

Sept. 5, 1933.

H. H. HOY ET AL

1,925,757

LIMIT LOCK

Filed June 7, 1927

4 Sheets-Sheet 1

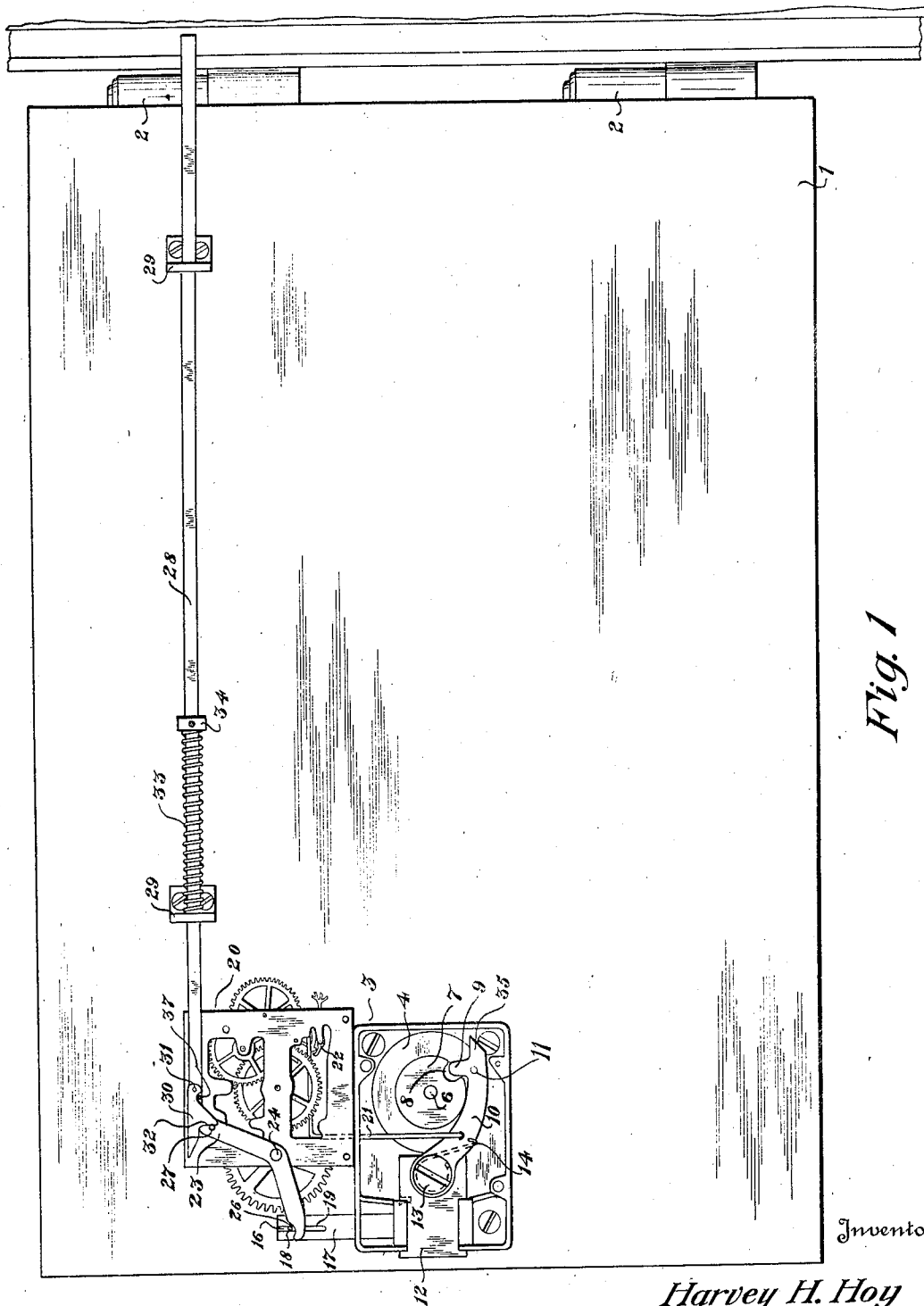


