T. M. BRINTNALL.

LOCK.

APPLICATION FILED MAR. 27, 1917.

1,259,353.

Patented Mar. 12, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

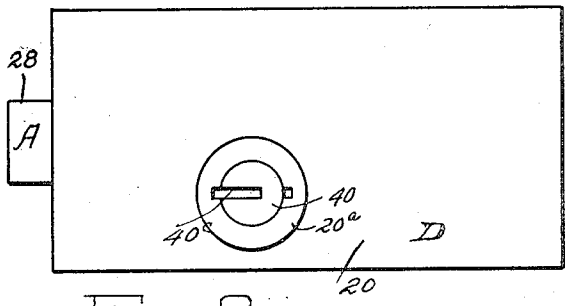


Fig. 5.

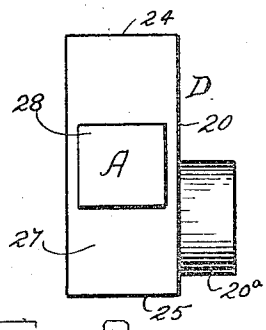


Fig. 2.

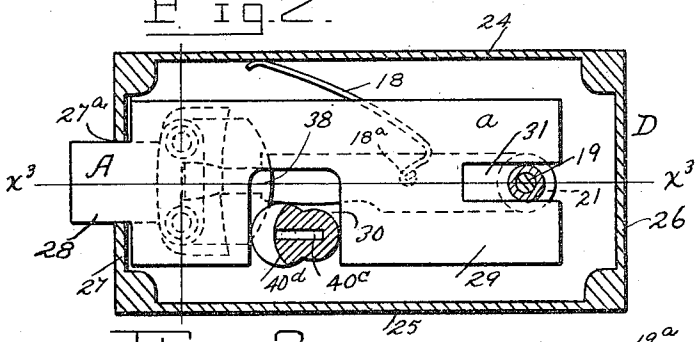


Fig. 6.

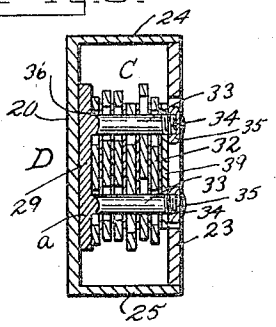


Fig. 3.

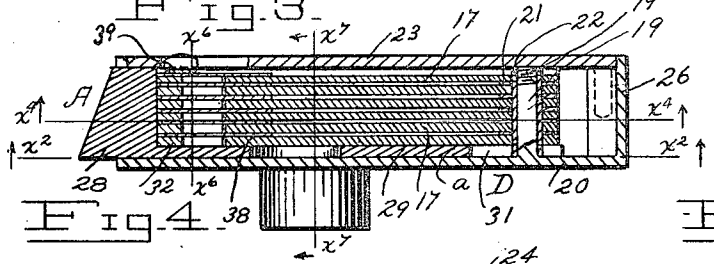


Fig. 4.

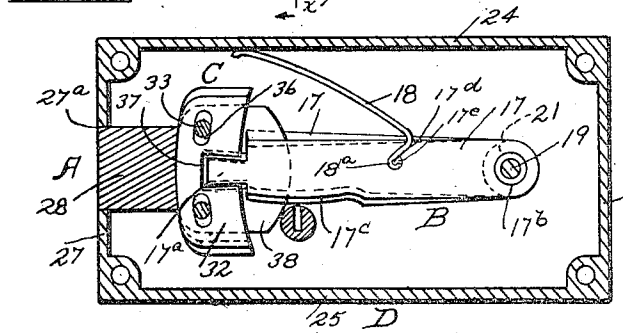
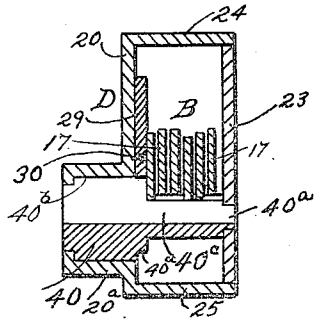


Fig. 7.



