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D E C I S I O N
of 29 October 1996

Case Number: T 0785/95 - 3.4.2

Application Number: 90309515.6

Publication Number: 0415771

IPC: G01B 17/00

Language of the proceedings: EN

Title of invention:

Measurement of spatial dimensions of object

Applicant:

QUANTRONIX, Inc.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 113(2), 123(2), 84, 56

Keyword:

"Text approved by the appellant (yes)"

"Subject-matter extended (no)"

"Clarity of the claims (yes)"

"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



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Boards of Appeal

Chambres de recours

Case Number: T 0785/95 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 29 October 1996

Appellant: QUANTRONIX, Inc.
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 5 May 1995 refusing
European patent application No. 90 309 515.6
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: E. Turrini
Members: M. Chomentowski
M. Lewenton

Summary of Facts and Submissions

- I. European patent application No. 90 309 515.6 (publication No. 0 415 771) was refused on the grounds that the subject-matter of claim 1 submitted by the applicant lacked an inventive step having regard to D1: US-A-4 419 384. Said claim had the following text:

"1. An apparatus (110) for the measurement of cuboidal objects (28), including three ultrasonic transducer means (12, 14, 16), each having an emitter and a receiver associated therewith, said ultrasonic transducer means (12, 14, 16), being located to define a three-dimensional volume and each being aimed in substantially mutually perpendicular relationship across said volume for emitting an ultrasonic signal toward an object (28) within said volume and receiving said emitted signal after reflection thereof from said object (28), said apparatus (110) further including trigger means for selectively activating the emitters of each of the said transducer means (12, 14, 16) to emit said ultrasonic signals when said object (28) is within said volume, timer means (204) for determining travel time between the emission of the said ultrasonic signal by each emitter and receipt of said emitted signal by its associated receiver after reflection from said object, and computing means (180) for correlating said travel times to linear distances, characterised in that the computing means is conditioned to calculate the actual dimensions of each said object from said linear distances, the apparatus further comprising data collection means to store the said actual dimensions; and in that the apparatus further comprises transducer and package mounting means including a three-armed jig (112), each arm (114, 116, 118) of said jig being substantially perpendicular to the other arms and said arms joining at a common point (120), each of said

transducer means (12, 14, 16) being supported by one arm and aimed in substantially parallel relationship thereto toward said common point, the jig being adapted to locate said cuboidal packages, one at a time, within the said volume."

II. The Examining Division took the following view:

First, the feature, at the end of the claim, that the jig was adapted to locate said cuboidal packages, one at a time, within said volume, was considered as unclear and as adding subject-matter which was not disclosed originally; this feature was ignored since it was found as being also implicit in the technique of D1.

In addition to the features of the preamble of claim 1, the feature of the characterising part that the apparatus further comprises data collection means to store the actual dimensions of the object were also known from D1. The device of claim 1 differed from this known device only in that the computing means was conditioned to calculate the actual dimensions of each said object from said linear distances, and in that the apparatus further comprised transducer and package mounting means including a three-armed jig (112), each arm (114, 116, 118) of said jig being substantially perpendicular to the other arms and said arms joining at a common point (120), each of said transducer means (12, 14, 16) being supported by one arm and aimed in substantially parallel relationship thereto toward said common point.

Concerning the first distinguishing feature, it was concluded that, since the apparatus of D1 was for identifying an object by its dimensions, this necessarily involved obtaining a measure of these dimensions. The last distinguishing feature of the

three-armed jig was found a mere design measure which could be inspired by routine considerations of accessibility. Therefore, these only two distinguishing features were obviously derivable from D1.

The Examining Division also added the remark that a new main claim including the features of dependent claims and relating to an apparatus which could combine dimensional and weight measurements in a single station could be allowable.

III. The appellant (applicant) lodged an appeal against this decision and, in particular, requested oral proceedings auxiliarily.

