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Datasheet for the decision of 13 September 2016

Case Number: T 2433/11 - 3.5.02

Application Number: 05077252.4

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Language of the proceedings: EN

Title of invention:
A medium-voltage vacuum circuit breaker and a related medium-voltage switchboard

Patent Proprietor:
ABB Technology AG

Opponents:
IMESA S.p.A.
AREVA T&D SA

Relevant legal provisions:
EPC Art. 54(1), 56

Keyword:
Novelty - (no) - main and first auxiliary requests
Inventive step - (no) - second auxilairy request

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Case Number: T 2433/11 - 3.5.02

D E C I S I O N
of Technical Board of Appeal 3.5.02
of 13 September 2016

Appellant: (Patent Proprietor)	ABB Technology AG Affolternstrasse 44 8050 Zürich (CH)
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Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 27 September 2011 revoking European patent No. 1772883 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	R. Lord
Members:	M. Léouffre
	R. Cramer

Summary of Facts and Submissions

I. On 23 November 2011 the proprietor appealed against the decision of the opposition division, posted on 27 September 2011, to revoke the European patent No. 1 772 883.

II. The opposition division held that the subject-matter of claim 1 of the main request lacked novelty having regard to each of the documents:
- EP 0 543 683 A1 (D10);
- EP 0 543 681 B1 (D17); or
- EP 0 559 552 A1 (D18),
and that the subject-matter of claim 1 of each of the first and second auxiliary requests did not involve an inventive step in the sense of Article 56 EPC having regard to the combination of document D18 with either D10 or D1 (EP 0 758 138 A1).

III. With the statement of grounds of appeal, which was received on 27 January 2012, the appellant filed anew the main request which was the subject of the contested decision, as well as two auxiliary requests which are identical to those which were the subject of the contested decision, except that in each case in claim 1 one feature has been transferred from the preamble into the characterising portion.

IV. In their replies to the grounds of appeal respondents I and II (opponents I and II) referred, inter alia, to documents D18, D10, D17, D1, and to
- D16 : Alsthom: "Vacuum circuit breakers VB L - DPI L (with D16a),
which had been cited with the grounds of opposition filed by opponent II.

V. In a communication accompanying the summons to oral proceedings the Board expressed the preliminary opinion that the subject-matter of claim 1 of the main request might not be novel having regard to documents D10, D17, D18, D1, D11 or D16 (Article 54 EPC), and that the subject-matter of the first and second auxiliary requests seemed to lack an inventive step (Article 56 EPC).

VI. With a letter dated 1 August 2016 the appellant informed the board that they would not attend the oral proceedings.

VII. On 23 August 2016 the oral proceedings scheduled for the 30 August 2016 were cancelled and the parties informed accordingly.

VIII. The appellant (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the main request or of one of the first and second auxiliary requests, all filed with the statement of grounds of appeal of 27 January 2012.

Both respondents requested that the appeal be dismissed, implicitly in the case of respondent I (opponent I), explicitly in the case of respondent II (opponent II).

IX. Claim 1 of the main request reads as follows:

"A medium-voltage vacuum circuit breaker (100) comprising:
- a plurality of interruption poles (1) each comprising a first connection terminal (2) and a second connection terminal (3), and a vacuum envelope (4) which contains

a fixed contact (5) electrically coupled to said first connection terminal (2) and a corresponding mobile contact (6) electrically coupled to said second connection terminal (3), wherein each interruption pole (1) comprises an insulating box (14-15) delimiting an internal free volume which accommodates a corresponding vacuum envelope (4), said interruption poles (1) being aligned each other and being arranged so as the respective mobile contacts (6) are movable, during actuation, along a substantial vertical axis (12), with the vertical axes (12) of the interruption poles (1) lying in a common vertical plane (20);
- an operating mechanism (200) suitable to supply energy for moving the mobile contacts (6) of said plurality of interruption poles (1) between a circuit breaker closed position where they are each electrically coupled with the corresponding fixed contact (5) and a circuit breaker open position where they are disengaged therefrom;
- transmission means (300) for transmitting the energy from the operating mechanism (200) to the mobile contacts (6), said transmission means (300) being positioned on a side of the aligned interruption poles (1);
- wherein said operating mechanism (200) is provided with a front panel (7) having a front face provided with functional components suitable for direct vision or intervention of users, said front face lying on a substantial vertical plane which is perpendicular to said vertical plane (20); characterized in that each insulating box (14-15) comprises two separate parts coupled together, the insulating boxes (14-15) being fixed to an elongated supporting member (30) which is positioned on a side of and parallel to the aligned interruption poles (1)".

X. Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the characterising part is replaced by the following:

"and wherein said transmission means (300) comprise an actuating rod (301) which is mechanically coupled to the operating mechanism (200) and to the movable contact (6) of each of the interruption poles (1), characterized in that said actuating rod (301) is arranged so as to transmit the energy from the operating mechanism (200) to the movable contacts (6) by moving along a rectilinear axis (306), and wherein said actuating rod (301) is arranged so as to cross transversely the insulating box (14-15) of each interruption pole (1)."

XI. Claim 1 of the second auxiliary request combines the features of claim 1 of the main request and claim 1 of the first auxiliary request.

XII. The arguments of the appellant in so far as they are relevant for the present decision may be summarised as follows:

D10 disclosed (see e.g. column 5 from line 35 onwards, and figure 2) an insulating bushing 10 (“traversée isolante”) in the form of, for example, a tubular sleeve, inside which was a vacuum ampoule 14. The insulating bushing 10 was a single-piece body (see e.g. column 6, lines 18 to 20, and figure 2) comprising portions 10A, 10B, 10C. Around and outside the bushing 10 were positioned fins 11 (“ailettes”).
The combination of bushing 10 and fins 11 was not an insulating box delimiting an internal free volume and comprising two separate parts coupled together, but was rather just a first part, namely the one-piece

insulating bushing 10 and a second part, the fins 10, on the exterior of the bushing. The fins 11 had no structural or functional relationship related to the bushing 10 as regards delimiting an internal free volume as presently claimed.

The insulating sheath 27 (gaine 27; see column 6 lines 28-34, figure 4) was inserted inside the bushing 10 in order to guarantee the dielectric strength between the bushing 10 and the metallic tube 25.
The combination of bushing 10 and sheath 27 was not an insulating box delimiting an internal free volume and comprising two separate parts coupled together, but was rather just two concentrically-placed insulating sleeves, wherein the internal sheath 27 was structurally and functionally totally unrelated to the bushing 10 as regards delimiting an internal free volume as presently claimed.

The metallic grid 51A ("grillage métallique", see column 8, lines 10 to 23, and figure 2) embedded in the bushing 10 served to prevent electric discharges due to the presence of air between the flange 17 and the bushing 10.
Hence the combination of bushing 10 and metallic grid 51 was not an insulating box comprising two separate parts coupled together, but was rather just a one-piece insulating bushing 10 and a metallic part embedded in the bushing, and again with a totally unrelated purpose as regards delimiting an internal free volume as presently claimed.

The same arguments and conclusions applied also when considering document D18.

The opposition division assigned to the features of D10, or D18, a technical function and meaning which was not disclosed or implied by either. The division had instead tried to bridge the differences between the features of independent claim 1 and D10 (or D18) by reading into D10 (or D18) characteristics which were present only in that claim, so that their argument was based on hindsight or ex-post facto analysis.

Since D10 and D18 taught substantially the opposite of what was claimed, i.e. to have a one-piece insulating housing (the bushing 10), the person skilled in the art would have been led away from the claimed invention.

The objective problem solved by the features of claim 1 of the first auxiliary request in view of D18, was to achieve an overall compactness and optimisation of the structure (see paragraphs 0008 and 0025 of the granted patent) and not just to provide an alternative actuator type.

When trying to solve the above objective problem a person skilled in the art would not have been motivated to replace the rotating shaft 38 of D18 with a rectilinear rod, as described for example in D10, because the mere substitution of the rotating shaft 38 with a rectilinear rod moving along the longitudinal axis of the shaft 38 would have led to a non-working solution, since the mechanism of D18 (e.g. crank 37, rod 35, lever 32) adapted to transmit the movement from the rotating rod 38 to the movable contacts was unsuitable for receiving and transmitting such a linear movement.
Hence the person skilled in the art would have been forced to modify other parts of the mechanism in order to transform the linear movement of the translating rod

along its axis, into a vertical movement in a plane substantially parallel to that of each moving contact (i.e. the plane where the rocking lever 32 moves around the pivot 38). Specifically, the crank 37 shown in figure 3 of document D18, i.e. the element connected to the actuating rod, would have needed to be replaced by a lever like the lever 38B shown in figure 5E of D10 and the rod 35 shown in figure 3 of document D18 would have needed to be replaced by a lever like the lever 32A shown in figure 5E of D10.

