

- [54] COMMUNICATION CIRCUIT WITH COMBINED POWER FEED AND DATA TRANSMISSION OVER A PHANTOM CHANNEL
- [75] Inventors: Alan Bloch, New York; Frank A. Coviello, Peekskill, both of N.Y.; Ira Guzik, Fairfield; Candido Puebla, Bridgeport, both of Conn.
- [73] Assignee: TIE/Communications, Inc., Stamford, Conn.
- [21] Appl. No.: 803,243
- [22] Filed: Jun. 3, 1977
- [51] Int. Cl.<sup>2</sup> ..... H04Q 5/18
- [52] U.S. Cl. .... 179/99 R; 179/15 BB
- [58] Field of Search ..... 179/3, 4, 15 BB, 99

[57] ABSTRACT

The disclosure relates to a four conductor circuit arrangement providing two communication channels between a control unit and a terminal device. Power feed and bi-directional signalling are accomplished simultaneously over the same four conductors used for the two communication channels without interference. The signalling from the control unit to the terminal is accomplished by means of a voltage modulator circuit in the control unit by which voltage pulses are transmitted via a phantom circuit arrangement over the four conductors to the terminal unit. The voltage pulses are sensed from the phantom circuit in a data receiver which is located at the terminal unit. Connected to the phantom circuit in the terminal unit is a voltage regulator circuit which receives power from the control unit via the four conductor phantom circuit interconnecting the control unit and the terminal. In series with the voltage regulator circuit is a constant current sink and an inductor. A current modulator circuit is provided in parallel for impressing current data pulses generated in the terminal onto the phantom circuit, which are, in turn, received by a receiver circuit in the control unit.

A preferred data format is disclosed as a method for transmitting information between the control unit and the terminal.

The preferred embodiment for the disclosed four conductor communication circuit and the disclosed data format is in a key telephone system in which the control unit is a station card in a key service unit and the terminal is a key telephone station set.

[56] References Cited

U.S. PATENT DOCUMENTS

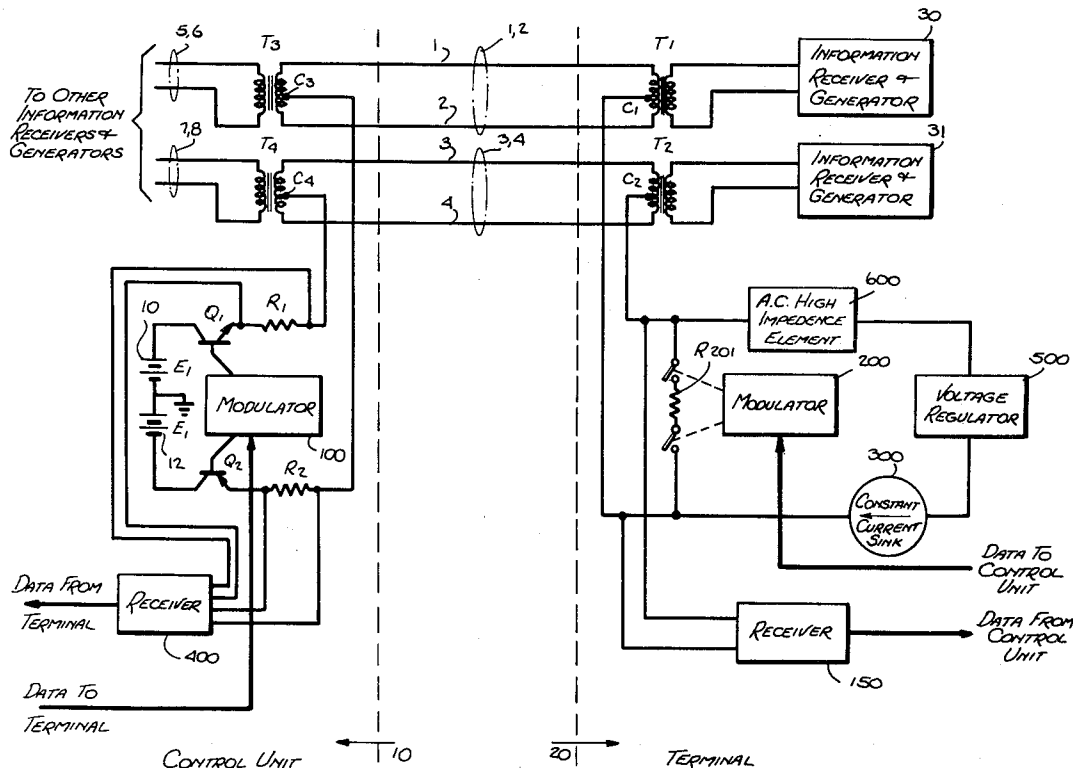
2,203,316	6/1940	Weissner .....	179/15 BB
3,701,854	10/1972	Anderson et al. ....	179/99
3,787,631	1/1974	Lewis .....	179/99
3,843,845	10/1974	Ridley .....	179/99
3,973,085	8/1976	Shiff .....	179/99
3,975,594	8/1976	Guntersdorfer .....	179/15 BB
4,046,972	9/1977	Huizinga et al. ....	179/99

