

12

EUROPEAN PATENT APPLICATION

21 Application number: **81300447.0**

51 Int. Cl.³: **G 08 B 15/02**
G 08 B 13/14

22 Date of filing: **03.02.81**

30 Priority: **04.02.80 AU 2218/80**

43 Date of publication of application:
12.08.81 Bulletin 81/32

84 Designated Contracting States:
CH DE FR GB IT LI NL SE

71 Applicant: **King, George**
11 Justin Avenue
Baulkham Hills New South Wales 2153(AU)

72 Inventor: **King, George**
11 Justin Avenue
Baulkham Hills New South Wales 2153(AU)

74 Representative: **Boydell, John Christopher**
Stevens, Hewlett & Perkins 5 Quality Court Chancery
Lane
London, WC2A 1HZ(GB)

54 **A thief detection device.**

57 A thief detection aid system utilizing an explosive device activated upon occurrence of abnormal conditions to disseminate a marking dye after a predetermined delay and to transmit a signal to assist in apprehension of the thief, and wherein the device simulates a bundle 11 of banknotes and is hollow at 15 to contain a battery electrical circuitry including an electromagnetic sensor for detecting an electromagnetic field indicative of the presence of an abnormal condition, a transmitter in a reinforced compartment, a store 16, 17 of dye and associated detonator, a switch for activating the detonator as well as the transmitter, and time delay means to delay activation of said detonator.

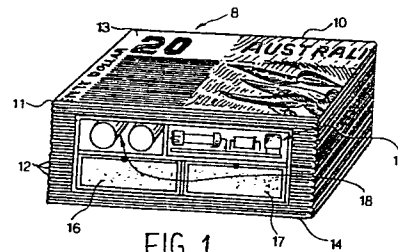


FIG. 1.

"A THIEF DETECTION DEVICE"

This invention relates to Thief Detection Aid Devices.

A device known as the "Scorpion" has been in
5 general use by banks and agencies where large cash
transactions occur. It is in the form of a hollow stack of
bank notes housing a battery and a detonator with a reed
switch interconnecting them and a dye reservoir, and is
normally seated in an individual holder provided with a
10 magnet for retaining the reed switch in an inoperative
condition. When removed from its holder the device, after a
predetermined time delay, detonates and disseminates a
permanent dye.

This device has been successful in the apprehension
15 of bank robbers, and the like. However, some inconvenience
arises by the need for the device to be always kept in its
holder while the mere dye-marking of the surroundings by a
detonating device is sometimes not sufficient for subsequent
detection of the robber or his booty.

20 It is a prime object of the invention, therefore,
to provide a device as an aid to the detection of a thief
and/or the recovery of his booty which does not require any
special storage provision.

The invention in one general form provides a thief
25 detection aid device comprising a hollow housing constructed
to simulate the external appearance of a bundle of
banknotes, electrical solid state circuitry together with
individual power supply within the housing and including an
electromagnetic sensor and an output switch responsive
30 thereto, a detonator charge associated with disseminating
dye within the housing and activated by said switch, timing
means imposing a predetermined delay in activation of said
detonator charge after energization of said sensor, and a
signal transmitter within a reinforced compartment within
35 the housing for protection against damage to said
transmitter with activation of said detonator and also being
activated by said electromagnetic sensor, whereby passage
from a quiescent to an active state of the device occurs
with electromagnetic energization of said sensor and signal
40 contact with the device is maintained after detonation of

said charge.

The invention will be understood more readily from the following description in conjunction with the accompanying drawings, in which:

5 Figure 1 shows in perspective one form of the device of the invention in half transverse section;

 Figure 2 is a similar view of another form of the device;

 Figure 3 depicts schematically a solid state receiver for incorporation within the device of Figure 1;

 Figure 4 depicts schematically a transmitter for activation of the device of Figure 1;

 Figure 5 depicts schematically a solid state transmitter for incorporation within either device of Figure 1 or Figure 2;

 Figure 6 depicts schematically a command transmitter for activation of the device of Figure 2; and,

 Figure 7 depicts schematically a solid state receiver for incorporation within the device of Figure 2 to respond to the transmitter of Figure 6.

The invention will now be described in more detail in respect of two independent applications of the device. In both applications as shown separately in Figs. 1 and 2 the device 8 or 9 is accommodated within a housing 10 which simulates the external appearance of a bundle 11 of banknotes. In most banks and similar agencies banknotes are stored either in a fold comprising ten notes folded about their mid point, and a bundle of notes which comprise ten folds arranged in a stack. Sometimes larger bundles consisting of twenty-five folds of notes are used and this size bundle is of ideal dimensions for simulation by the device 8 or 9 of this invention. In each instance the folds 12 and the entire bundle 11 are bound by paper wrappers or elastic bands (which are not shown in the drawings).

