

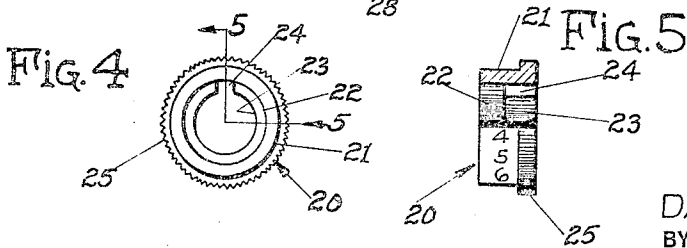
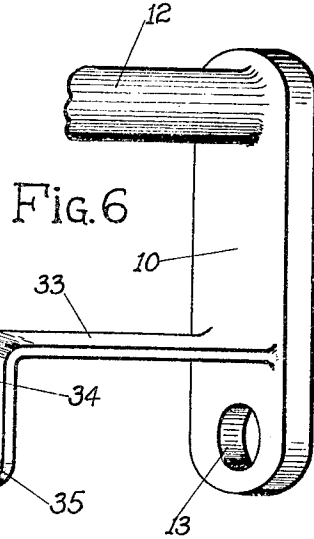
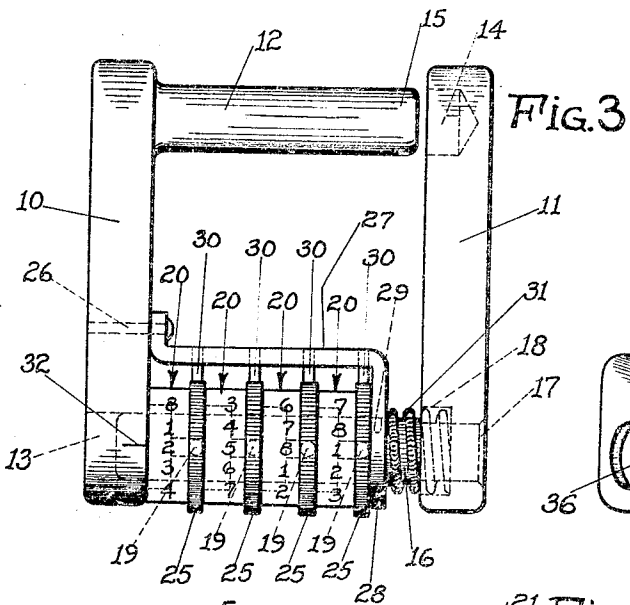
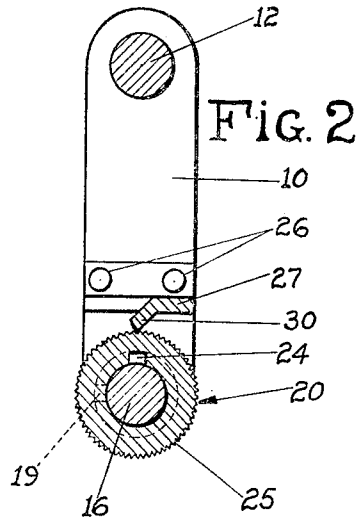
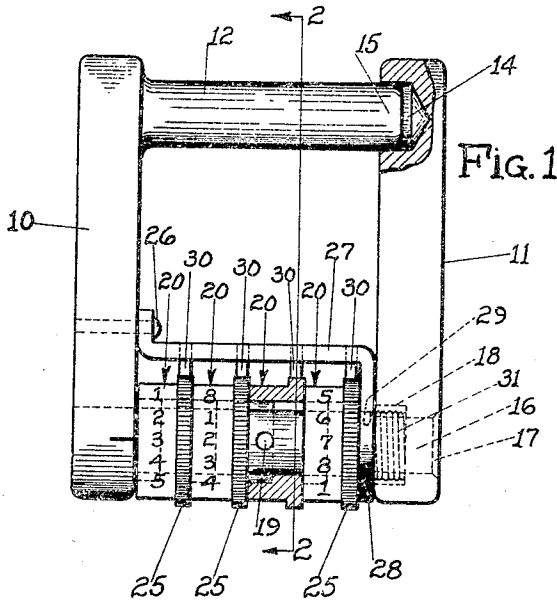
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PADLOCK

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PADLOCK

Application filed November 16, 1931. Serial No. 575,244.

