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File No.: T 0259/93 - 3.2.1  
Application No.: 85 904 372.1  
Publication No.: 0 190 336  
Classification: F16H 7/12  
Title of invention: BELT TENSIONER

**D E C I S I O N**  
of 20 October 1993

Applicant: DAYCO PRODUCTS Inc.

Opponent: SKF GmbH

Headword:

**EPC:** Art. 56

**Keyword:** "Inventive steps, (yes)"

**Headnote**  
**Catchwords**



Case Number: T 0259/93 - 3.2.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.1  
of 20 October 1993

**Appellant:**  
(Opponent)

SKF GmbH  
Postfach 14 40  
97404 Schweinfurt (DE)

**Respondent:**  
(Proprietor of the patent)

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**Representative:**

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**Decision under appeal:**

Interlocutory decision of the Opposition Division  
of the European Patent Office dated 5 February  
1993 concerning maintenance of European patent  
No. 0 190 336 in amended form.

**Composition of the Board:**

**Chairman:** F.A. Gumbel  
**Members:** P. Alting van Geusau  
J.C Saisset

## Summary of Facts and Submissions

- I. European patent No. 0 190 366 was granted with effect from 18 July 1990 on the basis of the European patent application No. 85 904 372.1, filed as an international application PCT/US85/01618 on 22 August 1985.
- II. With notice of opposition filed on 17 April 1991 the Appellant (Opponent) requested revocation of the patent for the reason of non-compliance with the provisions of Article 100(a) EPC.

In respect of an alleged lack of novelty of the subject-matter of the granted Claim 1 the opposition was supported by

D1: DE-A-2 608 277.

In respect of lack of novelty and inventive step of the subject-matter of amended claims filed during the Opposition proceedings the Appellant further cited

D2: DD-A-90 662 and

D3: US-A-2 337 591

By its interlocutory decision dated 5 February 1993 the Opposition Division maintained the patent in amended form.

The Opposition Division held that, taking into account the object of the patent in suit, i.e. the provision of a tensioner with full contact of the cooperating parts even when normal wear of the various members of the tensioner occurs, the prior art disclosed in the cited documents could not be considered pertinent for the subject-matter of the amended Claim 1.

The amended Claim 1 reads as follows:

"In a tensioner for a power transmission belt that is adapted to be operated in an endless path, said tensioner comprising a fixed support means (36) being fixed relative to said belt, a belt engaging means (38) carried by said support means and being rotatable relative thereto, mechanical spring means (39) operatively associated with said support means and said belt engaging means for urging said engaging means relative to said support means and against said belt with a force to tension said belt, and frictional dampening means (40, 40A) operatively associated with said support means and said belt engaging means to dampen the movement of said belt engaging means relative to said support means in at least one direction of movement thereof, said dampening means having a longitudinal axis, and said support means comprising a shaft (41, 41A) having a longitudinal axis and being fixed thereto, said belt engaging means having a portion (73, 73A) thereof being rotatably carried by the shaft, said dampening means (40, 40A) comprises frictionally engaging parts (104, 105; 104A, 105A) a first of these parts (104, 104A) comprises an annular pad (106, 106A) of friction material that is coaxially disposed and axially movable on said shaft (41, 41A) relative to an other part (105, 105A) by means of another spring means (114, 114A) having a certain spring force; characterised in that two frictionally engaging parts are provided, whereby the second of said two parts is either part of said fixed support means or part of said portion of said belt engaging means, said belt engaging means is fixed in axial direction on said shaft at all times independent of wear during operation of the tensioner, whereby said another spring means urges said first part which is adapted to cock relative to said shaft against said

second part thus permitting said two parts to self-align so as to maintain full contact therebetween at all times independent of wear during operation of the tensioner".

IV. An appeal was lodged against this decision on 6 March 1993 with payment of the appeal fee and submission of the Statement of Grounds of Appeal on the same day.

The Appellant requested revocation of the patent or, auxiliarily, that the claims be restricted to incorporate the features of Figures 10 and 12, in particular the guiding elements 115, 117 and 119.

In support of his requests the Appellant relied upon the following arguments:

Claim 1 is too general and in fact may read on to a simple obvious alternative for supporting a tensioner arm in which a spring biased friction pad is mounted with clearance on a shaft so that it may cock with respect to the friction surface of the arm (a sketch showing such a construction was submitted with the Statement of Grounds of Appeal).

