Nov. 9, 1926. 1,606,701

A. G. HATCH

ANTIPICKING DEVICE FOR KEYLESS LOCKS

Filed June 12, 1925

Fig. 1.

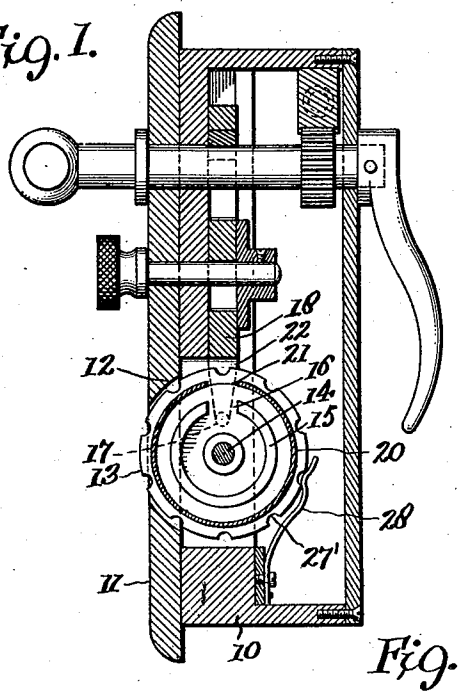


Fig. 2.

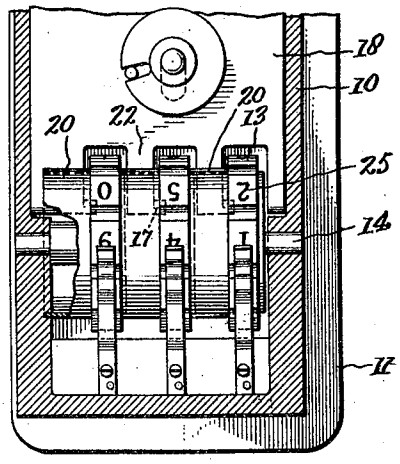


Fig. 7.

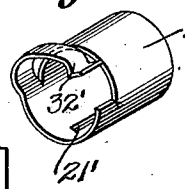


Fig. 4.

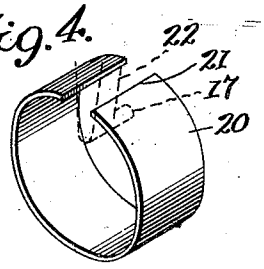


Fig. 3.

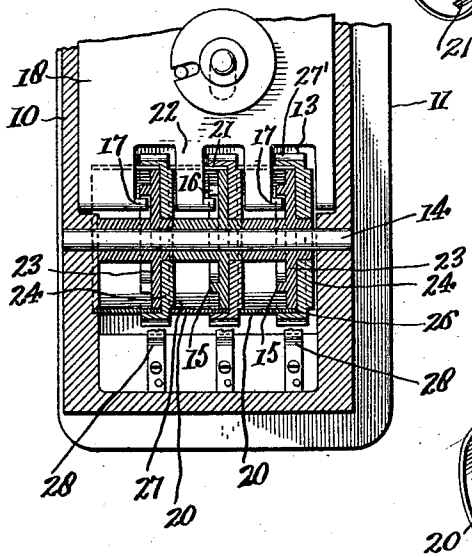


Fig. 5.

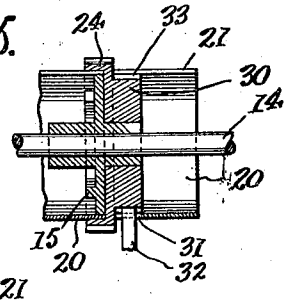
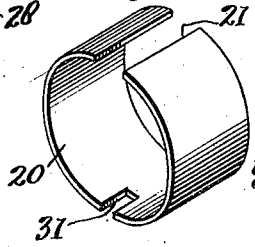


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ANTIPICKING DEVICE FOR KEYLESS LOCKS.

Application filed June 12, 1925. Serial No. 36,659.

