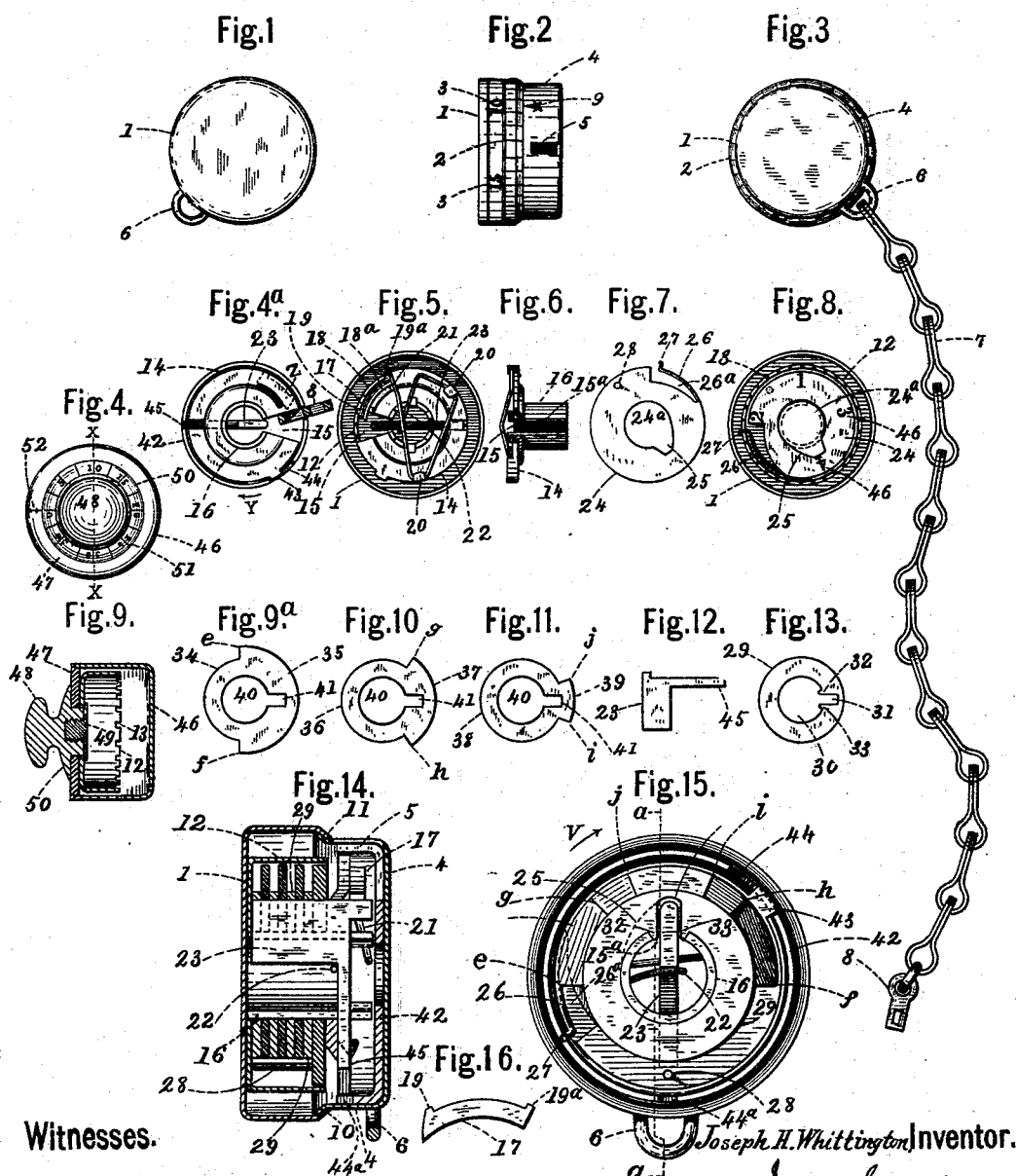


(No Model.)

J. H. WHITTINGTON.
COMBINATION LOCK.

No. 524,750.

Patented Aug. 21, 1894.



Witnesses.

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COMBINATION-LOCK.

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To all whom it may concern:

Be it known that I, JOSEPH H. WHITTINGTON, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Combination-Locks, of which the following is a specification.

My invention relates to certain improvements in combination locks for bicycles or other analogous uses and will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of the lock. Fig. 2 is a side elevation of the same. Fig. 3 is a rear elevation showing a portion of the index lines around the periphery, also a chain having the locking hasp attached to it. Fig. 4 is a modification of the case, the dial and means for operating it. Fig. 4^a, is a detached face view of the locking plate, an end view of its central sleeve, and a portion of the shell by which its rotary movement each way is limited, showing also, the locking bolt, the locking catch and the hasp into which the end of the locking catch passes when locked. Fig. 5, represents a detached inside face view of the index shell, showing the locking plate in its proper place located within it, its central sleeve and the manner of securing it to the locking plate, its locking bolt, locking catch, and the spring for operating them. Fig. 6, is a detached side elevation of the locking plate, showing a similar view of the spring for operating its locking catch. Fig. 7 is a detached face view of the throw-off plate for throwing the bolt in the position shown in Fig. 4, when the lock is locked and the combination is broken, and for allowing the bolt to move out (in the position shown in Fig. 15), when the combination is formed. Fig. 8 is a detached inside view of the index shell, showing the opposite side of the throw-off plate so as to present the side having the figures by which the combination is changed, showing also the stationary notched rim within which it is located and by which it is fixed and held stationary after any combination has been changed. Fig. 9 is a central section through line *x x* Fig. 4. Figs. 9^a,—10 and 11 represent detached face views of the combination tumblers of the lock. Fig. 12 is a de-

tached side elevation of the locking bolt. Fig. 13 is a detached face view of one of the stationary washers that intervene between the combination tumblers. Fig. 14 is an enlarged side sectional elevation through the lock in or about line *a a* Fig. 15. Fig. 15 is an enlarged face view of the lock, the rear or smaller case being omitted. Fig. 16, is an enlarged side elevation of the locking catch.

Referring to the drawings, 1 represents the index case. It is formed of sheet metal, brass or steel, and is raised up in dies in the usual way. I have shown thirty index lines 2, and index figures, 3, (see Fig. 2,) advancing by five up to thirty, but the number may be more or less if desired.

The rear portion of the case, 4, is made a little smaller in diameter as shown and is provided with a hole, 5, into which the hasp is entered when locked. It has also a staple, 6, to which a chain 7, is attached having on its opposite end a hasp, 8, and on the side near the index lines is stamped or otherwise impressed an index hand, 9, see Fig. 2. These two cases are put together by means of a flange, 10, on the rear case, which projects outward all around its peripheral edge, and the surrounding flange, 11, on the index case, 1, which projects over the flange, 10. These flanges being a perfectly true circle are fitted together so as to allow the index case to be easily turned around in either direction and thereby bring the index hand, 9, so as to point to any of the index lines, 2, or index figures, 3, that may be required. This construction allows the lock to be operated by turning the front portion of the case, 4, back and forth.

On the inside of the index case is rigidly secured, centrally, a rim, 12, having a series of notches 13 see Figs. 5—8 and 14, where this rim is shown. The object of this rim, 12, and its notches 13, is to afford the means for fixing and holding or retaining the combination when once determined upon, and set, as will appear more clearly farther on.

The combination portion of the lock consists, first, of a locking plate, 14, having a tapering opening, 15, in one side see Figs. 4^a—5 and 6. To this locking plate, 14, is rigidly secured a sleeve or barrel, 16, having an opening, 15^a, corresponding with the opening, 15.

On the side opposite to the sleeve or barrel, 16, is the locking catch, 17, an enlarged detached view of this catch, 17, is shown in Fig. 16. It is made in a curved form so as to slide back and forth in the curved guide-ways, 18, and 18^a, see Fig. 5, and is limited in its movements either way by the small projections, 19, and 19^a, shown in Figs. 5 and 16. This locking catch, 17, is kept forward in its normal position by means of a steel wire spring which is secured to the plate by the small pieces, 20, projecting from it and bent over on to the wire as shown in Fig. 5. One end, 21, of this wire spring is formed so that it lays and presses against the back of the locking catch, 17, and keeps it forward in the position shown in said Fig. 5. The other end 22 of the wire spring is formed so that it lays against the back of the locking bolt 23, substantially as shown in Figs. 5—14 and 15, and thereby keeps it forward in the position shown in said figures when the combination is formed and the lock unlocked.

The next plate is the throw off plate, 24, shown in Figs. 7 and 8. It is provided with a central hole 24^a adapted to fit over and turn on the barrel, 16, the opening 24^a, extends out to one side so as to form the inclined cam opening 25, shown in Figs. 7 and 8, and by dotted lines in Fig. 15.

