



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.11.2019 Bulletin 2019/46

(51) Int Cl.:
B66B 31/00 (2006.01)

(21) Application number: **18171025.2**

(22) Date of filing: **07.05.2018**

(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:
KH MA MD TN

(72) Inventor: **Stripling, Ralph**
13507 Berlin (DE)

(74) Representative: **Schmitt-Nilson Schraud Waibel Wohlfrom**
Patentanwälte Partnerschaft mbB
Pelkovenstraße 143
80992 München (DE)

(71) Applicant: **Otis Elevator Company**
Farmington, Connecticut 06032 (US)

(54) **MAINTENANCE CONTROL SYSTEM, PEOPLE CONVEYOR WITH MAINTENANCE CONTROL SYSTEM AND METHOD OF USING MAINTENANCE CONTROL SYSTEM**

(57) Maintenance control system (40) for a people conveyor (1) of the type having a tread band (12) operable to transport passengers between landings (20, 21), the people conveyor (1) comprising a drive control unit (42) for controlling operation of the tread band (12), and a safety control circuit (46) including a plurality of safety switches (47, 48, 64), the maintenance control system (40) comprising a remote control unit (44). The remote control unit (44) comprises at least one maintenance operation key (58, 60, 62) configured to manually control operation of the tread band (12) by operating the at least one maintenance operation key (58, 60, 62), an emer-

gency key (57) configured to provide an emergency stop signal, and a transmitter/receiver (45) configured to wirelessly communicate control signals between the remote control unit (44) and the drive control unit (42). The remote control unit (44) is configured to wirelessly communicate with the safety control circuit (46) of the people conveyor (1) to stop operation of the tread band (12), irrespective of the state of the at least one maintenance operation key (58, 60, 62), depending on the state of any of the safety switches (47, 48, 64) in the safety control circuit (46).

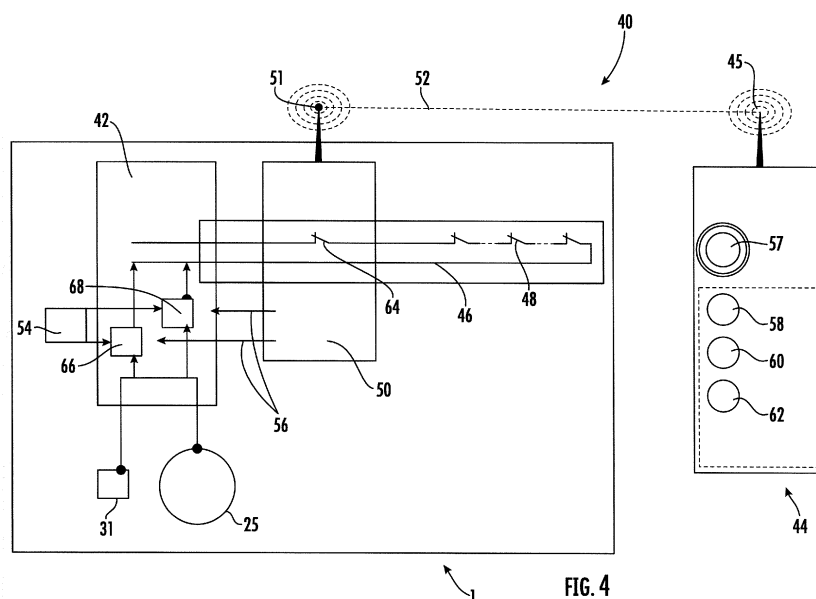


FIG. 4

Description

[0001] The invention relates to a maintenance control system for a people conveyor. The invention further relates to a people conveyor comprising a maintenance control system. Moreover, the invention relates to a method of using a maintenance control system.

[0002] Several types of people conveyors, such as escalators, moving walkways, moving sidewalks, etc. are widely used to effectively transport passengers from one location to another. Areas of usage of these people conveyors often include airports, hotels, shopping malls, museums, railway stations and other public buildings. Such people conveyors typically have two landings (e.g., a top landing and a bottom landing in case of an escalator) and a plurality of treads, such as steps or pallets, interconnected to form an endless tread band. The treads travel within a conveyance section of the endless tread band in between the landings.

[0003] These people conveyors are subject to maintenance operations. During maintenance operations an inspector controls operation of the people conveyor via a maintenance control system comprising a handheld operation control unit that is connected to the people conveyor by a cable. People conveyors comprise an inspection outlet in which the cable is inserted to transfer control signals from the handheld operation control unit to the people conveyor. These cables are becoming longer and heavier the longer the people conveyor is. Also, the risk increases that these cables are damaged. Moreover, people conveyors not only comprise one inspection outlet but a plurality of inspection outlets along the length of the people conveyor. These inspection outlets must be incorporated in a safety control circuit. Because of the large distances, relatively thick wires in the safety control circuit are required to avoid problems relating to correct operation voltage.

[0004] It would be beneficial to improve the maintenance control system to enable an inspector to move freely around the people conveyor while performing maintenance and inspection operation of the people conveyor.

