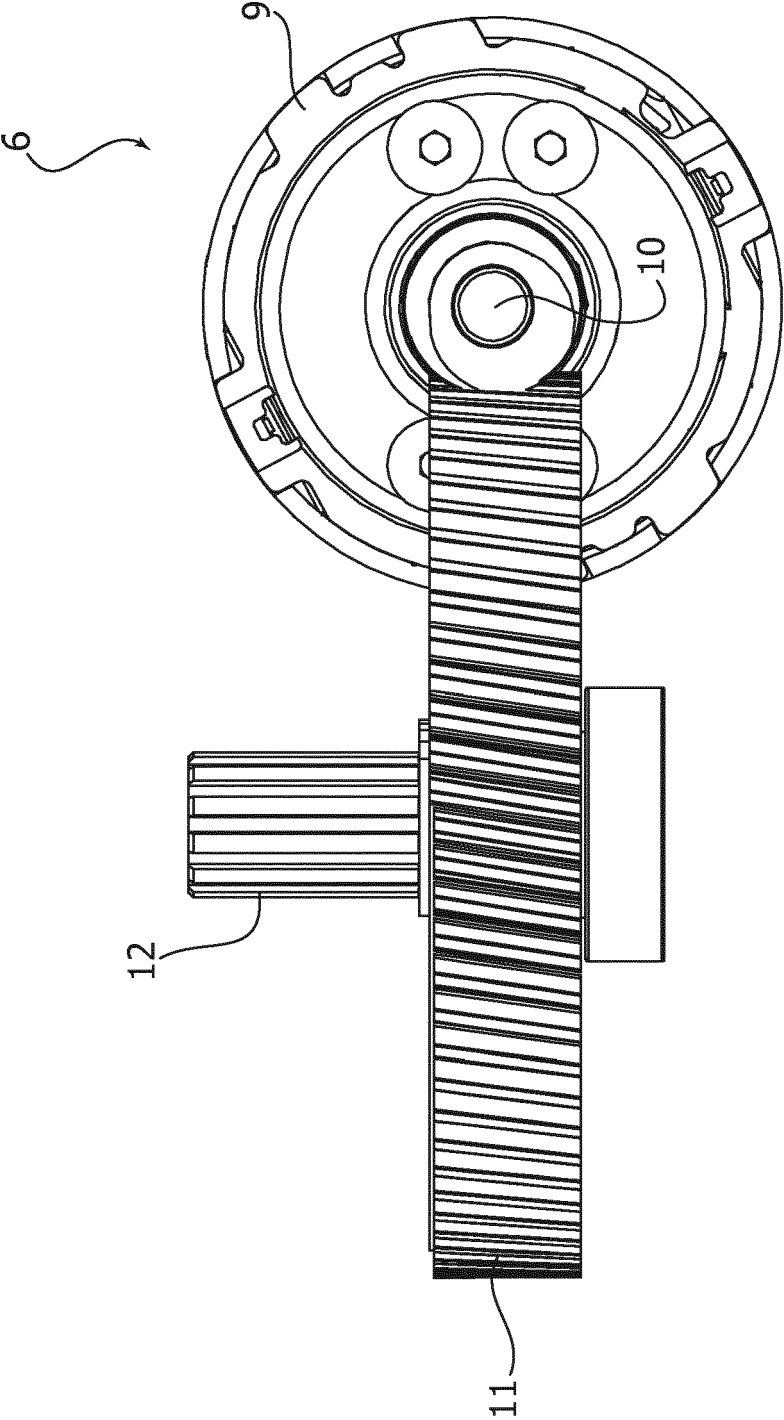


FIG. 7

