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Datasheet for the decision of 9 July 2014

Case Number: T 0789/10 - 3.4.02

Application Number: 03707875.5

Publication Number: 1474649

IPC: G01B5/008, B23Q35/04, B25J9/06

Language of the proceedings: EN

Title of invention:
PORTABLE COORDINATE MEASURING MACHINE WITH ARTICULATED ARM

Patent Proprietor:
FARO TECHNOLOGIES INC.

Opponent:
Leica Geosystems

Headword:

Relevant legal provisions:
EPC R. 99(1)(a), 99(1)(c)
EPC Art. 54(1), 54(2), 56

Keyword:
Admissibility of appeal - notice of appeal - name and address of appellant - notice of appeal - request defining subject of appeal - (yes)
Novelty - (yes)
Inventive step - (no)

Decisions cited:
T 0358/08

Catchword:

Beschwerdekammern
Boards of Appeal
Chambres de recours

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Case Number: T 0789/10 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 9 July 2014

Appellant: (Patent Proprietor)	FARO TECHNOLOGIES INC. 125 Technology Park Lake Mary, Florida 32746 (US)
Representative:	Verriest, Philippe Cabinet Germain & Maureau 12, rue Boileau 69006 Lyon (FR)
Respondent: (Opponent)	Leica Geosystems Heinrich-Wild-Strasse 9435 Heerbrugg (CH)
Representative:	Harmann, Bernd-Günther Kaminski Harmann Patentanwälte AG Landstrasse 124 9490 Vaduz (LI)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 8 February 2010 revoking European patent No. 1474649 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	A. Klein
Members:	A. Hornung
	L. Bühler

Summary of Facts and Submissions

I. The patentee appealed against the decision of the opposition division revoking European patent No. 1474649.

Opposition was filed against the patent as a whole and based on the grounds of Article 100(a), together with Articles 54(1) and 56 EPC, Article 100(b) EPC and Article 100(c), together with Article 123(2) EPC.

The opposition division held that the grounds for opposition mentioned in Article 100(a) EPC, together with Article 56 EPC, prejudiced the maintenance of the patent as granted.

II. Oral proceedings before the board were held on 9 July 2014.

III. The patentee requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main and sole request filed on 23 December 2009.

IV. The opponent requested that the appeal be rejected as inadmissible, or, alternatively, that the appeal be dismissed.

V. Independent claim 1 according to the patentee's main request reads as follows:

"A portable coordinate measurement machine, CMM, for measuring the position of an object in a selected volume, comprising:

a manually positionable articulated arm (14) having opposed first and second ends, said arm (14) including a plurality of joints (16, 18, 30, 32, 34, 36);

a measurement probe (28) attached to a first end of said articulated arm (14);

an electronic circuit (172) which receives the position signals from transducers (92, 94) in said arm (14) and provides a digital coordinate corresponding to the position of the probe (28) in a selected volume; and

wherein at least one of said joints (16) further comprises:

a periodic pattern (94) of a measurable characteristic;

at least two read heads (92) spaced from and in communication with said pattern (94); and

said pattern (94) and said at least two read heads (92) being positioned within said joint (16) so as to be rotatable with respect to each other, and

wherein said joint further comprises:

a first (62) and second (64) housing, and a rotatable shaft (68) extending from said second housing (62) into said first housing (64);

a bearing (52, 50) disposed said shaft (66) and said first housing (64) permitting said rotatable shaft (60) to rotate within said first housing (64);

said pattern (94) being directly attached to said rotatable shaft (60);

said at least two read heads (94) being fixed within said first housing (64) such that rotation of the first housing (64) with respect to the second housing (62) causes said at

least two read heads (92) to move relative to said pattern (94)."

