

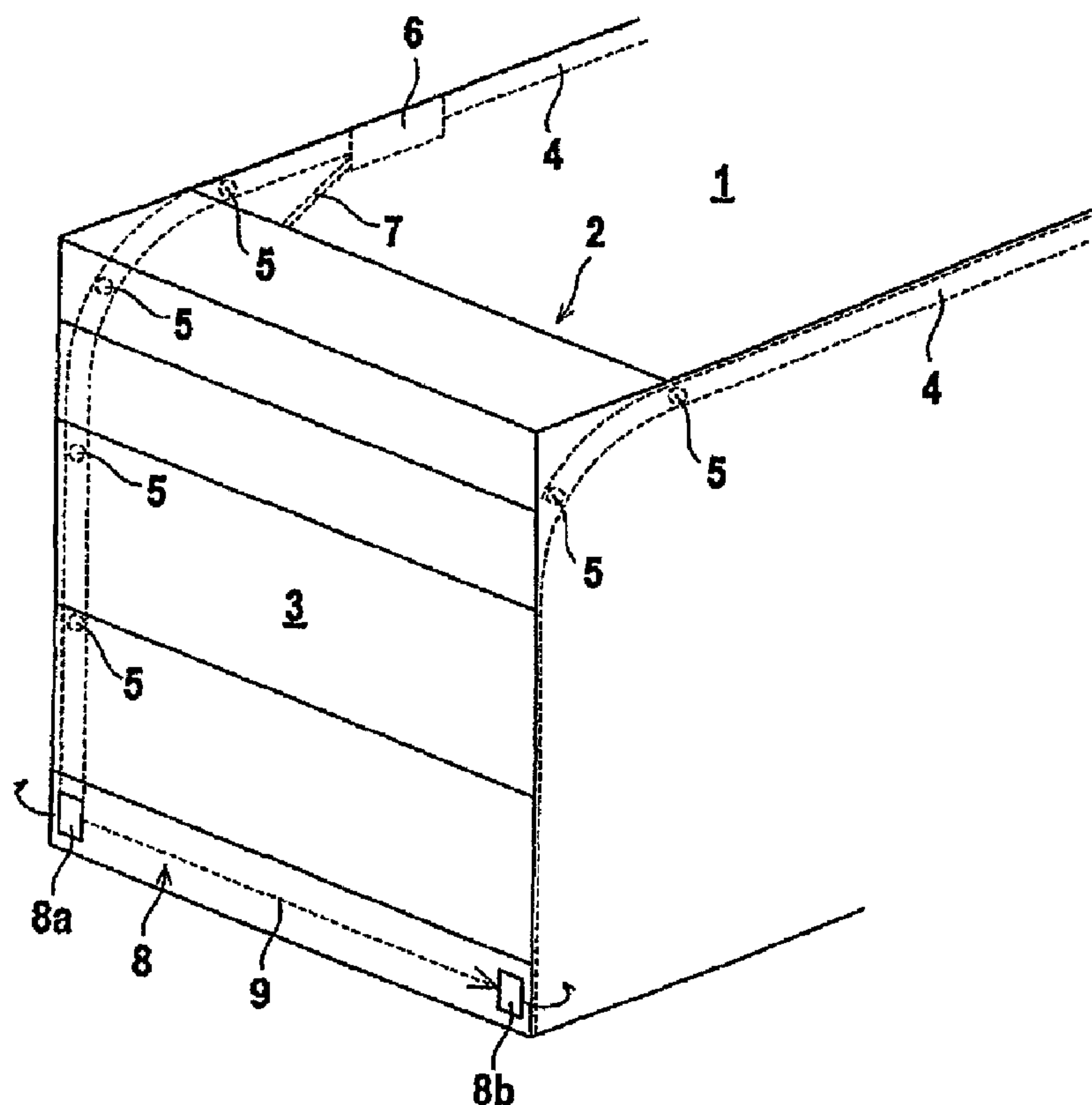


(86) Date de dépôt PCT/PCT Filing Date: 2009/09/02
(87) Date publication PCT/PCT Publication Date: 2010/03/18
(85) Entrée phase nationale/National Entry: 2011/01/14
(86) N° demande PCT/PCT Application No.: EP 2009/006337
(87) N° publication PCT/PCT Publication No.: 2010/028765
(30) Priorité/Priority: 2008/09/10 (DE10 2008 046 538.0)