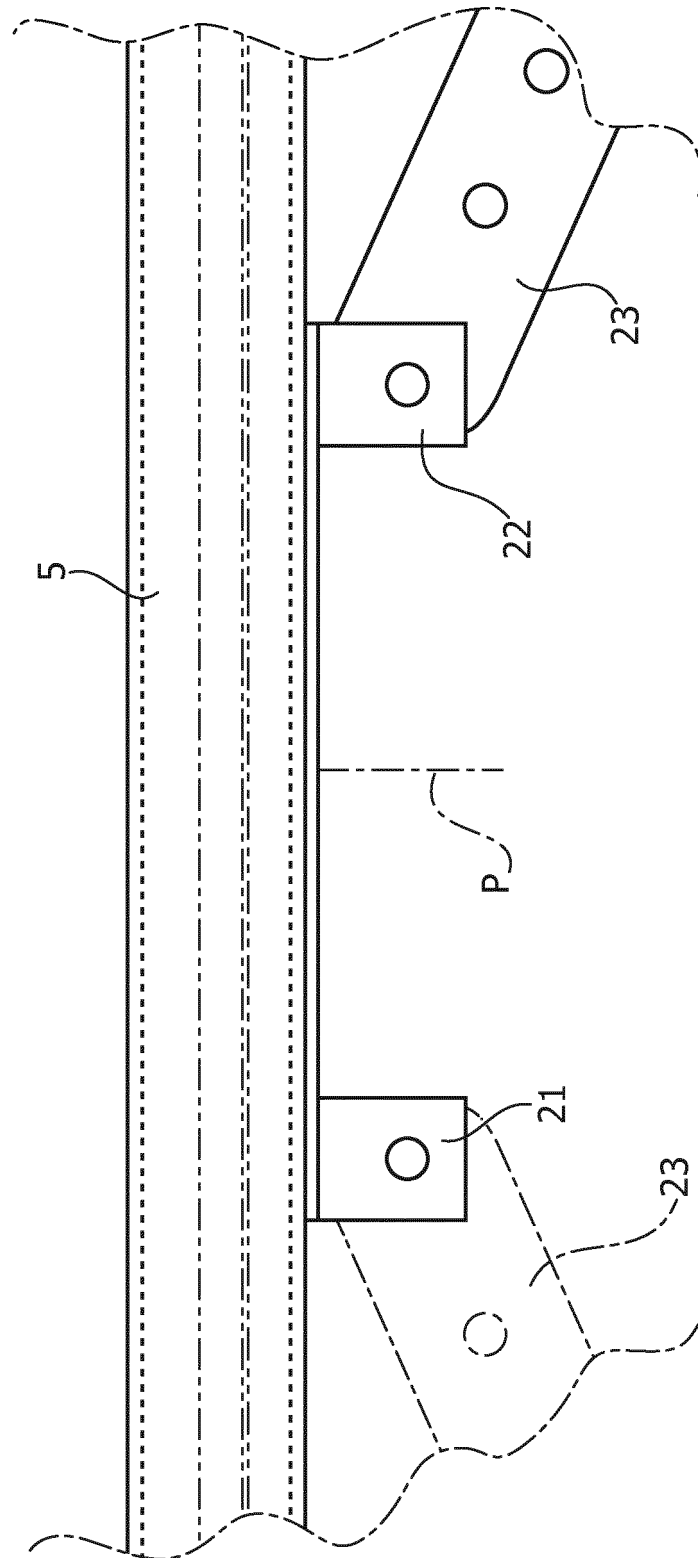


FIG. 8