As a consequence of the form of the bushing 10, each pair of levers 38B-32A (replacing the levers 37-35) would have needed to be placed in a position free from the obstacle represented by the body of the bushing 10 itself, and in particular outside the groove 10A of the circuit breaker shown in figure 3 of D18.

Hence each pair of levers 38B-32A could have been positioned:
- either along the actuating rod and outside the body of the respective bushing 10, thus resulting in a substantial increase of the entire length of the circuit breaker;
- or the actuating rod could have been moved outside the groove 10A so as to have a free space where the levers 38B-32A (replacing the levers 37-35) could move freely, thus resulting in an increase of the width of the circuit breaker.

Therefore, a person skilled in the art would have been motivated away from making this modification of D18, since it would have led to an increase in the size of the circuit breaker.

The objection of lack of inventive step against claim 1 of the first auxiliary request starting from D10 and combining it with D18 was not justified, because the feature “the actuating rod 301 is arranged so as to cross transversely the insulating box 14-15 of each interruption pole 1" (feature F4) was not disclosed in D18.

Since claim 1 of the second auxiliary request substantially corresponded to the combination of features of claim 1 of the main request and of claim 1 of the first auxiliary request, the arguments and conclusions about patentability presented above applied equally.

XIII. The arguments of respondent I in so far as they are relevant for this decision may be summarised as follows:

The feature "an insulating box (14-15) delimiting an internal free volume" (feature F0) of claim 1 of the main request was unequivocally anticipated by document D10.
The feature "each insulating box (14-15) comprises two separate parts coupled together" (feature F1) did not contain the limitation that the two separate parts of the insulating box both contributed to delimiting an internal free volume. According to the claim, it was possible that the first part of the insulating box contributed to delimiting an internal free volume while the second part of the insulating box did not. In this case, the combination of bushing 10 and fins 11 or the combination of bushing 10 and grid 51A, disclosed in D1O, each anticipated the feature F1 of claim 1.

Concerning the first two features added in claim 1 of each of the auxiliary requests it could be seen that D10 disclosed an alternative arrangement using a transmission lever (38B), a connecting rod (32A) and a rocking lever (32), which exactly correspond to the transmission lever (303), the connecting rod (304) and the rocking lever (305) of the contested patent.

Thus the only feature distinguishing claim 1 of the first and auxiliary requests from D10 was the feature "said actuating rod (301) is arranged so as to cross transversely the insulating box (14-15) of each interruption pole (1)" (feature F4).
According to the appellant the aim of feature F4 was to improve the compactness of the device, avoiding that the actuating rod protrudes externally with respect to the edges of the walls of the insulating box. Such a result could however be achieved either by a through hole or a groove in the wall of the insulating box. In both cases, the actuating rod crossed transversally the insulating box without protruding with respect to the edges of the walls of the insulating box.

Moreover, D18 referred to the same technical problem (see column 1, lines 27 to 36) and taught the same solution: “the actuating rod (38) is arranged so as to cross transversally the insulating box of each interruption pole (1; 2; 3)” (see Figures 1 and 3 and column 6, lines 32 to 44 of D18).
The arrangement of the actuating rod of D18 (a rod which transversally crosses the insulating box of each interruption pole) could be used in the device of D10, without any particular constructional modification.
Therefore claim 1 of the first auxiliary request was not inventive with respect to the combination of D10 with D18.

XIV. The arguments of respondent II in so far as they are relevant for the present decision may be summarised as follows:

The expression "the insulating box comprises two separate parts coupled to each other" in claim 1 of the main request covered a variety of configurations; in particular, portions might have been separate, while forming part of a single structural element. Such a configuration was disclosed in D10. The insulating box of the medium-voltage vacuum circuit breaker of that document comprised an upper part 10A and a bottom part 1OB, these two parts being connected by the intermediate part 10C (see D10, column 5, line 27 to column 6, line 19). That passage identified different elements, 10A, 10B, 10C as "parts" (see D10, column 5, line 53: "la partie de la traversée... ", see also column 6, lines 18 and 19: "Bien entendu, les parties 10A, 10B et 10C constituent qu'une seule et même pièce... "). The subject-matter of claim 1 was therefore known from D10. For similar reasons it was also known from D16, in particular from the figure on page 12.

