

# United States Court of Appeals for the Federal Circuit

2007-1391

SOLOMON TECHNOLOGIES, INC.,

Appellant,

v.

INTERNATIONAL TRADE COMMISSION,

Appellee,

and

TOYOTA MOTOR CORPORATION, TOYOTA MOTOR SALES, U.S.A., INC., TOYOTA  
MOTOR ENGINEERING AND MANUFACTURING NORTH AMERICA, INC., and  
TOYOTA MOTOR MANUFACTURING KENTUCKY, INC.,

Intervenors.

Kenneth L. Stein, Jenner & Block LLP, of New York, New York, argued for appellant. With him on the brief were Joseph Diamante and Richard H. An.

Clint A. Gerdine, Attorney, Office of the General Counsel, United States International Trade Commission, of Washington, DC, argued for appellee. With him on the brief were James M. Lyons, General Counsel, and Andrea C. Casson, Assistant General Counsel.

Donald R. Dunner, Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., of Washington, DC, argued for intervenors. With him on the brief were Thomas W. Winland, Christine Lehman, James R. Barney, and Hayley S. Weimer.

Appealed from: United States International Trade Commission

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On appeal from the United States International Trade Commission  
in Investigation No. 337-TA-561

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DECIDED: May 7, 2008

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Before LOURIE, RADER, and BRYSON, Circuit Judges.

BRYSON, Circuit Judge.

Solomon Technologies, Inc., filed a complaint with the International Trade Commission under section 337 of the Tariff Act of 1930, 19 U.S.C. § 1337(a)(1)(B), alleging that Toyota Motor Corporation and its affiliates imported and sold hybrid vehicles that infringed U.S. Patent No. 5,067,932 (the '932 patent). Following an

investigation, the presiding administrative law judge found no violation of section 337. The administrative law judge based that ruling on his determinations that (1) the accused devices do not infringe the '932 patent, (2) the '932 patent is invalid for lack of enablement, and (3) the domestic industry requirement was not established. The Commission reviewed in part the administrative law judge's initial determination and took no position on the administrative law judge's findings concerning the economic prong of the statutory domestic industry requirement. In all other respects, the Commission declined to review the administrative law judge's initial determination. The administrative law judge's initial determination therefore became the final determination of the Commission with respect to the administrative law judge's rulings on infringement, invalidity, and the technical prong of the domestic industry requirement. Accordingly, the Commission terminated the investigation with a finding of no violation of section 337 and refused to enter an order excluding Toyota's products. On Solomon's appeal, we affirm the Commission's final determination on the basis of noninfringement.

I

The '932 patent covers a combination motor and transmission device having two power inputs. The patent describes the invention as "an ideal infinite speed device" that can deliver peak power output "at any desired rotational speed." '932 patent, Abstract. The only claim at issue in this appeal is claim 7, which recites:

A combination motor and transmission device, comprising  
first power input means for receiving a first input of electrical power,  
second power input means for receiving a second input of electrical  
power, and

power conversion means for converting said electrical power of said first and second inputs for output, said power conversion means including a mechanical power transmission unit, said transmission unit having two inputs for respectively receiving mechanical power corresponding to said first and second power inputs provided to said first and second power input means and an output for outputting the converted power as rotational mechanical power,

wherein the rotational speed of said output is continuously variable, and [sic] said power conversion means includes, for each of said first and second power inputs, a respective integral combination of a respective electric motor element and an element of said transmission unit, each said integral combination involving one of said two respective elements thereof being at least to a large extent t [sic] within an envelope containing the other, whereby a compact structure is provided for each said integral combination, and said two integral combinations are located closely adjacent each other[.]

