

[54] **RESETTABLE TIMER-ALARM DEVICE
USED IN MONITORING GERIATRIC
PATIENTS**

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[57] **ABSTRACT**

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An alarm device for use in geriatrics, medical care etc., including a timing device, one or more actuating units and an alarm device. The actuating unit for the timing device consists of one or more operating units, each of which is connected to an object in the surroundings of the patient but is not attached to the person of the patient. The object is used in a routine and more or less regular manner by the patient in the course of daily existence, and is thus given a movement which actuates the attached operating unit.

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[51] Int. Cl. G08b 21/00

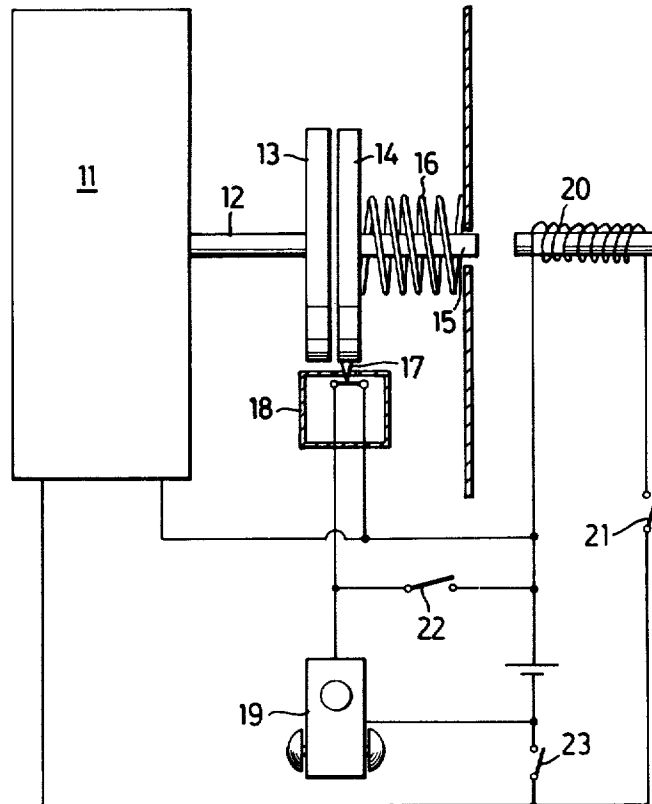
[58] Field of Search 340/279, 306, 309.1, 309.4; 58/21.1, 17; 200/40

