

EUROPEAN PATENT APPLICATION

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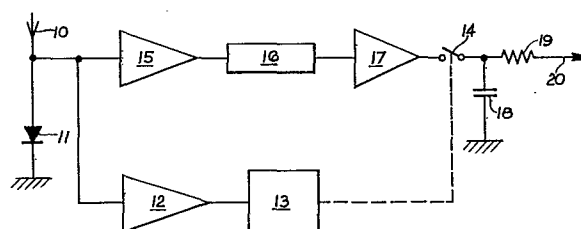
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Intruder detection apparatus.

In the receiver of an outdoor intruder detection apparatus, which receiver is spaced from and receives signals from a microwave transmitter and provides an alarm output upon the occurrence of change in the received signal, eliminator means is provided for eliminating pulses which may be superimposed on the signals e.g. from nearby radar. Such eliminator means comprises a wide band amplifier 12 which serves, by way of a monostable 13 to actuate a switch 14 which gates out, in synchronism with the superimposed pulses, the detected signals from aerial 10 and diode 11 as supplied by way of an amplifier 15, a delay line 16 and a wide band amplifier 17, to further signal-processing circuitry (not shown) as at 20.



SHORROCK DEVELOPMENTS LIMITEDINTRUDER DETECTION APPARATUSSPECIFICATION

This invention concerns intruder detection apparatus.

Various forms of intruder detection apparatus, particularly suitable for outdoor detection using a microwave transmitter and receiver combination, with the transmitter and receiver spaced some distance apart and aligned with each other, are known. The receiver monitors the level of a signal received from the transmitter and should there be a change in the level of the received signal, indicative of an intruder encroaching on the area between the transmitter and receiver, an alarm is produced. A typical detector of this kind, often known as a "microwave fence" is exemplified by United Kingdom Patent No. 1409658.

However, on occasion it is a requirement that such a microwave fence be required to function in close proximity to high-power pulse-modulated radars. Then, the received signal level at the microwave fence receiver, from its own transmitter, can be quite low, whereas the signal level, at the same receiver, resulting from the

proximity of the radar, can be extremely high; differences of the order of 120db can be experienced. Further, the operating frequencies of the microwave fence and the radar can be of the same order, so not
5 surprisingly the operation of the microwave fence can be disturbed as a result of breakthrough of the radar signal into the microwave fence receiver, causing malfunction.

Typically, the radar pulses are a few micro-
10 seconds wide and have a pulse-repetition frequency of 1KHz.

An object of the present invention is to provide a microwave fence arrangement wherein the above-discussed difficulty is obviated.

15 With this object in view, the present invention provides intruder detection apparatus comprising a microwave transmitter, a corresponding receiver spaced from and aligned with the transmitter to receive and monitor a signal from the transmitter and to provide
20 an alarm output upon detection of a change in the monitored signal indicative of an intrusion into the area between the transmitter and the receiver, characterised by the provision of eliminator means effective to eliminate any interfering pulses which may
25 be superimposed upon the detected signal (e.g. by

adjacent radar or other apparatus) comprising selector means operative to gate out the input to the receiver in response to each interfering pulse, for a period exceeding the duration of the pulse, and delay means
5 effective to synchronise the respective gating-out condition with said pulse, thereby to prevent said pulse being supplied to the receiver.

The invention will be described further, by way of example, with reference to the accompanying drawing
10 in which the single figure is a block circuit diagram of a preferred embodiment of eliminator means for use in intruder detection apparatus of the invention, and more particularly its manner of operation.

An embodiment of the intruder detection apparatus
15 of the invention comprises a microwave transmitter (not shown) and a corresponding receiver which is spaced apart from the transmitter so that the space therebetween is that to be protected. The receiver is aligned with the transmitter, and serves basically to
20 receive a signal therefrom and, upon occurrence of change in level of this signal to provide an alarm output.

In the illustrated case, an incoming signal is picked up by an aerial 10 from which it is fed to a
25 detector diode 11, the output from which consists of

the microwave fence modulation, typically 1KHz. In the event of the apparatus being installed near radar, this output is a modulated signal comprising the detected signal, plus narrow pulses from the interfering
5 radar. The combined signals are supplied to a high-frequency selective amplifier 12 which passes the narrow pulses from the radar, but substantially rejects the low-frequency 1KHz modulation.

Each pulse output from the amplifier 12 is used
10 to trigger a monostable 13 which produces a corresponding respective pulse of some thirty-microseconds duration. Each pulse is used to open a switch 14 (which will normally be closed) for the duration of the pulse.

The detected signal is also fed to an amplifier 15.
15 The output from this amplifier 15 is fed to a delay line 16 which delays the signal for a nominal five-hundred-nanoseconds and the delay line output is amplified by wide-band amplifier 17 and applied to the switch 14. As the switch 14 is under the control of the monostable 13,
20 should an interfering pulse occur, the switch 14 will open before the interfering pulse appears at the output of the amplifier 17. As the duration of switch opening is in excess of any anticipated interfering pulse, the pulse is effectively suppressed. Consequently, the
25 signal across a capacitor 18 is substantially that of

the microwave fence modulation with the interfering pulse removed.

The time constant of the capacitor 18 and a resistor 19 is such that whilst the switch 14 is open
5 the voltage across the capacitor 18 will change little and hence the required modulation waveform is preserved.