Fig. 1

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4 Sheets-Sheet 2

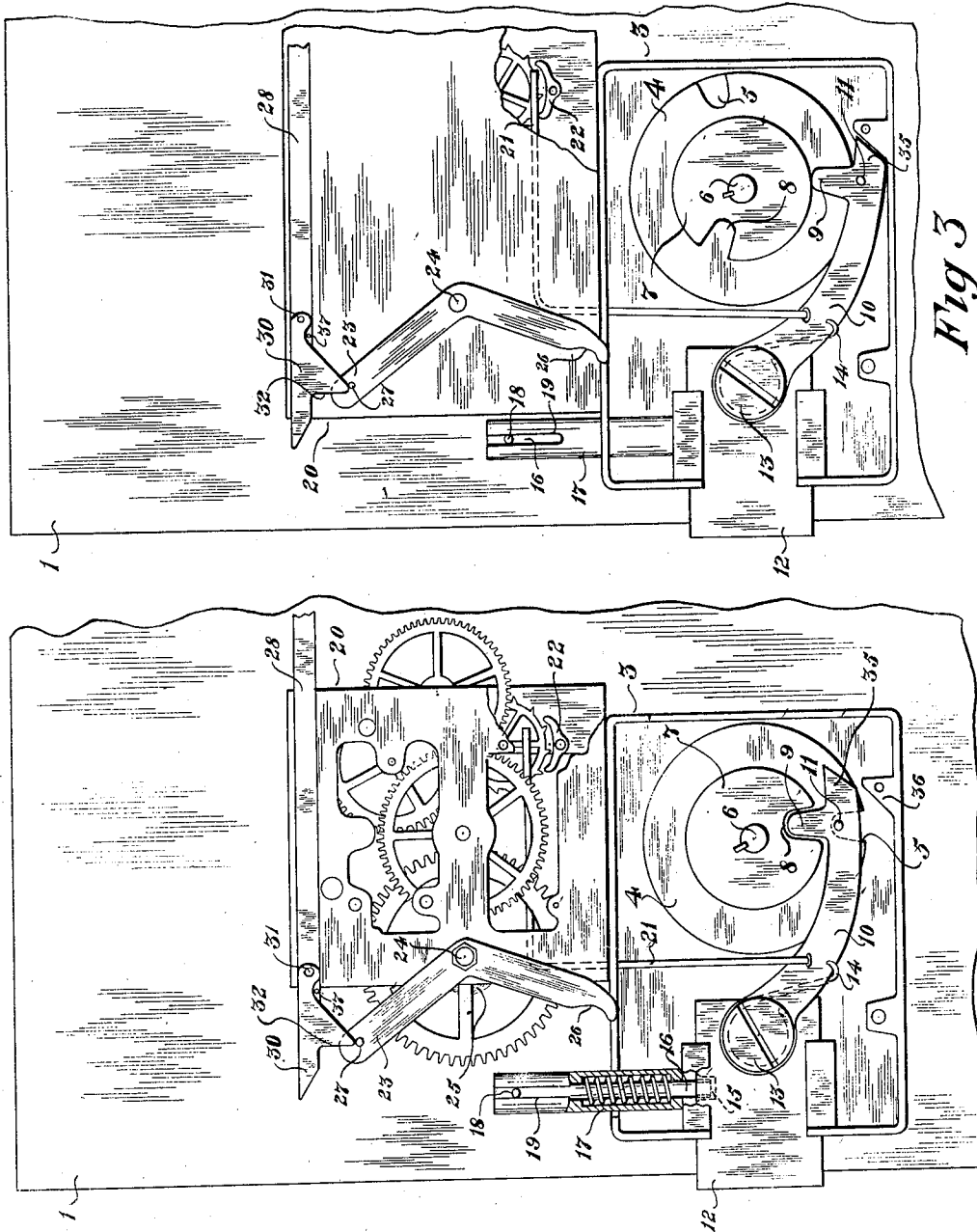


