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D E C I S I O N
of 25 January 1994

Case Number: T 0449/92 - 3.5.2

Application Number: 84104910.9

Publication Number: 0127006

IPC: H02B 13/02

Language of the proceedings: EN

Title of invention:
Gas-insulated switchgear equipment

Patentee:
Hitachi, Ltd.

Opponent:
Siemens AG

Headword:
-

Relevant legal norms:
EPC Art. 56

Keyword:
"Inventive step (yes)"

Decisions cited:
-

Catchword:
-

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Case Number: T 0449/92 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 25 January 1994

Appellant: (Opponent)
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Representative:
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office dated 10 March 1992 rejecting the opposition filed against European patent No. 0 127 006 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: W.J.L. Wheeler
Members: M.R.J. Villemin
F. Benussi

Summary of Facts and Submissions

I. The Appellant contests the decision of the Opposition Division rejecting the opposition to European Patent No. 0 127 006.

II. The following documents were referred to by the Appellant during the appeal proceedings:

D1: US-A-4 354 220,
D2: DE-A-2 718 436,
D3: Siemens Zeitschrift, Vol. 51, January 1977, pages 45 to 50,
D4: Siemens, Switchgear of Type 8D.5, Operating Instructions (not dated).

D1 and D2 had been taken into consideration during the proceedings before the Opposition Division.

III. The Appellant requested that the decision under appeal be set aside and that the patent be revoked.

IV. The Respondent requested that the appeal be dismissed and that the patent be maintained as granted (main request) or maintained on the basis of the single claim submitted with the letter of 29 March 1993 (auxiliary request).

(a) Claim 1 as granted is worded as follows:

"A gas-insulated switchgear equipment comprising a main bus conduit (10) containing a main bus conductor (13) and disposed substantially horizontally; a container (15,16) connected to said main bus conduit (10) at a top portion thereof for accommodating a disconnecting switch unit, wherein

said disconnecting switch unit is composed of a pair of contact members (6,8) one of which is to be electrically connected to said bus conductor (13); and spacers (11,12) disposed substantially vertically at predetermined positions in said main bus conduit (10) for defining a gas-filled compartment for said disconnecting switch unit; characterised by post-like insulation support means (20) fixedly mounted on said container (15,16) of said disconnecting switch unit for securely supporting a stationary conductor (19) mounted on the contact member (6) to be electrically connected to said bus bar (13); and a tulip-like current collector (18) for connecting one end of a branch conductor (17) having the other end connected to said main bus conductor (13) and said stationary conductor (19) to each other."

Claim 2 as granted is dependent on Claim 1.

(b) The single claim according to the auxiliary request is a combination of Claims 1 and 2 as granted.

V. Oral proceedings were held before the Board.

VI. The Appellant argued essentially that D4 was delivered with switchgear of type 8D.5 in 1976, as was shown in D3. The gas-insulated switchgear equipment described in D4 comprised a post-like insulation support means 62 for supporting a conductor 41.13 mounted on a contact member to be electrically connected to a bus bar by means of a tulip-like conductor. Metal dust could collect on the horizontal surface of the bushing 29. It was obvious to the person skilled in the art to replace the bushing 29 by vertical spacers as shown in Figures 4 and 6 of D1. D4 showed conductors connected together by tulip-like connectors, see Figure 2/5, part 30.41 and Figure 2/6.

It was obvious to use such a connector between the switchgear and the bus bar. The accommodation of thermal expansion was a mere bonus effect which could not contribute to an inventive step.

Therefore the subject-matter of Claim 1 as granted did not involve an inventive step over a combination of the teachings of D1 and D4.

VII. The Respondent explained that the rotary insulator 62 disclosed in D4 could not be regarded as a post-like insulation support means fixedly mounted on the container for securely supporting a stationary conductor as required by Claim 1 for it was rotatable and was used to position the movable conductor 41.13.

The horizontal bushing 29 of the device according to D4 was designed as support means for the break assembly 36.9 (Figure 2/8) and its replacement by vertical spacers as disclosed in D1 would entail numerous modifications which were not suggested in D4.

