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Norman et al.

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(54) **SYSTEM, APPARATUS, AND METHOD FOR PROVIDING CONTROL OF A TOY VEHICLE**

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(51) **Int. Cl.**
B60K 1/00   (2006.01)
(52) **U.S. Cl.** **180/65.1**; 446/465; 446/484
(58) **Field of Classification Search** 180/65.1, 180/908, 167, 170, 174
See application file for complete search history.

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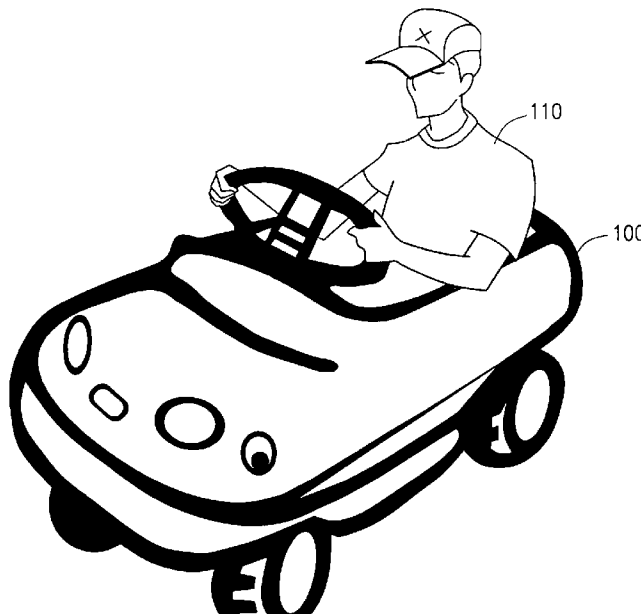*Primary Examiner*—Christopher P. Ellis
Assistant Examiner—Bridget Avery
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(57) **ABSTRACT**

