

**Internal distribution code:**

- (A) [ - ] Publication in OJ
- (B) [ - ] To Chairmen and Members
- (C) [ - ] To Chairmen
- (D) [ X ] No distribution

**Datasheet for the decision  
of 23 February 2021**

**Case Number:** T 1140/16 - 3.2.06

**Application Number:** 05779534.6

**Publication Number:** 1922278

**IPC:** B66B13/14

**Language of the proceedings:** EN

**Title of invention:**  
ELEVATOR ARRANGEMENT

**Patent Proprietor:**  
Kone Corporation

**Opponent:**  
Inventio AG

**Headword:**

**Relevant legal provisions:**

EPC Art. 100(a), 56  
RPBA Art. 12(4)  
RPBA 2020 Art. 13(1)

**Keyword:**  
Inventive step - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 1140/16 - 3.2.06

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.06**  
**of 23 February 2021**

**Appellant:** Inventio AG  
(Opponent) Seestrasse 55  
6052 Hergiswil (CH)

**Respondent:** Kone Corporation  
(Patent Proprietor) Kartanontie 1  
00330 Helsinki (FI)

**Representative:** K & H Bonapat  
Patentanwälte Koch · von Behren & Partner mbB  
Donnersbergerstraße 22A  
80634 München (DE)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 4 March 2016  
rejecting the opposition filed against European  
patent No. 1922278 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** M. Harrison  
**Members:** T. Rosenblatt  
E. Kossonakou

## **Summary of Facts and Submissions**

- I. The appellant (opponent) filed an appeal against the decision of the opposition division rejecting its opposition to European patent No. 1 922 278.
- II. Claim 1 of the patent has the following wording (feature numbering in square brackets introduced by the Board):

"[1.1] A method for improving the performance of an elevator system,  
[1.2] said elevator system comprising at least one elevator, said elevator comprising at least one elevator door and at least one door operator for opening and closing said elevator door, the method comprises the steps of:  
[1.3] measuring the acceleration and/or velocity of at least one of the aforesaid elevator doors and  
[1.4] the torque of a door motor moving the elevator door;  
[1.5] creating for the elevator door a dynamic model incorporating the forces acting on the elevator door;  
[1.6] estimating kinetic parameters of the elevator door via the use of the aforesaid measured acceleration or the aforesaid measured velocity and the aforesaid measured torque and the dynamic model of the elevator door;  
and [1.7] optimizing the operation of the elevator door via the use of the estimated kinetic parameters to improve the performance of the elevator system,  
[1.8] that the estimated kinetic parameters of one or more elevator doors are stored in the elevator system,  
and

[1.9] that the kinetic parameters to be used in the optimization of the functions of the elevator door are selected from the said stored parameters on the basis of an external selection signal, which external signal used is either

- [1.10a] a signal indicating the destination floor, said signal being generated in the elevator control system or in the group control of the elevator system, or
- [1.10b] a signal generated by a floor detector moving with the elevator car,

[1.11] whereby one or more of the control parameters of the controller of the door motor actuating the elevator door are determined by utilizing said kinetic parameters of the elevator door,

[1.12] said control parameters being gain of the controller and controller feedforward torque value."

The second independent claim (claim 10) of the patent in suit is directed to a corresponding system, defining the technical means corresponding to the method steps and functional features of claim 1. It was common ground between the parties that a decision on inventive step of the subject-matter of claim 1 would apply analogously to the subject-matter of claim 10. For the purpose of the decision to be taken in the present case, the recitation of its wording is not required.

III. The parties were summoned to oral proceedings before the Board. In a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA), the parties were informed of the preliminary opinion of the Board. The Board stated that it considered the appeal to be admissible and identified the relevant issues to be discussed in regard to the opposition ground under Article 100(a) in combination

with 56 EPC, starting from

D05 : EP 1 544 152 A 1

as the closest prior art to the subject-matter of claim 1 in combination with

D06 : Wörn, Heinz et al., "*Echtzeitsysteme*", Springer Verlag, 04.04.2005, ISBN: 3-540-20588-8, pages 80-82, together with D06a, a summary of the textbook as retrieved from the internet.

The Board also noted in its communication that documents

D06b : pages 86-88 of the book underlying D06,

D06c : table of content of the book underlying D06,

D27 : Fisher Controls International, "Type DPR910 Adaptive/Cascade Controller", Bulletin 6.1:DPR910:9008, July 1990.

were not admitted by the opposition division and that the Board saw no reason to overturn that decision.

