F. J. SUPER.

AUTOMATIC TAKE-UP LOCK FOR SAFES.

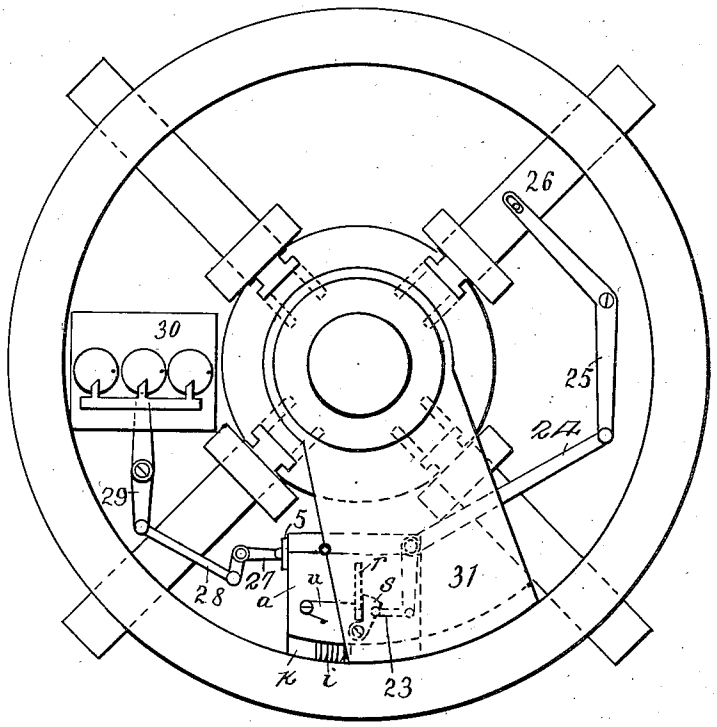
APPLICATION FILED APR. 7, 1910.

1,053,892.

Patented Feb. 18, 1913.

7 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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7 SHEETS—SHEET 2.

Fig. 3.

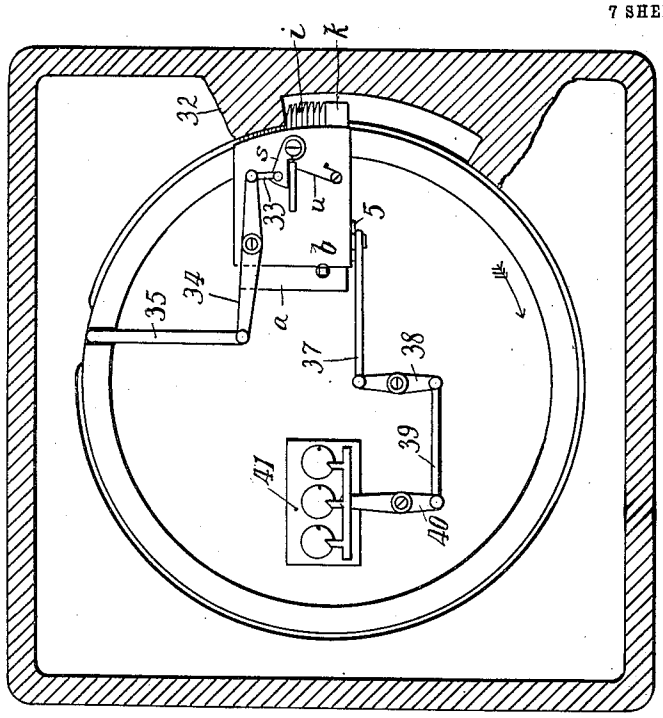
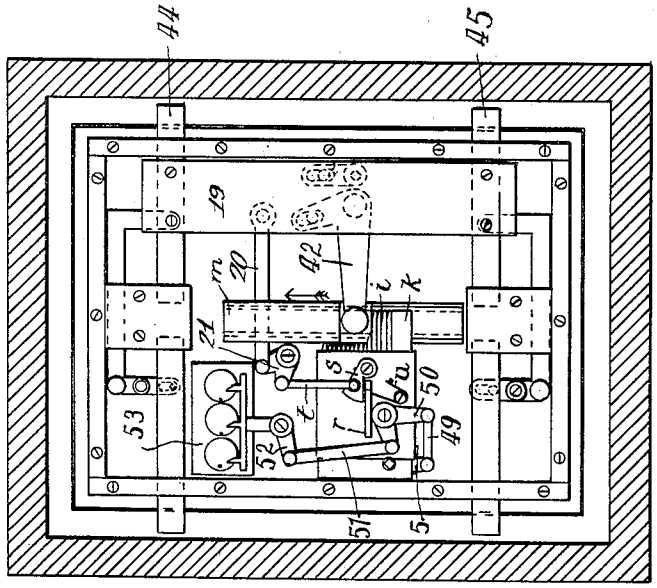


Fig. 2.



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7 SHEETS—SHEET 3.

Fig. 6.

