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**Datasheet for the decision
of 9 December 2020**

Case Number: T 1103/18 - 3.2.04

Application Number: 13183258.6

Publication Number: 2708716

IPC: F02B37/18, F16K1/20, F01D17/10

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. 100(c), 100(b), 54, 56
RPBA Art. 12(4)
RPBA 2020 Art. 13(1)

Keyword:

Grounds for opposition - added subject-matter (no) -
insufficiency of disclosure (no)
Novelty - (yes)
Inventive step - (yes)
Late-filed evidence - admitted (no)
Amendment to appeal case - exercise of discretion

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
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Case Number: T 1103/18 - 3.2.04

D E C I S I O N
of Technical Board of Appeal 3.2.04
of 9 December 2020

Appellant: BorgWarner, Inc.
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 2 March 2018
rejecting the opposition filed against European
patent No. 2708716 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman A. de Vries
Members: S. Oechsner de Coninck
C. Heath

Summary of Facts and Submissions

- I. The appellant (opponent) lodged an appeal, received on 30 April 2018 against the decision of the Opposition Division dated 2 March 2018 rejecting the opposition filed against European patent No. 2 708 716, and paid the appeal fee on 4 May 2018. The statement setting out the grounds of appeal was filed on 28 June 2018.
- II. Opposition was filed against the patent as a whole and based on Article 100(a) together with 52(1), 54(3) and 56 EPC, Article 100(b) together with 83 EPC as well as Article 100(c) together with 123(2) EPC. The Opposition Division held that the grounds for opposition mentioned in Articles 100 (a), (b) and (c) EPC did not prejudice the maintenance of the patent as granted having regard to the following documents in particular:

D2: DE 11 2009 002 230 T5
D3: EP 2 444 626 A1
D5: DE 44 39 432 C1
D6: WO 2009/106161 A1
D8: US 2004/0183046 A1
D9: US 4 480 815
D14: WO 2012/003456 A2
D15a: JP S56-171631 U
D15b: Machine Translation of D15a
D15c: Human Translation of D15a

The following document was additionally cited in appeal:

D16a: JP S56-97530 U
D16b: Machine Translation of D16a

- III. Oral proceedings were held on 09 December 2020 by means of videoconference.
- IV. The appellant requests that the decision under appeal be set aside and the patent be revoked, further that auxiliary requests 1 - 6 are dismissed as inadmissible.
- V. The respondent requests that the appeal be dismissed, alternatively the maintenance of the patent on the basis of one of auxiliary requests 1 - 6 all filed on 14 January 2019 with the reply to the grounds of appeal, further, that documents D15 and D16 not be admitted.
- VI. The independent claims 1 and 13 according to the main request (patent as granted) read as follows:

1."An assembly comprising:
a turbine housing (210) that comprises a bore(212), a wastegate seat (226) and a wastegate passage (223) that extends to the wastegate seat; characterized by a bushing (242) configured for receipt by the bore (212);
a rotatable wastegate shaft (1352) configured for receipt by the bushing;
a wastegate arm (1354) extending from the wastegate shaft; and
a wastegate plug (1356, 1357, 1359) extending from the wastegate arm wherein the wastegate plug comprises a profile, defined in part by a circumferential portion of a torus (1356), for contacting the wastegate seat to cover the wastegate passage in a closed state, and defined in part by a portion of a modified sphere (1357,1359), for defining a clearance with respect to the wastegate seat in an open state."

13."An assembly comprising:
a turbine housing (210) that comprises a bore (212), a wastegate seat (226) and a wastegate passage (223) that extends to the wastegate seat; characterized by a bushing (242) configured for receipt by the bore (212);
a rotatable wastegate shaft (1852) configured for receipt by the bushing;
a wastegate arm (1854) extending from the wastegate shaft; and
a wastegate plug (1856, 1857, 1858, 1859) extending from the wastegate arm wherein the wastegate plug comprises a profile, defined in part by a circumferential portion of a torus (1856), for contacting the wastegate seat to cover the wastegate passage in a closed state, and defined in part by a portion of a cone (1857,1858,1859), for defining a clearance with respect to the wastegate seat in an open state."

