June 20, 1939. J. HOLTZMAN 2,163,121

DOOR LOCK

Original Filed March 12, 1925

Fig. 1.

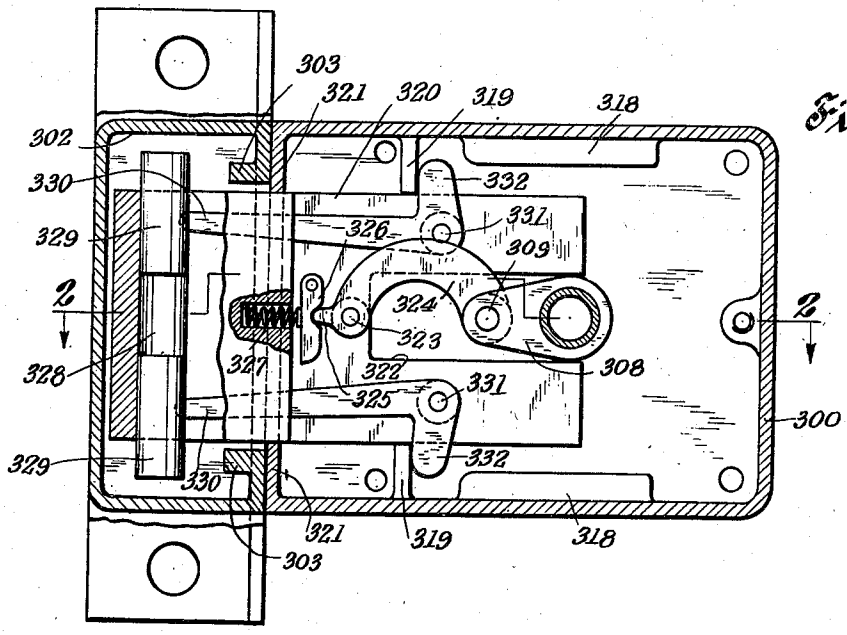
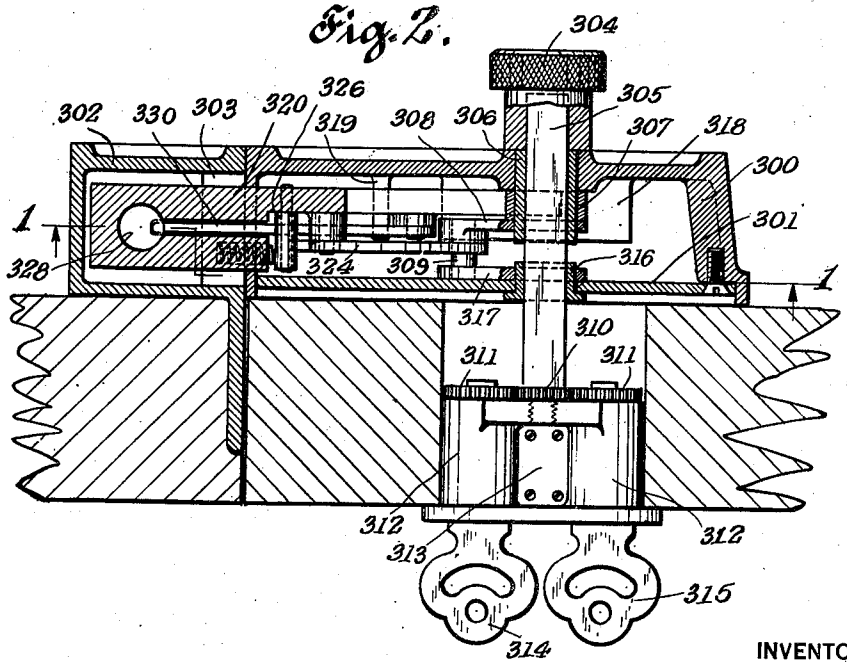


Fig. 2.



INVENTOR

John Holtzman

Patented June 20, 1939 2,163,121

UNITED STATES PATENT OFFICE

2,163,121

DOOR LOCK

John Holtzman, New York, N. Y., assignor of one-fourth to David Lampert, New York, N. Y.

Original application March 12, 1925, Serial No. 14,980. Divided and this application December 24, 1930, Serial No. 504,519½. Renewed December 4, 1937

11 Claims. (Cl. 70—131)

My invention relates to door locks of the type in which the locking mechanism is actuated or controlled by knobs or keys, my purpose being to provide a lock having such form and arrangement as to afford exceptional security.

More particularly stated, I seek to provide a lock with a keeper in which are slidably mounted a pair of plungers movable toward and from each other and so arranged that, with the lock mechanism as a whole in the condition commonly known as locked, the plungers are relatively wide apart, and in such positions as to prevent the door from being opened, the structure and action of these plungers and parts immediately adjacent thereto being such that the plungers can not be readily released from the keeper, by breaking the latter or otherwise.

Another object of my invention is to provide a lock having operating means and a plurality of lock cylinders so associated with the lock operating means and with each other that it is necessary to insert a key in each of said cylinders in order to actuate the lock operating means. Either or all the keys may be turned to operate the lock but in any event keys must be present simultaneously in the plurality of cylinders for the lock to be operated.

