



US006225873B1

(12) **United States Patent**  
**Hill**

(10) **Patent No.:** **US 6,225,873 B1**  
(45) **Date of Patent:** **May 1, 2001**

- (54) **FREQUENCY SHIFT KEY MODULATING OSCILLATOR**
- (75) Inventor: **John P. Hill**, Westland, MI (US)
- (73) Assignee: **Lear Automotive Dearborn, Inc.**, Southfield, MI (US)
- (\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.
- (21) Appl. No.: **08/566,270**
- (22) Filed: **Dec. 1, 1995**
- (51) **Int. Cl.<sup>7</sup>** ..... **H03C 3/00**
- (52) **U.S. Cl.** ..... **332/102; 332/100; 332/101; 375/272; 375/303; 375/304; 375/306; 375/307; 331/107 A; 331/179**
- (58) **Field of Search** ..... **332/100, 101, 332/102; 375/272, 303, 304, 306, 307; 331/107 A, 179**

Nick Demma, "Balanced Meissner Oscillator Circuits" RF design Dec. 1993 pp. 72-74.  
 Gary A Breed, "A Basic Review of Feedback" RFdesign Apr. 1993, pp. 62-64.  
 Craig Taylor & David Kenny, "Basic Crystal Oscillator Design Considerations" RFdesign Oct. 1992 pp. 75-79.  
 Fred Brown, "Stable LC Oscillators" rfdesign Mar. 1987 pp. 54-61.  
 Harvey L. Morgan, "An Emitter Follower Oscillator" rfdesign Oct. 1988 pp. 61-62.  
 D. L. Ash, "Saw Devices In Wireless Communication Systems", Oct. 31, 1993, p. 115-124, 1993 IEEE Ultrasonic Symposium.  
 Siemens Components, "Cost-Attractive, Reliable Remote Controls Use Saw Resonators", vol. 25, No. 4, Aug. 1990, p. 142-145.  
 Gec Plessey Semiconductor—Preliminary Information Kexrx01 290-460MHz Ask Receiver Sep. 1995 p. 245-251.  
 Temic—Telefunken Semiconductors—Preliminary Information UHF AM/FM Transmitter U2740B Rev. A1; 23,03, 1995.  
 Temic—Telefunken Semiconductors—Preliminary Information UHF AM/FM Transmitter U2741B Rev. A1; 02,05, 1995.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

2,930,991	*	3/1960	Edwards	.....	332/102
3,451,012	*	6/1969	Spiro	.....	332/102
3,560,881	*	2/1971	Fredricsson	.....	332/102

(List continued on next page.)

**FOREIGN PATENT DOCUMENTS**

3332307		3/1984	(DE)	.
3429574		2/1986	(DE)	.
0459781		12/1991	(EP)	.

(List continued on next page.)

**OTHER PUBLICATIONS**

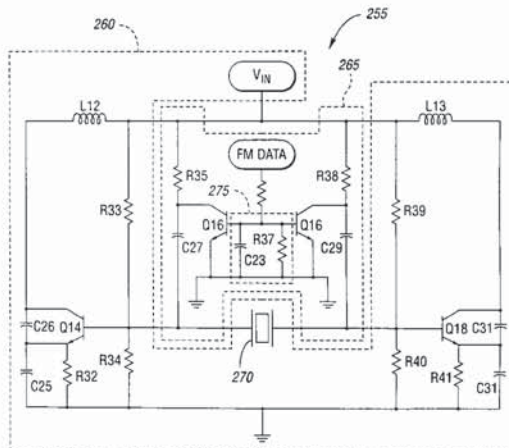
Branislav Petrovic, "A Balanced RF Oscillator", rfdesign Dec. 1989 pp. 35-38.  
 Robert Matthys, "A High Performance VHF Crystal Oscillator Circuit" rfdesign Mar. 1987 pp. 31-38.

*Primary Examiner*—Siegfried H. Grimm  
 (74) *Attorney, Agent, or Firm*—Brooks & Kushman P.C.

(57) **ABSTRACT**

The present invention teaches a system for selectably oscillating at a first or a second oscillating frequency. The system comprises an oscillator for providing an oscillating output. Moreover, the system comprises a switching device for selecting a first or a second impedance in response to a select signal having a voltage. Each of the first and second impedances is fixed independently of the select signal voltage such that the oscillating output oscillates at the first oscillating frequency when the first impedance is provided and oscillates at the second oscillating frequency when the second impedance is provided.

