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(54) Device for pickproofing combination locks.

(57) A mechanism for preventing picking of a combination lock comprises a sensor 11 for sensing the number of revolutions or partial revolutions of the shaft 4 of the combination lock within a given time period. The combination shaft 4 of the lock is provided with a toothed or cammed wheel and with a pivotably mounted lever arm 6. A first free end 8 of the arm is adapted to engage the toothed or cammed wheel 5 and a second end thereof is movable through the selectively applied attraction from an electromagnet 10 to lock the combination shaft 4 when it is determined that the combination wheel is being tampered with.

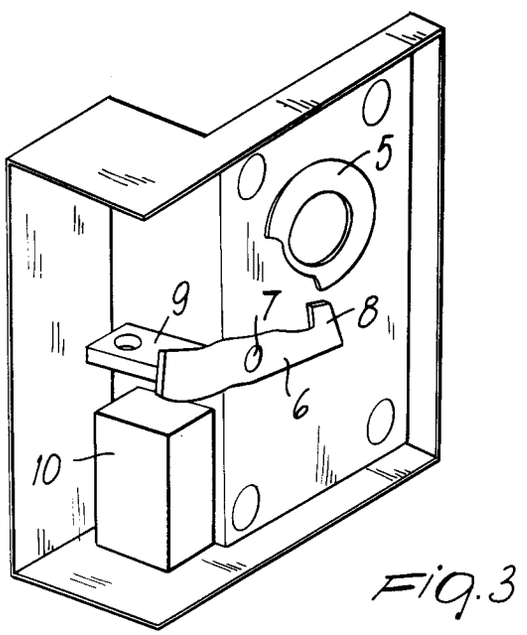

Fig. 3

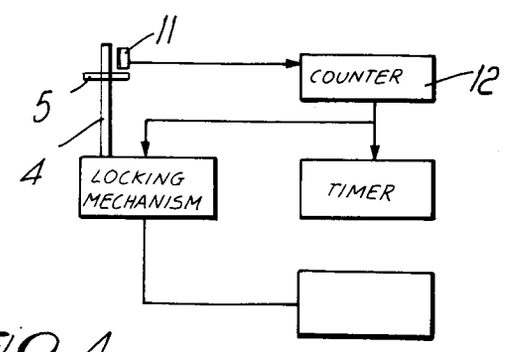

Fig. 4

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BACKGROUND OF THE INVENTION

The present invention relates to a safety means and more particularly to means to be used in conjunction with safes, strong rooms and the like. More specifically, the invention relates to a device which can be incorporated within or added to a combination lock for safes or the like which renders such combination lock pickproof.

It is well known that bankers, private premises and businesses of all kinds who have safes, strong boxes and strong rooms are subjected to burglars and safe crackers. These burglars use very sophisticated equipment in order to open locks by determining the opening combination code of the safe. Such equipment is attached to the combination wheel and by means of a fast revolution motor which turns the wheel back and forth the combination code is determined and the safe is opened within a few minutes.

SUMMARY OF THE INVENTION

It is thus the object of the present invention to provide a mechanism which will prevent the opening of safes when being tampered with.

It is a further object of the present invention to provide means which will block the main combination shaft is preventing the turning thereof.

It is yet a further object of the present invention to provide means which will block and automatically release the main axis after a predetermined period.

According to the broadest aspect of the invention there is provided a safety mechanism for safes, in the form of a combination trap, which includes a mechanical part and an electronic part. The mechanical part comprises a toothed or cammed wheel keyed on the safe's combination wheel shaft and a pivotably mounted lever arm, one free end of which is adapted to engage the toothed or cammed wheel. The other free end of the arm is in contact with an electromagnet which in turn is part of an electronic circuit. When activated, the electromagnet attracts the lever arm. The free end thereof then engages the toothed or cammed wheel thus locking it and preventing its rotation.

Other features and advantages of the present invention will become apparent from the following description of the invention which refers to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematical, vertical illustration of the mechanism according to the invention,

Fig. 2 is a top illustration thereof of Fig: 1.

Fig. 3 is a perspective, schematical illustration of the mechanism.

Fig. 4 is schematic illustration of the electrical part of the mechanism.

DETAILED DESCRIPTION OF THE DRAWINGS

Turning to the Figures, a door safe 1 is provided with a common combination mechanism 2, operated from the outside by combination wheel 3. The wheel is mounted on an axis or shaft 4. On the axis there is keyed a toothed or cammed wheel 5. A lever arm 6, which is pivotably mounted at 7, has one free end 8 adapted to be engaged with the wheel 5 and another free end with an extension 9 which is adapted to be attracted by an electromagnet 10.

