Oct. 3, 1950 R. T. ELLIS 2,524,696

LOCK FOR SAFETY DEPOSIT BOXES

Filed Jan. 19, 1945

Fig. 1.

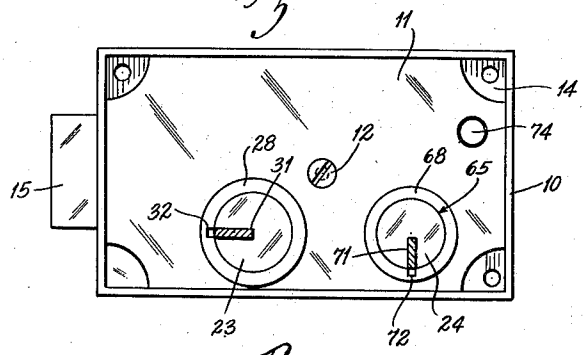


Fig. 7.

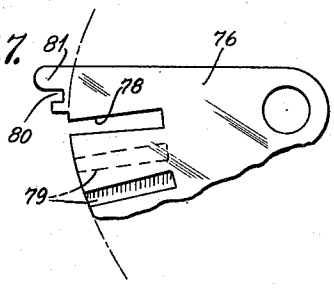


Fig. 8.

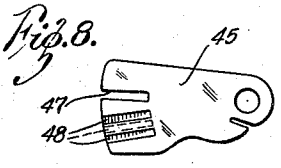


Fig. 2.

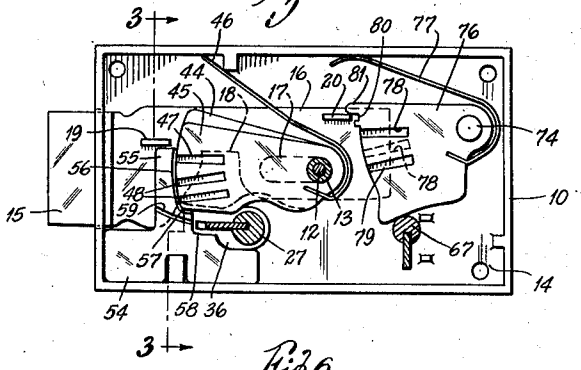


Fig. 3.

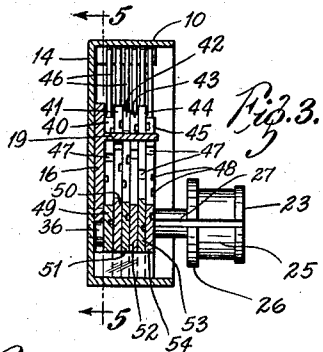


Fig. 6.

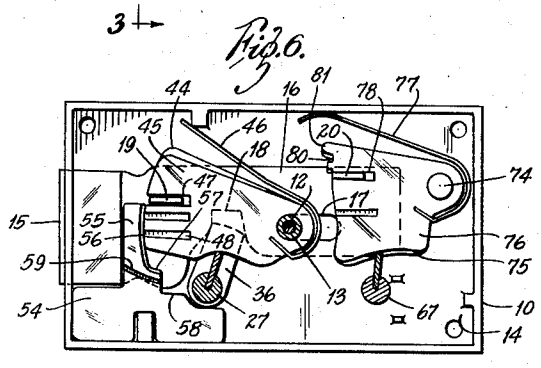


Fig. 4.

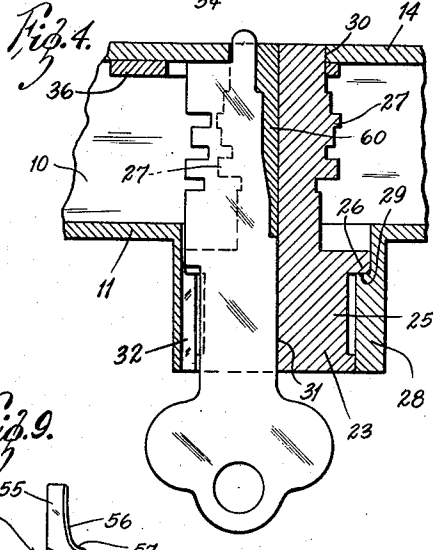


Fig. 5.

