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**Datasheet for the decision  
of 20 December 2018**

**Case Number:** T 0523/16 - 3.2.01

**Application Number:** 07796043.3

**Publication Number:** 2173572

**IPC:** B60C5/00, B60C5/10, B60C5/12,  
B60C15/02

**Language of the proceedings:** EN

**Title of invention:**

PNEUMATIC SEALING RING HAVING AN INNER TUBE AND EXPANDABLE  
LINER FOR A TUBE-TYPE TIRE

**Patent Proprietor:**

Douglas, Jeffrey P.

**Opponent:**

Ralf Bohle GmbH

**Headword:**

**Relevant legal provisions:**

EPC Art. 100(c), 100(a), 54, 56

**Keyword:**

Grounds for opposition - added subject-matter (no)

Novelty - (yes)

Inventive step - (yes)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 0523/16 - 3.2.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.01**  
**of 20 December 2018**

**Appellant:** Ralf Bohle GmbH  
(Opponent) Otto-Hahn-Strasse 1  
51580 Reichshof (DE)

**Representative:** Patentanwälte  
Ruff, Wilhelm, Beier, Dauster & Partner mbB  
Kronenstraße 30  
70174 Stuttgart (DE)

**Respondent:** Douglas, Jeffrey P.  
(Patent Proprietor) 855 South Wildflower Lane  
Anaheim, CA 92808 (US)

**Representative:** Carstens, Dirk Wilhelm  
Wagner & Geyer  
Gewürzmühlstraße 5  
80538 München (DE)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 5 January 2016  
rejecting the opposition filed against European  
patent No. 2173572 pursuant to Article 101(2)  
EPC.**

**Composition of the Board:**

**Chairman** G. Pricolo  
**Members:** J. J. de Acha González  
P. Guntz

## Summary of Facts and Submissions

- I. The appeal of the opponent is directed against the decision of the Opposition Division to reject the opposition against the above mentioned European Patent.
- II. The Opposition Division held that the subject-matter of claim 1 of the patent as granted did not extend beyond the content of the application as originally filed, was new over GB 1 453 727 (**E1**) and involved an inventive step when starting from the disclosure of E1 and in view of common general knowledge of the skilled person or combining it with the teaching of either DE 28 06 0325 A (**E4**), US 2 969 824 (**E2**), or GB 2 024 737 A (**E3**).

With letter of 15 February 2017 the appellant filed for the first time patent document US 2 674 291 (**E10**) during the appeal procedure.

- III. Oral proceedings were held on 20 December 2018.

The appellant (opponent) requested that the decision under appeal be set aside and that the European patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed and the patent be maintained as granted or, in the alternative, that the patent be maintained in amended form on the basis of the auxiliary request as submitted with the letter dated 20 November 2018.

- IV. Claim 1 of the patent as granted reads as follows (the feature numbering as used by the parties is adhered to):

- 1.1 "A tire and rim assembly for a wheel, comprising:
- 1.2 a tube-type tire (1) mounted on a rim (30) of a wheel,
- 1.3 said tire including a main tire section (3) extending circumferentially around the rim of the wheel and
- 1.4 having an air chamber (32) that is inflated with air to a first pressure,
- 1.5 an inner tube (5) extending circumferentially around the rim (30) of the wheel and having an air chamber (34) that is inflated with air to a second pressure,
- 1.6 the second pressure to which the air chamber of said inner tube is inflated being greater than the first pressure to which the air chamber (32) of said main tire section (3) is inflated and
- 1.7 wherein the volume and the size of the air chamber of said inner tube is smaller than the volume and the size of the air chamber of said main tire section
- 1.8 such that said inner tube is incapable of providing run flat support should the tire experience a flat in response to a deflation of the air chamber of said main tire section,
- 1.9 the air chamber of said main tire section being sealed from the air chamber of said inner tube to prevent the respective first and second pressures thereof from reaching equilibrium, and
- 1.10 an expandable liner (10) laying on said inner tube (5)
- 1.11 so as to separate said inner tube from the air chamber (32) of said main tire section (3),
- 1.13 **characterized in that** said liner (10) includes at least one sealing ring (14)
- 1.14 extending outwardly therefrom and
- 1.15 moving into sealing engagement with said main

