

Oct. 12, 1937.

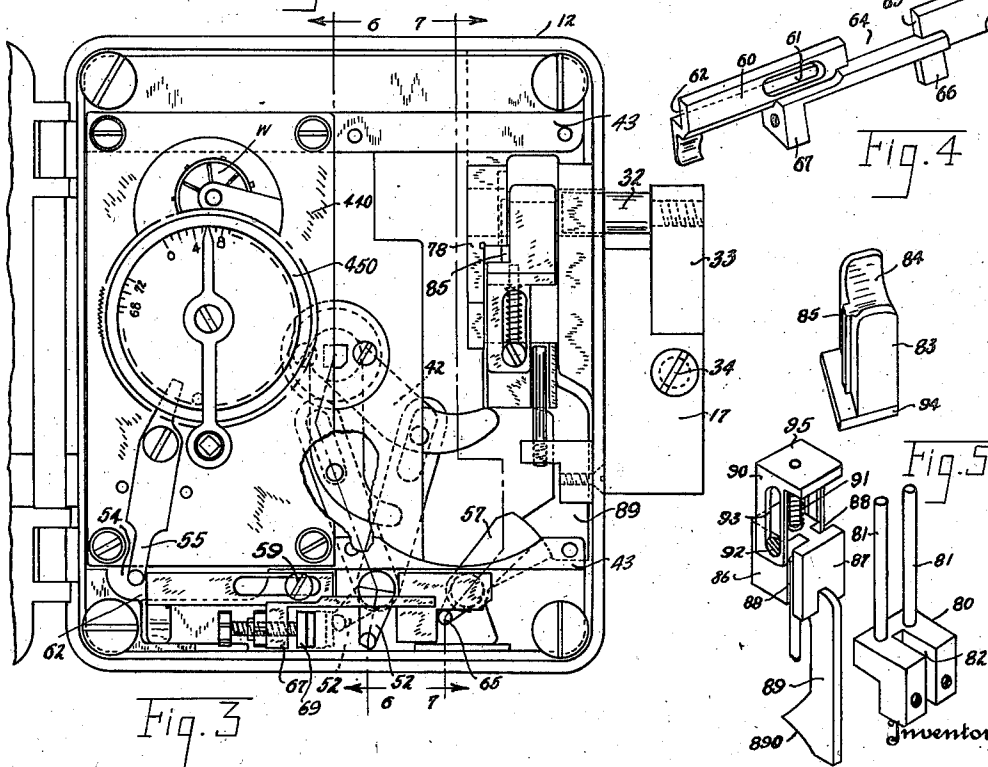
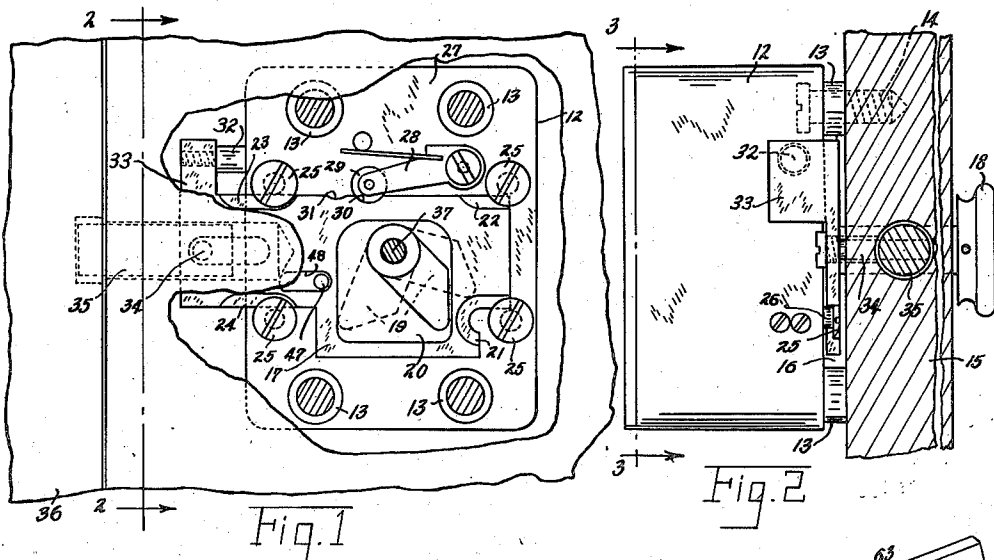
W. T. BENHAM

2,095,429

TIME LOCK MECHANISM

Filed April 9, 1936

3 Sheets-Sheet 1



William T. Benham

Murray and Zugel

Attorneys

Oct. 12, 1937.