The electrical part of the present invention comprises (see Fig. 4) a microswitch or sensor 11 which is connected to toothed wheel 5 and which senses the revolutions of the wheel 5 regardless of its direction and outputs pulses representative thereof. The electrical pulses are counted by a microprocessor 12. When the number of pulses occurring within a given time exceeds a predetermined value, the microprocessor 12 activates electromagnet 10 which forms part of the locking mechanism 20. This attracts lever arm 6 and causes the end 8 to engage wheel 5 and block its rotation. After a predetermined period, say 10-15 minutes, the microprocessor 12 releases the electromagnet 10 and consequently the combination wheel 3 is released. The microprocessor 12 may calculate the predetermined period by keeping an internal count of time as, for example, by executing a sequence of instructions a predetermined number of times. Alternatively, the microprocessor 12 may determine the elapsed time by receiving inputs from a timer 22.

In addition, the microprocessor may maintain a software generated calendar, and alter the magnitude of the predetermined period (during which the lock is disabled) so that it is enlarged to 30 minutes or more on weekends, holidays, etc.

It is within the scope of the invention to connect the mechanism to an existing alarm system which will be activated by the mechanism of the present invention.

Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art. It is preferred, therefore, that the present invention be limited not by the specific disclosure herein, but only by the appended claims.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims

and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. A mechanism for pickproofing a combination lock having a combination wheel which turns a combination shaft, said mechanism comprising:

   shaft locking means effective for being selectively engaged with the combination shaft to prevent the rotation thereof;

   means for counting the revolutions of the shaft; and

   control means for actuating the shaft locking means to lock the combination shaft when the number of revolutions within a given time period exceeds a predetermined number.

2. The mechanism of claim 1, wherein the shaft locking means comprises a toothed or cammed wheel which is mounted on the combination shaft and a lever arm mounted to selectively engage the toothed or cammed wheel.

3. The mechanism of claim 2, wherein the lever arm is pivotably mounted and has one free end which is adapted to engage the toothed or cammed wheel and another end which is movable to cause the first end to engage the toothed or cammed wheel to prevent rotation of the combination shaft.

4. The mechanism of claim 3, further comprising an electromagnet for attracting the second end of the lever arm.

5. The mechanism of claim 4, wherein the control means comprises an electronic circuit and the electronic circuit is effective for selectively energizing the electromagnet.

6. The mechanism of claim 1, wherein the control means further comprises a control program for setting the duration of the predetermined period.

7. The mechanism of claim 6, wherein the control means is effective to set the predetermined period to a duration which varies dependent on whether tampering with the combination wheel takes place or does not take place on a week day.

