

- [54] **ELECTRIC WHEELCHAIR WITH IMPROVED CONTROL CIRCUIT**
- [75] Inventor: Robert G. Klimo, Parma, Ohio
- [73] Assignee: Invacare Corporation, Elyria, Ohio
- [21] Appl. No.: 721,572
- [22] Filed: Apr. 10, 1985

Related U.S. Application Data

- [60] Division of Ser. No. 351,990, Feb. 24, 1982, Pat. No. 4,511,825, which is a continuation-in-part of Ser. No. 254,443, Apr. 15, 1981, Pat. No. 4,387,325.
- [51] Int. Cl.⁴ G05D 1/00
- [52] U.S. Cl. 318/139; 318/587; 320/2; 180/6.5; 180/907
- [58] Field of Search 318/587, 139; 320/2; 180/6.5, 907

References Cited

U.S. PATENT DOCUMENTS

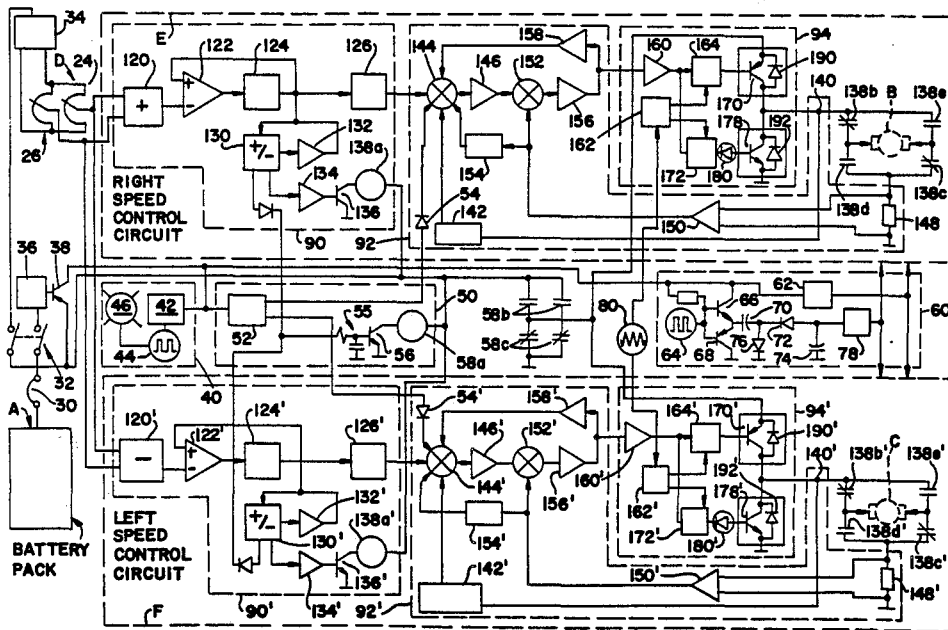
3,629,633	12/1971	O'Callaghan	310/94
3,683,253	8/1972	Rummel et al.	318/331
3,792,327	2/1974	Waldorf	318/139
3,814,199	6/1974	Jones	318/587
3,904,947	9/1975	Crews	318/139 X
3,970,160	7/1976	Nowick	318/67 X
4,059,786	11/1977	Jones et al.	318/17
4,079,301	3/1978	Johnson	318/338
4,151,450	4/1979	Fukuma et al.	
4,157,123	6/1979	Rodaway	318/380 X
4,166,238	8/1979	Binner	318/67
4,291,260	9/1981	Nixon	318/331
4,300,081	11/1981	Van Landingham	
4,303,874	12/1981	Iwai	318/331
4,375,631	3/1983	Goldberg	338/128
4,415,049	11/1983	Wereb	318/331 X

Primary Examiner—D. Dobeck
Attorney, Agent, or Firm—Fay, Sharpe, Fagan, Minnick & McKee