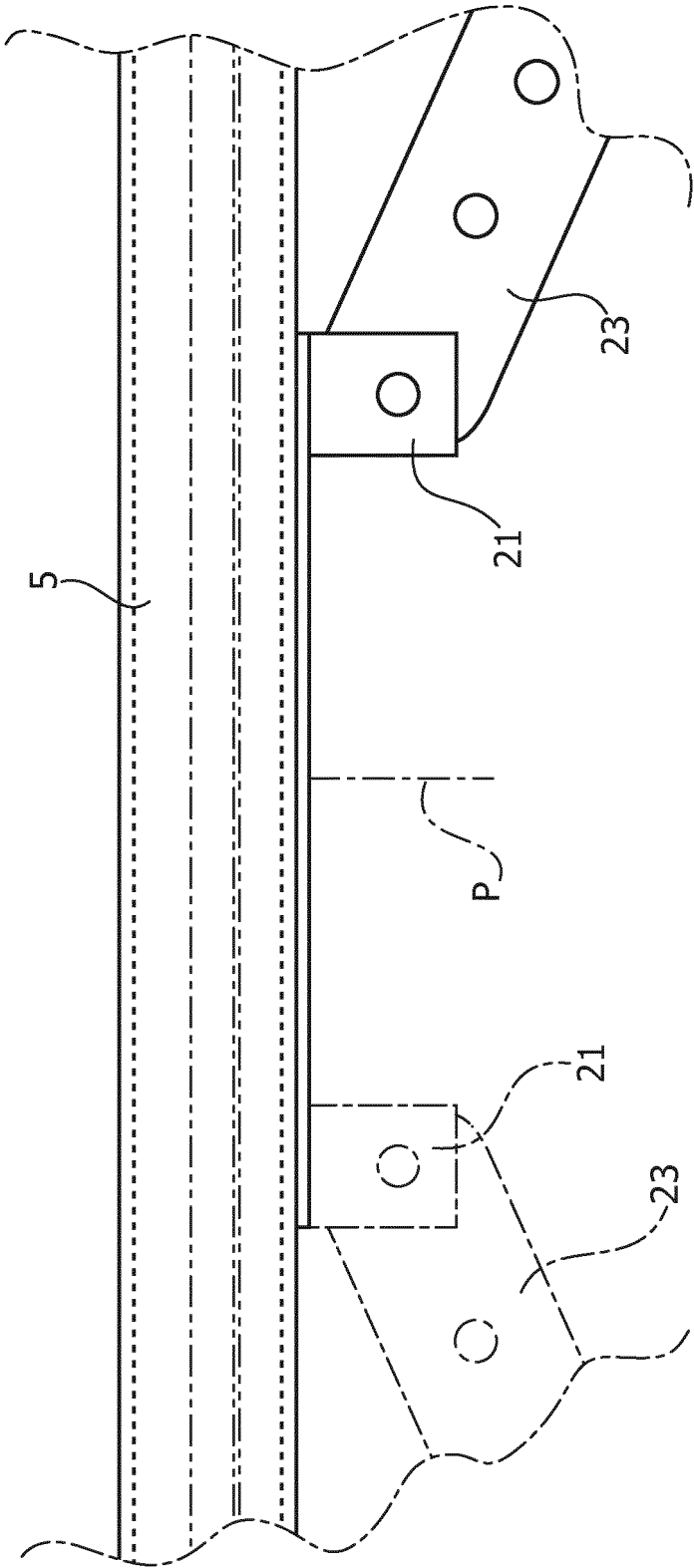


FIG. 9

