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Datasheet for the decision of 26 September 2013

Case Number: T 1570/10 - 3.2.06

Application Number: 03000339.6

Publication Number: 1327598

IPC: B66B 11/00

Language of the proceedings: EN

Title of invention:
Elevator with small-sized driving gear

Patent Proprietor:
Kone Corporation

Opponents:
Otis Elevator Company
INVENTIO AG

Headword:

Relevant legal provisions:
EPC Art. 54(3), 123(2), 123(3)
EPC 1973 Art. 54, 56, 83, 100(c)
RPBA Art. 13(1)

Keyword:
Amendments - added subject-matter (yes)
Sufficiency of disclosure - auxiliary request (yes)
Inventive step - auxiliary request (no)
Late-filed auxiliary requests - amendments after arrangement of oral proceedings - admitted (no)

Decisions cited:
G 0002/10, T 0042/92

Catchword:

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Case Number: T 1570/10 - 3.2.06

D E C I S I O N
of Technical Board of Appeal 3.2.06
of 26 September 2013

Appellant: (Opponent 1)	Otis Elevator Company 10 Farm Springs Road Farmington CT 06032 (US)
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Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 18 May 2010 rejecting the opposition filed against European patent No. 1327598 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman:	M. Harrison
Members:	M. Hannam
	W. Sekretaruk

Summary of Facts and Submissions

I. An appeal was filed by appellant I (opponent I) against the decision of the opposition division rejecting its opposition against European Patent No. 1 327 598. With its grounds of appeal, appellant I requested that the decision be set aside and that the patent be revoked on the basis of Article 100(c) EPC and under Article 100(a) EPC, in particular since the subject-matter of claim 1 lacked an inventive step.

II. An appeal was also filed by appellant II (opponent II) against the decision of the opposition division. With its grounds of appeal it requested that the decision be set aside and that the patent be revoked on the basis of Articles 100(a), (b) and (c) EPC.

III. The respondent (proprietor) requested that the appeals be dismissed or that the patent be maintained according to an auxiliary request 1 or 2.

IV. The Board issued a summons to oral proceedings including a communication containing its provisional opinion, in which it indicated *inter alia* that claim 1 of both the main request and of auxiliary request 2 appeared not to meet the requirement of Article 123(2) EPC. It also indicated that the requirement of Article 83 EPC appeared to be met by auxiliary request 1 whilst the subject-matter of claim 1 of this request seemingly lacked an inventive step in view of E5 in combination with the skilled person's general knowledge.

V. In response to the summons, the respondent filed two further auxiliary requests 3 and 4.

VI. Oral proceedings were held before the Board on 26 September 2013, during which both appellants I and II requested that the decision under appeal be set aside and that the European patent No. 1 327 598 be revoked.

During the oral proceedings, the respondent filed a replacement auxiliary request 3, requesting that the appeal be dismissed or the European patent be maintained on the basis of auxiliary requests I or II, both filed 1 April 2011, or on the basis of auxiliary request III, filed 26 September 2013 (during these oral proceedings), or on the basis of auxiliary request IV, filed with the letter of 16 July 2013.

VII. Claim 1 of the main request, with features subdivided for ease of reference, reads as follows:

M1 Elevator,
M2 preferably an elevator without machine room,
M3 in which elevator a hoisting machine (6) engages a set of hoisting ropes by means of a traction sheave (7),
M4 said set of hoisting ropes comprising hoisting ropes of substantially circular cross-section, and
M5 in which elevator the set of hoisting ropes (3) supports a counterweight (2) and an elevator car moving on their respective tracks, wherein
M6 the substantially round hoisting ropes (3) have a thickness below 8 mm
M7a and are made of steel wires
M7b having a strength exceeding 2000 N/mm^2,
M8 and wherein the contact angle between the hoisting ropes and the traction sheave (7) is larger than 180 deg.

Claim 1 of auxiliary request 1 reads as per claim 1 of the main request save for feature M7b which reads:

M7b having a strength which is greater than 2300 N/mm^2 and less than 2700 N/mm^2.

Claim 1 of auxiliary request 2 reads as per claim 1 of the main request save for features M1 and M6 which read as follows:

M1 Elevator for a nominal load below 1000 kg and a speed below 2 m/s,
M6 the substantially round hoisting ropes have a thickness of 3 to 5 mm.

Claim 1 of auxiliary request 3 reads as per claim 1 of the main request save for features M7a and M8 which read as follows:

M7a and are made of steel wires the average wire thicknesses of which is 0.5 mm
M8 and wherein the contact angle between the hoisting ropes and the traction sheave (7) is larger than 180 deg, wherein the diameter of the traction sheave is smaller than 320 mm.

Claim 1 of auxiliary request 4 reads as per auxiliary request 2 save for feature M7a which reads:

M7a and are made of steel wires the average of the wire thicknesses of the steel wires of the hoisting ropes (3) is greater than 0.1 mm and less than 0.4 mm and

VIII. The following documents are referred to in this decision:

E5 EP-A-0 578 237
E36 International standard ISO 4344, First edition
E40 WO-A-03/000581
E43 Drahtseile, Klaus Feyrer, Springer Verlag 1994
E50 DIN 2078, Stahldrähte für Drahtseile, May 1990
E55 EN 10264-2, Stahldraht für Seile, June 2002

IX. The arguments of appellant I may be summarised as follows:

As regards the main request, the addition of 'steel wires' to claim 1 and the introduction of 'strength exceeding 2000 N/mm^2' had no basis in the application as originally filed; iron wires were possible and wire strength was always disclosed together with thickness limitations. Claim 1 was so generally drafted that the need for a particularly flexible rope was not apparent. Article 123(2) EPC was thus contravened.

