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Datasheet for the decision of 26 June 2012

Case Number: T 1837/08 - 3.5.02

Application Number: 98966870.2

Publication Number: 1147531

IPC: H01H 33/36

Language of the proceedings: EN

Title of invention:
Operating device for driving and controlling an electrical switching apparatus

Patentee:
ABB AB

Opponent:
Areva T&D SA

Headword:
-

Relevant legal provisions:
EPC Art. 56, 83, 104(1), 123(2)
RPBA Art. 13

Keyword:
"Amendments - added subject-matter - yes (main request, auxiliary requests 1, 2)"
"Inventive step - no (auxiliary requests 3, 3a, 3b, 3c, 4)"
"request for apportionment of costs refused"

Decisions cited:
-

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1837/08 - 3.5.02

D E C I S I O N
of the Technical Board of Appeal 3.5.02
of 26 June 2012

Appellant: (Opponent)
Areva T&D SA
Tour Areva, 1 Place de la Coupole
92084 Paris La Défense (FRANCE)

Representative:
Moutard, Pascal Jean
Brevalex
22, Avenue du Doyen Louis Weil
38024 Grenoble Cedex 1 (FRANCE)

Respondent: (Patent Proprietor)
ABB AB
721 83 Västerås (SUEDE)

Representative:
Israelsson, Stefan
Bjerkéns Patentbyrå KB
P.O. Box 5366
102 49 Stockholm (SUEDE)

Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 25 July 2008 rejecting the opposition filed against European patent No. 1147531 pursuant to Article 101(2) EPC.

Composition of the Board:

Chairman: M. Ruggiu
Members: G. Flyng
P. Mühlens

Summary of Facts and Submissions

I. The opponent has appealed against the decision of the Opposition Division rejecting the opposition filed against European patent No. 1147531 pursuant to Article 101(2) EPC. The following documents were mentioned in that decision:

D1: US-A-5 334 919 (note: the decision referred to US'909, but this was evidently an error)
D2: Brosch P.F. "Moderne Stromrichterantriebe" Vogel Verlag und Druck, Würzburg, 1990: pages 102 to 105, 122 to 125, 132 to 135, 146 to 153
D3: Streiff H: "Rückgewinnung von Bremsenergie bei Schienenverkehrsmitteln (Teil I), Grundsätzliches zur Ruckgewinnung von Bremsenergie"
D4: GB-A-2 062 380
D5: US-A-5 595 287
D6: US-A-4 912 380
D7: US-A-4 179 646
D7': US-A-4 042 896
D8: US-A-5 444 348
D9: McSparran L.W. : "Considerations in the specification of AC propulsion equipment for passenger vehicles", IEEE/ASME Joint Railroad Conference, Pittsburg, 6 to 8 April 1993
D10: WO96/36982
D11: Schoenung S.M., Burns C.: "Utility energy storage applications studies", IEEE Transactions on Energy Conversion, 1996; 11: pages 658 to 665,
D12: Carlen M.W. and Christen T.: "Testing and modelling of supercap applications", 7th International Seminar on double layer Capacitors

and similar Energy Storage Devices, Derfield Beach, 8 to 10 December 1997.

The opposition division found in essence that the patent satisfied the requirements of Articles 83, 123(2), 54 and 56 EPC, such that none of the objections raised under Articles 100(a), (b) and (c) EPC prejudiced maintenance of the patent.

II. With the letter of 21 November 2008, setting out the grounds for appeal, the appellant (opponent) filed the following additional documents (references added by the Board):

D13: EP 0 294 561 A2
D14: GEC Alsthom T & D Revue 1/1996.

III. The Board summoned the parties to oral proceedings to be held on 26 June 2012. In an annex to the summons the Board set out its preliminary observations on the appeal.

IV. With a letter dated 25 May 2012 the respondent submitted a main request (request 1) for dismissal of the appeal and auxiliary requests 1a, 1b, 1c, 2, 2a, 2b, 2c, 3, 3a, 3b, 3c and 4 for maintenance in amended form based on correspondingly labelled claims that were enclosed with the letter.

