



US005200930A

United States Patent [19]

[11] Patent Number: **5,200,930**

Rouquette

[45] Date of Patent: **Apr. 6, 1993**

[54] TWO-WIRE MULTI-CHANNEL STREAMER COMMUNICATION SYSTEM

[75] Inventor: Robert E. Rouquette, Kenner, La.

[73] Assignee: The Laitram Corporation, Harahan, La.

[21] Appl. No.: 825,007

[22] Filed: Jan. 24, 1992

[51] Int. Cl.⁵ G01V 1/22

[52] U.S. Cl. 367/76

[58] Field of Search 367/20, 76, 80; 340/870.18, 870.26, 854.9

[56] References Cited

U.S. PATENT DOCUMENTS

3,958,216	5/1976	Chapman	367/80
4,219,810	8/1980	Joosten	340/853
4,912,684	3/1990	Fowler	367/76
4,967,400	10/1990	Woods	367/21

Primary Examiner—Ian J. Lobo

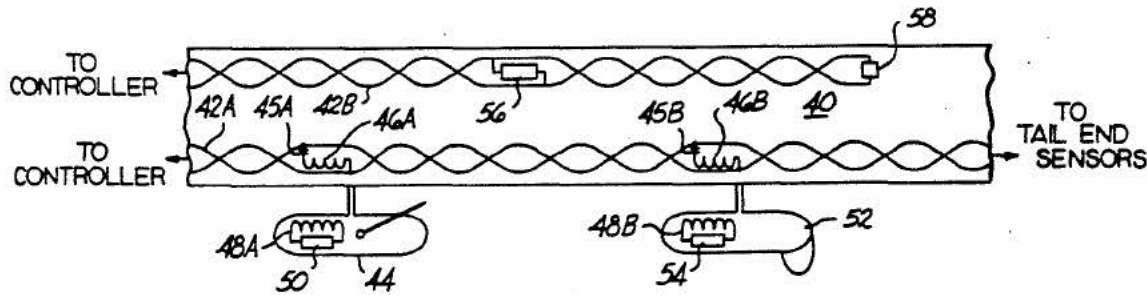
Attorney, Agent, or Firm—James T. Cronvich

[57] ABSTRACT

For use with marine seismic streamers, a two-wire, multi-channel communication system capable of handling the high throughput necessary for effective communication between a central controller aboard a tow vessel and the many sensors deployed along the

streamer. The central controller includes an intelligent modem with the capability of transmitting and receiving frequency-modulated message signals on one or more signal lines, such as conventional twisted-pair wires, over a number of individual inbound and outbound frequency channels. In the preferred embodiment, seventeen channels are spread over a frequency band ranging from about 20 kHz to 100 kHz, thereby making available for communication a bandwidth much wider than available in conventional single-channel streamer communication. In this way, many positioning sensors, such as compasses, depth sensors, cable-leveling birds, and acoustic-ranging transceivers, attached to the streamer and each having a transmitter and receiver tuned to one of the modem's inbound and outbound channels, respectively, can be put in communication with the modem. To take advantage of its high throughput capability, the intelligent modem refers to a stored table of individual sensor parameters, such as sensor type, transmit channel, and receive channel, to schedule an efficient scan of the sensors. As a diagnostic tool, the communication system also monitors the quality and performance of the communication link by measuring and recording such parameters as the transmitted and received signal strengths, signal-to-noise ratios, and number of incorrectly received messages.

