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**Datasheet for the decision  
of 8 November 2006**

**Case Number:** T 0962/04 - 3.2.04

**Application Number:** 97302104.1

**Publication Number:** 0806550

**IPC:** F01L 1/344

**Language of the proceedings:** EN

**Title of invention:**  
Valve timing control device

**Patentee:**  
AISIN SEIKI KABUSHIKI KAISHA

**Opponents:**  
Schaeffler KG  
DaimlerChrysler AG

**Headword:**

-

**Relevant legal provisions:**  
EPC Art. 100(a), 123(2)

**Keyword:**  
"Novelty (yes)"  
"Inventive step - main request and first auxiliary request (no)  
- third auxiliary request (yes)"  
"Added subject-matter - second auxiliary request (yes)"  
"Admissibility of a fresh ground for opposition with respect  
to the third auxiliary request (no)"  
"Auxiliary request filed during the oral proceedings  
(admitted)"

**Decisions cited:**  
G 0010/91

**Catchword:-**



Case Number: T 0962/04 - 3.2.04

**DECISION**  
of the Technical Board of Appeal 3.2.04  
of 8 November 2006

**Appellant I:** Schaeffler KG  
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**Appellant II:** DaimlerChrysler AG  
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**Representative:** Daub, Thomas  
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**Respondent:** AISIN SEIKI KABUSHIKI KAISHA  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 8 July 2004  
rejecting the opposition filed against European  
patent No. 0806550 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** M. Ceyte  
**Members:** C. Scheibling  
H. Preglau

## Summary of Facts and Submissions

- I. By its decision dated 8 July 2004 the Opposition Division rejected the oppositions. Appellant I (opponent I) filed an appeal and paid the prescribed appeal fee on 19 August 2004, and Appellant II (opponent II) filed an appeal and paid the prescribed appeal fee on 16 July 2004. The statements setting out the grounds of appeal were respectively received on 12 November 2004 (Appellant I) and 29 October 2004 (Appellant II).
- II. The following documents played a role in the present proceedings:
- D1: DE-C-38 25 074
  - D2: DE-A-42 18 081
  - D3: US-A-4 858 572
  - D4: EP-A-0 652 354
  - D5: DE-A-38 10 804
  - D6: DE-A-39 07 077
  - A3: EP-A-0 590 696
- III. The oppositions were filed on the grounds based on Article 100(a) EPC (lack of novelty and of inventive step).
- IV. Oral proceedings before the Board took place on 8 November 2006.

Both Appellants requested that the decision under appeal be set aside and that the patent be revoked.

They mainly argued as follows:

The subject-matter of claim 1 according to the main request lacks novelty with respect to D1 and does not involve an inventive step when considering D3 in combination with D1, D2, D4 or D6. The subject-matter of claim 1 according to the first and second auxiliary requests does not meet the requirements of Article 123(2) EPC. Additionally the subject matter of claim 1 according to the first auxiliary request does not involve an inventive step, since all the added features are also disclosed in D3. The third auxiliary request filed during the oral proceeding should not be admitted because it's late filed and the oral proceeding should be postponed in case it is admitted into the proceedings. Furthermore, the subject-matter of claim 1 of the third auxiliary request does neither meet the requirements of Article 123(2) EPC, nor involve an inventive step when taking into account D3 in combination with A3 or with D1, D2, D4 or D6.

The Respondent (patentee) countered the Appellants arguments and mainly argued as follows:

The main request, the first and second auxiliary requests meet the requirements of Article 123(2) EPC when interpreting the wording such that it is technically sensible and takes into account the whole of the disclosure of the patent.

Claim 1 of the new third auxiliary request is a combination of claims 1 and 9 as granted and was filed in response to an objection of added subject-matter (Article 123(2) EPC) raised for the first time during oral proceedings against the second auxiliary request. Thus, this new third auxiliary request cannot be considered to be late filed; furthermore since claim 1

is a combination of claims 1 and 9 as granted, the requirements of Article 123(2) EPC are met.

A skilled person would not contemplate combining D3 with one of documents D1, D2, D4, D6 or A3 because the problem to be solved by the invention is not addressed in either of these documents and the devices of these documents are too different from that of D3.

The Respondent requested that the appeal be dismissed (main request) or alternatively that the decision under appeal be set aside and the patent be maintained on the basis of one of the sets of claims according to the first and second auxiliary requests, filed with letter dated 6 October 2006, or according to the third auxiliary request filed during oral proceedings, or according to the set of claims according to the seventh auxiliary request filed with letter dated 6 October 2006 and now renumbered fourth auxiliary request.

