United States Patent [19]

Larsson

[11] **3,858,131**

[45] **Dec. 31, 1974**

[54] **APPARATUSES FOR MAKING DEVICES, SUCH AS ALARM DEVICES, OPERATIVE**

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[22] Filed: **July 9, 1973**

[21] Appl. No.: **377,738**

[30] **Foreign Application Priority Data**

July 10, 1972 Sweden 9085/72

[52] **U.S. Cl.** ..... **335/136,** 200/61.45 M, 335/131, 340/65

[51] **Int. Cl.** **H01h 50/64**

[58] **Field of Search** ..... 335/131, 141, 136; 200/61.45 M; 340/261, 65

[56] **References Cited**

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[57] **ABSTRACT**

Apparatus for triggering alarm devices including a mechanical pendulum, the oscillating end of which is provided with a load of magnetic material and an electromagnet arranged adjacent the load to stabilise and counteract the oscillation of the pendulum as long as operation of the alarm device is not desired, whereby the life span of the mechanical pendulum is improved and the function of the whole apparatus will be more reliable.

3 Claims, 2 Drawing Figures

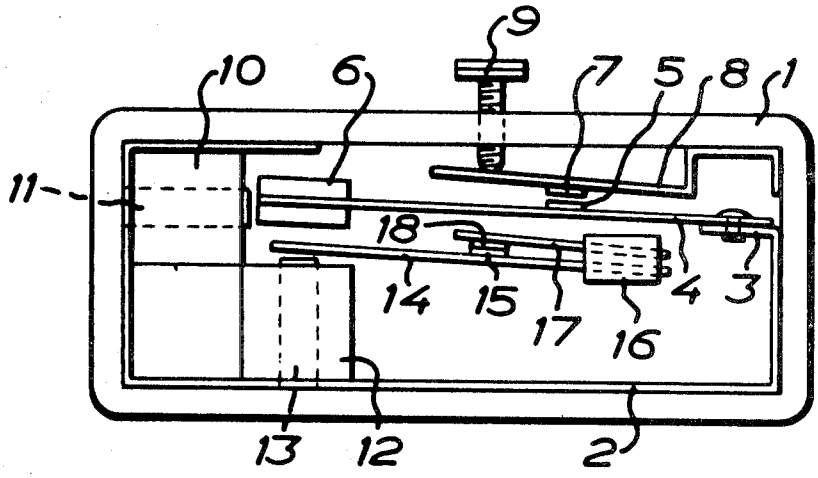
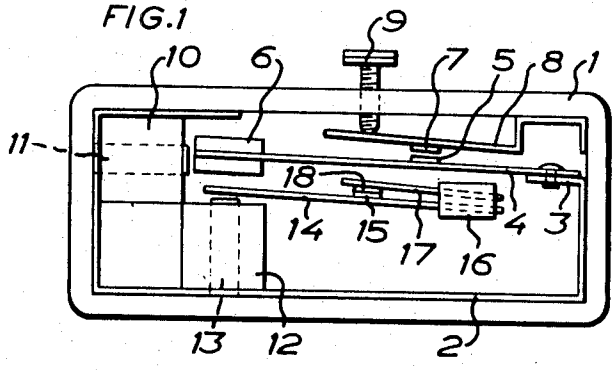


FIG.1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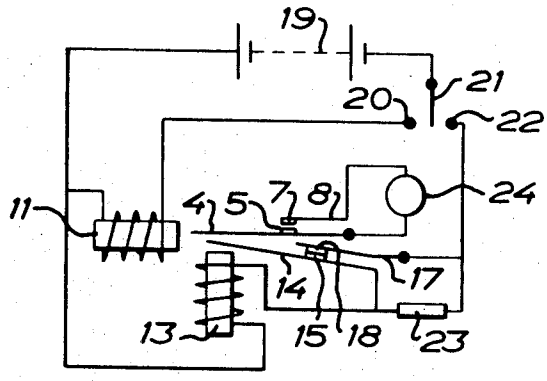
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FIG.2

APPARATUSES FOR MAKING DEVICES, SUCH AS ALARM DEVICES, OPERATIVE

This invention relates to an apparatus of the kind that makes a device, such as an alarm device, operative, and that comprises a sensing device which is arranged to react to various types of actuation such as shocks, vibrations and the like — i.e., movements on the whole — and which includes a mechanical pendulum having an electric contact for engaging a further electric contact disposed on an adjustable contact arm, said device being made operative through an engagement between the contacts.