V. Oral proceedings were held as scheduled on 26 June 2012.

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

requests 3a, 3b, 3c and 4 be not admitted into the procedure and requested apportionment of costs.

The respondent (patent proprietor) requested that the appeal be dismissed (main request) or in the alternative that the decision under appeal be set aside and the patent be maintained in amended form on the basis of one of the sets of claims filed as auxiliary requests 1a, 1b, 1c, 2, 2a, 2b, 2c, 3, 3a, 3b, 3c and 4, in that order, all filed with the letter of 25 May 2012. Furthermore, the respondent requested that the appellant's request for apportionment of costs be refused.

VI. **Respondent's requests**

Claim 1 of the patent (**main request**) reads:

"1. Operating device (200) for rapid operation of a medium voltage or a high voltage switching apparatus having at least one mobile contact, comprising a rotating electric machine (201, 302) which is operatively connected to the at least one mobile contact (203, 303) and an electric energy supply unit (204), whereby the operating device further comprises a control unit (205) such that an operating cycle includes a first part in which the movable contact is accelerated by transforming electric energy into mechanical energy, ***characterised by*** *a second part in which the moveable contact is decelerated by transforming mechanical energy into electric energy for storage into the energy supply unit (204)."*

Claim 1 of **auxiliary request 2** reads as follows (underlining added by the Board to emphasise differences with respect to claim 1 of the patent):

"1. Operating device (200) for rapid operation of a medium voltage or a high voltage switching apparatus having at least one mobile contact, comprising a rotating electric machine (201, 302) which is operatively connected to the at least one mobile contact (203, 303) and an electric energy supply unit (204), wherein the operating device further comprises a control unit (205) and wherein the rotating electric machine (201, 302) operates the at least one mobile contact (203, 303) upon receiving control signals (208) from said control unit (205) such that an operating cycle includes a first part in which the movable contact is accelerated, by means of the rotating electric machine (201, 302) operating as an actuator, by transforming electric energy into mechanical energy, and a second part in which the moveable contact is decelerated and in which the rotating electric machine (201, 302) operates as a generator by transforming mechanical energy into electric energy which is stored into the energy supply unit (204)."

Claim 1 of **auxiliary request 3** reads as follows (underlining and strike-out text added by the Board to indicate changes made with respect to claim 1 of auxiliary request 2):

"1. Combination of an operating device (200) and an electric energy supply unit (204), wherein the

operating device is for rapid operation of a medium voltage or a high voltage switching apparatus having at least one mobile contact, said operating device (200) comprising a rotating electric machine (201, 302) which is operatively connected to the at least one mobile contact (203, 303) ~~and an electric energy supply unit (204)~~, wherein the operating device further comprises a control unit (205) and wherein the rotating electric machine (201, 302) operates the at least one mobile contact (203, 303) upon receiving control signals (208) from said control unit (205) such that an operating cycle includes a first part in which the movable contact is accelerated, by means of the rotating electric machine (201, 302) operating as an actuator, by transforming electric energy into mechanical energy, and a second part in which the moveable contact is decelerated and in which the rotating electric machine (201, 302) operates as a generator by transforming mechanical energy into electric energy which is stored into the energy supply unit (204)."

Claim 1 of **auxiliary requests 1a, 2a and 3a** differs from the respective claim 1 of the patent and auxiliary requests 2 and 3 in that it includes at the end the additional feature (reference added by the Board):

(a) *"wherein the control unit (205) comprises a data storage means and a data processing means".*

Claim 1 of **auxiliary requests 1b, 2b and 3b** differs from the respective claim 1 of the patent and auxiliary requests 2 and 3 in that it includes at the end the additional feature (reference added by the Board):

(b) *"wherein information about the position, acceleration, torque and/or angular velocity of the rotating electric machine (201, 302) is transferred to the control unit (205) via a first feedback loop (208)".*

Claim 1 of **auxiliary requests 1c, 2c and 3c** differs respectively from claim 1 of the patent and of auxiliary requests 2 and 3 in that it includes at the end both of the additional features (a) and (b).

