

TITLE OF THE INVENTION

SUPERVISORY SYSTEM FOR SUPERVISING DRIVING STATE OF
PASSENGER CONVEYER

5 BACKGROUND OF THE INVENTION

Present invention relates to a supervisory system for supervising a driving state of a passenger conveyer such as an escalator or an electrically moving road. ..

In the conventional supervisory system for the
10 passenger conveyers such as the escalator or the electrically moving road, as mentioned in Japanese Patent Laid-open No. 1-281287(1989), for example, a driving state of a passenger conveyer is transmitted to a control room with wireless signal once, the wireless signal received by
15 the control room is transmitted to a supervisory station by using a telephone circuit, and a special maintenance engineer grasps the driving state precisely.

According to the above conventional technology, when the passenger conveyer break down temporarily, there is
20 advantage as that there is no need to report the trouble situation to a maintenance company for a manager and that a cause of the trouble may be confirmed by the maintenance company at first.

Without waiting the maintenance engineer from the
25 maintenance company however, a normal driving and an immediate recovering of the normal driving are not able to be expected.

In order to send monitored data furthermore to the maintenance company, there is a problem as that communication facilities should be built in respective routes from the passenger conveyer to the control room and
5 further from the control room to the maintenance company.

SUMMARY OF THE INVENTION

One of the object of the present invention is to provide a supervisory system for supervising a driving state
10 of a passenger conveyer by which a maintenance company may grasp the driving state promptly and the stopped passenger conveyer is promptly driven again according to the driving situation.

Other object of the present invention is to provide
15 a supervisory system by which a manager can reduce his burden to care the passenger conveyer.

In order to achieve the above objects in the present invention, displaying of the control condition of the passenger conveyer to the supervisory station and
20 transmitting of the control orders from the supervisory station to the passenger conveyer are performed by utilizing a wireless signal.

Furthermore, as a supervision camera and a broadcast facility in the passenger conveyer side are provided, it
25 becomes possible to control the passenger conveyer from the supervisory station side.

By constituting the present invention as above, if



the passenger conveyer stopped with any possible cause, the situation may be grasped in the supervisory station promptly, and in the case the passenger conveyer stopped by simple mischief, an attention message is broadcasted with a broadcast facility by looking at a monitor of the supervision camera and the passenger conveyer is driven again by receiving the control order from the supervisory station.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a conception diagram which shows one embodiment of the supervisory system for the driving state of the passenger conveyer in the present invention.

Fig. 2 is a conception diagram which shows other embodiment of the supervisory system for the driving state of the passenger conveyer in the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will be explained relating to an escalator as a one embodiment of the present invention. Several steps 4 which are connected in an endless state between an upper landing floor 2 and a lower landing floor 3 of a main frame 1 provided between an upper floor and a lower floor of a building , are provided so as to freely move around.

Railings 5 is provided to stand on both sides of the main frame 1 in a moving direction of the step 4 , and a handrail 6 is provided around the railings 5 to move with

a same direction and a same speed as the step 4. These step 4 and the handrail 6 are respectively actuated through a term gear 8 by a driving machine 7 installed in a machine room formed under the upper landing floor 2 of the main frame

5 1.

The driving machine 7 is controlled by a control unit 9 provided in the same machine room, and several safe detecting elements BOA ~ BOG are provided furthermore to everywhere of the escalator. When these safety detecting
10 element BOA ~ BOG detects any abnormality, the signals showing the abnormality are taken into a data acquisition equipment 11, and the control unit 9 generates a stop order based on the signals taken into the data acquisition equipment 11 so as to stop the driving machine 7.

15 Furthermore, the control unit 9 generates signals for showing control state of the escalator, and the signals showing the control state are converted into the signals capable of being transmitted by a signal converter 12, and the signals capable of being transmitted are transmitted
20 to outside as wireless signals by a transmitter receiver 13. For example, as such receiver transmitter 13, a cellular phone device or simple type cellular phone device is utilized.

On the other hand, in the maintenance company 14 being
25 the supervisory station, supervisory and control equipment 15 is provided, and the supervisory and control equipment 15 has a keyboard 15 A that generates control signals for



the control unit 8 of the escalator and a display 15B indicating the driving situation of the escalator, and further has a recording device recording the driving situation and a line printer for printing the data.

5 The signals from the control equipment 15 are converted into the signals capable of being transmitted by a signal converter 16, and the signals capable of being transmitted are transmitted to outside as wireless signals by a transmitter receiver 17.

