

S. KARSZ.
LOCK.

APPLICATION FILED MAR. 1, 1909.

944,268.

Patented Dec. 28, 1909.

2 SHEETS—SHEET 1.

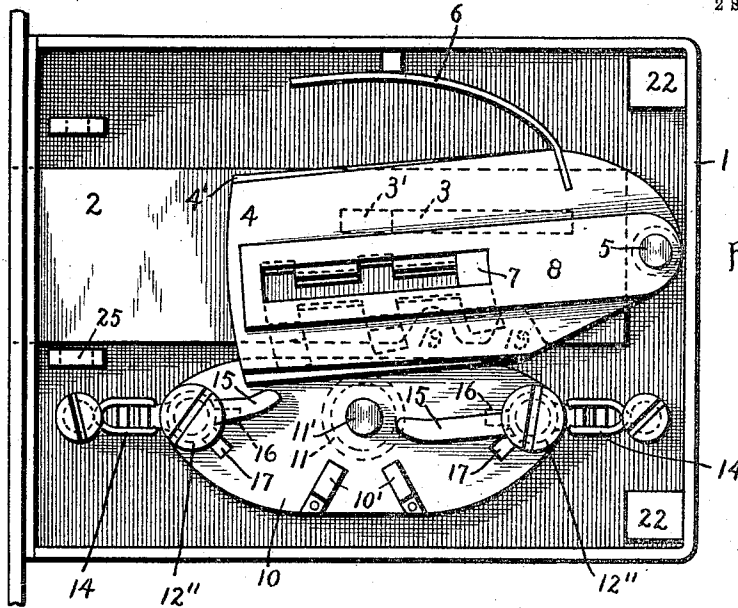


Fig. 1.

Fig. 2.

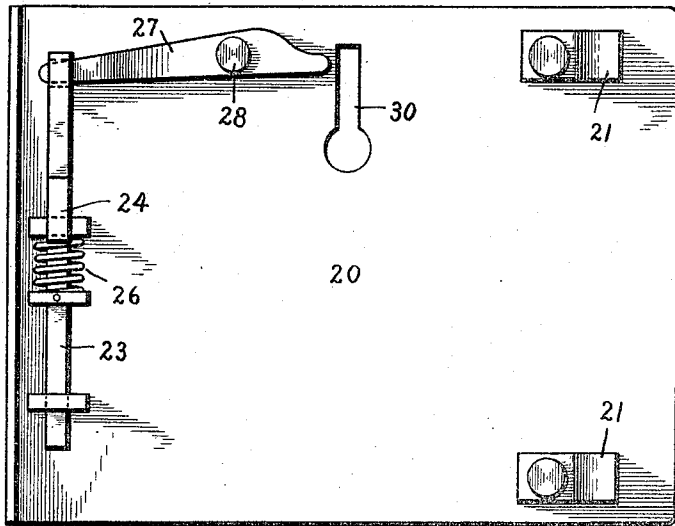


Fig. 3.

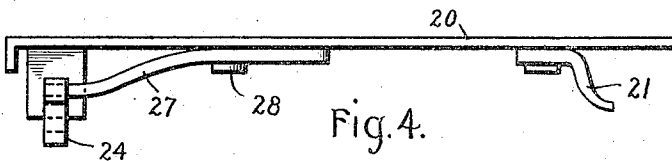
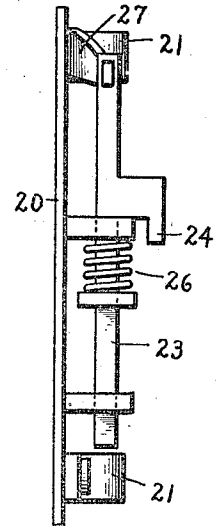


Fig. 4.

Witnesses
J. Ellis Glen
J. Earl Ryan

Inventor.
Stephen Karsz
by L. A. Hawkins
Atty.