35 It is intended according to the application of the device 8 shown by Fig. 1, that it will be stored within a teller's cash drawer and becomes activated when passing through an induced electromagnetic field about the doorway to the premises. In respect of the second application shown 40 by Fig. 2, the device 9 will be located within a satchel

used to carry pay-rolls and the like between a carrier vehicle, such as an armoured car, and a bank or payroll office. Activation of the device 9 occurs as a deliberate action originating from say an occupant of the vehicle by
5 electromagnetic signalling whenever a robbery involving the satchel occurs.

To this end, in respect of the first application and, therefore, the form shown in Fig. 1 the device 8 is accommodated within a housing 10 comprising a cavity 15
10 around which is formed a covering of paper strips simulating the external appearance of the edges of a bundle 11 of banknotes. Complete and genuine banknotes 13 and 14 of the same denomination are placed over the outer faces of the hollow housing 10 thus formed. To the casual observer the
15 housing 10 will appear to be a bundle 11 of banknotes similar in form to other bundles normally stored within a teller's cash drawer. The teller, of course, will be required to keep the device separate from genuine banknote bundles.

20 A receiver (Fig. 3) composed of electric solid state circuitry preferably of integrated form, is located within the cavity 15. Two dye chambers 16 and 17 are also provided in the cavity 15 in association with a detonator charge (not shown). Preferably, a wall of the receptacle
25 bounding these chambers 16 and 17 is of weakened form to effect a degree of control over the direction of dissemination of the dye upon detonation. Dry cells are included within a battery chamber 18. Preferably, the receiver is of the form shown by Fig. 3. Three separate
30 receiving detectors 19, 20 and 21 associated with individual orthogonal sensor coils 22, 23 and 24 are tuned to 30 KHz and apply a received signal of that frequency to a detector amplifier and clamp 25, which in cases where for security coded, or modulated, signalling is utilized, serves as a
35 decoder, amplifier, filter, counter and clamp. An output derived from amplifier 25 upon receipt of a correct signal is applied to activate a timer 26 and by line X to activate a UHF transmitter also contained within the housing 10. Upon lapsing of a predetermined time period the timer 26
40 activates a detonator firing circuit 27 which in turn

applies power from the batteries to fire the detonators associated with the dye chambers 16 and 17 (Fig. 1).

5 A UHF transmitter (shown in Fig. 5) is located within a reinforced compartment within the cavity 15 to avoid damage thereto whenever detonation occurs. The transmitter preferably transmits at a frequency of about 880 MHz and with a power of 0.5W and includes an output antenna 28 and an input microphone 29. An activation signal from the receiver of Fig. 3 when applied over line X switches on
10 a crystal controlled oscillator 30, a phase modulator 31 to which the microphone 29 is connected by an amplifier limiter bandshaper circuit 32, and the series of frequency multipliers 33, 34 and 35. The output of the latter is passed through a power amplifier 36 to the antenna 28 which
15 is preferably a turned loop. Thus dye-marking of the device's surroundings will occur with each activation, and subsequently by virtue of the transmitter conversations or other sounds in the vicinity of the device 8 will be broadcast. This facility will greatly assist law
20 enforcement officers in locating and apprehending those responsible for or accessory to the robbery.

Hence, a device 8 constructed as above described will normally remain in a quiescent state under normal conditions of commerce but can be rendered active under
25 abnormal conditions. This will require the installation of a transmitter antenna loop about the access doorway to the premises within which the device 8 normally resides, and which is energized by loop exciter apparatus of the required frequency. Preferably a control switch is incorporated to
30 remove the field when not required. Fig. 4 shows such apparatus in the form of a 30KHz transmitter provided with an output loop antenna 37. The transmitter preferably comprises a 90° phase shift circuit 38 connected for feedback from the output antenna 37 to a phase-locked
35 oscillator and comparator 39 connected through a biphasic interface 40 to the input of a pair of push-pull power amplifiers 41 and 42 and thence to a 30KHz tuned transformer 43 for application to the output antenna 37. Power is applied over smoothing choke 44 to the circuit from a
40 battery source 45 maintained on float charge from a power

rectifier 46 connected with the mains power. When modulated or coded signals are utilized a programmable modulator 47 may be added.

