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Datasheet for the decision of 12 October 2011

Case Number: T 0470/09 - 3.2.05

Application Number: 99115924.5

Publication Number: 980999

IPC: F16J15/32

Language of the proceedings: EN

Title of invention:
An annular seal assembly, in particular for the drive shaft of a vehicle

Applicant:
RFT S.p.A.

Opponent:
Carl Freudenberg KG

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - yes

Decisions cited:

Catchword:

Case Number: T0470/09 - 3.2.05

D E C I S I O N
of the Technical Board of Appeal 3.2.05
of 12 October 2011

Appellant: (Opponent)	Carl Freudenberg KG Patente und Marken, 69465 Weinheim (ALLEMAGNE)
Representative:	Göhmann, Marc, Patentanwaltskanzlei Reiser, Ehretstr. 12, 69469 Weinheim (ALLEMAGNE)
Respondent: (Patent Proprietor)	RFT S.p.A. Via Arcivescovado 1, 10121 Torino (ITALIE)
Representative:	Franzolin, Luigi STUDIO TORTA, Via Viotti 9, 10121 Torino (ITALIE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted 11 December 2008 concerning maintenance of the European Patent No. 980999 in amended form.**

Composition of the Board:

Chairman: W. Zellhuber
Members: S. Bridge
S. Hoffmann

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the interlocutory decision of the Opposition Division maintaining European patent no. 0 980 999 in amended form.

The opposition was filed against the patent as a whole based on Article 100(a) EPC (lack of novelty, Article 54 EPC, and lack of inventive step, Article 56 EPC).

II. Oral proceedings were held before the Board of Appeal on 12 October 2011.

III. The appellant requested that the decision under appeal be set aside and the European patent no. 0 980 999 be revoked.

The respondent (patent proprietor) requested that the decision under appeal be set aside and the patent be maintained on the basis of the following documents:
- claims 1 to 8 according to the main request
- description pages 2 and 3

filed during oral proceedings
- figure as granted.

IV. Claim 1 according to the main request reads as follows:

"1. A seal assembly for fitting between two concentric members (2,3) relatively rotatable around an axis (A), comprising a first annular screen (6) intended to be securely fixed to a first of the said members and having a seal member (13) made of an elastomeric material intended to sealingly cooperate with a sliding surface (23) carried by a second of the said members and axially spaced from the said first screen (6), the

said first screen comprising an axially extending sleeve portion (8) for fitting to the said first member and a flange portion (10) extending substantially radially from and perpendicular to the sleeve portion (8); the said seal member (13) being carried, at a root portion (15), by the said first screen at a perimetral edge of its flange portion and including a first annular lip (14) which extends axially from the root portion (15) in a direction towards the said sliding surface (23); wherein the said first lip (14) includes an enlarged end portion (16), opposite and extending radially offset from the root portion, wherein the said enlarged end portion (16) of the first lip is connected to the root portion (15) by an annular portion (28) shaped so as to form a resilient hinge, wherein said enlarged end portion (16) is delimited on the side facing the flange portion (10) of the first screen (6) by a circumferential rim (18) and on the other side by an annular sealing projection (20) having a V-shaped cross-section and defining the sealing edge (22) oriented axially towards the sliding surface carried by the said second member, with which it cooperates slidably in an axial direction; wherein a radial annular seat (24) is provided between the said circumferential rim (18) and the said enlarged portion (16) of the first lip so that the V-shaped projection is disposed axially alongside of said seat; and wherein a resilient circumferential retaining member (25) is located in said seat to exert a predetermined radial stress on the first lip (14); and wherein the seal assembly includes a second annular screen (7), mounted coaxially to face the first annular screen (6), each of which includes a sleeve portion (8;9) for fitting to one of the said members and a radial flange portion (10;11) substantially perpendicular to a respective sleeve portion (8;9), the

flange portions (10;11) of the said first and second screens facing each other; the said sliding surface (23) being defined by a surface of the said flange portion (11) of the second screen (7) facing the flange portion (10) of the first screen (6); wherein the said first screen (6) is fitted around the sleeve portion (9) of the second screen (7); characterised in that the first screen (6) is locked axially on the sleeve portion (9) of the second screen (7), with the V-shaped projection arranged with its sealing edge (22) against the flange portion (11) of the second screen (7), by a ring (40) engaged on the sleeve portion (9) of the second screen (7), on the opposite side to the respective flange portion (11), so as to bear axially against an elastomeric plug (41) of the flange portion (10) of the first screen (6), defined by an extension of the root portion (15) of the first lip (14)".