- VII. The appellant argues as follows:
- The term "circumferential" added in granted claims 1 and 13 is not comprised in the original disclosure.
 - Concerning sufficiency, it is impossible to achieve a tight sealing between a cone surface and toroidal portion in case of misalignment.
 - The prima facie assessment of D15 has not been properly performed by the opposition division, therefore D15 should be admitted into the proceedings. D16 is prima facie novelty destroying and should also be admitted.
 - Concerning novelty, D2 and D3 disclose at least a portion in the transition area of the plug wich is toroidal.

- Starting from either D6 or D5, the skilled person is faced with the problem of providing an alternative shape for the plug profile. D8, D9 and D14 all disclose toroidal shapes for a plug that the skilled person would obviously adopt to provide a suitable sealing surface.

VIII. The respondent argues as follows:

- The term "circumferential" added in granted claims 1 and 13 is interpreted by the skilled person as meaning the perimeter of the three dimensional plug as supported by the original disclosure.
- Suitable sealing between a cone surface and toroidal portion in case of misalignment is obtained when the wastegate plug is pressed against its seat.
- The opposition division had discretion not to admit D15 which was filed late and properly exercised its discretion. The prima facie assessment of D16 is based on figures modified by the appellant which are not convincing, D16 should not be admitted.
- Neither D2 nor D3 directly and unambiguously disclose a portion of a wastegate plug profile which is toroidal.
- Starting from either D6 or D5, the skilled person would not find in D8, D9 or D14 a teaching to provide a sealing surface as defined in claims 1 or 13.

Reasons for the Decision

1. The appeal is admissible.
2. Background - Interpretation of claims 1 and 13
 - 2.1 The patent concerns a wastegate valve assembly for a turbocharger, and more specifically aims at improving the wastegate plug. In paragraph 007 the patent

describes various examples of wastegates and wastegate components aimed inter alia at reducing exhaust leakage. Paragraph 020, more specifically refers to misalignment between axes of the bore, bushing and shaft that may occur during operation or assembly, causing clearances between the various components to change (e.g. plug, arm, shaft, bore, bushing, etc.) one of the reasons why it is difficult to maintain effective sealing.

2.2 To address the above problems the wastegate plug according to claim 1 and 13 has a particular profile "defined in part by a circumferential portion of a torus, for contacting the wastegate seat to cover the wastegate passage in a closed state". This definition of a circumferential portion is common to both claims 1 and 13. Claims 1 and 13 then further require that another portion of the profile is "defined in part by either a portion of a modified sphere" (claim 1) or "by a portion of a cone" (claim 13), thus defining alternative embodiments.

2.3 The wording of the characterising part of each claim thus defines requirements of the profile of the wastegate plug. The term "profile" normally denotes "a side or sectional elevation" (Merriam Webster, definition 3) presenting a two dimensional view of a cross-section of an object. Contrary to the appellant's submission, a profile itself is thus not normally three dimensional. However, for their definition of the requisite profile claims 1 and 13 refer to a circumferential portion of three dimensional geometrical shapes: a torus as forming part of the profile of the wastegate plug and either a modified sphere or cone forming another part. Thus, an apparent inconsistency exists between the terms used for the

definition of the shape or structure of the plug. The resulting lack of clarity is compounded by the fact that where the claim refers to a *circumferential* portion of a torus, a torus is seen to have circumferences in different directions : about its main, central axis, or about the perimeter of its generatrix, for example a circle.

2.4 This lack of clarity can be resolved by reading the claim wording contextually in the light of the description. Both claims, namely, further require that the circumferential portion of the torus should contact the wastegate seat so as to cover the wastegate passage in a closed state. If the circumferential portion were to be understood as referring to a portion of the circumference about the main torus axis and in the plane of the wastegate opening, it would make little sense to talk about a portion, as closure of the wastegate requires contact along the entire circumference in that direction. However, if read as relating to the perimeter of the generatrix, it makes much more sense: the profile is then in the plane of a cross-section through the plug and the wastegate (perpendicular to the plane of the opening, and containing the coincident axes of plug and wastegate opening).

