UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JAMES F. ZIECH, GLEN PERTERSON, and JAMES RIDGE

Appeal 2006-2530
Application 10/610,143
Technology Center 3600

Decided: March 22, 2007

Before TERRY J. OWENS, MURRIEL E. CRAWFORD, and STUART S. LEVY, *Administrative Patent Judges*.

CRAWFORD, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 (2002) from a final rejection of claims 2, 3, 5, 7-9, 12-13 and 15. Appellants withdraw, without prejudice, its appeal of claims 1, 6, 11, and 16 (Reply Br. 1). Claims 4, 10

and 14 have been allowed. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

Appellants invented a differential carrier housing for use in a wheel differential assembly, where the differential carrier housing includes a hollow rib extending from a forward end to a reward end of the differential carrier housing.

We need only discuss claims 2, and 5, which depend from claim 1. Claims 1, 2 and 5 read as follows:

> 1. A differential carrier housing, comprising:
>
> a body disposed about an axis and having first and second axial ends, said body configured to receive a pinion shaft, an inter-axle differential, and an input shaft supported on an input shaft bearing;
>
> a radially extending flange extending from said body proximate said second axial end of said body and configured for connection to an axle housing; and,
>
> a hollow rib extending from a forward end located on said body rearward of said input shaft bearing to a rear end located at said flange.
>
> 2. A differential carrier housing according to claim 1, wherein said hollow rib has a constant wall thickness from said forward end to said rear end.
>
> 5. A differential carrier housing according to claim 1, wherein said rear end of said hollow rib is aligned with a bearing support for a differential case of a wheel differential.

The Examiner rejected claims 2, 5, 7, 8, 12 and 15 under 35 U.S.C. § 102(b) as being anticipated by Christie; and claims 2, 3, 5, 7 to 9, 12-13 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Christie in view of Keller.

PRIOR ART

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Christie	Re. 25,269	Oct. 13, 1962
Keller	US 6,245,415 B1	Jun. 12, 2001

Appellants contend that the rejection under 35 U.S.C. § 102(b) is improper because Christie does not disclose or suggest all of the limitations recited in the claims. More specifically, the Appellants contend that Christie fails to teach or otherwise disclose a differential carrier housing having a hollow rib with a constant wall thickness from the forward end of the rib to the rear end of the rib (Reply Br. 1-2). The Examiner contends that the rib of Christie has a constant wall thickness from the forward end to the rear end as seen in Figure 2 (Answer 4 and 15).

The Appellants further contend that Christie fails to teach the hollow rib aligned with a bearing support for a differential case of a wheel differential (Reply Br. 2). The Examiner contends that the hollow rib is aligned with a bearing support 34 for an output shaft 45 of the differential case (Answer 4).

Appellants contend that the rejection under 35 U.S.C. § 103(a) is improper because the cited references fail to teach or suggest every limitation of the claimed invention. Specifically, the Appellants contend that Figure 1 of Christie relied on by the Examiner to illustrate the rib shows

the structure of the differential housing in a plan view. The Appellants further contend that there is no depth in this view that would allow anyone to know whether the rib extends from a forward end to a rearward end (Br. 5) or the relative location on the rib with respect to the input shaft bearing, or with respect to a bearing support for a differential case of a wheel differential (Br. 6). The Examiner contends that although Christie makes no specific reference to the structure of the rib in Figure 1, the use of ribs on gear housings are well known in the art for structural support and cooling means (Answer 11). Therefore, since ribs are well known in the art, the unreferenced structure (above the label 10) in Figure 1 of Christie is treated as a rib. The Examiner admits Christie lacks a specific mention to the rib or whether the rib is hollow, and relies on Keller to teach a casing with hollow ribs. The Examiner states "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to modify Christie to employ a hollow rib . . . in view of Keller in order to rigidify the housing for structural integrity" (Answer 6).

We reverse.

ISSUE

There are three issues on appeal. First, whether Christie discloses a rib that has a constant wall thickness from the forward end to the rear end. Second, whether Christie discloses a rib that is aligned with a bearing support for a differential case of a wheel differential. Lastly, whether the combination of Christie as modified by Keller teaches a rib that extends from a forward end to a rear end of a differential carrier housing.

FINDINGS OF FACT

Appellants invented a differential carrier housing having a hollow rib extending from a forward end located on the body rearward of the input shaft bearing to a rear end located at the flange (Specification paragraph 6; Fig. 4, element 64).

The use and location of the rib provides increased strength to the body of the differential carrier housing, especially along the load path created during operation of the axle assembly (Specification paragraph 7).

