AUTOMATIC EMERGENCY LOCK FOR SAFES

Filed July 17, 1922

Fig. 1

Fig. 2

Fig. 3

Inventor
Earle M. Jones
By his attorneys

Michael Kellog
My invention relates to safes and, more particularly, to bank vaults, safety deposit vaults, and the like, which have swinging doors equipped with sliding lock bolts that are arranged to be locked by primary lock mechanism such as combination locks and time locks.

The primary lock mechanism, under all ordinary conditions and, in fact, as long as it is operative, will serve to hold the lock bolt in a door-locking position. However, it has many times happened that robbers or safe blowers have blown the primary lock mechanism off the safe door, thereby releasing the lock bolts and permitting the safe door to be opened.

My invention provides a secondary lock mechanism which whereby said secondary lock, under normal conditions, will be restrained or held out of action, permitting the lock bolts to be controlled by the primary lock mechanism in the customary way. This secondary lock-restraining means is arranged to be disrupted or released whenever the primary lock is blown or forced out of position or otherwise seriously tampered with.

Said secondary lock is located on the inner side of the door or within the safe where it is not accessible for resetting or other mechanical manipulation by a person outside of the safe. Hence, as an important feature of the invention, I provide an electromagnetic releasing device including a circuit adapted to be closed by a switch outside of the safe to release said secondary lock and thereby permit the opening of the safe door. Without such a device, it would be impossible, without destroying parts of the door or safe, to open the safe door after the secondary lock had once been set into action. The place and manner of closing this lock-releasing circuit would be a matter of secret and unknown to burglars or safe robbers.

The bolt-locking element of the above briefly described secondary lock is set under yielding strain to move into a bolt-locking position, but is restrained by a device preferably in the form of a very small cable or wire passed over suitable guides and made to follow a tortuous course. One end of this restraining cable is preferably anchored to the case of the primary lock mechanism and certain of the cable guides are arranged to be dislocated when the primary lock case is moved from normal or operative position.

With this arrangement, the secondary lock will be released whenever the cable anchor or any of the cable guides are dislocated or whenever the cable itself is severed. With this arrangement, it will be impossible for the burglar or robber to blow out the primary lock or seriously damage the safe door by boring, blasting or otherwise without causing the secondary lock to function and lock the safe bolt or bolts.

As means for sounding a signal whenever the secondary lock, by any of the means suggested, is thrown into action, there is provided a signal circuit that is normally held open when the bolt-locking element of the secondary lock is retracted, but which circuit will be closed to sound the alarm whenever said bolt-locking element of the secondary lock is released and rendered operative.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is an elevation looking at the inner face of a safe door and showing my invention applied thereto;

Fig. 2 is a fragmentary vertical section on the line 2—2 of Fig. 1;

Fig. 3 is a diagrammatic view showing the wiring of the signal circuit and of the circuit for releasing the bolt-engaging element of the secondary lock;

Fig. 4 is a fragmentary perspective showing the case of the primary lock and, associated therewith, a replaceable support for certain cable guides;

Fig. 5 is a side elevation of the secondary lock showing the same applied to the safe door and in position to engage the safe lock bolt, some parts being sectioned; and

Fig. 6 is a side elevation showing the same construction as illustrated in Fig. 5, except that the lock shoulder of the safe lock bolt is of modified form.

In the drawings, the numeral 7 indicates an ordinary safe door provided with an inner face flange 8 and a sliding lock bolt 9. This door, as viewed in Fig. 1, would be hinged at its left-hand edge, and the lock bolt 9, which in Fig. 1 is shown in a door-locking position, would be released by sliding movement toward the left. The lock bolt is provided with a stop shoulder, which, in the main views, is afforded by a projecting...
split collar 10 rigidly secured thereto by screws or other suitable means.

