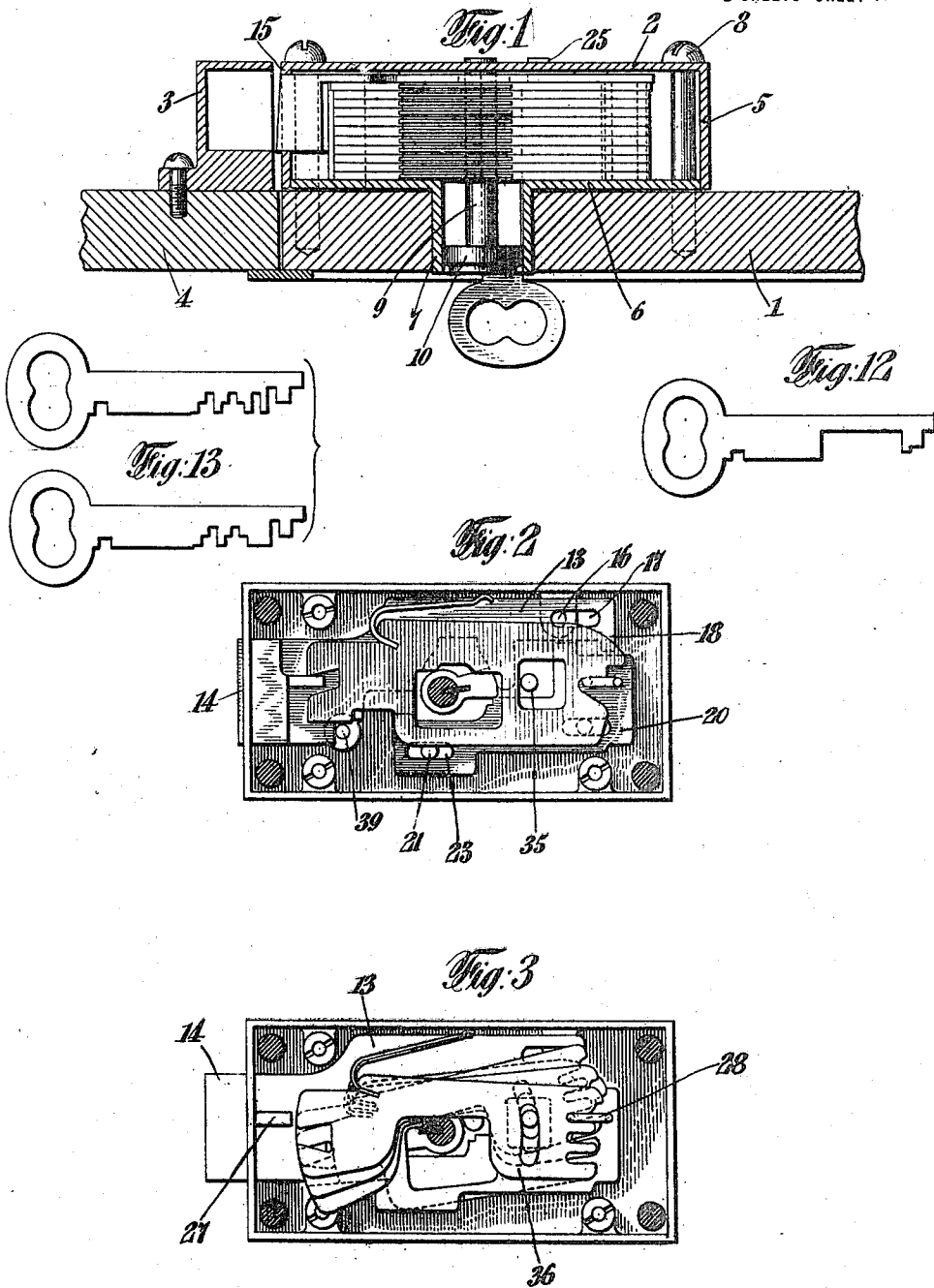


E. E. WATSON.
INTERCHANGEABLE KEY LOCK.
APPLICATION FILED MAR. 20, 1915.

1,268,900.

Patented June 11, 1918.
2 SHEETS—SHEET 1.



