



(43) International Publication Date
24 September 2015 (24.09.2015)

(51) International Patent Classification:

B66B 13/12 (2006.01) *B66B 13/06* (2006.01)
B66B 13/30 (2006.01)

(21) International Application Number:

PCT/IB2015/051023

(22) International Filing Date:

11 February 2015 (11.02.2015)

(25) Filing Language:

Italian

(26) Publication Language:

English

(30) Priority Data:

BS2014A000063 19 March 2014 (19.03.2014) IT

(71) Applicant: SEMATIC S.R.L. [IT/IT]; Via Comm. Francesco Zappa, 5, I-24046 Osio Sotto, BERGAMO (IT).

(72) Inventor: ZAPPA, Roberto; c/o SEMATIC S.r.l., Via Comm. Francesco Zappa, 5, I-24046 Osio Sotto, BERGAMO (IT).

(74) Agents: ETERNO, Enrico et al.; c/o JACOBACCI & PARTNERS S.p.A., Piazza della Vittoria, 11, I-25122 Brescia (IT).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))

(54) Title: BLOCK SYSTEM AND ASSEMBLY FOR LIFT DOORS

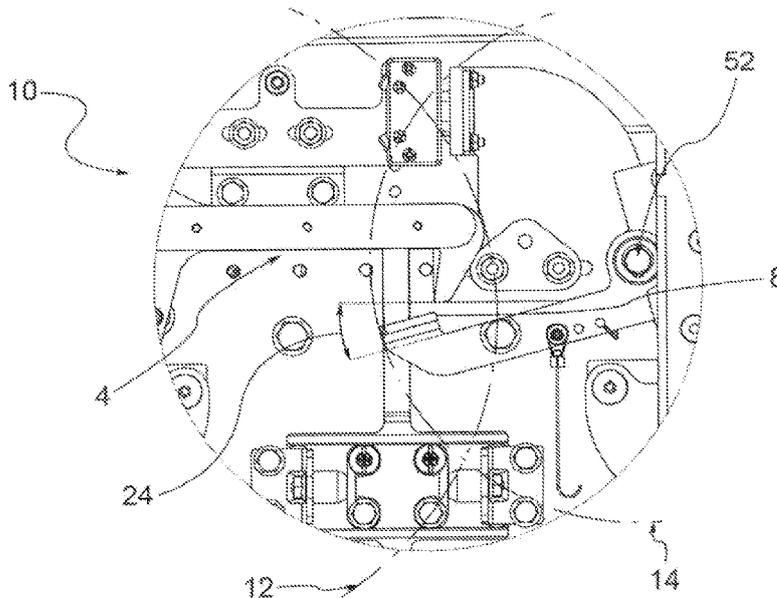


FIG. 4

(57) Abstract: Locking system (10) for a sliding door (2) with respect to a constraint structure comprising a latch (4), associable to the sliding door (2) or to the constraint structure, rotatable or rotatably translatable between a configuration of locking and a configuration of release of the door (2), a keyhole member (6), connectable to the other between the constraint structure or the sliding door (2), which delimits a holding edge (8) that, in the locking configuration, is engaged by the latch (4) to prevent movement of the sliding door (2) with respect to said structure, the keyhole member (6) being manually operable to move the holding edge (8) and the latch (4) apart, when the latter is in the locking configuration.



DESCRIPTION**"Block system and assembly for lift doors"**

[0001] The present invention relates to a locking system for a sliding door, and an assembly comprising such a system.

[0002] It is known that a sudden power failure can lead to difficulties in removing passengers from the cabin of a lift apparatus.

[0003] Independently of the fact that the lift doors may be misaligned with respect to the landing doors, the moving means for opening/closing of the doors are electrically locked and powered, so it may not be possible to free the passengers until the electric current is at least temporarily restored.

[0004] This invention addresses to this context, proposing to provide an emergency system for unlocking the doors of a lift system, designed so as to allow emergency responders (such as the fire department) to forcibly open the doors to remove or rescue the passengers of the cabin.

[0005] This objective is achieved by means of a locking system according to claim 1, and by means of an assembly according to claim 9. The claims dependent on these show variants of preferred embodiments.