25 Claims, 9 Drawing Sheets



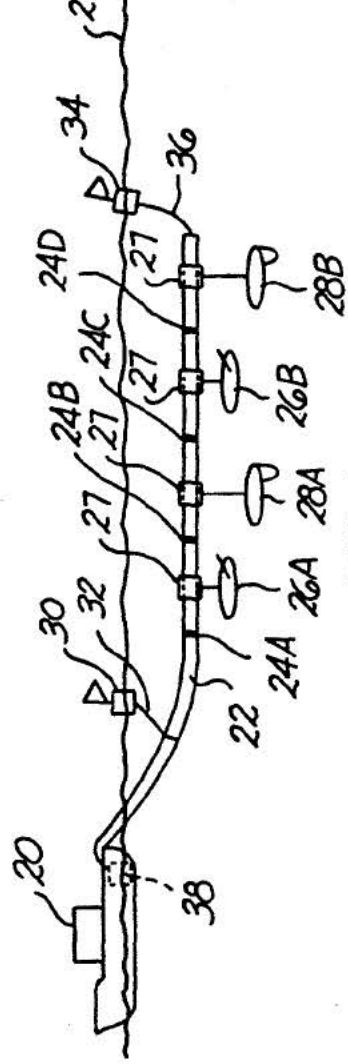


FIG. 1

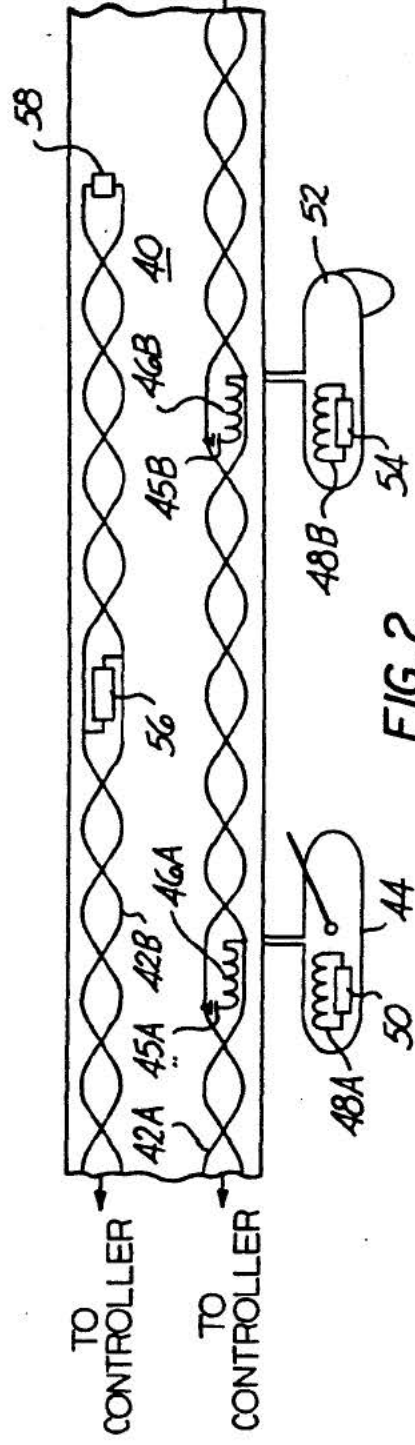