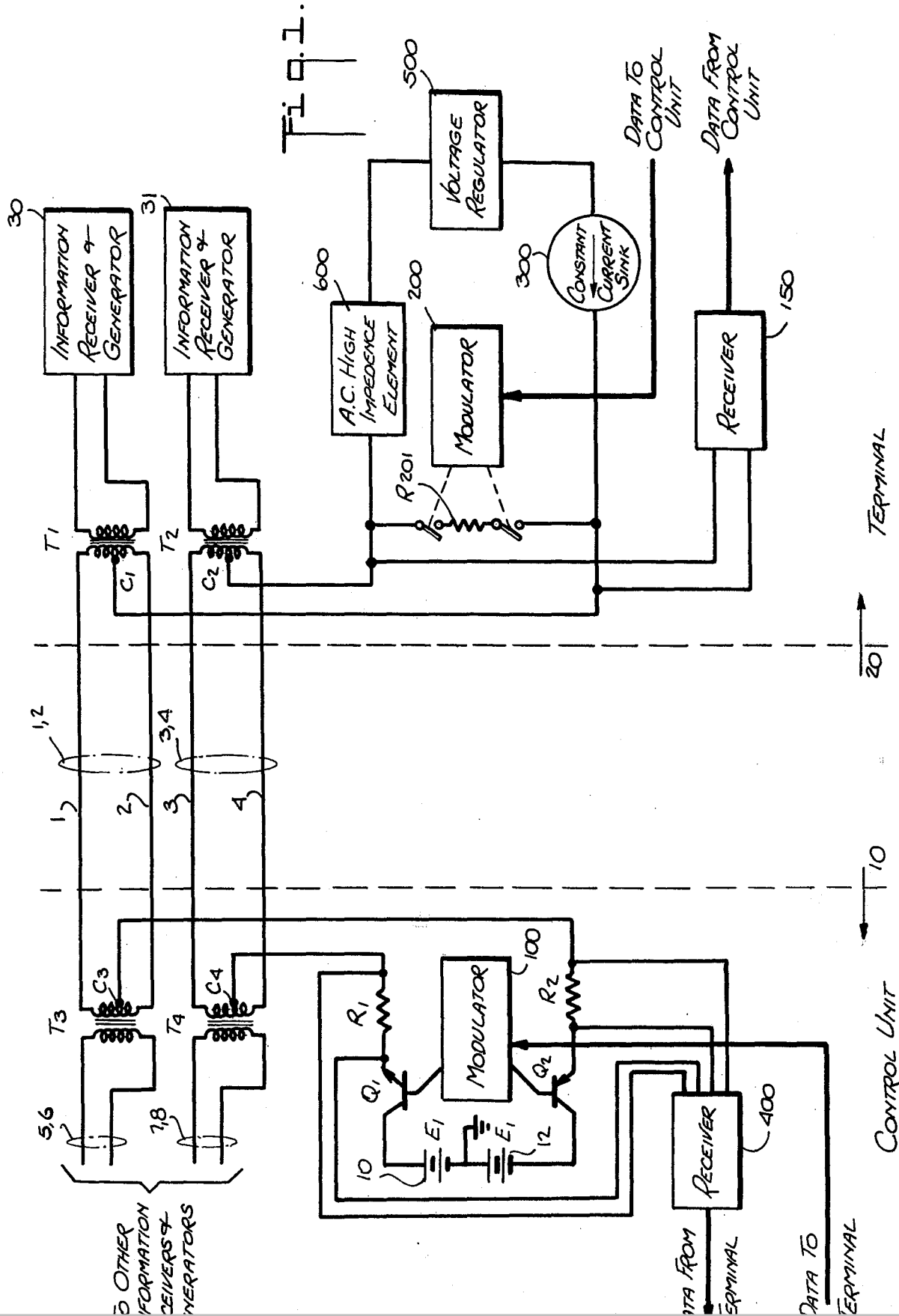
FOREIGN PATENT DOCUMENTS