Also when taking into account the disclosures of D1, which shows the combination of precharacterising features of Claim 1, the three remaining features defined in the characterising part would be nothing more than obvious further developments of the known construction of the belt tensioner disclosed in D1.

The first characterising feature concerns only two arrangements of the moving parts of the friction elements, which are functionally equivalent and in their effect comparable to the arrangement according to D1.

If it is necessary to accurately guide the transmission belt as is obviously achieved by the second characterising feature, the skilled person would obviously provide improved axial support of the pivot arm which does not alter when wear takes place, for example by using wear free friction discs or, when starting from the construction shown in D1, leaving out the disc 15 which is closest to the support 5.

In the contested decision the last characterising feature, i.e. that the first part is adapted to cock relative to the shaft against said second part thus permitting said two parts to self-align so as to maintain full contact therebetween at all times, was considered essential for the assessment of inventive step. However, even when D1 does not explicitly disclose such cocking of the friction means, cocking will inevitably result from the fact that the friction disc is usually mounted with some clearance on the shaft. It is not necessary that such clearance is shown in the drawings, such as there is also no clearance shown in Figures 5, 9 and 11 of the patent in suit, because the skilled person would consider this to be self evident.

Therefore all of the characterising features of the amended Claim 1 may be arrived at in an obvious manner when taking account of the teachings of D1 and the normal considerations of the skilled person and therefore no inventive activity was necessary to arrive at the subject-matter of this claim.

V. The Respondent (Proprietor) requested dismissal of the appeal. In support of his request he argued essentially as follows:

An important distinction between the belt tensioner defined in Claim 1 of the amended Patent and the one

disclosed in D1 resides in the fact that the belt engaging means is fixed against axial movement on the shaft at all times. This not only prevents additional wearing out of the bearing means in case an out-of-alignment belt is being tensioned which thereby could shift the belt engaging means back and forth axially on the shaft, but this would also prevent an increased biasing force on the friction damper pad with resulting higher wear out of the dampening means and unwanted change of the dampening characteristics.

In this respect it should be noted that also the construction presented in the sketch provided by the Appellant in his Statement of Grounds of Appeal permits the belt engaging means to be axially moved against the biasing spring and this construction has the same disadvantage as the prior art shown in D1. It is thus not an equivalent to the claimed subject-matter.

#### **Reasons for the decision**

1. The appeal complies with the requirements of Articles 106 to 108 and Rule 1(1) and 64 EPC. It is admissible.
2. *Amendments*
  - 2.1 The subject-matter of the amended Claim 1 results from the combination of the entirety of the features of the granted Claim 1 with the addition of the features taken from the drawings and description according to which
    - a) the second of the two frictionally engaging parts is either part of the fixed support means or part of the portion of the belt engaging means (see the original

description and description in the patent of these alternative embodiments shown in Figures 5 and 11) and

b) the first part is adapted to cock relative to the shaft against the second part (see the original description page 22, line 11 to page 23, line 11 and column 8, lines 12 to 43 of the granted patent).

2.2 The dependent claims 2 to 9 correspond to granted claims 2 to 9.

2.3 In view of the above assessments no objections under Article 123(2) or (3) EPC arise against the new set of claims.

### 3. *Novelty*

Novelty of the subject-matter of Claim 1 can be concluded for the reason that none of the cited documents discloses a belt tensioner with belt engaging means which is fixed in axial direction on the shaft at all times independent of wear during operation of the tensioner.

In this respect the construction of D1, which is the sole document cited relating to a belt tensioner, allows axial displacement of the belt engaging means in the direction of compression of the friction means biasing spring 17 (see Figure 2).

D2 which relates to a friction shock absorber for vehicles discloses a similar construction of the friction damper as the one of D1.

D3 concerns a chain tensioner with chain engaging means 16 which rotates freely on an eccentric hub. The chain engaging means are not fixed against moving axially on the hub (see Figure 1).

4. *Inventive step*

- 4.1 The closest prior art is that disclosed in D1, to which the preamble is related.

This document essentially discloses a belt tensioner with an arm 3 rotatably mounted on a shaft 6 between two friction discs 15 and 16. The discs and the end of the arm therebetween are pressed together by means of a compression spring which is concentric with the shaft 6. Hence, there are three frictionally engaging parts forming the dampening means.

