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(73) Proprietor: **N.V. Nederlandsche Apparatenfabriek NEDAP**
**Oude Winterswijkseweg 7**
**NL-7141 DE Groenlo (NL)**

(72) Inventor: **Fockens, Tallienco Wieand Harm**
**Reuvekamp 20**
**NL-7152 GV Eibergen (NL)**

(74) Representative: **Smulders, Theodorus A.H.J., Ir. et al**
**Vereenigde Octrooibureaux Nieuwe Parklaan 107**
**NL-2587 BP 's-Gravenhage (NL)**

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## Description

This invention relates to an electromagnetic detection system which, by means of at least one transmission aerial coil, generates a sweeping-frequency interrogation field in a detection zone, which field can be disturbed by the presence in said zone of a responder equipped with a tuned circuit, there being provided detection means for detecting such disturbance and activating an alarm device.

Systems of this kind are known in various embodiments. The disturbance takes place selectively, i.e. at a pre-determined frequency, or in a pre-determined frequency range, because the responder comprises a tuned circuit. As is known, the field disturbance by a responder can be detected both by detecting the results of energy absorbption by a responder at the transmission side of the system, and by detecting the signals sent out by a responder in reaction to the interrogation field, by means of a receiver. By the selective absorption, the energy contents of the transmission circuit are modulated, which modulation can be detected by means of an envelope detector, which may consist of a simple diode. This envelope detector produces a pulse in the form of the resonance curve of the tuned circuit of the responder. This form is known and the detected pulse can therefore be compared to the known form. Similarly, when using a receiver receiving signals sent out by a responder, a pulse can be detected which has the form of the resonance curve.

The form of the detected pulse is also found back in the frequency spectrum contained in the pulse.

Investigations have shown that a given sweep rate and Q factor of the responder circuit are associated with a most characteristic frequency range of the spectrum of the responder pulse.

This frequency range has a lowest frequency $f_L$ and a highest frequency $f_H$. There are virtually no signal components above $f_H$. In a practical system $f_L$ can be 2 kHz and $f_H$ 6 kHz.

Interference, for example, noise from the system's own transceiver circuit, external radio signals, or crackling (caused by passing metal objects, such as perambulators) have a rather flat spectral distribution.

As the receiver has a larger bandwidth than the responder pulse, e.g., a bandwidth of up to 25 kHz, frequencies of the spurious signals between 6 and 25 kHz are therefore also received.

It can then be concluded from the ratio between received frequency components within the frequency band of the responder pulse, 2 to 6 kHz, and those outside the frequency band whether the signal received is a spurious signal or a responder pulse.

This operational principle is known from Dutch patent application No. 8202951.

Although this principle works very well in practice, there is yet a situation in which a false alarm can be caused, namely, if there are spurious signals whose frequency components are mainly behween $f_L$ and $f_H$. Such spurious signals may in practice have the following cause.

In an anti-shop-lifting system in which the above operational principle is applied, the aerial coil may be placed in a, generally chromium-plated metallic tube which is electrically interrupted at one location. This tube has both a mechanical carrier function and a screening function for electrical fields. As the tube is not hidden, it is possible to make electrical contact with the tube from the outside. By inductive coupling with the aerial coil, the tube carries a high-frequency voltage. Now, if the tube is touched by metallic articles, human hands, a current will start to flow in it.

The making and breaking of such a touching contact causes crackling interference. In the case of contact with metallic articles, this crackling interference is of the broad-band type, so that owing to the above operational principle no false alarm is caused. If, however, contact is made with the human skin, a crackling interference is caused which is not of the broad-band type, but only causes frequency components of up to about 6 kHz in the receiver. This narrow-bandedness is caused by the fact that the skin is a relatively poor conductor, owing to which the conductivity of the junction from the tube to the skin is proportional to the contacting area. This area can only be varied at a limited rate, as a consequence of which the conductivity from the tube to the skin can only be changed slowly and continuously as well.

Consequently, the high-frequency impedance of the aerial is only varied slowly and continuously, so that the crackling interference products which in fact are formed by the modulation of the high-frequency transmission signal (=carrier wave) as a result of the impedance variation, only have a limited bandwidth as well. The result is that touching the screening tube only causes crackling interference in the frequency range of up to 6 kHz, i.e., only in the responder pulse band, and so may cause a false alarm.

It is an object of the invention to provide an electromagnetic detection system in which the described form of false alarm, that is to say, false alarm as a result of a spurious signal having a frequency spectrum substantially in the same frequency range as the frequency spectrum of a responder signal, is suppressed.

For this purpose, according to the invention, an electromagnetic detection system of the kind described is characterized in that the detection means comprise a channel for processing signals in a frequency band corresponding to the frequency band of a signal caused by a responder, and that a blanking circuit is connected to said channel for detecting the occurrence in said channel of signals exceeding a pre-determined threshold value, and, after detecting a first signal exceeding said threshold value, in response to one or more further signals exceeding said pre-determined threshold value, producing a blanking signal for a pre-determined time interval to prevent activation of said alarm device.

The invention will be described in more detail hereinafter with reference to the accompanying drawings.

Fig. 1 illustrates the relationship between a sweeping field frequency and the occurrence of responder pulses;

Fig. 2 shows an example of a known detection system comprising means for preventing false alarm;

Fig. 3 shows an example of a system according to the invention; and

Figs. 4 and 5 illustrate some waveforms occurring in the absence and in the presence of spurious signals.