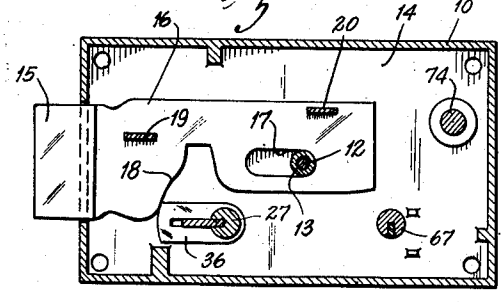
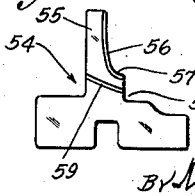


Fig. 9.



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ATTORNEYS

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LOCK FOR SAFETY DEPOSIT BOXES

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Application January 19, 1945, Serial No. 573,547

23 Claims. (Cl. 70—339)

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This invention relates a lock, and more particularly it relates to a lock of the type frequently used for safety deposit boxes having a guard key and a customer's key, with tumblers operated by each, which tumblers must all be properly aligned before the bolt can be thrown to open position.

It is an object of the invention to provide a lock of this kind that cannot be picked. More particularly, it is an object to provide a lock that cannot be picked with no keys at all, and to provide a lock in which one set of the tumblers cannot be picked where the key is available for the other set.

In locks of this type, the bolt includes a shank extending with the lock housing adjacent two sets of tumblers. Two pins are provided on the bolt, one for each set of tumblers. The tumblers of each set are pivoted on the lock housing and have slots extending inwardly from their edges, which slots are not aligned with the pin except when the key for such set is in the lock and is turned to raise each individual tumbler so that the slots of all the tumblers are aligned to receive the pin for that set.

It is an object of the invention to prevent detection by picks of the locations of the tumbler slots, so that the keys for proper alignment and disposition of the slots may be obtained. More particularly, it is an object to provide means to destroy the geometric relationship of the slots relative to the angle of rotation of the key nose, whereby to prevent determination of the location of the slot and the size of the key rises for detection of the key that will operate the lock. More particularly, it is an object to provide a predisposition of the tumblers at different angles, when in locked condition, to accomplish the foregoing as well as to provide additional lock combinations. It is a further object to disguise the location of the tumbler slots by provision of means giving the same sensation through a pick as that given by the slots. It is a further object to provide means obstructing the insertion of a pick into the lock, and obstructing the interleaving of a pick between the tumblers, and to provide a check shaped to resist insertion of a pick between the tumblers even if the check means itself is interleaved. It is a further object to provide a lock wherein the slots are disposed beyond reach of a pick capable of insertion into the key slot, even where the pick is caused to displace one or more tumblers to have access to the tumbler below those displaced.

It is a further object to provide slotted tumblers designed to prevent sawing or cutting off of their

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lower parts that form the bottom edges of their slots, and thereby to prevent reduction of the lock to operation by a simple key. It is a further object to provide space constrictions that would cause the lock to jam if the tumblers were cut.

It is a further object to provide means to prevent pulling of the lock noses to open the lock.

It is a further object to provide tumbler latches so designed as to prevent detection of their slots when the bolt can be urged against them.

In the drawings:

Fig. 1 is a front elevation of the lock;

Fig. 2 is a front elevation with the cover removed and certain parts shown in section;

Fig. 3 is a transverse section on the line 3—3 of Fig. 2 but with the key omitted;

Fig. 4 is an enlarged view showing a modified form of key nose;

Fig. 5 is a sectional view on the line 5—5 of Fig. 3;

Fig. 6 is a front elevation showing the lock in open position with the keys inserted, they being in section;

Fig. 7 is an enlarged fragment of one of the tumblers of one of the sets thereof;

Fig. 8 is a front elevation of one of the tumblers of the set; and

Fig. 9 is an elevation of a tumbler guard used in the lock.

The lock comprises a housing 10, formed of metal or the like, adapted to receive a front cover 11 held in place by a screw 12 that engages within a threaded opening in a lug or pin 13 projecting forwardly from the back wall 14 of the housing 10.