**2 Claims, 6 Drawing Sheets**



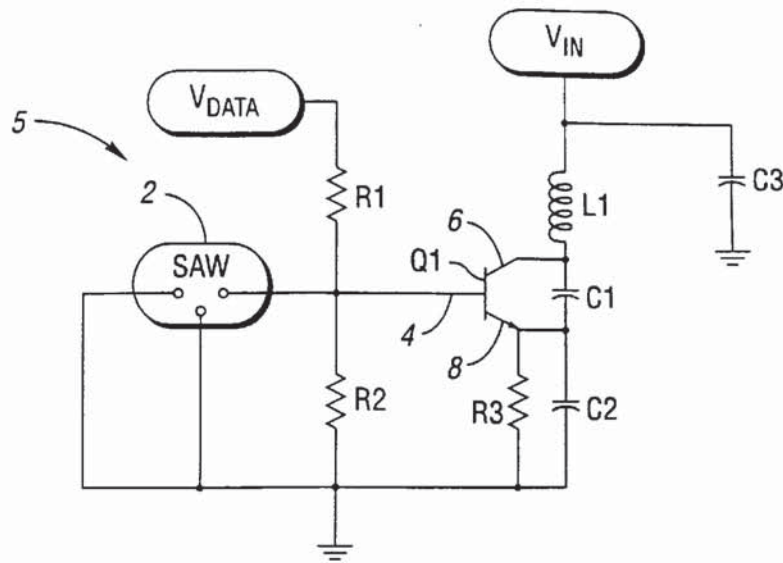
U.S. PATENT DOCUMENTS

4,189,676	2/1980	Arias et al. .	
4,794,622	12/1988	Isaacman et al. .	
5,103,221	4/1992	Memmola .....	340/825.31
5,138,284	8/1992	Yabuki et al. ....	331/56
5,367,537	11/1994	Anderson .....	375/65
5,422,605	6/1995	Yang et al. ....	331/116 R
5,532,654	* 7/1996	Ieki et al. ....	332/102

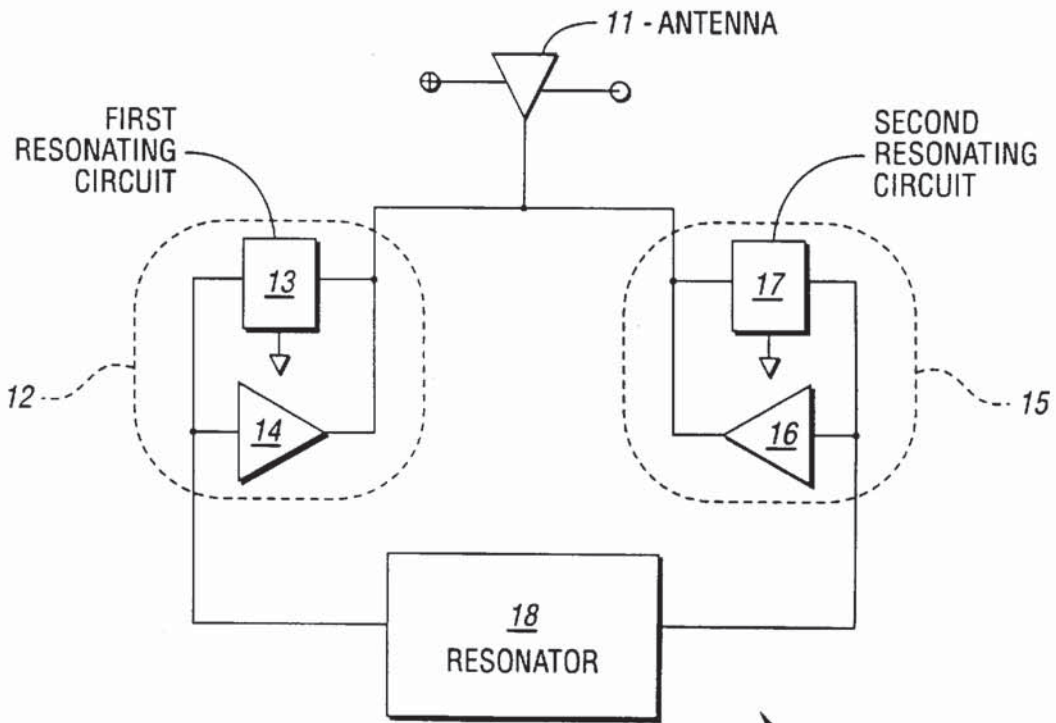
FOREIGN PATENT DOCUMENTS

0626772	11/1994	(EP) .
1603627	11/1981	(GB) .
WO96/16473	5/1996	(WO) .
91/4063	5/1991	(ZA) .
93/4726	7/1993	(ZA) .

