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Datasheet for the decision of 10 March 2023

Case Number: T 0759/20 - 3.5.06

Application Number: 15200345.5

Publication Number: 3035245

IPC: G06K9/00

Language of the proceedings: EN

Title of invention:
VEHICLE TYPE RECOGNITION METHOD AND FAST VEHICLE CHECKING SYSTEM USING THE SAME METHOD

Applicant:
Nuctech Company Limited

Headword:
Truck head radiation / Nuctech

Relevant legal provisions:
EPC Art. 56, 84

Keyword:
Clarity and support - after amendment (yes)
Inventive step - after amendment (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 0759/20 - 3.5.06

D E C I S I O N
of Technical Board of Appeal 3.5.06
of 10 March 2023

Appellant: (Applicant)	Nuctech Company Limited 2nd Floor, Block A TongFang Building, Shuangqinglu, Haidian District Beijing 100084 (CN)
Representative:	Parker, Andrew James Meissner Bolte Patentanwälte Rechtsanwälte Partnerschaft mbB Postfach 86 06 24 81633 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 17 October 2019 refusing European patent application No. 15200345.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Müller
Members:	T. Alecu
	B. Müller

Summary of Facts and Submissions

I. The appeal is against the decision of the Examining Division to refuse the application. With the grounds of appeal the Appellant requested that the decision of the Examining Division be set aside and that a patent be granted on the basis of a sole request, which was identical to the first auxiliary request underlying the appealed decision. That request was refused for lack of inventive step starting from

D1: US 2013/039462, also with reference to
D3: CN 104 050 811 and
D4: DUDA R O ET AL: "Pattern Classification", INTRODUCTION, 2001.

II. In a communication accompanying a summons to oral proceedings, the Board provided its provisional opinion that the subject matter of claim 1 was not obvious given the prior art at hand, but that it lacked clarity and support.

III. With its reply of 13 January 2023, the Appellant provided a new set of application documents as a new sole request. The Board indicated, with the communication of 20 January 2023 and in a telephone call of 8 February 2023, that further amendments to the claims and the description were necessary for the application to be compliant with the requirements of Article 84 EPC. In response, the Appellant provided an amended description on 7 February 2023 and an amended set of claims on 10 February 2023.

IV. Claim 1 of the current sole request defines:

A method of vehicle type recognition for vehicle security checking, based on a laser scanner recognizing, using computer image recognition, a gap portion between a first portion, which is a head portion, and a second portion, which is a cargo portion, of a vehicle to be checked, wherein a radiation amount to be used in the vehicle security checking is controlled as a function of whether the radiated portion is the head portion or the cargo portion, the method comprising steps of:

detecting that the vehicle to be checked has entered into a recognition area;

causing the laser scanner to move relative to the vehicle to be checked;

scanning the vehicle to be checked using the laser scanner on a basis of columns;

specifying a height difference threshold;

specifying an initial number of columns;

starting the step of determining height difference only when data of columns after the initial number of columns has been scanned;

determining a first height difference between the height at the lowest position of the vehicle to be checked in data of column N and the height at the lowest position of the vehicle to be checked in data of

specified numbers of columns preceding and/or succeeding to the column N,

if

the absolute value of the first height difference is larger than the specified height difference threshold,

the heights at the lowest position of the vehicle to be checked in data of the first N columns are all in a first predetermined range;

a length corresponding to data of the first N columns is in a second predetermined range; and

a contour spliced from the data of the first N columns complies with one of predetermined contours of head portions of vehicles,

labeling a position of the vehicle to be checked corresponding to the data of the column N as a start position of the gap portion (C) of the vehicle to be checked, wherein a length corresponding to data of the first N columns is the length of the first portion of the vehicle to be checked in the three-dimensional image;

after the column N is scanned, determining a second height difference between the height at the lowest position of the vehicle to be checked in data of a column M and the height at the lowest position of the vehicle to be checked in data of specified numbers of columns preceding to the column M, wherein M > N, if the absolute value of the second height difference is larger than the specified height difference threshold,

determining a length of the gap portion (C) of the vehicle to be checked in the three-dimensional image based on a distance difference between a position of the vehicle to be checked corresponding to the data of the column M and a position of the vehicle to be checked corresponding to the data of the column N; and

determining the type of the vehicle based on the length of the gap portion (C) and the length of the first portion of the vehicle to be checked, wherein the type of the vehicle includes van trucks and trucks with containers.

Reasons for the Decision

The application

1. The application relates to the field of vehicle security checking, where the driver drives the vehicle through a radiation exposure region; for health reasons, the cabs (truck heads) must be recognized and the radiation sources controlled so that the drivers receive no, or a very low, level of radiation (page 1, lines 9-16).

2. The application proposes (page 4) to recognize the truck type by laser scanning which measures the height of the truck as it moves through the recognition zone. The scans are taken from the side and define (vertical) data columns wherein the height of the object can be identified. The variation in height is used to identify the gap or recess between the truck head and cargo.

2.1 In figure 1 (pages 5-8), dealing with van trucks (page 5, line 4), height differences are thresholded to identify the position of both gap ends, at the head and the cargo sides. The gap length is measured and the truck type is determined based on the length of the truck head and the length of the gap (page 8, lines 8-10).

2.2 In figure 2, dealing with single frame trucks (page 8, lines 29-31), the gap is merely a recess portion (page 8, line 31 - page 9 line 1) and the position of the recess between the truck head and the cargo is identified by thresholding the height differences.

