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Nitta et al.

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(54) **ELECTRIC MOTOR WITH SPLIT STATOR CORE AND METHOD OF MAKING THE SAME**

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(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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Aug. 17, 1999 (JP) 11-230540

(51) **Int. Cl.**⁷ **H02K 1/12**; H02K 1/06; H02K 1/00; H02K 1/04

(52) **U.S. Cl.** **310/259**; 310/217; 310/193; 310/43

(58) **Field of Search** 310/269, 254, 310/258, 259, 216, 217, 218, 179, 185, 193, 43, 45; 29/596

(56) **References Cited**

U.S. PATENT DOCUMENTS

| | | | | |
|-----------|---|---------|------------------|----------|
| 4,015,154 | * | 3/1977 | Tanaka et al. | 310/42 |
| 4,365,180 | * | 12/1982 | Licata et al. | 310/216 |
| 4,665,329 | * | 5/1987 | Raschbichler | 310/13 |
| 4,672,253 | * | 6/1987 | Tajima et al. | 310/269 |
| 4,818,911 | * | 4/1989 | Taguchi et al. | 310/259 |
| 4,990,809 | * | 2/1991 | Artus et al. | 310/192 |
| 5,592,731 | * | 1/1997 | Huang et al. | 29/596 |
| 5,739,614 | * | 4/1998 | Suzuki et al. | 310/180 |
| 5,859,486 | * | 1/1999 | Nakahara et al. | 310/254 |
| 5,912,515 | * | 6/1999 | Ackermann et al. | 310/67 R |

FOREIGN PATENT DOCUMENTS

4-29536 1/1992 (JP) .

* cited by examiner

Primary Examiner—Elvin Enad

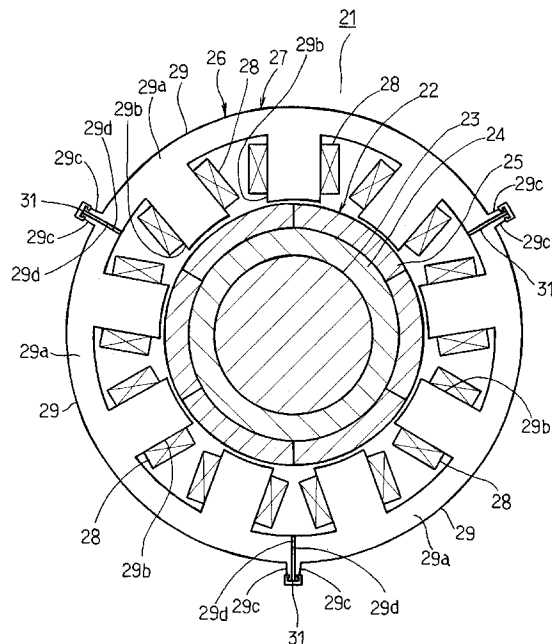
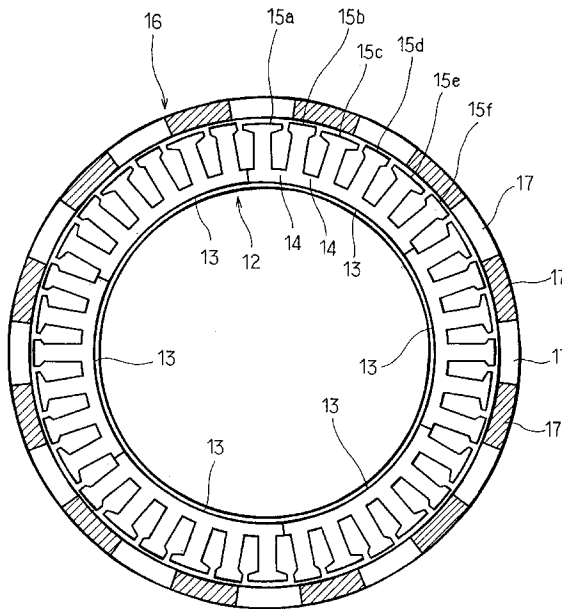
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(57) **ABSTRACT**

An electric motor includes a rotor and a stator including a plurality of unit cores each of which has two ends. The unit cores are disposed so that the ends of each unit core are adjacent to the ends of the neighboring unit cores respectively. Each unit core includes a yoke section and a plurality of salient poles which are integral with the yoke section and on which windings are wound respectively. Adjacent portions of the unit cores are selected so that magnetic fluxes passing through the respective adjacent portions are substantially the same.

