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For Creativity and Innovation

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3 October 2008

PATENTS ACT 1977

APPLICANT Dynamotors Inc

ISSUE Whether patent application number GB0608600.3 complies with section 1(1)(b)

HEARING OFFICER J Elbro

DECISION

Background

1 Application number GB 0608600.3 derives from Patent Cooperation Treaty Application PCT/US2004/036280, filed on 1 November 2004 which claims priority from an earlier US application 60/517256 dated 4 November 2003. It was published in English as WO 2005/048443 A2 on 26 May 2005, and entered the national phase on 4 June 2006. It was republished as GB 2423203 A on 16 August 2006.

2 A first substantive examination report was issued on 2 November 2006 addressing numerous clarity issues. In addition, the examiner additionally cited US 6049187 ("Haner" - also filed by Dynamotors Inc and published on 11 April 2000) as being potentially relevant to the issues of novelty or inventive step, subject to clarification of the specification. The agent amended the claims in order to address the clarity issues and argued that the claims were novel and inventive in light of Haner.

3 Three further examination reports and corresponding responses from the agent followed, but the examiner continued to maintain an objection of lack of inventive step. As a result of the failure to reach agreement, the matter came before me at a hearing on 5 August 2008, at which the applicant, Dynamotors Inc were represented by Mr Peter Bawden of Bawden and Associates. I was assisted by Mr Jeremy Cowen, and the examiner, Mr William Riggs, also attended.

The application

4 This application relates to brushless repulsion motors as used in, for example, hand drills. In the particular sort of motor considered by the application, the motor can be speeded up or slowed down by a series of shorting switches

mounted on the motor's rotating armature. These switches control the timing of the current flow in the armature coils, thereby influencing the motor speed. The application is concerned with using this mechanism to optimize the torque on the armature coil while it is turning.

The following diagram (figure 1 of the application) shows this set-up: LEDs 28 are turned on and off to trigger photodetectors 26 which operate the switches:

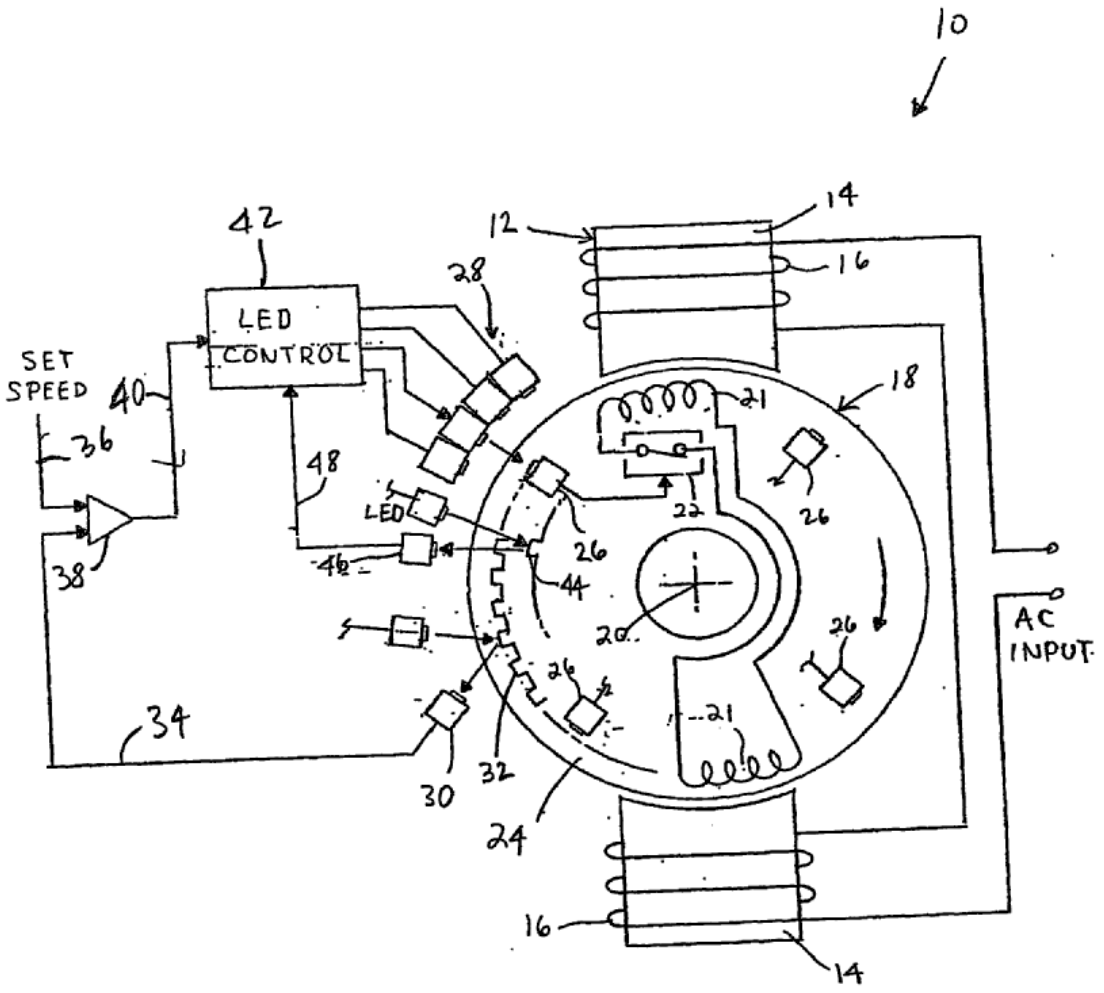

FIG. 1

6 Haner discloses a similar motor, as illustrated in figure 3 from Haner (LEDs are items 24):

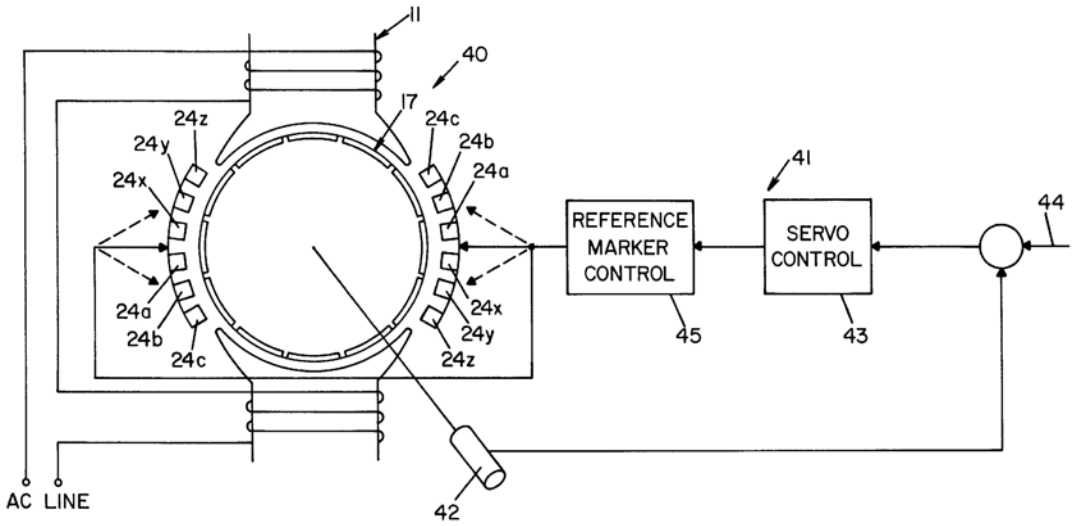

FIG. 3

7 The difference between Haner and the present application lies in the control system used to send instructions to the LEDs. As will be discussed in more detail below, Haner uses a single "transducer" 42 to measure the armature's behaviour while the present application uses two sensors (30 and 46). Unless indicated otherwise, when referring to numbers of components of the present application or Haner below, reference is being made to the respective figure above.

