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File No.: T 0983/91 - 3.2.1
Application No.: 85 305 072.2
Publication No.: 0 170 465
Classification: B60K 41/28, B60K 20/04
Title of invention: Semi-automatic transmission with twin splitter

D E C I S I O N
of 14 September 1993

Applicant: Eaton Corporation
Proprietor of the patent:
Opponent: Zahnradfabrik Friedrichshafen
Aktiengesellschaft

Headword:

EPC: Art. 56
Art. 114(2)

Keyword: "Admission of late filed documents (no)" - "Inventive step (yes)"

Headnote
Catchwords



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Beschwerdekammern

Boards of Appeal

Chambres de recours

Case Number: T 0983/91 - 3.2.1

DECISION
of the Technical Board of Appeal 3.2.1
of 14 September 1993

Appellant:
(Opponent)

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Respondent:
(Proprietor of the patent)

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Decision under appeal:

**Decision of the Opposition Division of the
European Patent Office dated 30 October 1991
rejecting the opposition filed against European
patent No. 0 170 465 pursuant to Article 102(2)
EPC.**

Composition of the Board:

Chairman: F.A. Gumbel
Members: P. Alting van Geusau
J.- C. de Preter

Summary of Facts and Submissions

- I. European patent No. 0 170 465 was granted with effect from 11 January 1989 on the basis of European patent application No. 85 305 072.2, filed on 17 July 1985.

Claim 1 of the patent in suit reads as follows:

"A method of controlling a semi-automatic mechanical change gear transmission system (10) comprising a manual fuel throttle control (24), a fuel throttle controlled engine (14), a multi-speed change gear mechanical transmission (12), a friction master clutch (16) interposed between the engine and the transmission, a manual clutch control (3) for selectively engaging and disengaging the master clutch, a manually operated shift selected lever (1) moveable in a first direction ("UP") from a centred position to select upshifts and in a second direction ("DOWN") from said centred position to select downshifts from the currently engaged gear ratio, a central processing unit (38) for receiving input signals indicative of transmission input shaft (28 and/or 32) and output shaft (36) rotational speeds and operation of said shift selection lever and for processing same according to predetermined logic rules to issue command output signals to non-manually controlled operators including a clutch operator (30), a fuel throttle control operator (26) and a transmission operator (34), the method of control characterised by:

processing said input signals to determine the currently engaged gear ratio of said transmission and to determine permissibly engaged gear ratios of said transmission under sensed vehicle operating conditions;

and sensing operation of said manual shift selection lever including the direction of movement thereof and the number of displacements of said lever from said centred position within a predetermined period of time;

and determining the transmission gear ratio selected by the operator to be shifted directly into from the currently engaged ratio by assuming each repetition of displacement from the centred position of said shift selection lever in a given direction indicates operator selection of a change of one additional consecutive ratio in said direction; and

issuing command output signals to cause an automatic upshift or downshift from the currently engaged gear ratio to the least displaced gear ratio from currently engaged gear ratio of 1) the operator selected gear ratio or 2) the most displaced from currently engaged ratio of the permissible gear ratios in the selected direction of shifting, said command output signals causing said transmission to be shifted directly from said currently engaged gear ratio to said least displaced gear ratio, said command output signals also causing the engine (14) and master clutch (16) to be automatically controlled during a shift".

II. With notice of opposition filed on 29 September 1989 the Appellant (Opponent) requested revocation of the patent for the reason of non-compliance with the provisions of Article 100 (a) EPC.

In respect of an alleged lack of novelty and inventive step the opposition was based on

D1: DE-A-3 237 509 (corresponds with EP-A-0 107 761 cited in the description of the patent in suit) and

D2: DE-A-3 237 517

III. By decision given at oral proceedings held on 8 October 1991 with written grounds posted on 30 October 1991, the Opposition Division rejected the opposition.

The Opposition Division held that in particular the features of Claim 1 relating to an automatic gear change into either the operator selected gear ratio or the most displaced from the currently engaged ratio of permissible gear ratios in the selected direction of shifting were neither known nor obvious from the cited documents.

IV. An appeal was lodged against this decision on 18 December 1991, with payment of the appeal fee on the same day. The Statement of Grounds of Appeal was filed on 28 February 1992. In the Statement of Grounds of Appeal the Appellant referred to the following additional prior art documents:

D4: Book: "Zahnradgetriebe" by Johannes Loomann, Springer Verlag, Berlin 1970, page 4

D5: US-A-4 442 730 (cited in the description of the patent)

D6: Separate print to "Automobil Technische Zeitschrift" Volume 58, Issue 9, page 9, Figure 19.

