

April 12, 1932.

A. TÖNNESSEN

1,854,080

LOCK ARRANGEMENT FOR SAFE DOORS, ETC

Filed July 18, 1930

2 Sheets-Sheet 1

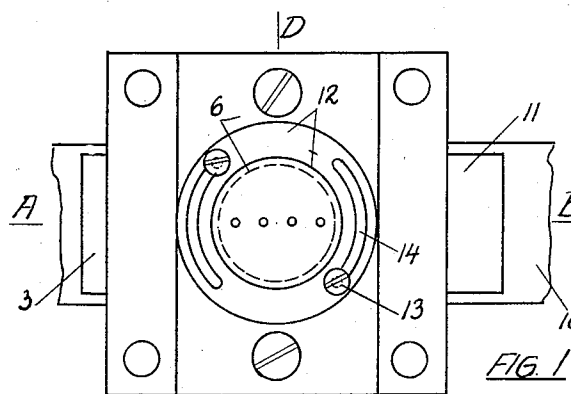


FIG. 1

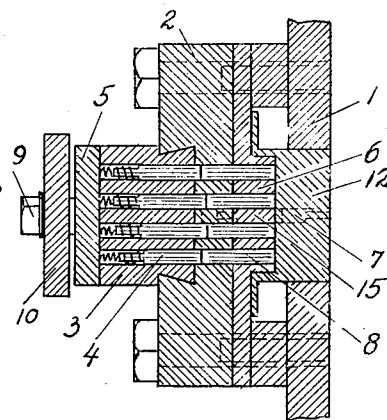


FIG. 3

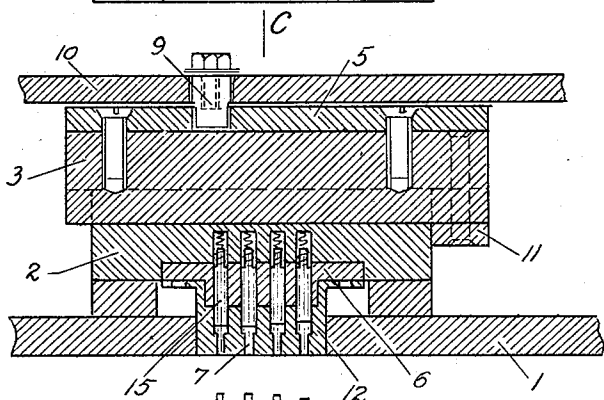


FIG. 2

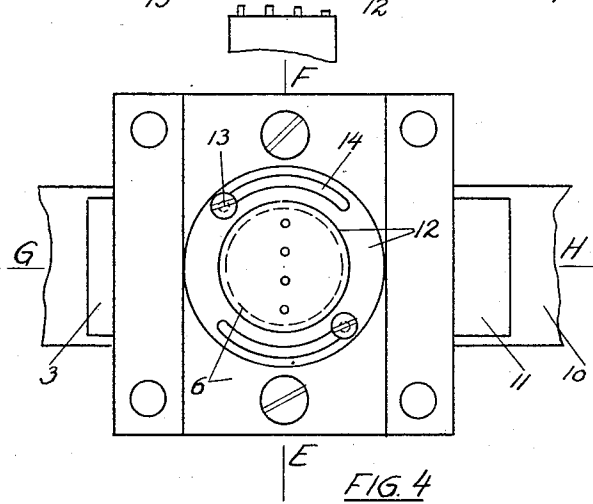


FIG. 4

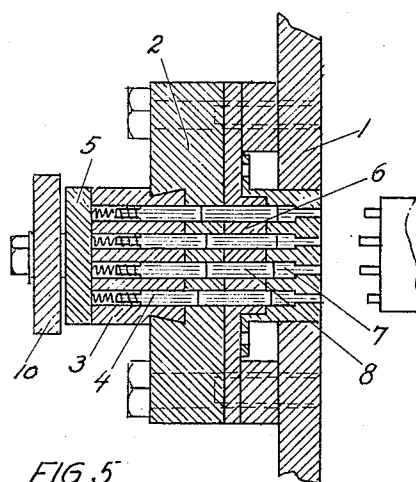


FIG. 5

Inventor:
 Adolph Tönnessen
 by his Attorneys
 Lawson & Lawson

April 12, 1932.