A bolt 15 extends through an opening in the end of the housing 10 and has a shank 16 extending back into the housing. The shank has a slot 17 (Fig. 5) engaging over the lug 13, which thereby supports the shank for its sliding movement, along with the opening through which the bolt emerges from the housing. The shank 16 is formed at the back edge of the bolt 15, and so engages the back wall 14 of the housing (cf. Fig. 3). The shank has a notch 18 to receive the key operating foot which slides the bolt back and forth. The shank also has two upstanding tumbler-engaging pins 19 and 20 that function in a manner to be described.

The lock has two key noses 23 and 24 of which ordinarily the key nose 23 is to receive the customer's key and the key nose 24 is to receive the guard's key. This choice and usage are matters of convenience, but for simplicity in this descrip-

tion the two key noses and their corresponding parts will be thus designated.

The key nose 23 includes an outer relatively large cylindrical portion, generally indicated at 25, having a flange 26 around the inner edge thereof. It also includes an inner reduced cylindrical portion, generally indicated at 27. It bears in a cylindrical portion 28 formed integral with the front wall 11 and having a circular shoulder 29 to receive the flange 26 and hold the key nose against outward movement. At its inner end, the key nose bears within a hole 30 in the back wall 14.

The key nose likewise has a key slot 31, and the cylindrical portion 28 has a slot 32 therein adapted to register with the slot 31 in conventional manner. At its inner end and bearing against the back wall 14, the cylinder 27 carries a foot or dog 36 adapted to engage in the slot 18 of the bolt when the key is rotated, and thereby to move the bolt backward or forward. This foot 36 is slotted to receive the end of the key.

The customer's key is adapted to operate a plurality of tumblers 40—45, inclusive (Fig. 3). One such tumbler appears in Fig. 8. All of these tumblers are freely pivoted on the pin 13 and are stacked in front of the bolt shank 16. Each is provided with a leaf spring 46 engaging the top wall of the housing and urging the tumblers counterclockwise in the views shown, which urges their lower edges counterclockwise toward the cylindrical part 27 of the key nose 23 except when they are elevated by the key.

Each tumbler is provided with a slot 47 of a size to receive the bolt pin 19. However, these slots are disposed at various positions along the left hand edge of the tumblers, and are out of registration except when the proper key is in position and they are pivoted clockwise individually to the proper amount to align the slots.

When a key, formed with the proper rises suitable for the individual tumblers of a particular lock, is inserted in the key slot 31 and turned, it will individually elevate the tumblers to align the slots, whereupon the bolt may be moved back by inserting its pin 19 into the slots of the tumblers.

Each of the tumblers 45 is further provided with a series of dummy grooves 48 on its opposite faces. These dummy grooves are similar to the grooves 47 in radial depth toward the pivot pin 13, but are mere indentations into the two opposite surfaces of the tumblers. They provide an anti-picking feature, as will be described.

In the lower corner of the lock, there are provided a series of tumbler checks 49—54, one of which is shown in Fig. 9. There is one check for each tumbler, and they are made of metal or other hard material of a thickness corresponding to that of the tumblers. The checks interfit within the corner space, and are stacked snugly together into the space, and substantially to fill the same. Each has an upstanding prong 55 extending upwardly to the pin 19, whereby to cover the ends of the slot 47. Each check has edges 56 and 57 forming a stop shoulder for the corresponding tumbler, these edges being shaped to complement the interfitting tumbler edges. These edges are likewise bevelled for a purpose to appear.

From the edge 57, each check is cut away at 58 to provide a space to receive the key when it is inserted into the lock. They then extend downward beneath the cylinder 27. The prongs 55 are grooved at 59 with a groove that does not extend, preferably, radially of the key hole, but is curved so that a pick may not be inserted through it.

Each check has its edge 57 at a predetermined elevation. By this means, the tumblers 40—45 do not, as in previous locks, all rest evenly upon the cylindrical portion 27, but rather, each tumbler is given a pre-set locked angular position, as shown in Fig. 3.

The checks thus offer a means to provide irregular setting of the tumblers when locked. Another way is shown in Fig. 4, wherein the cylindrical portion 27 is given a predetermined individual diameter for each tumbler. Fig. 4 also shows a cooperating anti-picking feature in a means, here an insert 60, to provide irregular depths for the key slot.

The key nose 24 comprises an outer relatively large cylindrical portion 65 similar to the nose 23. It has an inner reduced cylinder 67 extending across the housing and supported in the back wall 14. The large cylinder 65 bears in a tubular projection 68 extending from the panel 11. The nose 24 has a key slot 71 adapted to register with an extension 72 in the projection 68, for key insertion.

