Oct. 30, 1923. 1,472,577

R. BAER

COMBINATION LOCK

Filed June 15, 1921

Fig. 1.

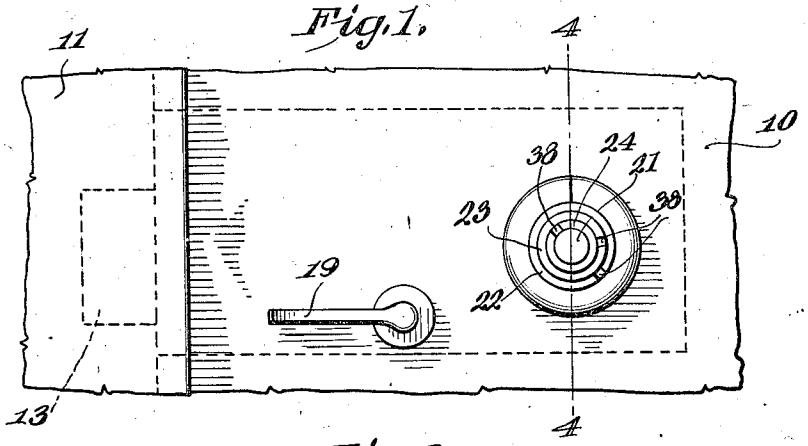


Fig. 2.

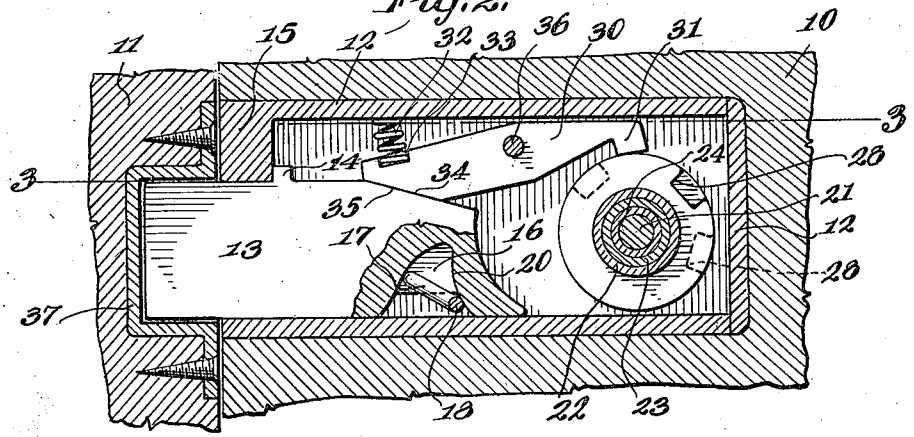


Fig. 3.

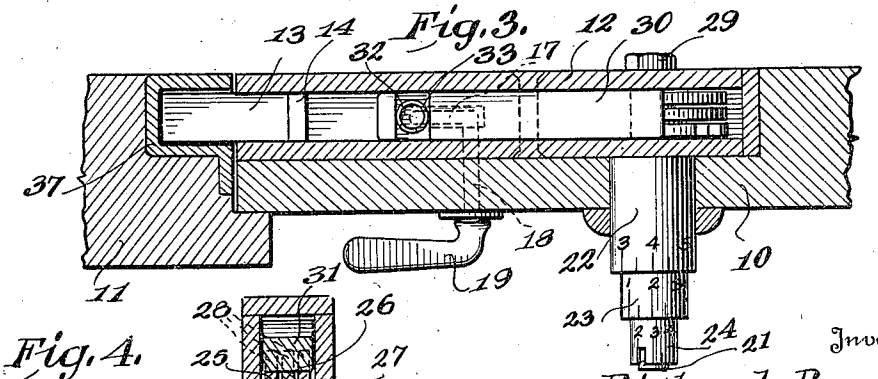
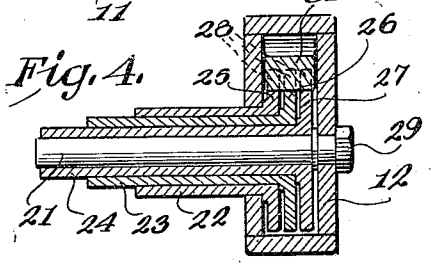


Fig. 4.



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Patented Oct. 30, 1923. 1,472,577

UNITED STATES PATENT OFFICE.

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COMBINATION LOCK.

Application filed June 15, 1921. Serial No. 477,642.

To all whom it may concern:

Be it known that I, RICHARD BAER, a citizen of the Republic of Czechoslovakia, and resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Combination Locks, of which the following is a specification.

