

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN W. KELLEY

Appeal No. 97-4079
Application No. 08/310,592¹

ON BRIEF

Before COHEN, JOHN D. SMITH and GONZALES, Administrative Patent Judges.

GONZALES, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1 to 5 and 14. Claims 6-13, the other claims remaining in the application, stand withdrawn from consideration under 37 CFR

¹ Application for patent filed September 22, 1994.

Appeal No. 97-4079
Application No. 08/310,592

§ 1.142(b) as being drawn to nonelected species.

BACKGROUND

The appellant's invention relates to a system for transmitting power and motion. According to the appellant, "[t]he appealed claims stand together" (brief, page 3). Pursuant to 37 CFR § 1.192(c)(7), we understand this to mean that for each ground of rejection, the grouped claims stand or fall together.

Therefore, for purposes of this appeal, we will limit our discussion to the broadest claim on appeal, selected claim 1, which is reproduced below:

1. A system for transmitting power and motion comprising: at least two means for transmitting power and motion, a first means and a second means, wherein said first means comprises a polyketone polymer and communicates power and motion to said second means, comprising a polyketone polymer; wherein said system can communicate power and motion to the point of the mechanical failure of either said first or said second means.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Nadal	4,037,483	July 26, 1977
Sahler	5,194,031	Mar. 16, 1993
Kastelic et al. (Kastelic)	5,242,966	Sept. 7, 1993

The following rejections are before us for review:

Appeal No. 97-4079
Application No. 08/310,592

(1) Claims 1 and 4 stand rejected under 35 U.S.C. § 103 as being unpatentable over Nadal in view of Kastelic.

(2) Claims 1 through 3, 5 and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Sahler in view of Kastelic.

Rather than reiterate the conflicting viewpoints advanced by the examiner and the appellant regarding the above-noted rejections, we make reference to the examiner's answer (Paper No. 19, mailed May 28, 1997) and to the appellant's brief (Paper No. 16, filed April 14, 1997) for the appellant's arguments thereagainst.

OPINION

a. Interpretation of the Claims

Claim 1 calls for, inter alia, "at least two means for transmitting power and motion, a first means and a second means, wherein said first means comprises a polyketone polymer and communicates power and motion to said second means, comprising a polyketone polymer."

Based on the appellant's use of the term "means" in combination with the function "for transmitting power and motion" and the lack of any structure linked to the term

Appeal No. 97-4079
Application No. 08/310,592

"means" other than the material used to fabricate the "means," we conclude that the appellant intends to invoke the statutory mandates of 35 U.S.C. § 112, sixth paragraph, for means-plus function clauses. Accordingly, we are required by statute to look to the appellant's specification and construe the "means" language recited in claim 1 as limited to the corresponding structure disclosed in the specification and equivalents thereof. In re Donaldson Co., 16 F.3d 1189, 1194-95, 29 USPQ2d 1845, 1850 (Fed. Cir. 1994).

The particular means language of claim 1 at issue reads: "at least two means for transmitting power and motion, a first means and a second means, wherein said first means comprises a polyketone polymer and communicates power and motion to said second means, comprising a polyketone polymer." In the "Detailed Description of the Invention" section of his specification, the appellant identifies the "means" as including "gears, belts, chain and sprocket assemblies, plane and roller bearings, linear bearings, sleeve bearings, pulleys, sliding plates and other like mechanisms" (page 7, lines 1-3). In discussing the "most preferred means," i.e., a system of pinion and spur gears, the appellant states that

Appeal No. 97-4079
Application No. 08/310,592

"one can comprise a system of pinion and spur gears for transmitting motion and power wherein both are comprised of polyketone polymer" (page 7, lines 5-7). Appellant goes on to state that "[i]t is this aspect of the invention comprising a system of means for transmitting power and motion in which two such means are in direct communication with each other that is most extraordinary" (page 7, line 12-14). See, also, page 8, lines 1-6. The specification also contains test results comparing two polyketone gears in direct communication with each other to a first pair of gears made of nylon and to a second pair of gears made of an acetal copolymer (pages 11-14).

Based on the description of the first and second means in the appellant's specification, we conclude that the phrase "said first means . . . communicates power and motion to said second means" requires direct communication between the first and second means. This interpretation of the language found in claim 1 is consistent with the appellant's description of the invention in his brief (brief, page 2) and with the appellant's arguments (brief, pages 3-6).

Appeal No. 97-4079
Application No. 08/310,592

b. Claims 1 and 4

We sustain the rejection of claims 1 and 4 under 35
U.S.C.