The object of the side opening, 25, is to provide the means for throwing the locking bolt in, into the position shown in Fig. 4^a, when the combination is being broken, this is done by turning the plate, 24, in the direction of the arrow, V, Fig. 15, which operation, it will be seen, draws the bolt in, and when it is turned until the bolt comes opposite the deepest part of the opening, 25, the spring will immediately force it out into the position shown in said Fig. 15. The plate 24, is also provided with a spring, 26, and an opening 26^a, in which the spring operates, having a short bend, 27, at the end, see Figs. 7—8 and 15. The end of this spring is placed in one of the notches, 13, of the notched rim, 12, substantially as shown in Fig. 8, when a combination is set and it is desired to keep it so that the lock may be opened or closed by that combination until it is desired to form another combination and secure it for use in the same way. On this plate, 24, is rigidly secured a projecting pin, 28, see Figs. 7—14 and 15, which pin, 28, projects out in the direction of the sleeve or barrel, 16, and as the index plate is turned the throw off plate is turned with it because it is held by the spring, 26, when secured in one of the notches 13.

The throw off plate is the first put on the barrel, 16, a stationary washer, 29, see Fig. 13, is then put on over it, this washer is provided with a central opening 30, through it, also a narrow opening 31, to allow the bolt, 23, to pass outward. The washer, 29, is held stationary on the barrel, 16, by means of two projections, 32, and 33, shown in Figs. 13 and 15, which fit in the opening, 15^a, substantially

as shown in Fig. 15. Over the stationary washer 29, is placed the first combination tumbler, 34, (see Figs. 9^a and 14) having an enlarged portion 35, extending half way around it, more or less, to the shoulders *e* and *f*, another stationary washer, 29, is now put on, and over that is put another combination tumbler, 36, (shown in Fig. 10) having a narrower enlarged portion, 37, extending from shoulders *g* to *h*, more or less, a stationary washer 29, is put on over this and then another combination tumbler, 38, having a still narrower projecting portion, 39, extending from shoulders *i* to *j*, more or less, another stationary washer 29 is then put on.

The combination tumblers are all provided with a central opening, 40, adapted to fit so as to move easily on the barrel, 16, and also with a narrow opening, 41, to allow the bolt, 23, to pass in when operating the device to unlock it.

In making or operating the combination the combination tumbler having the narrowest projecting portion, 39, for instance, is first operated, then the next widest is then operated and so on through the whole series, but the order in which I have placed them need not necessarily be observed as the location of either of the tumblers may be varied and the operation will still be substantially the same.

When the device is put together within the two cases the end carrying the locking plate, 14, is let down into a shallow case 42, (shown in Figs. 4^a—14 and 15,) so that the projecting portion, 43, will lay into a shallow recess or depression, 44, which limits the movement of the plate either way so that it has but a slight movement in either direction. The object of this slight movement is to provide the means for carrying the locking catch, 17, back out of the way so that the hasp can be withdrawn when the lock is unlocked. The shallow case, 42, is also provided with another opening, 44^a, shown in Figs. 14 and 15, for the rear portion 45, of the locking bolt to pass into. The rear portion, 45, of the locking bolt is shown in this recess, in Fig. 4^a, as the locking bolt is there shown in its position when pushed back, but the end, 45, cannot pass into the opening, 44, until the plate 14, has been turned around so that the projecting portion, 43, has reached the limit of its movement in the depression, 44, moving in the direction of the arrow, Y.

The operation of this device is as follows: The combination being fixed, for instance, at 29—22—5 and 12. The index side of the case being taken in the right hand and the other side held by the left hand, the index side of the case is in this instance turned to the left until the index hand, 9, is opposite the index line that indicates 29, this operation causes the pin, 28, to move against the shoulder *f* and move the tumbler 34, the index case is then turned back in the opposite direction until the index line indicating, 22, is opposite the index hand, this operation moves the combination

tumbler, 36, by means of the pin, 28, the index case is again reversed until the index hand is opposite the index line indicating, 5, which operates the tumbler, 38, by means of the pin, 28, the index case is then turned in a reverse direction until the index hand points to the line indicating, 12. The index case is again reversed and turned a short distance back to carry the locking catch out of the way as before mentioned, or substantially as shown by the dotted lines, *z*, in Fig. 4^a. When it is desired to set a new combination, all that is necessary to do is to remove the spring, 26, from the notch 13 in which it is engaged with within the rim, 12, and remove and fix it in another notch in said rim. This can be done without taking the case apart by turning the index case until the end of the spring is brought opposite the hole, 5, where it can be seen from the outside, then by means of a shoemaker's awl or any other similar instrument the end of the spring can be lifted out of the notch and easily transferred to another notch. After a new combination is thus made it is necessary to find out what the new combination is. This is done by means of the throw off plate, 24, and its figures, 46, see Fig. 8, where these figures are shown. Looking through the opening, 5, shown in Fig. 2, the index case is turned to the left until the figure, 1, can be seen through the said opening, then look and see where the index hand is, if it points direct to the line indicating, 29, for instance then, 29, is the first number of the combination. The index case is now turned in the reverse direction until the next consecutive figure, 2, comes into view through the opening, 5, and if the index hand should be opposite the line indicating, 22, then, 22, is the next or second combination number. The index case is now turned back in the reverse direction until the third number, 3, in consecutive order comes into view, and should the index hand, 9, indicate, 5, then, 5, is the third combination number. The index case is again reversed and turned until the fourth consecutive number, 4, comes into view through the opening, 5, and if that number should be, 12, then, 12, is the last or fourth combination number thereby making the combination number 29—22—5 and 12. The lock, in this instance cannot be unlocked except by this combination until it is changed for another combination.