Further, in regard to documents

D8 : Barney, George C., "Elevator Technology", John Wiley & Sons Inc, 1986, ISBN: 0-4 70-20702-4, pages 138-141,

D10 : JP 2005 170 652 A,

D14 : EP 0 318 660 A1,

D15 : EP 1 484 529 A1,

D17 : US 6 283 252 B1,

D18 : EP 0 628 015 B1,

the Board stated that it intended to hold objections based on these documents inadmissible (Article 12(4))

RPBA 2007).

- IV. Oral proceedings before the Board were held on 23 February 2021 by videoconference. The appellant submitted a modified version of Figure 3 of D05.
- V. The appellant requested that the decision under appeal be set aside and the patent be revoked.
- VI. The respondent (proprietor) requested that the appeal be dismissed either as inadmissible or as unallowable (maintenance as granted, main request).
- VII. The arguments of the appellant may be summarised as follows.

Starting from the closest prior art to the subject-matter of claim 1 disclosed in Figure 3 of D05, the distinguishing features were 1.8, 1.9, 1.11 and 1.12. Together they solved a single technical problem which was the optimisation of the door drive control so that the door motor should follow the (optimal) setpoint curve more precisely so as to open or close the door as fast as possible, observing the regulatory safety constraints imposed by the kinetic energy limits.

D06 was taken from a textbook, specifically from its introductory general part, and represented aspects of common general knowledge in the field of control systems, of which the skilled person entrusted with the technical problem in an elevator door control system was aware. D06 disclosed in Figure 1.65 on page 80 the structure of a feedforward control section added to a closed loop control system and, at the bottom of that page, cases in which feedforward control was usually acknowledged to be useful. The conditions mentioned in

points 2 and 3 on page 80 corresponded to the situation the skilled person was faced with in D05, pointing to the application of feedforward control in the closest prior art system. The skilled person would necessarily have added the feedforward function to the speed control portion 6 in Figure 3 of D05, since this was the module which received the desired motor speed pattern for a specific floor door from the velocity command portion 4 and issued the motor torque command by which the floor door should be driven. A diagram was also filed to show where the elements of D06 would be added to Figure 3 of D05. The "current control portion 10" corresponded to the motor controller card 54 in Figure 5 of the patent. It did not perform a true control function since it only operated to produce the correct current value for driving motor 10 from its torque command input. Applying the general structure of a feedforward control to the known system of D05, the skilled person had to use the inverse model of the controlled section. Using the model function of equation (3) in D05, which described the dynamic model of the door assembly to be controlled - according to Figure 3 of D05 the controlled section ("*Regelstrecke*") was composed of the current control portion 10, the motor 1 and the elevator door mechanism portion -, therefore necessarily involved the calculation of the friction parameter  $b$  in the inverse equation for the dynamics of the door model. In addition to the door mass, the friction,  $b$ , constituted a second estimated kinetic parameter of the dynamic door model which was used in determination of the control parameters of the controller according to features 1.11 and 1.12. Since friction in the door assembly generally remained constant and only changed slowly over time it would not be necessary to recalculate this parameter constantly. The skilled person would therefore obviously have



considered storing it in the elevator system control, thus implementing also features 1.8 and 1.9 without any inventive skill.

VIII. The arguments of the respondent may be summarised as follows.

The appeal should be rejected as inadmissible since the appeal grounds did not comply with Rule 99(2) EPC. The statements of the appellant were solely a new presentation of an opposition draft giving reasons of an alleged lack of inventive step, without regard to the reasons, on which the decision was based. The appellant had based part of its submissions on documents which had not been admitted by the opposition division, without providing reasons why they should be admitted into the appeal proceedings. The appellant also failed to provide counter arguments on several crucial aspects which had led the opposition division to its decision on inventive step based on D05 and D06.

The appeal should be otherwise rejected as unallowable because D06 would not have been considered by the skilled person for improving the elevator door control system of D05. Even when applying feedforward control as shown in D06, there was still no pointer in either D05 or D06 to store a further estimated kinetic parameter in the elevator system, let alone friction.

