(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 305 592 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.04.2011 Bulletin 2011/14

(51) Int Cl.:
B66B 13/16 *(2006.01)*

(21) Application number: **10010468.6**

(22) Date of filing: **24.09.2010**

(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 SE SI SK SM TR
Designated Extension States:
BA ME RS

(30) Priority: **30.09.2009 IT MI20091682**

(71) Applicant: **SEMATIC ITALIA S.p.A.**
24046 Osio Sotto,
(Bergamo) (IT)

(72) Inventor: **Zappa, Roberto**
24046 Osio Sotto (BG) (IT)

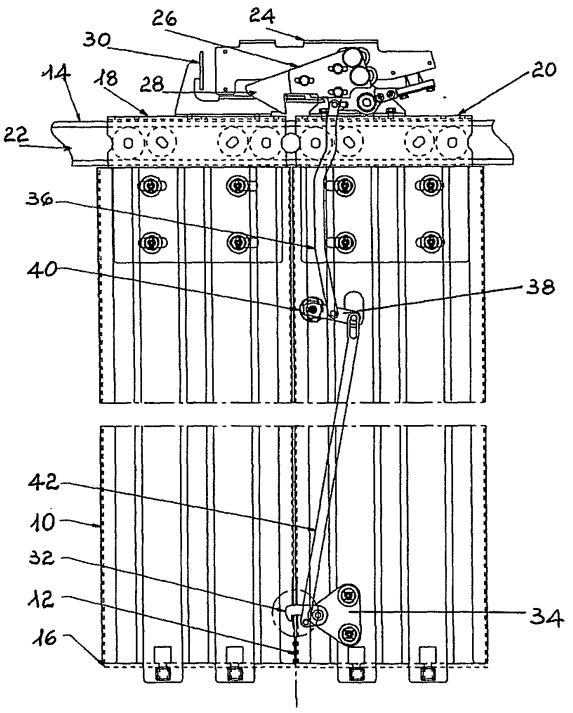
(74) Representative: **Lecce, Giovanni**
STUDIO NORD BREVETTI
Via G. Verdi, 14
24100 Bergamo (IT)

Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) Landing door loock

(57) An improved device for locking the floor door of lifts, applied to a pair of doors or panels (10-12) of a floor door, sliding along an upper track (14) through respective slides (18-20) and along a lower threshold (16), comprises a primary keyhole (24), fixed to the crosspiece (22) of said floor door, whereto a pivoting lock (26) is connected, provided with a bolt (28) engaged with the primary keyhole (24) and the secondary keyhole (30); said device comprises a second bolt (32), placed at or in the proximity of, the lower end of the floor door and fixed inside one of said doors (10) or (12). The second bolt is articulated on a support (34) and pivots along a plane parallel to the plane that identifies the inside and/or outside surface of the same doors hooking the opposite door (10) or (12) to the fitting bolt (32) in a slit made into the door.

FIG 1



EP 2 305 592 A1

Description

[0001] The present invention relates to an improved device for locking floor doors of lifts.

[0002] More in particular, the present invention relates to a device suitable for locking the floor doors with a double safety closure, that is, not just at the top but also at or in the proximity of the bottom end.

[0003] As is known, floor doors of lift systems with automatic opening are provided with a safety lock that keeps them side by side in closed position until the cabin arrives. When the cabin reaches a predetermined floor, the corresponding doors are released by the effect of the slide that engages the wheels of the safety lock and rotates them; in this way, the floor doors may open and allow access to the cabin or the exit therefrom.

[0004] It has been noted that this traditional solution has some considerable drawbacks. In the first place, any forcing for opening the floor doors manually may cause a deviation in the central-bottom part, with consequent misalignment and need for a restoration intervention; this is because said doors are locked to one another only in the top part, while in opposite position there are no similar retaining means.

[0005] Moreover, also during the testing, if the operator tries to forcedly open the doors, applying a predetermined force, the same doors may deviate by an excessive extent that requires corrective interventions.

[0006] A device is known from EP 0 498 025 for locking the floor doors of lifts that comprises a primary keyhole and a secondary keyhole whereto a pivoting lock is connected; said device also comprises a second lock located at the bottom. The two locks, however, are independent of one another and this solution therefore does not guarantee adequate safety in the event of need of a quick emergency opening of the doors.

[0007] The object of the present invention is to obviate the disadvantages mentioned hereinabove.