It was not indicated in D4 that conductor 30.5.1 (Figure 2/5) was connected to the break assembly 36.9 by means identical to the coupling contact 30.41 for linking horizontal bus conductors. Moreover, such a coupling contact 30.41 as depicted in Figures 2.5 and 2.6 had a structure different from that of a tulip-like current collector as described in the patent.

In conclusion, the combined teachings of D1 and D4 did not render obvious the subject-matter of Claim 1.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request*

The only question in dispute is whether the subject-matter of Claim 1 involves an inventive step within the meaning of Article 56 EPC.

2.1 D1 discloses with reference to Figures 4 and 6 gas-insulated switchgear equipment in accordance with the preamble of Claim 1 of the contested patent.

2.2 D2 relates, *inter alia*, to a disconnecting switch unit for a gas-insulated switchgear equipment. Figure 4 shows stationary contacts 6a, 6b which seem to have a "tulip-like" construction. The container 1 accommodates these stationary contacts 6a, 6b and movable contacts 13a, 13b.

Spacers 3a, 3b are disposed vertically at predetermined portions in the main bus conduit for defining a gas-filled compartment for the disconnecting switch. The stationary contacts are supported by post-like insulation members secured to the spacers.

2.3 D4 (whose availability to the public was not disputed in the oral proceedings) relates to switchgear equipment having the following features:

(a) a main bus conduit 30 (Figures 2/1 and 2/5) containing a main bus conductor 30.5 and disposed horizontally;

(b) a container (Figure 2/8) connected to said main bus conduit at a top portion thereof for accommodating a disconnecting switch unit;

(c) post-like insulation rotary means 62 mounted on the container and mechanically linked to a break assembly 36.9 containing a movable contact ("contact pin") 41.13 and a fixed contact ("sliding contact") 40.5;

(d) a gas-filled compartment defined by a horizontal insulating disc-shaped support means ("bushing") 29 fixed to the container. In this respect, this structure is similar to that as depicted by Figure 2 of D1 (see spacer 10).

It is known (cf. D1, column 3, lines 55 and 56) that conductive particles might be deposited on such a support means which can cause degradation of its insulation property.

2.4 If, following the Appellant's line of argument, D4 is regarded as the closest prior art document, it would appear that the problem addressed by the patent in suit could be objectively defined as supporting the stationary contact in a manner which prevents degradation of the insulating property caused by the deposition of dust and other conductive particles, and avoids adverse effects due to thermal expansion.

2.5 Starting from D4, the solution of the above problem according to Claim 1 of the patent in suit involves:

- replacing the horizontal spacer 29 by spacers disposed vertically in the main bus conduit, as known per se from D1 (Figure 4) or D2 (Figure 4),

- replacing the post-like rotary insulator 62 supporting the movable conductor 41.13 by a post-like fixed insulation support means supporting a stationary conductor;

- mounting such a stationary conductor on a contact member to be connected to a main bus conductor 30.5, (Figure 2/5);

- providing a tulip-like current collector, as known *per se* from D1 or D2, for connecting one end of a branch conductor 30.5.1(Figure 2/5) having the other end connected to the main bus conductor and said stationary contact to each other.

2.6 Since no cited document discloses a stationary conductor supported and connected as recited in Claim 1, it would not be obvious to make such a fundamental change to the switchgear described in D4 as to replace the horizontal bushing 29 by vertical spacers in the conduit and the rotary insulator 62 and the break assembly 36.9 by a post-like fixed insulation support supporting a stationary conductor mounted on the contact member to be electrically connected to the bus conductor.

None of the prior art documents discloses a tulip-like current collector as a possible permanent connection between a conductor branching off a bus conductor and a contact of the switch unit. The effects of thermal expansion are a serious problem in switchgear of the type with which the patent is concerned and must always be taken into consideration. Thus avoiding adverse effects of thermal expansion should not be discounted as a mere bonus effect.

2.7 The Board therefore agrees with the arguments put forward by the Respondent that it would not have been

obvious to the skilled person to employ a tulip-like current collector in the manner defined in Claim 1 of the patent in suit.

It follows that the subject-matter of Claim 1 of the patent in suit involves an inventive step within the meaning of Article 56 EPC. Consequently, the Respondent's main request has to be allowed.

Order

For these reasons, it is decided that:

The Appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl W.J.L. Wheeler