\* cited by examiner

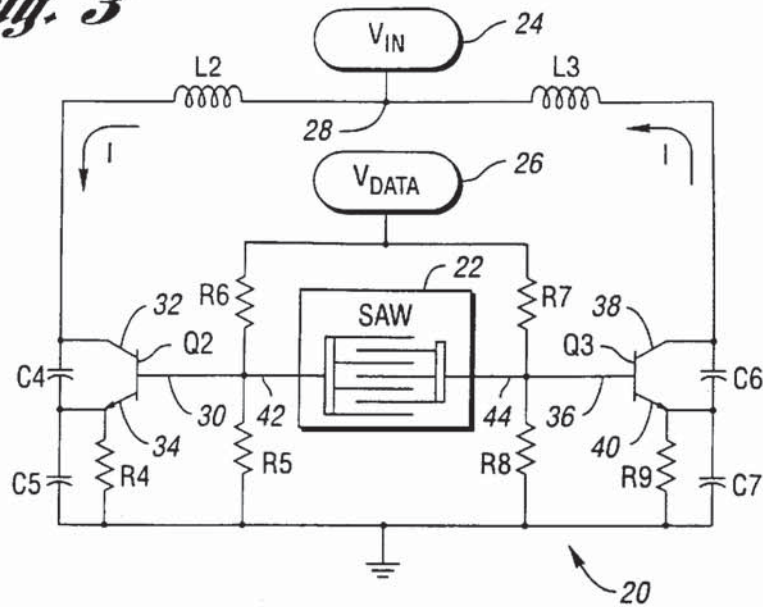


*Fig. 1*  
*(PRIOR ART)*

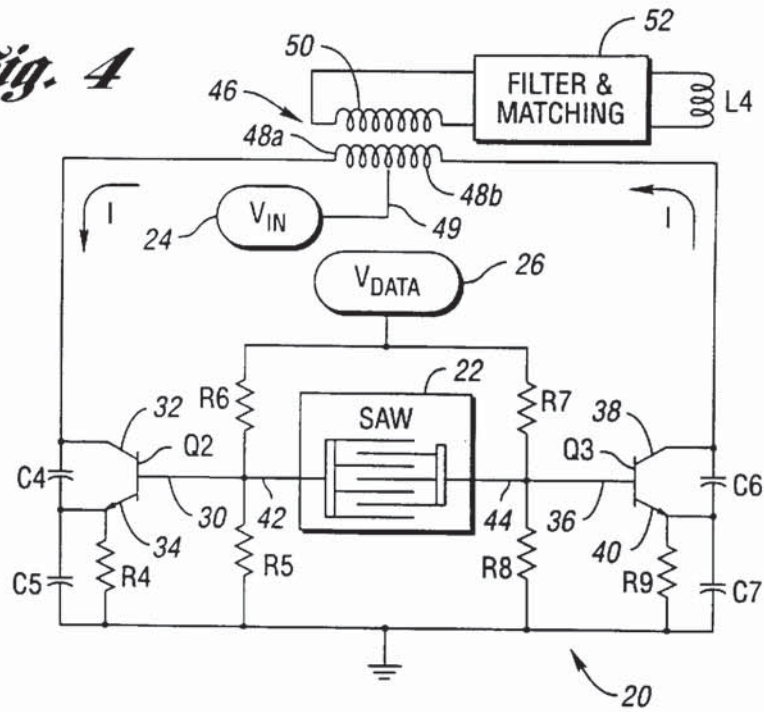


*Fig. 2*

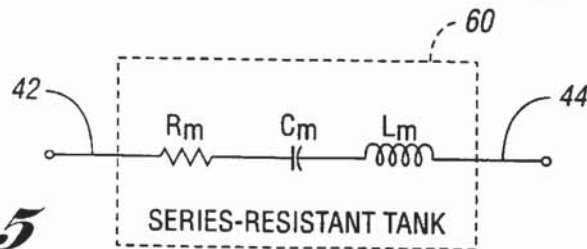