(51) Cl.Int./Int.Cl. *E05F 15/16* (2006.01),
E05F 15/00 (2006.01), *E05F 15/14* (2006.01)
(71) Demandeur/Applicant:
SOMMER ANTRIEBS- UND FUNKTECHNIK GMBH, DE
(72) Inventeur/Inventor:
SCHAAF, GERD, DE
(74) Agent: ANDREWS ROBICHAUD

(54) Titre : SYSTEME D'ENTRAINEMENT DE PORTE
(54) Title: DRIVE SYSTEM FOR A DOOR

Fig. 1



(57) **Abrégé/Abstract:**

The invention relates to a drive system (1) for a door, the door leaf (3) of which is guided at the sides in respective guide tracks (4). A carriage (6) that is guided along a guide track (4) is connected to the door leaf (3), said carriage containing an integrated drive



(57) **Abrégé(suite)/Abstract(continued):**

(10) with an autonomous power supply. The drive (10) can be charged at a stationary charging station by means of a wireless power supply unit. A security device is connected via a wireless signal transmission path to a control unit (11) that is allocated to the drive (10).

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG(19) Weltorganisation für geistiges Eigentum
Internationales Büro(43) Internationales Veröffentlichungsdatum
18. März 2010 (18.03.2010)(10) Internationale Veröffentlichungsnummer
WO 2010/028765 A1

(51) Internationale Patentklassifikation:

E05F 15/16 (2006.01) *E05F 15/00* (2006.01)
E05F 15/14 (2006.01)

(21) Internationales Aktenzeichen: PCT/EP2009/006337

(22) Internationales Anmeldedatum:
2. September 2009 (02.09.2009)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
10 2008 046 538.0
10. September 2008 (10.09.2008) DE(71) Anmelder (für alle Bestimmungsstaaten mit Ausnahme
von US): **SOMMER-ANTRIEBS- UND FUNKTECH-
NIK GMBH** [DE/DE]; Hans-Böckler-Str.21-27, 73230
Kirchheim/Teck (DE).

