

June 12, 1934.

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1,962,933

TIME LOCK

Filed March 23, 1929

3 Sheets-Sheet 1

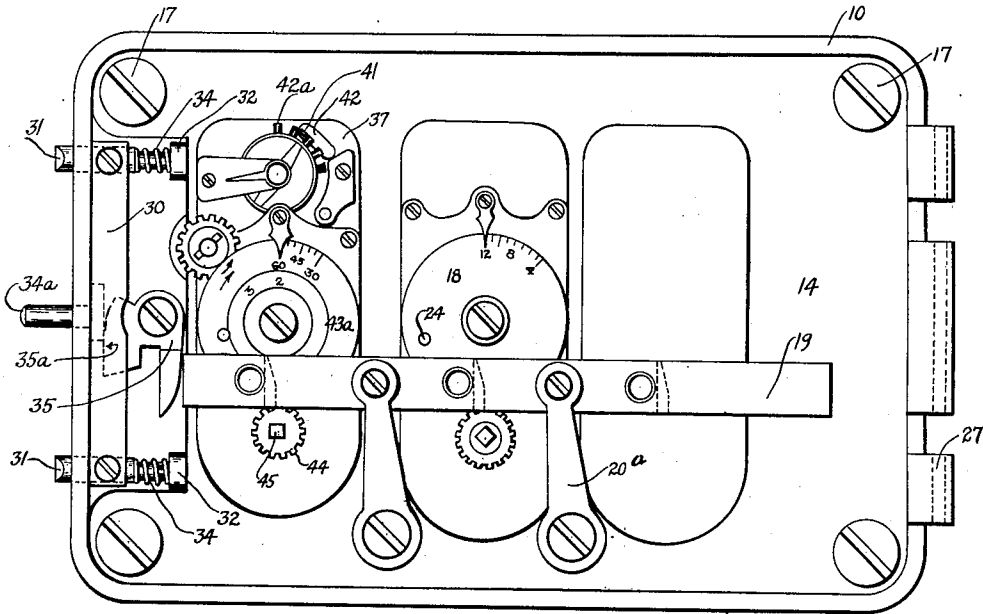


*Fig. 1*

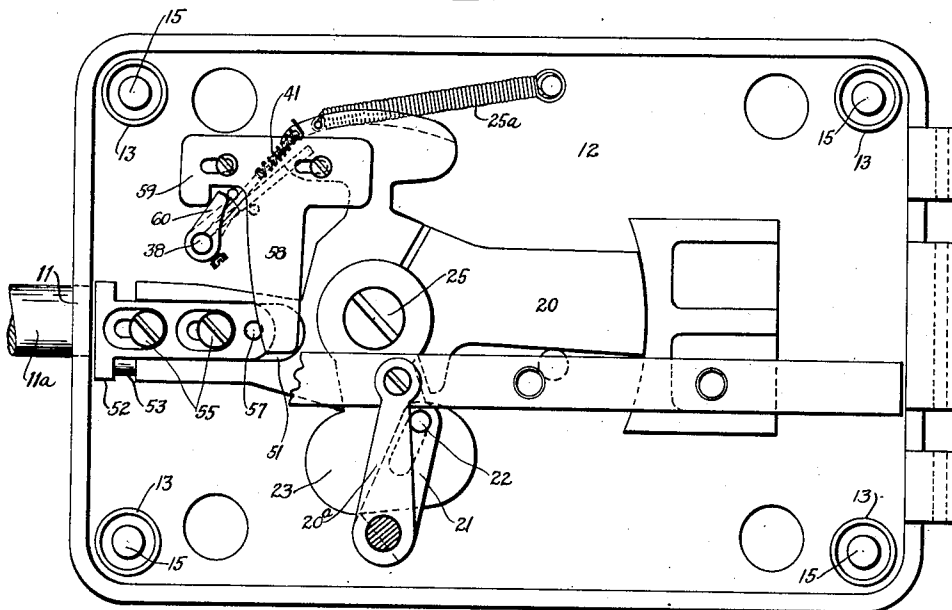


*Fig. 2*

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3 Sheets-Sheet 2

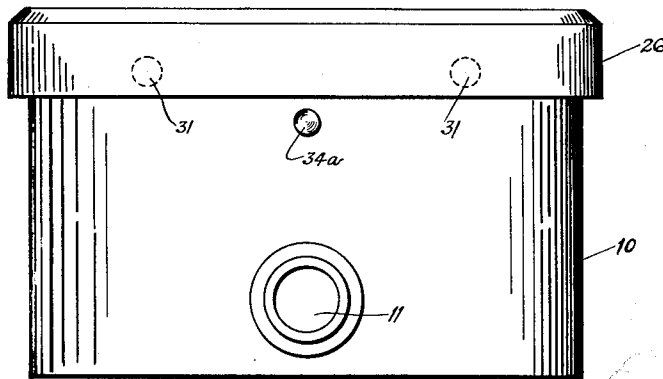


*Fig. 3*

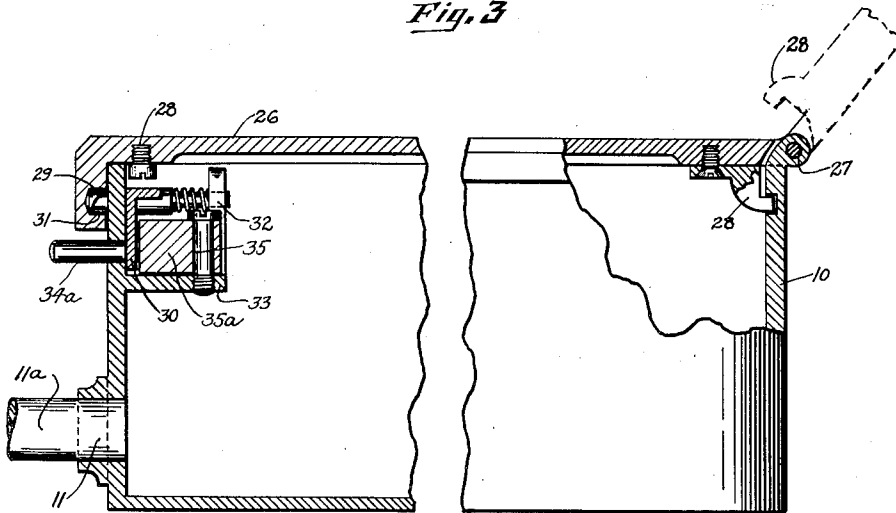


*Fig. 4*

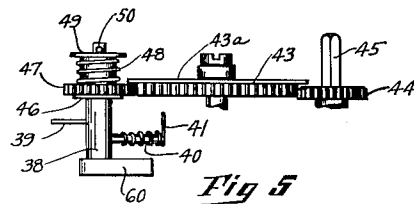


*Fig. 5*

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3 Sheets-Sheet 3

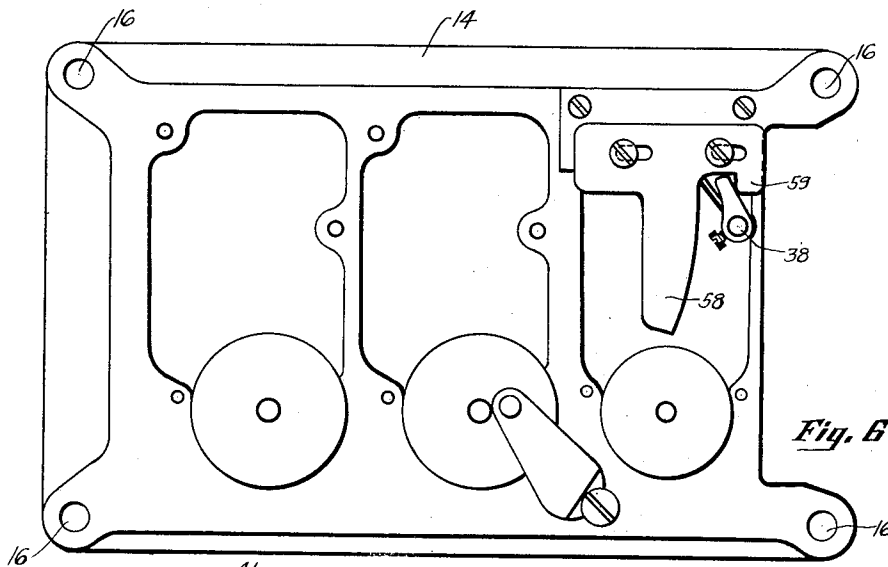


*Fig. 6*

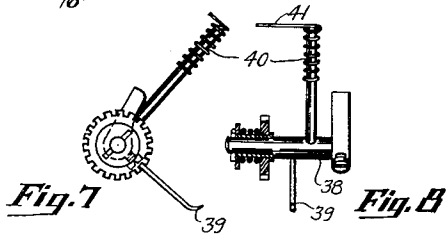


*Fig. 7*

*Fig. 8*

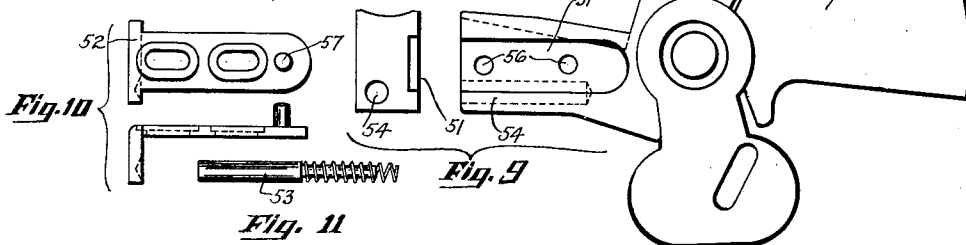


*Fig. 10*

*Fig. 9*

*Fig. 11*

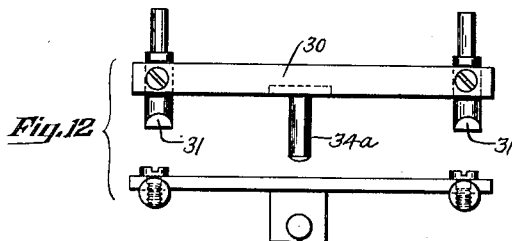


*Fig. 12*

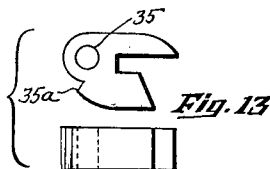


*Fig. 13*

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## UNITED STATES PATENT OFFICE

1,962,933

## TIME LOCK

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Application March 23, 1929, Serial No. 349,434

39 Claims. (Cl. 70—26)

This invention, relates to locks of the type, adapted to control the opening and closing of a safe door.

