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(56) Documents cited
GB 2155224 A GB 2040093 A EP 0045335 A1
US 4684931 A

(58) Field of search
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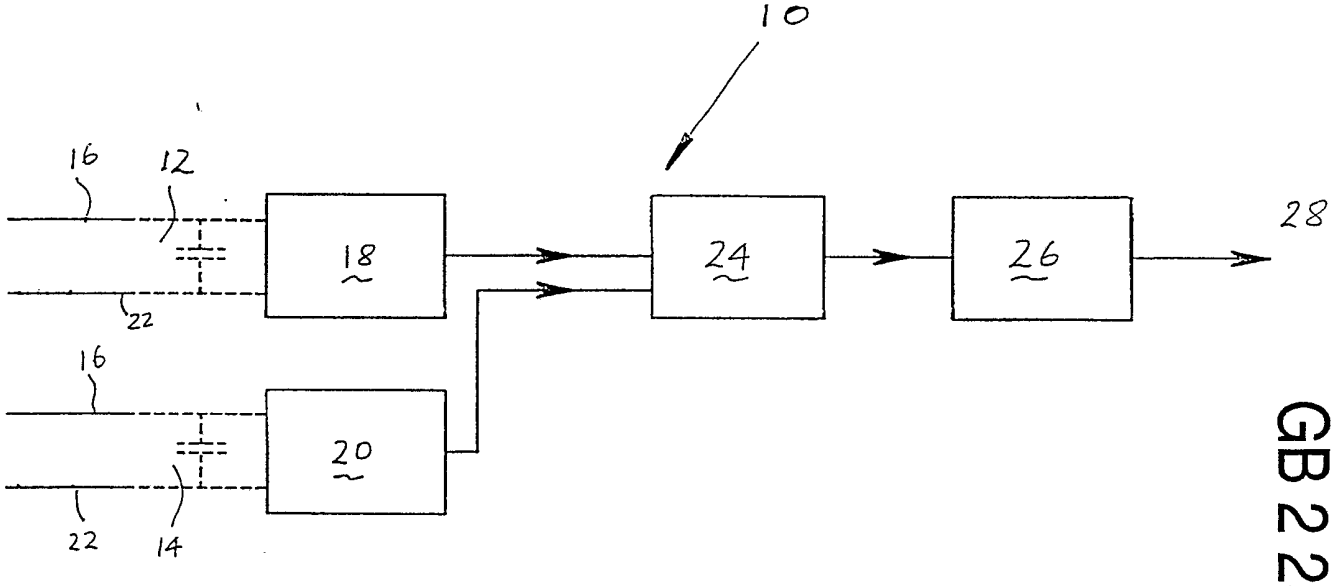
INT CL[5] G08B 13/22 13/24 13/26

(54) An intruder detector

(57) The invention provides an intruder detector for a parallel wire capacitance sensor arrangement in which there are two sets of sensor wires 12, 14. Each set of sensor wires comprises a field wire 16 energised by a respective oscillator 18, 20 an a ground wire 22 and is arranged to protect or cover a portion of a protected zone. Each set of wires 12, 14 is arranged to have a different capacitance and thus each associated oscillator 18, 20 will have a different centre, i.e. steady state frequency. A digital frequency comparator 24 compares variation in the two sets of sensor wires and sounds an alarm, via processing means 26, when there is a change in the capacitance of one set only.



