BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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File Number: T 956/91 - 3.2.1

Application No.: 83 301 458.2

Publication No.: 0 119 335

Title of invention: Power transmission belt

Classification: F16G 5/06

# D E C I S I O N
of 26 January 1993

Applicant: MITSUBOSHI BELTING LTD.

Opponent: Continental Gummi-Werke Aktiengesellschaft

Headword:

EPC Articles 84, 56, 100(b)

Keyword: "Sufficient disclosure (yes)"
"Clarity (yes)"
"Inventive step (no)"

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number : T 956/91 - 3.2.1

# D E C I S I O N
## of the Technical Board of Appeal 3.2.1
## of 26 January 1993

Appellant : (Proprietor of the patent)
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Respondent : (Opponent)
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Decision under appeal :
Decision of the Opposition Division of the European Patent Office dated 18 June 1991, with written grounds posted on 2 October 1991 revoking European patent No. 0 119 335 pursuant to Article 102(1) EPC.

Composition of the Board :

Chairman : F. Gumbel
Members : P. Alting van Geusau
W.M. Schar

Summary of Facts and Submissions

I. European patent No. 0 119 335 was granted on 7 September 1988 on the basis of European patent application No. 83 301 458.2 filed on 16 March 1986.

II. The Respondent (Opponent) filed an opposition by telecopy on 6 June 1989 and requested revocation of the patent for lack of novelty and lack of inventive step of its subject-matter in view of the prior art disclosed in:

D1: DE-A-2 754 793

D2: US-A-2 446 310

Reference was further made to the prior art acknowledged in Figure 6 of the patent in suit.

III. By the decision in oral proceedings of 18 June 1991 with written grounds posted on 2 October 1991 the Opposition Division revoked the patent.

The Opposition Division held that the subject-matter of the then valid Claim 1 was novel but that it lacked an inventive step in view of the prior art disclosed with respect to Figure 6 of the patent and the teachings of D1 as regards the omission of a cushion layer.

IV. An appeal was lodged against the decision on 12 December 1991, the appeal fee having been paid on 11 December 1991.

The Statement of Grounds of Appeal was filed on 10 February 1992 and contained two sets of claims forming the basis of a main and an auxiliary request for maintenance of the patent in amended form. The claims of the main request are identical to the claims underlying the impugned decision.

Claim 1 of the main request reads:

"A power transmission belt having a belt body comprising an inner compression rubber portion (26), an outer tension rubber portion (25;32), tensile cords (28) extending longitudinally of the belt, and a plurality of transversely extending reinforcing staple fibres (27), characterised in that the staple fibres (27) are confined to one of said portions (26; 25; 32) and the tensile cords (28) are embedded fully within the distribution of staple fibres (27) in that one portion, to be spaced from the other of said portions."

Claim 1 of the auxiliary request reads:

"A power transmission belt having a belt body comprising an inner compression rubber portion (26), an outer tension rubber portion (25;32) tensile cords (28) extending longitudinally of the belt, and a plurality of transversely extending reinforcing staple fibres (27), characterised in that the staple fibres (27) are confined to said outer tension rubber portion (25;32) and the tensile cords (28) are embedded fully within the distribution of staple fibres (27) in that portion, to be spaced from the other of said portions."

V. In accordance with an auxiliary request submitted by the Appellant the Board summoned the parties to oral proceedings. In its communication sent with the summons the Board expressed the provisional opinion that in the present case the exact meaning of the "inner compression rubber portion" and "outer tension rubber portion" as well as the exact limits of these portions defined in the independent claims of the requests appeared to be particularly important in order to be able to determine

the differences of the subject-matter vis-à-vis the prior art V-belt constructions.

Attention was drawn to the fact that, as was submitted by the Respondent, under the present wording of the independent claims, the V-belt construction of D2 would appear to anticipate the claimed subject-matter in full when considering the alternative construction covered by the claims and shown in Figure 7 of the contested patent, in which there are three V-belt portions comparable to the three portions disclosed in D2, Figures 2 and 4.

In the Board's view, in addition to D1 and D2 an important prior art document for considering inventive step of the subject-matter disclosed in the patent, appeared to be the V-belt construction described in relation to Figure 6 of the patent. The Appellant was asked to provide a document disclosing this prior art.

