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Datasheet for the decision
of 21 September 2020

Case Number:	T 0711/20 - 3.2.07
Application Number:	15183816.6
Publication Number:	2998076
IPC:	B25J9/16, B25J13/00, B65G47/90, G05B19/418
Language of the proceedings:	EN

Title of invention:
ROBOT SYSTEM AND METHOD FOR PICKING WORKPIECE

Applicant:
Kabushiki Kaisha Yaskawa Denki

Headword:

Relevant legal provisions:
EPC Art. 56, 84
RPBA 2020 Art. 15(1)

Keyword:
Claims - clarity (yes)
Inventive step - (no)

Decisions cited:

Catchword:

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Boards of Appeal

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Case Number: T 0711/20 - 3.2.07

D E C I S I O N
of Technical Board of Appeal 3.2.07
of 21 September 2020

Appellant: Kabushiki Kaisha Yaskawa Denki
(Applicant)   2-1, Kurosaki-Shiroishi
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Decision under appeal: **Decision of the Examining Division of the**
                             European Patent Office posted on 18 November
                             2019 refusing European patent application No.
                             15183816.6 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman   I. Beckedorf
Members: B. Paul
                  S. Watson

Summary of Facts and Submissions

I.   The appeal arises from the decision of the examination
        division to refuse European patent application No. 15
        183 816.6. The applicant (appellant) lodged the appeal
        in the prescribed form and within the prescribed
        period.

II.   In the decision under appeal the examining division
        held that claims 1 and 5 of the main request do not
        meet the requirements of Article 84 EPC (clarity). The
        main request (*obiter dictum*), the first auxiliary
        request and the second auxiliary were held not to meet
        the requirements of Article 56 EPC (inventive step).

III.   In a communication pursuant to Article 15(1) RPBA 2020,
        the Board gave its preliminary opinion that claims 1
        and 5 of the main request satisfied the requirement of
        Article 84 EPC, but that the appellant's arguments as
        to inventive step of the claimed subject matter of the
        main request appeared not to be convincing.

        The Board further indicated that the appellant's
        arguments concerning the involvement of an inventive
        step of the claimed subject matter of the first and
        second auxiliary requests appeared to be not
        sufficiently substantiated.

IV.   Oral proceedings before the Board took place on
        21 September 2020.

V.   The final requests of the appellant were

            that the decision under appeal be set aside and

that a patent be granted on the basis either of the
main request or, in the alternative, of the first
or second auxiliary requests, all requests decided
upon by the examining division and attached to the
decision under appeal as annexes I to III.

VI.   At the conclusion of proceedings the decision was
        announced. Further details of the proceedings can be
        found in the minutes thereof.

VII.   In the present decision reference is made to the
        following document which was considered in the decision
        under appeal:
            D1: JP 2014 104 524 A.

VIII.   The lines of argument of the appellant are dealt with
        in detail in the reasons for the decision.

IX.   Independent claim 1 according to the main request reads
        as follows:

        A robot system (1), comprising:
        a conveyor (10) configured to convey at least one
        workpiece (W, W1, W2, W3);
        a robot (20) comprising a plurality of holders (23a,
        23b) configured to hold the at least one workpiece (W,
        W1, W2, W3); and
        a controller (40) configured to control the robot (20)
        to hold the at least one workpiece (W, W1, W2, W3)
        conveyed on the conveyor (10) and transfer the at least
        one workpiece (W, W1, W2, W3) to a predetermined place
        using at least one holder (23a, 23b) among the
        plurality of holders (23a, 23b),
        the controller (40) comprising a control unit (41) and
        a storage (42),