Fig. 1 shows, in line A, the variation of the frequency of the interrogation field of a sweeping-frequency detection system. The frequency f of the interrogation field swings periodically relative to a frequency $f_r$. The frequency f may vary sinusoidally, as shown, but may also vary otherwise, e.g., in sawtooth form. The frequency $f_r$ corresponds to the resonant frequency of the responder. The resonant frequency of the responder may be the average of the highest and lowest field frequency, as shown, but this is not strictly necessary.

Line B of Fig. 1 shows the moments when responder pulses occur. The responder pulses occur at every moment when the field frequency f passes the resonant frequency $f_r$, provided indeed a responder is present in the interrogation field. Accordingly, in each sweep period of the field frequency a responder pulse occurs twice, and this at pre-determined points of time.

In the example shown, the responder pulses occur at intervals equal to half the period of the sweep frequency. In practice, as usual, a certain tolerance should be taken into account.

Starting from the fact that—in a detection system with a periodically sweeping field frequency—responder pulses can only occur at pre-determined points of time and at a fixed rhythm, it has already been tried in the past to suppress certain kinds of false alarm.

For this purpose, as described for example in US patent 3,868,669, use is made of time slot pulses derived from the frequency sweep of the interrogation field.

Line C in Fig. 1 shows these time slot pulses. The time slot pulses are generated in the transmission section of the detection system and are high at the moments when responder pulses can be expected. The time slot pulses open a responder pulse gating circuit at the times when the time slot pulses are high. This gating circuit then passes the responder pulses to the responder pulse detector.

Fig. 2 shows in a block diagram how this known technique is applied.

In a receiver/detector 1, the high-frequency signal is rectified, whereafter the responder pulse is supplied to two parallel gates, namely, a responder pulse gate 2 and an interference gate 4. At the time when a responder pulse is expected, the responder pulse gate 2 is opened by the time slot pulse p generated in the transmitter section. When no responder pulse is expected, the time slot pulse is low. The responder pulse gate 2 is then closed.

Via an inverter 6, interference gate 4 is simultaneously switched open. Spurious signals can then be detected in interference detector 5, which subsequently blocks the responder pulse detector 3, if indeed a spurious signal is detected. During the reception of interference, therefore, this installation is completely blocked, and no alarm can be given. The invention is predicated on the fact that the responder pulse itself occupies a limited period of time of the entire frequency sweep period, and that after the time interval of the first responder pulse a, generally longer, time interval follows in which a responder pulse is certain not to occur.

If, during this second time interval, pulses are detected all the same, such pulses originate with certainty from spurious signals, and the signalling should be blocked.

Fig. 3 shows a block diagram of an example of a circuit according to the invention forming part of an electromagnetic detection system. Figs. 4 and 5 show associated time diagrams.

Fig. 3 shows diagrammatically the detection means of an electromagnetic detection system according to the invention. Connected to an aerial 30 is a device 31 which is capable of receiving signals caused by the presence of a responder. The aerial 30 may be the same aerial as is used for generating the interrogation field or a separate aerial, depending on the fact whether the system works by the absorption principle or by the transmission principle.

In both cases the invention is applicable.

As described, for example, in the above Dutch patent application 8202951, the apparatus 31 may comprise means for eliminating so-called out-band signals, i.e., spurious signals having a frequency outside the sweep frequency band.

The apparatus 31 does not by itself form part of the invention, and will therefore not be described in any detail herein.

The output of apparatus 31 is connected to an amplifier 32 with automatic gain control (AGC). The output signals of the amplifier consist of noise and of signals resulting from signals received by the detection means and having a frequency within the sweep frequency band.

In a manner similar to hhat described in Netherlands patent application 8202951, the output signals from amplifier 32 are supplied to a discriminator filter device comprising two channels and serving to take so-called in-band spurious signals into account in actuating an alarm device.

The discriminator filter device comprise a low-frequency channel including a low-pass filter 33, an amplifier 34 and a diode detector or rectifier 35. The low-frequency channel can process signals having a frequency between $f_L$ and $f_H$, i.e., signals having a frequency corresponding to the frequency of responder pulse signals. In a practical embodiment, the cut-off frequency of the low-pass filter 33 may be at 6 kHz.

The discriminator filter device further comprises a high-frequency channel including a high-pass filter 36, an (adjustable) amplifier 37 and a diode detector or rectifier 38. The high-frequency channel can process output signals from amplifier 32 having frequencies higher than $f_H$. In a practical embodiment, the high-frequency channel can process (spurious) signals having frequencies of between 6 kHz and, e.g., 25 kHz.

The output of the low-frequency channel is connected to a positive input of a summator 39, and the output of the high-frequency channel is connected to a negative input of summator 39. The output of summator 39 is in turn connected to an integrator 40.

Accordingly, an output signal from the high-frequency channel causes a decrease of the output signal from the integrator, whereas an output signal from the low-frequency channel causes an increase of the output signal from the integrator.

Furthermore, connected to the output of amplifier 34 of the low-frequency channel is an (adjustable) AGC-detector 41, which controls the gain of the amplifier 32 in such a manner that the tops of the signal pulses at the output of amplifier 34 keep a substantially constant level.

Summator 39 is arranged so that the negative input is more sensitive than the positive input, so that, at rest, when the discriminator filter device only passes broad-band noise (2—25 kHz) the output signal from integrator 40 is low and no alarm signal can be given.