Fig. 2

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4 Sheets-Sheet 3

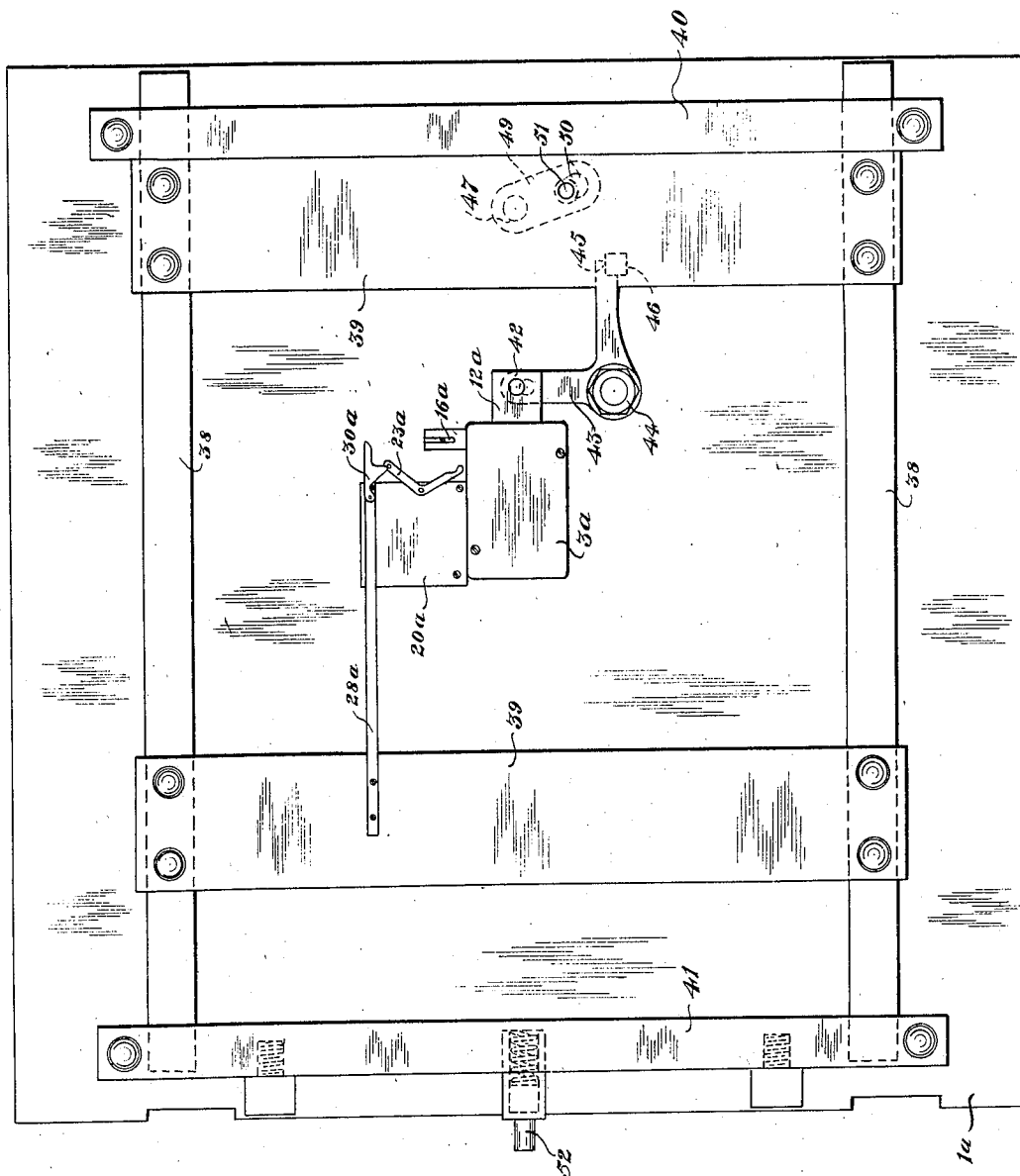


Fig. 4.

