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**D E C I S I O N**  
**of 10 June 2002**

**Case Number:** T 0028/00 - 3.2.1

**Application Number:** 95907767.8

**Publication Number:** 0694130

**IPC:** F16D 48/08

**Language of the proceedings:** EN

**Title of invention:**  
Clutch control system

**Applicant:**  
LuK Lamellen und Kupplungsbau Beteiligungs KG

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56, 84  
EPC R. 29(6)

**Keyword:**

"Novelty (yes)"  
"Inventive step (yes)"  
"Claims - clarity (yes)"

**Decisions cited:**

-

**Catchword:**

-



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Boards of Appeal

Chambres de recours

**Case Number:** T 0028/00 - 3.2.1

**D E C I S I O N**  
**of the Technical Board of Appeal 3.2.1**  
**of 10 June 2002**

**Appellant:** LuK Lamellen und Kupplungsbau Beteiligungs KG  
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**Representative:** Wallinger, Michael, Dr.-Ing.  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 16 September 1999  
refusing European patent application  
No. 95 907 767.8 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** F. A. Gumbel  
**Members:** J. Osborne  
J. H. P. Willems

## Summary of facts and submissions

- I. The appeal is directed against the decision of the Examining Division to refuse application No. 95 907 767.8 (EP-A-0 694 130), which was posted on 16 September 1999. Notice of appeal and the grounds of appeal were filed on 25 October 1999 and the appeal fee was paid on the same day.
- II. The Examining Division refused the application because it considered that the subject-matter of Claim 1 then on file lacked novelty in comparison with the general state of the art of an automobile equipped with an internal combustion engine and a friction clutch. The Examining Division furthermore considered that the claim merely related to a desired effect, thereby failing to clearly define the subject-matter (Article 84 EPC) and that the phrase "of the kind specified" made unnecessary reference to the description (Rule 29(6) EPC).
- III. The following prior art documents were cited in the search report:
- D1: EP-A-0 160 368
  - D2: GB-A-2 080 910
  - D3: US-A-4 081 065
  - D4: EP-A-0 137 247
  - D5: US-A-4 800 497.
- IV. The appellant requests that the decision of the Examining Division be set aside and that a patent be granted on the basis of the following documents:

Description - pages 1, 3 to 7 and 9 to 12 received  
28 February 2002 with a letter of  
27 February 2002  
pages 2, 8 received 3 May 2002 with a  
letter of the same date

Claims - 1 received 3 May 2002 with a letter of  
the same date  
2 to 7 received 28 February 2000 with a  
letter of 27 February 2002

Drawings - pages 1/2, 2/2 as published.

V. Claim 1 received 3 May 2002 reads:

"A clutch control system (36, 38) for the automatic control of a motor vehicle clutch (14) which connects an engine (10) with a gearbox (12) under the control of a driver-operated gear ratio selector lever (24), the control system controlling both initial clutch take-up on starting of the vehicle, clutch re-engagement following each ratio change, clutch disengagement on movement of the gear selector lever to change the operative ratio of the gearbox, and clutch disengagement on the coming to rest of the vehicle, characterised in that the control system includes audible and/or visual warning means (50), that audible and/or visual warning means being activated if the system detects one of the following conditions being regarded as abusing the clutch:

- (a) if an attempt is made to drive away by starting clutch take-up in a non take-up gear, those no take-up gears being the third gear and all higher gear ratios with a vehicle forward speed below a

predetermined level and

- (b) if an attempt is made to drive away by starting clutch take-up in second gear or a higher gear with the engine speed ( $v_e$ ) above a predetermined level and with vehicle forward speed below a predetermined level."

Dependent Claims 2 to 7 define preferred embodiments of the subject-matter of Claim 1.

## Reasons for the decision

### 1. *Amendments*

1.1 Additions to Claim 1 in comparison with its content as published are contained in the application as published as follows:

- preamble: the first paragraph of the description;
- audible and/or visual warning means: Claim 10;
- conditions (a), (b): Claims 2, 3 together with page 8, third and fourth paragraphs, of the application as published.

1.2 Claims 2 to 7 correspond to the published claims as follows:

- Claims 2, 3, 6, 7 correspond to published Claims 4, 5, 8, 9 respectively;
- Claims 4, 5 correspond to published Claim 7.

- 1.3 The description has been amended essentially only for consistency with the claims. The drawings are unamended.
- 1.4 The requirements of Article 123(2) EPC therefore are fulfilled.
2. The expression "of the kind specified", which was considered by the Examining Division to be an unnecessary reference to the description and so in contravention of the requirements of Rule 29(6) EPC, essentially has been replaced by the wording of the preamble of Claim 1 which now specifies the functions performed by the control system. The subject-matter of Claim 1 is a control system having warning means of a specified type and operating in response to the sensing by the control system of specified conditions. The Board therefore finds that the requirements of Rule 29(6) EPC and Article 84 in conjunction with Rule 29(1) EPC are fulfilled.
3. *Novelty*
- 3.1 The driver of a motor vehicle having a clutch control system according to the preamble of Claim 1 but who attempts to drive away under condition (a) specified in the claim may be made aware in an audible and/or visual manner by the behaviour of the vehicle that an unsuitable gear has been chosen. However, that behaviour of the vehicle would not result from a warning means which forms part of the control system.
- 3.2 D1 discloses a clutch control system according to the preamble of Claim 1 and which comprises audible and/or visual warning means 40 (page 8, line 5). However, the

control system of D1, which is primarily intended for use with automatic gear selection (page 6, lines 22 to 29), operates by simulating the heat build-up during clutch engagement and controls clutch engagement to avoid the build-up becoming excessive (paragraph bridging pages 3, 4). The subject-matter of Claim 1 in suit, on the other hand, is a warning system which operates at the start of clutch take-up, before significant heat build-up due to clutch engagement can occur. Similarly, D3 and D4 disclose warning means which operate only in response to a condition determined as causing heat build-up (D3, column 5, lines 10 to 23; D4, page 2, line 31 to page 3, line 9). D2 and D5 disclose no warning means.

