J. J. MURPHY.

COMBINATION LOCK.

APPLICATION FILED APR. 19, 1909.

930,079. **Patented Aug. 3, 1909.**

Fig. 1

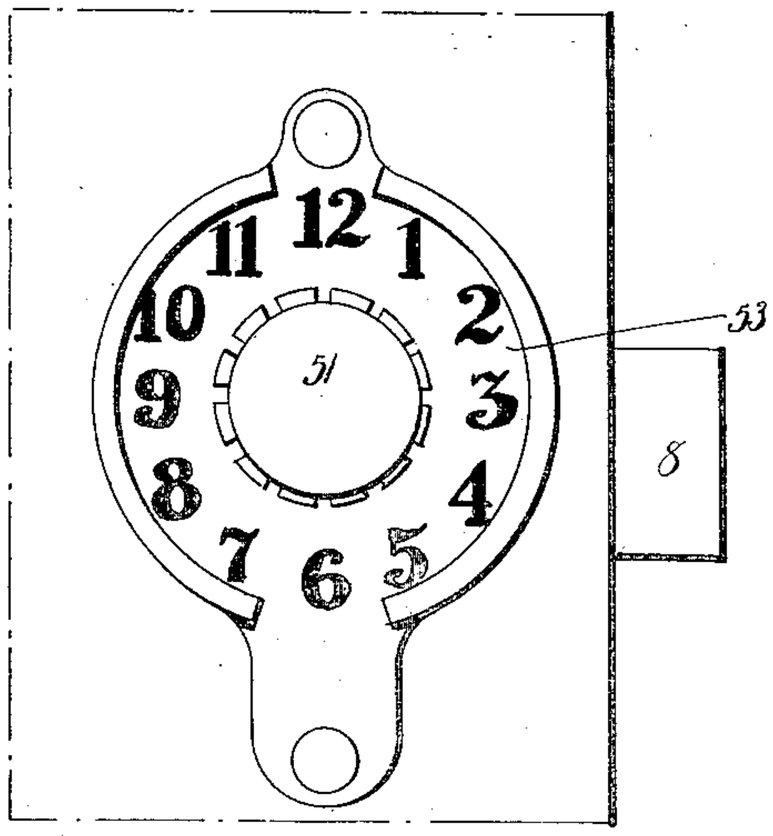


Fig. 2

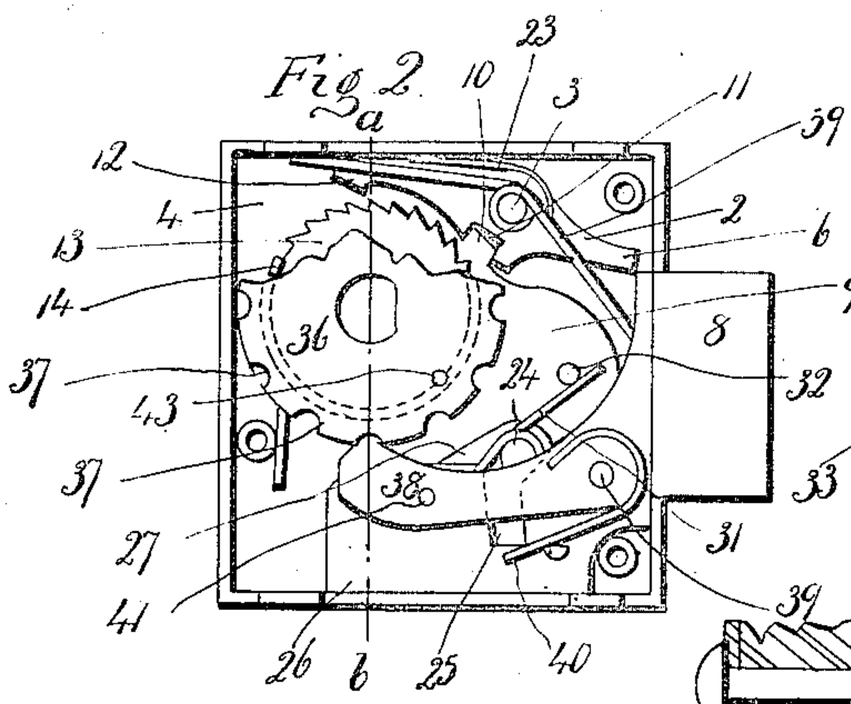


Fig. 3

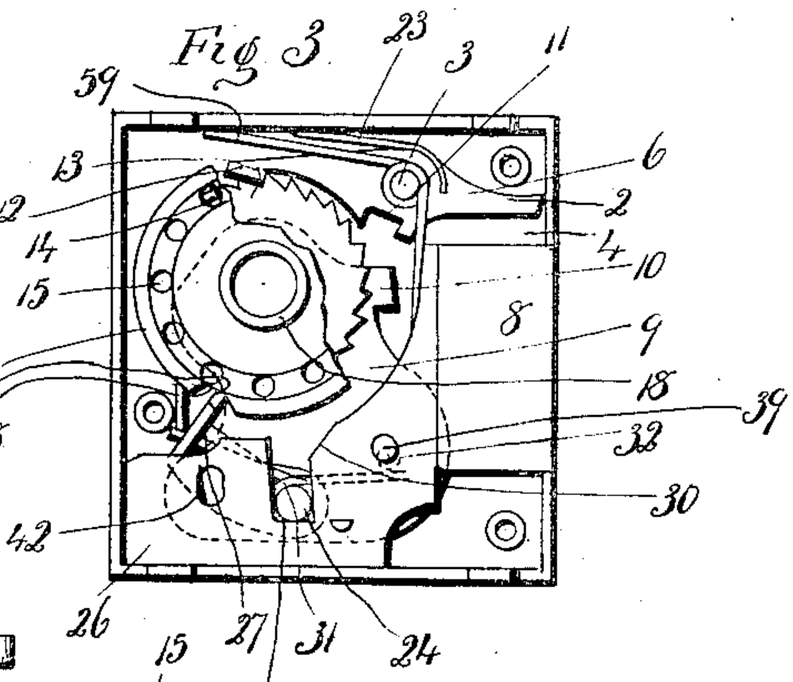


Fig. 4

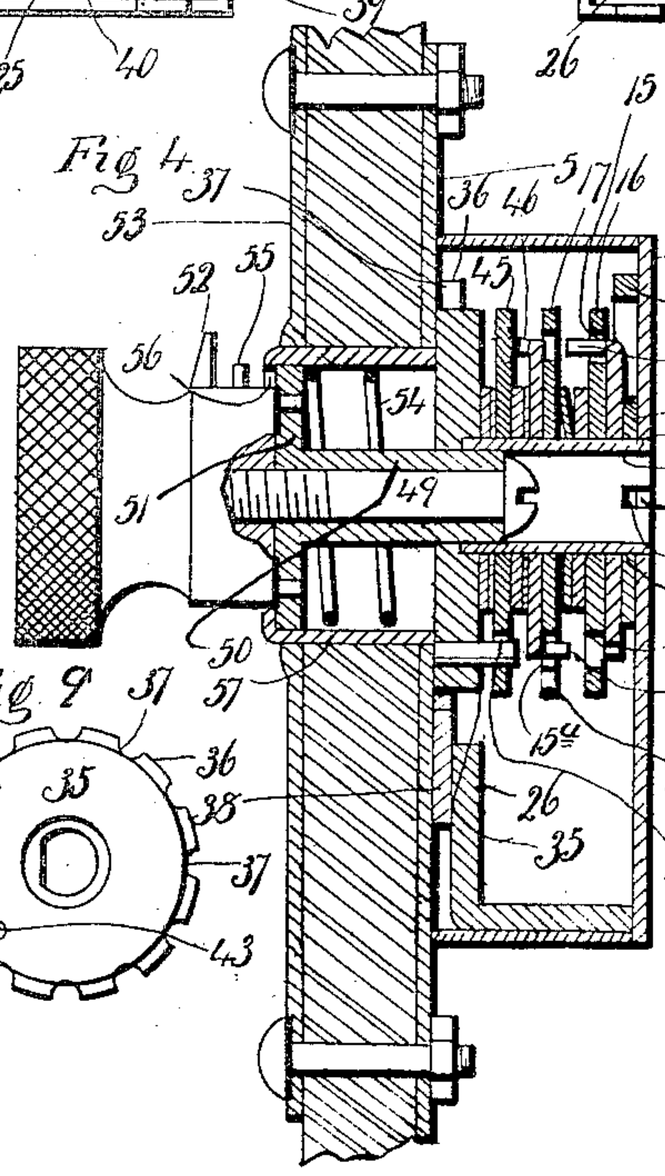


Fig. 5

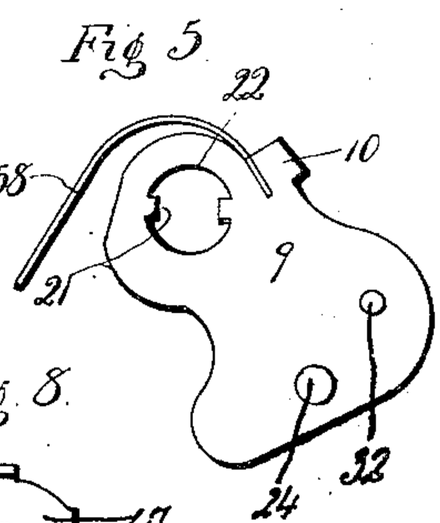


Fig. 6

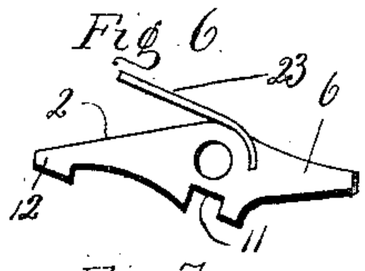


Fig. 7

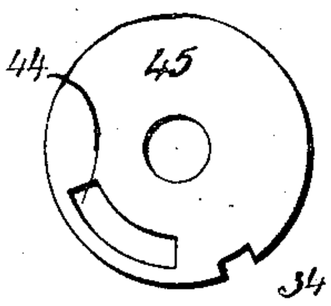


Fig. 8

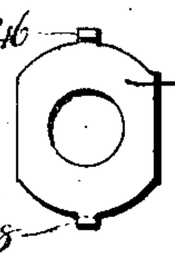
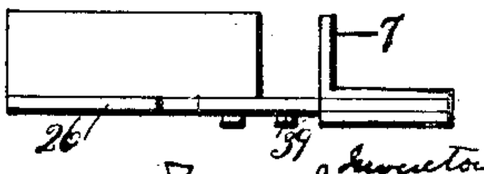


Fig. 9

Fig. 10



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UNITED STATES PATENT OFFICE.

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COMBINATION-LOCK.