The numeral 11 indicates the case of the primary door lock, which may be assumed to be tumbler-operated in the customary way and to have the usual connections, not shown, for locking the bolt 9 in a door-locking position. As shown, this case 11 is secured to a side plate 12, which, in turn, by means of screws or otherwise, is rigidly secured to the inner surface of the door.

The secondary bolt lock involves parts that are preferably contained within a casing 13, which, by means of screws or otherwise, is rigidly secured to the door with its lower portion spaced but slightly above the lock bolt 9. Secured within the case 13 is a bearing bracket 14 to which is attached a normally deenergized electromagnet 15.

Hinged to the bracket 14 at 16 is an armature 17 that is adapted to be made subject to the electromagnet 15.

On the bracket 14 is a guide clip 18 of insulating material, through which works freely the stem 19 of a movable electric contact 20. The lower end of the stem 19 is attached to the free end of the armature-acting lock piece 17. A coiled spring 21 placed around the stem 19 and compressed between the clip 18 and lock piece 17, is normally held compressed when the magnet 15 is energized, but, when said magnet is deenergized, forces the lock piece 17 in the path of the lock collar 10.

The electrical contact 20 is connected at one end to a small cable 22, preferably a fine wire, that runs over a plurality of guides, presently to be noted, and at its other end is anchored, as shown, by means of an anchor screw 23, an adjustable nut 24 to a small bracket 25 secured on the extended plate 12 of the primary lock case.

As shown, said cable is passed over guide sheaves 26 and 27 journaled on the inner surface of the door. Said cable 22 also runs over displaceable guide sheaves 28 journaled on studs 29 projected from the inner side of the door at points just above the primary lock. A coiled spring 30 is interposed in the cable 22 to give elasticity there to and to prevent the same from being broken accidentally by expansion and contraction and also to keep the cable always under approximately constant tension.

As a means for dislocating the sheaves 28, should the primary lock case be blown off or forced from position, there is provided a cable-releasing device that will be dislocated or acted upon by dislocation or serious distortion of the primary lock. This tripping device 31, as shown, is cross-shaped in elevation and its depending leg is offset so that it overlies and closely engages the inner side of the primary case 11, as best shown in Figs. 1 and 2. This offsetting of the lower leg of the tripping device, as shown, is provided by a tripping finger 32 bent angular and having its horizontal upper portion rigidly but adjustably secured to the horizontally bent lower end portion of the tripping device 31 by a small nut- equipped screw 33. The body of the tripping device 31 is normally laid flat against the inner surface of the door with its arms back of the sheaves 28. The said arms are perforated so that the studs 29 are freely passed therethrough.

Here it will be noted that the sheaves 28 are loosely placed on the studs 29 so that, if the lock case 11 is forced inward or dislocated, the tripping device 31 will be moved inward, thereby forcing the guide sheaves 28 off from the studs 29, and this will release the cable 22 and permit the spring 21 to force the latch piece 17 into its operative position, that is, into a position to lock the lock bolt in its door-locking position.

The movable contact 20 cooperates with but is normally held out of electrical contact with a cooperating contact in the form of a leaf spring 34, which, as shown, is secured to the insulating clip 18 and has a hole through which the stem 19 is passed with clearance. The contacts 20 and 34, when engaged, close the signal circuit 35, which includes a battery or source of electrical energy 36 and an electric gong or signal device 37. The movable contact 20 is grounded through metallic parts of the door and lock mechanism, which parts constitute elements in the electric circuit 35.

The wires of the circuit 35 will be hidden in the safe-work and the gong and battery will be suitably positioned outside of the safe or vault.

The coil of the electromagnet 15 is in a circuit 38, which includes a battery 39 and a switch or circuit closer 40. Normally, of course, the switch 40 will be open and the magnet 15 deenergized. As already indicated, the wires of the circuit 38 will be concealed and the switch 40 will be located at some place known only to employees of the bank.

The structure illustrated in Fig. 9 differs from that above described only in that the lock bolt 9, instead of having a shoulder afforded by a collar, has a lock notch 9' with which the lock element 17 is engageable when released.

