



July 23, 1929.

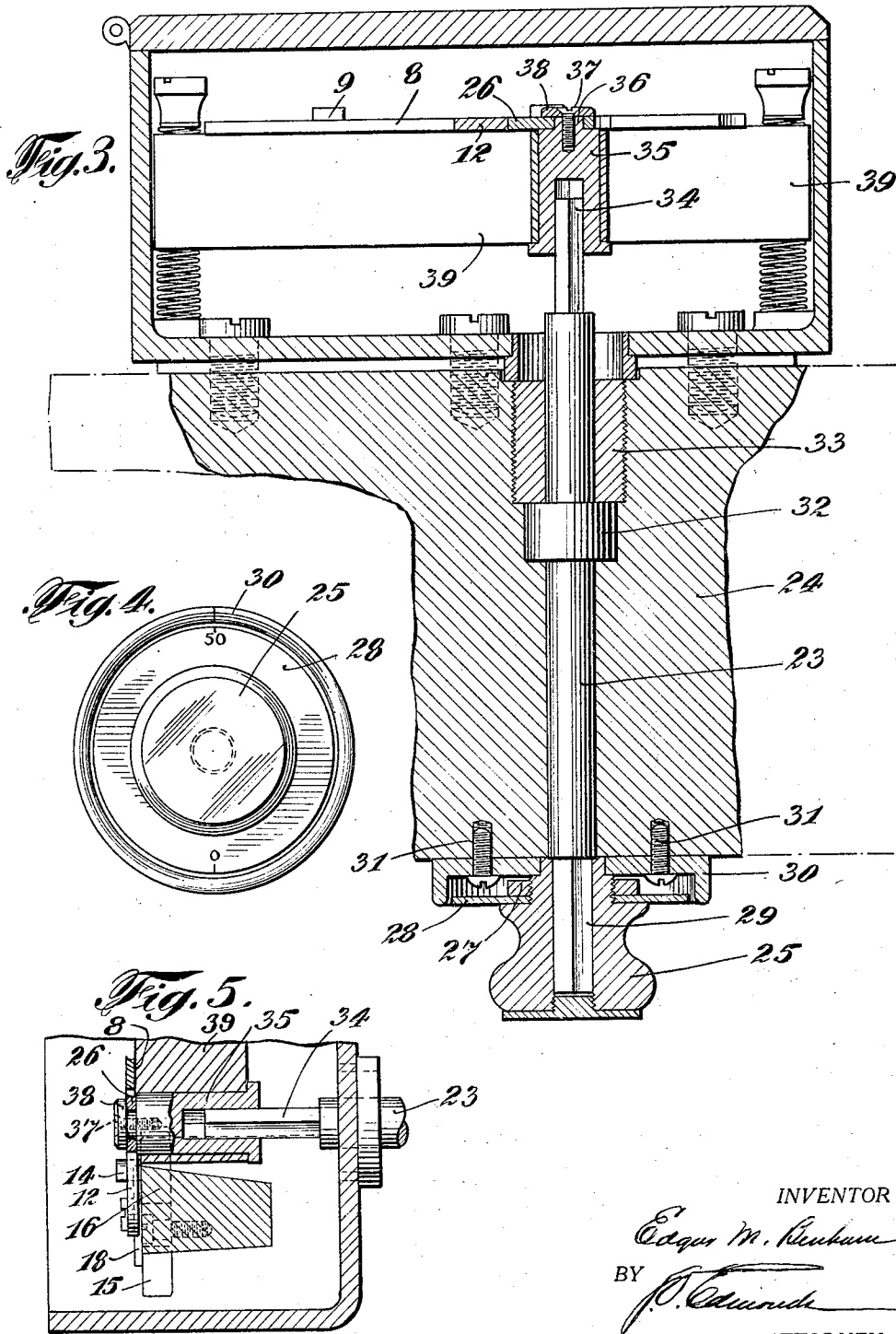
E. M. BENHAM

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TIME LOCK

Filed March 10, 1924

3 Sheets-Sheet 2



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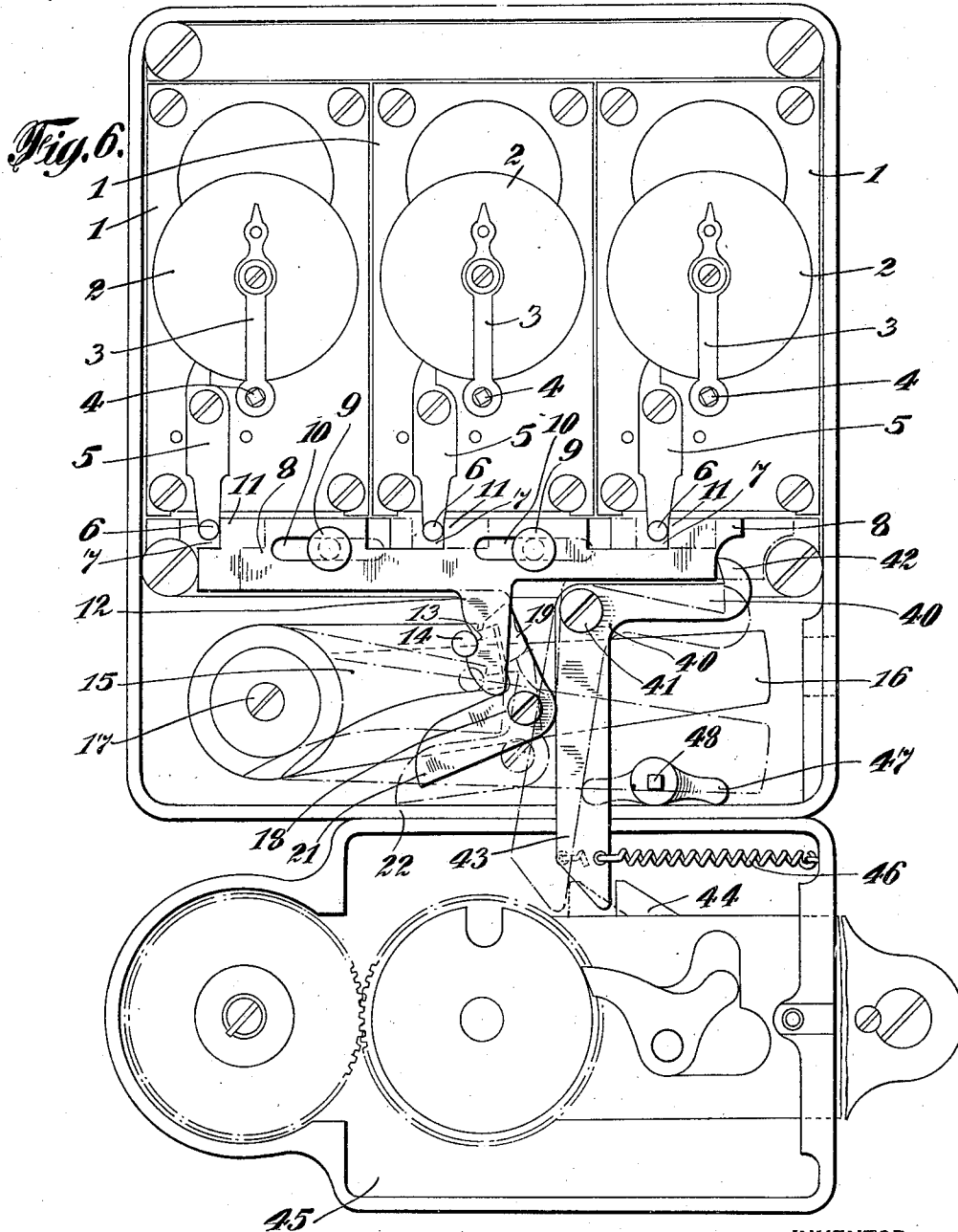
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## UNITED STATES PATENT OFFICE.

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## TIME LOCK.

Application filed March 10, 1924. Serial No. 698,056.

This invention relates to time locks, and more particularly relates to time locks for bank vaults and safes and similar structures.