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2 SHEETS—SHEET 2.

Fig. 8.

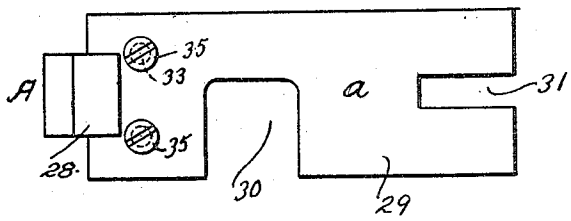


Fig. 9.



Fig. 10.

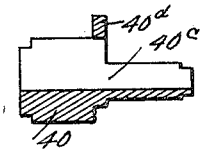


Fig. 11.

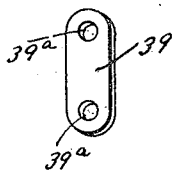


Fig. 12.

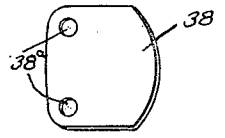


Fig. 13.

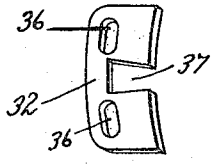


Fig. 14.

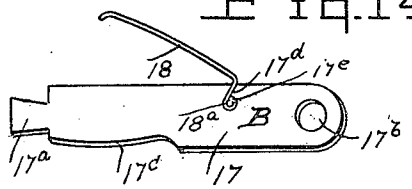


Fig. 15.

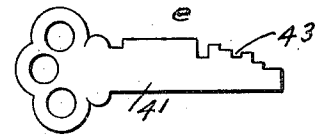
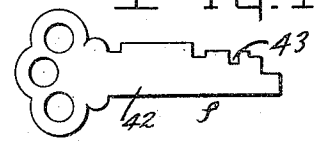


Fig. 16.



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UNITED STATES PATENT OFFICE.

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LOCK.

1,259,353. Specification of Letters Patent. Patented Mar. 12, 1918.

Application filed March 27, 1917. Serial No. 157,804.

To all whom it may concern:

Be it known that I, THOMAS M. BRINTNALL, a citizen of the United States, residing in Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Locks, of which the following is a specification.

This invention relates to locks, and more particularly to change combination locks, and it has for its object to provide an improved lock in which the adjustment of the combination changing members may readily be varied when it is desired to change keys, and which can not be picked or otherwise operated without a key of the particular formation for which the members are at any given time set; furthermore, in locks organized in accordance with the invention the adjustable features may be adjusted by means of the key to be used to operate the lock, and an almost infinite number of key changes may be made by employing only a few tumblers, with their co-acting combination changing members, as it is not necessary to have the wards of the keys of certain heights or lengths as in locks as ordinarily constructed and wherein any change in adjustment of the tumblers must be made in certain predetermined relations or steps. To permit the use of keys having wards which need not be of a predetermined height, I provide tumblers preferably adapted to be oscillated about an axis and to take into complementarily formed adjustable members, which members are movable preferably about the axis of oscillation of the tumblers prior to setting or fixing such members in their positions of adjustment, and such members are preferably fixed by clamping means, thus eliminating all "steps" of predetermined distance as would be required in lock practice when tumblers are to be adjusted for actuation by different keys.

With the above and other objects in view, including relative simplicity and inexpensiveness in construction and organization, taken in connection with positiveness in operation and convenience and facility in use and adjustment, the invention consists in the novel and useful provision, formation, construction, combination and relative arrangement of parts, members and features, all as hereinafter described, shown in the drawings, and finally pointed out in claims.