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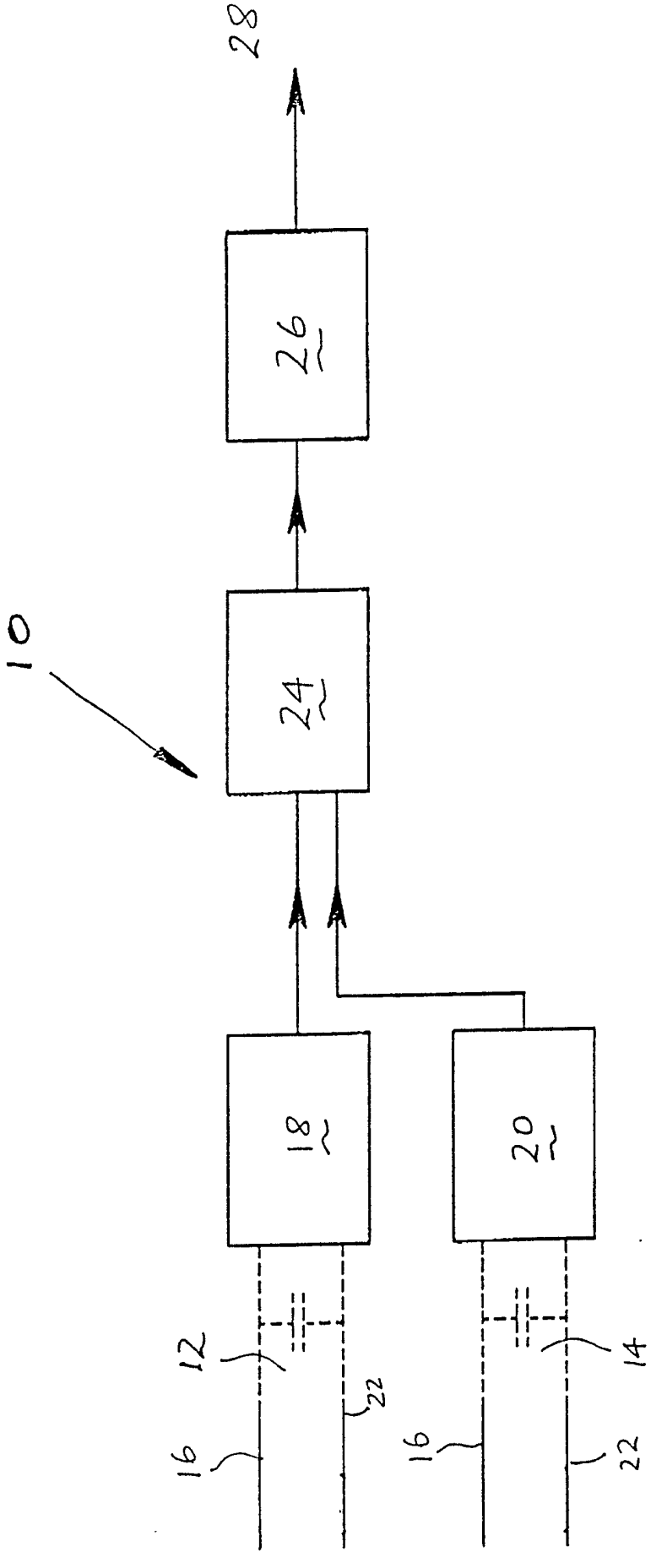
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INTRUDER DETECTOR

This invention relates to an intruder detector especially an intruder detector for outdoor use using the variance in capacitance of a pair of sensor wires.

Capacitance wire sensor arrangements are already well known where two parallel wires are supported over or around an area to be protected. One of the two wires is a field wire energised by means of an oscillator operating at a preset frequency and the second wire is a sensor wire which senses the electromagnetic field produced by the energised field wire. An intrusion into the electromagnetic field by a human or other animal intruder causes a disturbance in the field generated by the field wire. This disturbance causes a change in the sensor wire's output which can be detected by appropriate circuitry, for example, a comparator or other sensor device and used to provide an alarm condition indication.

Such systems operate on variations in the amplitude of the field signal strength and spurious alarms can be produced due to electrical disturbances other than that caused by a valid intruder.

It would be an advantage therefore to provide an improved intruder detector which maintains the simplicity of construction and operation of a parallel wire system whilst reducing the occurrence of erroneous alarm conditions.

Accordingly an aspect of the invention provides an intruder detector comprising two sets of sensor wires, each connected to a respective oscillator preset to a different predetermined frequency so as to form two balanced detection circuits, each oscillator's frequency output being supplied to a comparator operative to compare said frequency output and provide an alarm when there is a predetermined change from a

balanced state.

In this way the presence of an intruder near to one of the sets of sensor wires will alter the capacitance of that set. This will cause the frequency of the respective oscillator to change. A comparison of the frequencies from each oscillator will show a change, which change would be used to indicate an alarm condition.

