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Datasheet for the decision of 28 October 2010

Case Number: T 0140/09 - 3.2.06

Application Number: 96120445.0

Publication Number: 0780337

IPC: B66B 25/00

Language of the proceedings: EN

Title of invention:
Passenger conveyor control system having decentralized inputs and outputs

Patentee:
Otis Elevator Company

Opponent:
ThyssenKrupp Fahrtreppen GmbH

Headword:
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Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step (no)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0140/09 - 3.2.06

D E C I S I O N
of the Technical Board of Appeal 3.2.06
of 28 October 2010

Appellant: (Opponent)
ThyssenKrupp Fahrtreppen GmbH
Kolumbusstraße 8
D-22113 Hamburg (DE)

Representative:
Baronetzky, Klaus
Splanemann
Patentanwälte Rechtsanwalt Partnerschaft
Rumfordstraße 7
D-80469 München (DE)

Respondent: (Patent Proprietor)
Otis Elevator Company
10 Farm Springs
Farmington
CT 06032 (US)

Representative:
Klunker . Schmitt-Nilson . Hirsch
Patentanwälte
Destouchesstraße 68
D-80796 München (DE)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 17 November 2008 rejecting the opposition filed against European patent No. 0780337 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: M. Harrison
Members: G. Pricolo
K. Garnett

Summary of Facts and Submissions

I. The appeal is from the decision of the Opposition Division posted on 17 November 2008 rejecting the opposition filed against European patent No. 0 780 337.

II. Claim 1 as granted reads as follows:

"1. A passenger conveyor comprising an escalator (10) or moving walk, including a truss (12), passenger carrying means (18) disposed within the truss (12), means (26) for driving the passenger carrying means (18) disposed within the truss (12) and engaged with the passenger carrying means (18), a plurality of operational interface devices (32), and a control system comprising a plurality of junction boxes (58), each junction box (58) having at least one input/output (I/O) module, each I/O module in communication with one or more of the plurality of operational interface devices; a control unit (52) in communication with the driving means of the passenger conveyor, the control unit (52) including a bus master (54); a link (56) for providing serial communication between the plurality of I/O modules and the control unit (52)."

III. In coming to its decision the Opposition Division held that the subject-matter of claim 1 was novel and involved an inventive step over the cited prior art including

E1': EP-B1-859 735;

E2 : EP-B1-187 876;

E3 : US-A-5 083 653.

IV. Against this decision, the opponent lodged an appeal, received at the EPO on 16 January 2009, and on the same day paid the appeal fee. The statement setting out the grounds of appeal was received at the EPO on 18 March 2009.

V. In an annex to the summons for oral proceedings pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal, posted on 2 June 2010, the Board expressed the preliminary opinion that an arrangement including a serial bus was not disclosed by E3, but by E1', which disclosed the provision of a CAN-Bus for the transmission of data for diagnostic purposes. As was generally known, a CAN-Bus was a link for providing serial communication. The Board further stated that the appellant's view, according to which E2 represented the closest prior art, appeared to be based on hindsight because claim 1 of the patent in suit referred to a passenger conveyor comprising an escalator or moving walk whilst E2 exclusively concerned elevators.

VI. With letter dated 16 September 2010 the appellant submitted that the claimed subject-matter lacked an inventive step also when taking E3 as the closest prior art. In accordance with the Board's interpretation of E3 as set out in the annex to the summons, E3 did not disclose the following features of claim 1:
a plurality of junction boxes, each junction box having at least one input/output module, each I/O module in communication with one or more of the plurality of operational interface devices;

a control unit in communication with the driving means of the passenger conveyor, the control unit including a bus master;
a link for providing serial communication between the plurality of I/O modules and the control unit.

These features essentially defined the provision of an arrangement for serial communication between the control device and the operational devices via a serial link and a bus master. Such an arrangement was well known in the art. In particular, it was specifically disclosed by E2, which related to a control device for an elevator which was, in general terms, a passenger carrying means. Accordingly, the provision of serial communication between the control device and the operational devices via a bus master and a serial link in the passenger conveyor according to E3 was an obvious measure.

VII. With letter dated 27 September 2010, the respondent (patentee) filed new sets of claims forming the basis of auxiliary requests 1, 2, 2*bis* and 3 for maintenance of the patent in an amended form.

VIII. Oral proceedings, at the end of which the decision of the Board was announced, took place on 28 October 2010.

The appellant (opponent) requested that the decision under appeal be set aside and that the European patent be revoked.