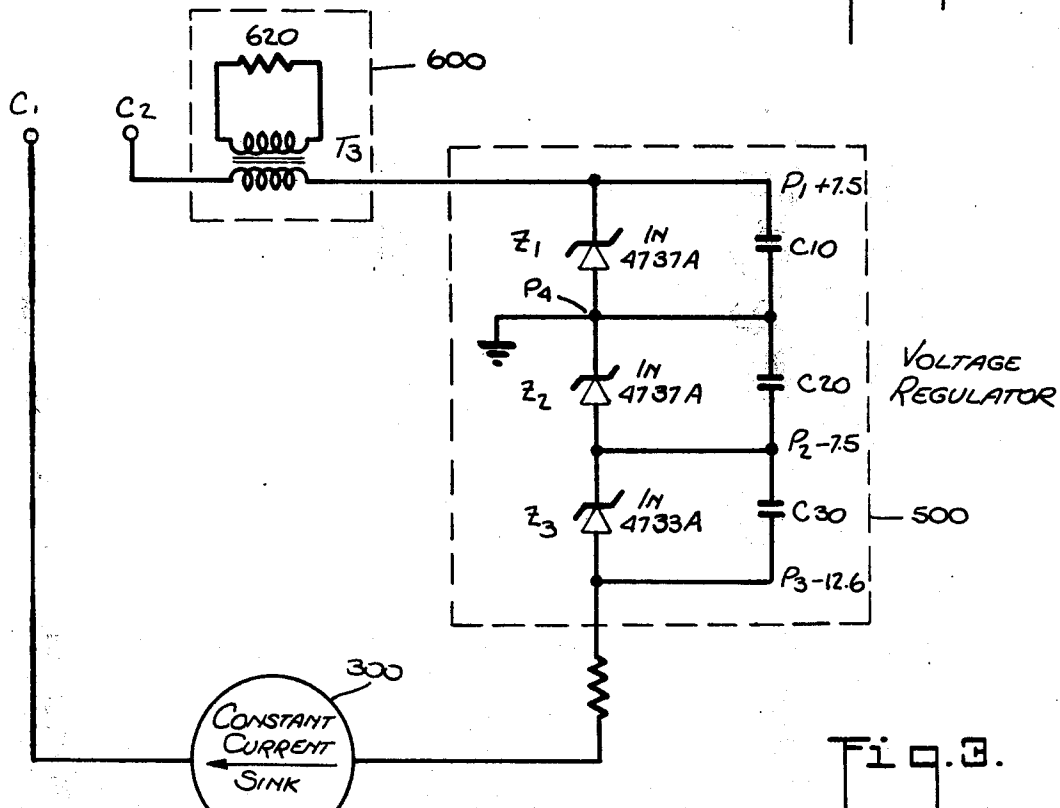