The patent (request 1) includes an independent method claim 17 and auxiliary requests 2 and 3 include an identical independent method claim 16. In **auxiliary request 4** the device claims have been deleted and claim 1 is the identical independent method claim, which reads as follows:

"Method of rapid opening or closing motion of a medium voltage or a high voltage switching apparatus having at least one mobile contact (203, 303) and an operating device (200) including a rotating electric machine (201, 302) in operational connection with the at least one mobile contact and an energy supply unit (204), comprising accelerating, under a first part of the motion, the moveable contact by transforming electric energy into mechanical energy, characterised in decelerating, under a second part, the moveable contact by transforming mechanical energy into electric energy, and storing the

transformed electric energy in the energy supply unit."

All requests further include a use claim.

VII. In so far as they are relevant to this decision, the arguments of the appellant (opponent) may be summarised as follows:

- Claim 1 of the patent adds fresh subject-matter contrary to Article 123(2) EPC.
- The respondent's auxiliary requests constitute amendments to the respondent's case in the sense of Article 13 of the Rules of Procedure of the Boards of Appeal and their number is such as to place an undue burden on the appellant in preparing for oral proceedings. These requests should not be admitted, and if they are, the costs incurred by the appellant in dealing with them should be borne by the respondent.
- Claim 1 of auxiliary requests 1a, 1b, 1c, 2, 2a, 2b and 2c adds fresh subject-matter contrary to Article 123(2) EPC.
- Claim 1 of auxiliary request 3 offends Article 123(2) and 123(3) EPC. Furthermore, the aspects of operating the rotating electric machine as a generator and storing the braking energy are not sufficiently disclosed in the sense of Articles 83 and 100(b) EPC.
- Claim 1 of auxiliary request 3 lacks novelty in view of document D1, and lacks an inventive step in view of document D1 combined with document D2.

– Claim 1 of each of auxiliary requests 3a, 3b and 3c lacks an inventive step over D1 combined with D2, or over D1 combined with D2 and D10.
– Claim 1 of auxiliary request 4 lacks novelty in view of document D1, and lacks an inventive step in view of document D1 combined with document D2.

VIII. In so far as they are relevant to this decision, the arguments of the respondent (proprietor) may be summarised as follows:

– Claim 1 of the patent does not add fresh subject-matter contrary to Article 123(2) EPC because there is sufficient support in the application as filed for the general manner in which the subject-matter of the invention is claimed. It is not important for the invention how the opening phrase of granted claim 1 is construed.
– The auxiliary requests were filed to deal with issues of added subject-matter and inventive step that were raised, some for the first time, in the annex to the summons to oral proceedings before the Board. They should be admitted into the proceedings.
– Claim 1 of auxiliary requests 1a, 1b, 1c, 2, 2a, 2b and 2c also does not add fresh subject-matter.
– Claim 1 of auxiliary request 3 does not offend Article 123(2) or 123(3) EPC. Furthermore, the skilled person would have no difficulty carrying out the aspects of operating the rotating electric machine as a generator and storing the braking energy, such that this is sufficiently disclosed in the sense of Articles 83 and 100(b) EPC.

– Claim 1 of auxiliary request 3 is novel over document D1, which does not disclose the claimed feature that the energy generated during deceleration of the mobile contact is stored in the energy supply unit. Furthermore, this feature is not obvious in view of the cited prior art. The braking resistor in D1 is a key part of the circuit and it would not be obvious to do away with it. Document D2 refers to inverter drives which are a different type of electrical machine to the DC machine used in D1. Hence it would not be obvious to the skilled person to look to D2 to improve on D1.

– Claim 1 of each of auxiliary requests 3a, 3b and 3c also involves an inventive step over the prior art. It would not be obvious to look to D10 to improve on D1 because it uses a different type of actuator (voice coil rather than rotating electrical machine). The additional features claimed in these requests enable better control of the electrical machine, making it possible to brake under controlled conditions, storing energy at the same time.