W. T. BENHAM

2,095,429

TIME LOCK MECHANISM

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3 Sheets-Sheet 2

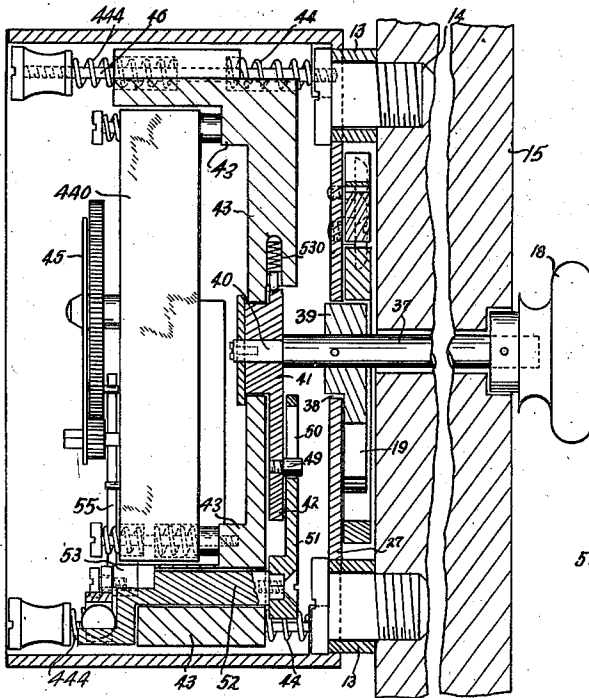


Fig. 6

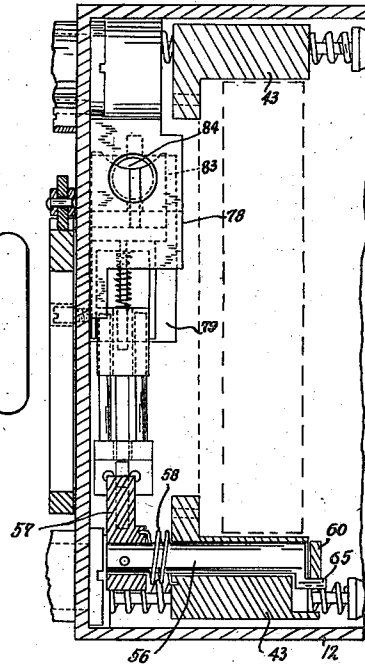


Fig. 7

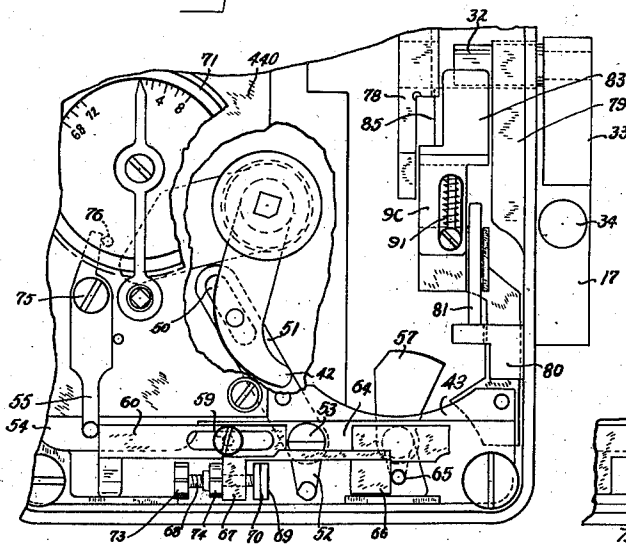


Fig. 8

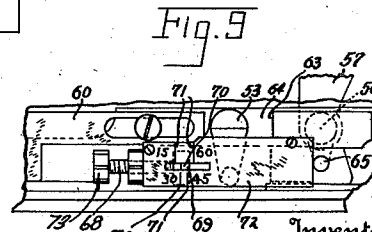


Fig. 9

Inventor
William T. Benham

By *Murray and Ziegler*
Attorneys

Oct. 12, 1937.

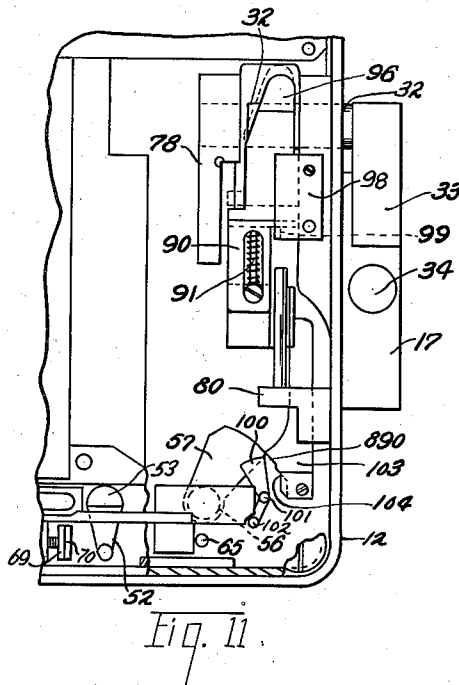
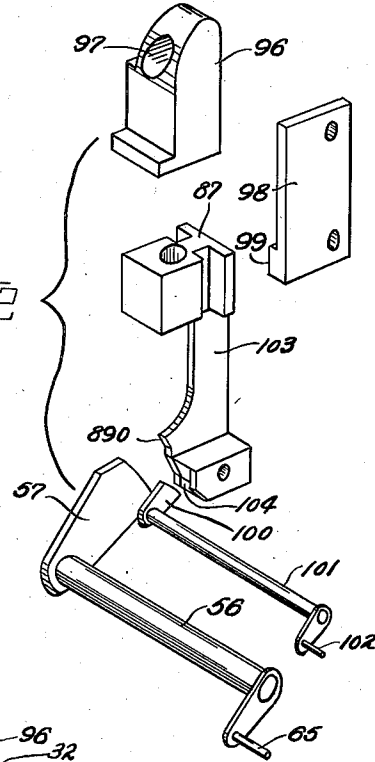
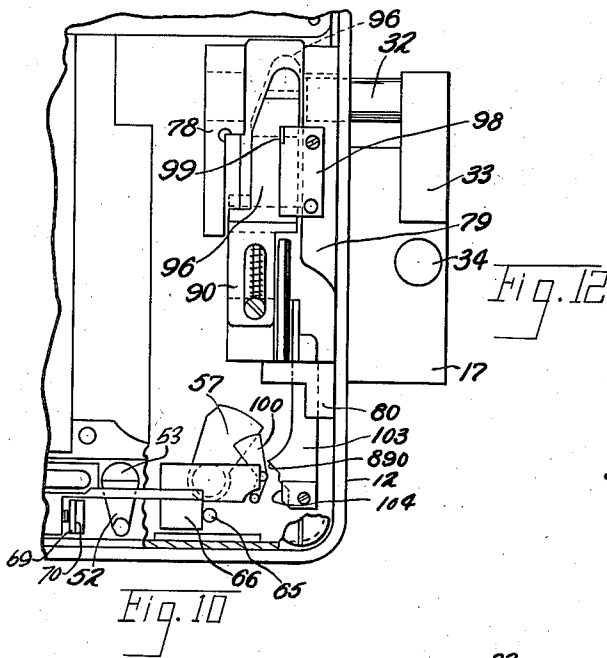
W. T. BENHAM

2,095,429

TIME LOCK MECHANISM

Filed April 9, 1936

3 Sheets-Sheet 3



INVENTOR.