In the second application of the invention, shown
5 by Figs. 2, 6 and 7 the device 8 will contain a UHF receiver to receive a command signal from a control station, such as an armoured car. A command transmitter (see Fig. 6) operative at an assigned ultra high frequency will therefore be provided within the car and will incorporate for security
10 against intentional or unintentional intrusion an encoder 48 which is either pre-programmed, key programmed or keyboard operated. Operation of the transmitter is controlled via the input line 49. The transmitting frequency is determined by the crystal controlled oscillator 50 and frequency
15 multipliers 51, 52 and 53 while the output power is supplied from the UHF amplifier 54 to the antenna 55. The encoder 48 is connected by a parallel to series converter 56 associated with timing generators 57 to a modulator 58 for imposing a coded command signal on the carrier of the transmitter.

20 The UHF receiver (see Fig. 7) is located within the cavity 15 of the device 8 in place of the 30KHz receiver described in connection with the previously discussed form of the invention. This receiver is fed from a tuned loop input antenna 59 through an R.F. amplifier 60 to a converter
25 61 supplied from a local crystal controlled oscillator 62 whose frequency corresponds to the carrier of the transmitter of Fig. 6. The output of converter 61 is amplified through the I.F. amplifier 63 and demodulated in circuit 64 whose output is passed via a noise quench circuit
30 65 and series to parallel converter 66 provided with timing generators 67 to a comparator 68 where comparison with a reference signal is made. This signal is obtained from a memory 69 which is either pre-programmed or key programmed. The output of the comparator 68 is then applied via line Y
35 to a similar detonation circuit as the timer 26 and circuit 27 of Fig. 3. An activating signal will also be sent to the UHF transmitter inbuilt into the device 8.

Preferred embodiments have been described in the foregoing passages but it should be realised that other
40 forms and modifications are possible within the scope of

this invention.

CLAIMS

1. A thief detection aid device characterized by a hollow housing (10) constructed to simulate the external appearance of a bundle (11) of banknotes, electrical solid state circuitry together with individual power supply within the housing and including an electromagnetic sensor (Fig. 3) and an output switch (27) responsive thereto, a detonator charge associated with disseminating dye (16 and 17) within the housing and activated by said switch, timing means (26) imposing a predetermined delay in activation of said detonator charge after energization of said sensor, and a signal transmitter (Fig. 5) within a reinforced compartment within the housing for protection against damage to said transmitter with activation of said detonator and also being activated by said electromagnetic sensor, whereby passage from a quiescent to an active state of the device occurs with electromagnetic energization of said sensor and signal contact with the device is maintained after detonation of said charge.

2. A thief detection aid device as claimed in claim 1, characterized in that said electromagnetic sensor (Fig. 3), output switch (23) and timing means (26) are incorporated in a tuned receiver (Fig. 3) comprising sensing means (19 to 25) for detecting the presence in the vicinity of said device of an electromagnetic field corresponding in frequency to that to which said receiver is tuned to produce a signal transmitted via said timing means to said output switch.

3. A thief detection aid device as claimed in claim 2, characterized in that said sensing means (19 to 25) includes a decoder (25) to ensure that said receiver responds to produce said signal only when said field is characterized by a predetermined code.

4. A thief detection aid device as claimed in any one of the preceding claims, characterized in that said transmitter (Fig. 5) transmits at UHF frequencies and comprises a microphone (29) and functions to transmit neighbouring sound from said device.

5. Thief detection aid equipment characterized by

a hollow device (8) externally simulating a bundle (11) of banknotes and containing an electrical battery; electrical solid state circuitry including an electromagnetic sensor (19 to 25) and a signal transmitter (Fig. 5) activated therefrom; switching means (27) activated through energization of said electromagnetic sensor; a dye reservoir (16 and 17); a detonator for disseminating said dye and being activated by said switching means; a time delay unit (26) ensuring activation of said detonator occurs upon lapsing of a predetermined time period from energization of said electromagnetic sensor; and a source (Fig. 4) of an electromagnetic field for energizing said electromagnetic sensor upon the occurrence of an abnormal condition.