When a responder pulse is received, then as a result of the operation of the AGC, which keeps the top signal level, i.e., the top of the responder pulse, at the output of amplifier 34 constant, the gain of the preceding amplifier 32 will decrease and hence the noise in the interference channel (i.e., the high-frequency channel) will decrease. As the responder pulse contains no frequency components in excess of 6 kHz, the integrator will no longer be controlled downwards, but will be controlled upwards by the output of detector 35. At a given moment, the output voltage of integrator 40 will exceed a detection threshold recorded in a comparator 42 connected to the integrator, and as a result actuate an alarming circuit 43.

It will now be clear that a spurious signal containing just frequency components in the range of 2—6 kHz will also cause an alarm. To suppress such an alarm, a blanking circuit 12 is added.

The operation of circuitry 12 will be elucidated with reference to Figs. 4 and 5. A pulse detector 8 connected to the outpt of amplifier 34 in the responder pulse channel forms a pulse $P_1$ so long as the (negative) top of a responder pulse R (see Fig. 4, line 1) exceeds a pre-determined detection threshold D (line 2) recorded in pulse detector 8. This pulse causes a timer pulse Pt (line 4) to start at the leading edge in a delay circuit 9 connected to pulse detector 8. The trailing edge of pulse Pt activates a time slot generator 10, which generates a time slot pulse Pe (line 5).

The output of the time slot generator is connected to an input of an AND gating device 11. The other input of the AND gating device 11 is connected to the output of pulse detector 8. Furthermore, the output of gating device 11 is connected to a negative input 14, which is separate in this example of the summator.

So long as the time slot pulse Pe is high, the gating device 11 is in the open condition, so that the pulses from pulse detector 8 are passed to the summator 13. A pulse which passes gate 11 (blocking pulse Pb, see line 6, Fig. 5), does cause the integrator output to be immediately decreased to zero, independently of the other input voltages of a summator and thus blocking alarm signals.

Fig. 4 shows that responder pulses R do not give rise to blocking pulses in gate 11 (see line 6), while Fig. 5 shows that (pulse) interference S of an irregular pattern does cause blocking pulses Pb in gate 11, so that alarm signals are blocked.

Fig. 5 shows similarly to Fig. 4 signals occurring in the blanking circuitry, but now for the case that a spurious pulse signal S appears at the output of amplifier 34 and hence at the input of pulse detector 8. Unlike a responder pulse R, such a signal will generally comprise a number of closely-spaced successive peaks, which with a correct selection of the detection threshold of pulse detector 8 will exceed this threshold, as indicated in Fig. 5 for the negative peaks $S_1$—$S_9$. Similarly to a responder pulse R, peak $S_1$ gives rise to an output pulse $P_1$ of the pulse detector 8, and the output pulse $P_1$ in turn causes a timer pulse Pt, which again results in a time slot pulse Pe. Peak $S_2$ falls within the duration of pulse Pt and thus has no effect. Peak $S_3$, however, falls within time slot pulse Pe and is thus, just as peaks $S_4$, $S_5$, $S_7$, $S_8$ and $S_9$ (in part), passed by gate 11 in the form of pulses Pb, Pb′ and Pb″ (see line 6 of Fig. 5).

However, if in addition to this (pulse) interference S a responder signal is received, and this signal is stronger than the interference, the AGC operation will attenuate the spurious signal, so that the interference no longer produces pulses in pulse detector 8. There is, accordingly, no blocking, and an alarm does go off (and rightly so).

This shows that the blanking circuit does not cause absolute blocking, as is the case with other known (shop-lifting) detection systems, but causes a decrease in detection sensitivity depending on the level of the spurious signal.

In this way, a detection system incorporating the above operational principles functions in an optimal manner under all conditions.

It is noted that, in practice, the duration of pulses Pt, i.e., the delay caused by delay circuitry 9, may be, e.g., 0.25 msec. This delay should be chosen so that any width of a responder pulse R which occurs in practice at the level of detection threshold D leads to a pulse $P_1$ which lasts no longer than Pt.

The time slot pulse Pe may, in a practical apparatus, last e.g. 2 msec.

It is further noted that, after the foregoing, various modifications will readily occur to those skilled in the art. Thus the pulse detector may be arranged to react positive peaks exceeding a positive pre-determined threshold.

Furthermore, the pulse detector 8 could be combined with the delay device 9. Also, summator 39 and integrator 40 could be combined to form a single integrator with a positive and a negative input and an additional negative input 14 or a reset input. As the normal negative input of the summator is more sensitive than the positive input, a good suppression of spurious signals can in certain situations also be obtained if the output of gate 11 is connected to the (normal) negative input of the summator.

The blanking circuit 12 can even be applied fully independently of the way in which signals in the frequency band associated with the frequency band of the responder pulses are obtained and further processed separately from the signals outside that band.

These and similar modifications are considered to fall within the scope of the invention.

**Claims**

1. An electromagnetic detection system which, in operation, by means of at least one transmission aerial coil, generates a sweeping-frequency interrogation field in a detection zone, which field can be disturbed by the presence in said zone of a responder equipped with a tuned circuit, there being provided detection means for detecting such disturbance and activating an alarm device, characterized in that said detection means comprise a channel (33—35) for processing signals (R, S) in a frequency band corresponding to the frequency band of a signal (R) caused by a responder, and that a blanking circuit (12) is connected to said channel for detecting the occurrence in said channel (33—35) of signals exceeding a predetermined threshold value, and, after detecting a first signal exceeding said threshold value, in response to one or more further signals exceeding said pre-determined threshold value, producing a blanking signal (Pb) for a pre-determined time interval to prevent activation of said alarm device (43).

