United States Patent [19]

Rocci et al.

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[54] **FREQUENCY AGILE SECURITY APPARATUS**

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[73] Assignee: **General Instrument Corporation**, New York, N.Y.

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[22] Filed: **Dec. 7, 1981**

[51] Int. Cl.³ **G08B 1/08; H04N 1/00**

[52] U.S. Cl. **340/533**; 340/505; 340/531; 340/825.08; 340/825.54; 455/3; 358/86; 375/36

[58] Field of Search .... 340/533, 531, 532, 518, 340/505–507, 536, 825.21, 825.06–825.13, 825.29, 825.52, 825.54, 870.09, 870.16, 870.18, 870.25; 179/5 R, 5 P; 178/63 R, 63 A, 63 B, 63 C; 358/10, 139, 122, 86; 375/36, 7; 455/3–6, 9, 14, 15, 17, 63, 20

[56]   **References Cited**

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Primary Examiner—Donnie L. Crosland
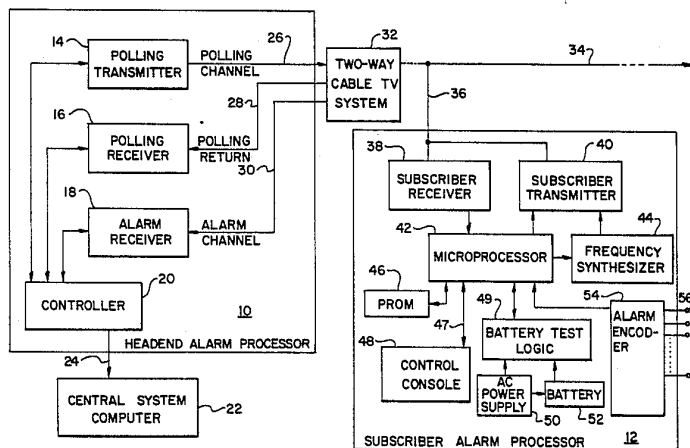*Attorney, Agent, or Firm*—Allan Jacobson

[57]   **ABSTRACT**

A cable TV security system utilizes three radio frequency signals as three data communication channels: one downstream channel and two upstream channels. A headend alarm processor transmits system commands on the downstream channel. A plurality of subscriber alarm units, connected to the cable TV system, transmit messages on the upstream channels to the headend alarm processor. The respective center frequency of both upstream channels is selectable by command on the downstream channel transmitted from the headend. In the event that one subscriber's alarm unit malfunctions whereby a continuous stream of upstream transmission jams one of the upstream channels, the headend alarm processor changes the respective transmitter frequency of the remaining subscriber alarm units to a clear channel frequency. Alternatively, the frequency or frequencies of the malfunctioning unit may be changed. In either case, system security coverage is rapidly restored.

