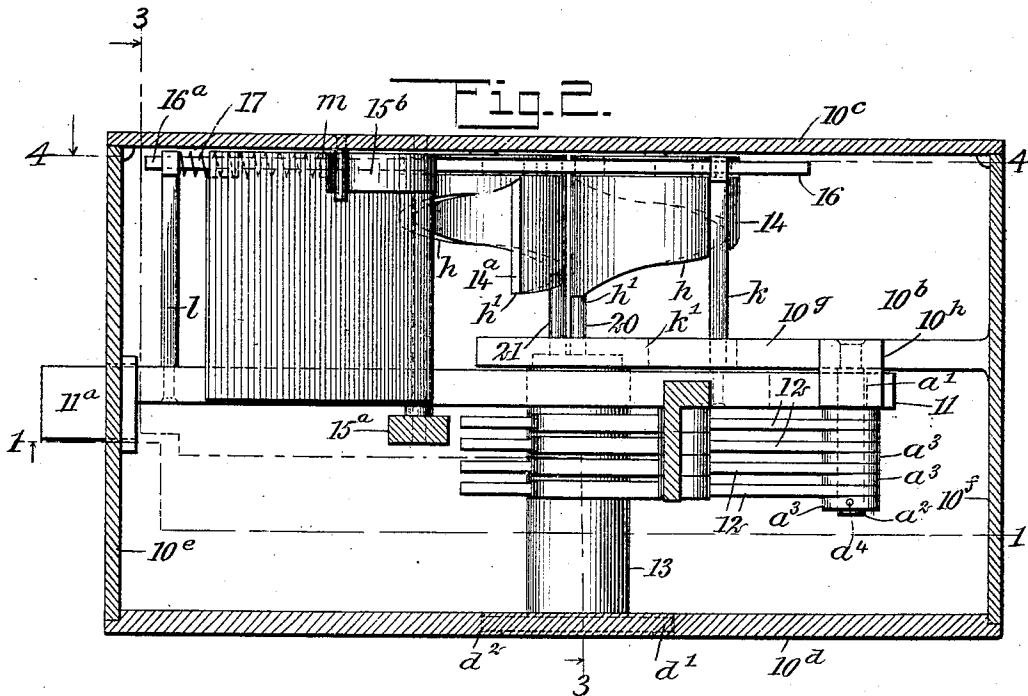


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Patented Nov. 29, 1910.

4 SHEETS--SHEET 1.



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4 SHEETS-SHEET 2.

Fig. 3.

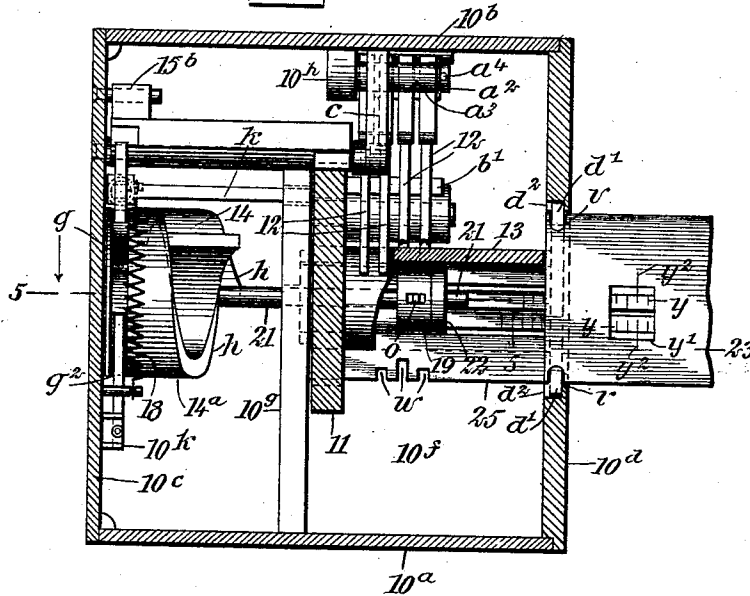
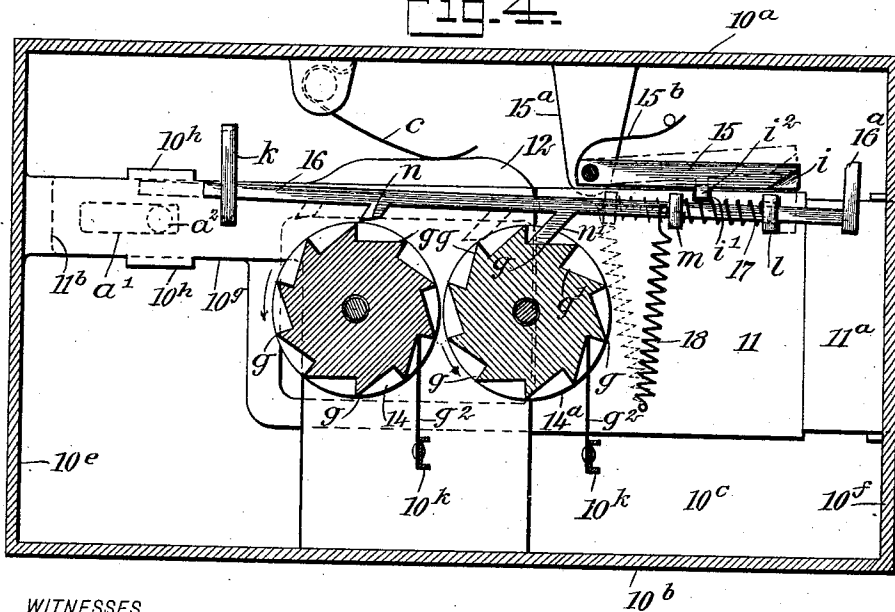


Fig. 4.



