Aug. 10, 1943. H. L. HULL 2,326,358

TUMBLER TYPE LOCK

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Fig. 1.

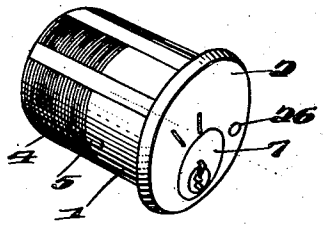


Fig. 2.

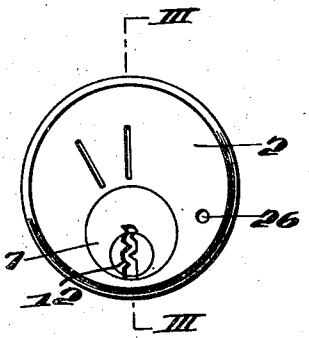


Fig. 3.

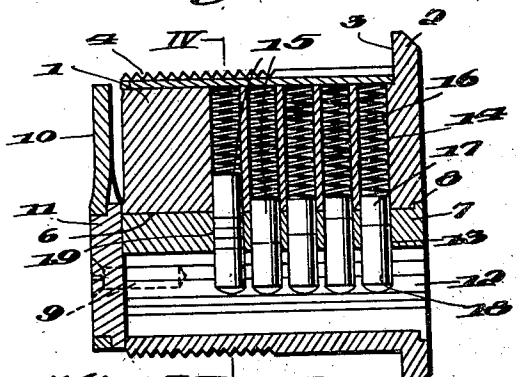


Fig. 4.

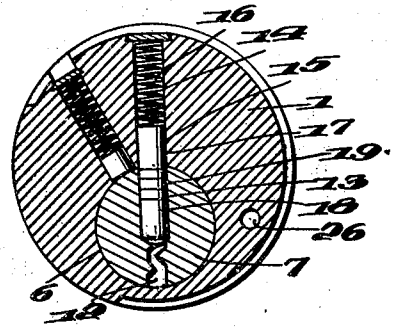


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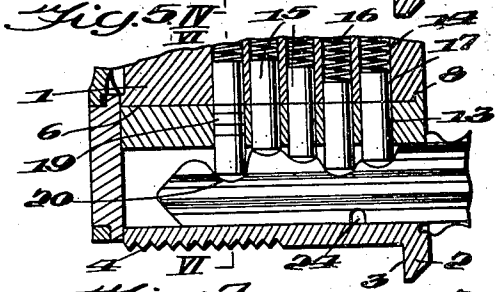


Fig. 6.

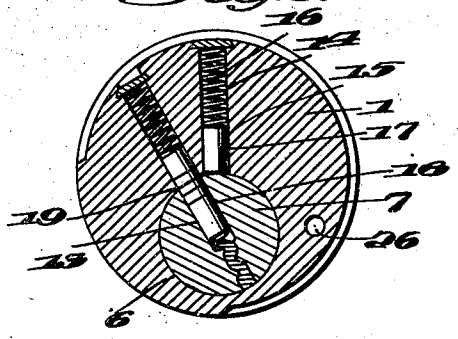
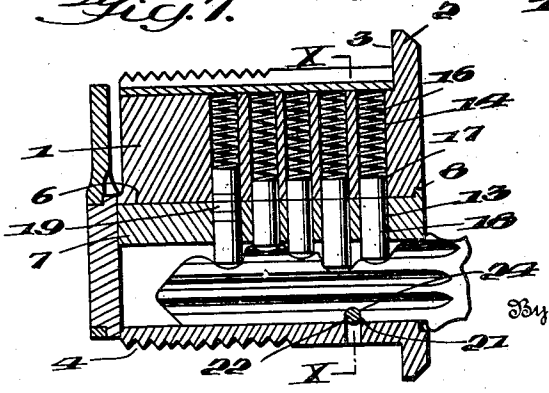


Fig. 7.



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Fig. 8.