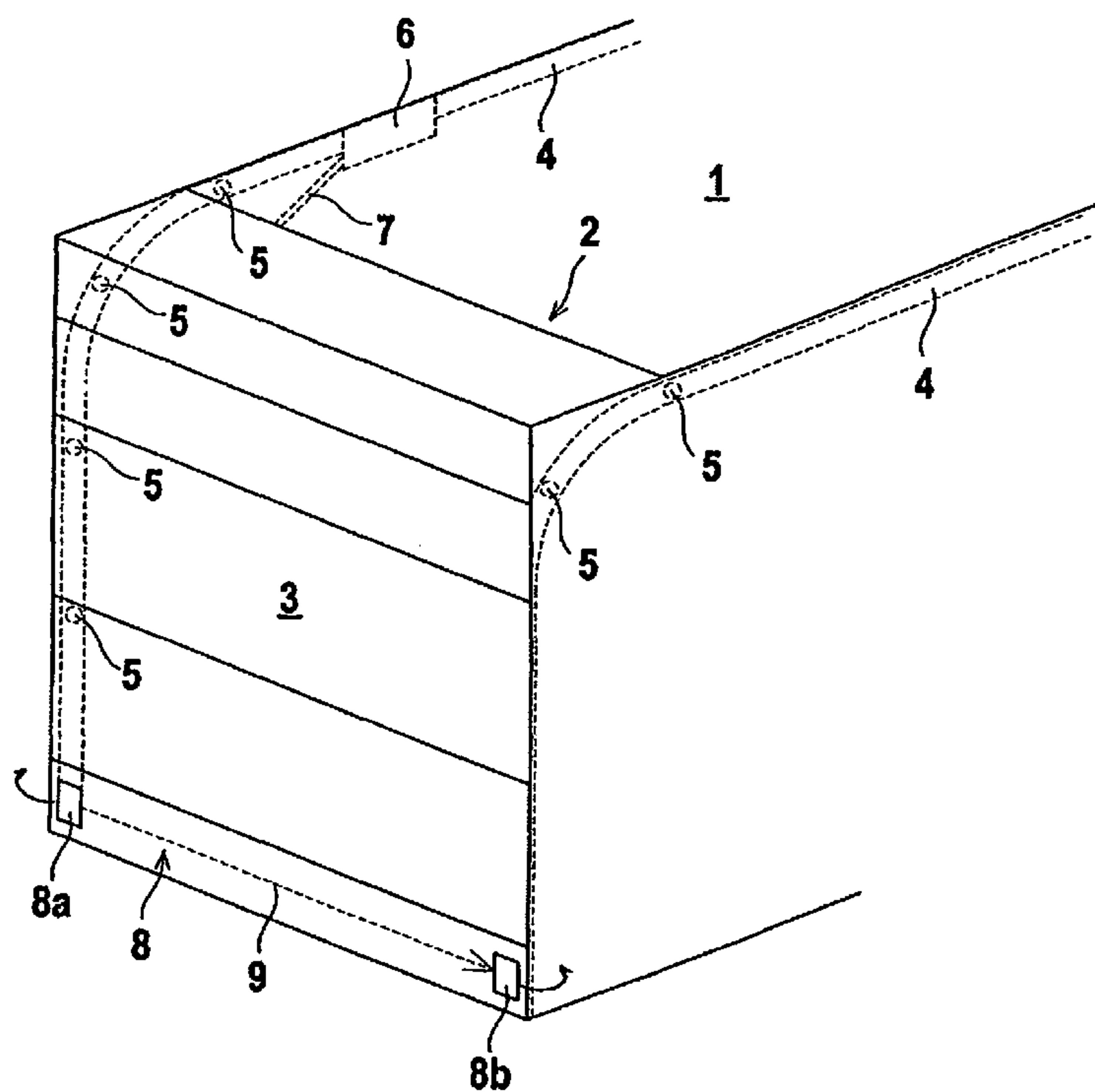
(72) Erfinder; und

(75) Erfinder/Anmelder (nur für US): **SCHAAF, Gerd** [DE/
DE]; Birkhahnweg 53, 73230 Kirchheim/Teck (DE).(74) Anwalt: **RUCKH, Rainer**; Fabrikstrasse 18, 73277
Owen/Teck (DE).(81) Bestimmungsstaaten (soweit nicht anders angegeben, für
jede verfügbare nationale Schutzrechtsart): AE, AG, AL,
AM, AO, AT, AU, AZ, BA, BB, BG, BH, 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, IS, JP, KE, KG, KM, KN,
KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA,
MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG,
NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC,
SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.(84) Bestimmungsstaaten (soweit nicht anders angegeben, für
jede verfügbare regionale Schutzrechtsart): ARIPO (BW,
GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG,
ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU,
TJ, TM), europäisches (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, SE, SI,

[Fortsetzung auf der nächsten Seite]

(54) Title: DRIVE SYSTEM FOR A DOOR

(54) Bezeichnung : ANTRIEBSSYSTEM FÜR EIN TOR

Fig. 1(57) **Abstract:** The invention relates to a drive system (1) for a door, the door leaf (3) of which is guided at the sides in respective guide tracks (4). A carriage (6) that is guided along a guide track (4) is connected to the door leaf (3), said carriage containing an integrated drive (10) with an autonomous power supply. The drive (10) can be charged at a stationary charging station by means of a wireless power supply unit. A security device is connected via a wireless signal transmission path to a control unit (11) that is allocated to the drive (10).(57) **Zusammenfassung:** Die Erfindung betrifft ein Antriebssystem (1) für ein Tor, dessen Torblatt (3) seitlich in jeweils einer Führungsschiene (4) geführt ist. Ein entlang einer Führungsschiene (4) geführter Laufwagen (6) ist mit dem Torblatt (3) verbunden, wobei in diesem ein Antrieb (10) mit einer autarken Energieversorgung integriert ist. Der Antrieb (10) ist an einer stationären Ladestation mittels einer drahtlosen Energieübertragungseinrichtung aufladbar. Eine Sicherheitseinrichtung, ist über eine drahtlose Signalübertragungsstrecke mit einer dem Antrieb (10) zugeordneten Steuereinheit (11) verbunden.