WITNESSES

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4 SHEETS—SHEET 3.

Fig. 6.

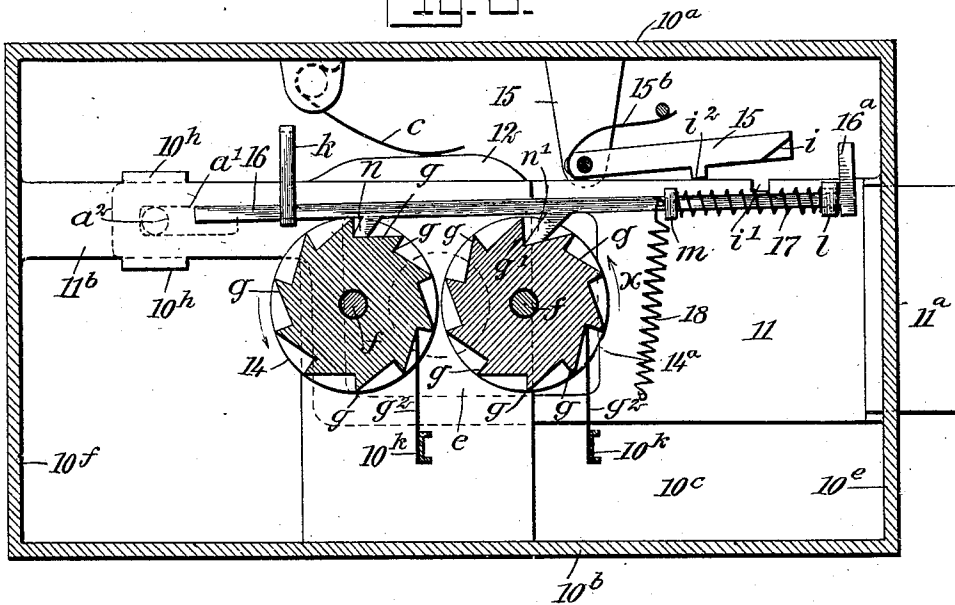


Fig. 5. d¹ 10^a

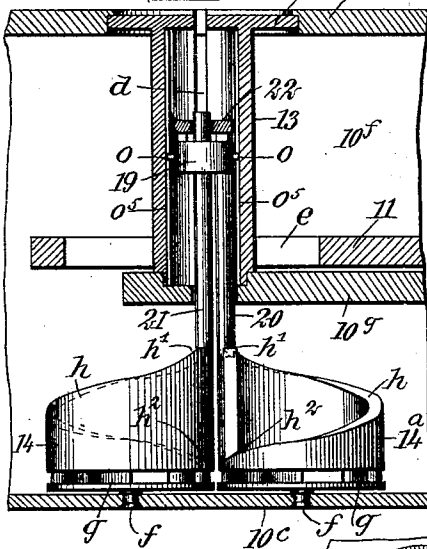
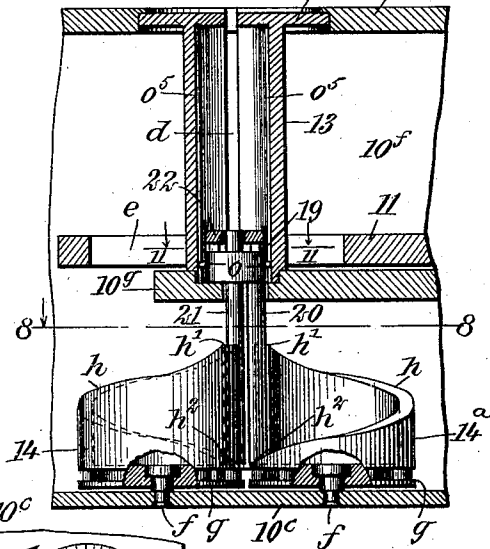


Fig. 7. d¹ 10^a



UNITED STATES PATENT OFFICE.

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LOCK.

977,181.

Specification of Letters Patent.

Patented Nov. 29, 1910.

Application filed October 10, 1908, Serial No. 457,041. Renewed April 29, 1910. Serial No. 558,336.

To all whom it may concern:

Be it known that I, JULES A. FREMON, a citizen of the United States, and a resident of Leeper, in the county of Wayne and State of Missouri, have invented a new and Improved Lock, of which the following is a full, clear, and exact description.

