

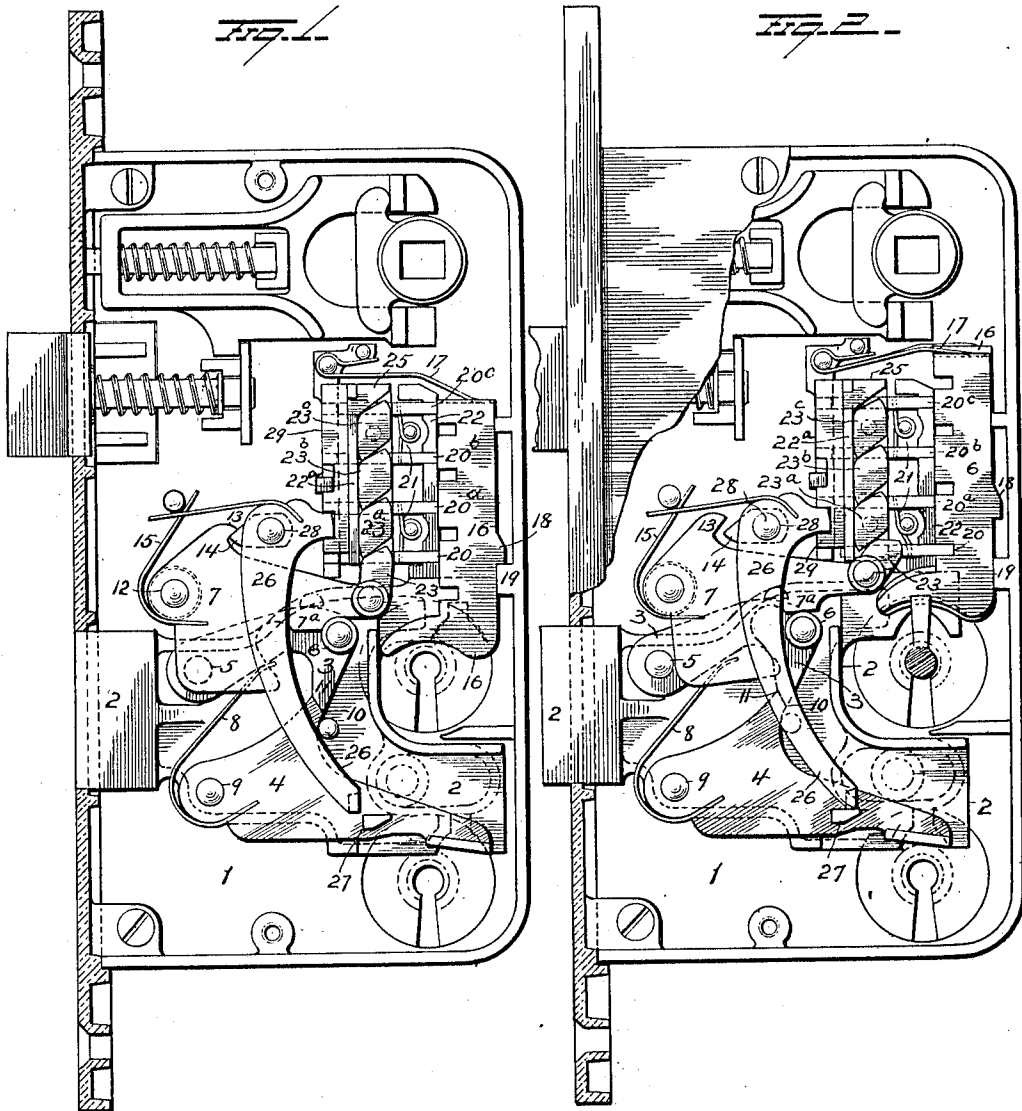
R. SCHOELL.
LOCK.

APPLICATION FILED SEPT. 22, 1911.

1,020,847.

Patented Mar. 19, 1912.