In contrast to this known belt tensioner, by using only two frictionally engaging parts, whereby the second of said parts is either part of the fixed support means or part of the portion of the belt engaging means which is rotatably carried by the shaft (first characterising feature of Claim 1), and providing a self-aligning function of these parts (last characterising feature) as well as preventing axial movement of the belt engaging means on the shaft (second characterising feature), the three characterising features of Claim 1 of the patent in suit lead to the effect that, even when some wear of the moving parts occur with possible sideward play of the end of the belt engaging means, the tensioning and dampening capabilities of the tensioner remain essentially the same during the whole life of the tensioner.

- 4.2 The objective problem to be solved by the subject-matter of Claim 1 can therefore be seen in the provision of an improved belt tensioner for accurate control of the tension ratio throughout the life of the belt and tensioner (see column 3, line 56 to column 4, line 21 of the patent).

4.3 Although the problem of accurate control of belt tensioning may be considered self-evident for the skilled person, no incentive to a solution comprising the above characterising features can be derived from the cited documents. In particular the self-aligning function of only two frictionally engaging parts and prevention of axial movement of the belt engaging means have no antecedent in any of the cited documents.

4.4 The Appellant considered that the construction defined in Claim 1 would be arrived at in an obvious manner when developing the construction of D1 to prevent disadvantages encountered when wear occurs, and in this respect referred to a construction shown in a sketch submitted together with the Statement of Grounds of Appeal.

However, apart from the fact that no lead can be derived from the cited documents to develop the construction of D1 to include only one pair of frictionally engaging parts, the development shown in Appellant's drawing is different from the construction claimed and does not lead to the same effects obtained by the features of Claim 1, essentially because the belt engaging means may be moved axially in the direction of the spring biasing the frictionally engaging parts with resulting change of the dampening characteristics and out-of-line control of the belt.

Although, admittedly, the friction discs 15 and 16 in D1 are probably mounted with some clearance on the shaft 6, clearly the intention of the friction damper shown in D1 is that both discs are kept in contact with the belt engaging arm 3 by the spring force pressing the discs and belt engaging arm 3 together.

Even if sideward thrust on the arm 3 would force the discs and arm apart, in case the disc 16 has sufficient clearance to self-align with the side of the arm 3, the dampening characteristics cannot be kept substantially constant as in the damper according to Claim 1 of the patent in suit because of the changing area of contact of the arm surface and other disc 15. No different situation would occur when the discs or arm were made substantially wear free, as was submitted by the Appellant.

4.5 In the Statement of Grounds of Appeal the Appellant relied upon D1 and the general considerations related to his sketch only. However, also when taking into account the disclosures of D2 and D3 no lead or incentive to adapt the construction of D1 and arrive at the subject-matter of Claim 1 can be derived from these documents. In particular the self-aligning function of two frictionally engaging parts in combination with an axially fixed guiding of the engaging means independent of wear during operation of the damper is not derivable from these documents so that the skilled person could not find any suggestion to adapt the known tensioner of D1 in the manner as claimed in Claim 1 of the patent in suit.

4.6 Summarising, in the Board's judgment, the proposed solution to the technical problem underlying the patent in suit defined in the independent Claim 1 is inventive and therefore this claim as well as its dependent Claims 2 to 9 relating to particular embodiments of the invention in accordance with Rule 29(3) EPC, can form the basis for maintenance of the patent (Article 52(1) EPC).

5. The description and drawings are in agreement with the actual wording and scope of the current claims. Hence these documents are also suitable for maintenance of the patent in amended form after the correction of the following spelling errors:

column 4, line 6: "deveoped" should read "developed"  
column 7, line 23: "copening" should read "copending"  
column 9, line 54: "enaging" should read "engaging"

6. Thus taking into account the amendments made and incorporating the above corrections, the patent and the invention to which it relates meet the requirements of the EPC and the patent as amended may be maintained in this form (Article 102(3) EPC). In view of this conclusion there is no necessity to consider the Appellant's auxiliary request for restriction of the claimed subject-matter.

**Order**

**For these reasons, it is decided that:**

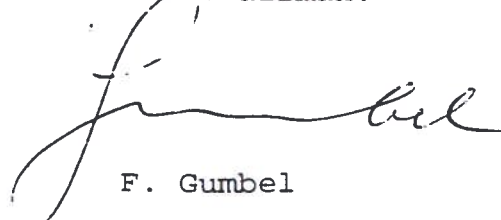
The appeal is dismissed.

The Registrar:



S. Fabiani

The Chairman:



F. Gumbel