Solomon's complaint alleged that four of Toyota's hybrid vehicles have transaxles that infringe claim 7: the Toyota Prius, Toyota Highlander HV, Toyota Camry HV, and Lexus RX 400h. The Toyota Prius uses a transaxle that connects two electric motor-generators with a planetary gear set in which the planetary gear carrier is driven by an internal combustion engine. The Toyota Highlander HV, Toyota Camry HV, and Lexus RX 400h use a similar system that has an additional planetary gear set. After a hearing, the administrative law judge construed the claim terms "continuously variable," "integral combination," and "within an envelope." Based on his construction of each of those terms, the administrative law judge found that Toyota's devices do not infringe claim 7. Additionally, he found that Toyota's transaxles lack a "power conversion means" that is identical or equivalent to the structure disclosed in the specification of the '932 patent. Finally, under his construction of the term "continuously variable," the administrative law judge ruled that claim 7 of the '932 patent was not enabled and that Solomon did not satisfy the technical prong of the statutory "domestic industry" requirement.

## II

With respect to the Commission's determination of noninfringement, Solomon challenges the administrative law judge's constructions of the three claim terms on which the administrative judge based his noninfringement ruling: "continuously variable," "integral combination," and "within an envelope." Solomon concedes that, under the administrative law judge's construction of each of those terms, the Toyota transaxles do not infringe claim 7.

As to the "power conversion means" limitation, Solomon argues that the administrative law judge applied an impermissible element-by-element analysis to determine whether the Toyota transaxles use a power conversion means that is equivalent to the structure disclosed in the '932 patent. We affirm the administrative law judge's determination of noninfringement with respect to each of the designated limitations, except for the "continuously variable" limitation, which we do not address.

## A

Claim 7 covers devices that have an "integral combination of a respective electric motor element and an element of said transmission unit." The administrative law judge construed that limitation as follows:

[A]n electric motor element and a transmission unit element rigidly and directly attached without the presence of shafts, bearings or other components between the electric motor element and the transmission unit element, supportable by a single bearing.

Solomon concedes that the Toyota transaxles do not satisfy that limitation as construed because they contain rotor shafts between the motor-generators and the transmission unit, and because the rotor shafts are not supported by a single bearing. Solomon argues that the patentee did not disclaim devices having shafts, bearings, or other

components between the motor and transmission elements, and that the patentee did not disclaim devices using more than a single bearing to support the integral combination of the motor and transmission elements. We reject Solomon's contention with respect to the disclaimer of devices having shafts.

The prosecution history could not be clearer in showing a disclaimer of devices that use shafts to connect the motor and transmission elements. To overcome an anticipation rejection over U.S. Patent No. 3,161,083 to Roe, the patentee stated the following:

Secondly and more importantly, this prior art does not at all teach or in any way suggest the feature of the present invention as recited in claims 1 and 2 [issued claim 7], or in claim 3/2, of the "integral" combination of each armature and respective gear element. Namely, in this prior art there are shafts and bearings and other elements such as one of the electric motors itself, between each respective pair of these two elements.

Solomon's central argument against a finding of prosecution disclaimer is that the patentee amended the claims in two ways to capture the "integral combination" feature of the invention. In claim 1, the patentee explicitly added a requirement that no shafts or bearings lie between the motor and transmission elements. In issued claim 7 (application claim 2), however, the patentee added a requirement that the motor and transmission elements be "at least to a large [extent] within an envelope containing the other." Solomon argues that the amendment to issued claim 7 sought to distinguish over the prior art in a different way from the amendment to claim 1. That is, the amendment to issued claim 7 sought to distinguish prior art structures having free-standing motors connected to transmission elements located outside the motor. Based on that characterization of the prosecution history, Solomon asserts that the "no shafts"

requirement of claim 1 should not be read into the “integral combination” limitation of claim 7.

We find Solomon’s characterization of the effect of the amendment unconvincing because, in his description of the “within an envelope” requirement, the patentee emphasized the absence of a shaft between the motor and transmission elements:

One aspect, now recited in claim 3, is that the respective gear element of each respective “integral combination” is approximately within envelope [sic] of the respective electrical motor element, as is seen for each illustrated embodiment. Again, there is no shaft running through the armature—just one support bearing for each integral combination of an electric motor element and a mechanical gear element. The power is taken off from inside the armature itself. In all the cited prior art devices, the power is taken out by a driven shaft from a free-standing electric motor.<sup>1</sup>

Solomon further asserts that a construction incorporating the patentee’s disclaimer of the use of shafts would exclude the preferred embodiment shown in Figure 5 of the ’932 patent. Figure 5 shows a sun gear extension element connected to a rotating disk that is driven by the invention’s motor element. Solomon argues that the sun gear extension is a shaft that connects the rotating disk carrying the armature elements (the motor elements) to the planetary gear set (the transmission unit).

