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**Datasheet for the decision  
of 8 December 2023**

**Case Number:** T 0053/22 - 3.2.04

**Application Number:** 15181646.9

**Publication Number:** 2998540

**IPC:** F02B37/18

**Language of the proceedings:** EN

**Title of invention:**

TURBINE WASTEGATE

**Patent Proprietor:**

Garrett Transportation I Inc.

**Opponent:**

BorgWarner Inc.

**Headword:**

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no)

**Decisions cited:**

T 0936/96, T 0192/82, T 0848/94

**Catchword:**



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Case Number: T 0053/22 - 3.2.04

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.04**  
**of 8 December 2023**

**Appellant:** BorgWarner Inc.  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
12 November 2021 concerning maintenance of the  
European Patent No. 2998540 in amended form.**

**Composition of the Board:**

**Chairman** A. de Vries  
**Members:** G. Martin Gonzalez  
K. Kerber-Zubrzycka

## **Summary of Facts and Submissions**

- I. The appeal was filed by the appellant opponent against the interlocutory decision of the opposition division to maintain the patent in amended form.

The division held inter alia that the upheld claims were new and involved an inventive step.

- II. In preparation for oral proceedings the board issued a communication setting out its provisional opinion on the relevant issues.

Oral proceedings before the Board were held on 8 December 2023.

- III. The appellant opponent requests that the decision under appeal be set aside and that the patent be revoked.

The respondent proprietor requests that the appeal be dismissed or, in the alternative, that the decision under appeal be set aside and that the patent be maintained on the basis of one of the auxiliary requests 1 to 4 submitted with reply of 20 July 2022 to the statement setting out the grounds of appeal.

- IV. Independent claim 1 of the requests relevant to this appeal read as follows:

(a) Main request - as upheld by the division

"A method comprising:

forming a shaft (420; 620) and an arm (440; 640) as a subunit (610) via a casting process or welding;

applying a force to a control arm operatively coupled to the shaft;

transmitting at least a portion of the force from the shaft, via the arm, to a plug (460; 660) positioned with respect to a wastegate seat (256) of a turbine housing (210);

maintaining an isostatic condition for relative positions of the shaft, the arm and the plug wherein contact exists between the plug and the wastegate seat; and

in the isostatic condition, fixing the relative positions of the shaft, the arm and the plug via welding the plug to the arm."

(b) Auxiliary request 1

Claim 1 as in the main request with the following added feature (emphasis by the Board to indicate added text):

"... transmitting at least a portion of the force from the shaft, via the arm, to a plug (460; 660) positioned with respect to a wastegate seat (256) of a turbine housing (210), wherein the plug comprises a shell portion;..."

(c) Auxiliary request 2

Claim 1 as in the main request with the following added feature (emphasis by the Board to indicate added text):

"... transmitting at least a portion of the force from the shaft, via the arm, to a plug (460; 660) positioned with respect to a wastegate seat (256) of a turbine housing (210), wherein the plug comprises a substantially hemispherical portion;..."

(d) Auxiliary request 3

Claim 1 as in the main request with the following added feature (emphasis by the Board to indicate added text):

"... transmitting at least a portion of the force from the shaft, via the arm, to a plug (460; 660) positioned with respect to a wastegate seat (256) of a turbine housing (210), wherein the plug comprises a shell portion and a substantially hemispherical portion;..."

(e) Auxiliary request 4

Claim 1 as in the main request with the following added feature (emphasis by the Board to indicate added text):

"... transmitting at least a portion of the force from the shaft, via the arm, to a plug (460; 660) positioned with respect to a wastegate seat (256) of a turbine housing (210), wherein the plug comprises a shell portion and a substantially hemispherical portion, wherein, responsive to applying the force, self-centering the plug with respect to the wastegate seat;..."

V. In the present decision, reference is made to the following document:

(D2) DE 10 2013 201 992 A1

(D10) US 2014/0174077 A1

VI. The appellant's relevant arguments can be summarised as follows:

The claimed method lacks an inventive step over D2 in combination with common general knowledge. D2 is silent about where to apply the force to the actuating element while performing the welding step between actuating element and plug in the manufacturing method described there. Applying it to a control arm operatively coupled to the actuating element's shaft is an obvious choice for the skilled person when tasked with carrying out in practice the method taught by E2.

The appellant agrees with the preliminary opinion of the Board that auxiliary requests 1, 3 and 4 are not admissible in view of the principle of prohibition of reformatio in peius. Claim 1 of auxiliary request 2 does not involve an inventive step in the light of D2, D10 and common general knowledge.