3 SHEETS-SHEET 1.



WITNESSES
E. J. Nottingham
G. J. Downing

INVENTOR
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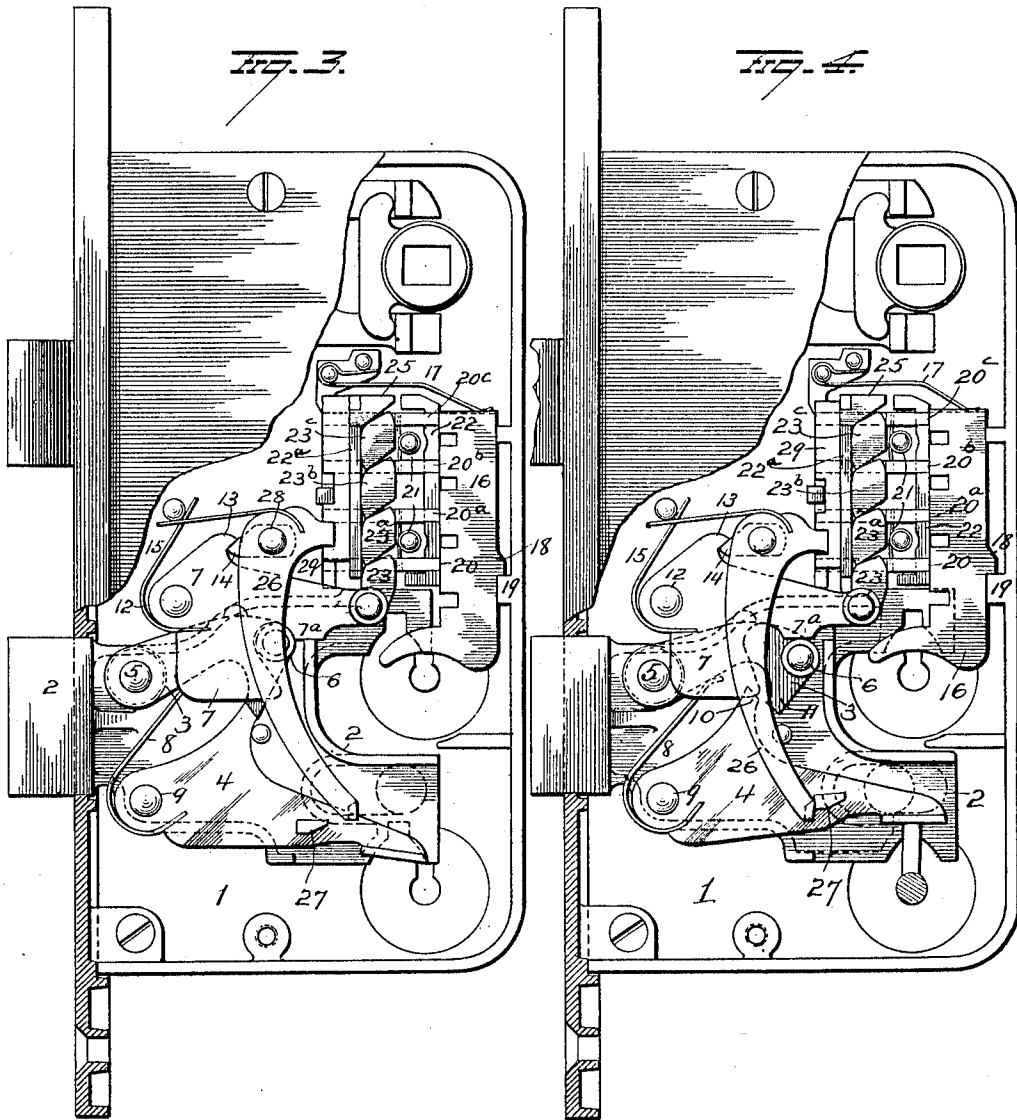
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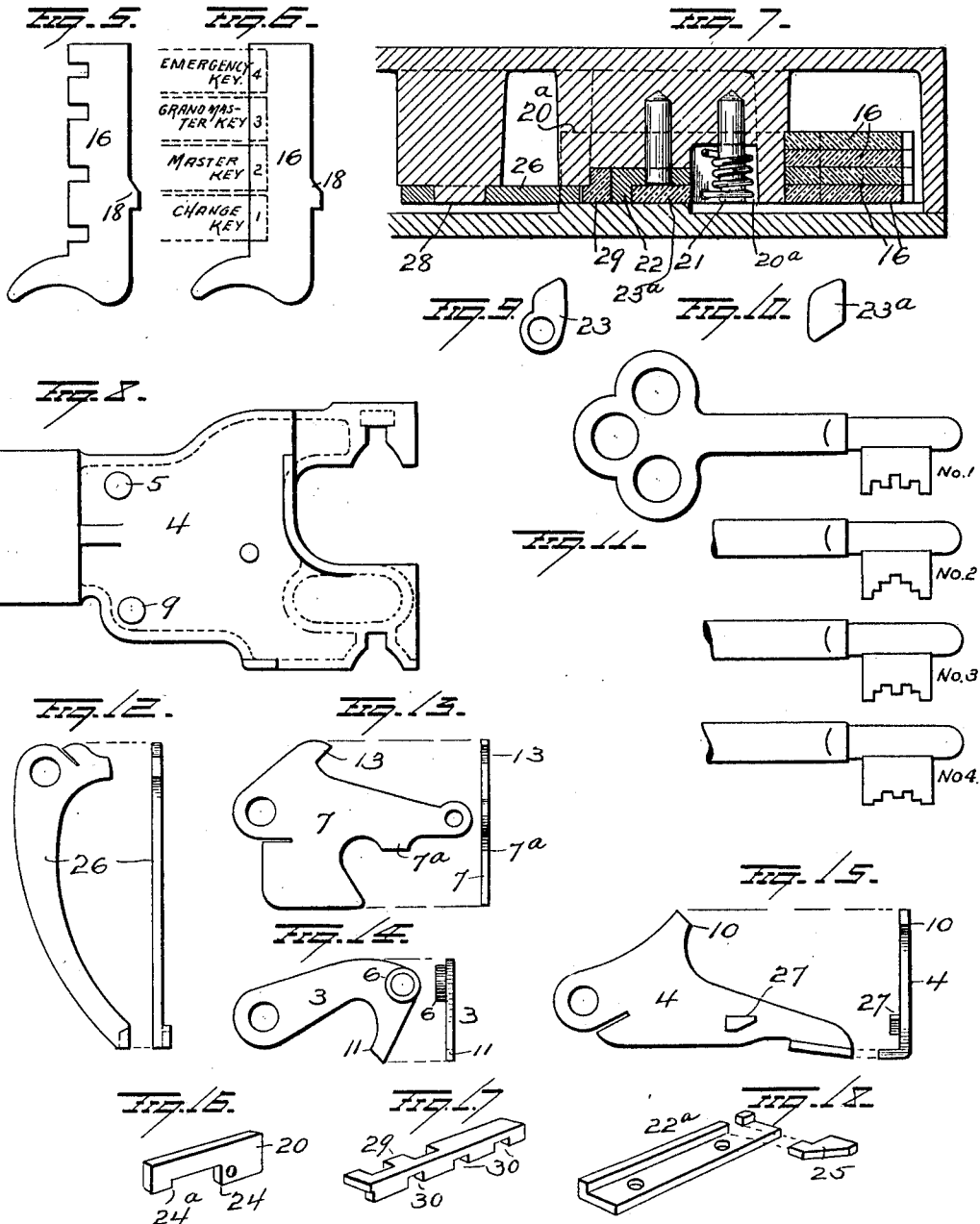
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UNITED STATES PATENT OFFICE.

