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Aktenzeichen / Case Number / N° du recours : T 32/87 - 3.2.1

Anmeldenummer / Filing No / N° de la demande : 81 200 132.9

Veröffentlichungs-Nr. / Publication No / N° de la publication : 0 034 388

Bezeichnung der Erfindung: Device for converting a rotary motion into a  
Title of invention: linear motion.  
Titre de l'invention :

Klassifikation / Classification / Classement : F16H 19/00

**ENTSCHEIDUNG / DECISION**

vom / of / du 10 November 1988

Anmelder / Applicant / Demandeur :

Patentinhaber / Proprietor of the patent /  
Titulaire du brevet :

SKF

Einsprechender / Opponent / Opposant :

L. Schuler GmbH

Stichwort / Headword / Référence :

EPÜ / EPC / CBE Article 56 EPC

Schlagwort / Keyword / Mot clé :

"Inventive step (yes)"

**Leitsatz / Headnote / Sommaire**

Europäisches  
Patentamt

Beschwerdekammern

Case Number : T 32 /87 - 3.2.1

European Patent  
Office

Boards of Appeal

Office européen  
des brevets

Chambres de recours



**D E C I S I O N**  
of the Technical Board of Appeal 3.2.1  
of 10 November 1988

Appellant : L. Schuler GmbH  
(Opponent) D-7320 Göppingen  
(DE)

Representative :

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Decision under appeal : Decision of Opposition Division of the European  
Patent Office dated 22 October 1986 rejecting  
the opposition filed against European patent  
No. 0 034 388 pursuant to Article 102(2) EPC.

Composition of the Board :

Chairman : P.E.M. Delbecque  
Members : C.T. Wilson  
F. Benussi

## Summary of Facts and Submissions

I. European patent No. 0 034 388 was granted on 5 December 1984 with four claims on the basis of European patent application No. 81 200 132.9. Claim 1 is worded as follows:

"Device for converting a rotary motion into a linear motion, comprising a housing (1) having a cylindrical bore (2) wherein has been placed a plurality of rolling bearings (7), the innermost races of which have an inside diameter greater than the outside diameter of a shaft (13) extending through the bore (2) of the housing (1) and the innermost races of the rolling bearings (7) placed therein, these bearings having been placed in the housing such that their center lines are at an angle to the center line of the shaft (13) and their innermost races rest against the shaft (13), each of the rolling bearings having been confined in a supporting unit (3), mounted in the bore (2) and having in the center a cylindrical aperture, in such fashion that the center line of each bearing (7) is at an angle to the center line of the aperture (5) and the annular inner surface of the innermost race projects inwardly with respect to the inner surface of the aperture (5), which supporting units (3) being placed resting against one another in the bore of the housing characterized in that each supporting unit (3) consists of two parts (3',3'') resting against each other, and in each part, in the side surface by which the part rests against the other part, a recess (6) is formed such that the recesses (6',6'') of said parts together with each other form a cavity (6) in which the said rolling bearing (7) is received, while means (8) are present for interconnection of said two parts (3',3'') and wherein said supporting unit (3) is held radially in position relative

to said shaft (13) by means of an adjustable pressure element (14) mounted in the wall of said housing (1)."

II. The patent was opposed in due time and form on 3 September 1985. The Opponent requested revocation of the patent on grounds of lack of inventive step. The following documents were cited in support of the opposition:

US-A-3 394 599

DE-A-2 718 885

US-A-2 204 638

III. The Opposition Division rejected the Opposition in a decision dated 22 October 1986, and noted that DE-A-2 718 885 is a family member of FR-A-2 351 327 cited in the search report. According to the decision the subject-matter of the main claim was novel since none of the cited documents had disclosed all the features of the claimed device. The closest state of the art according to DE-A-2 718 885 or FR-A-2 351 327 differs from the subject-matter of Claim 1 by the whole of the characterising part. Moreover, it would not be obvious to the man skilled in the art to combine the teaching of the two documents US-A-3 394 599 and DE-A-2 718 885, and even if he did combine them he would not arrive at the subject-matter of Claim 1. US-A-2 204 638 was disregarded in accordance with Article 114(2) EPC.