– Claim 1 of auxiliary request 4 is novel and involves an inventive step.

Reasons for the Decision

1. The appeal is admissible.

2. **Respondent's main request**

2.1 The following features of claim 1 of the patent are derivable, directly and unambiguously, from the application as filed, in particular from claim 1 and page 6, lines 22 to 28 (see the published application WO 00/36621):

an operating device for rapid operation of a medium voltage or a high voltage switching apparatus having at least one mobile contact, comprising a rotating electric machine which is operatively connected to the at least one mobile contact.

2.2 The following phrase of claim 1 of the patent as granted was not present in claim 1 as filed, but was introduced by way of an amendment:

"Operating device ..., comprising a rotating electric machine ... which is operatively connected to the at least one mobile contact ... and an electric energy supply unit ...".

The wording of this new phrase is ambiguous because it can be construed in a number different ways, in particular as specifying either:

– an operating device that comprises both a rotating electric machine and an electric energy supply unit, wherein the rotating electric machine is operatively connected to the at least one mobile contact; or

- an operating device that comprises a rotating electric machine, wherein the rotating electric machine is operatively connected to the at least one mobile contact and wherein the rotating electric machine is also operatively connected to an electric energy supply unit; or
- an operating device and an electric energy supply, wherein the operating device comprises a rotating electric machine that is operatively connected to at least one mobile contact.

Considering the first possible construction of this new phrase, the Board notes that in the application as filed, claim 6, together with claim 5 upon which it is dependent, disclosed an "energy storage or energy supply unit" in the context that the rotating electric machine, upon a decelerating motion of the mobile contact, generates electric energy and is arranged to deliver energy to an energy storage or energy supply unit. This disclosure does not necessarily imply that the operating device actually comprises (i.e. includes) the electric energy supply unit. Furthermore, there is no indication in the description as filed that the operating device may comprise the electric energy supply unit. Rather on the contrary, figure 2 shows the supply unit 204 as being outside of the area marked by a dashed line that seems to indicate the operating device 200.

Considering the second possible construction of the new phrase, the Board notes that in the application as filed the term "operatively connected", was used only in the specific context that the rotating electric machine is operatively connected to the at least one

mobile contact, with "operatively connected" meaning that the rotating electric machine is connected to the mobile contact without any intermediate energy storing device, such as for example a mechanical spring (see page 7, lines 18 to 28). With this meaning attached to the term "operatively connected", there is no indication in the application as filed that the rotating electric machine is operatively connected to the electric energy supply unit. Indeed that would make no sense from a technical point of view.

In view of the above, the Board finds that the first two possible constructions of this new phrase, which was introduced by amendment of claim 1, present the skilled reader with new information that was not directly and unambiguously derivable from the application as filed, contrary to Article 123(2) EPC.

2.3 The phrase of claim 1 of the patent as granted: "whereby the operating device further comprises a control unit (205) such that an operating cycle includes ..." (emphasis added) was also not disclosed in claim 1 as filed.

Claim 8 as filed mentioned a control unit, but there it was also stated that "the rotating electric machine (201,302) operates the at least one mobile contact (203,303) upon receiving control signals (208) from said control unit (205)". The Board can find no hint in the application as filed to provide a control unit for any reason other than controlling the rotating electric machine. Hence, the Board finds that by adding the control unit whilst omitting these other features of claim 8 as filed, claim 1 of the patent creates an

intermediate generalisation for which there is no basis in the application as filed.

Furthermore, the Board is rather unsure how the phrase "comprises a control unit (205) such that an operating cycle includes ..." should be construed, as it has difficulty making sense of it in the present context. It seems to imply that the mere fact of the operating device comprising a control unit leads to an operating cycle (of something) having the features claimed, but the Board can see no basis for the skilled reader to take such a notion from the application as filed.

The Board concludes that also this new phrase of claim 1 of the patent presents the skilled reader with new information that was not directly and unambiguously derivable from the application as filed, contrary to Article 123(2) EPC.