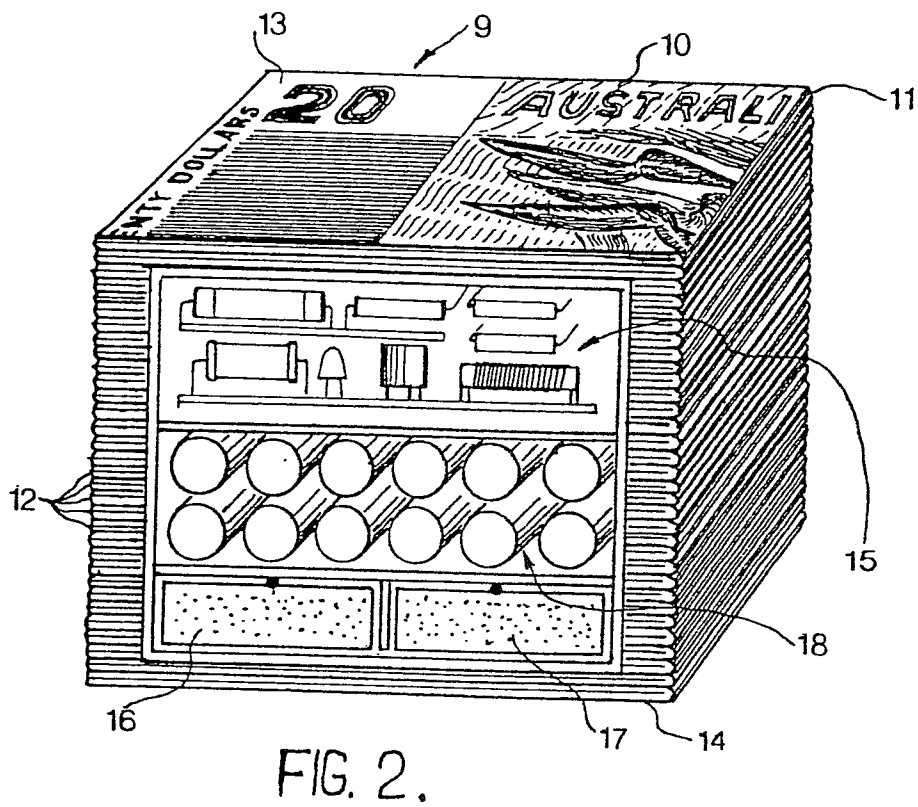
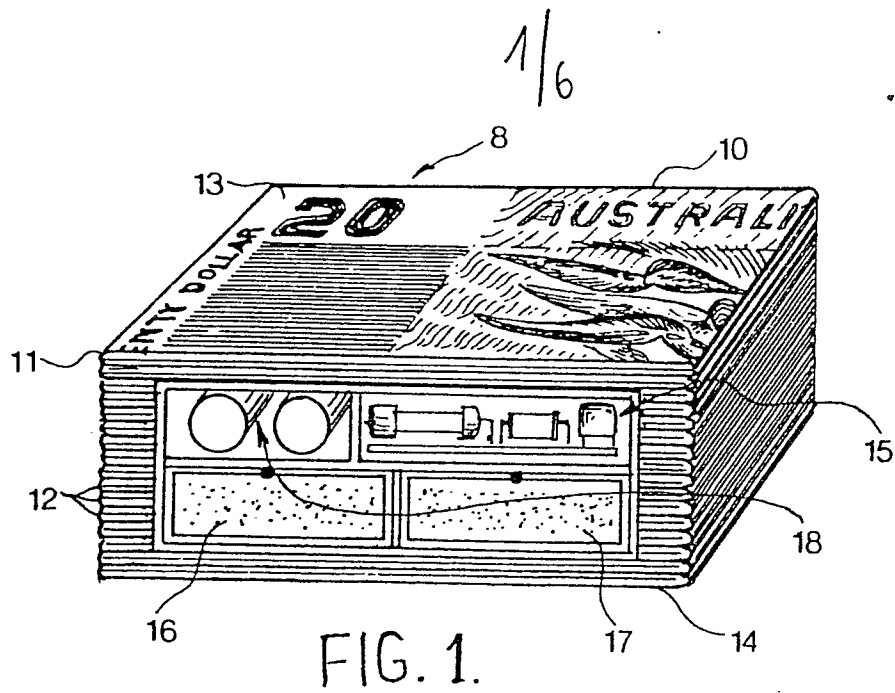
6. Thief detection aid equipment as claimed in claim 5, characterized in that said source of an electromagnetic field is a further transmitter (Fig. 4) for creating said field about a fixed protected area through which said device is not intended normally to pass.