This invention relates to an anti-picking device for keyless locks and has for one of its objects to provide a means for preventing the picking of permutation locks, particularly those of the type shown in my prior Patent No. 1,555,969, granted October 6, 1926, entitled "Keyless locks"; the patent of Meade Wildrick and Alexander G. Hatch, granted December 8, 1925, No. 1,565,132, entitled "Keyless locks;" and the patent of Meade Wildrick, No. 1,586,496, granted May 25, 1926, for improvements in keyless locks; although, as will appear more fully below, it readily lends itself to adaption to practically any form of permutation lock.

In the said prior Patent No. 1,555,969, there are shown several forms of permutation locks in each of which, however, there is a casing within which is mounted a plurality of permutation wheels, portions of which project through apertures in the casing, whereby they may be manually rotated to control the action of the locking slide or bolt. Each of the wheels is provided with a laterally projecting annular rib which is cut away at one point to provide a passage for a toe of the locking bolt. Although relatively small clearances are provided between the side faces of the wheels and the apertures in the casing, it is possible by the use of a very thin flat instrument inserted between the wall of the aperture and the wheel until its end engages the above mentioned rib and then rotating the wheel, to locate the position of the passage in the rib, whereupon it is a comparatively easy matter to align the said passage with the toe of the locking bolt, thereby permitting the lock to be operated by an unauthorized person.

In order to overcome the possibility of thus picking the lock, it is proposed to provide a shield member interposed between the aperture in the casing and the annular rib on the wheel which shield will effectively prevent the introduction of such a thin flat instrument to the point where it will engage the annular rib, and thereby make it impossible to ascertain the location of the said passageway.

The said shield will also serve as a dust guard to prevent the entrance of dust and dirt into the interior of the lock, with a consequent clogging of the moving parts; and in certain forms of lock the said shield may also perform the additional function of keeping the permutation wheels accurately located without the use of hubs.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel details of construction and combination and arrangements of parts, more fully and hereinafter described and particularly pointed out in the appended claims.

Referring to the accompanying drawings forming a part of this specification, in which like reference characters designate like parts in all the views;

Fig. 1 is a vertical sectional view through one form of lock. showing the shield constituting the present invention in operative position therein;

Fig. 2 is a fragmentary sectional view partly in elevation at right angles to Fig. 1, the permutation wheels as well as the shields being shown in elevation;

Fig. 3 is a view similar to Fig. 2 but with the wheels and shields shown in section;

Fig. 4 is a detail perspective view of one of the shield members constituting the invention;

Fig. 5 is a fragmentary sectional view, showing the application of the shield to a slightly modified form of permutation wheel;

Fig. 6 is a perspective view of the shield employed in Fig. 5; and,

Fig. 7 is a perspective view of a still further modified form of shield.

The general details of the lock form no part of the present invention and they will, therefore, be described only to the extent necessary to an understanding of the application of the shield members. For purposes of illustration only, the shield has been here shown as applied to a lock such as is commonly used upon automobile doors, although it will be understood, of course, that the shields are equally adapted for use with any of the various forms of lock, shown and described in the said co-pending applications, as well as other.

The lock here shown comprises a casing 10, having a face plate 11, provided with a plurality of apertures 12, through which project portions of the permutation wheels 13, which wheels are rotatably mounted upon a transverse shaft 14 carried by the said

casing 10. Each wheel is provided upon one flat face with an annular rib 15 which is cut away at one point in its circumference to provide a passage 16 through which the toe 17 of the locking bolt or slide 18 may pass.

As above mentioned, the clearances between the sides of the permutation discs and the walls of the apertures 12 are comparatively small, but at the same time they are sufficient to permit the insertion of a very thin flat instrument to engage the ribs 15 so that by turning the wheels 13 it is possible to feel with the said instrument, the position of the passage 16. In order to prevent this, there is provided by the present invention, a shield member 20 which may be formed of sheet metal, fiber or other suitable material and which is adapted to be interposed between adjacent wheels concentric therewith, as shown in the drawings. These shield members 20 are supported by the wheels but do not rotate therewith, inasmuch as they do not constitute complete circles, but are cut away at one point indicated at 21, to permit the passage of the depending legs 22 of the locking member 18. Inasmuch as this member does not rotate and since it passes through the shield member 20, it is obvious that the latter will be prevented from rotating with the wheels.