In a preferred embodiment a protected zone is divided into two sections, e.g. equal halves, each section or half being monitored by a respective set of sensor wires, and the two sets of sensor wires are connected to an LC oscillator. The output frequency of each oscillator is predetermined by the capacitance of the sensor wires and theirassociated circuitry and each oscillator is consequently set at a different centre frequency.

The detector preferably further includes a digital frequency processor for processing the frequency outputs from the two oscillators prior to comparison in the comparator/processor.

It will be understood that this invention operates on a variation in frequency of the oscillator's sensor wires rather than amplitude as used in previous parallel wire detector systems.

The invention will be described further by way of example with reference to the single figure which is a block diagram of a first preferred embodiment of the invention.

Referring to the single figure, an intruder detector according to a first preferred embodiment of the invention is referred to generally by the reference numeral 10 and comprises two sets of sensor wires 12, 14. At least a first wire 16 of each set of sensor wires is a field wire and is

energised by means of a respective oscillator 18, 20. At least a second wire 22 of each set of wires is connected to a ground. The energised wire 16, may be a single wire or a plurality of parallel connected wires.

In use these wires 16, 22 are strung between upright posts or pillars (not shown) in the manner of a fence and are arranged substantially parallel to each other and to the ground over which they are disposed. Preferably each set of wires 12, 14 is arranged to cover a separate sector, for example, half, of the protected zone.In this way an intruder (not shown) approaching the area protected will intrude into the electromagnetic field produced by one or other of the sets of sensor wires 12, 14.

Each of the sets of sensor wires 12, 14 is arranged to have a nominal capacitance. The frequency of the associated respective oscillator 18, 20 is inversely proportionally to the capacitance of the attached sensor wires and associated circuitry. Thus, each oscillator 18, 20 will be set at a different centre, i.e. steady state, frequency.

Each oscillator's output frequency is supplied to a digital frequency comparator 24 which processes the output frequencies and compares same to produce an output indicative of the balanced relationship between the two oscillators 18, 20. This comparison output is then supplied to further processing means 26 which determined whether an alarm condition is indicated by the results of the comparison. The further processing means could be connected to an alarm unit in order to give a visual or audible indication of an alarm condition if such should arise or to a data gathering network etc as required by the system operator.

It will be understood that the comparator 24 obtains information concerning possible intrusion by comparing variations in two halves of the protected area. When an

intruder is present and alters the capacitance of one set of wires 12, the output frequency of the associated oscillator 18, 20 changes. The resulting change between the output of the first oscillator 18 and the second oscillator 20 is detected by the digital frequency comparator 24 which supplies this to the further processing means 26. As a result of the change an alarm condition is noted and an alarm condition generated.

The invention is not confined to the foregoing details and variations may be made thereto within the scope of the invention. For example, the protected zone need not be divided into two equal halves but can be divided up according to operational or physical requirements e.g. a 60:40 division etc. Other variations may also be possible.

CLAIMS

1. An intruder detector comprising two sets of sensor wires, each connected to a respective oscillator preset to a different predetermined frequency so as to form two balanced detection circuits, each oscillator's frequency output being supplied to a comparator operative to compare said frequency output and provide an alarm when there is a predetermined change from a balanced state.

2. An intruder detector as claimed in claim 1 in which a protected zone is divided into two sections, each section being monitored by a respective set of sensor wires, and the two sets of sensor wires are connected to an LC oscillator.

3. An intruder detector as claimed in claim 2 in which the output frequency of each oscillator is predetermined by the capacitance of the sensor wires and their associated circuitry and each oscillator is consequently set at a different centre frequency.

4. An intruder detector as claimed in claim 1, 2 or 3 in which the detector further includes a digital frequency processor for processing the frequency outputs from the two oscillators prior to comparison in the comparator/processor.

5. An intruder detector substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

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Examiner's report to the Comptroller under Section 17 (The Search Report)

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Relevant Technical fields

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(ii) Int Cl (Edition 5) 08B (13/22, 13/24, 13/26)

Search Examiner

D L SUMMERHAYES

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

25 AUGUST 1992

Documents considered relevant following a search in respect of claims 1-5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2155224 A (SHORROCK)	1
A	GB 2040093 A (SHORROCK)	1
A	EP 0045335 A1 (STELLAR)	1
A	US 4684931 (PARKS)	1

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

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