8 The current version of claim 1, filed with the agent's letter of 10 May 2008 claims:

"1. A system for controlling the speed of a brushless repulsion motor (10) having a stator (12) and a rotating armature (18) with a series of switches (22) mounted on a printed circuit board (24) on the rotating armature (18) for shorting circumferentially spaced armature coils (21), the system comprising:

an array of LEDs (28) and a plurality of detectors (26) on the rotating armature for activating and deactivating the switches (22);

a plurality of markers (32) on the rotating armature (18) for speed control;

speed feedback generating means comprising a first stationary optical detecting means (30) for sensing the speed of the rotating markers (32) positioned on the motor (10) for

generating a speed feedback signal to be used for speed control;

generating means on the motor (10) for generating a speed command signal (36);

an error calculator (38) on the motor (10) for comparing the speed feedback and speed command signals (34,36) and generating an error signal (40);

an LED controller (42) on the motor (10) for controlling the array of LEDs (28) based on the error signal (40), wherein the LED controller (42) is operative to adjust the array of LEDs (28) in the positive or negative torque sector to correct the speed of the rotating armature (18);

a position feed back signal generating means on the motor (10) for sending a signal to be used for position control;

a position marker (44) on the printed circuit board (24) of the rotating armature; and

a second stationary optical detecting means (46) on the motor (10) for detecting the position marker (44) to determine the position of the armature coils (21) and sending a position feedback signal (48) to the LED controller (42) for maintaining the set speed.

9 Independent validity was not contended for any other claim and so I only consider inventiveness of claim 1 here.

The Law

10 Section 1 of the Patents Act 1977 ("the Act") sets out the requirements for a patentable invention, namely:

> ***Section 1(1)***
> *A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say -*
> *(a) the invention is new;*
> *(b) it involves an inventive step;*
> *(c) it is capable of industrial application;*
> *(d) the grant of a patent for it is not excluded by subsections (2) and (3) or section 4A below;*
> *and references in this Act to a patentable invention shall be construed accordingly*

11 Furthermore, section 3 of the Act details the requirements for inventive step thus:

> ***Section 3***
> *An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above (and disregarding section 2(3) above).*

12 The issue for me is thus whether claim 1 would have been obvious to a person skilled in the art.

Arguments and Analysis

13 The applicant and examiner are agreed that the appropriate test to determine the inventiveness (or lack thereof) of claim 1, is that set out in *Pozzoli*[1], in which

[1] *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588

Jacob LJ reformulated the long-established *Windsurfing*[2] approach into the following steps:

> (1)(a) Identify the notional "person skilled in the art"
>
> (1)(b) Identify the relevant common general knowledge of that person;
>
> (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;
>
> (3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;
>
> (4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

Step 1(a)

14 There appears to be no dispute that the skilled person would be a worker in the field of motors, with particular interest in brushless motors and associated speed control arrangements.

Step 1(b)

15 At the hearing, Mr Bawden agreed that the skilled person's common general knowledge would cover all commonplace motor design features, including motor speed sensing and control systems. In particular, use of optical sensors for control systems of brushless motors are well-known.

Step 2

16 Paring down claim 1, the inventive concept is a system for controlling the speed of a brushless repulsion motor with a rotary armature in which:

- a first stationary optical sensor is used to detect speed markers to indicate the speed of the armature
- a second stationary optical sensor is used to detect a position marker to indicate the position of the armature coils
- an array of LEDs is arranged to facilitate control of armature switches to change the speed of the armature
- the LEDs are controlled by a circuit on the armature in response to a calculated speed error signal and a positional signal

Step 3

17 As mentioned previously, the closest prior art was agreed to be the applicant's previous application, Haner. Mr Bawden identified a number of differences, with

[2] *Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd* [1985] RPC 59

particular reference to the two figures reproduced above:

a) Haner discloses the use of a single transducer (42 in the Haner figure) while the present application is explicit in requiring two sensing devices. Specifically, a first sensor (30 in this application's figure) generates a speed signal by sensing rotating markers 32, whilst second sensor 46 generates a position signal by sensing position marker 44.

b) all information gathered by transducer 42 in Haner is fed back into the signal comparison/servo control unit 43. Conversely, the position signal of the present application is supplied direct to the LED control unit 42, and not to the error calculator 38.

c) the position sensing arrangement in Haner seemed to relate to the position of the rotary armature, whereas the present application instead detects the armature coil position.

d) The present application explicitly claims optical sensors and associated markers as the position/speed detectors.

e) the necessary elements for detecting speed and position in the present application are on the printed circuit board 24 upon the rotating armature.

f) Only speed information is considered in Haner, not positional information.