§ 103 as being unpatentable over Nadal in view of Kastelic.

Nadal discloses a window operator comprising a housing 10 having a crank handle 31 for turning a worm gear 32 (the claimed "first means"). The worm gear meshes with a sector gear 20 having a plurality of helical teeth 21 (col. 3, lines 55, 56 and Figures 5 through 7) (the claimed "second means"). An operating arm 22 is integrally formed on gear 20 for connection with a link 26 connected to the hinged portion of a casement window (col. 3, lines 29-40). The rotation of the crank handle 31 causes the worm gear 32 to rotate which, in turn, causes the sector gear to be driven. The worm gear 32, sector gear 20 and link 26 are injection molded from a polymeric material consisting essentially of glass-filled nylon including about 30% glass, by weight (col. 2, lines 49-52).

Kastelic is cited by the examiner as evidence that it was known in the art prior to the appellant's invention to make gears using polyketone polymers (col. 1, lines 57-65). The

Appeal No. 97-4079
Application No. 08/310,592

polyketone polymer disclosed in Kastelic is said to be particularly advantageous because it provides a melt stabilized composition that may be readily processed into fabricated objects which exhibit useful mechanical properties (col. 4, lines 31-34).

In applying the test for obviousness,² we reach the conclusion that it would have been obvious to one having ordinary skill in the art, from a combined assessment of the Nadal and Kastelic teachings, to fabricate the worm gear and the sector gear of Nadal using the polyketone polymer disclosed in Kastelic. In our view, one of ordinary skill in the art would have been motivated to manufacture the worm and sector gears shown in Nadal using the polyketone material disclosed in Kastelic based on the advantageous properties of the polyketone material and would have had a reasonable expectation of success in doing so based on Kastelic's specific disclosure that the material disclosed therein was particularly suitable for making gears.

² The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. See In re Young, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991) and In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981).

Appeal No. 97-4079
Application No. 08/310,592

Having determined that the prior art itself reasonably establishes a prima facie case of obviousness, we will now consider the evidence asserted to support the patentability of the claimed invention, namely, the comparative tests found in the specification and the declaration under 37 CFR § 1.132 of John E. Flood (Paper No. 12, filed November 20, 1996).³

The specification at pages 11-16 discusses four comparative tests. The first three tests (examples 1-3) measure gear life, gear wear/weight loss, and sound level, respectively, of spur gear pairs made of: (1) neat polyketone polymers (Gear A); (2) nylon 6,6 polyamide polymer composition (Gear B); and (3) acetal copolymer (Gear C). The specification (pages 13, 14) describes the results of the

³ The examiner bears the initial burden of presenting a prima facie case of obviousness (see In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993)). Once a prima facie case is established, any evidence supporting the patentability of the claimed invention, such as any evidence in the specification or any other evidence submitted by the applicant must be considered. The ultimate determination of patentability is based on the entire record, by a preponderance of evidence, with due consideration to the persuasiveness of any arguments and any secondary evidence. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). All the evidence on the question of obviousness must be considered. In re Piasecki, 745 F.2d 1468, 1471, 223 USPQ 785, 787 (Fed. Cir. 1984).

Appeal No. 97-4079
Application No. 08/310,592

first and second tests as showing that the polyketone gears tested endured torques for a longer period of time, were capable of being stressed to their mechanical limit without significant loss in tooth dimension, and transmitted motion and power up to the point of tooth breakage. The results of the third test are illustrated in Figure 3 of the drawings which shows that the polyketone gears (Gear A) produced somewhat less sound than the acetal copolymer gears (Gear C), but produced more sound than the nylon gears (Gear A). The fourth test (example 4) compares the dynamic coefficient of friction (DCOF) and wear factors of a disk-pin combination made of a neat polyketone polymer (Disk A) to a disk-pin combination made of acetal homopolymer (Disk B). According to the specification (pages 15, 16), Table 1 shows that Disk A had a lower DCOF, indicative of higher lubricity, and a wear factor two orders of magnitude lower than Disk B.

For the following reasons, we do not find these comparative tests to be convincing of the patentability of the claimed subject matter. First, appellant has not established that the tests provide a comparison with the closest prior art. See In re Baxter Travenol Labs., 952 F.2d 388, 392, 21

Appeal No. 97-4079
Application No. 08/310,592

USPQ2d 1281, 1285 (Fed. Cir. 1991); In re De Blauwe, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed. Cir. 1984). It appears that the closest prior art is Nadal which teaches a worm gear and a sector gear made of glass-filled nylon, including about 30% glass by weight (col. 2, lines 49-52), and which are designed to have good strength and structural integrity (col. 2, line 16, 17). Appellant has not compared a like-polyketone gear pair to a like-glass-filled nylon gear pair, including about 30% glass by weight and designed to have good strength and structural integrity.

