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File Number: T 180/91 - 3.5.2  
Application No.: 82 902 503.0  
Publication No.: 0 113 341  
Title of invention: Windshield Wiper Control System

Classification: H02 P1/04

**D E C I S I O N**  
of 20 February 1992

Proprietor of the patent: KEARNS, Robert W., et al

Opponent: I. SWF Auto-Electric GmbH  
II. Bayerische Motoren Werke

Headword:

EPC Article 56

Keyword: "Inventive step - no"

**Headnote**



Case Number : T 180/91 - 3.5.2

**D E C I S I O N**  
of the Technical Board of Appeal 3.5.2  
of 20 February 1992

**Appellant :** SWF Auto-Electric GmbH  
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**Other party:** Bayerische Motoren Werke  
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**Respondent :** KEARNS, Robert W. and Timothy B.  
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**Decision under appeal :** Interlocutory decision of the Opposition Division  
of the European Patent Office dated  
28 December 1990 concerning maintenance of  
European patent No. 0 113 341 in amended form.

**Composition of the Board :**

**Chairman :** W.J.L. Wheeler  
**Members :** A. Hagenbucher  
L.C. Mancini

Summary of Facts and Submissions

I. The Appellant contests the interlocutory decision of the Opposition Division, maintaining European Patent No. 0 113 341 patent in amended form.

II. The following prior art documents were considered inter alia in the proceedings before the Opposition Division:

D1: DE-A-1 588 861

D2: US-A-3 721 115

III. The decision under appeal was based on the following independent Claim 1:

"1. In an intermittent windshield wiper system comprising an electric motor (10) connected to drive a windshield wiper through repeating wiping cycles over a windshield, each wiping cycle including a start and an end, an amplifying device (20), switch means (53) driven by said motor having a RUN position and a DWELL position and moving to said DWELL position at the end of each wiping cycle, and circuit means responsive to said switch means including a charge storage device (40) to cause said amplifying device, which is responsive to the potential on one side of said storage device to initiate a wiping cycle at the end of each dwell period and to initiate the dwell periods at the end of each wiping cycle, characterised in that said motor is a three brush motor, said amplifying device (20) is connected to energise the armature of said motor between a first brush (11) and a third brush (13) of said motor, said circuit means includes speed regulating means (32, 33, 130, 34; 21) responsive

to the speed of said motor (10) to apply a signal to the input of said amplifying device (20) to cause said amplifying device to energise said motor with continuous current controlled to regulate the speed of said motor to be substantially uniform at least at the entrance of the dwell region (8), so that the motor is continuously driven when the input of the amplifier is not influenced by the potential on this one side of the charge storing device or when the motor does not stop in the dwell periods depending on the above substantially uniform speed and the degree of dryness on said windshield, and said speed regulating means includes a first circuit (33, 34, 21) for applying a signal derived from a second brush (12) of said motor to the input control electrode of said amplifying device."

Claims 2 to 24 are dependent on Claim 1.

IV. In the Statement of Grounds and in the oral proceedings held on 20 February 1992, the appellant and the other party to the appeal proceedings under Article 107 EPC argued in effect that D1 did not only show an intermittent windshield wiper system with the features in the preamble of Claim 1, but additionally disclosed speed regulating means comprising motor-driven contacts cooperating with a printed circuit board to apply a signal to the input of the amplifying device in order to energise the motor in such a way that the speed of the motor was substantially uniform at least at the entrance of the dwell region. If the wetness of the windscreen was too high, the motor did not stop in the dwell period due to the kinetic energy at the entrance of the dwell period; cf. D1, the paragraph bridging pages 16 and 17 (hand written page numbering).

A difference between the subject-matter of Claim 1 and that of D1 existed only in the means for providing the

necessary speed regulation. According to D1 a two brush motor was pulse width controlled, whereas according to the attacked patent, a three brush motor was controlled by continuous current.

A motor speed control system for a motor with three brushes where two brushes were used for energy supply and the third brush for indicating the speed of the motor was known from D2, however. It had become standard practice to use three brush motors in windshield wiper systems by the time the present patent was applied for.

A person skilled in the art of motor speed control who wanted to simplify the speed control system of D1 would replace the complicated system of D1 by the simple analogue speed control system according to D2 and thus arrive at the solution in Claim 1 without involving an inventive step.

- V. The Respondent argued in accordance with the reasoning in the appealed decision, that the subject-matter of the patent in suit was distinguished from that of D1 in that it used the same amplifying device for controlling the intermittent operation and for energising the motor with continuous current to regulate the speed of the motor. Especially the feed back loop from brush 12 to the base of the amplifier 60 was new. The speed control of D1 functioned only during the upstroke and the downstroke of the wiper. It tried to keep the speed constant by changing the length of the pulses when the load on the motor changed; cf. Figure 11 of D1. A speed control by means of a feed back loop from a further motor brush to the input of the amplifying device energising the motor was not known from D1. The application of the speed control known from D2, which was from the same inventor as D1, to the systems disclosed in D1 necessitated a completely new and

non-obvious concept employing the same amplifier device for controlling intermittent operation and regulating the motor speed. The inventor had not tried that at the priority date of D1 although three brush motors were known to him.

The system of D1 was also driven in the dwell period, whereas according to the patent in suit, the windshield wiper may stop in the dwell region.

