Aug. 29, 1933. A. FURINO 1,924,987

COMBINATION LOCK

Filed Oct. 17, 1932

Fig. 1.

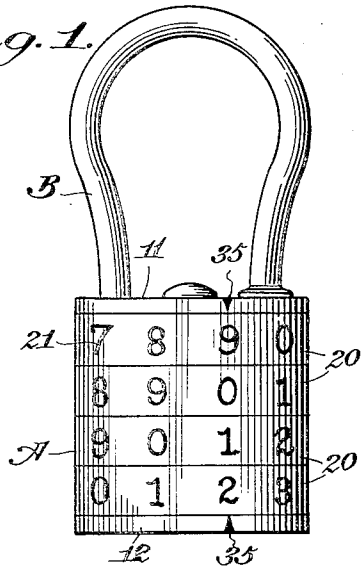


Fig. 2.

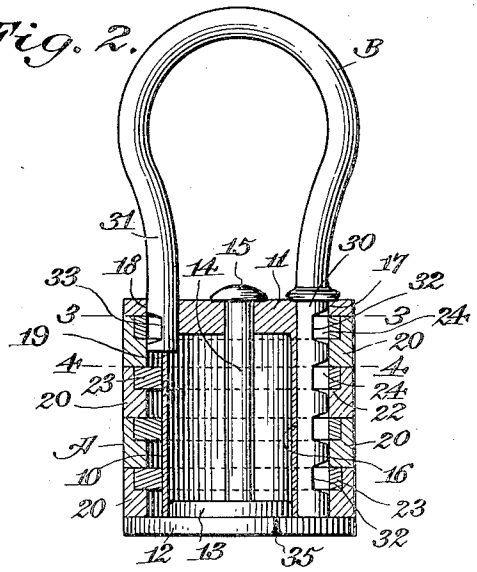


Fig. 3.

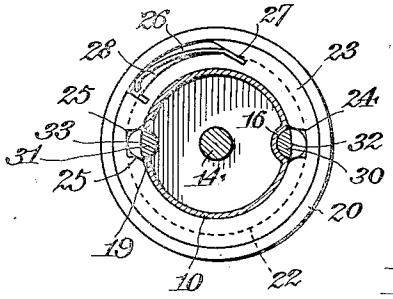


Fig. 4.

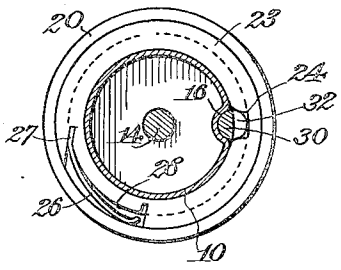


Fig. 5.

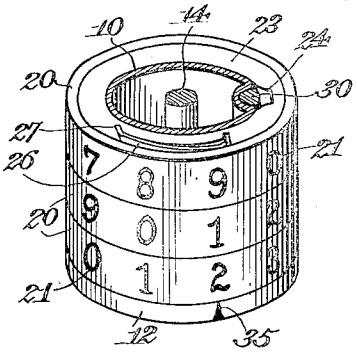


Fig. 6.

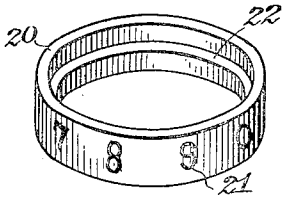


Fig. 7.

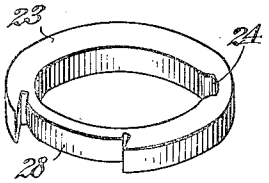
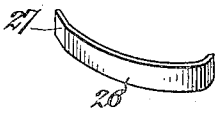


Fig. 8.



WITNESS

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COMBINATION LOCK

Antonio Furino, Brooklyn, N. Y.

Application October 17, 1932. Serial No. 638,233

2 Claims. (Cl. 70—113)

This invention relates to combination locks, and comprehends a lock which is so constructed and arranged as to permit of the ready changing of the combination without the necessity of disassembling the lock.

More particularly, the invention resides in a combination lock which includes locking members freely movable to a predetermined relation to release the lock and dialing means for gaging said predetermined relation, which dialing means is so connected with the locking members as to permit of intentional relative movement whereby the combination may be readily changed.

The invention further aims to provide an improved combination lock of the indicated character which embodies few and simple parts capable of economical production and assemblage and which lock is highly efficient in its purpose.

With the above recited and other objects in view, reference is had to the following description and accompanying drawing, in which there is exhibited one example or embodiment of the invention, while the claims define the actual scope of the same.

In the drawing:

Figure 1 is a side view of the invention as applied to a padlock.

Figure 2 is a vertical sectional view therethrough.

Figure 3 is a horizontal sectional view taken approximately on the line indicated at 3—3 in Figure 2.

Figure 4 is a similar view taken approximately on the line indicated at 4—4 in Figure 2.

Figure 5 is a sectional perspective view.

Figure 6 is a perspective view of one of the dialing members.

Figure 7 is a perspective view of one of the locking members.

Figure 8 is a perspective view of the spring which frictionally connects the dialing and locking members.

