

April 21, 1936.

O. A. SHANN

2,038,201

LOCK

Filed May 14, 1935

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FIG. 1

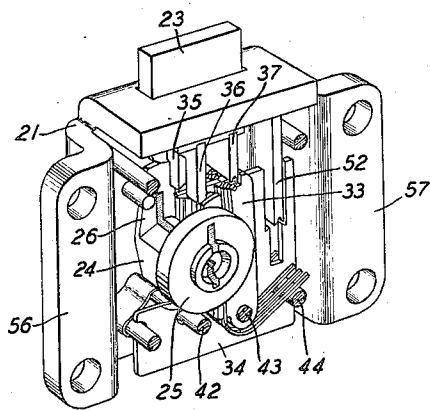


FIG. 3

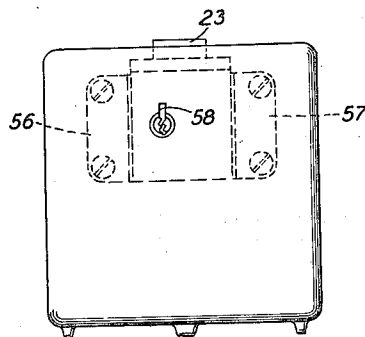
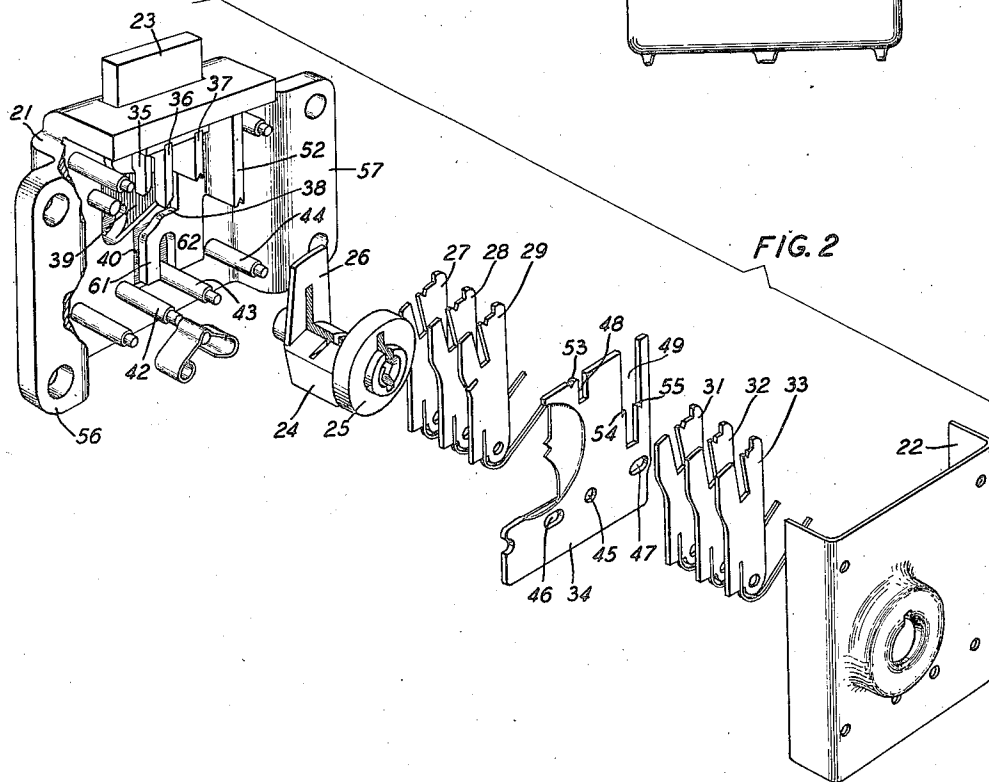


FIG. 2



INVENTOR
O. A. SHANN
BY

B. H. Jackson
ATTORNEY

April 21, 1936.