In the drawings:

Figure 1 is a front elevation of an adjustable lock constructed and organized in accordance with the invention;

Fig. 2 is a sectional view taken on the line X^2—X^2, Fig. 3, and looking in the direction of the appended arrows;

Fig. 3 is a sectional view taken on the line X^3—X^3, Fig. 2;

Fig. 4 is a sectional view taken on the line X^4—X^4, Fig. 3, and looking in the direction of the appended arrows;

Fig. 5 is an end view of the lock, looking in the direction of the large arrow near Fig. 1;

Fig. 6 is a transverse sectional view taken on the line X^6—X^6, Fig. 2;

Fig. 7 is a transverse sectional view taken on the line X^7—X^7, Fig. 3, and looking in the direction of the appended arrows;

Fig. 8 is an inside face view of the lock plate and its integral bolt, other features being omitted for clearness of illustration;

Fig. 9 is a face view of the lock barrel and other operating features;

Fig. 10 is a longitudinal sectional view through the lock barred, taken on the line X^{10}—X^{10}, Fig. 9;

Fig. 11 is a perspective view of the clamping plate whereby the adjustable features of the lock may be secured in any position of adjustment;

Fig. 12 is a perspective view of a spacer or guide plate provided between the several adjustable members and the respective tumblers;

Fig. 13 is a perspective view of one of the adjustable combination changing members adapted to co-act with one of the tumblers;

Fig. 14 is a perspective view of one of the tumblers;

Fig. 15 is a face view of a key adapted to operate the lock plate and the bolt carried thereby; and

Fig. 16 is a face view of another and different key which may be employed to operate the lock plate and the bolt carried thereby after the adjustable tumblers and the adjustable combination changing members have been adjusted to fit such key.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawings, A designates the bolt mounted upon or formed integrally with a lock plate *a*, B designates the tumblers, C designates the adjustable combination changing means or members, and D designates the lock casing

of an improved adjustable lock constructed and organized to embody the invention. Each of the tumblers preferably comprises a flat strip or bar 17 formed with a tooth 17^a at one of its ends and apertured as at 17^b near its other end. On its under face each tumbler is cut away as at 17^c to properly co-act with a ward of the key. Each of the bars 17 constituting a tumbler has preferably united therewith a spring 18 set into an obliquely disposed slot 17^d provided in the upper edge of the bar 17 and extending inwardly of the bar and terminating in a circular portion 17^e in which the curved end 18^a of the spring is seated. In assembling the spring and tumbler the spring may be passed sidewise into the slot 17^d and the material above such slot pressed or hammered intimately into contact with the spring, thereby securely uniting the spring and tumbler and thus providing for perfect union of spring and tumbler. A plurality of such tumblers each comprising a bar 17 with its spring 18, are provided and such tumblers are assembled upon a pivot pin or stud 19 springing from a wall 20 of the casing D. The tumblers are spaced apart by washers 21 surrounding the pivot pin or stud 19. A nut 22 is applied to the threaded end 19^a of the stud 19 and maintains the tumblers in assemblage therewith. The casing D may in addition to the side wall 20 comprise a movable side wall 23, a top wall 24, a bottom wall 25, and end walls 26 and 27, the end wall 27 being apertured as at 27^a to permit the play of the bolt A therethrough. The pivot pin or stud 19 is preferably located in the casing near the end wall 26 and ranges transversely of the same and from side to side, so that the tumber bars 17 may range forwardly toward the bolt A. The springs 18 of the bars 17 bear at their free ends against the top wall 24 of the casing.

The bolt A is shown as comprising a latch portion or head 28 formed integrally with the lock plate *a*, which lock plate is shown as a flat metallic strip 29 provided with an eccentric or cam-receiving opening 30 and a guide slot 31. The lock plate *a* lies against the wall 20 of the casing D and the head 28 is adapted to play through the aperture 27^a in the end wall of the casing D, the guide slot in the lock plate accommodating the pivot pin or stud 19, the plate being guided by such stud and the latch or head 28 thereon.