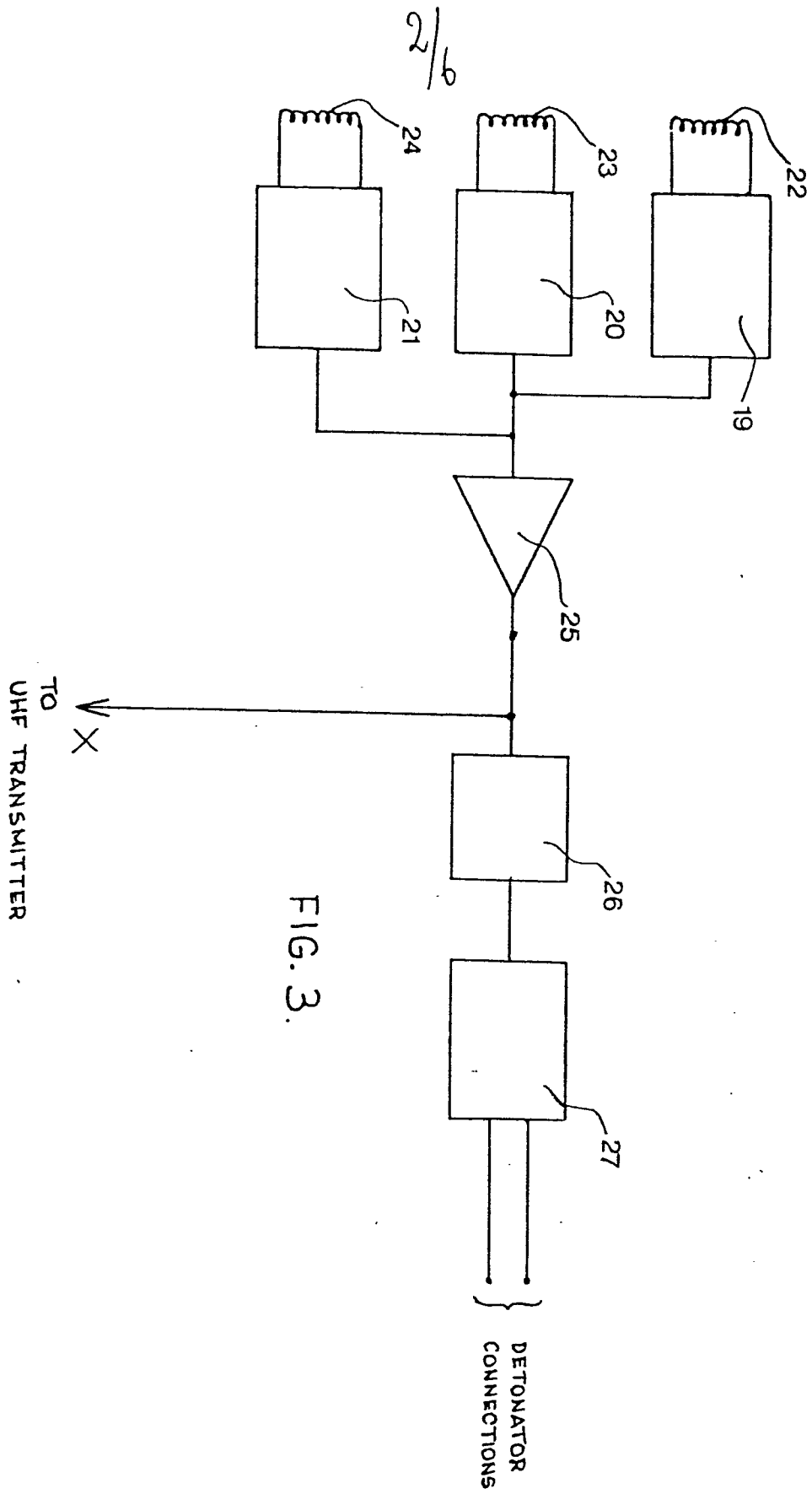
7. Thief detection aid equipment as claimed in claim 5, characterized in that said source of an electromagnetic field is a radio frequency command transmitter (Fig. 6) provided with a manual activating control (49) to transmit an electromagnetic signal for energization of said sensor.