This invention relates to locks of a type embodying a slide bolt and pivoted tumblers as elements, and has for its object to provide novel details of construction for a lock of the character indicated and for a special key therefor, which render the lock very secure and adapt the mechanism for an exposure of attempts to unlock the lock without a proper key.

The invention consists in the novel construction and combination of parts, as is hereinafter described and defined in the appended claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side view of the improvement, substantially on the line 1—1 in Fig. 2; Fig. 2 is a partly sectional plan view, substantially on the line 2—2 in Fig. 1; Fig. 3 is a transverse sectional view, substantially on the broken line 3—3 in Fig. 2; Fig. 4 is a vertical longitudinal sectional view, substantially on the line 4—4 in Fig. 2; Fig. 5 is an enlarged longitudinal, sectional view of details, substantially on the line 5—5 in Fig. 3; Fig. 6 is a partly sectional side view similar to Fig. 4, but showing the working mechanism in a different adjustment; Fig. 7 is a view similar to Fig. 5, but representing parts in different positions; Fig. 8 is a longitudinal sectional view of details, substantially on the line 8—8 in Fig. 7; Fig. 9 is an enlarged longitudinal sectional view of novel details, substantially on the line 9—9 in Fig. 11; Fig. 10 is a similar view to Fig. 9, but showing the working parts differently adjusted; Fig. 11 is a transverse sectional view of the parts, substantially on the line 11—11 in Fig. 9; Fig. 12 is a partly sectional side view of a key that is a feature of the invention; Fig. 13 is a longitudinal sectional view, substantially on the line 13—13 in Fig. 12; and Fig. 14 is an exterior side view of the novel key.

In the drawings, 10 represents the lock case, having rectangular, box-like form, that

is sufficiently elongated for the reception and support of operative details in proper relative positions, 10^a indicating the top wall, 10^b the bottom wall, 10^c and 10^d, opposite side walls, and 10^e 10^f, the end walls thereof. In the end wall 10^e that in service of the lock, is adjacent to the strike plate on a door casement or other abutment, a rectangular opening is formed wherein the beveled nose portion 11^a of a slide bolt 11 is slidably inserted, so as to project from said end wall as shown in Figs. 1, 2 and 6. From the opposite end wall 10^f, at a suitable point, a flat-bodied arm 10^g is projected horizontally toward the rear end of the slide bolt 11, and on the upper and lower edges of said arm, two laterally projected flanges 10^h are formed. From a point *a*, nearer the rear than the front end of the slide bolt 11, said bolt is reduced, having parallel upper and lower edges, producing a guide member 11^b thereon. In the guide member 11^b, a longitudinal slot *a'* is transversely formed, which receives a pivot stud *a*² that projects laterally from the arm 10^g.

A plurality of flat plate-like tumblers 12 are provided which at the corresponding ends thereof are loosely mounted on the pivot stud *a*² at the side of the guide member 11^b, these tumblers, of ordinary form, being spaced apart by washers *a*³ and loosely secured on the stud by a pin *a*⁴, as best shown in Fig. 2. An elongated slot or opening *b* is formed in each tumbler, said openings that are disposed oppositely, each having a depending toe *b'* thereon, which toes differ in degree of downward projection.

From the adjacent side of the slide bolt 11, a locking limb *b*² projects through the slots *b* in all the tumblers, and may have contact with the toes *b'*. There is sufficient space in the slots *b*, below the toes *b'*, for the locking limb *b*² to pass thereunder when the bolt 11 is to receive rearward sliding movement, and to permit of such movement, all the ears in the tumblers must be raised such an exact distance as will render their lower ends flush or disposed in the same plane.

From the top wall 10^a of the case 10, a number of finger springs *c*, equal in number with the tumblers 12, are extended downward and have pressure respectively on the upper edges of said tumblers, thus holding the latter depressed so that the locking limb *b*² normally receives the upper edges of the slots *b*. In the forward portion of the arm

10^c, the diametrically reduced journal end of a key-receiving barrel 13 is rotatably held, said barrel having a longitudinal slot *d* therethrough, which also cuts through a radial collar *d'* that is formed on the opposite end of said barrel, and as clearly shown in Figs. 5 and 7, and by dotted lines in Fig. 2, the radial collar *d'* is loosely mounted in a circular opening *d*² formed for its reception in the front side wall 10^a of the case 10.

In the wider portion of the slide bolt 11, an oblong opening *e* is formed, through which the barrel 13 loosely passes, said opening permitting the free reciprocation of the slide bolt. Equally distant laterally from a longitudinal center line extended rearward through the cylindrical barrel 13, two similar scroll wheels 14, 14^a, are centrally pivoted as at *f*, on the rear side wall 10^c of the case 10. The similar scroll wheels 14, 14^a each consist of a base portion having a plurality of ratchet teeth *g*, formed on the periphery thereof, ten teeth being shown for each wheel, and as appears in Figs. 4 and 6, one tooth *g* in the teeth of wheel 14^a is separated from the adjacent tooth *g* by a deeper notch *g'*, the purpose of which will be hereinafter explained. Upon the base portion of each scroll wheel 14, 14^a, a circular flange is laterally formed or secured, the free edge *h* of which is scroll-shaped, commencing at a point near the base portion and trending spirally upward, as is clearly shown for each scroll wheel, the upper terminal of each scroll-shaped edge being flattened, as is shown at *h'* in Figs. 5 and 7.