[0006] The object of this invention will now be described

in detail, with the help of the attached tables, wherein:

[0007] - Figures 1 and 2 show frontal views of a locking system object of this invention, according to a possible embodiment, mounted in the assembly in two different
5 operating configurations;

[0008] - Figures 3 and 4 show magnifications of the areas highlighted, respectively, in Figure 1 and in Figure 2;

[0009] - Figure 5 shows a view of a locking assembly, employing the system of Figure 1, according to a possible
10 embodiment.

[0010] With reference to the above-referenced tables, reference number 1 identifies in its entirety a locking assembly that comprises at least one sliding door 2, a constraint structure and a locking system 10, described
15 below, functionally connected to the sliding door 2 and to the constraint structure.

[0011] In this description, the term "constraint structure" refers to a structure that, by cooperating with the locking system 10, holds the sliding door 2 in a default
20 position. For example, the default position may be a position of at least partial closure of an internal compartment of a cabin-lift or a vertical shaft of a lift system.

[0012] In fact, the locking system object of this invention
25 could be used to constrain a landing leaf/door, but more

preferably it is used for a cabin leaf/door.

[0013] Purely by way of example, the constraint structure could be a side post, an opposite door 2', a translation guide 38, 38' of said door or the like.

5 [0014] For the variant with an opposite door 2', shown schematically in Figure 5, the assembly 1 therefore comprises a pair of centrally opening sliding doors 2, 2'.

[0015] Preferably, the assembly 1 comprises at least one
10 translation guide 38, 38' (such as a rail) that guides the movements of the door 2, 2' between its different operating modes.

[0016] According to a variant, the assembly 1 comprises first moving means 36 for moving the sliding door 2 and a
15 slide 26, 26' associated thereto from an abutment position of the door 2 with the side post (or with the opposite door 2'), to a separation position from said post (or from said opposite door 2').

[0017] Advantageously, the moving means can comprise at
20 least one electric motor, operatively connected to the door (or to the plurality of doors 2, 2') through first transmission means 44.

[0018] According to an embodiment, the first transmission means - which connect the sliding door 2 to the first
25 moving means - can comprise a belt connected to the

sliding door 2 so as to move it between the positions described, for example in opening and closing of the internal compartment. Analogous first transmission means could also be provided for the opposite door 2'.

5 [0019] According to an advantageous embodiment, the assembly comprises at least one slide 26, 26', translatably movable together with the sliding door 2 and configured for cooperating with a lock of a landing door (not shown) to allow an opening of the latter.

10 [0020] In other words, the slide 26, 26' works on a landing lock (for example on a pair of actuating rollers of such a lock adjacent to the slide) to unlock the related landing door, so as to coordinate or couple the movements of the sliding door 2 and the landing door.

15 [0021] According to a further embodiment, second moving means 28, preferably independent of the first moving means 36, act on a locking/unlocking trolley 30 of the slide by means of a kinematic coupling of the irreversible type.

20 [0022] In this description, the term "irreversible coupling" means a mechanical connection that cannot be reversed except through the application of an electric current to the second motor means 28. It follows that, in the absence of electric current, the locking/unlocking
25 trolley 30 remains in the same position even under the

action of external influences (such as a manual action).

[0023] As it can be seen for example from Figure 1, the slide 26, 26' comprises at least one constraint element 46 (for example a wheel or roller), on which the locking/unlocking trolley 30 works. In this way, the blades 32, 34 of the slide 26, 26' are maintained in reciprocal approach. Preferably, the trolley 46 acts in thrust to maintain this approaching.

[0024] When, on the contrary, the locking/unlocking trolley 30 releases the constraint element 46, the slide blades 32, 34 will be free to move away in order to work on the landing lock. For example, this release occurs by means of the locking/unlocking trolley 30 moving away from the sliding door.

[0025] Preferably, the slide blades 32, 34 are constantly pushed away by elastic means 48 acting between them (such means being just visible in Figure 2), in opposition to the action of the locking/unlocking trolley 30.

[0026] According to a variant, the second moving means 30 can comprise at least one electric motor and, optionally, such means could be connected to the trolley 30 through second transmission means. For example, the second transmission means may comprise a shaft and a pinion of the second motor means 30, such pinion meshing with a transmission rack associated to the locking/unlocking

trolley 30.

[0027] As said, the slide 26, 26' preferably comprises a pair of slide blades 32, 34, which can be brought together and separated in an articulated manner
5 (preferably in a roto-translatable manner), in particular through not shown levers.