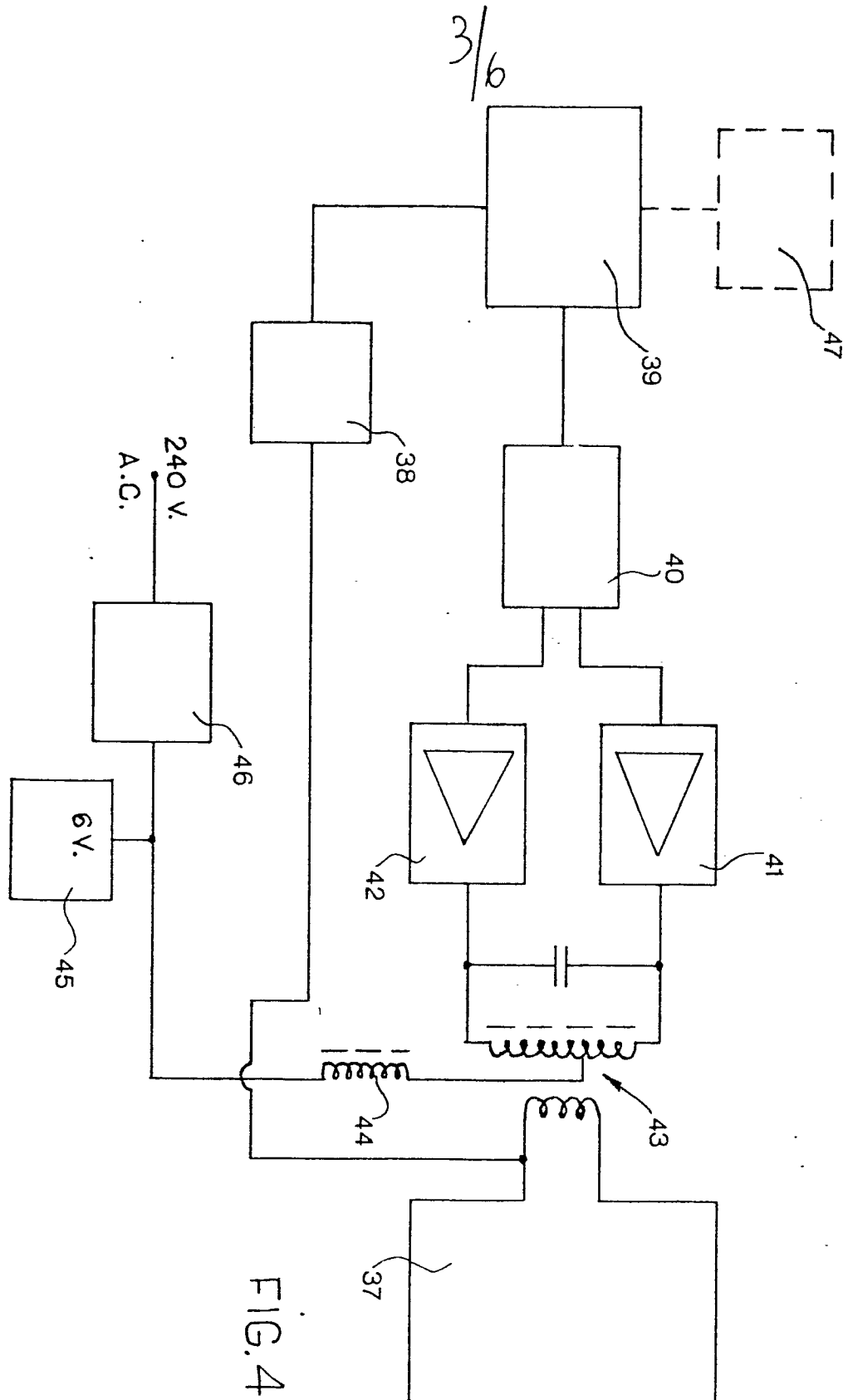
8. Thief detection aid equipment as claimed in claim 5, 6 or 7, characterized in that said sensor is a tuned receiver (Fig. 3 or Fig. 7), and said receiver and said source of an electromagnetic field include means for communication therebetween by a coded signal.

9. A thief detection aid device substantially as herein described with reference to Figs. 1, 3, 4 and 5 or to Figs. 2, 5, 6 and 7 of the accompanying drawings.

10. Thief detection aid equipment substantially as herein described with reference to Figs. 1, 3, 4 and 5, or to Figs. 2, 5, 6 and 7, of the accompanying drawings.







