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(54) Infra-red monitoring system

(57) An intruder monitoring apparatus 1 comprises a series of passive infrared detectors 2 for detecting infrared radiation within region to be monitored, and providing first signals containing information representing the temperature of objects emitting infrared radiation. The passive infrared detectors 2 are arranged in pairs and each pair of detectors 2 sends output signals to a

processor 3 which determines whether an object emitting infrared radiation lies within a predetermined temperature range and occupies a region exceeding a predetermined size. In such a situation, the processor 3 sends an output signal to alarm means 4 which sends an alarm call to a remote location via a radio antenna 5 or the public telephone network 6.

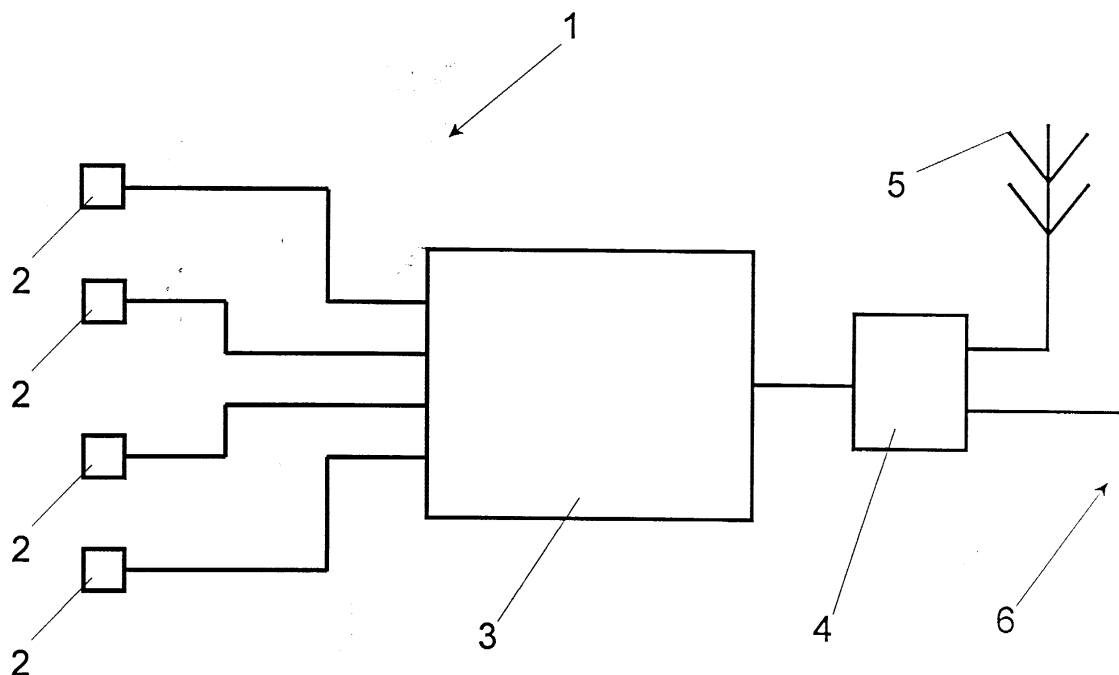


Fig 1

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Description

[0001] The present invention relates to an infra-red monitoring system, and relates particularly, but not exclusively, to an infra-red intruder detection system.

[0002] Intruder detection systems are known in which premises to be guarded are monitored by means of one or more passive infra-red detectors. The elevated body temperature of an intruder compared with the surroundings causes the emission of infra red radiation, which can be detected by one or more of the passive infra-red detectors, and an alarm signal generated as a result.

[0003] In the case of larger premises such as an industrial site, factory or warehouse, known monitoring systems of the above type suffer from the drawback that false alarms are often generated for example by animals. In addition, even though a correct alarm signal may be generated as a result of an intruder, known intruder detection systems generally do not provide information regarding the location of the intruder, as a result of which the intruder may escape as a result of the time taken to locate the intruder.

[0004] Preferred embodiments of the present invention seek to overcome the above disadvantages of the prior art.

[0005] According to the present invention, there is provided an infra-red monitoring system comprising:

infra-red detector means comprising at least one detector device for detecting infra-red radiation within a region to be monitored and providing a respective first signal containing information representing the temperature of objects emitting infra red radiation to the detector device;

processor means for receiving the or each said first signal and determining whether an object emitting infra red radiation to the or each said detector device lies within a predetermined temperature range and occupies a region exceeding a predetermined size; and

signal generator means for generating an alarm signal in response to said processor means determining that an object emitting infra red radiation to a said detector device lies within a predetermined temperature range and occupies a region exceeding a predetermined size.