O. A. SHANN

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FIG. 4

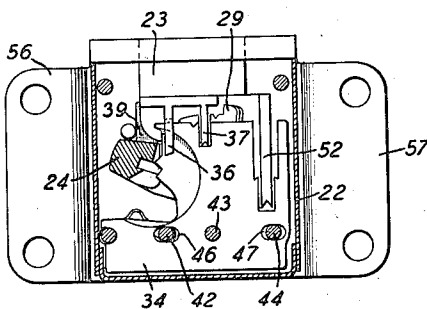


FIG. 5

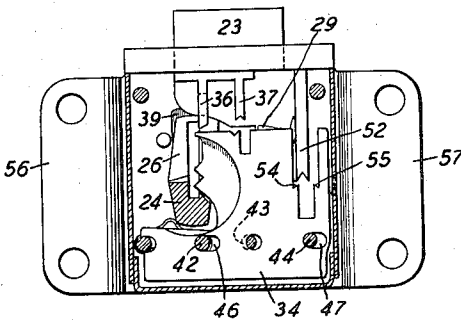


FIG. 6

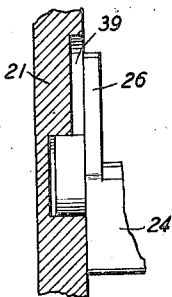


FIG. 7

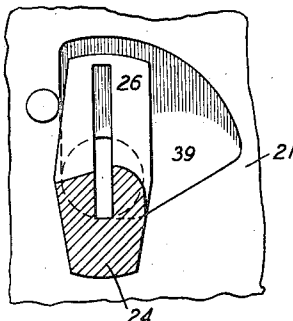


FIG. 8

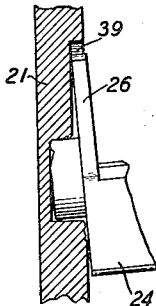


FIG. 9

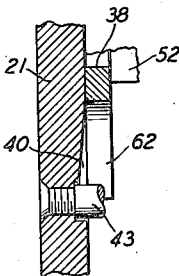


FIG. 10

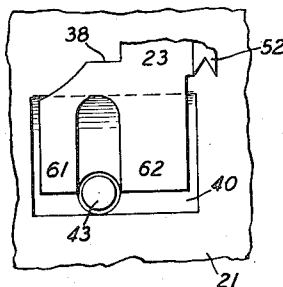
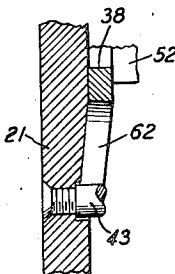


FIG. 11



INVENTOR
O. A. SHANN
BY
T. H. Jackson
ATTORNEY

UNITED STATES PATENT OFFICE

2,038,201

LOCK

Oscar A. Shann, Bayside, N. Y., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

Application May 14, 1935, Serial No. 21,350

10 Claims. (Cl. 70—14)

This invention relates to locks and particularly to locks of the key-operated type.

An object of the invention is the prevention of fraudulent operation of a lock by forcing.

According to a feature of the invention means are included whereby mutilation or distortion of parts of the lock due to attempts to force the lock result in a positive association of the bolt and other parts of the lock which is effective to prevent retraction of the bolt.

The invention may be applied, to mention only one specific embodiment by way of illustration, to doors of the type described in Hoyt et al. United States Patent No. 1,667,804 of May 1, 1928, which are particularly designed for use on telephone coin collectors. The door described in the Hoyt et al. patent is designed to protect the lock associated therewith. However, unscrupulous persons have been able in certain instances to fraudulently operate locks, even when so protected, by inserting a punch through the keyhole and hammering it until parts of the lock have been so mutilated that the bolt may be retracted without the use of a key.

According to a preferred arrangement of the invention, cavities are milled in the rear cover of the lock so arranged that they will receive the tongue of the key barrel and the end of the bolt, respectively, should the attempts at forcing result in bending or displacing these parts, the resulting cooperation of the cavities and the tongue and bolt preventing rotation of the key barrel and retraction of the bolt. In addition a stationary partition of the lock is provided with a slot which normally receives a lug on the bolt when the bolt is retracted. Should the attempts at forcing result in lateral displacement of parts of the lock, shoulders provided on the sides of the slot are brought into the path of the lug on the bolt and prevent retraction thereof.

