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**Datasheet for the decision
of 22 February 2018**

Case Number: T 1455/15 - 3.2.01

Application Number: 06016920.8

Publication Number: 1724181

IPC: B62D5/04

Language of the proceedings: EN

Title of invention:

Electric power steering apparatus

Patent Proprietor:

NSK LTD.

Opponent:

Robert Bosch Automotive Steering GmbH

Headword:

Relevant legal provisions:

EPC Art. 56

RPBA Art. 13(1)

Keyword:

Inventive step (no)

Admissibility of fourth auxiliary request (no)

Decisions cited:

Catchword:



Beschwerdekammern

Boards of Appeal

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Case Number: T 1455/15 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 22 February 2018

Appellant: Robert Bosch Automotive Steering GmbH
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
12 May 2015 concerning maintenance of the
European Patent No. 1724181 in amended form.**

Composition of the Board:

Chairman G. Pricolo
Members: C. Narcisi
S. Fernández de Córdoba

Summary of Facts and Submissions

- I. European patent No. 1 724 181 was maintained in amended form by the decision of the Opposition Division posted on 12 May 2015. Against the decision an appeal was lodged by the Opponent on 20 July 2015 and the respective appeal fee was paid. The statement of grounds of appeal was filed by the Opponent on 22 September 2015.
- II. Oral proceedings were held on 22 February 2018. The Appellant (Opponent) requested that the impugned decision be set aside and that the patent be revoked. The Respondent (Patentee) requested that the patent be maintained in amended form as upheld by the impugned decision (main request) or, in the alternative, according to auxiliary requests 1 to 3 (as filed on 5 February 2016), or according to auxiliary request 4 (filed during the oral proceedings on 22 February 2018).
- III. Claim 1 of the main request reads as follows:
- “An electric power steering apparatus of a rack assist type comprising:
a steering gear case (113) encasing a power assist mechanism; and
an electric motor (115) disposed on the axis different from said steering gear case and used for driving said power assist mechanism,
characterised in that lower most portions of the electric motor and of the steering gear case exist within the same horizontal surface such that the minimum ground clearances up to said steering case (113) and said electric motor (115) when mounted in a vehicle are made coincident.”

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that the wording "of a rack assist type comprising" is replaced by "of a rack assist type used for an automobile, the apparatus comprising".

Claim 1 of auxiliary request 2 differs from claim 1 of the main request in that the wording "are made coincident" is replaced by "are made coincident, and in that the electric power steering apparatus of a rack assist type is arranged to be disposed in a front portion of a body of the vehicle to steer front wheels of the vehicle".

Claim 1 of auxiliary request 3 differs from claim 1 of the main request in that the wording "are made coincident" is replaced by "are made coincident, and in that the lower most portions of both the electric motor (115) and the steering gear case (113) are arranged to be disposed below an engine and an exhaust pipe when mounted in the vehicle."

Claim 1 of auxiliary request 4 differs from claim 1 of the main request in that the wording "are made coincident" is replaced by "are made coincident; and wherein said electric motor (115) is disposed in front of said steering gear case (113) when mounted in a vehicle."

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

The subject-matter of claim 1 of the main request lacks an inventive step over D1 (WO-A2-01/15956) and the capabilities of a person of ordinary skill in the art. In effect, the characterizing features of claim 1, allegedly constituting a difference to the apparatus of

D1, are (at the very least) already suggested by figure 1 of D1, showing a side view of an electric power steering apparatus, with the steering gear case and the electric motor being located parallel and adjacent to each other and having substantially the same ground clearance. Nonetheless, even on the assumption that in figure 1 the steering gear case is located lower than the electric motor, as the steering gear case usually defines the minimum ground clearance in a vehicle, the skilled person would arrive in an obvious manner at the characterizing features of claim 1. Indeed, given the objective technical problem of the invention (see patent specification (hereinafter designated as EP-B), [0008]) consisting in providing "an electric power steering apparatus capable of ensuring a minimum ground clearance in a vehicle in a way that prevents thermal damages to the electric motor", the skilled person would necessarily envisage locating the electric motor at a maximum distance from the vehicle's motor. Consequently, as the electric motor would not be positioned lower than (but rather higher than) the steering gear case (to ensure minimum ground clearance), the skilled person would inevitably choose a ground distance equal to said minimum ground distance.

The same arguments as above also apply to the subject-matter of claim 1 of auxiliary request 1.

The subject-matter of claim 1 of auxiliary requests 2 and 3 lacks an inventive step over D1 and the skilled person's usual capabilities.

The features added to claim 1 of auxiliary request 2 cannot contribute to inventive step, for it implicitly results from D1 that the disclosed steering gear case

would be obviously arranged in the front portion of the vehicle.

The features introduced into claim 1 of auxiliary request 3 cannot contribute to inventive step, for they may be derived from common general knowledge and the skilled person's ordinary capabilities.

Auxiliary request 4 should not be admitted into the appeal proceedings since it was late filed and since anyway the amended subject-matter does not overcome the mentioned objections based on lack of inventive step. It would indeed be obvious, in order to provide a better cooling of the electric motor, to locate the latter in front of the steering gear case, i.e. in a position where cooling by air flow generated by movement of the vehicle would be quite effective.