A system, apparatus, and method for providing a soft-start for a toy vehicle configured to be operated by a person. The method includes receiving a throttle signal operable to induce motion via a motor operating as a drive mechanism of the toy vehicle. A transition signal may be generated based on the throttle signal. The transition signal may be applied to effect operation of the motor. The transition signal may be a pulse width modulated signal having a duty cycle between 20 and 100 percent to provide for an acceleration that avoids the problems of conventional control systems. The transition signal may be ramped in a linear or non-linear fashion. The system may couple the soft-start control circuit between a ground terminal of a battery of the toy vehicle and motor(s), thereby allowing the soft-start control circuit to operate on a low voltage (i.e., not the high voltage of the battery).
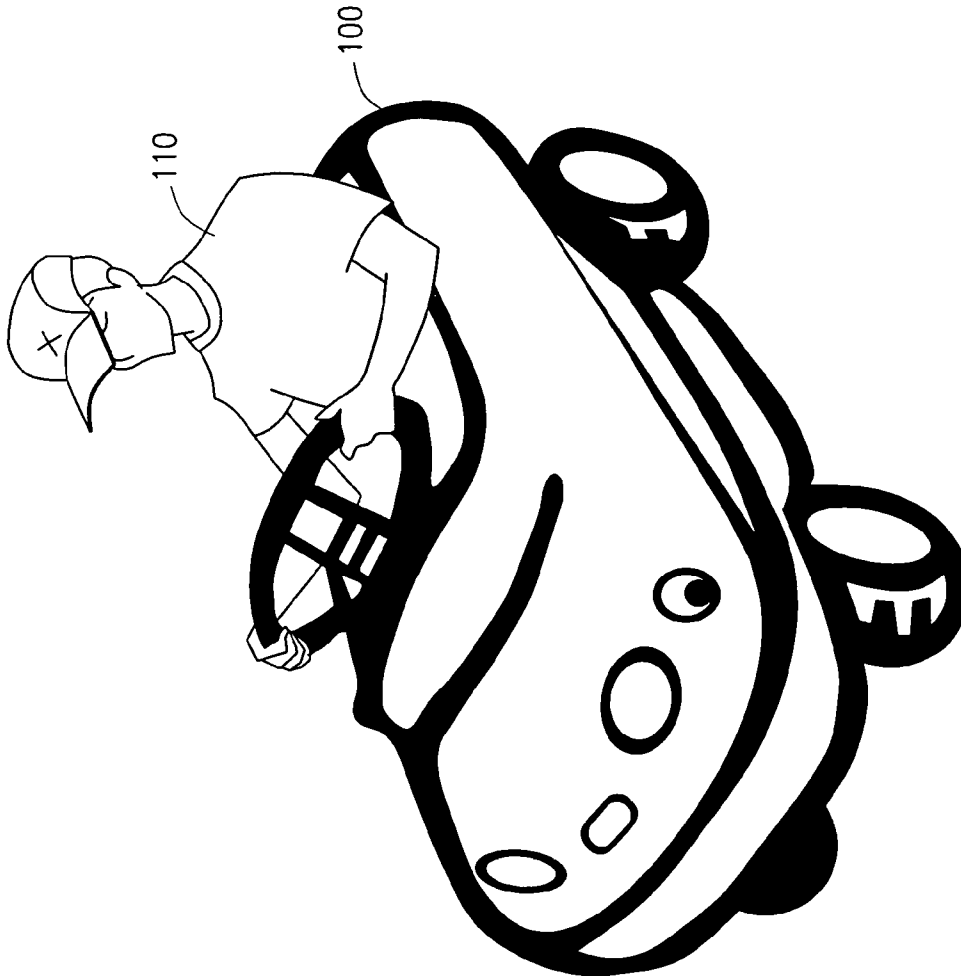
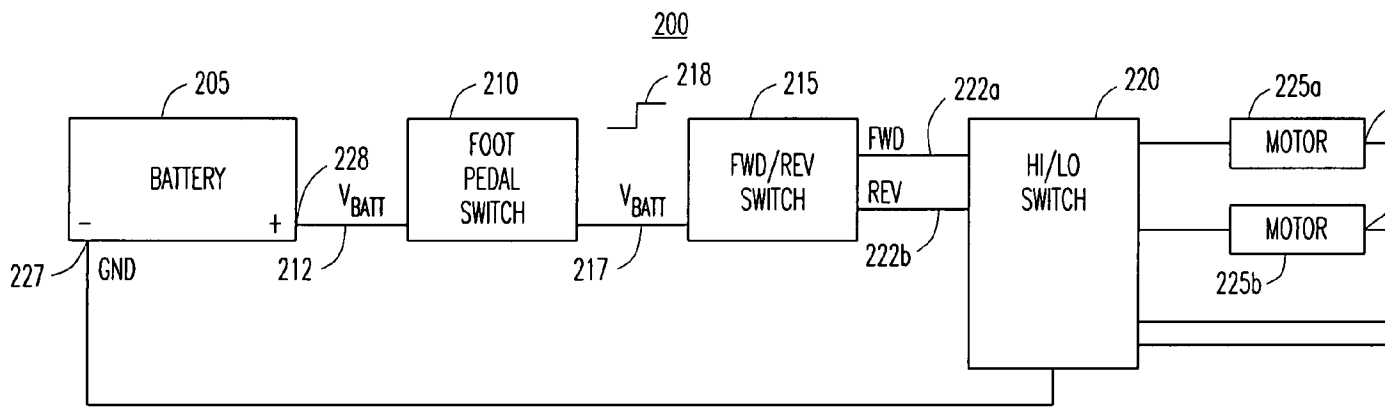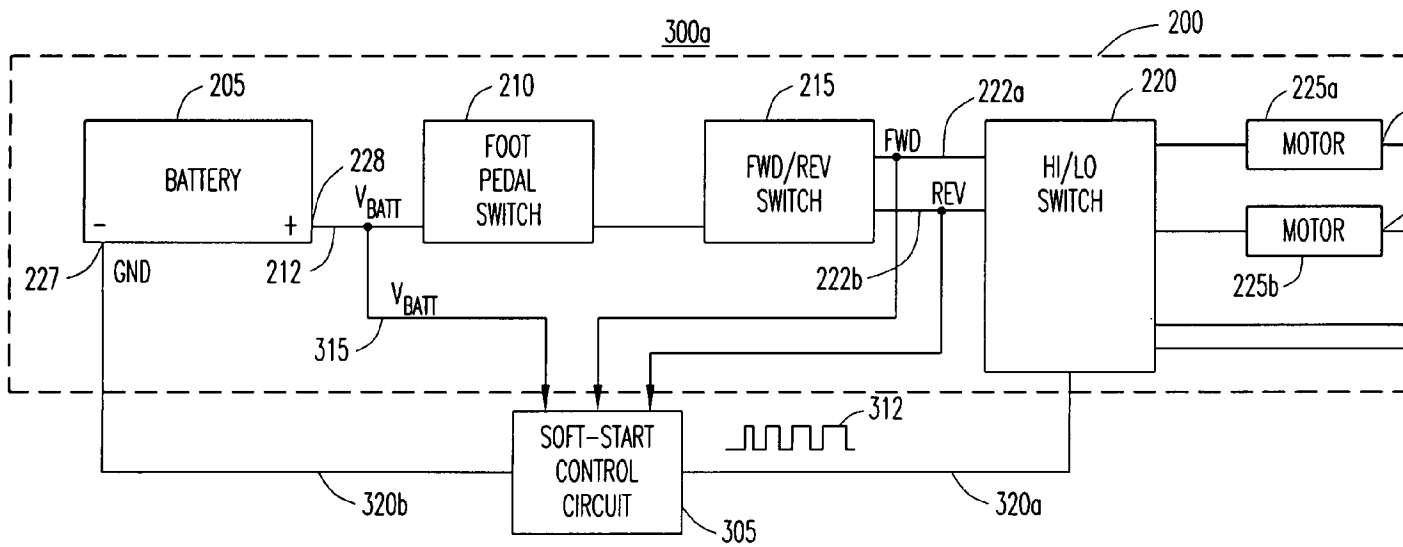**40 Claims, 13 Drawing Sheets**
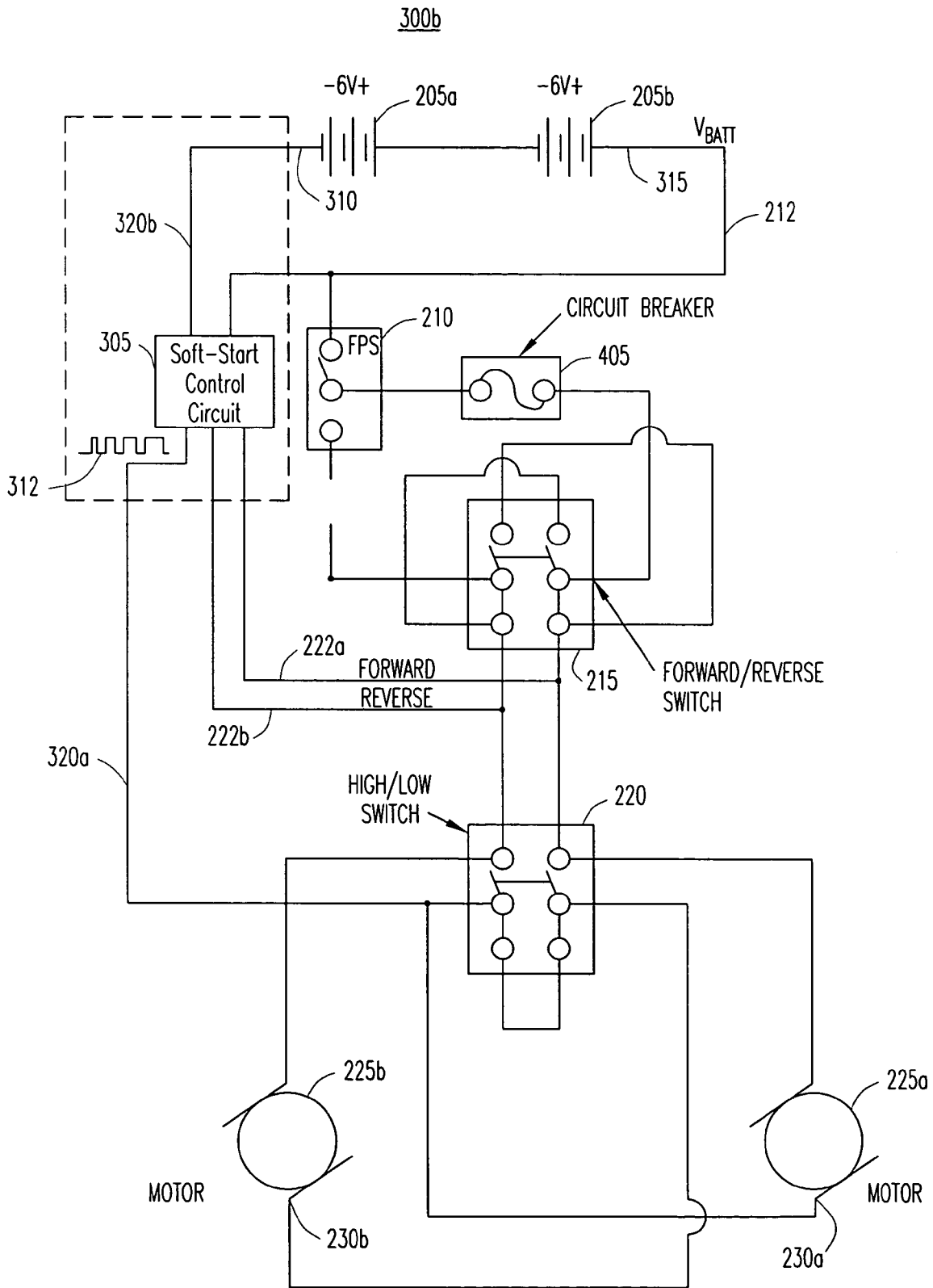
FIG. 1

