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EP-A-0 105 897

Bezeichnung der Erfindung: Signal coding for secure transmission
Title of invention:
Titre de l'invention :

Klassifikation / Classification / Classement : H04N 7/16

ENTSCHEIDUNG / DECISION

vom / of / du 30 May 1989

Anmelder / Applicant / Demandeur : Independent Broadcasting Authority

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56 EPC

Schlagwort / Keyword / Mot clé : "Inventive step (no)"

Leitsatz / Headnote / Sommaire

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Case Number : T 306/86 - 3.5.1

D E C I S I O N
of the Technical Board of Appeal 3.5.1
of 30 May 1989

Appellant : Independent Broadcasting Authority
70 Brompton Road
London SW3 (GB)

Representative : Crawford, Andrew Birkby
AA Thornton & Co.
Northumberland House
303-306 High Holborn
London WC1V 7LE (GB)

Decision under appeal : Decision of Examining Division 058 of the European Patent Office dated 4 April 1986 refusing European patent application No. 83 901 333.1 pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : P.K.J. van den Berg
Members : Y.J.F. van Henden
F. Benussi

Summary of Facts and Submissions

I. European patent application No. 83 901 333.1 (publication Nos. WO 83/03942 and EP-A-0 105 897), claiming priority from application No. 8 211 826 of 23 April 1982 in the United Kingdom, was accorded a filing date of 25 April 1983. The application was refused by decision of the Examining Division dated 4 April 1986. That decision was based on Claims 1-5 filed on 20 May 1985 with letter of 17 May 1985 and amended as requested in letter of 27 January 1986 and as agreed to in a telephone conversation of 27 February 1986.

II. The reason given for the refusal was that the subject-matter of the claims did not involve an inventive step, having regard to the prior art disclosed in the document WO 81/02499.

III. With telex of 4 June 1986 confirmed by letter received on 7 June 1986, the Appellant lodged an appeal against the decision and simultaneously paid the corresponding fee. A Statement of Grounds dated 12 August 1986 was received on 14 August 1986.

Cancellation of the decision was requested, as well as the grant of a patent on the basis of the claims refused by the Examining Division. In the event that the Board would find against the Appellant, oral proceedings were requested.

IV. On 17 May 1988, the Board issued a communication, in which it explained why the grant of a patent on the basis of the claims already refused by the Examining Division was not to be expected.

V. With a letter dated 26 September 1988, the Appellant filed on 28 September 1988 replacement pages 1, 3-7 of description and sheet 4/5 of the drawings. A corrected copy of said letter and replacement pages 4-7 of description was received on 29 September 1988.

VI. The Board summoned the Appellant on 16 February 1989 to oral proceedings to be held on 30 May 1989. In the accompanying communication, it explained why no possibility to grant a patent on the basis of the amended set of claims received on 28 September 1988 could still be perceived. The Board also asked the Appellant to declare whether the principles of the MAC transmission system had been made available to the public before the priority date of the patent application.

VII. In a letter dated 14 March 1989, the Appellant made clear that he did not intend to rely on the novelty of the MAC transmission system to obtain acceptance of the application. During the oral proceedings of 30 May 1989, he submitted a new set of claims reading as follows:

"1. A method of processing a signal representing a line of a television picture, the signal comprising a plurality of parts, the method comprising the steps of:

(a) receiving as an input the signal representing a line of a television picture;

(b) loading the parts of the input signal into stores in a first sequence; and

(c) reading out the stored parts of the signal in a second sequence different from the first, the information within a part when read out being in the same order as when loaded in to a store;

characterized in that step (a) comprises receiving as an input a signal comprising a time multiplex of a digital block an analogue chrominance block, and an analogue luminance block; and steps (b) and (c) are arranged so that both of analogue chrominance and luminance blocks are read out between the read out portions of the digital block.

2. A method of receiving and descrambling a scrambled signal representing a line of a television picture the method comprising the steps of:

(a) receiving as an input the scrambled signal representing a line of a television picture;

(b) loading of the input scrambled signal into stores in a first sequence;

(c) reading out the stored parts in a second sequence different from the first, the information within a part when read out being in the same order as when loaded into a store,

characterized in that the receiving step comprises receiving as an input a scrambled signal being a time multiplex of two portions of a digital block, an analogue chrominance block and an analogue luminance block, the analogue blocks being disposed in the time multiplex between the two portions of digital block; and the loading step comprises loading the two portions of digital block, the analogue chrominance block and the luminance block into stores in a first sequence.

