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**Datasheet for the decision  
of 17 November 2009**

**Case Number:** T 0558/08 - 3.2.04

**Application Number:** 99918508.5

**Publication Number:** 1071876

**IPC:** F02M 31/12

**Language of the proceedings:** EN

**Title of invention:**

Modular air intake heater

**Patentee:**

Phillips and Temro Industries Inc.

**Opponent:**

BERU AG

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56  
RPBA Art. 13(1)

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Novelty (main request): no"  
"Inventive step (main request): no"  
"Late filed request: not admissible"

**Decisions cited:**

T 1067/97, T 0025/03

**Catchword:**

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Case Number: T 0558/08 - 3.2.04

**DECISION**  
of the Technical Board of Appeal 3.2.04  
of 17 November 2009

**Appellant:** BERU AG  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 22 January 2008  
rejecting the opposition filed against European  
Patent No. 1071876 pursuant to Article 101(2)  
EPC.

**Composition of the Board:**

**Chairman:** M. Ceyte  
**Members:** A. de Vries  
C. Heath

## Summary of Facts and Submissions

I. The Appellant (Opponent) lodged an appeal, received 17 March 2008, against the decision of the Opposition Division posted 22 January 2008 to reject the opposition, and simultaneously paid the appeal fee. The statement setting out the grounds was received Monday 2 June 2008.

Opposition was filed against the patent as a whole and based on Article 100 (a) together with Articles 52(1) and 56 EPC 1973, for lack of novelty and inventive step.

The Opposition Division held that the grounds for opposition under Article 100 EPC 1973 did not prejudice the maintenance of the patent as granted having regard in particular to the following documents:

D1: DE-A1-195 15 533

D2: JP-U-1 152 057

II. Oral proceedings in appeal were duly held before this Board on 17 November 2009.

III. The Appellant (Opponent) requests that the decision under appeal be set aside and the patent be revoked in its entirety.

The Respondent (Proprietor) requests that the appeal be dismissed and the patent maintained as granted, or in the alternative that it be maintained in amended form according to a first auxiliary request filed during the oral proceedings before the Board.

IV. The wording of claim 1 of the requests is as follows:

**Main request**

"A heating device (510) for use in an internal combustion engine having an intake (512) defining a passage, the intake including an opening in communication with the passage, the heating device comprising:  
a access panel (511) removably mounted to the intake and closing the opening;  
a frame (514, 516) coupled at one end to said access panel and extending into the passage, said frame including a first portion positioned substantially parallel to and spaced apart from a second portion; and  
a heating element (518) coupled to said frame and positioned between said first and second portions, said heating element being positioned in heat transfer relation with the passage to thereby heat combustion air flowing through the passage."

**Auxiliary request 1**

"A heating device (510) for use in an internal combustion engine having an intake (512) defining a passage, the intake including an opening in communication with the passage, comprising:  
an access panel (511) removably mounted to the intake and closing the opening;  
a frame (514,516) including a first portion and a second portion, the frame being coupled at one end to the access panel (511) extending into the passage, the first portion being positioned parallel to and spaced from the second portion,

a serpentine heating element (518) having 180° bends, the heating element being positioned between the first and the second portions of the frame, the first and the second portions supporting said 180° bends, said heating element being positioned in heat transfer relation with the passage to thereby heat combustion air flowing through the passage."

V. The Appellant argued as follows :

The term "frame" can be interpreted broadly. In its broadest sense of underlying support structure, the term also refers to the isolating sleeve 8 in D1, which is also coupled at one end at 10 to an access panel 6. The projections 13, for example those at opposite ends, form parallel portions of the frame between which the heating element 5 is positioned. In that the meanders of the element engage with the projections of the sleeve, it is coupled thereto. All features of granted claim 1 are thus known from D1.