V. The following documents are referred to in the present decision:

D1: JP-U-7-14270
D4: US-A-5,348,312
D8: DE-A-37 39 513

VI. The arguments of the appellant in the written and oral proceedings can be summarised as follows:

The closest prior art (document D1, figure 1) discloses a seal which has an axial sealing action and which consists of two separate parts. The description of the patent in suit does not explicitly disclose particular advantages for the claimed invention whose only effect thus seems to be the cohesion of the seal as a unit during assembly.

Document D4 discloses a cassette seal in which the two parts are held together by ring projections acting on respective range spacers to ensure a simple assembly (column 4, lines 24 to 35, figure 4). Substituting a ring for a ring projection obtained by plastic deformation merely involves the use of a known alternative and does not require an inventive step by the person skilled in the art.

Should the ring 40 of claim 1 (main request) also be deemed to play a role in providing the correct pressure of the sealing lip against the sealing surface, then, in view of the use of automated assembly machinery, this can similarly be achieved by the ring projection obtained by plastic deformation known from document D4; i.e. there are no advantages to be obtained through the use of a ring nor does the patent in suit disclose any such advantages.

Document D8 discloses a cassette seal which forms a unit which is ready for mounting in one step (column 2, lines 38 to 42 and 50 to 57). Furthermore, figure 5 discloses an embodiment with a ring 64 for fixing the sealing lip with a sealing force in the axial direction (column 2, lines 28 to 34 and column 4, line 66 to column 5, line 11).

Thus, the skilled person starting from a seal according to document D1, would incorporate the teachings of either one of documents D4 and D8 and thereby immediately arrive at the subject-matter of claim 1 of the main request which therefore lacks an inventive step.

VII. The arguments of the respondent in the written and oral proceedings can be summarised as follows:

The combination of the seal according to document D1 with the teachings of either one of documents D4 and D8 does not result in the object claimed in claim 1 (main request).

Document D4 (figure 4) discloses a different type of axial seal, namely one without a V-shaped cross-sectional sealing projection. The teaching of document D4 cannot be applied to join the two parts of the seal according to the embodiment of document D1, because the dust lip 33 (document D1, figure 1) would interfere with the range spacer 12.1 and ring projection 3.2 (document D4, figure 4) and would require a different construction. The range spacers 12.1 and 12.2 (document D4, figure 4) are shorn off during the first revolution and thereafter cannot regulate the sealing pressure. Furthermore, the ring projection 3.2 obtained by plastic deformation (document D4) is not equivalent to a ring engaged on the sleeve portion of the second screen as these are subject to different manufacturing tolerances. In addition, the ring projections obtained by plastic deformation act against the range spacers whereas the position of the ring according to the subject-matter of claim 1 (main request) regulates the action of the sealing lip.

Document D8 (figure 5) also discloses a different type of seal, namely one which has a simultaneous axial and radial sealing action. In document D8, the screens are connected by means of a groove 13 which again does not correspond to the subject-matter of claim 1 (main request) where axial locking is achieved by a ring 40

engaged on the sleeve portion 9. Furthermore, the ring 64 from the embodiment of figure 5 of document D8 only serves to push the sealing lip axially against the sealing surface; i.e. there is no evidence that the ring 64 could axially lock the screens, in particular, as these are already locked by means of the groove 13. Furthermore, the ring 64 is positioned inside the screen and not on the opposited side thereof as in claim 1 (main request). The ring 64 of document D8 thus has a different function and cannot lead the skilled person to the invention as set out in claim 1 according to the main request.

