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**Datasheet for the decision
of 26 October 2021**

Case Number: T 0601/18 - 3.2.01

Application Number: 12706413.7

Publication Number: 2678748

IPC: B62D15/02, G05D1/02, B66F9/06,
B66F9/075, B62D6/00, G08C17/02

Language of the proceedings: EN

Title of invention:
OBJECT TRACKING AND STEER MANEUVERS FOR MATERIALS HANDLING
VEHICLES

Patent Proprietor:
Crown Equipment Corporation

Opponents:
Jungheinrich Aktiengesellschaft
BT Products AB

Headword:

Relevant legal provisions:
EPC Art. 54, 56, 123(2), 123(3)

Keyword:

Extended subject-matter (no)
Extendend scope of protection (no)
Novelty (yes)
Inventive step (yes)

Decisions cited:

Catchword:



Beschwerdekammern

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Chambres de recours

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Case Number: T 0601/18 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 26 October 2021

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
1 February 2018 concerning maintenance of the
European Patent No. 2678748 in amended form.**

Composition of the Board:

Chairman H. Geuss
Members: C. Narcisi
 S. Fernández de Córdoba

Summary of Facts and Submissions

I. The European patent No. 2 678 748 was maintained in amended form according to the decision of the Opposition Division posted on 1 February 2018. Against this decision an appeal was lodged by the Opponents I and II and by the Patentee in due form and in due time pursuant to Article 108 EPC.

II. The following documents are cited in this decision:

WO-A (designating the published patent application WO-A2-2012/115920 of the contested patent);

EP-B (designating the publication of the contested patent);

E2 (WO-A2-2010/065864);

E7/E7a (JP-A-2006-259877 with English translation E7a);

E9 (US-A1-2006/0229774).

III. Oral proceedings were held on 26 October 2021. The Appellant (Patent Proprietor) requested that the decision under appeal be set aside and that the patent be maintained on the basis of auxiliary request 8A filed on 7 June 2019 (now main request).

The Appellants (Opponents) requested that the decision under appeal be set aside and that the European patent be revoked.

IV. Claim 1 of the main request reads as follows:

"A method for a materials handling vehicle to automatically implement a steer maneuver comprising: receiving sensor data from at least one sensing device by a controller on a materials handling device;

detecting that a selected object is in an environment proximate the vehicle;

defining a hug zone that extends in an axial direction that is parallel to a central axis of the vehicle and is laterally displaced from a side of the vehicle and being usable by the controller to steer the vehicle relative to the selected object; and

performing a steer maneuver by steering the vehicle such that at least a portion of the selected object is substantially maintained on a hug line defining a laterally inner boundary of the hug zone, such that the vehicle is substantially maintained at a desired distance from the selected object; and wherein the vehicle is automatically steered such that the selected object is at least partially located in the hug zone, by :

if a laterally innermost portion of the selected object is located laterally between the hug line and the vehicle, the vehicle is automatically steered away from the selected object until the laterally innermost portion of the selected object is located on the hug line, at which point the vehicle is automatically steered to a desired heading; and

if the laterally innermost portion of the selected object is located laterally on the other side of the hug line than the vehicle, the vehicle is automatically steered toward the selected object until the laterally innermost portion of the selected object is located on the hug line, at which point the vehicle is automatically steered to the desired heading."