This is fully consistent with the description, see e.g. figure 10 and paragraphs 032 and 034. According to paragraph 017 of the published application (column 2, lines 28 and 29 of the patent specification), figure 10 show examples of *profiles*. As follows from corresponding paragraph 050 and 051 of the published application (paragraphs 032 and 031 of the patent specification), the profiles 1010, 1020, 1030 and 1040 are shown on the *left-hand* side of the figures which

are clearly 2 dimensional cross-sectional views of the plug and opening, confirming the normal use of the term "profile". The circumferential torus portions are shown as thick lines segments of the generatrix either side of the main rotational axis of the torus and opening. These segments are in contact with respective "seat profiles" 1015, 1025, 1035 and 1045 (application paragraph 051).

From the above it follows that the circumferential torus portions are to be understood as the sections or segments of the generatrix perimeter of a torus that engage the seat on either side of the plug and so close the wastegate cover the passage. In this understanding it is indeed contact between the torus profile portion and the seat that closes the passage. This understanding is not in any way contradicted by the further requirement of a spherical or conical portion which defines other portions of the profile and serves the different function of (together with the seat) defining a clearance between plug and seat when the wastegate is open.

Such a modified sphere is understood using a mind willing to understand, as defining a further, different portion of the profile in the same cross-sectional plane of a shape that the skilled person recognizes as essentially spherical (rather than toroidal or conical) but which is modified in some way. An example is shown in figure 14, which, application paragraphs 021 and 061 to 063 (specification paragraphs 043 to 045) shows the plug in profile, in the same cross-sectional plane as before, with upper torus portion profiles and a lower sphere portion 1357. The alternative of claim 13 with a cone rather than a modified sphere portion is shown in

figure 18 and described in application paragraphs 073 to 076, specification paragraphs 055 to 058.

3. Added subject-matter

3.1 During examination the granted claim 1 has been amended by adding the term "circumferential" to define the first part of of the wastegate plug profile as follows "...the wastegate plug comprises a profile, defined in part by a circumferential portion of a torus (1856), for contacting the wastegate seat to cover the wastegate passage in a closed state..."

3.2 The appellant considers that the scope of claims 1 and 13 has been amended beyond the content of the original application as filed because the original disclosure only provides support for a circumferential portion which is less than the full 360° circumference, only in relation with a circumference of the generatrix of the torus shown in the left hand side of figure 10, not around the main revolution axis of a torus.

3.3 As noted, the Board holds that the skilled person, using their mind willing to understand and reading the claim against the backdrop of the description, reads the relevant feature of claims 1 and 13 as only reasonably relating to the profile defined by a section or segment of the generatrix perimeter in the cross-sectional plane of the generatrix containing the torus main axis. Consequently, the term "circumferential" has not changed the original meaning of the claim and no information has been added.

3.4 The second amendment contested concerns the replacement in claims 2 and 14 of the adjective "unitary" by the adjective "monoblock". Both claims aim to further

define the assembly defined in claims 1 and 13 of rotatable wastegate shaft from which a wastegate arm extends and a wastegate plug extending from the wastegate arm as a -one piece- rotatable component. Within the context of such a component, unitary and "monoblock" both are seen by the Board to be used as synonyms. This is directly derivable from application paragraph 048, first sentence: "wastegate arm and plug ... may be a unitary wastegate arm and plug (e.g., a monoblock wastegate arm and plug". Therefore, no new information is added by replacing one term by the other.

3.5 Thus, the Board confirms the decision's finding that none of these amendments extends the subject-matter beyond the content of the application as filed, Art 100(c) EPC.

4. Sufficiency

4.1 This ground concerns the impossibility to achieve a tight sealing for a plug having a toroidal shape cooperating with a conical wastegate seat when the plug is misaligned.

