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Case Number: T 2177/14 - 3.2.01

Application Number: 08718861.1

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Language of the proceedings: EN

Title of invention:
TRAILER ELECTRONIC BRAKING SYSTEM

Patent Proprietor:
KNORR-BREMSE Systeme für Nutzfahrzeuge GmbH

Opponents:
WABCO GmbH
HALDEX BRAKE PRODUCTS LIMITED

Headword:

Relevant legal provisions:
EPC Art. 56

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Catchword:

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Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2177/14 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 10 January 2018

Appellant: (Opponent 1)	WABCO GmbH Am Lindener Hafen 21 30453 Hannover (DE)
Representative:	Günther, Constantin Gramm, Lins & Partner Patent- und Rechtsanwälte PartGmbB Freundallee 13 a 30173 Hannover (DE)
Respondent: (Patent Proprietor)	KNORR-BREMSE Systeme für Nutzfahrzeuge GmbH Moosacher Strasse 80 80809 München (DE)
Representative:	JENSEN & SON 366-368 Old Street London EC1V 9LT (GB)
Party as of right: (Opponent 2)	HALDEX BRAKE PRODUCTS LIMITED Moons Moat Drive, Moons Moat North Redditch Worcestershire B98 9HA (GB)
Representative:	Johnson, Emma Elizabeth Forresters IP LLP Skygarden Erika-Mann-Strasse 11 80636 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 11 September 2014 concerning maintenance of the European Patent No. 2129561 in amended form.**

Composition of the Board:

Chairman	G. Pricolo
Members:	C. Narcisi
	P. de Heij

Summary of Facts and Submissions

I. European patent No. 2 129 561 was maintained in amended form by the decision of the Opposition Division posted on 11 September 2014. Against this decision an appeal was lodged by Opponent 1 on 20 November 2014 and the appeal fee was paid. The statement of grounds of appeal was filed together with the notice of appeal on 20 November 2014.

II. Oral proceedings were held on 10 January 2018. The Appellant (Opponent 1) requested that the appealed decision be set aside and that the patent be revoked. The Respondent (Patentee) requested that the appeal be dismissed and that the patent be maintained in amended form according to the appealed decision (main and sole request).

III. Claim 1 reads as follows:

"A braking system for a motor vehicle having a plurality of trailers, wherein a first trailer is provided with a braking system comprising a braking device capable of generating a braking force on an axle on the trailer, a brake force into the brake cylinders being controllable by a first braking ECU in dependence on an output of a sensor adapted to detect lateral acceleration and/or wheel speed on the first trailer and wherein a second trailer is provided with a braking system comprising a braking device capable of generating a braking force on an axle on the trailer, a brake force into the brake cylinders being controllable by an ABS valve having a second braking ECU, communications means being provided so that that the ABS valve is controllable by the first braking ECU, wherein, in the event that the sensor detects lateral

acceleration and/or a wheel speed indicative of loss of stability, the sensor generates a signal for actuating stability control in the first trailer and the first braking ECU generates a signal to apply the brakes on the second trailer, characterised in that in a case of a braked vehicle the brake force is lowered at the braked wheel on the inside of a turn and a stability control event initiated if the rotational speed of the wheel increases by less than a predetermined amount."

IV. The Appellant's arguments may be summarized as follows:

The subject-matter of claim 1 is not inventive over a combination of prior art documents D2 (GB2284458A) and D12 (WO0222416A1) (or conversely D12 and D2), alternatively over D13 (MacAdam et al. "Rearward Amplification Suppression" (RAMS)) and D12, or over D14 (Ervin et al. "Two active Systems for Enhancing Dynamic Stability in Heavy Truck Operations") and D12.

D2 discloses all of the features of claim 1, except for the following features: "in the event that the sensor detects lateral acceleration and/or a wheel speed indicative of loss of stability, the sensor generates a signal for actuating stability control in the first trailer " (hereinafter designated as feature (f)), "and the first braking ECU generates a signal to apply the brakes on the second trailer" (hereinafter designated as feature (g)), "in a case of a braked vehicle the brake force is lowered at the braked wheel on the inside of a turn and a stability control event initiated if the rotational speed of the wheel increases by less than a predetermined amount" (hereinafter designated as feature (i)). Among the features known from D2, this document discloses in particular that "the ABS valve is controllable by the

first braking ECU" (hereinafter designated as feature (e)), since in the event that the ABS control function is triggered by the ECU 47 on the first trailer 11 (see, D2, figures 1 to 3) and the resulting braking pressure generated in this process is applied (by means of relay valve 32 and shuttle valve 60 on the first trailer) to air conduit 28 in the second trailer 12, said applied pressure leads to triggering of the ABS control function in the second trailer if it is too high in relation to the friction forces ensuring tractive contact of the wheels (in the second trailer) to the road surface. Therefore feature (e) is disclosed in D2 if the term "controllable" is understood in a broader sense, i.e. as meaning "influenced by".

