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I. SUMMARY OF FACTS AND SUBMISSIONS

Case Number: T 100 / 82

DECISION
of the Technical Board of Appeal 3.4.1
of 21 January 1983

Appellant: RELIABLE ELECTRIC COMPANY
11333 Addison Street
Franklin Park, Illinois 60131
USA

Representative: Carpenter, David et al
Marks & Clerk
Alpha Tower ATV Centre,
Birmingham B1 1TT
United Kingdom

Decision under appeal:	Decision of Examining Division 045	of the European Patent
	Office dated 9 March 1982	refusing European patent
	application No 80 300 592.5	pursuant to Article 97(1)
	EPC	

Composition of the Board:

Chairman: R. Kaiser
Member: O. Huber
Member: P. Ford

(1) European patent application No. 80 300 592.5 entitled "Line protector for a communications circuit", filed on 28 February 1980 and published on 29 October 1980 (publication No. 0 018 067) and claiming priority of 6 April 1979 from a previous application in the USA, was refused by decision of Examining Division 045 of the European Patent Office dated 9 March 1982. That decision was based on claims 1-4 received on 16 November 1981. The grounds for refusal were that it was obvious for a person skilled in the art to use a semiconductor voltage arrester according to DE-A-2 634 479, which also has the property to pass increasing current for a given voltage with increasing temperature and to become subject to a thermal runaway condition, in a line protector as known from US-A-3 975 664. Therefore, no inventive step was seen in the combination.

(2) On 4 May 1982 the appellant lodged an appeal against the decision by telex and paid the appeal fee. A document reproducing the essential contents of the telex was filed on 10 May 1982. The appellant submitted a Statement of Grounds on 29 June 1982 and maintained the claims 1-4 received on 16 November 1981. The claim 1, divided by the Board into parts (a) ... (i), reads as follows:

A line protector comprising

- (a) an insulating base (6),
- (b) line pins (8, 10; 12, 14) projecting through said base for connection to a line to be protected, and
- (c) a terminal (16) for connection to ground;
- (d) a surge voltage arrester (24) of the semi-conductor

type that has a resistance that decreases as increasing voltage is applied thereacross and which heats excessively in an over-current surge condition on the protected line,

- (e) said arrester comprising opposed surfaces (26,28) forming terminal portions one of which (26) is in electrical connection with said ground terminal, the other terminal portion (28) being in electrical connection with the line pins;

and characterised in that

- (f) said arrester passes increasing current for a given voltage with increasing temperature and becomes subject to a thermal runaway condition,
- (g) a normally open shunt circuit between said opposed terminals (26,28) but operable to close and thereby ground the line in the event of a surge condition on the line that causes said overcurrent condition,
- (h) said shunt circuit comprising resilient electrically conductive members (30,32,36) biased toward at least one of said terminal portions (26,28),
- (i) a dielectric member in thermally conducting relation with said surge arrester, said resilient members (30,32,36) being prevented from contacting said one terminal portion by said dielectric member except when an overcurrent condition that heats the semi-conductor a sufficient amount to melt said dielectric member.

By the communication dated 3 September 1982 the rapporteur on behalf of the Board additionally cited US-A-4 092 694 and observations of the appellant to this communication were received on 28 September 1982.

- (3) The appellant has submitted the following arguments:

The claimed line protector has the advantage that it can be plugged into a conventional connector board and the use of a particular kind of semi-conducting arrester (a highly negative temperature coefficient of resistance) provides a more rapid response to an over-current condition that is achieved by the known arresters according to DE-A-2 634 479 (varistor) or US-A-3 975 664 (gas discharge tube). In DE-A-2 634 479 nothing is said whether the resistance of the varistor decreases with increasing temperature.

Therefore, it was incorrect for the Examining Division to state that a combination of selected desired features from US-3 975 664 and DE-A-2 634 479, i.e. the use of a semiconductor arrester (varistor) according to DE-A-2 634-479 in the line protector described in US-A-3 975 664, would result in an arrangement which falls within the terms of claim 1. Moreover, the appellant was the first to recognise the need to embody a special varistor type arrester in a standard plug-in line protector module and to provide a practical solution to the problem.

US-A-4 092 694 does not teach that improved response and sensitivity can be achieved by utilising a varistor with a negative temperature coefficient, since such a known overvoltage surge arrester is designed to dissipate the unwanted heat generated by a varistor of that type. Taking into account these facts, the subject matter of the application is based on an inventive step.

- (4) The appellant has requested the cancellation of the decision to refuse the European patent application.