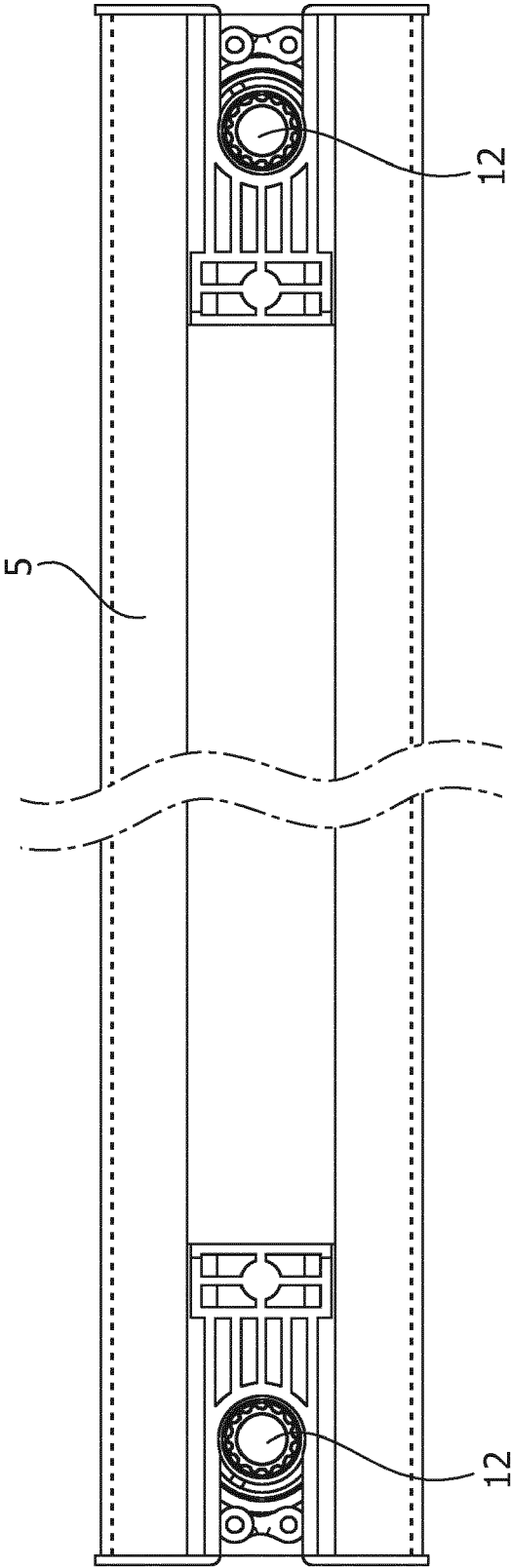


FIG. 10

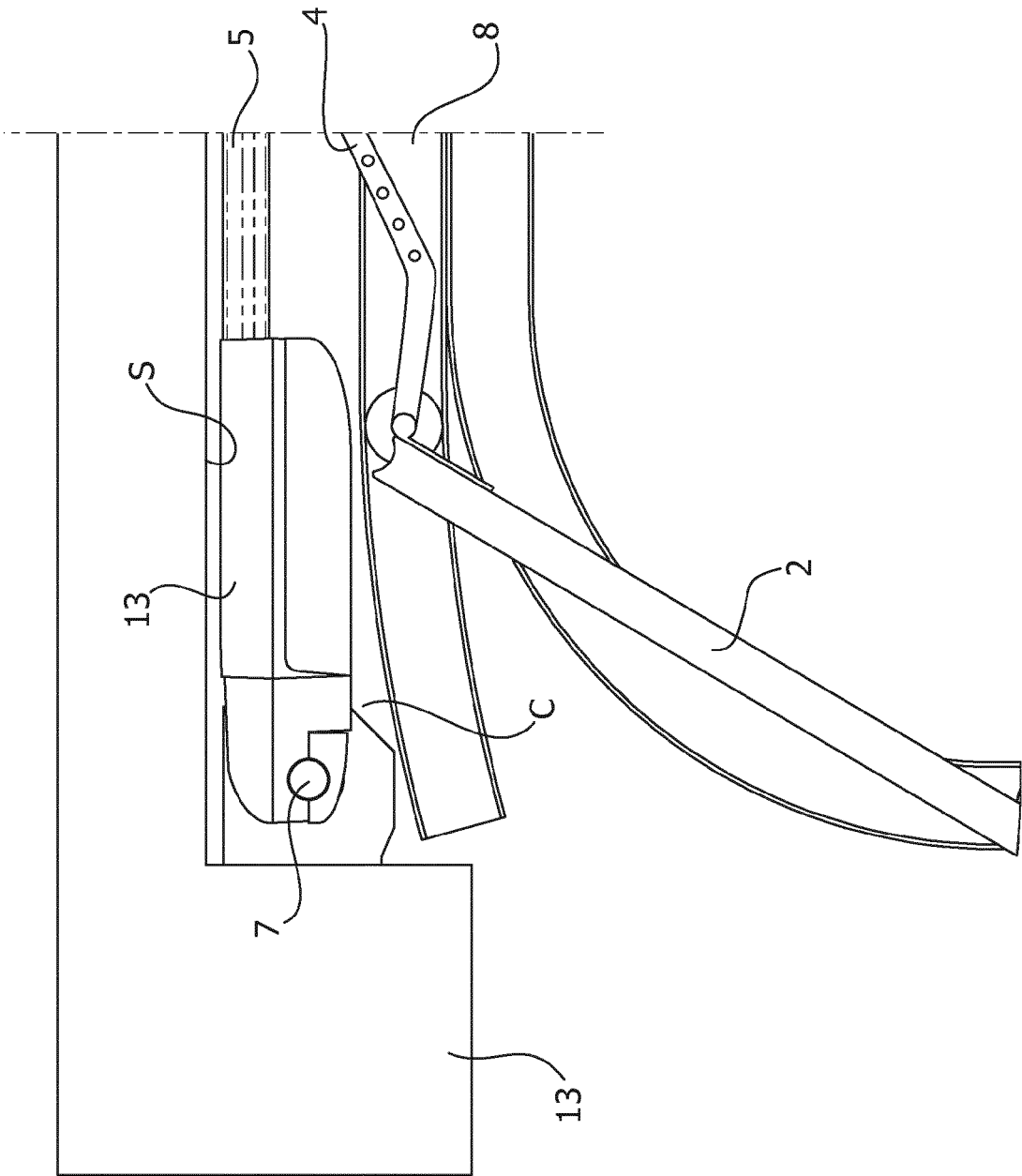