IV. In the communication dated 13 June 1996, the Board of appeal indicated that claim 1 of the set of claims having formed the basis for the decision under appeal and claim 1 of the set of claims filed as an auxiliary request with the statement of grounds of appeal appeared both to lack clarity, but that a new claim 1, annexed to the communication, could meet the objections and be allowable having regard to the arguments of the appellant. This claim, distinguished from claim 1 having formed the basis for the decision under appeal principally by substitution, in the second part of the claim, of the terms "object" and "objects, for measurement" for the terms "package" and "packages", respectively, and by addition of the expression ", on a base (122), proximate the intersection of the arms", as last feature of the claim, reads as follows:

"1. An apparatus (110) for the measurement of cuboidal objects (28), including three ultrasonic transducer means (12, 14, 16), each having an emitter and a receiver associated therewith, said ultrasonic transducer means (12, 14, 16) being located to define a three-dimensional volume and each being aimed in

substantially mutually perpendicular relationship across said volume for emitting an ultrasonic signal toward an object (28) within said volume and receiving said emitted signal after reflection thereof from said object (28), said apparatus (110) further including trigger means for selectively activating the emitters of each of the said transducer means (12, 14, 16) to emit said ultrasonic signals when said object (28) is within said volume, timer means (204) for determining travel time between the emission of the said ultrasonic signal by each emitter and receipt of said emitted signal by its associated receiver after reflection from said object, and computing means (180) for correlating said travel times to linear distances, characterised in that the computing means is conditioned to calculate the actual dimensions of each said object from said linear distances, the apparatus further comprising data collection means to store the said actual dimensions; and in that the apparatus further comprises transducer and object mounting means including a three-armed jig (112), each arm (114, 116, 118) of said jig being substantially perpendicular to the other arms and said arms joining at a common point (120), each of said transducer means (12, 14, 16) being supported by one arm and aimed in substantially parallel relationship thereto toward said common point, the jig being adapted to locate said cuboidal objects, for measurement, one at a time, within the said volume, on a base, proximate the intersection of the arms."

- V. The appellant's letter dated 4 October 1996 contained a statement that, in particular, claim 1 had been amended exactly in the way the Appeal Board suggested and that the dependant claims, i.e. claims 2 to 6, and the description, had been amended for consistency with new claim 1. Enclosed with said letter were in particular a retyped version of the claims and a copy of the claims showing the amendments made.

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of pages 1 to 4 and 6 to 22 filed with applicant's letter of 28 February 1995 and page 5 filed with appellant's letter of 4 October 1996 for the description, the claims Nos. 1 to 6 filed with appellant's letter of 4 October 1996 and with Sheets 2/4 to 4/4 of the drawings as originally filed, amended for renumbering the Figures. The appellant argued substantially as follows in support of its request:

Contrary to the present apparatus, the apparatus shown in the Figure of D1 in particular cannot measure a width of an object, i.e. the dimension of the object transverse to the direction of movement of the conveyor on which the object (6) is located, due to the manner in which the "width" transducer (5) is placed, firing transversely across said conveyor without a far side reference point; only the space or gap between the object and the "width" transducer face can be measured, and D1 does not provide further information in this respect. The apparatus of D1 does not further comprise either transducer and object mounting means including a three-armed jig being adapted to locate said cuboidal objects, for measurement, one at a time, within the said volume, on a base, proximate the intersection of the arms. However, this specific feature of the present apparatus provides for the rapid and simple location of packages, by hand, within the operating volume and the virtually immediate production of the dimensions required to be ascertained. Given this object of the present invention, it is doubtful whether the skilled person would even have identified D1 as a possible starting point, because D1 is concerned with identifying objects to be submitted to a coating operation at a farther location along the conveying path; even if he had done so, it is only by the benefit

of hindsight that he would have found it obvious to modify the known apparatus so drastically to arrive at the present apparatus with the specific jig for locating said cuboidal objects. Therefore, the subject-matter of present claim 1 involves an inventive step.