VI. At the oral proceedings the Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the claims in accordance with the main request, subsidiarily, on the basis of the claims in accordance with the auxiliary request and according to a further auxiliary request based on the main and auxiliary requests with the following amendments:

- deletion of Figures 7 and 9

- deletion of Claim 4

- insertion of the words "but extended throughout" after the words "confined to" on line 9 of Claim 1.

In support of his requests the Appellant essentially submitted the following arguments.

Considering the clarity objections raised by the Respondent concerning the terms compression and tension rubber portion used in the claims, it is immediately clear from the disclosure of the patent that these terms have a different meaning than the compression and tension zones referred to in the prior art. The portions defined in the claims merely relate to upper and lower regions of the transmission belt where there is at least partially, compression or tension.

It is further clear from the patent specification and claims that the belt has inner and outer portions only. The embodiment of Figure 7 shows a third layer but this is merely a part of the outer tension portion without staple fibres but of the same rubber material.

However to make it absolutely clear that only two portions are intended the second auxiliary request defines such an arrangement even more specificly.

Considering novelty, in the prior art belt shown in Figure 6 of the patent specification (known from JP-A-62 34043, a copy of which was presented to the Board at the oral proceedings), the cords are located in a cushion rubber portion, which contains no staple fibres, and hence the cords are not "embedded fully" within the staple fibres.

In Figure 1 of D1, staple fibres are present in both the inner and outer portions of the belt, while the tensile cords are located in a cushion rubber portion which contains no staple fibres. In Figure 3 of D1, staple fibres are distributed throughout the inner rubber portion and the outer rubber portion.

In D2, in Figures 2 and 4 staple fibres are located only in the cushion rubber portion and are not confined to one of the inner portion and the outer portion as required by the independent claims of the requests.

Turning now to inventive step, no teaching can be derived from the prior art to omit the cushion layer.

In this respect, it is not appropriate to attempt to combine the disclosures of D2 with Figure 6 of the patent specification, also having a cushion rubber portion, because the skilled person would not arrive at the claimed subject-matter, in which the tensile cords are stated to be embedded fully within the distribution of staple fibres in one of the inner and outer portions of the belt.

D1 is in fact concerned with the construction of a power transmission belt formed **only** from a single rubber material (or from different rubber materials having identical dynamic properties) together with tensile cords.

There is no teaching derivable from any of the cited documents that the omission of the cushion rubber layer provides any advantages when the tension and/or compression zones have other properties. Moreover, there is absolutely no suggestion that any advantage can be gained from using materials having different dynamic properties (for example one material with staple fibres and one material without staple fibres) for the inner and outer portions of the belt.

Furthermore attention is drawn to the test described in the patent. This test compares the running life of a conventional belt of the type shown in Figure 6 of the patent with that of a belt in accordance with the

invention. The results show that the present invention provides a surprising increase in belt life, particularly where the belt is to be used in a pulley system having a reverse bend therein. These results support the view that the invention as claimed in the requests involves an inventive step.

VII. The Respondent requested that the appeal be dismissed and essentially argued as follows.

In the independent claims the terms "inner compression rubber portion" and "outer tension rubber portion" are used in a manner which is not in agreement with the accepted terminology in this field and these claims are therefore misleading for the skilled person and do not meet the requirement under Article 84 EPC.

In V-belts of the type as claimed the load carrying cords define the neutral area above which the belt section is under tension and below which the belt section is under compression when driving a V-belt pulley. These facts are clear from

D3: "International Standard ISO 1081-1980" pages 1 to 3, 9 and 11

and the article

D4: "Treibriemen und ihre Herstellung" from GAK 7/1974 pages 503 to 505 and 508.

It is therefore not possible that the tensile cords fully lie in one of the tension or compression rubber portions and consequently the independent claims lack clarity (Article 84 EPC). Moreover, the invention is not sufficiently disclosed in this respect (Article 100(b) EPC).

When comparing the embodiments of Figures 2 and 4 of D2 and Figure 7 of the patent in suit it will further be clear that the subject-matter of the independent claims according to the main and the first auxiliary requests lack novelty. Both the belts shown in Figure 7 of the patent and Figures 2 and 4 of D2 comprise tensile cords embedded fully within the distribution of staple fibres and are spaced from the other portion.