A latch dog 15 is at one end pivoted upon a depending arm 15^a, and pressed by a spring 15^b toward the upper edge of the slide bolt 11, the free end of said dog, which projects toward the front end wall 10^c, being sloped upward and forward, as is shown at *i* in Figs. 1, 4 and 6. In the upper edge of the slide bolt 11, at a proper distance from the front end of the same, a notch *i'* is formed therein, and upon the lower edge of the latch dog 15, a toe *i*² is projected therefrom, that will fit in the notch *i'*, said toe being pressed by a spring 15^b into said notch when the slide bolt is fully retracted, as is shown in Fig. 4.

Upon the slide bolt 11, a carrier arm *k* is extended toward the rear side 10^c of the case 10, said arm passing loosely through a longitudinal slot *k'* in the bracket arm 10^a, and near the forward end wall 10^c another carrier arm *l* is projected from the slide bolt 11, parallel with the carrier arm *k* and near to the side wall 10^c, as is clearly shown in Fig. 2. There is a slot in the carrier arm *k*, that trends vertically at a point above the ratchet teeth *g* on the scroll wheel, and in the carrier arm *l*, a transverse perforation is formed.

A pawl bar 16 is loosely inserted through

the carrier arms *k* and *l*, this engagement near the ends of the pawl bar permitting the rearmost end thereof to be reciprocated in the slot in the carrier arm *k* upon the carrier arm *l* that it loosely engages in its perforation. Upon the forward end of the pawl bar 16, a limb 16^a is formed or secured, that projects upwardly in the path of the sloped free end *i* of the latch dog 15. At *m*, on the pawl bar 16, a collar is formed or secured, and between said collar and the carrier arm *l*, a coiled spring 17 is mounted upon the pawl bar, the expansion of said spring sliding the pawl bar into the position shown in Fig. 6. It is to be understood that the function of the latch dog 15 is to prevent the bolt 11 from moving outward until the pawl bar 16 completes its rearward sliding movement.

Upon the bar 16, two pawls *n*, *n'*, are formed, the pawl *n* that is shorter than the pawl *n'*, being so relatively positioned, that it may have a meshed engagement between the teeth *g* on the scroll wheel 14 at intervals, as will presently be explained. The pawl *n'* has such length as adapts it to normally engage between the teeth *g* on the scroll wheel 14^a. A contractile spring 18 is secured by its upper end on the pawl bar 16 near the collar *m*, and in taut condition is attached at its lower end on a projection from the slide bolt 11, the tension of said spring serving to cause the pawl *n'* to properly mesh between the teeth on the wheel 14^a.

From the side wall 10^c, transverse arms 10^k are extended that each carry a spring detent pawl *g*² that respectively mesh between the teeth of the scroll wheels 14, 14^a, so as to permit their rotation in one direction only, as indicated by curved arrows in Figs. 4 and 6. It may here be explained that the wheel 14^a which is the unit wheel, first receives progressive rotatable movement, and after it has nearly completed a revolution, the deep space *g'* between the two teeth *g* on the unit wheel, will be brought into such a relative position, that the pawl *n'* will enter therein and by its depression permit the tooth *n* to enter the space between two teeth *g* on the wheel 14 and adapt a longitudinal movement of the pawl bar 16 in the direction of the arrow *x* in Fig. 6, to effect a simultaneous turning movement of both wheels 14, 14^a.

In the rotatable barrel 13, a hollow cylindrical plunger head 19 is loosely fitted, from which projects a plunger rod 20 at one side of the center of said head, said rod being affixed at one end therein. Centrally in the plunger head 19, another plunger rod 21 is slidably fitted at or near one end thereof as best shown in Figs. 9 and 10. The length of the plunger rods 21 and 20 is so relatively proportioned, that when the plunger head 19 is positioned near the supporting arm 10^a

for the end of the barrel 13, the projected ends of the plunger rods will have a loose engagement with the edge portions h on the scroll wheels 14, 14^a, respectively, at points h^2 thereon adjacent to the ratchet teeth g on the end walls thereof, as is represented by full and dotted lines in Fig. 7, and also as represented in Fig. 8. It will also be noted in Fig. 5 that when the plunger head 19 is slid to a point nearer the flange d' than the arm 10^a, the free ends of the plunger rods 20, 21, will respectively become seated upon the upper terminations h' of the scroll formations of the wheels 14^a, 14.