REINHOLD SCHOELL, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE YALE & TOWNE MANUFACTURING COMPANY, OF STAMFORD, CONNECTICUT.

LOCK.

1,020,847.

Specification of Letters Patent.

Patented Mar. 19, 1912.

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To all whom it may concern:

Be it known that I, REINHOLD SCHOELL, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in locks, the object being to provide an absolutely secure and practical system of master-keying locks, whereby it will be possible to provide practically an unlimited number of sets of master keyed locks, in which the change keys and the master keys differ from each other, and it consists in the parts and combinations of parts, as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view of the lock with the face plate removed and the bolt retracted. Fig. 2 is a similar view showing the key in place and partly turned. Fig. 3 shows the bolt fully projected. Fig. 4 is a view showing the bolt partly projected by the key in the lower or inside key hole. Fig. 5 is a view of one of the tumblers. Fig. 6 is a view of a tumbler blank showing the spaces reserved for the several different keys. Fig. 7 is an enlarged view of the tumblers, finders and fences in their proper relative positions. Fig. 8 is a view in elevation of the bolt. Fig. 9 is a view in plan of the primary or main finder. Fig. 10 is a plan view of one of the secondary finders. Fig. 11 shows the four keys No. 1 of which is a key for a particular lock; No. 2 a master key for a series of locks; No. 3 a grand master key for a larger series; and No. 4 a great grand master or emergency key for the entire series. Figs. 12, 13, 14 and 15 are views in plan and edge elevation of several of the levers. Fig. 16 is a view in plan and edge elevation of one of the fences, Fig. 17 is a plan and edge elevation of the tumbler blocking slide, and Fig. 18 is a view in perspective of the frame 22 on which the fences are mounted, and also showing the fixed abutment 25.