Considering the prior art shown in Figure 6 of the patent in suit, the sole difference when compared to the arrangement of Figure 5 is that the tensile cords are now fully embedded in the material comprising the staple fibres. However both D1 and D2 disclose that, alternatively, the cords may be embedded directly in the rubber material comprising the staple fibres and therefore no inventive activity was necessary to arrive at the subject-matter of the independent claims according to all requests.

In this respect the Appellant's arguments concerning the use of different rubber materials for the different zones, which is in itself well known from D4 cannot be taken into account because the independent claims do not specify such a feature.

**Reasons for the Decision**

1. The appeal complies with the requirements of Articles 106 to 108 and Rules 1(1) and 64 EPC. It is admissible.

2. Amendments

2.1 The independent Claims 1 of the main and auxiliary requests are based on the granted Claim 1 and are further restricted in scope to comprise only embodiments in which the staple fibres are confined to one of the inner compression or outer tension rubber portions (main request, which consequently required the deletion of the embodiments shown in Figures 8 and 11 of the patent) or to embodiments in which the staple fibres are confined to the outer tension rubber portion only (first auxiliary request).

In the second auxiliary request the subject-matter of the claims was further explicitly limited to transmission belts with two belt portions only.

In view of the fact that the currently claimed subject-matter is fully supported by the content of the application as filed, in particular when considering the detailed embodiments disclosed therein and the fact that the scope of this subject-matter is more restricted than that claimed in the patent, no objections arise under Article 123(2) and (3) EPC.

3. Clarity of the claims and disclosure of the invention

3.1 In accordance with Article 102(3) EPC amended claims of a granted patent should meet the requirements of the EPC and thus also those of Article 84 as regards clarity. In the present case the claimed subject-matter is defined in the independent claims of all requests by references to an "inner compression rubber portion" and an "outer tension rubber portion" and it is further stated that the "tensile cords are embedded fully within one of these portions".

3.2 Although the Board agrees with the Respondent that in transmission belts of the type disclosed in the patent the tensile cords determine the limit between the outer tension and inner compression zones - which was not contested by the Appellant - and thus the claim appears to contain a conflicting statement when defining that the tensile cords are embedded fully within one of the inner compression or outer tension rubber portions, it is in the Board's opinion sufficiently clear from the disclosure of the patent that the portions defined in the claim are not identical to these zones but merely represent upper and lower portions of the belt as is immediately apparent from the drawings.

Therefore, in the context of the disclosure of the patent the definition of the claimed subject-matter cannot give rise to a misunderstanding of the claim and as such the Board considers the requirements of Article 84 to be complied with as regards clarity.

3.3 In view of the above interpretation of the different portions of the belt there is also no ground to question sufficiency of disclosure within the meaning of Article 100(b) EPC: in this respect in particular the drawings give sufficient details in order to enable a skilled person to carry out the invention.

4. Cited prior art

4.1 D1 discloses a transmission belt (V-belt) in which the tensile cords are fully embedded in rubber material comprising staple fibres (Figure 3 and Claim 1).

In Figures 1 and 2 of this specification prior art arrangements with cushion layers comprising the tensile cords are disclosed.

4.2 D2 concerns a V-belt in which the tensile cords are embedded in an intermediate layer with or without staple fibres. The upper and lower layers or portions of the belt do not comprise staple fibres.

4.3 The prior art discussed in the patent with respect to Figure 6 (JP-A-62-34043) discloses a transmission belt in which in an upper portion of the belt, which portion contains staple fibres, a cushion rubber portion containing the tensile cords is provided.

The lower rubber portion of the belt is free from staple fibres.

4.4 Documents D3 and D4 were primarily used to clarify the terms used in relation to and construction of transmission belts.

Since these documents are clearly less relevant than the ones discussed above, no further consideration of these documents is considered necessary.

5. Novelty

5.1 As follows from the above analysis of the prior art none of the cited documents discloses a transmission belt with the combination of features of the independent claims of the requests under consideration.

In particular none of these documents discloses a belt comprising merely an upper (outer) and lower (inner) belt portion in one of which portions the tensile cords are embedded fully within a distribution of staple fibres. The subject-matter of the independent claims of the requests is therefore novel within the meaning of Article 54 EPC.

5.2 The Respondent was of the view that D2 discloses a belt configuration which is similar to the belt configuration of Figure 7 of the patent and, considering that this embodiment is embraced by the scope of Claims 1 of the main and auxiliary requests the subject-matter of these independent claims lacks novelty.