The operation of the device above described, summarized, is substantially as follows:

Normally, the circuit 38 will be open and the magnet 15 will be deenergized so that the lock element 17 is held in its retracted or inoperative position and the lock bolt 9 may be then operated in the customary way.
Also, at such time and under such normal conditions, the contacts 20 and 34 of the alarm circuit will be held out of engagement and said signal circuit will remain dormant. If, however, the primary lock should be disconnected by blasting or otherwise, the guide sheaves 28 will be displaced, thereby releasing the tension on the cable 22 and permitting two important functions to take place, to wit: locking of the bolt 9 by the lock piece 17 and sounding of the alarm gong 37. The same result will take place if, from any cause, the cable 22 be broken or disrupted, and as the cable is extended over considerable portions of the door, it will be practically impossible for the door to be seriously distorted without disrupting the cable. Said cable, preferably a fine wire, is easily broken and may be made, in whole or in part, of a metal or alloy that will break down under comparatively low degrees of temperature, so that said cable will be disrupted in case a torch or blast is used to burn away portions of the door.

If, for any of the above causes, the secondary bolt lock 17 has been thrown into action, the bolt can, by a person knowing the location of the switch 40 and the function thereof, be released simply by closing the circuit 38 and thereby releasing the door lock bolt. This secondary lock, therefore, affords very great additional protection against safe blowers and burglars. Aside from the operation as a secondary lock, the releasing mechanism for setting the alarm into action is highly important.

The nuts 25 on the screw 23 afford means for setting the restraining cable under just the right tension to overcome the spring 21. Said spring 21, it will be observed, is the element that actually throws the lock from normal position, and to displace certain of said cable guides.

From what has been said, it will be understood that the invention as above described is capable of very considerable modification within the spirit of my invention as herein disclosed and defined in the claims. The term "safe" has been used in a broad and liberal sense to include vaults and other safety deposit receptacles.

What I claim is:

1. A safe having a door, a door-locking bolt and a primary lock mechanism, a secondary bolt lock, releasable means normally holding said secondary lock inoperative, means for causing said secondary lock when released to lock said bolt in a door-locking position, means operative from the exterior of the safe for manipulating said secondary lock to release said bolt, said releasable means including an anchored cable and guides therefor, and a displaceable guide trip additional to said cable and arranged to be displaced by movements of the primary lock from normal position.

2. A safe having a door, a door-locking bolt and a primary lock mechanism, a secondary bolt lock, releasable means normally holding said secondary lock inoperative, means for causing said secondary lock when released to lock said bolt in a door-locking position, means operative from the exterior of the safe for manipulating said secondary lock to release said bolt, said releasable means including an anchored cable and guides therefor, and a displaceable guide trip additional to said cable and arranged to be displaced by movements of the primary lock from normal position, and to displace certain of said cable guides.

3. A safe having a door, a door-locking bolt and a primary lock mechanism, in combination with a secondary bolt lock under yielding strain to move into a position to lock said bolt in a door-locking position, releasable means including a yielding element and a cable operative to normally hold said secondary lock inoperative, means for releasing the tension on said cable and permitting said secondary lock to become operative when said primary lock mechanism is displaced, and means controllable from the exterior of the safe for manipulating said secondary lock to release said bolt.

4. A safe having a door, a door-locking bolt and a primary lock mechanism, in combination with a secondary bolt lock under yielding strain to move into a position to lock said bolt in a door-locking position, an anchored cable normally holding said secondary lock inoperative, cable guides, certain of which are displaceably mounted, a tripping device arranged to be moved when said primary lock is displaced and, when moved, to displace said displaceable cable guides, thereby releasing said cable and permitting said secondary lock to operate, and electromagnetic means including a circuit having a circuit controller located at the exterior of the safe.

In testimony whereof, I affix my signature.

EARLE M. JONES.