## **Reasons for the Decision**

### *Admissibility of the appeal*

1. The appeal is admissible.

The respondent contested that the appeal grounds complied with the requirements of Rule 99(2) EPC. In its communication pursuant to Article 15(1) RPBA 2020 (see items 1.1 to 1.4 of the communication), the Board stated why the appellant's arguments in the appeal grounds had a direct and clear link to the contested decision, noting that if found convincing, these arguments could have led to the Board overturning the opposition division's conclusion in regard to inventive step.

The respondent did not submit any further comments in this respect, so that the Board's preliminary opinion is hereby confirmed.

Any further details of the reasons for the Board's decision in regard to the admissibility of the appeal can however be dispensed with for the purpose of this decision, since the Board anyway grants the respondent's other request to reject the appeal as unallowable for the reasons given below.

### *Opposition ground under Article 100(a) and 56 EPC*

2. It is common ground between the parties that the method disclosed in the context of the system for controlling the door operation in an elevator system illustrated in Figure 3 and described in paragraphs 46 to 56 of D05

can be considered as the closest prior art to the subject-matter of claim 1. It is also undisputed that the claimed method is distinguished over the closest prior art method in particular by features 1.8, 1.9, 1.11 and 1.12. The Board has no reason to reach a different conclusion. In fact, only a single kinetic parameter, namely the estimated door mass  $m$ , of the dynamic model (derivable from equation 3, paragraphs 51-53 of D05) of an elevator door for any floor is stored in the elevator system and used in the optimisation of the functions of the elevator door, see features 7, 9, 10 (on the upper left) in Figure 3 of D05. Similarly, only a single control parameter of the controller of the door motor (1) actuating the elevator door is determined by utilising the estimated and stored kinetic parameter, namely gain of the controller.

3. The Board can accept that the set of distinguishing features solves a single objective technical problem.

This problem can be understood to be the further optimisation of the door velocity progression, so that the door can be opened and closed as fast as possible.

The appellant acknowledged that this problem was close to the problem formulated by them. The only perceived difference relates to an even more ambitious constraint imposed of bringing the actual door velocity progression ("*Geschwindigkeitsverlauf*") as close as possible to the optimum velocity progression, which corresponds to a door velocity following as close as possible the speed pattern obtained from selecting unit 10 under the kinetic energy constraint of D05. However, although the Board cannot see which of the distinguishing features would necessarily lead to

achievement of this effect, it does not affect the final conclusion of the Board on the obviousness of the combination of features according to claim 1 of the patent in suit, as will be seen below.

4. The Board also accepts the appellant's argument that the content of D06 belongs to common general knowledge of the skilled person faced with the above problem. Contrary to the submission of the respondent, the fact that the textbook is directed to real-time systems (book title "*Echtzeitsysteme*") does not contradict this conclusion since the chapter from which pages 80 to 82 are extracted relates to the general background of control systems. The considerations therein are not specifically limited to real-time applications. Page 80 discloses the structure and the advantages of feedforward control implemented in addition to a closed loop control system. The Board therefore finds that the skilled person faced with the objective technical problem (see above Reasons 3.) would indeed consider applying this principle, belonging to common general knowledge as evidenced by D06, for its known advantages (see for example points 2 and 3 on page 80) in the method for operating the elevator system of Figure 3 of D05.
  
5. However, the appellant's arguments submitted to demonstrate that the skilled person would necessarily and obviously arrive at the subject-matter of claim 1 by applying the principles of feedforward control according to D06 to the system of Figure 3 were found unconvincing by the Board. Even if the Board were *arguendo* to follow the appellant's arguments in as far as they concern
  - the implementation of the feedforward path necessarily being parallel to the speed control

portion 6 of D05 as illustrated in the modified Figure 3 submitted by the appellant during the oral proceedings (rather than possibly including or being applied only to current control portion 10 for example) and, as a consequence thereof,