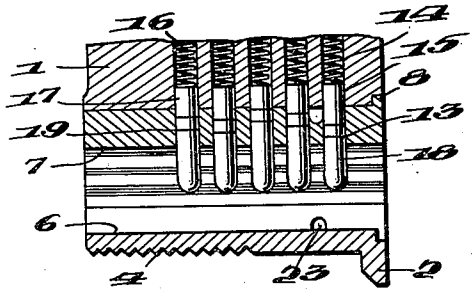


Fig. 9.

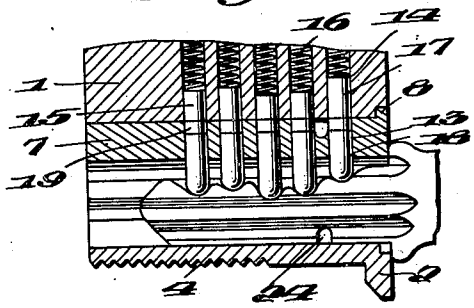


Fig. 10.

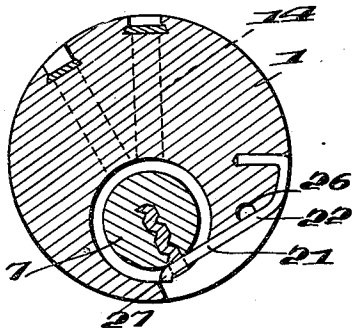


Fig. 11.

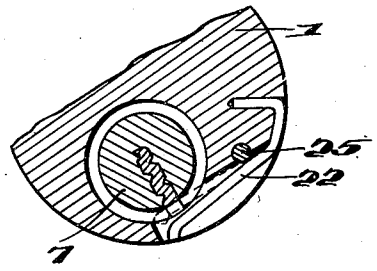


Fig. 12.

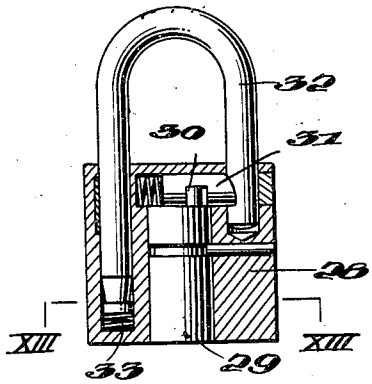
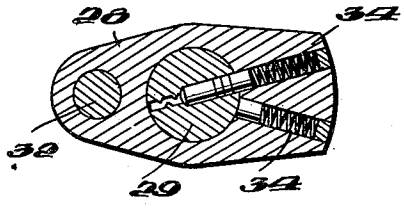


Fig. 13.



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TUMBLER TYPE LOCK

Homer L. Hull, Marion, Ohio

Application January 23, 1940, Serial No. 315,266

3 Claims. (Cl. 70—385)

This invention relates to locks and is particularly directed to locks of the tumbler type in which a body is provided with a movable member and means normally operative to prevent movement of the member. Locks of this general type now in use are objectionable in that when unauthorized persons obtain keys therefor and it is desired to change the combination of the lock, it must be removed from the door or other article to which it is attached and taken to a locksmith who must disassemble the lock and change the elements therein to set the lock to a new combination.

The primary object of this invention resides in the provision of a lock which may be changed without removal from the location through the use of a plurality of keys having predetermined shapes.

Another object resides in the provision of a lock having a body in which a plurality of sets of pinways are formed, said sets being disposed in integral relation to one another and adapted to register with sockets formed in a member movably supported in the body. The pinways are provided for the reception of tumbler elements which are composed of a plurality of sections, certain of which may be moved from one set of pinways to the other.

It is also an object to provide a lock body with a normal key receiving position and a combination changing key position. The insertion of a different key in the lock when in the combination changing position and movement of the key to the normal position serves to actuate elements in the lock to change the combination.

A still further object resides in providing a lock of the type above mentioned with means for preventing the removal of the key when in a combination changing position except upon the actuation of certain elements of the lock.

