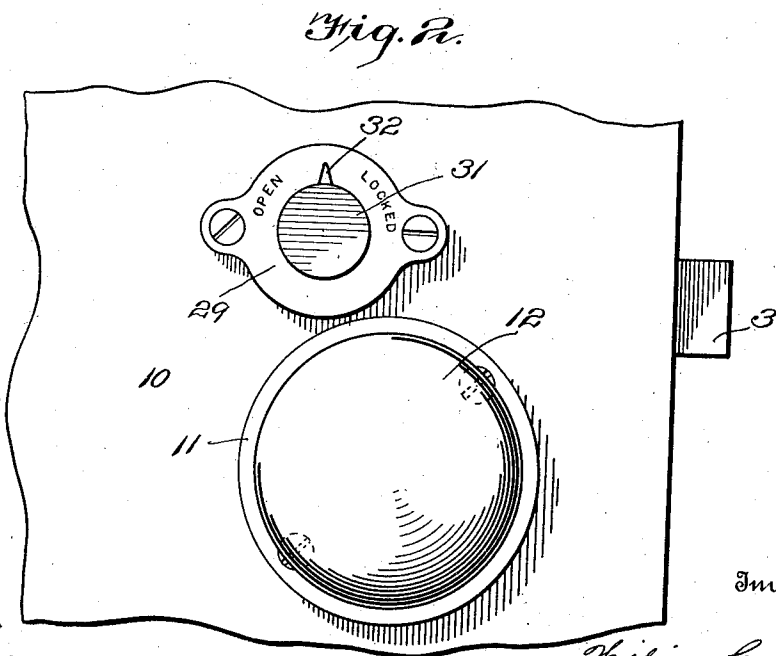
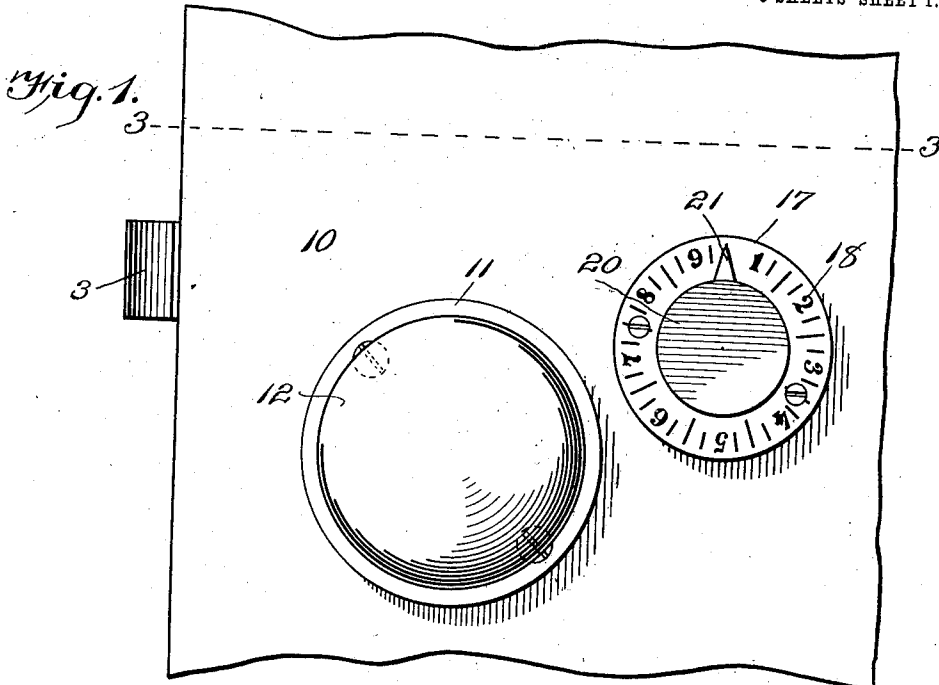


W. C. LOY.
 PERMUTATION DOOR LOCK.
 APPLICATION FILED JULY 27, 1910.

1,056,036.

Patented Mar. 18, 1913.

3 SHEETS—SHEET 1.



Witnesses

T. P. Britt
E. C. Duffy

Inventor

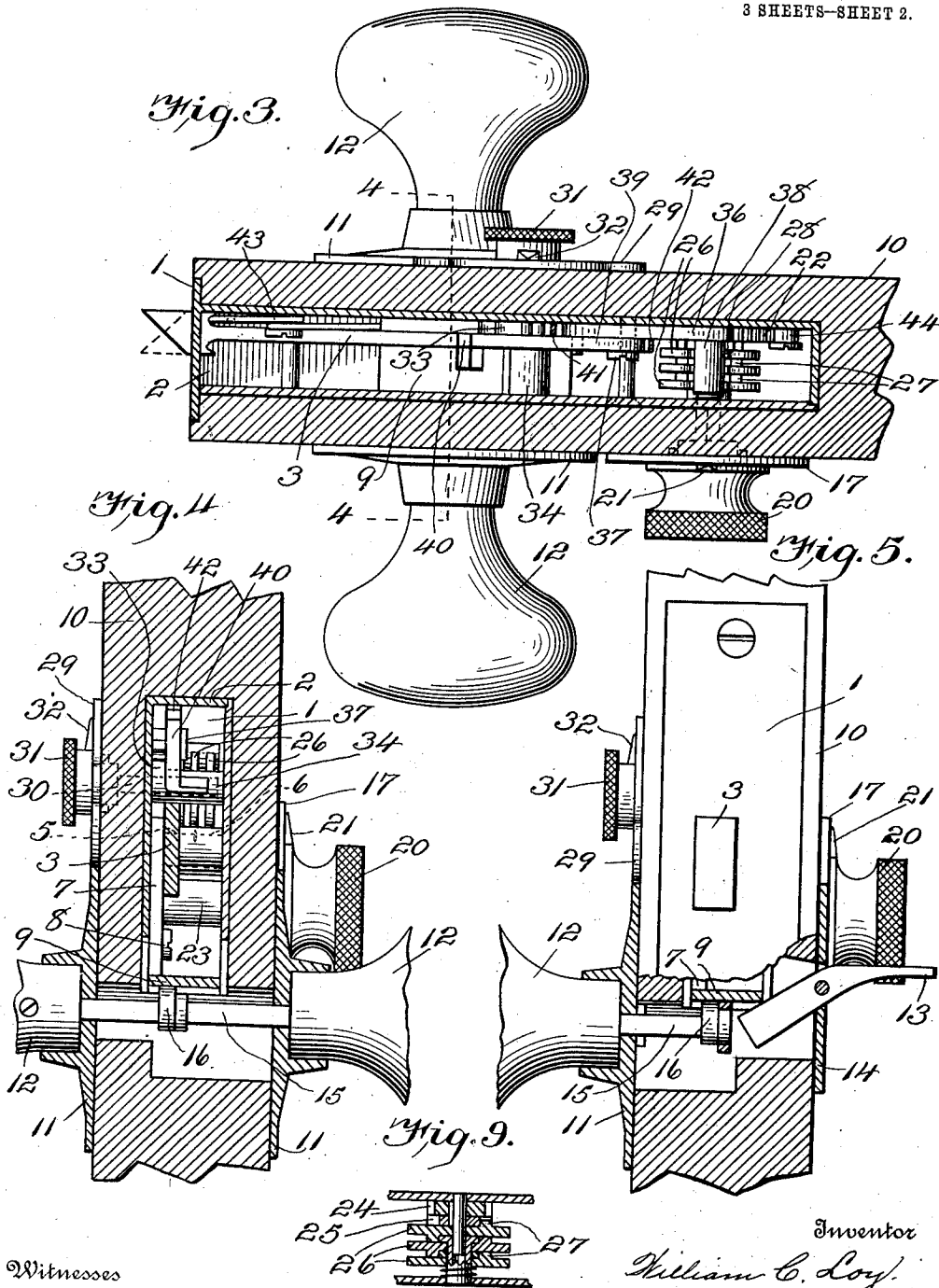
William C. Loy
E. C. Duffy
 Attorney

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Inventor

William C. Loy

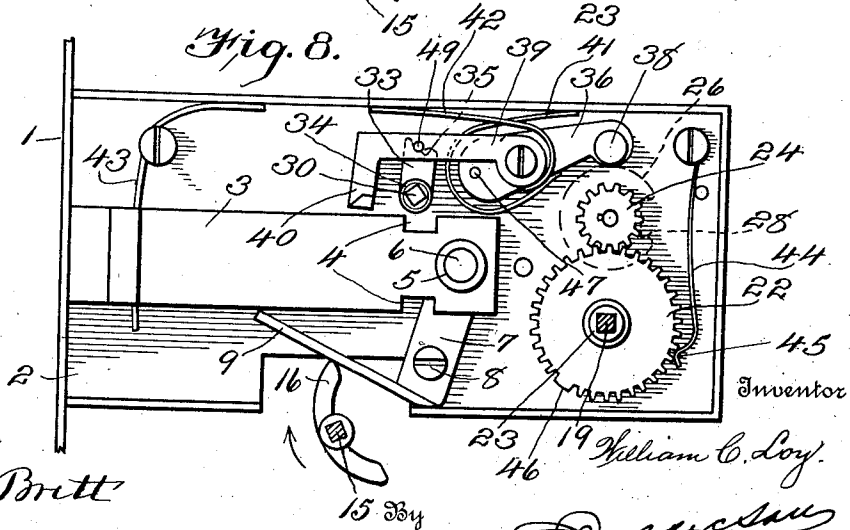
By

O. C. Duffys

Attorneys

1,056,036.

3 SHEETS—SHEET 3.



C. C. Duffer

William C. Loy.

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM C. LOY, OF ROCHESTER, INDIANA, ASSIGNOR TO OSTINELL A. DAVIS, HENRY F. CRIM, AND CHRISTIAN HOOVER, ALL OF ROCHESTER, INDIANA.

PERMUTATION DOOR-LOCK.

1,056,036.

Specification of Letters Patent.

Patented Mar. 18, 1913.

Application filed July 27, 1910. Serial No. 574,196.

To all whom it may concern:

Be it known that I, WILLIAM C. LOY, a citizen of the United States, residing at Rochester, in the county of Fulton and State of Indiana, have invented certain new and useful Improvements in Permutation Door-Locks; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to permutation door locks and has for its object to provide a combined latch and lock which can be employed either in the capacity of a latch or which can be used as a lock.

A further object of this invention is to provide a simple and rigid construction, easy and cheap to manufacture, strong, durable and efficient.

A further object of this invention is to provide a permutation lock in which the locking bolt can be changed to fit either a right or left hand door and in which an exceptionally wide range of combination is possible.

A further object of this invention is to provide a permutation latch and lock in which the lock can be operated from the inside of the door without having recourse to the combination, thus making it possible to open the door instantly from the inside.

With these objects in view the invention consists in the novel construction of the permutation latch and lock and in certain combinations of parts, all of which will be first fully described and afterward specifically pointed out in the appended claims.

Referring to the accompanying drawings: Figure 1 is a fragmentary view of a door with lock attached showing the appearance of the same from the outside. Fig. 2 is a similar view showing the appearance of the lock from the inside. Fig. 3 is a horizontal sectional view taken on line 3—3 of Fig. 1. Fig. 4 is a vertical sectional view taken on line 4—4 of Fig. 3. Fig. 5 is a view partly in section showing the lock provided with a knob and thumb piece. Fig. 6 is an elevation showing the interior of the lock and

illustrating the bolt unlocked. Fig. 7 is a similar view showing the bolt locked, and Fig. 8 is a similar view showing the mechanism in an unlocked position so that the bolt may be operated by the knobs or thumb piece without having recourse to the combination, and Fig. 9 is a sectional view through the tumblers.

Like numerals of reference indicate the same parts throughout the several figures in which;

1 indicates the lock which comprises a suitable casing 2.

3 indicates the locking bolt which as shown in the drawings is provided with two notches 4 on the upper and lower edges of the bolt and within the casing 2. The inner end of the bolt 3 is provided with a perforation 5 through which a transverse pin 6 extends, said transverse pin 6 being carried on an arm 7 which arm is pivoted near the bottom of the casing at 8, and connected to said arm 7 or formed integral therewith is a normally horizontal arm 9.

Arranged on each side of the door to which the lock is applied are suitable escutcheon plates 11 for the bolt operating knobs 12, and when employing the construction shown in Fig. 5, that is to say a knob 12 on one side of the door and a thumb piece 13 on the other, the thumb piece 13 is of course provided with a suitable escutcheon plate 14. As will appear from the drawings the spindle 15 of the knobs 12 passes under the lock casing in such manner that the lock may be removed from the door without disturbing the knobs 12, and the advantage of this construction is that it permits a quick and ready removal of the lock so as to change or vary the combination.

As will appear from Figs. 6, 7 and 8 the spindle 15 of the knobs 12 is provided with an arm 16 arranged under the lever arm 9 in such manner that by turning the knobs in either direction the arm 16 will engage the lever arm 9 and raise the same in position shown in Fig. 8, and when the bolt 3 is in an unlocked position this operation will throw the bolt 3 within the casing and into position shown in Fig. 8 allowing the door to be opened.

Arranged on the outside of the door is a dial 17 having thereon suitable markings 18, and passing through the door and entering the lock casing is a spindle 19 to which is

connected the dial knob 20, said dial knob having thereon a pointer 21 as shown in Fig. 1.

22 indicates a toothed wheel having preferably a hollow shaft 23 into which the shaft 19 of the dial knob 20 enters, said shaft 19 being preferably square in cross section in such manner as to communicate the rotation of the knob 20 to the toothed wheel 22. Associated with said toothed wheel 22 and preferably above the same is a small pinion wheel 24 (Fig. 8) and connected to said pinion wheel is a toothed wheel 25 shown in dotted lines in Fig. 7. Arranged under said toothed wheel 25 is a series of tumblers 26, each of which tumblers is provided with a small projection 27 on each of its faces for engagement with the next adjacent tumbler, except the lowermost tumbler as shown in Fig. 9 which has only a projection 7 on its uppermost face, in such manner that the rotation of one tumbler will be communicated to another. As will appear from Figs. 6, 7 and 8 the peripheries of the tumblers are provided with notches or recesses 28 for a purpose which will be hereinafter fully described.

Arranged on the inside of the door as shown in Fig. 2 is a small escutcheon plate 29 having the words "Open and Locked" appearing on the face thereof, and passing through said plate and through the inside of the door is a spindle 30 carrying a knob 31 on the outside of the escutcheon plate 29, and on said knob 31 is a pointer 32.

33 indicates an arm arranged within the casing, said arm having a hollow shaft 34 into which the spindle 30 of the knob 31 enters, said spindle 30 being preferably square in cross section for the purpose of communicating rotation of the knob 31 to the arm 33; and as will appear from Figs. 6, 7 and 8 the end of the arm 33 is recessed at 35 for a purpose which will be presently described.

Pivoted within the casing 3 is an arm 36 pivoted at 37 and carrying on its rear end a pin or projection 38, said pin or projection being normally in engagement with the peripheries of the tumblers 26 and of such a size as to enter the notches or recesses 28 in the peripheries of said tumblers as clearly shown in Fig. 6.

Pivoted at the point 37 is an arm 39, said arm having a downwardly extending projection 40 at its forward end, said projection 40 being designed to enter one of the notches 4 in the edge of the locking bolt 3 as is clearly shown in Fig. 7. Connected to the arm 36 is a leaf spring 41 which has a normal tendency to force the rear end of the arm 36 downwardly and to hold the pin or projection 38 thereon in close contact with the peripheries of the tumblers 26; and connected to the arm 39 is a leaf spring 42

whose office is to hold the arm 39 under pressure as shown in Figs. 6 and 8. Arranged within the casing and associated with the locking bolt 3 is a leaf spring 43 having a normal tendency to hold the locking bolt 3 in a position shown in Figs. 6 and 7 which is the position for locking the door; and as will appear from the drawings a leaf spring 44 is provided in the rear part of the casing the end 45 of which is in engagement with the toothed wheel 22 in such manner that the passage of the teeth of said wheel passing under the spring 44 gives out a series of clicks in such manner that the number of teeth passing under the spring 44 can be counted so that the extent of rotation of the said wheel can be determined by the ear or sense of touch; and as will appear from Fig. 8 a blank tooth 46 is provided in the toothed wheel 22 so as to limit the rotation of said wheel to slightly less than one full revolution, for as is obvious this blank tooth 46 will not mesh with the pinion wheel 24, and consequently the toothed wheel 22 will become locked or stopped as soon as the tooth 46 engages the pinion wheel 24. By means of this construction a starting place can always be determined when operating the combination, and on account of this the lock can be operated in the dark by counting the number of clicks even though the dial 17 cannot be seen.

Referring now to Fig. 5 it will appear that a single operating knob 12 can be employed on one side of the door, and the thumb piece 13 can be employed on the other side of the door, the thumb piece 13 being pivoted in such manner that upon depression of the same the inner arm of the thumb piece will engage the lever arm 9 within the lock casing and throw the locking bolt 3 into position shown in Fig. 8.

Having thus described the several parts of this invention its operation is as follows: The normal mechanism of the lock being as illustrated in Fig. 7 the lever 36 is raised by reason of its pin or projection 38 being in engagement with the peripheries of the tumblers 26. This raised position of the arm 36 allows the arm 39 to be lowered into position shown in Fig. 7 causing the extension 40 thereon to enter the notch 4 in the locking bolt 3. As the normal tendency, however, of the arm 36 is in a downward direction as soon as all of the notches 28 in the peripheries of the tumblers 26 register with one another directly under the pin or projection 38 on the arm 36 said pin or projection 38 drops into the registered notches 28 allowing the arm 36 to assume the position shown in Fig. 6, and by reason of the engagement of the pin 47 on the short arm 48 of the lever 36 with the arm 39 the latter is raised into the position shown in Fig. 130

6 thus carrying its extension 40 out of the notch 4 in the locking bolt 3 and allowing the locking bolt to be freely operated by the knobs 12 or by the thumb piece 13 in such manner that the device can be used as a simple latch. As soon, however, as the dial knob 20 is rotated this movement is communicated to the toothed wheel 22 and to the rotating tumblers 26 through the medium of the pinion wheel 24 and the projections 27 on the face of the tumblers. A slight rotation therefore of the dial knob 20 causes a relatively greater rotation of the tumblers 26, and as soon as one or more of the notches or recesses 28 in the tumblers 26 is moved from under the pin or projection 38 on the arm 36 said arm 36 is raised in the position shown in Fig. 7 again causing the extension 40 on the arm 39 to enter the notch 4 in the locking bolt 3 and before the lock can again be operated from the outside of the door the combination must be again resorted to in order to bring the notches or recesses 28 in the tumblers 26 into position shown in Fig. 6.

In order to operate the lock instantly from the inside of the door or in order to move the mechanism into position for permanently unlocking the locking bolt 3 the small knob 31 carried by the spindle 30 on the inside of the door is rotated which carries the arm 33 into an upright position as shown in Fig. 8 allowing the pin 49 in the arm 39 to drop into the recess 35 in the end of the arm 33 thus providing for holding the arm 39 in a raised position and out of engagement with the locking bolt 3. When the mechanism is in this position the locking bolt 3 can be freely operated either from the outside or inside of the door without having recourse to the combination.

As will appear from the drawings the locking bolt 3 is provided with duplicate notches 4, and in order to apply the lock to either a left hand or right hand door it is only required to remove the locking bolt 3 and reverse the same as is illustrated in dotted lines in Fig. 3.

In order to change the combination it is simply required to remove the lock which as before stated can be accomplished without disturbing the operating knobs 12 and when the lock is thus removed the tumblers 26 can be rearranged or the large toothed wheel 22 can be moved relatively to the pinion wheel 24. By means of this arrangement

an indefinite number of combinations is possible, and as the toothed wheel 22 is capable of approximately only a single revolution the starting point for the combination is at all times available.

Having thus fully described this invention what is claimed as new and what is desired to be secured by Letters Patent of the United States is:—

1. A lock of the type described, including a latch-bolt, a tumbler, interacting pivoted members adapted to effect an interlocking action between said latch-bolt and tumbler, said pivoted members having a common pivot, one pivoted member having its short arm extending beyond said pivot and provided with a lateral pin near its forward edge engaging the second pivoted member, said second pivoted member also having a lateral pin, and means engaging said last referred to lateral pin for disengaging said second pivoted member from the latch-bolt.

2. A lock of the character described, combining a latch-bolt, a tumbler, interacting pivoted arms adapted to effect an interlocking action between said latch-bolt and tumbler, one of said pivoted arms being provided with a lateral pin, a spindle-carried arm having a depression or recess in its free end for receiving said lateral pin, and means for actuating the spindle carrying said arm.

3. A lock of the type described including a latch-bolt, a tumbler, interacting pivoted members adapted to effect an interlocking action between said latch-bolt and tumbler, said pivoted members having a common pivot, one pivoted member having a short arm extending beyond said pivot and provided with a lateral pin engaging the second pivoted member, the long arm of the first referred to pivoted member having also a lateral pin, and a permutation mechanism for actuating said tumbler, said permutation mechanism including toothed disks, one of said disks having a blank tooth for engagement with one of the other toothed disks to limit the movement of said toothed disk having the blank tooth, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

WILLIAM C. LOY.

Witnesses:

NEWTON M. IZZARD,
ALEX RUH.