On the other hand, the said wheels are employed to support the shields 20 as will now be described. That is to say, as will be clear from the drawings, each wheel comprises two members 23 and 24 which may be secured together in any suitable way and the latter of which carries upon its outer circumference, suitable indicia 25 as is customary in this type of device. The said outer member 24 is recessed upon one face to receive the member 23 and the latter member is made of a somewhat smaller diameter than the diameter of the recess, whereby, there is provided an annular channel 26 into which one end of the shield member 20 may be received. The member 24 on the other hand is provided with a shoulder 27 which is also substantially the same diameter as the interior of the shield member 20 and which is adapted to be received within the other end of the said shield member and to thereby support the same. It thus results that when the parts are assembled as shown in the drawings, that the said shield members will be held in place by the wheels, but they will not rotate therewith, due to the projection of the legs 22 of the slide member 18, through the longitudinally extending slot 21 as above explained. Furthermore, the said shield members project within the wheels as well as past the clearance spaces between the wheel faces and the walls of the apertures 12, so as to make it impossible to insert a thin flat instrument through such clearances and into contact with the annular ribs 15, whereby the position of the passageways 16 might be ascertained.

In the form of the invention shown in Figs. 1 to 4 inclusive, the shields are applied to permutation discs, the outer circumferences of which are notched as indicated at 27′, and the notched portions of the discs are engaged by suitable detent springs 28, each spring and the part of the disc engaged thereby serving as a brake and brake drum for holding the wheels in set positions. In Fig. 5, there is shown a slightly modified form of wheel in which the part provided with detent notches, to serve as a brake drum, instead of being upon the outer circumference of the member 24 are located upon the shoulder or projection 30, which corresponds to the shoulder or projection 27, above described, except that in the present case the shoulder is wider. In this case it is necessary to provide the shields 20 with an additional cutaway portion or notch 31, (Figures 5 and 6) through which the detent spring 32, or other equivalent brake member, may project in order to engage the detent notches 33 formed on the shoulder 30. Otherwise, however, the construction may be the same as that above described.

In some cases, it may be desirable from a manufacturing standpoint or for other reasons, to form the detent spring as part of the shield, and this can be readily done by merely striking out an integral resilient tongue, as shown in Fig. 7 or by rigidly securing to the shield a separate tongue or detent, suitably positioned to engage the detent notches of the wheels or other locking members. Such a shield is illustrated in Fig. 7 in which a brake member in the form of a detent 32′ is indicated as having been formed by striking up and bending to shape a portion of the shield 20′, such detent being adapted to cooperate with notches 33 in an adjacent disc of the type illustrated in Fig. 5. The shield is slotted as at 21′ to permit the leg 22 of the locking member 18 to maintain its toe 17 in cooperative relation with the notched rib 15.

When employed in locks of the type shown in the said Patents Nos. 1,565,132 and 1,586,496, in which the locking action is accomplished without an annular rib on the wheels, and a toe moving through a notch therein, the slot, such as 21, may be dispensed with and the shield form a complete ring, since there is no locking bolt to pass through such slot. In this case, the shield may of course be secured in any suitable manner to the casing to prevent its rotation, or it may be formed as a rigid part of the permutation wheel and rotated therewith. If secured to the casing, it need not necessarily constitute a complete annulus, but

need only extend through a sufficient arc to cover and protect the wheel apertures in the casing.

It will be obvious that those skilled in the art may vary the details of construction as well as the precise arrangement of parts, without departing from the spirit of the invention and, therefore, it is not wished to be limited to the above disclosure, except as may be required by the claims.

What is claimed is:

1. In a keyless lock, a casing having an aperture; a locking member mounted within said casing; a permutation wheel rotatably mounted within said casing, projecting through said aperture, and provided with a laterally projecting rib in alignment with a portion of said aperture, said rib having a passage to accommodate said locking member; and a shield within said casing between said aperture and said rib, adapted to prevent the insertion of a thin instrument between the wall of said aperture and said wheel to locate the position of said passage.