In the operation of the lock, in connection with a key of special construction herein-after described, it is advantageous to provide means for locking the barrel 13 in a manner which will require the positive pressure of the key members upon the head of the plungers contained therein for its release, said mechanism that is clearly shown in Figs. 9 and 10, comprising the following details: An annular cap plate 22 is loosely fitted upon the normally outermost end of the free plunger rod 21 and fits loosely in the bore of the barrel 13. At diametrically opposite points, two similar arms 22^a extend down from the cap plate 22 and pass loosely through the top wall of the hollow plunger head 19. The arms 22^a are rectangular in cross section and at o^4 have their width reduced and sloped edges formed thereon, which are faced toward the plunger rod 21. The lower end portions of the arms 22^a are loosely seated on springs o^3 that occupy sockets formed in the lower wall of the plunger head 19, so that pressure applied upon the plate 22, that is elevated from the plunger head by the springs o^3 , as shown in Fig. 9, will depress the cap plate 22. A cross pin o^6 is secured in each arm 22^a at such a point as will prevent said arms from rising out of the sockets they occupy, thus limiting the expansion of the springs o^3 , see Figs. 9 and 10. Diametrically opposite each other in the bore of the barrel 13, two longitudinal grooves o^5 are formed that extend throughout the length thereof. In the depending arms 22^a, a longitudinal slot is formed in each arm adjacent to the sloped shoulders o^4 , and in said slots locking limbs o are loosely passed outward. The locking limbs o are rockably supported on resilient upright strips o' that project from the lower head wall of the plunger 13, and at their upper ends are fixed in the heels of the locking limbs o that are near the central plunger 21. In each locking limb o , at an equal distance from the outer ends thereof, a cross pin o^2 is inserted, and projects therefrom equally at each side thereof, said pins having engagement with the inner edges of the depending arms 22^a immediately below the

sloped shoulders o^4 , when the cap plate is raised into the position shown in Fig. 9, which will permit the free outer ends of the locking limbs o to be inserted into the grooves o^5 respectively, due to the force of the resilient plates or strips o' , as shown in Fig. 9. It will be seen that the application of pressure on the cap plate 19 by a key or the like, will slide the arms 22^a toward the lower wall of the hollow plunger head 19, and impinge the sloped shoulders o^4 upon the cross pins o^2 , which will draw the locking limbs o inwardly, so that their outer ends will be retracted from the grooves o^5 and thus permit a free rotation of the barrel 13.

The novel key provided for throwing the bolt 11 so as to project or retract it at the end 11^a thereof is deformable and is constructed essentially as follows: The elongated hollow body of the key is made up of duplicate side walls 23, that are flat plates, rounded edgewise at one end thereof, as shown at p in Figs. 12, 13 and 14, the side edges of said side walls being parallel with each other and the opposite end of each side wall cut at right angles to said edges, as is clearly shown in Figs. 12 and 14 at p' . A border frame 24 of suitable thickness, having a marginal form similar to that of the side walls on their edges, and a breadth of body sufficient to permit the formation of rivet holes therein, as shown in Fig. 12, is secured between the side walls 23, after the introduction of the working parts by rivets p^2 that are inserted through the perforations mentioned. From the end wall defined by the transverse edge p' , a flat parallel-edged key-bit 25 is projected and firmly affixed thereto, the outer edge of said key-bit being aligned with one side edge of the border frame 24. In a rectangular central opening formed in the end wall of the border frame from which the key-bit 25 is projected, three slide bars 26, 27 and 28 are slidably inserted side by side, each bar being independent from the others so far as longitudinal movement is communicated thereto. The slide bars are of an equal length, and upon the inner end of each one, a contractile coiled spring r is secured, and thence carried forward under tension, the forward ends thereof being attached to a side wall 23 of the key body by a stud or equivalent means, and normally said springs project all the slide bars an equal distance from the front end of the key body. Upon the corresponding sides of the slide bars 26, 27, 28, diamond cut serrations s are produced, rendering said sides rough. Within the hollow key body, a presser bar 29 is located that may have a longitudinal slot therein to permit it to occupy space over the actuating spring r that is connected with the central slide bar 27. The presser bar 29 has a flat,

rectangularly-edged head member t thereon which is of sufficient width to bear fully on all the slide bars, and thus be adapted for contact with their roughened surfaces.

5 Near the head piece t on the presser bar 29, said bar is rockably secured on a side wall 23 of the key body by means of ears t' that project from said side wall, and are pivoted upon the side edges of the presser bar. At

10 the opposite end of the presser bar 29, a push button formation u is integrally produced or secured, that is located in an opening in a side wall 23 formed near the end p of the key body, and a strong coiled spring

15 30 is inserted between the push button u and the opposite side wall 23. It will be noted that the pressure of the coiled spring 30 serves to rock the head piece t of the presser bar forcibly into contact with the

20 roughened surfaces of the slide bars 26, 27 and 28, thereby holding them stationary until said pressure bar is manually released by pressure on the push button formation u .