Regarding auxiliary request 1, no indication was provided as to how to achieve the claimed wire strengths nor which wire diameter was to be utilised in the invention, contrary to the requirement of Article 83 EPC; there was no disclosure for example of how to produce wires of the stated strength with a wire diameter of 0.5 mm even though this was covered by the claim. Claim 1 also lacked an inventive step (Article 56 EPC) starting from E5 and combining this with the general knowledge of the skilled person, as evidenced by E36. The claimed wire strength range appeared to be an arbitrary range offering no particular advantage over the wires known from E36.

Regarding auxiliary request 2, this also failed to meet the requirement of Article 123(2) EPC for those reasons presented against claim 1 of the main request.

Auxiliary request 3 was not to be admitted as the new feature in claim 1 regarding the sheave of a particular diameter was not taken from a granted claim, thus presenting subject-matter which could not reasonably be dealt with at short notice.

Auxiliary request 4 included a wire thickness range which was not disclosed in combination with a wire strength of 2000 N/mm^2 in the application as originally filed.

X. The arguments of appellant II may be summarised as follows:

Regarding the main request, there existed no basis for a wire strength of 2000 N/mm^2 independently of wire thickness, whereby Article 123(2) EPC was contravened.

Regarding auxiliary request 1, claim 16 as originally filed clearly should have been drafted as dependent on one of claims 12-14, in which steel wires provide the precedent for the steel wires recited in claim 16. Additionally the claim dependencies of the present application created contradictory disclosures to the remaining specification which, according to T42/92, should result in the disclosure of the claims being regarded as not technically possible. Article 123(2) EPC was thus contravened.

Concerning Article 83 EPC, the specification lacked a single example of a workable rope construction defining a rope diameter, the wire diameters incorporated or the

winding construction.

Regarding novelty of the subject-matter of claim 1, E40 disclosed the possibility of disposal of the diverting pulleys, traction sheave and hoisting ropes in other ways than shown. Displacement of the traction sheave 107 in figure 2 of E40 to the left for example would increase the contact angle of the hoisting rope around the traction sheave, thus anticipating the claimed contact angle of larger than 180^{o}, in particular when considering the tolerances involved.

Regarding inventive step with respect to claim 1, the standards showed an increase in accepted wire strengths with time (cf. E50 from 1990 showed a maximum strength class of 1960 N/mm^2 whereas E55, the corresponding standard from 2002, had a maximum strength class of 2160 N/mm^2), which reflected the natural development of acceptable wire strengths from users of wires pushing the accepted limits. The mere existence of standards did thus not stop the skilled person from choosing higher wire strengths.

Auxiliary request 2 also failed to meet the requirement of Article 123(2) EPC since, as for the main request, claim 1 failed to specify a wire thickness in conjunction with the wire strength.

Auxiliary request 3 should not be admitted since it represented a complex change of case and it was not procedurally efficient to have to adjourn the proceedings to another day. Furthermore, the new claim *prima facie* lacked an inventive step.

Claim 1 of auxiliary request 4 failed to meet the requirement of Article 123(2) EPC for the same reasons as applied to claim 1 of auxiliary request 2.

XI. The respondent's arguments may be summarised as follows:

Regarding compliance of the main request with Article 123(2) EPC, the skilled person would have read the claim in the light of the entire disclosure, as taught in G2/10, thus seeing wire strength as independent from wire thickness. The claims and examples in the patent would also be interpreted by the skilled person as a single disclosure. Furthermore, wire thickness was dictated by the need for thin ropes rather than by wire strength, as described in cols. 2 and 3 of the application as originally filed. Regarding paragraph [0012], this did not suggest a particular wire thickness being linked to wire strength. Similarly, claim 16 included a wire strength independent of wire thickness, which the skilled person would thus have understood for claim 1 as well. Furthermore, claim 1 did not need to cite an exact steel wire thickness because the skilled person would realise the need for thin steel wires in order to provide the necessary rope flexibility for traction sheave diameters less than 320 mm to be possible. Such a small sheave was implicitly understood to be part of the invention by the skilled person. It was therefore not necessary to include the exact wire thickness in the claim, as the skilled person understood the range of appropriate thicknesses implied from the disclosure as a whole. Additionally, a 1 mm diameter wire thickness was probably the maximum diameter possible in a rope of thickness below 8 mm, yet such thick wires would necessitate a much larger traction sheave if

damage to the wires was not to occur. Such a rope was therefore inappropriate for use in an elevator as claimed. As a result, only significantly thinner wires were obviously intended by the claimed invention, the skilled person understanding what thickness was appropriate without this being specifically recited in the claim.

Regarding auxiliary request 1, the teaching resulting from the combination of claims 1 and 16 as originally filed was not contradictory with the description such that Article 123(2) EPC was fulfilled.

Regarding Article 83 EPC, the skilled person could easily carry out the invention according to claim 1 since steel wires of the claimed strength were readily available. Also, no evidence had been provided by the appellants to suggest that an elevator as claimed could not be produced by the skilled person.