In recent years, it has become the practice of bank robbers to hold up the employees of a bank during office hours and then facilitate their escape by locking those employees in the safe vault. This practice is of course extremely inhuman and might easily mean the death of the employees due to suffocation. In order to safeguard the lives of the bank's personnel, safe makers have provided vaults with certain ventilating openings whereby the persons locked in may obtain sufficient air during such time as is necessary to open the vault and permit them to leave. This practice, however, is not very desirable, since it weakens the safe structure and leaves an opening whereby a night attack on the vault is facilitated.

It has also become the practice of safe makers to provide some sort of interior locking mechanism within the vault to permit the exit of the employees through a secret door. This method of safeguarding the lives of the bank employees is also subject to criticism on the ground that it weakens the safe structure. Moreover, both of the above expedients are expensive and difficult to install.

My invention relates to a slight modification in the time lock structure whereby the safe door may be locked open for an indefinite period so that it cannot be closed to lock in the employees in case of robbery. I am thus able to provide a safe door with the usual type of time lock, plus an extra attachment on the time lock only, to obtain the various functions heretofore accomplished only by more expensive and complicated structures, without the incidental weakening of the bank vaults usually incident to the use of the same.

More specifically, my invention relates to the utilization of the existing safe bolts for the purpose of locking the safe door open. This utilization of the safe bolts is possible under the general principle of providing mechanism on the inside of the door which makes it impossible to operate the safe bolt structure by any manual manipulation from the inside. In the particular embodiment of the invention described in this application, I use the regulation time lock for controlling the bolt but supply a locking cover for the same, this locking cover being controlled by time mechanism so as to lock the cover against opening by anyone until a certain definite time has expired.