2.3 In both cases (page 7, lines 23 to 29; page 10 lines 1 to 7), the determination of the position of the gap portion includes verifying that the range of heights in the scans corresponding to the presumed truck head, the shape of the presumed truck head contour, and the length of the presumed truck head portion correspond to what is expected for a truck head.

2.4 Given that the claimed method identifies the start and end position of the gap, the claims of the current request relate to the disclosure of figure 1, the one of figure 2 being incompatible with the claim.

Article 84 EPC

3. The Board objected in its preliminary opinion accompanying the summons to oral proceedings that the claim wording lacked clarity (point3, "*third height difference*"), that the claimed lacked support in the claimed generality (point 4, no support for "*single frame*

trucks"), and that it lacked the essential features of actually providing for radiation control (point 5).

4. In its communication of 20 January 2023, the Board was further of the opinion that, also with regards to the dependent claims and to the description, the scope of protection sought could not be determined in a precise manner.

5. All these objections have been overcome by the current set of application documents, which no longer suffers from those deficiencies.

Inventive step (Article 56 EPC)

6. The Examining Division denied inventive step starting from document D1. That document, as the current application, is concerned with the detection of the truck head using laser scanning in order to minimise the amount of radiation to the driver (abstract; paragraphs 90-92). D1 does not provide details as to how this is done, nor is it concerned with the identification of the vehicle type. The Examining Division (section 3.2) and the appellant (grounds of appeal B.7 and B.8) agree that claim 1 differs from D1 by a set of features which can be grouped as follows (feature lettering as used in the decision):

"*i) the type of truck is determined from the length of the gap portion (features a, k'), said length being determined according to features h1, i and j;*
ii) cab end detection is started after an initial length has been scanned, i.e. features f and g, and
iii) the height, length and contour of the cab portion are checked against known parameters, i.e. features l', m', n', h2."

7. The Examining Division held (3.2.1) that the first group of features would be implemented by the skilled person when attempting to solve the problem of classifying the vehicle type, this problem being considered obvious in the context of D1. The features in question were obvious to the skilled person when considering which features may be discriminative for the vehicle type.

7.1 The second group of features was considered obvious (3.2.2) when solving the problem of speeding up the processing.

7.2 The third group of features was considered obvious (3.2.3) in order to solve the problem of "improving the robustness of determining the end of the cab". This was because "*[d]etermining objects in signals by comparing measured heights, lengths and shape contours of objects with known ranges/ templates for said features is the first, most basic, commonly known approach - see e.g. D4 sect.1.2 par.1. In the case of D1, in the context of Fig.16, par. 88-90 this results in features I', m', n' and h2.*"

8. The Board disagrees at least with the assessment of the obviousness of the last group of features. This is because the problem solved is not one of classification (which is what D4 discusses) of the head truck type, wherein it may be obvious to compare "*measured heights, lengths and shape contours of objects with known ranges/ templates*", but one of a detection of a feature point that may later be used for classifying the object.

8.1 The claimed method defines first detecting a point by height difference by going through the columns in a

sequential manner and then confirming its validity by the defined comparisons. It can be said that the claimed method relies on a set of properties of the entire object, i.e. the truck head, in order to confirm the detection of a specific feature point, i.e. its end, which is otherwise the most critical one, because the driver can no longer be present after this point.

8.2 Should the skilled person use D4 in the context of D1, it may use different lengths and shapes to classify parts of the obtained profile (see figure 16B in D1) as a truck head or not, but the Board sees no obvious reason for it to proceed, as claimed, in a staged manner, i.e. point detection, then confirmation of the point by classification.

9. Therefore, the Board considers that the claimed matter is not obvious starting from D1 in view of D4. Nor is it obvious in view of, or starting from, D3, which does not discuss the gap detection at all. The Board is also satisfied, that, by controlling radiation as a function of whether the head or the cargo portion is radiated, as claimed, the claimed invention solves the technical problem of reducing the driver's exposure to radiation. An inventive step is therefore acknowledged.

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:

   - claims 1-10 as filed on 10 February 2023;
   - description pages 1-14 as filed on 7 February 2023; and
   - drawings 1 and 2 as originally filed (on a single page).

The Registrar: The Chairman:

L. Stridde M. Müller

Decision electronically authenticated

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Case Number: T 0759/20 - 3.5.06

D E C I S I O N
of the Technical Board of Appeal 3.5.06
of 29 March 2023
correcting an error in the decision
of 10 March 2023

Appellant: (Applicant)	Nuctech Company Limited 2nd Floor, Block A TongFang Building, Shuangqinglu, Haidian District Beijing 100084 (CN)
Representative:	Meissner Bolte Partnerschaft mbB Patentanwälte Rechtsanwälte Postfach 86 06 24 81633 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 17 October 2019 refusing European patent application No. 15200345.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: M. Müller
Members: T. Alecu
B. Müller

The order in decision T0759/20-3.5.06 referred to pages 1-14 of the description received on 7 February 2023, and thereby to the marked-up version. Obviously, reference should have been made to pages 1-13 of the clean version received on the same day.

Pursuant to Rule 140 EPC, the number of pages of the description indicated in point 2 of the order is corrected to read as follows:

- description pages 1-13 as filed on 7 February 2023.

The Registrar: The Chairman:

L. Stridde M. Müller

Decision electronically authenticated