It is also an object to provide a lock having a body formed for the reception of a cylinder, the body having a plurality of pinways to receive spring-pressed followers. The cylinder has a plurality of sockets for push members, the sockets being adapted to register with the pinways when the cylinder is in a normal position. The body is provided with a second set of pinways with which the sockets in the cylinder register when the cylinder is turned to destroy the alignment of the sockets with the first set of pinways. The sockets, in addition to the push members, receive short pin sections which may be deposited in the pinways of either set through the use of key means of suitable form.

Other objects will be apparent from the following description and the accompanying drawings in which the invention has been illustrated in several forms.

In the drawings:

Fig. 1 is a perspective view of a lock formed in accordance with the present invention;

Fig. 2 is a front elevational view of the lock shown in Fig. 1;

Fig. 3 is a vertical longitudinal sectional view taken on the plane indicated by the line III—III of Fig. 2;

Fig. 4 is a vertical transverse sectional view taken on the plane indicated by the line IV—IV of Fig. 3;

Fig. 5 is a view similar to Fig. 3 but shows a key positioned in the keyway of the lock cylinder to move the tumbler elements to a position whereby the cylinder may be rotated;

Fig. 6 is a vertical transverse sectional view taken on the plane indicated by the line VI—VI of Fig. 5;

Fig. 7 is a view similar to Fig. 5 showing a key positioned in the lock preparatory to changing the combination of the lock;

Fig. 8 is a vertical longitudinal sectional view through a modified form of lock;

Fig. 9 is a similar view showing a key positioned in the cylinder of the lock shown in Fig. 8, the tumbler elements being in position to permit rotation of the cylinder;

Fig. 10 is a vertical transverse sectional view taken on the plane indicated by the line X—X of Fig. 7 and shows the means for preventing the removal of the key when the cylinder is in a combination changing position;

Fig. 11 is a similar view showing the key retaining means in a released position to permit the removal of a key and the insertion of a different key;

Fig. 12 is a detail sectional view taken through a padlock provided with combination changing elements;

Fig. 13 is a horizontal sectional view taken on the plane indicated by the line XIII—XIII of Fig. 12.

Referring more particularly to the drawings, the numeral 1 designates the body of the preferred form of lock. This lock, in this instance, is of cylindrical form and is provided at its forward end with a disk-like head 2, the diameter of which is greater than that of the body to provide an annular shoulder 3 for engagement with the surface of a door or other article to which the lock is applied. The body 1 adjacent the rear

end is formed on its exterior surface with screw threads 4 to receive similar threads formed in the door or other article to hold the body 1 in connection therewith. As is usual in this type of lock, the body is provided with a groove 5 to receive the inner end of a set screw carried by the article to which the lock is applied to prevent turning movement of the lock body. Since this invention is directed to the lock, the elements employed in securing the lock to a support are not disclosed.

The body 1 is provided with a longitudinally extending bore 6 which is preferably eccentrically disposed in the body and is provided to receive a cylinder member 7. The length of the cylinder is substantially equal to that of the body so that the ends of the cylinder will be flush with the ends of the body when assembled therewith. One end of the cylinder has a flange 8 formed thereon to locate the cylinder with relation to the body and the opposite end is provided with threaded openings for the reception of machine screws 9 employed in securing a lever 10 to the cylinder. The inner end of the cylinder is provided with a transverse slot to receive a key 11 which assists the screws 9 in preventing relative movement between the lever 10 and the cylinder. The cylinder is provided with a longitudinally extending milled keyway 12 for the reception of key means having suitable cross sectional configuration.

Extending into the cylinder from the side thereof are a plurality of sockets 13, the axes of which are arranged in a plane passing through the axis of rotation of the cylinder and the longitudinal axis of the keyway. The body 1 is provided with a plurality of drilled openings 14 which are spaced longitudinally of the body 1 and have their axes in registration with the longitudinal axis of the opening 6. Certain of the drilled openings 14 as 14^a are disposed in angular relationship with the remaining openings. This spacing provides a plurality of sets of such openings. Corresponding openings in each set are in registration and spaced longitudinally of the body to conform to the spacing of the sockets 13 in the cylinder. By this construction, the sockets will be alternately aligned with the pin-ways of the sets upon rotation of the cylinder in the body. To prevent this rotation and consequent movement of the lever 10, tumbler elements 15 are positioned in the drilled openings or pinways 14. These elements include spring members 16, followers 17 and key-engaging pusher members 18. The pusher members are of different lengths and are disposed in the sockets in the cylinder. The length of the pusher members is less than the depth of the sockets so that the follower members 17 will enter the sockets when the latter are in registration with the pinways. Portions of each of the follower members remain in the pinways and prevent rotation of the cylinder.

