United States District Court,
E.D. Michigan, Southern Division.

EATON CORPORATION,
Plaintiff.
v.
ZF MERITOR LLC, Arvinmeritor, Inc. and ZF Friedrichshafen AG,
Defendants.

Aug. 14, 2006.

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SPECIAL MASTER'S REPORT AND RECOMMENDATIONS ON CLAIM CONSTRUCTION ISSUES U.S PATENTS 4,899,279 AND 5,644,458

JAMES F. DAVIS, Special Master.

INTRODUCTION

1. In this patent infringement suit, plaintiff Eaton Corporation alleges infringement by defendants, ZF Meritor LLC, ArvinMeritor, Inc and ZF Friedrichshafen AG (the "defendants") of three U.S. patents: No. 4,899,279 ("the '279 patent"); No. 5,624,350 ("the '350 patent"); and No. 5,644,458 ("the '458 patent"). The patents relate to improvements in automated mechanical transmission ("AMT") systems used in medium and heavy duty trucks.

PROCEDURAL HISTORY

2 (a) By Order of Reference dated March 31, 2006, the Honorable George Caram Steeh, United States District Judge for the Eastern District of Michigan, Southern Division, referred this matter to Special Master James F. Davis, pursuant to Fed.R.Civ.P. 53. The Order notes the "complexity of the subject matter" and "no objection" by the parties to appointment of a Special Master to deal with "claim construction" issues. The parties briefed the issues and a hearing was held in Washington, D.C. on June 1, 2006. The transcript of the hearing and tutorial materials used at the hearing are not filed herewith but are in the possession of counsel and the Special Master for review by the Court as deemed necessary.

(b) On May 31, 2006, defendants filed a Motion for Summary Judgment of Invalidity Based on Indefiniteness of the '350 patent. By Order dated June 12, 2006, the Court referred defendants' motion to the

Special Master. On June 21, 2006, plaintiff filed a Motion for Reconsideration and Clarification of the June 12 Order seeking among other things reversal of the reference of defendants' motion to the Special Master. On June 28, 2006, the Court denied plaintiff's motion noting that the Special Master "is authorized to hold evidentiary hearings necessary to resolve motions that have been referred to him".

(c) An evidentiary hearing is scheduled on August 29, 2006 to consider issues relating to defendants' motion. The evidence to be adduced will center on whether "persons skilled in the art" would consider the claims "indefinite" or "ambiguous" within the meaning of applicable law.

3. By request of the parties, a draft of this report which relates only to the '279 and '458 patents was submitted to counsel on July 30, 2006 for review and comment. Rule 53, Advisory Committee Notes, 2003 Amendments, Subsection (f). Both parties commented and thereafter, at the Special Master's invitation, the parties responded to each others comments.

4. The issues before the Special Master at this time are construction and interpretation of the '279 and '458 patent claims in issue.

THE LAW

5. The law of claim construction, not in dispute, is easily stated but often difficult to apply. Patent claims measure the scope of the patentee's right to exclude and claim construction is a matter of law. Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed.Cir.1995) a'ffd. 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Claim terms normally carry their ordinary and customary meaning. Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313 (Fed.Cir.2002). The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will usually be the correct construction. Phillips v. AWH Corp. 415 F.3d 1303 (Fed.Cir.2005). Claims are read and construed in light of the specification but not limited in scope thereby. *Markman,* supra; Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576 (Fed.Cir.1996).

Prosecution history may also be helpful in construing claims. *Vitronics,* supra. Prosecution history may limit the interpretation of claims to exclude any interpretation that was disclaimed during prosecution in order to obtain claim allowance. Southwall Technologies v. Cardinal IG Co., 54 F.3d 1570 (Fed.Cir.1995). In most cases, intrinsic evidence alone, i.e. the patent disclosure, the claims and the prosecution history, provides the basis for claim construction and interpretation. Pall Corp. v. Micron Separation, Inc., 66 F.3d 1211 (Fed.Cir.1995). Sometimes there is a fine line between construing claims in light of the specification and file history and reading limitations of the specification into the claims. Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182 (Fed.Cir.1998). Although claims need not be limited to the preferred embodiment when the invention is broadly described, "neither do claims enlarge what is patented beyond what the inventor has described as the invention" [citing Netword, LLC v. Centraal Corp. 242 F.3d 1347 (Fed.Cir.2001)] *Inpro II Licensing, S.A.R.L. v. T-Mobile USA, Inc. et al*. No. 05-1233, (Fed. Cir. decided May 11, 2006)