In this respect the Board is of the view that it is sufficiently clear from the description of the embodiment in the patent and the disclosure of D2 that there is a considerable difference in function and configuration of the layers comprising the tensile cords in the patent under consideration when compared to D2. This document clearly states that the layer comprising the tensile cords is an intermediate layer in both embodiments in which the tensile cords are embedded in rubber material with or without staple fibres, and thus not in the outer tension rubber portion defined in the claims under consideration when interpreted to form the upper part of the belt.

5.3 The Respondent also referred to D1 when attacking the novelty of the subject-matter of the independent claims of the request, however, although D1 mentions the use of different rubber materials for the different belt portions (see page 5, lines 29 to 35) there is no disclosure that the tensile cords are embedded fully within the distribution of staple fibres in one portion to be spaced from the other, in particular since the embodiment disclosed with respect to Figure 3 shows the use of one rubber material for the whole of the belt.

6. Inventive step

6.1 In the Board's opinion the transmission belt shown in Figure 6 of the patent in suit and disclosed in JP-A-62-34043 is the closest prior art.

When related to the subject-matter of the independent claims of the requests under consideration this prior art discloses the combination of features of the precharacterising part of these claims, the tensile cords being provided in a cushion layer.

6.2 The subject-matter of Claims 1 of all requests differs from this prior art in that the staple fibres are confined to either the upper or lower belt portion or solely to the upper portion and that the tensile cords are embedded fully within the distribution of staple fibres in that one portion to be spaced from the other of said portions.

These features provide, when related to the construction of Fig. 6 of the patent in suit, a simpler structure of the belt with less layers of different rubber materials and improved running life also in cases of high deformation of the belt (see also the patent specification, page 1, lines 56 to 58).

The objective problem underlying the present patent therefore relates to an improvement of the known belt structure shown in Figure 6 of the contested patent to achieve simpler manufacture and extended running life.

6.3 When looking for a solution to this problem the skilled person would, in the Board's opinion, be directly confronted with D1 which is also related to transmission belts of a similar type and shows in Figures 1 and 2 prior art belts with tensile cords embedded in a cushion layer.

Figure 3 of this specification, exemplifying an embodiment of the invention of D1, discloses a transmission belt in which the cushion layer is omitted and is thus

obviously of simpler construction than the prior art examples shown in Figures 1 and 2 of D1. Moreover, in the description it is stated on page 12 that the running life of this belt is improved substantially by this omission of the cushion layer. It would, therefore, in the Board's opinion, be obvious to the skilled person to apply this known solution and omit the cushion layer in the prior art transmission belt shown in Figure 6 of the patent in suit by directly embedding the tensile cords in the rubber material of the upper belt part comprising the staple fibres.

He would then immediately arrive at a transmission belt in accordance with Figure 5 of the patent in suit which is one of the alternatives claimed in Claim 1 of the main request, and literally represents the embodiment claimed in Claim 1 of the first auxiliary request.

Since the independent Claim 1 of the second auxiliary request differs from the main and first auxiliary requests only in that the two-layer construction of the belt is more clearly defined, the same consideration applies for the subject-matter of the second auxiliary request.

For these reasons none of the independent claims of the requests is acceptable for lack of inventive step of its subject-matter within the meaning of Article 56 EPC.

6.4 The Appellant submitted that D1 is not specifically concerned with the omission of the rubber cushion portion in which the tensile cords are placed and that the teaching of D1 is very specific and mainly concerned with the properties of the belt achieved by using material with staple fibres for the entire belt only whereas the patent in suit requires two kinds of rubber portion.

However, the Board cannot accept this argument. Firstly the claims of the requests do not specify different properties of the rubber portion other than that one portion comprises staple fibres. Secondly, although D1 discloses that it is advantageous to use only one material for the belt it is explicitly mentioned that this is not absolutely necessary and that the tension and compression portions may be manufactured from different materials if their dynamic properties meet the requirements posed (see page 5, last paragraph).

Therefore, no hindrance can be seen for the skilled person to apply in an obvious manner the teaching of D1 to the transmission belt known from Figure 6 of the patent.

Order

For these reasons, it is decided that:

1. The appeal is dismissed.

The Registrar: The Chairman:

S. Fabiani F. Gumbel

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