[0005] An exemplary embodiment of the invention relates to a maintenance control system for a people conveyor having a tread band operable for transporting passengers between landings. The people conveyor comprises a drive control unit for controlling operation of the tread band, and a safety control circuit including a plurality of safety switches. The maintenance control system comprises a remote control unit. The remote control unit comprises at least one maintenance operation key configured to manually control operation of the tread band by operating the at least one maintenance operation key, an emergency key configured to provide an emergency stop signal, and a transmitter/receiver configured to wirelessly communicate control signals between the remote control unit and the drive control unit. The remote control unit is configured to wirelessly communicate with the

safety control circuit of the people conveyor to stop operation of the tread band, irrespective of the state of the at least one maintenance operation key, depending on the state of any of the plurality of safety switches in the safety control circuit.

[0006] The maintenance control system according to the exemplary embodiment allows improving the safety when operating a people conveyor during inspection and maintenance. It is normally required to manually control operation of the tread band when carrying out inspection or maintenance operations. In the embodiments described herein, maintenance operations can be carried out by operating the remote control unit and hence no cable can be pulled into moving elements of the people conveyor. Moreover, floor plates of a landing zone can be kept closed during inspection runs, since no cable has to be connected to the drive control unit of the people conveyor. Particularly, it is not required to extend wire connections to remote electrical outlets.

[0007] A number of optional features are set out in the following. These features may be realized in particular embodiments, alone or in combination with any of the other features.

[0008] The wireless communication between the remote control circuit and the power control unit, and/or the remote control unit and the safety circuit may be a wireless safety communication. The wireless safety communication, in particular may fulfil the safety requirements of people conveyor safety codes with respect to communication between switches in a safety control circuit.

[0009] At least one of the plurality of safety switches may be a safety relay. The safety relay may be configured to wirelessly communicate with the remote control unit, particularly with the emergency key.

[0010] The control signals communicated between the remote control unit and the drive control unit may be maintenance control signals. These maintenance control signals are used during maintenance operation, when an inspector inspects functionality of the people conveyor. The maintenance control signals may include manual operation of the tread band.

[0011] The maintenance control system may further comprise a safety control unit connected in the safety control circuit. The safety control unit may have a transmitter/receiver configured to wirelessly communicate with the remote control unit, in particular via a wireless safety communication protocol. This allows a preferred communication between the safety control circuit and the remote control circuit.

[0012] The safety control unit may be configured to communicate control signals from the remote control unit to the drive control unit. Thereby, manual operation commands may be input to the drive control unit via the remote control unit.

[0013] The safety control unit may comprise a safety switch connected to the safety control circuit. The safety switch of the safety control unit may be directly controlled by the remote control unit.

[0014] The at least one maintenance operation key may be configured to provide a control signal for manually operating the tread band of the people conveyor. This allows an inspector to provide control signals, in particular movement in clockwise direction or counterclockwise direction, to the drive system to move the tread band of the people conveyor in an up direction or in a down direction. In a moving walkway the moving directions may be from left to right or from right to left.

[0015] The at least one maintenance operation key comprises a plurality of operation keys, particularly a first key configured to provide a control signal for commanding a first moving direction of the tread band of the people conveyor, a second key configured to provide a control signal for commanding a second moving direction opposite to the first moving direction, and a third key configured to provide a control signal for enabling the drive control unit to operate the tread band in the commanded first or second direction, when operated simultaneously with the first key or the second key. Such configuration improves the safety of the maintenance control system, since more than one key has to be pressed to activate movement of the tread band of the people conveyor.

[0016] The first key, the second key, and the third key may be positioned such that two hands of a maintenance person are needed for simultaneous operation of either the first key and the third key, or the second key and the third key. This increases the safety for the maintenance person, since both hands hold the remote control unit to provide manual operation of the tread band.

[0017] The remote control unit is equipped with an emergency key connected with the safety control circuit in a wireless manner. The emergency key may be configured to provide the emergency stop signal when operated by an operator of the remote control unit. The emergency stop signal may be given high priority so that it is communicated to the safety control circuit. Such configuration is particularly safe, since only one key has to be operated, activated or pressed to stop movement of the people conveyor.

[0018] The remote control unit may be an inspection handheld unit, which is carried by a maintenance person or technician while performing inspection and/or maintenance operations at the people conveyor.

[0019] The remote control unit may be configured to communicate via a safety radio transmission. In particular, the safety radio transmission may be a bi-directional safety radio transmission. This allows to safely communicate control signals back and forth between the remote control unit and the drive control unit and/or the safety control circuit.

[0020] The maintenance control system may be configured to detect presence of the remote control unit within a communication region around the drive control unit and/or the safety control circuit, and to switch the maintenance control system into an active mode, when the remote control unit is detected. This increases the safety during maintenance work and the reliability of the main-

tenance control system. To avoid unintended activation, it may be required to input an activation code via the remote control unit before the remote control unit is available for manual operation of the tread band.

[0021] The remote control unit may be configured to send an activation signal to the drive control unit and/or the safety control circuit. The activation signal may be sent upon operation of the remote control unit, e.g. by input of an activation code. Alternatively, the activation signal could be sent automatically, for example when the drive control unit or the safety control circuit receives an identification signal from the remote control unit, it may be configured to carry out an authentication procedure. Upon reception of the authentication, the remote control unit may be activated.

[0022] A people conveyor according to an exemplary embodiment of the invention has a tread band operable to transport passengers between landings. The people conveyor further comprises a drive system to drive the tread band, a drive control unit to control the drive system, a safety control circuit comprising a plurality of safety switches, and a maintenance control system according to an exemplary embodiment of the invention.