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4 Sheets-Sheet 4

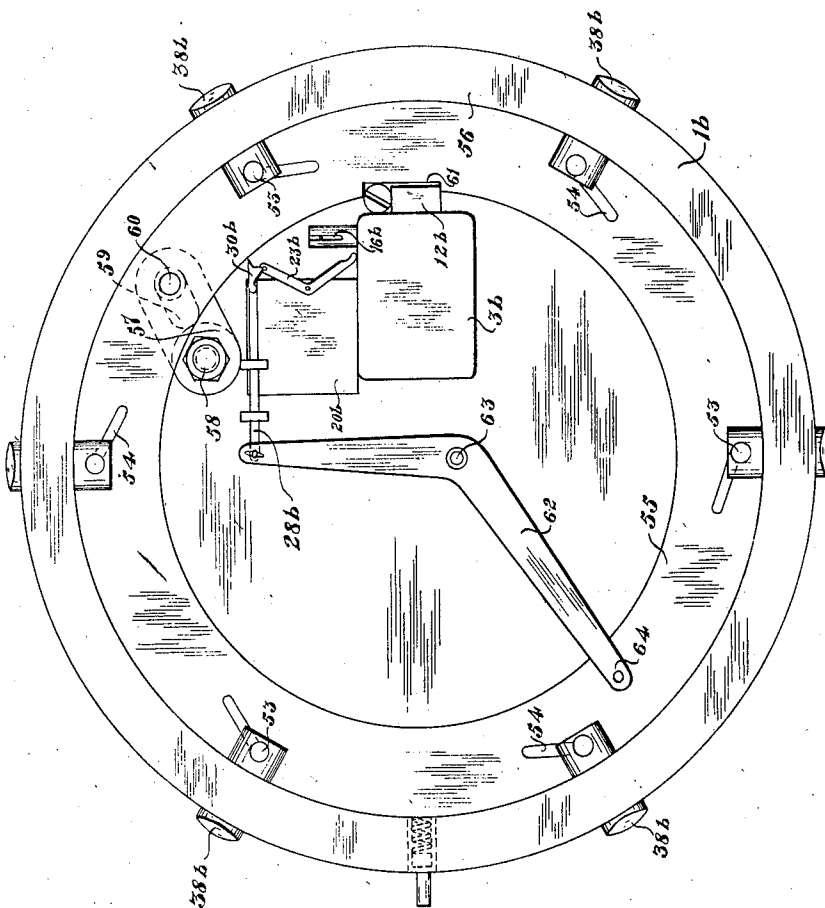


Fig. 5

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1,925,757

LIMIT LOCK

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Application June 7, 1927. Serial No. 197,056

14 Claims. (Cl. 70—26)

The invention relates to locks for the doors of safes and the like and more particularly to a lock provided with time mechanism which prevents opening of the locking mechanism until a predetermined time after the combination has been operated to open the safe.

The object of the improvement is to provide in combination with a safe door a lock controlled by a clockwork which is arranged to be wound by the closing of the safe door or the locking of the bolt or bolts and which is set in operation by setting the combination lock to unlock the safe, the bolt or bolts being held in locked position for a predetermined time after the combination lock has been set; means being provided for preventing the safe door from remaining closed without locking the same.

This construction is especially adapted for application to safes in gasoline filling stations and similar places where there is great danger of robbery, the construction being such that the safe cannot be hurriedly opened, it being necessary to wait for the clockwork to release the bolt or bolts before the door can be opened.