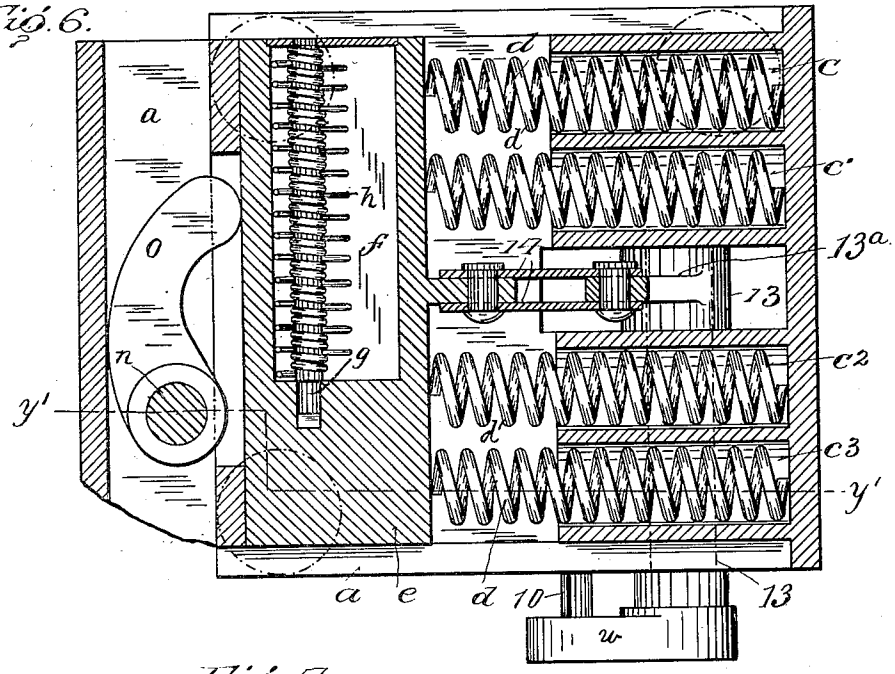
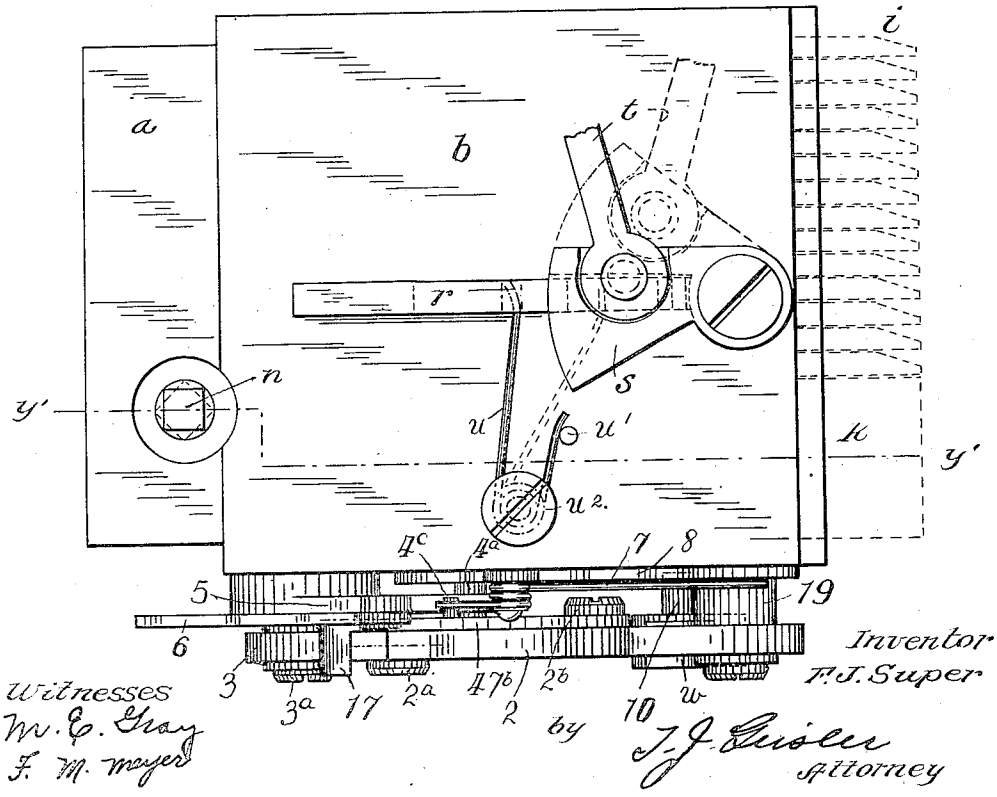


Fig. 4.



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AUTOMATIC TAKE-UP LOCK FOR SAFES.

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7 SHEETS—SHEET 4.

Fig. 7.