WO 2010/028765 A1

SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Erklärungen gemäß Regel 4.17:
— *hinsichtlich der Berechtigung des Anmelders, ein Patent zu beantragen und zu erhalten (Regel 4.17 Ziffer ii)*

— *Erfindererklärung (Regel 4.17 Ziffer iv)*

Veröffentlicht:
— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

Drive System for a Door

[0001] The invention relates to a drive system for a door.

[0002] The door which is operated with the drive system in particular is a sectional door or a sectional overhead door, wherein this door typically is a garage door.

[0003] The sections of the door are guided on the side inside guide tracks extending along the door frame and along the ceiling of the garage. Known drive systems for doors of this type are provided with a motor that moves along one of the guide tracks. The motor is positioned on a console or the like which is positioned so as to move with rollers in the guide track. A push rod is attached articulated to the console and is also connected articulated to the upper door slat. The door is opened or closed by moving the motor back and forth along the guide tracks.

[0004] A drive system of this type is known from the document DE 10 2005 053 560 A1, in which it is mentioned that a storage battery which serves as autonomous energy supply unit is provided in addition to a supply network connection for the motor.

[0005] The document DE 94 06 829 U1 discloses an electromotor door drive, provided with a motor which does not move in one of the guide tracks for the door but in a separate guide track. This drive system also comprises an

autonomous energy supply, comprising a storage battery which can be charged up at a charging station through the transfer of energy, if applicable in a non-contacting manner.

[0006] It is the object of the invention to make available a drive system of the aforementioned type which has a simple design along with high functionality.

[0007] This object is solved with the features disclosed in claim 1. Advantageous embodiments and useful modifications of the invention are described in the dependent claims.

[0008] The drive system according to the invention is used for operating a door having a door leaf that is guided on the side in respectively one guide track. A carriage that moves along a guide track is connected to the door leaf, wherein a drive with autonomous energy supply is integrated into the carriage. The drive can be charged up at a stationary charging station with the aid of a wireless energy transfer device. A safety device is connected via a wireless signal transmission path to a control unit that is assigned to the drive.

[0009] A first and essential aspect of the invention is that a wireless, preferably bi-directional data transfer takes place between the control for the drive and the safety device and that the drive is provided with an autonomous energy supply, wherein the autonomous energy supply is charged up contactless, meaning without making contact, in particular inductive or capacitive. No cables or wires are thus needed for this unit, thereby considerably reducing the installation expenditure for the drive system according to the invention.

[00010] For a particular advantage, the installation expenditure can be reduced even further if the safety device is also provided with an autonomous energy supply and consequently also does not require any feed lines for its energy supply.

[00011] The autonomous energy supply for the drive advantageously takes the form of a storage battery. However, a fuel cell or the like can alternatively also be provided for use as the autonomous energy supply. The autonomous energy supply for the safety device can take the form of a storage battery or also a solar cell.

[00012] The energy transfer device, which is assigned to the autonomous energy supply for the drive, is advantageously provided at one of the end positions for the carriage and thus the drive, wherein the door is closed completely in the first end position and the door is opened completely in the second end position. These end positions are preferably defined by limit switches which can be displaced along the guide track. In the simplest case, the energy transfer device is assigned as a separate unit to one of the limit switches. It is particularly advantageous if one of the limit switches functions as energy transfer device, thus resulting in an especially simple and cost-effective design.

[00013] The lower edge of the door leaf is monitored with the aid of the safety device, wherein the safety device in particular takes the form of a light-barrier arrangement.

[00014] The signal transmission path for the contactless bi-directional data transfer between the safety device and the control unit can preferably be a radio link.

[00015] A further essential aspect of the invention is the modular configuration of the drive system, wherein it is a particular advantage that the carriage with the drive can be mounted without tools on a guide track for the door. It is especially advantageous that no structural changes or adaptations are required on the guide track during the installation of the carriage. For this, the carriage is advantageously provided with suitable guide means which can be inserted into the guide tracks and can be guided inside the guide tracks during the operation of the drive system. Particularly suitable for this is an embodiment of the drive as friction-wheel drive. In that case, at least one friction wheel is provided which is driven by the drive and is guided frictionally engaged inside the guide track. It is particularly advantageous if the drive with the guide means is embodied such that it can be installed on differently designed guide tracks.