Regarding the presence of an inventive step in the subject-matter of claim 1, stronger wires were inherently more fragile such that a technical prejudice existed dissuading the skilled person from using wires of the claimed strength in the environment of elevators where safety was paramount. A legal prejudice also existed dissuading the skilled person from incorporating wires of a strength exceeding that in the appropriate standards in force at the time. Whilst there was no doubt that he could have chosen such high strength wires, there was no indication that he would have done so in the light of these prejudices.

Furthermore, starting from the elevator known from E5, this was a large, old-style elevator utilising significantly larger diameter hoisting ropes than those

in claim 1. The European standard EN81 also suggested the use of hoisting ropes of diameters greater than 8mm which would dissuade the skilled person from considering smaller rope diameters. Whilst E36 disclosed 6 mm ropes and thus the skilled person had these available for use, there was no reason why he would have selected them. Likewise, even if they had been selected, the maximum tensile strength of the wires was 1770 N/mm^2, so that the range 2300 to 2700 N/mm^2 was not taught.

Auxiliary request 2 met the requirement of Article 123(2) EPC for the same reasons as those presented for the main request.

Auxiliary request 3 should be admitted since the subject-matter of claim 1 now included features which had been identified in the course of the oral proceedings as missing from an allowable claim, particularly a wire thickness and a traction sheave of a particular diameter.

Claim 1 of auxiliary request 4 incorporated the wire thickness range from claim 13 as originally filed and thus overcame the objections regarding a lack of wire thickness in the previous requests.

Reasons for the Decision

1. Main request

1.1 Article 100(c) EPC 1973

The Board finds that the ground for opposition under Article 100(c) EPC is prejudicial to the maintenance of

the patent due to the subject-matter of claim 1 extending beyond the content of the application as originally filed. The reasons for this are as follows.

1.1.1 Regarding the first added feature to the claim, that the hoisting ropes 'are made from steel wires', paragraph [0005] of the A-publication (hereafter referred to as the application as originally filed, as it corresponds to the translation into English of the Finnish application as originally filed) presents an unequivocal teaching that the ropes of the invention are steel wire ropes. Contrary to the opinion of appellant I, the Board concludes that this paragraph clearly indicates that steel wires are exclusively used in the patent, the alternative artificial fibres being identified as not providing any substantial advantage and being comparatively expensive. Furthermore, the only specific wire material identified in the claims and the embodiments of the invention is steel wire. The feature regarding the ropes being made from steel wires for all embodiments of the invention is thus clearly and unambiguously disclosed to the skilled person in the originally filed application.

1.1.2 However, regarding the second added feature to claim 1, that the wires have 'a strength exceeding 2000 N/mm^2', the Board finds that this feature is not disclosed in isolation from other features relating to the wires. The originally filed application discloses a wire strength exceeding 2000 N/mm^2 in just 3 places, each of which is discussed below, none of which is however considered to provide the necessary basis for a clear and unambiguous disclosure to a skilled person.

(a) Claim 12

The wire strength is here disclosed in combination with an average wire thickness of about 0.5 mm. The additional features of this claim thus provide a basis only for the wire strength along with this specific average wire thickness.

With respect to the respondent's view that, regarding the entire disclosure, the skilled person would consider the wire thickness as a clearly unrelated and separate feature from the wire strength of 2000 N/mm^2, the Board finds this argument unconvincing. The claims of an application define the subject-matter for which protection is sought. In the case of claim 12 as originally filed, this subject-matter comprises a combination of those features present in claims 1 and 12 (claim 12 being dependent on claim 1). This combination of features, and only this combination, defines the particular embodiment of the invention defined by a combination of claims 1 and 12. The disclosure of claims 1 and 12 as originally filed can thus not provide a basis for a claim comprising a sub-selection from this combination of features, regardless of alternative embodiments supporting different combinations of features in the description.
The omission of the feature regarding an average wire thickness of about 0.5 mm from claim 1 thus prohibits claim 1 + claim 12 as originally filed from providing the basis for this second added feature of claim 1.

(b) Paragraph [0012]

In this paragraph, the claimed wire strength of 2000 N/mm^2 appears towards the end of the paragraph, the previous discussion in this paragraph concerning the

thickness of wires applicable with the invention in order to achieve the desired 'strong' wires. The Board concludes that the sentence, 'In ropes applicable with the invention, the wire thickness is below 0.4 mm on an average' as particularly salient in this respect, as it is a general statement describing 'ropes applicable with the invention'. This sentence is followed by two preferred average wire thicknesses of 0.3 and 0.2 mm, each well applicable to ropes of the invention. The Board thus finds that it is clearly in this context in which the subsequent statement that 'the invention employs rope wires having a strength of over 2000 N/mm^2' is made. Thus, this paragraph does not provide a basis for the second added feature to claim 1 (Article 100(c) EPC 1973) as the feature relating to the wire thickness being below 0.4 mm on an average has been omitted.

Regarding the respondent's argument that only thin ropes, and thus thin wires, were disclosed to the skilled reader of the opposed patent, the Board does not concur with this view. Indeed, thin (hoisting) ropes are discussed in some detail in cols. 2 and 3, even as an object of the invention on lines 25-26 of col. 2. Yet this discussion of thin ropes and the related thin wire thicknesses would not lead the skilled person to extract from the disclosure that this is the exclusive relationship for wire thickness, and that wire strength is therefore independent of wire thickness; it simply indicates one of the relationships. Moreover, the existence of a relationship between rope diameter and wire thickness does not allow the relationship between wire strength and wire thickness identified in paragraph [0012] to be ignored. Far from it; this relationship remains of equal importance as regards what the application as originally filed discloses, it being remembered that

only here is a specific minimum value of tensile strength disclosed.

