April 5, 1960 M. M. CHECK 2,931,203

COMBINATION PADLOCK

Filed Nov. 17, 1955

2 Sheets-Sheet 1

Fig. 1.

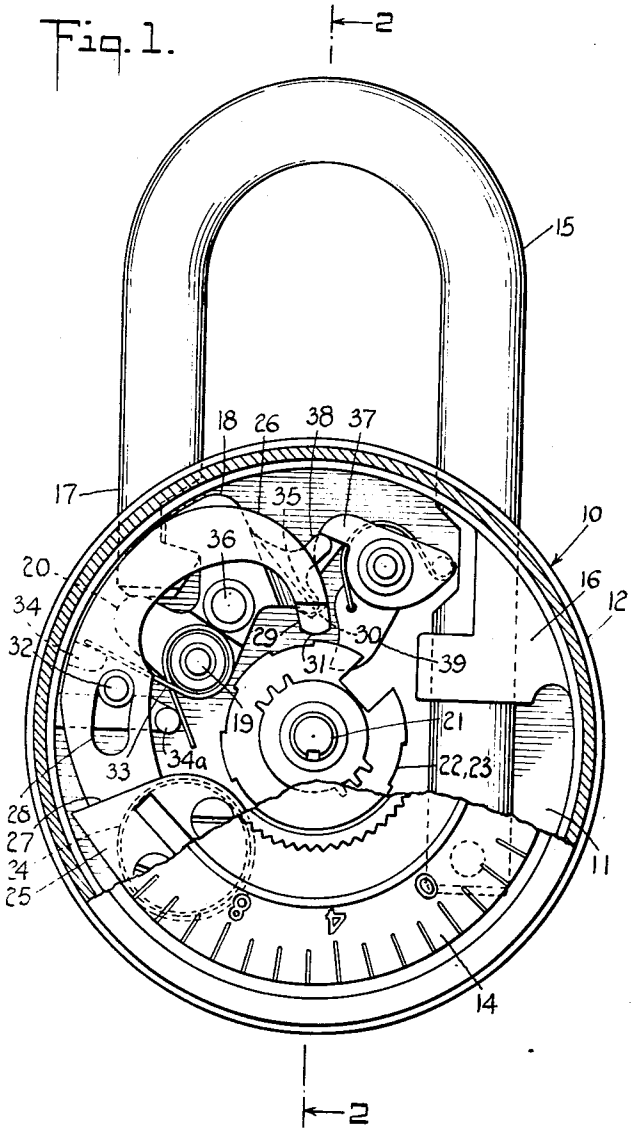
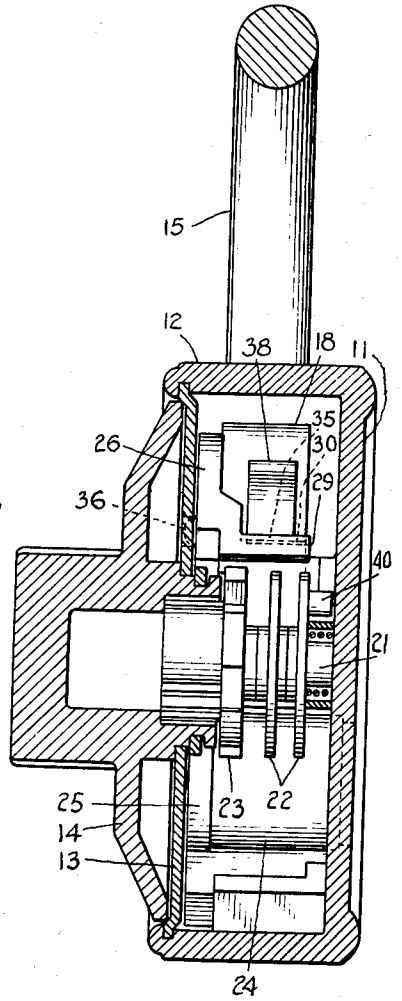


Fig. 2.