The usual form of time locks heretofore in use to operate to prevent opening of a protected structure continuously for a certain definite number of hours for which the time lock is set, and at the end of that time the lock automatically places the protected structure in condition to be opened in the regular manner without delay at any time or at regular intervals thereafter. Because these time locks run continuously from their starting time to releasing time and always permit opening of the protected structure without delay at any time or at regular intervals after the expiration of the time for which they are set, it has been impractical to use them for protection during business hours. Therefore, in banks and other business establishments having safes or vaults equipped with such time locks, the time locks are arranged to be inoperative continuously or for regular periodic intervals during business hours, and the safe or vault may be opened whenever desired during such hours or intervals at a moment's notice. Because of this situation, robbers have entered the premises during business hours and have been able to compel a person to open the safe or vault without delay, and in consequence have been able to make off with the contents in short order.

The principal object of my invention is to provide a time lock which may be used conveniently to prevent robbers from gaining quick entry into the protected structure during business hours, the time lock, however, permitting an authorized person to open the protected structure during such hours within a reasonable time.

Another object of my invention is to provide a time lock which is adapted to render it impossible to open a structure protected thereby on a moment's notice but which permits the protected structure to be opened within a reasonable time, and to provide a time lock which may be conveniently used to protect a structure during business hours or during periods of time when opening thereof may be desired from time to time. Another object of my invention is to provide a time lock adapted to be used for protection during both business hours and non-business hours. Another object of my invention is to provide a time lock which, when the protected struc-

ture is closed and locked, is responsive to an adjustment so as to become inoperative after the lapse of a certain period of time subsequent to the time such adjustment is made, to permit the protected structure to be opened, the time lock, however, being adapted to render protection indefinitely and continuously if such adjustment is not made, and irrespective of the expiring time for which the time lock has been wound. Another object of my invention is to provide a time lock which is adjustable to become inoperative at the expiration of the fixed period of time for which it is wound and set, and which is also adjustable to remain operative for an indefinite period of time, irrespective of the time for which the lock is wound, and until a certain period of time has passed subsequent to a further adjustment which is adapted to be made while the protected structure is closed and locked, and while the time lock is rendering protection thereto.

A further object of my invention is to provide a lock construction which operates positively and efficiently in the manner above stated. Another object of my invention is to provide a time lock which operates independently of a combination lock, and which permits the combination lock to be set up without in any way affecting the time lock.

Other objects will be in part obvious and in part pointed out hereinafter.

In accordance with my invention, I provide a time lock equipped with an adjustable stop mechanism which normally controls the releasing lever of the time lock in such a way as to stop the running of the time lock at a certain stage before the releasing point or inoperative position is reached, and whereby the time lock is maintained dormant and in protecting condition at this stage for an indefinite period of time. The stop mechanism; however, is adjustable from the outside of the closed protected structure to release the time lock to run through its final stage, so that at the end of the time required for the time lock to run through this stage, the time lock will become non-protecting and the protected structure may be opened in the regular way. The stop mechanism is preferably also arranged to be placed and held in inoperative position to condition the time lock to permit the protected structure to be opened at the expiration of any fixed period of time for which the time lock is wound and