FIG. 2

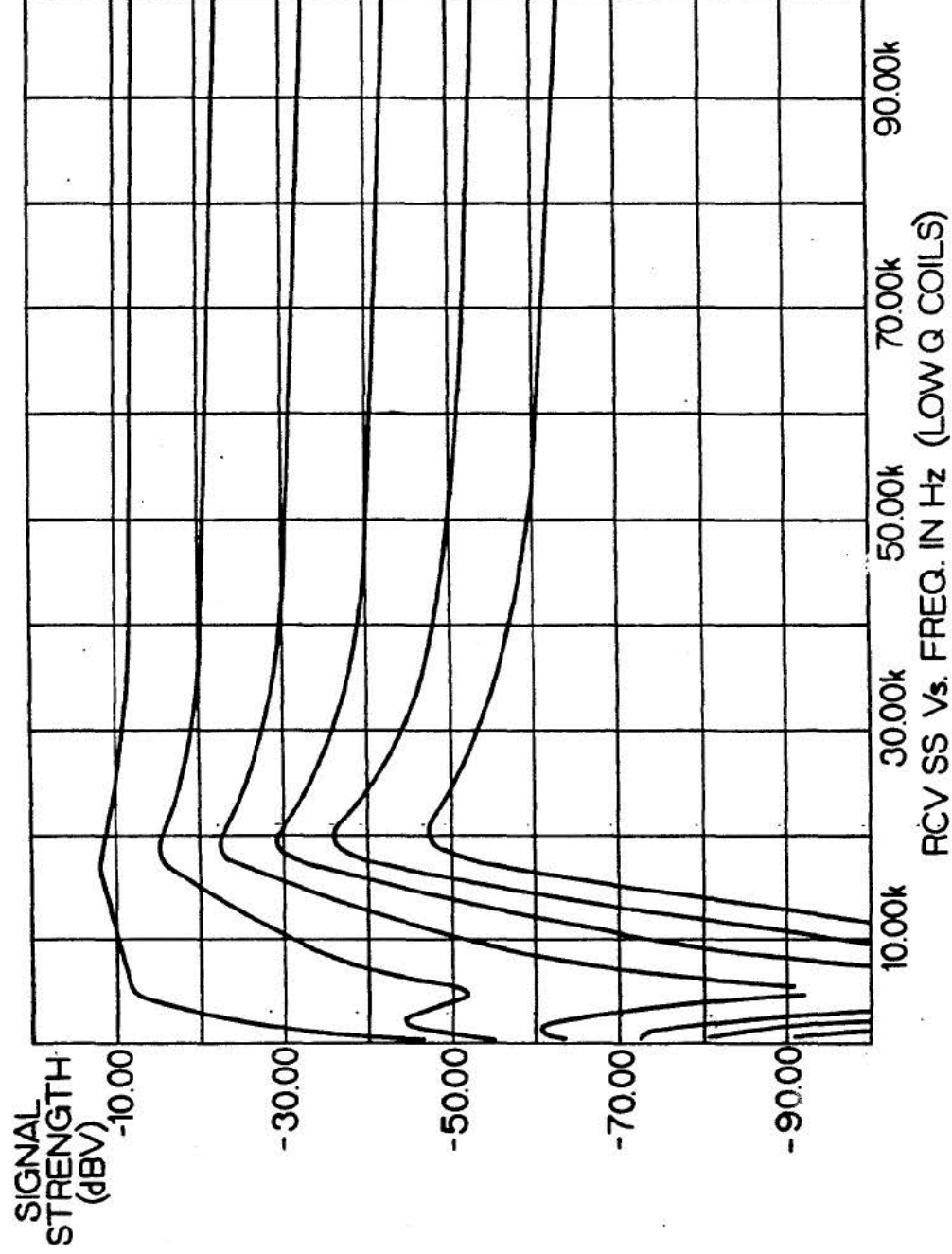
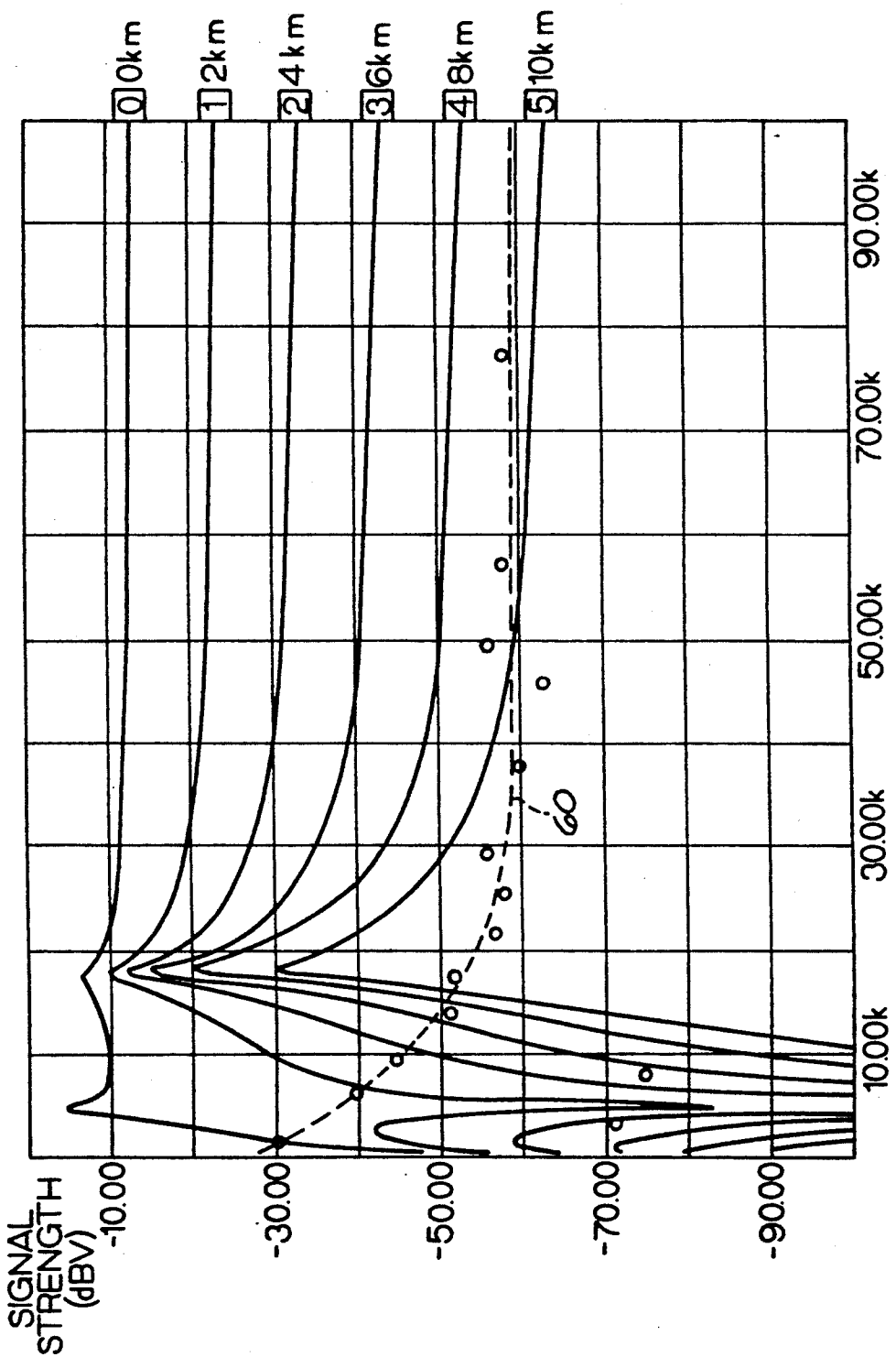