A complete understanding of the invention and of the various desirable features thereof may be gained from a consideration of the following detailed description in connection with the annexed drawings in which:

Fig. 1 is a perspective view of a lock constructed in accordance with the invention, the cover being omitted to show the interior of the lock;

Fig. 2 is an exploded view of the lock shown in Fig. 1;

Fig. 3 is a reduced front view of a coin collector door of a type to which the lock may be applied, the outline of the lock being shown by dotted lines;

Fig. 4 is a view of the interior of the lock, cer-

tain of the tumblers being omitted to show the association of the bolt lugs and the slots in the partition plate when the bolt is retracted and the partition plate is in normal position;

Fig. 5 is a view similar to that of Fig. 4 except that the partition plate is shown in an abnormally distorted position and the bolt is projected;

Fig. 6 is an enlarged sectional end view of another portion of the interior mechanism showing particularly the normal position of the key barrel tongue with respect to the rear wall of the lock case;

Fig. 7 is a front view of the portion of the mechanism shown in Fig. 6;

Fig. 8 is a view similar to that of Fig. 6 except for the fact that the key barrel tongue is shown in an abnormally distorted position;

Fig. 9 is an enlarged sectional end view of another portion of the interior of the lock showing particularly the normal position of the end of the bolt with respect to the rear wall of the lock case;

Fig. 10 is a front view of the portion of the mechanism shown in Fig. 9; and

Fig. 11 is a view similar to that of Fig. 9 except for the fact that the end of the bolt is shown in abnormally distorted position.

Referring now to the drawings, a lock is shown which may be, so far as the bolt, tumblers, key barrel, etc., are concerned, of ordinary construction, for example, of the general type described in United States Patent 1,793,254 issued to me February 17, 1931.

The lock shown in the drawings and in connection with which the features of the present invention will be described comprises (Figs. 1 and 2) a casing including a rear wall 21 and a front wall or cover 22, a bolt 23, a key barrel 24, said key barrel being provided with a cap 25 and a tongue 26, key operated tumblers or levers 27, 28, 29, 31, 32 and 33 and a stationary partition 34. The upper faces of the tumblers project into the paths of lugs 35, 36 and 37 of bolt 23 and prevent retraction of the bolt unless the tumblers be rotated to move the faces out of the paths of lugs 35 and 36 and to properly align the slots, which are provided in the faces to register with lug 37. This movement of the tumblers may be brought about in the usual manner by the use of a properly designed key. A shoulder 38 is provided on bolt 23, tongue 26 of the key barrel engaging this shoulder and causing retraction of the bolt when the key barrel is rotated. Cavities 39 and 40 are milled in rear wall 21 of the casing of the lock, the particular arrangement and application of which will be described later.

Stationary partition 34 is adapted to occupy a position in the assembled lock between tumblers 27, 28 and 29 and tumblers 31, 32 and 33 being midway between lugs 35 and 36 of the bolt. The partition is mounted on pins 42, 43 and 44, hole 45 provided in the partition being of a size to provide a tight fit on associated pin 43 while holes 46 and 47 are elongated to provide a laterally-slidable fit on associated pins 42 and 44. The partition is provided with slots 48 and 49 into which respective lugs 37 and 52 are adapted to slide when the bolt is retracted (Fig. 4). A notch 53 is provided on the upper side of the partition and shoulders 54 and 55 are provided in the side walls of slot 49, the particular purposes of which will be described later.

Referring now for a moment to Fig. 3, a front view (reduced size) of a coin collector housing door of the general type described in Hoyt et al. United States Patent 1,667,804 is shown, the lock being secured to the inner side of the cover (as shown by the dotted lines) by bolts passing through the holes provided in flange extensions 56 and 57 of rear wall 21 of the lock casing. As shown in the drawing the lock is protected by the door the only access to the lock being through key hole 58.