2.4 Regarding the features of claim 1 of the patent:

- a first part in which the movable contact is accelerated by transforming electric energy into mechanical energy; and
- a second part in which the moveable contact is decelerated by transforming mechanical energy into electric energy for storage into the energy supply unit (204),

the Board notes that the application as filed discloses the mobile contact being accelerated and decelerated only by means of the rotating electric machine being operated as an actuator and as a generator (see page 9, lines 5 to 21 and claims 5, 6 and 8). The respondent has argued that this is implicit from claim 1 of the patent; however, the Board is not convinced that this

is the case. Just because a rotating electric machine is operatively connected to a mobile contact does not necessarily imply that an acceleration or deceleration of the mobile contact is caused by the rotating electric machine. Hence, the Board finds that the omission of these features creates an intermediate generalisation for which there is no basis in the application as filed, contrary to Article 123(2) EPC.

2.5 In view of the above the Board finds that the respondent's main request for dismissal of the appeal cannot be allowed.

3. **Admissibility of the respondent's auxiliary requests**

3.1 The respondent's various auxiliary requests constitute amendments to the respondent's case in the sense of Article 13 of the Rules of Procedure of the Boards of Appeal.

Auxiliary requests 2 and 3 attempt to deal with issues of added subject-matter, some of which were raised for the first time in the Board's annex to the summons to oral proceedings.

The further auxiliary requests 1a, 2a and 3a add features to claim 1 that have been taken from claim 10 and claim 12 as filed. These amendments were made apparently in reaction to observations on inventive step that were made by the Board in the annex to the summons. The additional features relate to the control of the rotating electrical machine and in the Board's view are not so complex as to place an undue burden on

the appellant or the Board in preparing for the oral proceedings.

In auxiliary request 4 the device claims have been deleted, leaving only the method and use claims as granted. This too is a simple amendment that does not create any difficulty in preparing for the oral proceedings.

In view of these considerations the Board exercised its discretion to admit the amended requests into the proceedings.

4. **Respondent's auxiliary requests 1a, 1b, 1c, 2, 2a, 2b and 2c**

The reasons set out above in sections 2.2 to 2.4 apply equally to claim 1 of the respondent's auxiliary requests 1a, 1b and 1c. Furthermore, the reasons set out above in section 2.2 apply equally to auxiliary requests 2, 2a, 2b and 2c. Hence, these requests for maintenance in amended form can also not be allowed.

5. **Respondent's Auxiliary request 3**

5.1 The Board finds that the amendments made according to auxiliary request 3 overcome all of the objections set out in sections 2.2 to 2.4 above.

5.2 The appellant argued that claim 1 of auxiliary request 3 offends Article 123(2) EPC because it fails to specify that the motion of the mobile contact is controlled by the control unit controlling the operating current of the rotating electric machine

(cf. page 8, lines 5 to 10; page 10, lines 14 to 19; and page 12, lines 26 to 28). The Board was not convinced by this argument because there is a basis in claim 8 as originally filed for the added features that the operating device further comprises a control unit and the rotating electric machine operates the at least one mobile contact upon receiving control signals from said control unit.

The appellant also argued that the application as filed did not disclose a step of storing energy in the energy supply unit (Article 123(2) EPC) and that this was a method feature that introduced a lack of clarity in the apparatus claim (Article 84 EPC). The Board considers however that in the present context it is implicit, particularly from the disclosures that the rotating electric machine delivers energy to an energy storage unit (cf. claim 6 as filed) and that the electric energy produced by the rotating electric machine can be transferred to an energy storage unit (cf. page 9, lines 21 to 25), that the device operates such that energy is stored into the energy supply unit, a feature that the Board sees not as a method step, but as a functional feature of the claimed apparatus.

The appellant further argued that the amendments to claim 1 broaden its scope contrary to Article 123(3) EPC by removing the feature that the rotating electric machine is connected to the electrical energy supply unit. As explained above in section 2.2, the Board considers this feature was only one of the possible ways of interpreting the rather ambiguous wording of granted claim 1 (see the second interpretation mentioned above). Present claim 1 is restricted in

scope to one of the other possible interpretations of that ambiguous wording (the third interpretation mentioned above) and hence is narrower in scope than granted claim 1. Hence, the Board sees no extension of the protection conferred and thus no contravention of Article 123(3) EPC.