Within the casing, a pin 74 projects from the back wall 14 and supports a plurality of tumblers of suitable number, of which two are shown at 75 and 76. Conventionally, three to six are used. These tumblers are urged by springs 77 counterclockwise about the pin 74. Each of the tumblers is also provided with a slot 78 which is normally out of registry with the pin 20 of the bolt when the key is not within the lock and turned. They also are desirably provided with false grooves 79 corresponding to the grooves 47 on the tumblers of the other set. The disposition of the slots 78 along the left edges of the tumblers is varied, so that when all the tumblers are released to locked position the slots are out of registry with each other and with the pin 20. However, when the proper key is inserted and is turned, it lifts the several tumblers, moving them clockwise individually to align the slots 78 in an elevated position to receive the pin 20 and permit the bolt to be thrown back, as in Fig. 6.

Each of the tumblers 75 and 76 is provided with a latching notch 80 adjacent its upper edge. Each also has an upper projection 81 that engages against the pin 20 when the tumblers are released, to limit their downward movement. The notches 80 are designed to receive the pin 20 when the customer's key is inserted and the bolt is thrown partially backward, without the proper guard key. When this is done, the guard tumblers are locked against pivoting in either direction and cannot be individually picked. It will be observed in the present invention that, as shown in Fig. 7, the bottoms of the notches 80 are disposed slightly outward from the left hand edges of the tumblers, and this provides an anti-picking feature, as will be shown.

Operation

In the normal operation of the lock, both of the keys are inserted. The guard key is first turned and it engages the lower edges of the several tumblers 75 and 76. When this key is turned to its upward position, it individually pivots the several tumblers clockwise about the pin 74 until their several slots 78 are all aligned and elevated into position to receive the pin 20 on the bolt. Then the customer's key is turned. It first

elevates the several tumblers 40—45 individually to align the slots 47 in position to receive the pin 19 on the bolt. It then, when further turned, causes the foot 36, operating within the slot 18, to move the bolt inward, as shown in Fig. 6, this action being free because the pins 19 and 20 slide easily into the several slots of their tumblers. The mechanism is thereby unlocked. The guard key may be withdrawn, if desired, when the lock is opened.

The locking operation is just the reverse in that the customer's key is turned so that the foot 36 first throws the bolt 15 to locked position, thereby disengaging the pins 19 and 20 from their slots in their sets of tumblers, and then the customer's key withdraws from its set of tumblers, which thereupon, under the influence of the springs 46, fall down to engage the cylindrical portion 27. With the guard key then removed, and the pin 20 withdrawn, the tumblers 75, 76, etc., are pivoted by the springs 77 downwardly, so that the projections 81 engage over the pin 20 and the lower edges approach or engage the cylinder 67.

Anti-picking features

Picking of the customer's side of the lock is prevented by a combination of features. If a pick, having a thin, spring-like, radial arm with a slight axially extending projection at its end, is inserted into the key slot 31, the arm cannot be of a length greater than the radial extent of the key slot, as the edges of the cut-out 58 on the tumbler checks 49—54 form obstructions thereto. The checks are preferably maintained snugly together to prevent insertion of the pick arm between them. The pick arm cannot be intruded across or between the checks via the grooves 59, because these grooves do not extend radially from the key slot, and are, preferably, curved. If a pick could be inserted between the abutting edges of a tumbler and its check, the length would be limited by engagement of the pick against the prong 55 of the check. Preferably the slots 47 are all disposed above an arc struck by any pick across the tumbler.

In combination with the irregular predisposition of the individual tumblers afforded by the checks or the ridged cylinder, the insert 60 provides an uneven bottom wall to the key slot, and further upsets the geometry of determining key rise by a pick rotated about the bottom of the key slot as a center.

If a pick were inserted between the checks, and rotated toward the tumblers, it would be snagged by the slot 59. If it overcame this, it would be snagged by the bevel of the edges 56—57 and the tumbler edge, and would tend to lift the tumbler engaged, rather than to cross the same. It would detect these obstructions in substantially the same manner it would detect any real slot 47, were one within its reach. Assuming it overcame this bevel, and traveled across a tumbler, it would detect the false slots 48 indistinguishably from the real slot 47, and, with the pin 19 and the slots 47 disposed adequately high above the key slot, the pick could not reach the true slot.

