

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

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Paper No. 34

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte DAVID M. ERDMAN,  
DALE F. YODER, RICHARD S. TATMAN,  
and DAVID T. MOLNAR

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Appeal No. 1997-0397  
Application 07/863,900<sup>1</sup>

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HEARD: November 14, 2000

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Before BARRETT, FLEMING, and BARRY, Administrative Patent Judges.  
BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

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<sup>1</sup> Application for patent filed April 6, 1992, entitled "Integral Motor And Control."

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This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claim 66. Claims 1-58 and 72-75 stand withdrawn. Claims 59-65, 67-71, and 76 stand allowed.

We affirm.

#### BACKGROUND

The invention is directed to a brushless direct current (DC) motor and a control circuit. The control circuit includes a capacitor for controlling the input power supplied to the motor, whereby the power output of a given motor may be preselectively determined at the time of manufacture by selection of the capacitance value.

Claim 66, the sole claim on appeal, is reproduced below.

66. An assembly of motor hardware and a control circuit for use as a brushless DC motor said circuit including a capacitor for controlling the input power supplied to said hardware, said DC motor hardware including a permanently magnetizable rotor magnetized to establish at least one north and at least one south pole with a magnetic transition region located between adjacent north and south rotor poles, a C-frame ferromagnetic stator core defining a rotor accommodating bore, and a plurality of energizable winding turns disposed about a portion of the stator core for establishing alternating north and south magnetic poles in the stator core at locations adjacent to the bore; said winding turns being made from wire having a preselected diameter, and said winding turns being of a predetermined number; said stator core having a predetermined stack height; said motor hardware being operable within a range of power outputs with said range being determinable by the capacitance of the capacitor when such capacitance is within a predetermined range, and said capacitor being connected in

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series with said winding turns during energization thereof whereby the power output of a given hardware assembly may be preselectively determined, at the time of manufacture and interconnection with the control circuit by the capacitance value of said capacitor in the control circuit.

The Examiner relies on the following prior art:

Sato	4,600,864	July 15, 1986
Gerfast	4,929,871	May 29, 1990

Claim 66 stands rejected under 35 U.S.C. § 103 as being unpatentable over Sato and Gerfast. The rejection is stated in Final Rejection (Paper No. 16). The Examiner finds that Sato discloses a brushless DC motor essentially as claimed except for providing a capacitor in series with the motor winding. The Examiner finds that Gerfast discloses, at column 2, lines 36-41, providing a control circuit having capacitor in series with the winding of a brushless DC motor, where the size is selected to match the load, and observes that the capacitor 28 (figure 2) in Gerfast is connected between the AC input and the rectifying portion of the motor drive circuit just as capacitor 127 is connected between the AC input and the rectifier 128 in Appellants' invention. The Examiner concludes that it would have been obvious to provide a capacitor in series with the motor winding of Sato in order to control the amount of current supplied to the motor, as disclosed by Gerfast. The Examiner further reasons

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that the limitations about selection of the capacitor value to vary the power output are statements of intended use which do not patentably distinguish the invention.

We refer to the Final Rejection (Paper No. 16) and the Examiner's Answer (Paper No. 22) for a statement of the Examiner's position, and to the Appeal Brief (Paper No. 21) (pages referred to as "Br\_\_") and the Reply Brief (Paper No. 24) (pages referred to as "RBr\_\_") for Appellants' arguments thereagainst.

#### OPINION

We agree with the Examiner's conclusion that it would have been obvious to combine the motor of Sato with the circuit of Gerfast to arrive at a combination of a brushless DC motor and a control circuit having a capacitor in series with the winding turns. It appears to us that the hardware of claim 66 is common to most, if not all, brushless DC motors; i.e., that no special motor hardware limitations are recited. Nevertheless, Sato discloses a brushless DC motor having the claimed motor hardware. Sato does not disclose the nature of the DC voltage source. Gerfast discloses that a DC voltage for a brushless DC motor can be derived from AC using a rectifier circuit having a capacitor to limit the current, but does not disclose any details of the motor hardware. Gerfast discloses that the size of

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the capacitor should be selected to match the load (col. 2, lines 35-40). Gerfast shows the capacitor being connected to a rectifier circuit exactly as shown by Appellants. One of ordinary skill in the art would have been motivated to use Gerfast's circuit with its current-limiting capacitor to provide power to the brushless DC motor of Sato to power the motor from an AC voltage. Alternatively, one of ordinary skill in the art would have known that the brushless DC motor in Gerfast could have any structure and would have found it obvious to apply the control circuit to a known brushless DC motor, such as Sato.