FIG. 11

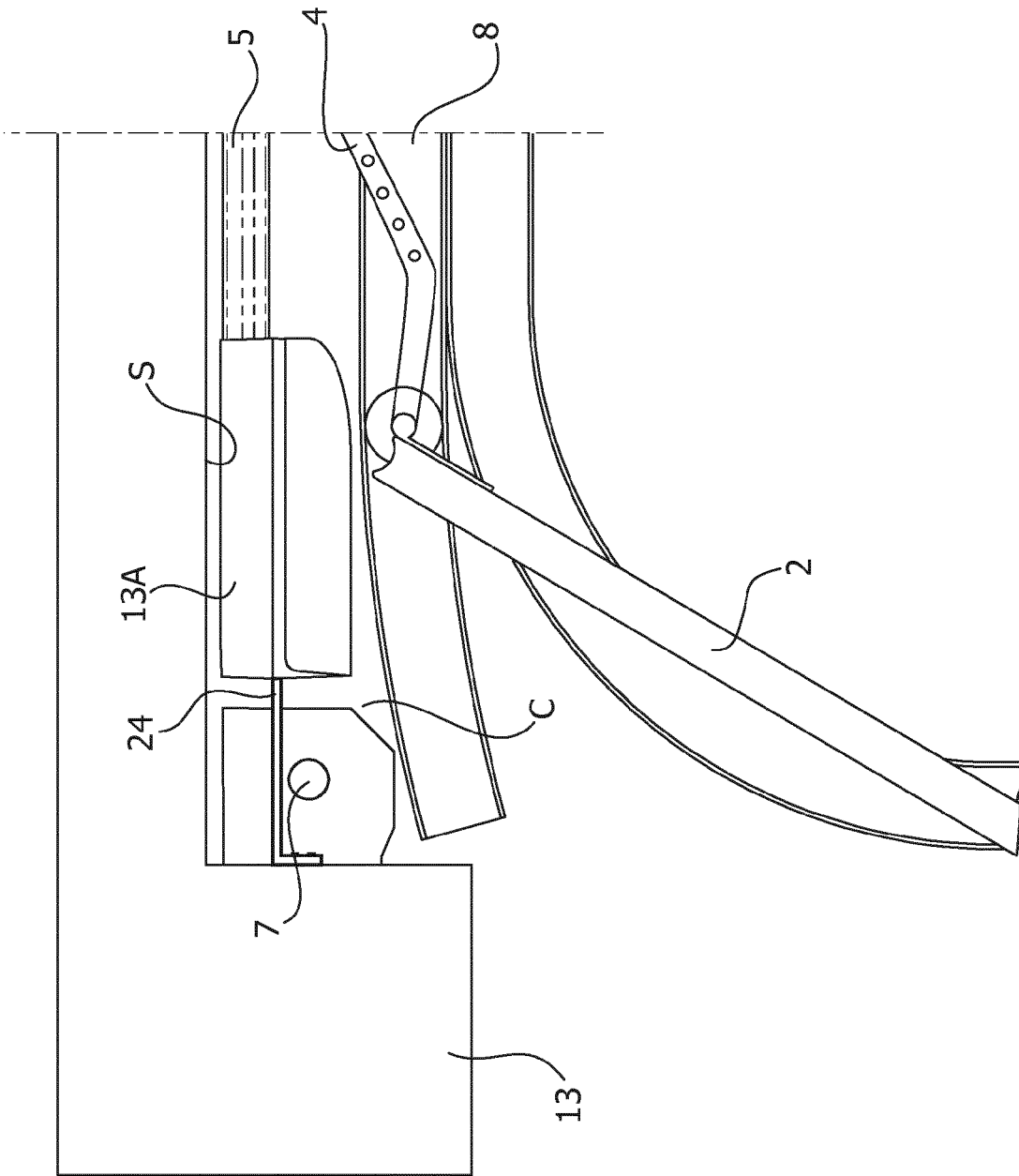