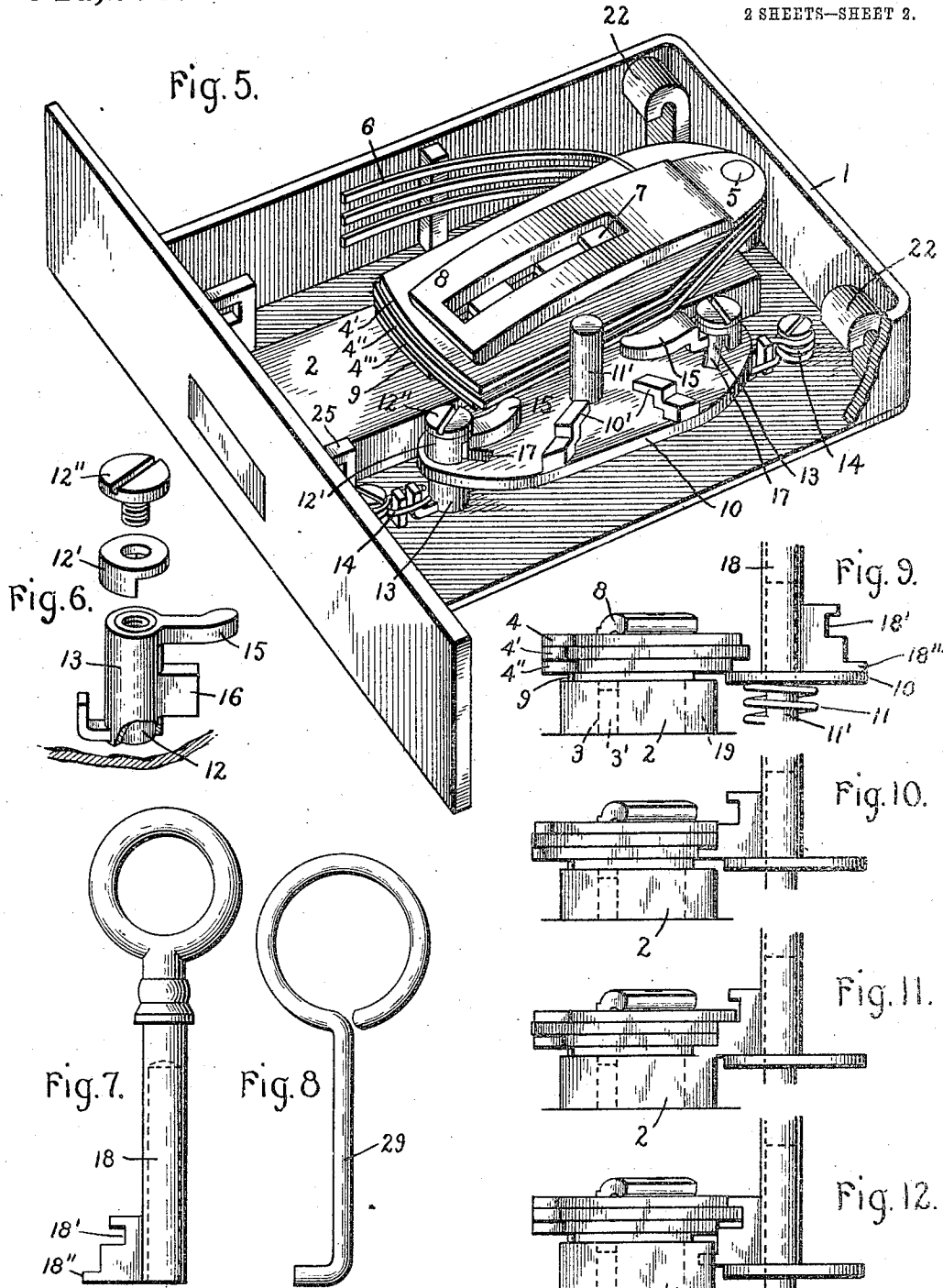
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2 SHEETS—SHEET 2.



Witnesses
J. Ellis Elen
J. Earl Ryan

Inventor.
Stephen Karsz
by L. A. Hanks
Atty.