Referring more particularly to the drawings in which my invention is shown in detail, it will be noted that Fig. 1 is a top view of my time lock casing with the casing cover removed. Fig. 2 is a view of the bottom plate of the time lock casing and the locking mechanism mounted thereon, this view showing also the bolt obstructing detent and the time operated mechanism for controlling the same. Fig. 3 is an end view of the time lock casing showing the cover in place. Fig. 4 is a section of the casing, showing the locking mechanism for the cover, and the cover re-enforcing means, a cut-away portion of the cover being shown in open position. Fig. 5 is a detailed view of the automatic movement stopping device. Fig. 6 is a rear view of the movement carrying block, showing also the movement controlling slide. Fig. 7 is a top view of the movement dogging device and Fig. 8 is a side view of the same. Fig. 9 is a plan view of the bolt obstructing detent, and a detailed view of the end of the bolt obstructing portion. Fig. 10 shows the bolt operated slide carried by the bolt obstructing detent. Fig. 11 is a view of the plunger for controlling the bolt operated slide. Fig. 12 is a plan and side view of the spring pressed casing cover locking mechanism. Fig. 13 is a plan and side view of the dog for dogging the casing cover bolts.

Referring more particularly to Figs. 1, 2, and 3, the time lock casing is represented at 10 and the same is provided in one wall with an opening 11, through which the usual boltwork 11a may enter. The bottom of the casing shown at 12 is equipped with four upstanding studs 13, which are adapted to support the movement block 14, shown in Fig. 6. The studs 13 are equipped with shoulders and screw threaded pockets 15, the movement block 14 being equipped with perforated portions 16, adapted to fit over the shouldered portions of the studs 13. The screws 17, shown in Fig. 1, are then adapted to hold the movement block in place.

As shown, this movement block is adapted to support three movements, although any number may be used. The two movements on the right only one of which is shown are the usual time lock movements adapted, through their dials 18, to operate the detent release bar 19 to control the bolt obstructing detent 20 shown in Fig. 2. This bolt obstructing detent 20 is controlled by the bar 19 through the arms 20a, 21, the pin 22 carried by the arm 21, and the slotted lower bar portion 23 of the detent. Thus, when the regulation movements run through the period of time to which they are set, the dials 18 through their pins

24 will act to move the release bar 19 to the right. This bar through the means just described, acts to rotate the bolt obstructing detent 20 counter-clockwise about its pivot 25 and against the pressure of spring 25a to remove the same from the position opposite the bolt hole 11, so that the bolt may enter when retracted in the usual manner. All this construction is of the usual type and forms no part of my invention.

10 In adapting the usual time lock casing for the purpose of my invention, I use the cover locking construction shown in Figs. 1 and 4 wherein the casing cover is shown both in locked and in cut-away open position. This cover 26 is hinged at 27 and is equipped with certain safety devices 28 and 29 so that it will be difficult to pry the same loose forcibly. A pair of bolt sockets 29 are provided in this cover, a pair of spring pressed bolts 31 being adapted to enter into these sockets to lock the cover in shut position. This bolt mechanism consists of a bar 30, shown in Fig. 12, this bar having the two bolts 31 fixed thereto. These bolts 31 are mounted in the bearing portion 32 of a bracket 33 integral with the front casing wall. The springs 34 act to press this locking assembly in an outward locking direction. A push rod 34a is fixed to the cross-bar 30 to retract the same when it is desired to open the casing. A gravity dog 35 having a weighted portion 35a is adapted to dog the locking mechanism when actuated in a locking direction by the detent release bar 19. The time lock casing is always adapted to be mounted in a vertical plane, so that when the release bar 19 is moved to the right prior to withdrawing the bolt obstructing detent from obstructing position, the dog 35 will be permitted to drop by gravity due to the action of the weighted portion 35a to release the casing cover locking mechanism.

40 Because of this relationship, between the locking mechanism of the casing cover and the detent operating mechanism, it is readily seen that the time lock movement will be adapted to control the casing lock as well as the main locking bolts of the safe.

45 At this time, it can be appreciated that if the safe door were permitted to be held locked open by the main movements it would be impossible to close the safe door until those movements had run their full extent. Such operation would be impossible, however, since the two main movements are usually set 24 hours ahead each morning so as to open the following morning. I have, therefore, further adapted the usual time lock for my particular invention by substituting for the usual third movement a special movement 37.