[0023] The people conveyor may comprise a brake unit to brake or stop the tread band when moving. The brake may be integrated in the drive system or may be positioned separately in the people conveyor. Often, two or more redundant brake systems will be provided.

[0024] The control signals may be drive control signals that are configured to drive the motor, to actuate the brake, or to interrupt the safety control circuit to initiate an emergency stop. This allows safe control of the people conveyor.

[0025] The drive control unit may be configured to control a movement direction of the tread band of the people conveyor.

[0026] The people conveyor may be an escalator comprising a plurality of steps forming the tread band, or a moving walkway comprising a plurality of pallets forming the tread band.

[0027] Another exemplary embodiment of the invention is a method of carrying out a maintenance operation in a people conveyor. The method comprises the step of operating the people conveyor using the maintenance control system according to an exemplary embodiment of the invention.

[0028] In the following exemplary embodiments of the invention are described with reference to the enclosed figures.

Figure 1 depicts a schematic side view of a an escalator.

Figure 2 depicts a schematic side view of a moving walkway.

Figure 3 shows a schematic diagram of a people conveyor comprising a maintenance control system

according to a first embodiment.

Figure 4 depicts a schematic diagram of a people conveyor comprising a maintenance control system according to a second embodiment.

[0029] Figure 1 shows a schematic side view of a people conveyor 1, in particular an escalator 1a, comprising an endless tread band 12 comprising a plurality of treads 13 (steps 13a) extending in a longitudinal conveyance direction between two landings 20, 21. The treads 13 comprise rollers 23 which are guided and supported by guide rails (not shown).

[0030] An upper turnaround portion 17 is provided next to the landing 20. The upper turnaround portion 17 is a driving portion and comprises a drive shaft 29 driven by a drive system 25 having a motor. The drive shaft 29 is driven by the drive system 25 via a transmission element 26, particularly a toothed belt, a belt or a chain. The drive shaft 29 supports a drive wheel 32. The drive control unit 42 is in communication with the drive system 25. The drive control unit 42 is configured to control the drive system 25.

[0031] In the upper turnaround portion 17 next to the landing 20 and in the lower turnaround portion 24 next to the landing 21 the endless tread band 12 passes from a conveyance portion 16 into a return portion 18, and vice versa. The lower turnaround portion 24 comprises a non-driven turnaround element 30, e.g. an idler wheel or an idler sprocket. The upper turnaround portion 17 comprises the drive wheel 32 as a turnaround element, around which the endless tread band 12 passes. The drive wheel 32, e.g. a sprocket or toothed wheel, is driven by the drive system 25.

[0032] Alternatively, the lower turnaround portion 24 may be a driving portion.

[0033] For clarity, only some of the treads 13, in particular treads 13 traveling in the conveyance portion 16, are depicted in Figure 1. Further, not all treads 13 and rollers 23 are denoted with reference signs.

[0034] A tread drive tension member 15, particularly a drive chain, a drive belt or a toothed belt, extending along a closed loop is connected to the treads 13 (steps 13a). The tread drive tension member 15 is in engagement with and driven by the drive wheel 32 arranged in the upper turnaround portion 17.

[0035] The people conveyor 1 further comprises a brake 31 which is configured for braking movement of the endless tread band 12. The brake 31 is depicted separately from the drive system 25 in Figure 1. The brake 31, however, may be integrated with the drive system 25. For example, the brake 31 may engage with the drive wheel 32 or the drive shaft 29.

[0036] Balustrades 4 supporting moving handrails 6 extend parallel to the conveyance portion 16. Only one of the balustrades 4 is visible in the side view shown in Figure 1.

[0037] Figure 2 depicts a schematic side view of a peo-

ple conveyor 1, which is provided as a moving walkway 1b.

[0038] The moving walkway 1b comprises an endless tread band 12 of treads 13 (pallets 13b) moving in a longitudinal conveyance direction in an upper conveyance portion 16 and moving in a return direction opposite to the conveyance direction in a lower return portion 18.

[0039] Landings 20, 21 are provided at both ends of the moving walkway 1b. A left turnaround portion 17 is provided at the landing 21, and a right turnaround portion 24 is provided at the landing 20. A turnaround element 30, in particular an idler wheel or an idler sprocket, is provided at the right turnaround portion 24. A drive wheel 32 forming a turnaround element is provided at the left turnaround portion 17. The endless tread band 12 passes from the conveyance portion 16 into the return portion 18 in the left turnaround portion 17 and in the right turnaround portion 24, and vice versa.

[0040] The left turnaround portion 17 is a driving portion and comprises a drive shaft 29 driven by a drive system 25 via a transmission element 26, particularly a toothed belt, a belt or a chain. The drive system 25 comprises a motor. The drive shaft 29 supports the drive wheel 32.

[0041] For clarity not all treads 13 (pallets 13b) are provided with reference signs.

[0042] A tread drive tension member 15, particularly a drive chain, a drive belt or a toothed belt, extending along a closed loop is connected to the treads 13 (pallets 13b). The tread drive tension member 15 is in engagement with and driven by the drive wheel 32 (e.g. a sheave or a sprocket) arranged in the left turnaround portion 17.

