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**D E C I S I O N**  
**of 24 February 2000**

**Case Number:** T 0435/98 - 3.5.2

**Application Number:** 90303455.1

**Publication Number:** 0412631

**IPC:** H02J 7/14

**Language of the proceedings:** EN

**Title of invention:**  
Motor vehicle power supply device

**Patentee:**  
Isuzu Motors Limited

**Opponent:**  
Robert Bosch GmbH

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
"Inventive step - yes"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0435/98 - 3.5.2

**D E C I S I O N**  
**of the Technical Board of Appeal 3.5.2**  
**of 24 February 2000**

**Appellant:** Robert Bosch GmbH  
(Opponent) Postfach 30 02 20  
D-70442 Stuttgart (DE)

**Representative:** -

**Respondent:** Isuzu Motors Limited  
(Proprietor of the patent) 22-10, 6-chome  
Miamiohoi  
Shinagawa-ku  
Tokyo 140 (JP)

**Representative:** Brunner, Michael John  
GILL JENNINGS & EVERY  
Broadgate House  
7 Eldon Street  
London EC2M 7LH (GB)

**Decision under appeal:** Interlocutory decision of the Opposition Division  
of the European Patent Office posted 23 February  
1998 concerning maintenance of European patent  
No. 0 412 631 in amended form.

**Composition of the Board:**

**Chairman:** W. J. L. Wheeler  
**Members:** A. G. Hagenbucher  
P. H. Mühlens

## Summary of Facts and Submissions

I. The appellant filed an opposition against European patent No. 412 631 and now contests the interlocutory decision of the opposition division concerning maintenance of the patent in amended form in accordance with the auxiliary request filed with the letter of 29 December 1997 as amended in oral proceedings on 6 December 1998.

II. The statement setting out the grounds of appeal referred to the following documents which had been cited in support of the opposition:

D1: Soviet Inventions Illustrated Section PQ, Week 8809, 3rd March 1988, Derwent Publications Ltd., London, GB; Class Q54, AN 88-062885 & SU-A-1 326 769,

D6: GB-A-979 969 and

D8: WO-A-7 900 617.

III. In reply to a communication from the Board, annexed to the summons to attend oral proceedings, the appellant filed a letter on 21 January 2000 citing the following document:

D9: DE-A-3 526 045.

IV. Claim 1 in the amended form maintained by the opposition division reads as follows (references (a), (b), (c) introduced here by the Board):

"A motor vehicle power supply device comprising:

an alternator (G) drivable by an engine mounted on a motor vehicle;

a battery (B) chargeable by electric energy generated by said alternator;

a capacitor (C) connected to said alternator (G) and said battery (B);

(a) charging speed varying means ( $R_1$ ,  $R_2$ ) connected between said capacitor (C), and said alternator (G) and said battery (B), for varying the speed at which said capacitor (C) is charged, wherein said charging speed varying means ( $R_1$ ,  $R_2$ ) comprises a plurality of parallel circuits connected to said capacitor and having respective switch means ( $S_1$ ,  $S_2$ ), one of said parallel circuits having a resistor ( $r$ ) for limiting a current flowing through said one of the parallel circuits;

(b) detecting means (SG, SA, SW, SS, SB) for detecting an operating condition of the motor vehicle; and

(c) control means (CC) for controlling said charging speed varying means ( $R_1$ ,  $R_2$ ) in response to detected signals from said detecting means."

Claims 2 to 5 are dependent on claim 1.