5.3 *Sufficiency of disclosure, Article 100(b) EPC*

Noting that according to the application as filed the rotating electric machine can be any type of conventional rotating electric machine such as a stepping motor, an AC motor of the induction type or an AC motor of the synchronous type such as for example a reluctance motor, a DC motor, an AC or a DC permanent magnet motor (see page 14, lines 27 to 32 of the published application), the appellant has argued that the application does not sufficiently disclose how to operate such rotating electric machines as a generator and how to store the energy generated into the energy supply unit (i.e. a network, a battery, a set of capacitors etc., see page 12, lines 28 to 30).

In the Board's view, however, techniques for controlling such electrical machines to operate in a generator mode belong to the general knowledge of the person skilled in the art of electrical machines, as do techniques for storing the generated electrical energy into electrical networks or storage means (batteries, capacitors etc.). Hence the Board finds that the person skilled in the art would have no difficulty carrying out this aspect of the invention.

5.4 *Novelty and inventive step, Article 100(a) EPC*

5.4.1 There is no dispute that document D1 is the closest prior art. It discloses (see figure 7 and column 6, line 46 to column 7, line 15) an operating device (motor control unit 112, motor 19) and an electric energy supply unit (battery 114), wherein the operating device is for rapid operation of a high voltage switching apparatus having at least one mobile contact (moving metal contact blade 82). The operating device comprises a rotating electric machine 19 which is operatively connected to the moving metal contact blade 82 (see actuating rod 98, crank 104, gearbox 106 and motor output shaft 20). The operating device further comprises a control unit 112 and the rotating electric machine operates the mobile contact 82 upon receiving control signals from the control unit 112 (see column 7, lines 1 to 4: "Operation of the motor 19 is by the control circuitry 112, as shown in detail in fig. 1 ...").

Figures 2 to 6 show different parts of the operating cycle of the circuit of figure 1.

In one part of the operating cycle shown in figure 3 and described in column 4, lines 4 to 17, the movable contact is accelerated (cf.: "to drive a member towards a closed position"), with the rotating electric machine operating as an actuator, transforming electric energy into mechanical energy.

In another part of the operating cycle shown in figure 5 and described in column 4, lines 33 to 67, the electric machine operates as a generator, generating a

current shown in broken lines which flows inter alia through braking resistor 32, motor armature 24 and motor field winding 22. According to column 4, lines 63 to 67 of D1:

"The braking resistor 32 contributes to the braking effect with the larger the value of the resistor, the less the generated current and the slower the braking"; and

"For some application, the braking resistor 32 can be dispensed with and replaced with a simple wire connection".

Furthermore, according to column 2, lines 36 to 41:

"any rotation of the armature is smoothly, rapidly, and predictably braked with the generated energy dissipated as heat in the braking resistor and the motor field winding".

From these disclosures in particular the Board concludes that D1 discloses decelerating the mobile contact by using the rotating electrical machine to transform mechanical energy into electric energy, that energy being dissipated by the braking resistor (if present) and by the motor field winding.

5.4.2 According to claim 1 of auxiliary request 3 the electric energy that is produced by the rotating electric machine when it operates as a generator is stored into the energy supply unit.

The appellant argued that in D1, when the rotating electric machine is operating as a generator, electrical energy is stored at least for a short time in the winding 22 and in stray capacitances of the

circuit and that this amounts to energy being stored into the energy supply unit as claimed. The Board is not convinced by this argument. The winding 22 is the field winding of the electrical machine, which is not a part of the energy supply unit. Furthermore it is explicitly stated that the field winding dissipates energy. Also, there is no disclosure of any capacitances in the circuit that would store energy.

The Board concludes that document D1 does not disclose the feature of claim 1 of auxiliary request 3 that the electric energy produced by the rotating electric machine when it operates as a generator is stored into the energy supply unit. Claim 1 of auxiliary request 3 is thus to be considered novel in the sense of Article 54 EPC.