William T. Benham

BY

Murray and Zagelster

ATTORNEYS

UNITED STATES PATENT OFFICE

2,095,429

TIME LOCK MECHANISM

William T. Benham, Norwood, Ohio, assignor to
The Mosler Lock Company, Covington, Ky., a
corporation of Ohio

Application April 9, 1936, Serial No. 73,507

13 Claims. (Cl. 70—269)

This invention relates to a time lock mechanism and has for its object the provision of a compact and relatively small unit which is somewhat less expensive to manufacture than heretofore used structures and which, because of its size is also adaptable to use on cashiers' money chests or safes, and in similar chests or safes in other establishments wherein it is desirable to place such chest under the control of time lock for an extended period such as a night season or holiday season, and in which daylight protection under the identical mechanism may be had for pre-arranged short periods in order to foil daylight bandits.

Another object is to provide a device which comprises but a single knob or handle, a quarter turn of which will serve, when necessary or desired, to shoot the bolt, set the daylight protection cam and check, wind the timing mechanism and stop the timing mechanism so that the chest or safe is indefinitely locked until the knob or handle is turned in the opposite direction to start the mechanism on its predetermined short period operation.

Another object is to provide a device of this kind wherein the short period daylight protection interval may be varied, the adjustment being simple and recorded upon a normally concealed indicator within the time lock casing.

Another object of the invention is to provide a modified form of the aforesaid invention wherein it is possible to selectively provide for automatic relocking of the lock after a predetermined short period following the daylight protection interval to avoid accidentally leaving a safe unlocked.

Another object is to provide a bolt check mechanism including a lost motion piece or member cooperating with a spring and detent member on its one side and with a timed release cam on the other side so that it is impossible for the bolt check to bind or hang after release and it is also impossible to transmit any movement or rough usage of the bolt operating knob or handle through the check mechanism to the timed release cam.

These and other objects are attained by the means described herein and disclosed in the accompanying drawings, in which:

Fig. 1 is a rear elevational view of a time lock of the invention attached to the safe door, part being broken away and showing in full and dotted lines the various positions of the bolt slide operating arm or cam.

Fig. 2 is a view taken on line 2—2 of Fig. 1

showing the time lock operatively mounted upon a money chest or safe.

Fig. 3 is a front elevational view of the time lock with its cover door in open position and showing the device in a locked position with the bolt check and time release cam in an operative position, one of the timing mechanisms being removed.

Fig. 4 is a perspective view of a slide forming part of the invention.

Fig. 5 is a perspective view of the entire bolt check mechanism in dismantled and separated relation.

Fig. 6 is a view taken on line 6—6 of Fig. 3.

Fig. 7 is a view taken on line 7—7 of Fig. 3.

Fig. 8 is a fragmental front elevational view of the device of Fig. 3 with the device in an unlocked position with the bolt withdrawn.

Fig. 9 is a fragmental detail showing the slide mechanism of Fig. 4 with an indicator plate attached.

Fig. 10 is a fragmental front elevational view showing a modified form of bolt check and time release cam mechanism arranged for automatic relocking, the bolt check being further shown in dotted lines in the locked position assumed thereby when the handle member has been subsequently operated.

Fig. 11 is a view like Fig. 10 showing the same device arranged so that it does not automatically relock.

Fig. 12 is a perspective view showing the modified bolt check, guide and holding plate and release cam used in the structure shown in Figs. 10 and 11.

Heretofore time locks have been used employing delicate watch movements to actuate the motive means for throwing bolts or intermediate mechanisms. Such time locks have been very effective for their purposes but usually require either an additional manual or motor driven mechanism to actually unlock the safe door by throwing the bolt. Frequently a combination lock is found employed on structures so protected, and it is to be understood that a combination lock may also be used as an auxiliary to the present device if desired. It will be understood then that while the present invention utilizes a case or housing which is as small as, if not smaller than, the usual time lock, it contains nevertheless, the complete mechanism and control necessary for operation of a door of a safe or a money chest and provides not only the relatively long periods of locked condition under the control of the watch mechanism, but is also

adapted upon the mere movement through a quarter turn of the single knob to throw the bolt, wind the time mechanism in accordance with the predetermined adjustment so that the safe or money chest is under the so-called daylight protection indefinitely or until the mechanism is again conditioned to allow the watch mechanism to operate for the predetermined short period to effect unlocking of the safe or chest.