10 The wireless signals generated from the receiver transmitters 13,17 are transmitted and received through a repeater station 18 mutually. Therefore, the converters 12, 16 have functions capable of conversion of receipt signal in addition to conversion of the transmission signal.

15 In driving of the supervisory system for supervising a driving state of a passenger conveyer constructed as above, When, either of the safe detecting element 10A ~ 10G operates during the escalator is driving, the signal from the safe detecting element is sent through the data acquisition
20 device 11 into the control unit 9 so as to stop the driving machine 7. At the same time, the signal to stop and the either operation signal from the safe detecting element 10A ~ 10G are changed to communication signals by the converter 12 so as to transmit from the receiver transmitter 13.

25 The communication signal transmitted is received by the receiver transmitter 17 in the maintenance company 14 through the repeater station 18, and after converted by the

converter 16, it is indicated by the display 15B of the supervisory and control equipment 15 and is recorded in the recording device.

Accordingly, an engineer of the maintenance company
5 watching the indicator 15B may understand contents of the escalator stopping depending on which of the safe detecting element 10A ~ 10G operated.

The engineer of the maintenance company may understand the cause of the escalator stopping, for example, it is
10 caused by a trouble of the escalator itself, by a simple mischief of the passenger, or by an accident resulting in injury or death, and may report a suitable information to the manager of the building where the escalator is established.

15 For example, in a case of the escalator stopping caused by the mischief by the passenger or the malfunction of the escalator, the watching engineer of the maintenance company may take necessary step for the control unit 8 for the escalator by operating the keyboard 15 A of the
20 supervisory and control equipment 15 or may restart the escalator by giving a restart order, if self diagnostics indication of the engineer is permitted.

In case of the trouble of the escalator itself, after reporting an injured person and rescue thereof to the manager
25 of the building, and directing a guidance for stop ping to use the escalator, the trouble outbreak spot and the trouble point are informed to the maintenance engineer.

Accordingly, the maintenance engineer may hurry to the trouble outbreak spot having the repair article only needed to the trouble point without depending on an information from the manager in the building, thereby, if
5 being an easy accident, the escalator may be repaired without letting stop time of the escalator drag on.

In case of the stopping by the mischief or by the malfunction, the restart operation of the escalator and awakening of attention to the passenger are directed to the
10 manager of the building. Furthermore, because a remote control from the maintenance company 14 becomes to be performed, there is no need to dispatch the maintenance engineer to the spot.

In case of the stopping by the accident resulting in
15 injury or death, after having directed the manager of the building to guide the rescue of the injured person and stopping to use the escalator, a member for the rescue, the maintenance engineer and a person in charge are dispatched to the accident spot, and a precise step is performed.

20 According to the embodiment of the present invention as stated above, At the same time with the accident outbreak, the maintenance company 14 the accident outbreak building, and the accident outbreak point and cause are grasped precisely, the maintenance company 14 may take a
25 quick correspondence to the accident. Furthermore, in order to supervise the driving situation of the escalator, there is no need to worry the manager of the building.

By the way, in the case that the accident report to the maintenance company 14 is performed by the manager of the building, it takes much time for the manager of the building to know the accident outbreak, it takes much time
5 for the manager to grasp the accident cause and to report it to the maintenance company 14, furthermore, the maintenance company 14 may not precisely grasp the accident cause only by the report from the manager, and the escalator which is possible to restart in a short time stops for a
10 long time.

Figure 2 shows an another embodiment of the present invention. Here, same numerals in Fig. 2 with that in Fig. 1 respectively show the same parts to omit repeated explanations.

15 The first characteristic of this embodiment is in providing a service car 19 mounting a supervisory and control equipment 20, a converter 21, and a receiver transmitter 22 respectively having a same function as the supervisory and control equipment 15, the converter 16 and the receiver
20 transmitter 17 in the maintenance company 14.

As such service car 19 is always driven, at the same time with the stopping of the escalator, it becomes possible for the maintenance company 14 to order to dispatch the service car 19 to the spot, and the service car 19 that
25 received the order may know the cause of the stopping with the supervisory and control equipment 15, thereby a more suitable supervisory system is provided.

The second characteristic of this embodiment is in providing a camera 23 capable to project the utilizing situation of the escalator, furthermore, a broadcast device 24 on the railing 5, thereby, various pictures by the camera 23 is transmitted to the maintenance company 14 and the service car 19 through the control unit 9, the converter 12 and the receiver transmitter 13, and the broadcast device 24 works according to the order from the maintenance company 14 or the service car 19.