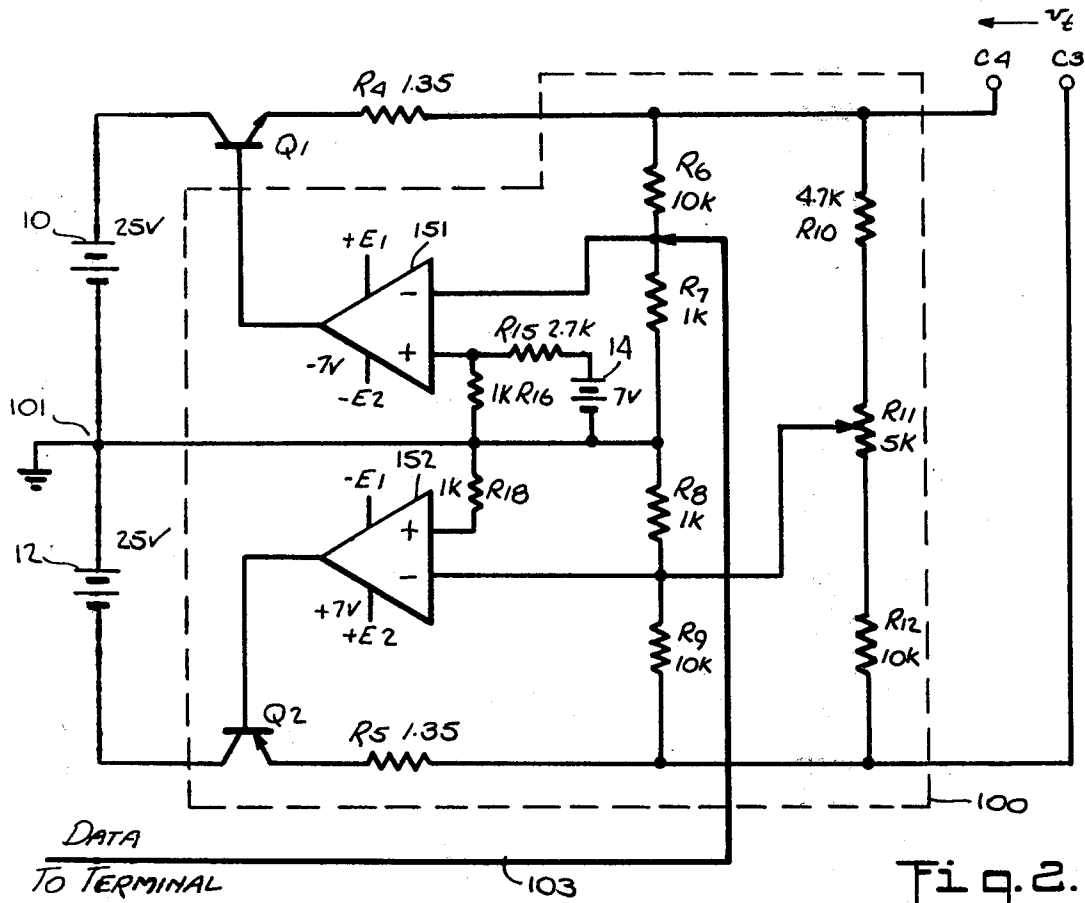
1437032 5/1976 United Kingdom .