25 In the side edges of the key body near the end wall p' thereof, two opposite channels v, v , are formed, which will receive the rounded inner edge of the circular opening in the front side wall 10^a of the case 10,

30 when the key-bit 25 is inserted fully within the longitudinal slot d in the barrel 13. In the outer side edge of the key-bit 25, at a suitable distance from the channels v, v , a plurality of wards or notches w are formed, the number of said wards that may be one

35 less than that of the tumblers 12, being designed as is usual in this class of locks, to co-act for the proper engagement with the toes b' in the tumblers for their proper elevation, and the release of the locking limb

40 b^2 on the slide bolt 11, this portion of the lock and means for release of the slide bolt being well known. On the sides of the slide bars 27, 28, that are opposite from the serrated sides s , each is graduated, as shown at

45 y in Figs. 3 and 14, said graduations being exposed through an opening y' in one side 23 of the key body, whereon the opposite index marks y^2 are formed, that will denote the relative longitudinal adjustment of the

50 slide bars in the key body.

Assuming that the ratchet teeth on the scroll wheels 14, 14^a , are relatively positioned as represented in Fig. 4, and the slide bolt thrown back as shown in Fig. 4, and

55 that the pawl bar 16 and latch dog 15 are positioned as shown by dotted lines in Fig. 4, the locking is effected by use of the key hereinbefore described as follows: The push button formation u is depressed, which will

60 release the slide bars 26, 27, 28, from pressure of the head piece t , and thus permit the springs r to move these bars outward an equal distance. The key is now inserted, which will permit the channels v, v , thereon

65 to receive the rounded inner edge of the cir-

cular opening in the front side wall 10^a of the case 10, and thus will dispose the wards w on the key-bit bar 25, opposite the toes b' on the tumblers 12, so that a turning movement of the key-bit toward the forward end

70 of the slide bolt will raise the tumblers and permit a forward movement of the slide bolt. It will be further noted that upon inserting the key-bit in the barrel, the slide bars 26, 28, are pressed upon the top of the

75 cap plate 22, and as the springs r are stronger than the springs o^3 , the cap plate will be pressed down on the top of the plunger head 19 and in the manner hereinbefore described will cause the locking limbs o to

80 be drawn inwardly so that their outer ends will be retracted from the grooves o^5 in the bore of the barrel 13, thus permitting the rotation of said barrel. It being understood that the plunger rods 20, 21, are seated upon

85 the edges h of the scroll wheels 14, 14^a , it will be noted that the slide bars 26, 27, 28, will be depressed to coincide with the relative positions had by the plunger rods. After fully inserting the key-bit, and before

90 same is withdrawn from the slot in the barrel 13, the presser bar which has been compressed at its end u is released, which will permit the spring 30 to rock the push

95 button u upward and depress the end portion t of the presser bar, thus impinging it forcibly upon the slide bars 26, 27, 28, and holding them stationary. Upon withdrawal of the key, the lock mechanism will be in the relative positions shown in Fig. 1, and

100 the slide bars 26, 27, 28, will remain as adjusted.

To unlock the slide bolt, the key is inserted in the barrel 13 as far as possible, and the slide bars being unmoved, the key

105 bit will be adapted for retracting the slide bolt. Upon drawing the slide bolt toward the rear of the lock case, the spring 17 will be compressed between the carrier arm l , and the collar m , which is due to the pawl

110 bar 16 being held from sliding by the pawl n' thereon being meshed between the teeth g , the scroll wheel 14^a being held stationary by pressure of the plunger rod 20 on the

115 scroll edge h of the wheel 14^a which is caused by the pressure on the plunger head 19 by the slide bars 26, 28. The retraction of the bolt 11 will correspondingly move the notch i' toward the projection i^2 on the latch

120 dog 15, so that when the slide bolt is completely slid into the case of the lock, the projection i^2 will be spring pressed into the notch i' . The withdrawal of the key removes pressure on the plungers 20, 21 and releases the scroll wheel 14^a which will be rocked by

125 the pressure of the pawl n' the distance of one tooth g in the direction of the curved arrow in Fig. 4 by the expansion of the spring 17. The pawl bar 16 is correspondingly slid rearward, which impinges the

130

limb 16^a upon the sloped end *i* of the pawl bar, thus rocking the latch dog 15 upward and removing the toe *i*² from the notch *i*¹ in the slide bolt 11, the relative position of the parts at this time being indicated by dotted lines in Fig. 4. It will be noted that as the unit wheel 14^a has been turned a distance of one tooth *g* thereon, the plunger rod 20 that seats on the scroll edge *h* of the wheel 14^a, will be correspondingly changed and this will in a like degree alter the position of the plunger head 19 in the barrel 13, due to the end of the rod riding upon the edge *h*. It will be found that the key, if entered into the slot *d* in the barrel 13, cannot be fully inserted therein, as the extension of the slide bars will prevent this. To compensate for this change in the relative positions of the unit wheel 14^a and the plunger rod 20, the push button end *u* of the presser bar 29 is depressed and at the same time the key is shoved into the barrel, the slide bars then adjusting themselves so as to conform to the changed adjustment of the plunger rod 20, and the key may now be turned for locking the slide bolt.