The question is whether this combination meets the limitations of claim 66. We see two possible issues. The first issue is whether the limitation of "said motor hardware being operable within a range of power outputs with said range being determinable by the capacitance of the capacitor when such capacitance is within a predetermined range" defines over the motor hardware in Sato and Gerfast. That is, the question is whether this is a property of all brushless DC motors (at least to some extent) or is only true of Appellants' brushless DC motor structure (which is not specifically recited in claim 66). The Examiner impliedly found this property inherent in the brushless DC motors in Sato and Gerfast. While some

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of Appellants' arguments suggest that the motor hardware in Sato and Gerfast must be redesigned to operate with different power outputs, Appellants never come out and directly state that the motors of Sato and Gerfast will not inherently operate over a range of power outputs. At the oral hearing, we asked whether it was Appellants' position that this property was not inherent in Sato, but did not get a clear answer. If it is Appellants' position that the motor hardware in Sato and Gerfast is not inherently capable of being operable over a range of power outputs with said range being determinable by the capacitance of a capacitor as shown in Gerfast, then some factual evidence is required. Mere arguments of counsel are not persuasive.

In any case, Gerfast discloses, regarding the selection of a capacitor (col. 2, lines 35-40):

The size of the current-limiting capacitor should be selected to match the load, a larger capacitor being necessary to supply a larger current. If the capacitor were too small, the voltage and current supplied to the appliance would be insufficient to drive it efficiently; if too large, the appliance might be damaged.

The fact that the efficiency (the ratio of useful power output to the total power input) changes with the capacitor suggests that the power output changes with the input current supplied by the capacitor for a fixed motor hardware. One of ordinary skill in the brushless DC

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motor art at the time the invention was made would have known that increasing the current to the stationary armature (coils) of a brushless DC motor would increase the torque and, hence, the power output at a given speed. See Fink et al., Standard Handbook for Electrical Engineers 20-8 (13th ed., McGraw-Hill, Inc., 1993) (copy attached) ("Speed of a dc motor is controlled either by varying the voltage across the armature, the field winding, or both. . . . Torque produced by a brushless dc motor is directly proportional to armature current.").<sup>2</sup>

Based on the evidence of record, we find that the brushless DC motors of Sato and Gerfast inherently have "said motor hardware being operable within a range of power outputs with said range being determinable by the capacitance of the capacitor when such capacitance is within a predetermined range."

The second issue is whether the "whereby" clause, "whereby the power output of a given hardware assembly may be preselectively determined, at the time of manufacture and interconnection with the control circuit by the capacitance value of said capacitor in the

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<sup>2</sup> Although the date of this standard reference work is after the filing date of the application, it is assumed that these teachings would have been known to those skilled in the art more than one year before the filing date.

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control circuit," patentably distinguishes claim 66 over the combination. The "whereby" clause here does not state a result of the limitations in the claim, as in many "whereby" clauses. There are at least three reasons for not giving patentable weight to the present "whereby" clause. First, the "whereby" clause does not recite a positive limitation because the phrase "may be preselectively determined" indicates the step is optional. Second, the "whereby" clause can be considered a "statement of intended use" because it merely says how the capacitor in the combination is intended to be selected. Statements of intended use are not structural limitations that distinguish over the prior art where the prior art is capable of that use. See In re Pearson, 494 F.2d 1399, 1403, 181 USPQ 641, 644 (CCPA 1974); In re Yanush, 477 F.2d 958, 959, 177 USPQ 705, 706 (CCPA 1973); In re Casey, 370 F.2d 576, 580, 152 USPQ 235, 238 (CCPA 1967). Here, the capacitor in Gerfast is capable of being selected in the intended manner. Third, the "whereby" clause states a step by which the final assembly could be made and, thus, defines a desired process of making the product. The patentability of product-by-process claims is determined based on the product itself. See In re Thorpe, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985). Here, the final structure, a motor hardware

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and control circuit, is the same as in the combination of Sato and Gerfast. For these reasons, the "whereby" clause does not patentably distinguish over the combination of Sato and Gerfast.