1 represents the lock case, and 2 the bolt mounted to slide therein and project through the face plate thereof, as shown in Figs. 1, 2 and 3. This bolt may be constructed to be actuated from the outside only, a latch or other means being employed for locking the door from the inside, but I have shown the bolt provided with two sets of talons, the upper ones of which are engaged by the key entered from the outside, and the lower ones, by the key entered from inside of the door. This bolt carries the lever 3, shown detached in Fig. 14, and the lever 4, shown detached in Fig. 15. The lever 3 is pivoted at 5 to the bolt 2, and is provided at its elbow with a stud carrying the roller sleeve 6 which latter is held in contact with the lower edge of lever 7, by the spring 8 on lever 4. Lever 4 is journaled on stud 9 fixed to the bolt 2, with its free end in a position to be engaged by the key in the lower or inside key hole, while its toe 10, forms a stop or abutment against which the free end 11 of lever 3 bears. Spring 8 tends to force lever 3 up, and force lever 4 down, but as the upward movement of lever 3 is restrained by means to be hereinafter described, the effect of spring 8, is to hold the beveled face of toe 10 of lever 4, in the path of movement of the beveled free end 11 of lever 3 so that each forms a stop or abutment for the other.

Carried by the lock case 1, is the bolt locking lever 7 shown detached in Fig. 13. This lever is pivoted to the case 1 at 12, and is provided with a hook-shaped projection 13 which overhangs the stop 14, rigid with the lock case, the said stop 14 limiting the swing of the lever 7, in both directions. This lever carries the spring 15, which tends to force the lever downwardly and into contact with the roller sleeve 6 on lever 3, which as before explained is carried by the bolt. This lever 7 is provided on its lower edge with a projection 7^a having curved ends against which the sleeve roller 6 bears. When the bolt 2 is retracted as in Fig. 1, the sleeve 6 rests against the rear end of projection 7^a, and when the bolt is projected the sleeve 6 rests in advance of said projection. It will be apparent from the foregoing, that when the bolt is retracted, it cannot be projected or thrown to its locking

position without moving lever 7 away from the sleeve 6, or moving the latter away from the projection 7^a on lever 7.

In the operation of the lock from the inside through the lower key hole, the turning of the key moves the toe 10 of lever 4, out of the path of the end 11 of lever 3, thus permitting the latter to give or yield as the bolt is projected by the key, but with a key introduced from the outside, through the upper key hole, this lever 4 is not disturbed, hence it is necessary that the lever 7 yield upwardly in order to permit sleeve 6 carried by lever 3, to be shifted to its forward position. Normally this lever 7 is locked by the tumbler mechanism, hence in order to actuate the lock from the outside or corridor side of the door, the tumblers must first be actuated by a proper key. The tumblers 16, three in the present instance, are each L-shape in plan, and are located adjacent the inner edge of the case 1, immediately over the key opening, and in a position to be engaged by the key as the latter is turned. These tumblers rest side by side, move vertically upwardly by the keys and downwardly by springs 17, and are limited in their downward movement by shoulders 18 engaging stop 19 on the lock case 1.

In the drawings I have shown four sets of gatings, but theoretically there is no limit to the number, consequently the number of different combinations and keys that may be used, is limited only by the length, the number of finders and the fences. The tumblers, as shown in dotted lines in Fig. 6, have four spaces reserved for gatings, which latter may be located anywhere within the reserved dotted spaces. In making up a bitting list for a quantity of locks where four keys, referred to above are to be used, it will be necessary to make up a list of possible changes. For instance if six tumblers should be used, each tumbler to provide for four sets of ten each, differently located gatings, the list would theoretically be 10x10x10x10x10x10 which gives a resultant of one million changes. Out of the million changes must be deducted the number of master keys, each master key to take up one change; the number of grand master keys, each to take only one change; and the emergency key for the series, to take only one change. For instance if twenty master keys should be required, twenty changes could be taken from anywhere out of the million group; if ten grand master keys should be required then ten changes may be taken from the group and the great grand master or emergency key would take one change, the balance to be used for change keys, thus providing in one type of lock a change for each individual lock. If the number of tumblers be less than six, the total number of changes will be reduced,

but the system of master keying will be the same, and if the number of tumblers be increased the number of changes will be increased in the same ratio as above explained.