Regarding the respondent's argument that claim 16 defines a preferred wire strength falling within the scope of claim 12 and yet does not include a wire thickness, the Board views these claims as separate disclosures not allowing such comparisons to be drawn, at least not unambiguously. Claim 16 as originally filed can clearly be dependent solely on claim 1, in which case no wire thickness is present in the scope of the claim. For what reason this was done can only remain speculation. Conversely for claim 12, also solely dependent on claim 1, a particular average wire thickness is included in the scope. The Board sees no reason to question what must be seen as the deliberate intention of the applicant to protect its invention as defined by the claims.

In summary, also paragraph [0012] as originally filed does not provide the skilled person with a clear and unambiguous basis for the inclusion of a wire strength of 2000 N/mm^2 independently of wire thickness in the subject-matter of claim 1.

(c) Paragraph [0024]

In this paragraph the wire strength of 2000 N/mm^2 for steel wire ropes is disclosed, but only with the additional reference to 'using wires in this thickness range' (see col. 12, lines 53-55). The thickness range of the wires in the steel wire rope is identified in lines 41-43 of col. 12 as to 'preferably have a thickness between 0.15mm and 0.5mm'. Thus also in this paragraph a clear link is established between wire thickness and wire strength, even if the range is

stated as being preferable. The extraction of wire strength alone from this paragraph for inclusion in the subject-matter of claim 1 thus represents an amendment for which there is no clear and unambiguous basis for the skilled person, whereby the opposition ground under Article 100(c) EPC 1973 is prejudicial to maintenance of the patent as granted.

Regarding the implicit inclusion of an appropriate sheave diameter and this limiting the steel wire thickness, it is noted that claim 1 of this request makes no reference to a traction sheave diameter; this is first defined in claim 18. Through claim language differentiation, therefore, it is clear that the skilled person would infer no restriction to traction sheave diameter in the subject-matter of claim 1, any technically logical diameter being possible. This argument of the respondent therefore does not lead the skilled person to implicitly read an appropriate wire thickness into the subject-matter of claim 1.

Regarding the respondent's further argument concerning a 1 mm diameter wire maximum in an 8 mm diameter rope for an elevator requiring a much larger traction sheave, the Board notes that claim 1 places no restriction on traction sheave diameter. With no such restriction, there exists, contrary to the opinion of the respondent, no implicit low values for wire thickness appropriate for the invention; even a standard wire construction with seven filaments is not implicit. Without this implicit guidance to wire thickness, the respondent's argument that the wire strength of 2000 N/mm^2 can be claimed without a specific wire thickness being claimed must also fail.

In summary, therefore, if taking paragraph [0024] as the basis for the adoption of a wire strength above about 2000 N/mm^2 into claim 1, the omission of the wire thickness range of 0.15 mm to 0.5 mm represents an unallowable intermediate generalisation of what is disclosed in this paragraph, whereby the opposition ground of Article 100(c) EPC 1973 is prejudicial to maintenance of the patent.

1.1.3 Concerning the respondent's reference to the decision G2/10, the Board refers to item 4.3 of that decision which, when referring to earlier decisions G 3/89 and G 11/91 states:

'…it follows that any amendment to the parts of a European patent application or of a European patent relating to the disclosure (the description, claims and drawings) is subject to the mandatory prohibition on extension laid down in Article 123(2) EPC and can therefore, irrespective of the context of the amendment made, only be made within the limits of what a skilled person would derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of these documents as filed…'.

In the present case, applying the guidance from G2/10, and as explained in point 1.1.2 above, the skilled person finds no basis in the application as originally filed for including a wire strength exceeding 2000 N/mm^2 in claim 1 without the inclusion of further features which are inextricably disclosed in combination with this wire strength.

1.2 The main request is therefore not allowable as the ground for opposition under Article 100(c) EPC 1973 is

prejudicial to the maintenance of the patent due to the subject-matter of claim 1 extending beyond the content of the application as originally filed.

2. Auxiliary request 1

2.1 Article 123(2) EPC

The Board finds that the subject-matter of claim 1 meets the requirement of Article 123(2) EPC for the following reasons.

2.1.1 When compared to claim 1 as originally filed, the subject-matter of claim 1 of this request differs as follows:

- the added feature of the hoisting ropes being 'made from steel wires';
- the added feature of the steel wires 'having a strength which is greater than 2300 N/mm^2 and less than 2700 N/mm^2';
- the deletion of the feature 'and/or the diameter of the traction sheave is smaller than 320 mm';
- the expression 'substantially round hoisting rope' being amended to read 'substantially round hoisting ropes'; and
- the deletion of the words 'hoisting rope or' in the expression 'contact angle between the hoisting rope or hoisting ropes and the traction sheave'.

As already discussed for the main request under point 1.1.1, the Board finds that the hoisting ropes are necessarily made from steel wires and that this is clearly and unambiguously disclosed to the skilled person, as results from e.g. paragraph [0005] of the originally filed application.

The added feature regarding the range of wire strength is taken from claim 16 as originally filed, although in claim 16 the wire strengths were cited as being 'greater than about 2300 N/mm^2 and less than about 2700 N/mm^2'. The Board finds that the specific wire strength values 2300 N/mm^2 and 2700 N/mm^2 adopted in claim 1 have a clear and unambiguous basis in the originally disclosed expressions about 2300 N/mm^2 and about 2700 N/mm^2, these original expressions having a broader scope, yet clearly including the specific wire strength values claimed. Furthermore, regarding the combination of claims 1 and 16 as originally filed, claim 16 was *inter alia* dependent from claim 1 such that their combination is clearly and unambiguously disclosed in the originally filed claims.