The respondent (patentee) requested that the appeal be dismissed, alternatively that the decision under appeal be set aside and the patent be maintained on the basis

of the request filed as Auxiliary Request 2 with letter dated 27 September 2010 (first auxiliary request) or Auxiliary Request 2 filed during the oral proceedings (second auxiliary request).

IX. Claim 1 according to the first auxiliary request reads as follows:

"1. A passenger conveyor comprising an escalator (10) or moving walk, including a truss (12), passenger carrying means (18) disposed within the truss (12), means (26) for driving the passenger carrying means (18) disposed within the truss (12) and engaged with the passenger carrying means (18), various types of operational interface devices (32) comprising sensors and actuators, and a control system comprising: a plurality of junction boxes (58), each junction box (58) having at least one input/output (I/O) module, each I/O module in communication with one or more of the plurality of operational interface devices; a control unit (52) in communication with the driving means of the passenger conveyor, the control unit (52) including a bus master (54); a link (56) connected to the bus master (54) for providing serial communication between the plurality of I/O modules and the control unit (52)."

Claim 1 according to the second auxiliary request reads as follows:

"1. A passenger conveyor comprising an escalator (10) or moving walk, including a truss (12), passenger carrying means (18) disposed within the truss (12), means (26) for driving the passenger carrying means (18)

disposed within the truss (12) and engaged with the passenger carrying means (18), a plurality of operational interface devices (32) and a control system comprising: a plurality of junction boxes (58), each junction box (58) having at least one input/output (I/O) module, each I/O module in communication with one or more of the plurality of operational interface devices; a control unit (52) in communication with the driving means of the passenger conveyor, the control unit (52) including a bus master (54); a link (56) for providing serial communication between the plurality of I/O modules and the control unit (52), wherein signals representing the operational condition of the escalator (10) or moving walk are continuously received from the bus master (54) and monitored by the control unit (52)."

X. During the oral proceedings, the appellant further submitted in respect of claim 1 as granted that when starting from E3, the objective technical problem was to reduce the number of electrical wiring connections between the control unit and the various operational interface devices. As generally known, an advantage of a serial communication link consisted in allowing data communication between various devices and a control unit via a single line. In particular, in the elevator according to E2, a serial communication link was used precisely for the purpose of reducing the number of wiring connections leading to the control unit.

As regards claim 1 according to the first auxiliary request, the appellant submitted that also the device according to E3 included sensors and actuators. The switches disclosed by E3 could be regarded as sensors.

E3 further disclosed switches triggering an operation, and these were actuators within the meaning of the patent in suit. Moreover, specifying in claim 1 that the serial link was connected to the bus master could not support an inventive step. This was a necessary feature of an arrangement for serial communication.

Claim 1 according to the second auxiliary request included the additional feature that signals representing the operational condition of the escalator or moving walk were continuously received from the bus master and monitored by the control unit. This feature reflected a normal functionality of the bus master and control unit and could not, therefore, support the presence of an inventive step.

XI. The respondent's reply can be summarized as follows:

Even though the skilled person was aware of serial communication arrangements, such as CAN-buses, it was not apparent how such an arrangement could be implemented in the escalator according to E3. Furthermore, the skilled person would not replace the electrical connections provided between the control unit and the various devices, such as switches, relays and alarms, with a single line in view of safety regulations. Nor would the skilled person consider using a CAN-bus arrangement in view of E3, because the known arrangement was specifically designed for transferring data between the control unit and the calling panels of an elevator. There were no calling panels in the escalator according to E3.

Claim 1 according to the first auxiliary request specified the presence of actuators, i.e. of elements suitable for converting an input quantity into an output quantity for generating a desired action or effect, usually mechanical. E3 did not disclose actuators.

The subject-matter of claim 1 according to the second auxiliary request was limited to a particular mode of operation of the bus master and control unit that was not rendered obvious by the cited prior art.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request (patent as granted)*

2.1 The appellant raised objections of lack of novelty having regard to the disclosure of E1' and E3. The Board, however, is satisfied that the subject-matter of claim 1 is novel with regard to E3 at least for the reasons set out in the annex to the summons to oral proceedings (see point V above). In regard to E1', the Board took the view that the CAN-Bus system disclosed therein did not provide serial communication between the I/O modules and the control unit as defined in the claim, but concerned instead communication of evaluation units with a further diagnostic device. Since the subject-matter of claim 1 is found to lack an inventive step it is however not necessary to give further reasoning for these conclusions.