V. The Appellants' I and II (Opponent 2 and 1) arguments may be summarized as follows:

The subject-matter of claim 1 (main request) includes subject-matter extending beyond the content of the application as filed (see published patent application, hereinafter designated as WO-A). The combination of features F6neu (i.e. "defining a hug zone that extends in an axial direction that is parallel to a central axis of the vehicle and is laterally displaced from a side of the vehicle and being usable by the controller to steer the vehicle relative to the selected object; and"), F7neu (i.e. "performing a steer maneuver by steering the vehicle such that at least a portion of the selected object is substantially maintained on a hug line defining a laterally inner boundary of the hug zone, such that the vehicle is substantially maintained at a desired distance from the selected object; and wherein"), F8.1 (i.e. "the vehicle is automatically steered such that the selected object is at least partially located in the first or second hug zone, by:"), F8.2 (i.e. "if a laterally innermost portion of the selected object is located laterally between the hug line and the vehicle, the vehicle is automatically steered away from the selected object until the laterally innermost portion of the selected object is located on the hug line,") and F8.3 (i.e. "if the laterally innermost portion of the selected object is located laterally on the other side of the hug line than the vehicle, the vehicle is automatically steered toward the selected object until the laterally innermost portion of the selected object is located on the hug line") is not originally disclosed in the application as filed (see WO-A). In particular, feature F6neu is based on claim 26 (in WO-A) which depends only on claims 22 and 21, whereas features F7neu, F8.2 and F8.3 are based on claims 23 and 24 which also depend on claim 22 and 21. Thus features F6neu on the one hand, and features F7neu, F8.2, F8.3 on the other hand

represent different embodiments whose combination is likewise not disclosed in the description of WO-A, since in figures 16 and 17 as well as in paragraphs 134, 135, 147, 149-153, 156 "hug zones" are defined only in association or relation to "steer zones".

Further, features F9 (i.e. "at which point the vehicle is automatically steered to the desired heading") and F10 (i.e. "while maintaining a desired distance from a selected object") of granted claim 1 are not any more present in claim 1 of the main request, this leading to an unallowable broadening of the scope of protection with respect to the granted claim.

The subject-matter of claim 1 of the main request is not new over E7/E7a, this document disclosing all claimed features and in particular features F8.2 and F8.3. With reference to figures 6 to 8 and particularly figure 8 of E7 it is disclosed that an object B is detected representing an object which is clearly not in line with a scheduled path (thus constituting a "selected object" according to claim 1), this "selected object" B being "hugged" by the vehicle, i.e. steering away from and keeping the object B at a separating distance on a hug line and within a hug zone (see feature F8.2). E7 discloses also feature F8.3, since this feature corresponds to the situation where the vehicle is approaching (from a distance) a selected object B, the distance getting thus reduced until the object B is located on the hug line (E7, figure 8).

The subject-matter of claim 1 of the main request does not involve an inventive step over E2, particularly in view of E9. In particular, concerning features F6neu, F7neu, F8.2, and F8.3, none of these features can involve an inventive step, as they are at least

suggested by E2 and anyway rendered obvious for the skilled person in view of E9 (see specifically feature F8.3). E2 discloses at least implicitly hug zones (see E2, figure 12) located respectively laterally rightwards of and contiguous to the right steer bumper 132B and laterally leftwards of and contiguous to the left steer bumper zone 132A (feature F6neu), these hug zones (and steer bumper zones) being used by the controller to steer the vehicle relatively to the selected object (see E2, paragraphs 89 to 91), if an object is detected outside a hug zone (i.e. within a steer bumper zone). Further, E2 discloses that the vehicle is kept at a desired distance from the selected object (see paragraph 93: "avoid ping-ponging down an aisle and instead converge to a substantially straight heading down the center of the aisle.."), such that the laterally innermost portion of the selected object is located on a hug line (feature F7neu). Thus, if a selected object is located laterally between a hug line and the vehicle (i.e. in a steer bumper zone), the vehicle is steered away from the selected object until the laterally innermost portion of the selected object is located on the hug line (feature F8.2).

As to feature F8.3, this feature is at least rendered obvious by E9, which explicitly discloses that "if a wall is determined to have been detected ..the mobile unit may approach the wall" (E9, paragraph 42), and "maintaining a constant, for example, distance from the wall" (E9, paragraph 63, figure 4) is also disclosed. The combination of E2 and E9 would be obvious for the skilled person, as the crucial and central issue in both E2 and E9 is automatic steering control of a vehicle, not the specific purpose or use of said vehicle.