10 As constituted as above in the present invention, when the escalator stopped by any cause, the maintenance company 14 and service car 19 may grasp the stopping cause immediately, and if the restart of the escalator is possible, the restart may be tried while confirming an image by the camera 23 and announcing an attention to the passenger by the broadcast device 24.

 If the restart of the escalator is not possible, the broadcast device 24 announce not to utilize the escalator and the maintenance company 14 and service car 19 may hurry to try the restart.

 In the above stated embodiments, operations corresponding to the accident outbreak are explained. However, when the maintenance inspection of the escalator is performed, because a precise indication may be informed from the engineer in the maintenance company monitor side for a complicated repairing by utilizing the above stated supervisory system, highly effective working may be

expected.

According to the present invention, the maintenance company may grasp the driving situation of a passenger conveyer promptly, a supervisory system for supervising a driving state of a passenger conveyer which may promptly recover a normal driving state according to the situation is provided and the supervisory system which may reduce a burden of the manager is provided.



CLAIMS

1. A supervisory system for supervising a driving state of a passenger conveyer, comprising
- a system in which a control condition of the passenger conveyer is displayed on a supervisory station by using a wireless signal and a control signal is ordered to the passenger conveyer from the supervisory station by using a wireless signal.
2. A supervisory system for supervising a driving state of a passenger conveyer, comprising
- a transmitter receiver, for transmitting a control condition for a passenger conveyer by using a wireless signal and for receiving said control signal by using a wireless signal, provided in a passenger conveyer side, and
- an another transmitter receiver for receiving said control condition by the wireless signal and transmitting said control signal by the wireless signal, and a display means for indicating the control condition received by the another transmitter receiver, in a supervisory station side provided in a remote location from the passenger conveyer.
3. A supervisory system for supervising a driving state of a passenger conveyer, as defined in claim 2, wherein further comprising
- a broadcast facility provided in the passenger





conveyer side for broadcasting an information through said transmitter receiver and said another transmitter receiver from said supervisory station side.

- 5 4. A supervisory system for supervising a driving state of a passenger conveyer, as defined in claim 2, wherein further comprising

a supervision camera provided in said passenger conveyer side for indicating a picture signal from said supervision camera on said display means through said transmitter receiver and said another transmitter receiver.

5. A supervisory system for supervising a driving state of a passenger conveyer, as defined in claim 2, wherein further comprising

a mobile station having a same function with said supervisory station.

6. A supervisory system for supervising a driving state of a passenger conveyer comprising

a passenger conveyer comprising a plurality of steps being connected in endless state and moving around,

guard rails respectively being guided by railings standing straight on both sides of said steps,

- 25 a driving means for driving said steps and said guard rails, various detecting means provided on said passenger conveyer,





a control unit for controlling said driving means based on signals from said detecting means, and

a supervisory equipment for supervising control condition of a control unit of said passenger conveyer
5 provided apart from said passenger conveyer,

wherein said supervisory system characterized by comprising

an output means for outputting a signal from said supervisory equipment, a signal converting means for
10 converting an output from said output means into a wireless signal, and a transmitter for transmitting said wireless signal, respectively provided in said passenger conveyer side, and

a receiver for receiving said wireless signal from
15 said transmitter in said passenger conveyer side, a receiving signal converting means for converting said wireless signal received by said receiver, a display means for displaying a signal converted by said signal converting means, an order signal converting means for converting a
20 control order into a wireless signal, and a transmitter for transmitting said wireless signal converted by said order signal converting means, respectively provided in said supervisory equipment side,

wherein further comprising

25 a receiver for receiving said wireless signal from said transmitter in said supervisory equipment side,

a receiving signal converting means for converting





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said wireless signal, and

a control unit controlled with a signal converted by
said receiving signal converting means, respectively
provided in said passenger conveyer side.