This special or emergency time movement 37 is equipped with a special balance and a specially calibrated dial and may be set in the usual manner to withdraw the detent bar by means of its connection with the release bar 19. Because of its fast moving parts, the movement 37 is very sensitive and may be set to release the detent bar within a minimum of a very few minutes. Ordinarily, the banker will set this auxiliary movement in the morning for any length of time he desires, for instance, 30 minutes, and will then set the main dials for the following morning. The time lock cover will then be closed and when the bolts are thrown the casing cover will lock. This will permit the fast running movement to operate to release the casing cover and remove the obstructing detent 20 to permit retraction of the bolts within the 30 minute period. During the period, the regular safe bolts will therefore operate to lock

the door open, and at the same time the time controlled casing lock will prevent any tampering with the time lock.

However, even this action is undesirable, since, if the time movement 37 is permitted to start running the moment the safe bolts are thrown, it will be able to withdraw the obstructing detent 20 after the period for which it is set, and will permit the safe door to be closed. This would give a certain definite period during which the robbers could safely attack the bank and lock the safe door in the same manner as if there was not in existence, the added protection brought about by my invention. I have, therefore, provided my auxiliary time movement with a movement stop which is normally operative to hold the movement at rest until such time as it is desired to retract the safe bolts. At that time, by an operation, which will be described later, the movement may be started to withdraw the detent and permit the casing cover to be opened for the manual manipulation of the time lock.

This auxiliary movement control is called a day stop and is more particularly shown in Figs. 7 and 8. This structure consists of a spindle (38) having affixed thereto a stop arm 39, which is adapted to mesh with a gear of the movement to hold the same in a stopped position. In order to insure the starting of the movement when the stop is released, this stop assembly is further equipped with an arm 40, about which is wound a coiled wire 41. The end of the wire is adapted to come through a slot 42 adjacent the balance of movement 37 (shown in Fig. 1) and co-operate with the balance wheel 42a. Thus, when the day stop is thrown into released-position the wire 41 will act to throw the balance wheel so as to give it an initial starting momentum.

In order to insure that upon winding the auxiliary time mechanism 37, the day stop 38 will be thrown into active position, I provide an automatic device, shown in detail in Fig. 5. In that Fig. 43 represents a gear under the dial 43a of my auxiliary movement, and 44 is a gear on the winding arbor 45. The spindle 38 carries thereon, a shoulder 46 which supports a small gear 47. This gear 47 is pressed frictionally into engagement with this shoulder by a spring 48, held in position by a washer 49 and a pin 50. Thus, when the winding arbor 45, is actuated to set the dial of the movement, the gear 43 will operate through the gear 47 and its frictional connection with the spindle 38 to actuate the spindle in a direction wherein the stop-arm 39 will be actuated into a movement stopping position.

Referring now to Figs. 2, 9, 10 and 11, I show the mechanism whereby I control this movement stopping mechanism from the outside of the time lock casing. The bolt obstructing detent 20 is equipped with a groove 51 in which is adapted to slide the member 52. A spring pressed plunger 53 is maintained in a bore 54 in the detent and is adapted to urge the slide 52 in an outward direction. A pair of screws 55 are adapted to enter the screw threaded holes 56 to limit the movement of the slide 52. This slide 52 is further equipped with an upstanding pin 57 which cooperates with a release slide 58. This release slide 58 is mounted on the rear of the movement block as shown in Fig. 6 and has a shoulder 59 thereon adapted to actuate a shoulder 60 which is fixed to the stop spindle 38. This mechanism operates in a manner which may be explained more clearly by reference to Fig. 2. In that figure the stop mechanism is shown in full lines in its active

movement stopping position while the dotted lines indicate it in its release position.