- the calculation or estimation of a second kinematic parameter, namely the friction parameter "b" (rather than just the closest approximation of the model or of a derivative thereof),
- which friction parameter would then, allegedly necessarily, be used in addition to the door mass (or inertia J because of the model equation 3 of D05) in the feedforward path's inverse model (obtained by inverting equation 3) for determining the control parameters of the controller (features 1.11 and in part 1.12), constituted by control portion 6 and the added feedforward path,
- and that this feedforward path would result in a feedforward torque value (within the meaning of the patent in suit, see Figure 5 and paragraph 57) to be used as a control parameter (feature 1.12), in addition to controller gain,

there is nevertheless no convincing reason, at least none given by the appellant, why the skilled person would find it obvious to store the friction parameter "b" in the elevator system control and use this stored parameter in the optimisation of the functions of the elevator door (features 1.8 and 1.9), notably in the determination of the control parameters of the controller of the door motor actuating the elevator doors according to the mutually agreed interpretation by the parties of features 1.11 and 1.12. D05 and D06 are wholly silent in this respect, as also submitted by the respondent. Indeed, the appellant did not provide any evidence for its allegation, submitted for the

first time during the oral proceedings, that the door mechanism's friction, in particular as roughly approximated by the simple parameter  $b$  in equation 3 of D05, in the elevator door mechanism is a slowly changing parameter. D05 only mentions in paragraph 51 that  $b$  takes into account "torque caused by running resistances during vehicle operation". The general friction parameter  $b$  in equation 3 could thus as well also capture blockage or hindrance of door movement due to sudden deposition of e.g. objects or dirt or other friction-altering parameters, which may lie in the door path or affect this only from time to time. This would, if anything, point the skilled person in the direction of considering the actual friction  $b$ , estimated or measured during the actual operation of the door, rather than taking a "historic" value.

There is also no reason apparent to the Board that storage of the friction parameter  $b$  in the elevator system control would have been obvious to the skilled person, if the even more ambitious problem formulated by the appellant would have been considered (see above, end of Reasons 3.).

The Board thus concludes that the subject-matter of claim 1 involves an inventive step in view of D05 and common general knowledge of the skilled person as represented by D06.

It was common ground that no other conclusion can be reached in regard to the subject-matter of claim 10.

6. In its preliminary opinion the Board had stated that it intended to hold inadmissible D06b, D06c, D27, D8, D10, D14, D15, D17 and D18 as well as the objections based on these (Article 12(4) RPBA 2007). With respect to

D06c, D06b and D27, which had not been admitted into the proceedings by the opposition division, the Board stated that the opposition division appeared to have correctly exercised its discretionary power and that no reason had been given by the appellant why that discretionary decision was wrong (section 2.4.3 of the Board's communication pursuant to Article 15(1) RPBA). In regard to the other documents, D8, D10, D14, D15, D17 and D18, the Board considered that again no reason had been given by the appellant why corresponding objections based on these could not have been raised in the opposition procedure (section 2.4.3 of the Board's communication). The appellant did not submit any further comment on the Board's provisional opinion. The Board therefore had no reason to deviate from its original intention and consequently decided to hold inadmissible the above documents and the objections based thereon.

7. The objection based on D05 and D06 being the only objection admissibly raised against the granted patent in the appeal procedure, it follows that the opposition ground under Article 100(a) and 56 EPC does not prejudice maintenance as granted of the patent in suit.
8. For the sake of completeness the Board notes that in a letter submitted after the respondent's reply to the appeal grounds, the appellant had raised *inter alia* an objection under Article 83 EPC against the subject-matter of dependent claim 4 in the context of its objections against auxiliary requests submitted by the respondent with its letter of reply. Although not explicitly stated, the same objection would have applied also in regard to the identical claim 4 of the main request. In as far as claim 4 of the granted patent is concerned, this objection constitutes an

amendment of the appellant's case within the meaning of Article 13(1) RPBA.

The corresponding ground for opposition under Article 100(b) EPC had indeed been raised in the notice of opposition. It was rejected by the opposition division in the impugned decision. With its appeal grounds the appellant nevertheless did not contest the conclusions of the opposition division in this respect. No reason was given in the appellant's subsequent letter why this objection was only raised at a later stage of the procedure.

In its preliminary opinion the Board stated that it was not apparent that the specific objection raised by the appellant was in any way occasioned by the amendments to claim 1 of the auxiliary requests filed in response to the appeal. The admittance into the proceedings of that objection was stated as appearing unlikely. The appellant did not submit any further comments. The Board thus had no reason to deviate from its intention stated in the preliminary opinion.

Under these circumstances the Board thus exercised its discretion under Article 13(1) RPBA 2020 not to admit into the proceedings the objection under Article "83" EPC (i.e. the objection under the opposition ground under Article 100(b) EPC in as far as it would relate to the subject-matter of claim 4 of the patent as granted).



**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



D. Grundner

M. Harrison

Decision electronically authenticated