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ABSTRACTS OF THE DISCLOSURE

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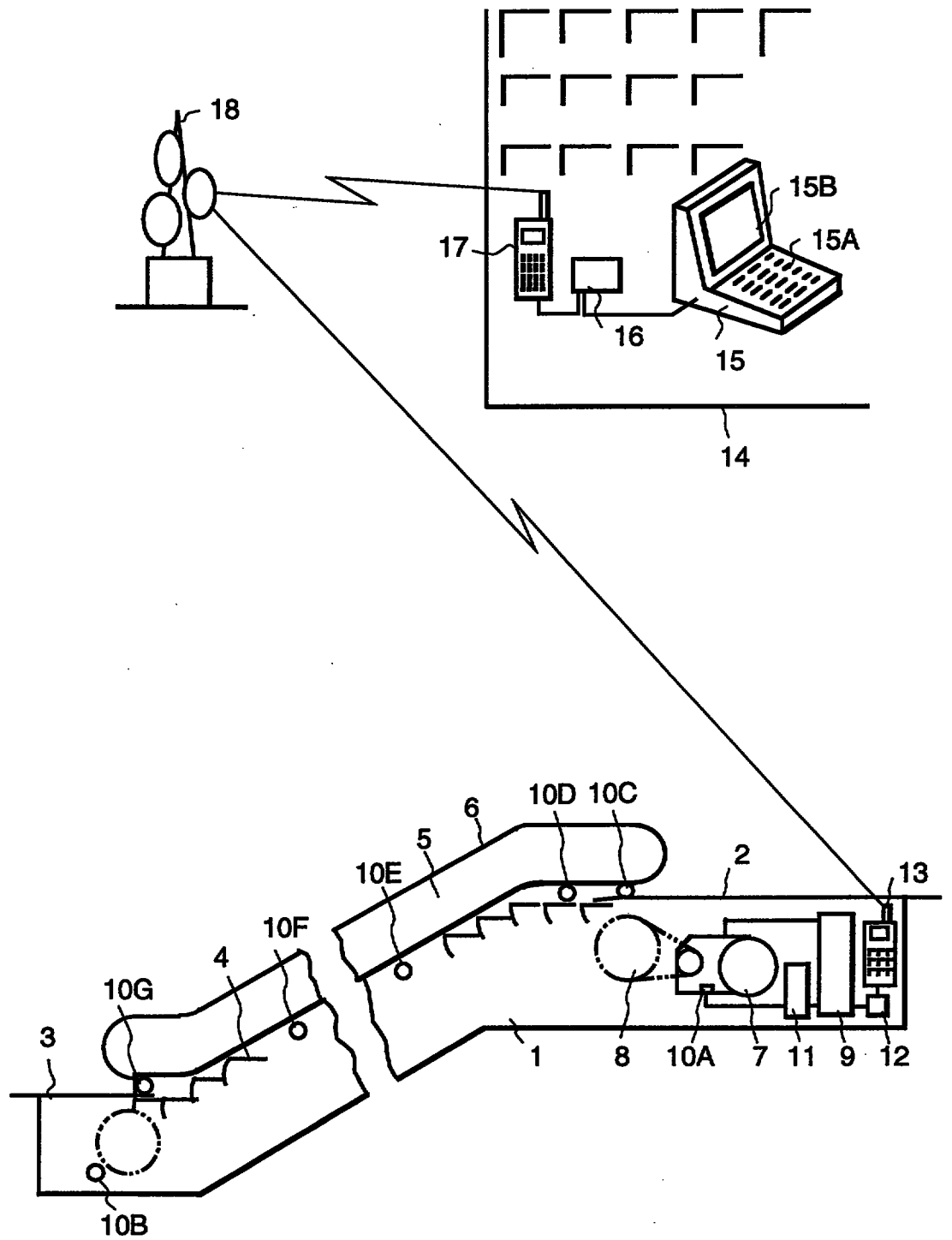
In order for the maintenance company to grasp the driving situation promptly, to recover to a normal driving state according to the situation promptly, and to reduce
5 a burden of a manager of the maintenance company, a receiver transmitter for transmitting control condition with wireless signal and for receiving a message of the control order with wireless signal is arranged in the passenger conveyer side, and a another receiver transmitter for
10 receiving the control condition with wireless signal and for transmitting the control order with wireless signal, and a display means for indicating the control condition received are provided in the supervisory station side provided far from the passenger conveyer.

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FIG. 1

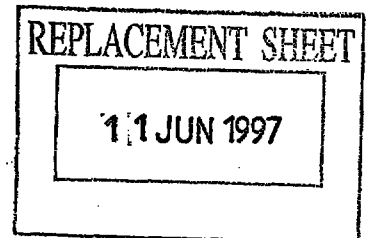


ABSTRACTS OF THE DISCLOSURE
SUPERVISORY SYSTEM FOR SUPERVISING DRIVING STATE OF PASSENGER
CONVEYER

In order for the maintenance company to grasp the driving situation promptly, to recover to a normal driving state according to the situation promptly, and to reduce
5 a burden of a manager of the maintenance company, a receiver transmitter for transmitting control condition with wireless signal and for receiving a message of the control order with wireless signal is arranged in the passenger
10 conveyer side, and a another receiver transmitter for receiving the control condition with wireless signal and for transmitting the control order with wireless signal, and a display means for indicating the control condition received are provided in the supervisory station side provided far from the passenger conveyer.