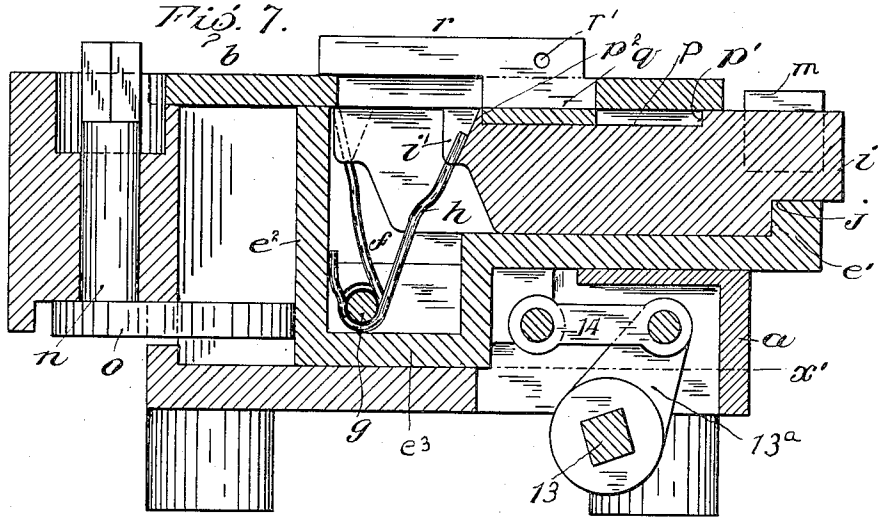
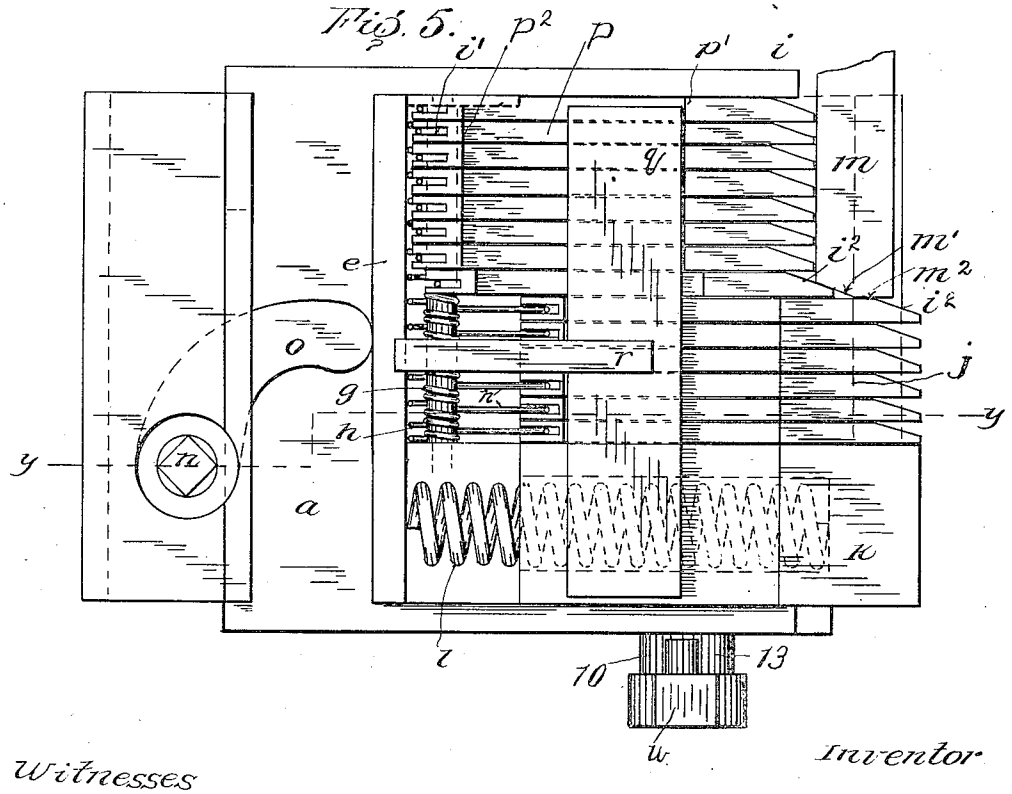


Fig. 5.



Witnesses

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7 SHEETS—SHEET 5.

Fig. 8.

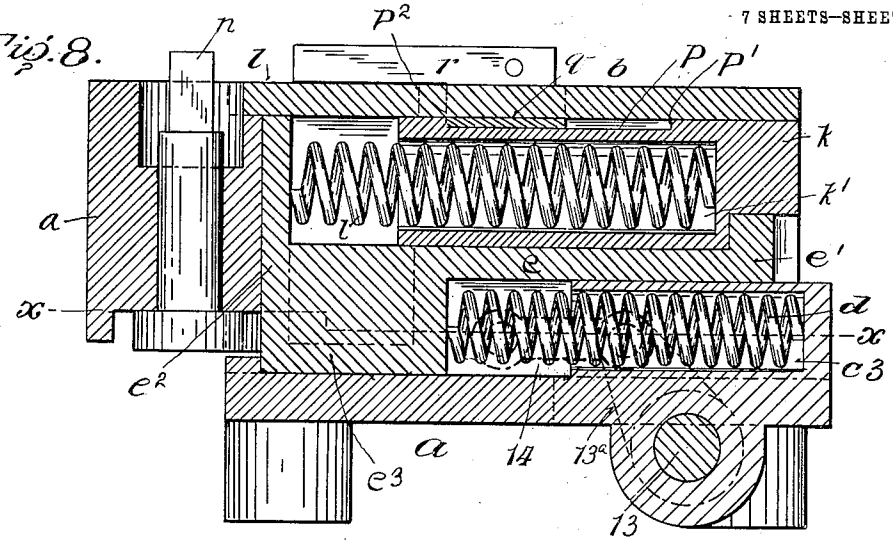
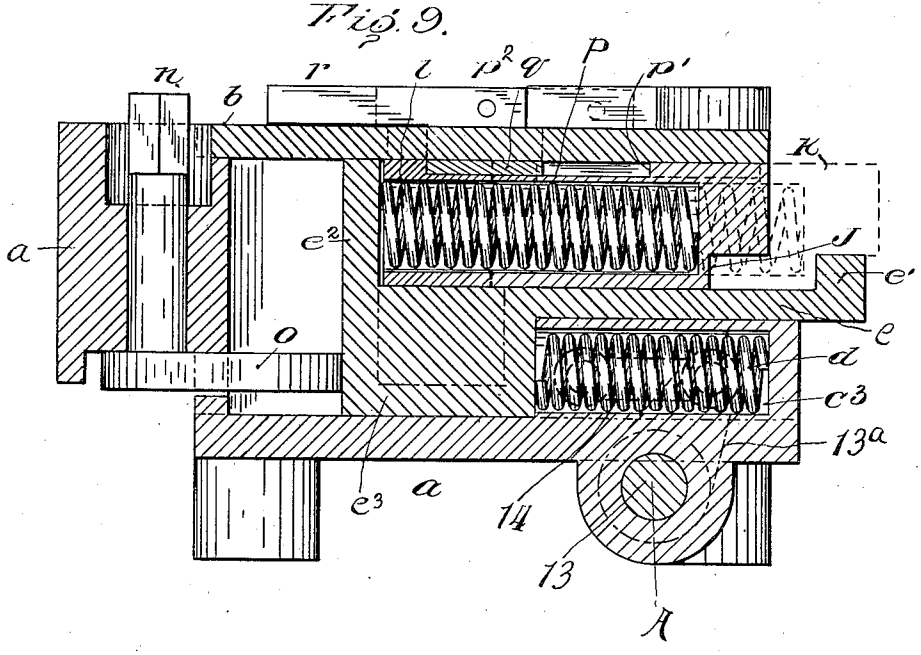


Fig. 9.