[0043] The moving walkway 1b further comprises a brake 31 which is configured for braking movement of the endless tread band 12. The brake 31 is depicted separately from the drive system 25 in Figure 2. The brake 31, however, may be integrated with the drive system 25. For example, the brake 31 may engage with the drive wheel 32 or the drive shaft 29.

[0044] Balustrades 4 supporting moving handrails 6 extend parallel to the conveyance portion 16 on both lateral sides of the chain 12 of conveyance elements 13. Only one of the balustrades 4 is visible in the side view depicted in Figure 2.

[0045] Figures 1 and 2 also show a maintenance control system 40 comprising a remote control unit 44. The remote control unit 44 is in wireless communication with the drive control unit 42 of the people conveyor 1. The drive control unit 42 controls movement of the drive system 25. In particular, the drive control unit 42 provides commands for the drive motor to drive the tread band 12 in a clockwise rotation or counterclockwise rotation, and thereby controls the moving direction of the treads in the conveyance portion. The remote control unit 44 may be used to provide control signals to the drive control unit 42 for driving the drive system 25.

[0046] The people conveyor 1 comprises a safety control circuit 46. The safety control circuit 46 comprises a

plurality of safety switches 48 placed at different portions in the people conveyor 1, in particular in the drive system 25, in the return portion 18, in the conveyance portion 16, and at the landings 20, 21. Not all safety switches locations are depicted in the Figures. The safety control circuit 46 is in communication with the drive control unit 42. Particularly, the safety control circuit 46 may comprise a safety chain formed by the safety switches 48. The safety chain may include further safety switches, for example safety relays 47 or 64, which are not depicted in Figures 1 and 2. Operation of the people conveyor 1, particularly for driving the tread band 12, is only possible when the safety chain is closed.

[0047] When one of the plurality of safety switches 48 is in an open position, the people conveyor 1 is stopped immediately and the people conveyor 1 cannot be activated until the respective safety switch 48 is brought into a closed position.

[0048] Figure 3 shows a diagrammatic view of the maintenance control system 40 with the remote control unit 44 and its interaction with the people conveyor 1 comprising the drive control unit 42. The remote control unit 44 may be an inspection hand held unit. The remote control unit 44 comprises a transmitter/receiver 45 to transmit and receive control signals 56, in particular maintenance control signals, wirelessly to the drive control unit 42 and/or to the safety control circuit 46. The drive control unit 42 comprises a transmitter/receiver 43 to enable communication between the remote control unit 44 and the drive control unit 42 and/or the safety control circuit 46.

[0049] The transmitter/receiver 43 may be positioned in the balustrade 4 or at one of the landings 20, 21 to provide optimal transmission power between the transmitter/receiver 43 of the drive control unit 42 and the transmitter/receiver 45 of the remote control unit 44.

[0050] In some embodiments, at least one of the safety switches 48 of the safety control circuit 46 may be configured to wirelessly communicate with the remote control unit 44.

[0051] Since the remote control unit 44 allows wireless communication between the remote control unit 44 and the drive control unit 42 and/or the safety control circuit 46, no communication cables to connect the drive control unit 42 and/or the safety control circuit 46 with the remote control unit 44 are necessary. This eliminates the risk that communication cables are damaged by the tread band 12 when operating the people conveyor 1 during maintenance operation.

[0052] The drive control unit 42 is in communication with the drive system 25, the brake 31, the safety control circuit 46 and the remote control unit 44. The drive control unit 42 receives movement direction signals 54 during normal operation (passenger operation), or receives maintenance control signals 56 via the remote control unit 44 during maintenance operation.

[0053] The safety switch 47 may be a safety relay 47. The safety relay 47 may be included in, or connected

with, the drive control unit 42. Alternatively, or in addition, at least one of the safety switches in the safety control circuit 46 may be configured to communicate wirelessly with the remote control unit 44, as indicated by 49 in Fig.3. In this case, the safety switch 49 may provide the functionality of the safety relay 47.

[0054] A further possibility is shown in Fig. 4. Here, the safety control circuit 46 is connected with a separate safety control unit 50. The safety control unit 50 includes a safety relay 64 and also a transmitter/receiver 51 for wirelessly communicating with the remote control unit 44. In this case, the remote control unit 44 can communicate with the drive control unit 42 and/or the safety control circuit 46 via the transmitter/receiver 51 and thus no separate transmitter/receiver is required for the drive control unit 42. The wireless communication may be achieved by a safety radio transmission 52, in particular by a bi-directional safety radio transmission.

[0055] The remote control unit 44 comprises an emergency key 57 and a plurality of maintenance operation keys, particularly a first key 58 (upward movement), a second key 60 (downward movement), and a third key 62 (run key).

[0056] When the emergency key 57 is operated, activated or pressed, the remote control unit 44 transmits a control signal to the safety switch 47 (or 49, or 64). In reaction to receipt of this control signal, the safety switch 47 (or 49, or 64) will open such that the safety control circuit 46 is interrupted. This triggers the drive control unit 42 to immediately stop movement of the drive system 25 thereby stopping the tread band 12 (not shown in Figure 3). In addition, at least one brake 31 will be activated.

