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D E C I S I O N
of 2 August 2001

Case Number: T 1078/99 - 3.2.1

Application Number: 93202608.1

Publication Number: 0588420

IPC: B60K 15/035

Language of the proceedings: EN

Title of invention:

Internal gas removal system for a fuel tank and method of making thereof

Patentee:

Solvay Automotive, Inc.

Opponent:

Mannesmann VDO AG

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 1078/99 - 3.2.1

D E C I S I O N
of the Technical Board of Appeal 3.2.1
of 2 August 2001

Appellant: Mannesmann VDO AG
(Opponent) Kruppstr. 105
D-60388 Frankfurt (DE)

Representative: -

Respondent: Solvay Automotive, Inc.
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Houston
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Representative: Decamps, Alain René Francois
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 25 October 1999
rejecting the opposition filed against European
patent No. 0 588 420 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: S. Crane
Members: M. Ceyte
J. van Moer

Summary of Facts and Submissions

- I. European patent No. 0 588 420 was granted on 29 December 1997 on the basis of European patent application No. 93 202 608.1.

Granted claims 1, 5 and 6 read as follows:

"1. Fuel tank system (1) comprising:

- a. a fuel tank (3);
- b. a breathing system including a fill vent tube (5);
and
- c. a venting system including a venting tube (21);

the fill vent tube connected to a first end (11) of a first exit line (13) for venting gases from the fuel tank, at the time that fuel is introduced into the fuel tank, the venting tube connected to a first end of a second exit line (29) for venting gases from the fuel tank when the fuel is not introduced into the fuel tank, characterized in that the fill vent tube and the venting tube are placed substantially completely inside the fuel tank and the fuel tank contains only one opening (31) through which the first exit line (13) and the second exit line (29) egress the fuel tank."

"5. Method of venting gases from a fuel tank at the time fuel is introduced into the tank and when the fuel is not introduced into the fuel tank, comprising,

at the time the fuel is introduced into the fuel tank collecting the gases inside the fuel tank into a breathing system including a fill vent tube, the fill vent tube connected to a first end of a first exit line and,

at the time the fuel is not introduced into the fuel tank, collecting the gases inside the fuel tank into a venting system including a venting tube, the venting tube connected to a first end of a second exit line,

and conducting the gases outside of the fuel tank through a second end of the first exit line and a second end of the second exit line,

characterized in that

the fill vent tube and the venting tube are placed substantially completely inside the fuel tank and egress the fuel tank through a single opening in the fuel tank."

"6. Method of manufacturing a fuel tank according to any one of the claims 1 to 4, comprising:

- a. placing the fill vent tube (205), attached at its distal end to a first attachment means (233) and at its proximal end to a support ring (246), inside a mold (244, 244A) for blow-molding the fuel tank;
- b. placing the venting tube, attached at its distal end to a second attachment means and at its proximal end to a second support ring, inside the mold;

- c. dropping a parison (242) around the fill vent tube and the venting tube;
- d. closing the mold, thereby forcing the first and second attachment means to contact one surface of the parison and become attached to that surface of the parison;
- e. introducing a pressurized gas into the mold for blow-molding the parison against surfaces of the mold; and
- f. opening the mold."

Dependent claims 2 to 4 relate to preferred embodiments of the fuel tank system according to claim 1 and dependent claims 7 to 13 to preferred embodiments of the method according to claim 6.

II. The granted patent was opposed by the present appellants on the grounds that its subject-matter lacked novelty and/or inventive step with respect to the state of the art (Article 100(a) EPC).

The state of the art relied upon was represented by the following pre-published documents:

(E1) EP-B-0 008 964

(E2) DE-C-3 442 149

(E3) DE-A-1 942 963

III. With its decision posted on 25 October 1999 the Opposition Division rejected the opposition.

IV. A notice of appeal against this decision was filed on 18 November 1999 and the fee for appeal paid at the same time. The statement of grounds of appeal was filed on 28 February 2000.

V. Oral proceedings before the Board were held on 2 August 2001.

The appellants requested that the decision under appeal be set aside and the patent revoked in its entirety.

The respondents (proprietors of the patent) requested that the appeal be dismissed and the patent maintained as granted (main request) or in the alternative that the patent be maintained in amended form on the basis of the sets of claims according to first and second auxiliary requests filed on 4 July 2001.

VI. The submissions of the appellants can be summarised as follows:

Document E2 disclosed a fuel tank system according to the preamble of claim 1 wherein the fill vent tube and the venting tube were located partly outside and partly inside the fuel tank. The requirement of the characterising clause of the claim that these tubes be placed "substantially completely" inside the fuel tank was obscure and could thus not provide any proper distinction over the prior art.

The remaining characterising feature, that the two exit lines egressed the fuel tank through a single opening, was known from document E3 and it would be obvious to apply this to the fuel tank of document E2 to reduce unwanted emission of fuel.

Claim 5 had essentially the same technical content as claim 1 and the same arguments applied *mutatis mutandis*.

Document E1 disclosed a method for attaching equipment to the inside wall of a fuel tank that corresponded in essence to what was defined in claim 6. It would be obvious to use such a method for attaching the fill vent tube and the venting tube in the manufacture of a fuel tank system according to claim 1.