As pointed out above unscrupulous persons sometimes attempt to fraudulently operate the lock by inserting a punch through key hole 58, placing it in contact with key barrel cap 25 and hammering the punch until parts of the lock are sufficiently mutilated to permit retraction of the bolt. The first result of the hammering is usually the partial destruction of the key barrel cap whereupon the force is then transferred to the tumblers, and thence to the bolt. The particular part of the lock that ultimately bears the brunt of the forcing attempt depends somewhat upon the angle at which the punch is held and the shape assumed by the key barrel cap as the hammering continues. For example, the force may be transferred to the tumblers in a glancing manner resulting usually in moving the tumblers laterally out of their normal position or the force may be transferred to the bolt in a direction perpendicular to the plane of movement thereof in which instance the tumblers are usually partially destroyed and either the bolt or the tongue of the key barrel (or both) is distorted or displaced.

Let us assume for purposes of description that an attempt has been made to force the lock in the above manner and that the force has been so applied that the tumblers have been moved laterally out of their normal position rendering them ineffective in retarding the movement of the bolt. However, this same force has also resulted in forcing stationary partition 34 laterally from its normal position shown in Fig. 4 to the position shown in Fig. 5. As pointed out above, holes 46 and 47 of the partition are elongated thereby allowing lateral movement of the partition, pin 43 alone preventing such movement. The attempts at forcing usually result in shearing pin 43 thereby allowing the partition to move sideways as illustrated, before the tumblers have been rendered ineffective.

It will be clear from this figure that the displacement of partition 34 is effective to prevent retraction of bolt 23 even though the tumblers are ineffective to prevent such retraction for, as shown, shoulder 54 is now in position to contact the edge of bolt lug 52. If for any reason this contact failed, retraction of the bolt would still be prevented by contact of bolt lug 37 and notch 53

which is provided in the upper edge of the partition.

Under certain conditions the partition 34 might be displaced to the left instead of to the right as shown in Fig. 5. In such an instance the displacement would be effective to prevent retraction of the bolt in the same manner as above, shoulder 55 contacting lug 52 in this case instead of shoulder 54 as before.

Let us assume further now that the force instead of acting as above described, acts squarely against key barrel 24 in such a way that the barrel is distorted as shown in Fig. 8. A cavity 39 (Figs. 2 and 7) is milled in rear wall 21 of the lock casing, tongue 26 in its normal position (Fig. 6) being out of actual contact with the walls of the cavity. As clearly shown in Fig. 8, however, distortion of the key barrel resulting from the forcing attempts has brought tongue 26 into a position where it will engage with the walls of cavity 39, this engagement being effective to prevent rotation of the key barrel. Prevention of rotation of the key barrel, of course, prevents retraction of the bolt, even though the other normal retarding parts have been mutilated, due to the cooperation between tongue 26 and the shouldered portion of the bolt.

Force acting in the manner just referred to often results in distortion of the lower legs 61 and 62 of bolt 23. A cavity 40 (Figs. 2 and 10) is milled in the rear wall 21 of the lock casing, the normal position of the bolt being such (Fig. 9) that legs 61 and 62 are out of contact with the walls of the cavity. Assuming, however, that the force has bent one or both of the legs backward it can be seen from Fig. 11 that the edge of the distorted leg will now engage with the bottom wall of cavity 40 thereby preventing retraction of the bolt.

It is believed that it will be apparent from the above description that the invention provides adequate protection against the several results most likely to occur from the particular fraudulent practice which is intended to be guarded against. That is, if the attempts result in lateral displacement of the tumblers in either direction, partition 34 is effective to hold the bolt projected, if key barrel 24 be displaced or distorted cavity 39 serves to prevent operation of the lock and if the bolt itself be distorted, cavity 40 is effective to prevent its retraction.

It will be apparent also from the above description that the "protecting" means do not interfere with or retard in any way the normal operation of the lock. As described above and as shown particularly in Fig. 4 the normal position of partition 34 with respect to the bolt is such that the lugs carried by the bolt slide freely into the slots provided in the partition as the bolt is retracted. As further described and as shown particularly in Figs. 6 and 9 the normal position of the key barrel tongue and the lower legs of the bolt with respect to cavities 39 and 40, respectively, is such that the normal movements of these parts is not interfered with.