V. Oral proceedings were held on 24 February 2000.

VI. The appellant argued essentially as follows:

Document D8 was the most relevant prior art document because it mentioned as one exploitation (page 7) a motor vehicle power supply with a generator. Such a motor vehicle power supply normally used an alternator

drivable by the engine of the motor vehicle as a generator for charging the battery. According to D8 two batteries were charged. One battery was always connected to the generator. This corresponded to the connection of battery (B) to the alternator in present claim 1. Instead of the claimed capacitor (C), document D8 disclosed an accumulator connected to the generator by means of switch (7). Switch (7) was a charging speed varying means because the charging speed depended on how often and how long the switch (7) was triggered by control means (8) in dependence on the amplitude of the charging current measured by detecting means, namely sensor (6). The charging current reflected the operation of the engine which ran the alternator. It could be seen from document D1 that the use of a capacitor instead of a battery for starting an engine was obvious. A capacitor could be charged more quickly and could provide sufficient energy. According to Figure 3 of document D8 switch (7) was controlled by a transistor. The simplest possibility of varying the charging speed would be to provide a plurality of parallel resistor branches respectively selected in dependence on a measured value. This was generally known and derivable from document D9. There a NC-accumulator was charged at different speeds in dependence on various parameters in order to allow a rapid charge, full charge or a compensation charge with different currents from a constant current source. According to D9 a microprocessor selected the appropriate resistor branch. The use of parallel resistor circuits was also obvious in view of document D6 because according to this document two batteries were charged via resistors 7',8' (Figure 3). These resistors limited the charging current. Since

capacitors had no internal resistance, such resistances were clearly necessary if the accumulator of D8 was replaced by a capacitor. Hence, the subject-matter of claim 1 was obvious.

VII. The respondent's arguments can be summarised as follows:

The appellant used a hindsight analysis selecting features from numerous prior art documents to assert that the subject-matter of the disputed patent was obvious. Document D8 was not the most relevant prior art document because it showed a battery rather than a capacitor as an energy source for starting a motor vehicle. Since document D1 showed the use of a capacitor for this purpose, it was more relevant. Nevertheless, if for some reason the person skilled in the art would start from the prior art disclosed in D8, this document would not lead to the claimed subject-matter. D8 did not disclose any charging speed varying means, nor any means for monitoring an operating condition of a motor vehicle. The battery installation described in D6 did not have any means for varying the charging current. Although document D9 was one of the appellant's own documents it was only cited one month before the oral proceedings. If the Board considered it detrimental to the present patent, the respondent requested a further opportunity for studying it more carefully and for commenting in writing. According to the respondent's first impression this document was not relevant because it did not concern the charging of a motor vehicle battery or capacitor but the charging of a low current NC-battery. Since the NC battery was charged from the mains supply, any effect the charging

of such a battery may have on the power source was negligible.

VIII. The appellant (opponent) requested that the decision under appeal be set aside and that the European patent No. 412 631 be revoked.

IX. The respondent (patentee) requested that the appeal be dismissed.

### **Reasons for the Decision**

1. The appeal is admissible.

2. *Novelty*

Novelty of the subject-matter of the present claim 1 with respect to the cited prior art has not been disputed.

3. *Inventive step*

3.1 The Board concurs with the opinion of the respondent that document D1 represents the most relevant prior art. In this context the following background is explained in the introduction of the patent in suit:

If motor vehicles are repeatedly stopped and started frequently, the batteries mounted on such vehicles cannot be charged sufficiently to make up for the electric power consumed when the engine is started. Accordingly, the battery tends to be discharged so that

it cannot start the engine. For this reason the prior art such as disclosed in document D1 uses for motor vehicle power supply devices in addition to a normal battery a large capacitance capacitor that is charged to the same voltage as the battery mounted on the motor vehicle. It discharges its stored electric energy to actuate the engine starter. A large capacitance capacitor can supply an intensive current even if the voltage of the battery is low but needs a large current for its charging. Although a capacitor can in principle be quickly charged the alternator of the motor vehicle cannot always provide sufficient current, especially when the engine is idling at low temperature. The engine may die or not accelerate quickly if the load on the alternator is large.

3.2 It is therefore the object of the present invention to provide a motor vehicle power supply device which has a large capacitance capacitor that can be charged by the battery and the alternator driven by the engine mounted on the motor vehicle, the motor vehicle power supply device having means for reducing adverse effects on the operation of engine at the time of charging the large capacitor; see EP-B-412 631, column 2, lines 24 to 31.