- tire section (3) when said liner (10) is forced against said main tire section (3) in response to the air chamber (34) of said inner tube (5) being inflated with air to the second pressure
- 1.16 and wherein said expandable liner is manufactured from a resilient material so as to be capable of expanding in response to the air chamber of said inner tube being inflated with air,
- 1.17 said expandable liner having continuous flexible cords (12) running therearound to provide structural reinforcement to said liner as said liner expands in response to the air chamber of said inner tube being inflated with air."

V. The appellant's submissions may be summarised as follows:

The subject-matter of claim 1 as granted went beyond the content of the application as originally filed. In particular, feature 1.9 of claim 1 had no basis in the originally filed documents. Paragraph [0021] of the application as originally filed disclosed only that the chambers were separated from each other but not sealed with respect to each other in order to prevent their respective pressures from reaching equilibrium.

Document E1 disclosed an assembly according to granted claim 1. In particular, features 1.13, 1.14 and 1.15 were implicitly disclosed in E1 for the skilled person because the outer ends of wall 6 were inevitably in sealing engagement with the inner walls of the tire 2. Alternatively, the outer part of the flexible wall 9 could be seen as the claimed liner.

In any case, the subject-matter of claim 1 did not involve an inventive step starting from the disclosure

of E1 and considering the common general knowledge of the skilled person or the teaching of any of the documents E2, E3, E4 and E10. Assuming that features 1.13 to 1.15 were not disclosed in E1, the object of the invention would be to improve the sealing function of the assembly. It was obvious for the skilled person to provide sealing rings in the outer ends of the wall 6 of the spreader tube according to E1. Moreover, E2 (see figure 3, sealing lips 6a), E3 (see figure 1, reference 22), E4 (see figure, rubber lips 11) and E10 (see figure 5, sealing strips 37) which pertained the same technical field, i.e. tire and rim assemblies comprising an inner tube, disclosed exactly the claimed sealing rings in a liner of the inner tube in order to provide a sealing engagement between the inner tube and the tire. It would be obvious for the skilled person to provide these on the outer ends of wall 6 of the spreader tube from E1 in order to improve its sealing function.

Finally, late filed E10 should be admitted in the appeal proceedings as being highly relevant for the patentability of the subject-matter of granted claim 1.

VI. The respondent (patent proprietor) countered essentially as follows:

Granted claim 1 had a basis in the application as originally filed. The skilled person could derive the contested feature directly and unambiguously from the disclosure of the invention as filed for the same reasons as put forward by the Opposition Division in its decision. It was clear for the skilled person that both chambers had to be sealed from each other in order for the invention to work properly.

The subject-matter of claim 1 as granted was new in view of the disclosure of E1. E1 did not disclose features 1.10 to 1.17 of granted claim 1. In particular, even if the outer wall 6 were to be considered as the claimed liner, the pressure within the spreader tube would act in a direction obliquely upwards at the lateral ends of the wall 6 so that the action of these ends on the side wall of the tire 2 would be counter-productive. It would tend to push the ends out of a sealing engagement with the tire 2. According to the geometry and structure of the assembly the only possible way that the lateral ends of the wall 6 could be in a sealing engagement with the tire inner walls would be if the pressure inside the tire chamber were higher than the one of the spreader tube. Further, the outer part of flexible wall 9 could not be seen as a liner. The complete wall 9 was to be seen as single element analogous to the liner of the patent in suit.

As regards the issue of inventive step, the subject-matter of claim 1 was not rendered obvious when starting from E1 as the closest prior art. Considering the difference from the disclosure of E1 with respect to the subject-matter of claim 1 being at least features 1.13 to 1.15, the object of the invention had to be seen as to seek an alternative tire and rim assembly which provided the same or similar effects or was more cost-effective.

