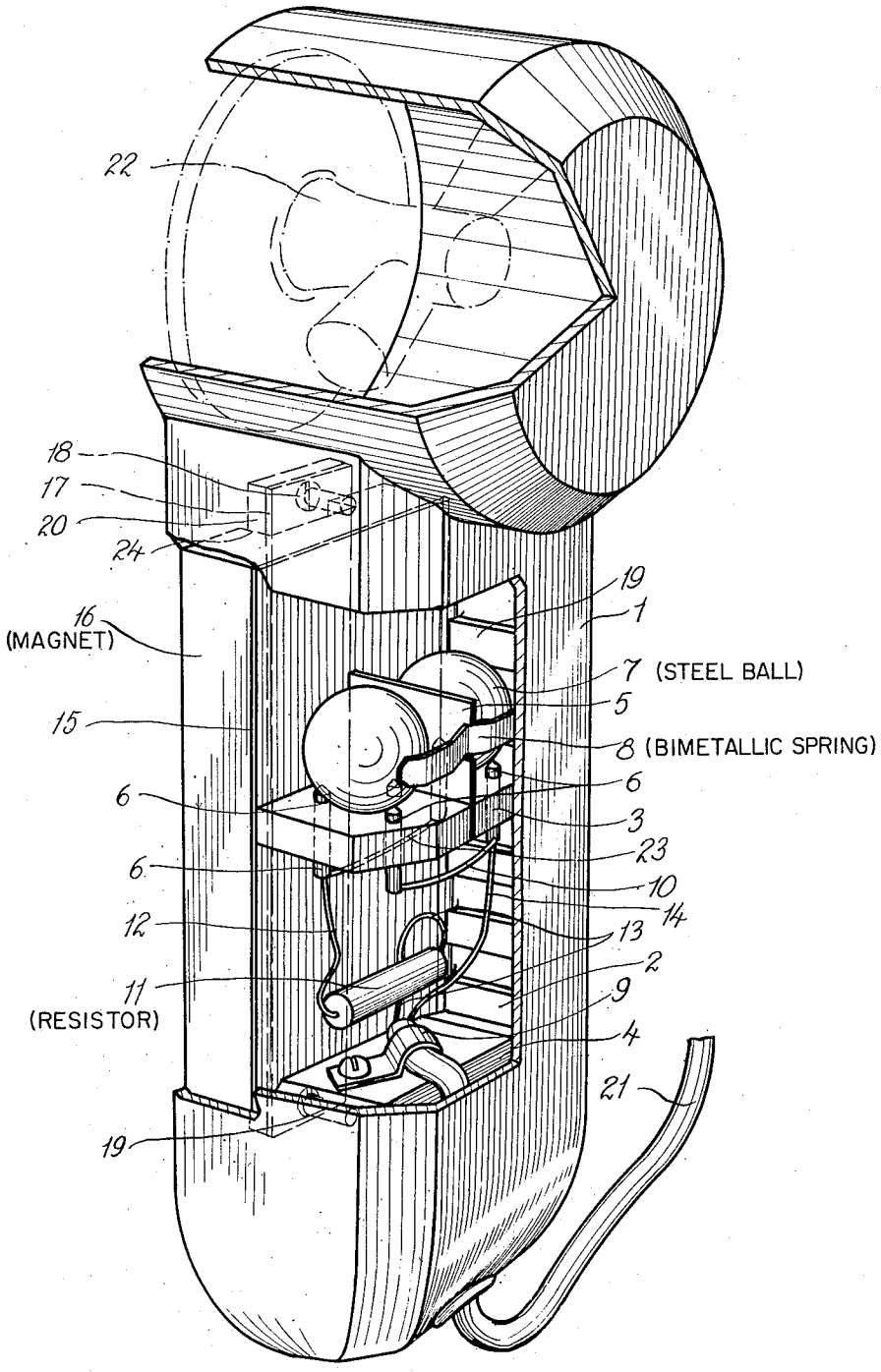
July 16, 1957 O. I. ULLMAN 2,799,741

CONTACT INITIATING APPARATUS FOR ALARM PURPOSES

Filed Nov. 9, 1954



United States Patent Office

2,799,741

Patented July 16, 1957

2,799,741

CONTACT INITIATING APPARATUS FOR ALARM PURPOSES

Otto Ingemar Ullman, Storangen, Sweden

Application November 9, 1954, Serial No. 467,871

5 Claims. (Cl. 200—42)

The present invention relates to alarm devices and more particularly to devices for the automatic activation of alarms to prevent unauthorized access to confined spaces provided with access means.

An object of the invention is to provide a reliable and improved contact initiating apparatus for the automatic activation of alarms.

A further object of the invention is to provide an inexpensive contact initiating apparatus which will automatically release an alarm if disabled.

Another object of the invention is to provide a contact initiating apparatus which will automatically release an alarm if removed from the object to be protected or if subjected to raised temperatures.

The invention will be more fully explained hereinafter with reference to a preferred embodiment thereof as illustrated in the attached drawing. The sole figure in the drawing illustrates, in a perspective view, a contact initiating apparatus provided in accordance with the invention.

Referring to the drawing, a casing 1 of light metal is internally furnished with bracket-like members 2 located in a vertical row at each side of the casing. Detachably inserted to rest on said bracket-like members are two shelves 3 and 4 of insulating material such as, for example, hard rubber. The shelf 3 is provided in the center thereof with a partition 5. On each side of said partition, the shelf 3 is provided with three contact pins or points 6, upon which steel balls 7 freely rest. Furthermore a bimetallic spring 8 is fixed intermediate its ends to said partition.