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FIG. 1



In order to send monitored data furthermore to the maintenance company, there is a problem as that communication facilities should be built in respective routes from the passenger conveyer to the control room
5 and further from the control room to the maintenance company.

According to a first aspect of the present invention there is provided a supervisory system for supervising a driving state of a passenger conveyer, comprising
10 a system in which control conditions of the passenger conveyer are displayed on a supervisory station by using a wireless signal and a control signal according to said control condition is ordered to the passenger conveyer from the supervisory station by using a wireless
15 signal, said control conditions being detected by safety detecting elements (10C, 10D, 10E, 10F, 10G) provided along a handrail of the passenger conveyer and safety detecting elements (10A,10B) provided elsewhere in the passenger conveyer.

20 According to a second aspect of the present invention there is provided a supervisory system for supervising a passenger conveyer, comprising
a transmitter receiver, for transmitting control conditions of a passenger conveyer by using a wireless
25 signal and for receiving a control signal by using a wireless signal, provided in a passenger conveyer side said control conditions being detected by safety detecting elements (10C, 10D, 10E, 10F, 10G) provided

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along a handrail of the passenger conveyer and safety detecting elements (10A,10B) provided elsewhere in the passenger conveyer, and

an another transmitter receiver for receiving said
5 control conditions by wireless signal and transmitting said control signal according to said control conditions by wireless signal, and a display means for indicating the control conditions received by the another transmitter receiver, in a supervisory station side
10 provided in a remote location from the passenger conveyer.

According to a third aspect of the present invention there is provided a supervisory system for supervising a passenger conveyer, as defined in claim 2, further
15 comprising:

a broadcast facility provided in the passenger conveyer side for broadcasting information through said transmitter receiver and said another transmitter receiver from said supervisory station side.

20 The present invention may thus enable a supervisory system for supervising a driving state of a passenger conveyer to be produced by which a maintenance company may grasp the driving state promptly and the stopped passenger conveyer is promptly driven again according to
25 the driving situation.

The present invention may also enable a manager of a supervisory system to reduce his burden to look after the passenger conveyer.

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2B

Furthermore, as a supervision camera and a broadcast facility in the passenger conveyer side may be provided, it becomes possible to control the passenger conveyer from the supervisory station side.

5 By constituting the present invention as above, if

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a same direction and a same speed as the step 4. These step 4 and the handrail 6 are respectively actuated through a terminal gear 8 by a driving machine 7 installed in a machine room formed under the upper landing floor 2 of the main frame 1.

The driving machine 7 is controlled by a control unit 9 provided in the same machine room, and several safe detecting elements 10A ~ 10G are provided furthermore to everywhere of the escalator. When these safety detecting element 10A ~ 10G detects any abnormality, the signals showing the abnormality are taken into a data acquisition equipment 11, and the control unit 9 generates a stop order based on the signals taken into the data acquisition equipment 11 so as to stop the driving machine 7.

Furthermore, the control unit 9 generates signals for showing control state of the escalator, and the signals showing the control state are converted into the signals capable of being transmitted by a signal converter 12, and the signals capable of being transmitted are transmitted to outside as wireless signals by a transmitter receiver 13. For example, as such receiver transmitter 13, a cellular phone device or simple type cellular phone device is utilized.

On the other hand, in the maintenance company 14 being the supervisory station, supervisory and control equipment 15 is provided, and the supervisory and control equipment 15 has a keyboard 15 A that generates control signals for



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CLAIMS

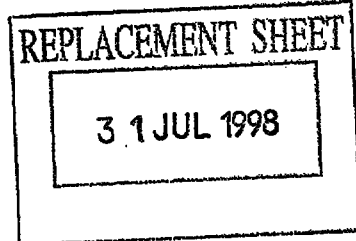
1. A supervisory system for supervising a driving state of a passenger conveyer, comprising

a system in which control conditions of the passenger conveyer provided far from a supervisory station, are displayed on said supervisory station by using a wireless signal and a control signal according to said control conditions is ordered to the passenger conveyer from the supervisory station by using a wireless signal, said control conditions being detected by safety detecting elements (10C, 10D, 10E, 10F, 10G) provided along a handrail of the passenger conveyer and safety detecting elements (10A, 10B) provided on a driving means (7) provided under a landing floor (2, 3) of the passenger conveyer for driving the passenger conveyer.