Referring now to the drawings the lock case or casing 12 is provided upon its rear with integral tubular bushings 13 through which lag bolts 14 extend from the interior of the casing 12 into the rear of the door 15 of the money chest or safe to which it is attached. These bushings 13 provide a space 16 wherein a lock bolt or slide plate 17 may reciprocate under the control of the single knob 18 and its attached bolt throwing arm 19. The arm 19 like plate 17 operates exteriorly of the casing 12, being disposed in a substantially rectangular aperture 20 in said plate 17. The plate 17 is cut away to reduce the thickness as at notches 21, 22, 23, and 24, and is retained for reciprocable movement and is limited in said movement by the overhanging heads 25 of screws such as 26 which are entered into the rear wall 27 of the casing 12. A spring-pressed detent 28 has a roller 29 on the end thereof which seats in a notch 30 in the top of the lock bolt or slide plate 17 when the bolt is thrown to a locked position. A relatively shallow notch 31 receives the roller 29 when the plate 17 is in a retracted position. The purpose of the first-mentioned notch 30 is to hold lock pin 32 carried by an offset extension 33 of plate 17 normally in such a position that it will not bind upon the bolt check mechanism when the time lock is set. This feature will be explained later in greater detail.

From the foregoing it will readily be appreciated that a pin 34 in that part of the plate 17 which is at all times extending without the body lines of the casing 12 may be inserted in the safe bolt 35 which actually locks the safe or chest door 15 in the frame or side wall 36 of the safe or chest. The knob 18 carries an arbor 37 upon which arm 19 is mounted and which also extends through an aperture 38 in the rear wall 27 of the casing. The arm also carries on one face a drilled boss 39 which serves as a journal for the arbor 37. The reduced end 40 of this arbor is developed into an angular cross section and is secured in the hub 41 of a lifting finger or lock control lever 42. The hub 41 is journaled in a table or frame 43 which is mounted between pairs of springs 44 and 444 upon studs 46 within the casing in order to render the entire mechanism proof against shock as in violently closing the safe door or from sledge blows and the like. Table 43 is arranged to carry a plurality of receptacles 440 in side by side relation and these receptacles house the delicate watch movements and which carry the dials 450. It is to be noted that but one of these is shown in the drawings, the other (not shown) being removed for the purpose of disclosing the interior of the casing. The mounting of the table and of the plurality of receptacles is more fully disclosed in the patent to Benham 1,205,147 of March 21, 1916.

From the foregoing, it will be apparent that the knob or handle 18 may be rotated through 90 degrees to the opposite limits of reciprocation of slide plate 17 which is provided by pin 47 operating in slot 48 in the plate 17. These limits are also defined by the seating of roller 29 in

notches 30 and 31. These limits are further defined by a stud 49 in the lock control lever 42 operating in a slot 50 in control lever link 51 which is secured to a control lever eccentric 52 which is journaled in the table 43. A spring-pressed pin 530 operating in a notch in lifting finger 42 tends to retain the lifting finger or lock control lever in its raised position after being moved by the knob. This in turn holds the eccentric 52 in one of its extreme positions.

Control lever eccentric 52 is cut away at 53 to clear the winding lever of the second receptacle or time mechanism (removed and not shown) which is identical and interchangeable with the receptacle 440 shown at the left of Figs. 3 and 8 wherein a clearance recess 54 is shown with the end of winding lever 55 movable therein. Journaled in the table 43 adjacent the control lever eccentric 52 is an automatic check eccentric 56 carrying an automatic check cam 57 and yieldably urged by spring 58 toward the bolt check mechanism shown at the right hand side of Figs. 3 and 8.

Reciprocably mounted on the front of table 43 by means of screw 59 is a lock slide 60 (see Fig. 4) which has the limit slot 61 through which screw 59 passes. The end 62 of lock slide 60 abuts the winding lever 55 at the left hand side of the device, while a shoulder 63 at the corresponding side of a notch 64 is adapted to engage a similar winding lever on the second of the receptacles 440 (not shown). A finger 65 on eccentric 56 is normally pushed against lug 66 on the lock slide by the spring 58. It follows then that as the lock slide is pushed toward the right hand side (Figs. 3 and 8) by the action of the winding levers 55 which are actuated by the usual spring driven and time controlled mechanism in the receptacles 440, the check cam and eccentric are moved against the resistance of spring 58 and away from the bolt check. It will be noted that lock slide 60 has a depending lug 67 having a threaded hole in which an adjusting stud 68 is carried. The stud has a flat ended cylindrical head 69 with an annular indicating line 70 around it adapted to be set in registry with graduations 71, on an indicator plate 72 carried by said lockslide. A notched adjusting head 73 and a notched lock nut 74 serve to turn and fix the head 69 relative to the lock slide and accurately adjust the amount of movement which can be imparted to the lock slide in a left hand direction by the eccentric 52 when it is actuated through link 51 upon turning of handle or knob 18. This movement of the lock slide in a left hand direction swings the winding levers 55 about their pivots at 75 so that the pin 76 on the rear of the dial 77 will be engaged and turns the dial sufficiently to wind the watch mechanism within the receptacle 440. The same movement of the lock slide removes lug 66 from the path of finger 65 and allows check cam 57 to move under the influence of its spring 58 toward the right and beneath the bolt check, which, as will be seen, is also lifted by lock control lever 42. The power spring and ratchet (not shown) which form part of the time mechanism in receptacle 440 will thus be conditioned and the dial 77 turned to a degree directly proportionate to the amount of movement of the lock slide. The amount of movement of the lock slide by eccentric 52 depends entirely upon the adjustment screw 68. Winding lever 55 will allow the chronometer to be manually worked to any desired degree but the lock slide to remain at the limit as it is held by eccentric 52 so that the chro-

nometer will be stopped before it is fully unwound. If eccentric 52 is moved, the chronometer will then proceed to move the lock slide toward its opposite limit. The lug 66 thus stops finger 65 in such position that check cam 57 is held beneath the bolt check which can thereafter drop instantaneously to inoperative position only after the lock slide 60 has been returned to its initial position (see Fig. 8) by winding lever 55 under the influence of the pin 76 as the dial 77 returns to zero position, at which time lug 66 will have moved finger 65 sufficiently to withdraw the check cam from the path of pin 32.