[0057] The first key 58 provides a control signal for moving the tread band 12 of the people conveyor 1 in an up or first direction 66. The second key 60 provides a control signal for moving the tread band 12 of the people conveyor 1 in a down direction 68 or opposite direction of the first direction 66. The control signals of either key 58 or 60 is only communicated to the drive control unit 42 when the third key 62 is activated or pressed simultaneously with either the first key 58 or the second key 60.

[0058] The keys 58, 60 and 62 may be arranged so that two hands are needed for simultaneous operation of the first key 58 and the third key 62, or the second key 60 and the third key 62. This suppresses the likelihood of unintended operation by a maintenance person, since the maintenance person has to use both hands to activate movement of the tread band 12 of the people conveyor 1. This provides a two hand control configuration.

[0059] Figure 4 shows a diagrammatic view of the people conveyor 1 comprising the drive control unit 42 and the maintenance control system 40 together with the remote control unit 44 according to a further embodiment. As mentioned above, the maintenance control system 40 of Figure 4 further comprises the safety control unit 50 in wireless communication with the remote control unit 44 via the safety radio transmission 52. The safety control unit 50 comprises a transmitter/receiver 51 to enable

wireless communication of the maintenance control signals 56 with the remote control unit 44.

[0060] The safety control unit 50 is configured to communicate the maintenance control signals 56 to the drive control unit 42.

[0061] The transmitter/receiver 51 may be positioned in the balustrade 4 or at one of the landing portions 20, 21 to provide optimal transmission power between the transmitter/receiver 51 of the safety control unit 50 and the transmitter/receiver 45 of the remote control unit 44.

[0062] The drive control unit 42 is in communication with the drive system 25, the brake 31, the safety control circuit 46, and the safety control unit 50. The drive control unit 42 receives maintenance control signals 56 from the remote control unit 44 via the safety control unit 50 during maintenance operation.

[0063] In the same way as described above with reference to Figure 3, the movement direction signals 54 and the maintenance control signals 56 trigger movement of the tread band 12 of the people conveyor 1 in the first moving direction 66 or in the second moving direction 68, by communicating these signals to the drive system 25 to rotate in a clockwise or counterclockwise direction. The second moving direction 68 is opposite to the first moving direction 66. Moreover, these control signals 54, 56 provide information to the brake 31 to brake the tread band 12 or to release the tread band 12 (not shown in Figure 4).

[0064] The drive control unit 42 provides movement direction signals 54 or maintenance control signals 56 to the drive system 25 and the brake 31 as long as the plurality of safety switches 48, 64 of the safety control circuit 46 are closed. If one of the plurality of safety switches 48, 64 is open, the drive control unit 42 stops providing any movement direction signals 54 or maintenance control signals 56 to the drive system 25.

[0065] When the emergency key 57 is operated, activated or pressed, the remote control unit 44 transmits a control signal to the safety control unit 50, which opens the safety switch 64 (particularly, the safety switch 64 may be a safety relay) such that the safety control circuit 46 is open. This results in the drive control unit 42 to immediately stop movement of the drive system 25 thereby stopping the tread band 12 (not shown in Figure 3). The safety switch 64 is integrated in the safety control unit 50. In another embodiment, the safety switch 64 may be positioned away from the safety control unit 50 in the safety control circuit 46.

[0066] The first key 58, the second key 60 and the third key 62 provide identical control signals to the drive control unit 42 in Figures 3 and 4.

[0067] While the invention has been described with reference to exemplary embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adopt a particular situation or material to the teachings of the in-

vention without departing from the essential scope thereof. Therefore, it is intended that the invention is not limited to the particular embodiments disclosed, but that the invention includes all embodiments falling within the scope of the claims.

References

[0068]

1	people conveyor
1a	escalator
1b	moving walkway
4	balustrade
6	moving handrail
12	tread band
13	treads
13a	steps
13b	pallets
15	tread drive tension member
16	conveyance portion
17	upper/left turnaround portion
18	return portion
20, 21	landings
23	rollers
24	(lower/right) turnaround portion
25	drive system
26	transmission element
29	drive shaft
30	turnaround element
31	brake
32	drive wheel (sheave or sprocket)
40	maintenance control system
42	drive control unit
43	transmitter/receiver of the drive control unit
44	remote control unit
45	transmitter/receiver of the remote control unit
46	safety control circuit
47	safety switch, in particular a safety relay
48	safety switch
49	safety switch
50	safety control unit
51	transmitter/receiver of the safety control unit
52	safety radio transmission
54	movement direction signals
56	maintenance control signals
57	emergency key
58	first key
60	second key
62	third key
64	safety switch, in particular a safety relay
66	first moving direction
68	second moving direction

Claims

1. Maintenance control system (40) for a people con-

veyor (1) having a tread band (12) operable for transporting passengers between landings (20, 21), the people conveyor (1) comprising a drive control unit (42) for controlling operation of the tread band (12), and a safety control circuit (46) including a plurality of safety switches (47, 48, 49, 64), the maintenance control system (40) comprising:

a remote control unit (44) comprising

at least one maintenance operation key (58, 60, 62) configured to manually control operation of the tread band (12) by operating the at least one maintenance operation key (58, 60, 62);
an emergency key (57) configured to provide an emergency stop signal; and
a transmitter/receiver (45) configured to wirelessly communicate control signals between the remote control unit (44) and the drive control unit (42);

wherein the remote control unit (44) is configured to wirelessly communicate with the safety control circuit (46) of the people conveyor (1) to stop operation of the tread band (12), irrespective of the state of the at least one maintenance operation key (58, 60, 62), depending on the state of any of the safety switches (47, 48, 49, 64) in the safety control circuit (46).