2. An electromagnetic detection system as claimed in claim 1, characterized in that the blanking circuit comprises a pulse detector (8) which produces a pulse ($P_1$) as soon as a signal occurring in said channel (33—35) passes said pre-determined threshold and that, in response to such pulse ($P_1$) a time slot generator (10) is actuated to open a gating circuit (11) for a pre-determined time interval, the output of the pulse detector (8) being also connected to said gating circuit.

3. An electromagnetic detection system as claimed in claim 2, characterized in that the time slot generator (10) is actuated with a pre-determined delay after the beginning of the pulse ($P_1$).

4. An electromagnetic detection system as claimed in any one of the preceding claims, characterized by a signal amplitude detector (41) connected to the channel (33—35), which controls the gain of an amplifier (33) preceding the channel in such a manner that the maximum signal level in the channel remains substantially constant.

5. An electromagnetic detection system as claimed in any of the preceding claims, characterized in that the length of the pre-determined time interval is set so that the pre-determined time interval ends just before the moment when, on the ground of the sweep of the frequency of the interrogation field, a next responder pulse can be expected.

6. An electromagnetic detection system as claimed in any of the preceding claims, characterized in that the output of the channel (32—35) for the processing of signals in the frequency band corresponding to the frequency band of a signal caused by a responder is connected to the positive input of an integrating device (39, 40) and that the output of the blanking circuit is connected to a negative input of said integrating device.

7. An electromagnetic detection system as claimed in claim 6, characterized in that the negative input of said integrating device is more sensitive than the positive input.

8. An electromagnetic detection system as claimed in claim 6, characterized in that said negative input is a reset input.

9. An electromagnetic detection system as claimed in any of the preceding claims, characterized in that the channel (32—35) comprises a low-pass filter (33), an amplifier (34) connected to said filter, and a rectifier (35) connected to the output of said amplifier.

10. An electromagnetic detection system as claimed in claim 9, characterized in that the blanking circuit is connected to the output of the amplifier.

11. An electromagnetic detection system as claimed in claim 9 or 10, characterized in that the signal amplitude detector (41) is connected to the output of the amplifier (34).

12. An electromagnetic detection system as claimed in any of the preceding claims, characterized in that the channel (33—35) forms part of a discriminator filter device which comprises a second channel (36—38) parallel-connected to said channel (33—35) and arranged for processing signals outside the frequency band corresponding to the frequency of a signal caused by a responder, the output of the second channel being connected to a negative input of an integrating device (39, 40), and the output of the channel (33—35) being connected to a positive

input of the integrating device, the output of the blanking circuit (12) being connected to a negative input of the integrating device.

**Patentansprüche**

1. Elektromagnetisches Erkennungssystem, das beim Betrieb durch wenigstens eine Sende-Luftspule in einer Erkennungszone ein Kippfrequenz-Abfragefeld erzeugt, das durch die Anwesenheit eines mit einer Abstimmschaltung versehenen Responders in der Zone gestört werden kann, wobei eine Erkennungseinrichtung zum Erkennen solcher Störungen und zum Aktivieren einer Alarmeinrichtung vorgesehen ist, dadurch gekennzeichnet, daß die Erkennungseinrichtung einen Kanal (33—35) zum Verarbeiten von Signalen (R, S) in einem Frequenzband aufweist, das dem Frequenzband eines von einem Responder erzeugten Signals (R) entspricht, und daß eine Austastschaltung (12) mit dem Kanal verbunden ist, um das Auftreten von Signalen in dem Kanal (33—35) zu erkennen, die einen vorbestimmten Schwellwert übersteigen, und daß, nach dem Erkennen eines ersten den Schwellwert übersteigenden Signals, in Reaktion auf ein oder mehrere den vorbestimmten Schwellwert übersteigende Signale ein Austastsignal (Pb) über ein vorbestimmtes Zeitintervall erzeugt wird, um ein Aktivieren der Alarmeinrichtung (43) zu verhindern.

2. Elektromagnetisches Erkennungssystem nach Anspruch 1, dadurch gekennzeichnet, daß die Austastschaltung einen Impulsdetektor (8) aufweist, der einen Impuls ($P_1$) erzeugt, sobald ein in dem Kanal (33—35) auftretendes Signal den vorbestimmten Schwellwert passiert, und daß, in Reaktion auf einen solchen Impuls ($P_1$), ein Zeitschlitz-Generator (10) betätigt wird, um eine Torschaltung (11) über ein vorbestimmtes Zeitintervall zu öffnen, wobei der Ausgangsanschluß des Impulsdetektors (8) ebenfalls mit der Torschaltung verbunden ist.

3. Elektromagnetisches Erkennungssystem nach Anspruch 2, dadurch gekennzeichnet, daß der Zeitschlitz-Generator (10) mit einer vorbestimmten Verzögerung nach dem Beginn des Impulses ($P_1$) betätigt wird.

4. Elektromagnetisches Erkennungssystem nach einem der vorhergehenden Ansprüche, gekennzeichnet durch einen mit dem Kanal (33—35) verbundenen Signalamplitudendetektor (41), der die Verstärkung eines dem Kanal vorgeschalteten Verstärkers (33) derart steuert, daß der maximale Signalpegel im Kanal im wesentlichen konstant bleibt.

5. Elektromagnetisches Erkennungssystem nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Länge des vorbestimmten Zeitintervalls derart eingestellt ist, daß das vorbestimmte Zeitintervall genau vor dem Augenblick endet, zu dem aufgrund des Kippens der Frequenz des Abfragefeldes der nächste Responderimpuls erwartet werden kann.