V. Claim 1 according to the main request (as granted) reads as follows:

"1. A valve timing control device comprising:  
a rotor (30) fixed on a cam shaft (10) of an engine (E);  
a housing member (50) rotatably mounted on the cam shaft (10) so as to surround the rotor (30);  
means (70) for driving the housing member (50) from a rotational output of the engine (E);  
a chamber (R0) defined between the housing member (50) and the rotor (30) and having a pair of circumferentially opposed walls (55, 56);  
a vane (40) mounted on the rotor (30) and extending outwardly therefrom in the radial direction into the

chamber (R0) so as to divide the chamber into a first pressure chamber (R1) and a second pressure chamber (R2);

a fluid supplying means (100) for supplying fluid under pressure selectively to one of the first and second pressure chambers (R1 and R2) thereby establishing a pressure differential between said pressure chambers (R1 and R2) so as to effect relative rotation between the rotor (30) and the housing member (50); and means (60) for locking the rotor (30) and the housing member (50) in a predetermined relative angular disposition and for selectively releasing that locking engagement;

characterized in that a spring element (92, 93) is provided within the device to urge the rotor (30) towards the angular position in which it is locked."

Claim 1 according to the first auxiliary request reads as follows:

"1. A valve timing control device comprising:  
a rotor (30) fixed on a cam shaft (10) of an engine (E);  
a housing member (50) rotatably mounted on the cam shaft (10) so as to surround the rotor (30);  
means (70) for driving the housing member (50) from a rotational output of the engine (E);  
a chamber (R0) defined between the housing member (50) and the rotor (30) and having a pair of circumferentially opposed walls (55, 56);  
a vane (40) mounted on the rotor (30) and aligned to extend radially outwardly therefrom along a plane through the rotary axis of the rotor (30) into the chamber (R0) so as to divide the chamber into a first

pressure chamber (R1) and a second pressure chamber (R2);  
a fluid supplying means (100) for supplying fluid under pressure selectively to one of the first and second pressure chambers (R1 and R2) thereby establishing a pressure differential between said pressure chambers (R1 and R2) so as to effect relative rotation between the rotor (30) and the housing member (50); and  
means (60) for locking the rotor (30) and the housing member (50) in a predetermined relative angular disposition and for selectively releasing that locking engagement;  
characterized in that a spring element (92, 93) is provided within the device to urge the rotor (30) towards the angular position in which it is locked."

Claim 1 according to the second auxiliary request differs from claim 1 according to the first auxiliary request in that the following wording has been added at the end of the characterising part of the claim:  
", wherein the action of the spring element (92, 93) on the rotor (30) is such as to bias the rotor (30) to an advanced locked timing condition."

Claim 1 according to the third auxiliary request is a combination of claims 1 and 9 as granted.

## Reasons for the Decision

1. The appeal is admissible.
2. *Main request - novelty:*
  - 2.1 Novelty has been disputed with respect to D1. The Appellants consider that in D1 (see Figure 2), the rotor is the flanged shaft 7 and that the rocker element 9 forms a vane in the meaning of the patent in suit. The chambers are referenced 24 and 37 in Figure 2.

However, the chambers (24, 37) are not defined between the housing and the rotor, but between the "vane" (rocker) and the housing and do not comprise a pair of circumferentially spaced walls. Therefore alone, novelty of the subject-matter of claim 1 according to the main request is already given with respect to D1. Furthermore, the "vane" is neither mounted on the rotor in the meaning of the patent in suit, nor extending radially outwardly from the rotor and there are no means for locking the rotor but a device for maintaining the "vane" in abutment. Finally the spring is not urging the rotor towards a locked position.

None of the other cited documents discloses all the features of claim 1. Thus, the subject-matter of claim 1 according to the main request is novel with respect to each of the cited prior art documents.



3. *Main request - inventive step:*

3.1 D3, which represents the closest prior art, is acknowledged and evaluated in the introductory part of the patent specification. This citation discloses a valve timing control device of the kind stated in the pre-characterising part of claim 1.

3.2 A drawback of a device according to D3 is that when the hydraulic pressure drops before the rotor has reached its locked position, the rotary vanes remain uncontrolled.

Thus, the problem to be solved by the present invention is to ensure that the vane cannot crash into the wall of the chamber when the engine is restarted after the pressure of the hydraulic fluid has dropped (see patent specification, paragraph [0004]).