The present invention relates to locks and more particularly to a combination lock adapted for use on doors and various other closures.

An object of the present invention is to provide a simplified construction of combination lock which may be used with or without a key and which requires a special knowledge of certain combinations to release the mechanism for permitting the retraction of the bolt.

Another object of the invention is to provide a combination lock comprising but relatively few parts and which may be mounted in relatively small space and may be entirely housed within a casing, which latter is adapted either to be mortised in a door or the like or secured against the side of the same.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Fig. 1 is a front elevation of the combination lock constructed according to the present invention and as mounted in a door;

Fig. 2 is a longitudinal vertical section taken through the same as shown in Fig. 1;

Fig. 3 is a horizontal section taken through the lock and its mountings on the line 3—3 of Fig. 2; and,

Fig. 4 is a transverse section taken through the inner end of the lock, showing in section the releasing disks and their respective shafts.

Referring to the drawing, 10 designates a door or other device which is movable relatively to the jamb or frame 11. The door 10 comprises a support or mounting for the lock and the latter may be mounted in any suitable manner upon the door, such as shown in the present instance. The lock comprises a casing 12 within the outer end of which is slidably disposed a locking bolt 13 having upon its upper edge a stop 14 adapted to engage the front wall 15 of the casing for limiting the outward projection of the locking bolt. The bolt 13 is provided in its lower edge and near its inner end with a relatively narrow recess or depression 16 into which projects a finger 17 carried upon the inner end of a spindle 18, which latter extends transversely in the lower portion of the casing 12 and projects beyond one side of the casing for supporting thereat a suitable handle 19.

The recess 16 has an abrupt shoulder 20 defining its rear side and against which the finger 17 is adapted to engage when the handle 19 is turned. The finger 17 is swung against the shoulder to force the locking bolt 13 back into the casing and thus retract the bolt therein. The forward side of the depression 16 is preferably curved on an arc of large radius to form a cam surface against which the extremity of the finger 17 is adapted to work for the purpose of projecting the bolt 13 from the casing.

When the bolt is projected from the casing the same is locked in such position by the following novel means:

The casing 12 carries a transverse shaft 21 near its inner end, upon which are concentrically arranged a plurality of hollow shafts or sleeves of any desired number, three being shown in the present instance and designated as 22, 23 and 24. These shafts carry respectively disks 25, 26 and 27. Each disk has a peripheral depression or notch 28 at one side and the shafts 22, 23 and 24 are adapted to be turned to rotate their respective disks for bringing all of the notches 28 into transverse alignment. The shafts extend transversely through one side of the casing 12 and may be passed through a portion of the support or door 10 for exposing the outer ends of the shafts, as shown in Fig. 3, for proper manual or other manipulation. The transverse shaft 21 which forms the axis for the hollow shafts and the disks is preferably rigidly secured at its inner end by a nut 29 which may bind against the inner side of the casing 12 of the lock.

Arranged in the upper portion of the casing 12 and intermediate the inner and outer ends thereof is a lever 30 which may be of any desired number of sections, but which in the present instance is shown as of one piece. The lever 30 is provided with a de-

pending projection or nose 31 adapted to extend across and bear against the outer peripheral edges of the disks 25, 26 and 27 and which is sufficiently narrow to drop into the notches 28 when the latter are brought into transverse alignment and register beneath the nose 31. The lever 30 is normally urged out of contact with the disks by a spring 32 which is interposed between the top of the casing 12 and the heel of the lever. The heel of the lever has a seat or depression 33 formed in its upper edge and into which is fitted one end of the spring 32, such seat holding the spring 32 in proper position and with its other end bearing against the top of the lock casing. The lower edge of the lever 30 is beveled to provide a shoulder 34 adapted to seat flat upon a corresponding shoulder 35 on the inner end of the locking bolt 13. The lever 30 is pivotally mounted intermediate its ends upon a pin 36 arranged transversely of the casing 12 and of sufficient size and strength to resist thrust upon the locking bolt 13 when attempt is made to retract the bolt when locked.

The lock is adapted to cooperate with any suitable keeper and for the purpose of illustration a keeper plate 37 is shown as mounted upon the frame or jamb 11 and provided with a recess or opening to receive the outer end of the bolt 13 when projected.

The outer ends of the sleeves or tubular shafts 22, 23 and 24 may have suitable marks or graduations thereon for enabling the shafts to be moved relatively to each other so as to bring the disks 25, 26 and 27 into proper positions for aligning the notches 28. Each hollow shaft may be provided, as shown particularly in Fig. 1, with a recess 38 in its outer edge for receiving a key or other suitable tool for bringing the shafts into proper alignment and for turning the same to move the notches 28 beneath the nose 31 of the tumbler.

When the notches 28 are in transverse alignment the concentric shafts may be turned as a unit to bring the notches into register beneath the nose 31 of the lever 30. When this position is obtained, the handle 19 may be operated to swing the finger 17 against the shoulder 20 and pressure of the finger against the shoulder is adapted to retract the bolt 13. As the bolt 13 is drawn back into the casing the shoulders 34 and 35 slide, one upon the other, with the result that the heel of the lever 30 is lifted against the tension of the spring 32 and the nose 31 of the lever is moved down into the notches 28.

When it is desired to lock the bolt 13 into projecting position, it is only necessary to turn the handle 19 in such direction as to move the finger 17 forwardly in the recess 16 of the locking bolt. The finger 17 forces the locking bolt 13 forwardly into projected position. When this position is reached the spring 32 urges the heel of the lever 30 down into engagement with the rearwardly facing shoulder 35 of the locking bolt and elevates the nose 31 out of the notches 28. The shafts 22, 23 and 24 are now turned relatively to one another so as to move the notches 28 out of transverse alignment. As the nose 31 now strikes the peripheral surface of one or more of the disks the lever 30 cannot be swung by the locking bolt and consequently binds the latter in its projected position.

From the foregoing it will be apparent that the lever 30 and spring 32 acting through the inclined surfaces 33 and 34 tend to maintain the bolt 13 in extended position. Accordingly the separate spring ordinarily provided for this purpose is not required in my improved lock.

Inasmuch as the lever 30 is urged by the spring 32 toward the bolt 13 and away from the disks 25, 26 and 27, no movement of the lever takes place as a direct result of the adjustment of the disks to releasing position. In other words, the lever 30 derives its movement from the bolt 13 rather than from the disks. So far as applicant is aware, combination locks have heretofore been so constructed that when the notches of the tumblers are moved into alignment beneath the holding member for the bolt, the holding member drops into the notches. The fall of the holding member produces an audible click which will apprise a person who endeavors to open the lock without knowledge of the combination that the bolt is free to be retracted. In applicant's construction, inasmuch as the lever 30 and all other parts of the lock are unaffected in their positions by the adjustment of the tumblers to releasing position, no sign would be given if the proper combination were obtained by a person attempting to actuate the lock without knowledge of the combination. This fact adds greatly to the security afforded by the lock.

Another advantage of applicant's construction is that inasmuch as the lever 30 exerts no pressure on the disks 25, 26 and 27, the disks may be adjusted more easily than in locks of known construction.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims:

What is claimed is:

1. In a lock, a sliding bolt, a handle for projecting and retracting the bolt, mechanism tending normally to maintain the bolt

yieldably in projected position, said mechanism including a lever arranged with one end in the path of the bolt and adapted to seat thereagainst when the bolt is projected, and tumblers for retaining the lever from movement out of the path of the bolt whereby to lock the bolt in projected position, said tumblers being adapted to be relatively adjusted into releasing position with respect to said lever whereby when released said lever may be moved out of engagement with the bolt and said bolt may be retracted.

2. In a lock, a casing, a bolt slidable in the casing a handle for projecting and retracting the bolt upon turning of the handle, a lever pivoted in the casing, a spring in the casing arranged to urge the forward end of the lever into the path of the bolt to maintain the bolt in projected position, concentric shafts arranged transversely in the casing, disk members mounted on the inner ends of the shafts adapted to turn therewith and having peripheral notches adapted to be brought into transverse alignment upon the turning of the shafts and disk members, said disk members arranged with their peripheral edges beneath the rear end of the lever to prevent the swinging of the lever out of engagement with the bolt and said notches when aligned being adapted to receive the rear end of the lever therein whereby the lever may be swung out of the path of the bolt.

3. In a lock, a casing, a bolt slidably mounted in the casing for movement between projected and retracted positions, and being formed to provide a rearwardly facing surface inclined relatively to the path of movement of the bolt, a member mounted in the casing for engagement with the inclined surface of the bolt, tumblers for preventing movement of said member so as to lock the bolt, yieldable means operably on said member to move it toward the bolt and away from the tumblers, said member and said yielding means acting to normally retain the bolt in projected position and said tumblers being movable relatively to each other to releasing position so as to enable said member to move away from the bolt upon the exertion of rearward pressure on the bolt.

In testimony that I claim the foregoing as my invention, I have signed my name.

RICHARD BAER.