No. 930,079. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed April 19, 1909. Serial No. 490,941.

To all whom it may concern:

Be it known that I, JAMES J. MURPHY, a citizen of the United States, residing at Terryville, in the county of Litchfield and State of Connecticut, have invented a new and useful Improvement in Combination-Locks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the numerals of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1 a view in front elevation of a lock constructed in accordance with my invention. Fig. 2 a view in inside elevation of the permutation mechanism with the click-wheel, the drive-wheel and the wheel-tumblers broken away to show the coaction of the operating-dog with the locking-wheel, the bolt being shown in its projected position in which it is locked or "dogged" by the nose of the dog. Fig. 3 a similar view with the click-wheel, drive-wheel and top wheel-tumbler removed, the bottom wheel-tumbler being broken away to expose the locking-wheel which is shown as engaged by the locking-dog the nose of which in this position of the dog is disengaged from the bolt which is shown in its unlocked or retracted position. Fig. 4 a view in vertical section on the line *a*—*b* of Fig. 2. Fig. 5 a detached view of the oscillating-plate 9. Fig. 6 a corresponding view of the locking-dog. Fig. 7 a detached view of the follower-wheel. Fig. 8 a corresponding view of one of the drivers. Fig. 9 a detached view of the drive and click-wheels. Fig. 10 an edge view of the bolt.