The time required for this operation of the clockwork may be ten or fifteen minutes or any other period of time which may be desired.

An embodiment of the invention is illustrated in the accompanying drawings, in which

Figure 1 is an interior elevation of a safe door with the improved limit mechanism applied thereto, the cover plate being removed from the lock and clockwork for the purpose of illustration, and the lock being shown in the unlocked position;

Fig. 2, an enlarged elevation of the lock and clockwork showing the parts in the position when the combination has been operated to start the clockwork;

Fig. 3, a similar view showing the lock in locked position and the clockwork held against movement by the friction spring carried by the lock;

Fig. 4, an interior elevation of a safe door provided with a standard form of bolt work showing the application of the invention thereto, and

Fig. 5, a similar view of a circular safe door showing the application of the invention thereto.

Similar numerals refer to similar parts throughout the drawings.

Referring first to the construction shown in Figs. 1 to 3 inclusive, a safe door is shown at 1 provided with the hinges 2 at one side edge. Lock mechanism, indicated generally at 3, which may be of any standard design of combination

lock, is located upon the inner side of the door adjacent to the swinging edge thereof.

This lock mechanism may be provided with the tumblers 4 each having a notch 5, said tumblers being rotatably mounted upon the spindle 6 and arranged to be operated by the usual combination dial.

The bolt operating disk 7 is mounted upon the spindle 6, which is arranged to be rotated by the usual knob (not shown). This disk is provided with the notch 8 arranged to receive the lug 9 upon the bolt slide lever 10, a pin 11 upon said lever being arranged to enter the notches 5 of the tumblers.

The bolt 12 of the lock is longitudinally slidably mounted therein and the bolt slide lever 10 is pivotally connected to the inner end of the bolt 12 by the screw 13, the usual spring 14 being provided for normally urging the lever upward.

The bolt is provided with a socket 15 to receive the spring pressed plunger 16 mounted in a tubular casing 17 supported in the housing of the lock, said plunger having a stud 18 which extends through the longitudinal slot 19 in the tubular casing 17.

Clockwork of any usual and well known construction is indicated generally at 20 and is mounted adjacent to the lock and a spring 21 is carried by the bolt slide lever for engagement with the escapement mechanism 22 of the clockwork to hold the same against operation when the bolt is in the locked position, as indicated in Fig. 3.

A lever 23 is fixed upon the shaft 24 of the main spring 25 of the clockwork. A notch 26 is provided in the lower end portion of this lever for engagement with the stud 18 upon the spring pressed plunger 16 and a stud 27 is located at the upper end portion of the lever.

For the purpose of winding the main spring of the clockwork, a rod 28 is slidably mounted upon the inner side of the door as through the lugs 29, and carries at its inner end a pawl 30 pivoted to the rod as at 31 and provided with a depending lug 32 for engagement with the stud 27 upon the lever 23.

A yielding coil spring 33 is interposed between one of the lugs 29 and a collar 34 upon the rod 28 for normally holding the rod in the position shown in Fig. 1, the outer end thereof extending beyond the hinged edge of the door.

As the safe door is closed it will be seen that this rod, by contact with the wall of the safe adjacent to the hinged edge of the door, will be forced into the position shown in Fig. 2 and

through the pawl 30 engaging the stud 27 upon the main spring winding lever 23, the lever will be rocked into the position shown in this figure and the main spring wound.

5 The spring pressure of the rod 28 against the inner wall of the safe will prevent the door from remaining in the closed position unless the knob (not shown) upon the spindle 6 is operated to move the bolt into the position shown in Fig. 2, thus obviating the danger of the safe door being closed and not locked.

When the door has been closed and locked, the parts will be in the position shown in Fig. 3, the bolt 12 being in locked position, the tapered end 35 of the bolt slide lever 10 being in contact with the tapered lug 36 upon the lock casing, and the tumblers 4 and bolt operating disk 7 being turned to positions where the notches therein will not register with the lug 9 and pin 11 upon the bolt slide lever.