The inner end of a two-wire lead 21 connected to an alarm apparatus, such as a bell or the like (not shown), is clamped to the shelf 4 by means of a clamp 9 and said lead is brought out of the apparatus through an aperture in the bottom of the casing 1. One of the wires of said lead 21 is by means of a wire 14 connected to one of the contact pins 6 on the right side of the partition 5, which pin 6 in turn by means of a lead 10 is connected to one of the contact pins 6 on the left side of said partition. The second wire of said lead 21 is connected via a lead 13 to a suitable resistance 11, which in turn is connected by means of a lead 12 to the second contact pin 6 on the left side of the partition 5, which latter pin by means of a lead 23 is connected to the second pin 6 on the right side of the partition.

As will be evident from the drawing the casing 1 in front of the balls and electric connections is closed by means of a sheet or plate 15 of insulating material. Close to said plate 15 is inserted a magnet 16 having a groove 24 for receiving a brass bar 17 which is fixed to the casing at each end by means of a screw 18 and 19 respectively. Placed close to said brass bar 17 is a further insulating plate 20. Thus the lower part of the casing 1 is substantially closed whereas the upper dome-like portion of said casing is open for being placed over a handle, keyway, or latch 22 of the door of a safe or like.

The alarm initiating apparatus according to the invention operates as follows. When a safe or the like is to be protected against illigitimate access, the casing 1 is placed with the upper domed portion covering the handle, keyway, or latch thereof. In this position the magnet 16 adheres to the metal of the safe thus providing a self-supporting attachment of the entire apparatus to said safe. An electric circuit is assumed to be closed through said apparatus by way of the lead 21. In an attempt at removing or displacing said casing in relation to said safe, the balls will be subjected to a shaking action so that the circuit will be alternately opened and closed giving rise to an alarm signal.

More particularly, the balls 7 constitute switches between the terminals 6. When the balls 7 are at rest, the terminals 6 are electrically connected, and this electrical connection is interrupted only by such motion of the balls 7 as will cause them to lose mechanical contact with the terminals 6.

One physical principle which is utilized to make the balls 7 effective in an alarm system is the phenomenon which occurs when a magnetic circuit is opened. The magnet 16 has a C-shaped cross-section which forms a closed magnetic path with the metallic object upon which the magnet rests. Most of the flux is contained within the closed path.

When the device and, therefore, the magnet 16 is removed from the metallic wall, the magnetic path is broken and the flux lines find substantially equal permeance in the all of the space surrounding the magnet and, therefore, encounter the balls 7 which as free bodies in a magnetic field are moved. This motion causes the terminals 6 to be disconnected despite the smoothness with which the device is removed from the safe.

In an attempt to short-circuit or by-pass the apparatus by short-circuiting the line 21 at any point, the resistance in the circuit or circuits would be changed and therewith the voltage. This change of the voltage would bring about a signal. The only possible way of preventing such a signal would be to interpose a resistance (of the same value as resistor 11) in the short-circuiting circuit. This would be extremely difficult to a person not familiar with internal construction of the device and must be carried out with extraordinary care.

It is further not possible by means of welding to by-pass the contact apparatus of the invention due to the provision of the bimetallic spring 8 which will react to an increase in temperature (due to heating in the vicinity of apparatus) by displacing the contact balls out of their positions upon the contact points so as to give rise to a signal. It would be substantially impossible to insulate the contact apparatus thermally such that the bimetallic spring would be prevented from operating. The spring, further, has another function which is to make it impossible, by welding or otherwise, to force through the casing of the contact apparatus and to lock the contact members or effect short-circuiting between the same and the earlier mentioned resistances. Finally, it also renders impossible attempts to deprive the magnet 16 of its magnetism by heating.

The contact apparatus provided by the invention offers an effective protection against burglary and thus protects articles of considerable value. Furthermore, it is readily standardized. Finally, it does not require any expensive mountings and may be attached to any object where a magnetizable element is available.

Having now particularly described and ascertained the nature of my said invention and which manner the same is to be performed, I declare, that what I claim is:

1. In a signal initiating switch apparatus for preventing illegitimate access to the operating means for the latch mechanism of safes and similar depository compartments

or rooms having a magnetic covering at least around said operating means, a magnet adapted to adhere to said magnetic covering as linked by magnetic flux to support the entire switch apparatus on said covering; a ball switch mechanism located in the vicinity of said magnet and comprising a magnetic ball, metallic contact points in an electric switch circuit of which said ball is a member, said ball freely resting on said contact points, a casing enclosing said magnet and said ball switch in an inaccessible manner when in mounted position and a cup-formed member integral with said casing to receive said operating means for the latch mechanism of the safe with the magnet adhering to said covering.

2. A signal initiating switch apparatus as claimed in claim 1, comprising a bimetal spring positioned adjacent the ball and adapted to move said ball from at least one contact point at a predetermined raise in temperature in the vicinity of the signal initiating switch apparatus.

3. A switch cooperative with a magnetic material comprising a magnet adapted to form a closed magnetic circuit with said material, metallic contacts adjacent said magnet, and a magnetic ball freely resting on and electrically coupling said metallic contacts, said magnetic ball being responsive to the opening of the magnetic circuit and the resultant magnetic flux pattern for being displaced from said metallic contacts and operating said switch.

4. A switch as claimed in claim 3 for operating when a cover is removed from a device, comprising a casing rigidly supporting said magnet, said cover and casing being integral so that with said cover over said device, said magnet and magnetic material form a closed magnetic circuit, the removal of said cover from said device causing the separating of said magnet and magnetic material to open said magnetic circuit and actuate said magnetic ball.

5. A switch as claimed in claim 4 for temperature response comprising a bimetallic strip adjacent said magnetic ball and responsive to a temperature change for displacing said ball from said contacts.

References Cited in the file of this patent

UNITED STATES PATENTS

365,345	Long	June 21, 1887
1,178,719	Hildebrand	Apr. 11, 1916