Nevertheless, even assuming, arguendo, that the "whereby" clause is limiting, we conclude that Gerfast does suggest this limitation. Gerfast discloses that "[t]he size of the current-limiting capacitor should be selected to match the load, a larger capacitor being necessary to supply a larger current" (col. 2, lines 35-37). The "load" signifies the demand on the motor, which should more or less equal the power output. Thus, Gerfast suggests that the power output to match the load can be adjusted by selection of the capacitor.

Appellants argue that the references do not teach, suggest, or provide any incentive for making the combination and that the Examiner has improperly applied hindsight (Br8-9).

We disagree. One of ordinary skill in the art would have been motivated to use Gerfast's circuit with capacitor to provide power to the brushless DC motor of Sato to power the motor from an AC voltage source without a transformer. Alternatively, one of ordinary skill in the art would have been motivated to apply Gerfast's circuit with capacitor to the brushless DC motor of Sato because it would have

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been appreciated that the circuit could be applied to drive any brushless DC motor.

It is argued that Sato does not suggest the use of a capacitor (Br9).

Since Gerfast is relied on for the capacitor, this argument is unpersuasive. One cannot show nonobviousness by attacking the references individually where the rejection is based on a combination of references. In re Keller, 642 F.2d 413, 426, 208 USPQ 871, 882 (CCPA 1981).

Appellants argue that Gerfast uses a current-limiting capacitor that matches the load to operate a DC motor from household AC, which "is very different from the invention of claim 66 that is directed to a combination of a motor and control, and which points out that when the specified capacitor's value is within a predetermined range, a given motor hardware is operable within a range of power outputs" (Br11). It is argued that the motor hardware (rotor parameters, stator core stack height, wire diameter, winding turn count, etc.) in Sato and Gerfast would have to be designed to deliver a proper torque at a speed necessary for proper operation, whereas the present invention only requires the selection and use of a particular value of capacitor (Br11-15).

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To the extent Appellants are arguing that the motors of Sato and Gerfast are not inherently capable of operating within a range of power outputs determinable by a capacitor, but must be physically changed to operate at different power outputs, no evidence has been provided to support this argument. As discussed supra, we find that Gerfast suggests changing the value of the capacitor to change the power output to a fixed motor hardware. Thus, this argument is not persuasive.

Appellants argue (Br11-12): "The power supply of Gerfast, while perhaps performing a current limiting function, does not 'determine' the power output of the appliance's motor." It is argued (RBr3): "Gerfast's capacitor at best merely limits the input current supplied to the appliance but this has nothing to do with controlling the output power of the appliance."

We disagree. The value of the capacitor limits the current, which limits ("determines") the power output of the motor. Thus, this argument is not persuasive.

Appellants argue that the results and advantages of the structure recited in claim 66 cannot be ignored (Br12). The advantage of Appellants' combined motor and control is said to be that the power output of a single defined motor hardware can be

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controlled by selection of one capacitor instead of redesigning the motor hardware for different power outputs (Br13-14; RBr2).

The advantages are attributable to the statement in the "whereby" clause, which we interpret as not patentably distinguishing over the combination. Moreover, we also find that Gerfast suggests that the power output of a fixed motor hardware can be preselectively determined by selection of the appropriate capacitor value, which provides the same advantages. Thus, this argument is not persuasive.

For the reasons stated above, we conclude that the Examiner has established a prima facie case of obviousness, which Appellants have not shown to be erroneous. The rejection of claim 66 is sustained.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

LEE E. BARRETT	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
MICHAEL R. FLEMING	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
	)	
LANCE LEONARD BARRY	)	
Administrative Patent Judge	)	

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