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7 Claims, 3 Drawing Figures



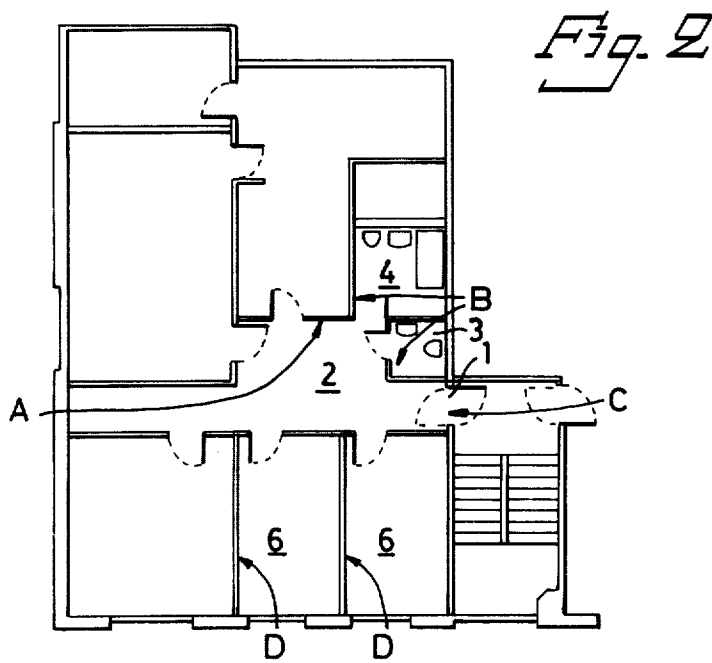
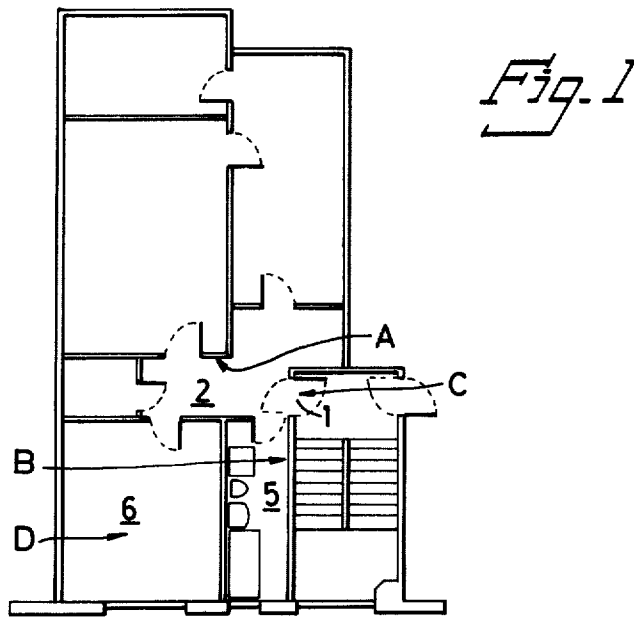
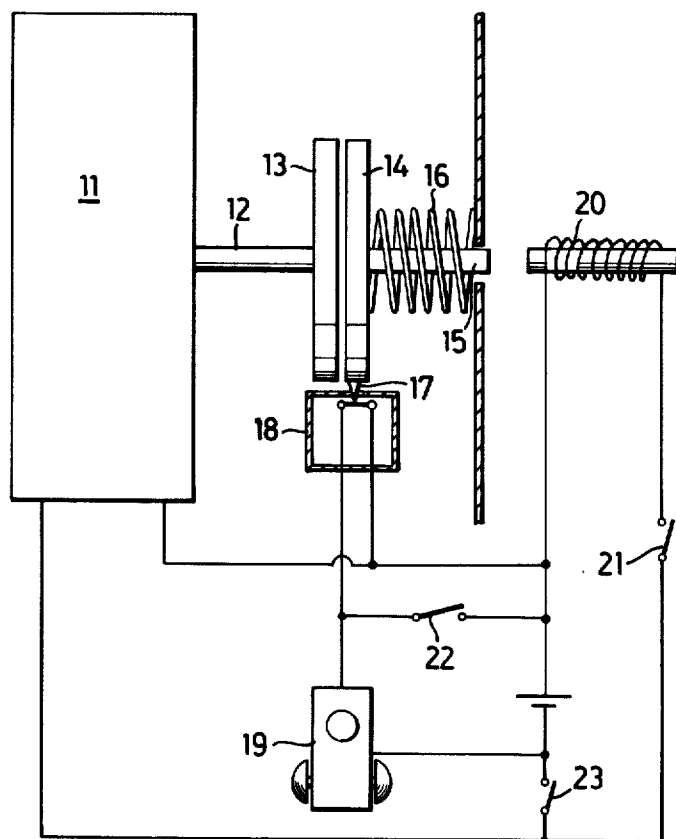


Fig. 3



RESETTABLE TIMER-ALARM DEVICE USED IN MONITORING GERIATRIC PATIENTS

This invention relates to an alarm device to be installed, for instance, in flats, and especially those where old people live on their own. One tragic problem which receives much attention in society concerns the deaths which have several times occurred in the homes of those living on their own and which have not been discovered for a very long time, in some cases several months. The same applies to elderly people living on their own who quickly become afflicted with an illness that makes them bewildered or paralysed and makes it difficult or impossible for them to contact those living nearby for help. This problem has the same degree of urgency for civic organisations and for the individual, and causes a lot of worry and anxiety, particularly among the old.

The problem which this invention has solved is of a complex nature, and a number of factors are of significance for the successful solution of the invention. The invention has also been considered, after very comprehensive investigations, from the technical, medical and gerontological points of view. This interdisciplinary examination of the invention has shown that it is a fundamental functional property of the invention that it does not perpetuate the predicament of the people in whose homes it is installed.