IV. The Appellant (Opponent) filed an appeal against this decision on 18 December 1986, at the same time paying the appropriate fee. In his Statement of Grounds filed on 19 February 1987 the Appellant argues that the subject-matter of the contested patent is not novel and constitutes equivalent means to that disclosed in the US-A-3 394 599 used to solve a general problem which would

concern every man skilled in the art. The only differences between the subject-matter of Claim 1 and the disclosure of FR-A-2 351 327 (=DE-A-2 718 885) are known from the disclosure of US-A-3 394 599.

V. The Respondent (Patentee) contests the arguments of the Appellant. He maintains that since the disclosures of DE-A-2 718 885 and US-A-3 394 599 relate to fundamentally different constructions, any combination of the teachings of these documents can only arise as a result of an unallowable ex post facto analysis.

VI. At the oral proceedings held on 10 November 1988 the parties presented the following arguments:

The Appellant argued essentially that the subject-matter of the contested Claim 1 lacked novelty in the light of the disclosure of US-A-3 394 599, the teaching of which was considered by the Appellant to embrace all well known equivalents. Alternatively, he argued that since the only differences between the subject-matter of Claim 1 and the disclosure of FR-A-2 351 327 are known from US-A-3 394 599 the subject-matter of the claim is lacking in inventive step.

The Respondent argued that the disclosure of FR-A-2 351 327 constitutes the nearest prior art and that, since the disclosure of US-A-3 394 599 relates to a completely different sort of apparatus, the man skilled in the art would receive no indication from this disclosure as to how he could solve the problem set out in the present patent, and solved by the characterising features of Claim 1.

VII. The Appellant requests that the decision under appeal be set aside and the patent be revoked. The Respondent

requests that the appeal be dismissed and the patent be maintained.

#### Reasons for the Decision

1. The appeal is admissible.
2. According to the opening description of the patent, the invention relates to the type of device for converting a rotary motion into a linear motion disclosed in DE-A-2 718 885 (corresponding to FR-A-2 351 327).

Such a device comprises a housing (1) having a cylindrical bore (1A) wherein has been placed a plurality of rolling bearings (7, 8, 9, 10) the innermost races of which have an inside diameter greater than the outside diameter of a shaft (2) extending through the bore of the housing (1) and the innermost races of the rolling bearings placed therein, these bearings having been placed in the housing such that their center lines are at an angle to the center line of the shaft and their innermost races rest against the shaft, each of the rolling bearings having been confined in a supporting unit (3, 4, 5, 6) mounted in the bore and having in the center a cylindrical aperture, in such fashion that the center line of each bearing is at an angle to the center line of the aperture and the annular inner surface of the innermost race projects inwardly with respect to the inner surface of the aperture, which supporting units being placed resting against one another in the bore of the housing.

The subject-matter of the claim differs from this prior art by the features of the characterising part of the claim, so that it follows that this subject-matter is novel with respect thereto.

3. However, the Appellant argues that the subject-matter of Claim 1 lacks novelty in the light of the disclosure of US-A-3 394 599.

The Board agrees that US-A-3 394 599 also discloses a device for converting rotary motion into linear motion. It comprises a number of rollers (30) mounted in a supporting unit (24) retained against rotation, but allowing for axial movement, within a housing (12) by means of four projections (32) on the unit sliding axially within axial slots (34) in the housing. The rollers (30) are urged radially, inward against a shaft (14) by means of adjustable helical springs (36), the shaft passing through the unit and the fixed housing.

The unit is made up of two separate parts fixed together (see Fig. 3). The inclination of the roller axes relative to the axis of the shaft is adjustable. Rotation of the shaft, when the axes of the rollers are not parallel to the axis of the shaft, results in axial movement of the supporting unit relative to the shaft and the housing.

In respect of this citation the Appellant argued that its disclosure also embraced equivalents which were not explicitly disclosed. For example, he argued that the principles of operation, drive, and manner of loading (by means of springs) were the same, the rollers being clear equivalents of the rolling bearings.

However, the Board cannot agree with this point of view that the "whole contents" of a document comprise also features which are equivalents to the features according to the document. This approach, namely the rejection of this point of view, has been consistently followed in the practice of the European Patent Office (see for example

T 167/84 dated 20 January 1987, (not published) and Part C, Chapter IV, 7.2 of the "Guidelines").

