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54 **Remote control signalling device.**

57 A signalling device for remote control purposes, the device comprising a front housing, a rear housing, a joining structure joining the front and rear housings in a spaced relationship to form a recess therebetween whereby the device may be slid onto a receiving web so as to be retained on the web by engagement of the web in the recess, operating means located in a first one of the housings, electronic circuit means located in a second one of the housings, means linking the operating means and the circuit means and extending through the connecting structure, and an actuating member for the operating means, the actuating member being located in an accessible region of the device.

Description

REMOTE CONTROL SIGNALLING DEVICE

This invention relates to a signalling device for remote control purposes.

Emergency call systems for the elderly and infirm are becoming widespread, both in sheltered housing schemes and in ordinary residential locations. In a typical application to an ordinary residential location, i.e. an ordinary dwelling occupied by an elderly or infirm person, an emergency call raising device, or call unit, is usually connected directly to the subscriber telephone line serving the dwelling in question. The call unit incorporates an automatic dialling device actuated in response to an external stimulus to dial a call on the public telephone network, either to a suitably staffed emergency control centre or to a pre-determined relative or friend. An example of such a call unit is described in GB-B-2166321.

The external stimulus for initiating an emergency call may be by specific actuation of a push-button or pull-switch, by an environmental detection unit, e.g. a smoke detector, by a device responsive to a period of inactivity in the dwelling, or by a remote trigger device carried by or kept within reach of the protected person, e.g. a radio, infra-red or ultrasonic transmitter.

The existing remote trigger devices are usually worn on a cord around the neck of the protected person, and they tend to be both bulky and unsightly. The invention seeks to provide a signalling device which avoids these disadvantages, and which may be used as a remote trigger device for emergency call equipment. The device is not, however, confined to this specific end use, and devices according to the invention may be designed for use in a range of remote control contexts.

According to the invention a signalling device for remote control purposes comprises a front housing, a rear housing, a joining structure joining the front and rear housings in a spaced relationship to form a recess therebetween whereby the device may be slid onto a receiving web so as to be retained on the web by engagement of the web in the recess, operating means located in a first one of the housings, electronic circuit means located in a second one of the housings, means linking the operating means and the circuit means and extending through the connecting structure, and an actuating member for the operating means, the actuating member being located in an accessible region of the device.

Such a device may be made extremely compact. It can be worn at any convenient location on the person, simply by clipping the device onto a web that may be formed by a section of a garment or onto a web designed specially for supporting the device. Thus, the device may be clipped onto a pocket, belt or other garment part, or may be clipped onto a strap designed to be worn on the wrist. If a user finds it particularly convenient to wear the device on a strap around the neck then such strap may either be connected directly to the device, or the device may

be clipped into a pouch that is itself supported by an appropriate strap.

In one preferred arrangement at least parts of the front and rear housings may converge towards the joining structure so as to provide a wedging effect on a web on which the device is retained. Additionally or alternatively at least one of the facing walls of the front and rear housings may be formed with an irregular surface to improve the grip onto the web. The irregularities may be provided simply by roughening the surface, or may be a more clearly defined arrangement of ribs or other projections on the surface.

Preferably the operating means is located in the front housing and the circuit means is located in the rear housing. Although the actuating member may be located at any accessible region of the device it is preferred that it be located on that wall of the front housing which faces away from the rear housing. The actuating member can then readily be made to be sufficiently distinctive and prominent that the user will have no difficulty in actuating that member in an emergency.

Preferably the operating means comprises additional electronic circuit means, desirably in the form of a switch operable by the actuating member, and the linking means comprises electrical connections between the circuit means and the additional circuit means. One convenient form for such switch means is a pressure-operable switch, the actuating member then being a push button.

In order to take maximum advantage of the miniaturisation permitted by modern electronics the circuit means desirably comprises a substrate having a printed circuit thereon, with surface mounted components supported on the substrate.