The allegations of the appellant were based on hindsight, since neither the common general knowledge nor any of the teachings according to E2, E3, E4 or E10 gave the skilled person any motivation to modify the spreader tube of E1 in such a way that it fell under the terms of granted claim 1.

Specifically, as discussed with respect to novelty, it was clear that the lateral ends of the outer wall of E1



were not construed to provide a sealing engagement and that in the contrary were pushed obliquely away from the inside walls of the tire 2 by the pressure inside the spreader tube. Additionally, the radial position of these ends where they contacted the tire 2 was further away from the outer vertical lips of the rim 5 and the deformation of the lateral walls of the tire 2 in use indicated to the skilled person that at that location a sealing engagement could not be guaranteed. Thus, even if the skilled person would seek to improve the sealing function of the spreader tube, he or she would not concentrate on the lateral ends of the wall 6, but would only try to provide a better sealing engagement of the flexible wall 9 which presses the beads of the tire against the rim.

Concerning E2, E3, E4 and E10, all of these disclosures dealt with tire and rim assemblies comprising an inner tube providing run flat support which was expressly excluded by claim 1. The skilled person would thus not look into these documents in order to find an alternative solution to E1 because their purpose and structure were different. Even if the skilled person would consider any of the alleged sealing rings disclosed in E2, E3, E4 or E10, he or she would not find any motivation to provide them specifically in the outer wall 6 but only in the flexible wall 9 at the position where the bracing and sealing engagement was achieved. As regards E2, the part 22 could not represent sealing rings since the assembly disclosed included a primary inner tube 3 and a secondary inner tube 5 each providing a completely sealed chamber without the need of further sealing.

Further, document E10 should not be admitted into the proceedings because it was not prima facie relevant and should have been filed already with the notice of

opposition, for the subject under discussion was still the patent as granted.

### **Reasons for the Decision**

1. Main request - Patent as granted - Inadmissible extension

1.1 The appellant considered that the subject-matter resulting from feature 1.9 of claim 1 as granted, that reads "the air chamber of said main tire section being sealed from the air chamber of said inner tube to prevent the respective first and second pressures thereof from reaching equilibrium", extended beyond the content of the application as originally filed. Considering that the basis for this feature was paragraph [0021] of the application as filed, the latter merely disclosed that the air chambers 32 and 34 were just separated and not sealed from each other. Two air chambers were sealed from each other only when a connection or channel existed between them, and this connection was thereafter closed or sealed. The wall 5 of the inner tube had no passage that was sealed. Claim 1 now left open how the sealing between the two chambers was achieved.

However, according to paragraph [0021] the air chamber of the inner tube and the air chamber of the main tire section form a dual air chamber tire in which the inner tube seals off the air chamber of the main tire section so that the tire can work as a tubeless tire. The Board agrees with the appellant that the terms "separated" and "sealed" are not synonymous. Nevertheless, the skilled person derives directly and unambiguously from

the disclosure of the application as filed that, in order for the disclosed tire and rim assembly to perform the desired tubeless function, the air chamber of the inner tube and the air chamber of the main tire section have to be sealed with respect to each other. In this context, the term "sealed" can only be understood by the skilled person in a broad sense - rather than in a literal sense in accordance to the appellant's interpretation requiring the presence of a connection or channel that is sealed - as defining that there is no air communication between the air chambers. Otherwise, it would not be possible to maintain the necessary difference in pressure between the two chambers that enables the fixing of the tire to the rim in a tubeless manner.

As a consequence, the subject-matter resulting from feature 1.9 of granted claim 1 does not extend beyond the content of the application as originally filed (Article 100 c) EPC).