Claim 1 of the first auxiliary request lacked novelty over D16.
The features added to claim 1 of that request compared to the main request were also disclosed in D16:
- the figure on page 12 of D16 showed clearly that the set of poles was connected to a central mechanical support which included the kinematic motion transmission; more specifically, a rod 11 coupled to the front mechanism 1 to 10 and to a mobile contact of each pole moved in translation along a linear axis;
- the figure on page 12 also showed that the rod passed

through a box associated to each pole; in this box, dividers defined a sub-unit associated with each pole individually and there was a communication between these sub-enclosures and each insulating box (vertical) which housed the corresponding pole. This was necessary to pass the vertical axis, which was connected to a lever, the latter itself being connected to the rod 11 (the device of page 12 of D16 was reproduced in an enlarged manner in document D16a). There were walls P1, P2, P3, P4 which delimited lower part compartments which communicated through an opening, O1, O2, O3 with the upper volume consisting of each of the individual insulating boxes. These compartments were therefore parts of the individual insulating boxes. Consequently the rod crossed the individual insulating boxes. D16 destroyed therefore the novelty of claim 1 of the first auxiliary request.

Reasons for the Decision

1. The appeal is admissible.

2. Main request - Article 54 EPC

2.1 In the statement of grounds of appeal the appellant argued that the subject-matter of claim 1 was novel having regard to document D10 because D10 did not disclose the following features:
- "each interruption pole (1) comprises an insulating box (14, 15) delimiting an internal free volume" (feature F0), and
- "the insulating boxes (14-15) comprise two separate parts coupled together" (feature F1).
The appellant did not dispute that the remaining features of the claim are known from D10, as had been

argued in the decision under appeal (see point 3.2.1 of the Reasons).

2.2 The insulating box of D10 shown in figure 2 is made of several parts, among which are a bushing 10, 10A, 10B, a grid 51A, fins 11, and a sheath 27. The insulating box of D10 delimits an internal free volume to accommodate a vacuum envelope 4. If the vacuum envelope is too small, the bushing may comprise a further part in the form of a cage as shown in figure 3 (see figures 2 and 3, and column 5, line 57 to column 6, line 20).

2.3 The appellant argued that these different parts were not as defined in features F0 and F1, because only one of them served to delimit the internal free volume. However, claim 1 does not specify that the insulating box comprises two separate parts coupled together, each part contributing to delimiting a portion of the internal free volume, but solely that an insulating box should delimit a free volume and that the insulating box should be made of several parts. Hence features F0 and F1 are disclosed in D10.

2.4 The Board concludes therefore that the subject-matter of claim 1 of the main request is not new over D10 (Article 54 EPC).

3. First auxiliary request - Article 54 EPC

3.1 Document D16 discloses a medium-voltage vacuum circuit breaker (see overview on page 2) comprising:
- a plurality of interruption poles (one per phase as shown in the figure of page 12) each comprising a first connection terminal and a second connection terminal (connections are visible on the two right poles of the picture shown on page 12), and a vacuum envelope

(vacuum interrupter 5 on the left pole) which contains a fixed contact electrically coupled to said first connection terminal and a corresponding mobile contact electrically coupled to said second connection terminal. Each interruption pole comprises an insulating box delimiting an internal free volume which accommodates a corresponding vacuum envelope 5.
The figure of page 12 clearly shows that the interruption poles are aligned with each other and arranged so that the respective mobile contacts are movable, during actuation, along a substantially vertical axis, with the vertical axes of the interruption poles lying in a common vertical plane.
An operating mechanism situated on the left of the interruption poles is suitable to supply energy for moving the mobile contacts of said plurality of interruption poles between a circuit breaker closed position where they are each electrically coupled with the corresponding fixed contact and a circuit breaker open position where they are disengaged therefrom.
The mechanism comprises transmission means 11 situated below the movable contacts for transmitting the energy from the operating mechanism to the mobile contacts.
The transmission means comprises an actuating rod which is mechanically coupled to the operating mechanism and to the movable contact of each of the interruption poles (over further mechanical components as is the case in the present invention). It is visible in the pictures on pages 2 and 12 that the operating mechanism is provided with a front panel having a front face provided with functional components 10 suitable for direct vision or intervention of users, said front face lying on a substantially vertical plane which is perpendicular to said vertical plane.

