June 18, 1929. E. FRISCHMUTH 1,718,130

COMBINATION LOCK

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Fig. 1

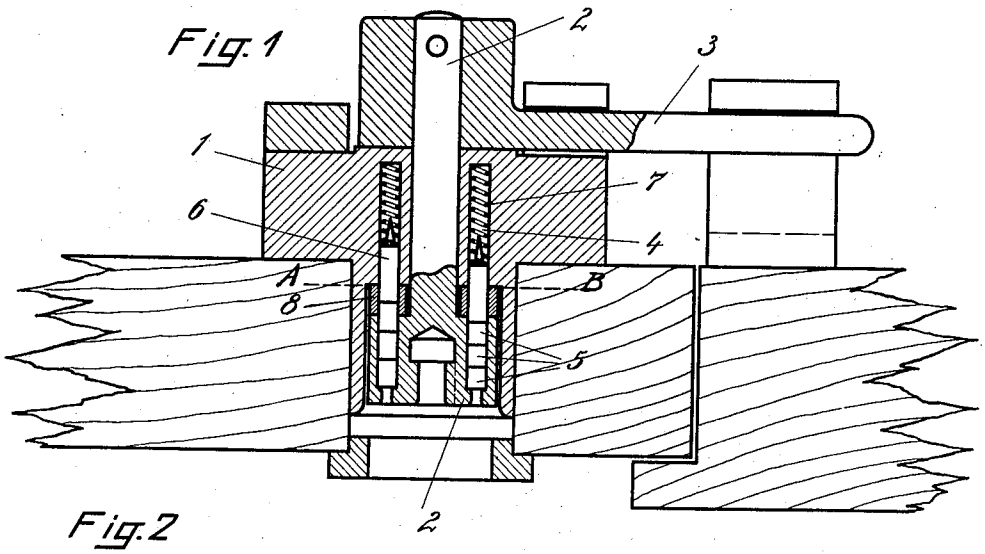


Fig. 2

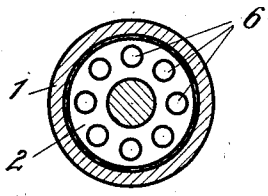


Fig. 3

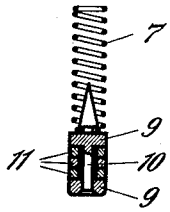
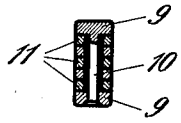


Fig. 4



Witnesses

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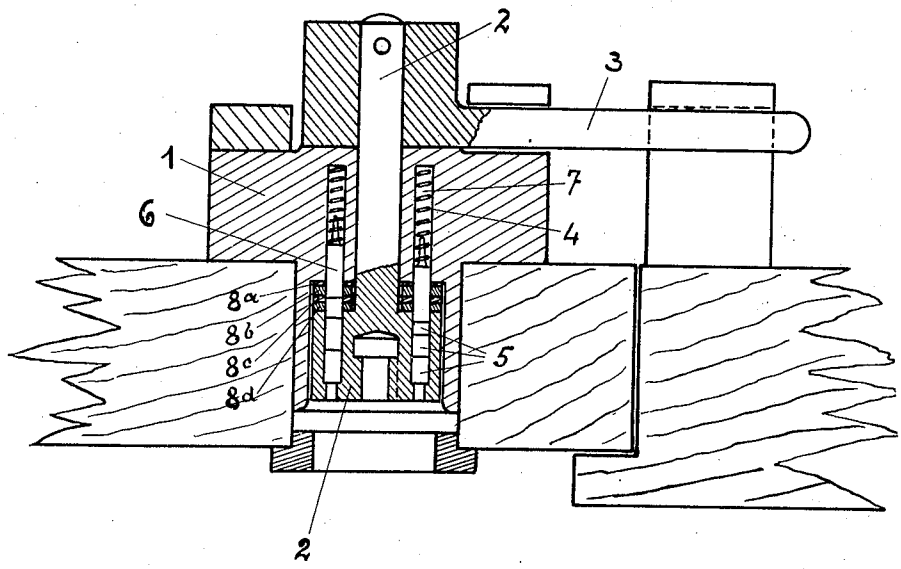
Attorney

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COMBINATION LOCK

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Fig. 5



WITNESSES:

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Patented June 18, 1929. 1,718,130

UNITED STATES PATENT OFFICE.

ERNST FRISCHMUTH, OF SIEMENSSTADT, NEAR BERLIN, GERMANY.

COMBINATION LOCK.

Application filed May 4, 1923, Serial No. 636,605, and in Germany May 5, 1922.

My invention relates to pin locks of the revolving cylinder type. This type of locks is locked by pins passing from the stationary part of the lock into the rotatable part. These pins are transversely divided and are adapted to be longitudinally displaced by the key against the resistance of springs in such a manner that their joints coincide with the joint between the locking parts. The rotatable part can then be turned in relation to the stationary part and the lock opened. The automatic return of the pins into the locking position by means of the springs necessitates these pins being guided in their bores with some play. Owing to this play it is possible, although only by a very considerable expenditure of time, to ascertain the coincidence of the joints of the pins with the joint of the locking part by probing and in this manner to open the lock without a key.

The object of my invention is to render the opening of the lock in this manner practically impossible. I attain this object by providing besides the locking joint between the rotatable and the stationary part and the dividing joints in which the locking pins abut against the control pins, further joints which render the finding of the locking joint by touch with a needle or other sharp instrument very difficult, if not entirely impossible.

A further improvement consists in constructing the key so, that it cannot be employed by an unauthorized person to open the lock to which it belongs.

Embodiments of my invention are illustrated in the accompanying drawings.

Fig. 1 is a longitudinal section through the lock.

Fig. 2 a cross-section along line A—B Fig. 1 through the locking joint.

Figs. 3 and 4 details of a slightly modified construction of the locking and control pins.

Fig. 5 a section similar to Fig. 1 of a slightly modified construction of the lock.

Similar parts are indicated by the same numerals throughout all the figures of the drawings.

Referring to Fig.1 it will be noted that 1 indicates the stationary portion of the lock and 2 the rotatable one with the bolt 3 fixed at the rear end. 4 are the longitudinal bores passing through the rotatable and the stationary portions within which are housed the control pins 5, and the locking pins 6 and the helical springs 7 which force the locking pins back into the locking position.

Two examples of means to provide dummy points are illustrated in the drawings. In Fig. 1 the control pins 5 which hitherto were made in a single part are made in a number of parts and furthermore a ring 8 is loosely inserted into the widened joint, this ring also being provided with bores through which the locking and control pins pass. Hereby portions of the control pins also act as locking pins. The diameter of the bore in the center of the ring 8 is suitably somewhat larger than the diameter of the bolt at the rear end of the rotatable part 2, on which the ring 8 is placed.

In the attempt to open the improved lock without a key it is necessary gradually to force back one of the control pins 5 by means of a needle or other suitable sharp instrument and to ascertain by repeatedly turning the rotatable part when a pin joint coincides with the locking joint. As each joint of a pin appears to enable the opening of the lock not only when it coincides with the joint between the part 2 and the ring 8 but also when it coincides with the joint between the ring 8 and the part 1, it seems practically impossible that the correct position can be found. The difficulty is still further increased by the fact that the pins would have to be probed in succession and mistakes are likely to occur regarding the correct position.

Figures 3 and 4 illustrate another construction of locking and control pins suitable for carrying out my invention. The pins consist in this case of two endplates connected and kept apart at the desired distance by a bolt 10. Between the endplates, disks 11 are mounted with slight lateral play upon the bolt 10 so as to deceive a person trying to pick the lock by the analogy of this lateral play to the relative lateral movement between locking and control pins in the correct and legitimate operation of the lock.

The control-pins are divided in unequal lengths, to accumulate the difficulties in the attempt, to open the lock without a key. It is further practical to divide the ring 8 into a plurality of rings 8 differing in thickness. This modified construction is illustrated in Figure 5. Instead of one ring 8 this drawing shows four rings 8^a, 8^b, 8^c and 8^d.

Locks of the type described are opened by

a key having a number of pins of unequal length each adapted to enter one of the bores in the lock and to depress the pins contained therein to take up the correct position in which the cylinder or drum can be turned. These pins may be made interchangeable in order to prevent the opening of the lock, if the key should have got into the hands of an unauthorized person.

It will be understood that I do not limit myself to the exact details of construction shown in the drawings as these may obviously be modified in many ways without departing from the spirit of my invention or sacrificing any of its advantages except as set forth in the claims.

An improved key adapted to be used in combination with the improved lock is described in my application No. 755,087, filed December 10, 1924.

What I claim as my invention is:—

1. A pin lock of the class described having a stationary part and a movable part both said parts being provided with tumbler bores capable of being alined, control and locking pins being movable in said bores, several of said locking pins being built up each of two endplates, a spindle connecting said endplates, and a plurality of disks mounted on said spindle, said disks having bores of a diameter somewhat greater than the diameter of said spindle.

2. A pin lock of the class described, a recessed stationary part, a rotatable part housed in said recessed stationary part, both said parts being provided with tumbler bores capable of being alined, control pins and locking pins being movable in said bores, said locking pins consisting of end plates connected by a spindle and disks mounted loosely on said spindles and a loosely mounted disk between the joint of said stationary and rotatable part.

3. A pin lock of the class described, a recessed stationary part, a rotatable part housed in said recessed part, both said parts being provided with tumbler bores capable of being alined, control pins and locking pins being movable in said bores, said locking pins consistng of end plates connected by a spindle and disks mounted loosely on said spindles and a plurality of loosely mounted disks between the joint of said stationary and rotatable part.

In testimony whereof I affix my signature.

ERNST FRISCHMUTH.