5.4.3 Considering the question of inventive step, starting from document D1, the technical problem solved by the claimed feature that the electrical energy is stored into the energy supply unit may be considered as being to find an alternative way of dealing with the generated electrical energy, produced during braking, other than dissipating it as heat as taught by D1. This technical problem is an objective one, because it is formulated in the light of the technical difference between the subject-matter claimed and the closest prior art, and it does not contain any pointer to the claimed solution.

5.4.4 Faced with this technical problem it would be an obvious matter for the person skilled in the art to take into account the disclosure of document D2, because it contains a section that deals specifically

with this issue. Document D2 is a textbook on modern variable speed inverter drives (see title). In a section entitled *controller enables motor and generator operation*, see "Steller ermöglicht Motor- und Generatorbetrieb", top of page 133), D2 states (see first paragraph under the heading "Generatorbetrieb"):

> *when kinetic energy is fed to the shaft generator braking is possible with this inverter circuit. For this the current in the machine and in the intermediate circuit must change direction so that a change occurs in the direction of power flow.*

The subsequent section 6.2.4 "Umsetzung der Bremsenergie" (see pages 133 and 134) sets out different possible options for converting the braking energy. One option, given in the first paragraph, is to convert the energy in a clocked resistance (braking chopper). The reference a) in figure 6.49 shows an example of this option applied to a multi-axis machine tool. It is further explained that in such an application individual axis controllers can be fed from an intermediate DC bus (option b) in figure 6.49). In the last paragraph of that section on page 134 it is explained that another option for using the energy is to connect a controlled inverter antiparallel to the controlled input inverter to feed back energy into the network. In the example of figure 6.49 this is shown as option c).

Whilst it is evident that the option b) is specifically recommended for a multi-axis machine tool application, it is also evident that the other two options are more generally applicable.

5.4.5 Seeking an alternative way of dealing with the electrical braking energy in D1 it would be a routine matter for the person skilled in the art to follow option c) of D2 and provide means to feed the braking energy back into the electrical supply network.

5.4.6 The respondent has argued that it would not be obvious to combine the teachings of D1 and D2 because D1 uses a DC machine fed from a DC supply, whereas D2 refers to AC machines fed with a controlled inverter from an AC supply. The Board considers however that this difference would not be a significant hindrance to the person skilled in the art of electrical machines. Having found in section 5.3 above that, for all of the different motor types mentioned, the skilled person would be able to devise means to store the generated braking energy in the energy supply unit, it would be rather incongruous when considering inventive step to find that that same skilled person would be unable to apply teachings from DC machines to AC machines or vice versa. The same measure of the skilled person's ability has to be used consistently.

5.4.7 For the reasons set out above the Board comes to the conclusion that the subject-matter of claim 1 of auxiliary request 3 is obvious in view of the prior art disclosed in documents D1 and D2 and hence does not involve an inventive step, Article 56 EPC.

5.4.8 For the sake of completeness, the Board notes in addition that the various cited prior art documents show that it is widely known to use rotating electric machines for regenerative braking and to store the electrical energy produced. In particular, this idea

has been shown to be known not only in various specific fields (i.e. electric vehicle drives - see D3 and D9, electric jacks for robotics - see D8) but also in electrical machine drives in general (see D2 and D4).

Indeed, the opposition division stated in the contested decision: "it cannot be contested that braking energy storage is widely known in the field of electric motor control" (see reasons for the decision, point 4.2, page 8, under the heading "Combination of D1 with D4") and the respondent has not argued against this point.

The above finding on inventive step is consistent with the appellant's argument that it would be obvious for the skilled person to use this evidently well known principle in the specific context of a circuit breaker drive such as disclosed in document D1.

6. **Respondent's Auxiliary request 3a**

6.1 Document D1 does not disclose data storage means and data processing means. According to the respondent, by providing data storage means and a data processing means better control of the movement of the mobile contact can be achieved by using stored desired motion profiles (cf. paragraph [0033] of the patent).