This is an important combination and it is a feature of my invention that the plural cylinder arrangement may be embodied in any type of lock without reconstruction of the lock mechanism. This feature makes it possible for different persons to have different keys for the same lock and requiring the application of the several keys simultaneously in order to operate the lock. This is useful where the lock is to be used for safe deposit boxes where the depositor and the attendant are supplied with different keys and where both must be used to open the depositors box. But, whereas it has heretofore been necessary to use two doors with separate locks for the different keys, with the present invention one lock may serve the purpose of the former two locks, and only one door is necessary.

The present device is useful wherever it is desired that a plurality of keys be required to operate the same lock. The plural cylinder lock makes it possible to multiply the number of combinations which may be obtained without unduly increasing the size of the keys. For instance, each cylinder may be designed for any combination within its limitations and by reason of the necessity of using the plurality of keys simultaneously it will be obvious that the number of combinations which may be formed with the plurality of cylinders is many times greater than where only one cylinder is used.

The present combination is also advantageous where the same person is supplied with the several keys to the same lock. A lock with one cylinder may be picked but it would be difficult if not impossible for a person to pick the plurality of cylinders.

This application is a division of my pending application for patent upon Door locks, Serial No. 14,980, filed March 12, 1925 now Patent No. 1,787,272, Dec. 30, 1930.

Reference is made to the accompanying drawing forming a part of this specification and in which like reference characters indicate like parts in both of the figures.

Figure 1 is a vertical section through my improved door lock, and is taken upon the line 1—1 of Figure 2, looking in the direction indicated by the arrows.

Figure 2 is a longitudinal section through the door lock, and is taken upon the line 2—2 of Figure 1, looking in the direction indicated by the arrows.

A casing is shown at **300** and is provided with a bottom plate **301**, the casing being mounted upon a door.

Located adjacent the path of travel of the casing **300** is a keeper **302**, open at its front and provided a pair of inturned flanges **303**, **303**, disposed adjacent the ends of the keeper.

A knob **304** is rotatively mounted upon a stem **305** extending through the outer side of the casing and is fixed to a bushing **306**. This bushing carries a sleeve **307**, to which is secured a lever **308**, having at its free end a pin **309**.

The stem **305** is secured at one of its ends to a gear **310**, meshing with mating gears **311** on each side, these gears being fixed upon short stems, supported by and extending from a pair of lock cylinders **312**. These lock cylinders are held in twin relation by a connection **313** and are actuated by different keys **314** and **315**. To cause the stem **305** to turn it is necessary that both keys be inserted simultaneously in the different cylinders. The turning of either or both keys will actuate the lock if both keys are inserted in their respective cylinders. If the operator merely grasps one key and turns it, the gears will transmit the motion to the other cylinder, and if the correct key is in the latter, it will be turned through the action of the gears. If preferred, both keys may be turned at the same time by the operator, but the result will be the same.

Another bushing 316, mounted in the stem 305 and revoluble relatively to the plate 301, has fixed to it a lever 317, in the outer end of which the pin 309 engages, in such manner as to couple together the levers 308 and 317.

Extending inwardly from the two side walls of the lock casing are elongated lugs 318 having parallel inner faces, and spaced in front of these lugs are a pair of narrow, transverse lugs 319, disposed oppositely to each other.

A sliding bolt 320 is mounted within the casing, its movements being guided by the inner ends of the lugs 319, and at the front end of the casing by inwardly extending flanges 321.

The rear portion of the sliding bolt 320 is forked, and thus provided with a space 322 whereby it is adapted to straddle the sleeve 307 in its movement, and at the front of the space is connected by a pin 323, having a link 324 of arcuate form, this link being attached at one of its ends to the pin 309, operated by the levers.

A lug 325, formed on the front end of the link 324 and having a rounded end, is adapted to engage in a correspondingly shaped recess in a spring pressed detent 326.

The detent is pivoted upon the bolt and is held in normal engagement by a compression spring 327 contained in a recess in the forward part of the bolt, this part of the bolt being relatively thick.

This construction serves to retain the various movable parts in adjusted positions.

The forward portion of the bolt, which is slidable into and out of the keeper 302, is provided with a bore 328 extending transversely, and into which are fitted a pair of plungers 329, 329, so that the latter move freely within the bore. These plungers, when extended or moved apart, prevent retraction of the bolt past the ledges or thickened walls 303 and flanges 321, and thus into the casing 300.

Each plunger is provided with a notch adapted to receive the adjacent or forward end of bell crank lever arms 330. These are pivoted at 331 upon the forks, and are provided with short, substantially right-angled arms 332, extending outwardly beyond the side edges of the bolt.

As the bolt is moved forward the lever arms 332 engage the lugs 319, thus carrying the arms 330 outwardly, and projecting the plungers 329. When the bolt is retracted the arms 332 strike the lugs 318, moving the plungers 329 into the bolt and retaining them. This is due in part to the length of the lugs 318.