This invention relates to new and useful improvements in permutation locks and has particular relation to a permutation or combination padlock.

An object of the invention is to provide a combination padlock which is extremely simple in construction and involves but a relatively few parts each of which may be produced at low cost and easily and quickly assembled into a complete lock whereby the lock may be sold at a moderate price.

Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein a satisfactory embodiment of the invention is shown. However, it will be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims to which claims reference should be had for a definition of the invention.

In the drawing:

Figure 1 is a front view of the improved lock in locked position, one of the tumblers being shown in section;

Fig. 2 is a sectional view taken substantially on the line 2-2 of Fig. 1;

Fig. 3 is a view similar to Fig. 1, but showing the lock open;

Fig. 4 is an end view of one of the tumblers, the view being taken looking from the left in Fig. 5;

Fig. 5 is an edge view of one of the tumblers, a fourth of the tumbler being cut away as indicated by the line 5-5 of Fig. 4; and

Fig. 6 is a perspective view showing a slight modification or alternative construction.

Referring in detail to the drawing the improved padlock as herein disclosed includes a pair of side or end plates or members 10 and 11 the side plate 10 having a bolt 12 rigid therewith and preferably integral therewith. Obviously, the bolt 12 projects from one side of the plate 10 adjacent an end thereof and adjacent its other end the plate 10 has an opening 13 therethrough the said opening being arranged parallel with the bolt 12.

Plate 11 is arranged opposite the plate 10 when the lock is closed and the plate 11 has a recess 14 to receive the free end portion 15 of the bolt 12 when the lock is closed. Toward its end opposite that having the recess 14, the plate 11 carries a bar 16 which may be cast with the plate or otherwise made rigid therewith as by being headed over as indicated at 17. About the bar 16, plate 11 is recessed as at 18 for the purpose to be described.

The bar 16 carries a plurality of tumbler pins 19, four such pins appearing on the bar disclosed. Obviously, the number of these pins may be varied as desired, the fewer pins employed the less the expense of manufacture and the more pins employed the more difficult the combination. If desired, the pins 19 may be formed separate from the bar and then inserted in openings or recesses in the bar so as to extend radially therefrom or the pins may be cast with the bar in the form of spaced projections.

A series of tumblers 20 are disposed on the bar 16 and the tumblers are arranged over the pins 19 and one tumbler is provided for each pin employed. The tumblers are identical in construction and each comprises a cylindrical body 21 having an annular recess 22 arranged between an end of the body and an internally thickened portion 23 having a slot 24 therein the said slot extending from one end of the body through the thickened portion to the recess 22. On its outer surface the body of each tumbler is provided with a series of markings here shown as numerals, and one of these markings is arranged opposite the slot 24 in each tumbler.

The tumblers are arranged on the bar 16 in such a manner that when the lock is closed and locked the pins 19 occupy the annular recesses 22 of the tumblers and the tumblers may be rotated on the bar. On their outer surfaces each tumbler has a portion 25 of increased diameter which portion is grooved or toothed as shown whereby it may be engaged as by the thumb or finger to rotate the tumbler. It will be understood that the owner or other proper person knows the combination of the lock and that on the

tumblers being rotated to align the various slots 24 with the pins 19 the bar 16 may be slid toward the right in Fig. 1 whereby the plate 11 is moved to carry the recess 14 away
5 from the end portion 15 of the bolt 12.

The lock will then, of course, be opened and the pins 19 will be disposed in the outer portions of the slots 24 of the tumblers as clearly shown in Fig. 3. This being the case
10 on relative turning movement of the plates 10 and 11 with the bar 19 as an axis the tumblers will retain their positions relatively and relative to the bar 16 and pins 19. It will, of course, be understood that the free
15 end portion of the bar 16 is capable of sliding and rotary movement in the opening 13 of plate 10.

Secured to the plate 10 as for example by rivets or pins 26 is a member 27 which extends in the direction of plate 11 across the
20 top of the tumblers and has a downwardly extending flange 28 provided with an opening 29 through which the bar 16 snugly fits. Since the member 27 is rigid with the plate
25 10 it is obvious that this member does not move with the plate 11 and bar 16 as the lock is opened and closed. The location of the flange 28 of member 27 is such that the distance between the inner surface of the
30 flange and the plate 10 is sufficient only to accommodate the tumblers 20.