set. With such a device, should a robber attempt to compel a person to unlock the safe, the most that such person could do would be to operate the time lock starting device, since the safe cannot be opened in the regular way until such time lock has consumed the necessary time required for it to release the locking mechanism for opening in the regular way. The time lock mechanism is preferably arranged to consume a sufficient period of time, for instance, twenty to forty minutes, before permitting the protected structure to be opened in the regular manner to render it unlikely that robbers will wait around the premises until such time has elapsed, yet a time not inconveniently long to a person desiring access to the structure for regular business.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings forming a part of this application and illustrating certain possible embodiments of my invention. Referring to the drawings, Fig. 1 is an elevation of a controllable time lock mechanism embodying my invention associated with a locking dog, and shown holding the locking dog in protecting position; Fig. 2 is a similar view of a portion of a mechanism, showing the locking dog released by the time lock and in releasing position; Fig. 3 is a sectional view of the controllable time lock mounted on a door, only a fragment of the door being shown; Fig. 4 is an end view of the time lock control knob; Fig. 5 is a sectional view of a portion of the structure; and Fig. 6 is an elevation of a modified form of controllable time lock associated with a combination lock, showing in full lines the positions of the parts when in protecting position, and showing in dot and dash lines the positions of the parts when in releasing position. Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to the drawings, the time lock mechanism comprises one or more usual movements 1, preferably three, each having the usual rotatable setting dials 2, pointers 3, winding stems 4, and pivoted levers 5, which are moved by the movements of the time lock, and which, when held against movement, stop the running of the movements. The lower end 6 of each of these levers 5 engages in a slot or recess 7 formed in the time lock slide bar 8. The slide bar 8 is slidably mounted on pins 9 which extend through slots 10 formed in the bar. When the time lock movements are running down, the levers 5 push against the shoulders 11 of the bar to move it toward releasing position. Bar 8 has a depending finger portion 12 which is notched, as at 13, to receive a stud or lug 14 carried on one portion 15 of a locking dog. The other portion of the locking dog is shown at 16 and both por-

tions are pivotally mounted on post 17. This locking dog is of usual form and is associated with suitable bolt work in the usual manner. Dog portion 16 carries a pivoted latch 18, the upper end 19 of which is adapted to disengageably enter a notch 20 provided in the dog portion 15. The latch 18 has also a heel portion 21 which, when the locking dog portion 16 is depressed, strikes against a casing wall 22 in such a way as to throw the pawl 18 out of engagement with the dog portion 15. When the dog portion 16 is in released or depressed position (as shown in Fig. 2), the protected structure may be opened in the regular manner, and when the locking dog is in raised position (as shown in Fig. 1), the protected structure may not be opened.

In the embodiment shown in Figs. 1 to 5, inclusive, there is a spindle 23 rotatably mounted through the door wall 24, or the like, of the structure to be guarded. An operating knob 25 is secured to the outer end of this spindle and a cam or eccentric stop member 26 is connected with the inner end of the spindle. The time lock controlling dial knob 25 is preferably threaded for a regular dial nut 27, and a special dial plate 28, suitably marked, as with a numeral zero and a numeral fifty on the center line, is associated with the knob 25. The spindle 23 has a squared outer end 29 which seats in a similar aperture in the knob 25. The knob and dial are preferably housed in a dial flange 30 of suitable metal, such as bronze, which is secured to the door wall 24, as by means of screws 31. The spindle 23 is preferably provided with an annular, enlarged shoulder portion 32 which seats in a similar recess in the door to prevent removal of the spindle 23 outwardly. The spindle mounting is preferably liquid proof to prevent insertion of explosives. A threaded plug 33 is preferably secured in the door wall 24 behind the shoulder 32 of the spindle 23 to prevent movement of the spindle inwardly of the door. The inner end of the spindle is preferably squared, as at 34, and there engages in a hub 35 on which the eccentric stop member 26 is attached. The hub 35 preferably has a squared end 36, which seats in a squared aperture in the stop member 26, and a screw 37, entering the hub 35, holds a washer 38 over the member 26 to retain it in position on the hub 35. The hub 35 is preferably attached through the movement supporting table 39. The spindle 23 is adapted to be turned by means of knob 25 to move the stop member 26 into and out of the path of movement of the slide bar 8. The slowly rotatable setting dials 2 are each provided with a pin 50 which are adapted to engage the heel portion 51 of the pivoted levers 5. During rotation of the dials, pins 50 strike the heel portions 51 and gradually pivot the levers 5 so as to gradually move the slide bar forwardly in unlocking direction. It is