The Board is convinced by the appellant's argument that these features do not contribute technically to the storage of braking energy, but relate to a separate technical problem of improving the control of the motion of the mobile contact.

6.2 Faced with this technical problem it would be obvious for the skilled person to look to other documents in the field of switching apparatus that deal with this problem. This would lead to document D10, which on page 4, lines 6 to 15 highlights the advantages of controlling the velocity at which the contacts are closed. To provide this control D10 discloses to use a voice coil actuator controlled by a motion control circuit that compares the actual position of the actuator to an ideal motion profile pre-programmed into the motion control circuit (see page 13, line 29 to page 14, line 18).

6.3 Applying this knowledge to the device of D1 it would be an obvious matter for the skilled person to provide a data storage means to store desired motion profiles and to provide a data processing means to control the movement of D1's rotating electric machine based on those profiles.

7. **Respondent's Auxiliary request 3b**

7.1 Document D1 discloses a cam 110, limit switches 46, 48, and interconnections 122 between the limit switches and the motor control unit (see figure 7). With this arrangement the interconnections 122 form a feedback loop that transfers at least some information about the position of the rotating electric machine to the control unit. Thus, document D1 itself discloses the additional feature (b) of auxiliary request 3b.

7.2 Hence, the Board finds that the subject-matter of claim 1 of auxiliary request 3b lacks an inventive step for the same reasons as given above for auxiliary request 3.

7.3 Notwithstanding the above, the Board also considers that it would be obvious for the skilled person to provide this additional feature when tackling the technical problem of improving the control of the motion of the mobile contact as discussed above in respect of auxiliary request 3a. In particular, document D10 discloses to provide a feedback sensor for monitoring movement of the actuator and a control system coupled to the feedback sensor so as to receive information from the feedback sensor concerning the movement of the actuator and for controlling movement of the actuator based on the information (see page 4, lines 16 to 24; page 14, lines 1 to 18 also relate to this). When using the disclosure of D1 to improve the control of the motion of the mobile contact it would be obvious for the skilled person to add these features.

8. **Respondent's Auxiliary request 3c**

Claim 1 of auxiliary request 3c differs from claim 1 of auxiliary request 3 in that it includes at the end both of the additional features (a) and (b). In considering auxiliary requests 3a and 3b the Board has already given reasons why these features would be obvious to the skilled person. For those reasons the Board finds that claim 1 of auxiliary request 3c also lacks an inventive step.

9. **Respondent's Auxiliary request 4**

Method claim 1 of auxiliary request 4 does not comprise any features that have not already been discussed above

in the considerations on novelty and inventive step of apparatus claim 1 of the earlier requests.

The only feature that renders claim 1 of auxiliary request 4 novel over document D1 is the method step:

"storing the transformed electric energy in the energy supply unit".

This feature corresponds to the functional feature of claim 1 of auxiliary request 3 that the electric energy is stored into the energy supply unit and the Board has already set out in the discussion on that request why this feature is obvious in view of the prior art. That reasoning applies equally to claim 1 of auxiliary request 4, which is thus considered to lack an inventive step, Article 56 EPC.

10. In view of the above, none of the respondent's requests provides a basis for maintenance of the patent in amended form. Hence, the board has to accede to the appellant's request for revocation of the patent.

11. Regarding the appellant's request for apportionment of costs associated with dealing with the appellant's auxiliary requests, the Board notes the following. Under Article 104(1) EPC each party to opposition proceedings must, as a rule, meet the costs it has incurred. A Board may, for reasons of equity, order a different apportionment of costs where they arise as a result of amendments to a party's case under Article 13 RPBA. In the present case the Board considers the amendments to the respondent's case to be justifiable in as much as they respond to observations that the Board made in the summons to oral proceedings, some of

those observations being raised for the first time. At least for this reason the Board refused the appellants request for a different apportionment of costs.

Order

For the above reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

3. The request for apportionment of costs is refused.

The Registrar: The Chairman:

C. Moser M. Ruggiu