

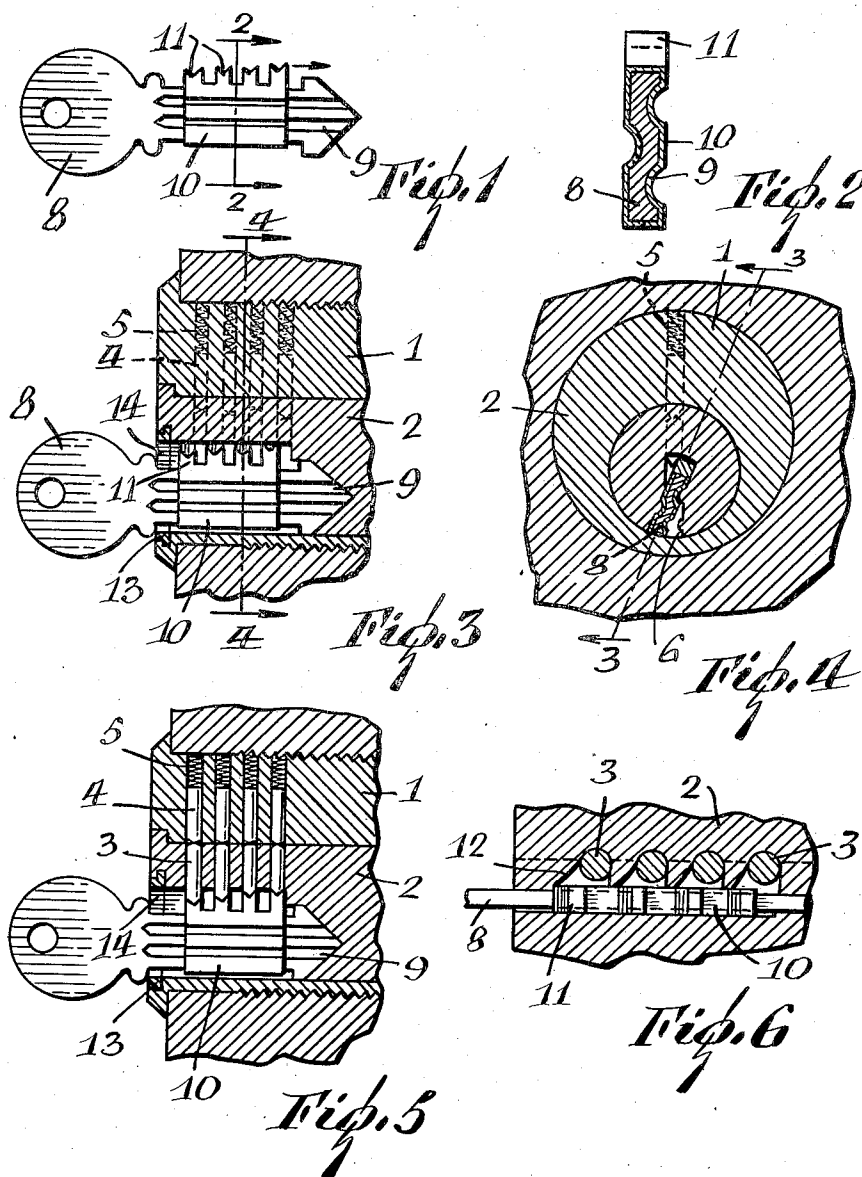
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COMBINED LOCK AND KEY

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## UNITED STATES PATENT OFFICE

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## COMBINED LOCK AND KEY

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4 Claims. (Cl. 70—364)

1

The present invention pertains to a novel lock of the tumbler type and a novel key to be used in conjunction therewith.

The principal object of the invention is to provide such an outfit wherein the teeth of the key must be and are advanced in the key slot on initial rotation of the key, in order to bring the teeth into register with the tumbler pins. In other words, an additional movement is required in order to operate the lock.

In the accomplishment of this object, the key embodies a blank on which is mounted a slide carrying the teeth. On initial insertion of the key in its slot, the teeth are offset longitudinally and laterally from the respective tumbler pins. The teeth are brought into register with the pins on the initial free rotation of the key within the slot, which is of sufficient width to permit such free rotation. During this movement, the teeth engage cam surfaces formed in the plug and designed to advance the slide on the key blank to the extent of the longitudinal offset but in the opposite direction, while the lateral offset is taken up by the turning of the key. Continued turning of the key in the same direction turns the plug and opens the lock.