Second, it is not enough for appellant to show that the results for the appellant's invention and the comparative examples differ. The difference must be shown to be an unexpected difference. See In re Freeman, 474 F.2d 1318, 1324, 177 USPQ 139, 143 (CCPA 1973); In re Klosak, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972). Appellant has not explained why one of ordinary skill in the art would not have expected the results obtained in the comparative tests of Examples 1-4, based on the properties of the polyketone materials which were tested.

Appeal No. 97-4079
Application No. 08/310,592

Third, the evidence presented in the declaration is not commensurate in scope with the claims. See In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 778 (Fed. Cir. 1983); In re Clemens, 622 F.2d 1029, 1035, 206 USPQ 289, 296 (CCPA 1980). The appellant's claim 1 encompasses the use of any polyketone, but comparative tests are presented only for a neat polyketone homopolymer formed from ethylene and carbon monoxide and a neat polyketone copolymer formed from ethylene, carbon monoxide, and propylene. We find in the evidence of record no reasonable basis for concluding that the great number of materials encompassed by appellant's claims would behave as a class in the same manner as the particular materials tested. See In re Lindner, 457 F.2d 506, 508, 173 USPQ 356, 358 (CCPA 1972); In re Susi, 440 F.2d 442, 445-46, 169 USPQ 423, 426 (CCPA 1971). In addition, unlike the comparative tests, claim 1 does not require that the first and second means comprise the same polyketone polymer.

We have also carefully considered the declaration under 37 CFR § 1.132 of John E. Flood (Paper No. 12, filed November 20, 1996). We find the statements contained therein more supportive of a conclusion of obviousness than of

Appeal No. 97-4079
Application No. 08/310,592

nonobviousness. The declarant states that it is unexpected that like-polyketone polymer combinations could be used in communicating significant (emphasis ours) power and motion (para. 4). The claims, however, are not limited to systems for transmitting "significant" power and motion and we find no definition of the term in the specification or in Flood's declaration. Furthermore, the declarant also states that "[i]n constructing systems for communicating motion and power, as for example in multi-gear systems, like-polymer combinations are rarely used" (para. 2). One known exception, according to Flood, is the use of PAEK polymers (para. 3). PAEK is an abbreviation for polyaryletherketone, a polyketone polymer.⁴ Based on these statements, we conclude that, while it may be rare, it was known in the art to use like-polymer combinations, including polyaryletherketone for power and motion transmission. The appellant's claim 1 calls for first and second means (e.g., gears) each comprising a polyketone polymer. It appears to us that claim 1 includes within its scope polyaryletherketone, which the declarant admits has been

⁴ Handbook of Plastics, Elastomers, and Composites page 2.48 (Charles A. Harper ed., 2d ed., McGraw-Hill, Inc. 1992).

Appeal No. 97-4079
Application No. 08/310,592

used in communicating power and motion in like polymer combinations.

In view of the foregoing, we are satisfied that when all the evidence and arguments are considered, the evidence of a prima facie case has not been rebutted by appellant's showing.

Appellant argues (brief, pages 3, 4) that Nadal employs a polymer material which is vastly different from the polyketone polymer called for in claim 1⁵ and that extreme dimensional limitations must be employed in the worm gear system disclosed by Nadal to avoid mechanical failure. The deficiency in this argument is that appellant is attacking a reference individually when the rejection is based on a combination of references. See In re Keller, 642 F.2d 413, 426, 208 USPQ 871, 882 (CCPA 1981); In re Young, 403 F.2d 754, 757-8, 159 USPQ 725, 728 (CCPA 1968). The use of a polyketone polymer for manufacturing gears is disclosed in Kastelic as discussed above.

⁵ Appellant's brief makes the point that the materials disclosed in Nadal do not include "aliphatic alternating polyketones." Claim 1, however, recites only a "polyketone polymer." At any rate, Kastelic teaches the use of an "aliphatic alternating polyketone" to make gears.

Appeal No. 97-4079
Application No. 08/310,592

Appellant also argues (brief, pages 4, 5) the unexpected nature of the results of using a like-polyketone system as evidenced by the comparative tests set forth in the specification and in view of the Flood declaration. We are not persuaded by these arguments for the reasons previously stated.