According to the patent in suit, this is achieved by providing a spring to urge the rotor towards the angular position in which it is locked to avoid any uncontrolled movement of the vane.

3.3 However, it is clear for a skilled person that, in order to avoid the above drawback, the rotor must be brought in its abutment end position, where it can be locked, even in the absence of hydraulic pressure.

The skilled person in charge of valve timing control devices is likewise aware of the devices comprising rotary actuators and of those comprising linear actuators.

Although D2 discloses a valve timing control device, comprising an actuator of the linear type with a piston, it teaches the use of a spring to urge the piston in abutment in one of its end positions when the hydraulic pressure has dropped (see column 3, lines 62 to 66). The problem facing the skilled person of losing control of a rotary vane in the known device according to D3 when there is insufficient hydraulic pressure and when the rotor is not in its locked position thus finds a similar solution in D2.

3.4 Therefore, it was obvious for a skilled person to apply the teaching of D2 to the known device according to D3 and thus to arrive at the claimed invention.

3.5 Consequently, in the Board's judgement, the subject-matter of claim 1 according to the main request does not involve an inventive step (Article 56 EPC).

4. *First auxiliary request:*

4.1 Article 123(2):

The Appellants considered that the feature according to which the vane is "aligned ... along a plane through the rotary axis of the rotor" is not directly and unambiguously disclosed in the patent application as originally filed. They objected that no rotary axis is defined in the description and that the orientation of the vane with respect to the axis is not indicated.

However, when interpreting the claims of a patent a skilled person should rule out interpretations which are illogical or which do not make technical sense. He

should try to arrive at an interpretation which is technically sensible and takes into account the whole of the disclosure of the patent.

Thus, taking into account the general technical knowledge of a skilled person in the field of valve timing control devices and especially his knowledge of rotary actuators with vanes, there is no need to define what the axis of a rotor is, and it is implicit for him and clear from the drawings, see Figures 4 to 6 and 7 that "aligned ... along a plane through the rotary axis of the rotor" can only mean that the vanes and the axis of a rotor all lie in a common plane.

Therefore, claim 1 according to the first auxiliary request meets the requirements of Article 123(2) EPC.

#### 4.2 Inventive step:

However the features which have been added to claim 1 are already disclosed in D3. Therefore, starting from D3 as closest prior art, the problem to be solved by the invention defined in claim 1 of the first auxiliary request is the same as that described in paragraph 3.2 above. The solution to this problem has already been shown to be obvious taking into account D2.

Consequently, the subject-matter of claim 1 according to the first auxiliary request does not involve an inventive step as it represents an obvious modification of the known device of D3 in the light of the teaching of D2.

5. *Second auxiliary request - Article 123(2) EPC:*

5.1 Claim 1 of the second auxiliary request comprises inter alia the following feature "wherein the action of the spring element (92, 93) on the rotor (30) is such as to bias the rotor (30) to an advanced locked timing condition."

In the Respondent's view, the above quoted feature has a basis in claim 9 as granted and in the description as originally filed page 7, second and third paragraphs.

However, as well in claim 9 as in the original description, the above quoted feature is disclosed only in combination with the exhaust cam shaft. There is no basis in the application as filed for the combination of the above quoted feature with the cam shaft controlling the admission valves. Therefore, introducing this feature into claim 1 without specifying that the cam shaft controls one or more exhaust valves extends the claimed subject-matter beyond the content of the application as filed (Article 123(2) EPC).

6. *Third auxiliary request - admissibility:*

6.1 The second auxiliary request was filed one month before the oral proceedings (within the time limit fixed by the Board). As already indicated above the features stated in claim 1 of this second auxiliary request were subject-matter of granted claim 1 and a part of claim 9, without specifying that the cam shaft controls one or more exhaust valves.

Although filed in the course of the oral proceedings the third auxiliary request cannot be considered to have been late filed, since it was presented in response to the Appellant's objection raised for the first time during the oral proceedings that claim 1 of the second auxiliary request contains added subject-matter, contrary to the requirements of Article 123(2) EPC.

Thus, in order to overcome the objection under Article 123(2) EPC, the Respondent filed this straightforward request, in which all features of granted claim 9 including the additional feature that the cam shaft controls one or more exhaust valves have been added to granted claim 1.

Appellant I commented on claim 9 in his statement setting out the grounds of appeal and Appellant II referred in his statement setting out the grounds of appeal to the submissions he made during opposition, in which claim 9 had been discussed.