VII. The arguments of the respondents in reply were essentially as follows:

It was clear in the context of the patent specification what was meant by the fill vent tube and the venting tube being "substantially completely" inside the fuel tank and it was evident that this requirement was not met in the fuel tank system of document E2.

Furthermore, there was no disclosure of this feature in document E3 or of the feature that both tubes egressed the fuel tank through a single opening. The schematic drawing on which the appellants sought to rely in this context could not be seen as a reliable source for this information.

The method disclosed in document E1 was not comparable to that defined in claim 6. In particular in this prior art the equipment to be attached to the inside of the fuel tank was only fixed after the latter had been blow-moulded, not before.

Reasons for the Decision

1. The appeal complies with the formal requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is therefore admissible.
2. As explained in the introductory description of the patent specification a fuel tank for an internal combustion engine must have means for venting gases, including hydrocarbon vapours. It is customary in the art to provide both a breathing system which provides means for venting gases during filling of the tank and a venting system which provides means for venting gases when the vehicle is in operation, the venting capacity of the breathing system being significantly higher than that of the venting system and allowing gases to be removed from the tank at substantially the same rate that fuel is introduced.

The aim of the invention is the provision of a vented fuel tank system of this type which can be economically manufactured and with which emissions of hydrocarbons into the atmosphere can be minimised. This is achieved by placing the fill vent tube of the breathing system and the venting tube of the operation venting system substantially completely inside the fuel tank and by having a single opening in the fuel tank through which the first and second exit lines connected respectively to the fill vent tube and the venting tube egress the fuel tank. By virtue of this arrangement it is possible to use a relatively cheap material for the fill vent tube and the venting tube since the permeability of this material to hydrocarbon vapours no longer plays a role. Only the exit lines need to be a relatively

expensive impermeable material. Moreover, by having only one egress opening the danger of hydrocarbon emission through the sealed area between the exit lines and the fuel tank is further reduced.

The appellants object that the term "substantially completely" is indeterminate. The Board cannot agree. In the context as outlined above it is plainly evident that it is an essential feature of the claimed invention that no significant length of the fill vent tube and the venting tube should lie outside the fuel tank since if this were the case it would not be possible to make them of relatively cheap material. This therefore sets a limit as to how the term "substantially completely" should be understood.

3. Document E2 relates to a vented fuel tank of the type described above and is particularly concerned with an arrangement which prevents overfilling of the tank, thus ensuring that there is sufficient space within the tank to accommodate thermal expansion of the fuel. This is achieved by positioning the open end of the fill vent tube at a lower position in the tank than the respective lower ends of a plurality of venting tubes (provided so as to guarantee venting irrespective of the inclination of the tank) and by blocking venting through these venting tubes by means of a valve mechanism operated by insertion of the fuel filler nozzle into the filler pipe of the tank. The fill vent tube and the various venting tubes extend both inside and outside the tank. As an estimate from the drawings of document E2 it can be said that approximately one half of the fill vent tube lies outside the tank, the proportion of the venting tubes outside the tank is even greater. Furthermore, each of the tubes appears to

egress the tank through a respective opening.

4. Document E3 is concerned with a fuel tank connected with an overflow receptacle via two conduits which terminate at opposite ends of the tank considered in the direction of movement of the associated vehicle. The overflow receptacle is in turn connected to a venting system comprising a valve which dependent on the overpressure in the receptacle vents to the crankcase of the associated motor (low pressure) or the atmosphere (high pressure). In this way emissions into the atmosphere are avoided in normal operation.

In Figure 1 of the document, which is a schematic line drawing of the overall arrangement, the lines representing the conduits connecting the fuel tank to the overflow receptacle are drawn in such a way which would be consistent with them egressing the fuel tank through the opening which connects it to the filler pipe, i.e. in a manner corresponding to that found in the embodiment of Figure 2 of the contested patent. However, given the schematic nature of Figure 1 of document E2, other interpretations are certainly possible and in the absence of any indication in the description of the document as to how the conduits are actually arranged, Figure 1 alone cannot be seen as a reliable source for a technical teaching that the conduits leave the fuel tank in the way claimed. Furthermore, there is no suggestion in document E3 of the possibility of using different materials for those parts of the conduits lying respectively inside and outside the tank, the basic idea underlying the claimed invention.

5. Having regard to the above the Board is of the opinion,

given the different layout and goals of the two fuel tank systems involved, that the person skilled in the art would have little reason to refer to document E3 when further developing a system as disclosed in document E2, and that even if he did then there is nothing in the former document which would have lead him to develop the latter know system in the direction taken by the invention. The subject-matter of granted claim 1 cannot therefore be derived in an obvious manner from the cited state of the art and accordingly involves an inventive step (Article 56 EPC).

6. It was common ground between the parties that independent claim 5 stood or fell with claim 1, a detailed consideration of its merits is therefore not necessary.

Since the method of claim 6 is specifically directed to the manufacture of a fuel tank according to anyone of the claims 1 to 4 it is evident that the novelty and inventive step of the claimed method follows from the positive finding on the patentability of the subject-matter of claim 1. In these circumstances there is no need to make a detailed comparison between the underlying principles of the claimed method as such and the method for the manufacture of a fuel tank disclosed in document E1.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

S. Fabiani

S. Crane