with the control unit (41) including a conveyor
controller (41a), a divided area setter (41b), an
allocator (41c), a situation acquirer (41d), and an
instructor (41e),
wherein the divided area setter (41b) is configured
to set a plurality of divided areas (CA1, CA2) on
the conveyor (10) in a width direction of the
conveyor (10), and is configured to store the
plurality of divided areas (CA1, CA2) in a storage
(42); and
wherein the allocator (41c) is configured to
allocate the plurality of holders (23a, 23b)
respectively to the plurality of divided areas
(CA1, CA2) so as to hold the at least one workpiece
(W, W1, W2, W3) when the at least one workpiece (W,
W1, W2, W3) is conveyed in the plurality of divided
areas (CA1,CA2),
characterized in that
the divided area setter (41b) is configured to set the
plurality of divided areas (CA1, CA2) based on stored
divided area setting information (42a) including the
position and dimensions of a movable area (WA) of the
robot (20), the width of the conveyor (10), and the
number of holders (23a, 23b),
wherein the robot system is configured such that
    (a) when a first holder (23a) of the plurality of
    holders (23a, 23b) is in use, the instructor (41e)
    determines whether the other holder, namely a
    second holder (23b), is not being used (S107),
    (b) when the second holder (23b) of the plurality
    of holders (23a, 23b) is not being used, the
    instructor (41e) operates the robot (20) to hold
    the workpiece (W) using the second holder (23b)
    (step S108), and
    (c) when the second holder (23b) is in use, so that
    both the holders (23a and 23b) are in use, the

instructor (41e) operates the robot (20) to
transfer the workpieces (W) held by the holders
(23a and 23b) to the conveyor (50), and then to
hold the workpiece (W) using the first holder (23a)
(step S109).

Independent claim 5 of the main request reads as
follows:

A method for picking a workpiece, comprising the steps
of:
  conveying (S101) at least one workpiece (W, W1, W2,
W3) using a conveyor (10) through a movable area (WA)
of a robot (20) comprising a plurality of holders (23a,
23b);
  detecting (S102) a conveyance situation in which the
at least one workpiece (W, W1, W2, W3) is conveyed on
the conveyor (10);
  setting a plurality of divided areas (CA1, CA2) on
the conveyor (10) in a width direction of the conveyor
(10) based on stored divided area setting information
(42a) including the position and dimensions of the
movable area (WA) of the robot (20), the width of the
conveyor (10), and the number of holders (23a, 23b);
  identifying (S103), based on the conveyance
situation, a divided area (CA1, CA2) to which the at
least one workpiece (W, W1, W2, W3) corresponds from
among the plurality of divided areas (CA1, CA2) of the
conveyor (10) that are divided in a width direction of
the conveyor (10); and
  operating (S106, S108) the robot (20) to hold the at
least one workpiece (W, W1, W2, W3) using one holder
(23a, 23b) among the plurality of holders (23a, 23b)
that is allocated to the divided area (CA1, CA2),
wherein

(a) when a first holder (23a) of the plurality of
holders (23a, 23b) is in use, an instructor (41e)
determines whether the other holder, namely a second
holder (23b) of the plurality of holders (23a, 23b) is
not being used (step S107),
(b) when the second holder (23b) is not being used,
the instructor (41e) operates the robot (20) to hold
the workpiece (W) using the second holder (23b) (step
S108), and
(c) when the second holder (23b) is in use, so that
both the holders (23a and 23b) are in use, the
instructor (41e) operates the robot (20) to transfer
the workpieces (W) held by the holders (23a and 23b) to
the conveyor (50), and then to hold the workpiece (W)
using the first holder (23a) (step S109).

X.   Independent claim 1 of the first auxiliary request
        reads as follows (additions with respect to claim 1 of
        the main request are underlined, deletions struck-
        through):

        A robot system (1), comprising:
        a conveyor (10) configured to convey at least one
        workpiece (W, W1, W2, W3);
        a robot (20) comprising a plurality of holders (23a,
        23b) configured to hold the at least one workpiece (W,
        W1, W2, W3); and
        a controller (40) configured to control the robot (20)
        to hold the at least one workpiece (W, W1, W2, W3)
        conveyed on the conveyor (10) and transfer the at least
        one workpiece (W, W1, W2, W3) to a predetermined place
        using at least one holder (23a, 23b) among the
        plurality of holders (23a, 23b),
        the controller (40) comprising a control unit (41) and
        a storage (42),