If, for the sake of argument, "frame" is interpreted in the more limited sense of a structure that supports and surrounds, then the device of granted claim 1 lacks inventive step over the combination of D1 and D2. Starting from D2 the sole difference is connecting the assembly of frame and heating element to the access panel. The problem is then how to adapt the D2 device to a "drop-in" design. The claimed solution is obvious.

The auxiliary request 1 is late filed and not clearly allowable. For example, wherever bends are originally disclosed they are described as seated within the holder. This is not in the claim, which is more general

than the original disclosure and thus adds subject-matter.

VI. The Respondent argued as follows :

"Frame" must be read in the light of the description, which only shows frames surrounding the heating element. This is not the case in D1, where furthermore the 1st and 2nd portions are not structurally isolated from each other. The device of claim 1 is clearly novel over D1.

Turning to inventive step, the use of a surrounding frame instead of central support as in D1 reduces mechanical and heating stress in the central area. It also provides protection during storage and shipping. D1 in column 1 teaches away from frames. As for D2, part 11 is not a frame in the sense of the patent, but serves as a flange. Combining these two teachings is therefore ex post facto.

Each of the features added to claim 1 of the auxiliary request 1 has a basis in original disclosure and no subject-matter is therefore added.

## **Reasons for the Decision**

1. The appeal is admissible.
2. *Background & Claim Interpretation*
  - 2.1 The invention concerns a heating device for heating the intake air of an internal combustion engine. Its

central idea is to mount the heating element on an access panel which is removably mounted on the intake to close an opening therein. The element is coupled between first and second portions of a "frame" coupled to the panel.

This type of heating device, referred to as "drop-in", allows "an end user to install the heater after the intake has been assembled to a vehicle increasing servicability and ease of installation", see specification paragraph [0030]. These benefits contrast it with "sandwich" type heating devices, where the element is mounted on a flange that is inserted between intake and manifold, requiring a more cumbersome installation and servicing and a more complex construction, cf. specification paragraph [0003].

2.2 The feature of a "frame" with spaced, parallel "portions" was added to claim 1 prior to grant. It replaces features of a "hanger" and "retainer mechanism" that appeared in corresponding independent claim 16 of the application as published, the first of the claims therein directed at the drop-in concept.

2.2.1 The term "frame", the Board notes, does not appear in the claimed context in the application as filed. The only mention of "frame" is on page 4, line 18 to 23, in a passage used to describe the mounting of *prior art* heating elements as disadvantageously large and complex vis-à-vis a retainer mechanism 20, see the immediately preceding and following sentence of this paragraph. There its use does not imply any specific shape or mounting of the heating element, other than that it is large and complex.

- 2.2.2 Nor does the term itself imply any particular shape in relation to the heating element it supports. In normal usage the term "frame" may mean nothing more than "a structure which serves as an underlying support or skeleton" (Oxford English Dictionary); "the underlying constructional system or structure that gives shape or strength (as to a building) (Merriam-Webster Online Dictionary), or "the basic structural unit onto or into which other constituents of a whole are fitted, to which they attach, or with which they are integrated" (Webster's 3rd New International Dictionary). Though it may in some instances also mean, more specifically, "an open case or structure made for admitting, enclosing, or supporting something" (Merriam Webster), it does not necessarily imply encasing of what is supported. The exact meaning will depend on context.
- 2.2.3 In the present case the Board has no reason to believe it should mean anything more than in its broadest sense, an underlying support structure. That claim 1 also requires the frame to have spaced apart parallel portions may add some further detail of the shape, but not enough to conclude that it encases the heating element.
- 2.2.4 The fact that all embodiments show structures that support and surround the heating element also does not mean that claim 1, read in the light of the description and figures, must relate to encasing structures. By virtue of the fact that claims are directed at the essence of an invention, they are generalizations. Reading "frame" in a broader sense as a generalization of the specific support structures shown in the



description is then not inconsistent with or contradictory to the content of the original disclosure. It rather brings to prominence the features of the "drop-in" design per se, which had hitherto (in the procedure up to grant) been presented as the inventive concept. This may also be the reason why the more specific features of the hanger support and of the retainer mechanism - the latter in particular presented consistently as essential in the application as filed - were dropped from corresponding independent claim 16 of the application as filed and replaced by those of the "frame" in granted claim 1.