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Fig. 3.

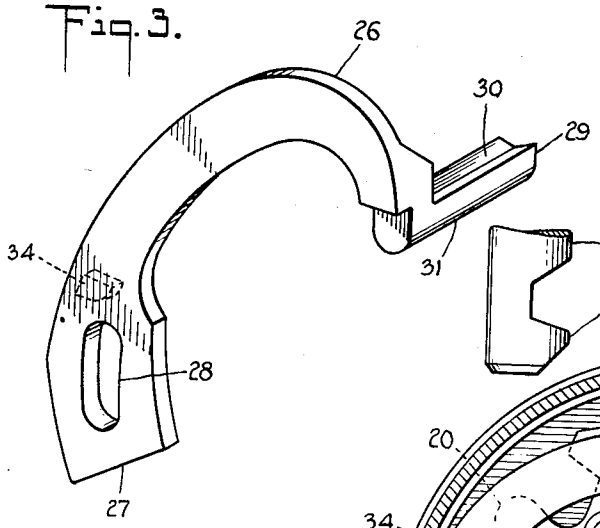


Fig. 4.

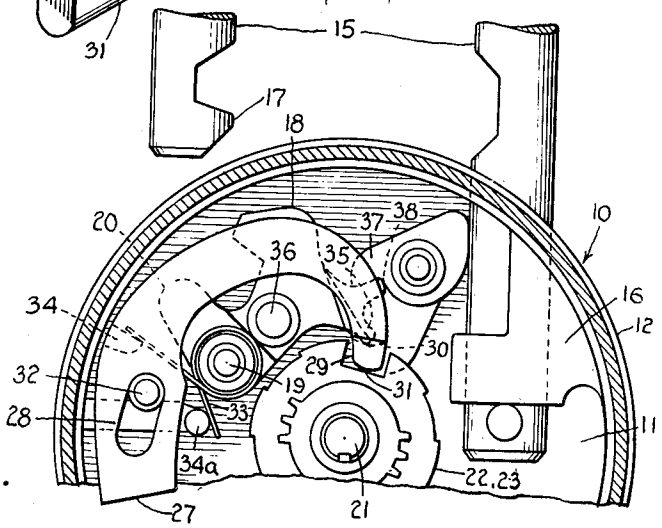
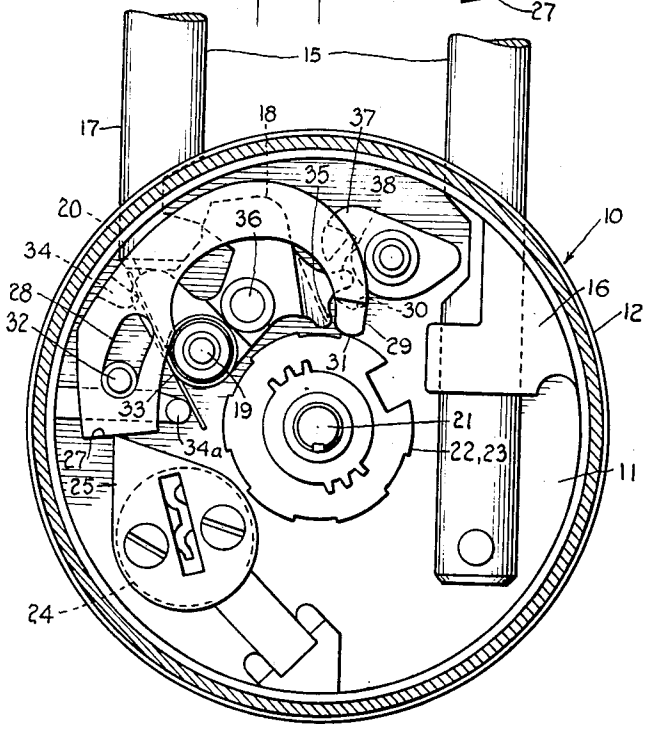


Fig. 5.