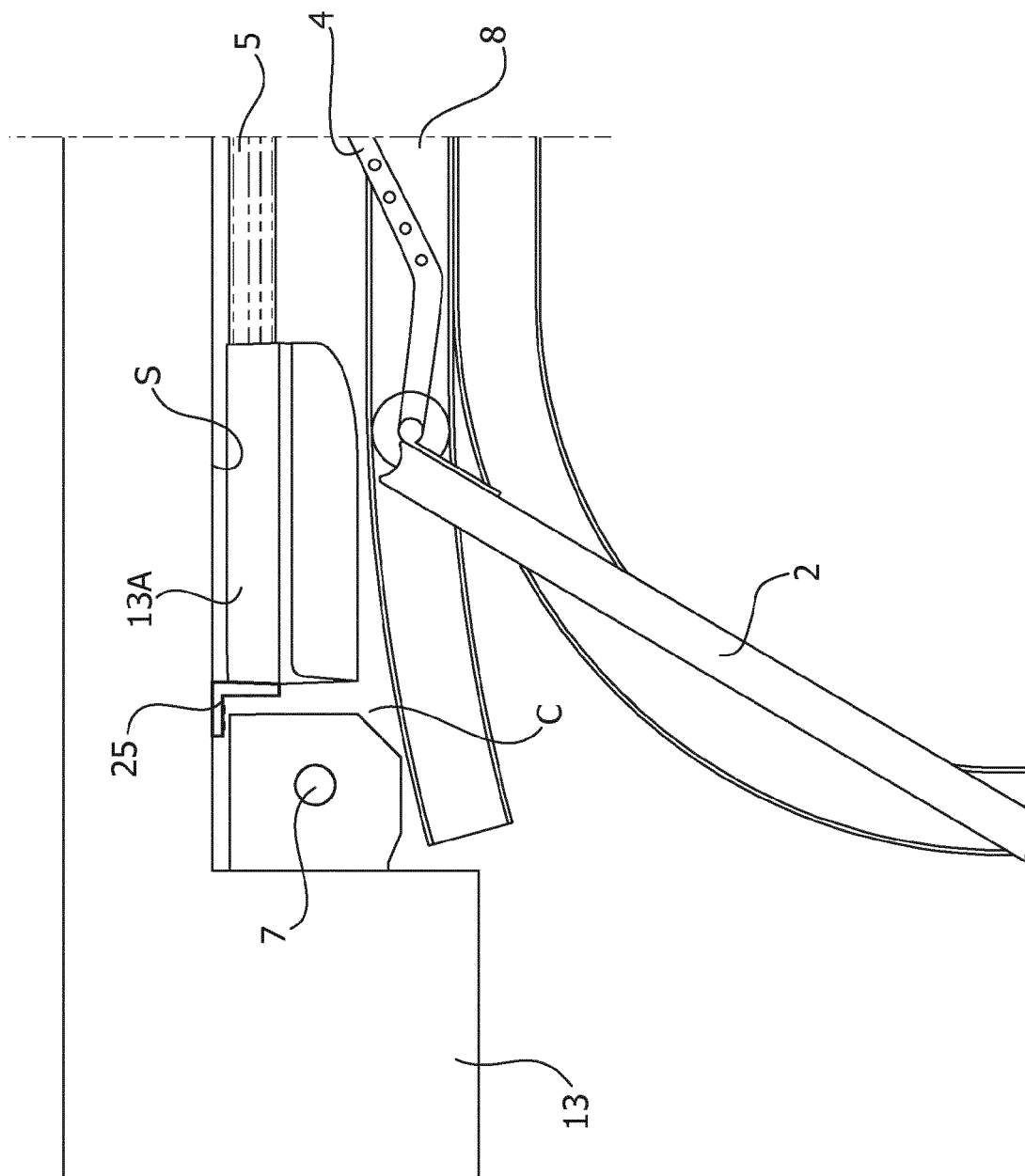