Located in front of the tumblers are the fences 20—20^a—20^b and 20^c. These fences are each provided with a spring 21, which normally holds the fences forwardly out of contact with the tumblers, so as to permit the latter to be moved without opposition. These fences are mounted in a supporting frame 22, preferably formed integral with the lock casing and which also forms the front support for the tumblers, the said frame being slotted to receive and support the several fences and hold them in their proper relative positions. The fences are cut away centrally as shown in Fig. 16, to receive the finders 23—23^a—23^b and 23^c, one for each fence, which finders are supported against movement outwardly, or toward the front edge of the lock, by the flange of the plate 22^a, secured to the lock casing, and each bears at its rear edge near its upper end, against a shoulder 24 formed by cutting away the fences. The top finder 23^c rests against the fixed abutment 25 at the top of plate 22^a. The finders 23^a—23^b and 23^c are loosely seated in frame 22, and each consists of a flat plate having parallel front and rear sides, and beveled ends, with slightly rounded corners. These finders are confined between the shoulders 24 of the fences 20—20^a—20^b and 20^c, so that when the tumblers are in their normal positions, with their gates out of alinement with all the fences, the finders will be restrained against all movement.

The main lower or primary finder 23, is pivotally mounted on the rear end of locking lever 7, with its upper beveled end resting against the lower beveled end of finder 23^a. The upper beveled end of the latter rests against the lower beveled end of finder 23^b, and the upper end of the latter rests against the lower beveled end of finder 23^c, while the upper beveled end of the latter rests against the lower beveled edge of abutment 25.

From the foregoing it will be seen, that, with the tumblers in their normal position, locking lever 7 will be held against any upward movement, hence if the bolt be in its retracted position it will be held so by the engagement of sleeve 6 with the rear end of projection 7^a, or if it be in its projected position it will be held so, until all the tumblers are so moved as to bring one gate in each in alinement with one fence. As an illustration, suppose a gate in each tumbler be brought into alinement with the lowest fence 20. By continuing the rotation of the key, the latter engages the front talon of the bolt and tends to push same outwardly. As the

bolt moves outwardly, the sleeve 6 riding under the projection 7^a of the locking lever 7, elevates the free end of the latter and the main finder 23 carried thereby. As all the
 5 finders above 23 are restrained from any movement by the plate 22^a, and the three upper fences, there can be no movement of any of them. The lower fence is however free to move into the alined gatings in the
 10 tumblers, hence the upward movement of the free end of lever 7, causes the main finder to slide against the lower inclined edge of the finder next above, thus forcing the lower finder laterally, and said finder
 15 bearing against its fence forces the latter into its gatings, thus providing for sufficient upward movement of lever 7 to permit the projection 7^a thereon to clear the sleeve 6 so as to permit the latter to move with the
 20 bolt to its forward position. If for instance the third series of gates were moved into alinement with fence 20^b, under such condition the main finder 23 would elevate finders 23^a and 23^b, and as finder 23^c would be held
 25 against longitudinal and lateral movement, finder 23^b will move laterally against its fence and force the latter into the gatings in alinement therewith. In order therefore to actuate the bolt from the outside a key
 30 must be used that will cause a gating in each tumbler to aline with one of the fences, and not until then can the bolt be actuated. If however the bolt be operated by a key from the inside, through the lower keyhole the
 35 key simply moves the toe of lever 4 out of the path of the free end 11 of lever 3 thereby permitting the latter to give or yield, and the sleeve 6 to ride under the lower face of projection 7^a of lever 7. I have also provided means actuated by the key from the
 40 inside, to lock out certain keys such as the master and grandmaster keys, sometimes called maids' and housekeepers' keys. This mechanism comprises the lever 26 pivoted to
 45 the lock casing with its lower end adjacent the lug 27 on lever 4. When the free end of lever 4 is raised by the key, the lug 27 will be raised to the plane of the free end of lever 26, and as the bolt 2 and lever 4 are
 50 moved outwardly by the key, the lug 27 engages the end of the lever and turns it on its fulcrum 28. The upper free end of lever 26 is in engagement with the slide 29 which latter is mounted to move vertically on the
 55 frame 22 which as before explained carries the fences and finders. Slide 29 rides on the cut away faces of the fences, and is slotted, as at 30, so that when in normal position, as it is when the parts are actuated by
 60 the key through the upper or outside key hole, the slots 30 will aline with the shoulders 24^a of the several fences, thus permitting the latter to be moved by the finders, but when lever 26 is shifted by the outward
 65 movement of the bolt, as previously ex-