12 Claims, 14 Drawing Sheets



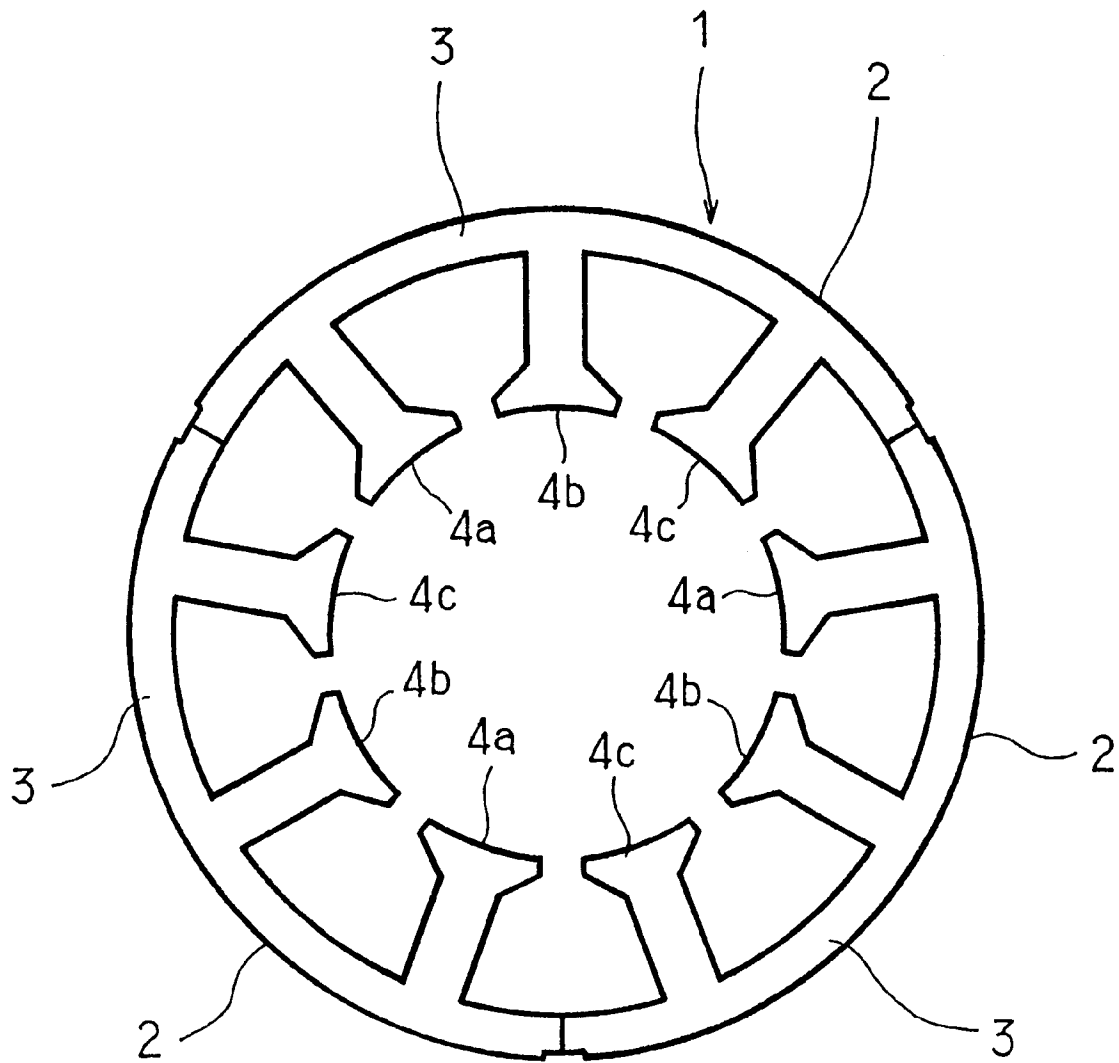