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

The claimed method involves an inventive step over D2 in combination with common general knowledge. The application of the force to a control arm operatively coupled to the shaft obtains a reduction of clearances or misalignments along the entire path from control arm to plug. The application of the force to the control arm in the claimed manufacturing method is not obvious per se and does not arise from common general knowledge.

Auxiliary requests 1-4 are new and inventive over the cited prior art.

## **Reasons for the Decision**

1. The appeal is admissible.
2. Background

The invention relates to a manufacturing method of a turbine wastegate. A turbine wastegate is a valve that can be controlled to selectively allow at least some exhaust to bypass a turbine, cf. paras 0001-0002. It includes a wastegate seat, a plug, an arm connected to the plug, a shaft, a control arm at the opposite end of the shaft. In a closed position an actuator acts on the control arm so that the plug seats against the wastegate seat with sufficient force, cf. para 0006. The invention aims at improving fit of the plug to the arm, shaft and wastegate seat for reducing leakage. With this aim the assembly process includes welding of the arm to the plug in a closed position against the seat in the turbine housing. Such a method reduces clearances and customizes fit of the plug with respect to the wastegate seat, improving sealing, cf. para 0053.

3. Main request - Inventive step
  - 3.1 Document D2 is regarded by both parties as a suitable starting point for the assessment of inventive step. Document D2 undisputedly discloses a method for manufacturing a turbine wastegate in the sense of the opposed claim 1.

### 3.2 Differences over D2

3.2.1 D2 does not directly and unambiguously disclose applying a force to a control arm. D2 discloses in paras 0018 and 0035 that the plug 4 is pressed by the actuating member 5 (which is the subunit formed by the shaft and the arm in the sense of the contested patent) against the wastegate seat 9 for welding. However, D2 is silent on how and where force is applied to the member 5 for obtaining that pressure.

3.2.2 Contrary to the respondent's assertions, D2 does not state that force is directly applied to actuation element 5. The welding step is outlined in para 0035, stating that the plug 4 is pressed "by means of" the actuating element 5 ("mittels des Klappenbetätigungselement 5"). This passage essentially describes actuation element 5 as a tool for applying pressure to the flap without specifying how the tool is practically rotated to press against the plug. The Board is thus also unable to infer as a matter of direct and unambiguous disclosure from this passage that force must be applied via the control lever 22, as argued by the appellant.

3.2.3 The Board concludes that there is no indication that during welding force is applied to the lever ("Hebel") 22, which corresponds to the control arm of the claim. The feature of applying force to the control arm operatively coupled to the shaft is thus not disclosed.

3.2.4 D2 is also silent in respect of how actuating member 5 is formed. Therefore, it does not disclose forming the actuating element 5 via a casting process or welding, as required by claim 1.

3.2.5 It follows from the above, that claim 1 differs from the known method of D2 in that it requires that the force is applied to a control arm and in that the actuating element subunit is formed via a casting process or welding.

3.3 Technical effect

3.3.1 D2 undisputedly already obtains a reduction of clearances at the plug seat area by rotating the actuation element 5 (within bushing 3) towards the plug 4 and pressing it on the seat 9, then welding plug and element during application of pressure, cf. D2 para 0018, 0035. D2 thus already appears to solve the problem of reducing leakage due to manufacturing tolerances, see patent para 0006, 0053, 0056.

Therefore, the objective technical problem must be formulated based on effects that can be associated with the differentiating feature of applying force to an operatively connected control arm.

3.3.2 In the Board's view the primary, main effect associated with specifying that force is applied via the control arm is that it allows D2's teaching to be put into practice. As noted D2 only states that force is applied by means of the actuating element 5 but gives no further detail. Therefore, if the skilled person wants to carry out D2's teachings, it must first identify a suitable way of applying force by means of the actuating member to produce the required contact pressure for welding. In the Board's view this is an objective and realistic reflection of what a skilled person, in this case an engineer designing turbochargers, would do and the considerations they

would have when confronted with the teaching of D2. It thus seems reasonable to formulate the objective technical problem starting from D2 accordingly, and as broadly as possible, as how to practically implement the invention taught by D2. This formulation is broader than that formulated by the appellant, - where to apply the force to obtain the required contact pressure -, which can be seen to include pointers to the solution.