understood that during the winding operation the setting dials 2 are turned in a counter-clockwise direction and set at the desired time interval, of say twenty four hours. The stop member 26 in the position shown in Figure 2 is rotated through 180° to the position shown in Figure 1, engaging the lug 12 and retracting the slide bar 8. The setting dials 2 rotate clockwise for the twenty-four hour period before pins 50 strike the heel portions 51 at a predetermined time stage prior to the releasing stage. When the stop member is in the position shown in Figure 1 slide member 8 is prevented from moving in unlocking direction and lever 5 prevents further rotation of the dial 2. The running down of the time lock is thus suspended indefinitely and only after stop member 26 has been rotated to the position shown in Figure 2 can the time dial 2 continue its running down movement to the final releasing stage. Levers 5 are then pivoted gradually, as described above, to move the slide bar forwardly in unlocking direction. When the stop member 26 is placed in the path of movement of the slide bar 8, it is adapted to arrest and stop movement of this slide bar in unlocking direction before the locking dog 15, 16 is released. The stoppage of bar 8 prevents further movement of time lock levers 5 and through levers 5 the time lock movements are stopped before they have run to the releasing stage. By turning the spindle 23, however, the stop member 26 may be withdrawn from behind the bar 8, thus releasing the bar 8 and the levers 5 for continuation of their movements, whereupon the time lock movements resume functioning and run for the remainder of the time for which they were set, and at the end of such time the slide bar 8 arrives at releasing position and its finger 12 is disengaged from the stud 14 of the locking dog, which now moves into inoperative position and permits the protected structure to be opened in the regular manner. It is understood that as the slide bar 8 moves toward unlocking position, notch 13 gradually withdraws from pin 14, finally disengaging therefrom. The time required for notch 13 to withdraw from the pin 14 (the suspended stage) is of course determined by the depth of the notch which may be of any depth desired.

A time lock of the character above described is capable of operating in several different ways, and is capable of adjustment for each. For instance, by placing and leaving the stop member 26 out of the path of the slide bar 8 (as by moving knob 25 to zero), the time lock may be adjusted to run continuously for a certain definite time for which it is set, and at the end of such time will automatically release the locking dog 15, 16 and place the protected structure in condition for being opened in the regular manner at any time thereafter. In this condition of adjustment the time lock

operates in the well known manner. It is sometimes desirable to use this adjustment for protection over comparatively long periods of time and when it is known in advance at exactly what time the opening of the structure is desired. This adjustment is, therefore, sometimes desirable for protection over night, or over a week-end or holiday.

However, if it is thought best not to have the protected structure placed in condition for being opened at the end of the period for which the time lock is set, then the stop member 26 is placed and left in the path of the slide bar 8, as by placing knob 25 at "fifty". Now, at a certain time before the time lock reaches releasing stage, its operation will be stopped by the eccentric stop member 26, thus maintaining the structure locked for an indefinite time beyond the time for which the time lock is set. In order to open the protected structure, the stop member 26 must be removed from engagement with the slide bar, as by turning knob 25 to zero, thus permitting the time lock to resume operating, and thereafter a length of time, preferably between twenty to forty minutes, must elapse before the time lock reaches releasing stage. After the time lock has run through this suspended stage, the protected structure may be opened in the regular manner.

For daytime protection or for protection against robbery during business hours, the time lock may be normally adjusted so that the slide bar 8 is stopped by the stop member 26. This may be accomplished by winding the time lock for a comparatively short period of time whenever it is closed and locked and placing the stop member 26 in operative position, as by turning knob 25 to "fifty". The slide bar 8 is then soon stopped by the stop member 26 and the operation of the time lock is suspended while in protecting position. If opening of the protected structure is desired, the knob 25 is turned to "zero" to withdraw stop member 26 from bar 8, whereupon the time lock resumes running and after the time required for the time lock to run to releasing stage, preferably twenty to forty minutes, the structure may be opened in the regular manner. The fact that the protected structure may not be opened at once at any time during business hours but requires a wait of from twenty to forty minutes after the adjustment of the knob 25 to "zero", results in efficient protection against robbery, since it is hardly possible that robbers could wait successfully for the twenty to forty minutes required before the protected structure can be opened. Before the time lock so releases the locking mechanism, it will be futile to attempt to open the safe in the regular manner on account of the position of the locking dog 15, 16. In addition, the robbers must be familiar enough with the construction to know

how to release the time lock to resume running, or must compel some person to make this necessary adjustment. The structure, if locked, must also be unlocked in the regular manner. When an authorized person desires to open the structure for business purposes, a delay of from twenty to forty minutes is entailed, but this is not objectionable in view of the protection secured against robbery.