FIG. 1

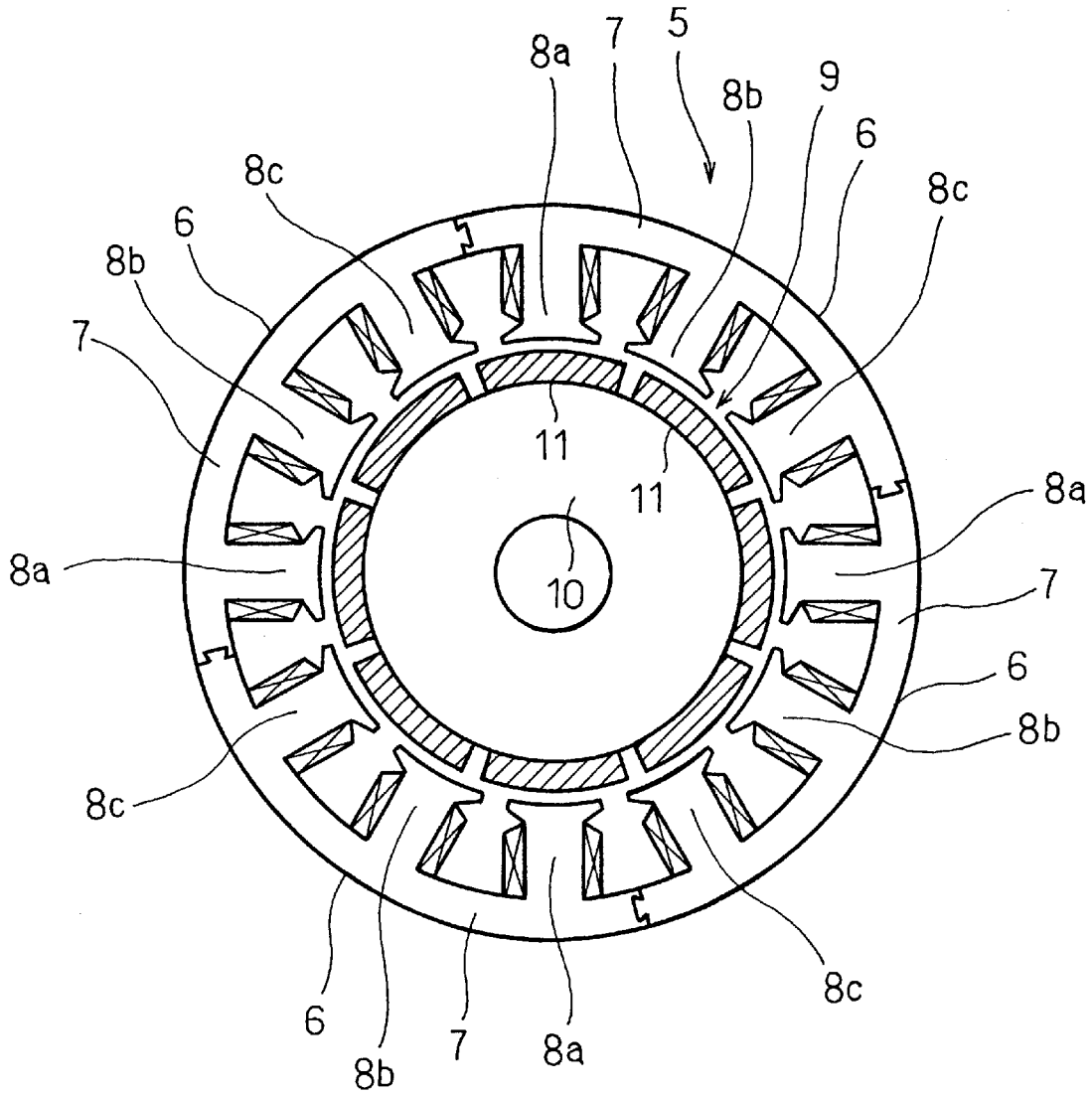


FIG. 2