[0006] By detecting whether the an object emitting infra red radiation to a detector device in the system lies within a predetermined temperature range and occupies a region exceeding a predetermined size, this provides the advantage that the system can be adapted to detect subjects of a particular type, for example by detecting a range corresponding to human body temperature distributed over a region corresponding to the size of a human body. As a result, false alarms caused by, for ex-

ample, animals of comparable size to humans but having different body temperature, or tanks of industrial liquid having similar temperature to human body temperature, but distributed over different volumes, are minimised.

[0007] The signal generator means may generate an audible and/or visible alarm signal.

[0008] Alternatively, or in addition, the signal generator means may automatically send an alarm signal to a remote location.

[0009] In a preferred embodiment, the signal generator means automatically sends an alarm signal to control centre at a remote location.

[0010] At least one said detector device may comprise a respective passive infra-red detector.

[0011] In a preferred embodiment, said detector means comprises at least one pair of said detector devices arranged at a respective location, and the signal generator means only generates an alarm signal in response both detector devices of a said pair indicating the temperature of an object lying within predetermined limits.

[0012] This provides the advantage of minimising the incidences of false alarms, for example as a result of malfunction of one or more of the detector devices.

[0013] The system may further comprise tamper detection means.

[0014] In a preferred embodiment, the system is adapted to generate at least one second signal containing information indicating location and time of detection.

[0015] This provides the advantage of enabling the position of an intruder to be monitored over time which, in the case of a region covering a large area, enables an intruder to be located as quickly as possible.

[0016] A preferred embodiment of the invention will now be described by way of example only, and not in any limitative sense, with reference to the accompanying drawing which is a schematic representation of an intruder monitoring system embodying the present invention.

[0017] An intruder monitoring apparatus 1 has a series of passive infra-red detectors 2 spread over an area to be monitored, for example a factory or industrial site to be guarded against intruders. The passive infra-red detectors 2 are adapted to detect emitted infra red radiation over a range of -20 to +70 degrees Celsius and are provided in pairs at each location. Each pair of detectors 2 sends output signals to a processor 3, such as a micro processor, the output signals containing information relating to the temperature of an objects emitting radiation within the range of a detector 2, and the size of the object (for example, as a result of the angle over which radiation within a given temperature range is received at a detector 2). In order to minimise the incidence of false alarms through malfunction of a detector 2, the processor 3 only processes signals from a particular location if the signals from each pair of detectors 2 indicate substantially the same object.

[0018] The output signal from each detector 2 contains information regarding the range of temperatures detected by the detector 2, as well as the temperature of sectors into which the field of view of the detector 2 is divided. In this way, the processor 3 can detect whether a continuous part of the region to be monitored, for example corresponding to the dimensions of a human body, lies within a range of temperatures including normal human body temperature. If such a situation is detected, the processor 3 sends an output signal to alarm means 4, which generates an audible signal at the region being monitored, or sends an alarm call to a remote location via a radio antenna 5 or the public telephone network 6. The processor also generates a signal indicating the time at which an intruder is detected by a particular detector 2. This enables the system to monitor the movement of an intruder so that the intruder can be located as quickly as possible.

[0019] It will be appreciated by persons skilled in the art that the above embodiment has been described by way of example only and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims.

Claims

1. An infra-red monitoring system comprising:

infra-red detector means comprising at least one detector device for detecting infra-red radiation within a region to be monitored and providing a respective first signal containing information representing the temperature of objects emitting infra red radiation to the detector device;

processor means for receiving the or each said first signal and determining whether an object emitting infra red radiation to the or each said detector device lies within a predetermined temperature range and occupies a region exceeding a predetermined size; and

signal generator means for generating an alarm signal in response to said processor means determining that an object emitting infra red radiation to a said detector device lies within a predetermined temperature range and occupies a region exceeding a predetermined size.

2. A system according to claim 1, wherein the signal generator means generates an audible and/or visible alarm signal.
3. A system according to any one of the preceding claims, wherein the signal generator means auto-

matically sends an alarm signal to a remote location.