[0008] More in particular, the object of the present invention is to provide an improved device for locking lift floor doors suitable for preventing the deviation of the bottom part of the relevant doors in the event of forced opening attempts.

[0009] A further object of the invention is to provide a device as defined above suitable for preventing the deviation and the non-alignment of the same doors in the bottom part during the testing operation of the lift system.

[0010] A further object of the invention is to provide an improved device suitable for allowing easy and quick opening of the doors in the event of an emergency.

[0011] Last but not least, another object of the invention is to provide an improved device suitable for obtaining a bottom lock that is not object of vandalic actions with consequent harmful events of great importance and hazard, because with the release the floor doors may be opened also when the cabin is absent.

[0012] A further object of the invention is to provide the users with an improved device for locking the floor doors of lifts suitable for ensuring high level of resistance and reliability over time, also such as to be easily and inexpensively constructed.

[0013] These and yet other objects are achieved by the improved device for locking the floor doors of lifts of the present invention which, applied to a pair of doors or panels of a floor door, sliding along an upper track through respective slides and along a lower threshold, which comprises a primary keyhole fixed to the crosspiece of said floor door, whereto a pivoting lock is connected, provided with a bolt engaged with a primary keyhole and a secondary keyhole and which is characterised in that it comprises a second bolt, placed at or in the proximity of, the lower end of the floor door and fixed inside one of said doors, said second bolt being articulated on a support and pivoting along a plane parallel to the plane that identifies the inside and/outside surface of the doors themselves.

[0014] The construction and functional features of the improved device for locking the floor doors of lifts of the present invention shall be better understood from the following detailed description, wherein reference is made to the annexed drawing tables showing a preferred and non-limiting embodiment thereof, and wherein: figure 1 schematically shows a front partially dissected view of the device of the present invention, applied to the floor doors of a lift system closed with a dual lock;

figure 1A shows an enlarged detail of figure 1, highlighting the arrangement of locking means arranged in the bottom part of floor doors;

figure 2 schematically shows a front partially dissected view of the device of the present invention, applied to the same floor doors and arranged so as to allow the opening of the relevant doors;

figure 2A schematically shows an enlarged detail of figure 1, highlighting the arrangement of locking means arranged in the bottom part of floor doors;

figure 3 schematically shows a front partially dissected view of the same device wherein one of the locking means is active;

figure 3A schematically shows an enlarged detail of figure 3 highlighting the position of the only active locking means.

[0015] With initial reference to figure 1, the improved device for locking the floor doors of lifts of the present invention is applied to a pair of doors or panels 10, 12 of a floor door, sliding along a top track 14 through respective slides 18, 20 and along a bottom threshold 16. According to a known embodiment, a primary lock 24 is fixed to crosspiece 22 of the floor door, whereto a pivoting lock 26 constituting the primary lock is fixed. Said lock comprises a hook or bolt 28 that when the primary lock is active, engages with keyholes 24 and 30, the latter mounted on slide 18 with the function of ensuring the safe locking of door 12.

[0016] According to the invention, the improved device

for locking the floor doors of lifts comprises a second bolt 32, arranged at or in the proximity of the bottom end of the floor door and fixed inside one of doors 10 or 12. The second bolt 32, in particular, is articulated on a support 34 constrained inside door 12, in the extreme lower end thereof, and can pivot along a plane parallel to those identifying the inside and outside surfaces of doors 10 and 12. The pivoting of the second bolt 32, which forms the secondary lock, is obtained through a plurality of linkages, as explained hereinafter. A first bar-shaped arm 36 or top connection extends vertically, starting from the pivoting lock 26 whereto it is connected by the top end thereof, in door 12 reaching with the opposite end a second arm 38, with a considerable shorter extension, whereto it is articulated in a substantially central position. Said second arm or intermediate arm 38 is turnably fixed with an end inside door 12; the same end carries a lock or emergency release 40, of the known type. The opposite end of the second arm 38 is articulated on a third arm 42, which in opposite position reaches and articulated-wise connects at 32' to the second bolt 32, articulated on support 34. Said latter is connected to the relevant support 34 so as to protrude during the pivoting of door 12 and partly insert into door 10 next to the first one. For this reason, both said doors are provided, along the vertical side band that defines their approach face, with respective vertical slits 44, 46, visible in particular in figures 2A and 3A; through such slits, bolt 32 exits from door 12 and fits into door 10, releasing it.

[0017] Such movement requires the intervention of levers or arms 36, 38 and 42, as specified below.