The deleted feature regarding the traction sheave diameter was included as an optional feature in claim 1 as originally filed. As the features remaining in the claim were not dependent on the deleted optional feature, the subject-matter of claim 1 has a basis in claim 1 as originally filed.

The amendment of the expression 'substantially round hoisting rope' to 'substantially round hoisting ropes' was made due to a lacking antecedent for the former expression in claim 1. The Board finds that basis exists for the amendment since nowhere in the original disclosure would a skilled person extract anything but an identical hoisting rope construction for all the ropes utilised in any particular elevator. It is furthermore noted that the appellants raised no objections to the basis for this amendment.

Regarding the final amendment to claim 1 which comprises the deletion of the words 'hoisting rope or'

in the expression 'contact angle between the hoisting rope or hoisting ropes and the traction sheave', the Board also finds this to have basis in the originally filed documents in compliance with Article 123(2) EPC. The deleted feature was included as an optional feature in claim 1 as originally filed. As the features remaining in the claim were not dependent on the deleted optional feature, the subject-matter of claim 1 has a basis in claim 1 as originally filed.

2.1.2 Regarding the argument of appellant II concerning the incorrect dependency of claim 16, it is noted that claims 12-14 equally to claim 16 refer to 'the steel wires' without an antecedent in a claim from which they depend. The suggestion that claim 16 should actually be dependent on at least one of claims 12-14 in order to solve a missing precedent of the steel wires in claim 16 is thus unconvincing.

Regarding the further argument of appellant II, that the dependencies of the claims in the application as originally filed created contradictory disclosures to the remaining specification, the Board holds this to be an incorrect assertion. It is noted that claim 16 as originally filed indeed claims steel wires with a strength greater than about 2300 N/mm^2 and less than about 2700 N/mm^2 yet without a specific wire thickness being claimed. In contrast, the paragraphs [0012] and [0024] of the description as originally filed (including this wire strength range) do so in combination with specific wire thicknesses. Despite this difference in including a wire thickness or not, there exists nothing contradictory between the disclosure in claim 16 to that in paragraphs [0012] and [0024]; they are simply different disclosures one with, the other without, a limitation of wire thickness in

combination with the wire strength range. Herein also lies the inapplicability of T42/92 (as cited by the respondent) to the present case. In T42/92 a contradiction existed between that which was claimed and that which was disclosed in the description of a prior art document. The Board in that case found that only those features of the prior art document which could be understood by the skilled person without contradiction were to be considered as disclosed (see reasons 3.4). In contrast, in the present case, there exists no contradiction between the disclosures of the claims and description simply, rather, separate disclosures.

The Board thus considers the subject-matter of claim 1 to be clearly and unambiguously disclosed to the skilled person and thus to meet the requirement of Article 123(2) EPC.

2.2 Article 123(3) EPC

The appellant II withdrew its objection under Article 123(3) EPC. The Board also sees no objection under this Article concerning the scope of protection provided by claim 1, feature M7b of the claim having been limited from 'a strength exceeding 2000 N/mm^2' (as granted) to 'a strength which is greater than 2300 N/mm^2 and less than 2700 N/mm^2' (in auxiliary request 1), which is a range of more limited scope. The amendment in auxiliary request 1 thus does not extend the protection conferred by the patent as granted.

2.3 Article 83 EPC 1973

For the reasons given below, the Board finds that auxiliary request 1 discloses the invention in a manner

sufficiently clear and complete for it to be carried out by a person skilled in the art, thus meeting the requirement of Article 83 EPC 1973.

2.3.1 The sole feature of claim 1 on which the appellants have cast doubt as to the skilled person's ability to carry out the invention concerns the steel wires of claim 1 'having a strength which is greater than 2300 N/mm^2 and less than 2700 N/mm^2'. There can be no doubt that steel wires exhibiting a strength within this claimed range can be produced, as evidenced in E43 on page 6, where a nominal wire strength of 2450 N/mm^2 is quoted as being commercially available. It thus follows that the skilled person would be well aware of available wires falling within the claimed strength range and could thus carry out the invention according to claim 1.

2.3.2 Regarding the argument of appellant I that claim 1 included no indication of wire diameter thus casting doubt on the skilled person's ability to achieve such strengths, the Board does not concur with this view. In paragraph [0024] as originally filed a range of possible wire thicknesses between 0.15 mm and 0.5 mm is given in conjunction with the claimed wire strength range. The skilled person would thus have no difficulty in selecting a suitable wire thickness from this range and producing a wire exhibiting a strength within the claimed range (as evidenced by E43, page 6). It is worth noting that, whilst the skilled person should be in a position to carry out the claimed invention over its whole scope to be in compliance with Article 83 EPC 1973, this does not require any and all possible wire diameters to fulfill the wire strength claimed, rather solely that a skilled person can arrive at wires which have the required strength, even if this means that

only a single one of the disclosed diameters has a strength falling within the claimed range. In this regard it is important to note that the claim does not define a specific diameter which must have the stated tensile strength; the wire diameter is left restricted only by the need to have wires suitable to make a rope of less than 8 mm diameter which can be used in an elevator as defined in the claim. It is furthermore important to note that appellant I also presented no evidence supporting its allegation that such wire strengths were technically not achievable at the filing date for the disclosed wire diameters and that the burden of proof lies with the appellant since it is the party alleging the contravention of Article 83 EPC 1973.