The time lock is wound and set in the regular manner, as by means of a key operating on the stems 4. The time lock operates independently of the regular locks, such as the combination locks, and the regular locks may be set up without in any way affecting the dogging or controlling mechanism of the time lock.

Referring to Fig. 6, a slightly modified construction may comprise the elimination of the spindle 23, and its knob and dial, and the eccentric stop member 26, and the substitution therefor of a latch lever 40 which is pivotally mounted as at 41. This lever has two arms, one of which, 42, has a shouldered end adapted to be removably placed in the path of travel of the slide bar 8, so as to arrest and stop its movement before it has moved a sufficient distance to release the locking dog. The end of the other arm 43 of this lever is in the path of movement of the bolt lug 44 of the regular lock, such as combination lock 45. A suitable spring 46 yieldingly holds the end of arm 43 against the lug 44. Whenever the lug 44 moves (as to the left in Fig. 6) due to the regular operation of the regular lock mechanism 45, the lever 40 will be moved on its pivot 41 and its end 42 will be withdrawn from the path of travel of the bar 8, and the time lock mechanism is permitted to continue its final movement, preferably requiring twenty to forty minutes, to place the locking dog 15, 16 in releasing position. Preferably, a key 47, provided with a square stem 48 adapted to the regular time lock winding key, is pivotally mounted on the casing, and is adapted to be adjusted into engagement with the lever arm 43 to hold the other arm 42 thereof permanently out of the path of the bar 8. Thus the time lock may be adjusted to operate in the regular way without the daylight hold-up feature. This method eliminates the extra hole through the door and the extra spindle with the extra flange dial and knob on the front of the door. The operation of this modified construction will be readily apparent. The operation is substantially the same as that of the controllable time lock first described, except that whenever the regular lock is set up, the time lock mechanism is released to run for its final period, preferably between twenty and forty minutes, and the safe may be opened in the regular manner when such interval of time has elapsed subsequent to the setting up of the

combination. When the regular lock includes a combination lock, either modification of the construction may be employed.

It will be readily apparent that the time lock controlling stop member 26 or lever 40 may be arranged to stop the slide bar 8 and to suspend the operation of the time lock while in protecting condition at any arbitrary time before releasing stage, and thus the period of time required for the running of the time lock from its release by the stop member 26 or lever 40 to its releasing stage may be arbitrarily predetermined, and such period of time is not necessarily limited to between twenty or forty minutes, as referred to above, but may be arranged to be longer or shorter, as desired.

Preferably all vaults, safes, chests, or other structures protected by a controllable time lock of the above character should be plainly marked to that effect, and prominent notice thereof should be displayed so that robbers will know that it is impossible for anyone to open the protected structure or structures immediately, and thus possibly forestall an attempt at robbery.

As many changes could be made in the above construction and as many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim is:—

1. The combination with a structure to be protected, and a time lock associated with said structure and including a movable releasing slide bar controlling the opening of the structure, of a movable stop member for said slide bar, and means operable to move said stop member into and out of the path of movement of said slide bar, for controlling the operation of said time lock.

2. The combination with a structure to be protected, and a time lock associated with said structure and including a movable releasing slide bar controlling the opening of the structure, of a movable stop member for said slide bar, and means operable to move said stop member into and out of the path of movement of said slide bar, for controlling the operation of said time lock, said means being operable from the exterior of the structure.

3. The combination with a structure to be protected, and a time lock associated with said structure and including a movable releasing slide bar controlling the opening of the structure, of a movable stop member for said slide bar, and means operable to move said stop member into and out of the path of movement of said slide bar, for controlling the operation of said time lock, said means

being operable from the exterior of the structure and including an element on the exterior of the structure and an operative connection between said element and said stop member.