FIG. 2
(PRIOR ART)

FIG. 3

300b

−6V+   205a   −6V+   205b

V_BATT

315

310

212

320b

305   Soft−Start Control Circuit

210   FPS

CIRCUIT BREAKER

405

312

222a

FORWARD REVERSE

215

FORWARD/REVERSE SWITCH

222b

320a

HIGH/LOW SWITCH

220

225b

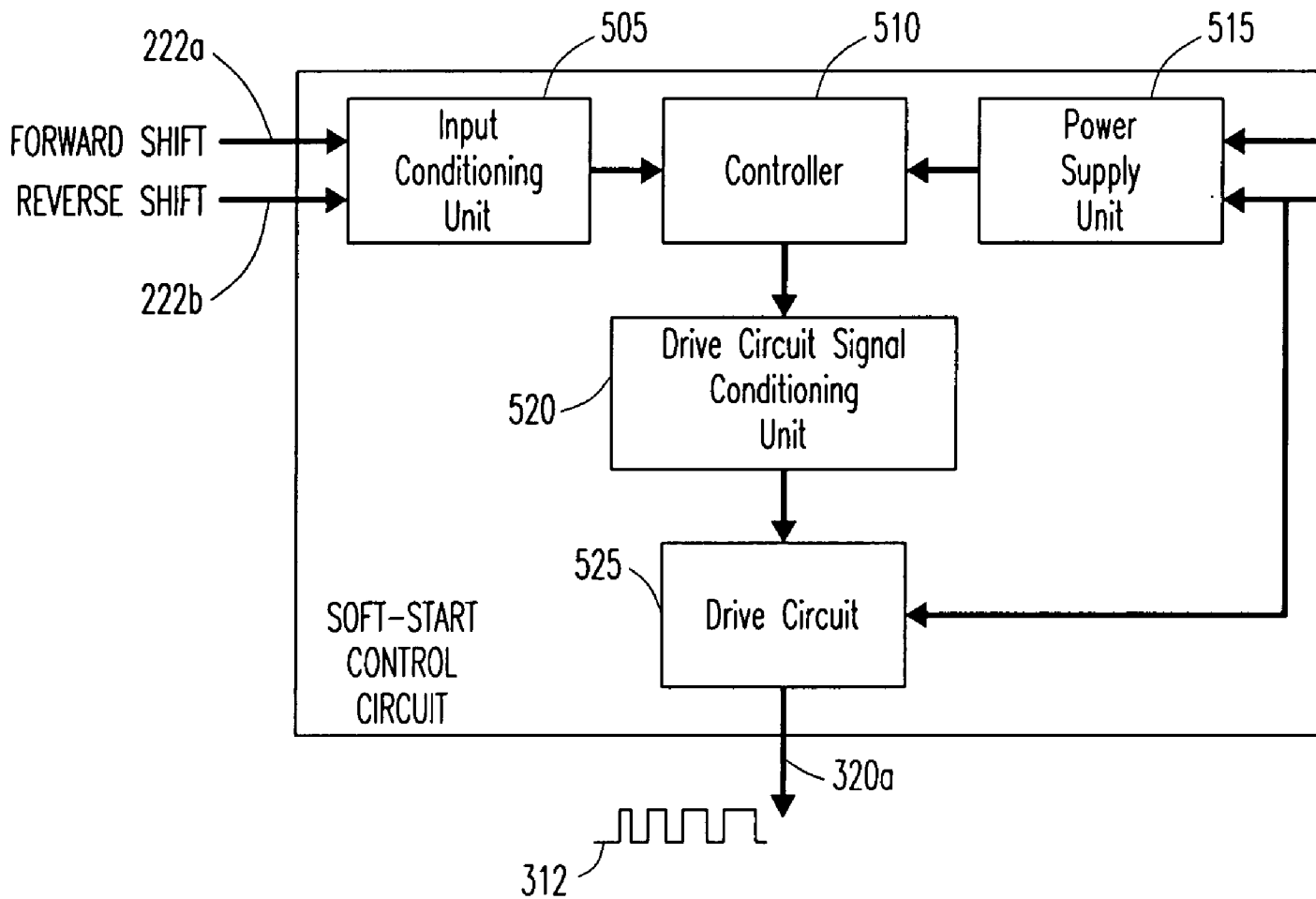MOTOR

230b

225a

MOTOR

230a

FIG. 4

FIG. 5

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