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PIN TUMBLER LOCK

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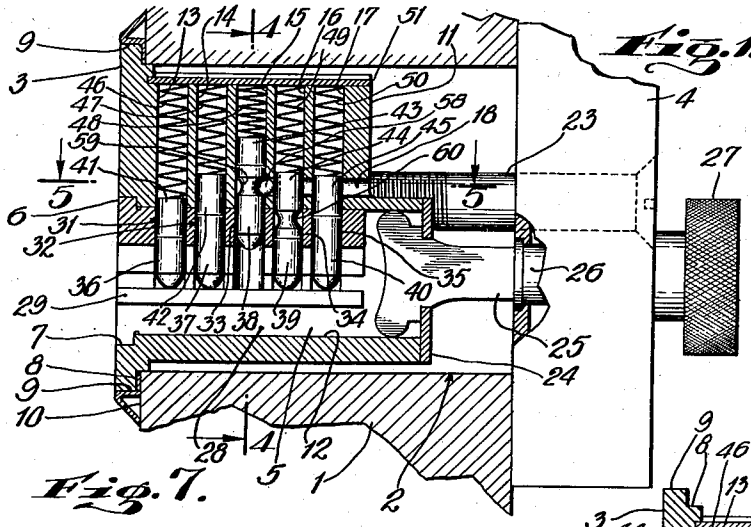


Fig. 1.

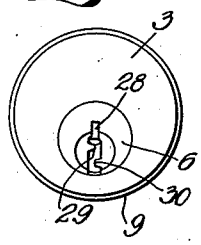


Fig. 2.

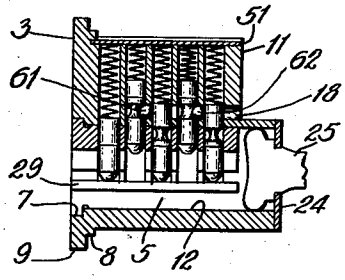


Fig. 7.

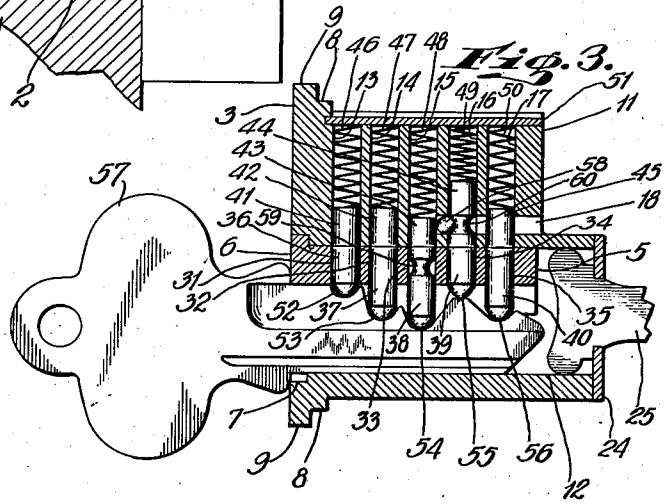


Fig. 3.

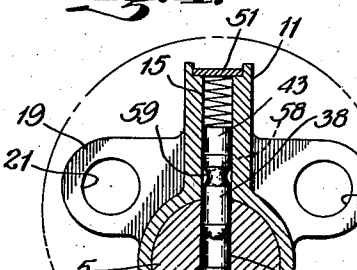


Fig. 4.



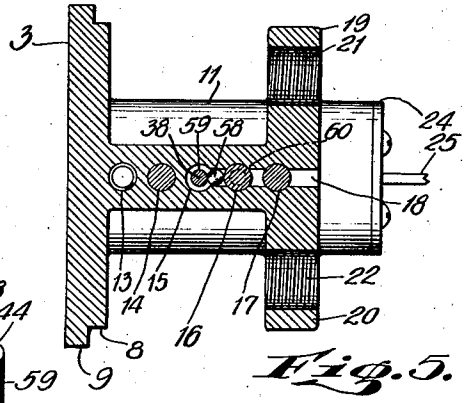


Fig. 5.

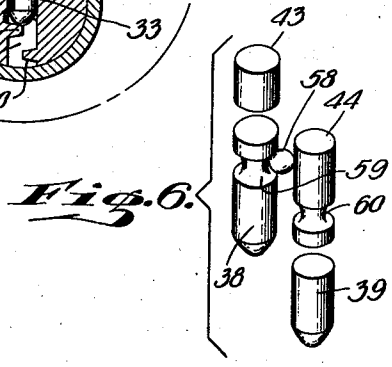


Fig. 6.