The slide 52 is shown in its most outward position against the casing wall and adjacent to the bolt hole 11. If the usual combination of the safe be now set up, the attempted retraction of the bolt 11a would actuate the slide 52 rearwardly against the resistance of its plunger 53, and the pin 57 would act against the release slide 58 which in turn would actuate the shoulder 60 through its portion 59 to move the stop spindle to the release or dotted line position. In moving to this dotted line position, the wire 41 would act, of course, to impart a starting movement to the balance. The auxiliary time movement 37 would then act in the usual way to withdraw the detent 20 from its bolt obstructing position and also remove the release bar 19 from the position of Fig. 1 to permit the gravity dog 35 to drop, so as to allow for the retraction of the casing lock bolts 31 to allow for the opening of the time lock casing. The entire operation is as follows:

When the banker arrives in the morning, the two main movements have acted to withdraw the bolt obstructing detent 20 from obstructing position, the auxiliary movement 37 having been unwound at the end of the previous day, so that the banker may set up his combination lock and retract his bolts. He then sets the main movements to operate to open the next morning and his auxiliary movement 37 to open in an interval of 30 minutes. During this operation of the auxiliary movement, the automatically operating mechanism of Fig. 5 has moved the spindle 38 to stopped position to hold the movement 37 inoperative. He then closes the casing cover 26 and throws the safe bolts with the door in open position. When the bolts are thrown the release bar 19 moves to the position of Fig. 1 and through the dog 35 acts to maintain the casing cover lock operative.

The situation now is that the doors are locked open and the time lock is inaccessible for any manual manipulation. If it becomes desirable during the day to close the safe, it is only necessary to set up the combination lock, and attempt to retract the bolts. This attempted retraction will actuate the slide 52 and this slide through its pin 57 will move the release slide 58, which will in turn move the stop spindle 38 to the released position, all as has been explained previously.

My invention thus makes it possible to utilize the usual fine safe locking mechanism for the additional purposes already explained. While I have shown one embodiment of my invention with the casing lock closely associated with the safe bolt locking mechanism, it should be understood that my invention may be embodied in a separate unit and in other ways all within the scope of the appended claims.

I claim:

1. In a time lock having the usual locking mechanism and time mechanism enclosed in a casing, a lock for said casing, time mechanism within said casing adapted to control said lock, and means external of said casing for starting the operation of said mechanism.

2. In a time lock, a casing, a lock for said casing, mechanism within said casing adapted to control said lock, said time lock including a bolt obstructing detent, and means carried by said detent for controlling said mechanism.

3. In a time lock, a locking bolt, a casing, a bolt obstructing detent in said casing, a lock for

said casing, time mechanism within said casing adapted to control said lock, and means carried by said bolt obstructing detent and operable by the bolt to control said time mechanism.

4. In a time lock, a casing adapted to be secured to a structure to be time controlled, a lock for said casing, an obstructing detent in said casing by which said structure is controlled, and means in said time lock adapted to release said casing lock and withdraw said detent from obstructing position.

5. In a time lock, a casing, a bolt obstructing detent, means for locking said casing, a time movement, and means operable by said time movement for withdrawing said detent from bolt obstructing position and releasing said casing lock.

6. In a time lock, a bolt obstructing detent, a plurality of movements, means of connection between said detent and movements whereby said movements may withdraw said detent from bolt obstructing position, a casing for said time lock, a lock for said casing, said lock being also controlled by said means of connection.

7. In a time movement assembly, a bolt, a casing, a time lock in said casing adapted to control the movement of said bolt to locking and unlocking positions, a lock for said casing, and means whereby said time movement may also control said casing lock.

8. In a time lock assembly a bolt, a casing, a time movement in said casing adapted to control the movement of said bolt to locking and unlocking positions, a lock for said casing, and means whereby said time movement may control the locking and unlocking of said casing while controlling the movement of said bolt.

9. In a time lock, a bolt obstructing detent, a plurality of movements, a release bar actuable by said movements to withdraw the detent from bolt obstructing position, a casing for said time lock, a lock for said casing, said release bar being operable to control said casing lock.

10. In a time lock, a casing and lock therefor, a bolt obstructing detent bar, a time movement for controlling said casing lock, a stop mechanism for said time movement, and means carried by said detent bar adapted to be operated to move said stop mechanism to release the time movement.

11. In a time lock, a casing adapted to be secured to a structure to be locked, a lock for said casing, a bolt, a bolt obstructing detent bar within said casing, a time movement adapted to render said casing lock inoperative, said movement being normally maintained ineffective, control means for said movement carried by the bolt obstructing detent bar, said control means being operable by attempted retraction of the bolt to render said time mechanism effective.