Prior art apparatuses of this kind did not provide the contemplated function as reliably as was expected. Above all, it proved difficult to set the sensitivity in the desired way to avoid that the device was made operative at undesired times. As a result, the component parts wore out, thus reducing the service life of the prior art apparatuses.

One object of the present invention is to provide an improved operating apparatus of reliable and exact function and long life.

According to the invention, this is attained with the type of apparatus outlined in the foregoing in that the oscillating end of the mechanical pendulum is provided with a load of magnetic material and that an electromagnet is arranged adjacent the load to stabilise and counteract the oscillation of the pendulum.

Further features of the apparatus will appear from the following description and the claims appended thereto.

The invention will be more fully described hereinbelow with reference to the accompanying drawing in which:

FIG. 1 is a diagrammatic view of a sensing device for an apparatus according to the present invention, certain parts having been removed for a detailed showing of the internal elements;

FIG. 2 is a wiring diagram of the apparatus according to the invention.

An apparatus according to the present invention incorporates a sensing device of the type shown in FIG. 1. The sensing device is enclosed in a box 1 of some suitable material, such as plastics. In FIG. 1, the lid of the box is removed for a detailed showing of the internal elements. A metal frame 2 is mounted in the box so as to extend along two entire side walls and parts of the other two side walls, the frame being bent inwardly to form a fastening lug 3. One end of a resilient pendulum 4 is fixed to the fastening lug 3, and at a point between its ends the pendulum 4 carries a contact 5 and at the end opposite to the lug it carries a weight 6 of magnetic material. At a movement, however small, of the box 1 the pendulum 4 with the weight 6 will oscillate about the end which is attached to the fastening lug 3. The pendulum 4 like the frame 2 may be manufactured from an electrically conductive material. A contact 7 is disposed opposite the contact 5 and fastened to a contact arm 8 which is bent in a suitable manner and fixed in the box 1 in the box corner which is devoid of the frame 2. A set screw 9 penetrates the box side wall opposite the contact arm 8 and extends into engagement with said contact arm 8 for setting the distance between the contacts 5 and 7 and, as a result, the oscillation amplitude of the pendulum, which is necessary for the closing of an electric circuit in which the

contacts 5 and 7 are connected. An electromagnet 10 is secured in the frame 2 substantially opposite the free end of the pendulum 4 which carries the weight 6. The electromagnet has an iron core 11 which is surrounded by a winding shown in detail in FIG. 2. On supply of current to the winding of the core 11 the magnetic field produced will tend to centre the end of the pendulum having the weight 6 opposite the iron core 11, whereby oscillations of the pendulum 4 are counteracted as long as a current flows through the coil of the iron core 11. The pendulum 4 is able to swing wholly freely as soon as the current ceases to flow through the coil of the iron core 11. A further electromagnet 12 having an iron core 13 and a winding (shown more in detail in FIG. 2) is mounted on the frame 2. The iron core 13 is placed approximately at right angles to the iron core 11 and in the oscillating path of the end of the pendulum carrying the weight 6. Upon supply of a suitable current to the winding of the iron core 13 the magnetic field produced will attract the weight 6, positively swinging the pendulum 4 towards the electromagnet 12. A contact arm 14 is disposed between the iron core 13 and the weight 6. Said contact arm 14 carries a contact 15 and is rigidly secured in a mounting block 16 in the box 1. Moreover, a contact arm is secured in the block 16. Said contact arm 17 carries a contact 18 opposite the contact 15. The contacts 15 and 18 are connected in the supply circuit of the electromagnet 12 whereby the current supplied to the winding of the iron core 13 is broken each time the end of the pendulum carrying the weight 6 swings towards the iron core 13 and urges the contact arm 14 against said core 13.

The function of the iron core described above will be explained in more detail when the wiring diagram shown in FIG. 2 is described. The parts in FIG. 2 corresponding to those in FIG. 1 carry the same reference numerals and have been placed in approximately the same positions as in FIG. 1. One end of the winding of the iron core 11 is connected to one side of a battery 19 of some suitable kind while the other end of the winding is connected to a contact point 20 in a switch having an adjustable switch arm 21. The contacts 5 and 7 are series-connected with an alarm device 24 in a separate electric circuit, and if the device 24 is for instance a summer it must have a power source of its own. The contacts 15 and 18 are series-connected with the winding of the iron core 13, one end of said winding being connected to one side of the battery 19 while the other end of the winding is connected via contacts 15 and 18 to a contact point 22 in the switch having the adjustable switch arm 21. Said arm 21 is connected to the other side of the battery 19. A resistor 23 is connected between the contacts 15 and 17 and serves to extinguish arcs that may occur between the contacts 15 and 18.