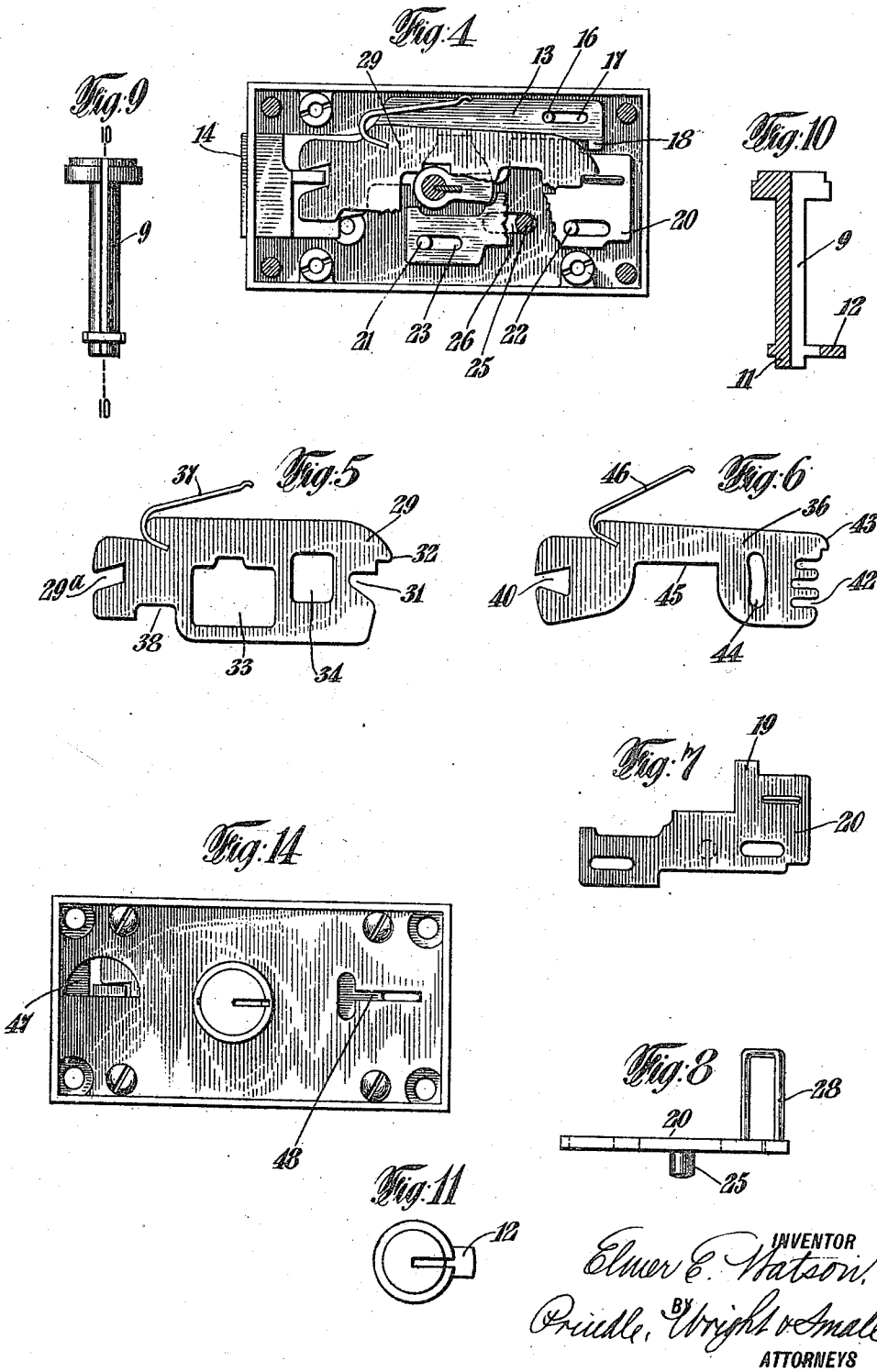
INVENTOR
Elmer E. Watson
BY *Prindle, Wright & Small*
ATTORNEYS

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INVENTOR
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UNITED STATES PATENT OFFICE.

ELMER E. WATSON, OF HAMILTON, OHIO.

INTERCHANGEABLE-KEY LOCK.

1,268,900.

Specification of Letters Patent. Patented June 11, 1918.

Application filed March 20, 1915. Serial No. 15,802.

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.

A further object of my invention is to provide a lock of this character which offers great difficulty to anyone seeking to open the same without being provided with the proper key, and which offers great difficulty to anyone seeking to discover the nature of the key required to open the lock.

In general, the key lock which constitutes an embodiment of my invention is constructed in such a manner that any 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 Furthermore, when the locking and unlocking key has been withdrawn and the lock is in its unlocked position, it is first necessary to set up a master tumbler by means of the guard key before the lock can be again locked by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 applications for an interchangeable key lock, Ser. No. 519,364 filed September 24, 1909, and Ser. No. 526,704, filed November 8, 1909. Specifically stated, the improvement comprised in the present application is the arrangement of the parts in such a manner that the tumblers when in engage-

ment with the stump at one end are not in engagement with the stump on the other end but rest on the key cylinder. The broad nature of the improvement, is set forth in the specification as a whole, however, and the claims appended hereto.

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 side elevation of the same;

Fig. 9 is a plan view of the key cylinder;

Fig. 10 is a longitudinal cross-section of the same;

Fig. 11 is an end view of the same;

Fig. 12 is a plan view of the guard key; and

Fig. 13 comprises plan views of two of the locking and unlocking keys; and

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 co-operates 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^a 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 9, 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 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 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 locking and unlocking keys, as these keys do not cooperate with the master tumbler 29 to move the latter from in front of the rear racking stump 28. It is, therefore, necessary in this position of the parts to first insert the guard key, in order to move the master tumbler 29 upwardly and longitudinally and cause the slot 31 therein to engage with the rear racking stump 28, as shown in Fig. 2. When the master tumbler has been moved into this position, 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^a 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. The top of the opening 33 and the tops of the recesses 45 engage with the top of the key cylinder 9 so that the slots 29^a and 40 are located at varying elevations in regard to the front racking stump 27. The varying elevations at which the tumblers 29 and 36 are supported with regard to the front racking stump 27, and the fact that all of these tumblers are supported directly in contact with the barrel 9, prevent anyone from determining the distance which the several tumblers must be elevated to bring the slots 29^a and 40 opposite the racking stump 27, by rotating a blank key or tool in the barrel 9. 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^a 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 withdrawal 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 guard 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 that 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 unlocking 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 combination, a locking member, a tumbler having a key engaging surface and controlling the movement of the locking member, and a racking stump at each end thereof adapted to engage and support the tumbler whereby when the locking member is in locked position one end of the tumbler is no longer engaged by its corresponding stump, and a fixed member for supporting said tumbler when the latter is out of engagement with said last mentioned stump.

2. In combination, a locking member, a tumbler having a key engaging surface and controlling the movement of the locking member, and racking stumps coöperating with the ends of the tumbler, one of said stumps being adapted to support one end of the tumbler at varying elevations and the other being thrown out of engagement with the tumbler when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is at the same elevation while one end of the tumbler may be at varying elevations.

3. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and controlling the movement of the locking member, and racking stumps coöperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported by the key receiving member, while one end of the tumbler may be at varying elevations.

4. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and controlling the movement of the locking member, and racking stumps coöperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported equidistant from the key receiving

member, while one end of the tumbler may be at varying elevations.

5 In combination, a locking member, a tumbler having a key engaging surface and provided with a stump engaging slot at each end controlling the movement of the locking member, and racking stumps adapted to engage and support the ends of the tumbler so that when the locking member is in
10 locked position one end of the tumbler is no longer supported by its stump and a fixed member for supporting said tumbler when the latter is out of engagement with said last mentioned stump.

15 6. In combination, a locking member, a tumbler having a key engaging surface and provided with a stump engaging slot at each end and controlling the movement of the locking member, and racking stumps cooperating with the ends of the tumbler adapted to support one end of the tumbler at varying elevations and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in
20 locked position, the parts being so constructed that when so out of engagement the key engaging surface is at the same elevation while one end of the tumbler may be at varying elevations.

25 7. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and provided with a stump engaging slot at each end controlling the movement of the locking member, and racking stumps cooperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking
30 member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported by the key receiving member, while one end of the tumbler may be at varying elevations.

35 8. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and provided with a stump engaging slot at each end controlling the movement of the locking member, and racking stumps cooperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the
40 tumbler at the other end thereof when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported the same distance from the key receiving member, while one end of the tumbler may be at varying elevations.

45 9. In combination, a locking member, a tumbler having a key engaging surface and controlling the movement of the locking

member, a racking stump at each end thereof adapted to engage and support the tumbler whereby when the locking member is in
65 locked position one end of the tumbler is no longer engaged by its corresponding stump, and a fixed member for supporting said tumbler when the latter is out of engagement with said last mentioned stump, and a movable abutment for preventing, when in one position, insertion of a key and locking of
70 the locking member, and when in another position permitting said insertion and locking.

10. In combination, a locking member, a tumbler having a key engaging surface and controlling the movement of the locking
75 member, racking stumps cooperating with the ends of the tumbler, one of said stumps being adapted to support one end of the tumbler at varying elevations and the other being thrown out of engagement with the stump when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is at the same elevation while one end of the tumbler may be at varying elevations, and a movable abutment for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

80 11. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and controlling the movement of the locking member, racking stumps cooperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking
85 member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported by the key receiving member, while one end of the tumbler may be at varying elevations, and a movable abutment for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

90 12. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and controlling the movement of the locking member, racking stumps cooperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking
95 member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported equidistant from the key receiving member, while one end of the tumbler may

be at varying elevations, and a movable abutment for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

13. In combination, a locking member, a tumbler having a key engaging surface and provided with a stump engaging slot at each end controlling the movement of the locking member, racking stumps adapted to engage and support the ends of the tumbler so that when the locking member is in locked position one end of the tumbler is no longer supported by its stump, a fixed member for supporting said tumbler when the latter is out of engagement with said last mentioned stump, and a movable abutment for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

14. In combination, a locking member, a tumbler having a key engaging surface and provided with a stump engaging slot at each end and controlling the movement of the locking member, racking stumps cooperating with the ends of the tumbler adapted to support one end of the tumbler at varying elevations and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in locked position, the parts being so constructed that when so out of engagement the key engaging surface is at the same elevation while one end of the tumbler may be at varying elevations, and a movable abutment for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

15. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and provided with a stump engaging slot at each end controlling the movement of the locking member, racking stumps cooperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported by the key receiving member, while one end of the tumbler may be at varying elevations, and a movable abutment for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

16. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and provided with a stump engaging slot at each end controlling

the movement of the locking member, racking stumps cooperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported equidistant from the key receiving member, while one end of the tumbler may be at varying elevations, and a movable abutment for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

17. In combination, a locking member, a tumbler having a key engaging surface and controlling the movement of the locking member, a racking stump at each end thereof adapted to engage and support the tumbler whereby when the locking member is in locked position one end of the tumbler is no longer engaged by its corresponding stump and a fixed member for supporting said tumbler when the latter is out of engagement with said last mentioned stump, and a slidable plate for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

18. In combination, a locking member, a tumbler having a key engaging surface and controlling the movement of the locking member, racking stumps cooperating with the ends of the tumbler one of said stumps being adapted to support one end of the tumbler at varying elevations and the other being thrown out of engagement with the stump when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is at the same elevation while one end of the tumbler may be at varying elevations, and a slidable plate for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

19. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and controlling the movement of the locking member, racking stumps cooperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported by the key receiving member, while one end of the tumbler may be at varying

elevations, and a slidable plate for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said
5 insertion and locking.

20. In combination, a locking member, a key receiving member, a tumbler having a key engaging surface and controlling the movement of the locking member, racking
10 stumps coöperating with the ends of the tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tum-
15 bler at the other end thereof when the locking member is in locked position, whereby when the last mentioned parts are so out of engagement the key engaging surface is supported equidistant from the key receiving
20 member, while one end of the tumbler may be at varying elevations, and a slidable plate for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position per-
25 mitting said insertion and locking.

21. In combination, a locking member, a tumbler having a key engaging surface and provided with a stump engaging slot at each
30 end controlling the movement of the locking member, racking stumps adapted to engage and support the ends of the tumbler so that when the locking member is in locked position one end of the tumbler is no longer supported by its stump, a fixed member for
35 supporting said tumbler when the latter is out of engagement with said last mentioned stump and a slidable plate for preventing, when in one position, insertion of a key and locking of the locking member, and when in
40 another position permitting said insertion and locking.

22. In combination, a locking member, a tumbler having a key engaging surface and provided with a stump engaging slot at each
45 end and controlling the movement of the locking member, racking stumps coöperating with the ends of the tumbler adapted to support one end of the tumbler at varying elevations and to be thrown out of engagement with the tumbler at the other end thereof
50 when the locking member is in locked position, the parts being so constructed that when so out of engagement the key engaging surface is at the same elevation while one

end of the tumbler may be at varying elevations, and a slidable plate for preventing,
55 when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

23. In combination, a locking member, a key receiving member, a tumbler having a
60 key engaging surface and provided with a stump engaging slot at each end controlling the movement of the locking member, racking stumps coöperating with the ends of the
65 tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in locked position, whereby when
70 the last mentioned parts are so out of engagement the key engaging surface is supported by the key receiving member, while one end of the tumbler may be at varying elevations, and a slidable plate for preventing,
75 when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

24. In combination, a locking member, a key receiving member, a tumbler having a
80 key engaging surface and provided with a stump engaging slot at each end controlling the movement of the locking member, racking stumps coöperating with the ends of the
85 tumbler, adapted to support one end of the tumbler at varying elevations, and to be thrown out of engagement with the tumbler at the other end thereof when the locking member is in locked position, whereby when
90 the last mentioned parts are so out of engagement the key engaging surface is supported equidistant from the key receiving member, while one end of the tumbler may be at varying elevations, and a slidable plate
95 for preventing, when in one position, insertion of a key and locking of the locking member, and when in another position permitting said insertion and locking.

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

ELMER E. WATSON.

Witnesses:

H. L. KRAUTH,
ELBERTA U. KRAUTH.