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D E C I S I O N
of 11 December 1996

Case Number: T 0836/94 - 3.5.2

Application Number: 86107379.9

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IPC: G08B 17/00

Language of the proceedings: EN

Title of invention:
Fire alarm system

Patentee:
MATSUSHITA ELECTRIC WORKS, LTD.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - (yes - after amendment)"

Decisions cited:
-

Catchword:
-



Case Number: T 0836/94 - 3.5.2

D E C I S I O N
of the Technical Board of Appeal 3.5.2
of 11 December 1996

Appellant:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 09 May 1994
refusing European patent application
No. 86 107 379.9 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: W. J. L. Wheeler
Members: A. G. Hagenbucher
B. J. Schachenmann

Summary of Facts and Submissions

- I. The present appeal contests the decision of the examining division refusing the European patent application No. 86 107 379.9.
- II. The reason given for the refusal was that the subject-matter of independent claim 1 and dependent claims 2 and 3 then on file did not involve an inventive step having regard to document
D1: DE-A-3 415 786.
- III. In an annex to the summons to oral proceedings the Board drew attention to discrepancies in the description and claims then on file. Doubts as to sufficient disclosure of the invention (Article 83 EPC) were expressed. During the oral proceedings on 11 December 1996 new claims 1 and 2 and description pages 2, 2a, 3 to 8 were filed.
- IV. Claim 1 now reads as follows:
- "1. A method of operating a fire alarm system comprising a receiver (10) in combination with a plurality of fire detecting terminal means (5, 6, 20) connected thereto through a common signal transmission line comprising two wires, at least some of said fire detecting terminal means (20) being of composite type including:
- a sensing section (21) for sensing a fire-indicative parameter such as a smoke density to be measured by means of a sensor (22) and producing an analog signal representative thereof;

a level-signal output section (41) which receives from the receiver (10) a series of high voltage signals (VH) each alternated by a low voltage signal (VL), said high and low voltage signals being applied between the wires of the transmission line, said level-signal output section (41) including a switching element (42) connected between the wires of the transmission line so as to cause the shorting of the high voltage signal (VH) during a level signal transmission time band when the sensed parameter has a level higher than a predetermined threshold level;

a level discriminating circuit (27) connected to the switching element (42), which level discriminating circuit has the threshold level with which the value of the analog signal from the sensor (22) is compared so that it actuates the switching element (42) to make the shorting of the high voltage signal (VH) when the analog signal has a level higher than the threshold level,

an analog-digital converter (32) converting the analog signal from the sensing section (21) into a corresponding digital signal;

a binary information transmission section for transmitting the digital signal in the form of a superimposed signal upon the low voltage signal (VL) during a superimposed signal transmission time band,

a signal processor (33) which receives a demodulated instruction signal (VS) from said receiver (10) and performs the functions of reading a control signal (CD) thereof when the accompanied address signal (AD) is coincident with

a specific address assigned to the individual sensor (22), provides a suitable bit number of serial pulse data from the output of the analog-digital converter (32) in accordance with the control signal, and transmits to the receiver (10) the resulting bits of serial pulse data as the reply signal to the receiver (10) during the time period of receiving a reply waiting period (RT) provided in the instruction signal (VS), and

remote testing means (29) responsive to an instruction from the receiver (10) for causing said fire detecting terminal means to provide such an output representative of fire presence, and

said receiver including:

first means (16) responsive to the shorting of the high voltage signal (VH) for determining fire presence;

second means (13) responsive to the digital signal transmitted from the analog-digital converter (32) for determining fire presence based thereon independently of the first means (16), the digital signals from a plurality of the fire detecting terminal means being transmitted in a time-division multiplexing manner on said low voltage signal (VL) over the transmission line;

said threshold level at said level discriminating circuit (27) being adjustable;

characterized in that

said threshold level is set in said fire detecting terminal means (20) of composite type to provide the same sensitivity for the determination of fire presence by the first (16) and second (13) means;