VI. The Appellant's III (Patentee) arguments may be summarized as follows:

The subject-matter of claim 1 (main request) does not extend beyond the content of the application as originally filed (WO-A), for features F6neu, F7neu, F8.1, F8.2 and F8.3 were disclosed in combination in the description of WO-A, specifically in claims 21, 22, 23, 24, 26, paragraphs 110 and 134, and throughout the various examples described in paragraphs 134 to 157 and as depicted in figures 17A to 17C. In particular it is stated in paragraph 156 (with reference to figures 17A to 17C) that "hug manoeuvres" and "hug zones" "may be used in combination with the other action zones", it thus being evident for the skilled person that a "hug zone" is not necessarily used only in combination with other zones, such as e.g. "steer zones". Further, paragraph 152 clearly defines a hug line as a laterally inner boundary of a hug zone, which extends axially parallel to the central axis of the vehicle and laterally displaced therefrom. This amounts to the definition given in claim 26, thus supporting the combination of claims 21, 22, 23, 24 and 26.

There is no extension of the scope of protection due to the alleged deletion of features F9 and F10, these features not having been deleted but merely moved to another position in claim 1, feature F9 being inserted after feature F8.2 and also after feature F8.3, whereas feature F10 is incorporated into feature F7neu. Therefore, claim 1 is now narrowed further by specifying how the vehicle maintains a desired distance from a selected object while using a hug line of the hug zone.

The subject-matter of claim 1 (main request) is new over E7/E7a, as this document at least does not disclose a hug line defining a laterally inner boundary of a hug zone (feature F7neu) and does not disclose feature F8.3, specifically a material handling vehicle controlled by "steering towards a selected object".

The subject-matter of claim 1 (main request) is inventive over E2 and E9. The technical problem as derived from features F7neu, F8.1, F8.2 and F8.3 consists in improving operability of the materials handling vehicle, by increasing efficiency and productivity of the stock picking operation. The skilled person starting from E2 would not turn to E9 in order to solve the mentioned technical problem, given that E9 is directed to small autonomous home appliances and not to materials handling vehicles. The vehicles of claim 1 and of E9 operating in different physical environments are very different in nature and require essentially different kinds of control. In addition, the above technical problem does not relate to automated control of vehicles in general, there being thus no reason for the skilled person to consult E9. Finally, even on the assumption that the skilled person would consult E9, nonetheless E9 at least does not disclose features F7neu, F8.1, F8.2, F8.3. and F9. Thus, the skilled person would not arrive in an obvious manner at the claimed subject-matter.

Reasons for the Decision

1. The appeals are admissible.

2. The subject-matter of granted claim 1 (main request) does not violate Article 123(2) EPC, since the inclusion of features F6neu (i.e. "defining a hug zone that extends in an axial direction that is parallel to a central axis of the vehicle and is laterally displaced from a side of the vehicle and being usable by the controller to steer the vehicle relative to the selected object; and"), F7neu (i.e. "performing a steer maneuver by steering the vehicle such that at least a portion of the selected object is substantially maintained on a hug line defining a laterally inner boundary of the hug zone, such that the vehicle is substantially maintained at a desired distance from the selected object; and wherein"), F8.1 (i.e. "the vehicle is automatically steered such that the selected object is at least partially located in the first or second hug zone, by:"), F8.2 (i.e. "if a laterally innermost portion of the selected object is located laterally between the hug line and the vehicle, the vehicle is automatically steered away from the selected object until the laterally innermost portion of the selected object is located on the hug line,") and F8.3 (i.e. "if the laterally innermost portion of the selected object is located laterally on the other side of the hug line than the vehicle, the vehicle is automatically steered toward the selected object until the laterally innermost portion of the selected object is located on the hug line") in combination does not constitute an extension of the content of the application as filed (WO-A).

First, it is noted that (undisputedly) features F8.1, F8.2 and f8.3 are originally disclosed in combination in claims 21 to 24 in WO-A, while feature F7neu (in combination with the former features) at least partly also results from the combination of these claims (see

in particular claims 22 and 23), except for the feature "a hug line defining a laterally inner boundary of the hug zone".