*Fig. 3*



*Fig. 4*



*Fig. 5*



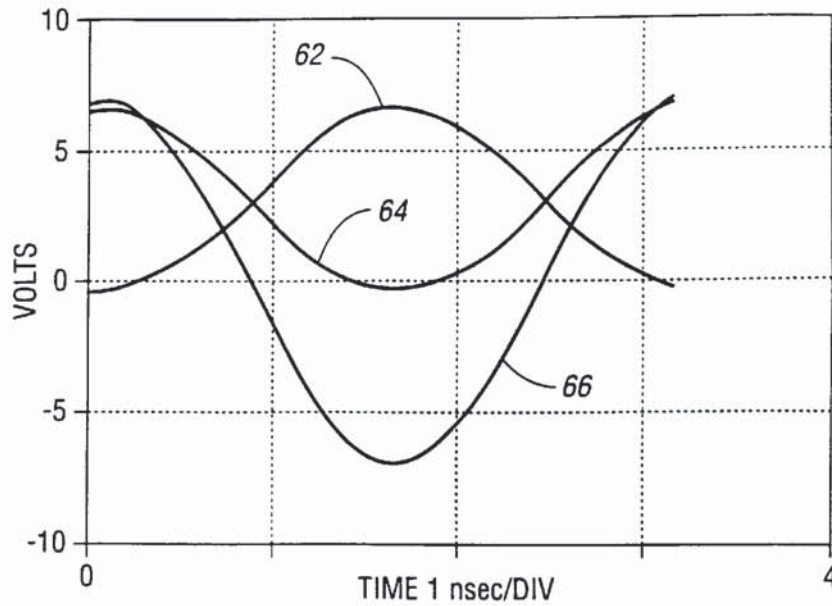


Fig. 6

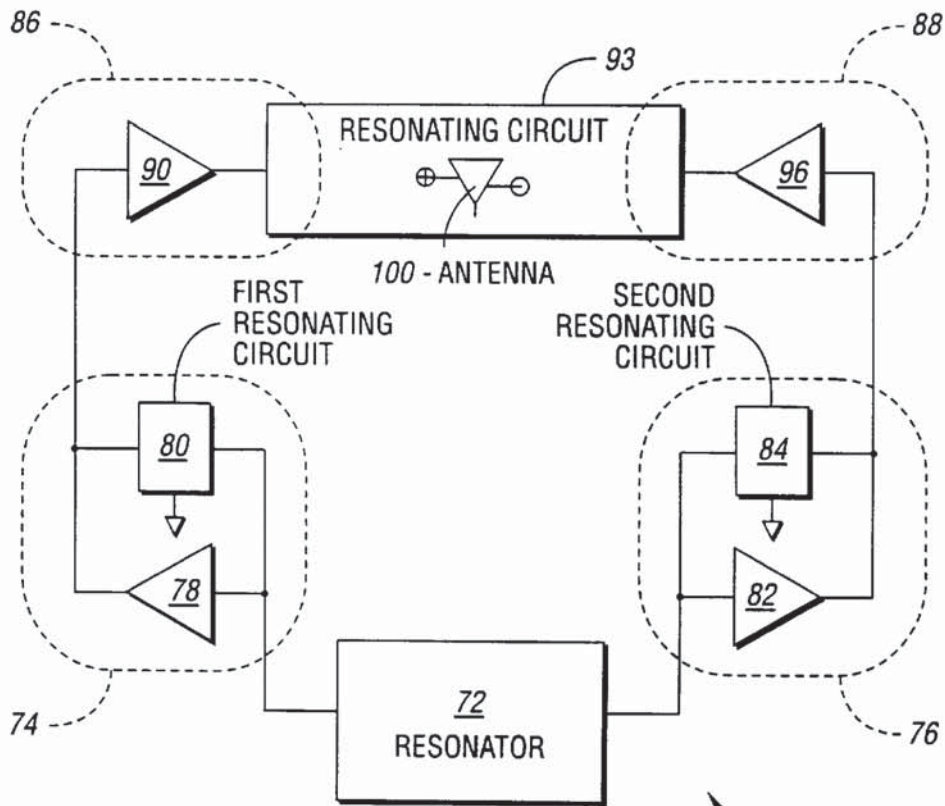


Fig. 7

# 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.