3.3 According to claim 1 this object is achieved by the features (a), (b) and (c)(see paragraph IV above). The description of the patent in suit (see column 3, line 50 to column 4, line 7) mentions five examples of means for detecting operating conditions of the motor vehicle, namely a gear position switch SG turned on when the transmission of the motor vehicle is shifted into one of the gear positions for moving the motor vehicle, an accelerator pedal switch SA, a brake switch



SB, a coolant temperature sensor SW and a vehicle speed sensor SS. All these operating conditions are in respect of load conditions on the engine which are not directly related to the magnitude of the electric current being generated by the alternator. When the alternator is charging a capacitor, it may place a large load on the engine.

- 3.4 Therefore, according to the present invention, the capacitor is charged via charging speed varying means comprising a plurality of parallel circuits, one of said parallel circuits having a resistor for limiting the charging current in dependence on a detected operating condition of the motor vehicle. This allows adverse effects on the operation of the engine to be reduced by adapting the charging speed of the starting capacitor to the instantaneous operating condition of the motor vehicle.
- 3.5 Document D8 discloses as one example a motor vehicle power supply device with two batteries. The motor vehicle has a generator which provides charging current varying in dependence on various driving and battery charging conditions. Battery (3) is permanently connected to the generator. Battery (2) is intermittently connected to the generator by a switch (7) which may be regarded as an on-off charging speed varying means because it closes when the total current delivered by the generator exceeds a predetermined first value and opens when the current supplied by the generator falls below a second predetermined value. The speed of charging the starting battery is therefore dependent on the charging current and the actuation of switch (7). In contrast to the present invention

sensing element (6) is a detecting means for detecting the value of the total current delivered by the generator. Control circuit (8) is a control means for controlling the on-off switch (7) in response to the detected signals from said detecting means. Even if sensing the total current generated may be regarded as detecting an operating condition of the motor vehicle, the fact remains that according to D8 the electric energy for starting the motor vehicle is not provided by a capacitor but by a normal battery (which requires a relatively small charging current) and the charging speed is not controlled by a plurality of parallel circuits having respective switch means, one of said parallel circuits having a resistor for limiting the current flowing through one of the parallel circuits, as specified in feature (a) of the present claim 1.

- 3.6 Document D9 describes a method for charging a low current NC-accumulator. The method uses charging speed varying means comprising a plurality of parallel circuits connected to the NC-accumulator and having respective switch means, one of said parallel circuits having a resistor for limiting the current flowing through said one of the parallel circuits. The charging energy is taken from the mains supply, and the charging speed varying means is not used for reducing adverse effects on the energy source, but for adapting the charging speed to the specific requirements of NC-accumulators, namely in order to allow a rapid charge, full charge or compensation charge with different currents. Hence, the problem solved by the parallel circuits according to D9 is completely different from that solved by the parallel circuits in present claim 1.

- 3.7 Document D6 describes a battery installation for vehicles with two batteries (2) and (4) charged by a common generator (1). Battery (2) is a starter battery and battery (4) is primarily for supplying the lighting or like load (5). Resistor 7' and diode 6 are provided in the starter battery circuit so that current cannot be drawn from the starter battery by the load (5). Diode 6 and resistor 7' cannot be regarded as charging speed varying means including a plurality of parallel circuits for reducing adverse effects on the operation of the engine at the time of charging the battery from an alternator.
- 3.8 When a large capacitance capacitor is used for starting a motor vehicle as known from document D1 it is necessary to consider the adverse effect of a possible high charging current on the operation of the engine which is more severe than the effect of the smaller charging current drawn by a starting accumulator as known from documents D6 and D8. No adverse effects on the power source can be expected in the solution known from document D9. Therefore, summarising, even when the late filed document D9 is also taken into consideration, the Board concludes that the subject-matter of claim 1 is not obviously derivable from a combined consideration of the cited documents. The claimed subject-matter is to be considered as involving an inventive within the meaning of Article 56 EPC.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

M. Hörnell

W. J. L. Wheeler