2. Maintenance control system (40) according to claim 1, wherein the safety control circuit (46) comprises a safety control unit (50), the safety control unit (50) having a transmitter/receiver (51) configured to wirelessly communicate with the remote control unit (44).
3. Maintenance control system (40) according to claim 2, wherein the safety control unit (50) is configured to communicate control signals from the remote control unit (44) to the drive control unit (42).
4. Maintenance control system (40) according to claim 2 or 3, wherein the safety control unit (50) comprises a safety switch (64) connected to the safety control circuit (46).
5. Maintenance control system (40) according to any of the previous claims, wherein the at least one maintenance operation key (58, 60, 62) is configured for providing a control signal for manually operating the tread band (12) of the people conveyor (1).
6. Maintenance control system (40) according to claim 5, wherein the at least one of maintenance operation key (58, 60, 62) comprises a plurality of operation keys (58, 60, 62), particularly:

a first key (58) configured to provide a control signal for commanding a first moving direction of the tread band (12) of the people conveyor (1); a second key (60) configured to provide a control signal for commanding a second moving direction opposite to the first moving direction; and a third key (62) configured to provide a control signal for enabling the drive control unit (42) to operate the tread band (12) in the commanded first or second direction, when operated simultaneously with the first key (58) or the second key (60).

7. Maintenance control system (40) according to claim 6, wherein the plurality of operation keys (58, 60, 62), particularly the first key (58), the second key (60), and the third key (62), are positioned such that two hands of a maintenance person are needed for simultaneous operation of the plurality of operation keys (58, 60, 62), particularly for simultaneous operation of either the first key (58) and the third key (62), or the second key (60) and the third key (62).
8. Maintenance control system (40) according to any of the previous claims, wherein the emergency key (57) is configured to provide the emergency stop signal when operated, irrespective of additional operation of the at least one maintenance operation key (58, 60, 62).
9. Maintenance control system (40) according to any of the previous claims, wherein the remote control unit (44) is an inspection handheld unit.
10. Maintenance control system (40) according to any of the previous claims, wherein the remote control unit (44) is configured to communicate via a safety radio transmission (52), particularly a bi-directional safety radio transmission.
11. Maintenance control system (40) according to any of the previous claims, wherein the safety control circuit (46) is configured to detect presence of a remote control unit (44) within a communication region around the drive control unit (42) and/or safety control circuit (46) and to switch the maintenance control system (40) into an active mode when the remote control unit (44) is detected.
12. Maintenance control system (40) according to any of the previous claims, wherein the remote control unit (44) is configured to send an activation signal to the drive control unit (42) and/or the safety control circuit (46).
13. People conveyor (1) having a tread band (12) operable to transport passengers between landings (20, 21), the people conveyor (1) comprising:

a drive system (25) to drive the tread band (12);
a drive control unit (42) to control the drive system (25);
a safety control circuit (46) comprising a plurality of safety switches (47, 48, 64), and
the maintenance control system (40) according to any of the previous claims.

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- 14.** People conveyor (1) according to claim 13, wherein the people conveyor (1) is an escalator (1a) comprising a plurality of steps (13a) forming the tread band (12); or wherein the people conveyor (1) is a moving walkway (1b) comprising a plurality of pallets (13b) forming the tread band (12).

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- 15.** Method of carrying out a maintenance operation in a people conveyor (1), the method comprising:
operating the people conveyor (1) using the maintenance control system (40) according to any of claims 1 to 12.