The foregoing precludes both detection of the slots of the tumblers, and severance of their lower corners, the latter being an operation dependent upon use, for example, of a Stellite headed pick. The detection in this manner of the slot location by such a pick could, in some

locks, give the proper key elevation for the key for the tumbler thus detected, where the key elevation is a function of the arcuate turning from a fixed starting point of a pick with a headed arm of known length, the pick being turned in the cylinder until the head on the arm drops into the slot with a sensible latching effect. The present lock further obstructs such detection by having the check shoulders 57 at different heights at the start. Hence the geometry, by which the proper key height per tumbler is a function of the angle of turning of a pick, is destroyed. The cylinder arrangement of Fig. 4 also accomplishes the same thing.

Also the tumbler disposition and the arrangement of the actual slots 47 above the arc drawn by any pick insertable into the slot, and substantially above the top part of the slot 31 when the nose is turned to its maximum free upward position, preclude sawing off of the lower corners of the tumblers by an abrasive pick or by a saw operating in the key slot. Further, the tumbler checks constitute a space filling means that leave such small space within that part of the housing that any severed lock parts would join the moving parts and prevent opening of the lock.

The foot 36 on the key nose 23 that shifts the bolt is fitted underneath the checks. Hence pulling of the nose is prevented by the hanging thereof onto the checks.

From the foregoing, it is evident that picking of the cutomer's part of the lock is made exceedingly difficult, if not impossible. Certainly the checks, the false slots, the positions of the slots above a zone wherein picking or cutting is possible, and the insert 60, all present many safety features over locks of this type heretofore made.

The foregoing features are also applicable to the guard key section of the lock. However, it may not be desired to employ them on the guard key end, which does not have an opening function, but has only a release function.

The guard tumblers 75, 76, etc., show a further safety feature. When the customer's key is operated, the bolt may be thrown back until the pin 20 engages within the latch slots 30. If this be done, the tumblers 75 and 76 cannot be raised to dispose their slots 78 opposite the pin 20, and hence picking of this side of the lock is prevented under the conditions mentioned.

If any guard tumbler is individually picked by a pick or a guard key designed to lift only one tumbler, and is rocked upwardly beyond the lower lug forming the slot 80, and thereafter the customer's key turned to urge the pin 20 backward, the pin will enter the slot 80 of the unmoved tumblers. This slot is insufficiently deep to permit the pin to move back far enough to bear against the edge of the pick-lifted tumbler. Hence the lifted tumbler cannot be further lifted with the pin 20 urged against its edge until the pin slips slightly into its slot 78, to give a sensible feeling, locating the slot in that tumbler as a function of the rotation of the key nose 24 with the pick.

It is apparent that this lock offers great improvement in its anti-picking security. The particular means used could be modified to accomplish the same results, without departing from the essence of the invention. It is also evident that while some features or combinations of features may be used individually with pro tanto improvement in security, the most successful lock relies upon the combination of them all.

It is also evident that these features are usable with flat or paracentric key locks.

What is claimed is:

1. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, latching slots on one set of the tumblers to receive the pin for that set when the other set is overcome and the bolt thrown back until the pin of said one set engages the working edges of its tumblers, and means to prevent the pin from entering the working slot of any tumbler displaced to disalign its latching slot from alignment with the pin.

2. In a lock, a housing, a bolt slidable within the housing and having a pin thereon, a plurality of tumblers movable within the housing and having working edges presented toward the pin, each tumbler having an individually located pin-receiving slot, whereby the bolt may be thrown when the tumblers are moved to align the slots with the pin, each tumbler having a latching slot in its working edge, the latching slots being shaped to prevent movement of the pin far enough to enter the working slot of any tumbler moved to displace its latching slot from the pin.

3. In a lock, a housing, a bolt slidable within the housing and having a pin thereon, a plurality of tumblers movable within the housing and having working edges presented toward the pin, each tumbler having an individually located pin-receiving slot, whereby the bolt may be thrown when the tumblers are moved to align the slots with the pin, each tumbler having a latching slot disposed to receive the pin when the tumblers are in lock position at rest, the inner limits of the latching slots being disposed outwardly at least as far as the outer openings of the working slots.