[00016] Since the drive for activating the door leaf is moved along a guide track, extending on the side, for guiding the door leaf, the force exerted by the drive onto the door leaf is correspondingly one-sided and non-symmetrical. With large door widths, this can result in an undesirable tilting of the upper edge of the door leaf and thus in an irregular guidance of the door leaf. Not only does this increase the wear of the mechanical components, but it can also result in causing problems with the function of the safety device. To prevent these types of problems, a carriage with therein integrated drive can respectively be provided on each guide track, wherein these drives are preferably embodied identical. In particular, these

drives have the same autonomous energy supply with an associated energy transfer device.

[00017] The invention is explained in the following with the aid of the drawings, which show in:

Figure 1: A schematic representation of a drive system for a door.

Figure 2: An enlarged representation of a portion of the arrangement according to Figure 1, comprising a carriage with integrated drive which is guided along a guide track.

[00018] Figure 1 schematically shows an exemplary embodiment of the door drive system 1 according to the invention. For the present case, the door is embodied as a sectional door 2 with a door leaf 3 which moves inside two guide tracks 4 on the side that are installed on a building, a garage in the present case.

[00019] As shown in Figure 1, the garage opening can be closed off with the door leaf 3. In the closed position of the door, the door leaf 3 is located in the region of the vertically extending segments of the guide track 4. In the opened position of the door, the door leaf 3 is located in the region of the horizontally extending segments of the guide track 4, below the garage ceiling. Guide rolls 5 that move inside the guide tracks 4 are provided on both side edges of the door leaf 3.

[00020] A motor-driven carriage 6 which moves in one of the guide tracks 4 is provided for the opening and closing of the door. With the aid of a push rod 7, the carriage 6 is connected articulated to the upper edge of the door leaf 3. A different type of connecting element can also be used in place of a push rod 7.

The door can be opened or closed by moving the carriage 6 back and forth in the region of the horizontal segment of the guide track 4.

[00021] A safety device which is used to monitor the lower edge of the door is installed on the lower border for the door leaf 3. An object intervention in this region is detected by the safety device as a danger-causing situation. If such a situation occurs, the door movement is stopped for safety reasons.

[00022] The safety device can generally be embodied as a mechanical device with contacts. However, it is particularly advantageous if the safety device operates contactless. In the present case, the safety device essentially consists of a light barrier 8. This light barrier 8 comprises a transmitter 8a for emitting light rays 9 and a receiver 8b for receiving light rays 9, wherein these are arranged at opposite edges of the door leaf 3. If no object intervention is detected, the light rays 9 emitted by the transmitter 8a are conducted directly below the lower edge of the door leaf 3 and parallel thereto to the receiver 8b. In case of an object intervention, the path of the light rays 9 is interrupted, thereby generating an object report in the light barrier 8 which results in a stop of the door movement.

[00023] Figure 2 shows an enlarged section of the guide track 4 with thereon arranged carrier 6.

[00024] A drive 10 in the form of an electric motor and a control unit 11 for controlling the door functions of, in particular, the drive 10 are arranged inside a carrier 6.

[00025] The carrier 6 with integrated drive 10 in the form of a modular unit can optionally be installed on one of the guide tracks 4. The carrier 6 is advantageously installed without tools on the guide track 4 and without structural interference with the guide track 4. This can be achieved in particular by providing a friction-wheel drive inside the carriage 6, meaning the drive 10 inside the carriage 6 drives one or several friction wheels which are guided frictionally engaged inside the guide track 4. These friction wheels can simply be inserted into the guide track 4. An adaptation of the friction wheel to different guide tracks 4 is possible through a suitable dimensioning and arrangement of the friction wheels.

[00026] The drive 10 is provided with an autonomous energy supply unit in the form of a storage battery 12. In general, a fuel cell or the like can also be provided for this.

[00027] In the same way, the safety device can also be provided with an autonomous energy supply unit, not shown herein, which can be a solar cell or also a storage battery 12.