While certain embodiments of the invention have been selected for detailed description, the invention is not, of course, limited in its application to the embodiments described. These embodiments should be taken as illustrative of the invention rather than restrictive thereof.

What is claimed is:

1. A lock comprising a casing, a bolt, a key barrel normally adapted to rotate when actuated by a key, a tongue on said key barrel for cooperat-

ing with the bolt to cause retraction thereof when the barrel is rotated, and a shoulder on a wall of said casing contacted by said tongue when said barrel is forced toward said wall for preventing sufficient rotation of the key barrel to completely retract said bolt.

2. A lock comprising a casing, a key barrel, a bolt normally adapted for projection and retraction under control of said key barrel, and a shoulder on a wall of said casing contacted by a portion of said bolt when said bolt is forced toward said wall for preventing complete retraction of the bolt.

3. A lock comprising a casing, a key barrel normally adapted to rotate when actuated by a key, and a tongue on said key barrel, a wall of said casing having a cavity for receiving said tongue when said key barrel is forced toward said wall for preventing sufficient rotation of said barrel to completely retract said bolt.

4. A lock comprising a casing, a key barrel, a bolt normally adapted for projection and retraction under control of said key barrel and a cavity in a wall of said casing for receiving a portion of said bolt for preventing full retraction of the bolt when said bolt is forced away from its normal path toward said wall.

5. A lock comprising a casing, a key barrel normally adapted to rotate when actuated by a key, a tongue on said key barrel, a bolt normally adapted for projection and retraction under control of said key barrel, a cavity in a wall of said casing for receiving said tongue when said key barrel is forced towards said wall for preventing sufficient rotation of said barrel to completely retract said bolt and a second cavity in a wall of said casing for receiving a portion of said bolt for preventing full retraction of the bolt when said bolt is forced away from its normal path toward said wall.

6. A lock comprising a barrel having a slot for the reception of a key, a bolt, a projection on the bolt, a normally stationary partition having a slot therein for reception of said projection when the bolt is retracted and a shoulder on a side of said slot contacting with said projection when said partition is forced laterally with respect to the axis of said barrel out of its normal position for

preventing complete retraction of said bolt.

7. A lock comprising a barrel having a slot for the reception of a key, a bolt, a projection on the bolt, a normally stationary partition having a slot therein for reception of said projection when the bolt is retracted, a shoulder on one side of said slot contacting with said projection when said partition is forced laterally with respect to the axis of said barrel in one direction out of its normal position and a second shoulder on the other side of said slot contacting with said projection when said partition is forced out of its normal position in the direction opposite to said first direction.

8. A lock comprising a barrel having a slot for the reception of a key, a bolt, a plurality of key operated levers for controlling the retraction of the bolt, a normally stationary partition positioned between certain of said levers, and means, effective when said partition is forced laterally with respect to the axis of said barrel out of its normal position, for preventing complete retraction of said bolt.

9. A lock comprising a casing, a key barrel, a bolt normally adapted for projection and retraction under control of said key barrel, and a shoulder on a wall of said casing contacted by a portion of said bolt upon partial retraction thereof when said bolt is forced toward said wall, the relative positions of the shoulder and said portion of the bolt being such when the bolt is fully projected that said shoulder is out of the path followed by said portion of the bolt when said bolt is forced toward said wall.

10. A lock comprising a casing, a key barrel, a bolt normally adapted for projection and retraction under control of said key barrel, and a cavity in a wall of said casing for receiving a portion of said bolt for preventing full retraction of the bolt when said bolt is forced away from its normal path toward said wall, the relative positions of the cavity and said portion of said bolt being such when the bolt is in its projected position that all of the defining edges of said cavity are out of the path followed by said portion of the bolt when said bolt portion is forced toward said wall.

OSCAR A. SHANN.