Claims are to be construed without reference to an accused infringing device, *Young Dental Mfg. Co. v. Q3 Special Products Corp.,* 112 F.3d 1135 (Fed.Cir.1997), though knowledge of an accused device can sometimes provide helpful context to claim construction. *Lava Trading, Inc. v. Sonic Trading Management, LLC* et al, No. 05-1177,-1192 (Fed.Cir., decided April 19, 2006). Validity issues including indefiniteness and ambiguity are resolved independent of claim construction. Liebel-Flarsheim Co. v. Medrad, Inc., 358

F.3d 898 (Fed.Cir.2004)

In construing means-plus-function claim phrases pursuant to 35 U.S.C 112, para. 6, the particular function claimed must be identified. Then the "corresponding structure, material, or acts described in the specification" must be identified. Intellectual Prop. Dev., Inc. v. UA-Columbia Cablevision of Westchester, Inc., 336 F.3d 1308 (Fed.Cir.2003).

Summary judgment is appropriate when there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. Fed.R.Civ.P. 56(c); Anderson v. Liberty Lobby, Inc. 477 U.S. 242, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986). Summary judgment is not appropriate when there is conflicting evidence and where credibility determinations are required. *Teleflex, Incorporated and Technology Holding Company v. KSR International Co*. (Fed.Cir. No. 04-1152 decided January 6, 2005) citing Jones v. Hardy, 727 F.2d 1524 (Fed.Cir.1984).

PATENTS IN SUIT

The '279 patent

6. The '279 patent entitled "Method for Controlling AMT System Including Wheel Lock-Up Detection and Tolerance" issued February 6, 1990 (application Serial No. 848,610, filed April 7, 1986) and was assigned to plaintiff. Claims 1, 3, 7, 8 and 15 are in issue.

7. The '279 patent relates to method and apparatus for dealing with a problem called "wheel lock-up condition" in a moving truck. Claim 1 (method) and claim 15 (apparatus) are the independent claims in issue. As background, modern heavy trucks often have AMT systems which include the truck's engine (usually diesel), a multi-geared transmission connected to the engine by a clutch through which the engine provides power to the transmission, a drive shaft driven by the transmission and a differential gear connected to the truck axle and wheels by which the axle and wheels rotate. In such automated systems, the commands for gear shifting (up or down) are generated by electronics (microprocessors, programmed software, etc.) all of which replace the oldfashioned manual shifting done by human drivers. Modern transmissions can have as many as 18 gears (gear ratios). Fig 1 of the patent is a schematic showing the elements of a typical AMT system, the electronic heart of the system being the central processing unit (56).

8. "Wheel lock-up condition" can occur when a truck's brakes are applied and one or more wheels lose their grip on the road surface and stop rotating while the truck continues to move (or skid) down the road, sometimes at significant speeds. This condition can cause the truck's transmission control system to believe that the truck has purposely slowed down and thus cause the system to downshift to a gear which in fact is inappropriate to how fast the truck is actually moving. This could cause the driver to lose control of the truck.

9. The solution to this problem is the subject of the '279 patent, viz. to prohibit the transmission from downshifting during wheel lock-up (and skidding). Claims 1 and 15 define a system by which the clutch is "disengaged" and all "gear change operations" cease if a "wheel lock-up" condition is "sensed" until such time that the wheel lock-up is terminated. Col. 2, ll. 48-65

10. The '279 patent and particularly apparatus claim 15 does not come to this Court on a clean slate. The International Trade Commission (ITC) considered the claim in an earlier proceeding captioned *Certain Automated Mechanical Transmission Systems for Medium and Heavy Trucks, and Components Thereof,* Inv.

