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G. OLIVIER

METHOD AND APPARATUS FOR MAINTAINING THE SECURITY OF PAPER CURRENCY

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GEORGES OLIVIER

INVENTOR

By Young & Thompson

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METHOD AND APPARATUS FOR MAINTAINING
THE SECURITY OF PAPER CURRENCY

Georges Olivier, Rue Pierre-Semard, Montlucon, France
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ABSTRACT OF THE DISCLOSURE

Valuable paper such as paper currency is maintained secure by providing bundles of paper in edgewise abutting relation against at least one pyrogenic chemical element which is disposed in the bottom of a receptacle and which is adapted when burning to heat paper above its charring temperature, providing an igniting electric element that will ignite the pyrogen upon a change in position of at least a portion of the receptacle, and thereafter maintaining that position unchanged. Preferably, the bundles are spaced from each other and are pressed independently in a plurality of packs against the pyrogen.

The present invention relates to a method and apparatus for maintaining the security of valuable paper such as paper currency, and more particularly for ensuring that valuable paper such as paper currency which is attemptedly stolen will be destroyed in the theft to the extent that it cannot be spent. Among these has been the proposal that coloring matter be applied to the currency at the time of theft. However, as the bills are ordinarily in rather tight bundles, the coloring matter touches only the two bills on opposite sides of the bundle and the edges of the intermediate bills. Application of coloring matter to the edges only of the bills may be insufficient to provide an obvious marking of the bills; and in any event, the colored edges of the bills can be cropped.

Accordingly, it is an object of the present invention to provide methods and apparatus for ensuring the security of valuable paper such as paper currency so that an obvious marking of stolen paper is effected at the time of theft.

It is also an object of the invention to provide such security during transit. These and other objects and features of the present invention will become apparent from a consideration of the following description, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a perspective view of a device according to the present invention;
FIGURE 2 is an enlarged fragmentary side cross-sectional view of a portion of the apparatus of the present invention, showing one form of actuator structure thereof;
FIGURE 3 is a view similar to FIG. 2 but showing another embodiment of actuator structure; and
FIGURE 5 is a somewhat diagrammatic perspective view of a modified form of marking element according to the invention.

Briefly, the present invention comprises the discovery that valuable paper such as paper currency can be indelibly and unmistakably marked at the time of theft, if it is stacked in edgewise abutting relationship against a heating element which is actuated by the act of theft. The heating element burns or chars the edges of the sheets in the stack, to an extent that cannot be concealed upon subsequent efforts to pass the paper. Preferably, the heating element is disposed in a receptacle, and preferably a portable receptacle, provided with means maintaining the heating element inactive during intended handling of the receptacle but having means for actuating the heating element upon a handling of the receptacle that is characteristic of theft.

Referring now to the drawings in greater detail, there is shown one embodiment of apparatus according to the invention, in the form of a receptacle comprising a small trunk or carrying case having a lid 1 lined with asbestos sheet 2. The carrying case has a body 3 whose lateral walls and bottom are also lined with asbestos sheets 4 and 5, respectively.

A number of ignition rods 6 are disposed parallel to each other and spaced apart and extend along the base or bottom or body 3 of the carrying case. These rods are comprised of any pyrotechnic mixture adapted to burn quickly with a high combustion temperature. Preferably, they release abundant fumes upon burning, which may or may not be colored as desired, or of penetrating odor or suffocating, so as to call attention to or identify the fumes. These pyrotechnic mixtures are of known composition and burn in the absence of atmospheric oxygen. They can be of sulfur or other known pyrogens. They can be standard pyrotechnic igniters used for decay mines. Preferably, the carrying case is provided with small perforations for the escape of fumes without surrendering the case.

Ignition devices for the rods are provided in the form of electrical resistance igniters 7 having electrical conductors 8 by which the rods are electrically conducted to a current source (not shown) that provides electrical resistance heating of igniters 7 to at least the ignition temperature of the rods 6.