My invention relates to an improved self-locking combination dead-bolt locker-lock in which as the bolt is moved by its spring into its locked position, the tumblers are automatically thrown out of alinement so that the bolt cannot be unlocked until after the combination has been "worked" to restore them to alinement, the object being to provide a lock of this character with simple, durable, reliable and effective means for dogging the bolt and throwing the tumblers out of alinement as the bolt is moved into its locked position.

With these ends in view my invention consists in a lock having certain details of construction and combinations of parts as will be hereinafter described and pointed out in the claims.

As herein shown I have applied my invention to a self-locking combination locker-lock constructed and operated on well known lines so far as its tumblers and click are concerned. I will therefore begin the description of the device with the novel parts rather than with the parts of known construction.

In carrying out my invention, I employ a lever-like locking-dog 2 which oscillates upon a pin 3 the respective ends of which are journaled in the bottom of the case 4 and its cover 5. One end of this dog is formed with a dogging nose 6 which coacts with a locking-arm 7 extending inward at a right angle from the bolt at a point near the base of the head 8 thereof. When the bolt is shot into its projected or locked position the dogging nose 6 of the dog 2 is moved so as to stand directly behind the arm 7 by the turning of the said dog upon its pivot 3 by the oscillation of a swinging carrier-plate 9 bearing upon the bottom of the case 4 and formed with a lug 10 entering a notch 11 in the inner edge of the dog. The opposite end of the dog 2 is formed with an inwardly turned hook 12 which engages with the teeth of a ratchet wheel 13 bearing upon the plate 9 and having an upwardly extending finger 14 entering some one of a circular series of holes 15 formed in the bottom wheel-tumbler 16 which conforms in construction to the top wheel-tumbler 17. These two wheel-tumblers 16 and 17 are of well known construction and are employed for changing the combination, the bottom tumbler 16 being set in different ways with relation to the wheel 13 the finger 14 of which may be passed through any one of the holes 15 in it. The said carrier-plate 9 is mounted upon a tube 18 the inner end of which enters an opening 19 in the bottom of the case 4, said inner end of the tube being formed with slots 20 for the reception of lugs 21 extending inward from the opening 22 of the plate, whereby the tube is coupled with the plate so as to turn therewith and whereby the tube is prevented from moving inward out of place through the plate. The wheel 13 and the tumblers 16 and 17 are also mounted upon the tube on which they are independently rotatable.

Normally the hook 12 of the dog 2 is disengaged from the teeth of the wheel 13, the

dog being held in this position against the tension of its spring 23, by the lug 10 of the plate 9 when the same is in its locked position. When, however, the plate 9 is swung into its unlocked position, it turns the dog 2 so as to clear the nose 6 thereof from the locking-arm 7 of the bolt before the post 24 carried by the plate is entered into the slot 25 in the tail 26 of the bolt so as to begin the retraction thereof. As the nose 6 of the dog 2 swings outward away from the arm 7, the hook 12 of the dog moves inward so as to engage with the teeth of the wheel 13. Now as the bolt is retracted, the wheel 13 will be turned from left to right, its teeth riding under the hook 12 which will snap over them, so to speak. This will continue until the bolt has been fully retracted. As soon, however, as the plate 9 begins to swing in the opposite direction for the projecting of the bolt into its locked position the hook 12 will take hold, so to speak, of the wheel 13 and prevent the same from rotation, whereby the bottom-wheel tumbler 16 is prevented from rotation by the operating-dog 27 as the same is bodily moved with the plate 9 upon which it is mounted when the said plate is turning during the projecting of the bolt. In other words, the edge of the operating dog 27 will be compelled to ride out of the notch 28 in the bottom wheel-tumbler 16 whether or not it rides out of the corresponding notch 29 in the top wheel-tumbler 17. Therefore as the bottom wheel-tumbler 16 is held against rotation during the projection of the bolt, by means of the wheel 13 and the locking dog 2, the alinement of the notches 28, 29, in the bottom and top tumblers 16 and 17 with respect to the edge of the operating dog 27 is necessarily broken as the bolt is being projected, making it necessary to "work" the combination before the bolt can be again retracted.