The rib is hollow in order to reduce the weight of the carrier housing compared to conventional housings configured with solid ribs (Specification paragraph 7).

Rejection under 35 U.S.C. § 102(b)

Christie discloses a differential carrier housing having a hollow rib (Fig. 2, where reference 67 resides) and meeting all the limitations of claim 1. The hollow rib shows a first thickness at the forward and rear ends, and a varying thickness in the middle of the rib (Fig. 2).

Christie discloses the hollow rib (located above numerals 67 and 62 in Fig. 2) is aligned (parallel) with a bearing support 45 for the output shaft 35.

Rejection under 35 U.S.C. § 103(a)

Christie discloses a structure (Fig. 1, above label 10) on a differential carrier housing meeting all the limitations of claim 1 except for the structure as a hollow rib extending from a forward end to a rear end of the housing body.

Keller teaches an automobile body casing with hollow ribs 16. Keller describes using hollow ribs made of injected thermoplastic resin on the body

of automobile body parts to strengthen the structure (Keller, col. 3 ll. 1-31; col. 4, ll. 1-18).

PRINCIPLES OF LAW

To support a rejection of a claim under 35 U.S.C. § 102 (b), it must be shown that each element of the claim is found, either expressly described or under principles of inherency, in a single prior art reference. *See Kalman v. Kimberly-Clark Corp*., 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), *cert. denied*, 465 U.S. 1026 (1984).

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). Moreover, in evaluating such references it is proper to take into account not only the specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968).

ANALYSIS

Rejection under 35 U.S.C. § 102(b)

The hollow rib of Christie does not have a constant wall thickness from the forward end to the rear end as recited in claim 2. As clearly seen in Figure 2 of Christie, the middle portion of the hollow rib has a different thickness as both the forward section and the rear end sections. Therefore, the rib does not have a constant wall thickness. Accordingly, we determine

that the Examiner has not shown, either expressly described or under principles of inherency, that each element of the claim is found.

The rear end of the hollow rib is aligned with a bearing support. However, the rib is aligned with a bearing support of the output shaft not a bearing support for a differential case of a wheel differential, as required by claim 5. The bearing support of the output shaft is used to support the output shaft and is located *within* the differential case. In no way can the bearing support of the output shaft be construed to support the differential case. Accordingly, we determine that the Examiner has not shown, either expressly described or under principles of inherency, that each element of the claim is found. On the record before us, it follows that the Examiner erred in rejecting claims 2 and 5 under § 102(b). Since claims 7 and 15 contain the same limitations as claim 5, and claims 8 and 12 contain the same limitations as claim 2, it follows that those claims were not properly rejected under § 102(b) over Christie.

Rejection under 35 U.S.C. § 103(a)

The Examiner premised the rejection on Christie showing a rib that extends from a forward end to a rear end of a differential carrier housing. Assuming arguendo that the structure identified by the Examiner is a rib, the Figure 1 relied upon by the Examiner is a plain view of the differential carrier and there is no depth in this view that would allow anyone to know whether the structure identified by the Examiner as a rib extends for a forward end to rear end. In addition, the structure identified by the Examiner as a rib in Figure 1, is not shown in Figure 2. Therefore, the location of the rib being rearward of the input shaft bearing, as required by claim 1, can not be ascertained. Keller is cited for the purpose of teaching a

hollow rib. Keller fails to cure the deficiencies of Christie, because it does not teach or suggest the orientation or the location of a rib on a differential carrier housing. Accordingly, we determine that the Examiner has failed to show how the cited references teach or suggest each and every claim limitation of the claimed invention. On the record before us, it follows that the Examiner erred in rejecting claim 1 under § 103(a). Since claims 2, 3, 5, 7-9, 12, 13, and 15 are narrower than claim 1, it follows that those claims were not properly rejected under § 103(a) over Christie and Keller.

CONCLUSION OF LAW

On the record before us, Appellants have shown that Christie does not meet the claims limitation of claim 2 and anticipate a hollow rib having a "constant wall thickness from said forward end to said rearward end." The Appellants have also shown that Christie does not meet the claim limitations of claim 5 and anticipate a hollow rib "aligned with a bearing support for a differential case of a wheel differential."

On the record before us, Appellants have shown that Christie as modified by Keller do not teach or suggest each and every claim limitation so as to result in the claim 1 requirement for "a hollow rib extending from a forward end located on said body rearward of said input shaft bearing to a rear end located at said flange."

DECISION

The Examiner's rejection of claims 2, 3, 5, 7-9, 12-13 and 15 is reversed.

REVERSED

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