4. In a lock, a housing, a bolt slidable within the housing and having a pin thereon, a plurality of tumblers pivoted together on the housing, said tumblers having coincident working edges remote from the pivot and disposed toward the pin, each tumbler having an individually located pin-receiving working slot extending inwardly from its working edge, said tumblers having projections extending from their working edges and disposed adjacent the pin when the tumblers are at rest in locking position, and said projections having latching slots to receive the pin to a distance insufficient to permit bearing of the pin against the working edge at the working slot of any tumbler displaced from latching position.

5. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key, for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising latching slots on one set of the tumblers to receive the pin for that set when the other set is overcome and the bolt thrown back until the pin of said one set engages the working edges of its tumblers, and means to prevent the pin from entering the working slot of any tumbler displaced to disalign its latching slot from alignment with the pin.

6. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key, for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising a check member in the housing opposite each tumbler of one set obstructing inserting into the key slot of a sufficient length of a radial arm of a pick to reach the working slots of the tumblers associated therewith.

7. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising means to dispose the edges of the tumblers adjacent the key slot at different distances away from the key slot.

8. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising means to dispose the edges of the tumblers adjacent the key slot at different distances away from the key slot, comprising uneven surfaces on the key nose, to act as varying stops to receive the tumblers when the same are at rest in locked position.

9. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising means to dispose the edges of the

tumblers adjacent the key slot at different distances away from the key slot, comprising tumbler check means having irregularly disposed checks to receive the tumblers when at rest in locked position, and dispose the tumblers at varying positions toward and away from the key slot.

10. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising means to dispose the edges of the tumblers adjacent the key slot at different distances away from the key slot, comprising tumbler check means having irregularly disposed checks to receive the tumblers when at rest in locked position, and dispose the tumblers at varying positions toward and away from the key slot, said check means comprising a plurality of check members, one for each tumbler, said check means having cut-away portions to receive the lower portions of the tumblers adjacent to the key slot, said cut-away portions being at varying positions, and said members being snugly held together to obstruct insinuation of a pick between them.

11. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising means to dispose the edges of the tumblers adjacent the key slot at different distances away from the key slot, comprising tumbler check means having irregularly disposed checks to receive the tumblers when at rest in locked position, and dispose the tumblers at varying positions toward and away from the key slot, said check means comprising a plurality of check members, one for each tumbler, said check means having cut-away portions to receive the lower portions of the tumblers adjacent to the key slot, said cut-away portions being at varying positions, and said members being snugly held together to obstruct insinuation of a pick between them, and having irregularities in both their surfaces to obstruct movement of a pick across such surfaces.

12. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for

operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising means to dispose the edges of the tumblers adjacent the key slot at different distances away from the key slot, comprising tumbler check means having irregularly disposed checks to receive the tumblers when at rest in locked position, and dispose the tumblers at varying positions toward and away from the key slot, said check means comprising a plurality of check members, one for each tumbler, said check means having cut-away portions to receive the lower portions of the tumblers adjacent to the key slot, said cut-away portions being at varying positions, and said members being snugly held together to obstruct insinuation of a pick between them, said cut-away portions being complementary in shape to the tumblers they receive, and being bevelled at their edges to provide obstructions to movement of a pick onto the surfaces of the tumblers.

13. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising means to dispose the edges of the tumblers adjacent the key slot at different distances away from the key slot, comprising tumbler check means having irregularly disposed checks to receive the tumblers when at rest in locked position, and dispose the tumblers at varying positions toward and away from the key slot, said check means so filling the space adjacent the key nose and tumblers as to prevent falling of cut-away segments of tumblers, away from and clear of the tumblers.

14. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt, within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing, presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for operating each set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers, relative to the key slot of such tumbler set, one of said obstruction means comprising means to dispose the edges of the tumblers adjacent the key slot at different distances away from the key slot, comprising tumbler check means having irregularly disposed checks to receive the tumblers when at rest in locked position, and dispose the tumblers at varying positions toward and away from the key slot, said nose having a bolt-throwing foot movable therewith, and extending outwardly therefrom adjacent the bolt, and said check means overlying the foot to prevent withdrawal of the key nose without release of the check means.