2.2 E3 is undisputedly to be regarded as an appropriate starting point for the assessment of inventive step. Using the wording of claim 1 of the patent in suit, E3 discloses a passenger conveyor comprising an escalator (see Fig. 1 and column 1, line 8), including a truss, passenger carrying means (footsteps 4) disposed within the truss, means (chain 3) for driving the passenger carrying means (4) disposed within the truss and engaged with the passenger carrying means, a plurality of operational interface devices (see Fig. 1: switches 31, 32, etc, 13, 14 and 121T,etc, and 124B; alarm buzzers 209, 211, etc; lamp 213; lamp-built-in audible alarms 215, 217, etc.), and a control unit (microcomputers 81, 82) in communication with the driving means of the passenger conveyor (see column 15, lines 45 ff.).

The subject-matter of claim 1 differs from the escalator according to E3 by the following features:
- a control system comprising a plurality of junction boxes, each junction box having at least one input/output (I/O) module, each I/O module in communication with one or more of the plurality of operational interface devices;
- the control unit includes a bus master;
- a link for providing serial communication between the plurality of I/O modules and the control unit.

2.3 The distinguishing features essentially define a serial communication architecture between the control unit and the operational interface devices. The serial communication architecture allows a single serial link to provide communication between the control unit and

the operational interface devices (see par. [0009] of the patent in suit).

In the escalator according to E3, operational interface devices are provided at different locations: switches 121T, 123T, etc are at the top entrance whilst switches 121B, 123B, etc are at the bottom entrance (see col. 6, lines 61 ff.); alarm buzzer 209 is installed in the top machine room and alarm buzzer 211 is installed in the bottom machine room (see col. 6, lines 26-32), and so on. Each of these devices requires a wiring connection to the control unit. The provision of a serial communication architecture in the escalator according to E3 allows replacement of these various wiring connections by a single serial link. Accordingly, the effect of the distinguishing features is of reducing the number of wiring connections. Furthermore, the serial communication architecture allows the addition of further operational interface devices via a simple connection into the serial link without the need for providing additional wiring (see par. [0009], lines 24 to 29, of the patent in suit).

Therefore, the objective technical problem solved is to reduce the number of wiring connections, and to improve the flexibility of the escalator with regard to the inclusion of further operational devices.

2.4 The skilled person would notice that the arrangement of E3 requires a number of wiring connections between the control unit and each of the various operational interface devices (such as switches and alarm buzzers) placed at different locations (such as the bottom and the top entrance) and would obviously consider

simplifying the arrangement by reducing the number of wiring connections. It was not contested by the respondent that the technical arrangement consisting of connecting a number of devices to a digital control unit (such as microcomputer 81 of E3) via a single communication link, in particular a serial link, was common general knowledge. E2, in particular, shows an example of serial communication via a serial link between the control unit 10 and the calling panels of an elevator (see Fig. 2 and e.g. col. 2, lines 41-49). Furthermore, as mentioned in the annex to the summons to oral proceedings (see point V above), a CAN-bus is a well-known example of a serial link. Accordingly, on the basis of common general knowledge, the skilled person would regard it as obvious to reduce the number of wiring connections in the escalator of E3 by providing serial data communication between the control unit (microcomputer 81) and the various operational devices via a single serial link. Since serial data communication requires *digital* data transmission according to a given protocol, the provision of a serial link necessitates enabling the switches of E3, i.e. the operational interfaces devices, to be compatible with digital data transmission. This means that the operational devices must be provided with suitable circuitry to receive/send digital data over the serial link in accordance with the given protocol. In other words, the operational interface devices, i.e. the switches of E3, must then be provided with a suitable junction box having an input/output module. Moreover, still in accordance with common general knowledge, the control unit must be provided with a bus master for allowing the plurality of operational devices connected via the serial link to communicate

with the control unit. Accordingly, the skilled person would regard it as obvious to provide the above-mentioned distinguishing features in the escalator according to E3 in order to reduce the number of wiring connections. Since the serial link allows the connection of several devices to the control unit via a common connection, the skilled person would notice that in doing this he would also solve the problem of improving the flexibility of the escalator, as further operational devices might be connected to the control unit via the same serial link.

2.5 The respondent submitted that the skilled person would not have considered modifying the wiring connections disclosed by E3, because he would not know whether a system based on a serial link would meet existing safety regulations.