The adjustable combination changing means C is shown as comprising a plurality of flat metallic members 32 mounted upon the lock plate and ranging transversely thereof. A plurality of binding studs 33 are provided on the lock plate behind the head 28 and such studs serve as guides for the adjustable combination changing members 32 as well as binding means whereby the clamping plate may be caused to draw the adjustable combination changing members tightly together, such studs 33 being threaded as at 34 and provided with nuts 35 to that end. Each of the members 32 is shown as comprising a flat metallic strip provided with a plurality of arcuate slots 36, one for each of the studs 33, and cut away as at 37 to accommodate the nose 17^a of the respective tumbler bars 17, it being understood that one such member 32 is provided for co-action with each tumbler or bar 17 and in registration therewith. The members 32 are spaced apart by separators 38 formed of preferably non-corrosive metallic sheets and apertured as at 38^a, the aperture 38^a being adapted to register with the studs 33 on the lock plate *a*. In assembling the members 32, one of the same may lie against the lock plate *a* and be separated from the next adjacent member 32 by means of a separator 38, a separator 38 being applied over the last member 32 of the series and between the same and a clamping plate 39 apertured as at 39^a to receive the threaded ends of the studs 33. The nuts 35 are applied to the studs 33 over the clamping plate 39.

A key-receiving barrel 40 ranges transversely of the casing D and is rotatably mounted therein as by journaling its one end in the casing wall 23, as at 40^a, and journaling its other end in an extension 20^a of the casing wall 20, as at 40^b. The barrel 40 is disposed beneath the tumblers B and at the cut-away portion 17^c of the tumbler bar 17. A key-receiving slot 40^c is provided in the barrel 40, such slot being in the form of an open groove or channel and adapted to permit the endwise insertion of a key into the barrel beneath the tumblers. A cam 40^d is provided on the barrel 40 and in the plane of the lock plate *a*, such cam lying in the cam-receiving opening 30 of the lock plate.

The casing wall 23, in the form of a removable closure may be secured to the other portion of the casing by means of screws or the like 23^a. The keys shown at *e* and *f* in Figs. 15 and 16, respectively, comprise flat portions 41 and 42, respectively, such flat portions being provided with wards 43 of varying or different heights.

The operation, method of use and advantages of the invention will be readily understood from the foregoing disclosure, taken in connection with the accompanying drawings and the following statement:

Upon the insertion of a key of the proper dimensions in the barrel, the nuts 35 being first loosened, the adjustable combination changing members may be moved trans-

versely of the lock plate through the agency of their respective tumblers when the key is in tumbler-lifting position. The slots 36 in the members 32, being elongated, permit of considerable movement of the members transversely of the lock plate, and each ward 43 of the key will determine the distance the respective member 32 is moved consequent upon the position of the respective tumbler bar 17, it being understood that when the combination is being made or changed the lock plate is in retracted position and the noses 17ª of the tumbler bars 17 are in their respective slots 37 in the members 32. When the adjustment of tumblers and members 32 has been so made, the nuts 35 may be tightened against the clamping plate 39 and the members 32 maintained in fixed relation clamped between the clamping member 39 and the lock plate *a*. The lock is now set so that only the proper key may be used to operate the bolt or head, together with the lock plate *a*, and such plate with the head 28 carried thereby may be reciprocated by rotating the barrel 40 and the cam 40ᵇ thereon by means of a key the wards of which are of proper height to lift the tumblers so that the noses 17ª thereof will enter the slots 37 in their respective adjustable combination changing members 32. When upon a partial turn of the key the tumbler noses 17ª are so alined with their respective slots 37, the lock plate may be further retracted by the eccentric 40ᵈ upon further rotation of the barrel 40 by means of the key. It will thus be seen that the lock bolt may be retracted or moved in either direction by means of the proper key, that is, a key the wards of which are just exactly the right height to lift the tumblers the proper distance, and preferably each tumbler is lifted through a different distance, this making it impossible to pick the lock.

The springs 18 bear against the wall 24 of the casing and at all times tend to move the tumblers downwardly toward the barrel to be engaged by the key. If a key of a different pattern or with wards of improper height is introduced in the lock and an effort made to retract the bolt thereby, the different spacing of the members 32 will prevent the retraction of the bolt, as some of such members are certain to strike the noses 17ª of tumbler bars 17 and thus prevent movement of the lock plate and the bolt carried thereby. It will thus be seen that even if a key differs but minutely from the proper key the lock plate and bolt can not be retracted and the device locked thereby can not be opened, this permitting of a wide range of adjustment in a single lock. When it is desired to set the lock so that a different key may actuate the bolt, which of course can only be done when the interior of the lock is accessible, the nuts 35 are loosened, the lock bar being retracted and the noses 17ª being in their respective slots 37, and the key turned to move the tumblers against their springs through the greatest distance that the wards can move their respective tumblers, whereupon the nuts 35 may be again tightened, and the lock is adjusted to fit the new key.