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## PIN TUMBLER LOCK

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10 Claims. (Cl. 70—364)

This invention relates to pin tumbler locks in general and more especially to devices for protecting the same against being picked.

Among the objects of the present invention, it is aimed to provide an improved device for protecting a tumbler lock against being picked or at any rate to reduce the risk of being picked to a minimum.

It is still another object of the present invention to provide an improved tumbler lock which is substantially tamperproof and at least positively so against the average picking devices today known, such as the lock picking gun and the like.

It is still another object of the present invention to provide an improvement in a tumbler lock whereby the average tumbler lock can be quickly and readily converted into a tamperproof device of this character with but a small structural change if desired.

These and other features, capabilities and advantages of the invention will appear from the subjoined detail description of specific embodiments thereof illustrated in the accompanying drawing in which

Figure 1 is a fragmental transverse section of a lock constituting one embodiment of the present invention;

Fig. 2 is a front elevation of the lock casing and barrel;

Fig. 3 is a fragmental transverse section of a lock constituting one embodiment with the correct key in position preparatory to opening the lock;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a section on the line 5—5 of Fig. 1;

Fig. 6 is a perspective of the tumbler elements and associated locking device separated from the lock casing and barrel; and

Fig. 7 is a transverse section of another embodiment.

In Fig. 1 of the embodiment shown, there is illustrated a door or the like framework 1 having an opening 2 therethrough in size less than the outer portion of the disc element 3 and smaller than the bolt controlling housing 4 so that the outer portion of the disc element 3 will completely conceal the opening 2 to the observer on the outside of the door and so that the bolt controlling housing 4 will completely conceal the opening 2 to the observer on the inside of the door.

Extending through the disc 3, there is provided the barrel 5 having the flange 6 to fit in the annular recess 7 formed in the outer end of the opening extending through the disc 3 to actuate the barrel 5.

The disc 3 is preferably provided with an annular inner recess to form a shoulder 8 conforming more or less substantially to the opening 2 so that the shoulder 8 can enter the opening 2 to center the lock proper with the overlapping portion 9 of the disc engaging the outer face 10 of the door frame 1.

The disc 3 preferably has an inward extension 11 having a main cylindrical chamber 12 to conform to and rotatably receive the barrel 5. The extension 11 also preferably has a plurality of tumbler chambers 13, 14, 15, 16 and 17 extending radially to the cylindrical chamber 12 and in communication with such chamber 12.

In order to facilitate assembling or introducing the new locking feature constituting one of the main elements of the present invention, there is provided the small opening 18 extending parallel to the axis of the chamber 12 preferably as here indicated into communication with the tumbler chambers 15, 16 and 17, in which case the opening 18 passes through the partition separating the chamber 17 from the rear face of the extension 11 and also passes through the partition separating the chambers 17 and 16 from one another as well as through the partition separating the chambers 16 and 15 from one another.

For securing the bolt controlling housing 4 to the extension 11, the latter is provided with two wings 19 and 20 having the internally threaded screw holes 21 and 22 respectively to receive the screws 23 extending through the bolt controlling housing 4.

For anchoring the bolt controlling mechanism in the housing 4 to the barrel 5, the barrel 5 is preferably provided with a disc 24, see Fig. 5, secured to the end of the barrel 5 and overlapping and engaging the end of the housing 11 through which the cylindrical chamber 12 extends. This disc 24, see Figs. 1 and 5 has connected thereto an extension 25 fixedly connected to the rotatable element 26 of the bolt controlling mechanism in the housing 4. This rotatable element 26 as is customary is provided with a handle 27 so that it may be turned by the handle 27 in turn to actuate the bolt not shown. Preferably also, either the rotatable element 26 or the bolt is provided with a stop spring for normally maintaining the same in extended or locking position.

The bolt controlling housing and its connection 25 with the barrel 5 is merely shown to

illustrate one operative connection between the barrel 5 equipped with the present improvement with a bolt controlling mechanism.

The barrel 5 is of conventional construction having a main slot 28 which, see Fig. 4, preferably has two lips or ledges 29 and 30 extending parallel to the axis of the barrel 5. The upper one 29 as shown extends approximately to the middle of the slot 28.

The barrel 5 is also provided in the present instance with a plurality of tumbler chambers 31, 32, 33, 34 and 35 which extend substantially radially to the slot 28 and communicate therewith thereby forming communications between the outer face of the barrel 5 and the slot 28. The chambers 31 to 35 inclusive are cut to register with the chambers 13 to 17 inclusive when the barrel 5 is secured in place by the disc 24 and the barrel 5 rotated to the proper angular position relative to the chambers 13 to 17 inclusive.

