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PROTECTIVE DEVICE

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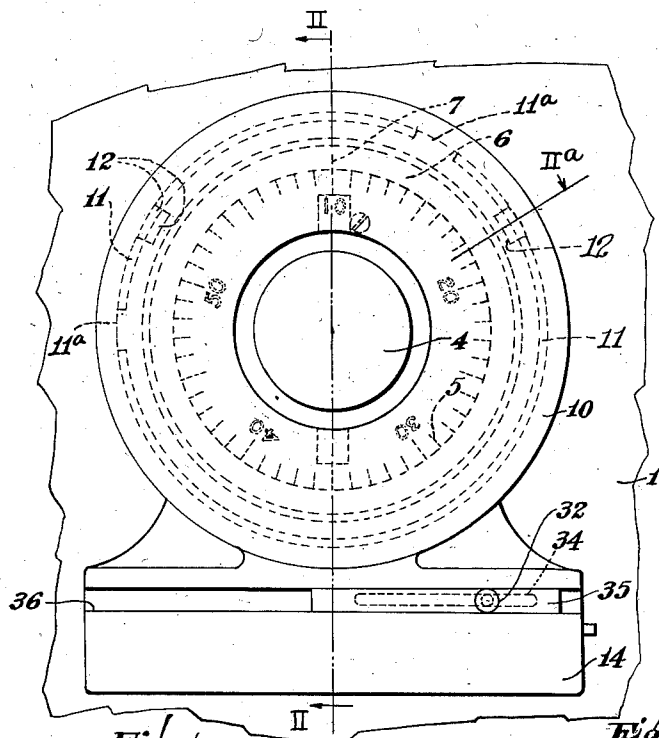


Fig. 1

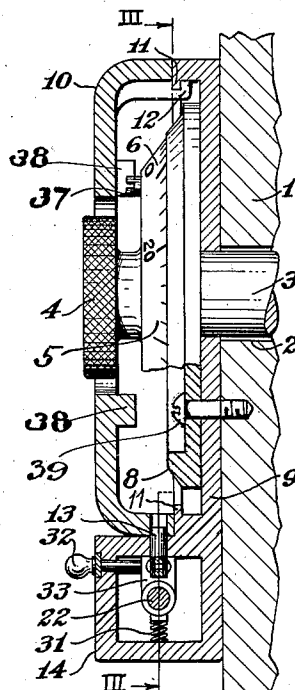


Fig. 2

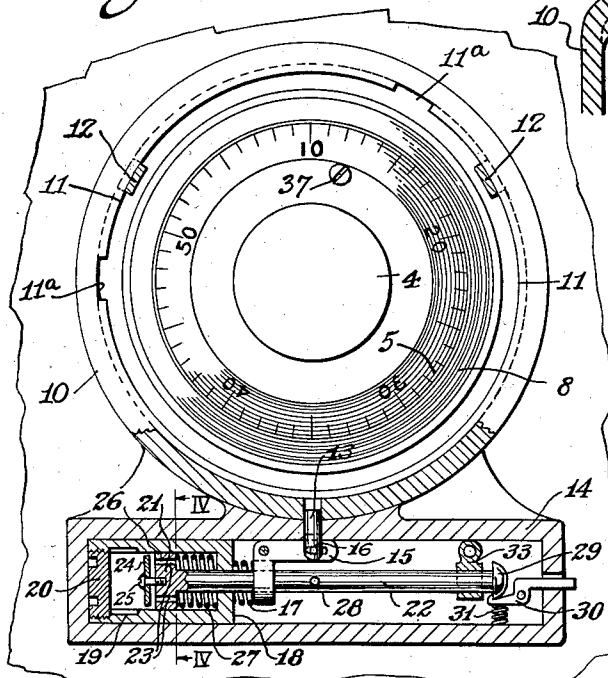


Fig. 3

Fig. 2a

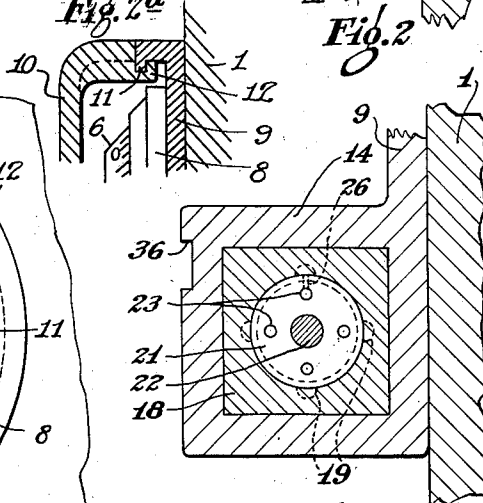


Fig. 4

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PROTECTIVE DEVICE

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13 Claims. (Cl. 70—26)

This invention relates to protective devices and is particularly applicable to the protection of safes, vaults and similar containers provided with combination and like locks.

5 Safes, vaults, burglar-proof chests and similar storage means, used for the keeping of money and other valuables, are quite customarily provided with combination locks which can be actuated only by a person familiar with their combinations. Such devices are also provided with strong bolts, interlocking doors, and other means which render it difficult to gain access to the interior by any means other than the working out of the combination. Frequently, these elements are supplemented by "anti-dynamiters" or similar automatic locking means actuated by any attempt to tamper with the locks.

These devices have been reasonably effectual in preventing the opening of such containers by unauthorized persons, and, although burglary and safe-cracking are still occasionally reported, by far the greater number of occasions on which such containers are robbed occur during the period when the establishment having the container is open for business, the access to the container being gained by robbers compelling someone who knows the combination to open the safe.

Naturally, a person familiar with the combination can operate the lock in a very few seconds, so that such a lock does not materially deter robbers from obtaining the articles which it is supposed to secure. If, however, they can be delayed a substantial time, the possibility of their capture or frustration is greatly increased.

It is an object of the present invention to provide an improved means which will preclude rapid operation of a combination or similar lock.

Another object is to provide an improved means rendering access to a lock difficult.

Another object is to provide an improved lock protecting means which will be simple and efficient in construction and operation.

Another object is to provide an improved lock protecting means which cannot be broken or removed from a lock without putting the lock out of commission.

Other objects will hereinafter appear.

The invention will be better understood from the description of one practical embodiment thereof illustrated in the accompanying drawing, in which;

Figure 1 is a front elevational view showing a lock protecting device embodying the invention as applied to a more or less conventional form of combination, such as is used upon safe and vault doors;

Figure 2 is a cross-sectional view of the apparatus of Figure 1 taken on the line II—II thereof the dial and dial-ring being shown partly in section and partly in elevation;

Figure 2^a is a broken sectional view taken as indicated at line II^a on Figure 1;

Figure 3 is a sectional view of the apparatus of Figures 1 and 2 taken on the line III—III of Figure 2; and

Figure 4 is a fragmentary view taken on the line IV—IV of Figure 3.

A fragmentary section of a safe door is shown at 1, this door having a hole at 2 through which the shank or spindle 3 of a combination lock extends, it being understood that the combination mechanism itself is housed within the door, if desired behind a drill-proof steel plate or the like.

Secured to the shank is an actuating knob 4 and a dial 5 provided with suitable indicia 6 which the operator may align with the stationary mark 7 upon a dial ring 8, the above mentioned elements being of usual or any desired construction.

The protective device illustrated is so arranged that it overlies and obscures the dial and dial ring, making it impossible, while the parts of the device are in the position shown in Figures 1 and 2, for anyone to accurately register the indicia 6 with the mark 7, and so preventing actuation of the lock.

It consists of a casing having a base or back plate 9 which is positioned against the front face of the door 1, the dial and dial ring being removed for this purpose and replaced upon the shank or spindle 3 after this plate has been put in position and so retaining it in place.

An annular cover 10 is arranged to fit over the dial and be secured to the plate 9 by means of an annular flange 11 upon the plate, and co-acting lugs 12 upon the cover, the lugs 12 entering through recesses 11^a in the flange 11 and interlocking in the manner of a bayonet joint or interrupted thread. It will be seen that to place the cover in position it must be moved axially over the dial and then rotated for a fraction of a turn, to interengage the lugs, and that to remove the cover it must first be rotated and then moved axially. Consequently, to lock the cover in position, it is only necessary to provide a bolt 13 arranged to enter an aperture in the cover and so prevent its rotation.

The bolt 13 is mounted in a casing 14 formed integrally with the plate 9 and extending along its lower edge. This casing also contains mechanism controlling the actuation of the bolt which prevents its withdrawal until after a substantial period of time has elapsed. In practice, it is believed that a delay of from 15 minutes to half an hour will be sufficient, and that very few, if any, robbers will be inclined to stand around this length of time and run the risk of capture while waiting to get into the safe.

The bolt actuating mechanism is best illus-

trated in Figure 3 and consists of a bell crank 15 arranged to oscillate the bolt 13, as by a pin and slot connection illustrated at 16. The bell crank lever is urged in a direction to move the bolt to locking position by a spring 17 bearing upon the end of a cylinder block 18 secured in one end of the housing 14.

The interior of the cylinder block is circular in cross-section, but, adjacent the end remote from the bell crank, grooves 19 are provided, and the end of the block is closed by a cap 20. Within the cylinder, a piston 21 is arranged to reciprocate, this being secured to a rod 22 passing through the head of the cylinder, spring 17, and one arm of bell crank 15. The piston is provided with a series of holes 23, overlying which is a circular plate 24 supported upon a screw 25, so that it may move against or away from the piston. A small notch or groove 26 extends from one of the holes 23 to the periphery of the piston. A spring 27 is arranged between the piston and the head of the cylinder.

The space within the cylinder is filled with oil or other suitable fluid, and it will be observed that when the piston is moved to the right, as viewed in Figure 3, the fluid may readily pass through the holes 23, moving the plate 24 away from the piston, to permit its free passage. When, however, the piston attempts to move to the left, as viewed in this figure, the fluid will carry the plate against the end of the piston, so that fluid can pass through the piston only by means of the groove 26, which, being much smaller in cross-section than the holes 23, retards the motion of the piston in this direction.

When, however, the piston is near the end of the stroke and has passed the grooves 19, the fluid may freely flow past the piston through these grooves, allowing it to execute the last part of its movement at an increased speed.

The rod 22 is provided with a pin 28 arranged to contact the depending arm of bell crank 15 at just about the instant that the piston passes grooves 19, and the spring 27 is appreciably stronger than spring 17, so that, as the piston is allowed to travel freely to the left under the influence of its spring, the bolt will quickly be retracted.

The end of the rod 22 is provided with an enlarged head 29 which may be engaged by a detent 30 pivoted within the housing 14, and urged to the position in which it engages the head by a spring 31. The end of the detent projects beyond the housing, so that it may be actuated by the hand. An actuating knob 32 is secured to a sleeve 33 and by it the rod may be moved to the right, the shank of the knob extending through a slot 34 in the front face of casing 14. This slot, in turn, is at all times covered by a plate 35 slidable in the groove 36.

The operation of the device is as follows:

When the user desires to lock the safe, he moves the bolts to locking position by the appropriate lever, as is the customary practice, and spins the dial. He then takes the cover 10, places it over the dial, and rotates it to engage the lugs 11 and 12, after which he moves the knob 32 to the right until detent 31 engages head 29. When this has been done, pin 28 has been removed an appreciable distance from bell crank 15, so that spring 17 moves this bell crank in a counter-clockwise direction, as shown in the drawing, and projects bolt 13 into the hole in the bottom of the cover.