With the parts in the position shown in FIG. 2, the pendulum 4 can swing freely as soon as it is subjected to some kind of actuation that produces oscillations, and as soon as the oscillating amplitude becomes so large that the distance between the contacts 5 and 7 is zero the alarm device 24, which may be a summer, a whistle, a lamp etc., is made operative. If, on the other hand, it is not desirable any longer to obtain an indication of oscillations, the arm 21 in the switch is set so as to engage the contact point 20 whereby the winding of the iron core 11 will carry current and the pendulum 4 will be centered opposite the iron core 11 so that os-

cillations thereof are counteracted with the aid of the magnetic field formed by the electromagnet **10.** However, should it be desired to provide a positive swinging of the pendulum **4** the arm **21** in the switch is set to engage the contact point **22,** whereby the winding of the iron core **13** will carry current and as a result the electromagnet **12** will attract the pendulum which on swinging towards the iron core **13** will engage the contact arm **14,** separating the contacts **15** and **18.** In this case, the circuit through the winding of the iron core **13** is opened and the pendulum swings back because of the resilience thereof so that the contacts **5** and **7** will engage each other, releasing the action of the alarm device **24.** As soon as the pendulum **4** has left the contact arm **14** and the contacts **15** and **18** have engaged each other the pendulum **4** will again be swung towards the iron core **13.** This positive swinging continues as long as the contact arm **21** is engaged with the contact **22.**

Using the apparatus described above it is possible to prevent unlawful misappropriation of a vehicle, of objects contained in the vehicle and in buildings etc. Thus the invention is of theft-preventing character. If a vehicle is equipped with the apparatus shown in FIG. **2** and the device **24** is the vehicle signalling system, the vehicle cannot be unlawfully misappropriated without its signalling system, for instance horn, lighting etc., becoming operative as soon as the vehicle is set in motion. The sensing device in FIG. **1** can also be so sensitive as to react to damages inflicted to the vehicle, without the vehicle being set in motion. The apparatus in FIG. **2** is made inoperative by setting the switch arm **21** so as to engage the contact point **20.** Said switch may be arranged at a particular location known only to the owner of the vehicle. The switch arm **21** may naturally be divided into a plurality of arms so that for instance the contact arm **21** and the contact point **22** are closed as soon as a car door is opened, a gear shift lever is actuated, or the steering wheel is turned, etc. As soon as the vehicle owner himself wishes to use his vehicle the contact arm **21** is set to engage the contact point **20,** which very reliably ensures that the apparatus in FIG. **2** is made inoperative.

What I claim and desire to secure by letters patent is:

1. An alarm activating apparatus which comprises a base means, a magnetic material weighted pendulum supported by said base means for oscillatory movement relative thereto in response to dynamic input forces applied to the base means, switch contact means including a switch contact carried by said pendulum, said switch contact means being disposed for connection to an alarm to activate same as the pendulum oscillates whereby said alarm is activated in response to said dynamic input forces, override means selectively operable to preclude activation of such alarm by said switch contact means, said override means including an electromagnet positioned in relation to the magnetic weighting material of said pendulum to magnetically counteract the oscillation thereof when the electromagnet is energized, electromagnetic driving means operable when energized to apply magnetic driving forces to said pendulum to impart oscillation thereto for activating the alarm independently of any activation thereof resulting from dynamic input forces applied to the base means, and switch means connected to said electromagnetic driving means and operable to selectively connect same with a source of electric energy for energization thereby.

2. An alarm activating apparatus according to claim **1** wherein said pendulum is resilient and has a free end weighted with a magnetic material, and the electromagnet of said override means and said electromagnetic driving means are positioned in adjacent relation to said free end of the pendulum.

3. An alarm activating apparatus according to claim **1** wherein said electromagnetic driving means includes switching means having a contact arm positioned in relation to an electromagnet and connected thereto to intermittently energize same.

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