As the transmission means 11 are positioned below the interruption poles, they are considered as being positioned on a side of the aligned interruption poles.

3.2 The features of the characterising part of claim 1 of the first auxiliary request read as follows:

- "said actuating rod (301) is arranged so as to transmit the energy from the operating mechanism (200) to the movable contacts (6) by moving along a rectilinear axis (306)" (feature F3); and
- "said actuating rod (301) is arranged so as to cross transversally the insulating box (14-15) of each interruption pole (1)" (feature F4).

3.3 These features F3 and F4 are known from D16 since the elongated rod 11 transmits the energy from the operating mechanism to the movable contacts by moving along a rectilinear axis.
The insulating box of each interruption pole of D16 comprises an associated second bottom part (see figure on page 12 of D16) accommodating, and crossed by, the elongated rod 11.

3.4 The circuit breaker of D16 thus includes all the technical features of claim 1 of the first auxiliary request. The subject-matter of that claim is therefore not new (Article 54 EPC).

4. First and second auxiliary requests - Article 56 EPC

4.1 The subject-matter of claim 1 of each of these requests does not involve an inventive step (Article 56 EPC) having regard to D10, for the following reasons.

4.1.1 D10 clearly discloses that the rotating transmission means 38 shown in figure 2 may be replaced by an elongated rod movable along a rectilinear axis as shown in figure 5E (see also column 9, lines 47 to 54). Thus this alternative would include not only the features of claim 1 of the main request as discussed above, but also the final feature of the preamble of claim 1 of each of the auxiliary requests, and the first feature of the characterising portion (i.e. feature F3).

4.1.2 The subject-matter of claim 1 of the first and second auxiliary requests thus differs from this teaching of D10 in that "the actuating rod is arranged so as to cross transversely the insulating box of each interruption pole".

4.1.3 According to the appellant this feature contributed to the reduction in size of the overall apparatus.

4.1.4 However, the insulating boxes of the interruption poles of the present invention are made larger than the insulating boxes of the interruption poles shown in D10. Indeed the walls of the base piece 15 of the interruption poles shown in figure 3 of the present patent are not as close to the vacuum envelope 4 as is the case in the cited prior art. Moreover, in contrast to the prior art, the actuating mechanism 301, 303, 304 is not positioned outside the insulating box but is enclosed by the walls of the base pieces 15 of the insulating boxes (see figures 3 and 4 of the contested patent). The insulating boxes, which comprise means for fixing to a supporting member, need therefore necessarily to be deeper than the boxes of the prior art, and consequently, the connecting rods 301 need necessarily to cross at least a part of the insulating boxes. The solution of the present invention wherein

the actuating rod is positioned between the elongated supporting member 30, to which the insulating boxes are fixed, and the vacuum envelopes 4 of the interruption poles thus does not save space compared to the solution known from the prior art, especially D10, but instead increases the volume of the interruption poles. No exercise of an inventive step can be seen in an arrangement which does not appear to save space but rather to increase the size of the medium voltage vacuum circuit breaker.

4.2 Furthermore the Board agrees with respondent I that the device of D18 already addresses the problem of compactness and that therefore the arrangement of the actuating rod of D18, wherein the rod passes through a groove in the insulating box, i.e. crosses the insulating box, could be applied to the device of D10 in an obvious manner.

4.3 The subject-matter of claim 1 of each of the first and second auxiliary requests therefore does not involve an inventive step according to Article 56 EPC.

5. Request for oral proceedings

With the letter dated 1 August 2016 the appellant informed the board that they would not attend the oral proceedings. This statement is equivalent to a withdrawal of the appellant's request for oral proceedings (see Case Law of the Boards of Appeal of the European Patent office 8th edition 2016, Chapter III.C.2.3 at pages 562 and 563). Thus, and in view of the above, the board is in a position to decide without holding oral proceedings. Since none of the appellant's requests provides a basis for maintenance of the patent

in amended form, the board has to accede to the respondents' request to dismiss the appeal.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

U. Bultmann R. Lord

Decision electronically authenticated