When, now, it is desired to actuate the lock,

the operator must first move the detent 30 to release head 29, whereupon spring 27 moves the piston and rod to the left. The resistance of the fluid in passing through groove 26 delays this motion, the rate of the motion, of course, being related to the size of this groove. After the period for which the device is designed has elapsed, the piston passes grooves 19 and so is permitted to speed up in its travel at just about the time pin 28 engages the bell crank 15, so that the bell crank is subjected to practically the entire force of spring 27, which overcomes the pressure of spring 17 and draws the bolt out of the hole in the cover. After this, the operator may readily rotate the cover and remove the same.

There is no way of speeding up the motion of the piston, and, even if plate 35 be pried off and an attempt be made to urge the motion of the rod 22, no substantial increase in speed can be imparted to it. Consequently, whoever wants to get into the device to which the lock is applied, must wait for a definite and protracted period.

Obviously, the cover, plate and housing should be made of malleable or, at least, not brittle, material, so that they may not be cracked and broken away, and for this purpose I find bronze to be particularly suitable, although obviously wrought or malleable iron or other materials or alloys might be used. Any attempt to break these parts will bend the dial or spindle, further increasing the difficulty of actuating the lock.

By providing the central perforation in the cover, the depth of the device is made less than it would otherwise be, reducing it to about that occupied by the combination knob and dial alone, this being particularly important in installations where the device is applied to an interior door such as that of a burglar-proof chest fitted within a safe, as in such devices no excess of clearance is provided between the knob of the inner door and the inner surface of the outer door. Also, by the arrangement of the casing transversely and close to the bottom of the dial, no interference with the bolt actuating lever will be experienced.

Obviously, any chronometric mechanism may be used to control the retraction of bolt 13, providing only that it effectively control this bolt and make it necessary for a substantial period of time to elapse before the bolt can be withdrawn.

The dial 5 may have threaded into it a screw 37 and the interior of cover 10 may be provided with one or more lugs 38 lying within the path of the head of this screw. These lugs prevent the rotation of the dial for any substantial distance, making it impossible to turn it a complete revolution.

The base-plate 9 of the housing for the dial and dial-ring must be fixed, of course, to the door 1. The same is true of the dial-ring 8. The usual securing-screws 39 of the dial-ring may pass through the plate 9 and into the tapped openings in the door, as shown in Fig. 2. Preferably, the opening in the plate 9 through which the spindle 3 extends is only of slightly larger diameter than the spindle, so that the base-plate 9 will be properly centered when applied to the spindle.

As is well known, none of the commonly encountered combination locks can be operated without turning the dial a plurality of revolutions in one or both directions, so that not only are the readings obscured by the cover, but the opera-

tion of the lock by feel or by memory is precluded.

While I have described the illustrated embodiment of my invention in some particularity, obviously many others will readily occur to those skilled in this art, and I do not, therefore, limit myself to the precise details shown and described but claim as my invention all embodiments, variations and modifications thereof coming within the scope of the appended claims.

I claim:

1. A lock protecting device comprising a plate adapted to be secured against a door and between the door and the dial ring of a combination lock, an annular cover arranged to be placed over said dial and having interlocking engagement with the plate, a bolt carried by said plate and arranged to retain said cover in interlocked relation therewith, a spring for retracting said bolt, detent means retaining the spring under tension and manually operable to release the same, and chronometric mechanism controlling the operation of said spring.

2. A lock protecting device comprising a plate adapted to be secured against a door and between the door and the dial ring of a combination lock, an annular cover arranged to be placed over said dial and having interlocking engagement with the plate, a bolt carried by said plate and arranged to retain said cover in interlocked relation therewith, a spring for retracting said bolt, detent means retaining the spring under tension and manually operable to release the same, and a dashpot controlling the operation of said spring.