In this position the spring 21 is pulled down into frictional engagement with the escapement mechanism 22 of the clockwork, preventing the clockwork from operating.

25 When it is desired to open the safe, the combination dial and knob (not shown) upon the spindle 6 are operated to turn the tumblers 4 and bolt operating disk 7 into position where the notches 5 and 8 thereon will register with the pin 11 and lug 9 respectively upon the bolt slide lever, permitting the same to be moved into the position shown in Fig. 2.

Further turning of the knob upon the spindle 6 is prevented as the bolt 12 is held against unlocking movement by the spring pressed plunger 16 engaging the socket 15 in the bolt.

However, by this raising movement of the bolt slide lever, the spring 21 will be raised out of engagement with the escapement mechanism 22 of the clockwork, permitting the clockwork to operate.

As the clockwork operates, the main spring 25 will slowly unwind and the lever 23 will be slowly moved from the position shown in Fig. 2 to that shown in Fig. 1, the notch 26 upon the lever finally engaging the stud 18 upon the spring pressed plunger 16 and withdrawing the plunger from engagement with the socket in the bolt 12 at which time, by a further rotation of the spindle 6, the bolt may be withdrawn to permit opening of the door.

The mechanism may be so adjusted that this operation will require a period of ten, twelve or fifteen minutes or more if desired, between the time that the combination is operated to set the parts in the position shown in Fig. 2 and the time when the spring pressed plunger releases the bolt.

Owing to the present danger of robberies of gasoline filling stations, such a device is especially adapted for use upon safes in such places, as it will hinder the thieves in opening the safe, making it necessary for them to wait for the clockwork to operate to release the bolt after the combination has been operated to put the clockwork in motion.

It should be noted that the pawl 30 which is pivoted at 31 upon the inner end of the rod 28 normally rests upon a stud 37, upon the rod, which prevents the pawl from dropping below the position shown in the drawings, although the same may be swung upward upon its pivot.

This is required for the withdrawing of the rod when the door is opened; as the lever will have assumed the position shown in Fig. 1 after

the clockwork has operated while the rod 28 remains in the position shown in Fig. 2 until the door is opened.

Thus as the door is opened, the spring 33 will force the rod outward, permitting the pivoted pawl 30 to ride over the stud 27 upon the lever as the rod and pawl are moved back to the position shown in Fig. 1.

Although the pawl and lever are shown for communicating winding motion from the rod 28 to the main spring shaft, it should be understood that this may be accomplished in any other suitable manner.

In Fig. 4 is shown an application of the invention to a safe door provided with a standard form of bolt work. In this form of the invention the door 1a is provided with a pair of bolt bars 38 connected together as by the tie bars 39 and slidably movable through apertures in the ribs 40 and 41 fixed upon the inner face of the door near the swinging and hinge edges thereof respectively.

The lock 3a may be the same as illustrated and described in Figs. 1 to 3 inclusive and the clockwork 20a may be the same as above described.

In the position shown in the drawings, the parts are in the locked position, the bolt 12a of the lock being in the outward position. This bolt is pivotally connected as shown at 42 to one arm of a bell crank lever 43 pivoted as at 44 upon the inner side of the door, the other arm thereof having a notch 45 in its free end for engagement with a stud 46 carried by one of the tie bars 39.

The bolt bars 38 may be arranged to be withdrawn by means of a spindle 47 extended through the outer side of the door and provided with a suitable knob (not shown). This spindle has fixed thereon a lever 49 having a slot 50 in its free end portion engaging a stud 51 upon one of the tie bars 39.

With the parts in the position shown in the drawings, the bell crank lever 43 engages the stud 46 upon the tie bar 39, preventing rotation of the spindle 47 to withdraw the bolt bars.

However, it will be seen that when the bell crank lever is disengaged from this stud, the spindle 47 may be rotated to withdraw the bolt bars.