The wanted modulation signal is then subsequently filtered to remove the wide band noise introduced by the wide band amplifiers 15 and 17 to improve the overall
10 signal to noise ratio.

The signal is then passed, as indicated at 20, to further signal-processing circuitry which serves to generate an alarm output in the event of change occurring in the signal indicative of an intrusion into
15 the protected space.

CLAIMS:

1. Intruder detection apparatus comprising a microwave transmitter, a corresponding receiver spaced from and aligned with the transmitter to receive and monitor a signal from the transmitter and to provide an
5 alarm output upon detection of a change in the monitored signal indicative of an intrusion into the area between the transmitter and the receiver, characterised by the provision of eliminator means effective to eliminate any interfering pulses which may
10 be superimposed upon the detected signal (e.g. by adjacent radar or other apparatus) comprising selector means operative to gate out the input to the receiver in response to each interfering pulse, for a period exceeding the duration of the pulse, and delay means
15 effective to synchronise the respective gating-out condition with said pulse, thereby to prevent said pulse being supplied to the receiver.
2. Intruder detection apparatus as claimed in claim 1 wherein the eliminator means comprises a high frequency
20 selective amplifier which will pass narrow interfering pulses which serve to trigger a monostable which in turn serves to open a switch which gates out the input to the receiver.
3. Intruder detection apparatus substantially as

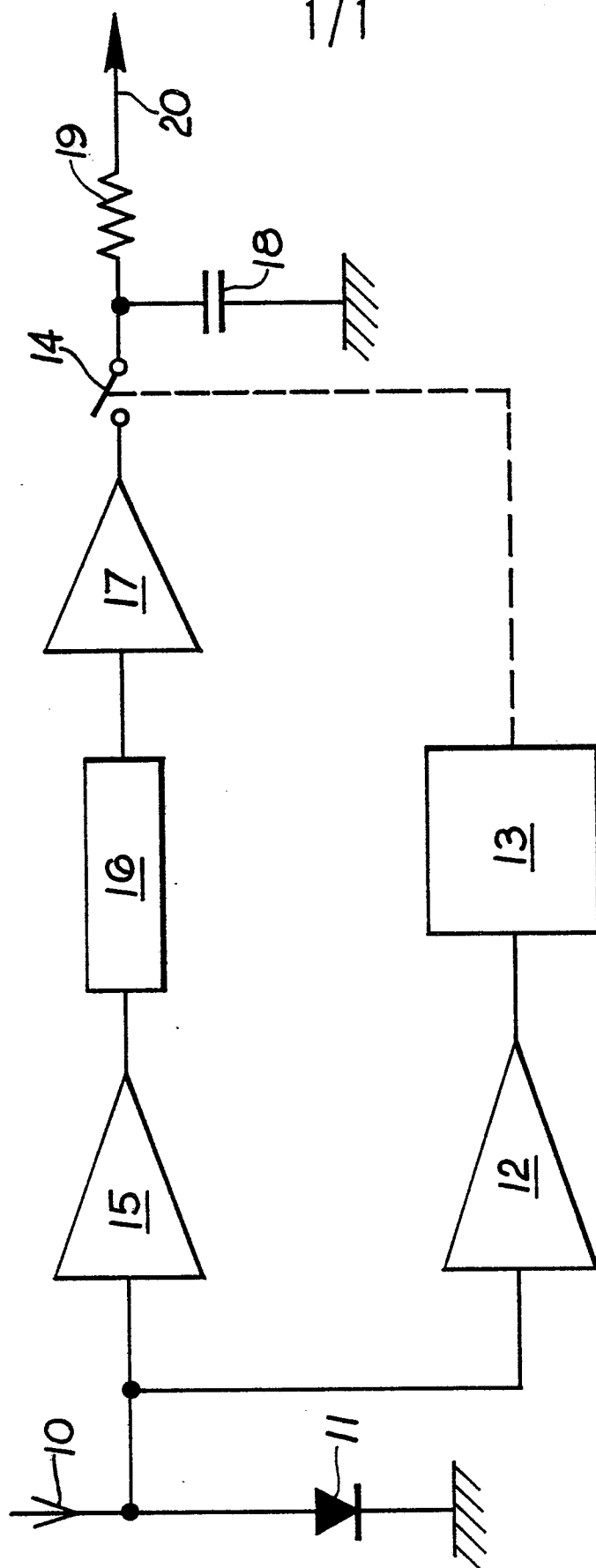
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hereinbefore described with reference to and as
illustrated in the accompanying drawing.

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EUROPEAN SEARCH REPORT

0068050

Application number

EP 81 30 2856

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
Y	<u>GB - A - 1 409 658</u> (SHORROCK) * page 1, line 26 to page 2, line 15 *	1	G 08 B 13/24 29/00
Y	<u>FR - A - 2 231 062</u> (TACUSSEL) * page 1, lines 1-22; page 4, line 16 to page 5, line 3; figure 1 * & <u>GB - 1 450 236</u>	1	
A	<u>US - A - 3 789 384</u> (AKERS) * abstract; figure 1 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl. ³) G 08 B 13/24 13/18 13/00 29/00 G 01 S 13/56
A	<u>GB - A - 1 319 005</u> (FROWDS) * the entire document *	1	
A	<u>US - A - 4 132 988</u> (BLACKSMITH) * column 1, line 65 to column 2, line 8; figure 1 *	1	CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons
The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search The Hague		Date of completion of the search 02-03-1982	Examiner SGURA