[00028] As a result of using an autonomous energy supply unit, no cables or wires are required either for the drive 10 or for the safety device. The communication between the control unit 11 and the safety device furthermore also occurs contactless, via a signal transmission path that is not shown separately herein. The signal transmission path in the present case is a radio link which is used for a bi-directional data transfer. Respectively one radio transmitter and one radio

receiver are provided for this in the safety device as well as in the control unit 11. In particular, the signals generated in the safety device are transferred via the radio link to the control unit 11, so that the control unit 11 can stop the drive with the aid of the safety device if an object intervention is reported.

[00029] Along the horizontal region of the guide track 4, the carrier 6 can move back and forth along a predetermined movement path. The end positions of the carrier 6 for the completely opened and the completely closed door are predetermined by the limit switches 13, which are arranged displaceable and thus adjustable on the guide track 4. Figure 2 shows the limit switch 13 for the closed position of the door. In this closed position, the carrier 6 rests against the limit switch 13 and is secured thereon with the aid of a locking element 14. In general, a motor brake or a similar configuration for the drive 10 can also be used for the locking operation.

[00030] Since the charging capacity of the storage battery 12 for the drive 10 is limited, the storage battery is charged up at predetermined intervals at a charging station, wherein the charging station is generally positioned at the location of one of the two limit switches 13 since these are the locations where the carriage 6 is stopped in the end positions.

[00031] The charging station for the present embodiment is arranged in the limit switch 13, shown in Figure 2, for the closed position of the door. The charging station in general is provided with a net voltage connection, not shown herein, as well as with an energy transfer device 15 for transferring energy to the storage

battery 12. A wireless energy transfer is generally possible with this energy transfer device 15. Known devices provided with contacts, such as plug-in systems, can generally also be used and function as hard-wired energy transfer devices.

[00032] An inductive energy transfer occurs in the present case, for which the energy transfer device 15 is provided with a coil arrangement. A transfer module 16 which comprises such a coil arrangement is installed in the carrier 6. One advantage of this energy transfer device 15 is that a voltage transformation occurs along with the energy transfer. Thus, the electrical components in the carrier 6 need not be laid out for the net voltage of 230V, but can also be laid out for a lower voltage, in particular a voltage near 12V. Instead of the inductive energy transfer, a capacitive energy transfer can generally also take place.

[00033] With larger door widths, the force exerted from one side onto the door leaf 3 by the drive 10 that is guided along one guide track 4 can have a negative effect. In that case, a separate carrier 6 with therein integrated drive 10 and autonomous energy supply unit can be provided in each guide track 4, wherein these arrangements are embodied identical and correspond to the arrangements as shown in Figures 1 and 2.

[00034] The movement of the drives 10 is controlled by the control unit 11 which is preferably integrated into one of the carriers 6. A computer unit can then be integrated in the second carrier 6 which, for example, receives control signals from the control unit 11 via a radio link.

WO 2010/028765

PCT/EP2009/006337

WO 2010/028765

PCT/EP2009/006337

Reference Number List

- (1) drive system
- (2) sectional door
- (3) door leaf
- (4) guide track
- (5) guide roll
- (6) carrier
- (7) push rod
- (8) light barrier
- (8a) transmitter
- (8b) receiver
- (9) light radiator [sic]
- (10) drive
- (11) control unit
- (12) storage battery
- (13) limit switch
- (14) locking element
- (15) energy transfer device
- (16) transfer module

Patent Claims

1. A drive system (1) for a door, having a door leaf (3) which is guided on the side in respectively one guide track (4), said drive system comprising a carriage (6) that is guided along a guide track (4), is connected to the door leaf (3), and is provided with an integrated drive (10) with autonomous energy supply unit, wherein the drive (10) can be charged up at a stationary charging station with the aid of a wireless energy transfer device (15), further comprising a safety device which is connected by way of a wireless signal transfer path to a control unit (11) that is assigned to the drive (10).
2. The drive system according to claim 1, characterized in that the carriage (6) with the drive (10) can be installed without tools on the guide track (4).
3. The drive system according to one of the claims 1 or 2, characterized in that the drive (10) is embodied as a friction-wheel drive.
4. The drive system according to claim 3, characterized in that the drive (10) is provided with at least one friction wheel that moves in the guide track (4).
5. The drive system according to one of the claims 1 to 4, characterized in that the lower edge of the door leaf (3) is monitored with the aid of the safety device.