We agree with the administrative law judge that the better view is that, in light of the patentee’s statements to overcome the Roe patent, the patentee understood the sun gear extension to be an element of the transmission unit. We therefore affirm the administrative law judge’s finding that devices such as the Toyota transaxles were

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<sup>1</sup> Application claim 3 became issued claim 8, which depends from claim 7. Claim 8 further specifies that the “envelope” is formed by the rotation of the motor element. Presumably claim 7 would also cover devices in which the transmission element rotates and forms an “envelope.”

disclaimed because of their use of rotor shafts between the motor-generators and the transmission unit.

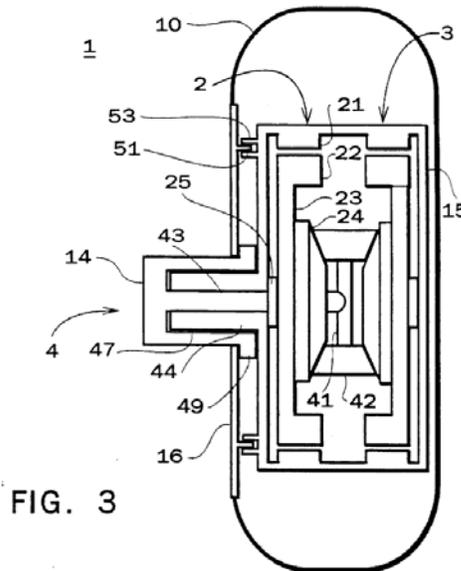
The administrative law judge also found that the patentee disclaimed coverage of devices having “other components” between the motor and transmission elements. The accused devices have spline connections between the rotors and the transmission elements, which the administrative law judge considered to be “other components.” We do not agree that the phrase “other components” provides a sufficiently clear basis for a finding of prosecution disclaimer.

The administrative law judge further found that the Toyota transaxles are not “supportable by a single bearing” because they are supported by two bearings. We do not believe that conclusion necessarily follows. A device could be “supportable” by one bearing even though it is actually supported by more than one bearing. In fact, when the patentee sought to limit the number of bearings used to support the integral combination, the patentee specified that “each said integral combination is supported by a single respective bearing.” ’932 patent, claim 20, col. 13, ll. 42-48. We therefore do not agree that the patentee disclaimed multiple bearings by describing the invention as being “supportable” by a single bearing. Nevertheless, we conclude that the presence of the rotor shaft supports the administrative law judge’s determination that the accused devices do not have an “integral combination” of a motor element and transmission unit.

## B

The administrative law judge also found that the Toyota devices did not satisfy the “within an envelope” limitation, apart from the presence of shafts between the motor and transmission elements. The administrative law judge construed the “within an

envelope” limitation to mean that “one of the integral combination elements is contained entirely or nearly entirely within the imaginary space defined by the rotation of the other integral combination element so that power is taken off from inside the armature itself.” Figure 3 of the patent, reproduced below, shows how the disclosed invention would satisfy that requirement. In operation, a series of field elements (21) repels a series of armature elements (22) arranged along the perimeter of a rotating disk (23). As the disk rotates, the armature elements form an imaginary cylinder in which the transmission gear (24) would lie to a large extent.



Solomon argues that the administrative law judge’s construction is too narrow. Instead, Solomon suggests that the construction should merely require the armature elements and the transmission gears to have a “close geometrical overlap.” Solomon’s main contention on this issue is that the administrative law judge’s construction would exclude the preferred embodiment displayed in Figure 6, reproduced below.