A. TÖNNESSEN

1,854,080

LOCK ARRANGEMENT FOR SAFE DOORS, ETC

Filed July 18, 1930

2 Sheets-Sheet 2

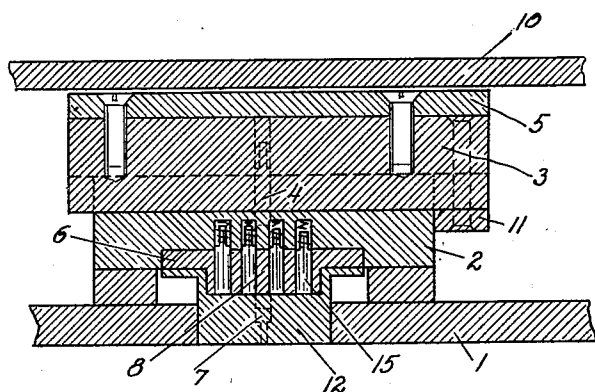


Fig. 6

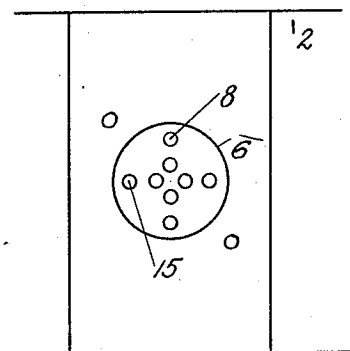


FIG. 7

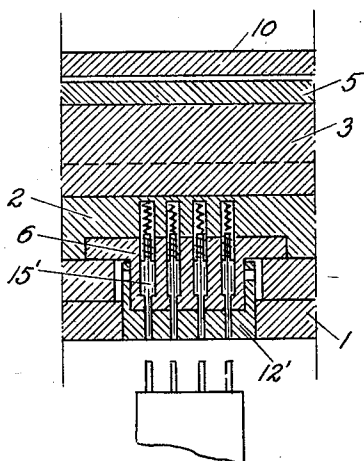


FIG. 8

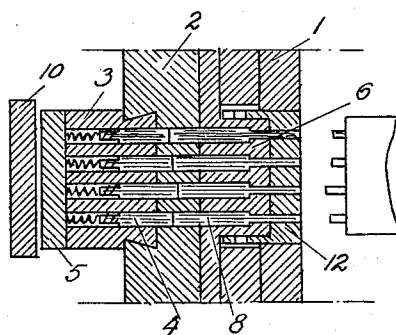


FIG. 9

Inventor:
Adolph Tönnessen
by his Attorneys
Harrison & Harrison

UNITED STATES PATENT OFFICE

ADOLPH TÖNNESSEN, OF STAVANGER, NORWAY

LOCK ARRANGEMENT FOR SAFE DOORS, ETC.

Application filed July 18, 1930, Serial No. 468,945, and in Norway March 1, 1930.

This invention relates to locking devices, and particularly to devices which are especially adapted for association with safe doors or the like. The general object of the invention is to provide a device of this class which is simple in construction and highly efficient in operation to prevent opening of the safe door and access to the contents of the safe or other closure by unauthorized persons.

A further object of the invention is to provide a device having constructional features which will decrease or even substantially eliminate the possibility of an intruder disabling the parts of the device to cause the same to cease functioning. An important feature of the device in this connection is the arrangement and construction of the pin tumblers and their associated springs.

The device comprises essentially a lock body attached to the safe door which slidably carries a locking bolt carrier and rotatably carries a key barrel. The bolt carrier is provided with a set of spring actuated pin tumblers which function to lock it to the body while the body is provided with two sets of pin tumblers, one set of which is adapted to actuate the bolt carrier tumblers, while the other set is adapted to lock the key barrel in a certain position with respect to the body, thereby preventing access to the first set of body tumblers until a proper key is inserted in the barrel.

Other objects of the invention, as well as the structural details of the device, will be clearly apparent hereinafter.

Reference may be had to the following detailed description and the accompanying drawings for a full and complete understanding of the invention.

In the drawings:

Fig. 1 is a front elevational view of the device of the invention in operative or locked condition as evidenced by the position of the key barrel;

Fig. 2 is a sectional view along line A—B of Fig. 1;

Fig. 3 is a sectional view along C—D of Fig. 1;

Fig. 4 is a front elevational view of the device with the key barrel in unlocked posi-

tion and allowing access to the locking elements;

Fig. 5 is a sectional view along line E—F of Fig. 4;

Fig. 6 is a sectional view along G—H of Fig. 4;

Fig. 7 is a front view of the front member of the lock body; and

Figs. 8 and 9 are views similar to Figs. 2 and 5, respectively, of a modified form of the device.