FIG. 12





EUROPEAN SEARCH REPORT

Application Number
EP 16 18 8139

5

10

15

20

25

30

35

40

45

50

55

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	US 2014/027391 A1 (MENNING CURTIS P [US]) 30 January 2014 (2014-01-30)	1,5,7	INV. E05F15/668
Y	* paragraphs [0039] - [0041], [0044],	2,4,6	
A	[0046], [0049], [0053], [0056], [0057] * * figures 1,1A,2,7 *	3	ADD. E05D13/00
Y	EP 0 939 189 A2 (P & D GROUP SERVICES LTD [GB]) 1 September 1999 (1999-09-01)	2,4	
A	* paragraphs [0014], [0017] * * figures 1,2 *	1,3,5-7	
Y	US 3 478 469 A (ESTES CYRUS L) 18 November 1969 (1969-11-18)	6	
A	* column 3, lines 5-32,52-64 * * figure 1 *	1-5	
A	US 2015/013229 A1 (SHALOM EDDY [US]) 15 January 2015 (2015-01-15)	1-5	
	* paragraphs [0080], [0089], [0090], [0097], [0099], [0107], [0109] * * figures 2,3,5,14 *		TECHNICAL FIELDS SEARCHED (IPC)
A	WO 2004/038162 A1 (ANZON AUTODOOR LTD [NZ]; SCHEIB MICHAEL KEVIN [NZ]) 6 May 2004 (2004-05-06)	1-7	E05F E05D
	* page 1, lines 7-11 * * page 6, lines 18-30 * * figures 1,4 *		
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16 January 2017	Examiner Wagner, Andrea
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 16 18 8139

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

16-01-2017

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2014027391 A1	30-01-2014	CA 2821387 A1	24-01-2014
		CA 2858883 A1	24-01-2014
		US 2014027391 A1	30-01-2014
EP 0939189 A2	01-09-1999	EP 0939189 A2	01-09-1999
		GB 2334750 A	01-09-1999
		GB 2344138 A	31-05-2000
US 3478469 A	18-11-1969	NONE	
US 2015013229 A1	15-01-2015	NONE	
WO 2004038162 A1	06-05-2004	AU 2003265024 A1	13-05-2004
		AU 2008202649 A1	10-07-2008
		NZ 522300 A	24-06-2005
		WO 2004038162 A1	06-05-2004

15

20

25

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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

- US 2014027391 A1 [0007]