said signal processor (33), in response to said remote testing means being actuated, appends to the bits of pulse data a single bit indicative of whether or not the switching element (42) is actuated to short the high voltage signal,

each of said fire detecting terminal means (20) of composite type is provided with means for transmitting said single bit indicative of whether or not the switching element (42) is actuated together with the digital signal to the receiver when said remote testing means is actuated, said receiver (10) having means to examine the single bit so that the receiver (10) can check the operation of the switching element (42) when said remote testing means (29) is actuated, and

said level-signal output section (41) includes a supervising circuit (43) for checking the operation of the digital signal transmission, said supervising circuit determining that the digital transmission is out of operation when the instruction signal (Vs) from said receiver or the required reply signal to the receiver to be transmitted on said low voltage signal (VL) is not acknowledged over a predetermined time period, and said supervising circuit actuating the switching element (42) to short said high voltage signal (VH) only when the supervising circuit (43) sees that the digital transmission is out of operation and when said remote testing means (29) is

actuated so that said first means (16) responds to determine the fire presence by the shorting of the high voltage signal independently of the determination of the fire presence at said second means (13)."

Claim 2 is dependent on claim 1.

- V. The appellant argued that the design of the fire alarm system underlying the claimed method would allow in principle, in contrast to D1, that the threshold level at the level discriminating circuit could be selected independently of a criterion utilised in determining fire presence by the second means receiving the superimposed signal including the information of the sensed parameter. However, in order to improve the reliability of the back-up fire detection scheme, according to the present invention the adjustable threshold level was set in the fire detecting terminal means of composite type in order to provide the same sensitivity for the determination of fire presence by the first (16) and second (13) means as disclosed at column 3, lines 37 to 52 of EP-A-241 574. Already this specific threshold voltage condition distinguished the present invention from the prior art (D1) as acknowledged at column 1, line 15 to column 2, line 23 of EP-A-241 574. It was clear from the new wording of claim 1 that the characterising features of claim 1 cooperated in order to improve the reliability of the back-up fire detection scheme. The features of the characterising part of claim 1 were not obviously derivable from document D1 even considering general knowledge. The examining division's reasoning with respect to claim 1 then on file was based on an *ex post facto* analysis.

VI. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the following documents:

Claims: 1 and 2 as submitted during the oral proceedings on 11 December 1996.

Description: Pages 2, 2a, 3 to 8 as submitted during the oral proceedings on 11 December 1996.

Drawings: Figures 1 to 7 as filed with the letter of 10 June 1996.

Reasons for the Decision

1. The appeal is admissible.
2. The amendments made to the documents (claims, description and drawings) comply with the requirements of Article 123(2) EPC. All the features in the present claims can be found in the original claims in conjunction with the description and drawings (see especially original claims 8 and 9; original description: paragraph bridging pages 4 and 5; page 6, third paragraph; page 14, last paragraph). The independent claims 1, 4 and 8 as originally filed comprise the feature "said threshold level being selected independently of a criterion utilised in determining fire presence by the second means receiving the superimposed signal including the information of the sensed parameter". The description as originally filed (see the above cited paragraphs) makes it clear, however, that this allows to set the threshold level in a fire detecting terminal means of composite type to provide the same or even higher sensitivity for the determination of fire presence by the first (16) means

compared with the second means (13) in contrast to the prior art which restricts the sensitivity of the first means to be lower than that of the second means. It is explained in the above cited paragraphs that the invention uses the same sensitivity for the first and second means in order to improve reliability.

3. *Novelty*

3.1 The claimed method is novel over the solution in D1 because it uses the same sensitivity for the determination of fire presence by the first and second means whereas according to the prior art the first means (16) normally has a smaller sensitivity than the second means (13). Moreover, D1 does not show the use of a supervising circuit in the level-signal output section and all the less its operation as defined in claim 1.