Referring to Figs. 1 to 7 of the drawings, there is disclosed at 1 a safe door or other such member with which the device is adapted to be associated. The device comprises a lock body composed of members 2 and 6 which are attached to the door by any suitable fastening means, such as bolts running through the body members. The lock body slidably carries a bolt carrier 3 which is preferably dovetailed into member 2, as shown clearly in Figs. 3 and 5. Carrier 3 is provided with a suitable set of recesses which are adapted to carry pin tumblers 4. These tumblers are preferably shaped as shown having their inner ends restricted in diameter and surrounded by coil springs whose function is to normally press the tumblers outward to lock the carrier to the lock body. As shown clearly in Figs. 3 and 5, the restricted end portions of these tumblers are of such length as to extend at least half way through the coil springs, for a purpose which will be explained hereinafter.

Carrier 3 has mounted on its rear surface, by means of suitable fastening screws, or the like, a bar 5. This bar is provided with a recess into which a detent 9 carried by the locking bolt 10 extends. The locking bolt is provided with suitable actuating means of any conventional type (not shown). It will be apparent that the locking means comprising detent 9 and the recess in bar 5 maintains the bolt in fixed relation with respect to carrier 3, and that when the carrier is locked to the body by means of its pin tumblers, the bolt is likewise rendered immovable. In order to limit the movement of the bolt and its carrier, a stop 11 is provided on the carrier which abuts against member 2.

The lock body is provided with a set of apertures extending through the members thereof which carry slidable pin tumblers 8. These tumblers are adapted to actuate tumblers 4 carried by carrier 3 when the device is operated to unlock the same. Member 6 of the lock body is shaped at its front end to provide a protruding cylindrical portion upon which a key barrel 12 is rotatably mounted. The key barrel is provided with an inner peripheral flange having slots 14 therein through which screws 13 extend. These screws are attached to member 6 and function not only to attach the key barrel to the lock body, but also as stops to limit the rotation of the key barrel. In the present instance, the barrel is adapted to be rotated through 90°, as will appear more clearly hereinafter, but it is obvious that any desired angle may be used.

The lock body is also provided with a set of recesses which carry pin tumblers 15 and which are disposed at right angles to the apertures carrying tumblers 8, as shown clearly in Fig. 7. Pin tumblers 15 are shaped similar to tumblers 4, and are also actuated by coil springs disposed at the bottom of the recesses and surrounding the restricted inner portions of the tumblers. The key barrel is provided with a set of apertures extending through the central portion thereof and carrying pin tumblers 7. These tumblers have the greater part of their length of restricted diameter, while their inner ends are of substantially the same diameter as the recesses carrying tumblers 15. The apertures in the key barrel are shaped to conform with and accommodate pin tumblers 7, as will be clearly apparent from Figs. 2 and 5.

The purpose of pin tumblers 15 is to lock the key barrel in a certain position with respect to the lock body when the device is in locked condition. They are shown in this position in Fig. 2, and it is apparent from Fig. 3 that in such instance, access to tumblers 8 to unlock the device is prevented by the key barrel. In other words, it is necessary that the key barrel be rotated through 90° to the position shown in Fig. 4 to bring its apertures and tumblers 7 in alignment with the apertures and tumblers 8 in the lock body to unlock the device. Tumblers 7 are of varying lengths so that it requires a key having suitable prongs to move these tumblers and actuate tumblers 15 until their outer ends lie in the plane of contact of the key barrel and the lock body. At such time, tumblers 15 will, of course, be moved from the recesses in the key barrel and the barrel may be rotated through the necessary angle to align its apertures and tumblers 7 with tumblers 8. This condition of the various parts is shown in Fig. 5. Obviously, in order to unlock the bolt carrier from the lock body and thereby release the bolt so that it may be actuated

to unlock the door, it is necessary that the contacting surfaces of the tumblers 4 and 8 be brought into the plane of contact between carrier 3 and member 2. A different key will be required to force tumblers 8, and, therefore, tumblers 4, rearwardly until the desired unlocking positions of the parts are obtained. The necessary keys for the device are shown adjacent the devices of Figs. 2 and 5.

In Figs. 8 and 9, there is disclosed a modified form of the device in which pin tumblers 8 and 15' carried by the lock body may extend entirely through the apertures in the key barrel. In this instance, therefore, the pin tumblers carried by the key barrel in the preferred embodiment, just described, are omitted and tumblers 8 and 15' are elongated and provided with extending restricted front portions. The apertures through the key barrel are restricted throughout their length while the recesses in the lock body are shaped as shown clearly in the figures to conform with and accommodate the tumblers. Otherwise, the modified device is the same as the device of the preferred embodiment, and operates in a similar manner.