2. A supervisory system for supervising a driving state of a passenger conveyer, comprising

a transmitter receiver (13) provided in a passenger conveyer side far from a supervisory station, for transmitting control conditions of a passenger conveyer by using a wireless signal and for receiving a control signal transmitted from said supervisory station by using a wireless signal,

said control conditions being detected by safety detecting elements (10C, 10D, 10E, 10F, 10G) provided along a handrail of the passenger conveyer and safety detecting elements (10A, 10B) provided on a driving means (7) provided under a landing floor (2, 3) of the passenger conveyer for driving the passenger conveyer,



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an another transmitter receiver (17) provided in said supervisory station for receiving said control condition by the wireless signal and transmitting said control signal by the wireless signal, and

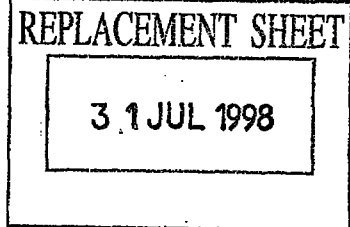
a display means for indicating the control condition received by the another transmitter receiver (17), provided in said supervisory station.

3. A supervisory system for supervising a passenger conveyer, as defined in claim 2, further comprising:

a broadcast facility provided in the passenger conveyer side for broadcasting information through said transmitter receiver and said another transmitter receiver from said supervisory station side.

4. A supervisory system for supervising a passenger conveyer, as defined in either claim 2 or claim 3 further comprising:

a supervision camera provided in said passenger



conveyer side for indicating a picture signal from said supervision camera on said display means through said transmitter receiver and said another transmitter receiver.

5. A supervisory system for supervising a driving state of a passenger conveyer, as defined in any one of the claims 2 to 4 further comprising:

a mobile station having the same function as said supervisory station.

6. A supervisory system for supervising a driving state of a passenger conveyer comprising

a passenger conveyer comprising a plurality of steps (4) being connected in endless state and moving around,

handrails (6) respectively being guided by railings standing straight on both sides of said steps (4),

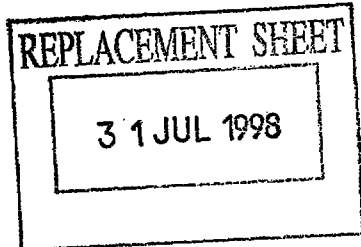
a driving means (7) for driving said steps and said handrails,

various detecting means provided on said passenger conveyer,

a control unit (9) for controlling said driving means (7) based on signals from said detecting means, and

a supervisory equipment (15) for supervising control condition of a control unit of said passenger conveyer provided apart from said passenger conveyer,

wherein said supervisory system characterized by comprising



an output means for outputting signals from said various detecting means comprising safety detecting elements (10C, 10D, 10E, 10F, 10G) provided along a handrail of the passenger conveyer and safety detecting elements (10A, 10B) provided on said driving means (7) provided under a landing

floor (2, 3) of the passenger conveyer for driving the passenger conveyer, a signal converting means (12) for converting an output from said output means into a wireless signal, and a transmitter (13) for transmitting said wireless signal, respectively provided in said passenger conveyer side, and

a receiver (17) for receiving said wireless signal from said transmitter in said passenger conveyer side, a receiving signal converting means (16) for converting said wireless signal [received by said receiver], a display means (15B) for displaying a signal converted by said signal converting means (16), an order signal converting means (15) for converting a control order into a wireless signal, and a transmitter (17) for transmitting said wireless signal converted by said order signal converting means, respectively provided in said supervisory equipment side,

wherein further comprising

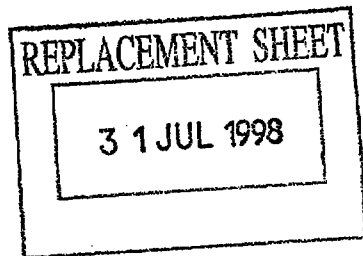
a receiver (12) for receiving said wireless signal from said transmitter (17) in said supervisory equipment side,

a receiving signal converting means (12) for converting said wireless signal, and

a control unit (9) controlled with a signal converted by said receiving signal converting means, respectively provided in said passenger conveyer side.



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7. A supervisory system for supervising the driving state of a passenger conveyer substantially as herein described with reference to an as illustrated in Fig 1 or Fig 2 of the accompanying drawings.