4.2 The Board observes that neither claim 1 nor 13 require tight sealing in aligned or misaligned state as the result to be achieved. The claim rather provides technical information concerning the basic structural limitations of the plug with specific profile portions and the functions or effects in the closed and open states respectively meant to result therefrom. Detailed information on the exact geometrical form and other features is then provided in the detailed description including the figures. The Board has no doubt, that using the totality of this information,

possibly supplemented by routine design knowledge in the field, the skilled person will be able to construct a plug having the claimed structure. This has in fact not been challenged by the appellant, who instead argues that due to geometry as soon as the plug and seat are misaligned by even the smallest amount the surface of the toroidal portions and the seat will no longer contact each other perfectly or completely around the perimeter of the passage opening.

- 4.3 The Board disagrees. The problem expressed in paragraph 007, last sentence of the patent only refers to reduced exhaust leakage, not to leakage avoidance. The sole functional requirement defined in the claims 1 and 13 is that the circumferential portion of the torus should contact the wastegate seat to cover the wastegate passage in the closed state. This is what the skilled person normally expects when a plug is in its closed state, with the surface covering the passage and obstructing flow through the wastegate passage. Within practical tolerances, this also happens or continues to happen even if there is some degree of misalignment between the plug and seat arising from wear and long life cycles, or due to inaccurate assembly or imperfect manufacturing tolerances. In such case, the sealing effect needs to be sufficient to ensure acceptable or improved sub-optimal operation. Thus, the fact that theoretically or geometrically speaking the seal may not be perfect in the operation conditions for which the plug is designed does not mean the invention cannot be carried out. At best this points to the typical limitations that are inherent in any design once realized in practice and of which every engineer is fully aware.

In this regard, attention is drawn to paragraph 004 of the patent which describes how a wastegate plug should normally be seated with sufficient force to prevent leaking of exhaust gas. This is because, as is well known in the field, such forces on the plug will help to center it and so may compensate to some degree for manufacturing and assembling tolerances. The underlying recognition however is that the seal is not perfect but only as good as tolerances allow.

- 4.4 As regards the further argument against sufficiency that the term "modified sphere" in claim 1 has no precise definition and cannot therefore be carried out, the Board observes that paragraphs 043 to 046 in conjunction with figures 14 and 15 give sufficient detail of at least one way of realising a modified sphere within the meaning of claim 1. More particularly in paragraph 045 in relation to figure 14, the patent explains that in a plane section referenced "X₀", the modified sphere has a sphere portion with a radius "r" and an ellipse defined in part in the modified portion. Based on this detailed embodiment, the skilled person is given a "blueprint" from which to develop further variants.
- 4.5 The Board thus confirms the opposition division's positive assessment of sufficiency, Article 100(b) EPC.
- 5. Admissibility of the documents D15 and D16
 - 5.1 Evidence not admitted by the first instance
 - 5.1.1 In view of the primary object of the appeal proceedings to review the decision under appeal in a judicial manner, according to Art 12(2) RPBA 2020, a party's

appeal case shall be directed to the requests, facts, objections, arguments and evidence on which the decision under appeal was based. According to Article 12(4) RPBA in its version of 2007 that applied at the time of filing of the contested submissions according the Art 25(2) RPBA 2020, the Board has the discretionary power to hold inadmissible facts, evidence or requests which could have been presented or were not admitted in the first-instance proceedings. In this case during oral proceedings before the opposition division, the opposition division decided not to admit document D15. According to established jurisprudence, the Board normally reviews only whether the division exercised its discretion properly, cf. CLBA, 9th edition 2019, V.A.3.5.1 b).

- 5.1.2 It is not apparent to the Board that the decision applied its discretion improperly or according to the wrong principles nor has this been argued. The appellant rather takes issue with the way the opposition division assessed prima facie relevance, because of too narrow a view of the feature of the circumferential portion of a torus. As is evident from the preceding section the Board reads the feature in like manner as the division. In that reading, the decision's assessment stating edges of figure 3 were not torus shaped but spherical (e.g page 9, chapter D15, admissibility) does not appear manifestly wrong. Therefore, the Board does not see any obvious reason for reversing the opposition division decision not to admit D15 and its translations.