Thus, the advantages of using a ring 40 according to claim 1 (main request) are axial locking during assembly whereby the position of the ring 40 on the sleeve also regulates the sealing action.

Therefore, the subject-matter of claim 1 (main request) is based on an inventive step.

Reasons for the Decision

1. Amendments

Claim 1 according to the main request differs from claim 1 as maintained in opposition proceedings in that the text from the characterising part "*the said first screen (6) is fitted around the sleeve portion (9) of the second screen (7) and locked axially thereon*" is replaced by "*wherein the said first screen (6) is fitted around the sleeve portion (9) of the second screen (7)*" in the preamble and "*the said first screen (6) is locked axially on the sleeve portion (9) of the second screen (7)*" in the characterising part.

Thus, this change merely specifies the position of the first screen (6) and does not add any subject-matter or extend the scope of protection. No formal objections were raised by the appellant concerning the main request.

2. Inventive step

2.1 Document D1 (figure 1) discloses a seal with an axial sealing action and which consists of two separate parts, corresponds to the preamble of claim 1 (main request) and represents the closest prior art. This was not contested by the parties.

2.2 The subject-matter of claim 1 (main request) differs from the seal according to document D1 by the features of the characterising part and, in particular, by "*a ring (40) engaged on the sleeve portion (9) of the second screen (7), on the opposite side to the respective flange portion (11), so as to bear axially against an elastomeric plug (41) of the flange portion (10) of the first screen (6), defined by an extension of the root portion (15) of the first lip (14)*". The required effect of this arrangement is to axially lock the first screen (6) on the second screen (7), with the V-shaped projection arranged with its sealing edge (22) against the flange portion (11) of the second screen (7).

2.3 The patent in suit (paragraph [0021]) describes this arrangement with reference to the embodiment without discussing any particular purpose or advantage. However, the sealing action of an axial seal is dependent on the correct axial positioning of its two parts. This was not contested by the parties.

The solution according to the subject-matter of claim 1 (main request) thus consists of a ring maintaining the correct axial position between the two parts of the seal during assembly and, in particular, for ensuring that the V-shaped projection is arranged with its sealing edge (22) against the flange portion (11) of the second screen (7).

2.4 The sealing lip 6 with several adjacent sealing teeth 6.1 to 6.4 of the seal according to document D4 (column 4, lines 6 to 11, figure 4) does not have a generally V-shaped cross-section so that document D4 concerns a different type of axial seal. Document D4 suggests a cassette seal in which the inner ring 3 and outer ring 5 are held together by ring projections 3.1 and 3.2 of the inner ring 3 respectively acting on range spacers 12.1 and 12.2 on either side of the outer ring 5 to ensure a simple assembly and an exact allocation of the rings 3 and 5 in the axial direction during normal use of the cassette seal (column 4, lines 24 to 35, figure 4).

According to document D4, the ring projection 3.2 is produced by plastic deformation and thus differs from the subject-matter of claim 1 where a separate ring is engaged on the sleeve portion 9 of the second screen. In particular, the Board considers that the different methods of manufacturing may impose substantially different constraints on the respective rings and, moreover, that plastic deformation has to be carried out after assembly of the seal parts whilst the mounting of a ring may make the assembly easier and thus the arrangement of the sealing edge against the flange portion of the second screen more accurate. There is no apparent reason for the skilled person to effect such a change and none was presented.

Furthermore, the skilled person would not necessarily consider the solution of document D4 when starting from the seal according to document D1, because of the extensive modifications this would require particularly in the root portion where the dust lip 33 of the seal according to document D1 already occupies the location of the ring projection 3.2 and the range spacer 12.1 of the seal according to document D4: Thus, the skilled person would have to extend the screens of the seal according to document D1 to enable the formation of a ring projection through plastic deformation, modify the sealing member to include range spacers while choosing to keep the lip construction of the seal according to document D1 and finally find a solution for the dust lip 33.