3. Receiving apparatus for receiving and descrambling a scrambled signal representing a line of a television picture, comprising:

means for receiving the scrambled signal representing a line of a television picture;

writing means for writing parts of the scrambled signal into stores;

reading means for reading out parts of the scrambled signal from the stores; and

control means for controlling the writing and reading means so that the reading means reads out the parts of the scrambled signal in an order corresponding to their order in the signal before scrambl (sic)

characterized in that the receiving means is adapted to receive a scrambled signal being a time multiplex of two portions of a digital block, an analogue chrominance block and an analogue luminance block, at least one of the analogue chrominance and luminance blocks being located in the time multiplex between the two portions of the digital block; and the control means is arranged to control the writing and reading means so that the writing means writes separately the portions of the digital block, the chrominance block and the luminance block; and the reading means reads out the two portions of the digital block prior to reading out said analogue chrominance and luminance blocks whereby to translate said analogue chrominance and luminance blocks."

VIII. The Appellant requested that the decision under appeal be set aside and a patent granted on the basis of the

Claims 1-3 submitted during the oral proceedings of 30 May 1989. In support of his view, the Appellant substantially argued as follows:

(1) In the document WO 81/02499, the expression "standard signals" would exclusively designate those television signals which were standard at the priority date of the present application. These signals are composite ones, i.e. in which chrominance and luminance information are sent simultaneously in the same analogue signal. Moreover, from the absence of any reference to PAL or SECAM, it might be assumed that the system disclosed in WO 81/02499 is applicable to the various versions of NTSC only.

(2) The system disclosed in WO 81/02499 in relation with Figure 6 is, in many respects, almost identical with the known method of "line rotation", which method involves splitting the composite (NTSC) video line in two parts at a pseudo randomly defined position and transmitting the second part before the first one. The cut picture edges appearing thereby at the beginning and end of the scrambled line form, however, sharp discontinuities which excite ringing in the channel and give rise to their own distortion. To remove this drawback, it has been proposed in GB-A-1 503 051 to sample the signal before cutting and to make each cut portion contain samples overlapping the cut position, but this principle was not put into practice. Finally, when line rotation is performed, a further distortion known as "line tilt" appears, which is a monotonic drift in the DC reference of the recede line following the clamping period. This could be owed to severe low frequency channel error or poor clamp performance.

(3) In WO 81/02499, the designation "video signal" would mean "the video information that determines picture content". The prior art, therefore, teaches to cut analogue information when scrambling on a line by line basis. The resulting distortion of the received signals would, however, make it very difficult to produce a receiver displaying an acceptable image. Having regard thereto, the skilled man would have misgivings in employing the techniques of the document WO 81/02499. Furthermore, by taking a standard signal and by producing a multiplexed analogue component signal, he would already have encrypted the original television signal sufficiently for the purpose outlined in the prior specification. Nevertheless, the inventors surprisingly found that, in the case of MAC signals, the cut and rotated line neither suffered from distortion nor from line tilt. These problems could be overcome due to the fact that the essential synchronising and clamping information can be contained in the data burst of the MAC signal in such a way that it is not moved in the scrambling process.

Reasons for the Decision

1. The appeal is admissible - Articles 106-108 and Rules 64 and 78(3) EPC.

2. **Novelty**

2.1 The invention disclosed in WO 81/02499 relates to the encoding and decoding of video information - see page 1, lines 5 and 6. According to Figure 14 and related part of the description, the receiver (256) of a decoder receives a signal broadcast by a television transmitter station. The demodulated video stream from the receiver (256) is supplied to a video decoder (260) which reverses the

encoding process that was performed at the transmitter station. If the latter uses an encoder of the kind described in relation with Figure 10, then decoder (260) may be identical to said encoder - see from page 33, line 6 to page 34, line 8. Now, the encoder of Figure 10 includes a storage device (140) in which segments forming a line of the video signal are stored in a first sequence and from which said segments are transferred to a second storage device (144) in a sequence determined by the control word. The line segments are subsequently shifted out, i.e. "read out", from the second storage device in a selected one of two directions - see page 24, lines 5-24. Provided the shift direction be properly chosen, it may thus happen that the information within a line segment when read out be in the same order as when loaded into any one of the stores.

Having regard thereto, it may be accepted that a receiving apparatus of the kind referred to in the pre-characterising part of Claim 3 is known from WO 81/02499.

The method to be carried out by the decoder described in that document includes, however, the step of splitting the video information. Moreover, processing signals that comprise a time multiplex of two portions of a digital block, an analogue chrominance block and an analogue luminance block is not envisaged in WO 81/02499 and, from its disclosure, it cannot be inferred that the means mentioned there are liable to serve the same purpose as those recited in the characterising clause of Claim 3.

The Board thus takes the view that the subject-matter of Claim 3 is novel and that said claim is properly delimited with respect to prior art - Article 54(1) and Rule 29(1) EPC.