[57] ABSTRACT

The electric wheelchair includes a battery pack (A), a right drive motor (B), a left drive motor (C), and a control circuit for controlling the amount of power supplied from the battery to the left and right control motors. A speed potentiometer (24) and a direction potentiometer (26) are connected with a joystick (22) for producing a selected vehicle speed signal and a selected vehicle direction signal, respectively. A right speed control circuit (E) and a left speed control circuit (F) receive the selected vehicle speed and direction signals and control the right and left motors in accordance with them. Each speed control circuit includes a reference signal circuit (90) which receives the selected vehicle speed and direction signals and produces a reference signal whose magnitude varies with the speed selected for its motor. The voltage and current across the armature of the motor are detected as measures of the motors actual speed. A comparing circuit (92) compares the actual speed as determined by the armature voltage and current with the selected speed as denoted by their reference signal. Specifically, it subtractively combines the armature voltage and the reference signal to produce a first difference signal. Further, it subtractively combines the first difference signal with the armature current signal to produce a speed error reference signal. The speed error reference signal controls a variable power regulator (94) which varies the amount of power supplied to the motor in a manner which tends to cause the actual and selected speeds to match.

17 Claims, 11 Drawing Figures



Dynacraft BSC, Inc.
Exhibit 1004
 Dynacraft v. Mattel
 IPR2018-00038

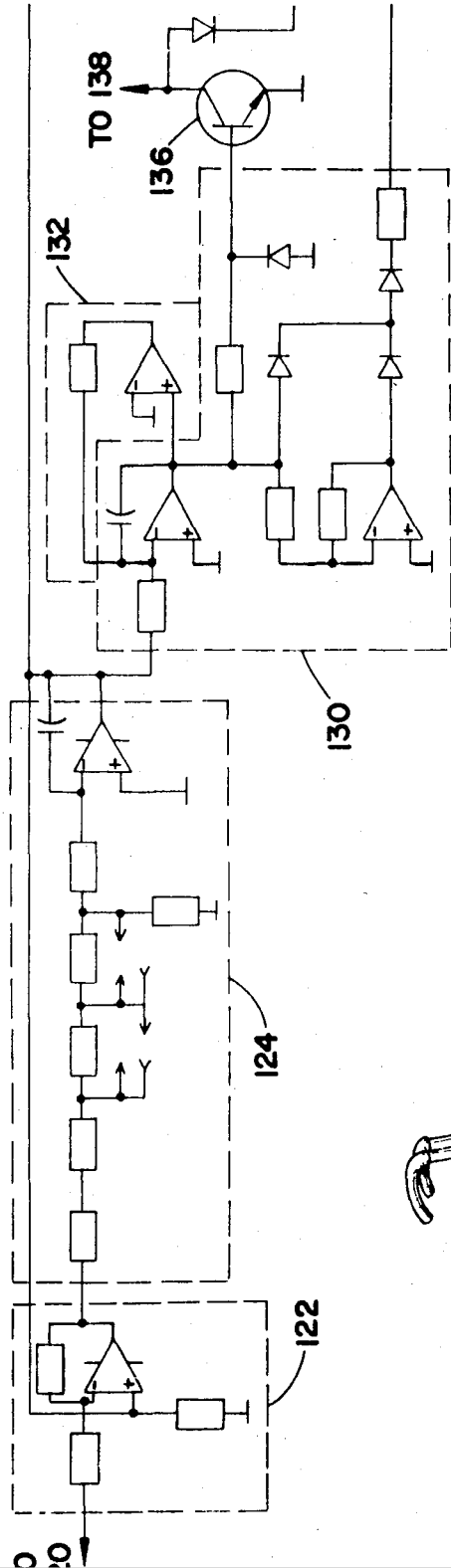


FIG. 4A

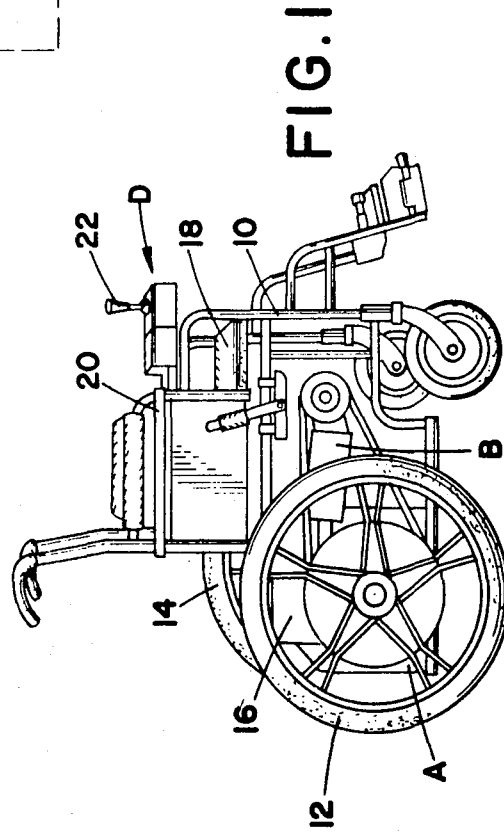


FIG. 1

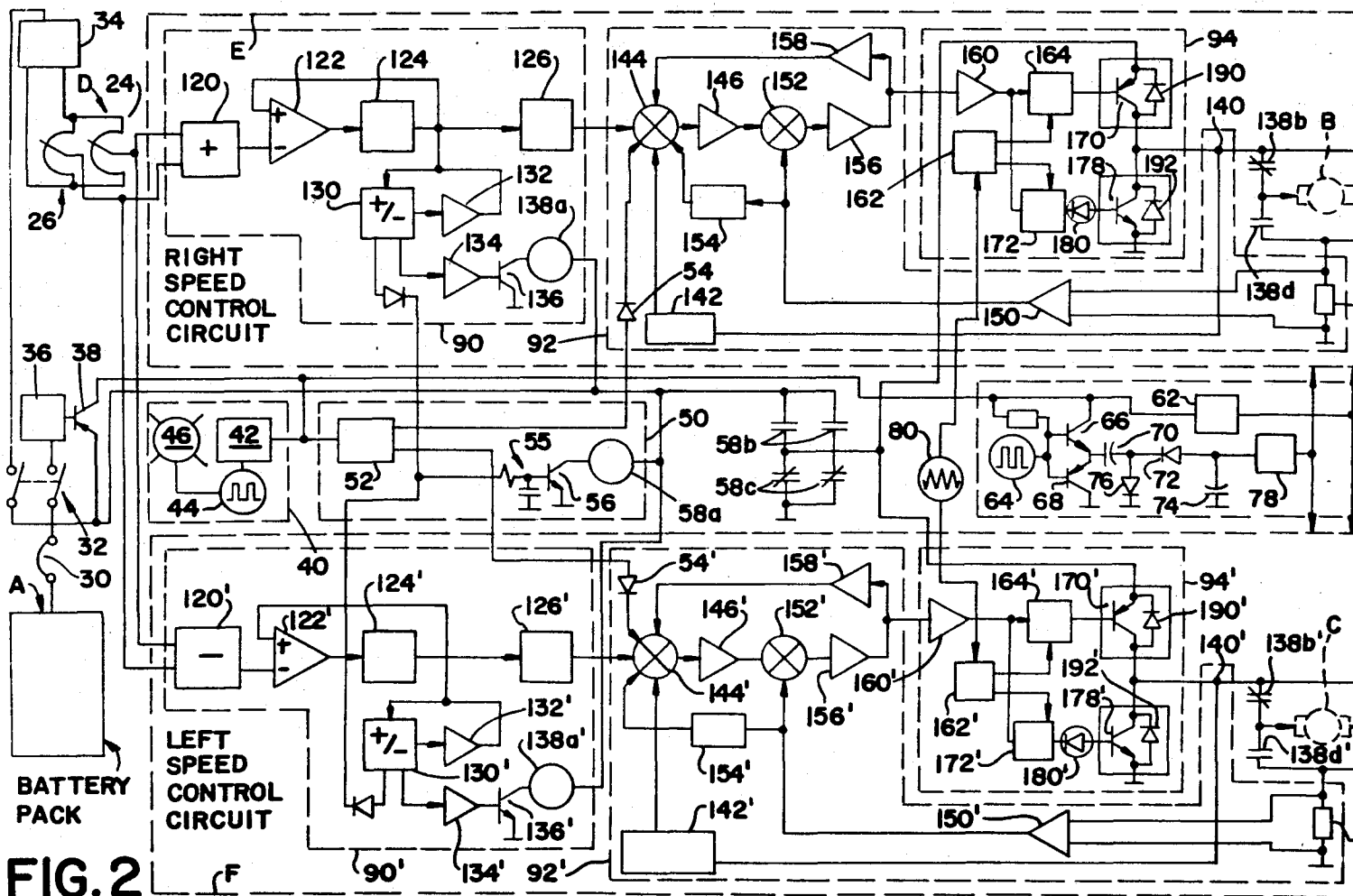


FIG. 2

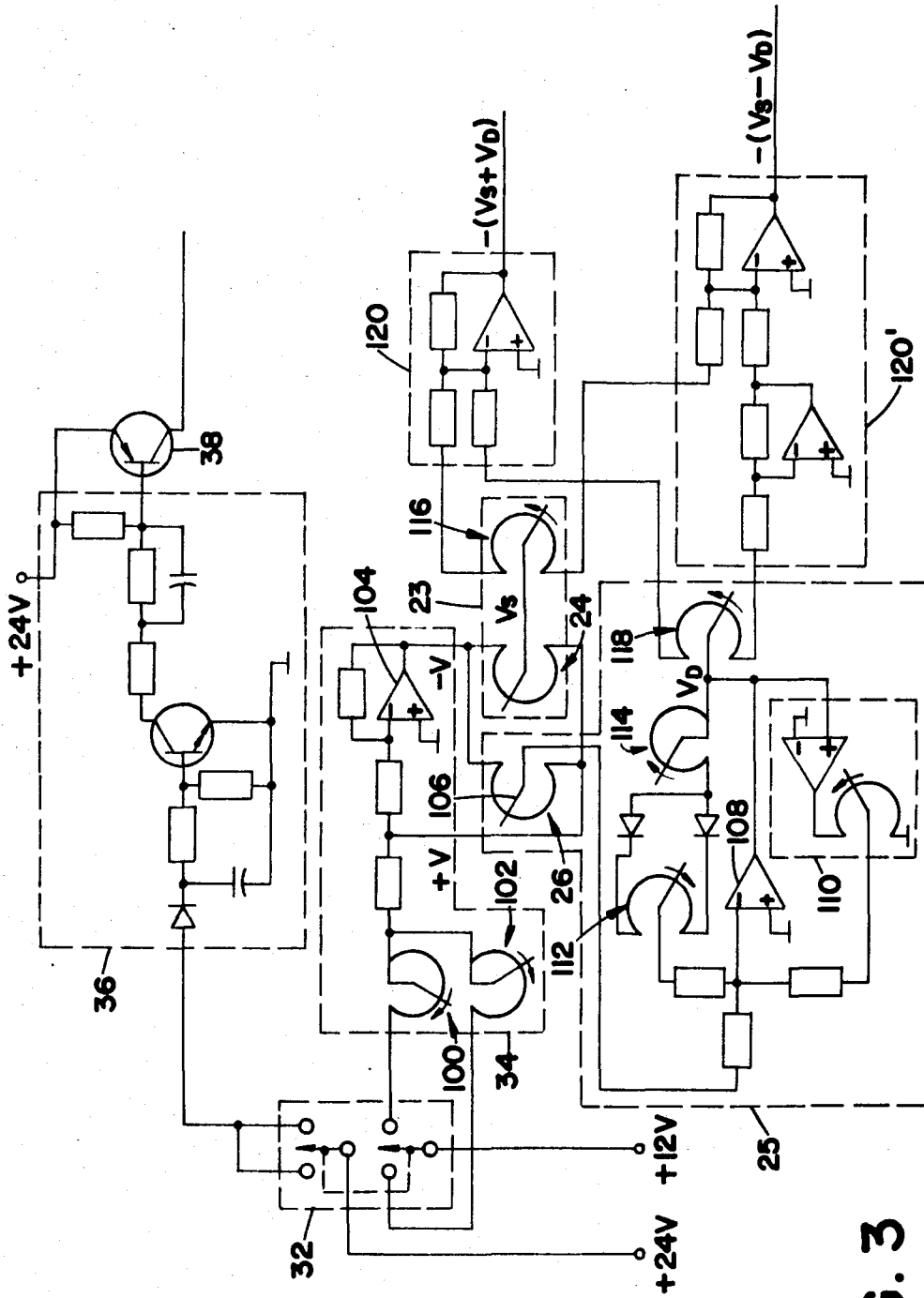


FIG. 3

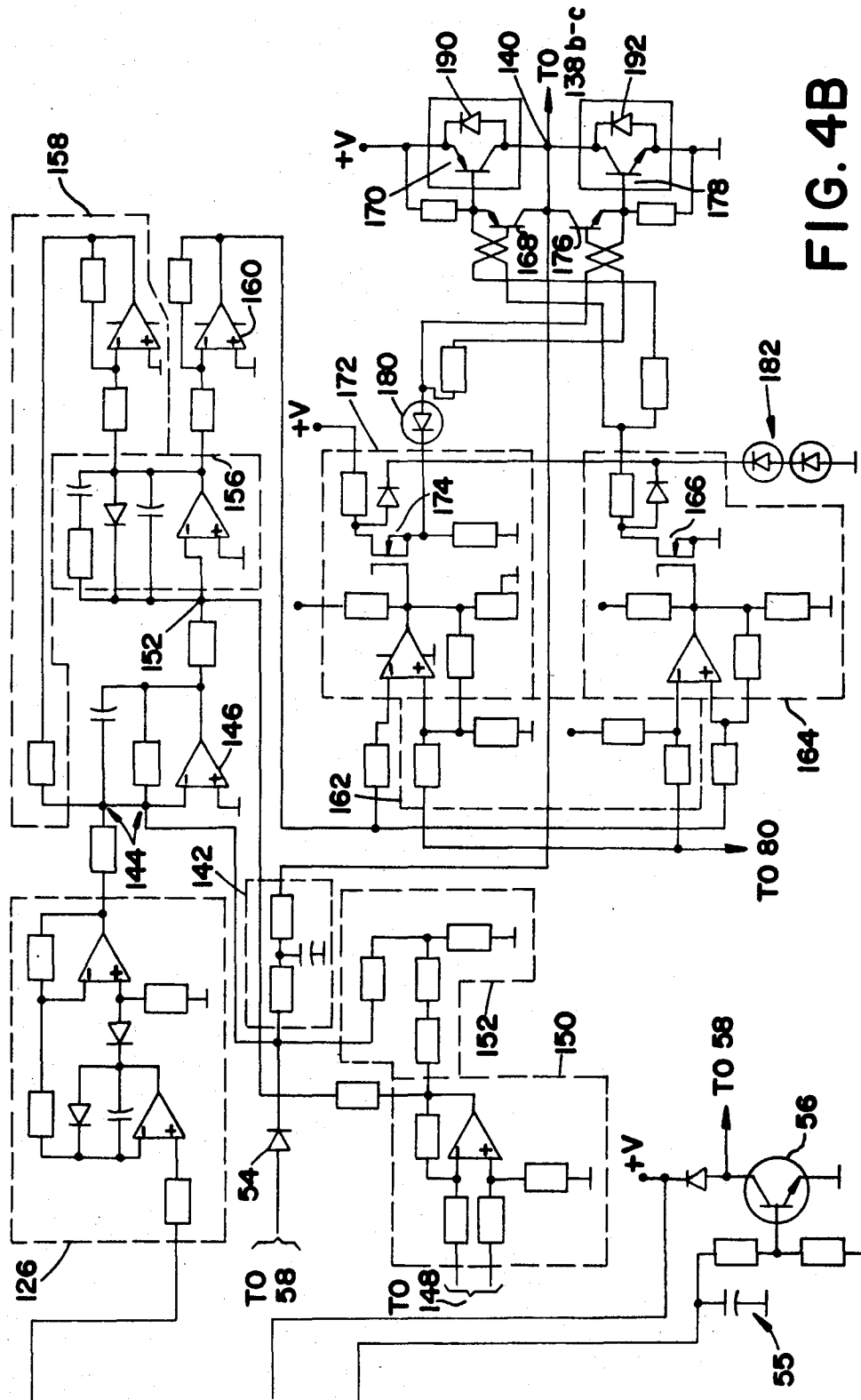


FIG. 4B

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.