

Publication in the Official Journal  Yes / No

File Number: T 721/89 - 3.2.1  
Application No.: 86 309 052.8  
Publication No.: 0 226 347  
Title of invention: Multi-ratio power transmission

Classification: F16H 3/16

DECISION  
of 8 November 1991

Applicant: GENERAL MOTORS CORPORATION

Headword:

EPC Articles 83, 84, 111(1) and Rule 67

Keyword: "Sufficiency of the disclosure" (yes) - "Dimensioning error in the drawing" - "Remittal to the first instance" (yes) - "Procedural violation" (no)

Headnote



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Boards of Appeal

Chambres de recours

Case Number : T 721/89 - 3.2.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.1  
of 8 November 1991

**Appellants:**

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**Decision under appeal :**

Decision of Examining Division of the European  
Patent Office dated 17 July 1989 refusing  
European patent application No. 86 309 052.8  
pursuant to Article 97(1) EPC.

**Composition of the Board :**

**Chairman :** F.A. Gumbel  
**Members :** F.J. Pröls  
C.V. Payraudeau

**Summary of Facts and Submissions**

- I. European patent application No. 86 309 052.8, filed on 19 November 1986 and published under publication No. 0 226 347, was refused by a decision of the Examining Division dated 17 July 1989.
  
- II. The decision was based on Claims 1 to 3, received 20 April 1989, of which Claim 1 reads as follows:

"A preselected multi-ratio power transmission in which input means (12) for transmitting drive forces is connected for driving output means (14) by way of a plurality of ratio gear means (22,30;24,38;26,40;28,44) having an associated selectively engageable double-acting synchroniser clutch (34), with provision for both sequential and skip-shifting patterns, characterised in that first, second and third friction clutch means (16,18,20) are each selectively engageable with the input means (12) for accepting drive forces therefrom, the ratio gear means (22,30;24,38;26,40;28,44) comprise first input gear means (22,24) drivingly connected to the first friction clutch means (16), second input gear means (26) drivingly connected to the second friction clutch means (18), third input gear means (28) drivingly connected to the third friction clutch means (20), first output gear means (30) drivingly connected to the first input gear means (22,24) second output gear means (38,40) drivingly connected to the first (22,24) and second (26) input gear means, and third output gear means (44) drivingly connected between the third input gear means (28) and the output means (14), reverse gear means (46,50) is drivingly connected between the first input gear means (22,24) and the third output gear means (44) and includes a selectively engageable mechanical clutch means (48), the double-acting synchroniser clutch (34) is actuatable for

effecting selective engagement of the first output gear means (30) with the output means (14) and alternatively of the second output gear means (38,40) with the output means (14), the first friction clutch means (16) and the double-acting synchroniser clutch (34) when engaged co-operate to establish two drive ratios between the input (12) and output (14) means, the second friction clutch means (18) and the double-acting synchroniser clutch (34) when engaged co-operate to establish two other drive ratios between the input (12) and output (14) means, the third friction clutch means (20) when engaged provides another drive ratio between the input (12) and output (14) means which is numerically central of the first-mentioned two drive ratios and also of the second-mentioned two drive ratios, and the first friction clutch means (16) and the mechanical clutch means (48) are simultaneously engageable to establish a reverse drive ratio between the input (12) and output (14) means."

- III. According to the impugned decision, the disclosure of the present invention is not sufficiently clear and complete to be carried out (Article 83 EPC), since the skilled person was not able to work out a practicable transmission from the drawing.
- IV. A notice of appeal was filed on 13 September 1989 and the appeal fee was paid on the same day. The Statement of Grounds of Appeal was filed on 24 October 1989.

According to the Appellants the Examining Division has placed too much emphasis on the arrangement shown in Figure 1 of the application which only acts as an aid in understanding the invention described and claimed. Based on the guidance of the decision of the Board of Appeal T 204/83, OJ EPO 1985, 310, the Appellants believe that a skilled person would not, as a first instance, take the

gear dimensions according to the figures, but would study the description and derive gear diameters purely from his own skill and knowledge of the present subject-matter. Furthermore, no mention is made anywhere in the specification that the axial length of the transmission has either to be reduced or maintained as before. Absolutely no special skill would therefore be necessary for a skilled person to offset gears which otherwise would unintentionally interfere with each other.

The Appellants request cancellation of the impugned decision and the refund of the appeal fee.

#### Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is admissible.
2. There is no objection under Article 123(2) EPC to the present amended claims, which differs from the originally filed claims only in respect of the additional feature "double-acting" which has been included into the claims before the words "synchroniser clutch (34)". This feature, however, can be derived from the description column 3, lines 25 to 29 and Figure 1 as filed.
3. Sufficiency of the Disclosure under Article 83 EPC

The EPC requires that the disclosure of the invention must be sufficiently clear and complete in order that a person skilled in the art is able to carry it out (Article 83 EPC).

- 3.1 In the present case, the subject-matter as claimed in the main claim relates to a general concept of a preselected

multi-ratio power transmission with three friction clutch means 16,18,20, one synchroniser clutch means 34, a reverse drive mechanical clutch means 48 and several input and output gear means providing five forward drive ratios and a reverse drive ratio whereby the engagement of the third friction clutch means 20 provides a (third) drive ratio being numerically central of the four other forward drive ratios.

