



US005448141A

United States Patent [19]

[11] Patent Number: **5,448,141**

Kelley et al.

[45] Date of Patent: **Sep. 5, 1995**

- [54] **ADJUSTABLE SPEED DRIVE FOR RESIDENTIAL APPLICATIONS**
- [75] Inventors: **Arthur W. Kelley**, Raleigh, N.C.;
Mohab A. Hallouda, Cairo, Egypt;
Aaron M. Jungreis, Raleigh, N.C.
- [73] Assignee: **North Carolina State University**,
Raleigh, N.C.
- [21] Appl. No.: **210,554**
- [22] Filed: **Mar. 18, 1994**
- [51] Int. Cl.⁶ **H02K 23/00**
- [52] U.S. Cl. **318/254; 318/138;**
318/439; 388/805
- [58] Field of Search 318/254, 138, 439, 801;
165/42; 388/805

Primary Examiner—William M. Shoop, Jr.
Assistant Examiner—Karen Masih
Attorney, Agent, or Firm—Bell, Seltzer, Park & Gibson

[57] ABSTRACT

The present invention relates to a method and apparatus for controlling the speed of an electronically commutated motor. Such motors typically include a rotor, a stator coil, and an electronic commutator for controlling electrical power flow from an electrical power source of predetermined frequency to the stator coil. The invention includes the steps of generating a switch control signal responsive to a position of the rotor; generating a phase gating signal from the electrical power source of predetermined frequency, the phase gating signal having twice the predetermined frequency and having transitions in timed relation to the zero crossings of the electrical power source; varying the timed relation of the phase gating signal in accordance with an operational parameter desired for the electronically commutated motor; generating a phase controlled switch signal which is responsive to the phase gating signal and the switch control signals; and applying the phase controlled switch signal to the electronic commutator to control the electronic commutator, thereby controlling the speed of the electronically commutated motor.

[56] References Cited

U.S. PATENT DOCUMENTS

4,015,182	3/1977	Erdman	318/254
4,167,691	9/1979	Sorensen et al.	318/138
4,556,827	12/1985	Erdman .	
4,668,898	5/1987	Harms et al. .	
4,682,093	7/1987	Murphy et al. .	
4,859,921	8/1989	Archer .	
4,959,596	9/1990	MacMinn et al. .	
4,972,134	11/1990	Getz et al. .	
5,076,076	12/1991	Payne .	
5,125,067	6/1992	Erdman	318/138
5,221,881	6/1993	Cameron .	

36 Claims, 9 Drawing Sheets