It has been known previously in geriatrics to make use of a device which comprises an alarm device for the emission of a signal, for instance when a person not under continuous surveillance, hereinafter referred to as the patient, has suffered a reduction in his normal functional capability, for instance his mobility, and a timing device which, when it remains unactuated by one or more actuating units which form part of the device, brings the alarm device into operation after a predetermined period of time. The actuating unit in this known device is a transmitter which is carried by the patient and emits impulses to the timing device when the patient performs movements, and thereby sets the timing device into an initial position, but ceases to emit impulses when these movements stop and allows the timing device to pass from the said initial position into a terminal position, in which an alarm device is put into operation. The drawback of this device is that it requires the patient to remember to carry the transmitter at all times and to perform movements during the said period of time, since otherwise a false alarm may be given.

This drawback is avoided by a constructional version in accordance with this invention. An alarm device for use in geriatrics, medical care, etc., which, as mentioned above, comprises a timing device, one or more actuating units and an alarm device, is characterised in accordance with this invention by the fact that the actuating unit for the timing device consists of one or more operating units, each of which is connected to an object in the surroundings of the patient and is not attached to the person of the patient, which object is used in a routine and more or less regular manner by the patient in the course of daily existence, and is thus given a movement which actuates the attached operating unit.

The invention is described below in greater detail by reference to the attached drawings and examples,

which are not, however, intended to constitute a limitation of the scope of the invention.

FIGS. 1 and 2 show plans of a two-room and four-room flat respectively in which an alarm device in accordance with the invention has been installed.

FIG. 3 shows diagrammatically an example of the construction of the alarm device.

FIGS. 1 and 2 show an entrance 1 to the flat in question, a hall 2, a lavatory 3, a bathroom 4 and a combined lavatory and bathroom 5, and a bedroom 6.

The alarm device in accordance with the invention comprises a timing device A, one or more associated actuating units B, an alarm device C and one or more alarm release units D which can be actuated manually.

The components A-D are placed in the flat in question, for instance in the positions indicated by the arrows in FIGS. 1 and 2, inasmuch as the timing device A is placed on a wall in the hall 2 and is electrically connected to the actuating unit B which serves to zero the timing device A and is placed in a lavatory or bathroom 3-5 and is actuated every time the patient makes use of the room in question. The alarm device (C) which emits a sound or light signal is placed at the entrance 1, for instance at the position where the bell push is fitted. In addition, one or more alarm release units D are connected to the alarm device C, each of which units is placed, for instance, near a bed in one or more bedrooms 6, so that the alarm device C may be put into operation independently of the self-regulating devices A and B.

In accordance with the constructional version shown diagrammatically in FIG. 3 as an example, which version may be energised by signal current or power current, the alarm device comprises a synchronous clock 11 with an output shaft 12 that rotates once every 24 hours. On the shaft 12 there is mounted a clutch plate 13 and parallel to this there is a similar clutch plate 14 carried by a shaft 15. The latter clutch plate 14 can be moved into or out of contact with the first clutch plate 13. A coil spring 16 presses the plate 14 onto the plate 13, with the result that the plate 14 rotates together with the plate 13 which is driven by the synchronous clock 11. On the driven plate 14 there is a pointer 17 which, when the plate 14 has made one revolution, makes contact with a switch 18, whereupon the circuit is closed so that an alarm device 19 incorporating sound and light signals is brought into operation.

Coaxially with the shaft 15 there is fitted an electromagnet 20, in the circuit of which there is a switch 21 which is placed, for instance, in combination with the light switch in the lavatory or bathroom, and closes the circuit of the electromagnet 20 when the light is switched on in the lavatory or bathroom, so that the electromagnet withdraws the clutch plate 14 from the clutch plate 13. The coil spring 16 is constructed to serve as a return spring by fixing one of its ends in position and attaching the other end to the clutch plate 14, with the result that the coil spring 16 is able to rotate backwards the plate 14 which has been released from the plate 13, so that the pointer 17 is returned to the initial position and the alarm system is zeroed. The switch 21 is constructed in such a way that it supplies current to the electromagnet 20 for a time which is sufficient for the pointer 17 to get back completely into its initial position. The switch 18 can be set at different distances from the initial position of the pointer 17, so that the desired alarm interval may be obtained over a

range from 0 to practically 24 hours. In the circuit of the alarm device 19 there is a switch 22 capable of manual actuation which is to be placed by the bed of the patient so that he can reach it easily. The whole alarm system may be turned off by means of a master switch 23.