4. *Inventive step*

4.1 Closest prior art and problem to be solved.

According to the description the present invention starts from D1 as closest prior art. Only this prior art document is referred to in the decision under appeal. D1 discloses a method of operating a fire alarm system with all the features in the preamble of present claim 1. It is explained in the introduction of the present description that according to this prior art the level signal transmission network of the fire detecting terminal means of composite type is limited to have less sensitivity against possible fires than the digital signal transmission network. Since the known back-up system was only operative on excessive conditions it did not provide a truly reliable back-up fire detection scheme.

Starting from D1, the problem underlying the subject-matter of claim 1 is seen in providing an improved method of operating a fire alarm system having a more reliable back-up fire detection scheme.

4.2 Solution

According to claim 1 this problem is solved in a method of operating a fire alarm system with the features indicated in the preamble of claim 1 (and known from D1) by:

- (a) setting the threshold level in the fire detecting terminal means of composite type to provide the same sensitivity for the determination of fire presence by the first (16) and second (13) means and
- (b) when the remote testing means (29) is actuated for causing the associated fire detecting terminal means to provide an output representative of fire presence
 - (b1) the associated signal processor (33) appends to the bits of pulse data intended as reply signal a single bit indicative of whether or not the switching element is actuated to short the high voltage signal;
 - (b2) the single bit is transmitted together with the digital signal to the receiver which checks by means of the single bit the operation of the switching element;

(c) a supervising circuit (43) in the level signal output section (41)

(c1) checks the operation of the digital signal transmission by determining whether the instruction signal (Vs) from the receiver or the required reply signal to the receiver to be transmitted on the low voltage level (Vl) is acknowledged over a predetermined period of time or not and

(c2) actuates the switching element to short the high voltage signal (VH) only when the supervising circuit sees that the digital transmission is out of operation and

when the remote testing means is actuated so that the first means (16) responds to determine the fire presence by the shorting of the high voltage signal independently of the determination of the fire presence at the second means.

In contrast to the solution in D1 feature (a) ensures that the back-up scheme can successfully determine fire presence in case of a failure of the main fire detection system at the same sensitivity. Feature (b) serves to test the function of the switching element provided for shorting the high voltage signal (VH) as long as the digital information processing and transmission operate correctly. According to feature (c) the operation of the digital signal transmission system is tested and the high voltage signal shorted by means of the switching element for fire determination by the first means when the digital transmission is out of operation and the remote testing means is actuated. The testing facilities in features (b) and (c) and the consequential step in the specific failure situation

indicated in feature (c) makes the operation of the fire alarm system more reliable. The European patent application discloses the invention as claimed in a sufficiently clear and complete manner for it to be carried out by a person skilled in the art. The requirements of Article 83 EPC are met.

- 4.3 Document D1 does not hint at any of features (a) to (c) (see paragraph 4.2 above). It does not even disclose a supervising circuit in the level signal output section. All the less can it point to the functions provided by the supervising circuit as defined in claim 1. Claim 1 has been amended considerably in contrast to claim 1 underlying the decision under appeal so that it is clear now in which way the respective features cooperate in order to solve the underlying problem. Therefore claim 1 no longer comprises just an "agglomeration" or collocation of features to be judged separately on inventive step only with reference to general knowledge as has been done in the decision under appeal.

Hence, the Board is of the opinion that the subject-matter of claim 1 is not obviously derivable from document D1 and general knowledge. The subject-matter of claim 1 involves an inventive step.

5. In the opinion of the Board, independent claim 1 together with dependent claim 2 are allowable. The amended application documents meet the requirements of the EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of
 - Claims 1 and 2 and description pages 2, 2a, 3 to 8 as submitted during the oral proceedings of 11 December 1996
 - Figures 1 to 7 as filed with the letter of 10 June 1996.

The Registrar:

The Chairman:

M. Beer

W. J. L. Wheeler