UNITED STATES PATENT OFFICE.

STEPHEN KARSZ, OF SCHENECTADY, NEW YORK.

LOCK.

944,268.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, STEPHEN KARSZ, a subject of the Czar of Russia, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Locks, of which the following is a specification.

My invention relates to locks adapted for use on doors, cabinets, chests, trunks, etc., and its object is to provide a novel lock of simple and inexpensive construction adapted to be operated by an ordinary key, but possessing to some extent the characteristics of the well known combination locks in common use on safes. That is, the lock can be actuated only after certain preliminary movements of such a character that the chance of successful operation of the lock by one ignorant of the required movements is very small.

My invention will best be understood by reference to the accompanying drawings, in which—

Figure 1 shows a lock, with the cover plate removed, arranged in accordance with my invention; Fig. 2 shows the inside of the cover plate; Figs. 3 and 4 show edgewise views of the cover plate; Fig. 5 shows a perspective view of the lock with a portion of the casing broken away; Fig. 6 shows a perspective view of a detail; Fig. 7 shows the key for operating the lock; Fig. 8 shows the key for removing the cover plate; and Figs. 9, 10, 11 and 12 show the key in different positions relative to the bolt.

In the drawings 1 represents the casing in which is inclosed the sliding bolt 2 provided with a slot 3 and guide pin 3¹.

4, 4¹ and 4¹¹ are tumblers, pivoted at 5, and normally held by the springs 6 in the position shown. Each of these tumblers has three arc-shaped slots joined by a straight central slot as shown in full and dotted lines in Fig. 1. The arc-shaped slots are of different lengths in the three tumblers. A pin 7 carried by the bolt 2 is normally engaged by the upper end of one of the arc-shaped slots of each tumbler, so that the bolt is prevented from moving. The bolt can be shifted only when the tumblers are moved on their pivot against the pressure of springs 6 just far enough to bring the straight central slot of each tumbler into line with pin 7 and pivot 5. If any tumbler is moved too far on its pivot, pin 7 is locked by the lower end of one of its arc-shaped

slots. Slotted plates 8 and 9 are pivoted at 5 on opposite sides of the tumblers.

10 is a guard or plate which is placed immediately back of the keyhole, and which is pressed toward the keyhole by a compression spring 11, shown in dotted lines in Fig. 1 and also shown in Fig. 9. The guard 10 has a central opening, through which extends the pin 11¹ for receiving the key, and end openings entered by the pins 12, which are surrounded by collars 13 which are normally held in the position shown by springs 14. A cap 12¹ and screw 12¹¹ hold the collars on the pins. On each collar is a tongue 15 which lies on one side of the plate 10 and a rib 16 which lies on the other side of the plate. The tongues 15 receive the pressure on the plate 10 due to spring 11, and the ribs 16 normally prevent pressure exerted on the key from moving plate 10 against the pressure of the spring 11. The plate 10 has slots 17 adapted to receive the ribs 16, but the ribs are normally displaced from the slots. The plate 10 carries stops 10¹ which prevent any key being turned in the lock, except the proper key, the profile of which fits the stops.

The key is shown in Fig. 7. When the key is first inserted in the keyhole it occupies the relative position shown in Fig. 9, it being obstructed by the guard 10 from entering the lock far enough to engage the bolt. If the key is rotated in this position it cannot affect the bolt which lies in another plane, but can only move the tumblers, as shown in Fig. 10, and moves them so far that the pin 7 is then locked by the lower end of one of the arc-shaped slots. In order to bring the key into position to engage the bolt it is rotated in a counter clockwise direction until it engages and rocks the tongue 15 of the collar on the left hand pin 12 as viewed in Figs. 1 and 5. It cannot engage the tongue on the right-hand collar, for that tongue is in the plane of the recess 18¹ in the ward of the key. When the key has rocked the tongue 15 far enough so that it is about to slip past its end, the rib 16 is now brought directly below the slot 17. If the rotary movement of the key is continued from this point it simply releases the tongue 15 and allows the spring 14 to return the collar to its normal position. But if instead of continuing the rotary movement a pressure is exerted on the key along its axis, the rib 16 enters the slot 17 and the left-