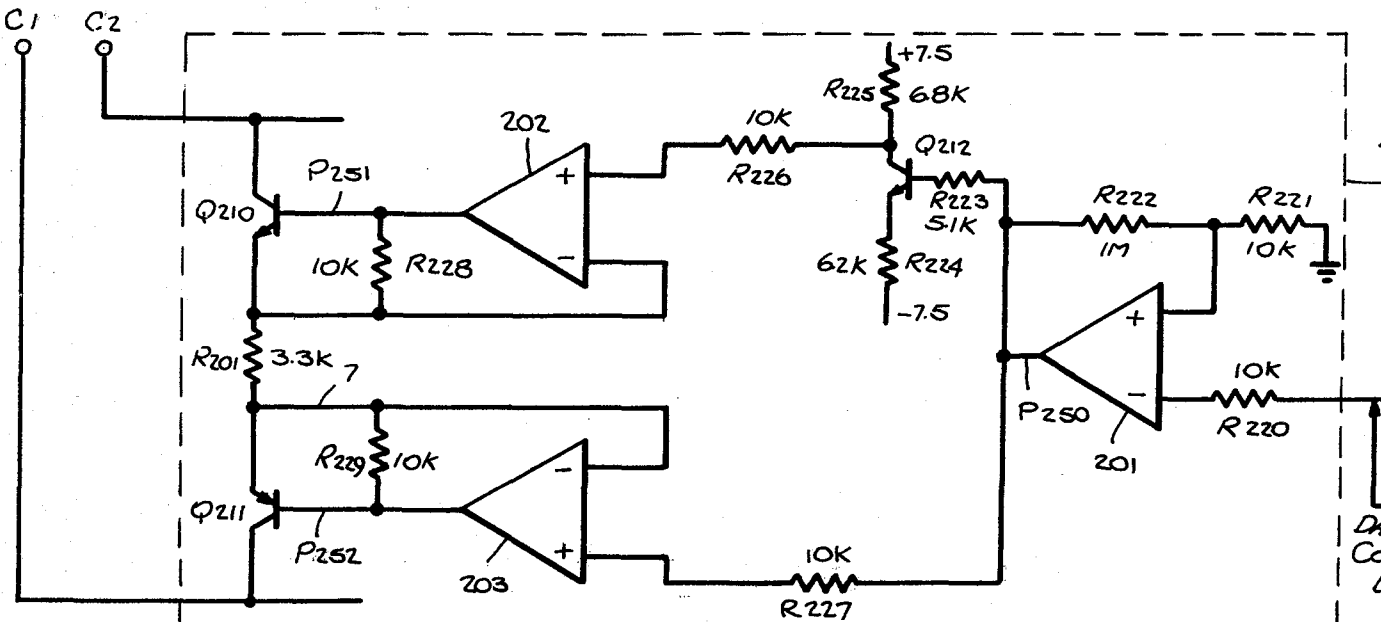
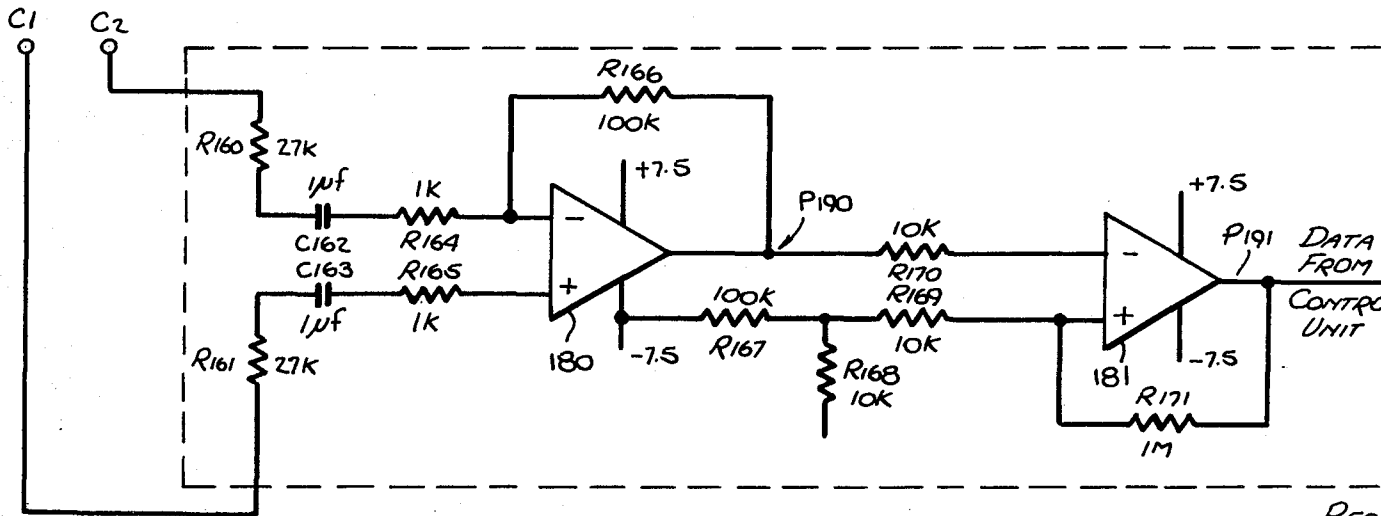
Primary Examiner—Bernard Konick  
 Assistant Examiner—Randall P. Myers  
 Attorney, Agent, or Firm—Francis N. Carten