6. Elektromagnetisches Erkennungssystem nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Ausgang des Kanals (32—35) zum Verarbeiten von Signalen in dem Frequenzband, das dem Frequenzband eines von einem Responder erzeugten Signals entspricht, mit dem positiven Eingang einer Integrationseinrichtung (39, 40) verbunden ist und daß der Ausgang der Austastschaltung mit einem negativen Eingang der Integrationseinrichtung verbunden ist.

7. Eelektromagnetisches Erkennungssystem nach Anspruch 6, dadurch gekennzeichnet, daß der negative Eingang der Integrationseinrichtung empfindlicher ist als der positive Eingang.

8. Elektromagnetisches Erkennungssystem nach Anspruch 6, dadurch gekennzeichnet, daß der negative Eingang ein Rückstelleingang ist.

9. Elektromagnetisches Erkennungssystem nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Kanal (32—35) ein Tiefpaßfilter (33), einen mit dem Filter verbundenen Verstärker (34) und einen mit dem Ausgang des Verstärkers verbundenen Gleichrichter (35) aufweist.

10. Elektromagnetisches Erkennungssystem nach Anspruch 9, dadurch gekennzeichnet, daß die Austastschaltung mit dem Ausgang des Verstärkers verbunden ist.

11. Elektromagnetisches Erkennungssystem nach Anspruch 9 oder 10, dadurch gekennzeichnet, daß der Signalamplitudendetektor (41) mit dem Ausgang des Verstärkers (34) verbunden ist.

12. Elektromagnetisches Erkennungssystem nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Kanal (33—35) einen Teil einer Diskriminatorfiltereinrichtung bildet, die einen zweiten Kanal (36—38) aufweist, der dem Kanal (33—35) parallel geschaltet ist und zur Verarbeitung von Signalen vorgesehen ist, die außerhalb des Frequenzbandes liegen, das der Frequenz eines von einem Responder erzeugten Signals entspricht, wobei der Ausgang des zweiten Kanals mit einem negativen Eingang einer Integrationseinrichtung (39, 40) und der Ausgang des Kanals (33—35) mit einem positiven Eingang der Integrationseinrichtung verbunden ist und der Ausgang der Austastschaltung (12) mit einem negativen Eingang der Integrationseinrichtung verbunden ist.

**Revendications**

1. Système de détection électromagnétique qui, en fonctionnement, au moyen d'au moins une bobine émettrice d'antenne, engendre un champ d'interrogation à balayage de fréquence dans une zone de détection, champ qui peut être perturbé par la présence dans ladite zone d'un répondeur équipé d'un circuit accordé, des moyens de détection étant prévus pour détecter ladite perturbation et déclencher un signal d'alarme, caractérisé par le fait que lesdits moyens de détection comprennent un canal (33—35) pour traiter des signaux (R, S) dans une bande de fréquences correspondant à la bande de fréquences d'un signal (R) causé par un répondeur, et qu'un circuit de suppression (12)

est relié audit canal pour détecter l'apparition dans ledit canal (33—35) de signaux dépassant une valeur de seuil prédéterminée, et, après avoir détecté un premier signal dépassant ladite valeur de seuil, pour produire, en réponse à un ou plusieurs autres signaux dépassant ladite valeur de seuil prédéterminée, un signal de suppression ($P_b$) pendant un intervalle de temps prédéterminé pour empêcher le déclenchement dudit dispositif d'alarme (43).

2. Système de détection électromagnétique selon la revendication 1, caractérisé par le fait que le circuit de suppression comprend un détecteur d'impulsions (8) qui produit une impulsion ($P_1$) aussitôt qu'un signal apparaissant dans ledit canal (33—35) dépasse ledit seuil prédéterminé, et qu'en réponse à une telle impulsion ($P_1$), un générateur d'intervalles de temps (10) est déclenché pour ouvrir un circuit à porte (11) pendant un intervalle de temps prédéterminé, la sortie du détecteur d'impulsions (8) étant aussi reliée audit circuit à porte.

3. Système de détection électromagnétique selon la revendication 2, caractérisé par le fait que le générateur d'intervalles de temps (10) est déclenché avec un retard prédéterminé aprés le début de l'impulsion ($P_1$).

4. Système de détection électromagnétique selon l'une quelconque des revendications précédentes, caractérisé par un détecteur de l'amplitude des signaux (41) qui est relié au canal (33—35) et qui commande le gain d'un amplificateur (33) précédant le canal de telle manière que le niveau maximal des signaux dans le canal reste sensiblement constant.

5. Système de détection électromagnétique selon l'une quelconque des revendications précédentes, caractérisé par le fait que la longueur de l'intervalle de temps prédéterminé est fixée de telle manière que l'intervalle de temps prédéterminé se termine juste avant le moment où, sur la base du balayage de la fréquence du champ d'interrogation, une impulsion suivante du répondeur peut être attendue.

6. Système de détection électromagnétique selon l'une quelconque des revendications précédentes, caractérisé par le fait que la sortie du canal (33—35) destiné au traitement de signaux dont la bande de fréquences correspond à la bande de fréquences d'un signal causé par un répondeur est reliée à l'entrée positive d'un dispositif intégrateur (39, 40), et que la sortie du circuit de suppression est reliée à une entrée négative dudit dispositif intégrateur.

7. Système de détection électromagnétique selon la revendication 6, caractérisé par le fait que l'entrée négative dudit dispositif intégrateur est plus sensible que l'entrée positive.