Ordinarily in the conventional tumbler lock with the present improvement when the chambers 13 to 17 inclusive are in registration with the chambers 31 to 35 inclusive, they are supplied with the key engaging tumblers 36, 37, 38, 39 and 40 respectively, the intermediate spring abutment tumblers 41, 42, 43, 44 and 45 respectively and the springs 46, 47, 48, 49 and 50 respectively.

Preferably after these registering tumbler chambers are so provided with the tumblers and springs the same are anchored in position by a plate 51 secured to the recessed and of the extension 11, see particularly Figs. 1, 3 and 4. The length of the key engaging tumblers relating to the spring abutment tumblers of course depends upon the combination desired as defined by the positions of the abutments 52, 53, 54, 55 and 56 relative to one another on the key 57.

In this arrangement, it is of course obvious that the key engaging tumblers will then rest on the lip 29 when the key is removed in which positions the divisions between the intermediate tumblers and the key engaging tumblers will not register with the division between the barrel 5 and the extension 11 so that the barrel 5 cannot be turned and consequently the connection 25 and bolt engaging shaft 26 not turned.

On the other hand, when the respective lengths of the intermediate tumblers and key engaging tumblers correspond to the combination defined by the positions of the abutments 52 to 56 respectively of the key 57 then when the key is inserted the sets of tumblers will be positioned so that the division between the intermediate tumblers and the key engaging tumblers will register with the divisions between the barrel 5 and extension 11 as shown in Fig. 3.

The invention illustrated in the embodiment of Figs. 1 to 6 particularly resides in the cooperation of the ball 58 with the annular recesses 59 and 60 of the tumblers 38 and 44 respectively. As an instance, after the ball 58 is once inserted through the opening 18 and positioned to cooperate either with the recess 59 or 60 of the tumblers 38 and 44 it will either lock the intermediate tumbler 44 against axial movement in its chamber as shown in Fig. 3 when the ball registers with the recess 60 in which position it happens that the division between the intermediate tumblers and the key engaging tumblers corresponds to the division between the barrel 5 and the extension 11, or else after the key is removed the tumbler 38 has been raised into position where it will permit the ball 58 to enter the recess 59 when the spring 49 will exercise a pressure on the intermediate tumbler 44 to move it to close the division between the barrel 5 and the extension 11 where the tumbler 44 will lock the ball 58 in engagement with the recess 59 and thereby lock the tumbler 38 in position where it will close the division between the barrel 5 and the extension 11 and thereby lock the barrel 5 in such position until the tumbler 39 has again been actuated to advance the tumbler 44 to permit the ball 58 to slip back into the recess 60 due to the spring pressure of the spring 48 exercised on the tumbler 43 and thereby causing a lateral camming action on the ball 58.

This locking device can be provided between any two adjacent sets of alined tumblers or a plurality of such locking devices be provided when four or more sets of alined tumblers are provided.

As an instance in the embodiment illustrated in Fig. 7, there is a ball 61 provided between the second and third sets of alined tumblers and a second ball 62 provided between the fourth and fifth sets of alined tumblers.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention as set forth in the appended claims.

We claim:

1. The combination of a tumbler lock including a casting having tumbler chambers, a barrel rotatably mounted in said casting and having tumbler chambers alineable with the tumbler chambers in said casting, a keyway, and a lip cooperating with said keyway normally to support the alined tumblers when the lock is closed, springs in said chambers for urging the alined tumblers toward said lip, the lengths of the tumblers selected corresponding to the pattern of the key to be used, there being a communication formed between two adjacent tumbler chambers in said casting, there being recesses formed in the sides of the tumblers mounted in said adjacent tumbler chambers, and a locking ball corresponding in size to fit in the recess in one of said tumblers and said communication but too large to fit in said communication without protruding therefrom whereby a tumbler in one or the other tumbler chamber may be locked against movement and only one released at a time.

2. A locking device for a tumbler lock having a plurality of tumbler chambers and a communication between two adjacent tumbler chambers, tumblers in said chambers with recesses in the sides of the tumblers located in said two adjacent tumbler chambers, and a locking device wider than the width of said communication but small enough to clear the tumbler in one of said tumbler chambers when protruding into the recess of the tumbler in the adjacent tumbler chamber.

3. A locking device for a tumbler lock having a plurality of tumbler chambers and a communication between two of the tumbler chambers which are adjacent to one another, tumblers in said chambers with annular recesses in the tumblers located in said two adjacent tumbler chambers, and a locking ball wider than the width of said communication but small enough to clear the tumbler in one of said tumbler chambers when

protruding into the recess of the tumbler in the adjacent tumbler chamber.