It will be noticed that the last combination number is provided by the action of the throw off plate, and at the same time the lock bolt passes into the throw-off plate opening, the bolt moving into the opening, 25, when the last movement is sufficient to bring it in the proper position to do so, the combination tumblers having been first brought to the proper position to leave the way clear as above described.

It will be noticed that as the locking bolt passes forward into the opening, 25, and the side openings in tumblers, its portion, 45,

moves out of the opening, 44, in the shallow case, 42, (which is rigidly fastened to the case, 4,) which operation releases the locking plate 14, so that it can be turned sufficiently to release the catch, 17, from the hasp, 8, and thereby allow it to be drawn out. In Figs. 4 and 9, I have shown a modification of the two part case consisting of the case, 46, formed in one piece as shown in said figures and having a flat front disk, 47, put on and secured in any well known way to the case.

On the inside of the case is located the notched rim, 12, which is rigidly secured to the knob, 48, by means of a screw, 49, so that the knob and notched rim can be easily turned by the fingers. Surrounding the knob 48, is a projecting flange, 50, on which is placed the index lines and figures 51, shown in Fig. 4.

The index hand, 52, is placed on the disk, 47, and the combination is formed by turning the knob, 48, the remaining parts of the lock are constructed exactly the same and operate in the same way as heretofore shown and described and consequently, require no further description in connection with Figs. 4 and 9.

I claim as my invention—

1. In a combination lock, the combination with a holding case, a throw off plate, mounted on a barrel upon which it turns, a rim projecting in from the inside of the index case to which it is rigidly attached, and within which the throw off plate turns a series of notches on the projecting rim, and a spring on the throw off plate adapted to be secured in either of said notches to retain the combination when set, substantially as described.

2. In a combination lock provided with an inclosing case, provided with an index, the combination of a rim projecting from the inside of the index case to which it is rigidly attached, a throw-off plate mounted upon a barrel upon which it turns, a spring on the throw-off plate for engaging with either of the notches in said rim, a consecutive series of numerals on the throw-off plate, an opening through the case by which said numerals can be seen, and a means substantially as above described for turning the same, whereby the combination after being set can be found on the index case, substantially as described.

3. In a combination lock provided with an inclosing case, the combination of a throw-off plate mounted on a barrel upon which it turns a rim rigidly fastened to and projecting in from one side of the holding case and provided with a series of notches, a spring on the throw-off plate for engaging with said notches, and a pin, 28, on the throw-off plate, for moving the combination tumbler and a means for operating it substantially as above described.

4. In a combination lock, the combination with an inclosing case in two parts made movable one upon the other, of a throw-off plate having a central opening, to receive the barrel upon which it turns and a cam shaped

opening, 25, a notched rim projecting in from one side of the holding case rigidly attached thereto and provided with a series of teeth, and a spring on the throw-off plate adapted to engage with either of the teeth in the rim, whereby the locking bolt may be thrown in or out substantially as described.

5. In a combination lock provided with an inclosing case one part movable for operating the device and provided with outside index marks, the combination of a series of movable combination tumblers each tumbler having projecting portions varying from the other, a series of intervening stationary washers, the whole mounted on a barrel upon which the combination tumblers turn between the stationary washers, a locking plate secured to the barrel at one end having a limited turning movement as described and provided with a locking catch and spring, and an opening at one side to permit the hasp to enter in position to be caught by the locking catch, the hasp being connected by a chain having its opposite end secured to the lock a throw-off plate provided with a pin, 28, and a means substantially as above described for keeping

the throw-off plate stationary when required in one side of the holding case, substantially as and for the purposes described.

6. In a combination lock, a holding case composed of two parts the one movable upon the other, one part having an index the other part having an index hand and a small opening through which the combination may be changed substantially as described.

7. In a combination lock, a holding case consisting of two parts one movable upon the other, and provided with an index on one side, and an index hand and a small opening in the other side, in combination with a throw-off plate mounted on a barrel and held stationary within the index case where a combination is set and provided with a series of numerals, whereby the numbers of the combination on the outside may be determined by the figures on the throw-off plate as seen through the small opening substantially as described.

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