6. The drive system according to one of the claims 1 to 5, characterized in that the safety device is a light barrier arrangement.
7. The drive system according to one of the claims 1 to 6, characterized in that the signal transmission path is a radio link by means of which a bi-directional data transfer takes place.
8. The drive system according to one of the claims 1 to 7, characterized in that the safety device is provided with an autonomous energy supply unit.
9. The drive system according to one of the claims 1 to 8, characterized in that the autonomous energy supply unit for the drive (10) is a storage battery (12) or a fuel cell.
10. The drive system according to one of the claims 1 to 9, characterized in that the autonomous energy supply unit for the safety device is a storage battery (12) or a solar cell.
11. The drive system according to one of the claims 1 to 10, characterized in that a limit switch (13) for limiting the back and forth movement of the carrier (6) serves as the energy transfer device for the drive (10).

12. The drive system according to one of the claims 1 to 10, characterized in that an inductive or a capacitive energy transfer takes place with the aid of the energy transfer device.
13. The drive system according to one of the claims 1 to 12, characterized in that a second carrier (6), which is connected to the door leaf (3), moves in the second guide track (4) and is provided with an integrated drive (10) having an autonomous energy supply unit.
14. The drive system according to claim 13, characterized in that the drives (10) and the components assigned to these on the two guide tracks (4) are embodied identically.
15. The drive system according to one of the claims 13 or 14, characterized in that both drives (10) are controlled by the control unit (11).