Thus the plungers are automatically moved in and out, in accordance with movements of the bolt.

My improved lock mechanism affords unusual security, due to the fact that when the plungers 329, 329, are moved apart to the respective limits of their travel they cannot be removed from the keeper. Any effort to remove them brings them against the inturned edges 303, 303, which as above described are made rather thick and massive. As the plungers can not be readily disengaged from the keeper, either by breaking the latter or otherwise, the locking mechanism when in its locked position effectively prevents the door from being opened otherwise than by means of the knob 304 or the keys 314, 315.

I do not limit myself to the precise mechanism here illustrated and described, as variations may be made therein without departing from my invention, the scope of which is commensurate with my claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. In a door lock, a casing, a bolt slidably mounted in said casing for engaging a keeper, mechanism for operating said bolt controllable by a knob on the inner side of said casing and a stem extending to the outer side, a pair of lock cylinders, gears on the inner ends of the lock cylinders, and a gear on said stem in mesh with said gears.

2. In a door lock, a casing, a bolt slidably mounted in said casing for engaging a keeper, mechanism for operating said bolt controllable by a knob on the inner side of said casing and a stem extending to the outer side, a pair of lock cylinders, gears on the inner ends of the lock cylinders, and a gear on said stem in mesh with said gears, said pair of lock cylinders being adjacent each other and operable by keys simultaneously.

3. In a door lock, a casing, a bolt slidably mounted in said casing for engaging a keeper, mechanism for operating said bolt controllable by a knob on the inner side of said casing and a stem extending to the outer side, a pair of lock cylinders, gears on the inner ends of the lock cylinders, and a gear on said stem in mesh with said gears, a connection being provided for holding said lock cylinders in fixed position to each other.

4. In a door lock, a casing having projections, a bolt slidably mounted in said casing for engaging a keeper, mechanism for operating said bolt controllable by a knob on the inner side of said casing and a stem extending to the outer side of the casing, a pair of lock cylinders, gears on the inner ends of the lock cylinders, and a gear on said stem in mesh with said gears, extendable plungers carried by the bolt, pivoted bell cranks for opreating the plungers, said bell cranks having long arms engaging with the extendable plungers, and both bell cranks having arms engagable with projections on said casing.

5. In a door lock, a casing having projections, a bolt slidably mounted in said casing for engaging a keeper, mechanism for operating said bolt controllable by a knob on the inner side of said casing, extendable plungers carried by said bolt and a stem extending to the outer side of said casing, a pair of lock cylinders, gears on the inner ends of the lock cylinders, and a gear on said stem in mesh with said gears, means for operating said plungers including pivoted bell cranks having long arms engaging with said extendable plungers, and having shorter arms engagable with said projections on said casing, said latter arms extending substantially at right angles to said long arms.

6. The combination of a lock having mechanism for locking a door, means for operating the lock mechanism, a plurality of lock cylinders for actuating said operating means, and means interconnecting said plurality of lock cylinders and said operating means in such manner that neither of said lock cylinders may actuate the lock operating means unless keys are simultaneously engaged in said plurality of lock cylinders.

7. The combination of a lock having mechanism for locking a door, a stem for operating said lock mechanism, a plurality of lock cylinders for actuating said stem, and gears interconnecting said plurality of lock cylinders and said stem, said gears intermeshing with each other and cooperating in such manner that neither of said

lock cylinders may actuate said stem unless the keys are simultaneously engaged in said plurality of lock cylinders.

8. A lock, including a casing, a bolt formed with a slit, a bell crank lever pivotally mounted on said bolt and riding within said slit, a locking plunger movably carried by said bolt and connected with said bell crank lever, means extending from said lever to rock the same and also project and retract the locking plunger, said means co-operating with the casing, rotatable means mounted in the casing to move the bolt, and a spring actuated detent locking said rotatable means in a dead center position to prevent a forcible retraction of said bolt and locking plunger from interlocking engagement with the keeper.

9. In a lock, the combination with a casing formed with an opening, a bolt movable through said opening and adapted to engage a keeper, said bolt formed with a slit and bore, a locking plunger mounted within said bore, a bell crank lever pivotally mounted on said bolt and extending through said slit and connected with said locking plunger to move the same into interlocking engagement with a keeper, a lever rotatably mounted in the casing for moving the bolt in both directions, means integral with the casing and acting to rock the bell crank lever on its pivot during the movement of the bolt to actuate the plunger in an up and down movement within the bore of the bolt, and a spring actuated detent pivotally mounted on the bolt and arranged to keep said lever in a dead center position when said bolt is moved into its final locking position to oppose the retraction of said bolt by external force applied to the bolt.

10. A locking mechanism including a spindle, a plurality of key operated elements controlling said spindle, and means interconnecting said key operated element to compel the use of a plurality of keys to permit the operation of said spindle.

11. A locking mechanism including a spindle, key operated mechanism for rendering said spindle operative and a second key operated mechanism for rendering said first key operated mechanism operative.

JOHN HOLTZMAN.