2.2 The steps of the method carried out by the encoder described in WO 81/02499 in relation to Figure 10 are those recited in the pre-characterising clause of Claim 1. Consequently, for similar reasons as already explained in above section 2.1, the Board takes the view that Claim 1 too meets the requirements of Rule 29(1) EPC.

2.3 The steps of the method to be carried out by the decoder according to Figure 14 of WO 81/02499 are unambiguously defined through the respective functions of the components forming part of said decoder. Said method is covered by the pre-characterising part of Claim 2. Still bearing in mind the reasons explained in above section 2.1, the Board thus takes the view that the second claim too meets the requirements of Rule 29(1) EPC.

3. **Inventive step**

3.1 It is the Board's view that no "signal comprising a time multiplex of a digital block, an analogue chrominance block and an analogue luminance block" can be received if it has not been previously produced. Now, generating a signal may not be considered as the first step of a method of scrambling said signal. Therefore, stating in Claim 1 that the method includes the step of receiving a signal of the type envisaged above rather than, for instance, a PAL or a SECAM signal is merely indicative of the result to be achieved by carrying out said method, i.e. scrambling a pre-existent MAC signal.

3.2 The Board takes the view that laying down the task which the method of Claim 1 sets out to meet, to wit scrambling MAC signals, does not involve an inventive step.

From the Appellant's declaration in his letter dated 14 March 1989, it may be accepted that the principle and

essential features of the MAC transmission system were made available to the public before the priority date of the present application, which Appellant's representative confirmed during the oral proceedings of 30 May 1989. He added that this new system was devised for improving direct television broadcast by satellite. The object of the MAC transmission system is thus not to provide encryption of signals specific of other standards but, as was the case a few decades ago when the PAL and SECAM systems were developed, to supersede the existing standards or at least compete with them.

Scrambling television signals is a general purpose being widely applied. Leaving aside the theoretical case where some specific technical hindrance might exist, no reason of reserving its application to a limited selection of standards can be set forth. It is thus to be expected that, whenever a new television standard has been devised, attempts to scramble the related signals will be made. Since the MAC standard was already known at the priority date of the application in suit, it was obvious to try also to scramble signals obeying that standard.

3.3 Attempting to solve a technical problem is an industrial activity and, as such, subject to economical requirements. Therefore, when a known problem arises in a new technical field, the skilled man concerned about cheapness and efficiency first inquires after known solutions to said problem and examines whether, eventually contingent on suitable adaptations, at least one of the known solutions would be appropriate in the case he is dealing with. According to the Board's view, it is consequently excluded that the skilled man seeking a solution to scrambling MAC signals would ignore the teachings of the cited documents on the ground that they pertain to systems working in the NTSC standard.

The fact that a known solution to a technical problem exhibits some shortcomings is not yet a sufficient reason to deter the skilled man from envisaging it when working in a new technical field. The appearance of such a shortcoming can often be linked to particular conditions prevailing in those technical fields where said solution was previously applied, rather than being inherent to that solution proper. Concerning this point, it is actually noteworthy that the misgivings of the skilled man which the Appellant called upon to support his view originate in the idea of cutting analogue video information - see Statement in support of appeal, third paragraph of page 6. In the view of the Board, however, it is obvious to a skilled person to avoid such cutting of analogue video information if the circumstances allow him to do so.

3.4 The MAC signal comprising three information blocks multiplexed temporally and of which the first one is digital, the skilled man readily understands that, in order to obviate the drawbacks which arise when an analogue video information block is cut and the order of its portions altered, the only possibility left for scrambling said MAC signal consists in cutting the digital block only and in changing the time multiplex of the analogue blocks and portions of the digital block. If the digital block is divided into only two portions, as must be the case for producing the scrambled signal which the method according to Claim 2 has for its object to descramble, the number of envisageable permutations of the analogue blocks and digital block portions remains, however, limited. This makes it possible to arrive at the most advantageous ones by routine trial and error, i.e. without involving the skilled man in the exercise of inventive ingenuity. Furthermore, no reason to believe that the particular

permutations envisaged in Claim 1 should be preferable was given nor can be perceived.

Having regard thereto, the Board takes the view that the method of Claim 1 lacks an inventive step - Article 56 EPC.

3.5 The same idea underlie the methods according to Claims 1 and 2. Therefore, no inventive step can be perceived in the subject-matter of Claim 2 either.

This conclusion also applies to the subject-matter of Claim 3 for the need of providing the means therein recited obviously results from the definition of the method covered by Claim 2.

4. Their subject-matter lacking an inventive step, none of the Claims 1-3 submitted during the oral proceedings of 30 May 1989 is allowable - Article 52(1) EPC.

Order

For these reasons, it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

S. Fabiani P.K.J. van den Berg