4. The combination with a structure to be protected, and a time lock associated with said structure and including a movable releasing slide bar controlling the opening of the structure, of a movable stop member for said slide bar, and means operable to move said stop member into and out of the path of movement of said slide bar, for controlling the operation of said time lock, said means being operable from the exterior of the structure and including a combination lock mechanism.

5. The combination with a structure to be protected, a locking dog and a time lock associated with said structure and including a movable locking dog releasing member, of a movable stop member for said releasing member, and means connected with said stop member and operable from the exterior of said structure for placing said stop member into and out of operative relation with respect to said releasing member, whereby said means control the movement of said releasing member into releasing position and the running down of said time lock into its releasing stage.

6. In a device of the character described, in combination, a time lock, including a movement and a slide bar connected with said movement for interdependent movement therewith, means movable into a certain position to dog said slide bar to prevent movement of said bar before reaching releasing position and thereby to stop the running of the time lock at a certain stage prior to its releasing stage, said means being movable out of said position to free said slide bar to permit the running of said time lock to its releasing stage, and to permit said time lock to move said slide bar into releasing position, and means for placing and holding said movable means in and out of said position.

7. In a controllable time lock of the character described, in combination, a time lock movement, a lever associated with said movement for interdependent movement therewith, a slide bar associated with said lever for movement thereby, a locking dog associated with said slide bar and controlled thereby, an adjustable stop member adapted to be placed in and removed from the path of movement of said slide bar, whereby the movements of said slide bar and said lever and the running of said time lock movement are governed to control the locking dog in accordance with the adjustment of said stop member, and means for placing said stop member into and out of the path of movement of said slide bar.

8. In a controllable time lock of the char-

acter described, in combination, a time lock movement, a lever associated with said movement for interdependent movement therewith, a slide bar associated with said lever for movement thereby, a locking dog associated with said slide bar and controlled thereby, an adjustable stop member adapted to be placed in and removed from the path of movement of said slide bar, whereby the movements of said slide bar and said lever and the running of said time lock movement are governed to control the locking dog in accordance with the adjustment of said stop member, and means for placing said stop member into and out of the path of movement of said slide bar, said means including a combination lock having a movable bolt lug in engagement with said stop member, whereby the position of said bolt lug determines the position of said stop member.

9. In a controllable time lock of the character described, in combination, a time lock movement, a lever associated with said movement for interdependent movement therewith, a slide bar associated with said lever for movement thereby, a locking dog associated with said slide bar and controlled thereby, an adjustable stop member adapted to be placed in and removed from the path of movement of said slide bar, whereby the movements of said slide bar and said lever and the running of said time lock movement are governed to control the locking dog in accordance with the adjustment of said stop member, and means for placing said stop member into and out of the path of movement of said slide bar, said means including a combination lock having a movable bolt lug in engagement with said stop member, whereby the position of said bolt lug determines the position of said stop member, the engagement between said lug and stop member being severable, and means separate from said means and adapted to be moved into engagement with said stop member to hold said stop member out of the path of movement of said slide bar irrespective of the positions of said bolt lug.

10. The combination with a slide bar, of a time lock mechanism, of a stop member co-acting with said slide bar, said stop member being rotatable to retract said slide bar and to normally assume a position preventing forward movement of the slide bar in unlocking direction, and adjustable into position permitting forward movement of the slide bar.

11. The combination with a structure to be protected, and a time lock associated with said structure, the lock being adjustable as to its protective running time, of control means adjustable beforehand to stop the running down of the time lock at a certain time interval prior to the completion of the run irrespective of the length of time run



to which the lock has been set, and adjustable to release the lock to complete its run, and means whereby a person may adjust said control means from the exterior of the  
5 protected structure.

12. The combination with a structure to be protected, and a time lock associated with said structure, the lock being adjustable as to its protective running time; of a control  
10 device associated with the time lock and

adapted to be set beforehand to stop and suspend indefinitely the running down of the time lock at a predetermined time stage prior to the releasing stage, said mechanism being adjustable to permit the time lock thereafter to resume and to complete its run to  
15 releasing stage.

This specification signed this 3 day of March, 1924.

EDGAR M. BENHAM.