The bolt check mechanism and its mounting constitute one of the novel improvements of the invention. A pair of guide bosses 78 and 79 spaced apart and preferably integral with the case 12 and a bracket 80 having a pair of guide pins 81 and a guide slot 82 serve to mount the three-part bolt check. This consists of the bolt check 83 grooved at 84 complementary to pin 32 and ribbed at 85 to guide in boss 78 for free non-binding instantaneous gravitational release whenever the influence of the automatic plunger (indicated generally as 86 in Fig. 5) is removed. This reduces wear that permitted premature opening in other locks and provides absolute security up to the last minute. The plunger 86 constitutes the other two pieces of the bolt check mechanism and comprises block 87 with grooves 88 receiving guide pins 81 and a depending finger 89 which rides in guide groove 82 of the bracket 80 and terminates in an arcuate cam face 890 which rests on the arcuate face of cam check 57. A lost motion member 90 is supported in normally elevated position on block 87 by a light spring 91 and screws 92 in slots 93. The bottom face 94 of bolt check normally rests on the top face 95 of block 90. This resilient connection permits the parts 87 and 90 to be compressed together for a distance slightly greater than the diameter of pin 32 when the parts together with bolt check 83 are lifted by lock control lever 42 and the slide plate 17 and pin 32 are still in the retracted position (as in Fig. 8). This allows cam check 57 to move into position beneath finger 89 (see Fig. 3). The bolt throwing arm 19 then moves the slide plate 17 out and withdraws pin 32 whereupon the compression on spring 91 is released to raise block 90 and carry bolt check 83 into operative position (see Fig. 3). It will be remembered that all of these movements which included actuation of the lock slide 60, raising of the bolt check mechanism and finally the actual throwing of the bolt by slide plate 17 were accomplished by a quarter turn of knob 18 in a clockwise direction (from the outside of the door or as viewed in Fig. 1). This movement also wound the time mechanism in receptacles 440 if previously run down and stopped the watch movements W therein. If, however, the time mechanism had previously been wound to operate for an interval greater than the "daylight protection interval" the watch movements will run for the desired "night protection interval" minus the particular "daylight protection interval" and would then stop. Eccentric 52 would block movement of the lock slide 60 which would in turn prevent pin 76 on the dial from further moving the winding lever 55. If now the knob 18 is turned in a counterclockwise direction (viewed from Fig. 1), the lifting finger 42 is removed from beneath automatic plunger 87 and eccentric 52 is retired

from adjusting screw head 69 and the watch mechanism is free to run and push lock slide 60 toward the right hand side (see Figs. 3 and 8) and finger 65, actuated by said lock slide, will gradually retire the cam check 57 from beneath finger 89 and at the end of said "daylight protection interval" allow the entire bolt check mechanism to drop instantaneously under the force of gravity. No gradual movement of the bolt check obtained and hence it would be impossible to force a premature opening as in many time locks heretofore in use. The knob 18 may now be turned further to retract the slide plate 17 and with it the locking bolt 35 in the door 15. The door may then be opened and closed at will by the attendant but is always ready upon a moment's notice to be again locked for the "daylight protection interval" whenever it is desired or is deemed necessary.

As shown in Figs. 10 to 12 inclusive, a relatively simple modification of the gravity bolt check mechanism and its associated parts has been provided whereby the function of the lock heretofore described may be attained in substantially the same sequence and, whereby, in addition thereto, these same parts can be selectively utilized to effect the additional and oftentimes desirable function of automatically relocking the entire device if the lock is not actually opened within a predetermined short time designated for the purpose of enforcing careful attention by the operator and at the same time, automatically taking care of any negligence on the part of the operator.

As indicated, these modifications are relatively simple and they will now be described and concurrently compared with the previously described comparable elements so that the slightly different structure and the cooperation thereof may be readily understood.

The gravity bolt check 96 is in this modified form extended slightly higher than the corresponding check 83 of Fig. 5. A bore 97 is provided in the extended part of bolt check 96 in lieu of the groove 84 of check 83. A guide plate 98 is adapted to be screwed onto the face 79 on the casing to serve as a means for guiding the bolt check 96, this arrangement effecting essentially the same function of the guide rib 85 on check 83. Plate 98 has two screw holes therein, one adjacent each end and this plate is adaptable to reversible mounting by means of a single screw. A lug 99 on plate 98 is adapted, in one position of the plate to extend inwardly and to serve as a stop for limiting the detent of the gravity bolt check at a position wherein the bore 97 is in registry with the line of movement of lock pin 32. When the lug 99 is disposed as stated, the lock is adapted to function essentially as the hereinbefore described structure, e. g. after either the combined long and short time or only the short time delay intervals have elapsed, the lock becomes conditioned for opening and so remains (see Fig. 11).

In this modified embodiment of the invention, the cam 57 (previously described) and which in the heretofore described embodiment served to effect the anti-bandit or "daylight protection delay interval" does not affect movement of the bolt check unless the device is conditioned by the simple operation of reversing plate 98 so that the lug 99 extends outwardly and out of the path of the gravity bolt check 96, to thereby provide for the automatic relocking of the device in the manner hereinafter to be explained.

A delay cam 100 fixed on a shaft 101 operates in a plane just in front of cam 57 and said cam 100 is actuated through the movement of a crank 102 by the lock slide 60 in order to release the gravity bolt check assembly at the end of the "daylight protection interval."

As just indicated, the device when arranged as shown in Fig. 10 will effect automatic relocking of the device if the attendant fails to open the safe within a predetermined time after the "daylight delay interval" has elapsed.