Reasons for the Decision

1. The appeal is admissible.
2. *Basis for the decision*

The appellant's letter dated 4 October 1996 contains a statement that, in particular, claim 1 had been amended exactly in the way the Appeal Board suggested. Enclosed with said letter are in particular a retyped version of the claims and a copy of the claims showing the amendments made. However, contrary to the terms "objects, for measurement, one at a time," of the suggested claim 1, the retyped claim 1 comprised the terms "objects for measurement one at a time". Moreover, contrary to the terms ", on a base, proximate the intersection of the arms" of the last feature of the suggested claim, the retyped claim 1 comprised the terms ", on a base (122) proximate the intersection of the arms". It is to be noted that the copy enclosed with said letter and showing the amendments made comprised the terms "objects for measurement, one at a time," and ", on a base (122), proximate the intersection of the arms", and thus differed as well from the text of claim 1 suggested by the Board and accepted by the appellant as from the retyped text enclosed in said letter. Therefore, the Board concludes that, taking into account the statement of the appellant that claim 1 had been amended exactly in the

way the Appeal Board suggested and the differences between, in particular, the copy showing the amendments and the retyped version, it is directly derivable that the texts enclosed with appellant's letter of 4 October 1996 contained clerical error and that it is the text of claim 1 submitted by the Board which is approved by the appellant (Article 113(2) EPC).

3. *Allowability of the amendments*

Present claim 1 includes those features of former claim 1 having formed the basis for said decision which, as credibly set forth in the decision under appeal, result in a claim basically combining and clarifying the features of originally filed claims 1, 2, 3 and 9. It is to be noted that present claim 1 has been amended specially concerning the feature of said former claim 1 that the jig is adapted to locate the cuboidal packages or objects, one at a time, within the volume defined by the ultrasonic transducer means (12, 14, 16), which feature had been objected in the decision under appeal; indeed, present claim 1 further includes the features of the original application (see in particular page 6, second paragraph, six last lines; page 19, last paragraph to page 21, first paragraph; see also Figure 3) concerning the means adapted for positioning of the object, which is stationary during measurement, on a base, proximate to the intersection of the three arms of the jig. Since this feature of present claim 1 specifies that, as can be seen for instance from original Figure 3, the stationary object to be measured is placed on a limited area of the base of the apparatus, the objection in the decision under appeal is in any case no more relevant and the European patent application satisfies the requirement of Article 123(2) EPC that it may not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed.

4. *Clarity*

As mentioned in the preceding paragraph, present claim 1 specifically contains features resulting in the measuring apparatus being such that it comprises a jig adapted to locate the cuboidal packages or objects, one at a time, within the volume defined by the ultrasonic transducer means (12, 14, 16) carried by the arms of said jig, on a base, proximate the intersection of said arms of the jig, which features are important with respect to the object of the invention as described in the present application. Therefore, present claim 1 is clear in the sense of Article 84 EPC.

5. *Novelty*

As credibly set forth in the decision under appeal, the subject-matter of claim 1 having formed the basis for this decision was not known from the prior art. Since present claim 1 comprises additional amendments which result in a more specific apparatus of the same type, the subject-matter of present claim 1 is also novel in the sense of Article 54 EPC.

6. *Inventive step*

6.1 An apparatus is known from D1 (see column 1, lines 9 to 18; column 2, lines 9 to 63; column 3, lines 12 to 45; column 3, line 55 to column 6, line 30; the Figure); this apparatus is operated for purposes related to the presence of cuboidal objects (6) and, in particular, includes some measurement of said cuboidal objects (6); the apparatus includes three ultrasonic transducer means (3, 4, 5), each having an emitter and a receiver associated therewith, said ultrasonic transducer means (3, 4, 5) being located to define a three-dimensional volume and each being aimed in substantially mutually perpendicular relationship across said volume for

emitting an ultrasonic signal toward an object (6) within said volume and receiving said emitted signal after reflection thereof from said object (6); said apparatus further includes trigger means (whereby detection by the photocell (8) triggers the height measurement) for selectively activating the emitters of each of the said transducer means (3, 4, 5) to emit said ultrasonic signals when said object (6) is within said volume; the apparatus also comprises timer means for determining travel time between the emission of the said ultrasonic signal by each emitter and receipt of said emitted signal by its associated receiver after reflection from said object, and computing means (10) for correlating said travel times to linear distances.