VI. The following documents relied on in the opposition proceedings will be referred to in the present decision:
E2: EP 0302194
E3: US 5,829,148
E6: DE 19907326
E10: DE 39 27 846

Furthermore, reference will be made to the following document filed by the patentee with the grounds of appeal:
E18: "Precision machine design", Alexander H. Slocum, 1992, pages 163-167

Reasons for the Decision

1. Admissibility of the appeal

1.1 According to the jurisprudence of the boards of appeal, the provisions of Rule 99(1)(a) EPC are satisfied if the notice of appeal contains sufficient information for identification of the appellant. The board notes in this respect, that the name of the patent proprietor, the title of the patent application and the publication number of the contested patent were given in the notice of appeal of 6 April 2010. Moreover, the name of the representative having filed the notice of the appeal was identical to the name of the patentee's representative during first-instance oral proceedings before the opposition division. From this information and the date of the contested decision, the identity of the appellant could be established without any doubt.

Furthermore, following decision T 358/08, Rule 99(1)(c) EPC is satisfied if the notice of appeal contains a request (which may be implicit) to set aside the decision in whole or only as to part. In this respect, the board notes that the set of claims of the sole request on which the opposition division's decision to revoke the patent is based, consisted of a single claim. In this situation, the statement by the patent proprietor in its letter of 6 April 2010 that it was filing an appeal with reference to said decision is to be understood that it requested that the decision to revoke the contested patent be set aside in whole.

For the above reasons, the board is of the opinion that the requirements of Rule 99(1) EPC are satisfied.

1.2 The opponent argued that the mere indication of the patent number and the patentee's name in the header of the notice of appeal is not sufficient for identifying the appellant, since, for instance, the opponent could have indicated the same information in a letter to the Office. For the opponent, the sum of all the information missing in the notice of appeal is such that the appeal should be found inadmissible.

These arguments are not found convincing by the board since, for the appeal to be admissible, it is sufficient that it is possible to derive from the information in the appeal with a sufficient degree of probability, where necessary with the help of other information on file, e.g. as they appear in the impugned decision, by whom the appeal should be considered to have been filed. In the present case, the patent was revoked during first-instance proceedings, which means that only one party, i.e. the patentee, was adversely affected by the first-instance decision and entitled to appeal. Based on the information in the appeal it was therefore possible to identify the appelant without any doubt (above point 1.1).

2. Novelty

The subject-matter of claim 1 is novel (Article 54(1) and (2) EPC) over the disclosure of document E3 which is considered to represent the closest prior art.

2.1 Feature of claim 1 relating to "at least two read heads"

2.1.1 Document E3 discloses, with reference to figures 3 and 4, a portable coordinate measurement machine comprising an optical encoder (17c) (see column 4, lines 27-39). While it is implicit that the optical encoder (17c) of E3 comprises "a periodic pattern of a measurable characteristic" as claimed and that the pattern and at least one read head are positioned within an articulated arm of the coordinate measurement device of E3 "so as to be rotatable with respect to each other" as claimed, E3 leaves open the question about the exact number of read heads in the optical encoder (17c).

It follows that the claimed subject-matter differs from the disclosure of E3 in that it comprises "at least two read heads spaced from and in communication with said pattern".

2.1.2 The opponent referred to E3, column 1, lines 62-63, reading "Light is shined through the wheels onto optical sensor**s** which feed a pair of electrical outputs." By using the plural form of the word "sensor", the skilled person would understand that the optical encoder used in the embodiment of E3 comprises at least two read heads. Therefore, for the opponent, the claimed feature relating to "at least two read heads" is not novel over E3.

The board is not convinced by this argument because the passage referred to by the opponent describes technical background of optical encoders in general without disclosing

that such conventional optical encoders are effectively used in the embodiment described in figures 3 and 4 of E3.

2.2 Feature of claim 1 relating to a "pattern being directly attached to the rotatable shaft"

The patentee was of the opinion that the claimed coordinate measurement machine further differed from the device of E3 in that a "periodic pattern is directly attached to said rotatable shaft".

2.2.1 The patentee elaborated that this expression of claim 1 has to be interpreted in the sense that the pattern is not mounted on an optical disk (94) as shown in the embodiment of figure 9 of the patent and described in paragraphs [0025] to [0035], but is "deposited, secured or otherwise positioned or reside upon any of the relatively moving components (such as the shaft, bearings or housing) of the cartridge" (see [0034]).