4. A locking device for a tumbler lock having a main casting, said casting having a barrel chamber and a plurality of tumbler chambers extending radially to said barrel chamber, a barrel rotatably mounted in said barrel chamber having a plurality of tumbler chambers alineable with the tumbler chambers in said main casting, two tumblers operable in each pair of alineable tumbler chambers, one of the tumblers in each of two adjacent alined sets of tumbler chambers having an annular recess, said casting having a communication between the tumbler chambers of said latter two sets of tumblers, and a locking ball wider than the width of said communication but small enough to clear the tumbler in one of said tumbler chambers when protruding into the annular recess of a tumbler in the adjacent tumbler chamber.

5. A locking device for a tumbler lock having four or more tumbler chambers and a communication between the two adjacent tumbler chambers of two or more pairs of adjacent chambers, tumblers in said chambers with recesses in the sides of the tumblers located in said adjacent tumbler chambers, and locking devices wider than the width of said communication between adjacent chambers but small enough to clear the tumbler in one of said tumbler chambers when protruding into the recess of the tumbler in the adjacent tumbler chamber.

6. A locking device for a tumbler lock having a main casting, said casting having a barrel chamber and a plurality of tumbler chambers extending radially to said barrel chamber, a barrel rotatably mounted in said barrel chamber having a plurality of tumbler chambers alineable with the tumbler chambers in said main casting, two tumblers operable in each pair of alineable tumbler chambers, one of the tumblers in each of two adjacent alined sets of tumbler chambers having a lateral recess, said casting having an opening extending from the rear wall thereof into communication with the tumbler chambers of said latter two adjacent sets of tumblers to form a communication between the tumbler chambers of said latter two sets of tumblers, and a locking ball wider than the width of the communication between said two adjacent set of tumbler chambers but small enough to clear the tumbler in one of said tumbler chambers when protruding into the lateral recess of a tumbler in the adjacent tumbler chamber.

7. A locking device for a tumbler lock having a main casting, said casting having a barrel chamber and four or more tumbler chambers extending radially to said barrel chamber, a barrel rotatably mounted in said barrel chamber having four or more tumbler chambers alineable with the tumbler chambers in said main casting, two tumblers operable in each pair of alineable tumbler chambers, one of the tumblers in each chamber of two pairs of adjacent alined sets of tumbler chambers having a lateral recess, said casting having an opening extending from the rear face thereof into communication with the tumbler chambers of said two pairs of adjacent tumbler chambers to form a communication between the chambers in each pair, and a locking ball for each pair of tumbler chambers wider than the width of the communication between each pair but small enough to clear the tumblers in one of the chambers of a pair when protruding into the lateral recess of a tumbler in the other chamber of such pair.

8. A locking device for a tumbler lock having a main casting, said casting having a barrel chamber and a plurality of tumbler chambers extending radially to said barrel chamber, a barrel rotatably mounted in said barrel chamber having a plurality of tumbler chambers alineable with the tumbler chambers in said main casting, two tumblers operable in each pair of alineable tumbler chambers, the division between which will aline with the division between the barrel and the casting in unlocking position, the outer tumbler in one of two adjacent alined sets of tumbler chambers having a lateral recess, the inner tumbler in the other of such two adjacent alined sets of tumbler chambers having a lateral recess, said casting having a communication between the tumbler chambers of said latter two sets of tumblers, and a locking device wider than the width of said communication but small enough to clear the unrecessed portion of the tumblers in one of said tumbler chambers when protruding into the lateral recess of a tumbler in the adjacent tumbler chamber.

9. A locking device for a tumbler lock having a main casting, said casting having a barrel chamber and a plurality of tumbler chambers extending radially to said barrel chamber, a barrel rotatably mounted in said barrel chamber having a plurality of tumbler chambers alineable with the tumbler chambers in said main casting, two tumblers operable in each pair of alineable tumbler chambers with the division between said pairs of tumblers alined with the division between the barrel and said casting in unlocking position, the tumbler nearest the barrel in the foremost of two adjacent alined sets of tumbler chambers having a lateral recess, the tumbler nearest the casting in the rearmost of said two adjacent alined sets of tumbler chambers having a lateral recess, said casting having a communication between the tumbler chambers of said latter two sets of tumblers, and a locking ball wider than the width of said communication but small enough to clear the unrecessed portion of the tumblers in one of said tumbler chambers when protruding into the lateral recess of a tumbler in the adjacent tumbler chamber.

10. A locking device for a pin tumbler lock having at least two tumbler chambers, tumblers in said chambers with recesses in the sides of the tumblers, and a locking device small enough to clear the tumbler in either of said tumbler chambers when protruding into the recess of the tumbler in the other tumbler chamber.

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