2.2.5 The Board concludes that the term "frame" is to be read in its broadest sense, meaning "an underlying support structure".

3. *Novelty & Inventive Step : Main Request*

3.1 D1 indisputably concerns *a heating device for use in an internal combustion engine having an intake* as will be clear from e.g. the opening paragraph or the pre-characterizing part of its claim 1 identifying the heating device as a "Heizflansch". That the engine intake defines a *passage* also behoves no further comment.

3.1.1 Figures 1 to 3 illustrate a particular embodiment of its heating device described in column 1, line 63, to column 2, line 54, of the description. Its basic design is apparent from figures 1a and 1b, showing a serpentine heat element 5 supported on a rod or post 12 projecting from and connected to a housing 6.

3.1.2 As described in column 1, lines 64 to 66, the housing ("Gehäuse") 6 is to be flange-mounted via a sealing ring 7 to the side of the intake ("ein seitlich an einem Saugrohr etwa unter Zwischenlage einer Dichtung anzuflanschendes Gehäuse 6"). Flange mounting classically provides a tight but releasable seal between similarly flanged components. In this case it means that the housing 6 has a flange - clearly visible in figure 1b as seating seal 7 on its inner face - and meets an opposing flange on an opening in the side of the intake via the seal 7. Heating element 5 then extends through the opening into the interior of the intake. Housing 6 is thus an *access panel* in the sense of claim 1, *removably mounting to the intake and closing the opening therein.*

3.1.3 The support rod or post ("Trägerstab") 12 consists of an isolating sleeve ("Isolierhülle") 8 on a hexagonal bolt ("Sechskantenschraube" [sic]) 4 extending through the housing and clamping the sleeve in place perpendicular to the housing between its head and a nut on the other side of the housing, see column 1, lines 67, to column 2, line 8, and clearly illustrated in figures 1a and 1b. The sleeve 8, shown in greater detail in figures 2a, 2b and 2c, has radial projections ("radiale Vorsprünge") 13, column 2, line 9 to 11, which serve as spacers between subsequent windings of the meandering heating element, column 2, lines 24 to 26. One end of the heating element 5 is clamped between the bolt head and the upper end of the sleeve 8, column 2, line 34 to 36, the other end between an upward projection of the housing and the lowermost projection of the sleeve, as is evident from figures 1a and 1b.

3.1.4 It is evident that the above assembly gives the heating element 5 in the form of a meandering conductive tape ("meanderförmiger Bandleiter"; column 2, line 13) support and structural integrity it would not have otherwise. It thus constitutes an underlying support structure or *frame* in its broadest sense. This frame - bolt 4, sleeve 8 and the upper (narrow diameter) part of the housing 6 - is naturally *coupled at one end* to the housing as access panel. The Board adds that the claim does not exclude parts of frame and the access panel being integral to each other, as will be clear from the first embodiment of figures 1 to 3 of the present patent. There the first holder of portion 14 of the frame doubles as access panel, see figure 1.

In use, with the device mounted on the intake, rod or frame 12 together with the heating element *extends into the intake passage*.

3.1.5 The upper small diameter part of the housing and the bolt head can be identified as the frame's *first and second spaced apart, parallel portions*. They are clearly spaced apart, and shown as parallel in figures 1a and 1b. Alternatively, one or both could be formed by different parallel projections 13 on the sleeve. In both cases the *heating element* - meandering tape 5 - can be said to be *positioned between the portions*. In either case it is clamped to and thus *coupled to the frame*. That the heating element, in use, is *positioned in heat transfer relation with the passage to thereby heat combustion air flowing through the passage*, goes without saying.

