Oct. 10, 1939. C. LEDIN 2,175,808

COMBINATION PADLOCK

Filed Sept. 20, 1935 2 Sheets-Sheet 1

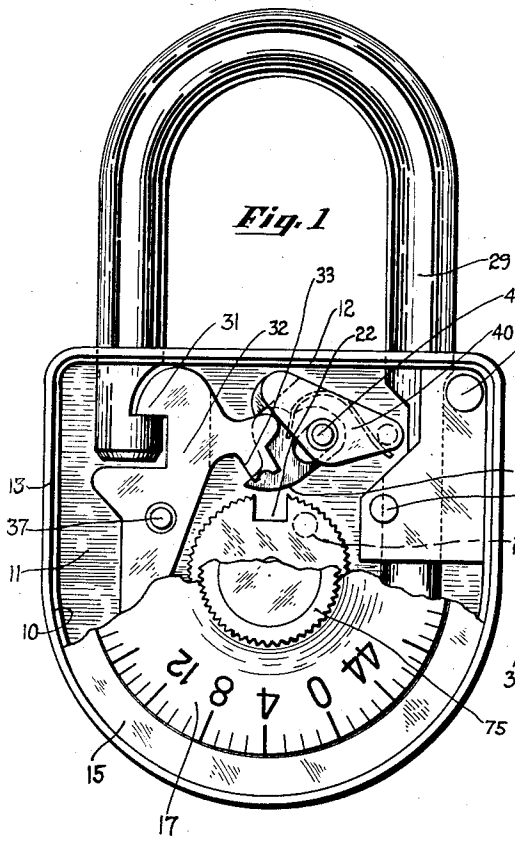


Fig. 1

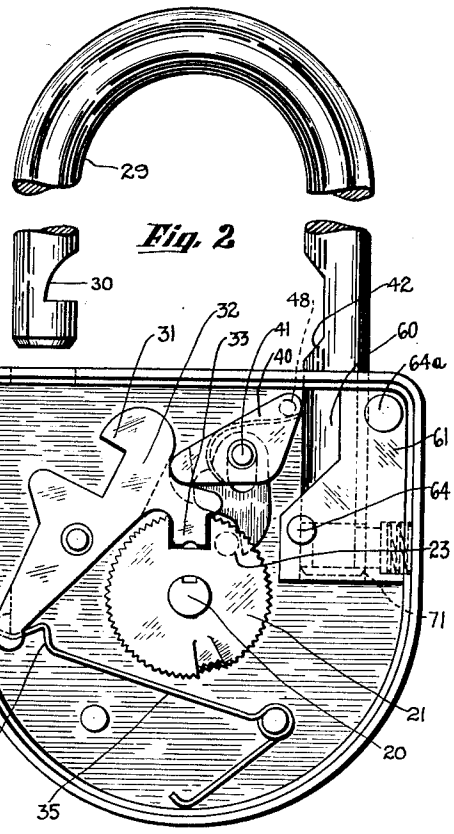


Fig. 2

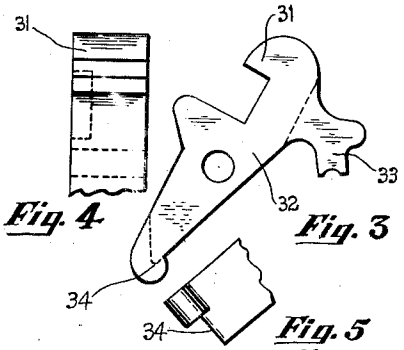


Fig. 4

Fig. 3

Fig. 5

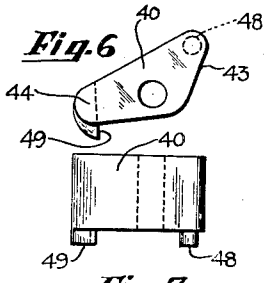


Fig. 6

Fig. 7

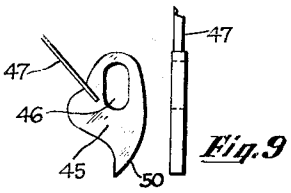


Fig. 9

Fig. 8

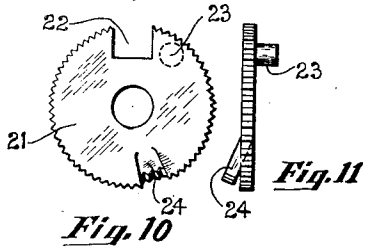


Fig. 10

Fig. 11

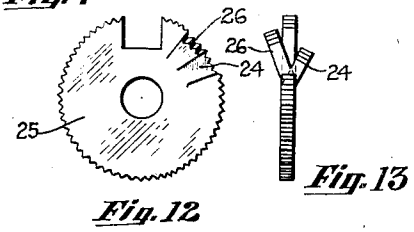


Fig. 12

Fig. 13

INVENTOR

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COMBINATION PADLOCK

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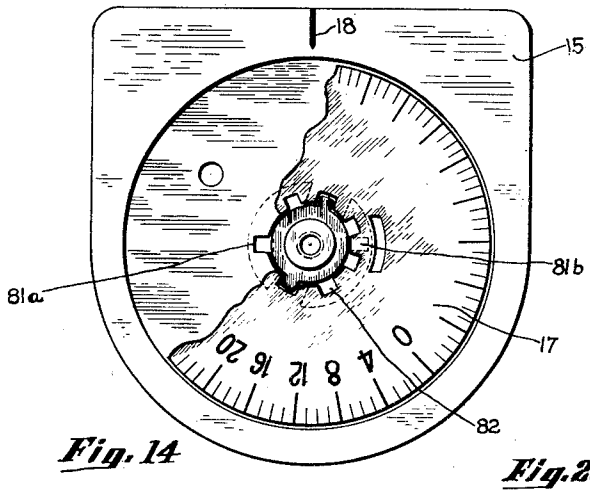


Fig. 14

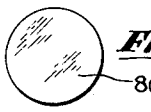


Fig. 21

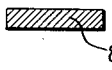


Fig. 22



Fig. 23

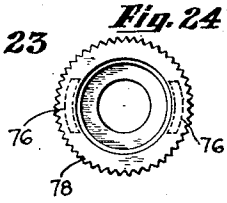


Fig. 24

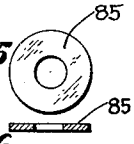


Fig. 25

Fig. 26

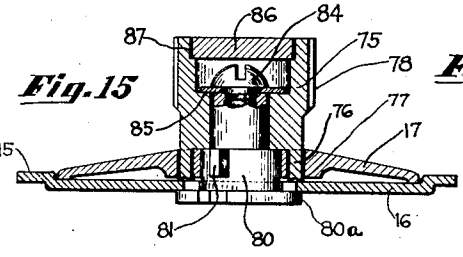


Fig. 15

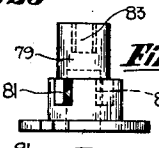


Fig. 27

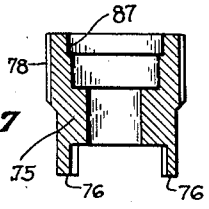


Fig. 29

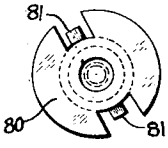


Fig. 28



Fig. 16

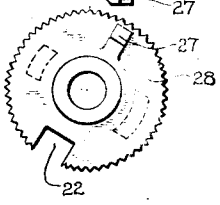


Fig. 17

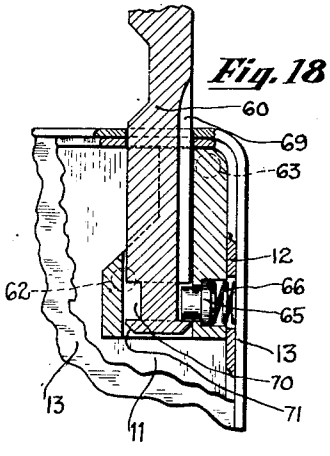


Fig. 18

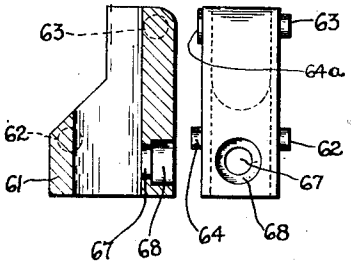


Fig. 19 Fig. 20

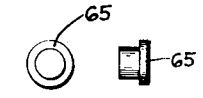


Fig. 30 Fig. 31

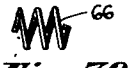


Fig. 32

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Patented Oct. 10, 1939

2,175,808

UNITED STATES PATENT OFFICE

2,175,808

COMBINATION PADLOCK

Charles Ledin, Stamford, Conn., assignor to The Yale & Towne Manufacturing Company, Stamford, Conn., a corporation of Connecticut

Application September 20, 1935, Serial No. 41,355

7 Claims. (Cl. 70—25)

This invention relates to a padlock of the combination type. Combination padlocks have been very highly developed in the art, but I believe that I have devised a combination of means whereby I am able to obtain a very fine and unusual locking action.

As a feature of my invention, I utilize a rather unusual form of combination disperser which is moved into dispersing position upon the release of the shackle, and which is actuated to disperse the combination upon reinsertion of the shackle into the padlock casing, and only after the fence has left the gatings. More in detail, the combination disperser is operated by an unusual fence, which is preferably integral with the shackle locking bolt and which places the disperser under tension during the first part of its movement out of the alined gatings, and, as it leaves the alined gatings, releases the tumblers for dispersion by the tensioned disperser. Preferably, also, I associate the disperser with a dogging lever which acts to dog the fence and maintain it in the gatings when the shackle is in released position outside the padlock casing. Thus, the fence is maintained within the gatings of the tumblers until the shackle is reinserted.

My invention comprises also a rather unusual type of shackle guiding member, and means for maintaining the shackle within the padlock once it is inserted therein.

My invention includes also a rather unusual type of assembly of the combination dial and tumbler actuator, and means for retaining the dial relatively to the base plate or index plate relatively to which it moves.

For a detailed description of my invention, I shall now refer to the drawings wherein Fig. 1 is a partial section of the padlock of my invention. Fig. 2 is a view similar to Fig. 1 showing several of the parts of Fig. 1 in a different operating position and having some of the parts of Fig. 1 entirely removed. Fig. 3 is a plan view of the combination locking bolt and fence, while Figs. 4 and 5 are partial side and bottom views of Fig. 3 illustrating the construction of the combination bolt and fence. Figs. 6 and 7 are respectively plan and side views of the fence dogging member. Figs. 8 and 9 are plan and side views of the disperser. Figs. 10 and 11 are plan and side views of one type of tumbler, while Figs. 12 and 13 are plan and side views of another type of tumbler. Fig. 14 is a partial section and plan view along substantially lines 14—14 of Fig. 15. Fig. 15 is a section through the dial and index plate and illustrates the assembly of those members. Figs. 16 and 17 are side and top views of still a further type of tumbler. Fig. 18 is a section through part of the padlock showing the construction of the shackle guiding member and the shackle retainer. Figs. 19 and 20 are respectively a section and a side view of the shackle guiding member. Figs. 21–32, inclusive, illustrate in detail some of the parts used in the padlock and shown assembled in Figs. 14–18, inclusive.

Referring now more particularly to the drawings, the casing of my padlock comprises an inside sheet metal part 10 having a bottom surface 11 and a continuous side wall 12. An outside sheet metal casing 13 surrounds the casing 10 and has side walls 14 which extend above the walls 12 and are adapted to be bent over the walls 12 and in engaging relation to a dished plate 15, shown in Fig. 14, so as to maintain that dished plate in position to form the upper surface of the padlock casing. This plate 15, which is dished at 16 as shown in Fig. 15, is actually a base or index plate on which is mounted the dial 17 for rotation relatively to an index line 18.

There is secured within the casing a post 20 on which is mounted a series of tumblers, the bottom-most of which is indicated by reference numeral 21, and is shown in detail in Figs. 2, 10 and 11. Each of the tumblers is provided with a gating 22 which must be alined opposite a fence to be indicated later, in order that the padlock may be opened. The bottom-most tumbler in addition has a disperser pin 23, the operation of which will also be indicated later. In order that the tumbler 21 be actuated, it has a struck out portion 24 which cooperates with a similar portion on the next superimposed tumbler 25, illustrated in Figs. 12 and 13. It will be noticed that the tumbler 25 has an additional struck out portion 26 which in turn cooperates with a lug 27 on the next superimposed tumbler 28, illustrated in Figs. 16 and 17. All of the tumblers of the type shown in Figs. 10–13, inclusive, may be made alike in actual manufacture, and the struck-out portions 24 and 26 may be placed in various positions on the periphery of those tumblers in order to set up the various combinations, as will be quite clear to those skilled in the art.

The shackle 29 has a locking portion 30 with which cooperates the nose 31 of a locking bolt 32 which has preferably an integral fence portion 33. This locking bolt is best shown in Figs. 3, 4 and 5, in which it will be noticed that the under side of the bolt is cut away as at 34 for cooperation with a spring 35 whose action is best illustrated in Fig. 2. This spring has a bumped out

portion 36 which cooperates with the cut away surface 34. Incidentally, the combination bolt and fence 32 is of the type which is actuated positively by the shackle for movement into locking position and also for movement out of locking position.

Thus, with the tumbler gatings 22 all in alignment, as in Fig. 1, an outward pull of shackle 29 will rotate the bolt 32 about its mounting on pin 37 so as to force the bolt into its position of Fig. 2. It will be appreciated that in Fig. 1 the portion 34 is in back of the bumped out part 36 of spring 35 so that the spring will tend to maintain the bolt in a shackle locking position. When the bolt is in its position of Fig. 2, its portion 34 is in front of portion 36 of the spring 35 so that the spring then tends to maintain the bolt within the alined gatings of the tumblers 21, 25 and 28.

A fence dogging member 40 is mounted on a pin 41 supported by the inner lock casing 10 and is adapted normally to occupy the position shown in Fig. 1. As the shackle 29 moves outwardly, its surface 42 will strike the under surface 43 of the dogging member 40 and will move it into the position of Fig. 2. The shackle will maintain member 40 in that position so long as the shackle is outside the casing. It will be appreciated that the surface 44 of the dogging member 40 will lie against the bolt 32 so as to maintain it dogged with its fence portion within the alined tumbler gatings, so long as the member 40 is held by the shackle as shown in Fig. 2.

A disperser member 45 is slotted at 46 so as to be mounted for both sliding and pivotal movement on the pin 41 on which the dogging member 40 is pivoted. Spring 47 carried by the disperser 45 cooperates with a pin 48 on the dogging member so as to be constantly spring pressed into abutting relation to a lug 49 on the dogging member. In view of this relationship between the disperser and the dogging member, the dogging member will move the disperser as it rotates in a counter clockwise direction from Fig. 1 to Fig. 2, but the disperser will remain behind, due to its contact with disperser pin 23 of tumbler 21, as the dogging member rotates in a clockwise direction from Fig. 2 back to Fig. 1. However, during this movement of the dogging member, the spring 47 will be tensioned so that it may throw the disperser 45 rather rapidly as soon as the disperser may move from its position of Fig. 2 to its position of Fig. 1, upon withdrawal of the fence 33 from the alined tumbler gatings.

The operation of the parts just described is as follows: During the movement of bolt 32 from the position of Fig. 1 to the position of Fig. 2, the dogging member 40 will move as illustrated because of its coaction with surface 42 of the shackle. The curved surface 50 of the disperser will abut the disperser pin 23 on the bottom tumbler 21 and this will cause the disperser to slide upwardly on its pin mounting 41 until such time as it passes the pin 23 whereupon it will assume the position of Fig. 2. Of course, the curved surface 50 will not abut the pin 23 until after the fence portion 33 has entered the gating 22 to maintain the tumbler 21 stationary.

During movement of the fence back from the position of Fig. 2 to the position of Fig. 1 by reinsertion of the shackle 29, the dogging member 40 will be rotated to place the spring 47 under tension, but the disperser 45 will be maintained in its position of Fig. 2 against the pin 23 until such time as the fence 33 is entirely outside the gating 22. Thereupon, the disperser 45 will be released for snapping action under the influence of its spring 47 and will impart a spinning movement to the bottom tumbler 21 through pin 23 so as to readily disperse the combination, as will be quite apparent to those skilled in the art.

It will be noted that the shackle 29 is guided through means of its long leg 60, by a shackle guiding member 61 (Fig. 18). This shackle guiding member has pins 62 and 63 (Figs. 19 and 20) whereby it is doweled into the bottom surface of the lock casing. It is maintained in this doweled position by the upper dished plate 15 which cooperates with its lugs 64 and 64*a*. In this way, a very smooth guiding of the padlock shackle is obtained without the presence of complicated mechanism.

A retaining pin 65 is spring pressed by a spring 66 as best shown in Fig. 18 in a bore 67 of the shackle guiding member and is limited in this movement by a shoulder 68 within this bore. The spring 66 operates against a wall of the outside casing member 13. The shackle leg 60 is vertically grooved as at 69 and contains a further circular communicating groove 70 near its lower end. The end surface of the leg 60 is beveled as at 71 so that the shackle may be readily inserted, camming pin 65 outwardly against the pressure of its spring 66. Once the groove 70 is opposite the pin 65, that pin will drop into groove 70 and will thereafter maintain the shackle against complete outward movement from the padlock casing. Through the vertical groove 69, pin 65 does permit vertical movement of the shackle 29 relatively to the casing and also prevents rotary movement of the shackle once it is moved sufficiently to bring the groove 70 below the pin 65.

The numbered or combination disk 17 has supported thereon a hollow knob 75, illustrated best in Figs. 15 and 24. This knob has lugs 76 which are staked over relatively to the disk 17 as at 77 for securing the disk and knob for integral rotation. The outside surface of the knob is knurled as at 78 to permit easy manipulation thereof.

A tumbler actuator 80 has a portion 80*a* located at one side of the dished portion 16 of the plate 15, and has a shaft portion extending above plate 15, into the hollow knob 75. Actuator 80 has a pair of lugs 81 cooperable with any two of a series of slots 82 in the disk 17 so as to facilitate changing the combination relation between the disk 17 and the tumbler actuator 80. This relationship between the dial 17 and the actuator 80 is one which is quite well known in this art. The plate 15 is slotted as at 81*a* and 81*b* to permit movement of the actuator lugs 81 into the position of Fig. 15. The tumbler actuator 80 is threaded at 83 so that a screw 84, through the intermediary of a washer member 85, may secure the knob 75 and dial 17 against endwise movement relatively to the actuator 80. In this way, the parts will be all maintained assembled, as best shown in Fig. 15. For covering the hollow portion of the knob 75 to conceal the screw 84, I utilize a disk member 86 which is wedged into the portion 87 of the knob 75, as best illustrated in Fig. 15. Preferably, this disk 86 will bear the trade-mark of the manufacturer.

I claim:

1. In a combination padlock having a shackle and a casing, a series of combination tumblers

having gatings, a fence adapted to enter said gatings when alined and adapted when so doing to release the shackle for movement outwardly partially from said padlock casing, a dogging lever for said fence, a part of said shackle maintaining the dogging lever in a position maintaining the fence within the gatings when said shackle is in its release position and moving the dogging means from dogging position when said shackle is reinserted into the casing, tumbler dispersing means, means whereby said tumbler dispersing means is tensioned when said dogging lever is moved out of dogging position by reinsertion of the shackle, and means whereby at least one of the tumblers is moved by said dispersing means when the fence is moved out of the tumbler gatings.

2. In a combination padlock having a shackle and a casing, a series of combination tumblers having gatings, a fence adapted to enter said gatings when alined and adapted when so doing to release the shackle for movement outwardly partially from said padlock casing, a dogging lever for said fence, a part of said shackle maintaining the dogging lever in a position maintaining the fence within the gatings when said shackle is in its release position and moving the dogging means from dogging position when reinserted into the casing, a disperser, a spring for said disperser, means whereby said spring is tensioned incidental to the movement of said dogging lever out of dogging position upon reinsertion of the shackle, said disperser being maintained against one of the tumblers while said tensioning is being accomplished, said tumbler being in turn held by the fence within its gating, said disperser moving to disperse said tumbler as soon as said fence is moved out of the gating thereof.

3. In a combination padlock having a shackle and a casing, a series of combination tumblers having gatings, a fence adapted to enter said gatings when alined and adapted when so doing to release the shackle for movement outwardly partially from said padlock casing, a dogging lever for said fence, said shackle maintaining the dogging lever in a position maintaining the fence within the gatings when said shackle is in its release position and moving the dogging means from dogging position when reinserted into the casing, a disperser, a spring for said disperser, means whereby said spring is tensioned incidental to the movement of said dogging lever out of dogging position upon reinsertion of the shackle, said disperser being maintained against one of the tumblers while said tensioning is being accomplished, said tumbler being in turn held by the fence within its gating, said disperser moving to disperse said tumbler as soon as said fence is moved out of the gating, and means whereby said fence is moved out of said gating upon reinsertion of the shackle into the casing.

4. In a combination padlock having a shackle and a casing, a series of combination tumblers having gatings, a fence adapted to enter said gatings when alined and adapted when so doing to release the shackle for movement outwardly partially from said padlock casing, said fence being thereafter movable out of the gatings when it is desired to lock the shackle once again, a disperser, a spring for said disperser, and means actuated by said fence whereby said spring is tensioned during the first part of the movement of the fence from the tumbler gatings, whereby when said fence finally leaves the tumbler gatings said disperser will disperse at least one of the tumblers.

5. In a combination padlock having a shackle and a casing, a series of combination tumblers having gatings, a fence adapted to enter said gatings when alined and adapted when so doing to release the shackle for movement outwardly partially from said padlock casing, a disperser, means mounting said disperser for pivoting and sliding movement, a spring adapted when tensioned to force the disperser in a particular direction from its dispersing position, means whereby said disperser is moved in a pivoting and sliding manner relatively to one of said tumblers to be placed in its dispersing position after at least a partial entry of the fence into said gatings, and means whereby said spring is tensioned during the first part of the movement of the fence out of the tumbler gatings, whereby when said fence finally leaves the tumbler gatings said disperser will be pressed from its dispersing position to disperse at least one of the tumblers.

6. In a combination padlock, a U shackle having a locking nose on one leg, a combined bolt and fence movable into and out of locked relation to said shackle nose by a pushing in or a pulling out of said shackle relatively to said padlock, combination tumblers having gatings, the said shackle moving the fence of said bolt into said gatings when said shackle is pulled out and the tumbler gatings are aligned, a locking dog for said fence in the shape of a pivoted lever having one end abutting said fence and the other end abutting the other leg of said shackle, a cam surface on said other leg cooperating with said dog, said cam surface moving said dog into a position locking the fence in the tumbler gatings as said shackle is pulled out and the fence enters said tumbler gatings, said cam surface releasing the dog for movement by the fence when the fence is moved by the insertion of the shackle into the casing.

7. In a combination padlock, a U shackle having a locking nose on one leg, a combined bolt and fence movable into and out of locked relation to said shackle nose by a pushing in or a pulling out of said shackle relatively to said padlock, combination tumblers having gatings, the said shackle moving the fence of said bolt into said gatings when said shackle is pulled out and the tumbler gatings are aligned, a locking dog for said fence in the shape of a pivoted lever having one end abutting said fence and the other end abutting the other leg of said shackle, said dog being movable on its pivot incidental to the pushing in or pulling out of said shackle whereby to lock the fence in the tumbler gatings or to release the fence for movement out of the tumbler gatings.

CHARLES LEDIN.