For the patentee, the "rotatable shaft" referred to in claim 1 corresponds to the "inner shaft (30)" of E3, shown on the right-hand side of figure 4 of E3 and connected to the "shaft end flange (34)" and "base plate (35)". Since the patentee believes that the pattern in E3 is positioned inside the optical encoder (17c) of E3, as shown on the left-hand side of figure 4 of E3, it is evident for the patentee that the pattern of E3 is not directly attached to the rotatable shaft (30): interjacent mechanical elements between the pattern and the shaft are at least the central axle of the encoder (23) and the central axle (50) of the slip-ring sub-assembly (15).

2.2.2 The board cannot follow this view for the following reason.

On the one hand, according to the wording of claim 1, the "rotatable shaft" is merely defined by its functional

properties that the shaft extends from a second housing into a first housing and the shaft rotates within the first housing. The claimed "first housing" and "second housing" are merely defined in claim 1 by their property that at least two read heads are fixed within the first housing such that the rotation of the first housing with respect to the second housing causes the at least two read heads to move relative to the pattern. No concrete structural features of the rotatable shaft are defined in claim 1.

On the other hand, E3, figure 4, discloses a rotatable shaft comprising the "inner shaft (30)", the "central axle (50)" and the "encoder axle (23)", all three mechanical sub-elements being inevitably and fixedly connected to one another, thereby forming a composite but unique rotatable shaft. See E3, column 4, line 59 to column 5, line 45. Furthermore, it is implicit that the pattern of the optical encoder (17c) of E3 is directly attached to the encoder axle (23) in the sense that the pattern and the encoder axle (23) rotate together.

It follows that, in view of the broad meaning of the expressions used in claim 1, i.e. "shaft", "first housing", "second housing" and "directly attached", the pattern of the optical encoder (17c) and the composite rotatable shaft (23, 50, 30) of E3 are covered by the wording of claim 1, i.e. "said pattern being directly attached to said rotatable shaft".

2.3 Feature of claim 1 relating to "read heads being fixed within the first housing"

The patentee was of the opinion that the claimed coordinate measurement machine still further differed from the device of E3 in that said at least two read heads are fixed within said first housing.

2.3.1 The patentee considers that the sheath (31) of E3 is equivalent to the claimed first housing (64), the base plate (35) and pedestal (12) of E3 are equivalent to the claimed second housing (62) and the inner tubular shaft (30) of E3 is equivalent to the claimed rotatable shaft (60). The patentee notes that the housing of the swiveling joint (7c) does not form part of the first housing because this housing is foreseen to be dismounted for detaching the optical encoder. Since the optical encoder (17c) of E3, which is fixed outside the sheath (31), and since the read head(s) of E3 are positioned inside the optical encoder (17c), it is evident for the patentee that the read heads of E3 are not fixed within the sheath (31), i.e. the first housing of E3.

2.3.2 In the board's view, the expression "first housing" of claim 1 covers in its broadest meaning a composite housing including the sheath (31) and the housing of the swiveling joint (7c) to which the sheath is mounted by fastening means (36). See E3, column 5, lines 3-8 and figure 4. In particular, the claim wording does not exclude a first housing comprising two housings fastened together by screws. Since the optical encoder (17c) is fixed within the housing of the swiveling joint (7c) and since the read heads are fixed within the optical encoder (17c), the feature "read heads being fixed within the first housing" of claim 1 is anticipated by the device of E3.

2.4 In conclusion, the claimed coordinate measurement machine is novel and differs from the device of E3 only in that it comprises "at least two read heads (92) spaced from and in communication with said pattern (94)".

3. Inventive step

The subject-matter of claim 1 lacks an inventive step (Article 56 EPC) over the disclosure of document E3 in combination with common general knowledge.

3.1 It is undisputed that E3 represents the closest prior art.

The claimed subject-matter differs from the device of E3 in that at least two read heads are in communication with the pattern of the optical encoder.