The device must be such that when the master switch is actuated, whether this is done to switch off the alarm device or to switch it on, the timing device is zeroed, so that after every switching-on of the alarm device, the whole length of time set on the timing device must elapse before the alarm may be set off. There is otherwise a risk that a false alarm may be given since, when switching on, the time remaining on the timing device might be so short that there is no certainty that one of the routine actions carried out by the patient, which action will zero the timing device, will occur.

Where a patient who has an alarm device in accordance with this invention is away for a longer period from the flat where the alarm device is installed, for instance because of a journey, it is best if the patient turns off the alarm device by the master switch before leaving. There is however a risk that the patient, on his return, will forget to switch the device on again. In order to reduce or eliminate this risk, there may be a device which causes the alarm device to be automatically switched on when the patient performs a conscious or unconscious, routine action within a comparatively short time after his arrival, for instance when he works a switch in a lavatory or similar room. In order to eliminate the risk that such a device will cause unintentional switching-on of the alarm device when the patient, after switching off but before the actual departure, unintentionally performs the said routine action, the master switch may be connected to a delay unit of some kind which will put the said device for automatic switching-on into a serviceable state only after some time, for instance thirty minutes, had elapsed since switching off. The said delay device may be a clock which is started by an electric signal from the master switch and which, after the said delay period, prepares the closure of a feeder circuit to the said device for automatic switching-on.

It will be evident without further elucidation that the components 11-18 and 20 shown in FIG. 3 are comprised in the timing device A in FIGS. 1 and 2, that component 21 corresponds to the actuating device B, that component 19 corresponds to the alarm device C and that component 22 corresponds to the alarm release device D.

The impulse which is used to zero the alarm device, i.e. to cause the clutch plate 14 to assume its initial position, can be triggered off electrically or manually or by sound waves. The actuating unit may, for its releasing action, be combined with a switch in different pieces of apparatus in the flat, such as the lighting circuit, radio sets, television sets, electric cooker, household appliances.

An alarm device in accordance with the invention may be used for surveillance purposes other than those in geriatrics or medical care. Examples of such surveillance are night surveillance of industries, offices and other installations and military surveillance of different kinds. In such surveillance it is usual for a watchman to make certain definite rounds through the installation at certain definite times. The watchman must then pass certain given points where he actuates a time clock

which records that he was there at that time. The watchman has a special key which he uses to work the clock or to open a cupboard in which the clock is kept.

In accordance with this invention, such a surveillance installation may comprise a timing device and an alarm device. Each point which the watchman passes need not be provided with a clock but may have a contact unit that is actuated by the watchman on his round, and thereby causes the central timing device to be zeroed. The time taken between such a zeroing operation and the zeroing operation at the next point, according to the time table which the watchman must observe, must naturally be a little shorter than the time taken by the timing device, after such a zeroing operation, to release the alarm. Owing to the fact that the distances between different points may be different and the time table of the watchman may therefore be fairly irregular, the setting time of the timing device, i.e. the time taken for the timing device to release the alarm after a zeroing operation, must be of different lengths depending on the point from which zeroing is carried out. This may for instance be accomplished in such a way that the rotating actuating unit of the zeroing device (the clutch plate 14 in the constructional version shown) is zeroed against different stops, depending on the point from which zeroing is performed. At each point, therefore, the operation comprises the closing of a common circuit (the one through the electromagnet 20 in the constructional version shown) in order to accomplish the zeroing operation, and also the closing of a circuit (not shown) which is individual to the point and which causes a stop (not shown) to be introduced into the path of the pointer 17 during its zeroing movement, and thus causes a time setting to take place, which setting is individually adapted to the time required until the next zeroing operation at the next point.

Instead of using a key, it must be possible for zeroing to be accomplished by the watchman's actuating the operating unit by means of a special code that only he knows. A key may be lost or stolen.

One of the advantages of the use of this invention for surveillance purposes of the type outlined above would be that an alarm is automatically given if the watchman, for instance owing to some act of violence, is put out of action on his journey from one point to another. If, however, the intruder should take from the watchman the key to the zeroing unit, he would be able to cause zeroing to take place so that the alarm is not given. This is prevented by the use of a code instead of a key.