6 Claims, 15 Drawing Figures

FIG-1

FIG-2

```
B7 B6        B5 B4 B3    B2 B1 BO
2 CONTROL    6 COMMAND  OR
  BITS         ADDRESS  BITS
```
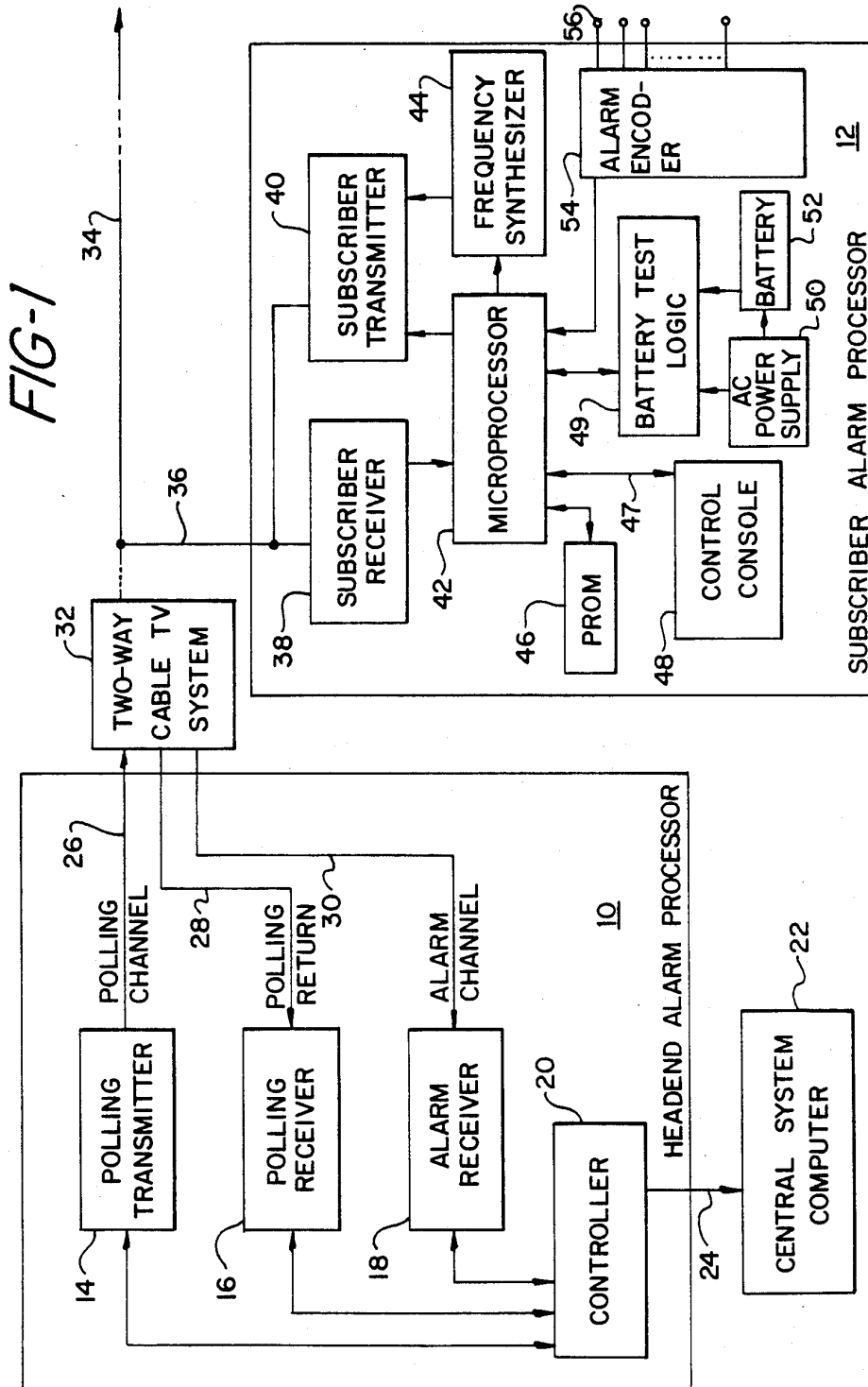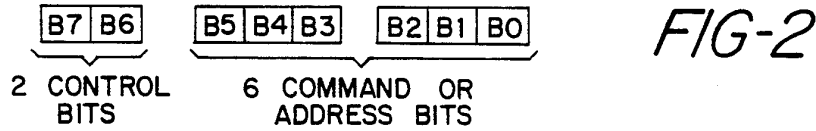
	B7	B6	B5 — BO
WO	O	O	LOWER 6 BITS OF 18 BIT SUBSCRIBER ADDRESS
W1	O	1	MIDDLE 6 BITS OF 18 BIT SUBSCRIBER ADDRESS
W2	1	O	UPPER 6 BITS OF 18 BIT SUBSCRIBER ADDRESS
W3	1	1	COMMAND CODE

FIG-4

```
            T-9                          F M

        17.75  23.75      50        88        108    MHz

        POLLING  RETURN                POLLING
              AND                      CHANNEL
    ALARM   FREQUENCIES               FREQUENCY
```

FIG-3

(a) CLOCK

(b) DATA WORD
367~"ALL QUIET"