2. Main request - Patent as granted - Novelty over E1
- 2.1 The subject-matter of claim 1 as granted is new in view of E1 (Articles 100 (a) and 54 EPC). The tire and rim assembly disclosed in E1 does not include features 1.13, 1.14 and 1.15 of claim 1. These features read as follows:
  - 1.13 said liner includes at least one sealing ring;
  - 1.14 extending outwardly therefrom and;
  - 1.15 moving into sealing engagement with said main tire section (3) when said liner (10) is forced against said main tire section (3) in response to the air chamber (34) of said

inner tube (5) being inflated with air to the second pressure.

According to E1 (see E1, page 2, lines 1 to 10 and 47 to 60, figures 1 to 3) and contrary to the respondent's view, when the spreader tube 1 is inflated to its high pressure, the outer wall 6 is prevented from moving radially outwardly because of the strips 7 which are inextensible in the circumferential direction. By avoiding the radial extension of the outer wall, the effect of the pressure inside the spreader tube 1 is to apply the lateral portions of the flexible wall 9 against the axially inner faces of the beads of the tyre 2 and the central part of the wall 9 against the well-base of the rim. The result is a bracing action which presses the beads against the shoulders of the rim that, according to page 2, lines 96 to 110, enables a seal to be produced comparable to that of tubeless tires and rims.

2.2 The appellant considered that a sealing engagement of the outer lateral ends of the wall 6 with the inner side of the tire 2 is inevitable. When comparing figures 1 and 2 with figure 3 of E1, one could observe that upon inflation of the spreader tube 1 the outer ends of the wall 6 rotated outwardly and downwardly. Due to this rotation the ends of the wall were pressed against the inside of the tire and functioned as a sealing ring. Moreover, the passage on page 2, lines 105 to 110 of E1, explained that the whole spreader tube 1 and not only the flexible wall enabled a seal to be produced. Hence the outer wall 6 was also in sealing engagement with the tire.

However, the unreinforced sections 8 of the outer wall 6 are only explicitly disclosed as being compressible

in the transverse direction of the outer wall 6 (see page 2, lines 6 to 10 and lines 18 to 21) for packing and mounting purposes (see page 2, lines 78 to 89). E1 is silent on the mechanical behaviour of the outer ends of wall 6. According to figures 1 to 3 these ends deform. However, it cannot be ascertained whether the contact of these outer ends with the tire 2 represents a sealing engagement. On the contrary, the radially outer position of the wall 6 with respect to the rim outer vertical lips and the pressure distribution of the inflated spreader tube 1 point towards a pressing force into the outer ends of wall 6 that tends to separate these from the inside of the tire 2. The pressure should come from the upper part of the wall 6, i.e. from the tire main chamber towards the rim 5 in order for the outer ends of wall 6 to be able to carry out a sealing contact with the tire 2.

E1 thus neither implicitly nor explicitly discloses if the outer wall 6 undergoes a transverse (axial) extension, when the spreader tube 1 is inflated to its high pressure, and if, at all, the outer wall moves into sealing engagement with the main tire section. As a consequence, it is not disclosed in E1 that the outer lateral ends of the outer wall 6 form a sealing ring according to features 1.13 to 1.15. Hence, these features are not directly and unambiguously disclosed in E1.

2.3 In a further line of argumentation, the appellant considered that the wall 9 included already a liner since it was formed by a layer of rubberised textile or metal fabric having cords (see page 2, lines 12 to 18 of E1). The outer rubber layer of the flexible wall 9 represented the claimed liner.

The Board however concurs with the respondent that the outer rubber part of the flexible wall 9 cannot be considered a liner. The flexible wall 9 as a whole represents a component of the spreader tube disclosed in E1 which is made out of a rubber part and embedded cords. This is analogous to the liner of the contested patent which comprises a flexible rubber that includes casing cords and sealing rings. This flexible wall 9 corresponds thus to the inner tube of claim 1 of the patent in suit and not to the liner.