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7 SHEETS—SHEET 6.

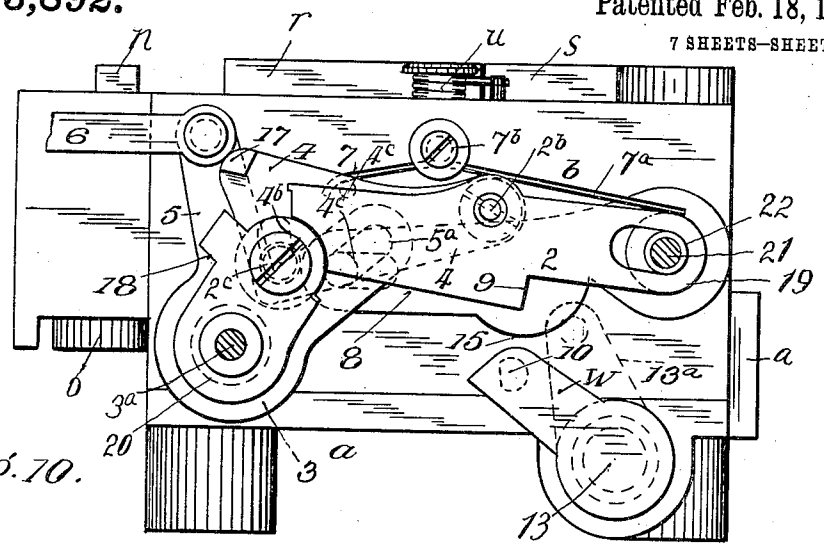
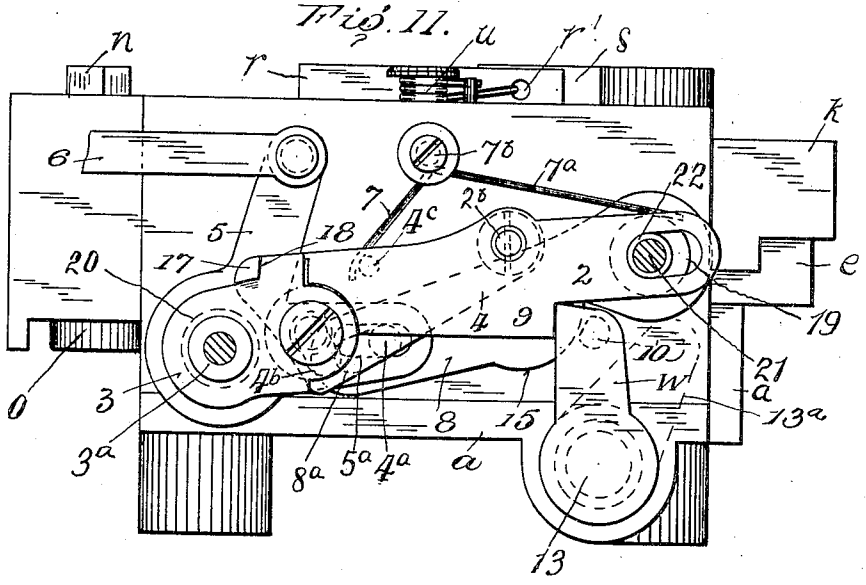


Fig. 10.

Fig. 11.



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7 SHEETS—SHEET 7.

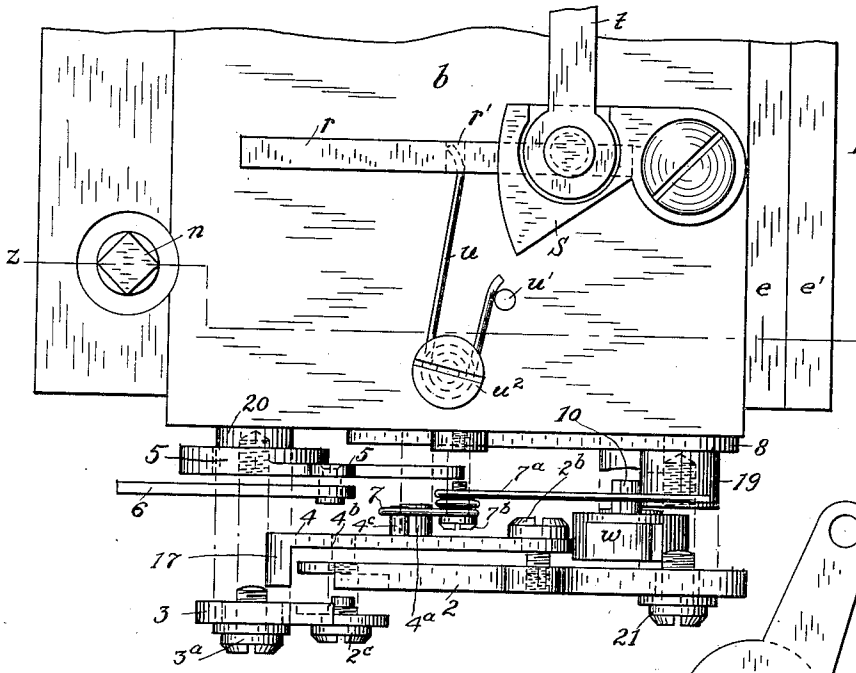

Fig. 12.

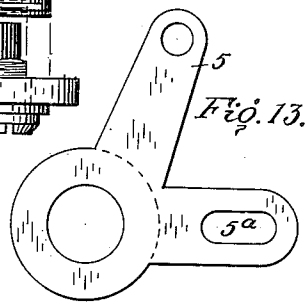

Fig. 13.