As will be understood in connection with the earlier description of the device, the bolt check assembly is raised to its uppermost limit by the finger 42 and is held there by the delay cam and said finger until such time as the knob 18 is actuated to initiate the running of the "daylight protection delay period." Thereafter, the delay cam supports the bolt check assembly until, at the expiration of the "daylight protection delay interval", the lock slide 60 has removed the delay cam from beneath the bolt check assembly. The device as arranged in Fig. 11 would thus have the bolt check disposed, during the protection periods, in the position shown in dotted lines in Fig. 10. The running of the "daylight protection interval" would find cam 100 supporting the bolt check assembly upon the face 104 of the slightly modified finger 103 of the bolt check plunger. When cam 100 is moved until it no longer supports the bolt check plunger, the bolt check assembly drops until the cam 57 contacts the descending face 890 of the bolt check plunger assembly. At this time, the bore 97 in bolt check 96 is in registry with the lock pin 32 so that the safe may now be manipulated for opening. However, cam 57 will continue to support bolt check 96 in this position only for a predetermined short interval (e. g., 8 minutes), after which, upon continued movement of the cam 57 the lock slide 60 which is under the influence of the chronometer mechanism passes from beneath face 890 and allows the bolt check assembly to drop instantaneously and gravitationally to the position shown in full lines in Fig. 10 where, it will be noted, that the bore 97 in bolt check 96 is again out of registry with the lock pin 32 so that the device has been automatically relocked for failure to throw the lock pin 32 during the said 8 minute opening interval.

The time lock described is adapted for adjustment to fulfill practically any requirement as to the specific period of protection and the manner in which it can be opened after the time protection period has passed. In the description of the operation of the device, it will be assumed that the time lock has had the daylight protection adjustment control set so that the annular mark 70 on head 69 is in registry with the "30" minute mark on plate 72 and that the watch movements have run down. It will be assumed also that the lock slide 17 and lock pin 32 are in retracted position so that the safe door 15 is unlocked, but in a closed position. The parts are then in the position shown in Figs. 8 and 11.

To lock the safe to which the device of the invention is attached, the handle 18 is turned clockwise. This movement swings finger 42 to the raised position shown in Fig. 3 and lifts the bolt check and plunger assembly compressing the spring 91 and urging the bolt check against the lock pin 32. The same movement swings lever 51 and causes the eccentric 52 to push on the end of the cylindrical head 69 which moves the lock slide 60 against the resistance of wind-

ing lever 55. The winding levers 55 thus pushed serve to wind the power springs of the watch movements in receptacles 440 in proportion to the extent of movement of the lock slide. In this case, the adjustment was set for 30 minutes and the winding movement just referred to is sufficient to operate the watch movements for that length of time. In moving the lock slide 60 to the left from the position shown in Fig. 1 to the position shown in Fig. 3, the cam check 57 drops to a position below the now raised end of depending finger 89. Since eccentric lever 52 is held at the extreme position shown in dotted lines in Fig. 3, the watch movements are precluded from operation because the levers 55 are blocked by the lock slide. The time movements are therefore stopped in wound position. The continued movement of handle 18 in the same direction causes the arm 19 to move slide plate 17 to its extreme outer position, thus withdrawing lock pin 32 and permitting the loaded spring 91 to raise the bolt check 83 to fully locked position.

So long as the handle 18 is left at the extreme position to which it has just been moved, the device remains locked definitely.

In order to open the lock, the handle 18 is turned in the opposite direction as far as it will go, i. e. about a quarter turn. By this movement, the finger 42 is retracted from its supporting position beneath the gravity plunger assembly 86 and the eccentric 52 is swung on its axis so that it no longer resists the pressure of the winding levers 55 on the lock slide 60. The cam check 57, however, remains beneath the finger 89 and as the release winding levers 55 now move slowly under the power of the time mechanisms, they push the lock slide 60 in the opposite direction and the shoulder or lug 66 on the lock slide correspondingly pushes the eccentric lever 65 which gradually removes the cam check 57 from beneath the finger 89. When the end of cam check 57 passes from beneath the extreme end of finger 89, the gravity plunger assembly and the bolt check drop, whereupon the time lock is in unlocking position, but the bolt 35, slide plate 17 and pin 32 are still in the position shown in Fig. 1, so that the safe door cannot be pulled open. To draw the bolt 35, the handle is turned further in the direction required to initiate the operation of the time mechanism which causes finger 19 to push the slide plate 17 and corresponding parts to the position shown in Fig. 8, whereupon the door may be opened. The operation just described is used during the day season as an anti-bandit protection which requires a necessary delay of 30 minutes between initiating the operation and the actual opening of the safe door. For night season protection, the timing mechanism in receptacles 440 are wound to run for the selected number of hours indicated by the hand or indicator member 45 with relation to the dial which was turned in the winding movement in known manner. With the time mechanism thus conditioned, the safe door may be closed and the handle 18 operated in the afore-described manner, so that the parts are all operated as previously described except that the winding levers 55 have already been moved beyond the influence of lock slide 60. Assuming that the handle lever 18 has been left in a position wherein finger 42 is beneath the gravitational bolt check assembly, the winding levers will return in a normal fashion under the influence of the timing mechanism until they abut shoulders 62 and 63 respectively of the lock slide 60. Since

the lock slide 60 is still held against further movement by eccentric lever 52, the watch movements now stop. The time required to reach this position will be the number of hours for which the time mechanism was wound minus the 30 minute delay interval to which the cylindrical head 69 had been set. To open the safe, the operator turns the knob to withdraw finger 42 and eccentric 52 from their blocking positions and then waits for the 30 minute interval to pass during which cam check is withdrawn from beneath the bolt check assembly. When the cam check has withdrawn and the bolt check has dropped, the locking bolt 35 and plate 17 may be shifted to open the safe door.