- 3.3.3 As variously stated in case law, once a realistic problem has been defined and once it has been established that a particular solution to such a problem is obvious, that solution cannot be said to involve an inventive step, and this assessment is not altered by the fact that the claimed invention inherently also solves further technical problems, cf. Case Law of the Boards of Appeal, 10th edition 2022 (CLBA) I.D.10.8.

In this case, when considering how to carry out D2's teaching, the skilled person might take into account other effects or potential benefits, such as for example further reduction of misalignment in the control linkage. These are however, secondary to the primary effect and associated problem of realizing D2's teaching. Such a secondary effect may under certain circumstances militate in favour of inventive step, but that is not the case here, as explained below.

#### 3.4 Obviousness of the solution

- 3.4.1 In the present case the issue of inventive step for the contested feature hinges on whether the skilled person seeking to solve the problem of how to carry out in practice the invention taught by D2 would as a matter of obviousness realistically consider rotating the

actuating element to press the plug onto its seat by applying force to an (already) operatively connected control arm.

- 3.4.2 When implementing the teachings of D2, the skilled person will need to identify a suitable way to apply the force by means of actuating member 5 in order to achieve the contact pressure required by the described method. Therefore, it cannot be said that the skilled person lacks motivation to address his issue, as put forward by the respondent proprietor. If they did not address it, they would not have put D2's teaching into practice.
- 3.4.3 When seeking to rotate the actuating member 5 of D2 to press the plug 4 onto its seat, the skilled person has limited available choices to impart rotation to the shaft. They would do so either via the arm of the actuating member itself connecting with the plug 4, or at the other end of the shaft which would require some means offering leverage on the shaft, such as the control arm or lever ("Hebel") 22 or a specialised tool connected to the shaft at either side of the bush 3.

The number of options is thus very limited. The Board thus disagrees with the finding that "many different locations are imaginable to apply the force" (decision, page 10, last paragraph). Firstly, the figures of D2 are purely schematic, meant only to illustrate the basic concept of D2, and thus do not reflect reality. In an actual (in situ) wastegate arrangement (as better reflected in the drawings of D10, see figures 2, 3 and 14) the bush is provided in a through hole in the wall of the turbine housing. At either side of the bush the shaft of the actuation member projects only minimally; this is especially so within the housing near the

wastegate within the volute, where there is very little space. Thus, whereas it might seem that in figures 5 or 6 of D2 where significant sections of the actuating element extend either side of the bush and offer ample space for insertion of a tool to apply a torque to the shaft, in reality there is no such space.

Thus, in a real in situ waste gate arrangement, because of dimensions and space constraints there are really only few options - either at the shaft arm within the housing or at the other end of the shaft outside the housing, via an appropriate tool. That a force could be applied at different points on the shaft arm or the lever does not change the fact that only the arm or the lever end of the shaft are available as options.

3.4.4 Each of these options would occur to the skilled person as a matter of course when they consider how to realize this part of D2's teaching to realize a wastegate in a real turbocharger. Choosing one or the other of these known, obvious options does not require any special insight. The skilled person might weigh the pros and cons of each option depending on the circumstances and specifications but that is routine. Here the pros and cons arise from straightforward practical constraints, such as space and simplicity.

3.4.5 Given that in normal operation rotation is effected in D2 by the control lever 22 using the very same lever to rotate the actuator element to press the plug into its seat prior to welding also seems both a natural and a likely choice.

Using the control lever 22 is naturally simpler than providing a separate tool for the sole purpose of welding. Because the lever 22 is located on the outside of the turbine housing, it will be much easier to carry

out the welding of the plug and arm within the very confined space within the turbine housing than if the plug were also pressed in its seat via the shaft arm by some tool within the same confined space in the housing.

3.4.6 It is of no consequence that the paragraph 0035 of D2, that describes the welding step during manufacturing, does not mention the control arm, as argued by the opposition division. That paragraph does also not mention the arm connecting the actuation member 5 to the plug. The paragraph merely underlines the fact that D2 is silent as to how the force is applied to the plug via the member.

3.5 The respondent proprietor argued that using the control lever reduces the introduction of undesirable misalignment in the control linkage, see their reply of 14 February 2023, page 2, penultimate paragraph. This is related to the effect mentioned in the decision, page 10, final paragraph, that by applying a force to the control arm (during welding) causes the force to be applied identically later on during operation. If not already the primary effect on which the objective technical problem should be based, it was more than just a "bonus effect". For it to be a "bonus effect", the respondent proprietor argues, citing CLBA, 10th edition, 2022, I.D.10.8 and case law mentioned therein, the skilled person must be in a "one-way street" situation with no other alternative courses of action.