with the control unit (41) including a conveyor
controller (41a), a divided area setter (41b), an
allocator (41c), a situation acquirer (41d), and an
instructor (41e),
wherein the divided area setter (41b) is configured
to set a plurality of divided areas (CA1, CA2) on
the conveyor (10) in a width direction of the
conveyor (10), and is configured to store the
plurality of divided areas (CA1, CA2) in a storage
(42);
and wherein the allocator (41c) is configured to
allocate the plurality of holders (23a, 23b)
respectively to the plurality of divided areas
(CAI, CA2) so as to hold the at least one workpiece
(W, W1, W2, W3) when the at least one workpiece (W,
W1, W2, W3) is conveyed in the plurality of divided
areas (CA1,CA2),
characterized in that
the divided area setter (41b) is configured to set the
plurality of divided areas (CA1, CA2) based on stored
divided area setting information (42a) including the
position and dimensions of a movable area (WA) of the
robot (20), the width of the conveyor (10), and the
number of holders (23a, 23b),
wherein the robot system is configured such that
    (a) when a first holder (23a) of the plurality of
    holders (23a, 23b) is in use, the instructor (41e)
    determines whether ~~the~~ another holder <u>of the
    plurality of holders</u>, namely a second holder (23b),
    is not being used (S107),
    (b) when the second holder (23b) of the plurality
    of holders (23a, 23b) is not being used, the
    instructor (41e) operates the robot (20) to hold
    the <u>at least one</u> workpiece (W, <u>W1, W2, W3</u>) using
    the second holder (23b) (step S108), and

(c) when the second holder (23b) is in use, so that
both the holders (23a and 23b) are in use, the
instructor (41e) operates the robot (20) to
transfer the workpieces (W) held by the holders (23
a and 23 b) to ~~the~~ <u>a second</u> conveyor (50), <u>which is
parallel to the conveyor (10),</u> and then to hold the
<u>at least one</u> workpiece (W, <u>W1, W2, W3</u>) using the
first holder (23a) (step S109).

Independent claim 5 of the first auxiliary request has
been adapted in accordance with the changes to claim 1.

XI.   Independent claims 1 and 5 of the secondary auxiliary
request comprise, in addition to the features of claims
1 and 5 of the first auxiliary request, the following
features:
    - on the conveyance path of the conveyor (10), the
    robot (20) has a movable area (WA);
    - wherein the divided area setter (41b) is
    configured to set a plurality of divided areas
    (CA1, CA2) of the movable area (WA) on the conveyor
    (10);
    - wherein the allocator (41c) is configured to
    store the result of the allocation as allocation
    information.

Reasons for the Decision

1.   *Main request – Clarity (Article 84 EPC)*

1.1   The examining division found that, in the
         characterizing part of claims 1 and 5, the expression
         "the other holder" is not clear, because it is not
         clear if the other holder is part of the plurality of

holders as defined at the beginning of the claims or
not (cf. contested decision, section 2.1).

The Board concurs with the appellant's argument that
the language of claim 1 of the main request uses the
contested term, 'other holder' exactly once, and the
claim language "*... the other holder, namely a second
holder, ...*" clearly and unambiguously defines that the
other holder is a second holder, while the claim
language "*...the second holder of the plurality of
holders*" clearly and unambiguously defines that the
second holder is part of the plurality of holders (cf.
statement setting out the grounds of appeal, section
2.1.1.1).

1.2   The Board is further not convinced by the examining
        division's finding that it is not clear if the
        workpiece in the characterizing part of the claims
        corresponds to the at least one workpiece conveyed by
        the conveyor (10) as defined at the beginning of the
        claims or not (cf. grounds for the decision, section
        2.2).

1.3   The Board shares the opinion expressed by the appellant
        that a skilled person understands the term "the
        workpiece" to be part of "the at least one
        workpiece" (cf. statement setting out the grounds of
        appeal, section 2.1.1.2).

1.4   The examining division finally found, that in claims 1
        and 5, it is not clear if the **conveyor (50)** in the
        characterizing part of the claims corresponds to the
        conveyor (10) defined at the beginning of the claims or
        not (cf. contested decision, section 2.3).

The appellant has however convincingly argued (cf.
statement setting out the grounds of appeal, section
2.1.1.3) that the claim language leaves room for both
interpretations. The Board concurs that the claim is
broadly defined, but still allows a skilled person to
determine the scope of the claim.

The Board therefore concludes that, contrary to the
findings in the contested decision, the requirements of
Article 84 EPC are met by claims 1 and 5 of the main
request.