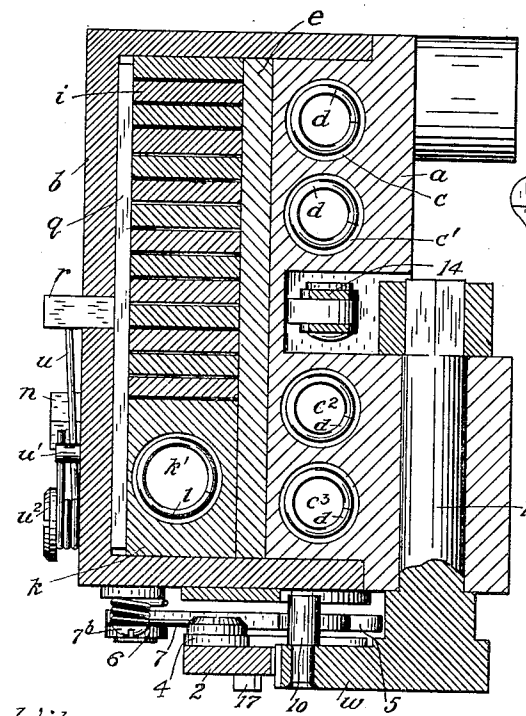

Fig. 12.a

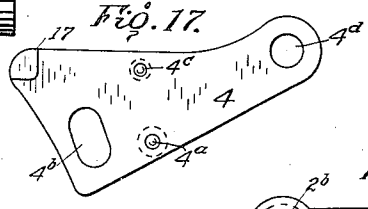

Fig. 17.

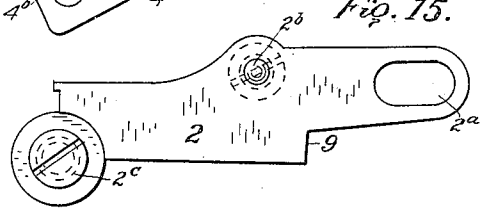

Fig. 15.

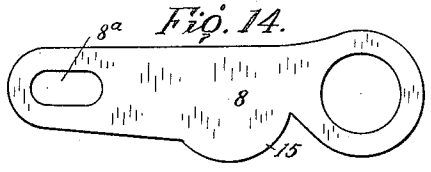

Fig. 14.

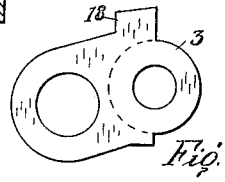

Fig. 16.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC-TAKE-UP LOCK FOR SAFES.

1,053,892. Specification of Letters Patent. Patented Feb. 18, 1913.

Application filed April 7, 1910. Serial No. 553,986.

To all whom it may concern:

Be it known that I, FRANK J. SUPER, a citizen of the United States, and a resident of Portland, in the county of Multnomah and State of Oregon, have invented a new and useful Improvement in Automatic-Take-Up Locks for Safes, of which the following is a specification.

This invention relates to safe and vault doors provided with locking mechanism having a member which is advanced and retracted, in the operation of locking and unlocking the safe, and such member may be the locking-bolt itself, or be a member auxiliary thereto and coöperating therewith; and my invention has for its object to embody within the locking mechanism an automatic take-up for any lost motion which may be induced by forcing said movable member of the locking mechanism in an undue degree, in an attempted burglary of the safe. The advantage of such means is obvious, for to all experienced safe experts the fact is known, that the success of burglarious attempts on a modern safe depends upon inducing a crevice between the door and the door jamb, or other abutting parts, in which to introduce explosive material, and that such crevices are frequently induced by forcibly advancing the movable members of the door-locking mechanism to an abnormal degree, so as to obtain some play or looseness between the abutting faces of the door and door jamb, when such forcing is relieved.

To this end my invention in general consists in combining with the movable member of a safe and vault door-locking mechanism of the type referred to, of a series of wedges, and means automatically projecting the latter under said movable member of the locking mechanism, for the purpose of wedging said member against any return movement or play or looseness while the safe remains locked. Thus the forcing of the movable member of said locking mechanism, as mentioned, becomes immaterial, since it will not cause any looseness of the parts.

My invention applies also to that type of safes having a rotatable door, in which case my wedging means are arranged to prevent any reverse rotation, or rotary play, of the door while the safe remains locked.

The modes of application of my invention and the means used for accomplishing the result in mind are readily understood from the accompanying drawings, in which:

Figure 1 is an interior elevation of a safe door provided with radial bolts which are projected by the rotation of a central spindle, provided with rigid radial arm, and means for locking the latter against reverse rotation while the door remains locked. The type of safe-locking mechanism here referred to being like that for which Letters Patent were granted to me March 12, 1907, numbered 847,265, and Fig. 1 illustrates the application of my present invention to prevent any "lost motion" or looseness of said rotatable arm; Fig. 2 illustrates the application of my invention to a safe of the type comprising a door provided with laterally projected locking-bolts and a connected member, the movement of which controls the operation of said locking-bolts; and my invention in this instance is applied to wedge said movable controlling member against return movement or play, while the safe remains locked; Fig. 3 shows an interior view of a safe of the rotatable-door type, having locking mechanism provided in the door adapted to engage with an abutment on the door frame, so as to prevent the reverse rotation of the door after having been locked; and in this instance my invention is applied to wedge the rotatable door against any reverse rotation of the slightest degree from the position to which it is advanced; Fig. 4 is a front elevation of my automatic device, in particular showing the location and operation of a keeper or latch connected with and operated by the door-locking mechanism, said latch when down, as shown in full outline, temporarily restraining the wedges, which is necessary while the door remains unlocked, and the latch being raised, to position shown by broken outline, simultaneously with the locking of the door, so that the wedges are free to act; Fig. 5 is an interior view, the cover of the case being removed, and said cover supporting the latch illustrated in Fig. 4; this view illustrates the arrangement and action of the wedges of my device; a number of the wedges are shown as having been projected under and wedging the movable lock-controlling member of a safe door lock of the type illustrated in Fig. 2; this figure also shows the location of the brace-bar, whereby the projected wedges are supported; Fig 6