The device of the preferred embodiment which utilizes tumblers 7 in the key barrel is, however, preferable to the modified device for several reasons. It will be noted in Figs. 3 and 5 that by virtue of the fact that a slight movement only of tumblers 8 is necessary to bring their front ends in the plane of contact between member 6 and barrel 12, the coil springs which actuate tumblers 4 are placed under slight compression when the device is in locking position. This is an important feature since such a device is normally in locked position during considerable periods of time. By having the springs under slight compression, they retain their resiliency and are very little affected, if at all, by long usage of the device. It will be understood, however, that the springs are placed under sufficient compression to properly operate the device at all times. Contrasting this construction with that of Figs. 8 and 9, it will be noted that considerably more movement is necessary in the device of the latter figures to bring the front ends of tumblers 8 into the contact plane between member 6 and key barrel 12. It will, therefore, be obvious that the springs of this device are placed under considerably greater compression. This same feature is, of course, applicable to the springs which actuate tumblers 15 and 15' of the respective devices. When the device is in unlocked position, these tumblers are, of course, maintained in their inwardly pressed position (see Fig. 6) and the springs remain under compression until the device is again locked.

Another feature, which is inherent in the preferred embodiment by virtue of the use of

pin tumblers 7, is the fact that due to the varying lengths of these tumblers, a key having prongs of varying lengths is required to unlock the key barrel and enable rotation of the same. On the other hand, a key having prongs of equal length will unlock the key barrel in the device of Figs. 8 and 9. Obviously, it would be easier for an intruder to make or obtain a key which would unlock the barrel in the latter case.

As has already been stated, an important feature of the device of the invention is the novel construction of the spring-actuated tumbler pins and their associated springs. It is often the practice of intruders who encounter devices of this nature to flatten the coil springs by imparting a hard blow to the pin tumblers, thereby rendering the springs useless to perform their intended function. Since the restricted ends of the pin tumblers of the present device are of such length that they extend at least half way through the coil springs, it will be obvious that an intruder could at the most only partly flatten the springs. In other words, he could not render the springs entirely inoperative and they would perform their intended function even though tampered with in the manner indicated.

Other new and novel features of the device will be apparent to persons skilled in the art. Obviously, changes in the structural details of the device may be made without departing from the spirit of the invention. It is, therefore, understood that the present disclosure is for the purpose of illustration only and that the invention is to be limited only by the scope of the appended claims.

I claim:

1. A lock for safe doors or the like, comprising a lock body mounted on said door, a bolt carrier slidably carried by said body, a key barrel rotatably carried by said body to assume a plurality of positions, key operable means for locking said barrel in a certain position thereof, and key operable means for locking said carrier, said last mentioned means being accessible only when said barrel is in another of its positions.

2. A lock for safe doors or the like, comprising a lock body mounted on said door, a bolt carrier slidably carried by said body, a key barrel rotatably carried by said body to assume a plurality of positions, key operable means comprising pin tumblers carried by said body for locking said barrel in a certain position thereof, and key operable means comprising pin tumblers carried by said body and said carrier for locking said carrier, said last mentioned means being accessible only when said barrel is in another of its positions.

3. A lock for safe doors or the like, comprising a lock body mounted on said door, a bolt carrier slidably carried by said body, a

key barrel rotatably carried by said body, a plurality of sets of pin tumblers carried by said body, and a set of pin tumblers carried by said carrier and adapted to lock said carrier to said body, said last mentioned tumblers being operable by one of said first named sets of pin tumblers to release said carrier, the other of said first named sets of pin tumblers being adapted to lock said barrel in a position to prevent access to said one set of pin tumblers until a proper key is inserted in said barrel.

4. A lock for safe doors or the like, comprising a lock body mounted on said door and provided with a plurality of sets of pin tumblers, a bolt carrier slidably carried by said body and provided with a set of pin tumblers adapted to lock said carrier to said body and operable by one of said first-mentioned sets of tumblers to unlock said carrier, and a key barrel rotatably carried by said body and provided with a set of apertures into which said first-mentioned sets of tumblers are adapted to extend to lock said barrel against rotation, said apertures being alignable with said one of said first-mentioned sets of tumblers by insertion of a proper key therein to enable unlocking of said carrier.

5. A lock for safe doors or the like, comprising a lock body mounted on said door and provided with a plurality of sets of pin tumblers, a bolt carrier slidably carried by said body and provided with a set of pin tumblers adapted to lock said carrier to said body and operable by one of said first-mentioned sets of tumblers to unlock said carrier, and a key barrel rotatably carried by said body and provided with a set of pin tumblers adapted to actuate said first-mentioned sets of tumblers respectively to permit rotation of said barrel and unlocking of said carrier.

In testimony whereof I have signed my name.

ADOLPH TÖNNESSEN.