3. Main request - Patent as granted - Inventive step
- 3.1 The subject-matter of claim 1 as granted involves an inventive step (Articles 100 (a) and 56 EPC) starting from document E1.
- 3.2 As pointed out above, the subject-matter of granted claim 1 differs from the disclosure of E1 at least by the aforesaid features 1.13 to 1.15.
- 3.3 The appellant argued that the skilled person would provide sealing rings on any or both of the flexible wall 9 and the outer ends of the outer wall 6, when confronted with the problem of improving the sealing engagement between the spreader tube and the tire from E1. It belonged to common general knowledge that a sealing interaction could be improved by using sealing rings, which compensated irregularities in the inner wall of the tire.

It might be that the skilled person would consider adding sealing rings to the flexible wall 9 of E1 which carries out the bracing and sealing action for the beads 3 of the tire 2 once the spreader tube is inflated to its high pressure. However, as pointed out

above under point 2.2, it cannot be inferred from E1 either implicitly or explicitly that the ends of the outer wall 6 should be in sealing engagement with the inner wall of the tire 2. The structure of the assembly of the spreader tube together with the rim and the tire is moreover such that when the spreader tube is inflated to its high pressure, the ends of the wall 6 would tend to be pushed upwards and not against the inner wall of the tire 2. As a consequence, the skilled person has no motivation to provide sealing rings on the outer ends of the wall 6 because the latter does not perform a sealing function. Further, as observed by the respondent, these ends cannot guarantee the sealing required to make the tire 2 work as a tubeless tire. They do not press the tire against the rim upon inflation of the tube but merely lie on the inner side of the side walls of the tire 2 which in use undergo deformation that would compromise any such possible sealing. Accordingly, it is not evident for the skilled person to bring into sealing engagement the outer ends of wall 6 with the tire 2 and even less evident to add any sealing rings on these ends because in E1 clearly this function is accomplished by the flexible wall 9 which presses the beads against the rim 5 in a plugging and sealing manner.

3.4 For the same reasons as presented above, the skilled person cannot find any hint in any of the documents E2, E3, E4 and E10 to provide specifically a sealing function with a sealing ring as claimed in claim 1 to the outer ends of the wall 6 of the tire and rim assembly of E1.

In particular, documents E2 and E3 are directed to tire and rim assemblies comprising a run flat support tire within the main tire, in which both chambers are

inflated through the same valve to the same working pressure. Such tires are expressly excluded by granted claim 1. The skilled person would thus not look into these documents because their structure and purpose is different from the one of E1.

Even if the skilled person would consider implementing the sealing lips 6a from E2 into E1, he would not provide them on the outer wall 6 of E1 but in the flexible wall 9 which performs the sealing. Further, E3 does not disclose sealing rings according to features 1.13 to 1.15. The alleged sealing rings 22 (see figure 3 of E3) are not disclosed as such and the tire and rim assembly include a primary inner tube 3 and a secondary inner tube 5 each providing a completely sealed chamber without the need of further sealing.

The tire and rim assemblies of E4 and E10 also provide run flat support. Even if the skilled person would consider the sealing rings disclosed in those documents (see sealing lips 11 in the figure and on page 12, first paragraph of E4; sealing strip 37 in figure 5 and in column 5, lines 25 to 47 of E10) he does not have any motivation to provide them on the lateral ends of the outer wall 6, i.e. the liner, of E1. In both E4 and E10 the referred sealing elements are provided at positions corresponding to the flexible wall 9 of E1. Thus, the skilled person would utmost provide them in the flexible wall 9 of E1, which carries out the sealing function.

The allegations of the appellant are thus based on hindsight.

4. The question of the admissibility of document E10 into the appeal proceedings may thus be left aside since, as



explained above, the conclusion on inventive step remains the same even in view of E10.

5. It follows from the above that the appellant's arguments fail to persuade the Board that the findings of the Opposition Division in the decision under appeal are not correct. Accordingly, the appeal must be dismissed.

## Order

### For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



A. Vottner

G. Pricolo

Decision electronically authenticated