When it is desired to rotate the cylinder to unlock the door with which the lock mechanism is connected, a key may be inserted in the keyway and if the key is of the proper shape, the outer ends of the pusher members will be brought into registration with the exterior surface of the cylinder at which time the cylinder may be revolved in the body.

To change the combination of the lock, one or more of the sockets has a plurality of wafer-like pin sections 19 disposed therein between the outer end of the pusher member and the exterior of the cylinder. In the form shown in Figs. 3 to 7 inclusive, only one socket is provided with the short pin sections, in this instance, three in number being illustrated.

It will be apparent from the foregoing that any key provided with a tumbler engaging edge which will position the outer ends of the pusher members and any of the pin sections in registration with the outer surface of the cylinder will place the lock in operating condition. As shown in Fig. 5, a key having the proper shape to position the outer end of the uppermost pin section in registration with the exterior of the cylinder is placed in the keyway and the cylinder, if rotated with such a key therein, will carry the pin sections therewith. If the sockets are brought into registration with the second set of pinways, and the key is removed, a second key having the shape shown in Fig. 7 may be inserted and will serve to move the uppermost pin section into the pinway of the second set. Then if the cylinder is turned to a normal position and the key withdrawn, the follower will move into the socket to a greater extent and if the first key is inserted in the keyway, the tumbler engaging surface at 20 will be of an insufficient height to entirely push the follower out of the socket. Since a portion of the follwer remains in the socket, the cylinder will be precluded from rotation.

It will thus be seen that the combination of the lock has been changed to such an extent that the first key has been rendered useless. This operation may be repeated until all the pin sections have been removed from the cylinder to the supplemental pinway.

In Figs. 8 and 9, one pin section 19 has been positioned in each socket in the cylinder. These pin sections may be transferred from the cylinder to the supplemental pinways in the same manner as above set forth, the elimination of each pin section serving to effect such change in the combination of the lock.

It is obvious that, if desired, the pin sections 19 could be disposed in the supplemental pinways when the lock is originally assembled and then be transferred to the cylinder and back, one at a time, through the use of suitable keys, to change the combinations of the lock.

Either of the forms so far described will permit the effective changing of the combination without removing the lock from the door. In the first form described, when all the pin sections are positioned in the cylinder, all the keys will open the lock, the keys being eliminated one at a time as the pin sections are moved from the cylinder to the supplemental pinway. In the form shown in Figs. 8 and 9, when all the pin sections are contained within the cylinder, any key having a shape which will position the inner or outer ends of the pin sections in registration with the exterior surface of the cylinder will operate the lock. As the pin sections are eliminated, certain of the keys will be rendered useless and the combination of the lock will be changed so that a different key will be required. When one or more pin sections are placed in each socket, the number of combination changes possible is greatly increased.

To prevent the undesired withdrawal of keys at the combination changing position, a lock shown at 21 has been provided. This lock comprises a spring bar 22 secured to the body in any suitable manner. This spring extends through a slot formed in the body and has its outer end in an annular recess 23 in the cylinder. The keys are provided with a recess 24 which, when the key is in proper position in the keyway,

will register with the annular recess in the cylinder. When the cylinder is in a combination changing position, the end of the spring bar will be disposed in the slot in the key and outward movement of the key will be resisted. When it is desired to change the combination by removing the key at the combination changing position, the spring bar 22 may be moved out of the recess in the key by inserting a plunger 25 in an opening 26 in the body 1. The opening is so positioned that when the plunger 25 is inserted, the angular end of the plunger will flex the spring bar so that the outer end will be moved out of the recess 23 and the key withdrawn. To prevent resistance to rotary movement of the cylinder, the outer end of the bar is slightly curled as at 27 to present a smooth surface for engagement by the key.