It will be understood from the foregoing description, that upon use of the key, the operation will be repeated and the unit wheel 14^a be rotatably moved, requiring a change in adjustment of the slide bars 26, 27, 28, and if desired, the last position given thereto may be seen through the opening *y*¹ in the side wall 23 of the key body. Furthermore, it will be evident that after the unit wheel 14^a has made nine-tenths of a revolution, the deep notch *g*¹ in said wheel will be brought into engagement with the pawl *n*¹ and this will permit the retraction of the spring 18 to pull the pawl *n* into mesh with the top notch between the teeth *g* on the wheel 14. The next rotatable impulse given to the scroll wheel 14^a will also move the scroll wheel 14 the distance of one tooth *g* thereon, and this will correspondingly alter the position of both plunger rods 20, 21 on the scroll edges *h*, *h* of said scroll wheels, which will require a change in the adjustment of the slide bars 26, 27, 28, to compensate therefor.

In Figs. 9, 10, the additional constructive details shown are preferably employed to render the operation more secure; and it will be seen that at any point of engagement of the plunger rods 20, 21, with the scroll edges of the wheels 14, 14^a, the barrel will be held from turning until there is pressure applied by the slide bars on the cap plate 22, which must be depressed a sufficient degree for the release of the ends of the dogs *o* from the grooves in the barrel 13. It will be noted that this feature makes it necessary for the slide bars to exactly correspond in projection with the positions had by the

plungers 20, 21, before the lock can be operated.

Briefly stated, the broad idea embodied in this invention is to prevent the use of a fraudulent key without detection, as for example, assuming that the lock has been locked by the proper key and then unlocked by a duplicate or skeleton key and subsequently locked by said second key, the first key that may be the proper one will not fully enter the barrel of the lock, thus showing that the lock has been tampered with.

It should be explained that for the purpose of conveniently illustrating the ratchet toothed hubs on the scroll wheels 14, 14^a, the minimum number of the teeth thereon has been shown and described, but it is not necessary to confine the number of teeth to that specified and shown, as an increased number thereof may be provided if deemed advantageous.

Minor changes in the constructive details and arrangement of the parts, as well as their relative proportion, may be made without exceeding the scope of my invention, and I claim the right to all such immaterial alterations of design, proportion and arrangement of the details as fall within the scope and manifest intent of the claims.

It will be evident from the description, that the scroll wheels are the wards of the lock, and that the key comprises a plurality of bits sundry of which are movable and one fixed, and that the said wards are displaced or moved by the turning of the key, while the bits are moved or displaced by the wards.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A lock embodying a slidable bolt, means for holding the bolt from sliding, a key that will release and slide said bolt, and means within the lock adapted to prevent a re-use of the key until said key is altered.

2. In a lock, the combination with a rectangular case, and an arm projected from an end wall within the case, of a hollow key barrel loosely mounted at one end in the arm and at the other end engaged in an opening in a side wall of said case.

3. In a lock, the combination with a rectangular case, an arm projected from an end wall of said case, and a slide bolt mounted loosely at one end on the arm and at the other end in an opening in the opposite end wall of the case, of a hollow key barrel loosely mounted in the arm and extending therefrom through an opening in the slide bolt, and at the other end thereof loosely engaged in an opening in a side wall of the case.

4. In a lock, the combination with a case, and a slide bolt reciprocal in the case, of a

scroll wheel journaled on one side wall of the case and rotatable therein, and means controlled by the reciprocal slide bolt and adapted for giving a step by step rotatable movement to the scroll wheel.

5. In a lock, the combination with a case, and a slide bolt reciprocal in the case, of a scroll wheel having a ratchet toothed end wall, and centrally journaled on a side of the case therein, and means controlled by the slide bolt and adapted by a successive engagement with the teeth of the end wall of the scroll wheel for giving a step by step rotatable movement to the scroll wheel.

6. In a lock, the combination with a case, and a slide bolt reciprocal in the case, of a pair of scroll wheels, each having a ratchet-toothed end wall, and centrally journaled side by side on a side wall of the case therein, and means controlled by the slide bolt, and teeth on the ratchet toothed end walls of the scroll wheels for giving step by step movements to the scroll wheels periodically.

7. In a lock, the combination with a case, and a slide bolt reciprocal in said case, of a scroll wheel journaled in the case and having a ratchet-toothed end wall, a pawl bar slidable on the slide bolt and having a pawl adapted for engagement with the ratchet teeth, and a spring adapted for longitudinally moving the pawl bar.

8. In a lock, the combination with a case, and a slide bolt reciprocal in said case, of a latch dog that may interlock with a notch in the slide bolt and hold the slide bolt retracted, and means carried by the slide bolt adapted for raising the latch dog out of engagement with the slide bolt.

9. In a lock, the combination with a case, a slide bolt reciprocal in the case, and a pair of scroll wheels journaled side by side in the case, each wheel having a ratchet-toothed end wall, of a spring-pressed pawl bar loosely mounted on a side of the slide bolt above the ratchet teeth, said pawl bar having a long pawl and a shorter pawl which successively engage with the teeth on a respective scroll wheel.