The invention is fully disclosed by way of example in the following description and in the accompanying drawings in which:

Figure 1 is an elevation of a key according to the invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 4;

Figure 4 is a section on the line 4—4 of Figure 3;

Figure 5 is a diametrical section in a plane angular to Figure 3; and

Figure 6 is a partial axial section in a plane perpendicular to Figure 5.

Reference to these views will now be made by use of like characters which are employed to designate corresponding parts throughout.

In Figures 3 and 4 is shown a combination lock including a fixed barrel 1 and a rotatable plug or cylinder 2 therein. Tumbler pins 3 are slidable radially in the plug 2 and are engaged with aligned follower pins 4 slidable in the barrel 1 and backed by coil springs 5. The tumblers and followers are dimensioned to have their contacting ends disposed in the parting surface of the barrel and plug on insertion of the proper key in the plug in the usual manner and as will presently be described.

The plug 2 is formed with a key slot 6 running

2

beneath the pins 3 and also wider than the key to be inserted. Thus, the slot extends somewhat laterally of the pins, in its width, as may be seen in Figure 4.

The key comprises a blank 8 having longitudinal grooves 9 and on which is fitted a slide 10. The latter is formed with a series of unequal teeth 11 adapted to engage respectively beneath the pins 3 and bring them to the unlocking position shown in Figure 5, whereupon the plug 2 may turn in the barrel 1.

However, the slide 10 must move forward on the blank 8 in order to engage the pins 3 in the manner described. Accordingly, the key is first inserted in the slot 6 at an angle to the plane of the pins, as shown in Figure 4.

Adjacent to each pin 3, the plug 2 is formed with a sloped surface or cam 12 engageable by the corresponding key tooth 11. As the key is turned towards the pins, the teeth are cammed on the surfaces 12, advancing the slide and bringing the teeth from the non-registering position of Figure 3 to a position beneath and in engagement with the pins 3, as in Figure 5, in which the plug may be turned.

The exposed end of the key slot 6 is covered by a ring 13 loosely mounted in the forward end of the plug. The ring has a slot 14 of sufficient size to receive the key, and the ring turns freely with the key.

Although a specific embodiment of the invention has been illustrated and described, it will be understood that various alterations in the details of construction may be made without departing from the scope of the invention as indicated by the appended claims.

What I claim as my invention is:

1. In a lock, a barrel, a plug rotatable therein, tumbler pins slidable radially in said plug, follower pins slidable in said barrel and engaging said tumbler pins in alinement therewith, said plug having a key slot exposed to said tumbler pins, said slot extending also laterally from said pins, a key insertable in said slot and having relatively slidable teeth adapted to register with said tumbler pins, said key being rotatable a limited angular extent in said slot, and cam surfaces formed in said plug and engageable by said teeth to move said teeth into engagement with said tumbler pins on rotation of said key.

2. In a lock, a barrel, a plug rotatable therein, tumbler pins slidable radially in said plug, follower pins slidable in said barrel and engaging said tumbler pins in alinement therewith, said

3

plug having a key slot exposed to said tumbler pins, said slot extending also laterally from said pins, a key blank, a slide thereon having teeth adapted to register with said tumbler pins, said key blank and slide being insertable in said key slot and rotatable therein a limited angular extent, and means in said plug for moving said slide on said blank and bringing said teeth into register with said tumbler pins on rotating said blank and slide in said slot.

3. In a lock, a barrel, a plug rotatable therein, tumbler pins slidable radially in said plug, follower pins slidable in said barrel and engaging said tumbler pins in alinement therewith, said plug having a key slot exposed to said tumbler pins, said slot extending also laterally from said pins, a key blank, a slide thereon having teeth adapted to register with said tumbler pins, said key blank and slide being insertable in said key slot and rotatable therein a limited angular extent, and cam surfaces formed in said plug and engageable by said teeth to move said teeth into engagement with said tumbler pins on rotation of said key.

4. In a lock, a barrel, a plug rotatable therein, tumbler pins slidable radially in said plug, fol-

4

lower pins slidable in said barrel and engaging said tumbler pins in alinement therewith, said plug having a key slot exposed to said tumbler pins, said slot extending also laterally from said pins, a key insertable in said slot and having relatively slidable teeth adapted to register with said tumbler pins, said key being rotatable a limited angular extent in said slot, and cam surfaces formed in said plug and engageable by said teeth to move said teeth into engagement with said tumbler pins on rotation of said key, and a ring loosely mounted in said plug at the outer end of said slot and having a narrower slot adapted to admit said key in a sliding fit.

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