2.   *Main request - Inventive Step (Article 56 EPC)*

2.1   According to Article 56 EPC, an invention is to be
        considered as involving an inventive step if, having
        regard to the state of the art, it is not obvious to
        the person skilled in the art.

2.2   It is undisputed that document D1 is considered as
        closest state of the art.

2.3   The appellant however disagreed with the findings of
        the examining division, as discussed in the context of
        the auxiliary requests and referred to, *obiter dictum,*
        for the main request, on what is disclosed by D1 (cf.
        statement setting out the grounds of appeal, section
        2.1.2).

2.4   In particular, the appellant expressed the opinion that
        D1 does not disclose the following feature of claim 1:
            (i) "[...] the controller comprising [...] a
            storage, with the control unit including a conveyor
            controller, a divided area setter, [...] wherein
            the divided area setter is configured to set a
            plurality of divided areas on the conveyor in a

width direction of the conveyor, and is configured
to store the plurality of divided areas in a
storage [...] wherein the divided area setter is
configured to set the plurality of divided areas
based on stored divided area setting information
including the position and dimensions of a movable
area of the robot, the width of the conveyor,
[...]".

The appellant argued that the disclosure of D1 did not
implicitly require a divided area setter that is part
of a controller.

The appellant further argued, that the divided area
setter of the main request was an electronic device,
contrary to D1 which remained completely silent in this
respect, and might address a human being instead.

In the appellant's opinion, the teaching of D1 could
only be realized by using respective detections means
(for example a separate sensor device for each
respective detection region (divided areas)) that were
positioned by a human being such that they were
configured to detect the respective detection region.
Such a design would require neither a storing device
for storing the detection regions nor a divided area
setter (that is part of the controller) that set the
divided areas.

The Board is not convinced by these lines of argument.
D1 describes a detection means 6 which is provided with
a camera 11 placed above a supply conveyor 3 upstream
from the robot 5 and an image processing means 12 which
recognizes the positions of articles 1 from images
captured by the camera 11. The image processing means
12 inputs the speed of conveyance of the articles 1

from an encoder fitted to the supply conveyor 3,
recognizes the subsequent positions and orientations of
the articles 1 when the articles 1 are conveyed to the
holding position by the robot 5, and transmits the
results of said recognition to a control means 7 (cf.
par. [0009] of D1). To the Board the aforementioned
clearly discloses a detection means 6, which is
manifested by appropriate technical means, *scilicet* by
an electronic device.

In addition, the Board is not convinced by the
appellant's argument presented during oral proceedings,
that D1 merely disclosed a detection means 6 that
recognises conveyor regions on either side of a center
line by using an identifiable marking of said center
line on the conveyor belt. Since Fig.1 of D1 is a
schematic representation of the article management
system 2 disclosed in D1, the Board considers the thin
chain double dashed line shown on the supply conveyor 3
in the figure, as a schematic indication of the course
of the center line dividing the conveyor belt into two
regions. Nowhere in the description of D1 can a clear
disclosure of an identifiable marking of the center
line on the supply conveyor itself be found.

Further to that, par. [0014] of D1 discloses that the
image processing means 12 is constituted such that, for
all of the articles 1, it recognizes the region, *i.e.*
conveyor region SA or SB, in which they are positioned,
and the orientation thereof, from images captured by
the aforementioned camera 11. For executing this
function, the image processing means 12 has to perform
some kind of discrimination in order to relate the
position of articles to one of the conveyor regions SA
or SB. It appears therefore to the Board, that the
finding of the examining division is correct, according

to which D1 implicitly discloses some kind of storage
for storing information on the divided conveyor regions
SA and SB.

In consequence, the Board is of the opinion that
feature (i) is disclosed by D1, and thus is not a
distinguishing feature.

2.5   The appellant further argued that D1 did not disclose
        the following feature of claim 1:
            (ii) "wherein the robot system is configured such
            that [...] (c) when the second holder is in use, so
            that both the holders are in use, the instructor
            operates the robot to transfer the workpieces held
            by the holders to the conveyor, and then to hold
            the workpiece using the first holder".

        With respect to feature (ii), the appellant stated,
        that contrary to the finding of the examining division
        neither paragraph [0018] nor Fig.1 of D1 showed the
        disputed feature.