plained, the slide 29 will be moved downwardly thus moving the slots out of the path of movement of the shoulders 24^a and blocking fences 20^a and 20^b against the
 action of their respective keys, the maids' 70 and housekeepers', but leaving the fences 20 and 20^c free to be actuated by the change key and the emergency key respectively. The slide may however be constructed to
 lock out all the keys, or any one key, but 75 ordinarily the keys referred to are the ones locked out.

With this type of lock it is possible to provide an unlimited number of sets of master keyed locks and have the change keys 80 all different, and a different master key for each set of locks the whole series or sets being under the control of a single grand master or emergency key.

It is clearly evident that numerous 85 changes in the details of construction might be resorted to without departing from the spirit and scope of my invention hence I would have it understood that I do not confine myself to the details, arrangement and
 90 location of the parts, as shown and described, but consider myself at liberty to make such changes as fairly fall within the spirit and scope of the claims.

Having fully described my invention what 95 I claim as new and desire to secure by Letters-Patent, is:—

1. In a master key lock, the combination of a bolt, a series of tumblers each having a plurality of gatings, a fence for each series 100 of gatings in the several tumblers, bolt locking means, and devices intermediate the several fences and the bolt locking means whereby when any series of gatings is brought into alinement with its fence, the
 105 intermediate device will yield and permit the bolt locking means to release the bolt.

2. In a master key lock, the combination of a bolt, a series of tumblers each having a gating for each key to be used with the lock, 110 a fence for each series of gatings in the several tumblers, bolt locking means, and devices intermediate the several fences and the bolt locking means, whereby when any one of the series of gatings in the several tumblers is brought into alinement with its
 115 fence, the intermediate devices will yield and permit the bolt locking means to move in a direction to release the bolt.

3. In a master key lock, the combination 120 of a bolt, a series of tumblers each having a reserved space for each of the several different keys, a gating within each key space, a fence for each series of gatings in the several tumblers, bolt locking means, and devices 125 intermediate the several fences and the bolt locking means whereby when the gatings of any one series in the several tumblers are brought into alinement with their fence, the intermediate device and said fence will yield, 130

and permit the bolt locking means to move in a direction to release the bolt.

4. In a master key lock, the combination of a bolt, a series of tumblers, each having a plurality of gatings, a fence for each series of gatings in the several tumblers, bolt locking means and finders intermediate the bolt locking means and the several fences, whereby when any one fence is in alinement with any one series of gating in the tumblers, it will be forced by said finder or finders into its gatings in the several tumblers to permit the locking means to be moved to release the bolt.

5. In a master key lock, the combination of a bolt, a series of tumblers, each tumbler having a plurality of gatings, bolt locking means, a series of fences and a series of finders intermediate the bolt locking means and fences and operating to hold the bolt locking means against movement, except when one series of gatings in the several tumblers has been moved into alinement with one of the fences by a proper key.

6. In a master key lock, the combination of a bolt, a series of tumblers, each tumbler having a plurality of gatings, a series of fences, bolt locking means, a series of finders located intermediate the bolt locking means and the fences, the said finders being normally restrained from any movement by the fences, and means to move said finders by power applied to the bolt through the key, when any one of the series of fences is in alinement with its series of gatings in the several tumblers.

7. In a master-key lock, the combination of a bolt, a series of tumblers each having a plurality of gatings, each gating representing a different key, a fence for each series of gatings, bolt locking means and a series of finders interposed between the bolt locking means and the fences and restrained against movement by the latter, whereby when any one fence is in alinement with its gatings in the several tumblers, its finder may be moved by power applied to the bolt by the key, and thus release the bolt locking means.