The spring pressed plunger 16a and lever 23a are the same as illustrated and described with respect to Figs. 1 to 3 inclusive. The rod 28a is carried by one of the tie bars 39 and has the pawl 30a for engagement with the stud upon the lever 23a. In this form of the invention a spring pressed plunger 52 may be carried by the rib 41 for preventing the door from remaining in closed position unless the bolts 38 are in locked position.

It will be seen that in this form of the invention the main spring is not wound until the bolt bars 38 are moved to locked position, moving the rod 28a therewith and through the pawl 30a moving the lever 23a to the wound position.

When the combination upon the lock 3a is operated to unlock the door, the clockwork will be set in motion in the manner above described and after the desired time the lever 23a will engage the stud upon the spring pressed plunger 16a, raising the same out of engagement with the bolt 12a and permitting the bolt to be withdrawn as above described.

As the bolt 12a is withdrawn, the bell crank lever 43 will be rocked out of engagement with the stud 46 upon the tie bar 39, permitting the

spindle 47 to be rotated to release the bolt bars 38.

locked, and means operated by setting the lock for unlocking for starting said clockwork.

4. In combination, a door, lock mechanism including a bolt, means for normally preventing withdrawal of the bolt, clockwork associated with the lock and arranged to release the bolt, a spring pressed rod and means associated therewith operated by closing the door for winding said clockwork, and the spring pressed rod preventing the door from being maintained in closed position until the door is locked, and means operated by setting the lock for unlocking for starting said clockwork.

5. In combination, a door, lock mechanism including a bolt, means normally preventing withdrawal of the bolt, clockwork associated with the lock and arranged to release the bolt, means operated by setting the lock for unlocking for starting said clockwork, a winding lever upon the clockwork, and means operated by the closing of the door for operating said winding lever.

6. In combination, a door, lock mechanism including a bolt, means normally preventing withdrawal of the bolt, clockwork associated with the lock and arranged to release the bolt, means operated by setting the lock for unlocking for starting said clockwork, a winding lever upon the clockwork, and a rod operated by the closing of the door for operating said winding lever.

7. In combination, a door, lock mechanism including a bolt, means normally preventing withdrawal of the bolt, clockwork associated with the lock and arranged to release the bolt, means operated by setting the lock for unlocking for starting said clockwork, a winding lever upon the clockwork, and a spring pressed rod operated by the closing of the door for operating said winding lever.

8. In combination, a door, lock mechanism including a bolt, a plunger normally preventing withdrawal of the bolt, clockwork associated with the lock, a winding lever upon the clockwork, said winding lever being arranged to withdraw the plunger when the clockwork is operated, means operated by setting the lock for unlocking for starting said clockwork, and means operated by the closing of the door for moving said winding lever to the wound position.

9. In combination, a door, lock mechanism including a bolt, a plunger normally preventing withdrawal of the bolt, clockwork associated with the lock, a winding lever upon the clockwork, said winding lever being arranged to withdraw the plunger when the clockwork is operated, means operated by setting the lock for unlocking for starting said clockwork, and a rod operated by the closing of the door for moving said winding lever to the wound position.

10. In combination, a door, lock mechanism including a bolt, a plunger normally preventing withdrawal of the bolt, clockwork associated with the lock, a winding lever upon the clockwork, said winding lever being arranged to withdraw the plunger when the clockwork is operated, means operated by setting the lock for unlocking for starting said clockwork, and a spring pressed rod operated by the closing of the door for moving said winding lever to the wound position.

11. In combination, a door, lock mechanism including a bolt, means normally preventing withdrawal of the bolt, clockwork associated with the lock and arranged to release the bolt, means operated by setting the lock for unlocking for starting said clockwork, a winding lever upon the

In Fig. 5 is illustrated an application of the invention to a circular safe door. The door 1b is circular and provided with the radial locking bolts 38b, each of which has a pin 53 at its inner end engaging an angular slot 54 in the bolt operating ring 55 which is rotatably mounted within the rim flange 56 of the door, and arranged to be rotated by means of a slotted lever 57 fixed upon a spindle 58 which may be provided upon the outer side of the door with a knob (not shown).