15. In a lock, a housing, a bolt having a pin

thereon, said bolt being slidable in the housing, a key-receiving slot, a plurality of tumblers movable within the housing, each tumbler having a working edge toward the pin, with a pin-receiving slot individually disposed therein, and having an actuating edge disposed toward the key slot for movement of the tumblers when the key is inserted, said tumblers being adapted to rest with the slots away from the pin when the bolt is locked, means limiting the maximum radial length of a pick insertable into the lock via the key slot including a check member disposed at the end of each tumbler and adjacent the key receiving slot, and all of the pin-receiving slots being disposed outside this length.

16. In a lock, a housing, a bolt having a pin thereon, said bolt being slidable in the housing, a key-receiving slot, a plurality of tumblers movable within the housing, each tumbler having a working edge toward the pin, with a pin-receiving slot individually disposed therein, and having an actuating edge disposed toward the key slot for movement of the tumblers when the key is inserted, said tumblers being adapted to rest with the slots away from the pin when the bolt is locked, said tumblers having indentations in their surfaces corresponding to their slots, adapted to give a sensation like that afforded by the slots to a pick arm moved across the tumbler surface.

17. A lock tumbler comprising a plate-like element having an attaching means by which it may be secured to a lock for movement therein, said tumbler having a working edge and a slot extending inwardly from said edge, and having an indentation in its surface, spaced from the slot but similar thereto to give a sensation to a pick drawn across said surface, like the sensation afforded by the slot itself.

18. A lock tumbler check for use with a tumbler in a lock having a housing, a bolt therein, and a plurality of tumblers pivoted in the housing with peripheral generally arcuate working edges, and generally radial edges merging thereinto to form a corner, said check having a prong adapted to extend along said working edge and a ledge adapted to extend along said generally radial edge, thereby forming a cut-away portion to receive and hold the tumbler at the position determined by the disposition of the ledge.

19. A tumbler for use with a lock bolt having a pin thereon, said tumbler comprising a plate-like element having a pivoting means thereon, a working edge opposite the pivoting means, a pin slot extending into the working edge, a latching slot extending into the working edge at a point spaced from the pin slot, the maximum effective depth of the latching slot toward the pivot means further away from the pivot means than the working edge adjacent the pin slot.

20. In a lock, a housing, a bolt having a pin thereon, said bolt being slidable in the housing, a key-receiving slot, a plurality of tumblers movable within the housing, each tumbler having a working edge toward the pin, with a pin-receiving slot individually disposed therein, and having an actuating edge disposed toward the key slot for movement of the tumblers when the key is inserted, said tumblers being adapted to rest with the slots away from the pin when the bolt is locked, and means providing different distances from the effective bottom of the key slot and the several tumblers, comprising means providing an irregular bottom to the key slot.

21. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing and presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for each operating set of tumblers, means to obstruct detection of the locations of the slots in the several tumblers of one tumbler set relative to the key slot of such tumbler set, said obstruction means comprising means to dispose the edges of the tumblers adjacent the key slot at different distances from the key slot, a latching slot in the working edge of each tumbler of the other tumbler set, the latching slot being so shaped and disposed to prevent movement of the associated pin far enough to enter the working slot of any tumbler of the set moved to displace its latching slot from the pin.

22. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing and presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for each operating set of tumblers, and radial indentations in each tumbler extending inwardly from the working edge thereof and spaced from the working slot, said indentations being adapted to give a sensation to a pick drawn across the tumbler surface similar to the sensation of the pick passing into the working slot itself.

23. In a lock, a housing, a bolt slidable within the housing, a pair of pins projecting from the bolt within the housing, a pair of tumbler sets, one for each pin, each set comprising a plurality of tumblers pivoted to the housing and presenting working edges adjacent its pin, each working edge having an individually pre-located working slot, said bolt being slidable when each set has all of its slots aligned with its pin, a key nose having a key slot for receiving a key for each operating set of tumblers, a latching slot in the working edge of each tumbler of one tumbler set, the rear wall of each of said latching slots being disposed at a greater radius from the pivotal connection of the tumbler than the radius of the working edge into which the working slot extends, whereby movement of the associated pin of the tumbler set to engage the working edge in the vicinity of the working slot of any tumbler moved to displace its latching slot from the pin is prevented.

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