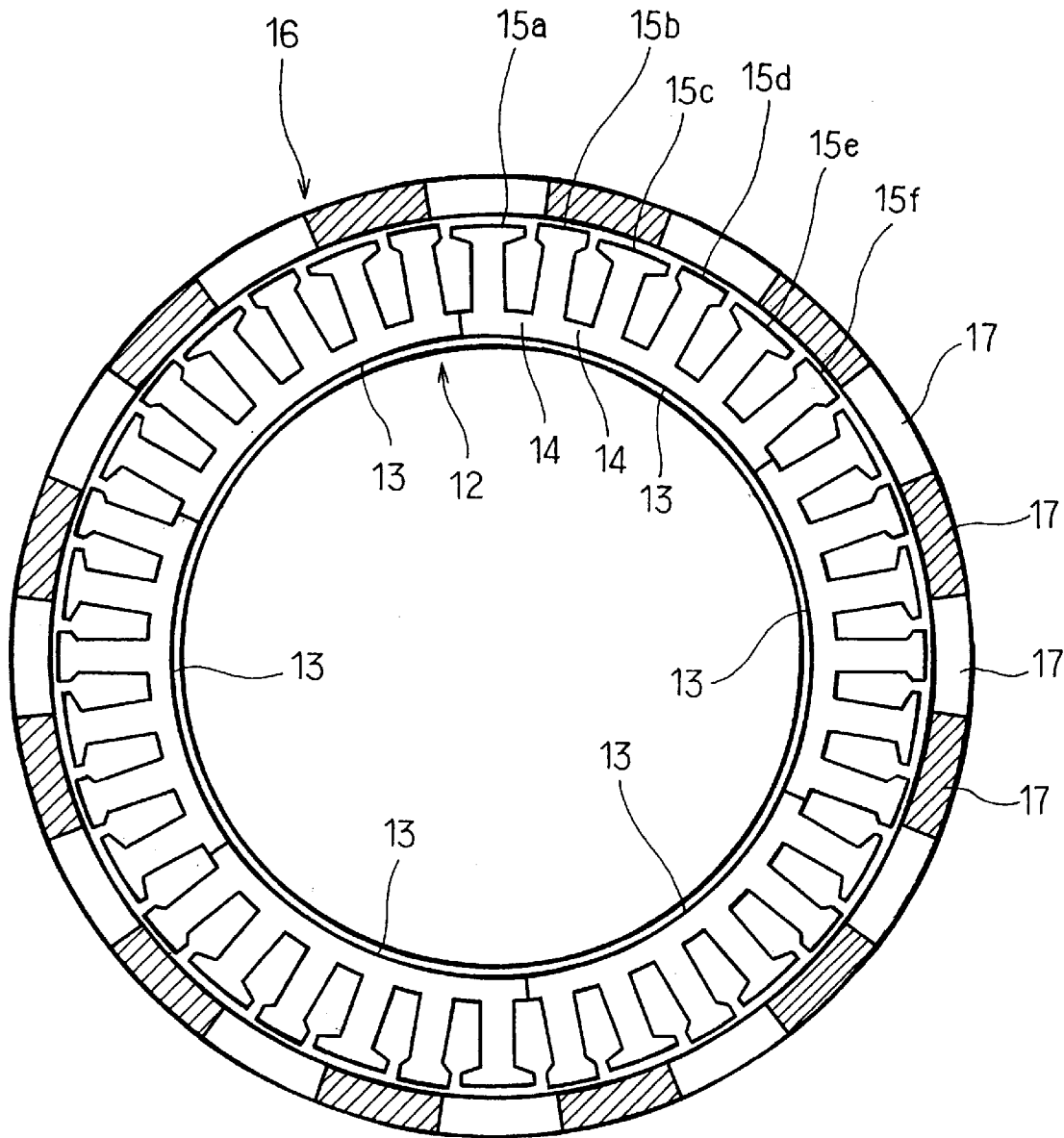


FIG. 3

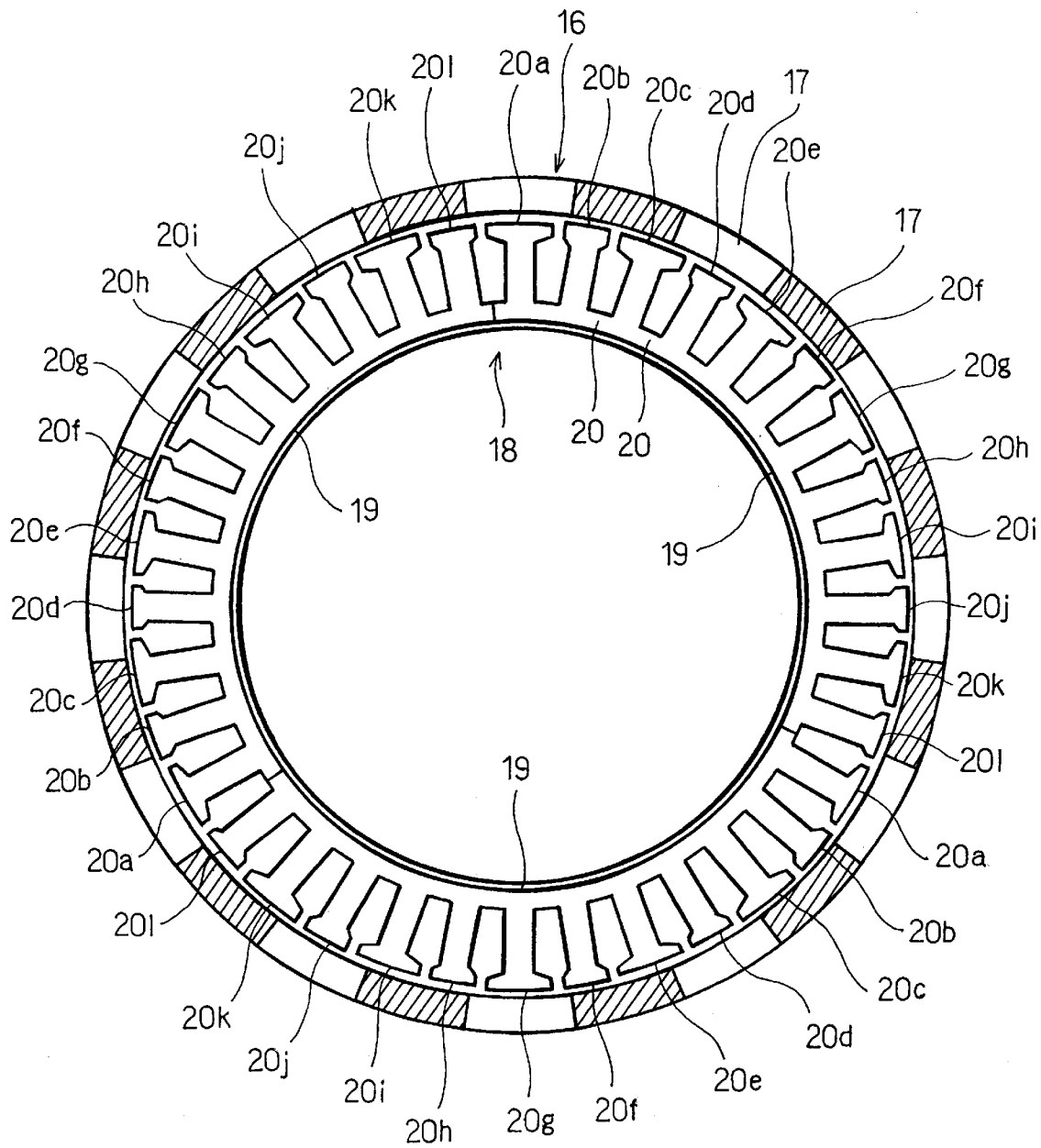


FIG. 4

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