No. 337-TA-503 (ITC 2004). On January 7, 2005, an ITC Administrative Law Judge (ALJ) issued his 225-page Final Initial and Recommended Determination. On February 24, 2005 the ITC indicated it would not review the Determination. On January 10, 2006, the ALJ issued his 51-page Enforcement Initial Determination and Initial Advisory Opinion. So far as relevant here, the ALJ construed claim 15 which construction was not reviewed by the ITC and was not appealed by either party. Both parties here were parties in the ITC.

11. Defendants urge adoption of the ITC's construction of claim 15 and to that end set out at pp. 5 and 6 of their opening brief what they believe to be such construction. At the hearing on June 1, 2006, the Special Master invited plaintiff to point out any respects in which defendants' representations of ITC claim construction are in error. Plaintiff did so and defendants responded. Plaintiff contends error in the construction of claim clauses [a] and [f] (see paragraphs 12 and 13 hereof, infra). That is, plaintiff contends that clauses 13[a] and 13[f], which represent what defendants believe to be the ITC's construction, inaccurately do so. Review of the ITC record and transcripts shows that 13[a] and 13[f] are virtual verbatim statements from the ITC record. (13[a] at p. 104 of the ITC Final Initial and Recommended Determination; 13[f] at p. 21 of the ITC Enforcement Initial Determination and Initial Advisory Opinion). Plaintiff's contentions therefore are rejected.

Furthermore, the ITC construction was the result of thorough analysis having the benefit of a full ITC hearing with the same parties as here and also ITC staff counsel's office participating representing the public interest which is conventional in ITC proceedings. Under the circumstances, the ITC claim construction is entitled to considerable weight. Texas Instruments Incorporated v. Cypress Semiconductor, Inc. 90 F.3d 1558 (Fed.Cir.1996). Accordingly, the ITC construction of claim 15, as set out at paragraph 13 hereof, is adopted.

12. Claim 15 is set out below, the italicized portions being those portions construed by the ITC with such construction set out thereafter at paragraph 13.

A control system for controlling a vehicular automatic mechanical transmission system utilized in connection with a vehicle equipped with vehicle wheel brakes for retarding the rotation of at least one of the vehicle drive wheels, said automatic mechanical transmission system comprising a throttle controlled engine, a change gear transmission having a plurality of gear ratio combinations selectably engageable between a transmission input shaft and the transmission output shaft, said transmission output shaft drivingly coupled to said vehicle drive wheels, and a disengageable coupling drivingly interposed said engine and said transmission input shaft, said automatic mechanical transmission system additionally comprising an information processing unit having [a] *means for receiving a plurality of input signals including (1) an input signal indicative of the rotational speed of said transmission output shaft,* said processing unit including [b] *means for processing said input signals in accordance with a program to provide a predetermined* [c] *gear ratio for a given combination of input signals and for generating command output signals whereby said transmission is operated in accordance with said program,* and [d] *means associated with said transmission system effective to actuate said transmission system to effect engagement of one of said gear ratios combinations in response to said output signals from said processing unit,* the system characterized by:

[e] *means for sensing the presence of* [f] *wheel lock-up condition, and, if and as long as the presence of a wheel lock-up is sensed,* [g] *prohibiting said processing unit from generating all transmission* [h] *gear change command output signals.*

13. The ITC construction of elements [a] through [h] is set out below:

[a] Construed function: "to receive multiple input signals, one of which must be an input signal relating to the speed of the transmission output shaft"

Corresponding structure: "the central processing unit 56 with input means for receiving said input signals" ... "in accordance with a program of predetermined logic rules"

[b] Construed function: "to select a predetermined gear ratio based on the received input signals and use the logic rules of the software to issue command output signals based on the selected predetermined gear ratio"

Corresponding structure: "the central processing unit 56 including logic or algorithm of the software operating inside the central processing unit, is the structure disclosed in the '279 patent for performing the recited processing and generating functions"

[c] "A gear ratio is the difference in rotational speed from the input shaft of the transmission to the output shaft of the transmission; i.e. the ratio at which those two members are spinning"

[d] Construed function: "to put the transmission system into mechanical action to cause engagement of a gear ratio combination in response to command output signals from the CPU [central processing unit].