4/6

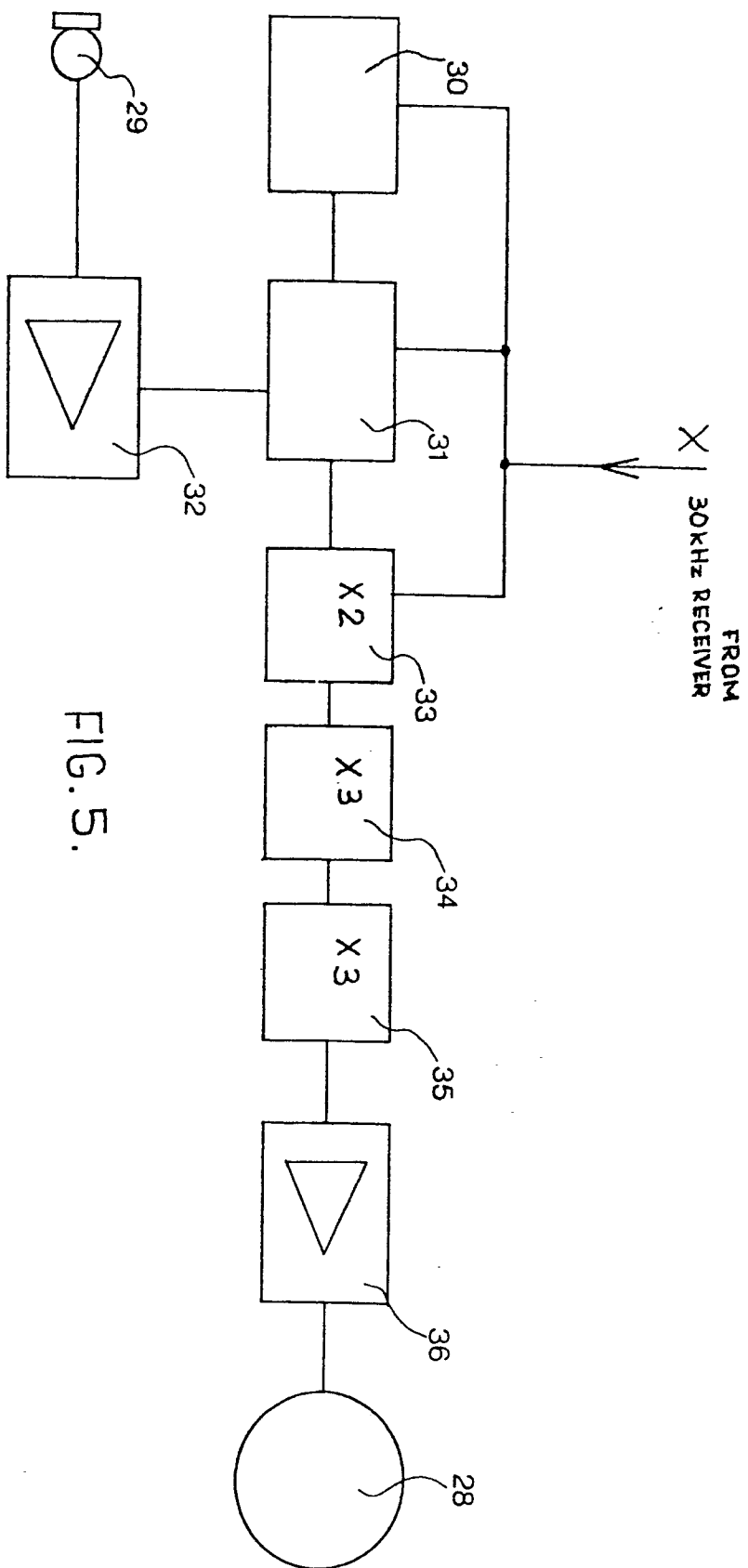
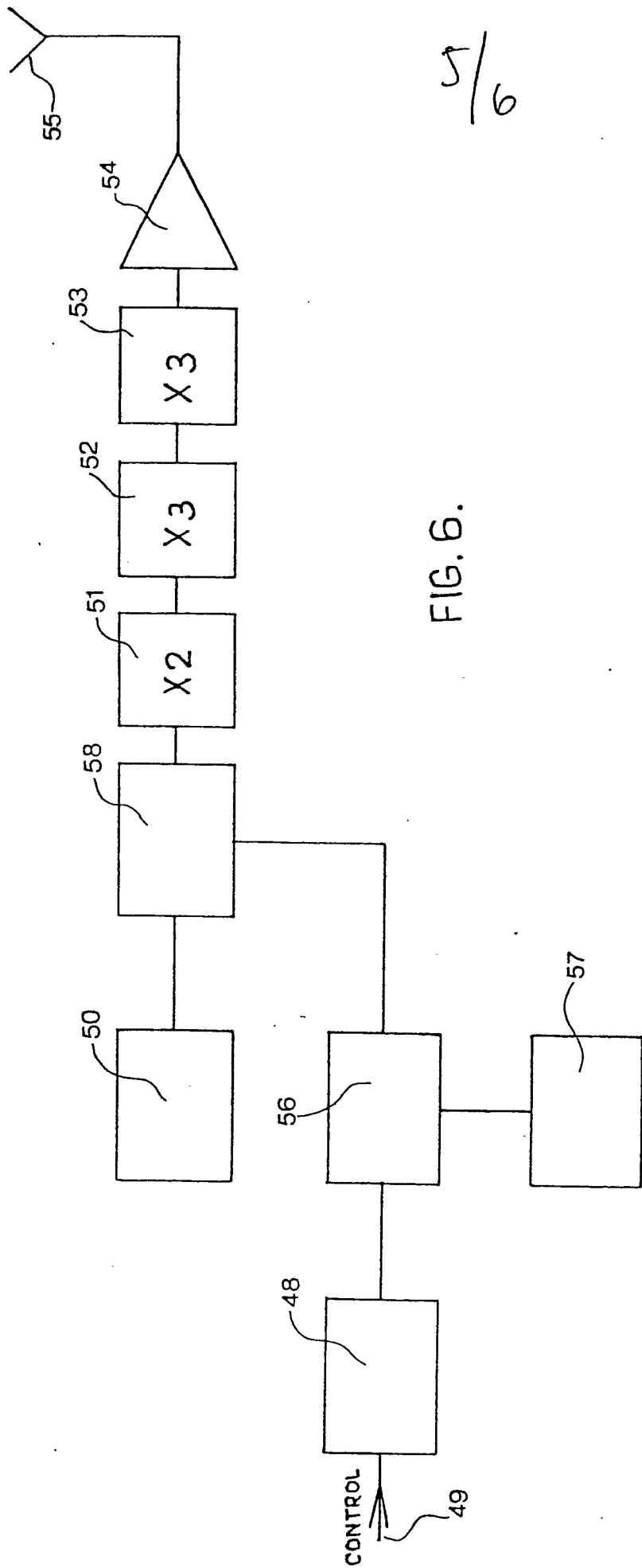


