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Bezeichnung der Erfindung:
Title of invention:
Titre de l'invention : Measuring instrument provided with analog and digital display

Klassifikation / Classification / Classement : G 01 R 13/40, G 01 R 13/02, G 01 D 7/00

ENTSCHEIDUNG / DECISION

vom / of / du 11 January 1990

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent / Titulaire du brevet : Federal Products Corporation

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56 EPC

Schlagwort / Keyword / Mot clé : "Inventive step (yes, after amendment)"

Leitsatz / Headnote / Sommaire

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Case Number : T 397 /88-3.4.1

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 11 January 1990

Appellant : (Proprietor of the patent)
Federal Products Corporation
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Respondent :

Representative :

Decision under appeal : Decision of Opposition Division of the European Patent Office dated 20 April 1988 posted on 22 June 1988 revoking European patent No.0 031 716 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : K. Lederer
Members : J. Roscoe
C. Payraudeau

Summary of Facts and Submissions

I. European patent 0 031 716 was granted on the basis of European patent application no. 80 304 699.4.

II. The patent was revoked on opposition by Standard Elektrik Lorenz Aktiengesellschaft, who subsequently withdrew from the opposition proceedings, on the ground of non-patentability because of lack of inventive step in view of the following prior art documents:

DE-B-1 623 874 (D1);
US-A-3 924 336 (D4).

The Opposition Division held in particular that the subject-matter of claim 1 of the patent as granted resulted from an obvious adaptation of the combined analog and numeric display of document D1 to an instrument such as that of document D4.

III. The Appellant lodged an appeal against the decision of the Opposition Division.

IIII. Following several communications from the Board in which doubts were expressed as to the admissibility of successive versions of an amended claim 1 presented by the Appellant, oral proceedings were held on 11 January 1990.

At the end of the proceedings the Appellant requested that the decision under appeal be set aside, and that the patent be maintained in amended form, on the basis of Claims 1 to 3 presented at the oral proceedings, of which Claim 1, the only independent claim, reads as follows:

"1. A measuring instrument comprising an electro-mechanical input transducer having a movable measuring element (30) extending therefrom to contact a workpiece (31) and providing an electrical analog signal representing the position of the measuring element, a digital display comprising at least three numeric indicators (18) supported on a viewable display face, each numeric indicator comprising a multi-segment liquid crystal display (18a,18b), means (36) for converting said analog signal to a digital form signal, and decoder means (40,40a) responsive to said digital form signal and connected to said digital display to activate the numeric indicators in accord with said digital form signal, said decoder means comprising adecoder/ driver means (40a) connected to selectively activate said numeric indicators in response to the digital form signal in accord with the value of the analog signal, c h a r a c t e r i z e d by

an analog display comprising an array of liquid crystal display segments (14 - 16) supported on said viewable display face in form of a scale providing a stepped analog display,

said decoder means comprising a further decoder/driver means (40) connected to selectively activate said array in response to the digital form signal so as to activate a segment of said scale in accord with the value of the analog signal,

the operation of said decoder/driver means (40,40a) being related with respect to the values displayed such that an

increment of one segment of the array scale (14 - 16) equates to a unit change of number in the second least significant digit (18b) of the numeric display (18) whereby the second (18b) and third (18a) least significant digits together display numbers corresponding to the number indicative activated segment of the analog scale, and the least significant digit provides an interpolation of values lying between adjacent scale segments,

a further display segment (24 or 26) set in said face, and comparator means (43 or 45) connected to activate said further segment (24 or 26) and responsive to said digital form signal to cause said further segment to display when a preset limit (42 or 44) is equalled or exceeded, and

means (60,71,72) for supporting a workpiece to be measured, means (61,62;70,74,76,77) supporting said transducer for the measuring element thereof to contact the workpiece, said workpiece supporting means allowing movement of a workpiece supported thereby relative to said measuring element such that the measuring element follows variations in a peripheral dimension of said workpiece whereby such variations are displayed."