2.3.3 Regarding the argument of appellant II that, without a single example of a workable rope construction, an undue burden was placed on the skilled person, the Board notes that claim 1 indeed has a very broad scope and is not restricted to a particular rope construction. The claimed hoisting rope construction is limited to simply having a thickness below 8 mm and being made from steel wires having a strength greater than 2300 N/mm^2 and less than 2700 N/mm^2. Provided that the skilled person can be expected without undue burden to produce such a rope for use in the elevator as claimed in claim 1, then the requirement of Article 83 EPC 1973 is met. As identified under point 2.3.2 above, suitable steel wires meeting the strength requirement are considered well known to the skilled person.

Incorporating these wires into a hoisting rope having a thickness below 8 mm is also not problematic for the skilled person, particularly since he is not restricted to a particular rope construction (such as a Warrington

construction) and could choose a rope construction of very few individual wires. Furthermore, with no restriction of the elevator size, weight or operating speed defined in claim 1, such considerations do not need to be reflected in the selection of a suitable rope construction.

2.3.4 The Board thus concludes that the skilled person is able to carry out the invention according to claim 1 due to its being disclosed in a manner which is sufficiently clear and complete, auxiliary request 1 thus meeting the requirement of Article 83 EPC 1973.

2.4 Novelty - Article 54 EPC 1973

The Board finds that the subject-matter of claim 1 is novel over E40, the only prior art cited in this respect by the appellants.

2.4.1 E40 represents prior art under Article 54(3) EPC, a fact not disputed by any party. Furthermore, the parties are in agreement as to the disclosure of features M1-M6, M7a and M7b in E40, the sole feature of claim 1 disputed as regards its disclosure in E40 being feature M8, 'wherein the contact angle between the hoisting ropes and the traction sheave is larger than 180 deg'.

To be prejudicial to the novelty of the subject-matter of a claim, the claimed subject-matter must be derivable directly and unambiguously as a whole from a single piece of prior art. This condition is not met in the present case for the following reasons.

E40 includes no explicit mention of the contact angle of the hoisting rope 3, 103 around the traction sheave

7, 107 (see the embodiments in Figures 1 and 2). For the embodiment of Figure 1, the rope portion going from the counterweight 2 to the traction sheave 7 is disclosed as being substantially parallel to the path of the counterweight (see page 9, lines 15-17). Similarly in Figure 1, the rope portion going from the elevator car 1 to the traction sheave 7 is disclosed as substantially parallel to the path of the elevator car (page 9, lines 23-26). From Figure 1, it is also evident that the counterweight and elevator car move substantially parallel to each other such that the ropes going to and from the traction sheave create a contact angle of 180° with the sheave. Similarly for the embodiment of Figure 2, there is nothing to suggest a contact angle of the rope around the traction sheave of greater than 180°. Indeed, if anything, this embodiment suggests the possibility of a contact angle of less than 180° due to the diverting pulleys being of a larger diameter than the traction sheave (see page 12, lines 28-30).

In summary, therefore, E40 nowhere discloses a contact angle of greater than 180° for the hoisting rope around the traction sheave.

2.4.2 Regarding appellant II's argument that displacement of the traction sheave 107 in Figure 2 of E40 to the left would increase the contact angle of the hoisting rope around the traction sheave, this appears to be pure conjecture. It is undisputable that displacing the traction sheave to the left in Figure 2 would indeed increase the horizontal component of the hoisting rope's path between the diverting pulley 105 and the traction sheave 107 and of the hoisting rope's path between the traction sheave 107 and the diverting pulley 104. However, any effect of gravity acting on

the two hoisting rope paths would be equivalent, such that both rope paths would sag a small but equal amount, resulting in no unambiguously derivable change to the contact angle of the hoisting rope around the traction sheave. The further argument of appellant II that due to the tolerances associated in practice with such an arrangement, contact angles of, for example, 180.1° would result, is also unsupported. It is equally likely that contact angles of 179.9° would result, such that a contact angle of greater than 180° is not clearly and unambiguously disclosed in E40.

2.4.3 It thus follows that no argument has been presented by appellant II which can lead the Board to the conclusion that the subject-matter of claim 1 lacks novelty. The subject-matter of claim 1 is thus novel over the cited prior art (Article 54 EPC 1973).

2.5 Inventive step - Article 56 EPC 1973

The Board finds that the subject-matter of claim 1 lacks an inventive step (Article 56 EPC 1973) when starting from the disclosure of E5 and combining this with the general knowledge of the skilled person. The reasons are as follows.

2.5.1 E5 discloses an elevator (see Fig.1; col.4, lines 19-22), in which elevator a hoisting machine engages a set of hoisting ropes (3) by means of a traction sheave (7), said set of hoisting ropes (3) comprising hoisting ropes of substantially circular cross-section (implicit to the skilled person, particularly in view of col.4, lines 27 - 50), and in which elevator the set of hoisting ropes (3) supports a counterweight (2) and an elevator car (1) moving on their respective tracks, wherein the contact angle between the hoisting ropes

and the traction sheave is larger than 180° (see Fig.1; col.4, lines 51-54).