6.2 Thus, the Appellants had not been taken by surprise by a combination of claims 1 and 9 as granted, all the more claim 1 of the auxiliary request 7 filed with letter of 6 October 2006 (now fourth auxiliary request) contains all the features of claims 1 and 9 as granted too.

Therefore, the Board decided to admit the new third auxiliary into the proceedings.

6.3 Appellant II asked for postponement of the oral proceedings should the Board decide to admit this third auxiliary request.

As explained in section 6.1 above, since the third auxiliary request is not deemed to have been late filed and since the Appellants should have been prepared to discuss such a straightforward request, the Board saw no reason to postpone the oral proceedings.

7. *Third auxiliary request - Article 123(2) EPC:*

As already indicated, point 6.1, claim 1 of the third auxiliary request comprises all the features of claims 1 and 9 as granted. Claim 9 as granted refers back to "any preceding" claim, and thus, the direct combination of claims 1 and 9 is disclosed in the patent specification as granted. No objection under Article 123(2) EPC has been raised during the opposition proceedings. Raising such an objection, at this stage of the proceedings, against the combination of claims 1 and 9 as granted, amounts to introducing a fresh ground for opposition. This could be done only with the consent of the patent proprietor (see G 0010/91, OJ EPO 1993, 421). In the present case, since the patent proprietor did not agree to the introduction of this fresh ground for opposition, the Board has decided not to admit this ground into the appeal proceedings.

8. *Third auxiliary request - inventive step:*

8.1 D3 is still considered as being the closest prior art document.

8.2 The device according to claim 1 differs from that of D3 in that a spring element is provided within the device to urge the rotor towards the angular position in which

it is locked, wherein the cam shaft controls one or more exhaust valves of the engine and the spring element acts to bias the rotor to an advanced valve timing condition.

- 8.3 Therefore, starting from D3 as closest prior art, the problem to be solved by the invention defined in claim 1 of the third auxiliary request can be seen in ensuring that the vane cannot crash into the wall of the chamber when the engine is restarted after the pressure of the hydraulic fluid has dropped, even if the rotor has not yet reached its locked position.

By biasing the rotor towards the advanced valve timing condition, the spring counteracts the tendency of the rotor to move to the retarded position due to the asymmetric reaction force generated by the valve springs when the engine is restarted, before the rotor has reached its locked position.

- 8.4 None of the cited prior documents addresses this specific problem.

- 8.5 The Appellants argued that D1 also urges the rotor to an advanced valve timing condition.

This cannot be accepted. In D1 the spring only urges the "vane" into an end position, either in the advanced or the retarded valve timing condition depending on the position of the "vane" when pressure drops. Therefore, a skilled person cannot find in D1 an indication into which valve timing condition the rotor should be urged.

8.6 The Appellants further argued, that A3 especially in the embodiment according to Figure 24 discloses to urge the device to an advanced valve timing condition.

However, A3 is a totally different type of valve timing control device, therefore a skilled person trying to avoid that the vane crashes into the wall of the chamber when the engine is re-started after the pressure of the hydraulic fluid has dropped and the vane has not yet reached its locked position would not take into consideration a device according to A3 at all.

According to the established case law of the Boards of appeal, the question is not whether a skilled person, with access to the entire prior art, could have made the combination according to the invention, but whether he actually would have done so in the hope of solving the underlying technical problem or in expectation of an improvement. So the point is not whether the skilled person could have arrived at the invention by modifying the prior art, but rather whether, in expectation of the advantages achieved in the light of the technical problem addressed, he would have done so because of prompting in the prior art.

8.7 Appellant II also argued that the subject-matter of claim 1 would not involve an inventive step when considering D3 in combination with D2, D4 or D6. However, Appellant II failed to show that these documents disclose or suggest a spring element biasing the rotor in an advanced valve timing condition, even when taking into account the normal capability of a skilled person.



8.8 Consequently, the subject-matter of claim 1 according to the third auxiliary request involves an inventive step.

9. Since the third auxiliary request of the Respondent can be allowed it is needless to proceed with the fourth auxiliary request.

## 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 maintain the patent on the basis of the following documents:

Description:      - columns 3 and 4 of the patent specification  
                    - columns 1, 2, 5, 6 filed during the oral proceedings

Claims:            - 1 to 8 filed during the oral proceedings

Drawings:          - figures 1 to 8 of the patent specification

The registrar:

The Chairman:

G. Magouliotis

M. Ceyte