In detail the present case is concerned with the question of whether the disclosure of the original documents is sufficient to enable the skilled person to define the diameters of the gear wheels and their teeth number so that the afore-mentioned numerically central drive ratio represents the third drive ratio in the shifting sequence 1-2-3-4-5 of the claimed five-speed transmission. The basic construction and the operation of the claimed transmission is set out in the description of the application, which refers to Figures 1 and 2 of the drawings. The description and the drawings do not give any instruction as to the absolute diameter and teeth number of the gearwheels. Merely the relative diameters of the gear wheels can be measured from Figures 1 and 2 of the drawings. Therefrom can be derived that the gear wheels 28,44 which according to Claim 1 and the description shall define the third drive ratio, provide the lowest gear ratio instead of the central ratio in the shifting sequence 1-2-3-4-5 as claimed and described.

- 3.2 The Appellants objected to the argumentation in the first communication of the Examining Division which was based on the afore-mentioned disaccord between the dimensioning of the gear wheels in the drawing and of the corresponding statements in the application by filing an example for the dimensioning of the gears having teeth numbers which

fulfill the condition that the third ratio is numerically central to the four other forward gear ratios.

The further argument of the Examining Division as to the unintentional material interference between the gear wheel 38 and the reverse gear wheel 50 of the transmission having the teeth numbers as suggested in this example is rejected by the Appellants arguing that it is standard practice for a skilled person (a) either to use non-standard teeth gears which run in mesh with a standard gear or (b) to offset the gears which are unintentionally meshing and to increase the width of the tooth face of the corresponding gear wheel.

Thus, according to the latter suggestion the gear wheels 38 and 50 which are arranged in the same plane as the gear wheel 24 and mesh therewith (as represented in Figures 1 and 2 of the application) shall be offset and the gear wheel 24 shall be provided with wider teeth so that it can mesh with both these gear wheels 38 and 50 being now axially spaced from each other.

- 3.3 The impugned decision rejects the afore-mentioned arguments (a) and (b). The tooth correction according to (a) would not be considered by the skilled man, since any significant tooth correction would reduce the efficiency. The correction according to (b) would lead to an undesired increase of the axial length of the transmission. Thus, both adaptations (a) and (b) would be considered by the skilled person as disadvantageous and as a step backwards.

The decision further concludes that the skilled person looking for a way to carry out the invention would be inclined to avoid such disadvantages and therefore cannot put the invention into practice.

- 3.4 The Board, however, cannot accept the arguments of the Examining Division and takes the view that the requirements of Article 83 EPC are satisfied.

The aim of the invention as set out in the description of the refused application column 1, lines 10 to 15 consists in the provision of a transmission which is based on a concept of shifting operation (as known from US-A-4 513 631) that permits ratio skip-shifting but which avoids the need for duplicate ratio gearing and needs only one synchroniser clutch for the forward gear ratios contrary to the prior art transmission according to US-A-4 513 631 which needs duplicate ratio gearings for the first and second gear (see the meshing gears 40/46 and 20/28 for the first ratio and the meshing gears 42/48 and 22/30 for the second ratio in Figure 1) and three double-acting synchroniser clutches 58,60,62.

Thus, the claimed five-speed transmission needs less gear wheels and clutches than the known four-speed transmission.

If the claimed transmission basic principle has to be put into practice many structural details, such as the layout of ratios, the shifting control, the housing, the lubrication etc. have to be considered by the skilled person.

The mere schematic drawing of the present application obviously does not reveal such structural details, so that in the first instance an expert would not consider the diameters of the meshing gear wheels as represented in Figures 1 and 2 of the application as being definitive.



In the Board's opinion the fact that the gear ratios as derivable from the drawing by measurement do not correspond to the teaching of Claim 1 represents neither a significant deficiency in the sense of Article 84 EPC (clarity) nor an obstacle for the skilled person to put the invention into practice in the sense of Article 83 EPC.

In the view of the Board the drawing of the present application is nothing but a diagrammatic representation which shows the general concept study of the transmission confined to the essential features and allows considerable latitude in the practical realisation of the transmission. In accordance with the decision T 204/83, OJ EPO 1985, 310, as cited by the Appellant, the Board further considers that a diagrammatic representation cannot be regarded as an exact representation of all details of the subject-matter concerned. A skilled person would not measure details in such a diagrammatic representation in order to reliably determine the dimensions of the object shown. Thus, the transmission shown in the drawings corresponds to the general concept of the claimed transmission but these drawings appear to be inaccurate concerning the gear ratios, as would be immediately recognised by a skilled person. However, in the Board's opinion this does not mean that the practical realisation of the claimed invention is made impossible or even unduly difficult by the afore-mentioned inaccurate dimensioning.