The subject-matter of claim 1 thus differs from the elevator known from E5 through the following features:

M6 the substantially round hoisting ropes have a thickness below 8 mm
M7a and are made of steel wires
M7b having a strength which is greater than 2300 N/mm^2 and less than 2700 N/mm^2.

The parties did not dispute that these features were the only features not known from E5.

2.5.2 The objective technical problem being addressed by the skilled person in view of these characterising features of claim 1 over E5 is seen as

- how to provide an improved hoisting rope for an elevator.

An alternative problem suggested by appellant II and the respondent was included in the patent itself, concerning how to achieve an appropriate thinner hoisting rope. This problem, however, includes part of the solution provided by claim 1 (the hoisting ropes have a thickness below 8 mm) such that it cannot be regarded as truly objective.

2.5.3 In coming to its conclusion regarding the subject-matter of claim 1 lacking an inventive step, the Board notes that claim 1 is drafted so broadly that no particular or special requirements are placed on the rope by the elevator. For example, no load carrying capability, space saving necessity or operating speed is indicated in the claim which could, if present in a

claim, be regarded as giving an indication of required rope strength, minimum or maximum traction sheave diameter or particular rope construction. All these possible restrictions on the hoisting rope are left open such that the skilled person is almost unlimited in his search for an appropriate solution to the objective problem.

E36 is an International Standard for steel wire ropes for lifts dated 1983, thus indicating the skilled person's knowledge in this subject at the priority date of the patent (2002). On page 1, section 3, a table of rope constructions with appropriate nominal rope diameters is presented including, for a 6 x 19 equal lay construction a minimum nominal rope diameter of 6 mm. It thus follows that the skilled person, at the priority date of the patent, would be aware of 6 mm diameter ropes as being appropriate for steel wire hoisting ropes for elevators. This diameter falls within the scope of the hoisting rope claimed in claim 1 in which the hoisting rope should have a thickness below 8 mm.

E43 is a handbook dated 1994 concerning wire ropes and can thus also be considered to indicate the skilled person's knowledge at the priority date of the patent. On page 6, nominal wire strengths of 2450 N/mm^2 are indicated as being readily commercially available. The skilled person was thus aware, at the priority date of the patent, of steel wires for ropes being available at strengths of 2450 N/mm^2 i.e. within the range of wire strengths defined in claim 1.

The Board understands that the skilled person in the field of elevator rope construction would desire to always improve upon known constructions by optimising

the design within known parameters. In producing higher strength and smaller diameter ropes the skilled person would achieve lighter weight ropes presenting advantages as regards hoisting system mass and thus drive train power consumption, presenting therefore nothing more than the expected consequences of such design considerations. This as such must be regarded as well known generally to a skilled person involved with the design of elevators. The Board thus concludes that the skilled person, when starting from E5 and wishing to solve the identified objective technical problem, would reach the solution presented by the subject-matter of claim 1 based on the skilled person's general knowledge, as evidenced by E36 and E43, without exercising an inventive step (Article 56 EPC 1973).

2.5.4 Regarding the respondent's argument concerning the presence of a technical prejudice dissuading the skilled person from using wires of the claimed strength, the Board finds the argument unpersuasive. As identified under point 2.5.3 above, the elevator of claim 1 is not limited to a particular load carrying capability or traction sheave diameter which might damage the wires of the hoisting rope. Indeed, with no restriction to traction sheave diameter included in the claim, a significantly large diameter could be used in order to minimise potential damage to the wires and allow the safe incorporation of stronger, even if more fragile, wires into the hoisting ropes. It is not relevant that lift systems should normally be made compact, since claim 1 puts no size and bulk restrictions on the elevator at all.

Regarding an alleged legal prejudice, the Board is also not persuaded by this argument. As appellant II also argued, the standards show an increase in accepted wire

strengths with time reflecting the natural development of acceptable wire strengths from users of wires pushing the accepted limits. The argument that the skilled person would thus restrict his wire selection to those referenced in a standard is unconvincing, the standards in the technical field not dictating the developments in that field.

Regarding the claimed wire strength of greater than 2300 N/mm^2 and less than 2700 N/mm^2, the Board points out that the patent is silent as to whether this range of wire strength offers any particular technical advantages over wire strengths marginally above or below this range. The claimed range appears simply to represent wires of suitably high strength to offer potential diameter and thus weight advantages when compared to wires of lesser strength, which advantages are however obvious to the skilled person. The adoption of the range itself can therefore not be considered to involve an inventive step in terms of being an inventive selection.

As an additional consideration to the technical advantages offered by the claimed strength range, the particular suitability of wires displaying the claimed strength in elevator hoisting ropes is also considered. However, equally here, the patent is silent as to why steel wires in this strength range are particularly suited to elevator hoisting ropes. There is nothing in the patent elaborating the particular properties of the claimed wire and why this makes it particularly suited to elevator applications let alone in a way which could provide support for the presence of an inventive step. It is thus evident that, other than the suitability obvious to the skilled person relating to reduced diameter and thus weight reduction, wires of the

claimed strength range are no more suited to elevator applications than wire strengths lying below this range. Under this consideration, the adoption of the claimed wire strength range can not be considered to involve an inventive step (Article 56 EPC 1973).