The substrate may conveniently be a laminate comprising a relatively rigid backing and a relatively flexible layer. The printed circuit may then be printed onto the flexible layer and a projecting part of the flexible layer may extend beyond the backing and be folded through the joining structure to project into the front housing. Thus, an integral structure embodying the circuit means and the additional circuit means may be used. The projecting part of the flexible layer will then conveniently be printed with circuitry which comprises the switch means and the means electrically connecting the circuit means and the additional circuit means. Further compactness can be achieved if battery contacts are printed on the projecting part of the flexible layer, and the joining structure then desirably includes a battery compartment for housing battery means in contact with the battery contacts.

The electronic circuit may be designed to generate a radio signal when the actuating member is actuated by a user of the device, or alternatively the device may generate an infra-red or ultrasonic signal. Whatever type of signal is generated it will be such that the emergency call equipment or other equipment controlled by the device is operated in

response to actuation of the actuating member.

In order that the invention may be better understood a specific embodiment thereof will now be described in more detail, by way of example, with reference to the accompanying drawings in which:-

Figs 1 and 2 are front and side elevations respectively of a first embodiment of the device;

Fig 3 is an exploded view of the device;

Fig 4 is a schematic plan view of a sub-assembly incorporated in the device;

Figs 5 to 7 illustrate different ways of wearing the device; and

Fig 8 illustrates an alternative component for use in a second embodiment of the device.

The device comprises a main body shown generally as 1, parts of which define a front housing 2, a rear housing 3 and a joining structure 4 joining the front and rear housings together in a spaced relationship to form a recess 5 therebetween. The body may be suitably moulded from plastics material. The facing walls 6 of the front housing 2 and 7 of the rear housing 3 each have spaced ribs which converge towards the opposite wall in the direction of the joining structure 4. The ribs are interdigitated, so that each rib lies over or in space not occupied by ribs on the opposite wall.

The front housing 2 in the as-moulded form has an open front face surrounded by a rim 8 upstanding from the rear face of the housing. A groove 9 is formed around the interior surface of the rim 8. A switch mat 10 made from a suitable elastomeric material can be fitted into the open front face, with the edges of the switch mat being snapped into position in the groove 9 so that the mat is located in the required position. The switch mat has mounted thereon three pressure domes 11, each carrying a carbon pill that is exposed on the underside of the switch mat. An actuating member in the form of an alarm button 12 is mounted over the pressure domes 11, the button having a flange 13 projecting around the lower circumference thereof. A bezel moulding 14 fits over the button 12 and is a snap fit into position in the open face of the front housing 2. When so fitted it retains the alarm button and switch mat in position and closes the front of the front housing.

Fig 4 shows a sub-assembly comprising an electronic circuit capable of generating and transmitting a radio signal. The sub-assembly 15 comprises a rigid backing plate 16 having a flexible layer 17, for example of a polyimide material coated onto one surface thereof. The flexible layer has a part 18 that extends beyond the rigid backing. As will be seen schematically from Fig 4 the flexible layer carries an appropriate printed circuit, and the electronic components required for the circuit are surface mounted onto the flexible layer. The rigid backing also supports a light emitting diode 19 that, in use, lies behind a translucent cover 20 mounted in the front face of the front housing 2.

The printed circuit components on the flexible layer 17 include a printed circuit switch 20 having spaced conductive elements that may be bridged by the carbon pills on the underside of the pressure domes 11. The extension is also printed with battery

contact 21 and 22.

During assembly the extension 18 of the flexible material is folded as shown in Fig 3 and the sub-assembly is slid into the main body. When properly positioned the backing plate 16 and that section of the electronic circuit that is co-extensive therewith is received in the lower housing 3, while part 23 of the extension 18 extends through the connecting structure 4 and part 24 of the extension 18 lies in the front housing 2, with the switch 20 properly located beneath the pressure domes 11.

The joining section 4 defines an open topped chamber 25 with two upstanding, internally threaded bosses 26. A battery housing 27 is positioned within the chamber 25 and is located by slots 28 which fit around the bosses 26. Batteries 29 are inserted into the battery housing, a battery cover seal is fitted, and finally the open top of the chamber 25 is closed by a battery cover 31 secured in place by screws 32 passing through O-ring seals 33 and threadably engaging the bosses 26.

