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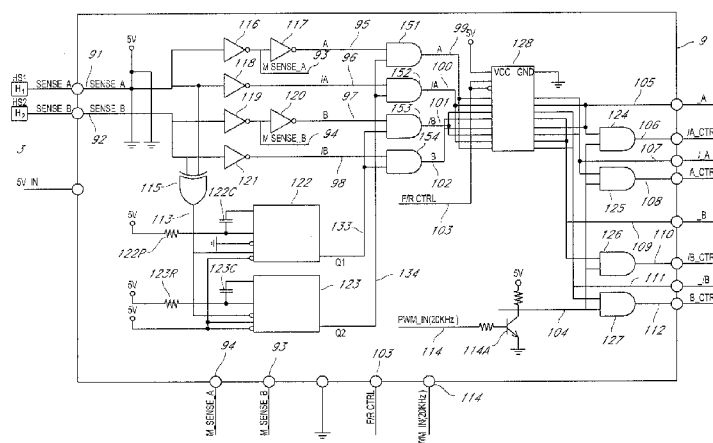


FIG. 4C

(57) Abstract: Circuitry (e.g., 7, 9) for controlling motors (e.g., Figs. 2A and 2B), such as a brushless motor (BLM), is disclosed. The circuitry (e.g., 7, 9) may comprise one or more inputs for receiving rotor position signals (e.g., 91, 92) from one or more Hall effect sensors (e.g., 3) that detect the position of, for example, a BLM rotor (e.g., Figs. 2A and 2B). The circuitry (e.g., 7, 9) may also comprise an input for receiving a pulse width modulated speed control signal (e.g., 114, 320). The circuitry (e.g., 7, 9) generates one or more drive signals (e.g., 322, 324, 326, 328, 41 -42, 43-44, 41 -42 (PWM), 43-44 (PWM)), each of which may comprise a logical combination (e.g., a logical AND combination) of the speed control signal (e.g., 114, 320) and a rotor position signal (e.g., 91, 92), for controlling power switches (e.g., F1-F8) that are coupled to electromagnets of the BLM (e.g., Figs. 2A and 2B).

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H02P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y Y A	FR 2 896 638 A (VALEO EQUIP ELECTR MOTEUR [FR]) 27 July 2007 (2007-07-27) abstract; figures 1,2 page 5, line 25 - page 8, line 28 US 4 271 385 A (AZUSAWA NOBORU) 2 June 1981 (1981-06-02) column 2, line 50 - column 3, line 60; figures 1-4 US 5 663 616 A (STRINGFELLOW DAVID WAYNE [US] ET AL) 2 September 1997 (1997-09-02) column 5, line 56 - column 6, line 19; figures 1,2 column 1, line 6 - line 20 ----- -/--	1,8-11, 22,24,25 2,3, 12-14, 23,26,27 2,3, 12-14, 23,26,27 1,8,25

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 389 606 A (DETERING RICHARD L) 21 June 1983 (1983-06-21) column 4, line 45 - column 5, line 23; figures 1,4-6 column 6, line 13 - line 35 column 7, line 34 - column 8, line 10 -----	1,8,25
A	JP 2004 023823 A (NIDEC SHIBAURA CORP) 22 January 2004 (2004-01-22) abstract; figure 3 -----	6

INTERNATIONAL SEARCH REPORT

Information on patent family members

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PCT/US2009/035921

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2896638	A	27-07-2007	CN 101371432 A EP 1974455 A1 WO 2007083062 A1 JP 2009524394 T	18-02-2009 01-10-2008 26-07-2007 25-06-2009
US 4271385	A	02-06-1981	CH 627892 A5 DE 2836467 A1 JP 1248881 C JP 54034016 A JP 59023194 B SE 438063 B SE 7808758 A	29-01-1982 08-03-1979 25-01-1985 13-03-1979 31-05-1984 25-03-1985 23-02-1979
US 5663616	A	02-09-1997	NONE	
US 4389606	A	21-06-1983	NONE	
JP 2004023823	A	22-01-2004	NONE	