8. In a master key lock, the combination with a bolt, a series of tumblers, a series of fences, and bolt locking means, of means whereby when the bolt is projected by a key from the inner side of the door, one or more of the fences will be locked against the action of a master key inserted from the outer side of the door.

9. In a master key lock, the combination with a bolt, a series of tumblers, a series of fences and locking means for the bolt, of a slide, and means for actuating same by a key inserted at the inner side of the door only, whereby when said bolt is projected by a key from the inside, the slide will be moved to a position to block the movements of one

or more of the fences, whereby the latter will be locked against the action of a master key inserted from the outer side of the door.

10. In a master key lock, the combination with a bolt, bolt-locking means, a series of tumblers each having a plurality of gatings, and a series of fences, of a finder for each fence and means connecting the finders and locking means.

11. In a master-key lock, the combination with a bolt, bolt-locking means, a series of tumblers each having a plurality of gatings and a plurality of fences, of a finder for each fence, one of said finders being carried by the locking means and actuating the other finders.

12. In a master key lock, the combination with a bolt, bolt-locking means, a series of tumblers each having a plurality of gatings, and a plurality of slidable fences, of a finder for each fence, the several finders being restrained against movement by their respective fences, and one of said finders being carried by the bolt locking means and adapted to actuate the other finders.

13. In a master key lock, the combination with a bolt, a bolt locking lever coöperating therewith, a series of tumblers each having a plurality of gatings and a fence for each series of gatings, of a finder for each fence, one finder being carried by the bolt locking lever and actuated by the same, and the other finders being actuated by the movements of said first mentioned finder, the said finders being restrained against movement by their respective fences, and each adapted to actuate its fence only when the latter is in alinement with its gatings in the tumbler.

14. In master key locks, the combination with a bolt, a series of tumblers each having a plurality of gatings and a fence for each series of gatings, of a finder for each fence, the said finders having beveled ends whereby they may be moved laterally against their respective fences, and a bolt locking lever coöperating with said finders whereby when any one series of gatings in the tumblers are in alinement with their fence, the pressure of the locking lever against the finders will cause the freed fence to be actuated by its finder and thus permit the locking lever to move sufficiently to release the bolt.

15. In master key locks, the combination with a bolt, a series of tumblers each having a plurality of gatings, a fence for each series of gatings and a finder for each fence, the said finders being superimposed and normally restrained against movement by the fences, of bolt locking means connected to the lower finder, and adapted to actuate the several finders.

16. In master key locks, the combination with a locking lever and a bolt carrying locking means engaging said locking lever,

of a series of tumblers each having a plurality of gatings, a fence for each series of gatings, and a finder for each fence, the said finders having end to end engagement, one of said finders being carried by the bolt locking lever and engaging the end of the finder next above.

17. In master-key locks, the combination of a bolt, a bolt locking lever and two spring pressed levers carried by the bolt and having engaging members, one lever having a projection engaging bolt locking lever and the other a member to be engaged by the key, whereby when the key is inserted and the lever engaged thereby is turned, the other lever carrying the bolt locking projection will be released from the bolt locking means and permit the bolt to be actuated.

18. In a lock the combination of a bolt, a tumbler having a gating, a fence coacting with said tumbler, bolt locking means, and a device intermediate the fence and the bolt locking means whereby when the gating of the tumbler is brought into alinement with its fence, the intermediate device will yield and permit the bolt locking means to release the bolt.

19. In a lock the combination of a bolt, a series of tumblers each having a gating, a fence for the series of gatings, bolt locking means and a device intermediate the bolt locking means and the fence, whereby when the gatings in the several tumblers are brought into alinement, the said intermediate device will yield and permit the bolt locking means to release the bolt.

20. The combination with a bolt, bolt locking means, a tumbler having a gating, and a fence coacting with said tumbler, of a finder intermediate the fence and the bolt locking means.

21. The combination with a bolt, bolt locking means, a series of tumblers each having a gating and a fence coacting with said tumblers, of a finder intermediate the fence and the bolt locking means.

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

REINHOLD SCHOELL.

Witnesses:

P. F. AUGERBRANN,
H. S. WISDOM.