The actual detail of the electronic circuit forms no part of the invention. Suffice it to say that when the alarm button 12 is pressed one or more of the carbon pills on the lower sides of the pressure domes 11 will be moved into contact with the switch 20, so bridging spaced elements of the switch and closing the circuit. Closure of the circuit will generate and transmit a radio signal from the device, and that signal may be received by other equipment controlled from the device, particularly by an emergency call unit.

As will be appreciated from the drawings the device is light in weight, compact and elegant. It can be worn in any convenient location on the person, and Figs 5 to 7 show examples of use. In example 5 the device is shown worn on a pocket, belt or other section of clothing, the device simply being clipped onto the clothing by engaging the clothing between the facing walls 6 and 7. The wedging effect provided by the converging ribs causes the clothing to be firmly gripped. In Fig 6 the device is shown worn on a wrist strap, the device again being securely located on the strap by inserting the strap between the front and rear housings. Fig 7 shows the device located in a pouch, the rear housing being located within the pouch and the front housing projecting over the front of the pouch, the front wall of the pouch being engaged in the space between the two housings. The pouch has a cord enabling the pouch to be suspended from the neck of the wearer. Other methods of wear will be apparent.

If a greater transmission range is required from the device then the device may readily be formed with a suitable aerial. Fig 8 shows one convenient way in which an aerial may be incorporated, the aerial forming part of a neck cord 40 which is secured to mounting bosses 41 on a modified battery cover 42. Contacts on the inner surface of the battery cover 42 engage contacts that extend from the printed circuit in any convenient manner.

The rib arrangement provided to give a gripping effect may be replaced by any other suitable configuration of the facing walls. For example, the facing walls themselves may converge, rather than

only rib sections thereon, or one or both walls may be formed with a roughened surface, or with a surface housing having projections other than the converging ribs that have been described.

Other modifications will be apparent.

Claims

1. A signalling device for remote control purposes, the device comprising a front housing, a rear housing, a joining structure joining the front and rear housings in a spaced relationship to form a recess therebetween whereby the device may be slid onto a receiving web so as to be retained on the web by engagement of the web in the recess, operating means located in a first one of the housings, electronic circuit means located in a second one of the housings, means linking the operating means and the circuit means and extending through the connecting structure, and an actuating member for the operating means, the actuating member being located in an accessible region of the device.

2. A signalling device according to claim 1 in which at least parts of the facing walls of the front and rear housings converge towards the joining structure to provide a wedging effect on a web on which the device is retained.

3. A signalling device according to claim 1 or claim 2 in which at least one of the facing walls of the front and rear housings is formed with an irregular surface.

4. A signalling device according to claim 1 in which the operating means is located in the front housing and the circuit means is located in the rear housing.

5. A signalling device according to claim 4 in which the actuating member is located on that wall of the front housing which faces away from the rear housing.

6. A signalling device according to any one of the preceding claims in which the operating means comprises additional electronic circuit means, and the linking means comprises electrical connections between the circuit means and the additional circuit means.

7. A signalling device according to claim 6 in which the additional circuit means includes switch means operable by the actuating member.

8. A signalling device according to claim 7 in which the actuating member is a push button and the switch means is a pressure-operable switch.

9. A signalling device according to any one of the preceding claims in which the circuit means comprises a substrate having a printed circuit thereon, with surface mounted components supported on the substrate.

10. A signalling device according to claim 6 in which the substrate is a laminate comprising a relatively rigid backing and a relatively flexible

layer, the printed circuit is printed on to the flexible layer and a projecting part of the flexible layer extends beyond the backing and is folded through the joining structure to project into the front housing.

11. A signalling device according to claim 10 insofar as dependent on claim 7 or claim 8 in which the projecting part of the flexible layer is printed with circuitry which comprises the switch means and the means electrically connecting the circuit means and the switch means.