V. Following summons for oral proceeding auxiliarily requested by the parties and a communication of the Board in which the provisional opinion was expressed that the document D4 to D6 did not appear to be more relevant than the documents already on file and that the Board envisaged to disregard these late filed documents in accordance with Article 114 (2) EPC, the Appellant cited the following further prior art documents:

D7: DE-A-1 964 524

D8: Leaflet: "Scania - Leichter Schalten mit Computer",
December 1983

D9: US-A-4 320 381

D10: US-A-4 079 638

D11: US-A-4 140 031

D12: US-A-4 324 322

D13: DE-A-2 902 632

VI. In support of his request for revocation of the patent the Appellant submitted in writing and at the oral proceedings essentially the following arguments:

- The subject-matter of Claim 1 would be considered void of any inventive activity by the skilled person merely on the basis of his professional knowledge and thus even without reference to prior art documents being necessary.

- On the other hand the Opposition Division obviously did not have the relevant prior art available and mainly for this reason the late cited documents had to be introduced into the proceedings.

- The majority of the features of Claim 1 are in principle known from D7. This prior art discloses non-manual control of the throttle and clutch for semi-automatic gear change as well as the prohibition of changing gear to an unallowable gear ratio. By manipulating the gear selector pulses are given to change gear upwardly or downwardly. D7 thus discloses an automatic transmission with manual intervention and prohibition of gear change to unacceptable ratios principally identical to the claimed system. In this respect the Appellant referred at the oral proceedings mainly to the US-counterpart, US-A-3 628 642, of DE-A-1-964 524 (D7), in particular to the text in column 1, lines 65 to 72 and column 5, lines 43 to 47.

- The single difference left, when comparing the system of Claim 1 with the system of D7, is that the system in accordance with Claim 1 allows skipping of gears. However this is well known in manual gear boxes and also in semi-automatic gear change systems. In this respect reference D8 discloses skipping of gears in a semi automatic gear change system and there is also shown that the gear change lever is used to give pulses which are counted to determine the selected gear. It must further be considered as self-evident that if selected gear is not acceptable the nearest acceptable gear will be engaged. Moreover, in the present case essentially the availability of a microprocessor opened the possibility for the

skilled person to adapt semi-automatic gear change systems to the particular needs of heavy vehicles with their many gears. However, in accordance with the conclusions arrived at in the decision T 24/81 (OJ EPO 1983, 133) a process that could be readily met by an obvious combination of teachings from the state of the art, which does not only include the cited documents but for a great extent relies upon the professional knowledge of the skilled person, does not involve an inventive step. The skilled person is well acquainted with the requirements of semi-automatic gear change systems which can also be derived from D5 and indeed had all the necessary knowledge available to arrive in an obvious manner at the subject-matter of the patent.

The Appellant declared at the oral proceedings to refrain from giving any arguments in respect of the documents D1 and D2, relied upon in the opposition proceedings, because in his opinion D7 and D8 should be considered as the most relevant prior art.

- VII. The Respondent (Proprietor) contested the Appellant's view and requested dismissal of the appeal. He further requested that the documents cited by the Appellant for the first time in the appeal proceedings were disregarded in accordance with Article 114 (2) EPC. In case the Board using its discretion should admit any of these late filed documents into the proceedings the Appellant requested that the case be remitted to the first instance and that the Appellant bears the costs caused by his tardiness.

In support of his request he argued essentially as follows:

The gist of the present invention is a new transmission management which is not even remotely suggested by the cited documents.

The cited prior art discloses a semi-automatic transmission where provision is made to prevent the driver's control from leading to an impermissible shifting operation which is principally different from the system in accordance with Claim 1 of the patent in suit in which the transmission being shifted into the permissible gear ratio that is closest to the driver's desire.

The cited documents do also not reveal the slightest indication of counting the up and down pulses generated by sequential operation of the shift lever within a predetermined period of time and then doing a direct shift into the desired gear or closest permissible gear. The combination of features of Claim 1 amount to a very easy and practical operation of the system under all driving conditions with substantial advantages not obtained by any of the prior art systems.

The Appellant merely succeeded in showing, in a hindsight approach, that bits and pieces of the invention were known as such and in this respect also the late cited documents only disclose some single features defined in the system of Claim 1 of the patent in suit without any suggestion to combine same. Since these documents are clearly not more relevant than the documents on file, the introduction of this late cited prior art should be refused.

VIII. At the oral proceedings held on 14 September 1993 the Board decided after a discussion of the relevance of the documents D7 and D8 that none of the documents D4 to D13 could be considered more relevant than the documents already in the proceedings and that these late cited documents were disregarded in accordance with Article 114(2) EPC.