8. Système de détection électromagnétique selon la revendication 6, caractérisé par le fait que ladite entrée négative est une entrée de remise à zéro.

9. Système de détection électromagnétique selon l'une quelconque des revendications précédentes, caractérisé par le fait que le canal (33—35) comprend un filtre passe-bas (33), un amplificateur (34) relié audit filtre et un redresseur (35) relié à la sortie dudit amplificateur.

10. Système de détection électromagnétique selon la revendication 9, caractérisé par le fait que le circuit de suppression est relié à la sortie de l'amplificateur.

11. Système de détection électromagnétique selon la revendication 9 ou 10, caractérisé par le fait que le détecteur de l'amplitude des signaux (41) est relié à la sortie de l'amplificateur (34).

12. Système de détection électromagnétique selon l'une quelconque des revendications précédentes, caractérisé par le fait que le canal (33—35) forme une partie d'un dispositif de filtrage sélectif qui comprend un second canal (36—38) monté en parallèle sur ledit canal (33—35) et conçu pour traiter des signaux extérieurs à la bande de fréquences correspondant à la fréquence d'un signal causé par un répondeur, la sortie du second canal étant reliée à l'entrée négative d'un dispositif intégrateur (39, 40), et la sortie du canal (33—35) étant reliée à une entrée positive du dispositif intégrateur, la sortie du circuit de suppression (12) étant reliée à une entrée négative du dispositif intégrateur.