5.2 Amendment of the appellant's case

5.2.1 With their submission of 5 October 2018 the appellant filed a new document D16a, with translation D16b. The evidence D16a, D16b and the novelty and inventive step attacks based thereon was filed after the appellant's grounds of appeal of 17 April 2018 but before the summons to oral proceedings of 20 January 2020.

5.2.2 Under Article 13(1) RPBA 2020, applicable according to Article 25(1) RPBA 2020 of the revised version of the rules of procedure, any amendment to a party's case after it has filed its grounds of appeal may be admitted only at the Board's discretion.

5.2.3 Apart from the fact that there is no clear justification for its late filing, the Board also does not consider D16 to be prima facie relevant.

Thus, even if in profile the plug 14 at its rounded edges can be seen to be defined by portions of a torus generatrix the portion between them is undoubtedly flat and not what the skilled person would reasonably understand as a "modified sphere". Prima facie, it thus lacks a characterizing feature of claims 1 and 13 and is not prejudicial to novelty as argued.

5.2.4 For these reasons the Board decided to use its discretion under Article 13(1) RPBA 2020 not to admit the late filed document D16a with its translation D16b into the proceedings.

6. Main request - Novelty

6.1 D2 discloses a wastegate valve comprising a valve top ("Ventiloberseite" 31), which affixes the valve to the valve arm ("Ventilarm" 33). As explained in paragraph

040 the wastegate valve ("Ventilfläche" 36) is pressed against the sealing surface ("Fläche " 32). The disclosure of D2 aims at better regulating the flow of exhaust gas during opening (paragraph 039). For this purpose the lower part of the valve ("Horn" 90) is modified to take the shape of a horn. This horn is used to form a central restriction of the wastegate passage in an open state so that air is guided in an annular passage around the horn (paragraph 041). Several embodiments of the horn are shown in figures 9 and 10.

6.1.1 According to the appellant, figures 9B and 10A would depict profiles defined by a circumferential portion of a torus according to claims 1 and 13. More particularly the varying radius in the transition region between the horn and the flat valve top would exhibit a concave toroidal section on at least a part of this transition region. Further relying on the explanation given in paragraph 024 in reference to figure 6 of the patent, according to the wording of claims 1 and 13, only the plug profile would need to contact the wastegate seat.

6.1.2 The Board disagrees. In these embodiments, paragraphs 046 in relation to figure 9 and paragraph 047 in relation to figure 10A explicitly refer to parabolic shapes for the horn ("parabolische Form" respectively "parabolischen Bauform" 111). These parabolic flanks either side of which could be described as a spherical portion (figure 9B or 10A) do not qualify as portions of the circumference of a torus, i.e. that (as this feature is understood) lie on the perimeter of a torus generatrix which by definition must be circular or ellipsoidal. Nor is any clear information derivable from the description concerning the transition between the parabolic flanks of the horn and the flat seat that might fit this requirement. The fact that this

transition is smooth with varying curvature is far from what is necessary to conclude that it follows a portion of the generatrix of a torus. Any statements in this regard are entirely conjectural.

6.1.3 Irrespective of the question of its geometry, the concave transition region shown in either figure 9B or 10A of D2 does not contact the wastegate seat 32. Rather, as explained in paragraph 040 the outer flat sealing surface of the wastegate valve ("Ventilfläche" 36) bears against the annular sealing surface ("Fläche" 32) allowing relative sliding between the valve head ("Ventilkopf" 31) and seat ("Fläche" 32) and thus a degree of translational misalignment under which sealing contact between the two flat surfaces of valve and seat is maintained. This is in contrast to the requirements of claims 1 and 13. Using the interpretation given in item 2.4 above, and contrary to the appellant's opinion, claims 1 and 13 require that that part of the plug profile to contact the seat in the closed state include the defined circumferential portion of a torus.

6.2 D3 discloses a valve body 1 of the waste gate valve which opens and closes a valve seat part 12,12a of an exhaust bypass passage 5s (paragraph 055). D3 seeks to improve the conventional wastegate valve shown in figures 18B and 19 having a flat valve body (paragraph 009; first sentence) by providing a central protrusion of different shapes. Common to all embodiments, in the closed state it is the flat seat surface 1a that contacts the seat face 12a (last sentence of paragraph 034).