In order to provide for the further advantage of selectively arranging for automatic re-locking of the device of the invention if the safe is not open within a predetermined short interval e. g. 8 minutes after the bolt check has been automatically released, the structure illustrated in Figs. 10, 11 and 12 is utilized. With the plate 98 mounted with the lock 99 thereof disposed inwardly and into the path of the gravity bolt check, the time lock of the invention when operated as previously described will automatically arrive at unlocked position and remain so until the safe is either opened or the mechanism is relocked by the operation of the handle 18.

When it is desired to provide for automatic relocking, the position of the plate 98 is reversed, so that the lock 99 extends outwardly and out of the path of the bolt check and thereby enables the finger 103 (corresponding to finger 89 in the previously described mechanism) to rest upon the supplementary cam 100 for the additional interval (e. g. 8 minutes) while the lock slide pushes the pin of eccentric 102 until the supplemental cam 100 is also removed from beneath the finger 103. This permits the bolt check 96 to further drop to a position wherein the bore 97 is below pin 32 and thereby precludes movement of plate 17 and the bolt until the device has been again conditioned by a proper operation of handle 18 and the original daylight protection delay interval of 30 minutes has elapsed.

From the foregoing, it will be seen that the operation of the device is simple and positive and that the release thereof is susceptible of accurate timing and certainty of operation. Since the device bears no external indicia to show how it has been conditioned, the protection against "daylight" hold-up efforts is very effective because it is impossible for any person, authorized or unauthorized, to open the safe earlier than the intended interval for which the device is adjusted. Furthermore, because the initiation of the opening delay interval is effected by the knob 18 which is the sole actuating device for the entire mechanism, one who is uninformed, and who wishes to operate the device by stealth or force, is very apt to manipulate knob 18 from time to time and to thereby unwittingly condition the device as of the initiation of the "daylight protection interval" each time the knob is thus actuated.

I claim:

1. In a time lock, the combination with a casing having a vertical way therein, of a slide plate comprising a lock pin for movement into the way, a gravity check member in said way, means operable from the exterior of the casing to raise said gravity check member to a position precluding entry of the lock pin into the way, means to hold the gravity check member in said

raised position, and means comprising chronometer mechanism and a lock slide movable thereby for releasing said holding means after a predetermined period of operation of said chronometer and lock slide.

2. In combination, a casing, an apertured slide plate mounted for limited reciprocation on the casing and adapted for connection with and control of a locking bolt, a knob actuated arbor extending into the casing, means on the arbor and disposed in the aperture in the slide plate whereby the slide plate is actuated, a lock pin on the slide plate adapted for movement into and out of the casing, said casing having a way therein across the path of said lock pin, a gravity bolt check member including a yieldable plunger guided for movement vertically in the way, detent means yieldably urging the slide plate to a position wherein the lock pin is held in non-binding relation to the gravity bolt check and means including chronometer mechanism and means actuated thereby for retaining the gravity bolt check member in position precluding movement of the lock pin for predetermined time intervals, said bolt check being thereafter freed for instantaneous gravitational descent in the way and out of the path of said lock pin.

3. In a time lock, the combination with a casing supporting suitable chronometer mechanism, of a lock slide reciprocably mounted in the casing, means operative between the lock slide and chronometer mechanism whereby the lock slide, when moved in one direction, effects winding of the chronometer mechanism, and whereby operation of the wound chronometer mechanism effects a timed return movement of the lock slide, reciprocably mounted slide plate means including a lock pin for entry into the casing, a gravity check member vertically adjustable in the casing to positions permitting and precluding movement of the lock pin, means manually operable to effect lifting of the gravity check member and winding movement of the lock slide, and cam means adapted to hold the gravity check member in elevated position and further adapted for movement by the lock slide for timed release of the gravity check member to a position wherein the lock pin is operable.

4. In a time lock, the combination with a casing supporting suitable chronometer mechanism, of a lock slide reciprocably mounted in the casing, means operative between said lock slide and said chronometer mechanism whereby the lock slide when moved in one direction, effects winding of the chronometer mechanism, and whereby operation of the wound chronometer mechanism effects timed return movement of the lock slide, reciprocably mounted slide plate means including a lock pin for entry into the casing, a gravity check member vertically adjustable in the casing to positions permitting and precluding movement of the lock pin, means manually operable to effect lifting of the gravity check member and winding movement to said lock slide, cam means adapted to hold the gravity check member in raised position, said cam means being movable by the lock slide for timed release of the gravity check member for permitting operation of the lock pin, and additional cam means controlled by the lock slide for holding the gravity check member in the last mentioned position, said additional cam means being movable, on continued movement of the lock slide, to a position wherein the gravity check member is released for further

descent to a position wherein the lock pin is again precluded from operation.

5. In a time lock mechanism the combination of a casing adapted for mounting on a structure to be protected, a slide plate reciprocally mounted on said casing for connection with a bolt, chronometer mechanism in the casing, a lock slide in the casing movable in one direction by said chronometer mechanism, manually operable means for moving the slide plate and for effecting movement of the lock slide in a reverse direction whereby the chronometer mechanism is wound, a gravity check member to preclude operation of the slide plate, and means supporting the gravity check member in such position and movable by the lock slide under the influence of the chronometer mechanism for effecting timed gravitational release of the gravity check member.

