E. McDONNELL.

COMBINATION LOCK.

APPLICATION FILED FEB. 6, 1914.

1,120,513.

Patented Dec. 8, 1914.

2 SHEETS—SHEET 1.

Fig 2

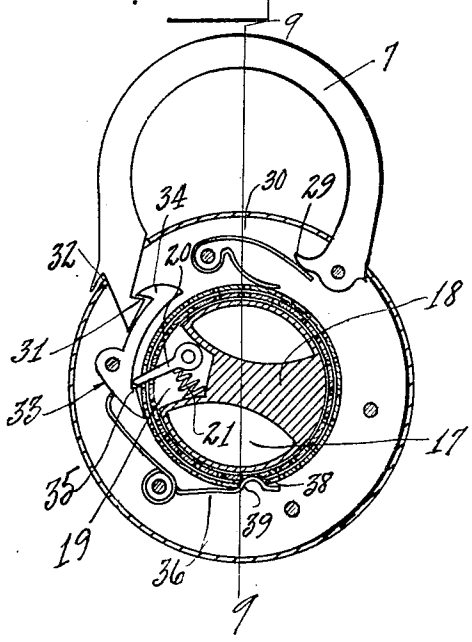


Fig 1

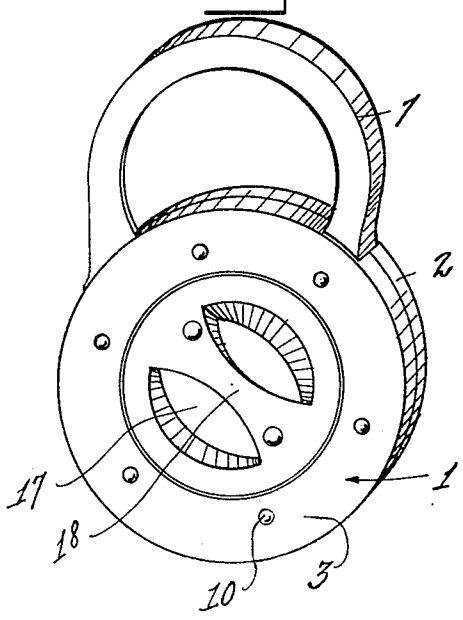


Fig 3

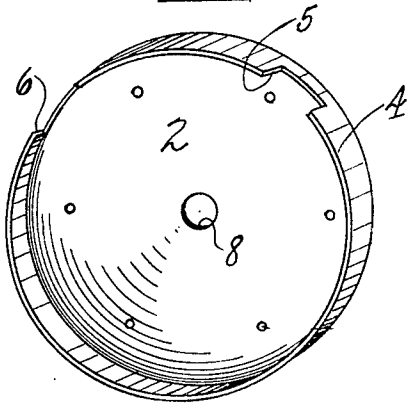
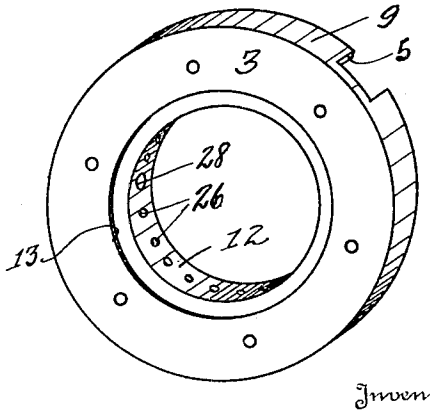


Fig 4



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2 SHEETS—SHEET 2.

Fig 5

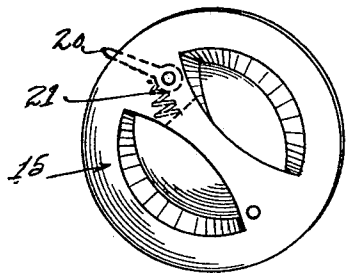


Fig 6

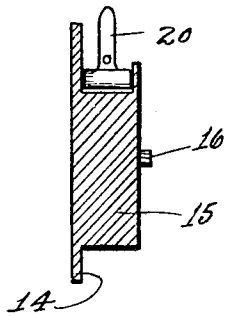


Fig 7

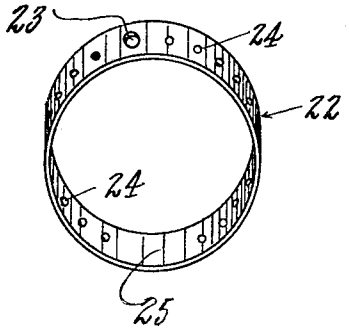


Fig 8

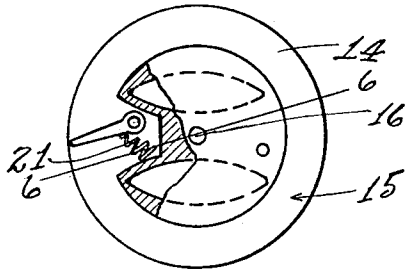
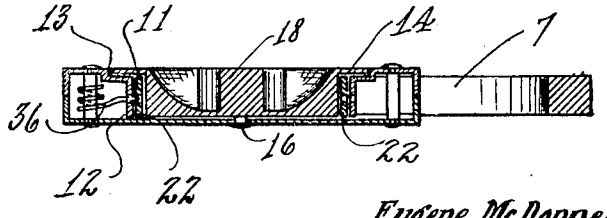


Fig 9



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UNITED STATES PATENT OFFICE.

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COMBINATION-LOCK.

1,120,513. Specification of Letters Patent. Patented Dec. 8, 1914.

Application filed February 6, 1914. Serial No. 817,008.

To all whom it may concern:

Be it known that I, EUGENE McDONNELL, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Combination-Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The primary object of this invention is to provide a combination or permutation lock of extremely simple and practical construction, which is capable of a large number of combinations, and which is devoid of all protuberances, such as operating knots and pins, which are customary in locks of this type.

Another object of the invention is to provide a lock of this nature having a rotatable lock disk which carries a spring pressed releasing pawl to engage a shackle pawl and release the latter when the proper combination obtains.

With these and other objects in view as will become more apparent as the description proceeds, the invention consists in certain novel features of construction, combination and arrangement of parts as will be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a perspective view of my improved combination padlock, Fig. 2 is a side elevation with one of the casing plates removed, and parts of the mechanism shown in section, Fig. 3 is a perspective view of the rear casing plate, Fig. 4 is a perspective view of the front casing plate, showing one of the combination bands in position, Fig. 5 is a perspective view of the operating disk, Fig. 6 is a section taken on the plane of line 6—6 of Fig. 3, Fig. 7 is a perspective view of the rotatable combination ring, Fig. 8 is a rear elevation of the operating disk, shown partly broken away and partly in section, and Fig. 9 is a section taken on the plane of line 9—9 of Fig. 2.

Referring in detail to the drawings by numerals, 1 designates, as an entirety, the lock casing which is formed of two plates designated 2 and 3 respectively. The rear casing plate 2, illustrated in Fig. 3, is provided with a peripheral flange 4 having edge opening notches 5 and 6 to accommodate the shackle 7, and also formed with a central circular opening 8 for a purpose to be hereinafter explained. The front casing plate 3 is formed with a peripheral flange 9 having edge opening notches which coöperate with the notches 5 and 6 when the two plates are secured to each other by means of the rivets 10.

The casing plate 3 is formed with a central opening 11 which is surrounded by an inwardly projecting circular flange 12. The exterior of the plate is inset around the periphery of the opening 11, as indicated by the numeral 13, to receive a lateral flange 14 formed on the operating disk 15. This disk fits within the ring 12 and is rotatably secured to the casing plate 2 by a stud 16 which extends through the opening 8. The front face of the operating disk is formed with a pair of finger recesses 17 which provides a finger piece 18, so that the disk may be easily and conveniently rotated. The operating disk is also provided with a peripheral recess 19 in which is pivoted one end of a releasing pawl 20. This pawl projects outwardly beyond the recess and it is forced in one direction by means of an expansive helical spring 21 housed within the recess.

Between the operating disk 15 and the flange 12, I interpose what may be termed a combination band 22, clearly illustrated in Fig. 7. This band is formed with a pawl opening 23 to accommodate the pawl 20, and a plurality of smaller openings 24 arranged on opposite sides of the opening 23 for the purpose of producing clicks as the operating disk is rotated by having the pawl ride over them. Separating the two series of openings 24, which are arranged on opposite sides of the opening 23, is an imperforate portion 25 which is termed the silence portion, and which is employed to start counting for the combination.

The flange 12 is provided with a circumferential series of openings 26 which are termed check openings and which engage the pawl 20 at certain times to hold the operating disk 15 against rotation in one direction; and is also provided with a pawl opening 28 through which the pawl 20 projects when the combination is set.

The shackle 7 is pivotally secured at one

end to one of the rivets 10, and is formed adjacent said pivoted end with a lug 29 which is engaged by a flat metal spring 30 to throw the shackle when the free end is released. The other end of the shackle, which is insertible through the slot 6 and the corresponding slot formed in the cover plate 3, is shaped to form an upwardly facing shoulder 31 and is also provided with a stop projection 32. The shoulder 31 is engaged by a pawl 33 supported on one of the rivets 10. The head 34 of the pawl engages the shoulder 31 to prevent the free end of the shackle being withdrawn from the casing 1. The inner edge of the pawl 33 is formed on the opposite side of the pivot point from the head 34 with a shoulder 35 against which the pawl 20 engages to swing the head 34 from engagement with the shoulder 31. A spring 36 is coiled about one of the rivets 10 and serves to hold the head 34 normally in the path of the shackle. One end of the spring extends in the direction of the slot 38 formed in the stationary flange 12 and is bent to form a tongue 39 which projects inwardly through this slot into engagement with the combination band 22.

Having described the construction of my improved combination padlock, I will now explain briefly the operation thereof: It will be seen that the operating disk 15 is always free to turn to the right or in a clockwise direction, and may be thus rotated without disturbing the combination band 22. When, however, the disk 15 is turned to the left or in a counterclockwise direction, the tip of the pawl 20 will catch in one of the openings 24, thus causing the band 22 to rotate with the disk. It will be understood that the openings 24 are not of sufficient size to permit the pawl 20 passing into engagement with the check openings 26 in the flange 12. Should the pawl 20 pass through the opening 23, when the latter is not in registration with the opening 28, it will engage one of the check openings 26 and lock the disk 15 against further rotation in a counterclockwise direction. Suppose now for example the combination of the padlock be five clicks left and eight clicks right, meaning left and right of the silence portion 25 of the ring 22. Turn the disk 15 to the left until the portion 25 passes over the clicker arm 39 of the spring 36, and then continue the rotation in this direction until five clicks are heard. The opening 23 will then be alined with the opening 28 in the stationary flange 12. Now reverse the rotation of the disk 15 to bring the pawl to the silence portion 25 of the ring 22, and then count eight clicks, these last mentioned clicks being made by the pawl passing across the openings 24. The pawl is then alined with the registering openings 23 and 28, and the lock may be opened by turning the disk 15 to the left, which movement causes the pawl 20 to engage the shoulder 35 of the pawl 33 and swing the latter from engagement with the shackle, allowing said shackle to fly open. To lock the mechanism, turn the disk 15 to the right a few clicks and then to the left and close the shackle 7.

From the foregoing description taken in connection with the accompanying drawings, it will be apparent that I have provided a very simple and practical combination or permutation padlock, which is capable of a multitude of combinations, which may easily be changed by shifting the position of the opening 23 and the clicker arm 39.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of the invention as claimed.

Having thus described my invention, I claim:—

1. In a combination lock, a casing, a rotatable disk supported by said casing, a spring pressed pawl carried by the disk and projecting beyond the periphery thereof, a band encircling the disk and formed with an opening through which the pawl may project, a stationary band surrounding said first mentioned band and formed with an opening to receive the pawl, a locking element, and means for engagement by the pawl to release the locking element.

2. In a combination padlock, a casing having an opening in the front wall thereof, a disk mounted to revolve within said casing and accessible through said opening, the disk being formed with a peripheral recess, a spring pressed pawl secured at one end within said recess and projecting beyond the periphery of the disk, a combination band encircling the disk and formed with an opening through which the pawl may project, a stationary band encircling said first mentioned band and formed with an opening adapted to register with the second mentioned opening, a shackle and a locking pawl for the shackle, said pawl being released from engagement with the shackle by said first mentioned pawl.

3. In a combination padlock, a cylindrical casing having a central opening in the front wall thereof, a disk rotatably secured to the rear wall of the casing and accessible through said opening, the disk being formed with a peripheral opening, a spring pressed pawl pivotally secured at one end within said opening, a combination band loosely encircling the disk and formed with an opening through which the pawl may project, the band being also provided with a plurality

of smaller openings over which the pawl rides, a stationary band encircling said first mentioned band and formed with an opening to register with the pawl openings, clicking mechanism, a shackle, and a shackle pawl operated on by said first mentioned pawl.

4. In a combination padlock, a cylindrical casing having a central circular opening in one wall thereof, a disk rotatably mounted within the casing and accessible through said opening, the disk being formed with a peripheral recess, a pawl pivoted at one end within said recess, a combination band encircling the disk, said band being formed with a pawl opening and with a plurality of small openings, a stationary band encircling the first mentioned band having a pawl opening for registration with said first mentioned pawl opening, and a plurality of check openings, a clicker spring, a shackle, and a shackle pawl pivoted within the casing, the first mentioned pawl engaging the shackle pawl to move it into inoperative position.

In testimony whereof I affix my signature in presence of two witnesses.

EUGENE McDONNELL.

Witnesses:
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M. E. FEEHAN.