However, this feature or wording is supported by paragraph 134 (see "laterally inner boundaries of the hug zones 312, 314 are defined by left and right hug lines 312A, 314A, as illustrated in Figs. 16A-16C and 17A-17C") and paragraph 149 (see "...the intent of the steer maneuver may be such that a portion of the selected object 276, e.g., the edge portion 276A thereof, is substantially maintained on the right hug line 314A that is associated with the right hug zone 314"), both these paragraphs in WO-A being based on the embodiment according to figures 17A to 17C, on which original claims 21 to 24 are also based. It ensues that the combination of features F7neu with F8.1, F8.2 and F8.3 is originally disclosed in WO-A.

As to feature F6neu, this feature is derived from paragraph 152 (see "a steer maneuver to achieve a straight heading of the truck 10 in the axial direction, i.e. parallel to the central axis CA, so as to maintain the edge portion 276A of the selected object 276 on the right hug line 314A") in conjunction with the embodiment of figures 17A, 17B and 17C, on which again original claims 21 to 24 are based. Thus it ensues from the description of WO-A that the hug zone mentioned in claims 21 to 24 extends in an axial direction that is parallel to a central axis of the vehicle, the hug zone being laterally displaced from a side of the vehicle.

Contrary to the Appellants' I and II view the combination of features F6neu, F7neu, F8.1, F8.2 and F8.3 does not necessarily imply the omission of any

further technical feature, which is allegedly inextricably linked therewith. In particular the Board considers that the omission of the feature implying a "steer zone" (see e.g. claim 27 in WO-A; see also figures 17A, 17B and 17C), being located laterally of and contiguous to said "hug zone", does not extend the subject-matter of the application as filed (see WO-A). In particular, the steering control function as detailed in features F8.1, F8.2 and F8.3 already implicitly includes a zone (located between the hug line of the laterally displaced hug zone and the materials handling vehicle; see feature F6neu), which is effectively equivalent to a "steer zone" (albeit without being explicitly defined as such) in that detecting a selected object in that zone causes the vehicle to steer away from the selected object until its laterally innermost portion is located on said hug line.

3. The subject-matter of claim 1 (main request) does not entail an extended scope of protection with respect to granted claim 1 (Article 123 (3) EPC).

Features F9 (i.e. "at which point the vehicle is automatically steered to the desired heading") and F10 (i.e. "while maintaining a desired distance from a selected object") of granted claim 1 were not deleted in claim 1 of the main request. In particular, feature F9 is now inserted in claim 1 respectively after feature F8.2 and after feature F8.3, whereas feature F10 is now incorporated into feature F7neu only (as it was already incorporated into feature F7 of granted claim 1), without it being needlessly repeated at the end of claim 1 (as is the case in granted claim 1). This amendment does not extend the scope of protection for the following reasons.

The structure, sequential order and wording of the method steps in claim 1 implies that the vehicle performs the steering maneuver "such that the vehicle is substantially maintained at a desired distance from the selected object" (see former feature F10 included in feature F7neu), "wherein" the vehicle is maintained within the hug zone (see feature F8.1) and "wherein" both features F7neu and F8.1 are in particular implemented "by" performing either feature F8.2 or F8.3 (thus feature F7neu representing a limiting feature or constraint (in addition to feature F8.1) for features F8.2 and F8.3), and finally feature F9 is implemented.

It ensues that no extension of the scope of protection can arise, given that admittedly the feature "while maintaining a desired distance from a selected object" (feature F10) is now included only in feature F7neu, but nonetheless (by the very wording of the claim : see in particular the above terms "wherein" and "by") it poses a constraint on the following steps according to features F8.2 and F8.3. The same obviously analogously applies to feature or step F9, being inserted in claim 1 of the main request after features F8.2 and F8.3 in much the same way as it followed immediately after feature F8 in granted claim 1.

4. The subject-matter of claim 1 (main request) is new over E7/E7a (Article 54 EPC), at least feature F8.3 being not derivable therefrom.
Feature F8.3 states that "if the laterally innermost portion of the selected object is located laterally on the other side of the hug line than the vehicle, the vehicle is automatically steered toward the selected

object until the laterally innermost portion of the selected object is located on the hug line".