Starting from D2 the skilled person would aim at improving vehicle stability, in particular with respect to the risk of lateral overturn, and would obviously combine D2 with D12, this document specifically dealing with the risk of lateral overturn. D12 discloses a vehicle comprising a tractor and a trailer and discloses a stability control including aforementioned features (f) (see D12, e.g. monitoring of lateral acceleration in blocks 1,2 of flux diagram in figures 1, 2) and (i) (see D12, page 7, lines 16-21), feature (g) necessarily resulting from the combination with D2 (since the braking pressure generated by the ECU (in the first trailer) during stability control would be transmitted (through shuttle valve 60 in the apparatus of D2) to the brakes in the second trailer).
Finally, said feature (e) is not only known from D2 (see above) but it likewise results from the combination of D2 and D12. In effect, during stability control (performed according to D12 by the electronic control unit (ECU) in the first trailer) the generated braking pressure (being higher than the brake pressure

demand signal generated by the operator) is transmitted to the second trailer (via shuttle valve 60) and this would in all likelihood trigger the ABS control function in the second trailer. Thus, the remaining features of claim 1 being known from D2, the skilled person would arrive at the claimed subject-matter in an in obvious manner.

Conversely, starting from D12 the skilled person would seek to apply the stability control system of D12 to a vehicle including a plurality of trailers and would therefore obviously combine D12 with D2, thus arriving at the subject-matter of claim 1 (see above).

Starting from D13, the skilled person would aim at improving the stability control system, for the braking system according to D13 merely includes a Rearward Amplification Suppression System (RAMS). The vehicle of D13 comprises a first and a second trailer (the term “trailer” being not clearly defined and sufficiently broad to encompass a vehicle comprising a “dolly” and a “semitrailer”; see “trailer-only” configuration in D13) and further includes all claimed features, except for said features (f) and (i). The skilled person would obviously combine D13 and D12, for this could simply be implemented by extending the software of D13, thus improving stability control and reducing the risk of lateral overturn of the vehicle. Thereby the skilled person would directly arrive at the subject-matter of claim 1 (said features (f) and (i) being known from D12; see above), no inventive step being involved.

Even on the assumption that the term “trailer” should be given a narrower meaning (the term "a plurality of trailers" (in claim 1) thus excluding a mere "dolly-semitrailer” configuration) the obvious combination of

D13 and D12 would nevertheless lead to the subject-matter of claim 1. Indeed, D13 discloses (on page 7, paragraph designated “trailer-to-trailer”) that the features included in the “dolly-semitrailer" configuration can be extended to a configuration comprising a plurality of "full-trailers” (e.g. a plurality of "dolly-semitrailer" units).

Starting from D14 the skilled person would arrive at the subject-matter of claim 1 combining in an obvious manner D14 with D12. The same arguments essentially apply as for the combination of D13 with D12. In particular, D14 discloses a vehicle including a tractor, one or more “dollies”, and one or more “semitrailers” (see figure 33, page 51). A Rearward Amplification Suppression – algorithm is disclosed, wherein a communications bus is provided between the plurality of trailers. Thus, the claimed subject-matter would be obtained without exercising an inventive activity.

V. The Respondent’s arguments may be summarized as follows:

The subject-matter of claim 1 involves an inventive step over documents D2 and D12. D2 does not disclose aforesaid feature (e), since the term “control” is commonly used in engineering in the sense of regulating or putting a system into a defined, desired state in a defined time-frame. To claim that “control” in the context of brake control should be given the meaning of a brake influencing unit does not make any sense. D2 simply does not disclose that the ABS valve is controllable by the ECU. In addition, D12 merely discloses a single vehicle including a truck-semi-trailer combination, thus not disclosing two or more

trailers. Specifically, a “dolly” associated with a semi-trailer is simply equivalent to a full trailer.

The combination of documents D13 and D12 would not lead the skilled person in an obvious manner to the subject-matter of claim 1. In effect, the skilled person would not selectively modify a RAMS rollover protection system by another rollover system (see e.g. pages 45 and 48 in D14). Furthermore a "dolly" as mentioned in D13 cannot be regarded as a trailer within the meaning of the invention.

Similar reasons lead to the conclusion that documents D14 and D12 do not render obvious the subject-matter of claim 1.