[0028] For variants that provide for the opposite door 2', a locking/unlocking trolley 30 could be provided in parallel on a slide 26, 26' of each of these doors.

10 [0029] The locking system 10 of the sliding door 2 with respect to the constraint structure, comprises a latch associated to the door 2 or to the constraint structure, rotatable about a primary rotation axis X (or roto-translatable, according to another embodiment), between a
15 locking configuration and a release configuration of the door 2.

[0030] Preferably, the latch 4 comprises at least one hooking portion 42, for example an end portion shaped in this way.

20 [0031] According to an advantageous embodiment, the latch 4 delimits a cam-shaped front surface 40, whose function will be clarified below. For example, the front surface 40 extends in a direction inclined with respect to a prevailing extension direction of the latch.

25 [0032] According to a further embodiment, the movement of

the latch 4 is controlled (or coordinated) by the movement of at least one of the slide blades 32, 34.

[0033] The locking system 10 comprises also a keyhole member 6, connected to the other between the constraint structure or the sliding door 2, delimiting a holding edge 8 that, in the locking configuration, is engaged by the latch 4 to prevent the sliding door 2 from moving relative to the structure.

[0034] In other words, as long as the latch 4 (and in particular the related hooking portion 42) interferes with the holding edge 8, the sliding door 2 and the constraint structure are forced to remain in substantially the same relative position.

[0035] Advantageously, the latch 4 and the keyhole member 6 are secured in correspondence to the respective slides 26, 26' associated to adjacent doors 2, 2'.

[0036] According to the embodiment shown in the tables, the keyhole member 6 comprises a moving/rotatable shaft 16, at one end of which a transversal component 18 is secured that delimits a part of the holding edge 8.

[0037] For example, the transversal component 18 has a generally plate-like shape.

[0038] The keyhole member 6 is innovatively manually operable to distance the holding edge from the latch 4 (as shown, for example, in Figures 2 and 4), when the

latter is in the locking configuration.

[0039] In this way, through the disengagement of the holding edge 8 from the latch 4 with a manual intervention, it is possible to reciprocally free the sliding door and the constraint structure.

[0040] For this reason, even in the presence of a kinematic coupling of the irreversible type of the first and/or second moving means, the system that is object of this invention allows to unlock the movement of the sliding door.

[0041] Advantageously, the keyhole member 6 is rotatably actuatable about a secondary rotation axis Z substantially parallel to the primary rotation axis X.

[0042] According to a further advantageous embodiment (as for example shown in Figure 4), the keyhole member 6 is rotatable relative to the constraint structure or relative to the sliding door 2, wherein one first arc trajectory 12 of said member overlaps at least in projection a second arc trajectory 14 travelled by the latch 4.

[0043] According to a variant, the locking system comprises manual actuating means 20 - for example a cord, chain or manoeuvring rod - that acts on the moving/rotatable shaft 16 to disengage the holding edge 8 from the latch 4.

[0044] For example, with reference to the arrangement shown in Figures 1 and 2, pulling the manual actuating means 20 in the direction of the arrow 50 causes a downward rotation of the holding edge 8, which thereby frees the trajectory along which the latch moves.

[0045] According to a variant of particular advantage, when the latch 4 approaches the holding edge 8, the cam-shaped front surface 40 causes a deviation between the latch and the edge (and more precisely moves the edge away), and allows a subsequent engagement of the hooking portion 42 to the holding edge 8, in this case after the aforesaid hooking portion has slid over this edge.

[0046] In this way, even in the case in which the latch was brought close to the keyhole element in the locking configuration, the locking system would still be suitable to constrain the door, since the front surface 40 would cause the movement or rotation of the keyhole element and the engagement of the holding edge with the latch.

[0047] According to an embodiment, the locking system 10 comprises elastic return means 22 that constantly act on the keyhole member 6 and on the constraint structure, or on said member and on the sliding door 2, in an opposite direction to the direction of manual actuation of said member. For example, the elastic return means comprise a helical spring mounted coaxially to a pivot pin 52 that

extends along the secondary rotation axis Z.

[0048] According to an advantageous embodiment, the keyhole member 6 or the holding edge 8 is rotatable by a maximum angle 24 equal to or of smaller than 20° , preferably
5 equal to or smaller than about 15° .

[0049] Advantageously, the locking system and the assembly of this invention are implementable in any existing lift door, by virtue of the relative construction simplicity and reliability.

10 [0050] Advantageously, the locking system and assembly that are the object of this invention are designed to ensure reliable mechanical coupling in all circumstances.

[0051] Advantageously, the locking system that is the object of this invention is designed to perform movements
15 with a low inertia.

[0052] Advantageously, the locking system that is the object of this invention is designed to perform accurately controlled maximum excursions.

[0053] Advantageously, the weight of the locking/unlocking
20 trolley constitutes an additional security against possible and accidental unhooking of the latch.

[0054] To the embodiments of the aforesaid locking system and assembly a skilled person, in order to meet specific needs, may make variants or substitutions of elements
25 with others functionally equivalent.

[0055] Even these variants are contained within the scope of protection, as defined by the following claims.

[0056] Moreover, each of the variants described as belonging to a possible embodiment can be realized
5 independently of the other variants described.

CLAIMS

1. A locking system (10) for a sliding door (2) relative to a constraint structure, for example relative to a side post, to an opposite door (2'), to a translation guide (30, 38') of said door or the like, 5 said system (10) comprising:
- a latch (4), associable with the sliding door (2) or with the constraint structure and rotatable about a primary rotation axis (X), or roto-translatable, between 10 a locking configuration and a release configuration of said door (2);
 - a keyhole member (6), connectable to the other between the constraint structure or the sliding door (2), delimiting a holding edge (8) that in the locking 15 configuration is engaged by the latch (4) to prevent the sliding door (2) from moving relative to said structure; wherein the keyhole member (6) is manually operable to distance the holding edge (8) from the latch (4), when the latter is in the locking configuration.
- 20 2. A locking system according to claim 1, wherein the keyhole member (6) is rotatable relative to the constraint structure or relative to the sliding door (2), wherein one first arc trajectory (12) of said member overlaps at least in projection a second arc trajectory 25 (14) travelled by the latch (4).

3. A locking system according to claim 1 or 2, wherein the keyhole member (6) is rotatably operable about a secondary rotation axis (Z) substantially parallel to said primary rotation axis (X).
- 5 4. A locking system according to any one of the preceding claims, wherein the keyhole member (6) comprises a mobile/rotatable shaft (16) at one end of which a transversal component (18) is secured delimiting at least one part of the holding edge (8).
- 10 5. A locking system according to the preceding claim, comprising manual actuating means (20) acting on the mobile/rotatable shaft (20) to disengage the holding edge (8) from the latch (4).
6. A locking system according to any one of the
15 preceding claims, wherein the latch (4) comprises a hooking portion (42) and delimits a cam-shaped front surface (40) that, when the latch (4) and the holding edge (8) approach, causes a displacement between said latch and said edge, and allows the hooking portion (42)
20 to subsequently hook to the holding edge (8).
7. A locking system according to any one of the preceding claims, comprising elastic return means (22), constantly acting on the keyhole member (6) and on the constraint structure, or on said member (6) and on the
25 sliding door (2), in an opposite direction to the

direction of manual actuation of said member.

8. A locking system according to any one of the preceding claims when dependent on claim 2 or 3, wherein the keyhole member (6) is rotatable by a maximum angle
5 (24) equal to or smaller than 20° , preferably equal to or smaller than about 15° .

9. A locking assembly (1) comprising:

- at least one sliding door (2);
- a constraint structure, in particular a side post, an
10 opposite door (2'), a translation guide (38, 38') of said door or the like; and
- a locking system (10) according to any one of the preceding claims, operatively connected to the sliding door (2) and to the constraint structure.

15 10. An assembly according to the preceding claim, comprising:

- at least one slide (26, 26'), translatably movable together with the sliding door (2) and configured for cooperating with a lock of a landing door to allow an
20 opening of the latter;
- second moving means (28) acting on a locking/unlocking trolley (30) of said slide by means of a kinematic coupling of the irreversible type.

11. An assembly according to the preceding claim,
25 wherein the slide (26, 26') comprises a pair of slide

blades (32, 34) that are movable towards and away from each other in an articulated manner, the movement of the latch (4) being controlled by the movement of at least one of said blades.

5 12. An assembly according to claim 10 or 11, wherein the latch (4) and the keyhole member (6) are secured at respective slides (26, 26') associated with adjacent doors (2, 2').