Paper currency 9 or other valuable paper is placed in bundles resting on their edges on rods 6, as seen in FIG. 1. The edges of the sheets extend transversely of the rods. The bundles are firmly pressed against the rods by bands 10 of rubber or other elastic material, carried by the case and encompassing the sheets.

A control compartment 11 is provided, insulated with asbestos sheets 12 so that the contents of the control compartment will not be damaged upon ignition.

A push button 13 is carried by compartment 11, which is continuously yieldably urged upwardly but which is pressed down by the cover of the carrying case when the case is closed. The push button 13 is connected to an electrical contact (not shown) which is in series with igniters 7, so that when the cover is opened and push button 13 is raised, the circuit to igniters 7 is opened and ignition cannot take place. Thus, the person storing paper in the case or removing it from the case can operate in complete safety. It is only when the cover is lowered and the case is closed that ignition can be effected by means to be described hereinafter.

The compartment 11 also carries a signal lamp 14 which is illuminated when the cover is opened and the corresponding batteries 14a shown in FIG. 2 are well charged. Signal lamp 14 is also in circuit with the contact of push button...
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so that lamp 14 is on when push button 13 is raised in the position of FIG. 1 but is turned off when the cover is closed and bush button 13 is depressed.

The ignition circuit for igniting the igniters 7 may be energized in any of a variety of ways. Electronic means (not shown) may be used to initiate the powering of the circuit that includes batteries 14a and 14b. Wave signals such as Hertz or ultrasonic may be used to effect ignition through appropriate relay means (not shown). An emitter and a receiver (not shown) can be used, one on the carrying case and the other at some point such as on the bearer of the carrying case or in the vehicle for transporting the carrying case, such that an increase in distance between the receiver and the emitter above a predetermined maximum will trigger ignition. For example, an emitter of ultrasonic or other waves can be mounted at a reference point and a tuned receiver can be disposed in the carrying case, the signal emitted by the emitter exciting the receiver and thus keeping open the contact of a relay when the distance between the emitter and the receiver does not exceed a predetermined maximum.

Various mechanical means can also be employed for triggering ignition. In FIG. 2, the compartment 11 is shown as enclosing not only the batteries 14a which power the igniter in the embodiment, but also a cylinder 15 in which is slidable mounted a striker 16 urged downwardly by a spring 17 and secured at one end to a flexible wire 18 which passes through the wall of the body 3 of the carrying case and is fixed to the pivot 19 of the handle 20 of the carrying case. A rupture plate 21 is disposed below the striker 16. Two electrical switch contacts 22 are normally spaced apart but are movably mounted to be pressed together by striker 16 upon the destruction of rupture plate 21.

In operation, in the embodiment of FIG. 2, when the case is held in the hand, the handle 20 is in the position shown in dotted lines in FIG. 2. The wire 18 is in tension and the spring 17 is compressed. Striker 16 is in the position shown in dotted lines. If the hold on the handle is roughly broken, the handle 20 will move to the full line position shown in FIG. 2, so that there is slack in wire 18. The striker 16 is then urged by spring 17 toward and into rupturing contact with rupture plate 21, breaking the plate and proceeding on to close the two contacts 22 to ignite the ignitor rods.

In the embodiment of FIG. 3, there are provided a glass tube 23 containing mercury 24 and two spaced contacts 25 in series in the circuit of the igniters. As long as the case is held in an upright position such that the mercury 24 assumes the position of FIG. 3, the circuit to the igniter is open. But when the case is tilted or laid flat, with the lid closed, the mercury establishes electrical contact between the two contacts 25 so that ignition is effected.

In the embodiment of FIG. 4, a contact body 26 is slidable mounted in an insulated tube 27. Body 26 carries a guide collar 28 at its one end and a collar 29 at its other end. Collar 29 is of an electrically conducting metal such as brass. Body 26 is urged by a spring 30 downwardly as shown in FIG. 4 but is connected by a rod 31 to a flexible wire 32 which is fixed at its other end to an external point, such as a ring or a bracelet on the person carrying the case. Two contacts 33, connected in the electric circuit of the igniters, are fixed in the tube 27 and project into the interior wall thereof. If the wire 32 is pulled, as would happen if the case is snatched away from its bearer, the contact body 26 is drawn upwardly as seen in FIG. 4 against the force of spring 30, and the collar 29 completes the circuit between the two contacts 33, thus effecting ignition.

Ignition can be course effectuated in other ways. For example, an electric wire (not shown) in a holding or control circuit can be ruptured. Moreover, if desired, a sound warning system may also be initiated by theft at the same time that ignition is effected.

In FIG. 5 there is shown a modified form of igniter rod, in which the rod has sloped edges along which is disposed a series of holes 33a. Preferably, the spacing between the holes in each row is about the same as the thickness of a bundle or paper it is desired to transport. A metal wire 34 is disposed in or at each of its ends in a hole 33a, and the bundles are individually disposed between adjacent pairs of wires 34. With the bundles thus slightly spaced from each other, the edgewise abutting contact of the bundles on the ignition rods is made more certain and the chances are reduced that a bundle can become wedged between two other bundles out of contact with the ignition rods.

It will also be appreciated that the device of the present invention is reusable. All that needs to be done is to replace and reconnect the spent ignition rods.

From a consideration of the foregoing disclosure, therefore, it will be evident that the initially recited objects of the present invention have been achieved.

Although the present invention has been disclosed and illustrated in connection with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit of the invention, as those skilled in this art will readily understand. For example, in the case of a fixed installation such as a door or a safe or a strong box, an external source of electric current can be provided. These and other modifications and variations are considered to be within the purview and scope of the present invention as defined by the appended claims.

Having described my invention, I claim:

1. A method for maintaining the security of valuable paper, comprising pressing bundles of valuable paper in edgewise abutting contact against at least one pyrogenic element disposed in the bottom of a receptacle and adapted when burning to heat paper above its charring temperature, establishing an open electric circuit which when closed ignites said pyrogenic element and which closes upon a change in position of at least a portion of the receptacle, and thereafter maintaining said position unchanged.

2. A method as claimed in claim 1, and maintaining at least some of said bundles spaced apart from each other.

3. A method as claimed in claim 1, and pressing groups of said paper independently against said pyrogenic element.

4. Apparatus for maintaining the security of valuable paper, comprising a receptacle, at least one pyrogenic element in the bottom of the receptacle adapted when burning to heat paper above its charring temperature, an electric igniting element in close contact with said pyrogenic element and adapted to ignite said pyrogenic element, means for pressing bundles of valuable paper in edgewise abutting relation against the pyrogenic element, a source of electric current, and means responsive to a change in position of at least a portion of the receptacle to feed said igniting means with current from said source of current to ignite said pyrogenic element.

5. Apparatus as claimed in claim 4, said means for pressing the paper against the pyrogenic element comprising means for independently pressing separate groups of paper against the pyrogenic element.

6. Apparatus as claimed in claim 4, said responsive means being responsive to a change in position of the handle relative to the rest of the receptacle to feed said igniting means with current to ignite said pyrogenic element.

7. Apparatus as claimed in claim 4, said responsive means comprising a mercury switch which is open when the receptacle is upright and which closes when the receptacle is tilted thereby to feed the igniting means with current to ignite said pyrogenic element.

8. Apparatus as claimed in claim 4, said responsive means comprising a mercury switch which is open when the receptacle is upright and which closes when the receptacle is tilted thereby to feed the igniting means with current to ignite said pyrogenic element.
means comprising switch means including a switch actuator adapted to be secured to the person of the bearer of the receptacle so that when the receptacle is taken away from the bearer thereof without permission, the switch actuator closes the switch means to feed said igniting means with current to ignite said pyrogenic element.

9. Apparatus as claimed in claim 4, and spacer means for maintaining the paper in spaced bundles.