12. A signalling device according to claim 10 or 11 in which battery contacts are printed on the projecting part of the flexible layer, and the joining structure includes a battery compartment for housing battery means in contact with the battery contacts.

13. A signalling device according to any one of the preceding claims in which the electronic circuit is designed to generate a radio signal when the actuating member is actuated by a user of the device.

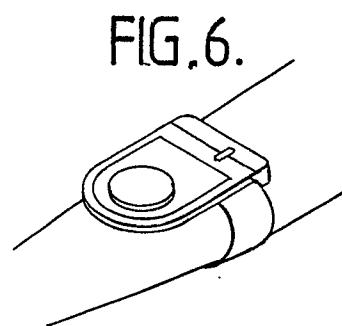
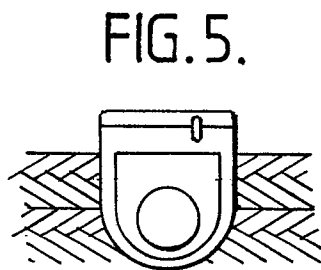
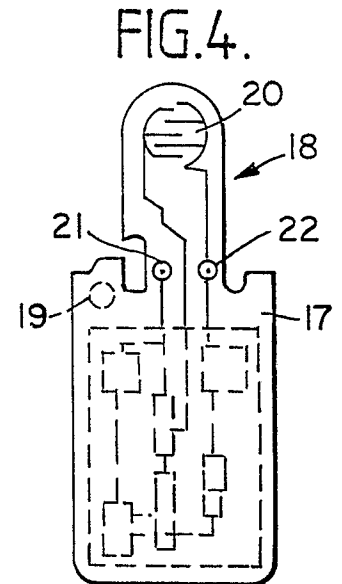
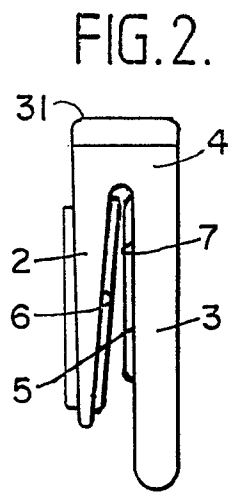
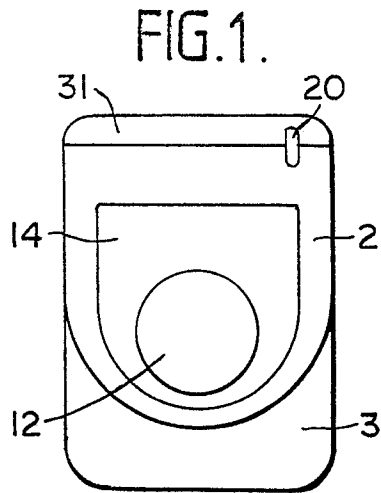


FIG. 7.

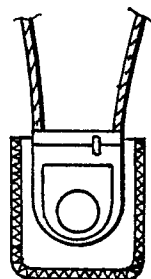
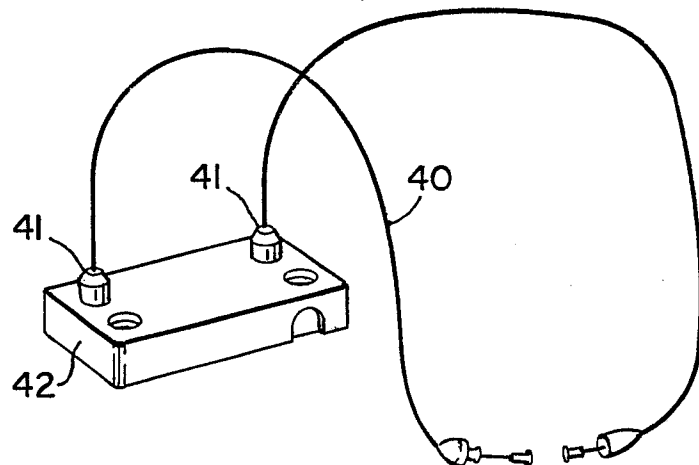


FIG. 8.