In addition, the geometric arrangement of the ring projections 3.1 and 3.2 according to document D4 is such as to primarily act against the range spacers 12.1 and 12.2 on either side of the outer ring 5. There is thus no indication in document D4, that "*a ring (40) engaged on the sleeve portion (9) of the second screen (7), on the opposite side to the respective flange portion (11), so as to bear axially against an elastomeric plug (41) of the flange portion (10) of the first screen (6)*" could axially lock the first screen (6) "*on the sleeve portion (9) of the second screen (7), with the V-shaped projection arranged with its sealing edge (22) against the flange portion (11) of the second screen (7)*", which geometric arrangement is such that the position of the ring regulates the sealing action of the sealing lip.

In consequence, starting from the seal set out in document D1 and even if the teaching from document D4

were taken into consideration, the subject-matter of claim 1 (main request) could only be arrived at with hindsight.

2.5 The seal disclosed in document D8 (figure 5) has both axial and radial sealing and thus constitutes a further, different sealing arrangement.

The cassette seal according to document D8 forms a unit which is ready for mounting in one step, because the free end 30 of the flange 29 of the inner ring 28 is constrained in a groove 13 thus rendering the two parts of the seal inseparable (column 2, lines 38 to 42 and 50 to 57).

Even if the skilled person seeking to hold together the two parts of the seal known from document D1 would do so in accordance with the teaching of document D8, he would only provide the outer part with a groove for retaining the free end of the flange of the inner part. The resulting object thus differs from the subject-matter of claim 1 (main request) in that there is no ring engaged on the sleeve portion on the opposite side to the respective flange portion, so as to bear axially against an elastomeric plug of the flange portion of the first screen, defined by an extension of the root portion of the first lip.

Document D8 discloses a further embodiment (figure 5) in which a ring 64 is press fitted onto the sleeve portion of the inner ring 28d. The ring 64 acts, via spring 38d, on a plug 48d of the enlarged end portion 42d to axially press the sealing edge 26d against the flange portion 29d of the inner ring 28d (column 2, lines 28 to 34 and column 4, line 66 to column 5, line 11). However, there is no indication in

document D8 that the ring 64 is also suitable for locking the outer ring 1d onto the inner ring 28d: In particular, the ring 64 is positioned axially between the flange portion 3d of the outer ring 1d and the enlarged end portion 42d of the sealing lip. The ring 64 of figure 5 of document D8 therefore does not bear axially against an elastomeric plug *on the opposite side of the flange portion* 3d of the outer ring 1d, defined by an extension of the root portion of the sealing lip. There is no apparent reason why the skilled person would reposition the ring 64 to act against an elastomeric plug which has to be provided on the opposite side of the flange 3d of the outer ring 1d in order to axially lock the two parts of the seal while still enabling the positioning of the ring to regulate the axial sealing action of the sealing lip. Furthermore, no such reason was presented.

In consequence, starting from the seal set out in document D1 and even if any of the teachings from document D8 were taken into consideration, the subject-matter of claim 1 (main request) could only be arrived at with hindsight.

2.6 Thus, the seal assembly according to document D1 in combination with any of the teachings of either one of documents D4 and D8 does not result in the subject-matter of claim 1 according to the main request. The ring according to claim 1 (main request) constitutes an alternative manner of axially locking the first screen (6) on the sleeve portion (9) of the second screen (7) with the V-shaped projection arranged with its sealing edge (22) against the flange portion (11) of the second screen (7) and is based on an inventive step (Article 56 EPC).

2.7 The subject-matter of claims 2 to 8, which are dependant on claim 1, similarly involves an inventive step. In addition, the description was adapted to bring it into conformity with the claims. The appellant did not raise any objections concerning the dependent claims or the description.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent on the basis of the following documents:

- claims 1 to 8 according to the main request filed during the oral proceedings
- description pages 2 and 3 filed during the oral proceedings
- figure as granted.

The Registrar: The Chairman:

D. Meyfarth W. Zellhuber

Decision electronically authenticated