is a sectional elevation of my device on the plane of the line x—x in Fig. 8, the intersected coil-springs, however, being shown in full outline; Fig. 7 is a horizontal section looking up on the plane of the line y—y in Fig. 5; and thus shows the wedge-member intersected as projected to its fullest extent; Fig. 8 is a horizontal section looking up on the plane of the line y'—y' in Figs. 4 and 6, the intersected coil-springs being, however, shown in full outline; thus this figure represents the slide in which the wedges, and the wedges' brace-bar, are reciprocably contained as being in its initial position; Fig. 9 shows a horizontal section looking up on the plane of the line z—z of Fig. 12, and thus shows the slide, in which the wedges and their brace are contained, advanced to compress the coil-springs provided to automatically return the slide to its initial position; Figs. 10 and 11 show each a bottom view of my device, and in particular the means provided for locking said slide in place, when advanced to compress the springs in said slide contained; Fig. 10 showing the slide in its initial position and its said locking mechanism in its inactive position, and Fig. 11 showing said slide in its advanced position, and said locking mechanism as holding the slide in its said advanced position; Fig. 12 shows a partial front elevation of my device and in particular the parts of which the said slide locking-mechanism is composed; said parts being shown as separated from each other but arranged in their correlative positions, ready for assembling, as shown in Figs. 4 and 12^a; Fig. 12^a is a transverse vertical section taken on the plane of the line A in Fig. 9; and Figs. 13 to 17, inclusive, show details of the parts of the mechanism for locking the slide in its advanced position, these views showing the same faces of the parts as seen in Figs. 10 and 11.

My device comprises a hollow case, a, having a removable three-sided plate or cover b. c, c', c^2, c^3 are short longitudinally extending chambers in the case, in which chambers are contained the right ends of a series of coil-springs d, the function of which is to automatically return the slide e to its initial position. Said slide e comprises a horizontal part e^3 and parts e^2, e', perpendicular thereto, as shown in Figs. 8 and 9, and said slide has a chamber f, in which is secured a rod g, on which are mounted a series of springs h, each arranged and adapted (see Figs. 5 to 7) to project one of a corresponding series of reciprocable wedges, i, resting and slidable in the case, one on top of the other, and on the brace-bar k, which is slidable on the bottom of the case. The inner ends of the wedges i (see Figs. 5 and 7) are provided with a groove i' for the extremities of the longer members of the springs h to lie in, so as to prevent the displacement thereof. The front ends of all the wedges, i, are respectively made with a shoulder j, and the slide e is provided with said perpendicular part or abutment e' to engage with said shoulder and limit the projection of the wedges i. The wedges, i, are supported, when in their projected position, by said brace-bar k, which is projected by a coil-spring l, contained, in part, in a chamber k'.

The mode of operation of my lock is more clearly illustrated in Fig. 5, in which m represents the member connected to and controlling the door-bolts of a safe-lock of the type illustrated in Fig. 2.

It is to be noted that the extremities of the wedges, i, are made with an inclined tip i^2, and that the bottom face m^2 of the locking-member m is made with a correspondingly inclined face m'. Thus as the locking-member m is forced upward, in locking the safe, the particular one of the series of wedges i which is in the same plane as the bottom of such member m, will be impelled by its spring h to work itself under the member m, following the upward movement of the latter; that is to say, in the first instance the tip i^2 of such wedge-member will be projected under the inclined face m' of the locking-member m, and finally the wedge will pass entirely under the bottom face m^2 of the member m. Before the wedge-member, so projected, has entirely spent its wedging power the member m will have been moved upward to such extent as to permit the next overlying wedge, i, to act in similar manner as described; and this action is repeated in correspondence with each upward movement of said member m. By these means my device operated to take up any possible forward movement of the locking-member m; the wedges being arranged to provide wedging means in excess of the possible movement of the member m.

The slide e is moved into its projecting position, as shown in Figs. 5 and 9, by means of a key placed on the shank n of a crank arm o. The act of so advancing the slide e compresses the series of springs d, also the spring l, of the brace-bar k, and the series of springs h. To restrain the wedges i and the brace-bar k against being projected by the impulse of the springs h and l is the function of the plate q, which slides in recesses p, in the wedges i, and the brace-bar k, and said plate q in its movements abuts against one or the other of the shoulders p', p^2 of said recesses p. The movement of the plate q is restrained, until the proper instant, by throwing in front of the rib r, on the plate q, a pivoted keeper or latch s (see Figs. 4 and 12) to which latch is connected a link t, which is connected with the door-bolt or locking-mechanism of the safe, as

illustrated for example in Fig. 2; the connection being so arranged as to cause the parts to work in coöperation with each other, so that the latch remains down and restrains the wedges until the door-locking mechanism has been operated to lock the safe. A spring u is arranged to return the plate q to its normal position simultaneously with the retraction of the wedges i. The spring u is secured in place by a stud-screw u^2, one leg thereof is inserted in a hole r' in the rib r, and the shorter leg bears against a pin u'. The plate q will be moved forward by the brace-bar k, as soon as the latter is free to be actuated by its spring l.

Referring now, for the illustration of the operation of my device, to Fig. 2, it will be seen that the member 19, of the door-locking mechanism there shown, is connected by a rod 20 and bell-crank 21 and rod t with the latch s. Thus in the position in which the member 49 is shown in Fig. 2, the latch s has been lifted from in front of the rib r of the plate q, and the wedges i are free to be projected by their springs h. Part of the lower series of wedges are seen projected under the member m, in the manner above described, and the brace-bar k has also been projected to support the projected wedges. Hence my device wedges the lock-member m against any return movement; and any further forcible, forward movement of said lock-member is instantly taken up in like manner.