Reasons for the decision

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 1(1) and 64 EPC. It is admissible.
2. *Late filed documents first relied upon in the appeal proceedings*
 - 2.1 In the appeal proceedings the Appellant did not any longer base his arguments on the prior art disclosed in D1 and D2 filed in the opposition proceedings but cited new documents D4 to D13 and based a fully new argumentation for lack of inventive step regarding the subject-matter of Claim 1 of the patent in suit on these documents.
 - 2.2 In accordance with established jurisprudence of the Boards, late cited prior art documents should be regarded if they reflect prior art which is more relevant than the prior art already on file. If this is not the case the documents are disregarded in accordance with Article 114 (2) EPC (see for example T 156/84, OJ EPO 1988, 372).

2.3 Considering the documents D4 to D6 and D9 to D13 only some single features of the claimed subject-matter of the patent in suit are disclosed and when compared to D1, which is the prior art acknowledged in the precharacterising part of Claim 1 of the patent in suit, these documents are clearly less relevant. Moreover the Appellant did not any longer base any argument on this prior art at the oral proceedings but considered only D7 and D8 of particular relevance. In his written submissions and at the oral proceedings he essentially relied on the combination of the teachings of these documents for attacking the inventive merit of the system of Claim 1 of the patent in suit.

2.4 The discussion of D7 (mainly US-A-3 628 642 was considered) at the oral proceedings revealed that in fact, when compared to the disclosures of D1, automatic throttle fuel control during shifting, a feature contained in the precharacterising portion of Claim 1 under consideration but **not** explicitly shown in D1, is known from D7 and that during shifting the engine and master clutch are controlled together.

However, none of the characterising features, each considered in its entirety and not, as was done by the Appellant, only partially, are disclosed in D7. Moreover, D7 does neither include a central processing unit nor does this known system disclose the possibility to skip gears such as in the system of D1. Because the feature of automatic fuel control during shifting of gears is already acknowledged in the description of the patent as known from US-A-4 361 060, D7 does not add anything relevant for deciding upon the inventive activity of the subject-matter of Claim 1 of the patent in suit and for this reason was disregarded.

2.5 D8 considered by the Appellant to disclose the characterising feature of Claim 1 relating to the operation of the manual shift selection lever being sensed within a predetermined period of time, does neither contain an explicit disclosure of this feature nor can it be considered to contain an implicit disclosure in this respect because of a number of other equally likely possibilities for actuating the lever for selecting a new gear ratio (for example by keeping the lever pressed forwards or backwards to scroll through the displayed gear numbers, a possibility suggested by the Respondent, or switching down or upwards one by one through the displaced gear numbers, see text and figures relating to "Automatische Gangwahl vom Fahrer beeinflusst" and "Manuelle Gangwahl").

Therefore, this document was also disregarded in accordance with Article 114(2) EPC.

2.6 In view of the above conclusions with respect to the non-pertinence of the late cited documents the Respondent's request for remittal of the case to the first instance with an apportionment of costs for the Appellant in the Respondent's favour, has become redundant.

3. *Prior art*

3.1 The prior art disclosed in D1 concerns a semi-automatic mechanical gear change system comprising manual fuel control of an engine 22, a multi speed change gear transmission 6, a master clutch interposed between the engine and the transmission and a manual clutch control, a manually operated shift lever 2 movable in a forward or a rearward direction to select upshifts or downshifts respectively (see the embodiment of Figure 1), a central processing unit 4 for receiving input signals 10

indicative of the output shaft rotational speed and the engaged gear 7,9 and operation of the shift selection lever 2. The processing unit 4 controls the semi-automatic shifting of gears and non-manual operation of the clutch (see page 9, second paragraph) in accordance with the received signals and a predetermined program. The program includes the feature that the engaged gear ratio is maintained, if the operator has selected an unacceptable gear ratio, in respect of the maximal allowable engine speed, (see page 6, third paragraph).

Hence, this prior art discloses a method of controlling a semi-automatic mechanical change gear transmission essentially in accordance with the precharacterising features of Claim 1 of the patent in suit. However, the features relating to an input signal indicative of the transmission input shaft rotational speed being transmitted to the central processing unit and the presence of a non-manually controlled fuel throttle control operator also mentioned in the precharacterising portion of Claim 1, are lacking.

In so far Claim 1 is not satisfactorily related to the closest prior art as required by Rule 29 (1) EPC. However, the requirements of Rule 29 are not a ground of opposition under Article 100 EPC and therefore this deficiency does not affect the validity of the patent.

- 3.2 Document D2 concerns a display system for in particular a manually operated shift gear selection lever with three possible positions i.e. upshift, downshift and neutral(see page 4, second paragraph), which indicates the engaged gear, the recommended gear and the recommended direction of a gear shift. An electronic control is provided which has an input for data relative to the engine and output transmission shaft speed as

well as the engaged gear ratio (see page 2, lines 21 to 26).