V. In support of his request, the Appellant submitted essentially that the claimed instrument was specifically dedicated to the measuring of rotating workpieces, and that it allowed the user to easily check, during movement of the workpiece, whether its minimum or maximum dimensions remained within preset tolerance limits.

In contrast, document D4 disclosed only a hand-held, manually operable device, which therefore did not exhibit such capability of measuring a rotating workpiece.

Neither did the remaining prior art documents on the file in any way relate to the measuring of moving workpieces.

Reasons for the Decision

1. The appeal is admissible.

2. The Board is satisfied that the present patent documents meet the formal requirements of the EPC.

2.1 In particular, claim 1 as amended comprises in substance all the features of claim 1 as granted, together with those of granted Claims 3 and 5, which restrict the scope of protection of Claim 1 as granted. Accordingly, the claims have not been amended in such a way as to extend the protection conferred, in compliance with Article 123(3) EPC.

2.2 Neither do the requested amendments result in the European patent being amended in such a way that it now contains subject-matter which extends beyond the content of the application as filed, (Article 123(2) EPC).

In particular, the description has merely been rendered consistent with the wording of Claim 1 as amended, and supplemented by a brief summary of the relevant contents of document D1.

3. Novelty.

3.1 Document D4 discloses a measuring instrument as set out in the preamble of claim 1, which comprises an electro-mechanical input transducer (9; Figures 1 and 2) having a

movable measuring element (4) extending therefrom to contact a workpiece (7) and providing an electrical analog signal representing the position of the measuring element, a digital display (12) comprising at least three, i.e. four, numeric indicators supported on a viewable display face, each numeric indicator comprising a multi-segment liquid crystal display, means (98) for converting said analog signal to a digital form signal, and decoder means (10,11) responsive to said digital form signal and connected to said digital display to activate the numeric indicators in accord with said digital form signal, said decoder means comprising a decoder/driver means (11) connected to selectively activate said numeric indicators in response to the digital form signal in accordance with the value of the analog signal (column 1, line 35 to column 2, line 28).

This known measuring instrument does not exhibit any further display means, and it is designed to be manually operated for measuring the thickness or outer diameter of an object brought into a measuring position between the end of the movable measuring element (4) and the opposing surface (3a) of an anvil (column 1, lines 43 to 48).

Thus, the subject matter of claim 1 is distinguished from this known measuring instrument by the features set out in its characterizing portion, which may in substance be summarized as follows:

(a) a further, analog, liquid crystal display with its own associated decoder/driver means with a precision corresponding to that of the second least significant digit of the numeric display;

(b) further display and comparator means for indicating when a preset limit is equalled or exceeded; and

(c) means for supporting both the workpiece to be measured and the transducer in such a way that the measuring element follows the surface of the workpiece during movement thereof.

3.2 Document D1 discloses an apparatus for displaying non specified measured values, which comprises an analog display comprising an array of segments (C1 to C7; Figure 1) supported on a viewable display face in form of a scale (45, 46; Figure 9) providing a stepped analog display, means (1 to 3) for converting an analog signal to a digital form signal, and decoder means comprising a decoder/driver means (5) connected to selectively activate said array in response to the digital form signal so as to activate a segment of said scale in accordance with the value of the analog signal (column 3, line 65 to column 4, line 46). The particular display apparatus disclosed with reference to Figure 9 further comprises a digital display (47,48) comprising at least three, i.e. seven, numeric indicators supported on said viewable display face which are (necessarily) associated with a further decoder/ driver means connected to selectively activate the numeric indicators in response to the digital form signal in accordance with the value of the analog signal. The analog and numeric displays may indicate the same measured value the analog display provides on a relatively roughly divided scale an easily readable information, while the numeric display allows a precise reading of the value (column 13, lines 24 to 42). In a further embodiment described with reference to Figure 10, the digital display (52) comprises three numeric indicators which may be

manually set by means of associated control means (51) in such a way as to indicate a predetermined reference value.

Document D1 discloses neither a specific application of the described display apparatus, nor any display segments on the viewable display face other than those of the analog and digital displays.

Thus, the subject-matter of Claim 1 is distinguished from the device disclosed in document D1 in that it forms a measuring instrument comprising an electromechanical input transducer having a movable measuring element and supporting means for both a workpiece to be measured and said transducer, in that both displays comprise liquid crystal display segments, in that the operation of the respective decoder/driver means is related in the specific way defined in the third paragraph of the characterizing portion of the claim, and in that it comprises a further display segment set in the common viewable display face and comparator means to cause said further segment to display when a preset limit is equalled or exceeded.

3.3 The remaining documents on file do not come closer to the claimed subject-matter.

3.4 For these reasons, the subject-matter of Claim 1 is considered to be novel in the sense of Article 54 EPC.

4. Inventive Step.

4.1 The nearest prior art is, in the Board's view, constituted by the device described in document D4, from which the subject-matter of Claim 1 is distinguished by features (a) to (c), as summarized in paragraph 3.1. above.

The Board fully supports the Opposition Division's opinion that, in view of the disclosure of document D1, introduction of feature (a) alone into an instrument according to the preamble of Claim 1 would not involve an inventive step since document D1 stresses the advantage of combining in a single measuring apparatus on the same display face an easily readable analog display giving a rough indication of measured value and a numeric display indicating the precise value. However, the Board is satisfied that the subject-matter of Claim 1 as amended by introduction of the additional features (b) and (c) cannot be derived in an obvious manner from the cited prior art.

4.2 Though the workpiece and transducer suporting means set out in feature (c) allow continuous monitoring and display of variations in the position of the surface of the workpiece during movement, recognition of whether a measured dimension remains within preset tolerance limits from the mere observation of the indications displayed either by the digital or the analog display defined in the preamble and in characterizing feature (a) of claim 1 may still be difficult or unreliable since, on the one hand, the digital information may vary too rapidly to be recognized by the user's eye and, on the other hand, the precision of the analog display is one order of magnitude below that of the digital display, and since the user has to mentally compare the displayed information with a value which is either held in his memory or displayed other than on the display face.

However, the further display segment and comparator means specified in feature (b) clearly cooperate with feature

(c) in such a way as to provide a direct and reliable indication of whether a preset dimensional limit is equalled or exceeded while the measuring element contacts the rotating workpiece and follows variations in the position of its outer surface.

None of the cited prior art documents addresses the problem of providing such direct indication, nor, that of recognizing whether continuously varying values measured and displayed by a measuring instrument of any kind equal or exceed a preset tolerance limit. Neither do these documents disclose any means which could actually achieve this result nor show, or in any way hint at, the display segment and comparator means of feature (b).

Accordingly, the Board considers, on the evidence before it that the combination of features set out in Claim 1 could not, without hindsight, have been derived in an obvious manner from the prior art by the skilled person and it therefore involves an inventive step in the sense of Article 56 EPC.

5. For the above reasons, Claim 1 defines patentable subject-matter (Article 52(1) EPC). So do remaining Claims 2 and 3, since they both include the same combination of features as Claim 1.

Accordingly, taking into consideration the amendments requested by the Appellant, the patent and the invention to which it relates are considered to meet the requirements of the EPC and the patent can therefore be maintained as amended (Article 102(3) 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 maintain the patent with the following amendments:

   (a) Claims 1 to 5 are replaced by Claims 1 to 3 presented at the oral proceedings;

   (b) in the description, page "A" presented at the oral proceedings is inserted in column 2, after line 53, and in column 3, lines 11 to 52 are replaced by pages 1 and 2 also presented at the oral proceedings.

The Registrar: The Chairman:

M. Beer K. Lederer