The appellant relies on the seventh embodiment according to figure 8(A) and paragraph 055, according

to which the central protrusion 2 is a distorted hemisphere and serves to control the clearance between the protrusion surface 2q which is warped and allows a specific relationship between the valve opening and the ratio X (%) of the flow rate of a gas passing through the waste gate valve defined in paragraph 55 and shown in figure 8(B).

- 6.2.1 The Board agrees this distorted hemispherical portion of the plug may be seen to correspond to the profile portion defined as a modified sphere of claim 1. However, as in D2 the portion of the waste gate valve that contacts the seat in D3 and seals or closes the passage is the sealing surface 1a, which is a flat annular region that contacts the opposite annular seat surface 12a.
- 6.2.2 As regards the rounded edge portions of the plug, the observations as in relation to D2 apply. That rounded edges as shown in profile would lie along portions of a torus generatrix is highly conjectural. Regardless of this question, there is no direct and unambiguous disclosure in D3 that such a transition would be made for contacting the seat surface 12a in a closed state as explicitly required by claims 1 and 13. Their shape is rather meant to regulate flow, i.e. come into play only when the plug is in its open state.
- 6.3 As neither of D2 or D3 discloses all the features defined in claims 1 and 13 of the opposed patent, the Board thus confirms the Opposition Division's positive assessment of novelty.

7. Main request - Inventive step
 - 7.1 D6 as starting point
 - 7.1.1 D6 discloses a wastegate assembly in a turbine housing. D6 seeks to improve actuation of a prior art wastegate assembly shown in figures 1 and 2 that only allows sideway rotation or pivoting of the wastegate plug on or off the waste gate passage (page 2, lines 21-24). The relevant embodiment is shown in figures 3 to 5 and is explained in the paragraph bridging pages 7 and 8 to have a wastegate plug ("Schließelement" 24) with a spherical segment ("Kugelsegment" 26) that cooperates with a conical seat ("konische Fläche" 28) of the wastegate passage ("Wastegate-Kanals" 12).
 - 7.1.2 The subject-matter of claim 1 and 13 therefore differs from D6 at least by the feature of the plug profile defined in part by a circumferential portion of a torus, for contacting the wastegate seat in a closed state.
 - 7.1.3 The advantages obtained by the toroidal portion of the plug profile, are detailed in paragraphs 026 and 028. This particular shape of the contacting portion allows contact with the wastegate seat to be maintained (within practical tolerances) even if the the wastegate arm is angularly misaligned in relation to the bore (figure 7) or misaligned by displacement within the bore axis (figure 8). The technical problem can be formulated accordingly as how to reduce further leakage resulting from such angular or displacement misalignment.

- 7.1.4 The appellant considers this problem to have already been solved in D6, so that a less ambitious objective technical problem needs to be formulated. The appellant relies in particular on paragraph 071 of the patent which discloses a plug with a spherical portion. As this plug must solve the misalignment problem, then so must the similarly shaped plug of D6.
- 7.1.5 The Board disagrees. In the present case the advantage of compensating tolerances and thermal expansion derivable from the first paragraph of page 9 of D6 concerns the manner of actuating the wastegate valve, which pivots or swivels into the waste gate passage ("Einschwenken in den WastegateKanal") using an offset lever arm ("mit einem abgewinkelten Steller bzw. Arm 38 vollzogen"). Any technical advantage in D6 that pertains to inaccurate position of the waste gate valve on its seat is not presented in relation to its spherical shape. Therefore, if D6 can be seen to address the same or similar problem as the invention it does so in a significantly different way. At best the objective technical problem could be reformulated as finding an alternative solution to reducing leakage due to misalignment. Reformulating the problem as merely finding an alternative plug shape as suggested includes a clear pointer to the solution and is thus not appropriate.
- 7.1.6 Even in case the skilled person might recognise that leakage will be related to the relative shape of the contacting surfaces of plug and seat, the Board is unconvinced that the skilled person would find any teaching of associating the toroidal shape of a portion of the plug profile that contacts the seat in the closed state with with reduced leakage in either

D8, D9 or D14 directly applicable to modify the assembly of D6.