Corresponding structure: "the transmission operator 34 is the structure disclosed in the '279 patent specification corresponding to the aforementioned actuating function".

[e] Construed function: "sensing the presence of a wheel lockup condition"

Corresponding structure: "the central processing unit 56 and either (1) an ABS system or (2) an algorithm dependent on the speed of the transmission output shaft"

[f] "A wheel lock-up condition is also known as a skid and refers to the condition in which the vehicle is moving, but the wheels are not rotating at a speed representative of the vehicle speed"

[g] Construed function: "preventing all signals from being produced by the processing unit that direct the transmission operators to cause a change in the gear ratio of the transmission"

Corresponding structure: "the logic of the central processing unit"

[h] "a signal from the processing unit that directs the transmission operators to cause a change in the gear ratio of the transmission"

14 (a) Claim 1 of the '729 patent, not construed by the ITC, is the method claim counterpart of apparatus claim 15 and comparable claim elements are here construed the same as in claim 15. Claim 1 however contains a clause not found in claim 15 which is in dispute (italicized portion):

"... if the presence of a wheel lock-up condition is sensed, causing said coupling to be immediately disengaged, and *then processing said input signals to determine if said previously sensed existing or*

impending wheel lock conditions have terminated if, after sensing the presence of a wheel lock condition, the sensed throttle position exceeds a predetermined minimum reference value."

(b) The patent teaches that after a wheel lock-up occurs and the clutch disengages, the system senses output shaft speed which is lower than, and no longer represents, vehicle speed. "Until the output shaft obtains a predetermined percentage of prelock-up value [i.e. a predetermined minimum reference value] and/or the throttle ... is reapplied it is assumed that the skid is still proceeding ... and the clutch ... remains disengaged ..." Col. 5, ll. 26-3. Once the predetermined minimum value is reached, it is "presumed" that the lock-up has ended, and "skid recovery is allowed to proceed by resuming control of the AMT system ... by the nonwheel lockup control algorithms." Col. 5; ll. 39-45.

Thus the essential teaching of the patent is that after clutch disengagement because of wheel lock-up, the system is designed to be able to sense a predetermined minimum throttle position and if such position is exceeded then other input signal information is used to determine whether the lock-up condition has ended and return control to the AMT system algorithm.

(c) Defendants contend that the construction of the disputed portion of the claim should be "... thereafter [i.e. after disengagement], if the throttle position exceeds a predetermined minimum value, checking the other input signals to determine whether or not the previously sensed wheel lock-up position has terminated (according to the algorithm disclosed in FIG. 2)". Plaintiff disagrees and contends that the disputed portion should be construed as follows: "... and thereafter [i.e. after disengagement] determining if the wheel lock-up condition has terminated using the input signals." Both contentions are rejected and the following is adopted viz. "... and thereafter, if the throttle position exceeds a predetermined minimum reference value, using other input signals to determine whether the previously sensed lockup condition has terminated".

(d) Claims 3, 7 and 8 of the '729 patent are dependent on claim 1 and contain no additional disputed elements.

The '458 patent

15. The '458 patent entitled "Rolling Start Control System/Method for Semi-Automated Mechanical Transmissions" issued September 9, 1997 (application Serial No. 600,583, filed February 13, 1996) claiming priority to a UK application filed in 1995 and was assigned to plaintiff. Claims 1, 3-6, 12 and 14-17 are in issue. Claims 1 and 12 are independent claims. Claims 3-6 and 14-17 are respectively dependent thereon.

16. The '458 patent relates to method and apparatus for semiautomatic control of an AMT system in a truck by which the driver can shift directly into an appropriate gear when making a so-called "rolling start". To explain, a "rolling start" is one in which the truck is already moving in neutral, i.e. no clutch engagement between the engine and the transmission. If the driver wants to engage the clutch while the truck is moving, hence a "moving start", he must do so into a transmission gear (gear ratio) which essentially corresponds to the truck ground speed. Otherwise, the engine/transmission mating through the clutch will not be smooth and may not be safe. Before the days of automated transmission systems when truck drivers operated the clutch and gears manually, the driver would have to determine from the truck's road speed and the driver's knowledge of transmission's gears (and their gear ratios) which gear to shift to for smooth transition, i.e. whether 2nd gear, 4th gear, 6th gear, etc., then make the shift in manual steps. This was cumbersome and made for possible driver error and delay.