10. In a lock, the combination with a case, a slide bolt reciprocal in the case, an arm therein, and a hollow key barrel journaled at the respective ends in the openings in the arm and in a side wall of the case, of a scroll wheel having a spiral edge and journaled in the case on a side wall opposite the inner end of the barrel, a plunger head reciprocal in said barrel, and a plunger rod extended from said head into contact with the spiral edge on the scroll wheel.

11. In a lock, the combination with a case, a slide bolt reciprocal in the case, an arm therein, and a hollow key barrel journaled at its respective ends in the openings in the arm and in a side wall of the case, of two scroll wheels journaled side by side on the

opposite side wall of the case therein, each scroll wheel having a circular wall, the defining edge of which is spiral, a plunger head reciprocal in the barrel, a plunger rod secured by one end in the plunger head and seating at the other end on the spiral edge of one scroll wheel, and a slidable plunger rod central near one end in the plunger head and at the other end seating upon the spiral edge on the other scroll wheel.

12. In a lock, the combination with a case, an arm in the case extended from one end of the case, and a cylindrical barrel journaled at its respective ends in an opening in the side of the arm and in an opposite side wall of the case, said barrel having a longitudinal slot therein, of a key having a bit-bar extended at one end and from one side edge thereof, said bit-bar sliding through the slot when the key is used to operate the lock.

13. In a lock, the combination with a case, and a cylindrical barrel rotatably mounted in an opening in said case at one side thereof, the barrel having opposite longitudinal grooves therein, of a hollow plunger head, comprising a top wall having two slots therein, also sockets and springs therein in the bottom wall of said plunger head, a cap plate, two arms depending from said cap plate and passing down through the slots in the top wall, the lower ends of said arms seating on the springs, and spring-supported dogs passing through the slots in the arms and at their outer ends entering the grooves in the barrel, each arm having a sloped edge that engages with pins on the dogs and retracts said dogs from the grooves when the cap plate receives pressure thereupon.

14. In a lock and key therefor of the character described, the combination with a key barrel rotatable in the lock and open at one side thereof, said barrel having a longitudinal slot therein, of a key, comprising a hollow elongated body, a key bit-bar projected therefrom at one end of the body and aligned with a side edge thereof, said key bit-bar having wards cut therein, a plurality of slide bars in the key body and adapted for extension therefrom at one end of said body, and springs adapted to effect an equal projection of the slide bars.

15. A key for a lock of the character described, comprising a hollow body, a bit-bar projected therefrom at one end, and a plurality of spring-actuated slide bars adjustably held in said body.

16. A key for a lock of the character described, comprising a hollow body, a bit-bar projected therefrom at one end, a plurality of slide bars in the body, a plurality of springs normally drawing the slide bars through one end of the body, and means for holding the slide bars at points of outward adjustment.

17. A key for a lock of the character de-

scribed, comprising a hollow body, a bit-bar projected from one end of the body, a plurality of slide bars disposed side by side in the body, a spring attached to each slide bar and drawing it outward, and a rockable presser bar spring-pressed at one end thereof and pressing upon the slide bars at its opposite end, thus holding them stationary.

18. A key for a lock of the character described, comprising a hollow body, a bit-bar projected from one end of the body, a plurality of slide bars disposed side by side within the body in contact with one side wall thereof, a spring attached to each slide bar and drawing it outward through an open end of the key body, said body having an opening in the side wall whereon the slide bars have contact, said slide bars having scale graduations that are exposed through said opening, and a pivoted presser bar spring-pressed at one end thereof and pressing at its opposite end on the slide bars for holding them stationary.

19. A lock comprising a bolt, means for preventing movement of the bolt, a key provided with means for releasing the bolt and for moving the same, and means in connection with the key and the lock for preventing a reuse of the key until it is altered.

20. A lock comprising a slidable bolt, means for locking the bolt in adjusted position, a key having means for releasing the locking means, and sliding the bolt, said key being provided with movable members, the lock having means for engaging and moving the members when the key is turned

in the lock, and a connection between the bolt and the engaging and moving means for shifting said means when the bolt is moved for the purpose set forth.

21. A key for a lock of the character described, comprising a body member, a fixed bit-bar projecting from one end thereof, and a plurality of spring actuated bit bars adjustably held in the body.

22. In a lock, a sliding bolt, means for engaging the bolt to prevent movement thereof, a deformable key for releasing said means and sliding the bolt, and means operated by the sliding of the bolt for deforming the key to prevent the reuse thereof until the key is re-adjusted.

23. In a lock, a sliding bolt, movable wards in the lock, a key for operating the bolt and provided with movable bits moved by the wards, means for moving the wards upon withdrawal of the key, and releasable means for locking the bits in their displaced position.

24. In a lock, a slidable bolt, movable wards in the lock, a key for operating the bolt, said key having bits movable by the wards, and means to move said wards upon the withdrawal of the key.

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

JULES ALBERT FREMON.

Witnesses:

H. A. RADTKE,
R. BURFORD.