As is visible from figure 8 of E7/E7a (see also claims 1 and 2 in E7/E7a), if an object is detected and determined to be located in a position such as to constitute an obstacle ("unevenly positioned to one side of the scheduled travel path") for the predetermined scheduled path of the vehicle, a "deviation amount" is determined by the controller, and the vehicle is caused "to separate during detour traveling from the scheduled travel path by the deviation amount toward the other side of the scheduled travel path where the obstacle is not present". In other terms, if a selected object is detected representing an obstacle along the scheduled travel path, then the control unit prompts the materials handling vehicle to effectuate a steering maneuver by steering away from the detected object, which is quite the opposite of steering towards the selected object as required by feature F8.3.

Finally, the situation where the vehicle is approaching the selected object before its detection (or immediately after its detection, but before implementation of the steering away maneuver) while proceeding along its scheduled path, likewise cannot be considered as constituting "steering toward a selected object" (as no reduction of the lateral distance between the selected object and the vehicle is implied, which would naturally occur when "steering toward" a selected object).

For these reasons the subject-matter of claim 1 is new over E7.

No novelty objections based on other documents were submitted, as confirmed the Appellants I and II during oral proceedings.

5. The subject-matter of claim 1 (main request) involves an inventive step over E2 (Article 56 EPC), particularly in view of E9, given that at least feature F8.3 would not be obvious for the skilled person in view of E9.

The objective problem consists in the improvement of the operability and control of the material handling vehicle, such as to increase inter alia efficiency and control of the stock picking operation. Thus, the objective technical problem does not relate to automated control of vehicles in general but rather to the automated control of vehicles in the specific technical field of materials handling vehicles.

In the Board's view the skilled person would not turn to and retain E9 when confronted with the above technical problem. E9 is directed to small autonomous home appliances and the problem of avoiding objects, such as tables or desks, which are typically difficult to detect (E9, paragraph 10). Such small home appliances (and vehicles) usually operate in a physical environment which may include a multitude and variety of different objects all constituting potential obstacles along the vehicle's travel path, which in E9 is also not a scheduled travel path since it may vary considerably depending on the specific physical environment (or operating area). By contrast, the physical environment where a materials handling vehicle operates is usually a warehouse having an orderly and systematic arrangement of warehouse racks and aisles, the vehicle largely using scheduled travel paths and

encountering mainly predetermined kinds of objects or obstacles.

It ensues that (as stated by the Patentee) a different type of vehicle control is required in both cases and that the skilled person starting from E2 would have no incentives to consult E9 when looking for a solution of the above technical problem.

Moreover, even on the assumption that the skilled person would consult E9, it would not obviously and necessarily arrive at claimed feature F8.3. Indeed, the skilled person would not necessarily derive from E9 that "if the laterally innermost portion of the selected object is located laterally on the other side of the hug line than the vehicle, the vehicle is automatically steered toward the selected object until the laterally innermost portion of the selected object is located on the hug line". Indeed, in E9 a vehicle control is disclosed, wherein a predetermined distance is maintained to the wall (see E9, abstract, claim 1, description paragraph 75). This, however, is not equivalent to aforesaid feature, as it does not imply, or let alone suggest, that for any kind of selected object (not necessarily a wall), an alignment of the vehicle along a "hug line" (determined by the position of said object) may occur, thus determining a vehicle's heading along a straight line (parallel to said "hug line"). In effect, whilst feature F8.3 certainly is advantageous in the vehicle's physical environment according to E2 (implying a largely orderly and systematic arrangement of warehouse racks and aisles) this would be much less so in the environment of the vehicle according to E9 (in case the selected object is not a wall), given the unpredictable number, nature and location of the detected selected objects and subsequent frequently occurring necessary changes in

the vehicle's heading.

No further inventive step objections based on other documents were submitted, as confirmed the Appellants I and II during oral proceedings.

6. The Board decided to remit the case to the first instance department in order to adapt the description to the subject-matter of claim 1, in agreement with the requests of the parties.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Opposition Division with the order to maintain the patent on the basis of the claims of the auxiliary request 8A (now main request) filed on 7 June 2019 and a description to be adapted thereto.

The Registrar:

The Chairman:



A. Vottner

H. Geuss

Decision electronically authenticated