[0018] Starting from the condition shown in figure 1, it is noted that the primary lock formed by the pivoting lock 26 is active, since bolt 28 is hooked to keyholes 24 and 30 and thus prevents the deviation and the opening of doors 10, 12 in the top part. In the same figure 1 it is also noted that the secondary lock consisting of the second bolt 32 is active since said bolt comes out of door 12 and hooks door 10 crossing the vertical slits 44 and 46 of the same doors; in this condition, the floor door is closed with dual safety, that is, also in the bottom part as well as in the top one. The pivoting of the second bolt 32 that hooks door 10 is determined by the fact that the pivoting lock is lowered and lever 36 is equally lowered; this also leads arm 42 or second connection to lower, moving the second bolt 32, articulated in 32' to the same arm, to hook door 10.

[0019] The simple pivoting of lock 26, which occurs when the cabin slide (not shown) engages the wheels of the pivoting lock 26 and closing, partially rotates the same lock, releases bolt 28; as a consequence, the top connection formed by the first arm 36 lifts and it also lifts the bottom connection consisting of the third arm 42 whereto the second bolt 32 is connected. In this way, the two safeties, top and bottom, lock in a synchronous manner as shown in figure 2 and partly in figure 2A.

[0020] Said second bottom connection, in fact, lifts with the end of the third arm 42 connected to the intermediate arm 38, moving along slot 48 created in door 12 wherefrom it partly protrudes. While said slot allows lifting the second bolt 32 during any vandalic actions, however it does not allow also the release of bolt 28, thus preventing the opening of the floor door. The emergency release actuated by a triangular key is of the known type and carries a lever that actuates the primary connection causing the opening of the primary lock; at the same time, said emergency release lifts the bottom connection that lifts the secondary lock, thus allowing the opening of the floor door.

[0021] As can be noticed from the above, the advantages achieved by the invention are clear. The improved device for locking floor doors of lifts of the present invention ensures excellent safety levels also against possible vandalic actions. This last hypothesis for which reference shall be made to figure 3, has a great importance considering that any tampering with release of the second bolt 32 is not sufficient to open doors 10 and 12, which remain closed and constrained to one another thanks to the top bolt 28. The advantage consequent to the adoption of the dual safety according to the invention is also clear in the testing step, as the bottom bolt 32 does not allow the deviation of doors 10 and 12 during the tests required by the regulations in force.

[0022] Even if the invention has been described hereinbefore with particular reference to an embodiment thereof made by way of a non-limiting example, several changes and variations will appear clearly to a man skilled in the art in the light of the above description. This invention therefore is intended to include any changes and variations thereof falling within the spirit and the scope of protection of the following claims.

Claims

1. An improved device for locking the floor door of lifts, applied to a pair of doors or panels (10-12) of a floor door, sliding along an upper track (14) through respective slides (18-20) and along a lower threshold (16), comprising a primary keyhole (24), fixed to the crosspiece (22) of said floor door, whereto a pivoting lock (26) is connected, provided with a bolt (28) engaged with a primary keyhole (24) and a secondary keyhole (30), further comprising a second bolt (32), placed at or in the proximity of, the lower end of the floor door and fixed inside one of said doors (10) or (12), said second bolt being articulated on a support (34) connected to a plurality of linkages, **characterised in that** said plurality of linkages comprises a first top connection or arm (36) connected by an end to the pivoting lock (26) and at the opposite end, to an intermediate arm (38) provided with an emergency release (40) and with a slot (48) wherefrom it partially protrudes.

2. The device according to claim 1, **characterised in**

that said intermediate arm (38) is articulated, in a position opposite that of the emergency release (40), to a third arm or lower connection (42) that connects articulated-wise to the support (34) of the second bolt (32), said latter pivoting along a plane parallel to the plane that defines the inside and/or outside surface of the doors (10-12).

3. The device according to claim 1, **characterised in that** the first arm or upper connection (36), the intermediate arm (38) and the third arm or lower connection (34) are actuated by the pivoting of the lock (26).

4. The device according to claim 1, **characterised in that** the doors (10-12) are provided, along the vertical side band that defines their approach face, with respective slits (44-46) wherethrough the bolt (32) arranges during the coupling or safety engagement.

Amended claims in accordance with Rule 137(2) EPC.