18 I agree with differences a), b), and d).

19 On point c), I am not sure that this difference is claimed, as it seems to me that a device detecting the armature position as a proxy for the coil position would fall within the scope of the current claims. However, this could perhaps be remedied by amendment, and I consider it below.

20 Regarding point e), it is apparent that in Haner the printed circuit board controlling the armature movement is also mounted on the armature (see figure 2). Thus, I do not see this to be a difference.

21 On f), Mr Bawden highlighted columns 10-11 of Haner (which detail the use made of signals from the transducer) as not indicating what use is made of position data, only of speed data. However, lines 57-59 of Haner state that *'The speed, direction and angular position of the rotor or armature shaft is monitored by a transducer 42 that produces a signal to a servocontroller 43.'*

Step 4

22 Dealing with the use of optical sensors (point d) above) first, given the acknowledged common general knowledge it seems clear that there is no inventive step in the specific choice of optical sensors rather than a general transducer. Mr Bawden did not disagree with this at the hearing.

23 Considering next difference c), the position of markers (for the speed sensor to detect) on the coil itself, Mr Bawden argued (in line with paragraph 37 of the application), that the coils can 'wobble' upon the rotary armature, suggesting that

the detected position of the armature may not accurately reflect the coil position. While this may be true, I consider that the placing of the markers on the coil rather than the armature would simply be part of how the skilled person would make appropriate use of optical sensors. I note that the application refers to the placing in a throw-away line, among other options.

24 On difference f), the quoted lines show Haner suggests a system for controlling motor speed by detecting armature speed *and* position, albeit using a single sensor. Although Haner does not appear to be totally explicit about how positional information would be used, it seems to me that, even if not implicit, it would be obvious given Haner for the skilled person to use it to slow the motor down if it had gone too far, and speed it up if it had not gone far enough.

25 Difference b) is that in the application the detected position information is fed directly to the LED control 42 and not to the error calculator 38, as appears to be the case in Haner. This seems to be an expected consequence of using a separate position detector, as it seems pointless to feed detected position information for comparison with the set speed information. As the sensor of Haner evidently outputs all parameters together, it follows that the combined signals must be conveyed to the comparison stage, presumably for the necessary signal portion relating to speed to be extracted and compared to the speed command signal. Either way, both speed and position data is eventually conveyed back to the LED control unit in both the application and Haner. Thus I do not think this difference adds anything inventive beyond what may be added by difference a).

26 Finally, on point a) itself, taking into account the widespread use of optical sensors in the art, and the lack of the identification of a specific advantage in using two physically separate sensors in place of one, I consider this difference to be an obvious workshop variation to the person skilled in the art.

27 In view of the above, I can find nothing to suggest that the identified differences between the applicant's claim 1 and Haner, either separately or in combination, are inventive. Rather, they would appear to be features that would have been obvious to the skilled person working in the field of brushless motors and their associated control, in view of Haner and the common general knowledge in the field.

Other matters

28 The examiner also raised some clarity objections to claim 7. Given my finding above, I do not intend to consider these here.

Conclusion

29 I find that the invention as claimed in this application lacks an inventive step in the light of US 6049187 and common general knowledge. I therefore refuse this application under Section 18(3) of the Act.

Appeal

30 Under the Practice Direction to Part 52 of the Civil Procedure Rules, any appeal must be lodged within 28 days.

J Elbro
Deputy Director acting for the Comptroller