To temporarily hold the slide in position after having been advanced by the cam o, I provide the locking mechanism illustrated in Figs. 4, 10, 11, 12 and 12^a. The slide locking-mechanism is connected by a rod 6 with the time or automatic lock of the door-locking mechanism. Said rod 6, shown in the figures last referred to, is replaced in Fig. 1 by the bell crank lever 27, rod 28 and lever 29, connecting with the usual time-lock mechanism 30; said rod is replaced in Fig. 2 by the rod 49, bell crank lever 50, rod 57 and bell crank lever 52, and is replaced in Fig. 3 by the rod 37, lever 38, rod 39, and lever 40. The purpose of the slide locking-mechanism is to prevent the releasing of the arm w, and thus the slide itself, by any hammering or jarring, or by anything short of the action of the automatic lock of the door. When the automatic lock acts it rocks, through the medium of the connecting rod 6, the two-membered rock arm 5 and the slide locking-mechanism assumes the position in which it is shown in Fig. 10. The rock arm 5, a detail of which is shown in Fig. 13, is pivoted on a stud 20 on the bottom member of the cover b. On the stud 20 is also pivoted a link 3, and these parts are secured in place by a stud-screw 3^a. To the link 3 is hinged a latch-plate 2, the joint being like that of the common rule, the parts being united by a stud-screw 2^c. The other end of the latch-plate 2 is provided with a slot 2^a and said end has limited movement on a stud-screw 21 provided with a roller-like sleeve 22. The stud-screw 21 screws in a stud 19 on the bottom member of the cover b. Thus the jointed members, 3, 2, have two positions, one shown in Fig. 10, the other in Fig. 11. On the stud 19 is pivoted a link 8, provided with a convex portion 15 and slotted end 8^a, as seen in the detail view thereof, Fig. 14. To the latch-plate 2 is pivoted a keeper 4 by a stud-screw 2^b, inserted through hole 4^d. A detail of the keeper 4 is shown in Fig. 17. It is made with a slot 4^b, into which the stud-screw 2^c extends. The keeper 4 further has a perpendicular lug 17 adapted to engage with the shoulder 18 of the link 3; and from the opposite face of the keeper 4 project pins 4^c and 4^a, the latter being inserted in the slot 8^a of the link 8, and the pin 4^c serving as a bearing for the shorter leg of the spring 7 secured in place by a screw 7^b, and the longer leg 7^a of the spring 7 bearing on the stud 19. The spring 7 holds the parts of the slide locking-mechanism in their normal position, as shown in Fig. 11. The slide e is connected by link 14 with an arm 13^a, rigid on a shaft 13, which extends through the bottom of the case a. On the projecting end of the shaft 13 is a rigid arm w provided with a pin 10. When the slide e is advanced by the rotation of the cam o, the shaft 13 is rotated, which causes the pin 10, on the arm w, to bear against the convexed face 15 of the link 8, moving the latter. The pin 4^a of the keeper 4 connecting the latter with the slotted end of the link 8, the movement of the latter moves also the keeper, thus relieving the shouldered link 3 from the restraint of the lug 17 of the keeper 4. The latch-plate 2 may now be moved by the extremity of the arm w, which passes the shoulder 9 of the plate 2, and then the latter falls back, by reason of the spring 7 urging the keeper 4 to resume its place, and the tip of the arm w has become engaged with the shoulder 9 of the latch-plate 2, as illustrated by Fig. 11. It is now impossible for the latch-plate 2 to be again moved to release the arm w until the rock arm 5 is moved by the time lock of the door to the position in which it is shown in Fig. 10. When so moved, the arm w is released, by the moving out of engagement of the latch-plate 2, and the releasing of the arm w permits the springs d to act to return the slide e to its initial position.

Referring now to Fig. 2, the movable member m, of the type of door lock here shown, is connected by a bell crank 42 with a plate 19, fastened on the door bolts 44, 45, and thus the movement of the latter in the direction to lock the door causes the mem-

ber m to be lifted, and it is wedged in the position to which it is to be lifted by the wedges i. The latch s is connected by a link t with a bell crank 21 and link 20, also to the plate 19, so that the outward movement of the plate 19 will fit the latch 3 from in front of the rib r of the plate q.

The rock arm 5 of the slide locking-mechanism is connected by a link 49, bell crank 50, link 51, bell crank 52, with the time lock 53, and the latter, in operating, moves the rock arm 5, so as to position the slide locking-mechanism as shown in Fig. 11. The rock arm 5 is the only part shown in Fig. 2 of such slide locking-mechanism, the other parts being omitted because of the small scale on which this view is drawn.

In setting my wedging means the procedure is as follows: Supposing the safe door to be provided with a time lock, and the door to be open, the door bolts being thus in retracted position and the latch s positioned as shown in full outline in Fig. 4, the time lock will then be wound to the required number of hours, which winding will arrange the latching mechanism as shown in Fig. 11, but the crank arm w being still positioned as shown in Fig. 10, the crank shaft n is then rotated, by means of a suitable key, advancing the slide e and causing the crank arm w to become locked with the member 2 of the latching mechanism, as shown in Fig. 11, and finally the door is closed and the door bolts are projected by means of its regular handle provided on the outside of the door. This projection of the door bolts will move the latch s from in front of the bar r, and my wedging mechanism is then released, and free to perform its function as described.

