

(No Model.)

2 Sheets—Sheet 1.

J. E. R. RIDDICK.
COMBINATION LOCK.

No. 476,821.

Patented June 14, 1892.

Fig. 1.

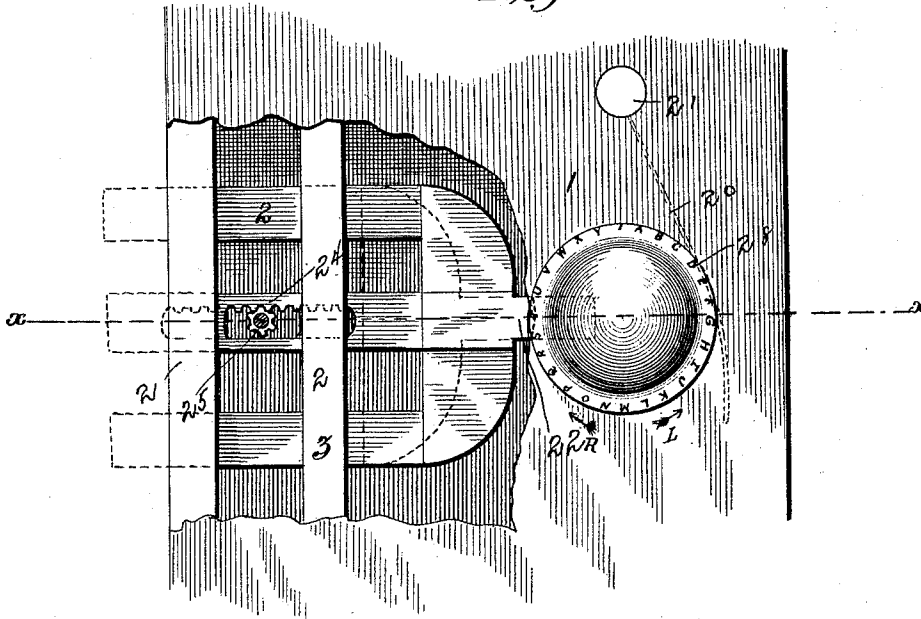
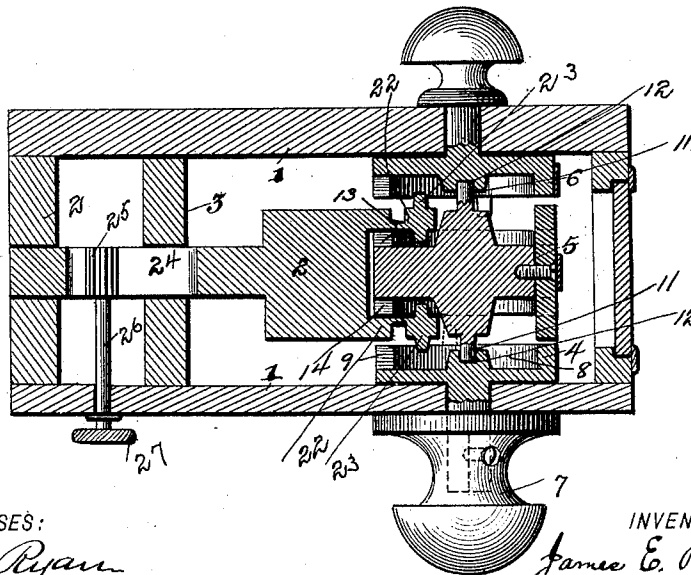


Fig. 2.



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Fig. 3.

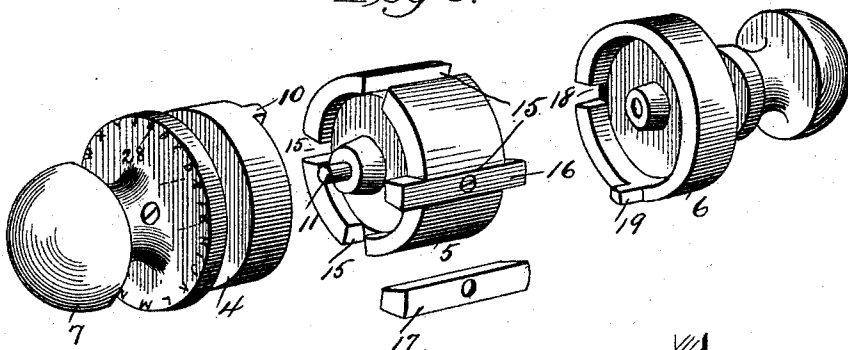


Fig. 4.

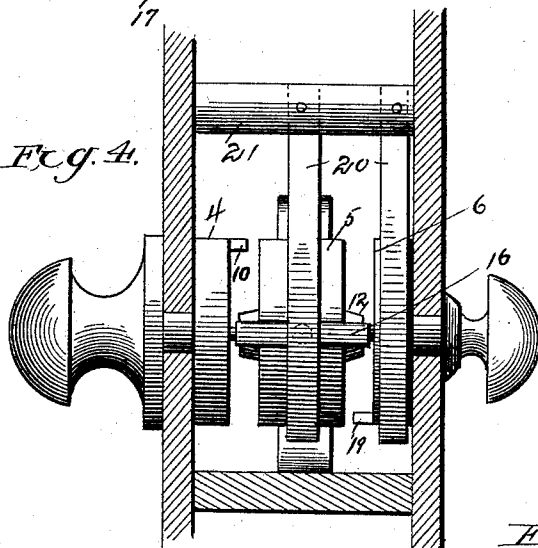


Fig. 5.

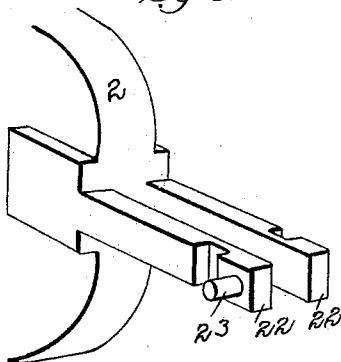


Fig. 7.

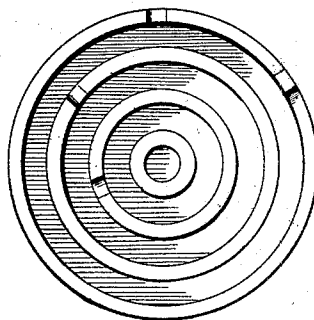
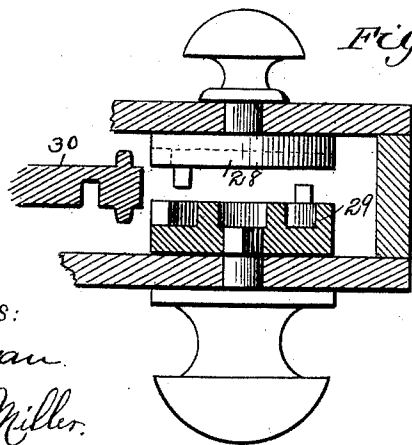


Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES E. R. RIDDICK, OF WAKEFIELD, VIRGINIA.

COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 476,821, dated June 14, 1892.

Application filed April 2, 1891. Serial No. 387,377. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. R. RIDDICK, a citizen of the United States, and a resident of Wakefield, in the county of Sussex and State of Virginia, have invented a certain new and useful Improvement in Locks, of which the following is a specification.

My invention has relation to permutation-locks; and my object is to provide a simple, durable, and cheap lock of this character which will be susceptible of almost innumerable combinations.

In the accompanying drawings, forming part of this specification, Figure 1 is a front elevation of my lock, part of the casing being removed; Fig. 2, a view on line *xx* of Fig. 1; Fig. 3, a perspective view of the tumblers in their normal position. Fig. 4 is a detail perspective view of the bolt portion of the lock with bifurcation, pegs, and slots, as hereinafter described; Fig. 5, a side elevation of the tumblers in position, and Fig. 6 a sectional view of a modification of my lock.

In the drawings hereinabove referred to the numeral 1 indicates the casing of the lock, and 2 a slidable bolt having suitable guides 3. The bolt 2 may, as is obvious, be either a single, a double, or a triplicate bolt, the outer ends of which bolt or bolts project into the frame-work adjoining the door containing the lock or (in the modification of the lock adapted for use on chests or trunks) through a hook or other device answering the same purpose fastened to the lid of the trunk.

In the preferable form of my lock, as indicated in Figs. 1 to 5, I employ three disk tumblers 4 5 6. All the disks are placed in end alignment or facing each other. Disk 4, being the outer one, is provided with a projecting knob extending through the casing, which projection may be either a flat milled head or knob 7. The inner face of this tumbler is hollowed out, and the flange 8 thus made has a recess 9 in it. From the inner face of this flange 8 projects a pin 10. The central tumbler 5 resembles somewhat an ordinary flanged wooden wheel, as it has trunnions 11 projecting from each side of it, said trunnions having bearings 12 12 in the adjacent disks. Each flanged face of this central tumbler has a recess 13 13 and 14 in alignment with each other. Removably secured in a re-

cess 15, cut in the periphery of the central tumbler 5 and projecting at both edges, is a stud 16. I illustrate two other recesses 15 15 in the periphery of this tumbler, said last-mentioned recesses being adapted to be filled with suitable plugs when the lock is in use, and, as is obvious, I may have from five to ten or twenty such recesses, in either of which the stud 16 may be placed in order to vary the permutations, one of the plugs 17 filling the place vacated by the stud 16. The inner tumbler 6 has flanges extending toward the central tumbler, and, like tumbler 4, is provided with a recess 18 in its flange and with a pin 19 on said flange, pointing toward the central tumbler, said last-mentioned recess and pin being in all respects like the similar parts on tumbler 4 except that they are transposed in position. The tumblers when in operative position are slightly separated, and when the recesses mentioned in the various tumblers are brought in alignment the bifurcated portions of the bolt and the pins thereon may pass in between said tumblers, which is the retracted position of the bolt.

20 indicates suitable flat metal springs secured on post 21 and bearing on the tumblers for the purpose of steadying them. Obviously this spring may be dispensed with.

The bolt 2 has bifurcated inner ends 22 22, each provided with a pin 23 23, projecting above and below the bifurcated portions. About the center of the bolt on its outer side is a toothed rack 24, which may be integral with the bolt or secured thereto in any suitable manner. A pinion 25 meshes with this rack 24 in order to throw the bolt in or out. A spindle or shaft 26 extends outwardly from the pinion through the casing, and at its outer end is provided with a milled head or knob 27 to operate the bolt 2 by turning the said knob 27 in one direction or the other.

On the casing at the base of knob 7 is an indicating-mark 28—such, for instance, as an arrow—and upon the base of the knob is a series of letters "A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z."

The bolt 2 having been moved to lock the door in order to unlock it, the following is the operation, it being presumed that the tumblers have been turned so as to prevent the bolt being retracted by one to whom the com-

bination is not known. It is to be understood
 that this is what is known as a "three-letter"
 permutation lock, although it can be mathe-
 matically demonstrated that at least a million
 5 different combinations may be formed by my
 simple lock. On the base of the knob 7 are two
 arrows, letter "R" indicating right and "L"
 indicating left. Assuming the desired com-
 bination to be "A E I," the operation in open-
 10 ing the lock would be as follows: The letter
 "A" on the base of the knob is placed in align-
 ment with the indicating-mark 28 on the cas-
 ing. The knob 27 is then given three turns
 to the right. By so doing the pin 10 on tum-
 15 bler 4 contacts with stud 16 on the central
 tumbler, causing the rotation of the latter,
 and the inner end of stud 16 contacts with
 pin 19 on the inner tumbler 6, which latter
 tumbler is thus caused to rotate. At the
 20 end of the third rotation to the right the re-
 cess 18 has been brought in alignment with
 the pin 23 on the bifurcated portion 22 of the
 bolt 2. The knob 7 is then turned to the left
 a distance equal to the space from the letter
 25 "A" to "E," by which operation the pin 10 in
 the tumbler 4 engages the stud 16 on tumbler 5,
 and moving said tumbler so as to bring both
 its recesses 15 15 in alignment with the bifur-
 cated portion of the bolt and with the re-
 30 cess 18 in the tumbler 6. The knob 7 is then
 turned to the right a distance equal to the
 space between the letters "E" and "I" on the
 dial, which causes the tumbler 4 to move so
 as to bring its recess 9 in alignment with the
 35 other recesses in the tumblers, all of said re-
 cesses now being in alignment with the pins
 23 on the bifurcated portion 22 of the bolt 2.
 By now turning the knob 27 the pin connected
 therewith will retract the bolt from its locked
 40 position, whose inner bifurcated ends 22, with
 pins 23, enter the recesses in the tumbler, as
 already described.

In order to retain the bolt in the unlocked
 position, it is only necessary to give the tum-
 45 blers a slight movement through the medium
 of the knob 7, so as to turn the recesses away
 from the pins 23 on the bifurcated portions of
 the bolt.

In order to lock the bolt in position, the
 50 pins 23 and bifurcated portion 22 of the bolt
 are, through the medium of the knob 27, with-
 drawn from the hereinbefore-described re-
 cesses in the tumblers 4, 5, and 6, and the
 knob 7 turned any number of times, which
 55 revolution will bring the recesses in the tum-
 blers out of alignment, and, as is obvious, the
 bolt cannot then be retracted.

The positions of the pins, studs, and recesses
 in all the tumblers may be varied in the same
 60 manner as I have described, so as to vary the
 position of the stud in the central tumbler by
 having a series of recesses around the pe-
 ripheries of said tumblers and a series of
 plugs for filling the recesses not in use. By
 65 changing the positions of said pins and re-
 cesses, which may readily be accomplished by
 the owner of the safe, desk, or room upon

which my lock is placed, the number of per-
 mutations which may be made is almost un-
 limited.

In the modification illustrated in Fig. 6
 only two tumblers are employed, the central
 tumbler being omitted. This is what is known
 as a "two-letter combination." The princi-
 ple of its construction is the same as that of
 the first invention described, the two tumblers
 28 29 being in all respects similar to the outer
 and inner tumblers of the lock first described.
 These tumblers are also provided with adjust-
 able pins and with recesses having removable
 80 plugs, so that the combinations may be varied
 as heretofore described. The bolt 30 is a sin-
 gle bar working in guides and the inner end
 of which enters the recesses in the two tum-
 blers. It is closed and retracted in the same
 85 manner as bolt 2. As is apparent, both locks
 shown may be employed on one door where
 greater security is essential, and the locks,
 or rather the bolts of each lock, might be con-
 nected by a suitable bar in such a manner
 90 that both might be operated simultaneously.

I desire to have it understood that I do not
 limit myself to the details of construction
 herein shown and described, since the con-
 struction may be varied slightly with equally
 95 good results.

Having described my invention, what I
 claim herein as new, and desire to secure by
 Letters Patent, is—

1. The combination, with two oppositely-
 placed exterior tumblers having interior
 notched flanges thereon, of a central tumbler
 interposed between the said exterior tumblers
 and having notched annular flanges upon
 each side, each of the said tumblers having
 105 engaging projections thereon, a locking-bolt
 having a bifurcated rear end provided with
 shoulders adapted to bear upon the said
 flanges upon the tumblers or to pass through
 the notches thereof, and a graduated handle
 110 secured to one of the said exterior tumblers,
 substantially as described.

2. In a lock, the combination, with two op-
 positely-placed exterior tumblers having
 notches and projections thereon, of a tumbler
 115 centrally placed between the said exterior
 tumblers and having notches and recesses in
 its periphery, of a stud adapted to be remov-
 ably secured in any of the said recesses and
 to engage the projections upon the exterior
 120 tumblers, a locking-bolt adapted to have its
 rear end bear against the periphery of the
 said tumblers or to pass into the notches
 therein, and a graduated handle secured to
 one of the said exterior tumblers, substan-
 125 tially as described.

3. The combination, with two oppositely-
 placed exterior tumblers having projections
 and interior annular notched flanges thereon,
 of a tumbler centrally placed between the
 130 said exterior tumblers and having annular
 notched flanges upon its opposite sides and
 recesses in its periphery, a stud adapted to
 be removably contained in any of the said

recesses and to engage the projections upon the exterior tumblers, a locking-bolt having a bifurcated rear shouldered end adapted to bear upon the flanges of the said tumblers or to pass through the recesses therein, and a graduated handle secured to one of the exterior tumblers, substantially as described.

4. The combination, with two oppositely-placed exterior tumblers having projections and interior annular notched flanges, of a tumbler centrally placed between the said exterior tumblers and having annular flanges upon its opposite sides and having recesses in its periphery, each of the flanges upon the said central tumbler having a plurality of notches therein, a stud adapted to be removably secured in any of the said peripheri-

cal recesses and to make contact with the projections upon the exterior tumblers, plugs adapted to be inserted in the unused notches in the flanges of the central tumblers, a locking-bolt having a bifurcated rear shouldered end adapted to bear upon the flanges of the said tumblers or to pass through the recesses therein, and a graduated handle secured to one of the exterior tumblers, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

JAMES E. R. RIDDICK.

Witnesses:

JOSEPH H. RIDDICK,
EXUM ELLIOTT.