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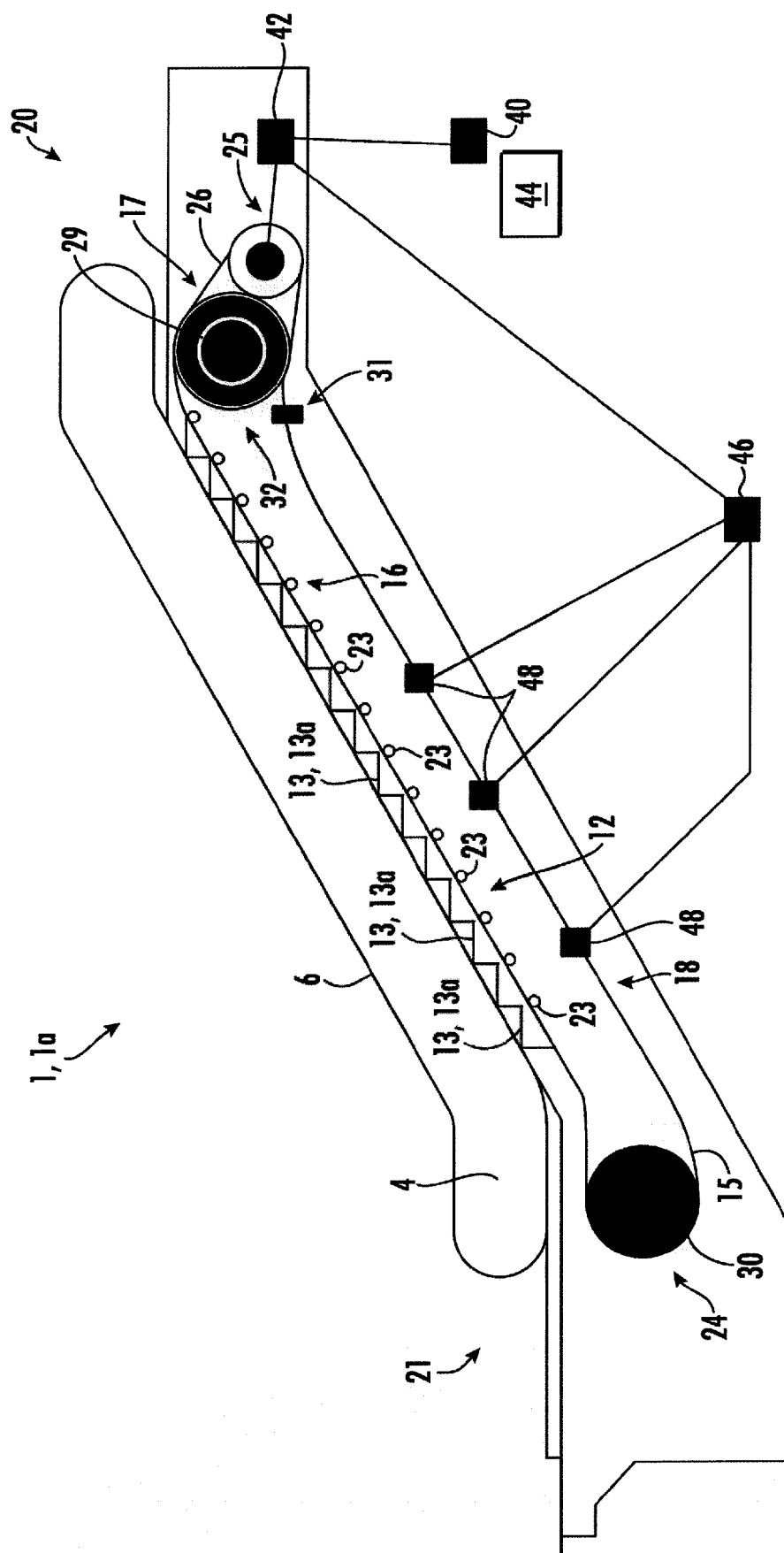
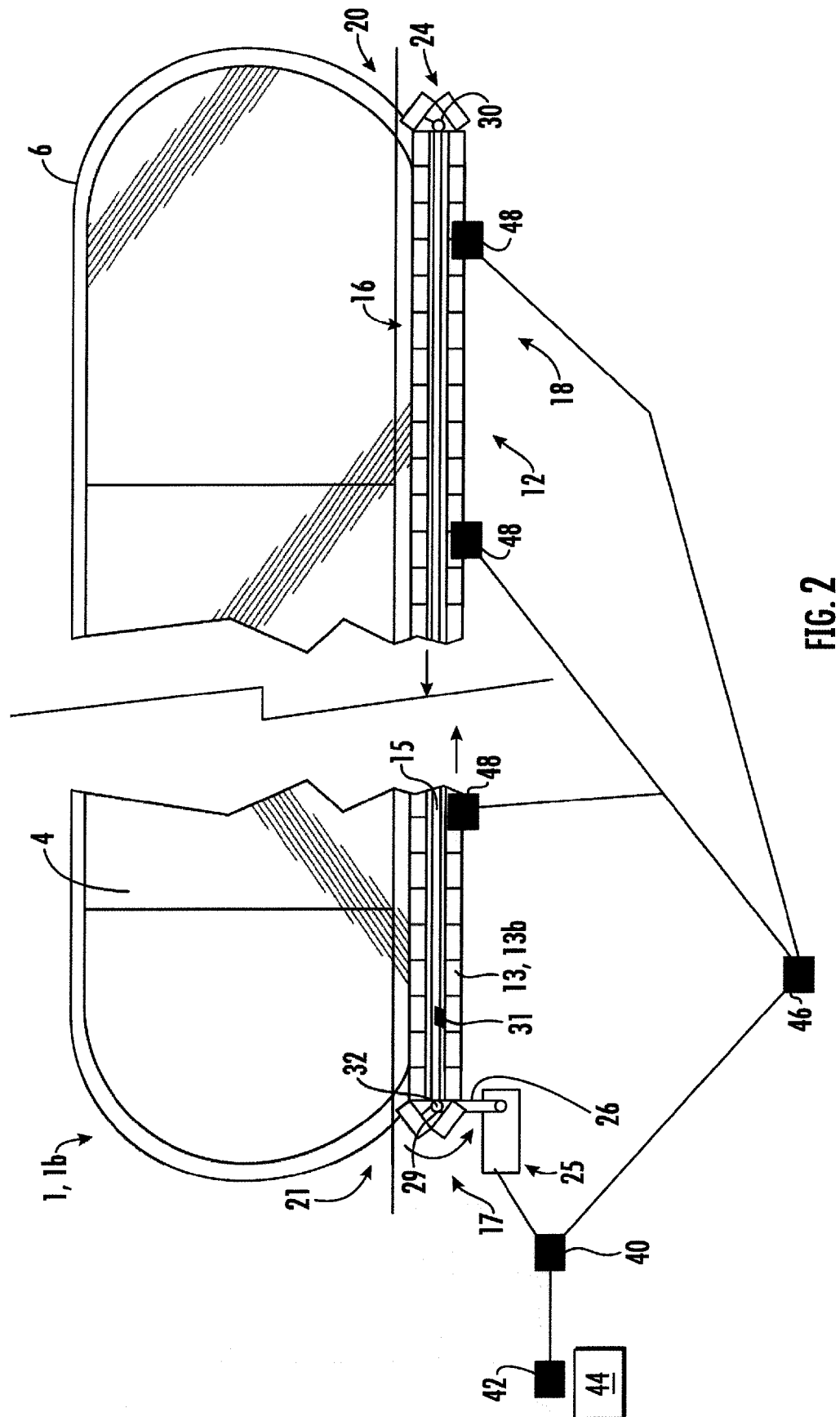
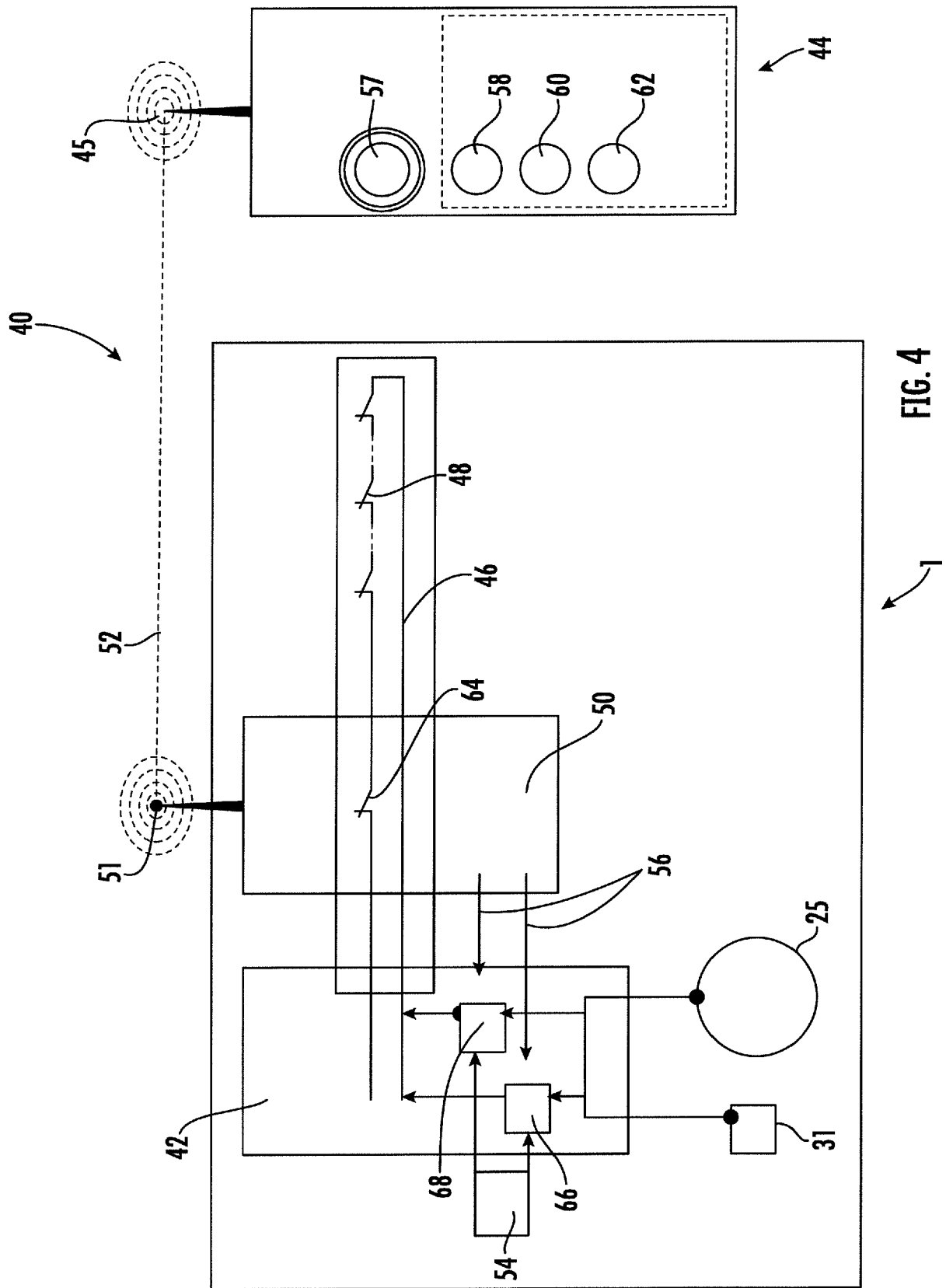


FIG. 1







EUROPEAN SEARCH REPORT

Application Number
EP 18 17 1025

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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	JP 6 117321 B1 (TOSHIBA ELEVATOR CO LTD) 19 April 2017 (2017-04-19)	1,5-15	INV. B66B31/00
A	* paragraph [0001] - paragraph [0050] * * figures 1, 2 *	2-4	
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 October 2018	Examiner Dijoux, Adrien
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			

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