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COMBINATION PADLOCK

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Application November 17, 1955, Serial No. 547,406

6 Claims. (Cl. 70—21)

This invention relates to a combination padlock of the type disclosed in the patent to Ledin, No. 2,175,808, in which a series of tumblers must be set in order to release the shackle of the padlock for movement outwardly of the casing. The invention relates more particularly to means whereby a key operated mechanism such as a pin tumbler plug may release the shackle independently of the combination tumblers.

In the Ledin patent, there is disclosed a combination locking mechanism including a bolt that is formed with an integral fence so that the bolt and fence move to release position when the tumblers are positioned with their gatings aligned with the fence. Ledin discloses also means for maintaining the fence in the gatings when the shackle is out of the casing so that the shackle may be reinserted at any time, there being further means for dispersing the combination when the shackle is so reinserted.

The invention of this application is concerned particularly with means for allowing the movement of the bolt to release position without requiring the setting of the combination, upon operation of a key operated cylinder or plug.

It is quite old in the art to utilize key operated means for releasing a shackle independently of combination tumblers, but so far as I know it has not been possible to obtain effective key release and still maintain the bolt mechanism rap-proof. The Ledin padlock does not have key release, and it will be noted that with the gatings out of alignment there is a solid obstruction present to prevent the movement of the bolt to the release position. Without such solid means, a lock of the particular class may be rapped to retract the bolt through maintenance of pressure on the shackle and vibration of the lock.

In one patent of the prior art, the bolt carries shackle locking means in the form of a spring pressed plunger that is retracted by a key independently of the tumblers, if key operation is preferred. Therefore, the plunger in that patent can yield, and rapping can be carried out because there is no solid obstruction to the movement of the shackle locking mechanism. In another construction of the prior art, the fence is adapted for movement in either of two paths, and moves in one of the said paths freely of the tumblers if key operation is required. This construction also leads itself to rapping because there is no solid obstruction to the bolt movement.

As a feature of my invention, the bolt that locks the shackle is held against movement to release position by a fence that in turn cannot move to release position unless the tumbler gatings are aligned. Therefore, the bolt and fence together present a solid obstruction to the release movement of the shackle. The fence may be moved in a path different from that in which it moves with the bolt so as to release the bolt for release movement without the setting of the tumblers. However, this movement of the fence, while achieved through operation of key mechanism, cannot be accomplished by rapping. Thus, when the shackle is pulled outwardly as is necessary to permit rapping, it interlocks the bolt and fence to prevent release

of the bolt from the fence except by such force as cannot be applied by rapping. In other words, an outward pull of the shackle effects even more than the usual engagement between the fence and bolt, so that it is not possible to rap the fence out of the path of the bolt. On the other hand, it will be possible to move the fence through the key operation of the lock.

Therefore, as a result of my invention I prevent rapping of my padlock locking mechanism while, at the same time, allowing key operation. Further, I make it possible to secure all the other results flowing from the structure of the Ledin patent.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of my invention, in order to prevent the appropriation of my invention by those skilled in the art.

Referring now to the drawings:

Fig. 1 is a sectional view showing my novel padlock.

Fig. 2 is a section on the line 2—2 in Fig. 1.

Fig. 3 shows the novel fence that I utilize in my lock.

Fig. 4 is similar to Fig. 1 but shows the bolt released through setting of the tumblers.

Fig. 5 illustrates key release of my lock.

In order to facilitate a description of my invention, it will be well to state first that I prefer to utilize in my novel padlock an arrangement that is quite similar to that shown in the Ledin patent, No. 2,175,808, to which I have referred. Thus, I show in Figs. 1 and 2 a lock casing **10** having a bottom wall **11** and a peripheral side wall **12**. The casing **10** has also a cover **13** on which rotates a combination dial **14**. A shackle **15** moves between locking and release positions relatively to the casing with one side of the shackle mounted to slide on a casing portion **16**, Fig. 1. The opposed side of shackle **15** has a locking portion **17** adapted to be locked by a bolt **18** that is mounted to pivot on a pin **19** on the bottom wall of casing **10**. The bolt **18** has novel features that I shall presently describe, but it will be sufficient to state here that bolt **18** is formed with a surface **20** against which the shackle **15** will act when moving into the casing, as from the position shown in Fig. 4 to the position of Fig. 1, whereby to rotate the bolt **18** into locking relation to the shackle portion **17**. A pull on the shackle **15** will move the bolt **18** to release position, when the bolt is free for such movement, all as in the Ledin patent.

As best shown in Fig. 2, the lock casing **10** has a post **21** on which rotates a series of gated combination tumblers **22** including a driver tumbler **23**. The knob dial **14** is splined to driver tumbler **23** and thereby can set the tumblers with their gatings in aligned relation. Since the tumblers **22**, **23** are rather conventional and operate like those of Ledin, I believe that it will be unnecessary to describe them in further detail.

In the extremely novel padlock structure that I have now conceived, I utilize a lock cylinder **24**, Fig. 2, that will act independently of the tumblers **22**, **23** for effecting key release of the bolt **18**. The particular details of the lock cylinder **24** are not important to an understanding of my invention, and it is necessary to know merely that the cylinder is mounted on the lock casing, with a

cam 25 that rotates with a key plug in the cylinder. To enable either the key plug cam 25 or the combination tumblers 22, 23 to control the release movement of the bolt 18, I utilize an exceedingly novel fence 26, shown in detail in Fig. 3. This fence 26 is formed near one end 27 with an elongated slot 28 and at its opposed end with a transverse part 29. For reasons that will appear, I form the upper surface of the transverse part 29 with a dwell 30. The fence has also a gating entering portion 31 that I prefer to form integrally on the part 29.

When the fence 26 is assembled in the lock, as in Figs. 1 and 2, its slot 28 is applied to a pin 32 on the lock casing 10 whereby to mount the fence to slide and also to rotate relatively to the casing. However, I hold the fence 26 in what I term a normal position, shown in Fig. 1, through a spring 33 that acts between a lug 34 on the fence and a lug 34*a* on casing 10. The spring action is such as to slide the fence 26 downwardly and toward the left on its pin 32, as viewed in Fig. 1, and also to rotate the fence counterclockwise on that pin into and out of the tumbler gatings.

When the fence 26 is in the normal position I have described, a surface 35 on the bolt 18 lies within the dwell 30 of the fence with the pressure of spring 33 tending to hold the fence and bolt in such relation that they move together. Moreover, the gating entering portion 31 on the fence is in opposed relation to the outer peripheries of the combination tumblers 22, 23. Therefore, when a pull is applied to shackle 15, the bolt 18 will tend through its surface 35 and dwell 30 to move portion 31 of the fence 26 against the tumblers. If the gatings 22*a* of the tumblers are aligned through setting by knob dial 14, the fence will enter the gatings as in Fig. 4 and the shackle will be released. If the tumbler gatings are not aligned the fence 26 will not enter the gatings and with bolt part 35 will then present a solid obstruction to the release movement of bolt 18.

If the tumbler gatings are not aligned and an attempt be made to rap the lock while pulling on the shackle to rotate the bolt and fence to bring the fence portion 31 against the tumblers, there will be a solid obstruction to the release of the bolt, since, in effect, the bolt and fence are one piece, as in Ledin, because of the relationship at 35, 30. In view of this, rapping is not effective any more than in Ledin.

I do arrange a slight clearance between the fence portion 31 and the tumblers 22, 23 when bolt 18 is in locking position, as in Fig. 1, but that clearance is not in itself sufficient to allow release movement of the bolt. Its function will be indicated below. I prefer to equip the bolt 18 with a yielding detent 36, Figs. 1 and 2, that presses against the lock cover 13 for holding the bolt 18 in locking position. Detent 36 helps to maintain the clearance between the fence and tumblers, but can yield to allow release movement of bolt 18.

By referring to Fig. 4, we see what happens when release is effected through setting of the combination tumblers 22, 23. The tumbler gatings have been aligned relatively to the fence portion 31, so that the tumblers no longer present an obstruction to release movement of fence 26 and bolt 18. A pull on the shackle 15 has moved bolt 18 on its pivot 19, with part 35 of the bolt moving fence portion 31 into the tumbler gatings through rotation of the fence 26 on its pivot 32.

Alternately, Fig. 5 shows key release of the lock. The key plug cam 25 has rotated through key action, thus acting positively against the lower end 27 on fence 26 to slide the fence on its pin 32, from the position of Fig. 1 to the position shown in Fig. 5. By that sliding movement, the fence 26 places its transverse part 29 out of the path of the bolt surface 35. Of course, the dwell 30 by its engagement with bolt surface 35 will oppose somewhat the sliding of fence 26, but the fence nevertheless will slide because key plug cam 25 acts with positive pressure, and because of the slight clearance that I have already described between the fence part 29 and the peripheries of tumblers 22, 23. Thus, the fence no longer obstructs the bolt 18, and the bolt can be moved independently of the fence to release position through a pull on shackle 15, all as shown in Fig. 5.

For holding the bolt 18 in release position until the shackle 15 returns to locking position, I am able to utilize a dogging member 37 like that shown in the Ledin patent. This dogging member 37 is operated by the release movement of shackle 15, and then acts against a portion 38 on the bolt to hold the bolt in the release position shown in Fig. 4, as will be understood by those skilled in the art. I utilize further a disperser 39, Fig. 1, through which the bolt dogging member 37 will act against a pin 40 on the innermost tumbler 22, whereby to disperse the tumblers when the shackle 15 moves to locking position. The particular arrangement is like that shown by Ledin, and need not be described in further detail.

Through the extremely novel construction I have described, I am able to equip a combination padlock with a key release while still maintaining the lock rap-proof. Thus, I utilize a novel fence that allows either key release, or release through combination tumblers, but that will positively prevent release movement of the bolt unless the lock is actuated by authorized means. Should an outward pull be applied to the shackle while attempting to rap the lock, the bolt will merely be pressed the more firmly into engagement with the fence, thus positively locking the bolt to the fence and presenting a solid barrier to the relase of the bolt. It is possible, on the other hand, to release the fence from the bolt through key action, so that the bolt may move to release position independently of the tumblers and fence. I accomplish all of these things, more over, while retaining the very desirable features of the Ledin lock. I believe, therefore, that those skilled in the art will fully appreciate the very considerable value of my invention.

I now claim:

1. In a lock of the class described, a shackle, a bolt for locking said shackle, a series of combination tumblers having gatings, means mounting said bolt for movement from a shackle locking position in a predetermined path toward said tumblers to an unlocking position, a movable fence having a part positioned in said path for contact by said bolt so that said fence must move in order to allow said bolt to move to unlocking position, means through which the bolt acts when pressed in unlocking direction to interlock relatively to said fence part whereby to hold said part in said path of the bolt, a gating entering portion on said fence coacting with the ungated parts of said tumblers for preventing release movement of said bolt and fence unless said tumbler gatings are aligned with said gating entering portion of said fence, a key operated member in said lock, and means whereby said key operated member moves said fence part out of the path of said bolt whereby to allow movement of the bolt to release position while said tumbler gatings are not aligned and said fence part is not held by said interlocking means.

2. In a lock of the class described, a shackle, a bolt for locking said shackle, a series of combination tumblers having gatings, means mounting said bolt for movement from a shackle locking position in a predetermined path toward said tumblers to an unlocking position, a movable fence having a part positioned in said path for contact by said bolt so that said fence must move in order to allow said bolt to move to unlocking position, said fence part and said bolt contacting one another through cam and dwell surfaces that interlock to hold said fence part in said path of the bolt when the bolt is pressed in unlocking direction, a gating entering portion on said fence coacting with the ungated parts of said tumblers for preventing release movement of said bolt and fence unless said tumbler gatings are aligned with said gating

entering portion of said fence, and key-operated means for moving said fence part out of the path of said bolt when said part is not held by said cam and dwell surfaces.

3. In a padlock of the class described, a shackle, a series of tumblers having gatings, a bolt for locking said shackle and movable by said shackle toward unlocking position in a predetermined path toward said tumblers upon pull of said shackle outwardly of said casing, a movable fence having a part positioned in said path for contact by said bolt so that said fence must move in order to allow said bolt to move to unlocking position, a gating entering portion on said fence coacting with the ungated parts of said tumblers for preventing release movement of said bolt and fence unless said tumbler gatings are aligned with said gating entering portion of said fence, a key operated member in said lock, means whereby said key operated member moves said fence part out of the path of said bolt, and portions of said bolt and said fence part pressed into interlocking relation to one another by pressure of the shackle when said shackle holds said bolt against said fence and said fence against the tumblers, to resist movement of said fence relatively to said bolt.

4. In a lock of the class described, a shackle, a series of combination tumblers having gatings, a bolt for locking said shackle, said bolt movable from a locking to an unlocking position in a predetermined path toward said tumblers, a fence mounted for movement in two paths and having a part positioned in the path of said bolt and movable in said path with said bolt when said bolt is moved by said shackle, a gating entering portion on said fence coacting with the ungated parts of said tumblers for preventing release movement of said bolt and fence unless said tumbler gatings are aligned with said gating entering portion of said fence, a key-operated member in said lock, means whereby said key-operated member moves said fence part out of the path of said bolt through movement of said fence in the other of its two paths, and portions of said bolt and fence part pressed into interlocking relation to one another by pressure of the shackle when said shackle holds said bolt against said fence and said fence against the tumblers, to resist movement of said fence relatively to said bolt.

5. In a lock of the class described, a shackle, a bolt for locking said shackle, a series of combination tumblers having gatings, means mounting said bolt for movement from a shackle locking position in a predetermined path to an unlocking position, a fence, means mounting said fence for bodily movement in two paths from a predetermined initial position, a part of said fence positioned in the path of movement of said bolt when the fence is in

initial position for obstructing movement of said bolt to unlocking position, said fence part and bolt contacting one another through surfaces that interlock when pressure is applied to the bolt whereby to hold the fence against movement out of obstructing relation to the bolt, said fence moving from its initial position in one of its paths into said tumbler gatings when said gatings are aligned relatively thereto whereby to release said bolt for movement to unlocking position, a key-operated device on said lock, and means whereby said key-operated device moves said fence bodily from its initial position in the other of its two paths to release said bolt without requiring the proper alignment of said tumbler gatings relatively to the gating entering portion of said fence, and yielding means pressing said bolt and fence part relatively to one another for holding their surfaces in interlocking engagement.

6. In a lock of the class described, a shackle, a bolt for locking said shackle, a series of combination tumblers having gatings, means mounting said bolt for movement from a shackle locking position in a predetermined path toward said tumblers to an unlocking position, a movable fence having a part positioned in said path for contact by said bolt so that said fence must move in order to allow said bolt to move to unlocking position, a key-operated member, means whereby said key-operated member moves said fence part out of the path of the bolt to enable the bolt to move to unlocking position, said fence having a portion entering the tumbler gatings incidental to pressure of the bolt on said fence part when the gatings are aligned whereby to enable the bolt to move to unlocking position, and interlocking means actuated by bolt pressure on said fence part to lock that part in the path of the bolt when said tumbler gatings are not aligned and the gating entering portion of the fence cannot enter the gatings.

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