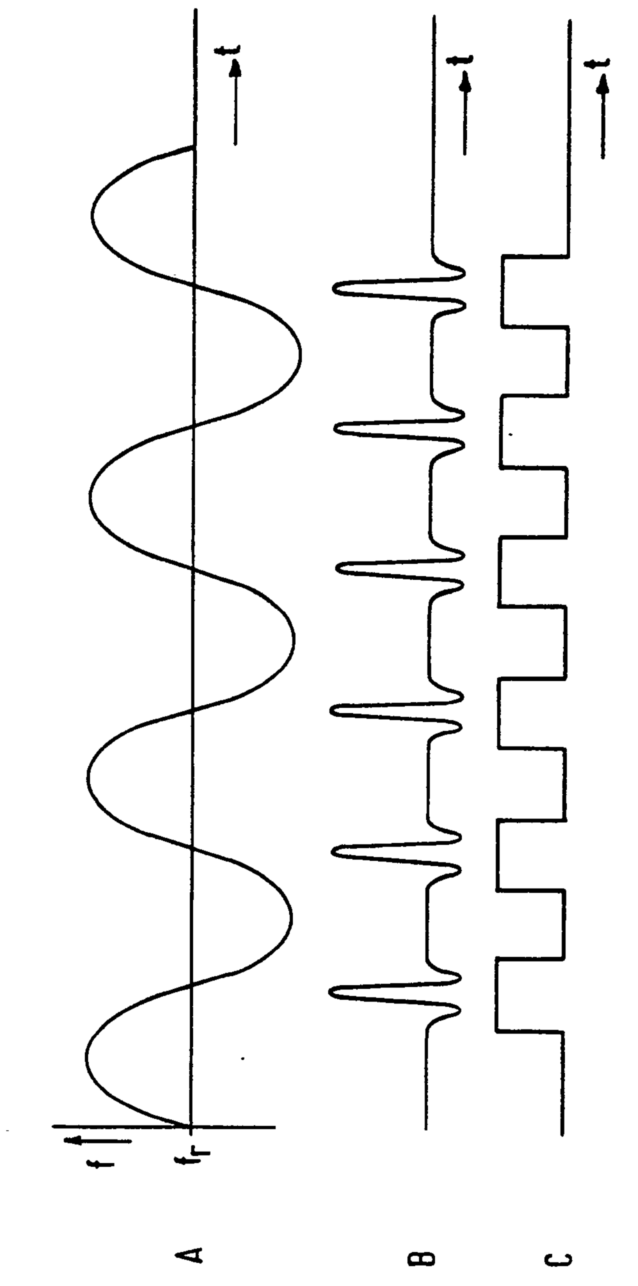


FIG. 1

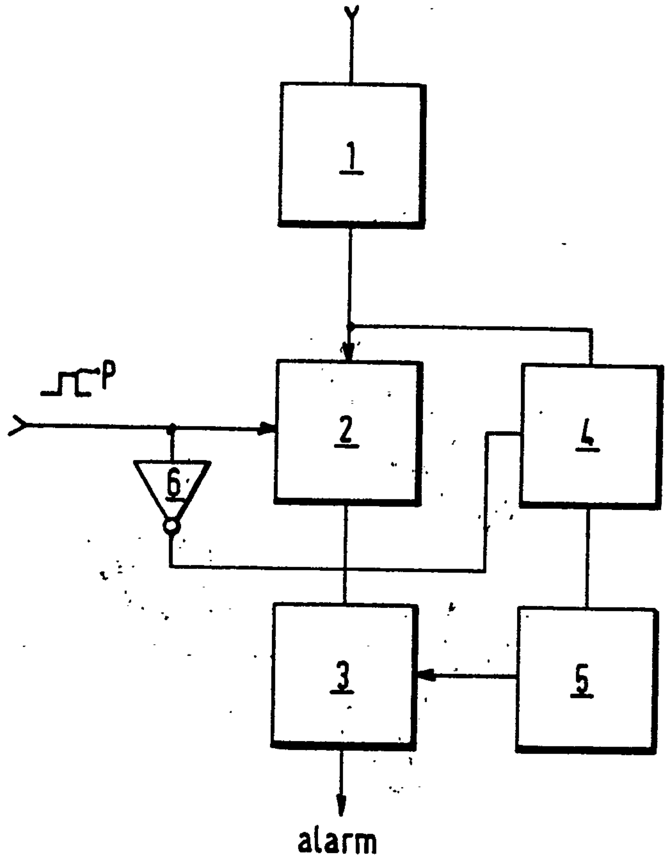


FIG. 2

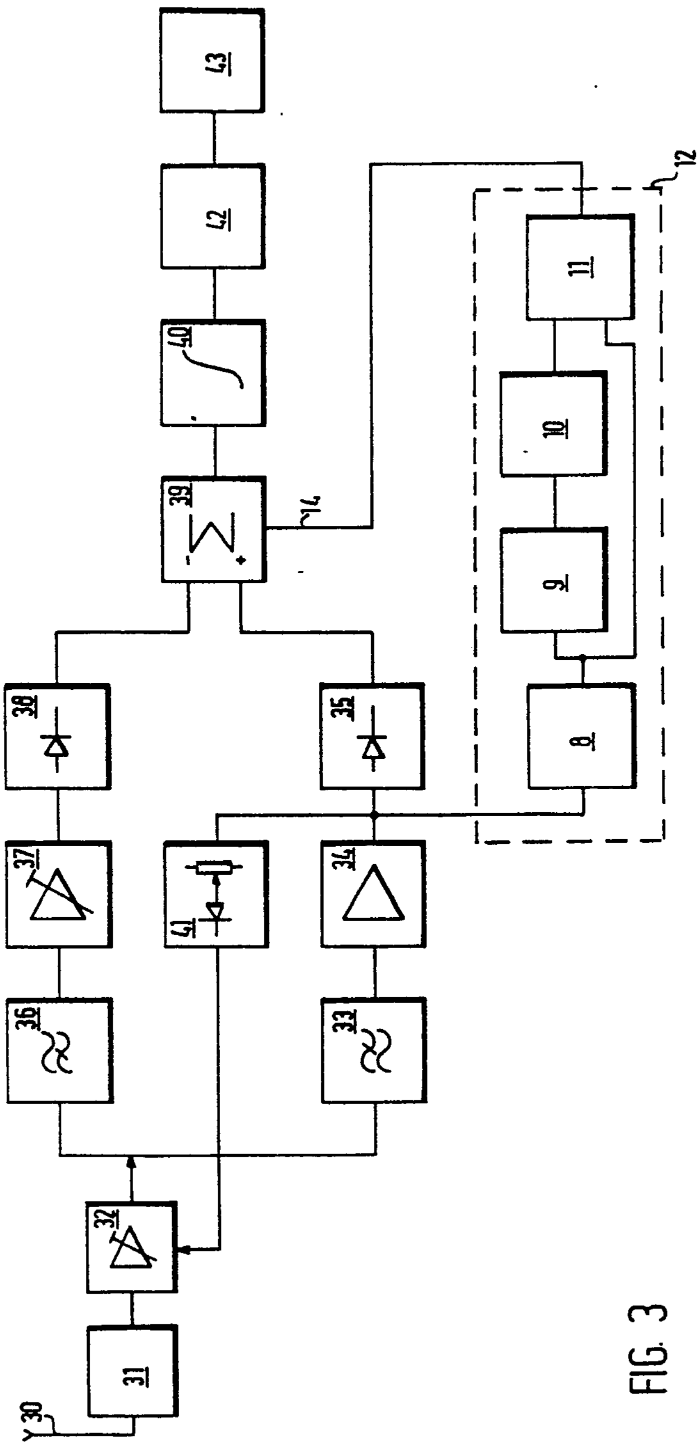