2. In a keyless lock, a casing having an aperture; a locking member mounted within said casing; a permutation wheel rotatably mounted within said casing, projecting through said aperture, and provided with a laterally projecting annular rib in alignment with a portion of said aperture, said rib having a passage to accommodate said locking member; and a substantially annular shield within said casing surrounding said rib, adapted to prevent the insertion of a thin instrument between the wall of said aperture and said wheel to locate the position of said passage.

3. In a keyless lock, a casing having an aperture; a locking member mounted within said casing; a permutation wheel rotatably mounted within said casing, projecting through said aperture, and provided with a laterally projecting annular rib in alignment with a portion of said aperture, said rib having a passage to accommodate said locking member; and a substantially annular non-rotatable shield within said casing surrounding said rib, adapted to prevent the insertion of a thin instrument between the wall of said aperture and said wheel to locate the position of said passage.

4. In a keyless lock, a casing having an aperture; a locking member mounted within said casing; a permutation wheel rotatably mounted within said casing, projecting through said aperture, and provided with a laterally projecting annular rib in alignment with a portion of said aperture, said rib having a passage to accommodate said locking member; and a substantially annular non-rotatable shield within said casing surrounding said rib, adapted to prevent the insertion of a thin instrument between the wall of said aperture and said wheel to locate the position of said passage said shield being cut away to accommodate said locking member.

5. In a keyless lock, a casing having an aperture; a locking member mounted within said casing; a permutation wheel rotatably mounted within said casing, projecting through said aperture, and provided with a laterally projecting annular rib in alignment with a portion of said aperture, said rib having a passage to accommodate said locking member; and a substantially annular non-rotatable shield within said casing surrounding said rib, adapted to prevent the insertion of a thin instrument between the wall of said aperture and said wheel to locate the position of said passage, said shield being provided with a cut away portion to accommodate said locking member and a cut away portion to accommodate a detent spring.

6. In a keyless lock, a casing having a plurality of apertures; a locking member mounted within said casing; permutation wheels rotatably mounted within said casing, projecting through said apertures, each provided with a laterally projecting annular rib in alignment with its respective aperture, said ribs having passages to accommodate said locking member; and substantially annular non-rotatable shields positioned between and supported by adjacent wheels, surrounding said ribs, adapted to prevent the insertion of a thin instrument between the walls of said apertures and said wheels to locate the positions of said passages, said shields being cut away to accommodate said locking member.

7. A permutation mechanism for a keyless lock comprising pairs of movement-obstructing elements, each pair consisting of an element comprising a stop and an element having an externally disposed slotted abutment opposing relative lock-controlling movement between said elements except when said stop and the slot in said abutment are in registration, a casing for said mechanism having openings each exposing a portion of one element of one of said pairs whereby it may be set, and a series of anti-picking guards so disposed within said casing as to be interposed between said openings and said slotted abutments.

8. A lock comprising a casing, a locking member mounted for movement therein from an effective to an ineffective position, and vice versa, and a plurality of permutation wheels mounted in said casing and having peripheral portions exposed through slots in the wall of said casing whereby they may be individually manipulated, said wheels having parts lying in the paths of movement of parts of said locking member and obstructing effective movement thereof

except when set in the predetermined relation, each of said wheels having an externally disposed slotted annular abutment concentric with its axis of rotation to serve as its movement-obstructing portion and a shielding element so disposed as to form a constantly effective guard interposed between said abutment and the slot in the casing through which said wheel is manipulated, thereby concealing and rendering difficult the detection, through said slots, of the location of the slots in the abutments through which the movement-obstructing elements of said locking member may be passed when the wheels are set.