4. A system according to claim 3, wherein the signal generator means automatically sends an alarm signal to control centre at a remote location.
5. A system according to any one of the preceding claims, wherein at least one said detector device comprises a respective passive infra-red detector.
6. A system according to any one of the preceding claims, wherein said detector means comprises at least one pair of said detector devices arranged at a respective location, and the signal generator means only generates an alarm signal in response both detector devices of a said pair indicating the temperature of an object lying within predetermined limits.
7. A system according to any one of the preceding claims, further comprising tamper detection means.
8. A system according to any one of the preceding claims, wherein the system is adapted to generate at least one second signal containing information indicating location and time of detection.

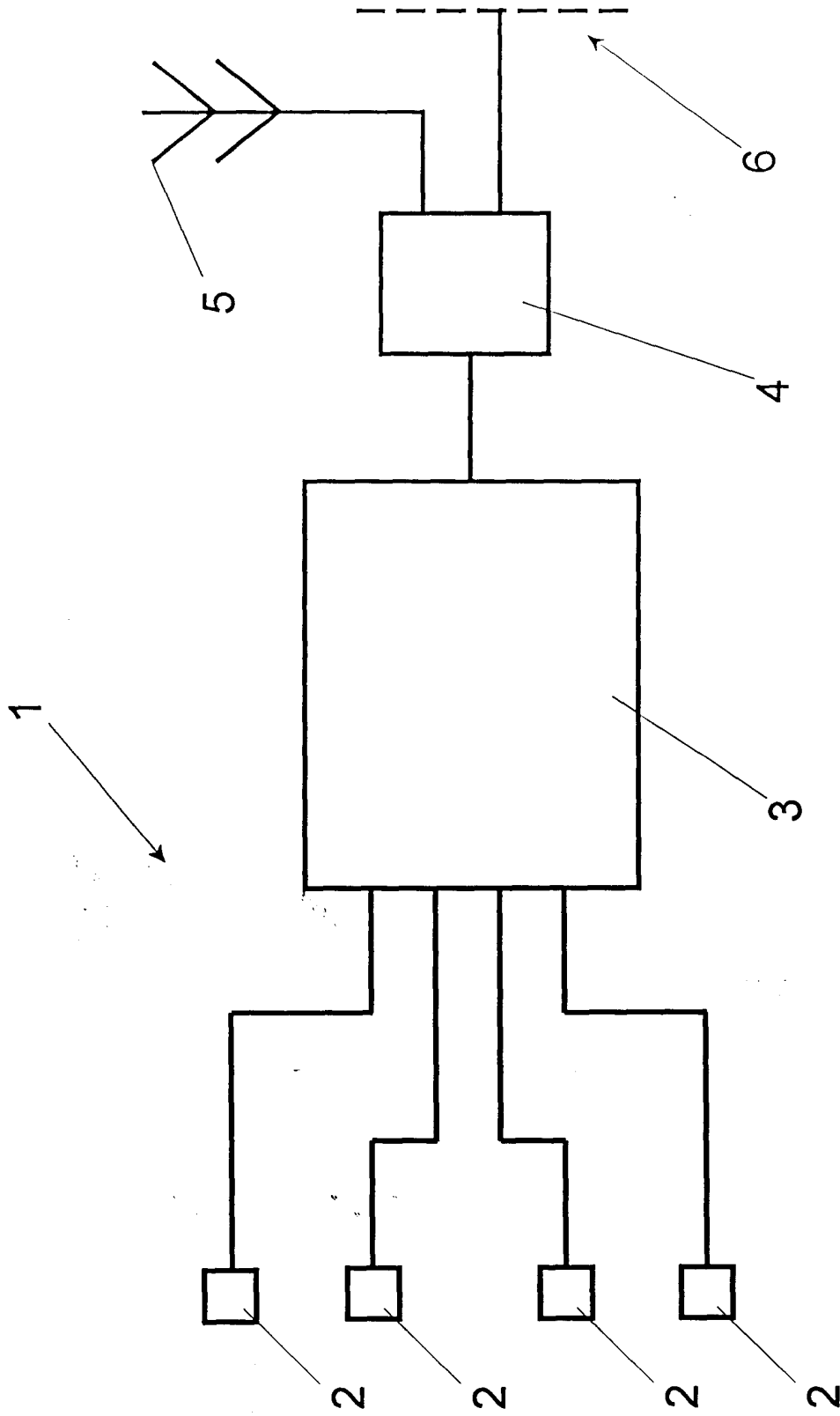


Fig 1