It is to be noted that, in the apparatus of D1, the computing means (10) is derivable as being conditioned to calculate actual dimensions of each said object (6) from said linear distances; in particular, the height of the object (6) can be calculated by using the gap of space measurement by the height transducer (3) and taking into account the definite distance between the surface of the conveyor (2) and said height transducer (3). Moreover, the apparatus of D1 is derivable as further comprising data collection means to store the said actual dimensions.

- 6.2 However, as convincingly argued by the appellant, the apparatus shown in the Figure of D1 cannot measure a width of an object, i.e. the dimension of the object transverse to the direction of movement of the conveyor on which the object (6) is located, due to the manner in which the "width" transducer (5) is placed, firing transversely across said conveyor without a far side reference point; only the space or gap between the object and the "width" transducer face can be measured so that, without further information being provided by D1, this gap measurement cannot indeed result in the

measurement of the width. Thus, contrary to the present apparatus, the computing means of the known apparatus is not conditioned to calculate the actual dimensions of each said object from said linear distances.

- 6.3 Moreover, as also convincingly argued by the appellant, contrary to the present apparatus, the apparatus of D1 does not further comprise transducer and object mounting means including a three-armed jig, each arm of said jig being substantially perpendicular to the other arms and said arms joining at a common point, each of said transducer means being supported by one arm and aimed in substantially parallel relationship thereto toward said common point, the jig being adapted to locate said cuboidal objects, for measurement, one at a time, within the said volume, on a base, proximate the intersection of the arms.

However, it is credible that, as already derivable from the original application (see page 4, last paragraph to page 5, first paragraph) and as pointed out by the appellant, the present apparatus provides for the rapid and simple location of packages, by hand, within the operating volume and the virtually immediate production of the dimensions required to be ascertained.

- 6.4 In this respect, the appellant has convincingly argued as follows:

Given the object of the present invention to provide an apparatus for determining the precise dimensions of objects presented in random series, it is doubtful whether the skilled person would even have identified D1 as a possible starting point, because D1 is concerned with identifying objects on a conveyor and instructing a coating device located farther for a controlled coating operation on said objects; even if he had done so, it is only by the benefit of hindsight

that he would have found it obvious to modify the known apparatus so drastically to arrive at the present apparatus with a jig being adapted to locate said cuboidal objects, for measurement, one at a time, within the said volume, on a base, proximate the intersection of the arms.

6.5 The following can be added in this respect:

Indeed, the apparatus of D1 comprises a plurality of means such as photodiodes and measuring means for the displacement of the conveyor which could allow the skilled person to arrive at an apparatus, not directly derivable from D1, but adaptable for measurement of the dimensions of the object. The question, whether this adaptation could be obvious, can remain open, because in any case, this adapted apparatus would be different from the present apparatus and in particular would not comprise any jig providing for the rapid and simple location of packages, by hand, within the operating volume and the virtually immediate production of the dimensions required to be ascertained.

6.6 The decision under appeal does not contain any reasoning concerning another prior art document which could be used as a starting point and/or the combination of prior art documents to arrive in an obvious way at the present apparatus, and the Board does not see any such combination either. Therefore, the subject-matter of present claim 1 involves an inventive step in the sense of Article 56 EPC and the claim is allowable in the sense of Article 52(1) EPC. Thus, a patent can be granted (Article 97(2) EPC).

7. Therefore, the oral proceedings requested auxiliarily by the appellant are not necessary.

Order

for these reasons it is decided that:

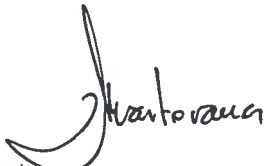
1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:

Description: Pages 1 to 4 and 6 to 22 filed with applicant's letter of 28 February 1995 and page 5 filed with appellant's letter of 4 October 1996 for the description,

Claims: No. 1 annexed to the communication of the Board dated 13 June 1996 and approved by the appellant in its letter of 4 October 1996, and Nos. 2 to 6 filed with appellant's same letter,

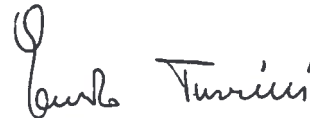
Drawings: Sheets 2/4 to 4/4 as originally filed, amended for renumbering the Figures.

The Registrar:



P. Martorana

The Chairman:



E. Turrini

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