9. A lock comprising a casing, a locking member mounted for movement therein from an effective to an ineffective position, and vice versa, and a plurality of permutation wheels mounted in said casing and having peripheral portions exposed through slots in the wall of said casing whereby they may be individually manipulated, said wheels having parts lying in the paths of movement of parts of said locking member and obstructing effective movement thereof except when set in a predetermined relation, each of said wheels having an externally disposed slotted annular abutment concentric with its axis of rotation to serve as its movement-obstructing portion and a shielding element comprising a continuous guard ring surrounding and concentric with its slotted abutment, thereby concealing and rendering difficult the detection, through said slots, of the location of the slots in the abutments through which the movement-obstructing elements of said locking member may be passed when the wheels are set.

10. A permutation mechanism for a keyless lock comprising pairs of movement-obstructing elements, each pair consisting of an element comprising a stop and a permutation wheel settable relatively thereto, said wheel having an externally disposed slotted abutment opposing relative lock-controlling movement between said elements except when said stop and the slot in said abutment are in registration, a casing for said mechanism having openings each exposing a portion of one of said permutation wheels whereby it may be set, and a series of anti-picking guards disposed between said openings and the opposed parts of said movement-obstructing elements, said guards being fixed in position relative to the part of said casing having the openings through which said wheels may be set.

11. A permutation mechanism for a keyless lock comprising pairs of movement-obstructing elements, each pair consisting of an element comprising a stop and a permutation wheel settable relatively thereto and having an externally disposed slotted abutment opposing relative lock-controlling movement between said elements except when said stop and the slot in said abutment are in registration, a casing for said mechanism having openings each exposing a portion of one of said permutation wheels whereby it may be set, said wheels being mounted in said casing with their axes of rotation in alignment, and a series of anti-picking guards, of which each, except one, comprises a sleeve extending continuously from the exposed portion of one of said wheels to the exposed portion of an adjacent wheel, the remaining guard comprising a sleeve extending from the exposed portion of one of said wheels to an adjacent wall of said casing.

12. A permutation mechanism for a keyless lock comprising pairs of movement-obstructing elements, each pair consisting of an element comprising a stop and a permutation wheel settable relatively thereto and having an externally disposed slotted abutment opposing relative lock-controlling movement between said elements except when said stop and the slot in said abutment are in registration, a casing for said mechanism having openings each exposing a portion of one of said permutation wheels whereby it may be set, said wheels being mounted in said casing with their axes of rotation in alignment, and each being provided with a portion effective as a brake drum, brake members mounted in said casing and having frictional contact with said drums to yieldingly oppose free rotation thereof, and a series of anti-picking guards of which each, except one, comprises a sleeve extending continuously from the exposed portion of one of said wheels to the exposed portion of an adjacent wheel, the remaining guard comprising a sleeve extending from the exposed portion of one of said wheels to an adjacent wall of said casing, certain of said guards being slotted along portions not readily accessible from the openings in said casing, to provide for a frictional engagement between said brake members and said drums.

13. A permutation mechanism for a keyless lock comprising pairs of movement-obstructing elements, each pair consisting of an element comprising a stop and a permutation wheel settable relatively thereto and having an externally disposed slotted abutment opposing relative lock-controlling movement between said elements except when said stop and the slot in said abutment are in registration, a casing for said mechanism having openings each exposing a portion of one of said permutation wheels whereby it may be set, said wheels being mounted in said casing with their axes of rotation in alignment, and each being provided with a portion effective as a brake drum, brake members mounted in said cas-

ing and having frictional contact with said drums to yieldingly oppose free rotation thereof, and a series of anti-picking guards of which each, except one, comprises a sleeve extending continuously from the exposed portion of one of said wheels to the exposed portion of an adjacent wheel, the remaining guard comprising a sleeve extending from the exposed portion of one of said wheels to an adjacent wall of said casing, certain of said guards being provided with a resilient element held in frictional engagement with the brake drum of an adjacent wheel and serving as its brake member.

14. A lock comprising a casing, a lock-controlling mechanism therein including a plurality of permutation wheels having their axes of rotation aligned, said wheels having indicia-bearing portions of relatively large diameter accessible through openings in said casing so as to be independently settable, and anti-picking guards comprising sleeves extending from wheel to wheel and having telescoping joints therewith, said guards enclosing the differentiated lock-controlling elements of said wheels and preventing detection of their relative locations by implements inserted through the openings in said casing.

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