1. An improved device for locking the floor door of lifts, applied to a pair of doors or panels (10 - 12) of a floor door, sliding along an upper track (14) through respective slides (18 - 20) and along a lower threshold (16), comprising a primary keyhole (24), fixed to the crosspiece (22) of said floor door, whereto a pivoting lock (26) is connected, provided with a bolt (28) engaged with a primary keyhole (24) and a secondary keyhole (30), further comprising a second bolt (32), placed at or in proximity of the lower end of the floor door and fixed inside one of said doors (10) or (12), said second bolt being articulated on a support (34) connected to a plurality of linkages, **characterized in that** said plurality of linkages comprises a first top connection or arm (36) connected by an end to the pivoting lock (26) and at the opposite end to an intermediate arm (38) moving along a slot (48) created iin the door (12) wherefrom it partly protrudes.

FIG 1

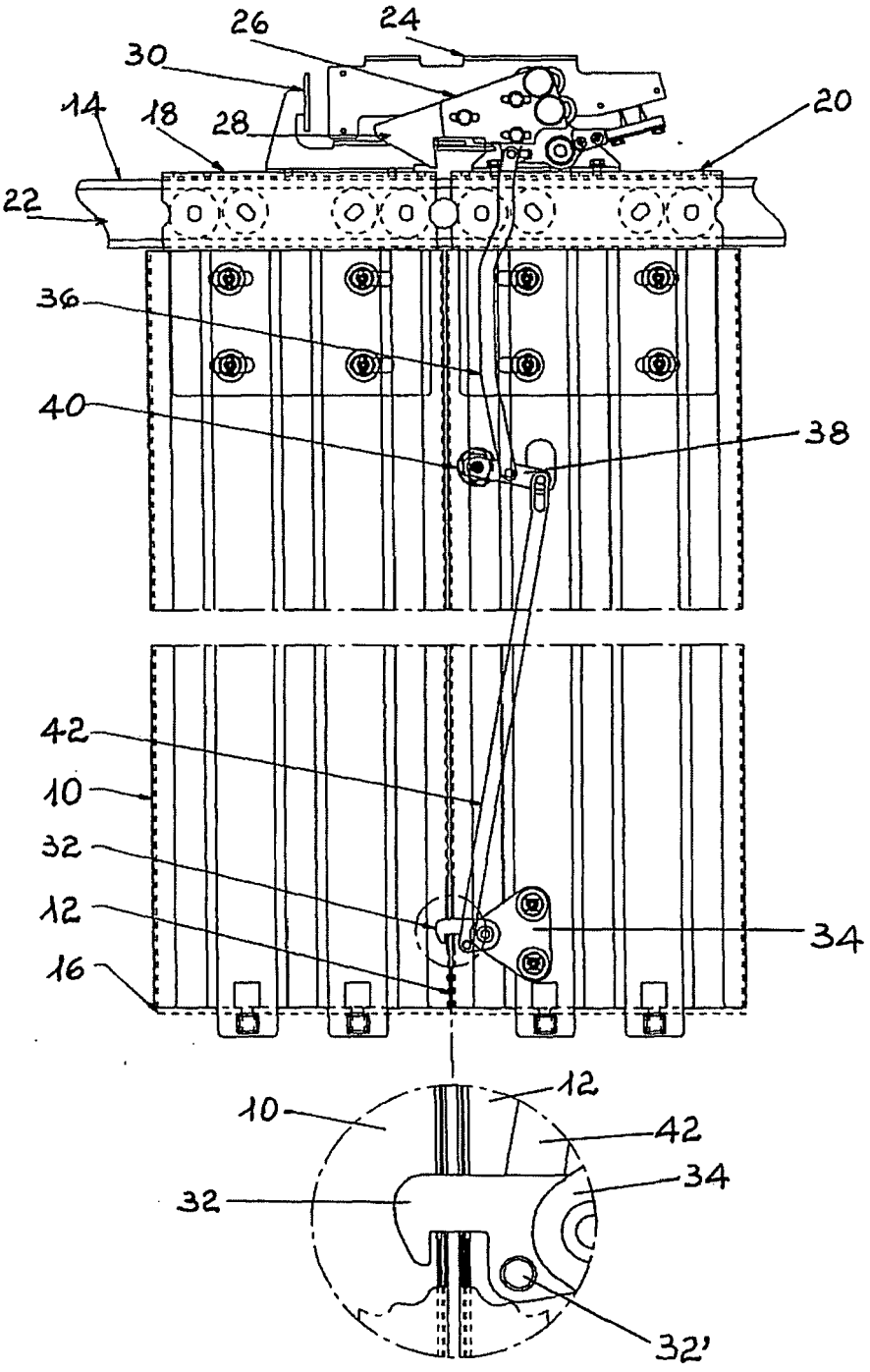


FIG 1A

FIG 2

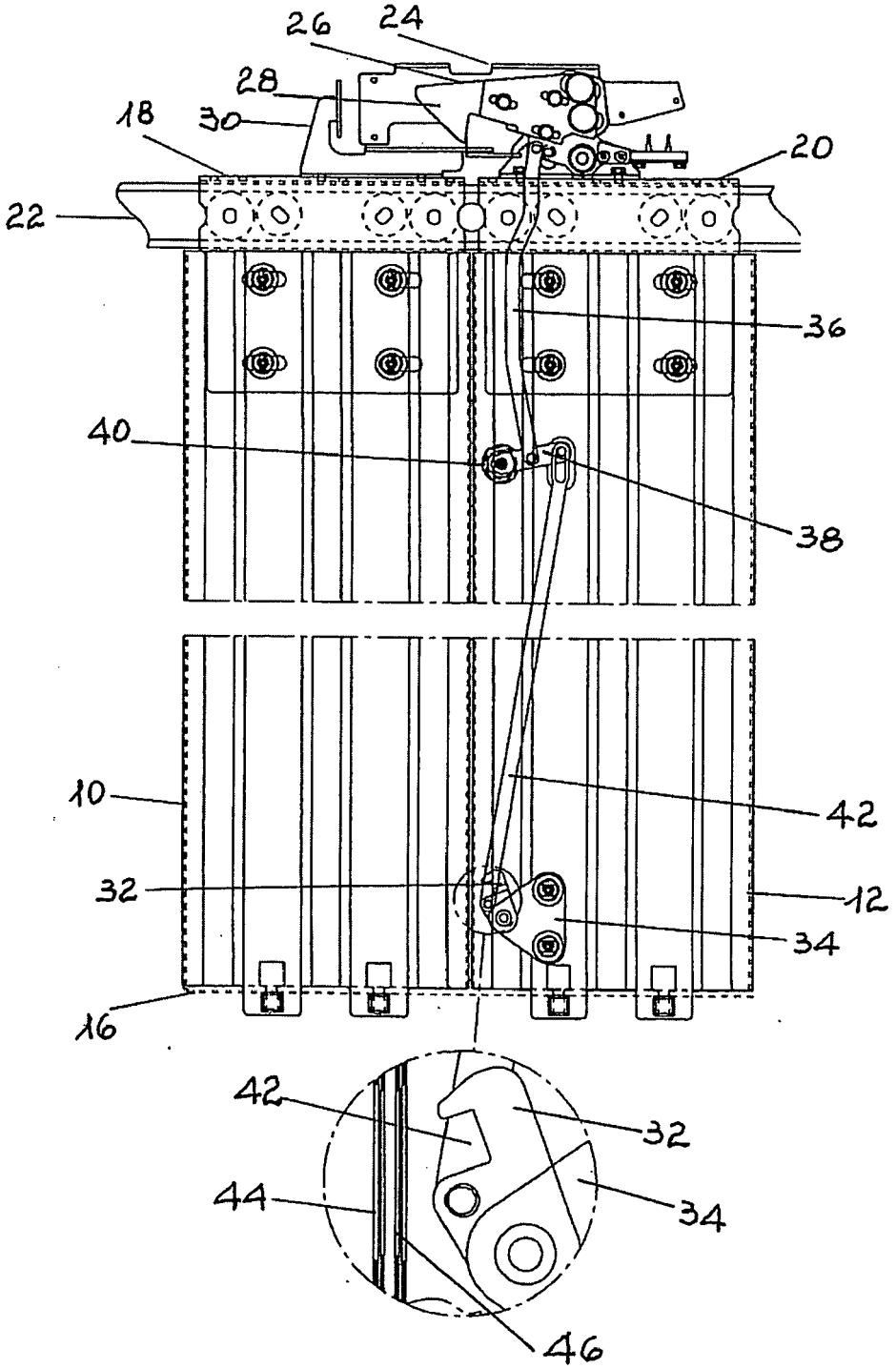


FIG 2A

FIG 3

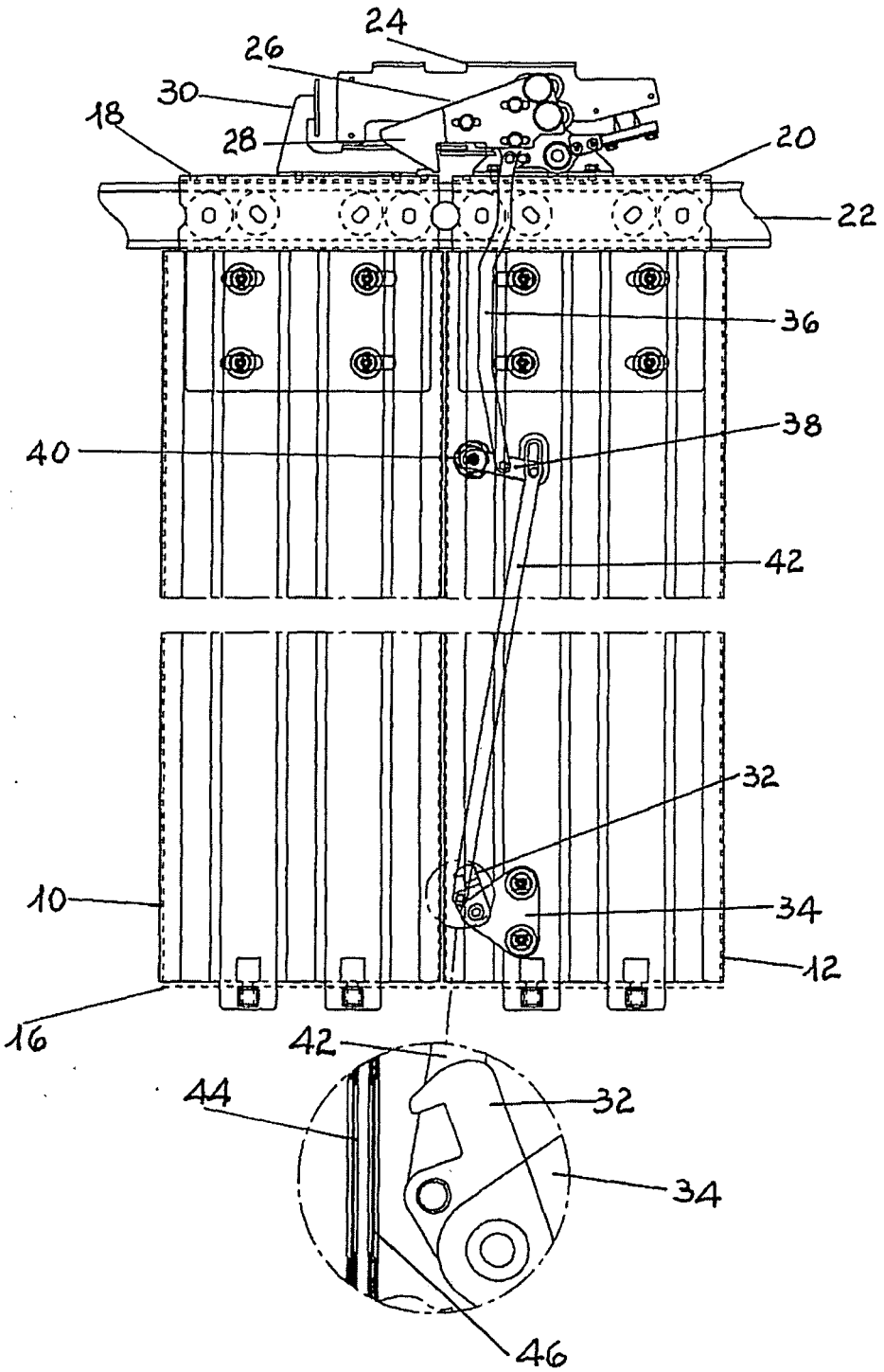


FIG 3A

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 10 01 0468

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 0 498 025 A2 (HAUSHAHN C GMBH CO [DE]) 12 August 1992 (1992-08-12) * column 1, line 1 - column 2, line 25; figures 1,25 *	1-4	INV. B66B13/16
A	US 1 525 215 A (FRANZ WOLFF) 3 February 1925 (1925-02-03) * figures 1,2 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 January 2011	Janssens, Gerd

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

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 01 0468

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.

04-01-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0498025 A2	12-08-1992	DE 9101424 U1	11-06-1992
US 1525215 A	03-02-1925	NONE	

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

- EP 0498025 A **[0006]**