        The Board, however, is of the opinion that feature (ii)
        has to be seen as part of a larger context, which
        describes the configuration of the robot when the first
        holder is in use. The assessment of the examining
        division has been performed with respect to the
        complete context in which feature (ii) is found (cf.
        section 3.1 of the contested decision).

        The Board notes that claim 2 of D1 describes a system
        that in a scenario in which all of the holding means
        corresponding to a given conveyor region hold articles
        and when an article positioned downstream is conveyed
        through the aforementioned given conveyer region, the
        control means controls the robot so that the article is

held by holding means which does not correspond to the aforementioned conveyor region. In addition, D1 describes in par. [0018] the same scenario including a transfer to the discharge conveyor in case all holding means of the robot are in use.

Accordingly, the Board concludes that feature (ii) is disclosed by D1, and thus is not a distinguishing feature.

2.6   In consequence of the above, the Board does not find any convincing line of argument demonstrating that the conclusions reached *obiter dictum* and with reference to section 3 of the contested decision, where inventive step starting from D1 is discussed, are not correct and have to be set aside.

3.   *First auxiliary request*

The appellant contested that the examining division neglected to discuss the feature
     (iii) "the second conveyor (50) is parallel to the
     conveyor (10)"
when presenting the inventive step argumentation in respect to the first auxiliary request (cf. statement of grounds of appeal, section 2.2).

The Board concurs with the appellant that claim 1 of the first auxiliary request differs from the main request by feature (iii). The examining division did however make reference to Fig.1 of D1 when citing the second conveyor in claim 1 (cf. sections 3.1 and 3.2 of the contested decision)and the Board notes, that feature (iii) is directly and unambiguously derivable from Fig.1 of D1. This finding remained undisputed by the appellant. Accordingly, the Board is of the opinion

that feature (iii) is also disclosed by D1, and thus is not a distinguishing feature.

During oral proceedings before the Board, the appellant further stated that the first auxiliary request had been submitted only to address the clarity objection raised by the examining division but did not add to inventive step when compared with the main request so that no argument on inventive step was submitted (cf. minutes of oral proceedings of 21 September 2020). However, even with the clarity objection raised by the examining division being without merit, as set out in point 1 above, the objection of lack of inventive step still remains, as discussed in point 2 above.

3.1   In consequence, the Board does not find any convincing line of argument showing that the conclusions reached with reference to section 3 of the contested decision, where inventive step starting from D1 is discussed, are not correct and have to be set aside.

4.   *Second auxiliary request*

4.1   The appellant contested that the examining division, when refusing the second auxiliary request, only provided very rough arguments and did not consider the particularities of the present case, and that the decision was not sufficiently founded (cf. statement of grounds of appeal, section 2.3).

4.2   The Board finds that the second auxiliary request was discussed during oral proceedings of 14 November 2019 before the examining division (cf. section 4 of the minutes of oral proceedings of 14 November 2019) and in section 3.1, sixth bullet point, as well as in section 4.5.2. of the contested decision.

4.3   The Board is further not convinced by the appellant's
        argument, that the examining division did not consider
        that D1 did not disclose the feature, that
              (iv) "a divided area setter is configured to set a
              plurality of divided areas of the movable area of a
              robot."
        (cf. statement of grounds of appeal, section 2.3)

        To the Board, it is evident that a divided area setter
        configured to set the plurality of divided areas (CA1,
        CA2) based on stored divided area setting information
        (42a) including the position and dimensions of a
        movable area (WA) of the robot (20), as set out in
        claims 1 and 5 of the main request, intrinsically
        encompasses that the divided area setter is configured
        to set a plurality of divided areas of the movable area
        of a robot, so that feature (iv) does not provide any
        further limitation that could provide a basis for
        inventive step.

4.4   Neither in the statement setting out the grounds of
        appeal nor during oral proceedings before the Board did
        the appellant put forward any further reasons as to why
        the findings set out in the contested decision should
        be considered erroneous.

5.   In conclusion, the Board considers that none of the
        arguments provided by the appellant demonstrate the
        incorrectness of the findings of the examining division
        with respect to the requests on file.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Nachtigall   I. Beckedorf

Decision electronically authenticated