II. REASONS FOR THE DECISION

- (1) The appeal complies with Articles 106-108 and Rule 64 EPC. It is therefore admissible.
- (2) There is no formal objection to the current claims, since they are adequately supported by the original documents. As to the special varistor type, see in the description page 2, lines 26-30.
- (3.1) The line protector according to claim 1 differs from that disclosed in US-A-3 975 664 in the three following features only:
 - (i) the surge voltage arrester in form of a gas discharge tube (20 in US-A-3 975 664) is replaced by one of the semi-conductor type (varistor) (feature (d) in parts);
 - (ii) said arrester passes increasing current for a given voltage with increasing temperature and becomes subject to a thermal runaway condition (feature (f)); and
 - (iii) the meltable member consists of a dielectric material (feature (i) in parts) and not of a slug element such as solder.
- (3.2) According to page 1, last paragraph, and page 2, first paragraph, of the description the appellant aims
 - (a) to provide a line protector that utilises a varistor of the type stated and which can be embodied into a central office protector module of the plug-in

type, thereby enabling the module to be plugged into conventional connector blocks, and

(b) to provide a line protector of the type stated in which a direct metallic shunt to ground is provided in the event of a surge condition that results in excessive heat build up in the varistor, thereby eliminating or reducing the possibility of a thermal runaway condition or destruction of the varistor. In order to meet this requirement, the provision of a very sensitive line protector with a more rapid response to an over-current condition on the protected line than is possible with semi-conductor surge arresters of the reference citations (DE-A-2 634 479) is envisaged, c.f. first paragraph of page 2 of the Statement of Grounds of the Appeal.

- (3.3) The manufacturer and the user of a line protector according to US-A-3 975 664 will undoubtedly discover that there are certain deficiencies in the utilisation of a gas discharge tube as the arrester element. Therefore, a person skilled in the art can be expected to consult the relevant prior art for components which perform the same function and are better suited to meet the requirements.

Thus, DE-A-2 634 479 teaches that a varistor can be used as a surge voltage arrester in an overvoltage protector for electric and electronic devices (feature (d) in parts).

In addition this document discloses the use of an insulating base with projecting pins (in parts features (a), (b) and (c)) and the other mechanical

mounting features of the claimed line protector (features (e), (g), (h), (i)), see the Figures in DE-A-2 634 479. Furthermore, the meltable member (8) also consists of a dielectric material in compliance with the feature (i), see claim 3. The replacement of the gas discharge tube in a line protector according to US-A-3 975 664 by a varistor (feature (d)), in order to make use of the readily apparent technical advantages of such a varistor is therefore to be regarded as an obvious step comparable with the generally non-inventive replacement of a vacuum tube by a transistor. The same is true for the feature (i). The mere fixing of the overvoltage protector system described in DE-A-2 634 479 on a base with projecting line pins of a protector module of the plug-in type for a communications circuit (US-A-3 975 664) can be done without any difficulty and thereby solves part (a) of the problem.

The difference between the claimed line protector and the state of the art according to US-A-3 975 664 resulting from the features (d) and (i) is thus lacking in inventive step supportive of a patent.

- (3.4) In the present application only a metal oxide varistor, particularly in the form of a zinc oxide ceramic varistor, is mentioned as sole surge voltage arrester element with a negative temperature coefficient of the electric resistance corresponding to the feature (f), see claim 3 and line 26 on page 2 of the description. The utilisation of a metal oxide varistor is also indicated in DE-A-2 634 479, cf. page 5, line 7. It is true, as the appellant submits, that in DE-A-2 634-479 nothing is said about the dependence of the resistance of the varistor on the temperature.

.../...

But a person skilled in the art knows that the response time (sensibility) of a line protector using a meltable member depends on the heat quantity per time unit generated by the leakage current. Therefore it is evident that the response time can be shortened by utilizing a varistor type generating a large quantity of heat, e.g. a varistor which passes increasing current for a given voltage with increasing temperature (feature (f)). Such varistors are well known, see "Background of the Invention" in US-A-4 092 694, column 1, page 15-17. It is true, as the appellant submits, that in the case of the overvoltage surge arrester according to US-A-4 092 694 this property of a zinc oxide compound varistor is not desired and that, accordingly measures are provided to improve the thermal coupling between the varistor and the porcelain housing in order to dissipate the heat resulting from the leakage current. However, this fact is irrelevant, since this known overvoltage arrester serves the purpose of treating high powers and is not comparable with a line protector for a communications circuit. In particular, the heat generated by the leakage current through the varistor is not used, as in the application, for melting a dielectric distance member between two mechanically biased electrically conductive elements of a shunt circuit.

Therefore, there is no obstacle to prevent a skilled man from using a semi-conductor arrester element (varistor) with a negative temperature coefficient in accordance with the feature (f), in order to solve part (b) of the problem, if the need arises. The sort

.../...

of varistor depends only on the desired response time and can be selected by a person skilled in the art without any inventive activity.

Thus, the line protector according to claim 1 does not involve an inventive step (Article 56 EPC). Claim 1 therefore cannot be allowed under Article 52(1) EPC.

- (4) The claims 2-4 are formulated as dependent claims. They are not allowable since their existence is conditional on the allowability of claim 1. Furthermore, in view of the prior art, the Board cannot find any patentable features in the subclaims.

III. Order

For these reasons,

it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman