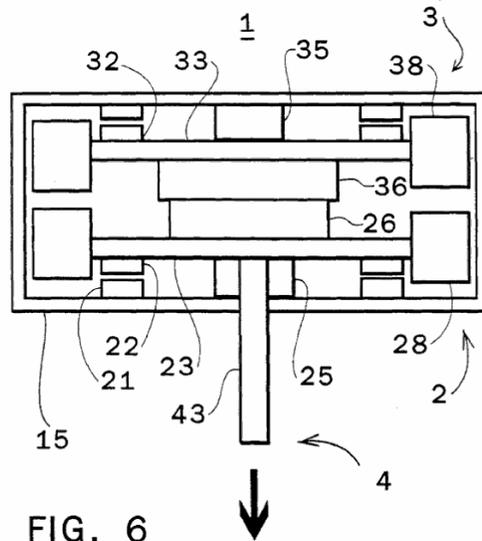


FIG. 6

Down for distribution  
to drive wheels

Figure 6 shows the combination motor and transmission device with heavy cylindrical peripheral masses (28 and 38) acting as flywheels. The transmission elements in Figure 6 are the ring gear (36) and the planetary gear hub (26). Neither of those elements would lie within the sweep of the armature elements (22) because Figure 6 shows the armature elements fixed to the side of the rotating disk rather than on the outer perimeter. The parties dispute, however, whether the patentee was referring to Figure 6 when he stated during prosecution that “the respective gear element of each respective ‘integral combination’ is approximately within envelope [sic] of the respective electrical motor element, as is seen for each illustrated embodiment.” Toyota argues that the patentee had generally treated Figure 6 separately from the other preferred embodiments. That is seen in the specification, Toyota asserts, because the written description makes reference to the “integral combination” limitation only in the descriptions of Figures 3 through 5. Solomon asserts, however, that the

patentee clearly intended Figure 6 to fall within the scope of claim 7 because claim 13 covers devices using flywheels, and because that claim depends from claim 7.

Even if the patentee intended to refer to Figure 6 in his explanation of the “within an envelope” limitation, we do not believe that a proper construction of that limitation necessarily excludes the embodiment in Figure 6. Rather, it seems that the flywheel masses (28 and 38) can be considered to be the motor elements that define the envelope, so that the transmission elements (26 and 36) lie to a large extent within imaginary space defined by the rotation of each flywheel mass. Indeed, the specification’s description of Figure 6 characterizes the flywheel masses as components of the two inputs, along with the other motor elements:

The input 2 includes the field assembly units 21 distributed about the inside of the half 15 of the housing, and the armature units 22 located on the top side of the disk 23 (shown edgewise) which has a heavy cylindrical 28 for increasing the moment of rotational inertia. Input 3 has similar components.

'932 patent, col. 9, ll. 35-43.

To be sure, in the embodiment depicted in Figure 6, power is taken off the flywheel rather than off “from inside the armature itself,” as was required by the administrative law judge’s construction of the “within the envelope” limitation. The administrative law judge’s construction may be unduly restrictive in that respect, as it is based on language from the prosecution history that appears to describe the operation of a device modeled on Figures 3 through 5. The pertinent claim language, however, does not require that power be taken off from inside the armature in all cases. Rather, as claim 13 illustrates, it permits power to be stored (and supplied when needed) by the flywheel. While the administrative law judge should have omitted the words “so that the power is taken off from inside the armature itself” from the construction of the “within an

envelope” limitation, that aspect of the construction does not affect our conclusion as to noninfringement because Toyota has shown that its devices have transmission gears outside the imaginary space defined by the motors’ magnet assemblies. We thus do not find that the administrative law judge erred in his construction in any respect that affects the issue of infringement.

Solomon’s competing construction—that the “envelope” requires a “close geometrical overlap” among the components—provides little meaningful guidance for determining the boundaries of the claimed “envelope.” The administrative law judge therefore did not err in rejecting Solomon’s construction.

### C

Solomon next challenges the administrative law judge’s finding that the accused devices do not satisfy the power conversion means. The administrative law judge found a substantial difference in structure between the Toyota devices and the devices described in the specification of the ’932 patent. The administrative law judge focused in particular on the Toyota transaxles’ use of rotor shafts instead of disks to connect the motor elements to the transmission elements. Relying on Odetics, Inc. v. Storage Technology Corp., 185 F.3d 1259 (Fed. Cir. 1999), Solomon argues that the administrative law judge performed an impermissible component-by-component analysis in comparing the accused devices with the structure described in the specification. As the administrative law judge observed, however, our case law allows for greater weight to be given to individual components that play a central role in the identified structure. See Toro Co. v. Deere & Co., 355 F.3d 1313, 1324 (Fed. Cir. 2004). Solomon argues that the disk does not play a central role in the power

conversion means, but we disagree. To overcome the examiner's rejection over the Roe patent, the patentee described the importance of the disk's role in reference to the "integral combination" limitation:

The power transfer is directly from the back side or inside of the armature to the gear element, not along any shaft connecting the two, and the output is direct to the driving wheel or hub, again with no substantial shafting in comparison to that of the prior art.

Every embodiment of the invention disclosed by the patent shows the disk connecting the armature to a gear element. That configuration allows a direct power transfer from the armature to the gear element in order to generate the rotational mechanical power output of the power conversion means. The prosecution history shows that the patentee relied on that advantage of a disk over a shaft in order to overcome the prior art. We therefore see no error in the administrative law judge's finding that, based on the use of rotor shafts rather than disks, the Toyota transaxles are not structurally equivalent to the structure disclosed in the specification of the '932 patent.

#### D

Finally, the administrative law judge found that Toyota's transaxles do not provide rotational output speed that is "continuously variable." To understand the parties' disagreement on this issue, it is important to understand that there are two ways that a motor and transmission, working together, can vary the rotational speed of a wheel being driven. First, the rotational speed of a wheel may be increased simply by increasing the operating speed of the motor. Increasing rotational speed in that manner does not require a transmission or gear reduction of any kind; the rotational output speed of the wheel being driven simply matches the rotational speed of the motor. The

second way that a motor and transmission can vary the output speed of a wheel being driven is by changing gears. When the motor is driven at a constant speed, the transmission can increase or decrease the output speed by engaging either a high gear or a low gear.

Most transmissions provide a limited number of gears. Those transmissions therefore provide a limited number of gear ratios to vary the output speed and torque at any given speed at which the motor is operating. '932 patent, col. 1, ll. 35-42. Infinite speed devices, also known as continuously variable devices, provide an advantage over conventional transmissions, in that they provide an infinite number of gear ratios. That means that at any given motor speed a continuously variable transmission allows a wheel to be driven at a continuous range of different rotational speeds.

The '932 patent describes the advantage of an infinite speed device as permitting a wheel to be driven over a large range of speeds while the motor is driven at "peak power." The written description of the patent explains that above a certain speed the power output of a motor will plateau. '932 patent, col. 7, line 53 to col. 8, line 3. That plateau is the peak power output of the motor. When the motor runs at the minimum speed necessary to reach that plateau, the power output of the motor will no longer increase. Above that maximum speed of the peak power plateau, the power output will begin to decrease. The range of speeds at which a motor operates in its peak power plateau is generally narrower than the range of desirable output speeds. A continuously variable transmission allows the motor to operate in its narrow peak power range while driving a wheel at a larger, continuous range of rotational speeds.

The language of claim 7 does not quite capture that feature of a continuously variable transmission. It states that the “power conversion means” provides “an output for outputting the converted power as rotational mechanical power” and that “the rotational speed of said output is continuously variable.” Solomon argues that “continuously variable” in claim 7 merely means that a device can drive a wheel at “a continuous variation in speed from a negative maximum value to a positive maximum value.” In other words, Solomon argues that “continuously variable” merely refers to a transmission that can achieve a continuous range of output speeds as opposed to a transmission that only provides a discrete set of output speeds. Solomon’s construction is problematical because even vehicles with manual transmissions can operate at a continuous range of output speeds by varying the speed of the motor. Although a manual transmission provides a discrete set of gear ratios, it would be physically impossible for a vehicle with a manual transmission to jump from one “discrete” speed to a second “discrete” speed without operating at any rotational speeds in between. The administrative law judge was therefore correct to reject that proposed construction of the term “continuously variable.”

Toyota’s construction, on the other hand, is overly narrow. Toyota argues that the “continuously variable” limitation covers only those devices that can attain “any desired rotational speed, from a negative maximum value to a positive maximum rotational value . . . at peak power.” The administrative law judge adopted that view and found that Toyota’s devices do not infringe because the two motor-generators used in Toyota’s transaxles do not operate at peak power when both are operating as motors. Claim 7, however, does not require the first power input means and the second power

input means to provide peak power. The claim merely requires the power input means to provide electrical power to the power conversion means, which in turn converts the electrical power to mechanical power. At whatever level of power the motor operates, a continuous range of speeds should be attainable. The claim does not, however, specify a level of power that must be provided.

Because we disagree with the administrative law judge's construction of the "continuously variable" limitation, we do not uphold the finding of noninfringement on that basis. Nonetheless, we affirm the administrative law judge's finding of noninfringement based on each of the other limitations addressed in this appeal. We therefore affirm the final determination without resolving the dispute over the "continuously variable" limitation.<sup>2</sup>

#### IV

Because we do not agree with either party's proposed construction of the "continuously variable" limitation, we do not address the administrative law judge's ruling that claim 7 is not enabled. Nonetheless, the Commission's final determination may be affirmed on the basis of noninfringement without the need to address the issue of invalidity. In district court cases in which invalidity is asserted as a counterclaim, the

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<sup>2</sup> The administrative law judge also found that the patentee disclaimed devices having an "intervening gear reduction" and construed "continuously variable" to reflect that disclaimer. That finding of disclaimer was based on the patentee's statement that "the present invention teaches providing a truly infinite speed transmission . . . with no intervening gear reduction to the surface." The Highlander HV transaxles have a reduction gear between one of the motor-generators and the transmission unit. The administrative law judge therefore ruled that those transaxles do not meet the "continuously variable" limitation. Because including a "no intervening gear reduction" requirement would exclude the preferred embodiment in Figure 6, that construction is questionable, and we decline to affirm the final determination on that ground.

Supreme Court has held that the question of validity does not become moot when there has been a determination of noninfringement. For that reason, it is ordinarily necessary for the district court, and this court on appeal, to address the counterclaim even if noninfringement has been found. Cardinal Chem. Co. v. Morton Int'l, Inc., 508 U.S. 83, 96 (1993). Where invalidity is raised as an affirmative defense, however, it is not necessary for the reviewing court to address the validity issue. Id. at 93-94; Lacks Indus., Inc. v. McKechnie Vehicle Components USA, Inc., 322 F.3d 1335, 1346 (Fed. Cir. 2003); Hill-Rom Co. v. Kinetic Concepts, Inc., 209 F.3d 1337, 1344 (Fed. Cir. 2000).

Before the International Trade Commission, invalidity is not a separate claim, as it is when raised as a declaratory judgment claim in district court litigation. Instead, invalidity is simply one ground for determining that the importation and sale of allegedly infringing articles do not “infringe a valid and enforceable United States patent.” 19 U.S.C. § 1337(a)(1)(B). The final determination that we review on an appeal in a section 337 proceeding before the International Trade Commission is a determination that section 337 has, or has not, been violated. If we uphold the Commission’s order, as we do in this case, we are not required to address every possible ground on which the Commission’s order might be sustained. See Sinorgchem Co., Shandong v. Int’l Trade Comm’n, 511 F.3d 1132, 1141 (Fed. Cir. 2007). For that reason, we may affirm the Commission’s final determination on the basis of noninfringement without addressing the invalidity of claim 7. Accordingly, we decline to decide the enablement issue or remand the case to the Commission to determine whether claim 7 is enabled under a proper construction of the term “continuously variable.” We likewise decline to address the Commission’s determination with respect to the technical prong of the

domestic industry requirement, because that determination was also based on the “continuously variable” limitation.

AFFIRMED.