Reasons for the Decision

1. The appeal is admissible.

2. The subject-matter of claim 1 (of the main and sole request) is not rendered obvious by documents D2 and D12. In effect, even if the skilled person would combine these documents, the claimed subject-matter would not be derived thereby. This is due to several reasons.
First, feature (e) of claim 1 is not known from D2, for D2 discloses that the trailers 11 and 12 each have a separate ECU 47 triggering the ABS control function in each trailer, when the wheel speed sensor 60’ (provided in each trailer) detects an incipient skid condition and sends a corresponding signal to the ECU 47 in the specific trailer (D2, page 10, last paragraph-page 11, first paragraph). Thus, the ABS control function in the

second trailer cannot be actuated by the ECU 47 of the first trailer. In addition, D2 clearly discloses that this cannot happen when ABS operation is activated in the first trailer 11, for in this case the brake pressure in the first trailer will fall below the fluid pressure brake demand signal supplied from the tractor, and accordingly the shuttle valve 60 of the first trailer will ensure that the fluid pressure brake demand signal in the line 28 (of the first trailer), bypassing the brake sub-subsystem in the first trailer, is fed to the section of the line 28 in the second trailer (downstream of the shuttle valve 60 in the first trailer) (see D2, page 13, second paragraph). Consequently, the ABS operation in the first trailer cannot influence, let alone control, the ABS operation in the second trailer.

Second, the above conclusions do not change in the least if a combination with D12 is considered. Indeed, the skilled person, even when combining D2 and D12, would not combine these documents D2 and D12 in the way suggested by the Appellant, for the simple reason that this runs counter to the general teaching of D2 (see above), disclosing that ABS control in the second trailer is under no circumstances activated by the ECU 47 in the first trailer (ABS activation in the second trailer being only possible by a corresponding signal of the second trailer's ECU 47). In addition, the skilled person would hardly implement a system, as suggested by the Appellant, wherein triggering of the rollover protection (as disclosed in D12) in the first trailer would in all likelihood cause simultaneous activation of the ABS control function in the second trailer, given that ABS activation cannot be fortuitous or accidental, or be dependent on rollover protection in another (i.e. first) trailer but is based on the

signal from the sensor detecting the specific wheel's speed in the specific (i.e. second) trailer.

Finally, D12 alone likewise does not disclose feature (e), for D12 is directed to a vehicle comprising only a tractor and a trailer or "semitrailer" (see D12, page 4, line 34-page 5, line 15).

In conclusion, the subject-matter of claim 1, particularly feature (e), would not result or anyway be rendered obvious by the combination of D2 and D12 (Article 56 EPC).

For the same reasons as above, starting from document D12 and combining it with D2 (on the assumption that the combination would be obvious), the skilled person would not arrive in an obvious manner at the subject-matter of claim 1.

3. The combination of D13 and D12 (on the assumption that the skilled person would combine these documents) would not lead to the subject-matter of claim 1, given the failure of D13 (and D12, see above) to disclose or suggest said feature (e). Indeed, D13 (see figures 1 and 2 on pages 51, 52) merely discloses an EBS/ABS unit located on the "dolly" in front of a "semitrailer", such a configuration however not being equivalent to a vehicle including a (full) first and second trailer. In effect, a "dolly" and a "semitrailer" is commonly equated to a full trailer (see D13, pages 6, 7).
There is thus in D13 no ABS valve on a second trailer which is controllable by a first braking ECU on a first trailer.
Additionally, it would not make sense to construe the first trailer in claim 1 as being a "dolly", the second trailer being construed as a "semitrailer". Indeed,

this would imply that according to claim 1 (see feature (f)) stability control is actuated on the "dolly" but not on the "semitrailer", which is technically not reasonable, these two parts constituting a unit from a physical and mechanical point of view.

If the "trailer-to trailer" configuration of the Full-Vehicle RAMS System (comprising a plurality of "dollies" and "semitrailers") in D13 is considered, then feature (e) of claim 1 would likewise not ensue from the combination of D13 and D12. In effect, in the RAMS stability control performed according to D13 each trailer is dealt with on equal footing and (full) stability control is implemented in each trailer (see D13, pages 6, 7 and pages 60-62). Just sensor information is shared between trailers. Thus, D13 does not disclose, or let alone suggest, that the ABS control function on the second trailer may be activated by the ECU on the first trailer, and this is likewise neither disclosed nor suggested in D12 (see above, point 2). Similarly and for the same reasons, features (f) and (g) do not result from the combination of this configuration in D13 and D12, for full stability control being implemented in D13 (as well as in D12) there would be no reasons for implementing features (f) and (g), which would be contrary to treating the different trailers on equal footing, particularly requiring that stability control be actuated by the first braking ECU in the first trailer, whilst merely sending signals to apply the brakes on the second trailer. Conversely, features (f) and (g) on the other hand just express the inventive concept (disclosed by the contested patent) of limiting full stability control to the first trailer, while enabling the second trailer "to emulate the stability control of a full

electronic braking system" (see patent specification, [0026]).

Therefore, the combination of D13 with D12 (even if considered obvious) would not directly lead to and render obvious the subject-matter of claim 1 (Article 56 EPC).

The same conclusions apply to the combination of documents D14 and D12 as for the above combination of D13 and D12. Indeed, neither feature (e) nor features (f) and (g) are disclosed or suggested in D14 or in D12.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated