

April 5, 1960

M. M. CHECK
COMBINATION PADLOCK

2,931,204

Filed Oct. 5, 1956

2 Sheets-Sheet 1

Fig. 1.

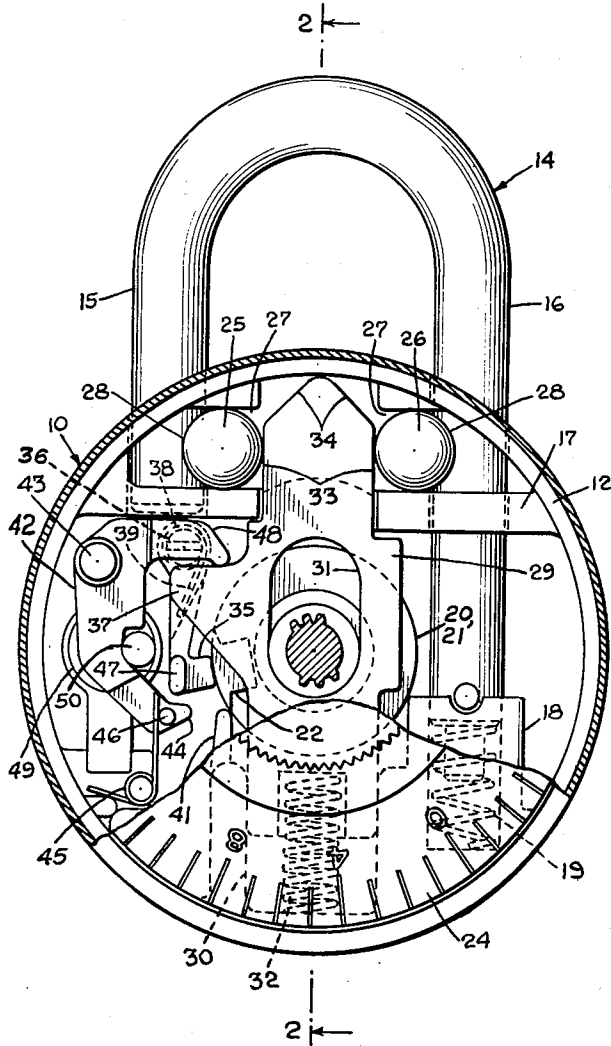
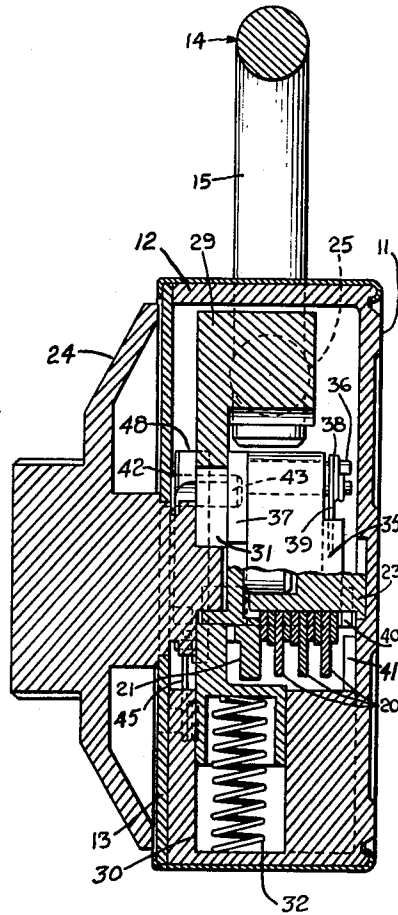


Fig. 2.



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2 Sheets-Sheet 2

Fig. 3.

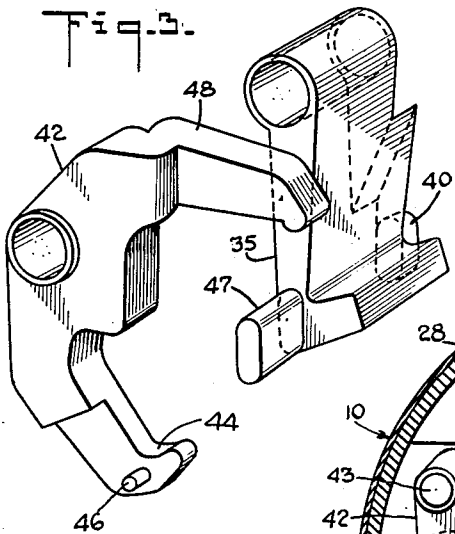


Fig. 4.

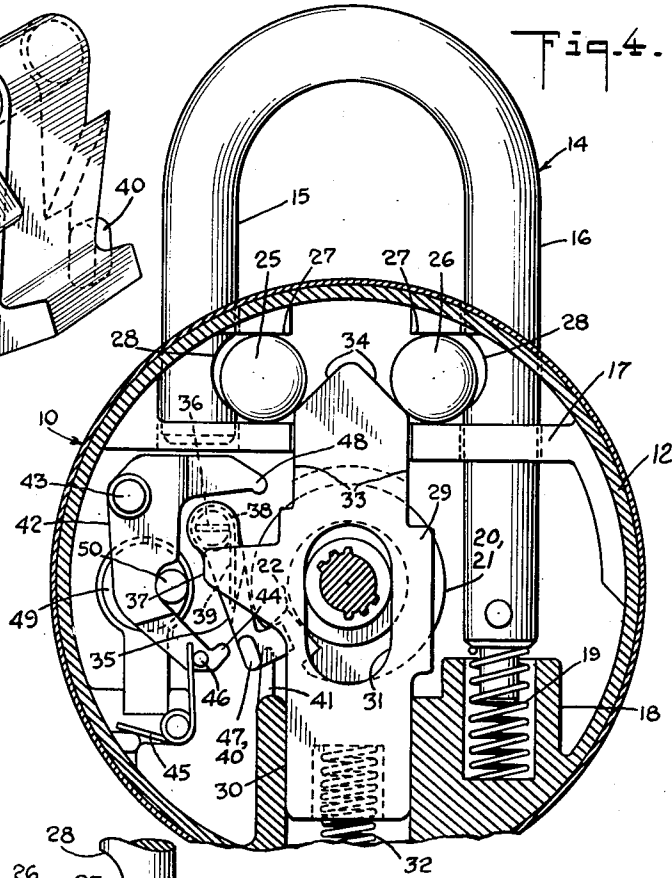
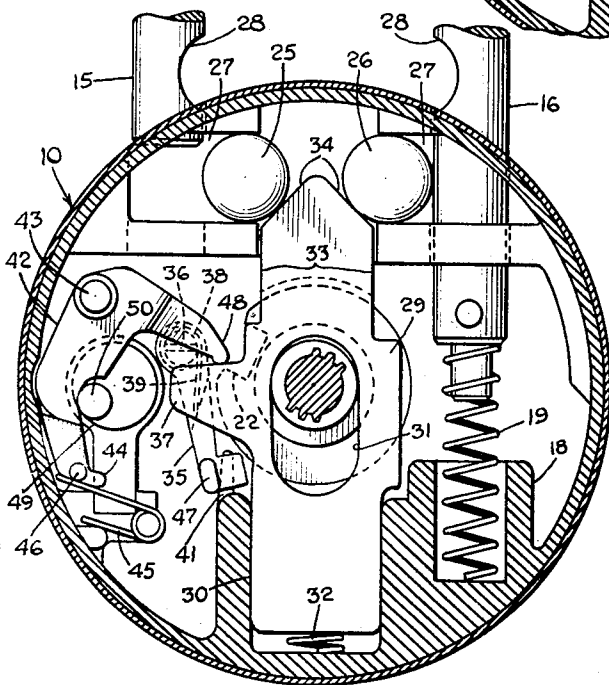


Fig. 5.



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2,931,204

COMBINATION PADLOCK

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Application October 5, 1956, Serial No. 614,264

13 Claims. (Cl. 70—21)

This invention relates to a padlock, and more particularly to a padlock of the combination type adapted also for key operation. As a feature of my invention the usual U-shaped shackle of my padlock is maintained in locking position by a pair of balls, the balls being in turn maintained in locking position by a dogging mechanism in the form, preferably, of a bolt. The arrangement is such that the balls are deadlocked in their locking position so that the padlock cannot be rapped.

Those persons skilled in the art appreciate fully that certain padlocks may be opened surreptitiously by the application of pressure to the shackle in a release direction, this being accompanied by the rapping or vibrating of the lock mechanism to force the locking mechanism gradually into release position. This cannot be accomplished in my padlock because of the arrangement of the locking balls and the bolt maintaining the locking balls in locking position.

As a further particular feature of the invention the locking bolt cannot be moved toward unlocking position except upon the movement first of a fence that is carried in some suitable way by the bolt. Since the fence cannot be moved except upon the setting of the tumbler gatings, or upon the operation of a key actuated mechanism, the bolt cannot be rapped to release the locking balls. This is an extremely important feature of my invention.

As a further feature of the invention to which I have just alluded, the locking bolt may be retracted from locking position by operation of key actuated locking mechanism that may take the form of a simple cylinder lock of the type well known in the art. As a further feature of this part of the invention, it is the key operated mechanism that forms the locking means for the fence to prevent the movement of the fence and bolt by rapping. Through the particular arrangement of parts, I am therefore able to effect dual functioning of certain of the parts so as to minimize the number of parts in the lock, thereby simplifying greatly the mechanism of the lock and reducing to a minimum its cost.

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.

In the drawings:

Fig. 1 is a sectional view of my novel padlock;

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

Fig. 3 shows in detail the fence and anti-rap retractor that I utilize in my novel lock;

Fig. 4 is similar to Fig. 1, but illustrates release of the lock through setting of the combination tumblers;

Fig. 5 shows key release of the lock.

For the purpose of describing my invention, I show my lock in Figs. 1 and 2 constructed with a circular casing 10 somewhat like that shown in my earlier application, Serial No. 547,406, with a bottom wall 11, a peripheral side wall 12 and a cover 13. On casing 10 is a U-shaped shackle 14 having opposed legs 15, 16. The leg 16 is relatively long and is mounted to slide longitudinally in openings in portions 17, 18 of the casing so that the shackle will move between locking and release positions, as will be understood. I prefer to utilize on the portion 18 of the casing a coil spring 19 that presses the shackle outwardly toward release position. I further show in Figs. 1 and 2 a series of rather usual combination tumblers 20 and driver tumbler 21, those tumblers having gatings 22, and being mounted to rotate on a post 23 on bottom wall 11 of the lock casing. A knob dial 24 rotates on the cover 13 to actuate driver tumbler 21. I believe it will be unnecessary to describe in detail the manner in which the tumblers 20, 21 are set, since those tumblers are conventional. It is necessary here to know merely that, through proper manipulation of the dial 24, the tumblers 20, 21 will be set to place their gatings 22 in aligned relation to a fence that I shall describe.

In the extremely novel padlock construction that I have now conceived, I utilize for locking the shackle 14 a pair of locking elements 25, 26, Fig. 1, those elements preferably being in the form of balls. I mount each locking element or ball 25, 26 in a pocket 27 on the lock casing 10, with the balls 25, 26 adapted to move in those pockets relatively to notches 28 that I form in the legs 15, 16 of the lock shackle. I further utilize a dogging member 29 that is mounted to move vertically between the locking elements or balls 25, 26. In the particular construction that I have chosen to illustrate, the dogging member 29 actually is a bolt that slides in a vertical guide way 30 on the lower part of casing 10, the medial part of the bolt being formed with an opening 31 whereby to have clearance relatively to the hub of driver tumbler 21. A coil spring 32 acts against the lower end of bolt 29 to press the bolt upwardly to a locking position that I show in Fig. 1.

To appreciate fully the action of the dogging member or bolt 29, it is necessary to observe that I form the upper portion of the bolt with a pair of opposed locking surfaces 33, and also with tapered holding surfaces 34. When bolt 29 is in locking position, Fig. 1, the locking surfaces 33 will be positioned against the balls 25, 26 and will dog the balls in locking position in the notches 28 of the shackle 14, thus acting positively to lock the shackle. If pressure is then applied to the shackle 14 in a release direction, the notches 28 will press the balls 25, 26 against the locking surfaces 33 on the bolt 29 so that the balls will simply hold the bolt more firmly in locking position. Thus, bolt 29 will be effective to deadlock the shackle 14, and it will not be possible to utilize a force applied to shackle 14 to move the bolt 29 in a release direction. I shall presently describe the means through which I move the bolt 29, but first I shall call attention to the fact that the bolt, when moving to a release position that I show in Fig. 5, will place its surfaces 34 opposite the balls 25, 26. This naturally will enable the shackle 14 to move to release position, since the notches 28 can then cam the balls 25, 26 inwardly toward the holding surfaces 34. In fact, the leg 16 on shackle 14 will then hold the ball 26 against one surface 34, as shown in Fig. 5, so that the bolt 29 can-

not return to locking position. Thus, once bolt 29 moves to release position, it will remain in that position until shackle 14 is again pressed to the locking position shown in Fig. 1, at which time the spring pressure of bolt 29 will act through holding surfaces 34 to move the balls 26, 27 into the notches 28 of the shackle.

As a very important part of my novel padlock, I utilize a fence 35, shown in detail in Fig. 3, that coacts with several parts of the lock mechanism, as will appear. I mount the fence 35 on the bolt 29, preferably through a pivot shaft 36 on a side portion 37 of the bolt, as shown in Figs. 1 and 2. On the pivot shaft 36 is a coil spring 32, Figs. 1 and 2, having an end portion 39 that acts against a surface on the fence 35 to press the fence toward the tumblers 20, 21. It will be understood, therefore, that the fence 35 will move bodily with the dogging member or bolt 29, but can in addition pivot on the bolt 29 whereby to move relatively to the tumblers 20, 21. When the tumbler gatings 22 are aligned relatively to the fence 35 through manipulation of the dial 24, the fence by its spring pressure will enter the gatings 22. Then the dial, by rotating driver tumbler 21, can move the fence 35 and bolt 29 bodily toward release position, that movement being illustrated in Fig. 4.

At this point it should be observed that I form the fence 35 with a portion 40, best seen in Fig. 3, that is adapted to coact with a lug 41 on the lock casing 10 in the manner shown in Fig. 4. As the bolt 29 moves toward release position, the fence 35 will move downwardly, with the fence portion 40 moving against the lug 41. Through that movement, the lug 41 will be effective to move the fence 35 out of the tumbler gatings 22 as the bolt 29 reaches its release position. The bolt 29 will then remain in release position, since the spring pressure of shackle 14 will have acted to move the locking element or ball 26 into holding relation to one surface 34 on the bolt, as shown in Fig. 5. Moreover, the tumbler gatings 22 will no longer be in aligned relation to the fence 35, because the tumblers 20, 21 have rotated while moving fence 35 in contact with lug 41. Therefore, when fence 35 again moves with bolt 29 to the locking position shown in Fig. 1, it will again be necessary to set the tumblers 20, 21 before fence 35 can enter the gatings 22 in the tumblers.

I have thus far referred to the fence 35 to describe the tumbler release of my padlock. However, it is exceedingly important to realize that, in my novel concept, I utilize the fence 35 with a lever 42, shown in detail in Fig. 3. The lever 42 is pivoted to the lock case 10 through a pin 43, Fig. 1, and will perform several different functions in my lock. In order that those functions may best be understood, I shall first call attention to the fact that I form on the lower end of lever 42 an anti-rap portion 44. The lever 42 is pressed in a counter-clockwise direction, as viewed in Fig. 1, through a spring 45 acting against a lug 46 on lever 42, thus holding the anti-rap portion 44 of the lever normally in the path of a portion 47 on the fence 35. The arrangement is such that the fence 35, when resting against the peripheries of the combination tumblers 20, 21 cannot move past the anti-rap portion 44. Since the fence 35 moves bodily with bolt 29, the anti-rap portion 44 will coact with portion 47 of the fence to prevent the movement of the fence and bolt to an unlocking position. Therefore, if an attempt is made to rap the lock, with blows applied in a direction to move bolt 29 toward release position, the lever 42 will prevent such movement of the bolt. Of course, if the tumbler gatings 22 are aligned relatively to the fence 35 through proper setting of the tumblers 20, 21, as has already been described in connection with Fig. 4, the fence 35 will move into the gatings 22 and can then bypass the anti-rap portion 44 of lever 42, so that the bolt 29 can move to release position.

I further form the lever 42 with a retractor arm 48 that normally lies in position to contact the upper surface

of the side portion 37 on the bolt 29, as shown in Fig. 1. On the lock casing 10 I mount a conventional lock cylinder 49, that cylinder having a key operated cam 50 adapted to act against the lever 42. When actuated by a key, the cam 50 will rotate lever 42 on its pivot 43 in a clockwise direction as shown in Fig. 5, so that the retractor arm 48 will press in a downward direction against the side portion 37 on the bolt 29. Further, by so rotating, the lever 42 will move its anti-rap portion 44 out of the path of the fence portion 47, so that lever 42 will no longer prevent release movement of the bolt 29. The lever 42 will then be effective, through its retractor portion 48, to move bolt 29 to release position. It will be understood, therefore, that I am able through the utilization of the single lever 42 to contribute key release of my pad-lock, as well as to prevent release through movement of the fence when the lock is rapped by unauthorized persons.

I believe that those skilled in the art will now understand that I have contributed an extremely novel padlock having very considerable advantages over the prior locks of the particular class. Through my novel concept, I am able to deadlock the lock shackle in such a way that pressure on the shackle cannot successfully be utilized in an attempt to defeat the lock through rapping. In addition, I am able through my inventive concept to effect either key release or tumbler release of the lock, but with means whereby the lock mechanism will be positively locked against release movement and cannot be moved to release position by rapping or vibrating the lock. I accomplish these things through a relatively simple mechanism that does not require a large number of parts. I believe, therefore, that the very considerable value of my invention will be fully appreciated.

I now claim:

1. In a padlock of the class described, a shackle, a part adapted to coact with said shackle, a bolt movable to locking and release positions relatively to said part, said bolt having a surface acting against said part when the bolt is in locking position to deadlock said shackle, a fence pivoted on said bolt, a series of combination tumblers having gatings, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with its pivot on said bolt to move the bolt to release position, and anti-rap means positioned in said padlock to prevent movement of said fence bodily with its pivot and said bolt until said fence moves relatively to said bolt on its pivot to enter said tumbler gatings.

2. In a padlock of the class described, a shackle, a part adapted to coact with said shackle, a bolt movable to locking and release positions relatively to said part, said bolt having a surface acting against said part when the bolt is in locking position to deadlock said shackle, a fence pivoted on said bolt, a series of combination tumblers having gatings, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings upon alignment of said gatings whereupon the rotation of said tumblers will move said fence bodily with its bolt pivot to move the bolt to release position, anti-rap means positioned in said padlock to prevent said movement of said fence bodily with its pivot when said fence lies against the tumbler peripheries, said fence moving away from said anti-rap means when it enters said tumbler gatings, and key actuated means acting independently of said fence for moving said bolt to release position.

3. In a padlock of the class described, a shackle, a part adapted to coact with said shackle, a bolt movable to locking and release positions relatively to said part, said bolt having a surface acting against said part when the bolt is in locking position to deadlock said shackle, a fence pivoted on said bolt, a series of combination

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tumblers having gatings, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with its pivot on said bolt to move the bolt to release position, movable anti-rap means positioned in said padlock to prevent movement of said fence bodily with its pivot and said bolt until said fence moves relatively to said bolt on its pivot to enter said tumbler gatings, and key operated means for moving said anti-rap means out of the path of said fence whereby said fence and bolt may move to release position without the prerequisite of said fence entering said tumbler gatings.

4. In a padlock of the class described, a shackle, a part adapted to coact with said shackle, a bolt movable to locking and release positions relatively to said part, said bolt having a surface acting against said part when the bolt is in locking position to deadlock said shackle, a fence pivoted on said bolt, a series of combination tumblers having gatings, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with its pivot on said bolt to move the bolt to release position, movable anti-rap means positioned in said padlock to prevent movement of said fence bodily with its pivot and said bolt until said fence moves relatively to said bolt on its pivot to enter said tumbler gatings, key operated means for moving said anti-rap means out of the path of said fence, and a part through which said key operated means is effective upon moving the anti-rap means out of the path of the fence to move the bolt to release position without the prerequisite of said fence entering said tumbler gatings.

5. In a padlock of the class described, a shackle, a part adapted to coact with said shackle, a bolt movable between locking and release positions relatively to said part, said bolt having a surface effective against said part when the bolt is in locking position to deadlock said shackle, a fence movably mounted on said bolt, a series of combination tumblers having gatings, a spring urging said fence toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with said bolt to move the bolt to release position, movable anti-rap means positioned in said padlock to prevent movement of said fence bodily with said bolt until said fence moves relatively to said bolt to enter said tumbler gatings, key operated means in said padlock for moving said anti-rap means out of the path of said fence, and a part through which said key operated means act upon movement of said anti-rap means out of the path of the fence to move said fence and bolt to release position.

6. In a padlock of the class described, a shackle, a part adapted to coact with said shackle, a bolt movable between locking and release positions relatively to said shackle, said bolt having a surface acting against said part when the bolt is in locking position to deadlock said shackle, a fence mounted on said bolt, a series of combination tumblers having gatings, a spring urging said fence toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with said bolt to move the bolt to release position, anti-rap means positioned in said padlock to prevent movement of said fence bodily with said bolt until said fence moves relatively to said bolt to enter said tumbler gatings, and key operated means acting independently of said fence for moving said bolt to release position without the prerequisite of said fence entering said tumbler gatings.

7. In a padlock of the class described, a shackle, a part adapted to coact with said shackle, a bolt movable between locking and release positions relatively to said shackle, said bolt having a surface acting against said part when the bolt is in locking position to deadlock said

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shackle, a fence mounted on said bolt, a series of combination tumblers having gatings, a spring urging said fence toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with said bolt to move the bolt to release position, movable anti-rap means positioned in said padlock to prevent movement of said fence bodily with said bolt until said fence moves relatively to said bolt to enter said tumbler gatings, and key operated means for moving said anti-rap means out of the path of said fence whereupon said fence and bolt may move to release position without the prerequisite of said fence entering said tumbler gatings.

8. In a padlock of the class described, a shackle, a part adapted to coact with said shackle, a bolt movable to locking and release positions relatively to said part, said bolt having a surface acting against said part when the bolt is in locking position to deadlock said shackle, a fence pivoted on said bolt, a series of combination tumblers having gatings, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with its pivot on said bolt to move the bolt to release position, anti-rap means positioned in said padlock to prevent movement of said fence bodily with its pivot and said bolt until said fence moves relatively to said bolt on its pivot to enter said tumbler gatings, and key operated means acting independently of said fence for moving said fence and bolt while said fence is outward of said gatings.

9. In a padlock of the class described, a series of combination tumblers having gatings, a bolt, a fence pivoted on said bolt, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with its pivot on said bolt to move the bolt to a release position, movable anti-rap means positioned in said padlock to prevent movement of said fence bodily with its pivot and said bolt until said fence moves relatively to said bolt on its pivot to enter said tumbler gatings, key operated means for moving said anti-rap means out of the path of said fence whereby said fence and bolt may move to release position without the prerequisite of said fence entering said tumbler gatings, a U-shaped shackle having a locking notch in each leg thereof, a locking ball for each notch, said bolt having opposed locking surfaces for holding one ball in each notch, opposed holding surfaces on said bolt movable with said bolt opposite to said balls to release said balls for movement out of said locking notches and to allow the consequent movement of said shackle legs to release position, and one of the legs of said shackle in said release position coacting with its ball whereby through one holding surface to hold said bolt in release position until the shackle is moved to bring its notches opposite said balls.

10. In a padlock of the class described, a series of combination tumblers having gatings, a bolt, a spring pressing said bolt toward a locking position, a fence pivoted on said bolt, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with its pivot on said bolt to move the bolt from locking to a release position, movable anti-rap means positioned in said padlock to prevent movement of said fence bodily with its pivot and said bolt until said fence moves relatively to said bolt on its pivot to enter said tumbler gatings, key operated means for moving said anti-rap means out of the path of said fence, a part through which said key operated means is effective upon moving the anti-rap means to move said fence and bolt to release position without the prerequisite of said fence

entering said tumbler gatings, a U-shaped shackle having a locking notch in each leg thereof, a locking ball for each notch, said bolt having opposed locking surfaces acting when the bolt is in locking position to hold one ball in each notch, opposed holding surfaces on said bolt movable with said bolt opposite to said balls to release said balls for movement out of said locking notches and to allow the consequent movement of said shackle legs to release position, one of the legs of said shackle in said release position holding its ball relatively to the corresponding holding surface on the bolt whereby to hold said bolt against its spring pressure in release position.

11. In a padlock of the class described, a case, a series of rotatable combination tumblers having gatings, a bolt mounted to move in said case, a fence pivoted on said bolt, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings so that said tumblers when rotating will move said fence bodily with its pivot on said bolt to move the bolt to a release position, a lever pivoted on said case and having a part positioned in the path of said fence to prevent movement of said fence bodily with its pivot and said bolt until said fence moves relatively to said bolt on its pivot to enter said tumbler gatings, an arm on said lever adapted for contact with said bolt, and key operated means for moving said lever whereby to withdraw its part out of the path of said fence while simultaneously through said arm moving said bolt to release position without the prerequisite of said fence entering said tumbler gatings.

12. In a padlock of the class described, a shackle having a locking notch, a locking ball for said notch, a bolt having a locking surface for holding said locking ball in the notch, a fence pivoted on said bolt, a series of combination tumblers having gatings, a spring urging said fence for pivotal movement toward the peripheries of said combination tumblers for entrance into the tumbler gatings whereupon the rotation of said tumblers will move said fence bodily with its pivot on said bolt to move the bolt to a release position, anti-rap means positioned in said padlock to prevent movement of said fence bodily with its pivot and said bolt until the fence moves relatively to said bolt on its pivot to enter the tumbler gatings, said locking ball effective when held in the shackle notch by the locking surface of the bolt to accept pressure that may be applied to the shackle,

so as to prevent an application of the shackle pressure through the bolt and fence to said anti-rap means, a holding surface on said bolt movable to a release position opposite said ball as the bolt and fence move bodily whereby to release said ball for movement out of said locking notch and to allow the consequent movement of said shackle to release position, and said shackle in said release position coacting with said ball through said holding surface whereby to hold said bolt in release position until the shackle is moved to bring its notch opposite said ball.

13. In a padlock of the class described, a case, a series of rotatable combination tumblers having gatings, a bolt mounted to move in said case, a fence mounted for movement on said bolt, a spring urging said fence for movement relatively to the bolt toward the peripheries of said combination tumblers for entrance into the tumbler gatings so that said tumblers when rotating will move said fence bodily with said bolt to move the bolt to a release position, a member mounted for movement on said case and having a part positioned in the path of said fence to prevent movement of said fence bodily with said bolt until said fence moves relatively to said bolt to enter said tumbler gatings, key operated means for moving said member whereby to withdraw its said part out of the path of said fence, and an integral portion of said member in opposed relation to a surface on the bolt and adapted to move in contact with that surface for moving said bolt as said member is moved by the key-operated means, so that the bolt will move to release position without the prerequisite of said fence entering said tumbler gatings.

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