hand end of guard 10 is depressed, partly compressing spring 11. The length of the tongue 15 is so proportioned that it is engaged only by the projection 18¹¹ on the ward of the key, and the distance between the tongue 15 and rib 16 (see Fig. 6) is made slightly greater than the thickness of the plate 10 plus the width of the projection 18¹¹, so that if sufficient pressure is exerted on the key to compress the spring 11 before the rib 16 is brought below the slot 17, the plate is simply pressed down against the rib 16 and the projection 18¹¹ slips under the tongue 15, so that the movement must be repeated. It will be noted that for producing the desired result the key must be brought to a predetermined position and then moved inward by pressure along its axis. The key is however not yet in position to engage the bolt, but, as shown in Fig. 11, can only shift the tumblers and shifts tumbler 4 not far enough and tumblers 4¹ and 4² too far to release the pin 7 on the bolt. Now, while the pressure on the key is maintained, it is turned in the opposite or clockwise direction until it engages and rocks the tongue 15 of the collar on the right-hand pin 12, the depression of one end of the guard having brought the projection just above the recess 18¹ into the plane of the tongue, so as to bring the rib 16 directly below the slot 17, when the pressure on the key causes the rib to enter the slot and the right-hand end of guard 10 to be depressed. Now, if the key is returned in a counter-clockwise direction, the pressure on it being maintained, it engages the left-hand notch 19 (shown in dotted lines in Fig. 1) in the bolt 2. The relative positions of key, bolt, and tumblers are shown in Fig. 12. It will be seen that the key is in position to shift the bolt while the tumblers are engaged by different portions of the ward of the key so that each is moved just far enough to bring its straight central slot into line with pin 7 and pivot 5, so that the bolt is free to move. The continued movement of the key therefore shifts the bolt one step, and a further complete turn of the key in the same direction causes the key to engage the second notch 19 and to shift the bolt a second step. Then when the key is withdrawn the pin 7 on the bolt is locked by the left-hand arc-shaped slot in the tumblers. If at any time before the bolt is shifted the pressure on the key along its axis is relaxed, the guard 10 is returned to its normal obstructing position by spring 11, ribs 16 are released from the slots 17 and the springs 14 return the collars 13 to their normal positions, so that the preliminary key movements must be repeated before the key can engage the bolt. Similarly, after the bolt has been shifted and the key removed, the guard 10 and collars 13 are returned to their normal posi-

tions and the preliminary key movements already described are necessary before the bolt can be engaged and slid back. The key movements for sliding the key back are the same as already described, except that after the guard 10 has been depressed, the key is turned two complete revolutions in a clockwise direction. The fact that the key must be brought successively to several positions through a series of unlike movements and a pressure maintained on it until the movements have been completed renders the lock practically inoperable by any one except those who understand the necessary combination of movements. Thus my construction offers in part the protection of the costly so-called "combination" locks, while it is simple in construction and cheap to manufacture.

In order to prevent access to the lock mechanism except by the proper persons, I employ the cover plate construction shown in Figs. 2, 3 and 4. The cover plate 20 carries at one side fixed lugs 21 adapted to pass under and be locked by fixed lugs 22 on the inside of the casing 1. The other side of the cover plate carries a member 23 sliding in suitable guides and having a lug 24 adapted to enter a hole (shown in dotted lines in Fig. 1) in a lug 25 fixed within the casing. A compression spring 26 normally holds member 23 in the position shown. When the cover plate is in position on the casing the lugs 21 are locked by the lugs 22 and the lug 24 by the lug 25. The locking means are thus all inclosed within the casing and cannot be released by any ordinary tools. For releasing the cover plate a member 27 is pivoted at 28 on the inside of the cover plate with one end engaging the member 23 and the other extending near to the keyhole 30, so that by inserting a suitable key 29 (see Fig. 8) the member 27 may be turned on its pivot so as to move member 23 against the pressure of spring 26, thereby disengaging lug 24 from lug 25.

I do not desire to limit myself to the particular construction and arrangement of parts here shown, but aim in the appended claims to cover all modifications which are within the scope of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

1. In a lock, a key, a bolt adapted to be shifted by said key, a guard normally obstructing the operation of the bolt by the key, and a plurality of stops normally preventing said guard from being moved by the key but adapted to be successively engaged and moved by the key to release the guard step-by-step.

2. In a lock, a key, a bolt adapted to be shifted by said key, a guard normally obstructing the operation of the bolt by the

key, a plurality of stops normally preventing said guard from being moved by the key but adapted to be successively engaged and moved by the key to release the guard step-by-step, and springs opposing the movements of said stops, said guard being adapted when moved step-by-step to lock the stops successively in releasing position.

3. In a lock, a key, a bolt adapted to be shifted by said key, a guard normally obstructing the operation of the bolt by the key, a plurality of stops normally preventing said guard from being moved by the key but adapted to be successively engaged and moved by the key to release the guard step-by-step, and a spring for holding the guard in its normal position and for returning it to said position when moved.

4. In a lock, a key, a bolt adapted to be shifted by said key, a guard normally obstructing the operation of the bolt by the key, a plurality of stops normally preventing said guard from being moved by the key but adapted to be successively engaged and moved by the key to release the guard step-by-step, a spring opposing the movement of said guard, and springs opposing the movements of said stops, said guard being adapted when moved against the spring pressure step-by-step to lock the stops successively in releasing position.

5. In a lock, a key, a bolt adapted to be shifted by said key, a guard normally obstructing the operation of the bolt by the key, and a plurality of stops normally preventing said guard from being moved by the key but adapted to be successively engaged by the key in different positions thereof and moved by the key in different directions into positions to release the guard.

6. In a lock, a key, a bolt adapted to be shifted by said key, a guard normally obstructing the operation of the bolt by the key, a plurality of stops normally preventing said guard from yielding to pressure exerted by the key but controllable successively by a series of predetermined and unlike key movements to release the guard to permit it to yield step-by-step to pressure exerted on the key in the direction of its axis, and a spring adapted to restore the guard to its normal obstructing position if the pressure on the key is relaxed before the series of

key movements is completed and the bolt shifted.

7. In a lock, a key, a bolt adapted to be engaged and shifted by said key, a guard normally held interposed between the key-hole and said bolt and preventing the key from engaging the bolt, a plurality of stops normally preventing said guard from being moved by the key but adapted to be successively engaged and moved by the key to release the guard step-by-step, and a stop carried by said guard having a profile fitting the ward of said key and adapted to prevent the turning of other keys in said lock.

8. In a lock, a key, a bolt adapted to be shifted by said key, a guard normally obstructing the operation of the bolt by the key, a plurality of stops normally preventing said guard from yielding to pressure exerted by the key but controllable successively by a series of predetermined and unlike key movements to release the guard to permit it to yield step-by-step to pressure exerted on the key in the direction of its axis, and a stop carried by said guard having a profile fitting the ward of said key and adapted to prevent the turning of the other keys in said lock.

9. In a lock, a key, a bolt adapted to be engaged and shifted by said key, a guard normally held interposed between the key-hole and said bolt and preventing the key from engaging the bolt, a plurality of stops adapted to be engaged and moved by said key in different positions thereof having projections engaging the side of the guard away from the key-hole preventing the guard from yielding to pressure exerted on the guard by the key, said guard being provided with slots through which said projections may pass when said stops are moved by the key so as to release the guard to permit it to yield step-by-step to pressure on the key, and springs normally holding said stops in position to prevent the yielding of said guard.

In witness whereof, I have hereunto set my hand this 20th day of February, 1909.

STEPHEN KARSZ.

Witnesses:

F. BLAKE PERRY,
HARRY MARTIN.