As so far described, my device is applied, in its operation, to the type of locking mechanism shown in Fig. 2, but it is evident that it may be applied for the same purpose and to the same effect to types of lock illustrated in Figs. 1 and 3. In the type of lock shown in Fig. 1, the latch s is connected by a bell crank 23, link 24 and bell crank 25 with one of the bolts 26, and thus, when the bolts are projected to lock the door, the latch s is moved from in front of the rib r, of the plate q. The rock-arm 5 is connected by a bell crank 27, link 28 and lever 29 with the time lock 30, so that, when the latter has been wound, it will position the slide locking-mechanism as shown in Fig. 11. The parts of my device shown in Fig. 1 are lettered to correspond with the detail views thereof in the other figures, and the wedges i operate to wedge the arm 31 against return motion.

In Fig. 3 the wedges i of my device constitute a part of the door bolting mechanism abutting, when the safe is closed, with an abutment 32 in the frame of the door. The latch s is connected by a link 33 with a lever 34, and a push rod 35, which, when moved in, moves the latch s from in front of the rib r of the plate q. The push rod 35 is moved inward by contact with the abutment 32 of the door frame when the door is rotated, as shown by the arrow in Fig. 3, and normally, that is to say, when the door is opened, it is moved out, so as to position the latch s in front of the rib r. The rock arm 5 of the slide locking mechanism is connected by a link 37 with a lever 38, link 39, and lever 40 with the time lock 41.

Figs. 1, 2 and 3 are intended merely to be diagrammatic views of the door locking mechanism, to illustrate the operation of my device.

In order to facilitate the writing of my claims I shall designate the controlling part of the door-locking mechanism, of any type of lock, and which my device wedges in the position to which it may be advanced, as the master member of the lock. Thus in the type of lock shown in Fig. 1, it is the member 31 in Fig. 2 it is the member m, and in Fig. 3 it is the member k, which is the part designated by me as the master member.

I claim:

1. The combination in a door locking mechanism including a master member; a series of wedges movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a series of springs actuating the wedges individually; means restraining the projection of the wedges by their springs; and connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door.

2. The combination in a door locking mechanism including a master member; a series of wedges movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a series of springs actuating the wedges individually; means restraining the projection of the wedges by their springs; connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door; and means operating to automatically retract the wedges.

3. The combination in a door locking mechanism including a master member; a case; a slide within the case; a series of wedges in the slide movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a series of springs actuating the wedges individually; said springs arranged to be compressed by

the act of advancing the slide; means restraining the projection of the wedges by their springs; connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door; means to advance the slide; a latch arranged to lock the slide in its advanced position, and means for releasing said latch; and automatic means for operating said latch releasing means.

4. The combination in a door locking mechanism including a master member and a time lock; a slide within the case; a series of wedges in the slide movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a series of springs actuating the wedges individually; said springs arranged to be compressed by the act of advancing the slide; means restraining the projection of the wedges by their springs; connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door; and means to advance the slide; a latch arranged to lock the slide in its advanced position, and means for releasing said latch; connections between the releasing means of the latch and said time lock; and a spring arranged to restore the slide to its initial position when the latch is released.

5. The combination in a door locking mechanism including a master member and a time lock; a case; a slide within the case; a series of wedges in the slide movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a series of springs actuating the wedges individually; said springs arranged to be compressed by the act of advancing the slide; means restraining the projection of the wedges by their springs; connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door; means to advance the slide; a latch arranged to lock the slide in its advanced position, and means for releasing said latch; connections between the releasing means of the latch and said time lock; said latch releasing means and its connections being arranged to lock said releasing means against operation otherwise than by the time lock; and a spring arranged to restore the slide to its initial position when the latch is released.

6. The combination in a door locking mechanism including a master member; a series of wedges movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a brace bar located under the lowermost wedge and arranged to support the projected wedge or wedges; a series of springs actuating the wedges and the brace bar individually; means restraining the projection of the wedges by their springs; connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door; and means operating to automatically retract the wedges.

7. The combination in a door locking mechanism including a master member; a case; a slide within the case; a series of wedges in the slide movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a brace bar located under the lower most wedge in the slide and arranged to support the projected wedge or wedges; a series of springs actuating the wedges and the brace bar individually; said springs arranged to be compressed by the act of advancing the slide; means restraining the projection of the wedges by their springs; connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door; means to advance the slide; a latch arranged to lock the slide in its advanced position, and means for releasing said latch; a spring arranged to restore the slide to its initial position when the latch is released; and automatic means for operating said latch releasing means.

8. The combination in a door locking mechanism including a master member and a time lock; a slide within the case; a series of wedges in the slide movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a brace bar located under the lower most wedge in the slide and arranged to support the projected wedge or wedges; a series of springs actuating the wedges and the brace bar individually; said springs arranged to be compressed by the act of advancing the slide; means restraining the projection of the wedges by their springs; connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door; means to advance the slide; a latch arranged to lock the slide in its advanced position, and means for releasing said latch; connections between the releasing means of the latch and said time lock; and a spring arranged to restore the slide to its initial position when the latch is released.

9. The combination in a door locking mechanism including a master member and

a time lock; a slide within the case; a series of wedges in the slide movable one over the other and adapted, when projected, to progressively wedge the master member of the lock against return movement; a brace bar located under the lower most wedge in the slide and arranged to support the projected wedge or wedges; a series of springs actuating the wedges and the brace bar individually; said springs arranged to be compressed by the act of advancing the slide; means restraining the projection of the wedges by their springs; connections between said restraining means and the door locking mechanism arranged to withdraw said restraining means simultaneously with the act of locking the door; means to advance the slide; a latch arranged to lock the slide in its advanced position, and means for releasing said latch; connections between the releasing means of the latch and said time lock; said latch releasing means and its connections being arranged to lock said releasing means against operation otherwise than by the time lock; and a spring arranged to restore the slide to its initial position when the latch is released.

F. J. SUPER.

Witnesses:
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C. B. LONG.