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

The subject-matter of claim 1 of the main request is inventive over D1. The skilled person starting from D1 would not arrive in an obvious manner at the claimed subject-matter for several reasons. First, contrary to the Appellant's view, figure 1 of D1 does not suggest the characterizing features of claim 1, as this figure is not a side view of the disclosed steering apparatus, similarly to figures 6 and 9 of the contested patent (EP-B), which are likewise merely perspective views of the steering apparatus. Hence no conclusions can be drawn from figure 1 as to whether the electric motor and the steering gear case do have approximately equal or let alone equal ground distances. Second, the passage on page 6, lines 15-17 of D1 ("i.e. the great advantage of this arrangement is that the motor may be

placed just about anywhere around the perimeter of the rack axis, depending on where the space is needed for the particular design of the car") does not imply that the electric motor could be arranged in principle at any angular position around the rack axis since proper functioning of the pinion-rack engagement mechanism has to be ensured and since the longitudinal position along the rack axis also plays a significant role. Quite to the contrary, in view of the mentioned need for "easy access and serviceability" (D1, page 6, lines 20-22) the skilled person would rather dispose the electric motor above minimum ground clearance.

The subject-matter of claim 1 of auxiliary request 1 implies an inventive step over D1 for the same reasons as set out hereinabove.

The subject-matter of claim 1 of auxiliary request 2 is inventive over D1. Further to the reasons given above (see claim 1, main request) it is noted that the added feature moreover cannot be inferred from D1, either explicitly or implicitly.

The subject-matter of auxiliary request 3 involves an inventive step over D1. Further to the reasons given above (see claim 1, main request) it is also noted that the added feature does not form part of common general knowledge and is not suggested by D1, whilst providing an obvious advantageous effect (reducing heat radiation impacting the electric motor).

The fourth auxiliary request should be admitted to the appeal proceedings since claim 1 results from a combination of granted claims and their subject-matter was already previously considered by the Appellant. Therefore no entirely new discussion involving complex

issues would arise. Also, the added feature clearly improves the cooling effect on the electric motor by the direct impact of external air flow.

Reasons for the Decision

1. The appeal is admissible.

2. The subject-matter of claim 1 of the main request does not involve an inventive step over D1 and the skilled person's usual capabilities. The Board concurs with the Respondent's view that the characterizing feature of claim 1 is not clearly and unambiguously disclosed in D1. Consequently, this constitutes the distinguishing feature of the claimed steering apparatus over D1, the remaining features being undisputedly known from D1. However, this feature cannot (in combination with the further claimed features) justify an inventive step, regardless of whether figure 1 of D1 is considered as representing a side view or merely a perspective view of the steering apparatus of D1. In effect, in view of the posed technical problem (consisting in providing "an electric power steering apparatus capable of ensuring a minimum ground clearance in a vehicle in a way that prevents thermal damages to the electric motor"; see EP-B [0008]) the skilled person would dispose the electric motor in a lower portion of the motor compartment at the greatest possible distance from the vehicle's motor block, which is the most significant source of heat. At the same time however, the electric motor has to be arranged in the immediate vicinity of the steering gear case and the rack axis, in order to easily allow direct transfer of power for

the steering assist function (see e.g. D1, figure 1), and moreover minimum ground clearance should also be complied with. Under these circumstances, the skilled person would almost inevitably contemplate locating the electric motor at a specific angular position around the rack axis, such that the ground distance coincides with the minimum ground clearance as usually defined by the ground distance of the steering gear case. This is explicitly suggested by figure 1 and the description of D1 (see page 6, cited passage), where, contrary to the Respondent's view, any arbitrary angular position of the electric motor around the rack axis is envisaged, according to given needs. Indeed, any chosen angular position would not impair or impede the power assist function or the steering function independently performed by the pinion-rack mechanism. In conclusion the skilled person would arrive in an obvious way at the subject-matter of claim 1 (Article 56 EPC).

3. The subject-matter of claim 1 of auxiliary request 1 lacks an inventive step over D1 for the same reasons as stated above, D1 explicitly disclosing the use of the known electric power steering apparatus in a car (see D1, page 6, lines 15-17), i.e. an automobile as recited in claim 1.
4. The subject-matter of claim 1 of auxiliary request 2 lacks an inventive step over D1 for the reasons as stated in relation to claim 1 of the main request, further considering that it would be obvious for the skilled person to dispose the electric power steering apparatus in the front portion of a car, where the steering wheel is commonly located.
5. The subject-matter of claim 1 of auxiliary request 3 lacks an inventive step over D1 for the reasons as

stated in relation to claim 1 of the main request, further considering that by positioning the electric motor in a lower portion of the motor compartment (to minimize heat radiation from the motor block, as mentioned above) and at minimum ground distance, the motor will necessarily be located higher than the electric motor of the power steering apparatus. Moreover, it would be an obvious choice for the skilled person faced with the problem of providing a suitable location for the exhaust pipe, to dispose the latter higher than the power steering apparatus, depending on circumstances, as the exhaust pipe is rooted in the motor block (thus its initial portion is at a relatively high level) and further it should not be located too low such as to impair ground clearance. Thus, the skilled person would arrive in an obvious manner at the claimed subject-matter.

6. The Board decided to exercise its discretion pursuant to Article 13(1) RPBA (Rules of procedure of the Boards of Appeal) not to admit the Respondent's fourth auxiliary request, which was filed only during the oral proceedings. The Board considered that the further added features did not render the subject-matter of claim 1 clearly allowable in view of the cited prior art, particularly in view of the Appellant's objections in relation to inventive step (see point IV above). Therefore, for reasons of procedural economy, given the state the proceedings it was decided not to admit the fourth auxiliary request into the appeal proceedings.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The patent is revoked.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated