To all whom it may concern:

Be it known that I, Elmer E. Watson, of Hamilton, in the county of Butler, and in the State of Ohio, have invented a certain new and useful Improvement in Interchangeable-Key Locks, and do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to an improvement in interchangeable key locks.

The object of my invention is to provide an interchangeable key lock of very simple construction, which at the same time is capable of adaptation to any one of a very great number of different keys.

In general, the key lock which constitutes an embodiment of my invention is constructed in such a manner that one of a given series of keys may be used to operate the lock, but that when adjusted and locked by a certain key, only the key which has been used to lock the lock can be used again to unlock it. Again, when the lock has been locked, it is first necessary to insert a guard key for the purpose of setting up a master tumbler before the lock can be unlocked by the key which has been used for locking the same. Furthermore, when the locking and unlocking key has been withdrawn and the lock is in its unlocked position, it is first necessary to set up a master tumbler by means of the guard key before the lock can be again locked by means of one of the locking and unlocking keys. Finally, when the master tumbler has thus been set up in the unlocked position of the lock, any one of the series of keys referred to may be used for locking the lock and subsequently unlocking the same.

The present application covers an improvement over the lock disclosed in my earlier application for an interchangeable key lock, Ser. No. 519,664, filed September 24, 1909.

I have shown one embodiment of my invention in the accompanying drawings, in which—

Figure 1 represents a horizontal cross-section of a door equipped with one of my locks; Fig. 2 illustrates an elevation of the interior of my lock; Fig. 3 is a similar view taken from the opposite side of the lock; Fig. 4 is a similar view to the view shown in Fig. 2, except that certain parts are broken away, and except that the parts are shown in the position in which the lock is ready to receive the guard key for setting the master tumbler up, so that the lock may be locked by one of the locking and unlocking keys; Fig. 5 is a plan view of the master tumbler; Fig. 6 is a plan view of one of the auxiliary tumblers; Fig. 7 is a plan view of the auxiliary bolt member; Fig. 8 is a plan view of the auxiliary bolt member; Fig. 9 is a plan view of the auxiliary bolt member; Fig. 10 is a plan view of the auxiliary bolt member; Fig. 11 is a side elevation of the same; and Fig. 12 is a plan view of the guard key, and Fig. 13 comprises plan views of two of the locking and unlocking keys. Fig. 14 is a plan view of the cover-plate for the lock.

In the drawings, 1 is a door carrying a lock 2, designed to cooperate with a bolt-receiving bracket 3, carried by a wall or partition 4. The lock 2 comprises a casing 5 and a cover-plate 6, the cover-plate 6 being provided with a cylindrical boss 7, which extends through and to the front of the door. The lock 2 is secured to the door by means of screws 8. Supported within the cylindrical boss 7 there is a key-cylinder 9, the front end of which has a cylindrical extension 10 fitting within the cylindrical boss 7, and the other end 11 of which is carried within a recess in the lock casing 5. The end 11 carries a talon 12, which is adapted to be received upon the inner face of the casing 5. The talon 12 cooperates with a plate 13 carrying a bolt-head 14, which projects through an opening 15 in one end of the lock casing 5. The front end of the plate 13 and its attached bolt-head 14 is retained in place by the opening 15, through which the bolt-head passes, while the rear end of the plate 13 is maintained in its proper position by means of a pin 16, which engages with the slot 17 in the plate 13. A transverse projection 18 appears at the rear of the plate 13, which projection engages with a similar projection 19 upon an auxiliary bolt-member 20. Said member 20 is guided within the lock casing 5 by means of pins 21 and 22, projecting from the lock casing and engaging with slots 23 and 24 respectively in the auxiliary bolt-member 20. The auxiliary bolt-member 20
carries a rearwardly projecting pin 25, which projects outwardly through the lock casing 5 through a slot 26 therein, the purpose of which construction is to be described hereinafter. The bolt-head 14 and the plate 13 carry a front racking stump 27, while the auxiliary bolt-member 20 carries a rear racking stump 28. A master tumbler 29 is supported in the lock adjacent to the plate 13 and the auxiliary bolt-member 20. The master tumbler 29 is supported in position by means of the front and rear racking stumps 27 and 28, the master tumbler being provided at its front end with a slot 29 and a projection 30 to engage with the front racking stump, and a slot 31 and projection 32 upon its rear to engage with the rear racking stump 28. An opening 33 is provided in the master tumbler 29 to receive the key cylinder 0, and an opening 34 to pass over a pin 35 fixed to the lock casing, which constitutes the pivot for the auxiliary tumblers 36. A spring 37 is attached to one side of the master tumbler 29, said spring 37 cooperating with the interior of the lock casing 5. At one side and at the front of the master tumbler 29 there is provided a recess 38, which passes over a pin 39, projecting upwardly from the lock casing 5. Each of the auxiliary tumblers 36 is provided at its front end with a slot 40 and a projection 41, and at its rear end with a series of slots 42 and a projection 43. Each of the auxiliary tumblers 36 is, furthermore, provided with a slot 44 to receive the pin 35, a recess 45 at one side to cooperate with the projections on the locking and unlocking keys, and a spring 46 at the other side to cooperate with one side of the lock casing 5. The slots 40 and projections 41 on the auxiliary tumblers 36 are designed to cooperate with the front racking stump 27, while the slots 42 and projections 43 upon the rear of the auxiliary tumblers 36 are designed to cooperate with the rear racking stump 28.

It will be noted from Fig. 14 that the front and rear racking stumps project through slots 47 and 48 respectively in the cover-plate 6, these slots forming guides for the free ends of said stumps.

The lock operates as follows: Assuming the parts to be in the position as shown in Fig. 4, the lock cannot be locked by any one of the series of locking and unlocking keys can be inserted to lock the lock. The insertion of one of these keys and the rotation thereof, causes the various auxiliary tumblers 36 first to be moved upwardly until a given set of the slots 42 are moved opposite to the rear racking stump 28, then a further rotation of the key causes the talon 12 to move the plate 13 and its attached bolt-head 14 forwardly so as to lock the lock. As the lock is thus being locked, the projection 18 upon the rear of the plate 13 engages with the projection 19 upon the auxiliary bolt member 20 to draw the rear racking stump 28 forwardly into the slots 42, which have been moved opposite to the same. As the lock becomes completely locked, the front racking stump 27 is withdrawn from the slots 29 and 40 in the master tumbler 29, and the auxiliary tumblers 36 respectively and the master tumbler and auxiliary tumblers are pressed downwardly by means of the springs 37 and 46 until the projections 30 and 41 engage with the top of the front racking stump 27, as shown in Fig. 3. In this position of the parts, the front racking stump 27 is dogged, so as to prevent the withdrawal of the bolt-head 14 until the various tumblers are again moved. The master tumbler 29 dogs the front racking stump 27 by the engagement of the end of the recess 38 with the pin 39. The parts having now been moved into the locked position, the lock cannot again be unlocked by the same key which has been used to lock it, until the guard key has been first inserted to bring the slot 29 at the front of the master tumbler 29 into engagement with the front racking stump 27, in a manner similar to the engagement of the slot 31 at the rear of the master tumbler with the rear racking stump, which has already been described. When the master tumbler 29 has thus been set up, the locking and unlocking key can now be utilized to unlock the lock by bringing the slots 40 opposite the front racking stump 27 and moving the plate 13 rearwardly, so as to cause the front racking stump 27 to enter said slots. The lock can in this manner be completely unlocked, but when so unlocked, the key cannot be withdrawn in the normal operation of the lock until the lock has been again locked. This follows from the fact that in the unlocked position of the lock, as shown in Fig. 2, the talon 12 engages with a portion of the auxiliary bolt member 20. If it is desired, however, to draw the key from the lock in the unlocked position thereof, this may be accomplished by moving the pin 25 rearwardly. When the pin 25 is moved rearwardly, the auxiliary bolt member 20 is moved out of engagement with the talon 12, so as to permit a further rotation of said talon, which, in turn, permits the with-
drawer of the key. Simultaneously with the rearward movement of the auxiliary bolt member 20, the rear racking stump 28 is withdrawn from the slots 31 and 42, thereby permitting the tumblers 29 and 36 to move downwardly until the projections 32 and 43 come into engagement with the rear racking stump 28. Hence, when the tumblers are to be reset for a new pass key, the master key must be used before the tumblers can be thus reset and the bolt shot.

The lock is now in a position to be set up by the guard key, and to receive for further operation of the lock any one of the series of locking and unlocking keys adapted to be used therein.

It is to be understood that in the normal operation of the lock, the latter is set up by a master key and operated by means of one of the series of locking and unlocking keys. The latter being used to unlock the lock and being withdrawn from the lock only when the lock is locked. The lock is designed in this manner to be set up for use with a particular one of the series of locking and unlocking keys, and is designed to be retained in this condition until it is desired, for some reason, to operate the lock with an entirely different one of the series of locking and unlocking keys. It is understood, of course, that once the lock is set up for a particular one of the series of keys, no other one of said series of keys can be used for unlocking and locking the lock until the lock has been again set up for this purpose, by moving the pin 25 rearwardly, withdrawing the locking and unlocking key in the unlocked position of the lock, inserting the master key to set up the master tumbler, and inserting another one of the series of locking and unlocking keys.

While I have described my invention above in detail, I wish it to be understood that many changes may be made therein without departing from the spirit thereof.

I claim:

1. In a device of the character described, the combination of a locking member and means to permit the insertion of any one of a series of keys and the locking of the locking member thereby, said means comprising a member movable as a whole longitudinally of the lock and cooperating with the locking member, said movable member in one position preventing the locking and unlocking of the locking member with any other than a certain key.

2. In a device of the character described, the combination of a locking member, and means permitting the insertion of any one of a series of keys and the locking of the locking member thereby, said means comprising a member movable as a whole longitudinally of the lock and cooperating with the end of the locking member, said movable member in one position preventing the locking and unlocking of the locking member with any other than a certain key.

3. In a device of the character described, the combination of a locking member, a tumbler for controlling the movement of the locking member, a stump cooperating with the tumbler at each end thereof, and a slidable plate for preventing, when in one position, the insertion of a key for locking the locking member, and when in another position, permitting said insertion.

4. In a device of the character described, the combination of a locking member, a tumbler for controlling the movement of the locking member, said tumbler having an operative slot on each end, and a slidable plate for preventing, when in one position, the insertion of a key for locking the locking member, and when in another position, permitting said insertion.

5. In a device of the character described, the combination of a locking member, a plurality of tumblers for controlling the movement of the locking member, a stump cooperating with the tumblers at each end of each of the tumblers and a slidable plate for preventing, when in one position, the insertion of a key for locking the locking member, and when in another position, permitting said insertion.

6. In a device of the character described, the combination of a locking member, a plurality of tumblers for controlling the movement of the locking member, said tumblers having an operative slot on each end, and a slidable plate for preventing, when in one position, the insertion of a key for locking the locking member, and when in another position permitting said insertion.

7. In a device of the character described, the combination of a locking member, and a tumbler cooperating therewith for controlling the movement of the locking member, a stump cooperating with the tumbler at each end thereof, and a slidable plate for preventing when in one position the insertion of a key for locking the locking member, and when in another position permitting said insertion.

8. In a device of the character described, the combination of a locking member, a pin, a tumbler cooperating therewith for controlling the movement of the locking member, said tumbler having an operative slot on each end, and a slidable plate for preventing when in one position the insertion of a key for locking the locking member, and when in another position permitting said insertion.

9. In a device of the character described, the combination of a locking member, a plurality of tumblers cooperating therewith for controlling the movement of the locking member, a stump cooperating with the tum-
blers at each end of each of the tumblers, and a slidable plate for preventing, when in one position, the insertion of a key for locking the locking member, and when in another position permitting said insertion.

10. In a device of the character described, the combination of a locking member, and a single tumbler for preventing the unlocking of the lock without the insertion of a guard key and for preventing the locking of the lock when the locking and unlocking key has been withdrawn without the preliminary insertion of a guard key.

11. In a device of the character described, the combination of a locking member, a single member for preventing the unlocking of the lock without the insertion of a guard key and for preventing the locking of the lock when the locking and unlocking key has been withdrawn without the preliminary insertion of a guard key, and means for preventing the withdrawal of the key in the unlocked position of the lock.

12. In a device of the character described, the combination of a locking member, a single tumbler for preventing the unlocking of the lock without the insertion of a guard key and for preventing the locking of the lock when the locking and unlocking key has been withdrawn, without the preliminary insertion of a guard key, and means for preventing the withdrawal of the key in the unlocked position of the lock.

13. In a device of the character described, the combination of a locking member, a single member for preventing the unlocking of the lock without the insertion of a guard key and for preventing the locking of the lock when the locking and unlocking key has been withdrawn, without the preliminary insertion of a guard key, and means for preventing the withdrawal of the key in the unlocked position of the lock, said last mentioned means being constructed so as to allow movement to permit the withdrawal of said key.

14. In a device of the character described, the combination of a locking member, a single tumbler for preventing the unlocking of the lock without the insertion of a guard key and for preventing the locking of the lock when the locking and unlocking key has been withdrawn, without the preliminary insertion of a guard key, and means for preventing the withdrawal of the key in the unlocked position of the lock, said last mentioned means being constructed so as to allow movement to permit the withdrawal of said key.

15. In a device of the character described, the combination of a locking member, a single member for preventing the unlocking of the lock without the insertion of a guard key and for preventing the locking of the lock when the locking and unlocking key has been withdrawn, without the preliminary insertion of a guard key, and means for preventing the withdrawal of the key in the unlocked position of the lock, said last mentioned means being constructed so as to allow movement to permit the withdrawal of said key.

16. In a device of the character described, the combination of a locking member, a single tumbler for preventing the unlocking of the lock without the insertion of a guard key and for preventing the locking of the lock when the locking and unlocking key has been withdrawn, without the preliminary insertion of a guard key, and means for preventing the withdrawal of the key in the unlocked position of the lock, said last mentioned means being constructed so as to allow movement to permit the withdrawal of said key, but the lock being so constructed as to require thereafter the insertion of a guard key before locking the lock.

17. In a device of the character described, the combination of a locking member, and means for controlling the operation of the same, said means comprising a master tumbler having a movable axis.

18. In a device of the character described, the combination of a locking member, and means for controlling the operation of the same, said means comprising a master tumbler having pivotal movement around either of its two ends.

19. In a device of the character described, the combination of a locking member, and means for controlling the operation of the same, said means comprising a master tumbler, a racking stump adapted to cooperate with the master tumbler at each end thereof.

20. In a device of the character described, the combination of a locking member, and means for controlling the operation of the same, said means comprising a master tumbler, a racking stump adapted to cooperate with both ends of the master tumbler, said master tumbler having pivotal movement only upon said racking stumps.

21. In a device of the character described, the combination of the locking member, and means for controlling the operation of the same, said means comprising a tumbler, a racking stump adapted to cooperate with said tumbler, said racking stump being attached to the locking member, and a slotted guide through which the free end of the racking stump projects.

22. In a safety lock, the combination of a reciprocating locking bolt provided with a lateral fin; a series of laterally adjacent key tumblers each provided at its rear edge with a corresponding series of recesses, and a
single recess at its front end for engagement over and upon said lateral fin of the bolt in a sliding connection permitting reciprocation of the bolt, and a relatively fixed catch engaging said tumblers in common by means of the recesses at their rear in independent relations of adjustability thereto.

23. In a device of the character described the combination of a locking member, and means comprising a slidable member cooperating with the locking member and constructed to prevent in one position the withdrawal of the bolt operating key when the bolt is in withdrawn position and in another position permitting said withdrawal and the insertion of any one of a series of different keys for operating the locking member.

In testimony that I claim the foregoing I have hereunto set my hand.

ELMER E. WATSON.

Witnesses:
A. NEWCOMB,
M. MEIKLE.

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