FIG. 5.



6/6

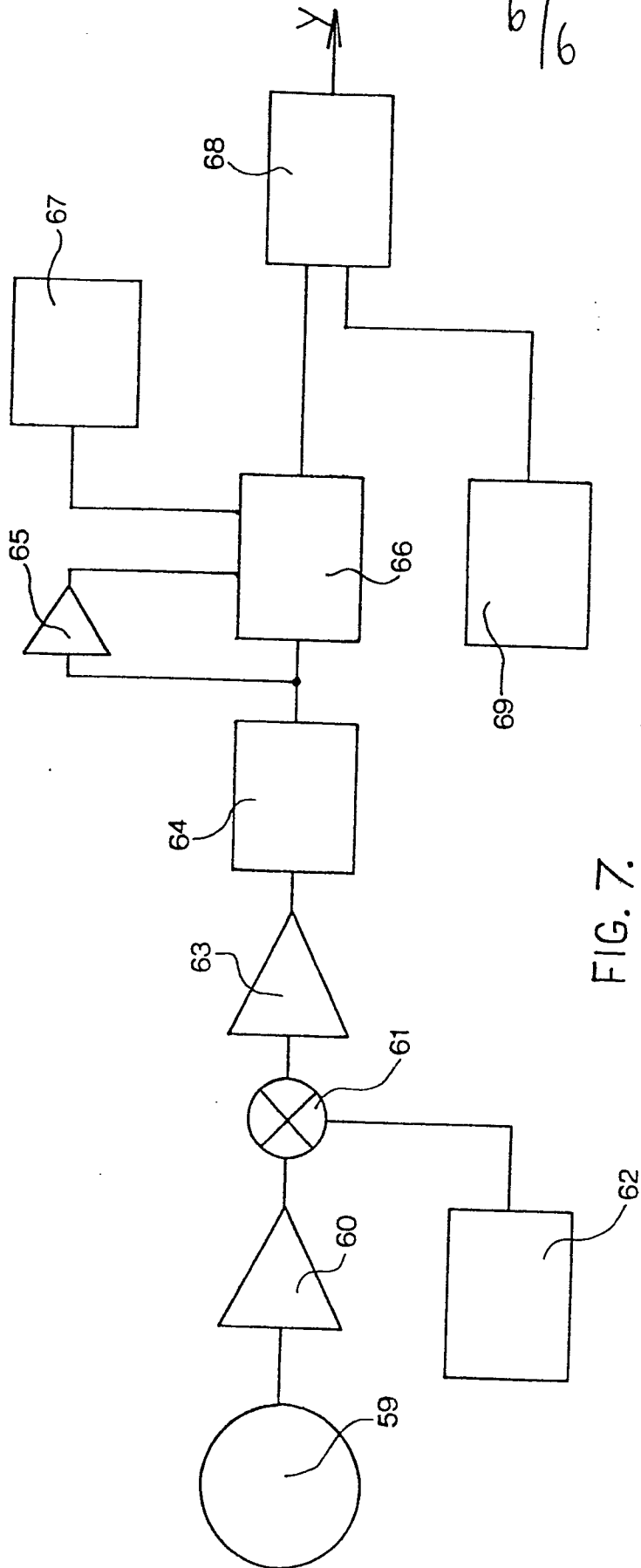


FIG. 7.