12. In a time lock, a bolt obstructing detent, a time movement for withdrawing said detent from bolt obstructing position, a casing and a casing lock for said time lock adapted to render the same inaccessible, time controlled means within said casing for releasing said casing lock, said means being normally inoperative, and means carried by said detent and operable by the bolt to render said time controlled means operative.

13. In a time lock, time controlled lock mechanism including a bolt obstructing detent bar and a bolt, a casing and a lock therefor, an emergency time movement adapted to control said casing lock, a stop mechanism including means to engage the moving parts of said movement and

- hold the latter at rest, a member mounted on the detent bar and adapted to be actuated by the bolt, said member being co-operable with said stop mechanism for operating the latter to release the emergency time movement when the bolt is moved in an unlocking direction.
14. In a safe, a door, means on said door adapted to prevent closing of the same, said means being manually operable to permit closing of the door, and time controlled means adapted to render said means inaccessible for manual operation.
15. In a safe, a door, means on said door adapted to prevent closing of the same, said means being operable to permit closing of the door, and a time controlled casing adapted to render said means inaccessible for operation.
16. In a safe, a door, a bolt, means for throwing said bolt when the door is in open position, time controlled means for preventing retraction of the bolt so as to prevent closing of the door, and additional time controlled mechanism for preventing manipulation of said first named timed means.
17. In a safe, a door, a bolt adapted to be thrown to prevent closing of said door, a time lock, means operable by said lock to prevent retraction of said bolt by manipulation on either side of the safe door, and a casing and casing lock for said time lock controlled by a movement thereof.
18. In a safe, a door, a bolt adapted to prevent closing of the same, a time lock adapted to prevent retraction of said bolt, a casing for said time lock and a lock for said casing, time mechanism adapted to control said casing lock, and means operable by the bolt for controlling said time mechanism.
19. In a safe, a door, a bolt adapted to be thrown to lock said door in open or closed position, a time lock for controlling said bolt, a casing and casing lock for said time lock to prevent manipulation of said bolt from the inner or outer side of said door, and means operable by a movement of said time lock to release said casing lock.
20. In a safe, a door, a bolt adapted to be thrown to lock said door in open or closed position, a time lock, a detent operable by said lock to prevent retraction of said bolt, a casing for said time lock, and a lock for said casing, controlled by a movement of said time lock to prevent manipulation of said bolt.
21. In a safe, a door, a bolt adapted to prevent closing of said door, a time lock, mechanism controlled by said lock to prevent retraction of said bolt by manipulation from either side of the safe door, means operable by a movement of said time lock to permit manipulation of said bolt after a predetermined time of effective operation, control means for maintaining said movement ineffective to operate said mechanism, said control means being operable by attempted retraction of the bolt.
22. In a safe, a door, a bolt adapted to prevent closing of said door, a time lock, a time lock casing to prevent retraction of the bolt by manipulation of the time lock from either side of the safe door, a casing lock, means operable by a movement of said time lock to release said casing lock and allow manipulation of said bolt after a predetermined lapse of time, control means for maintaining said movement ineffective to operate said mechanism, said control means being operable from the outside of the casing to render said movement effective.
23. In a time lock, a casing, a bolt obstructing detent, a time movement for withdrawing said detent from bolt obstructing position, a casing lock, said movement being adapted to control said casing lock in conjunction with the control exercised over the bolt obstructing detent.
24. In a time lock, a casing, a lock for said casing, a bolt, a bolt obstructing detent bar, a time movement operable to remove said detent bar from bolt obstructing position and render said casing lock inoperative, stop means for normally holding said movement inoperative, and release means adapted to be operated by the bolt to move said stop to release position.
25. In a time lock, a casing, a lock for said casing, a bolt, a bolt obstructing detent within said casing, means for actuating said casing lock and co-incidentally throwing the detent into bolt obstructing position, mechanism adapted to withdraw the detent from obstructing position and co-incidentally render said casing lock inoperative, and means for controlling said mechanism, said means being mounted on the bolt obstructing detent and adapted to be actuated by the bolt.
26. In the time lock, a bolt, a casing, a lock for said casing, a bolt obstructing detent within said casing, an opening in said casing adapted to permit entrance of the bolt when said detent is removed from obstructing position, means operating to throw the detent into bolt obstructing position and co-incidentally lock said casing, a time movement adapted to withdraw the detent from obstructing position and co-incidentally render said casing lock inoperative, control means for said time movement carried by said bolt obstructing detent, said control means being operable by attempted retraction of the bolt.
27. In a time lock, time controlled mechanism, a bolt obstructing detent bar, a bolt, a casing and casing lock for said mechanism, an emergency time movement adapted to operate said detent bar and render said casing lock inoperative, retaining means co-operable with said time movement to normally hold the same at rest, a member mounted on the detent bar to slide and to be engaged by the bolt, and means co-operable with said member and with said retaining means to release the time movement when said member is actuated by the bolt.
28. In a time lock, a casing, a bolt obstructing detent, a time movement for withdrawing said detent from bolt obstructing position after a relatively long interval of time, a second time movement for withdrawing said detent from bolt obstructing position after a relatively short interval of time, a lock for said casing, means associated with said casing lock and the bolt obstructing detent whereby said lock will be controlled by said movements in conjunction with the operation of the detent.
29. In a time lock, a casing, a lock for said casing, a bolt, a bolt obstructing detent within said casing, an opening in said casing adapted to permit entrance of the bolt when said detent is removed from obstructing position, means operating to control said casing lock and co-incidentally throw said detent into bolt obstructing position, a time movement adapted to withdraw said detent from obstructing position after a relatively long interval of time and co-incidentally unlock said casing, additional time controlled mechanism adapted to withdraw the detent and unlock said casing after a relatively short interval of time, said mechanism being normally inoperative.