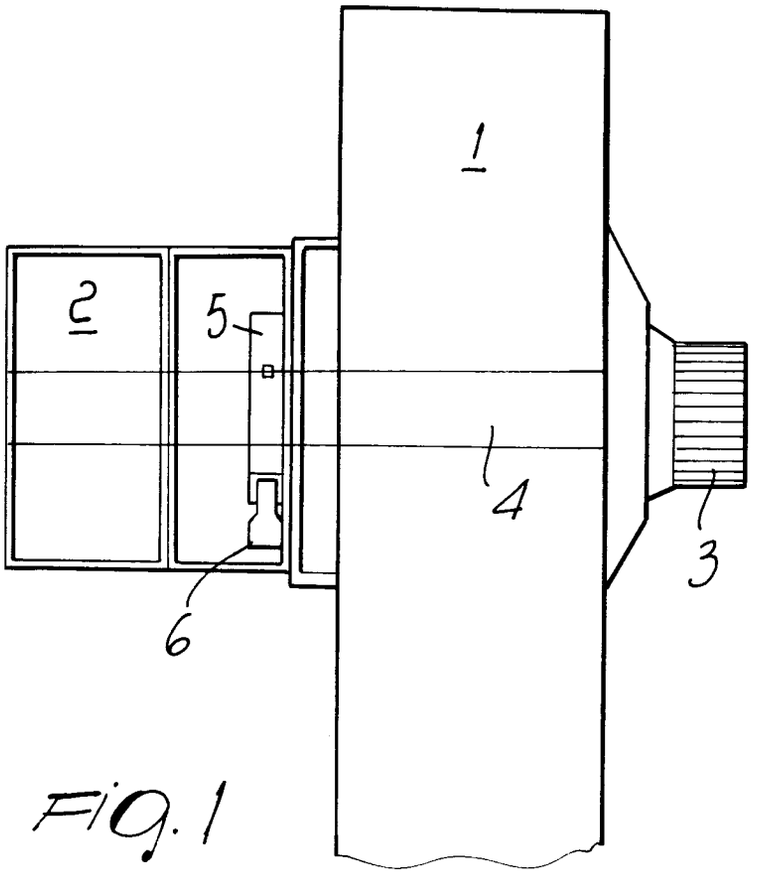

FIG. 1

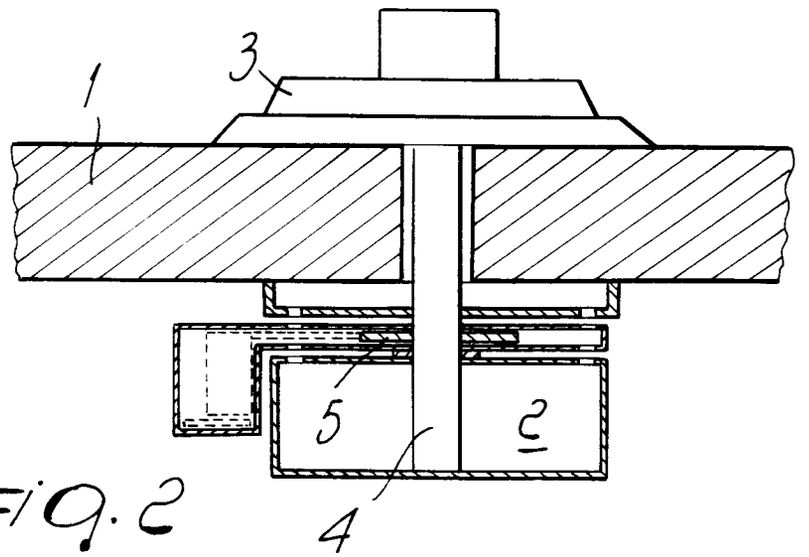

FIG. 2

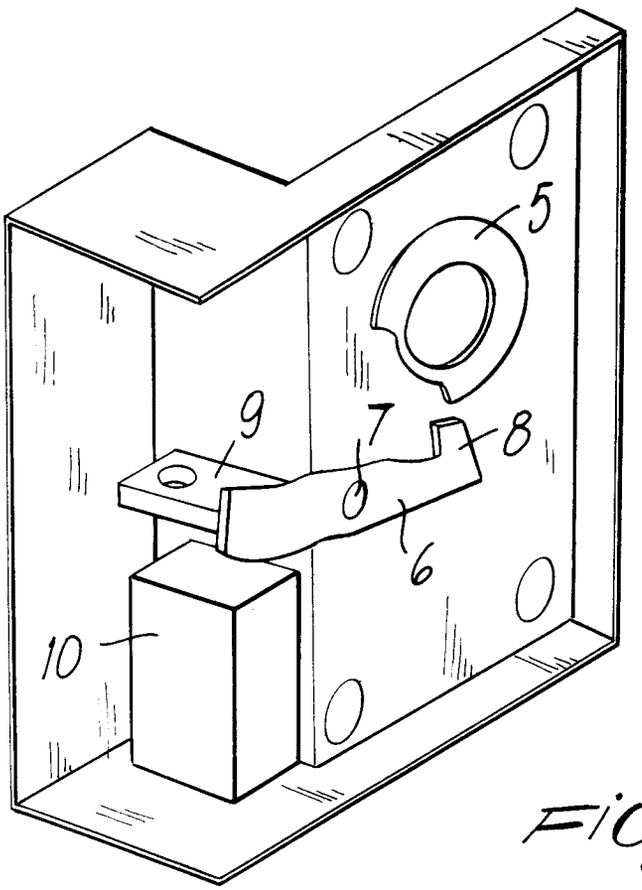

FIG. 3

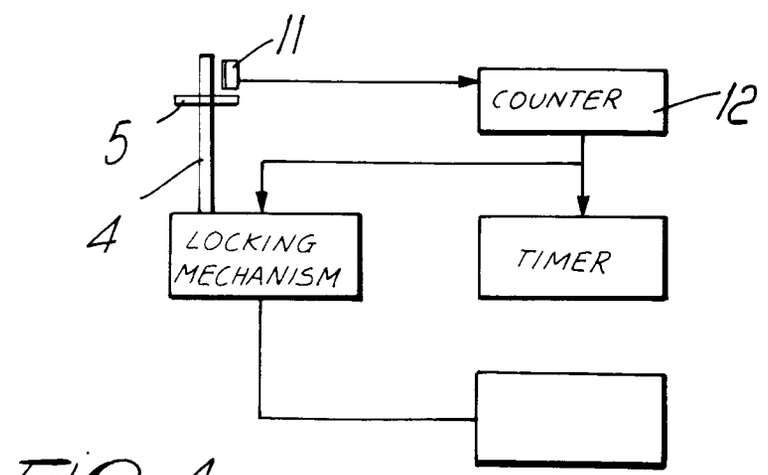

FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 11 1767

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 361 881 (C&M TECHNOLOGY, INC.)	1	E05B37/08
A	* abstract *	6	E05B37/00
	* column 6, line 36 - line 53; figures 1-3 *		
A	EP-A-0 371 701 (YALE SECURITY PRODUCTS LIMITED)	1-4	
	* abstract *		
	* column 4, line 42 - line 54; figures 8,9 *		
A	DE-A-3 700 891 (GECO GMBH SICHERUNGSTECHNIK)	1-4	
	* abstract *		
	* column 4, line 46 - line 57; figures 1,2 *		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 FEBRUARY 1992	VESTIN K.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

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E : earlier patent document, but published on, or after the filing date
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& : member of the same patent family, corresponding document

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