Appeal No. 97-4079
Application No. 08/310,592

c. Claims 1-3, 5 and 14

We will not sustain the rejection of claims 1-3, 5 and 14 under 35 U.S.C. § 103 as being unpatentable over Sahler in view of Kastelic.

We agree with the appellant's argument (brief, pages 5, 6) that Sahler does not provide a basis for a like-polymer gear combination. In fact, we are unable to find any statement in Sahler regarding the use of plastic or polymer to manufacture the gears shown in his gear assembly. For this reason, the rejection must be reversed.

d. New Ground of Rejection; 37 CFR 1.196(b)

Claims 2, 3, 5 and 14 are rejected under 35 U.S.C. § 103 as unpatentable over Nadal in view of Kastelic.⁶

Claim 2 depends from claim 1 and further recites that "at least two of said means are gears." Nadal's system includes two like-polymer gears, namely, worm gear 32 and sector gear 20 and this would have been suggestive of the gears of claim 2.

⁶ We incorporate herein our analysis regarding the affirmed rejection of claim 1, supra.

Appeal No. 97-4079
Application No. 08/310,592

Claim 3 depends from claim 2 and further recites that the gears are spur gears. Appellant admits in the specification (page 2, lines 14, 15) that the use of spurs gears to transmit power and motion is well known in the art. Considering the knowledge in the art, as above, we are of the view that the application of polyketone polymer to spur gears, as set forth in claim 3, would have been obvious.

Claim 5 depends from claim 1 and further recites that for a given application of force, motion can be transmitted between each of the two means (e.g., gears) up to the point of mechanical failure of the two means when such system is operated below 85 degrees C. As to the specific limitation added by claim 5, we note that in the "Background of the Invention" section of appellant's specification (page 1), appellant explains that it was known that gear failure can result from the inability of the gear material to hold a tolerance, from the inability to withstand the torsional stresses of start-up and shut-down, and from cyclic fatigue. We consider all of these reasons to fall within the broad definition of the term "mechanical failure." Obviously, the gears shown by Nadal will fail whenever a torsional stress at

Appeal No. 97-4079
Application No. 08/310,592

start-up exceeds the strength of the material used to make the gears. Thus, the additional limitation recited in claim 5 would have been suggested by the Nadal teaching.

Claim 14 is dependent on claim 5 and defines the two means as gears which are affixed to non-intersecting and non-parallel shafts. Nadal shows an integral worm gear-shaft arrangement and a gear having helical teeth mounted on axle 24. The axis of the worm gear-shaft arrangement and the axis of axle 24 are non-intersecting and non-parallel. Thus, the additional limitations recited in claim 14 would have been suggested by Nadal.

CONCLUSION

This panel of the board has made the following determinations:

affirmed the rejection of claims 1 and 4 under 35 U.S.C. § 103 as being unpatentable over Nadal in view of Kastelic;
and

reversed the rejection of claims 1 through 3, 5 and 14 under 35 U.S.C. § 103 as being unpatentable over Sahler in view of Kastelic.

Appeal No. 97-4079
Application No. 08/310,592

In addition to affirming the examiner's rejection of one or more claims, this decision contains a new ground of rejection of claims 2, 3, 5 and 14 pursuant to 37 CFR § 1.196(b) (amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53131, 53197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides, "[a] new ground of rejection shall not be considered final for purposes of judicial review."

Regarding any affirmed rejection, 37 CFR § 1.197(b) provides:

(b) Appellant may file a single request for rehearing within two months from the date of the original decision

37 CFR § 1.196(b) also provides that the appellant, WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (37 CFR § 1.197(c)) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .

Appeal No. 97-4079
Application No. 08/310,592

(2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

Should the appellant elect to prosecute further before the Primary Examiner pursuant to 37 CFR § 1.196(b)(1), in order to preserve the right to seek review under 35 U.S.C. §§ 141 or 145 with respect to the affirmed rejection, the effective date of the affirmance is deferred until conclusion of the prosecution before the examiner unless, as a mere incident to the limited prosecution, the affirmed rejection is overcome.

If the appellant elects prosecution before the examiner and this does not result in allowance of the application, abandonment or a second appeal, this case should be returned to the Board of Patent Appeals and Interferences for final action on the affirmed rejection, including any timely request for rehearing thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR

Appeal No. 97-4079
Application No. 08/310,592

§ 1.136(a).

AFFIRMED-IN-PART, 37 CFR § 1.196(b)

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