6. In combination a casing adapted for mounting on the door of a structure to be protected, a locking bolt for said door, a slide plate on the casing for actuating the locking bolt, said slide plate being apertured, an arbor extending through the door and into the casing, means on the arbor and disposed in the aperture in the slide plate whereby turning of the arbor may effect movement of the slide plate, time lock mechanism within the casing including a chronometer, a lock slide mutually operable one with the other and a gravity check member controlling operation of the slide plate and under control of the lock slide and means operable by movement of the arbor in one direction for simultaneously moving the slide plate, shifting the lock slide whereby the chronometer is wound, raising the gravity check member and stopping the chronometer, movement of the arbor in the opposite direction serving to start operation of the chronometer and release the gravity check to the control of the lock slide for timed delay release upon predetermined operation of the chronometer.

7. In a time lock the combination of a casing having a vertical way therein and a perforation communicating with the way, a slide plate having a pin therein movable into said way upon movement of the plate, said plate being adapted to control a door bolt, a gravity check member freely movable in said way, a manually operable arbor, means on the arbor to move the slide plate, means on the arbor to lift the gravity check member to a position precluding movement of the pin and slide plate, a chronometer, a lock slide movable in one direction to wind the chronometer, an eccentric mechanism including a slotted link whereby movement of the said lifting means effects movement of the lock slide, said lifting means in raised position arresting operation of the chronometer after winding it, a plunger supporting the gravity check member and having an arcuate faced finger depending therefrom and a release cam adapted to support the plunger and gravity check member in elevated position and to be progressively withdrawn from such supporting position by movement of the lock slide under the influence of the chronometer.

8. In combination a time lock casing having a vertical way therein and a transverse bore communicating with the way, a gravity check member reciprocable in the way, a pin reciprocable in the bore and adapted to abut the gravity check member in certain positions of said check member, said check member having a bore therein adapted for registry with said pin, a lug extending into

the way adapted to limit descent of the gravity check member so that the pin and the bore in said check member are aligned, externally operable means adapted to simultaneously move the pin out of the bore in the check and to lift the gravity check member to a position wherein the bore thereof is out of alignment with said pin, means to hold the gravity check means in said elevated position and chronometer actuated means to effect timed release of the holding means.

9. In a time lock, the combination of a casing having a way therein open along one side, and having a bore communicating with the way, a gravity urged check member reciprocable in the way and having a bore capable of alignment with said bores in the casing, means to raise the check member in the way, chronometer mechanism, means under the control of the chronometer mechanism to hold the check member in elevated position for a predetermined time interval and to thereafter release said check member, a second member under the control of the chronometer mechanism adapted to limit the descent of the check member to a position wherein the bores in the check member and casing are aligned, said second member being movable by said chronometer after a predetermined time to again release the check member for further descent whereby said bores are disaligned, and a pin for movement in said bores and adapted to control operation of a lock bolt.

10. In a time lock the combination of chronometer actuated means whereby time delay intervals of night season character are obtained by known winding operations of the chronometer, a bolt controlling slide plate, a knob for actuating said slide plate, and means actuatable by said knob in one direction to simultaneously move the slide plate to closed position, to impart a limited winding movement to the chronometer and to arrest unwinding movement of the chronometer, said means operating independently of the conditioning of the chronometer for night season time delay interval.

11. In a time lock the combination of a casing, an arbor adapted for manual operation through substantially 90° of rotation, an apertured slide plate having a pin movable therewith for entry into the casing, a chronometer in the casing, a lock slide, means cooperating with the lock slide and chronometer for effecting movement of said lock slide by the unwinding operation of the chronometer and effecting winding of the chronometer by movement of the lock slide, a gravity check member guidedly supported for movement into and from the path of said pin, a telescopically yieldable plunger beneath the gravity check member, cam means normally urged to a position beneath said plunger and adapted to be positively moved from beneath the plunger by operation of the lock slide by said chronometer, and means on the arbor comprising an arm for operating the slide plate, a finger for lifting the plunger and gravity check and an eccentric cooperating with the finger and said lock slide whereby movement of the arbor in one direction automatically and simultaneously moves the slide plate to locking position, lifts the gravity check member and plunger to preclude movement of the pin and lock slide, turns the eccentric whereby the lock slide effects limited winding of the chronometer and stops operation of the chronometer in such wound condition and permits the cam means to assume a supporting position

beneath the plunger, retractive movement of the arbor serving to return the finger and eccentric to initial position whereupon the lock slide is released to slow movement by the chronometer for effecting predetermined movement of the cam means from supporting position beneath the plunger.

12. In combination a reciprocably mounted lock slide adapted for movement in one direction by the unwinding movement of chronometer mechanism, an eccentric adapted for manually controlled operation to move the lock slide in the opposite direction for winding the chronometer mechanism, a crank actuated cam operable by movement of the lock slide in the first mentioned direction, a vertically guided check member, a telescopic yieldable plunger disposed beneath the check member, a finger depending from the plunger and having an arcuate face on one side edge thereof, the crank actuated cam normally urged to a position beneath the arcuate face of the finger, and means manually operable to effect lifting of the plunger and check member and connected with the eccentric for simultaneously effecting movement of the lock slide whereby the chronometer is wound and the cam is released for movement beneath the finger.

13. In a time lock, the combination of a casing having a way therein open along one side, and having a bore communicating with the way, a gravity urged check member reciprocable in the way and having a bore capable of alignment with said bores in the casing, means to raise the check member in the way, chronometer mechanism, means under the control of the chronometer mechanism to hold the check member in elevated position for a pre-determined time interval and to thereafter release said check member, a second member under the control of the chronometer mechanism adapted to limit the descent of the check member to a position wherein the bores in the check member and casing are aligned, said second member being movable by said chronometer after a pre-determined time to again release the check member for further descent whereby said bores are dis-aligned, a lug member selectively adjustable to positions respectively in the path of the check member and out of the path of the check member whereby the last mentioned release of the check member is selectively precluded and permitted, and a pin for movement in said bores and adapted to control operation of a lock bolt.

WILLIAM T. BENHAM.