VI. The Appellant requested that the decision under appeal be set aside and that the European Patent No. 0 113 341 be revoked. The other party supported the Appellant's request.

VII. The Respondent requested that the appeal be dismissed and that the patent be maintained on the basis of Claim 1 in the form maintained by the Opposition Division.

#### Reasons for the Decision

1. The appeal is admissible.
2. It is common ground between the parties and the Board that the closest prior art is disclosed in D1. Starting on page 37 (hand written numbering), it discloses an intermittent windshield wiper system comprising an electric motor (22) connected to drive a windshield wiper through repeating cycles over a windshield, each wiping cycle including a start and an end (cf. page 38). As shown in Figure 4, the system comprises an amplifying device  $Q_1$ ,  $Q_2$  and switch means  $r_2, r_3$  comprising contacts driven by the motor which cooperate with contacts printed on a printed circuit board. The motor has a run position and a dwell position. The dwell position is at the end of each

wiping cycle; cf. D1, paragraph bridging pages 40 and 41. Charge storage devices (Capacitors C1, C2) are responsive to said switching means to cause the amplifying device Q<sub>1</sub>, Q<sub>2</sub>, which is responsive to the potential on one side of said capacitors to initiate a wiping cycle at the end of each dwell period and to initiate a dwell period at the end of each wiping cycle (cf. page 40, second paragraph).

3. Furthermore, a signal is applied to the input of the amplifying device Q<sub>1</sub>, Q<sub>2</sub> to cause it to regulate the speed of the motor in the controlled torque period following the full torque period to be substantially uniform at least at the entrance of the dwell region, so that the motor is continuously rotated by its kinetic energy when the input of the amplifier is not influenced by the potential on said one side of the capacitors, or when the motor does not stop in the dwell period depending on the above mentioned substantially uniform speed and the degree of dryness on said windshield. D1 (page 40, last paragraph, especially the six last lines; page 46, first paragraph, and page 48) explains that the motor may or may not stop in the dwell period depending on the kinetic energy or substantially uniform speed during the controlled torque and the degree of dryness on the windshield. Contrary to the Respondent's arguments (and those of the Opposition Division), the amplifier defined in Claim 1 does not carry out more functions than energising the motor with continuous current to regulate the speed of the motor until the entrance of the dwell region. Afterwards the speed control is ineffective (cf. patent in suit, column 7, lines 15 to 30 and page 3, lines 5 to 7, of the Proprietor's reply dated 24 August 1989 in the proceedings before the Opposition Division). If according to D1 (page 40, lines 13 to 21) the transistors Q<sub>1</sub>, Q<sub>2</sub> are non-

conductive at the entrance of the dwell region, the motor is continuously rotated only by its kinetic energy as in the patent in suit.

4. The intermittent windshield wiper system according to Claim 1 of the patent in suit differs from that of D1 in that
  - a) according to D1 a two brush motor is used, whereas the present subject-matter uses a three brush motor and derives from one of the brushes not used for energising the motor a control signal, which is applied to the input control electrode of the amplifying device;
  - b) according to D1 speed regulation is achieved by pulse width modulation applied through a printed circuit board to the amplifying device, whereas according to the present subject-matter the amplifying device and consequently the motor is controlled by continuous current.
5. As can be seen from the comments in the introduction of the patent in suit about US-A-3 483 459 which corresponds to D1, the use of pulse width control and a printed circuit board were considered as resulting in a disadvantageous modification of the speed controlled motor.
6. Starting from D1, the objective problem underlying the subject-matter of Claim 1 is therefore, in accordance with the introduction of the patent in suit, to provide a safe windshield wiper system with a motor speed control applicable to various systems without any extensive modifications.
7. A person skilled in the art who is confronted with the problem of simplifying the motor speed control of the

prior art system known from D1 would, in the Board's view, take into consideration all speed regulated motors known for intermittently driving a movable member making wiping contact on a surface of varying slipperiness, and providing a dwell period at the end of each wiping cycle.

Thus he would take D2 into consideration. D2 shows in Figure 6 a continuous current driven three brush motor wherein two brushes (one connected to the output of amplifier 144 and the other connected to earth), are used for driving the motor and a further brush (142) serves for speed regulation (cf. column 9, lines 7 to 20).

Since the system as claimed in D1 requires the speed of the motor to be regulated as it approaches the dwell region, the person skilled in the art would consider replacing the rather complicated speed regulated motor of D1 by the simpler one shown in Figure 6 of D2. As soon as the possibility of using one brush of a three brush motor for speed control was known from D2, such a speed regulated motor was available to a person skilled in the art for intermittent windshield wiper systems. If the speed regulation of D1 has disadvantages, a person skilled in the art would be encouraged to pursue the possibility of using the continuous current driven speed controlled motor known from D2 (Figure 6) by his awareness that it no longer requires a printed circuit board.

8. For the above reasons the Board finds the subject-matter of Claim 1 to be lacking an inventive step as defined in Article 56 EPC. Consequently, the patent in suit cannot be maintained with that claim.

Order

For these reasons, it is decided:

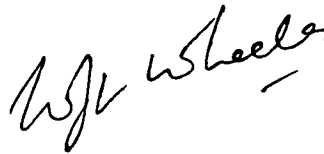
1. The decision under appeal is set aside.
2. European Patent No. 0 113 341 is revoked.

The Registrar:



M. Kiehl

The Chairman:



W.J.L. Wheeler