- 7.1.7 D9 discloses a butterfly valve of unspecified application, explicitly comprising a valve flap 25 with a sealing surface shaped as an obliquely cut toroid segment S' (col. 7, lines 1-5; figure 3). For this type of valve the pivot axis is located on one side but within the seat plane (col. 1, lines 12-15). On either side of this pivot axis V the valve approaches the seat from opposite sides of its opening section (arrows P5, P6 in figure 1). In addition, the kinematics of a butterfly valve also differ considerably, requiring one of the sides edges of the valve to penetrate towards an inner side of the device on which it is mounted. These differences in design and operation imply that the skilled person would not recognise teachings in the context of butterfly valve to be directly or obviously applicable to a waste gate valve of different type according to D6.

The Board is also unconvinced by the further argument that in the context of providing sealing, only the shape of the line of contact in the closed state between the plug and the seat would matter, irrespective of the type of valve or its field of application. As observed above, the problem that the skilled person seeks to solve concerns improved sealing in a waste gate valve to address misalignment. It is immediately clear to the skilled person with a knowledge of valves, the great variety of types differing in design, function and application, that those differences normally militate against a simple or straightforward transfer of features, sealing or other, between different types.

- 7.1.8 D8 discloses a rotary control valve 50 in the remote field of control of fluids such as slurries in a pipe and designed to prevent scaling. As in D6 this valve has a plug in the form of control element 54 that swivels onto or away from a seat, as shown in figure 2 for example. The shape of the seating surface 60 and adjoining recess surface 62 are chosen to improve fluid flow in a secondary path 74 when the valve is open so as to reduce scale formation, paragraph 0018. Regardless of their specific shape, whether toroidal or spherical, D8 does not relate it to reducing leakage due to misalignment. Thus, even if the skilled person, an engineer designing wastegates in engines, would look this far afield - the Board believes they would not - they would not find here an alternative solution to the problem posed.
- 7.1.9 D14 discloses a poppet type control valve for regulating gas flow in a medical respirator exposed to high pressure gas (paragraph 26; figure 8A). Downstream of the actual seat the poppet is shaped to better modulate flow between inlet and outlet, to reduce cross flow interference and produce substantially parallel fluid flow jets, paragraph 0003. An example of such a specific shape of the main valve body, poppet 318, is shown in figure 8A cited against claim 13. As with D8, the Board is unconvinced the the skilled person in the field of wastegate design would look this far afield, and that even if they did, that they would find a solution to the problem of reducing leakage caused by misalignment.
- 7.1.10 Consequently, the combination of D6 with any of D8, D9 or D14 does not render the subject-matter of claims 1 or 13 obvious.

- 7.2 Leaving aside the question of the admission into the proceedings of the inventive step attacks starting from D5 and D2 first submitted with the appellant's appeal, none of these would succeed.
- 7.2.1 D5 discloses an exhaust valve for a combustion engine located upstream of catalytic converter (column 1, lines 3-7), and therefore does not concern a wastegate assembly in a turbine housing as defined in either claim 1 or 13. If the skilled person would start from such an exhaust valve, the result of any routine design effort would only ever be an exhaust valve for a combustion engine. The skilled person is thus constrained by their starting point, see Case Law of the Boards of Appeal (CLBA), 9th edition, 2019, I.D.3.6).
- 7.2.2 The waste gate plug of figure 7 of D2 has an essentially annular flat sealing surface and thus lacks any spherical or otherwise curved portion of a plug profile that contacts the seat, cf. section 6.1 above. In the Board's view, D2 is therefore less promising than starting from D6. The same considerations apply when considering combination with D8, D9 or D14.
- 7.3 It follows that the Board confirms the Opposition Division's positive assessment of inventive step.
8. In the light of the above confirmation of the decision's conclusion in relation to added subject-matter, sufficiency, novelty and inventive step, the Board confirms also the Opposition Division's decision to reject the opposition under Article 101(2) EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



G. Magouliotis

A. de Vries

Decision electronically authenticated