FIG. 3A



RCV SS Vs FREQ. IN Hz (HIGH Q COILS)

FIG. 3B

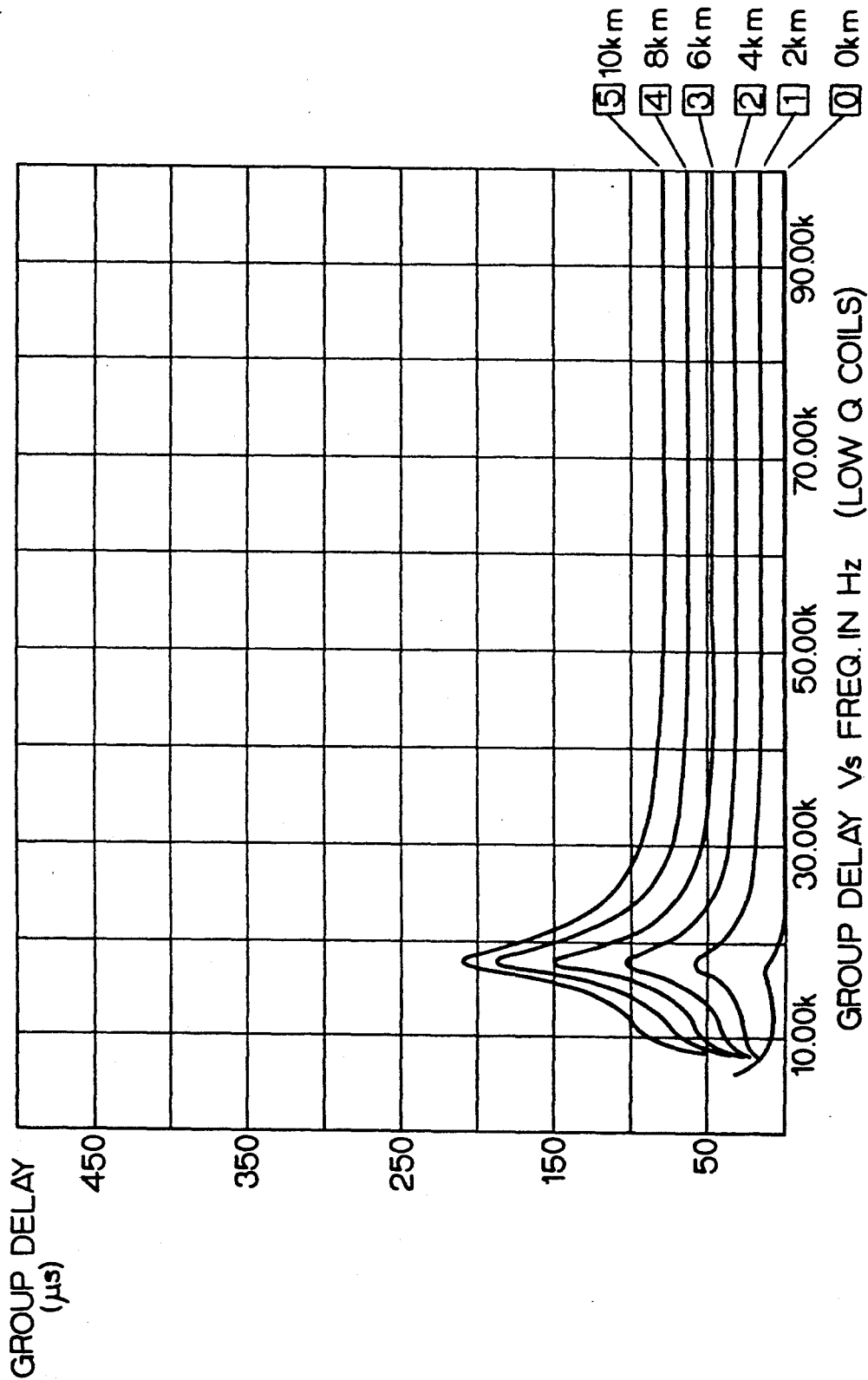


FIG. 4A

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.