3.5.1 The Board has already indicated above why it considers any further effect, and thus also the (further) reduction of misalignment, to be only secondary or supplementary to the primary effect of realizing D2's teaching. Because, as also explained above, there are

only very few realistic options available to the skilled person when carrying out D2's teaching to press the plug into its seat by means of the actuator, and these are all known and thus obvious to them, the presence of a further effect (whether surprising or not) cannot change the fact that each of these very few options is obvious. The situation may be different if there is a "multiplicity", as in "a large number", of options as in the case law cited, e.g. **T0192/82**. There, and in other cited decisions, it was held that if a selection of one amongst many options could be associated with a (derivable and plausible) "surprising effect" then that selection was non-obvious by virtue of that surprising effect.

Nor is this case similar to **T0848/94**, where the Board held an effect arising from a combination of measures to be a synergistic effect and not a bonus effect, because that combination of measures, that might each be prima facie obvious, was not a "one-way street", that is something the skilled person would inevitably do. In this case it has not been argued that the reduced misalignment would be a synergistic effect arising from a combination of measures.

Further cited **T0936/96** in section 2.6 underscores the general approach to bonus effects mentioned above without reference to a "one way street". Indeed, it is clear from section 2.4, last paragraph, that there were several choices available to the skilled person, but that nonetheless the alleged effect was seen to be a bonus effect that could not render an obvious combination inventive (section 2.7).

3.5.2 The Board concludes that any additional effect stemming from this obvious combination, such as further tolerance reduction at the shaft area, is a supplementary or bonus effect that cannot establish an inventive step. Employing the control arm to apply force in the manufacturing method of D2 is thus an obvious solution for the skilled person addressing the practical implementation of D2's teachings.

3.6 The other differentiating feature of forming the actuating element subunit via a casting process or welding, is unrelated to the application of the force on the control arm. Nor indeed has the contrary been argued. Inventive step of the two differing features can therefore be assessed independently. In the Board's view both casting and welding are part of the skilled person manufacturing methods playbook and thus obvious. Which one they choose depends on the particular circumstances. That choice does not render any of these options inventive.

3.7 The Board therefore holds, contrary to the division's conclusion, that claim 1 lacks an inventive step. The appealed decision must thus be put aside.

4. Auxiliary requests 1-4

4.1 In its written communication, the Board gave a preliminary opinion on the issue of admissibility and patentability of the auxiliary requests:

*"7.2 Regardless of the question of their admissibility, auxiliary requests 1, 3 and 4 appear not to be admissible in view of the principle of*

*prohibition of reformatio in peius, cf. CLBA, V.A.3.1. and V.A.3.1.4.*

*The subject-matter of claim 1 of these requests incorporates the subject-matter of granted claim 7 of the main request before the opposition division, which was rejected for added subject-matter of that claim. The division specifically found that the combination of welding the plug to the arm, included in claim 1, and that the plug comprises a shell portion, granted claim 7, had no basis in the original application. Reintroducing into the scope of protection subject-matter that was found not to be allowable by the opposition division would put the opponent and sole appellant in a worse situation than if they had not appealed."*

*7.3 Claim 1 of auxiliary request 2 is a combination of granted claims 1 and 8. As explained below in point 9.2, it does not appear to contain added subject-matter.*

*This request adds that the plug comprises a substantially hemispherical portion. Using such a geometry for the plug 4 of D2 appears to be obvious in the light of the teachings D10. D10 appears to teach in para 0070 for the hemispherical plug, as described in para 0038 of D10, the same aerodynamic and impact prevention properties as are described in the contested patent for the hemispherical shapes described therein, cf. patent specification paras 0037, 0041 and 0085 cited by the respondent."*

- 4.2 Both parties refrained from comment on the above issues after issuance of the communication. Absent any further submission the Board sees no reason to change its preliminary point of view.

It therefore rejects auxiliary requests 1, 3 and 4 as inadmissible in view of the principle of prohibition of reformatio in peius. The Board also holds that auxiliary request 2 does not involve an inventive step in the sense of Article 56 EPC.

5. For the above reasons the Board finds that the decision was wrong in concluding inventive step and that therefore it must be put aside. Furthermore, taking into consideration the amendments made by the respondent-proprietor, the patent and the invention to which it relates do not meet the requirements of the Convention and the patent must be revoked pursuant to Article 101(3)(b) EPC.

**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

A. de Vries

Decision electronically authenticated