12 Claims, 8 Drawing Figures









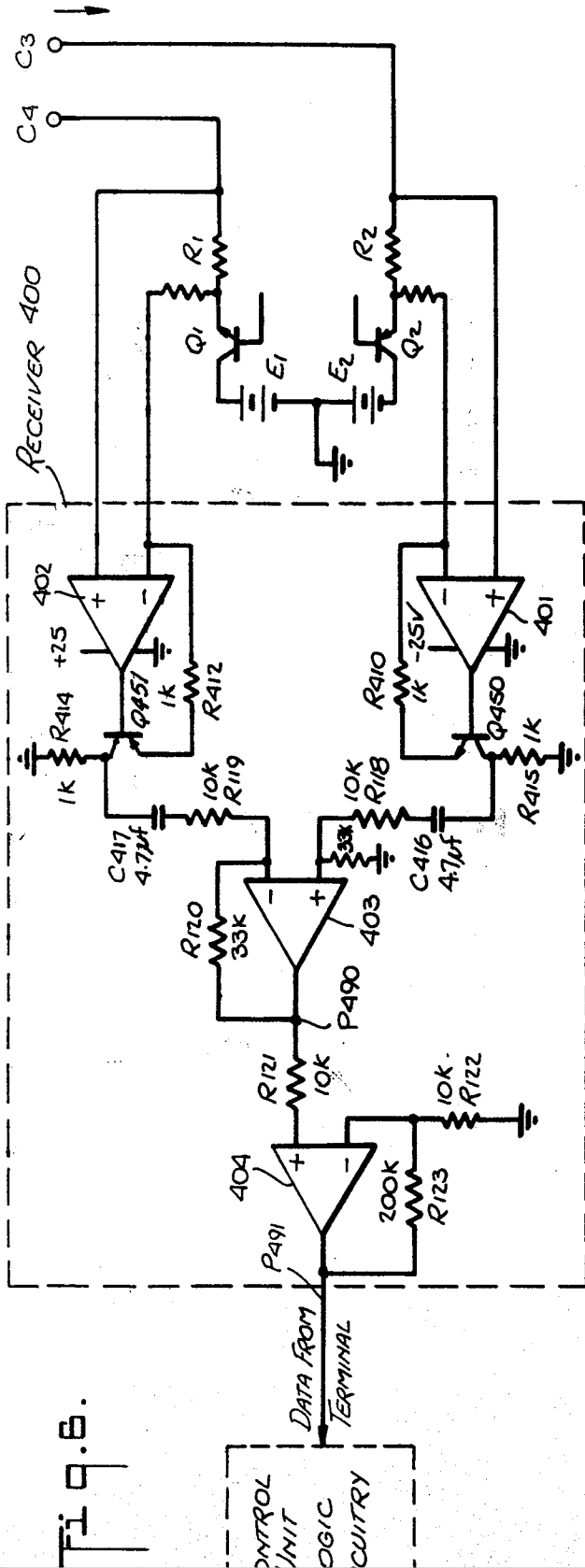


FIG. 8.

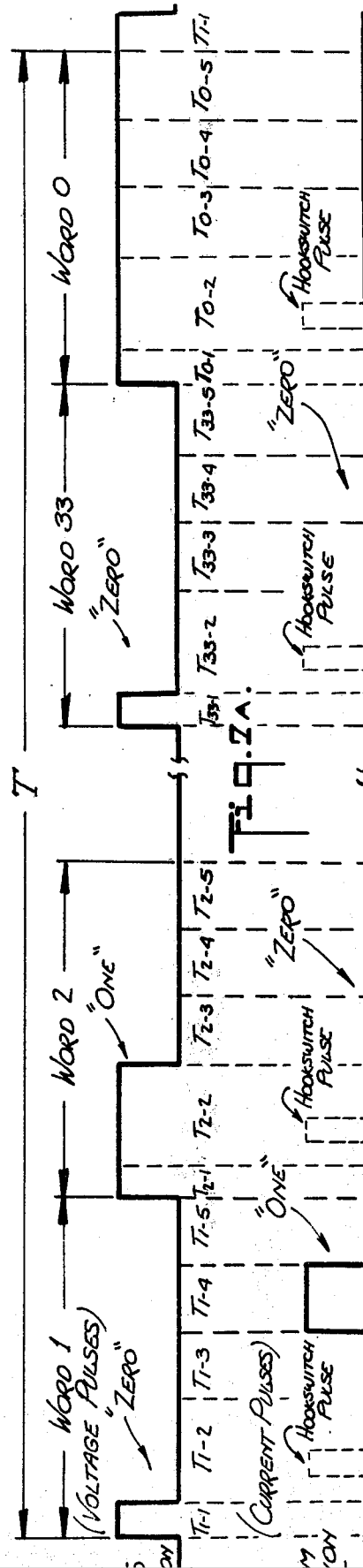


FIG. 9B.

# 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.