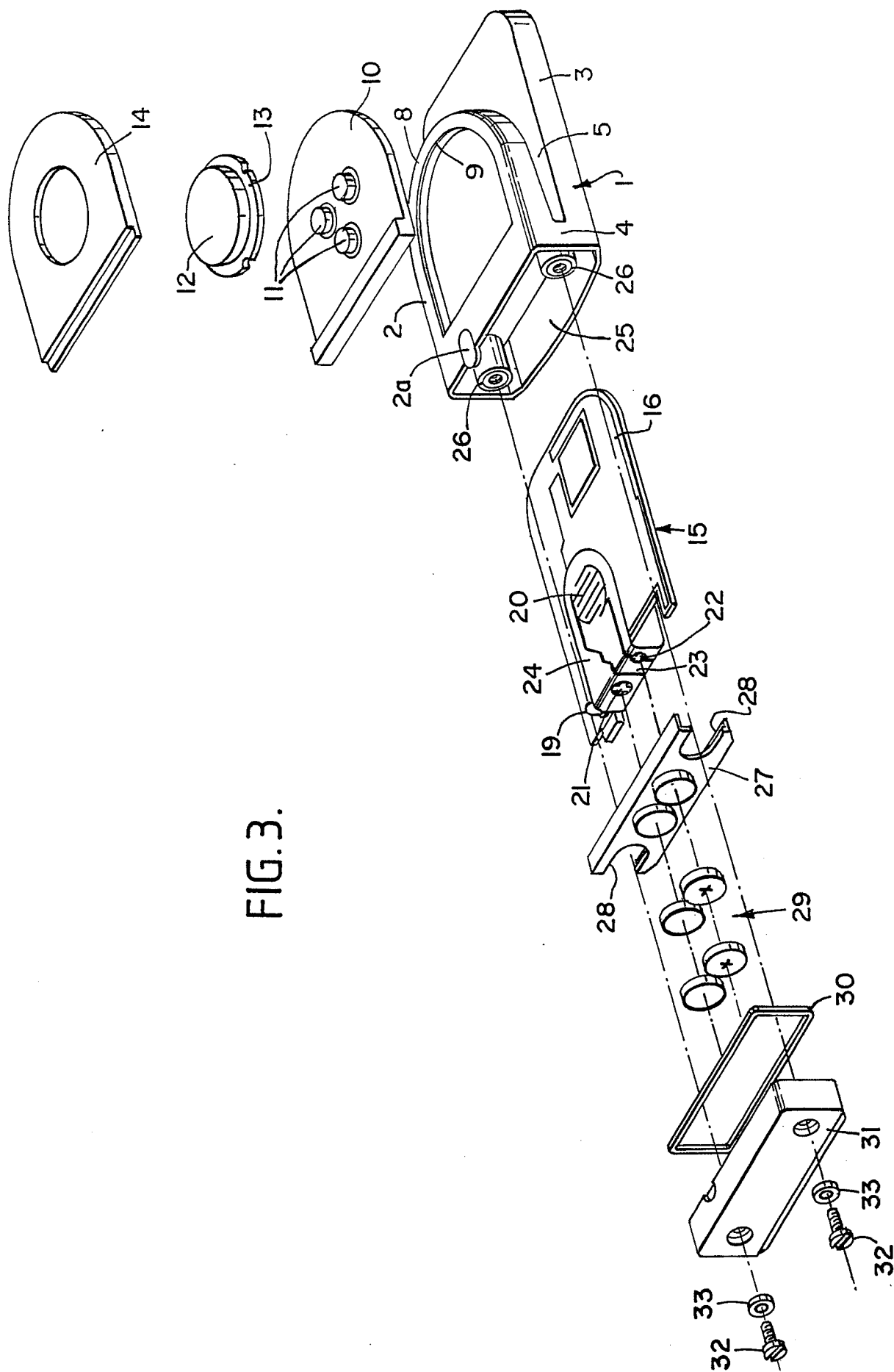


FIG.3.