- 3.5 Concerning the question whether the instructions set out in the application as a whole are sufficiently clear for the expert to reduce the claimed transmission to practice, if necessary with reasonable experiments or calculations but without undue burden, the following is observed:

In the field of gear transmissions it is quite normal first to draft the concept study for the system of a

transmission, namely to define the number of the desired gear ratios, the shafts, the meshing gear wheels and the clutches, their arrangement relative to each other, their basic construction and the way of the power flow through the transmission in each selected speed ratio.

In the present case the invention is essentially concerned with features which belong to a concept study. If such a concept study shall be put into practice, then the sizing studies for the components must be performed and the further structural details such as the definition of the ratios, the draft of the control system, the lubrication, the seals, the gear box case etc. and last but not least all questions as concern the fabrication must be considered.

It is normally not necessary that for reasons of Article 83 EPC a patent application must contain a complete teaching as concerns all further above-mentioned performing details. Therefore, the Board takes the view that in the present case it could be expected from a skilled person to put the concept study of the transmission into practice without there being provided further definitions of the details such as the diameters of gear wheels and the exact value of the gear ratios.

The afore-mentioned example for the dimensioning of the gear diameters (teeth number) and the gear ratios filed by the Applicant would indeed make it necessary to offset the reverse idler gear 50 with respect to the output shaft gear 38. Both gears 38 and 50 mesh with the input shaft gear 24 and would interfere with each other if the proposed teeth numbers (and so the corresponding gear diameters) are chosen, as is demonstrated by the calculation set out in the impugned decision.

The Board is of the opinion that

- (a) the dimensioning of gears according to the example (see point 3.2 above) is not the only one which can be found by an expert without inventive activity and
- (b) offsetting of meshing gears to avoid unintentional mesh with other gears belongs to the common activities of any design engineer in the field of gearings.

The statement in the impugned decision that a modification of the application to include the originally undisclosed offsetting of gears would add new subject-matter and contravene Article 123(2) EPC has no bearing on the question of whether this measure is available for the skilled person to carry out the invention, since Article 123(2) EPC restricts the inclusion of subject-matter into the wording of the claims or the description to the original disclosure whereas the question whether the invention can be put into practice refers to any knowledge and skill available to the practitioner.

- 3.6 The impugned decision further stresses that it cannot be expected by an expert to perform two steps whereof only the first (adapting of the gear diameters) is obvious and the second (offset of meshing gears) produces an undesired increase of the axial length and therefore represents a step backward.

This objection, however, can also not prevail. It is true that by offsetting the gears 38 and 50 the axial length of the transmission is increased. However, this is not a result which is to be avoided by the invention, since the problems to be solved consist in avoiding duplicate ratio gearing and the use of not more than one synchroniser

clutch for the forward gear ratios. Thus, the skilled person is by no means hindered in offsetting the gears to avoid unintentional contact.

Furthermore, there is in the Board's opinion, no requirement in the European Patent Convention that where it is not explicitly described how a claimed invention is to be carried out this must be practicable with the aid of only a few additional non-disclosed steps. The only essential requirement that must be fulfilled is rather that everyone of these additional steps must be so apparent to the skilled person that, in the light of his common general knowledge, a detailed description thereof is superfluous.

- 3.7 This requirement is, for the reasons set out above, met in the present case. Therefore the disclosure of the claimed subject-matter is considered to be sufficient for a skilled person to carry out the invention (Article 83 EPC).

4. Remittal for further examination

The Examining Division has refused the application in suit for insufficiency in disclosure without expressing any opinion in view of novelty and inventive step and with respect to the other requirements of the EPC.

Therefore, the examination in respect of all further requirements of the EPC should be continued on the basis of the documents as filed.

For these reasons and in order not to deprive the Appellants of the possibility to have any findings revised by a second instance, the Board considers it appropriate

to remit the case to the Examining Division under Article 111(1) EPC for further prosecution.

5. Request for Refund of the Appeal Fee

5.1 To support their view that the appeal fee should be reimbursed, the Appellants refer to the fact that the Examining Division has rejected the application without making any attempt at examining either the claimed invention or the application as a whole, without making a comparison between the present invention and the prior art and without commenting on the patentability of the present invention over the prior art.

5.2 The Board is of the view that the Examining Division had no reason to continue with the further examination of this application after they had come to the conclusion that the document as filed did not meet the requirements of Article 83 EPC, since insufficiency of disclosure cannot be removed by the fact that the application possibly fulfills further requirements of the EPC.

The Board, therefore, is of the opinion that the proceedings before the Examining Division did not in the present case suffer from a violation of a provision or principle of procedure in accordance with the EPC or its Implementing Regulations. Therefore, in the Board's judgment, there is no basis for a reimbursement of the appeal fee under Rule 67 EPC.

Order

For these reasons, it is decided that:

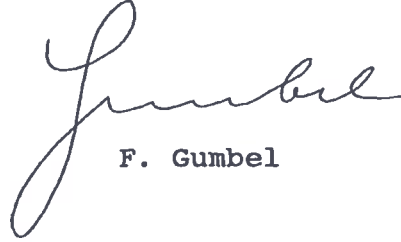
1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division for further examination on the basis of the documents on file.
3. The request for reimbursement of the appeal fee is rejected.

The Registrar:



S. Fabiani

The Chairman:



F. Gumbel

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