17. The invention of the '458 patent takes the uncertainty out of "rolling starts". In essence, it provides a semi-automatic system by which the driver, with a "single movement" of a "control lever" can put the transmission into proper gear for the truck's ground speed. As stated in the patent "... if the vehicle is in forward motion above a minimum reference speed and the transmission is in neutral, then a single movement of the control lever in the upshift direction is interpreted and executed as a request for a direct shift into a rolling start ratio, determined as a function of current vehicle ground speed." (col.2, ll.39-45) The patent's specification and drawings describe the hardware and electrical sensing and control elements by which the system is able to effect the proper sensing and shifting, knowing the vehicle ground speed, the proper gear setting corresponding to ground speed, etc. Figs 1-4 along with associated written description illustrate and describe system elements in detail.

18. Method claim 1 is representative and is used below to set out the disputed claim elements:

1. A method of controlling a semi-automatic mechanical change gear transmission system (10) comprising a fuel-throttle-controlled engine (14) having a known idle speed (ES IDLE), a multi-speed change-gear mechanical transmission (12), a friction master clutch (16) interposed between the engine and transmission, a manually operated shift selection lever (1) movable in a first direction from a centered position to select upshifts and in a second position from said centered position to select downshifts from the currently engaged gear ratio, a central processing unit (38) for receiving inputs indicative of transmission engaged ratio, of vehicle speed (OS) and of operation of said manual shift selection lever and for processing same according to predetermined logic rules to issue command output signals to non-manually controlled operators including a fuel throttle control operator (26) and a transmission operator (34), said method comprising:

[a] *determining currently engaged transmission ratio; determing current vehicle speed;* and [b] *if said transmission is in neutral (GR=N) and said vehicle speed exceeds a minimum reference value (OS-REF),* [c] *automatically selecting operation in a rolling start mode of operation wherein a single movement of said shift selection lever in the upshift direction is interpreted as an operator selection of a direct shift from neutral into an appropriate rolling start gear ratio (GR), said* [a] *appropriate rolling start ratio* [d] *determined as a function of current vehicle speed.*

19. [a] " *currently engaged transmission ratio* " and " *appropriate rolling start gear ratio* "

"Gear ratio" and "transmission ratio" are construed as referring to integer gear numbers, i.e. 2nd gear, 3rd gear, etc in which the gear ratios are engaged. The patent specification fairly read uses gear numbers as a short hand way to refer to gear and transmission ratios, i.e. the numerical ratio of the input shaft or engine speed to output shaft speed of the transmission.

20. [b] " *if said transmission is in neutral ... as a function of current vehicle speed* "

This phrase is construed that if the transmission is in neutral and the speed of the vehicle is higher than a reference speed, a move by the driver of the shift lever in an upshift direction is interpreted as a request for an appropriate rolling start ratio that is selected based on current vehicle speed.

The conditions of neutral, vehicle speed and upshift can be checked by the processor in any order.

21. [c] " *automatically selecting operation in a rolling start mode of operation* "

This phrase means that when the transmission processor receives an upshift request with the vehicle in rolling start mode of operation, the processor automatically selects operation to an appropriate start gear.

22. [d] [appropriate rolling start ratio] *determined as a function of current vehicle speed* "

The phrase "determined as a function of current vehicle speed" means based on current vehicle speed.

23. Claims 3-6 and 14-17 depend from claims 1 and 12 respectively and have a common disputed element:

"*... said approximate rolling start gear ratio is selected such that the numerical ratio thereof is [one of four numerical ratios representing engine speed divided by output shaft speed] ...* "

The disputed element means that the start gear ratio must meet one of the four specific numerical ratios i.e. engine speed divided by output shaft speed as set out in each particular claim.

CONCLUSIONS

The disputed claim terms are construed as indicated seriatim in the body of this report.

E.D.Mich.,2006.
Eaton Corp. v. ZF Meritor LLC