tive, control means therefor carried by the bolt obstructing detent, said control means being operable by attempted retraction of the bolt.

30. In a time lock, a movement having a dial and winding arbor, a stop for said movement, and means actuated by the winding movement of said dial to move said stop to movement stopping position, lock mechanism controlled by said movement, and means operable by said locking mechanism, and independent of said stop actuating means, for moving said stop means to movement releasing position.

31. In a time lock, a movement, winding means for said movement, a stop mechanism for said movement, and means actuated by the winding means to move said stop mechanism to movement stopping position, lock mechanism controlled by said movement, and means controlled by said locking means for moving said stop mechanism to movement releasing position independently of said winding means.

32. In a time lock, a movement, a winding arbor, a dial having connection with said arbor to indicate setting time, a stop mechanism for said movement, and a driving connection between said dial and stop whereby when said dial is actuated by the winding arbor it will move said stop mechanism to movement stopping position.

33. In a time lock, a movement, a winding arbor, a dial for said movement having a geared connection with said arbor to indicate setting time, a movement stop, a friction clutch between said dial and stop, said dial being adapted when rotated to move said stop through the friction clutch to movement stopping position.

34. In a time lock, a release bar, a casing for said time lock, a bolt for locking said casing and a dog adapted to be operated by said release bar to dog said bolt.

35. In a time lock, a release bar, a casing for said time lock, a bolt for locking said casing, a gravity dog adapted to be normally in an inoperative position, said dog being movable into bolt dogging position by said release bar.

36. In a time lock, a casing, locking mechanism in said casing and time mechanism for controlling said locking mechanism, a lock for said casing whereby access to said locking and time mechanism is prevented, and time controlled mechanism within said casing adapted to control said lock.

37. In a time lock assembly, a casing, locking mechanism in said casing and time mechanism for controlling said locking mechanism, a lock for said casing whereby access to said locking and time mechanism is prevented, and time controlled means within said casing adapted to release said casing lock and permit manual manipulation.

38. In a safe, a door, a locking bolt to prevent closing of said door, a time lock including a bolt obstructing member, means for preventing manual operation of said time lock, and a movement of said time lock adapted to remove said member from obstructing position and render said means inoperative.

39. In a time lock, locking mechanism and time control means for controlling the operation of said mechanism, means for preventing manual operation of said time control means, a locking bolt, a bolt obstructing member constituting a part of said locking mechanism, and a movement of said time lock adapted to remove said member from obstructing position and render said first mentioned means inoperative.

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