2.5.5 Regarding the respondent's suggestion that E5 was a significantly larger elevator than that being claimed, the Board notes that no explicit indication is present in E5 to this effect. The respondent's contention that the design of the elevator for 'tall buildings and heavy use' in column 1, lines 4 to 6 implied this, is not followed; 'heavy use' would normally be understood to imply a large amount of use rather than implying anything about the weight of the elevator system. Even if it were the case that E5 disclosed a very large elevator, it is pointed out that the claimed elevator has such a broad scope as to be unrestricted by load capability, speed or sheave size. The claimed elevator could thus be of a similar dimension to that disclosed in E5, the required smaller hoisting rope diameter (less than 8 mm) being compensated for by a different roping arrangement.

2.5.6 Regarding the respondent's argument that the European standard EN81 would suggest E5 to utilise rope diameters in excess of 8 mm rather than diameters less than 8 mm, the Board does not concur with this view. The Board holds that the skilled person is always looking for ways of improving elevator systems and, in the case of hoisting rope diameter, smaller diameter ropes present known weight benefits for the hoisting system. Equally to EN81, the skilled person would be aware of E36, itself an international standard, disclosing a range of suitable rope diameters, the smallest of which is at 6 mm (see page 1, section 3).

The Board thus holds that the skilled person would select the 6 mm rope diameter taught in E36 rather than a larger possible diameter, due to his desire to always improve elevator systems in the manner identified above, whenever this particular aspect of improvement is desirable for a particular purpose.

2.5.7 For the reasons given above, the subject-matter of claim 1 is found not to be inventive (Article 56 EPC 1973). Auxiliary request 1 is therefore not allowable.

3. Auxiliary request 2

3.1 Article 123(2) EPC

The Board finds that claim 1 contains subject-matter which does not meet the requirement of Article 123(2) EPC. The reasons for this at least include the findings on Article 123(2) EPC for the main request (see point 1.1.2) since, as for the main request, the present request includes feature M7b, 'having a strength exceeding 2000 N/mm^2' without the inclusion of a wire thickness. No other feature introduced into the claim gives rise to find differently with respect to this request. Nor did the respondent argue that this should alter the Board's finding on Article 123(2) EPC when considering its finding on the main request.

Auxiliary request 2 is thus not allowable.

4. Auxiliary request 3

4.1 Non-admittance of the request into the proceedings

This amended auxiliary request was filed during the oral proceedings (after discussion of the main, first

and second auxiliary requests). The considerations laid out in Article 13(1) of the Rules of Procedure of the Boards of Appeal (RPBA) thus apply, whereby 'any amendment to a party's case after it has filed its grounds of appeal or reply may be admitted and considered at the Board's discretion. The discretion shall be exercised in view of inter alia the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.'

The Board is of the view that at least the amendment introduced into claim 1 relating to the diameter of the traction sheave being smaller than 320 mm represents a significant change of case, due not least to this feature not having been present in the claims as granted. Indeed, this feature was even deleted from the claims during examination of the original application. This amendment must thus be regarded as both unexpected and of significant complexity to be dealt with at such a late stage of the proceedings, as the subject-matter had not hitherto been of any pertinence to the appeal case.

The respondent argued that the feature had been introduced in order to overcome the objections raised in the course of the oral proceedings regarding the very broad scope of claim 1 of each of the requests on file and that the wire strength value was dictated by an industry standard. Be that as it may, the introduction of a feature into the claims not present in the granted claims represents such a significant change of case, especially at the very latest possible stage of the proceedings, so as to be unreasonable to expect the parties to deal with the amendment. Merely because the feature may relate to something resulting

from an industry standard does not affect the Board's reasoning given above concerning the complexity of the subject-matter resulting from the amended request.

The Board thus exercised its discretion in not admitting auxiliary request 3 into the proceedings (Article 13(1) RPBA).

5. Auxiliary request 4

5.1 Article 123(2) EPC

The Board finds that claim 1 contains subject-matter which does not meet the requirement of Article 123(2) EPC for the following reasons.

Amongst other additions to claim 1 as originally filed, claim 1 includes the features:

M7a are made of steel wires the average of the wire thicknesses of the steel wires of the hoisting ropes is greater than 0.1 mm and less than 0.4 mm; and

M7b having a strength exceeding 2000 N/mm^2.

The sole explicit disclosure of feature M7a in the application as originally filed is in claim 13 as originally filed. This claim is solely dependent on claim 1 which lacks feature M7b, this being only included in claim 12. There is thus no unambiguous basis (Article 123(2) EPC) in the originally filed claims for the combination of features M7a and M7b.

Paragraph [0012] as originally filed discloses a rope wire strength of over 2000 N/mm^2, although not in combination with steel wire thicknesses of greater than

0.1 mm and less than 0.4 mm. The sole reference to 0.1 mm thick wires in this paragraph is in relation inter alia to 4 mm ropes, which feature is not included in claim 1, claim 1 instead defining hoisting ropes having a thickness of 3 to 5 mm. There is thus no basis for the combination of features M7a and M7b in paragraph [0012] as originally filed.

Paragraph [0024] as originally filed discloses a rope wire strength of above about 2000 N/mm^2, although in combination with steel wire thicknesses of specifically 0.15 mm to 0.5 mm (see col.12, lines 41-45 and 53-55). Thus paragraph [0024] offers no basis (Article 123(2) EPC) for the combination of features M7a and M7b.

It thus follows that, without a basis at least for a combination of the features M7a and M7b in the application documents as originally filed, the subject-matter of claim 1 does not meet the requirement of Article 123(2) EPC.

Auxiliary request 4 is thus not allowable.

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:

P. Martorana M. Harrison

Decision electronically authenticated