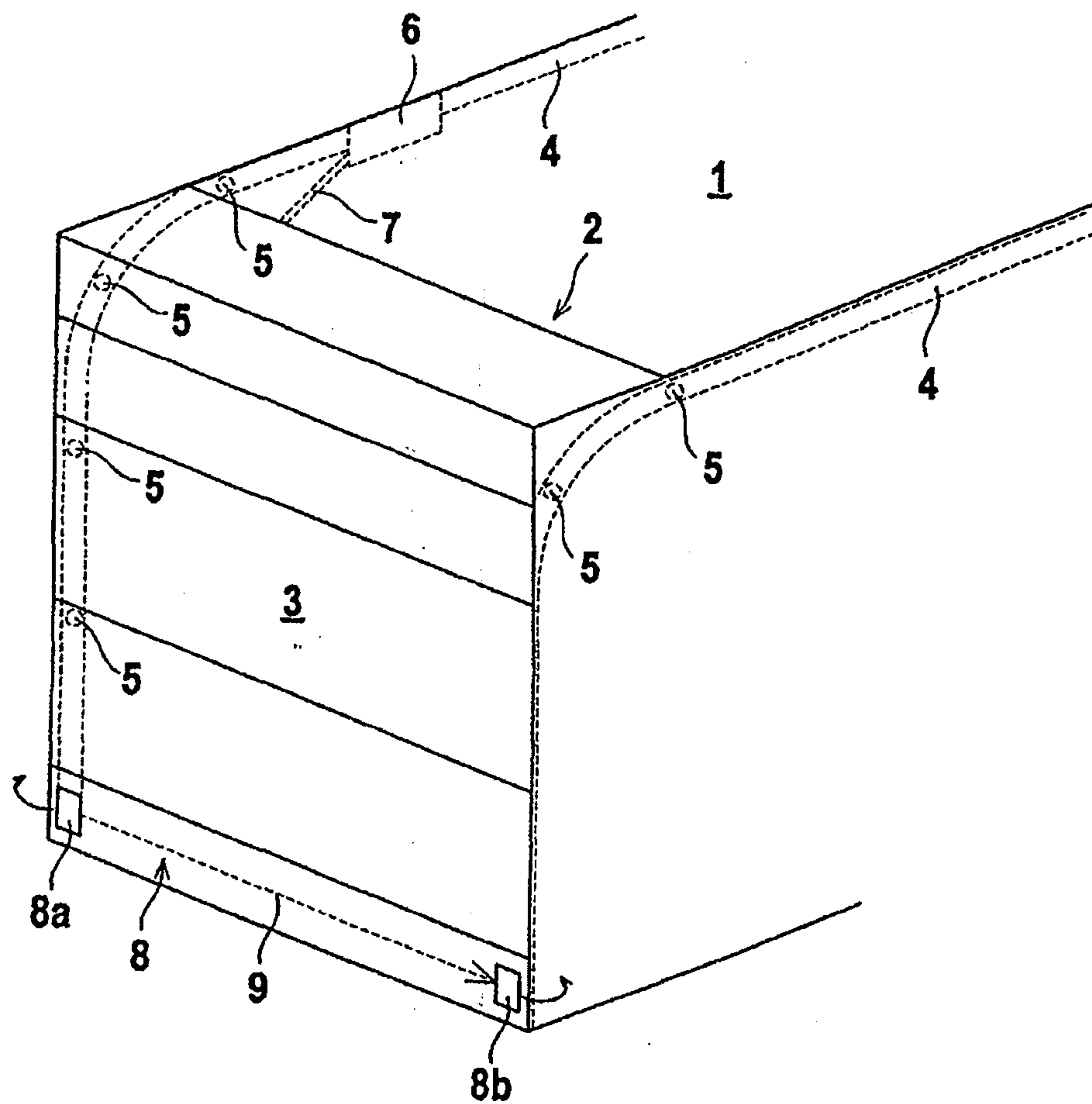
Fig. 1

Fig. 2

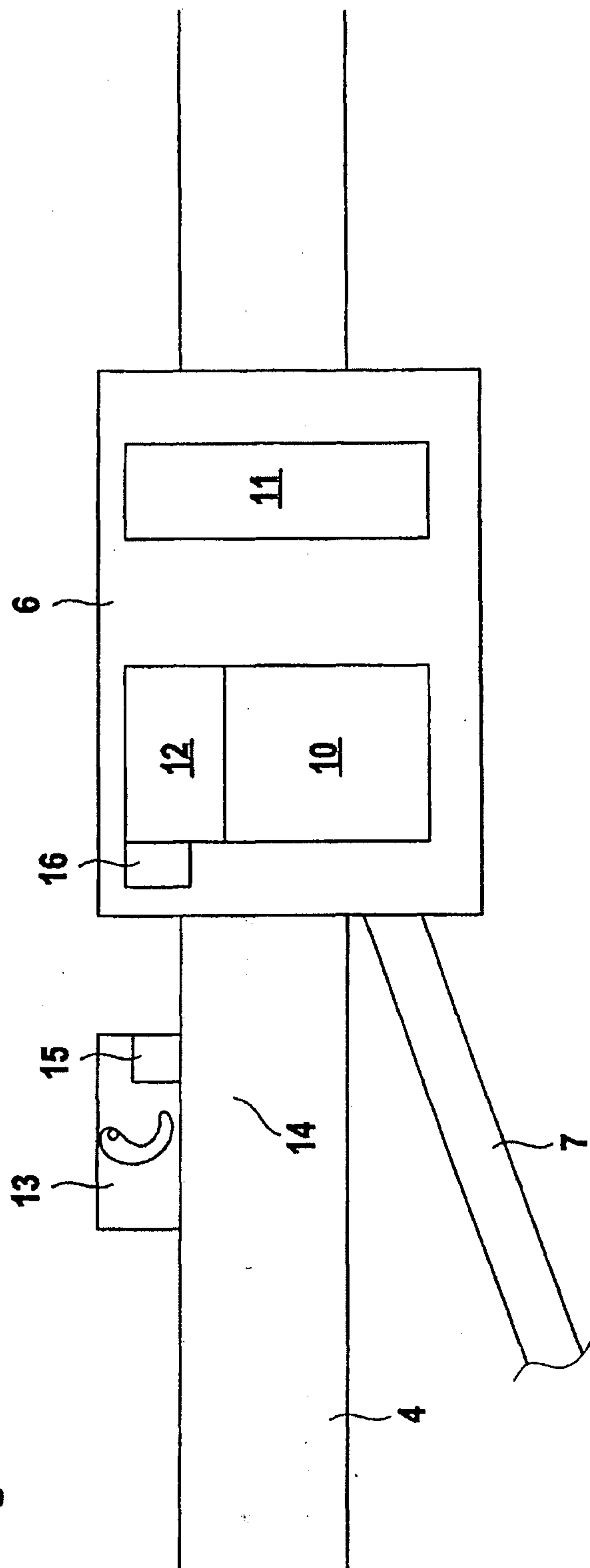


Fig. 1