We claim:

1. A device for use in geriatrics, medical care, and the like for the emission of a signal, for instance when a person not under continuous surveillance, hereinafter referred to as the patient, has suffered a reduction in his normal functional capabilities, for instance his mobility, comprising:

- a. a timing device for continuous operation through a time cycle of a predetermined length,
- b. an alarm device operatively connected with said timing device,
- c. means releasably coupled to said timing device and having an initial position, for triggering an alarm by the alarm device at the end of said length of time,
- d. a plurality of switch means for releasing the coupling of said triggering means to said timing device,

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- e. means for restoring the coupling between the triggering means and the timing device, including means for automatically resetting the triggering means into the initial position,
- f. each of said switch means being connected to an object in the surroundings of the patient, said object being in daily routine use by the patient, and said switch means being unattached to the person of said patient, and
- g. wherein said device is used for surveillance, for instance during the night, of industries, military installations or other installations where a watchman checks certain points along his patrol route, wherein each point comprises said switch means connected to the timing device in parallel, causing the triggering means to return to the initial position when the watchman performs the checking operation.

2. A device for use in geriatrics, medical care, and the like for the emission of a signal, for instance when a person not under continuous surveillance, hereinafter referred to as the patient, has suffered a reduction in his normal functional capabilities, for instance his mobility, comprising:

- a. a timing device for continuous operation through a time cycle of a predetermined length,
- b. an alarm device operatively connected with said timing device,
- c. means releasably coupled to said timing device and having an initial position, for triggering an alarm by the alarm device at the end of said length of time,
- d. a plurality of switch means for releasing the coupling of said triggering means to said timing device,
- e. means for restoring the coupling between the triggering means and the timing device, including means for automatically resetting the triggering means into the initial position,
- f. each of said switch means being connected to an object in the surroundings of the patient, said object being in daily routine use by the patient, and said switch means being unattached to the person of said patient,
- g. said timing device comprising a synchronous clock having (1) an output shaft; (2) a first clutch plate integrally connected with said output shaft; and (3) means causing the first clutch plate to rotate such as to make one revolution every twenty-four hours,
- h. said triggering means comprising (1) a second clutch plate; (2) means for moving the second clutch plate into contact with the first clutch plate; (3) a pointer fastened to the second clutch plate; and (4) a switch in the alarm device circuit constructed to be closed and opened by said pointer; and
- i. said means for moving the second clutch plate into contact with the first clutch plate comprising a coil spring disposed adjacent the second clutch plate, said coil spring constructed to urge the second

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clutch plate to rotate back into its initial position.
 3. The device as set forth in claim 2 including means for moving the second clutch plate out of contact with the first clutch plate comprising an electromagnet being in electric series connection with said switch means.

4. A device for use in geriatrics, medical care, and the like for the emission of a signal, for instance when a person not under continuous surveillance, hereinafter referred to as the patient, has suffered a reduction in his normal functional capabilities, for instance his mobility, comprising:

- a. a timing device for continuous operation through a time cycle of a predetermined length,
- b. an alarm device operatively connected with said timing device,
- c. means releasably coupled to said timing device and having an initial position, for triggering an alarm by the alarm device at the end of said length of time,
- d. a plurality of switch means in the living quarters of the patient for releasing the coupling of said triggering means to said timing device,
- e. spring means for restoring the coupling between the triggering means and the timing device subsequent to the releasing of the coupling and for automatically resetting the triggering means into the initial position, and
- f. each of said switch means being connected to an object in said living quarters, at least one of said objects comprising a switch in an electric appliance being in daily routine use by the patient, and said switch means being unattached to the person of said patient.

5. The device as set forth in claim 7 including at least one means for actuating the alarm device directly, said actuating means comprising an electric switch directly manually operable for closing a circuit for the alarm device.

6. The device as set forth in claim 4 comprising a master switch in the circuit of the alarm device for manually turning off the alarm device by said person, including means for restoring the triggering means to its initial position.

7. The device as set forth in claim 4 in which the timing device comprises a synchronous clock having an output shaft driven thereby, a first clutch plate integrally connected with said output shaft and rotating therewith, said output shaft and first clutch rotating one revolution every 24 hours, and the triggering means comprises a second clutch plate spaced axially from said first clutch plate, means for moving the second clutch plate axially into driven contact with the first clutch plate, a pointer fastened to the second clutch plate, and a switch in the alarm device circuit in proximity to the second clutch plate and adapted to be closed and opened by said pointer.

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