3.3 The subject-matter of Claim 1 therefore is novel (Article 54 EPC).

4. *Inventive step*

4.1 The closest prior art is that known from D2 which in relation to Figure 6 discloses a clutch control system for the control of a motor vehicle clutch 103 which connects an engine 101 with a gearbox 105 under the control of a driver-operated gear ratio selector lever (page 9, line 120). The control system controls initial clutch take-up on starting of the vehicle (page 10, lines 22 to 32; page 7, lines 83 to 91), clutch re-engagement following each ratio change (page 7, lines 104 to 107), clutch disengagement on movement of the gear selector lever to change the operative ratio of the gearbox (page 10, lines 9 to 14; page 6, line 129 to page 7, line 5) and clutch disengagement on the coming to rest of the vehicle (page 7, lines 18 to 20).

4.1.1 The control system of D2 includes a logic circuit (Figure 9) for a disengagement control 119 which operates to disengage or prevent engagement of the clutch if, with the third or fourth gear ratio engaged, the road speed is below a predetermined value (page 11, lines 90 to 101). If the vehicle is at rest or its speed is below a predetermined value a threshold stage 179 emits a "1" signal to an AND gate 181. Engagement of the third or fourth gear ratio results in an additional "1" signal to the AND gate 181, which is indirectly connected with a switch 115 for disengaging the clutch. It follows that "an attempt to drive away by starting clutch take up" is not possible if the third or fourth gear ratio is selected below the predetermined road speed.

4.1.2 Following selection of the first or second gear ratios at rest, clutch take up is controlled as a function of engine speed (page 10, lines 22, 23). Selection of the second gear ratio at rest and with an engine speed above a predetermined level will result in more rapid clutch engagement in accordance with the higher engine speed. However, in the event that the road speed fails to rise accordingly, e.g. due to "slipping" the clutch to hold the vehicle in position on an incline, a time control 141 emits a signal to engage the clutch to prevent damage to the clutch linings (page 10, lines 104 to 119).

4.1.3 It follows that the subject-matter of Claim 1 differs from that of D2 in that:

- the control system includes audible and/or visual warning means, that audible and/or visual warning means being activated if the system detects one of the



following conditions being regarded as abusing the clutch:

- (a) if an attempt is made to drive away by starting clutch take up in a non take up gear, those non take-up gears being the third gear and all higher gear ratios with a vehicle forward speed below a predetermined level and
- (b) if an attempt is made to drive away by starting clutch take up in second gear or a higher gear with the engine speed above a predetermined level and with vehicle forward speed below a predetermined level.

4.1.4 With the control system of D2 the degree of clutch engagement is regulated automatically in different ways, depending on the abuse condition. The selection of a non take up gear at rest results immediately in an inability to propel the vehicle forward because of failure of the clutch to engage. On the other hand, "slipping" of the clutch results after a certain period of time in a more rapid engagement than may be desired. In each case the driver may be faced with an unexpected and undesirable reaction from the control system, without warning. The control system according to the application in suit also preferably operates to rapidly engage or to rapidly disengage the clutch (Claims 5, 6). The differentiating features have the effect that the driver is given a clear warning of the existence of both abuse conditions at the commencement of clutch take up. In this way the driver can react before any damage occurs, without the need to recognise an abnormal operation of the vehicle. The corresponding problem is to provide a clear, early warning of the

existence of an abuse condition.

5. Each of D1, D3, D4 discloses a warning means. In the event that the control system of D1 determines excessive heat build-up in the clutch it is preferably fully engaged to avoid further abuse (page 4, line 27 to page 5, line 20). The control system includes an alarm 40 but its operation is not disclosed (page 8, lines 1 to 7). The control system of D3 discloses disengagement of the clutch in the event that excessive heat build-up in the clutch has been determined and an alarm is suggested to enable the driver to override the control system (column 5, lines 10 to 23). D4 discloses a warning device which informs the driver if the control system determines that a certain level of energy has been dissipated in the clutch, before, upon achieving a higher level of dissipation, the clutch is automatically fully engaged (page 7, lines 9 to 23). D5 discloses no warning means. None of these documents either discloses the differentiating features or concerns itself with the problem solved by the subject-matter of Claim 1 in suit.
  
6. The Board therefore comes to the conclusion that the subject-matter of Claim 1 in suit and therefore also of dependent Claims 2 to 7 involves an inventive step (Article 56 EPC).

## **Order**

### **For these reasons it is decided that:**

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to grant a patent on the basis of the following documents:

Description - pages 1, 3 to 7 and 9 to 12 received 28 February 2002 with a letter of 27 February 2002  
pages 2, 8 received 3 May 2002 with a letter of the same date

Claims - 1 received 3 May 2002 with a letter of the same date  
2 to 7 received 28 February 2000 with a letter of 27 February 2002

Drawings - pages 1/2, 2/2 as published.

The Registrar:

The Chairman:

S. Fabiani

F. Gumbel