Referring to the drawing by characters of reference, the lock includes a body which is designated generally by the reference character A and a member to be locked which is designated generally by the reference character B. The lock body in the present instance is composed of a cylindrical core 10 having a fixed upper head 11 and a separate lower head 12 to facilitate assembly of the body, the heads 11 and 12 being of larger diameter than the core 10. As shown, the core 10 is hollow, mainly for the purpose of reducing the weight of the lock and the lower head 12 is provided with a reduced boss 13 fitted within the lower open end of the core. A concentric upwardly projecting shank 14 extends through the upper head 11 and is provided with an upset or riveted upper end 15 for securing the head 12 in assembled relation with the core. In effect, the core 10 and heads 11 and 12 define a spool lock structure, and the core 10 at one side thereof is provided with a substantially semi-circular groove 16 extending longitudinally thereof and registering in part with a circular opening 17 in the upper head 11. At a diametrically opposite point, the head 11 is formed with a circular opening 18 and the upper portion of the core adjacent said opening is cut away as at 19. The body of the lock is completed by a plurality of dialing rings 20 of identical construction, the exterior diameters of which conform substantially to the external diameters of the heads 11 and 12 and the exterior peripheries of which rings are formed with circumferentially spaced indicia 21, in the present instance numbers ranging from zero to nine. The inner peripheries or diameters of the dialing rings coincide with the outer peripheries of the openings 17 and 18 and are spaced from the outer periphery of the core 10. Each dialing ring 20 is rabbeted or provided with an annular internal cut-away portion 22 which extends throughout approximately a half of its thickness and a half of its depth. A locking ring 23 is fitted within the rabbeted or cut-away portions 22 and the inner peripheries of the locking rings are of a diameter approximating the diameter of the outer periphery of the core 10. Each locking ring is formed with a notch 24 opening through its inner periphery and the locking ring of the uppermost dialing ring is formed with a second diametrically disposed notch 25. Any suitable means is provided for holding the dialing and locking rings against unintentional relative movement while allowing an intentional relative movement thereof. The means illustrated by way of example consists of a leaf spring 26 having one terminal 27 anchored to one of the rings, in the present instance the inner locking ring. The spring lies within a notch 28 opening through the outer periphery of the locking ring, and the tension of the spring is such that it frictionally engages with the annular wall of the rabbeted or cut-away portion 22. The member B to be locked is shown as a yoke having substantially parallel circular arms 30 and 31, the former being of a length to extend through the opening 17 and throughout the length of the groove 16 and the latter being of a length to extend through the

opening 18 and to terminate at the cut-away portion 19 of the core 10. The arm 30 is formed with a series of longitudinally spaced outwardly disposed notches 32 corresponding in arrangement and location to the locking rings 23 when the arm 30 is fully inserted in the lock. The arm 31 is formed with a single notch 33 which when the member B is fully inserted, registers with the locking ring of the uppermost dialing ring.

Obviously, when the member B is inserted in the lock body A as illustrated in Figure 2, turning of the dialing and locking rings disposes the notches 24 and the notch 25 out of registry with the notches 32 and the notch 33, so that the member B is locked in the body A against withdrawal until the locking rings are brought into their predetermined relation with all of the notches 24 in registry with the groove 16, which automatically positions the notch 25 in registry with the opening 18. The locking element B may then be withdrawn, as the lock is then in an unlocked condition. The particular combination of indicia 21 may be aligned with any arbitrary gage mark or marks 35 on the heads 11 and 12 to indicate to the initiated operator the proper setting of the combination for release. As previously explained, the leaf spring or equivalent means normally prevents relative turning of the locking and dialing rings and disruption of the set combination, as it is apparent that no resistance is offered to the free turning of the rings.

When, however, it is desired to change the combination, intentional relative turning movement of the dialing rings with reference to the locking rings may be effected by holding the inner locking rings against turning. This may be accomplished in various ways, several of which will suffice. One manner of changing the combination is to set the old combination and withdraw the member B slightly until the unnotched portions of the arm 30 between the notches 32 are disposed in registry with the notches 24 in the locking ring. The operator then turns one or more of the outer dialing rings until the new combination of indicia 21 aligns with the gage marks 35. Obviously, this disposes the notches 24 in a different relative position to the indicia, requiring the new combination of indicia 21 to be aligned with the gage marks 35 before the member B is released for withdrawal. Another manner in which changing of the combination may be accomplished is to set the old combination, completely withdraw the arm 30 of the member B and re-insert the same with the notched side 32 disposed in the groove 16 and with the unnotched side disposed outwardly and engaging in the notches 24. Obviously, this positively holds the locking rings against turning movement while permitting the operator to shift one or more of the dialing rings with reference to the locking rings and to bring a new combination of indicia 21 alignment with the gage marks 35.

While the invention has been illustrated and described in connection with a padlock in order to demonstrate applicant's conception, it is to be clearly understood that the invention is not to be limited to this particular type of lock but is intended to cover broadly any combination lock in which a plurality of locking members are employed which are adapted to be moved to a predetermined relation for releasing the lock and in which dialing members are associated with the locking members and form means which normally retain both of said members in a fixed relation, and which means permits of relative movement when one of the members is held so as to change the dial combination.

What is claimed is:

1. A combination lock including a body, a member to be locked insertable in the body, freely rotatable locking rings adapted to be moved to a predetermined relation with reference to each other and the body to release said member and dialing rings surrounding the locking rings and so connected therewith that when the locking rings are held against movement, the dialing rings may be moved with reference thereto for changing the combination, the connection between said locking and dialing rings consisting of a notched portion of the outer periphery of the locking ring and a leaf spring arranged in said notched portion and anchored at one end thereof to the locking ring with the free end of said leaf spring frictionally engaging with the inner periphery of the dialing ring.

2. In a combination lock, a plurality of locking members adapted to be moved to a predetermined relation for the release of the lock and means for gaging the release relation of the locking members comprising a dial member associated with each locking member and normally movable therewith and means normally retaining the dial and locking members in a fixed relation against unintentional movement while permitting of intentional relative movement to change the combination, said means consisting of a notched portion of the outer periphery of the locking member and a leaf spring arranged in said notched portion having one end anchored to the locking member and one end of the notched portion and having an inturned terminal at the free end of the spring to frictionally engage with the inner periphery of the dialing member.

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