The separators 38 are relatively thin and extend toward the pivot 19, so that the noses 17ª of the tumbler bars may be guided thereby, and the tumbler bars 17 are preferably of slightly thinner gage material than the members 32, so that the noses 17ª of such tumbler bars 17 are not clamped when the members 32 are clamped into the position in which it is desired to maintain them in combination.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. A lock, comprising a casing, a bolt, a combination changing member adjustably mounted in the casing, means to hold said member in adjusted position, a tumbler pivoted within the casing and connected with the combination changing member, and means for actuating the bolt through the agency of a key after the key has moved the tumbler; said combination changing member being adjustable in an arc which is concentric with the axis of the tumbler.

2. In a lock, a bolt, a tumbler arcuately movably mounted within the lock, a combination changing member operatively associated with the tumbler and bolt and being adjustable in an arc concentric with the arc of movement of the tumbler, means to releasingly hold the combination changing member in adjusted position and means operating when the combination changing member is held against movement, to permit a key to move the tumbler and subsequently actuate the bolt; also operating when the combination changing member is free to be adjusted, to permit a different key to engage and move the tumbler to adjust the combination changing member and the tumbler for operation by said different key.

3. In a lock, a bolt, a tumbler movably mounted within the lock, a combination changing member operatively associated with the tumbler and bolt and being arcuately adjustably disposed within the lock, means to releasingly hold the combination changing member in adjusted position and means to permit a key to move the tumbler and subsequently actuate the bolt when the combination changing means is held against adjustment, and to permit a different key to engage and move the tumbler to adjust the combination changing member when said combination changing member is free to be adjusted.

4. A lock, comprising a casing, a bolt, a combination changing member arcuately ad-

justably mounted within the casing, means to hold said member in adjusted position, a tumbler fixedly pivoted within the casing and operatively associated with said combination changing member, and means for actuating the bolt through the agency of a key after the latter has moved the tumbler.

5. A lock, comprising a casing, a bolt slidably mounted within the casing, a combination changing member arcuately adjustably mounted upon the bolt, means to hold said member in adjusted position, and a tumbler fixedly pivoted within the casing and operatively associated with the combination changing member.

6. A lock, comprising a casing, a bolt slidably mounted within the casing, pins carried by the bolt, a combination changing member arcuately adjustably mounted upon and having elongated openings therein receiving said pins, a tumbler fixedly pivoted within the casing and operatively associated with the combination changing member, and means for holding said combination changing member in adjusted position.

7. A lock, comprising a casing, a bolt slidably mounted within the casing, pins carried by the bolt, a combination changing member arcuately adjustably mounted upon and having elongated openings therein receiving said pins, a tumbler fixedly pivoted within the casing and operatively associated with the combination changing member, and means for holding said combination changing member in adjusted position, comprising a plate mounted upon said pins and adapted to clamp upon said combination changing member, and nuts turned upon said pins and holding said plate in clamping position.

8. A lock, comprising a casing, a bolt slidably mounted within the casing, pins carried by the bolt, a combination changing member arcuately adjustably mounted upon and having elongated openings therein receiving said pins, a tumbler fixedly pivoted within the casing and operatively associated with the combination changing member, and means for holding said combination changing member in adjusted position, comprising a plate mounted upon said pins and adapted to clamp upon said combination changing member and nuts turned upon said pins and holding said plate in clamping position, said casing having an opening therein permitting access to said nuts.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS M. BRINTNALL.

Witnesses:
ALFRED H. DAEHLER,
WILLIS S. MITCHELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."