The slot 59 in this lever engages a stud 60 upon the ring 55. By rotating the spindle 58 to the right, the bolts 38b will be radially moved into the locked position, as shown in Fig. 5, and by rotating the spindle in the opposite direction, the angular slots 54 in the ring will withdraw the bolts. The lock 3b and clockwork in the casing 20b may be the same as above described.

The clockwork is provided with the lever 23b arranged to engage the stud upon the spring pressed plunger 16b to withdraw the lock bolt 12b from the notch 61 in the ring 55.

As the ring 55 is rotated to the locked position, the winding lever 23b is arranged to be moved to the wound position. This may be accomplished by providing an angular lever 62 pivoted upon the door as at 63 and having one end pivotally connected to the ring 55, as shown at 64, the other end of the lever being pivotally connected to the bar 28b.

It will be seen that as the ring 55 is rotated to the locked position, the bar 28b will be slidably moved to the right, the pawl 30b thereon engaging the pin upon the lever 23b and moving the lever to the wound position, winding the main spring.

When the lock 3b is turned to the locked position, the bolt 12b will be projected into the notch 61 of the ring 55, preventing the ring from being turned to the unlocked position.

In the operation of this form of the invention, the lock 3b will be operated as in the other forms above described to start the clockwork and when the lever 23b has engaged the stud upon the spring pressed plunger 16b and raised the same out of engagement with the bolt 12b, this bolt may be withdrawn, permitting the ring 55 to be turned to the unlocked position to withdraw the lock bolts 38b.

We claim:

1. In combination, a door, lock mechanism including a bolt, means normally preventing withdrawal of the bolt, clockwork associated with the lock and arranged to release the bolt, means operated by closing the door for winding the clockwork, and means operated by setting the lock for unlocking for starting said clockwork.

2. In combination, a door, lock mechanism including a bolt, means normally preventing withdrawal of the bolt, clockwork associated with the lock and arranged to release the bolt, a spring pressed rod and means associated therewith operated by closing the door for winding the clockwork, and means operated by setting the lock for unlocking for starting said clockwork.

3. In combination, a door, lock mechanism including a bolt, means for normally preventing withdrawal of the bolt, clockwork associated with the lock and arranged to release the bolt, means operated by closing the door for winding said clockwork and for preventing the door from being maintained in closed position until the door is

clockwork, and means for automatically operating the winding lever to wind the clockwork when the door is moved to locked position.

12. The combination of a safe having a door, bolt work for securing the door, guard means for the bolt work operating to hold the same against release, a combination lock mechanism, timing mechanism arranged after operation for a predetermined period to release said guard means, means operated by closing the door for winding the timing mechanism, and means under the control of the combination lock mechanism including a part spaced from and independent of the guard means arranged upon destroying the combination to move into position to hold the timing mechanism in check.

13. The combination of a safe having a door, locking mechanism for the door, guard means movable to effect release of said locking mechanism, normally inactive timing mechanism having associated therewith a member arranged after the timing mechanism has been released

and operated for a predetermined period to move into operative engagement with the guard means to release the same whereby to release the locking mechanism, means operated by closing the door for winding the timing mechanism, and obstructing means arranged to hold the timing mechanism in check in advance of the movement of said member by the timing mechanism into position to engage said guard means, said obstructing means being operated to obstructing position after the door has been closed.

14. In combination, a door, lock mechanism including a bolt, means rendered operative by locking the door for preventing withdrawal of the bolt, clockwork associated with the lock, means operated by closing the door for winding the clockwork, means operated by the clockwork to release the bolt, and means operated by setting the lock for unlocking for starting said clockwork.

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