4. *Novelty*

As follows from the above discussion of the documents D1 and D2 none of these documents discloses the combination of features claimed in Claim 1 of the patent in suit and therefore the subject-matter of this claim is deemed novel in accordance with Article 54 EPC. Novelty was in fact not contested by the Appellant.

5. *Inventive step*

- 5.1 In comparison to the system of D1, the system claimed in Claim 1 of the patent in suit gives the driver the possibility to shift directly to a ratio different from the optimum proposed ratio (providing the best fuel economy or best performance) for example in prevision of a change of gradient of the road or a traffic congestion.

Furthermore, when selecting an unacceptable gear ratio, for example in a difficult driving situation where the driver's attention is fully needed for manoeuvring the vehicle, gear shift is not simply blocked as in the prior art but the nearest acceptable gear ratio in the direction of gear selection is automatically engaged.

- 5.2 The problem to be solved by the present patent can therefore be seen in the provision of a semi-automatic mechanical change gear transmission system which has most of the advantages of a fully automatic change gear transmission while permitting a degree of driver control beyond the override or kickdown facilities normally available on fully automatic transmissions and at the same time permitting easy and flexible operation in all

driving conditions (see also column 2, lines 1 to 6 and column 7, lines 5 to 16 of the patent).

- 5.3 The Board agrees with the Opposition Division that neither D1 nor D2 can be considered to give any lead to modification of the system disclosed in D1 to arrive in an obvious manner at the subject-matter of Claim 1 of the patent in suit.

In particular, the skilled person starting from the system of D1 did not have any indication or incentive to modify the operation of the processor such as to engage directly the most displaced acceptable gear ratio instead of just ignoring a gear shift command if an unacceptable gear was selected.

- 5.4 The Board cannot accept the Appellant's view, submitted at the oral proceedings, that the claimed control is just one obvious possible way among equally likely possibilities of semi-automatically shifting a mechanical change gear transmission.

Clearly, in the present case, the claimed system provides possibilities of transmission management which cannot be derived from any of the cited documents and moreover provides in specific driving situations advantages which are nowhere hinted to in the cited prior art. The Appellant's allegation of the self-evidence of the characterising features of Claim 1 under consideration can, in the Board's opinion, only be based on hindsight because no account was taken of the particular effects obtained by these features in a semi-automatic mechanical change gear transmission, which to a large extent determine the objects of the invention to be achieved and the direction of further development to be chosen by the skilled person. In this respect the Appellant failed to give any plausible reason why the

skilled person would have developed a prior art system in the direction chosen by the invention and with the means claimed in Claim 1 of the patent.

Although Claim 1 comprises many features which might in themselves be known in the transmission art, which was not contested by the Respondent, the essence of the invention lies in the provision of a new transmission management system. This new management of shifting results in fully different effects from those that are achieved with the prior art system of D1 and also for this reason the system of the patent in suit cannot be considered as an equally likely alternative to this known system.

- 5.5. Regarding the decision T 24/81 (OJ EPO, 1983, 133) cited by the Appellant in support of his submissions, the Board sees no parallel with the present case in the manner as suggested by the Appellant. On the contrary, this decision clearly indicates that for an objective assessment of inventive step the technical problem which the invention addresses and solves from an objective point of view should be determined first and only then considerations to the question of obviousness of the disclosed solution should be given as seen by the person skilled in the art. As will be clear from the above appreciation of the Appellant's submissions his arguments of lack of inventive step were rather based on subjective considerations without exact and verifiable evidence of the general knowledge attributed to the skilled person and why this general knowledge would lead him in an obvious manner to the present invention. Furthermore, a precise analysis of the differences and technical effects achieved vis-a-vis the closest prior art, which to a large extent determine the objects to be solved, was not at all taken into account.

5.6 Summarising, in the Board's judgment, the proposed solution to the technical problem underlying the invention as defined in Claim 1 comprises an inventive step, and therefore this claim as well as its dependent Claims 2 to 8 relating to particular embodiments of the invention in accordance with Rule 29(3) EPC are acceptable.

The Grounds of Opposition do therefore not prejudice maintenance of the patent as granted.

Order

For these reasons, it is decided that:

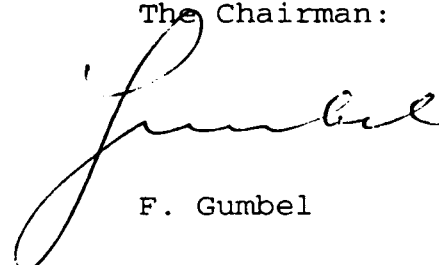
The appeal is dismissed.

The Registrar:



S. Fabiani

The Chairman:



F. Gumbel