3. A lock protecting device comprising a plate adapted to be secured against the surface of a door and between this surface and the dial mechanism of a combination lock and provided with lugs, an annular cover adapted to overlie the dial of said lock and having lugs interlocking with the lugs upon the plate, the lugs being engageable by rotation of the cover about the axis of the dial, a housing carried by the plate, a bolt supported in the housing and adapted to retain the cover in interlocked position upon the plate, a cylinder within the housing, a piston movable in the cylinder, a spring urging the piston in one direction, a spring urging the bolt to extended position, means carried by the piston arranged to retract said bolt, manually operable means for moving the piston in a direction to compress the first mentioned spring, and a detent arranged to retain the piston in spring compressing position and manually operable from the exterior of the housing.

4. A lock-protecting unit comprising: a casing for a dial-plate comprising a base-plate having an opening for a dial-spindle and a removable complemental cover-member adapted to overlie and hide the indicia of the dial-plate, said cover-member having interlocking engagement with said base-plate and being revoluble about the axis of said opening to effect said interlocking engagement and release from said interlocking engagement a lock securing the cover to the base-plate; and chronometric mechanism mounted on one of the mentioned parts of said casing and controlling the release of said lock.

5. A lock-protecting device as specified in claim 4, in combination with a door-lock spindle extending through said opening, a dial-ring within the casing adjacent the front side of and fixed to said base-plate, and a dial secured on said spindle in front of said dial-ring having the indicia thereof hidden by said cover-member.

6. A lock-protecting device as specified in claim 4, in which said base-plate carries said lock and said chronometric mechanism.

7. A lock-protecting device as specified in claim 4, in which said chronometric mechanism is equipped with an actuating-spring, and with means accessible externally of said casing for tensioning said spring, and for releasing it, at will.

8. A lock-protecting device comprising: a casing comprising a base-plate and a complemental cover adapted to house a dial and cover the indicia thereof, said base-plate having an opening for a lock-spindle and having an extension carrying a casing; and a lock and chronometric controlling mechanism therefor housed in said last-mentioned casing, said lock serving to secure said cover to said base-plate.

9. A lock-protecting device comprising: a casing for a dial-ring and dial-plate comprising a base-plate having an opening for a dial-spindle and having an integral extension carrying a housing, and a removable complemental cover-member adapted to overlie and hide the indicia of the dial-plate; and a lock and chronometric controlling mechanism therefor within said housing releasably securing said cover to said base-plate.

10. A lock-protecting device comprising: a casing for a dial-plate comprising a circular base-plate having a forwardly projecting annular flange and carrying at its lower edge-portion a housing, said base-plate having an opening for a dial-spindle, and a removable circular complemental cover-member having an inwardly extending flange having interlocking relation with said first-mentioned flange; and a lock and chronometric controlling mechanism therefor mounted in said housing, said lock releasably securing said cover-member against rotation to position permitting removal from said base-plate.

11. A lock-protecting device as specified in claim 10, in which said chronometric mechanism comprises a spring-actuated, releasably-latched plunger and a co-acting dash-pot for retarding the movement of the plunger to the lock-releasing position.

12. In combination: a door; a rotatable lock-actuating spindle extending through the door and projecting at the outer side thereof; and a protecting unit comprising a casing comprising a base-plate having an opening through which said spindle projects, said base-plate having one edge thereof equipped with a housing, and a cover-member having interlocking relation with the base-plate adapted to be rotated to non-interlocking position for removal; a dial fixed on said spindle in front of said base-plate; and a lock and chronometric controlling mechanism therefor mounted in said housing, said lock releasably securing said cover-member against rotation.

13. A lock-protecting device comprising: a casing for a dial-plate comprising a casing-member adapted to be secured to a door and having an opening for a dial-spindle, said casing-member carrying at one edge a housing; a complemental cover-member having interlocking relation with said casing-member and having one edge-portion adjacent said housing; a locking-bolt in said housing adapted to lockingly engage said cover-member; and chronometric mechanism in said housing controlling said locking-bolt.