3.1.6 All features of claim 1 as granted are thus derivable from D1. The subject-matter of granted claim 1 thus lacks novelty.

3.2 The Board adds, that even if it were to read "frame" more restrictively as also encasing the heating element, it is unconvinced that claim 1 would then define inventive subject-matter.

3.2.1 Heating elements supported in encasing frames are well known in "sandwich" type devices, see e.g. D2. Figures 2 to 5 of D2 show a serpentine heating element 18 mounted in insulators 30 held resiliently via wave springs 22 in spaced (upper and lower) parallel portions of an encasing frame 11. The only difference of the device of granted claim 1 over D2 is the "drop-in" design, which, see above, offers easier installation and serviceability. The objective technical problem can be formulated accordingly as how to make a D2 type support arrangement easier to install and service.

3.2.2 Drop-in design is however already known to the skilled person in the field, an engineer designing heating elements for engine intakes, see D1. Though D1 shows the design with a different support, it will be obvious to him that the drop-in design is an isolated aspect of D1's teaching (for example, its main aspect is shown also in a "sandwich" configuration, figure 4), and can in principle be applied more generally to other support arrangements.

3.2.3 The skilled person who values the benefits of a support as in D2 (e.g. because of the spring loaded lateral

support of individual bends) but wants it to be easier to install and service, will as a matter of course adopt a drop-in design as taught by D1. This involves straightforward mounting of the encasing frame on a flanged housing/panel as in D1, and basic design level dimensioning of the various parts (frame, opening). He so arrives at the subject-matter of granted claim 1 without an inventive step.

3.2.4 That the frame in D2 has a double function - acting as flange and as support - is of no import. The skilled person recognizes as a matter of course that the two functions are separate and separable, and the frame can be used for support only.

#### 4. *Admissibility of the Auxiliary Request*

4.1 This request, with amendments said to address issues under Article 123 EPC raised during the discussion of previous auxiliary requests subsequently withdrawn, was submitted at the end of the oral proceedings, at the latest possible stage of the procedure. Article 13(1) of the Rules of Procedure of the Boards of Appeal of the EPO (RPBA) affords the Boards the discretion in disregarding such late filed submissions in particular where their admission might compromise procedural economy. A criterion applied by the Boards in this regard is whether or not they are "clearly allowable", that is whether or not it is immediately apparent to the Board, with little or no investigative effort on its part, that amendments successfully address the issues raised without giving rise to new ones (see e.g. Case Law of the Boards of Appeal, 5th edition, 2006 -

CLBA hereinafter -, section VII.D.14.2.1 and the case law cited therein).

4.2 In the present case, the amendments add detail of the heating element and its support to claim 1 from the description. There they appear in detailed embodiments in the context of other features, which, for example, consistently define a particular way of mounting the bends (via spring loaded insulators, see figures 5,6). Only stipulating that bends are mounted, but not how, as does claim 1 of this request, at first sight represents a generalization of the information originally presented in the disclosure, so adding subject-matter contrary to Article 123(2) EPC, cf. T 1067/97 or T 0025/03 mentioned on page 240 of the CLBA (English edition). For this reason alone the request is not clearly allowable, and the Board has therefore decided not to admit it into the proceedings.

4.3 The Board adds that the auxiliary request also does not clearly remedy the deficiencies noted above in regard to patentability for the main request. Thus, D2 also clearly shows the added features of serpentine heat elements with 180° bends supported by first and second portions. Had it been admitted, this request was unlikely to succeed.

## 5. *Conclusion*

As the Board has decided not to admit the auxiliary request, it need decide only the main request on its merits. For this request the Board finds that the grounds for opposition mentioned under Article 100(a) in combination with Articles 52(1), 54 and 56 EPC

prejudice the maintenance of the European Patent as granted.

**Order**

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

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar

The Chairman

G. Magouliotis

M. Ceyte