According to the patent, [0039], the technical effect of this differing feature is to cancel errors of the angle measurement which are due to "disk run out or radial motion".

Therefore, the technical problem consists in the provision of a coordinate measurement machine which is "less error prone and more accurate" (see [0039] of the patent).

In the field of coordinate measurement machines, striving for less error prone and more accurate angle measurements is notorious. It naturally leads the skilled person to contemplate the improvement of the measurement accuracy of the device of E3.

While E3 explicitly teaches how to improve the general measurement accuracy, e.g. by mechanically coupling the transducers to the rotating joint as directly as possible (column 1, lines 51-54) or by measuring the actual value of the encoder's electrical outputs at the exact instant in question (column 1, line 67 - column 2, line 4), E3 remains vague about the exact type of optical encoders and the exact number of sensors to be used. However, the mention in E3, column 1, lines 62-63, of optical sensor**s** is a significant hint for the skilled reader to contemplate the use of optical encoders comprising more than one read head. In this respect, the skilled person is aware of a large variety of

conventional optical encoders, including encoders with at least two read heads in communication with the encoding pattern. Furthermore, optical encoders with at least two read heads are generally known to improve measurement accuracy: see the disclosure of the technical handbook E18, page 165, line 1, and of the patent application documents E2, E6 and E10.

Therefore, starting from E3 and being confronted with the above technical problem, the skilled person, using common general knowledge, will obviously select from the large variety of known encoders an optical encoder with at least two read heads for further improving the measurement accuracy, thereby arriving at the claimed subject-matter without exercising any inventive skills.

3.2 The patentee presented the following counter-arguments.

3.2.1 There is neither a hint in E3, nor any other obvious reason starting from E3, to select an optical encoder with the objective to improve measurement accuracy, a fortiori in view of E3 disclosing other means to improve the measurement accuracy. In particular, the patentee notes that "E3 makes a systematic relationship between a better accuracy and two sinusoidal signals which are 90 degrees out of phase". The presence of two sinusoidal signals, however, do not imply the presence of two sensors, since a single sensor may suffice. Therefore, the argumentation concluding that the claimed device lacks an inventive step is based on an ex post facto approach.

The board is not convinced by this argument since the use of optical encoders with multiple sensors for improving the measurement accuracy is considered to be common general knowledge (see point 3.1). The fact that E3 teaches other ways to improve the precision of the angle measurement is not

a sufficient reason to hold off the skilled person to further improve the measurement accuracy by selecting an appropriate optical encoder.

3.2.2 For the patentee, E3 discloses a measuring device with a completely different mechanical set-up than the device of the invention. The sheath (31) of E3 does not provide sufficient space for integrating, within the sheath (31), an optical encoder having at least two read heads. E3 is concerned about the ruggedness of the optical encoder and would be dissuaded from replacing the encoder (17c).

The board notes that the only difference between the claimed device and the device of E3 is the use of at least two read heads inside the optical encoder. Whether other differences exist between concrete embodiments of the invention and E3 is not relevant for the issue at stake, since these differences are not claimed. Moreover, should it become necessary to redesign certain parts of the device of E3 in order to use a conventional optical encoder having at least two read heads, the board is of the opinion that such modifications are within the capabilities of the skilled person. Anyway, the patentee did not provide any evidence about modifications of the device of E3, due to the use of at least two read heads, which would go beyond the skilled person's skills.

3.2.3 Acknowledging that E10 shows an coordinate measurement machine using four read heads, the patentee provides arguments why the skilled person would not combine E3 and E10 and, even if he would try to combine the two teachings, why he would not arrive at the claimed device in an obvious manner.

This argumentation, however, is not relevant because the board's finding of lack of inventive step is not based on a

combination of document E10 with document E3 (see the board's reasoning in point 3.1 above).

3.3 In conclusion, the claimed coordinate measurement machine lacks an inventive step with respect to the disclosure of E3 in combination with common general knowledge.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Kiehl A. Klein

Decision electronically authenticated