As shown in Figs. 12 and 13, the principles of changing the combination of a lock have been incorporated in a lock of the padlock type. In this type, a body 28 is provided with a recess for the reception of a cylinder 29, the latter corresponding to the cylinder 7 in the preferred form. The inner end of the cylinder is provided with an eccentric pin 30 which, upon rotation of the cylinder, serves to move a spring pressed keeper 31 from engagement with a shoulder formed on a U-shaped bail member 32. When the keeper is thus moved, the bail member is free to move outwardly in response to the force of a spring 33 and the lock will be released. To provide changes in the combination, the body 28 has a plurality of sets of pinways 34 which are angularly related and receive spring pressed plungers, as in the preferred forms of locks above described. The cylinder is formed with sockets to receive pusher members and pin sections which permit the combination of the lock to be changed in the same manner as in the preferred form.

It will be apparent from the foregoing that a lock has been provided wherein combination changing elements have been incorporated which will permit the lock to be set up for different keys without removal from the door. Locks of this type are particularly desirable for use in residences or offices leased to different tenants and it is necessary to change the combinations of the locks to prevent the previous occupants who retain keys from having access to the premises. An important advantage secured by the provision of the lock mechanism disclosed is that the combination may be changed without the addition or removal of any parts simply by the manipulation of a key.

What is claimed is:

1. In a lock of the type having a body, a cylinder mounted for rotation in said body from a normal to a combination changing position, tumbler means in said body and cylinder for normally resisting movement of the latter, said means being rendered inoperative upon the insertion of a key having a predetermined shape into said cylinder, means provided in said lock for changing the combination thereof, said means being operated by inserting a different key in the cylinder while the same is in the combination changing position and returning the cylinder to a normal position, and means provided in said body for preventing the withdrawal of the keys from the cylinder when in a combination changing position, said means being releasable at will.

2. In a lock, a cylindrical body provided with a longitudinally extending eccentrically disposed socket, a cylinder revolubly positioned in said socket, said cylinder having a longitudinally extending keyway and a plurality of transversely extending sockets communicating therewith, said body having a set of pinways disposed in a plane passing through the longitudinal axes of said body and cylinder and a second set of pinways disposed in a plane passing only through the longitudinal axis of said cylinder, rotation of said cylinder serving to alternately align the sockets therein with the sets of pinways, spring-pressed followers mounted in said pinways, pin tumbler pusher members disposed in the sockets in said cylinder, relatively thin tumbler sections formed for reception by said pinways and sockets, said sections being transferable between said sockets and said pinways through the insertion of predetermined key means in said keyway when the sockets in said cylinder are in alignment with the pinways, key-retaining means carried by said body to normally prevent the removal of the key from said cylinder when said sockets are in alignment with the pinways of said second set, and means formed for engagement with said body to render said key-retaining means inoperative.

3. In a lock, a cylindrical body provided with a longitudinally extending eccentrically disposed socket, a cylinder revolubly positioned in said socket, said cylinder having a longitudinally extending keyway and a plurality of transversely extending sockets communicating therewith, said body having a set of pinways disposed in a plane passing through the longitudinal axes of said body and cylinder and a second set of pinways disposed in a plane passing only through the longitudinal axis of said cylinder, rotation of said cylinder serving to alternately align the sockets therein with the sets of pinways, spring-pressed followers mounted in said pinways, pin tumbler pusher members disposed in the sockets in said cylinder, relatively thin tumbler sections formed for reception by said pinways and sockets, said sections being transferable between said sockets and said pinways through the insertion of predetermined key means in said keyway when the sockets in said cylinder are in alignment with the pinways, and manually releasable key-retaining means for normally preventing the removal of the key from said cylinder when said sockets are in alignment with the pinways of said second set, said retaining means having a resilient key-engaging member.

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