FIG. 3

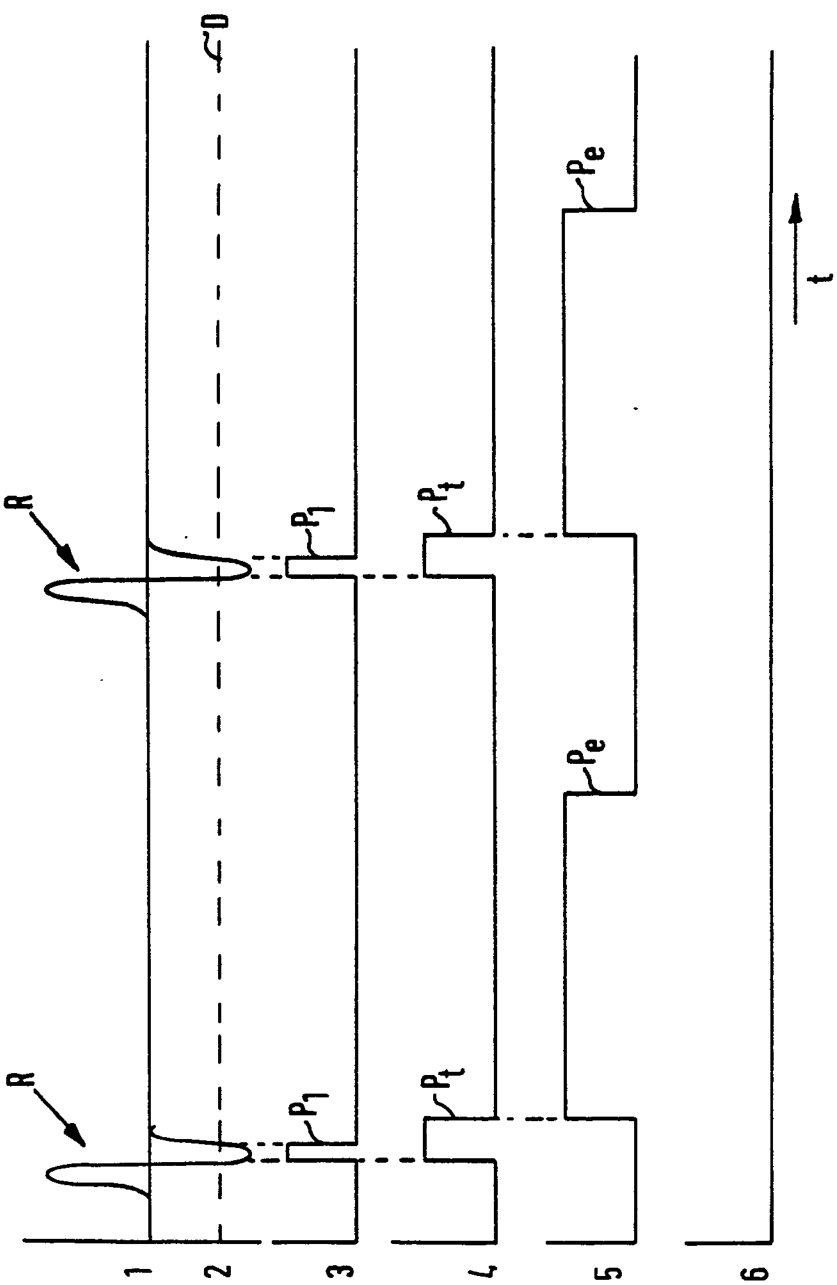


FIG. 4

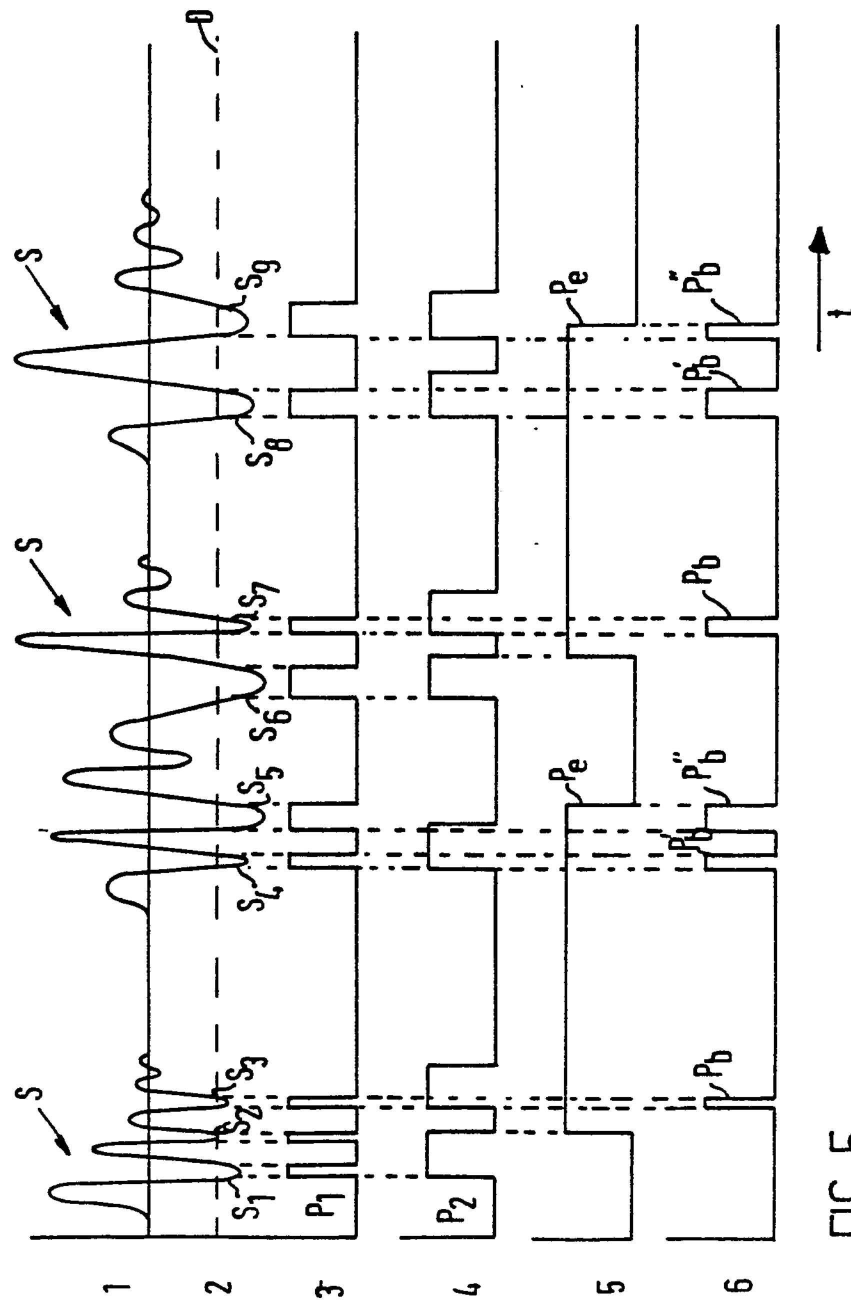


FIG. 5