13. An assembly according to any one of claims 10-12,
10 comprising first moving means (36), independent of the second moving means (28), to move the sliding door (2) and the respective slide (26, 26') from an abutment position of the door (2) with the side post or with the opposite door (2'), to a separation position from said
15 post or from said opposite door (2').

14. An assembly according to claim 10, comprising a pair of centrally-opening sliding doors (2, 2'), and a locking/unlocking trolley (30) acting in parallel on the slide (26, 26') of each of said doors.

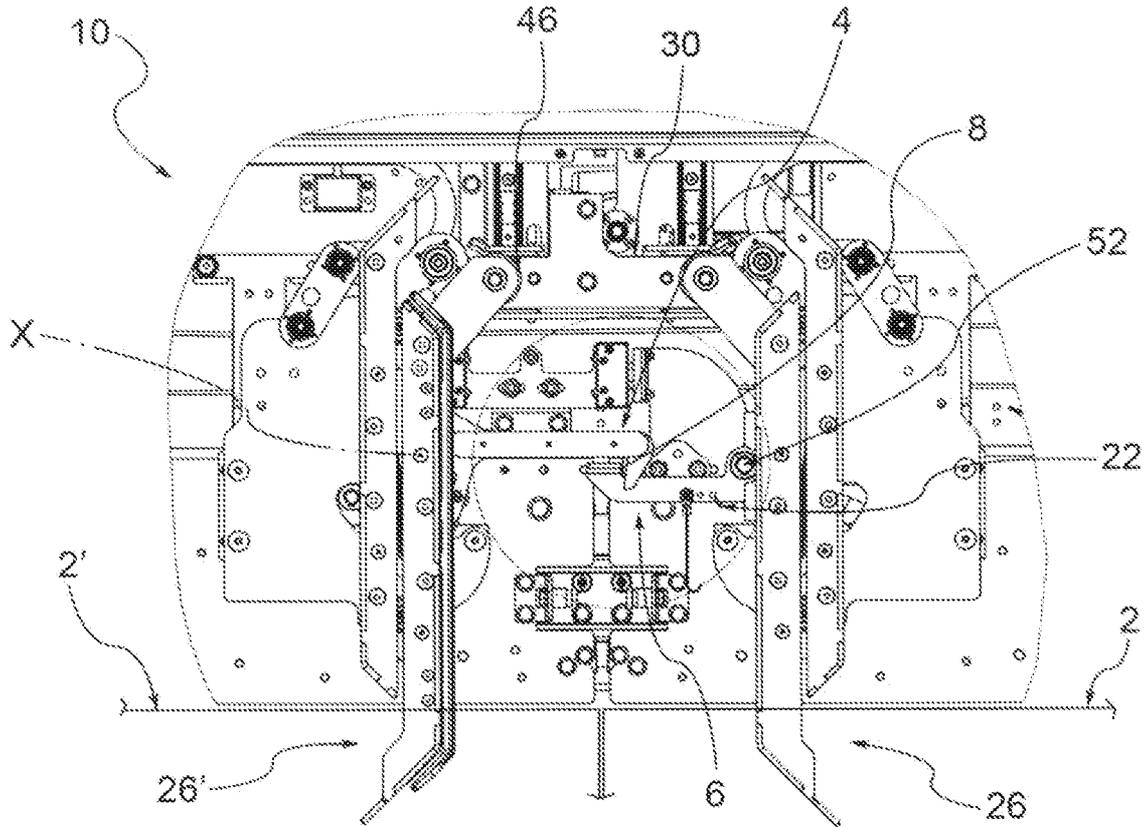


FIG. 1

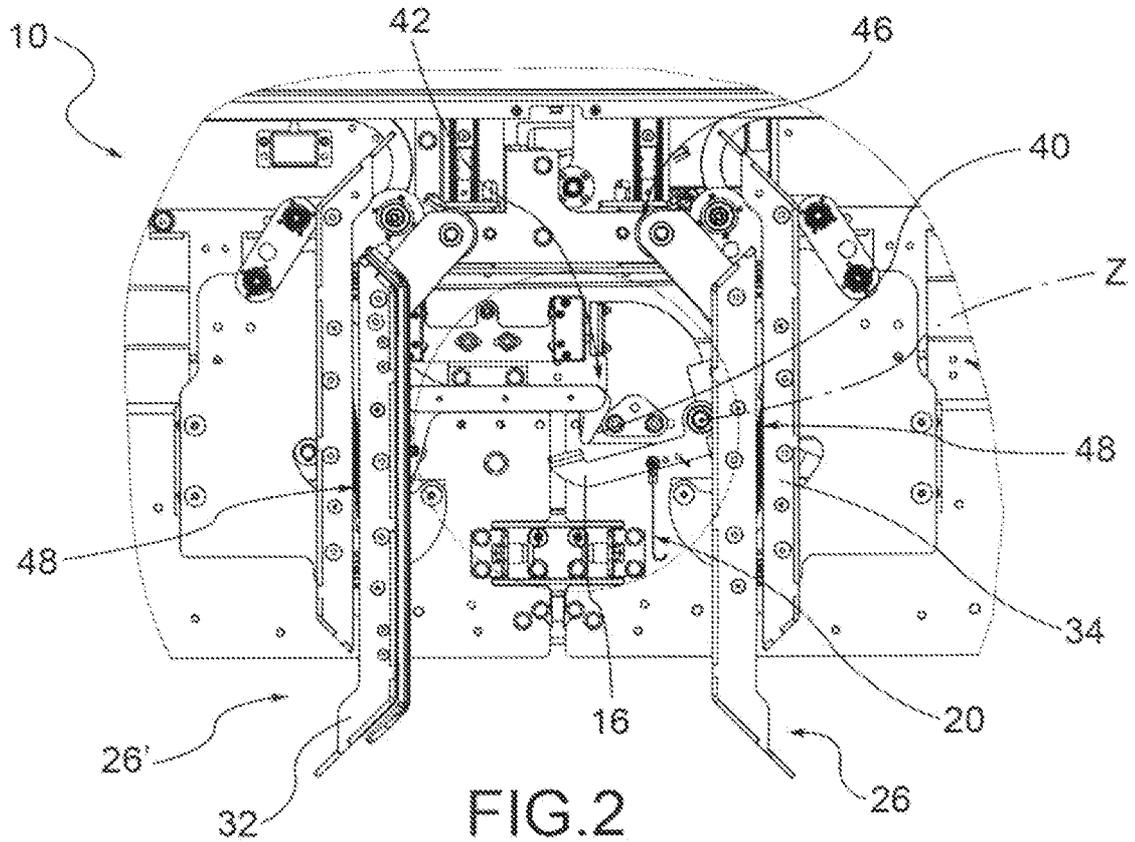


FIG. 2

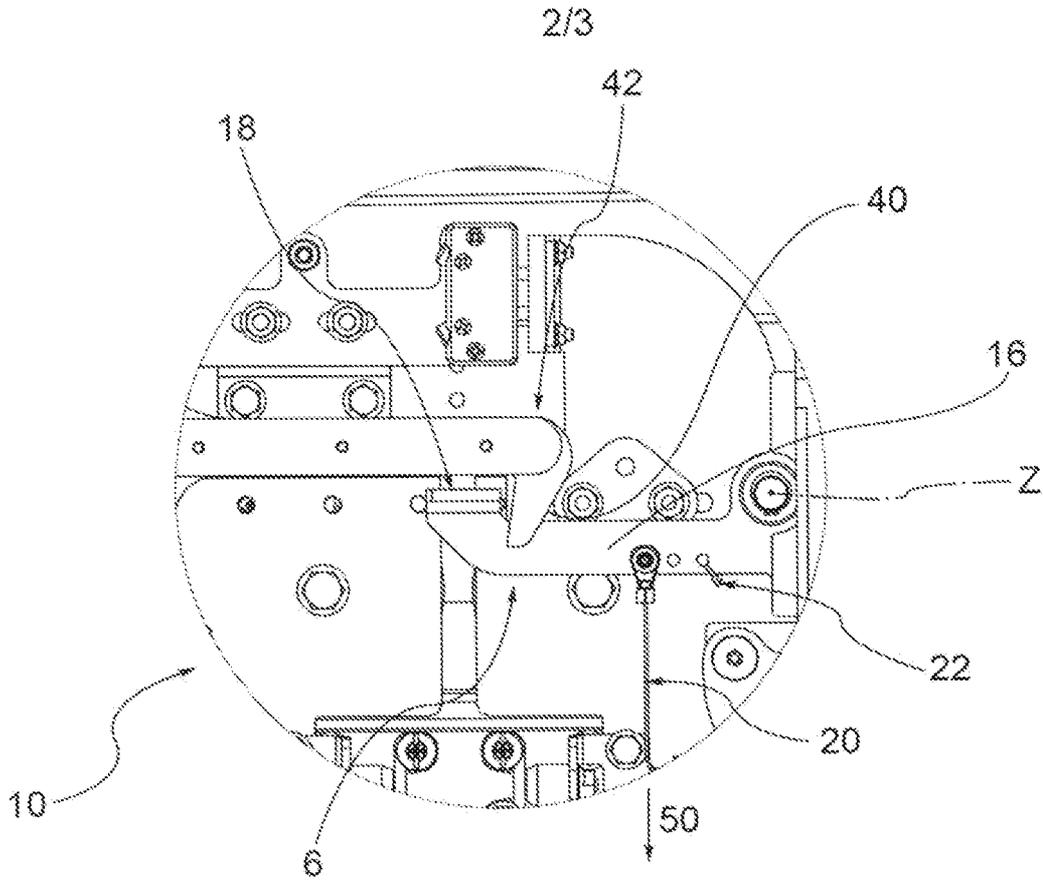


FIG.3

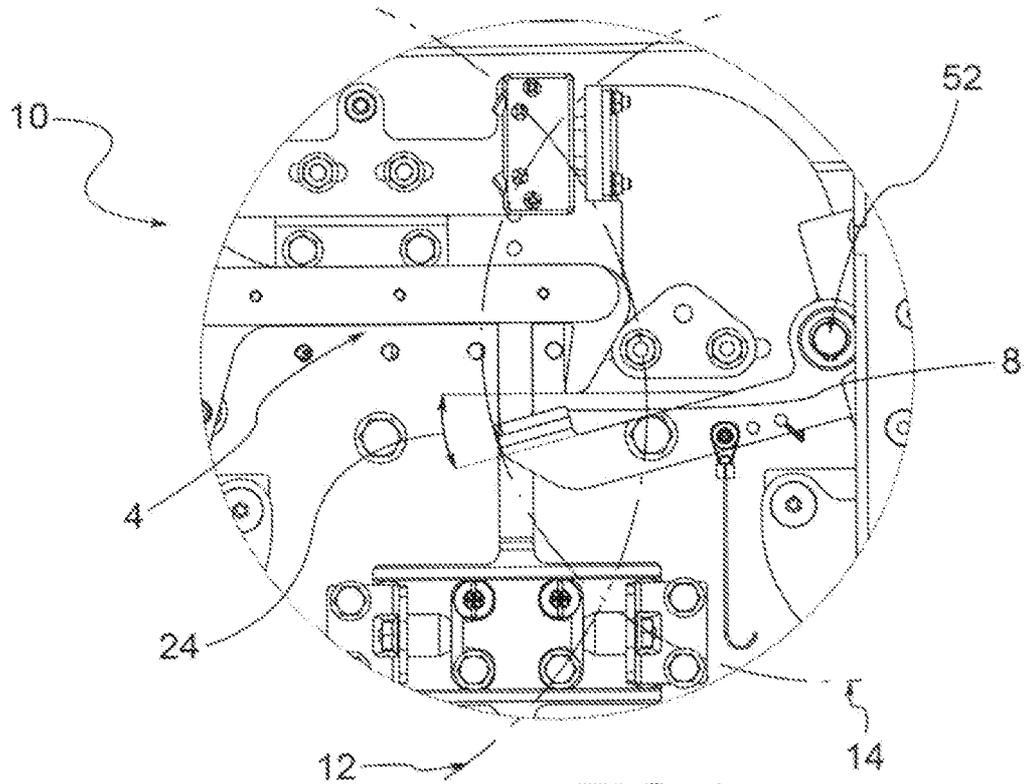


FIG.4

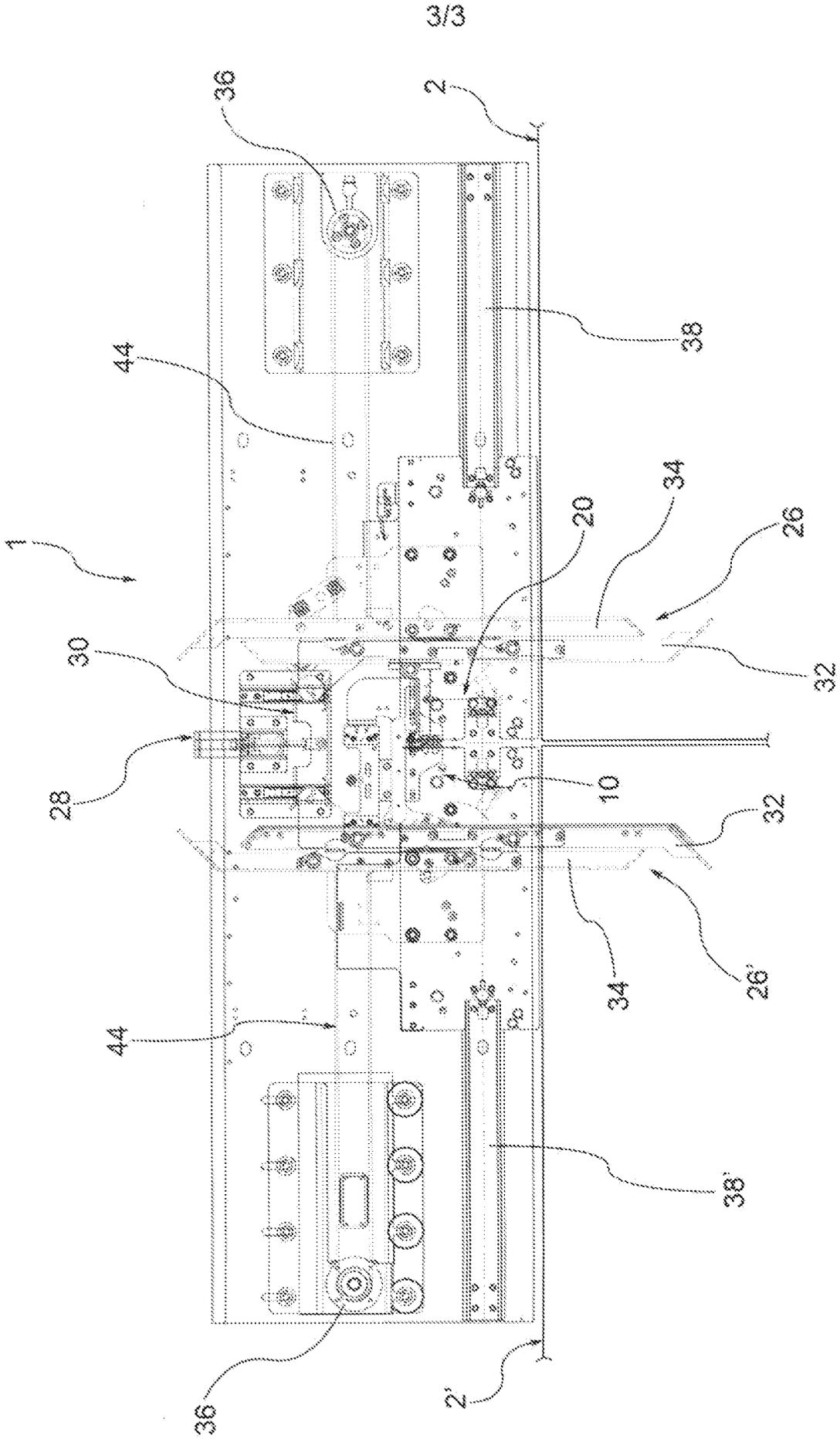


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/051023

A. CLASSIFICATION OF SUBJECT MATTER
INV. B66B13/12 B66B13/30 B66B13/06
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
B66B
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2013/190578 A1 (SEMATIC S P A [IT]; ZAPPA ROBERTO [IT]) 27 December 2013 (2013-12-27) paragraphs [0019] - [0041], [0051] - [0064]; figures 2-5 -----	1-14
A	US 5 730 254 A (NGUYEN HAI T [US]) 24 March 1998 (1998-03-24) column 6, line 30 - column 7, line 15; figures 2,10,11 -----	1,10-14

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 17 April 2015	Date of mailing of the international search report 07/05/2015
---	---

Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Iuliano, Emanuela
--	--

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2015/051023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2013190578	A1	27-12-2013	
		CN 104379486 A	25-02-2015
		EP 2861517 A1	22-04-2015
		WO 2013190578 A1	27-12-2013

US 5730254	A	24-03-1998	NONE