This member serves to prevent movement of the tumblers along the bar 16 and when the lock is to be opened the member prevents
35 movement of the tumblers in a direction away from the plate 10. Further, when the lock is opened the pin 19 closest to the plate 11 will engage the flange 28 of member 27 and limit the outward movement of the
40 bar 16 in a manner to prevent the bar being entirely removed from the recess or opening 13 in the plate 10 and from the tumblers 20. This last action it will be understood prevents the lock from being accidentally dis-
45 assembled.

Means may be provided to prevent casual turning of the tumblers 20 whereby in the opening of the lock each tumbler after adjustment will remain in its adjusted position
50 while the other tumblers are being adjusted to position permitting the lock to open. This means as here disclosed comprises a series of fingers or dogs 30 which may be struck from the member 27 and which are carried by
55 this member as clearly shown in Figs. 1, 2 and 3. These fingers 30 engage the enlarged toothed portions 25 of the tumblers and enter between the grooves or teeth therein in such a manner as to prevent casual movement of
60 the tumblers. However, there is but a spring or frictional engagement between the fingers and the portions 25 of the tumblers and the tumblers may be rotated against the action of fingers.

65 Means may also be provided for shifting

the plate 11 outwardly or to open position on the tumblers being adjusted to align their slots 24 with the respective pins 19. This means as here disclosed comprises a coil
70 spring 31 arranged on the bar 16 in such a manner as to engage the flange 28 of the member 27 and to have a portion extending into the recess 18 in the plate 11 whereby to engage the closed end of this recess. It is
75 obvious that when the lock is closed as in Fig. 1 this spring 31 is rather tightly compressed and that when the tumblers have been adjusted to align their slots 24 with the respective pins 19 the spring will expand and
80 shift the plate 11 and bar 16 outwardly and into the open position as shown in Fig. 3.

When the parts have been shifted to the open position as shown in Fig. 3 the plates 10 and 11 may be rotated relatively whereby to
85 leave the end portion 15 of the bolt 12 entirely unencumbered. That is, the plate 11 may be rotated forwardly from the position shown in Fig. 3 while the plate 10 and bolt 12 may be rotated rearwardly from the position
90 shown in that figure. This particular action is possible since movement of the plate 11 will result in rotary movement of the tumblers forwardly below the fingers or dogs 30 while movement of the plate 10 will
95 result in a movement of the said fingers relative to the tumblers.

In addition to serving to shift the lock from the position shown in Fig. 1 to that shown in Fig. 2 immediately on the tumblers
100 being adjusted to align their slots 24 with the pins 19 the spring 31 serves to prevent casual closing of the lock. It will be understood that the lock must not be closed or that the bar 16 must not be moved through the
105 tumbler toward locking position except when the plates 10 and 11 are in such relative position that the bolt 12 enters the recess 14. Otherwise, the combination might be lost with the parts locked in a useless position.

As disclosed the combination of the lock
110 is 2-5-8-1 and it will be noted that the plate 10 carries a mark 32 with which the proper numbers are aligned in order to bring the slots 24 of the various tumblers into alignment with the respective pins 19 with
115 which the tumblers are associated.

In assembling the lock thus far described the bar 16 may have its end disposed in the recess 13 of the plate 10 after which the
120 tumblers are slipped onto the bar. Next, the member 27 is assembled with its flange 28 about the bar and this member may then be secured to the plate 10 as by the rivets or pins 26. The spring 31 is now disposed over the bar and the plate 11 applied and secured as
125 by heading the end of the bar at 17.

Fig. 6 shows a slight modified construction wherein a member 33 corresponding with the member 27 of the embodiment first described is integral with the plate 10. This member
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33 also has a flange 34 provided with an opening 35 to receive the bar 16. Through its flange 34 and entering into its opening 35 the member 33 is provided with a notch 36 of the dimensions required to permit of the passing of the pins 19 therethrough.

In assembling the lock on a frame such as is shown in Fig. 6 the bar 16 has its end passed through the opening 35 in the flange 34, the notch 36 permitting the pins 19 to pass. As the bar is fed through or threaded through the opening 35 the tumblers are applied and the inserted end of the bar finally enters the opening 13 in the plate 10. Of course, with the use of a frame as shown in Fig. 6, the bar 16 may be integral with the plate 11 and in that event the spring 31 would be applied before the bar was started through the opening 35 of the flange 34 of the member 33.

It is apparent that the notch 36 is shown as 180 degrees from the location of the pins 90 when the lock is closed. Therefore, when the lock is opened by the spring 31 as shown in Fig. 3 the bar 16 will not pass out through the opening 35 but will have its movement limited by engagement of the innermost pin 19 with the flange 34 as described in connection with the form of invention previously considered. However, this lock may be easily disassembled when opened and the tumblers rearranged to give a different combination.

Having thus described the invention, what is claimed is:

1. In a combination padlock, a pair of opposed side plates, a bar rigid with the first of said plates and extending toward the second thereof, a bolt rigid with the second of said side plates and extending toward the first thereof, said first plate having a recess to receive the end portion of the bolt when the padlock is locked, a series of pins extending radially of and carried by the bar, a series of tumblers on the bar, a member having a flange encircling the bar at one end of the series of tumblers and said member rigidly secured to the second plate to limit movement of the tumblers away from said second plate, a coil spring surrounding the bar and arranged between the flange and the first plate, said bar having its free end slidably received in the second plate, one of said tumblers being arranged over each of said pins, and each of said tumblers containing an annular recess and a slot leading into the recess whereby the tumblers may be rotated and the slots aligned with the pins and the bar drawn outwardly through the tumblers to release the bolt from the recess in the first plate.

2. In a combination padlock, a pair of opposed side plates, a bar rigid with the first of said plates and extending toward the second thereof, a bolt rigid with the second of said side plates and extending toward the first thereof, said first plate having a recess to receive the end portion of the bolt when

the padlock is locked, a series of pins extending radially of and carried by the bar, a series of tumblers on the bar, a member having a flange encircling the bar at one end of the series of tumblers and said member rigidly secured to the second plate to limit movement of the tumblers away from said second plate, said bar having its free end slidably received in the second plate, one of said tumblers being arranged over each of said pins, each of said tumblers containing an annular recess and a slot leading into the recess whereby the tumblers may be rotated and the slots aligned with the pins and the bar drawn outwardly through the tumblers to release the bolt from the recess in the first plate, and said flange fitting about the bar in a manner to be engaged by one of the pins as the bar is drawn outwardly through the tumblers whereby to limit outward movement of the bar relative to the tumblers.

3. In a combination padlock, a pair of opposed side plates, a bar rigid with the first of said plates and extending toward the second thereof, a bolt rigid with the second of said side plates and extending toward the first thereof, said first plate having a recess to receive the end portion of the bolt when the padlock is locked, a series of pins extending radially of and carried by the bar, a series of tumblers on the bar, a member having a flange encircling the bar at one end of the series of tumblers and said member rigidly secured to the second plate to limit movement of the tumblers away from said second plate, said bar having its free end slidably received in the second plate, one of said tumblers being arranged over each of said pins, each of said tumblers containing an annular recess and a slot leading into the recess whereby the tumblers may be rotated and the slots aligned with the pins and the bar drawn outwardly through the tumblers to release the bolt from the recess in the first plate, said tumblers on their outer surfaces having toothed portions, and said member carrying fingers engaging said toothed portions of the tumblers to retain them against casual movement.

4. In a combination padlock, a pair of opposed side plates, a bar rigid with the first of said plates and extending toward the second thereof, a bolt rigid with the second side plate and extending toward the first thereof, said first plate having a recess to receive the end portion of the bolt when the padlock is closed, a series of pins extending radially of and carried by the bar, a series of tumblers on the bar, a member having a flange encircling the bar at one end of the series of tumblers and said member rigidly secured to the second plate to limit movement of the tumblers away from said second plate, said bar having its free end slidably received in the second plate, one of said tumblers arranged over each of said pins, and each of said tum-

blers containing an annular recess and a slot leading into the recess whereby the tumblers may be rotated and the slots aligned with the pins and the bar drawn outwardly through the tumblers to release the bolt from the recess in the first plate.

5. In a combination padlock, a pair of opposed side plates, a bar rigid with the first of said plates and extending toward the second thereof, a bolt integral with the second side plate and extending toward the first thereof, said first plate having a recess to receive the end portion of the bolt when the lock is closed, a series of pins extending radially of and carried by the bar, a series of tumblers on the bar, a member integral with the second plate and extending across said tumblers and having a flange encircle the bar at one end of the series of tumblers to limit movement of the tumblers away from the second plate, said member in its flange having a notch opening through its portion encircling the bar to permit of the passage of the pins on insertion of the bar through the flange of the member in the assembling operation, said bar having its free end slidably received in the second plate, one of said tumblers arranged over each of said pins, and each of said tumblers containing an annular recess and a slot leading into the recess whereby the tumblers may be rotated and the slots aligned with the pins and the bar drawn outwardly through the tumblers for a predetermined distance to release the bolt from the recess in the first plate.

6. In a combination padlock, a pair of opposed side plates, a bar rigid with the first of said plates and extending toward the second thereof, a bolt rigid with the second of said side plates and extending toward the first thereof, said first plate having a recess to receive the end portion of the bolt when the lock is locked, a series of pins extending radially of and carried by the bar, a series of tumblers on the bar, a member having a flange snugly encircling the bar at one end of a series of tumblers and said member rigidly secured to the second plate to limit movement of the tumblers away from said second plate, a coil spring surrounding the bar and arranged between the flange and the first plate to move the first plate outwardly and release the bolt from the recess in the first plate on the tumblers being moved to unlocked position, said bar having its free end slidably received in the second plate, one of said tumblers being arranged over each of said pins, each of said tumblers containing an annular recess and a slot leading into the recess whereby the tumblers may be rotated to unlocked position with the slots of the tumblers aligned with the pins, said slots of the tumblers being relatively long, and said flange being arranged to be engaged by the outermost of said pins as the first plate is

shifted by the spring to prevent the pins from moving entirely through the slots of their respective tumblers whereby the tumblers will rotate with the bar and first plate on the first plate being rotated after being moved to release the bolt from the recess.

7. A combination padlock consisting of a plate having a bolt, a plate having a recess to receive the end portion of the bolt when the lock is locked, a bar rigid with the second plate and having an end slidable in an opening in the first plate to permit the plates to be moved toward and from each other, radially extending pins on the bar, tumblers on the bar, one of said tumblers being arranged over each of said pins, a member rigid with the first plate and extending beyond the tumblers and having a flange at one end of the series of tumblers to limit movement of the tumblers away from the first plate, and each of said tumblers containing an annular recess and a slot leading into the recess whereby the tumblers may be rotated and the slots aligned with the pins and the bar drawn outwardly through the tumblers to release the bolt from the recess in the first plate.

8. A combination padlock consisting of a plate having a bolt, a plate having a recess to receive the end portion of the bolt when the lock is locked, a bar rigid with the second plate and having an end slidable in an opening in the first plate to permit the plates to be moved toward and from each other, radially extending pins on the bar, tumblers on the bar, one of said tumblers being arranged over each of said pins, a member rigid with the first plate and extending beyond the tumblers and having a flange encircling the bar at one end of the series of tumblers to limit movement of the tumblers away from the first plate, each of said tumblers containing an annular recess and a slot leading into the recess whereby the tumblers may be rotated and the slots aligned with the pins and the bar drawn outwardly through the tumblers to release the bolt from the recess in the first plate, and said flange adapted to be engaged by the outermost of said pins on outward movement of the bar to release the bolt whereby to prevent disassembly of the lock.

9. In a combination padlock, a pair of plates, a bolt carried by one of said plates, the other of said plates having a recess to receive the end portion of the bolt when the lock is locked, a bar rigid with one of said plates and having an end slidable in an opening in the other plate to permit the plates to be moved toward and from each other, radially extending pins on the bar, tumblers on the bar, one of said tumblers arranged over each of said pins, a member rigid with the plate having the opening slidably receiving the end of the bar, said member extending beyond the tumblers and having a flange at one end of the series of tumblers to limit movement of

the tumblers away from the plate with which
said member is rigid and each of said tum-
blers containing an annular recess and a slot
leading into the recess whereby the tumblers
5 may be rotated and the slots aligned with
the pins and the bar drawn outwardly
through the tumblers to release the bolt from
the recess.

Signed at Bridgeport, county of Fairfield,
10 State of Connecticut, this 14th day of Novem-
ber, A. D., 1931.

DAVID M. RAINEY.

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