The Board accepts that a skilled person would not consider making technical modifications to a passenger conveyor that would raise concerns in respect of safety and reliability. The respondent, however, has not indicated any particular technical aspects of the above-mentioned modification of E3 that would be regarded by a skilled person as a matter of concern. On the contrary, in view of the readily recognizable technical improvements of such modification, the skilled person would be motivated to modify the passenger conveyor of E3 as discussed above. The fact that, in practice, the modified conveyor would have to be tested for compliance with existing regulations is irrelevant, as this is common practice in the present technical field for any relevant technical modifications.

2.6 For these reasons, the subject-matter of claim 1 does not involve an inventive step as required by Article 56 EPC 1973.

3. *First auxiliary request*

3.1 Compared to claim 1 as granted, claim 1 according to the first auxiliary request additionally includes the features taken from the description (cf. col. 2, lines 8 to 11 of the patent in suit) according to which (i) the passenger conveyor comprises various types of operational interface devices comprising sensors and actuators, and (ii) the link for providing serial communication is connected to the bus master. Since also the first auxiliary request fails for reasons of lack of inventive step (Article 56 EPC 1973), as explained below, it is not necessary to consider the further objections under Article 84 EPC 1973 and 123(2) EPC that were raised by the appellant.

3.2 In accordance with the description of the patent in suit, the passenger conveyor may comprise the following sensors: speed sensors, a sensor to detect missing treadplates, a limit switch to detect excessive wear of the step chain and treadplates (see col. 3, lines 19-26). The passenger conveyor may further comprise the following actuators: a pair of switches to detect the presence of a passenger and to trigger a change in speed of the escalator, and a pair of switches to actuate the operation of a wheelchair platform (see col. 3, lines 26-32). Therefore, in accordance with the patent in suit, a switch may well be regarded as a "sensor" (such as the limit switch to detect excessive

wear) or as an "actuator" (such as the switch to detect the presence of a passenger).

Switches that can be regarded as sensors are disclosed by E3: these are for instance the limit switches such as the inlet switches 13 and skirt guard switches 14 that are connected in series to the up and down change-over-switches 55, 57 (see col. 6, lines 45 to 58 and also col. 1, lines 44 to 51). Switches that can be regarded as actuators are also disclosed by E3. These are for instance the switches 121T and 121B used for an up movement and switches 124T and 124B used for down movement (see col. 6, line 63 to col. 7, line 4 and col. 16, line 60 ff.). These switches are also actuators in the sense intended by the respondent, because by their action a mechanical operation (escalator start or stop) is initiated.

When providing a serial link as explained above (in connection with the main request), the skilled person would obviously consider using it also for providing serial communication between the limit switches 13 and 14 (sensors), or at least between the change-over-switches 55 and 57 to which the limit switches 13 and 14 are connected, and the control unit (microcomputer 81). In doing this, the skilled person would also provide, as explained above, respective junction boxes having input/output modules. Accordingly, the provision of feature (i) is an obvious measure.

As regards feature (ii) it is clear that, when providing serial communication between the operational interface devices and the control unit by means of a serial link and a bus master, a connection between the

serial link and the bus master must also be provided for enabling serial communication. Accordingly, the provision of feature (ii) is the direct consequence of the provision of a serial link and a bus master. As such, this feature cannot support the presence of an inventive step.

4. *Second auxiliary request*

4.1 As compared to claim 1 as granted, claim 1 according to the second auxiliary request additionally defines the feature, taken from the description (cf. col. 4, lines 13 to 16), according to which signals representing the operational condition of the escalator or moving walk are continuously received from the bus master and monitored by the control unit. No formal objections were raised by the appellant against this request nor does the Board have any objections.

4.2 However, also the subject-matter of claim 1 according to the second auxiliary request does not involve an inventive step (Article 56 EPC 1973). Indeed the above-mentioned additional feature does not define anything else than a normal, well-known mode of operation of a bus master and control unit. As was pointed out during the oral proceedings, and was not contested by the respondent, the bus master normally transfers data in a continuous manner (according to the device working frequency and communication protocols) to the control unit (note that claim 1 specifies signals received *from* the bus master and monitored by the control unit and therefore does not refer to the data transferred from the escalator devices to the bus master). Equally, in

accordance with normal operation, the control unit continuously monitors such data.

5. Since none of the requests presented by the respondent can be allowed, due to lack of inventive step (Article 56 EPC 1973), the decision under appeal must be set aside and the patent revoked.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

M. Patin M. Harrison