(c) DATA FRAME
START PARITY STOP

(d) ENCODED DATA

(e) FSK SIGNAL
| T0 | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 | T10 | T11 |
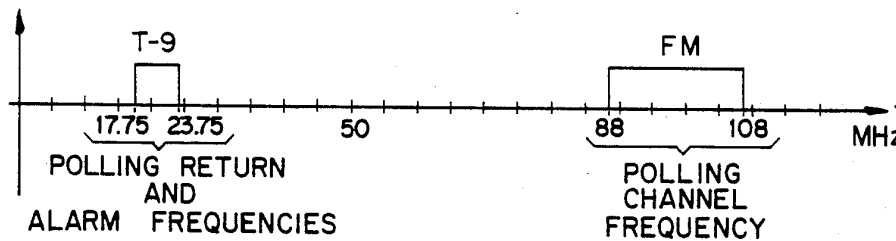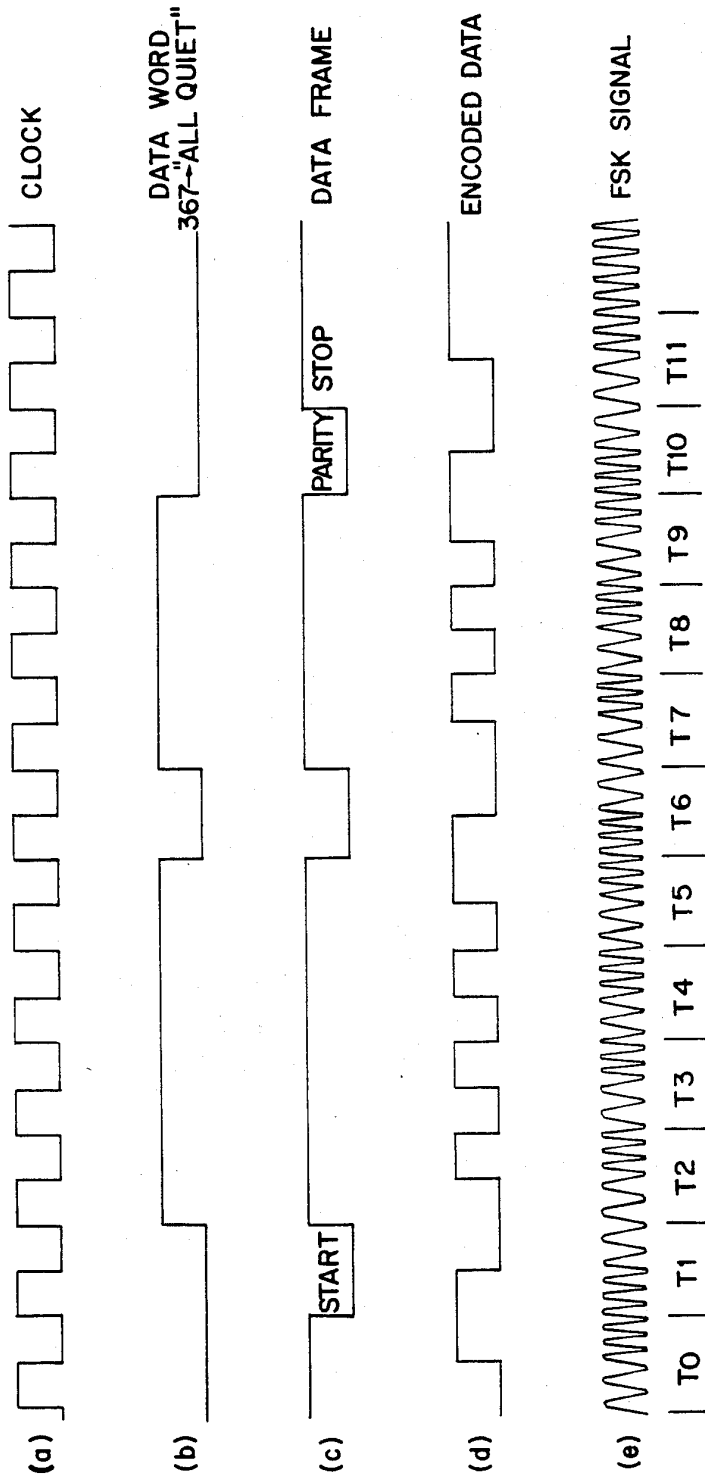
GLOBAL COMMANDS: [3 | X | X]
　　　　　　　　　　　└─ W3 ─┘

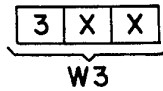## FIG-5

CODE	NAME	OPERATION
377	INTER-RECORD GAP (IRG)	SYNCHRONIZING SIGNAL
367	ALL QUIET	STOP UPSTREAM TRANSMISSION ON ALARM CHANNEL
353	ALL SPEAK AGAIN	REQUEST UPSTREAM TRANS-MISSION ON ALARM CHANNEL
354	RESTORE ORIGINAL FREQUENCY	SET POLLING RETURN AND ALARM CHANNEL FREQUENCIES AS DEFINED IN SUBSCRIBER PROM
374	ALL STAND ALONE	LOCAL ALARM ONLY, STOP UPSTREAM TRANSMISSION
356	BATTERY TEST ON	ALL OPERATE ON BATTERY
357	BATTERY TEST OFF	ALL OPERATE ON PRIMARY AC
376	RESET	RESET TO INITIAL CONDITION

FIG-6

ADDRESSABLE: [3 | X | X] [2 | X | X] [1 | X | X] [0 | X | X]
COMMAND　　　└─ W3 ─┘　└─ W2 ─┘　└─ W1 ─┘　└─ W0 ─┘
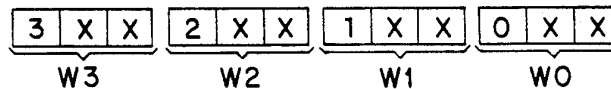
CODE	NAME	OPERATION
360	POLLING	REQUEST ADDRESSED SUBSCRIBER TO ACKNOWLEDGE
352	ALARM VERIFIED	INFORM ADDRESSED SUBSCRIBER THAT HEADEND HAS RECEIVED ALARM MESSAGE
373	DIRECT VERIFY	REQUEST ADDRESSED SUBSCRIBER TO SEND ALARM MESSAGE ON POLLING CHANNEL
375	DISARM	TURN OFF INTRUSION ALARM
355	LEARN PRIMARY CODE	PERMIT SUBSCRIBER TO ENTER A NEW PRIMARY CODE

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