The subject-matter of Claim 1 is also therefore novel with respect to these two other citations.

4. A consideration of the question of inventive step results in the following points:

Again, according to the patent the elements retaining the bearings in the housing disclosed in DE-A- 2 718 885 have relative high surface tolerances with both the housing and the bearing. Removal of the bearings is therefore difficult, and adjustment thereof after assembly is impossible.

The object of the invention is therefore to allow easy removal or exchange of the rolling bearings and adjustment thereof in relation to the shaft, as well as relatively low cost manufacture of essential parts.

This object is achieved by the features of the characterising part of the claim.

In respect of the statement of problem, it should be pointed out that the Board is of the opinion that removal of the bearings from the elements retaining them in the housing of the known device only causes difficulties when the bearings are "force-fitted" therein. This is only one possibility disclosed in the known device, which also discloses a loose fit. The problem could therefore possibly have been more correctly phrased in the contested patent to make clear that the easy removal is allowed for the case where the bearing is fixed axially within its retaining element.

4.2 Whereas not explicitly disclosed equivalents of features of the apparatus disclosed in US-A-3 394 599 were left out of consideration when examining the question of novelty, they may be of importance for deciding the question of inventive step. A teaching applied in the prior art to a clear equivalent of a claimed feature may be considered to render obvious the application of this teaching to the claimed feature. However, care must be taken in establishing both that clear equivalents do exist, and that the teaching is the same.

According to the characterising part of Claim 1,

(i) each supporting unit (3) consists of two parts (3', 3'') resting against each other, and in each part, in the side surface by which the part rests against the other part, a recess (6) is formed such that the recesses (6', 6'') of said parts together with each other form a cavity (6) in which the said rolling bearing (7) is received, while means (8) are present for interconnection of said two parts (3', 3''), and

(ii) said supporting unit (3) is held radially in position relative to said shaft (13) by means of an adjustable pressure element (14) mounted in the wall of said housing (1).

The Appellant has argued generally that the rollers of US-A-3 394 599 are clear equivalents of the rolling bearings of the present claim. He also argues that the two-part roller mounting means (20) is a clear equivalent to the two part supporting unit of the claim and that the spring-loading (36, 38, 40) of the rollers is equivalent to the adjustable pressure element of Claim 1 so that it would be obvious for the man skilled in the art to apply these teachings to the apparatus known from DE-A-2 718 885 to

arrive at the subject-matter of the claim. However, here already the general equivalence and a comparison of the teachings does not clearly stand up to examination. If the rollers were equivalent to the rolling bearing, and the roller mounting means (20) were equivalent to the support unit, the teaching of the US-A-3 394 599 would then be to apply an adjustable pressure element between the rolling bearing and its supporting unit rather than in the wall of the housing. Clearly, such an arrangement would not teach the man skilled in the art to take up any free play between the supporting unit and the wall of the housing as defined in Claim 1.

Alternatively, if the springs according to US-A-3 394 599 are considered to make this teaching, i.e. the roller mounting means is considered as an equivalent to the housing of Claim 1, then the supporting units would be defined by pivot pins (28) having bi-furcated ends mounting the rollers. These pivot pins do not however disclose the two-part recessed form.

Therefore, there is no clear direct equivalence analysis of the disclosure of US-A-3 394 599 which would lead the man skilled in the art to arrive at the solution as set out in the characterising part of Claim 1.

5. The claim is therefore allowable.
6. Claims 2 to 4, which are dependent on Claim 1, relate to specific embodiments of the device as therein claimed and are therefore also allowable.
7. The Board does not consider that any amendment to the description in respect of the possibly incorrectly stated problem is necessitated by proper opposition grounds, and

therefore none is proposed (see Gr 1/84, OJ EPO 10/1985, 299, and T 127/85, to be published).

Order

For these reasons, it is decided that:

The appeal is dismissed.

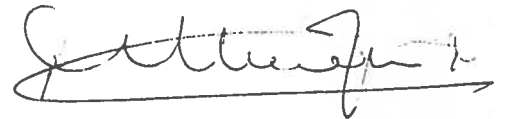
The Registrar:



S. Fabiani



The Chairman:



P.E.M. Delbecque