It will be understood that the locking-dog 2 is never in position to coact with the wheel 13 for the purpose of insuring the throwing of the tumblers 16 and 17 out of alinement, except when the lock is unlocked and during the brief interval in which the bolt is being moved from its unlocked into its locked position. After the bolt has been moved into its fully projected and locked position, the plate 9 on account of the clearance cut 30 in the tail 26 of the bolt continues to swing so as to operate through its lug 10 in swinging the locking-dog 2 so as to bring its dogging-nose 6 thereof back of the locking arm 7 of the bolt for holding the same in its locked position. In other words, the carrier-plate 9 has an excess of movement in each direction from the movement required of it to project and retract the bolt, the excess of movement in one direction being necessary to move the dogging nose 6 of the dog 2 out of the path of the arm 7 of the bolt preparatory to retracting the bolt and so as to unlock the same, and the excess of movement in the other direction being necessary so that after the bolt has been fully projected the nose 6 of the dog 2 may be moved into position back of the arm 7 of the bolt to lock the same.

The operating-dog 27 which swings upon the post 24 carried by the plate 9, is provided with a spring 31 which exerts a constant effort to move the edge of the dog into the notches 28 and 29 of the bottom and top tumblers 16 and 17, one end of this spring being engaged with the dog, and the other with a pin 32 in the plate 9. The said plate 9 is swung in the direction required for unlocking the lock, through the medium of the operating-dog 27 which is formed with a shoulder 33 for engagement by the straight edge of a notch 34 in the drive-wheel 35 which is riveted to a click-wheel 36 the regularly spaced notches 37 of which coact with a click 38 turning upon a pivot 39 in the tail 26 of the bolt, the click being furnished with an operating-spring 40, and provided upon its inner face with a stop-pin 41 entering a slot 42 in the tail 26 of the bolt. The drive-wheel 35 is provided with a driving-pin 43 passing through a slot 44 in a follower-wheel 45 mounted on the tube 18, the projecting inner end of the said pin 43 coacting with the finger 46 of a driver 47 mounted upon the tube 18 and having its inner end formed with a finger 48 passed through one of the circular series of holes 15^a in the front wheel-tumbler 17. The wheel 13, already described, takes the place, as it were, of another driver like the driver 47. The drive-wheel 35 and the click-wheel 37 are connected by a screw 49 with the hollow shank 50 of a knob 51 having an index 52 which is turned with reference to a dial 53 in the usual manner. A spring 54 encircling the shank 50 normally pushes the knob 51 outward. Inward pressure upon the knob enters a pin 55 carried by it into a notch 56 in the hub 57 and provides a point from which to begin the working of the combination.

The lock may be operated by counting the "clicks" as the click 38 drops into and rides out of the notches 37 in the click-wheel 36, or by the feeling of the same operation, or by following the index 52 over the dial 53, the lock being thus adapted in the usual manner to be used by day or by night. The plate 9 is provided with a spring 58 for swinging it in the direction required for projecting the bolt in locking the lock. A spring 59 applied to the pivot 3, is employed to assist the spring 58 in throwing the bolt into its locked position.

It will be understood that I do not claim as new the general mechanism of the lock, my invention being particularly directed, as already specified, to the locking dog 2 and the locking-wheel 13 which insure the throw-

ing of the wheel-tumblers 16 and 17 out of alinement as the bolt is moving into its locked position so as to preclude any such thing as the retraction of the bolt without "working" the combination again.

I claim:—

1. In a self-locking combination dead-bolt lock, the combination with the bolt and tumblers thereof, of a locking-wheel connected with one of the tumblers, a locking-dog coacting with the said wheel and also coacting with the bolt for locking the same in its projected position, and means for operating the said locking-dog to bring it into play for coaction with the said wheel after the bolt has been unlocked, and when the bolt is moving into its locked position.

2. In a self-locking combination dead-bolt lock, the combination with the bolt and tumblers thereof, of an oscillating plate, an operating-dog carried by the said plate and coacting with the tumblers, a locking-dog connected with the said plate for oscillation thereby so as to lock and unlock the bolt, and a locking-wheel connected with one of the said tumblers for rotation therewith and engaged by the said locking dog to hold the wheel against rotation when the bolt is moving into its projected or locked position, whereby the throwing of the tumblers out of line at that time is insured.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

JAMES J. MURPHY.

Witnesses:

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HARRY C. CLOW.