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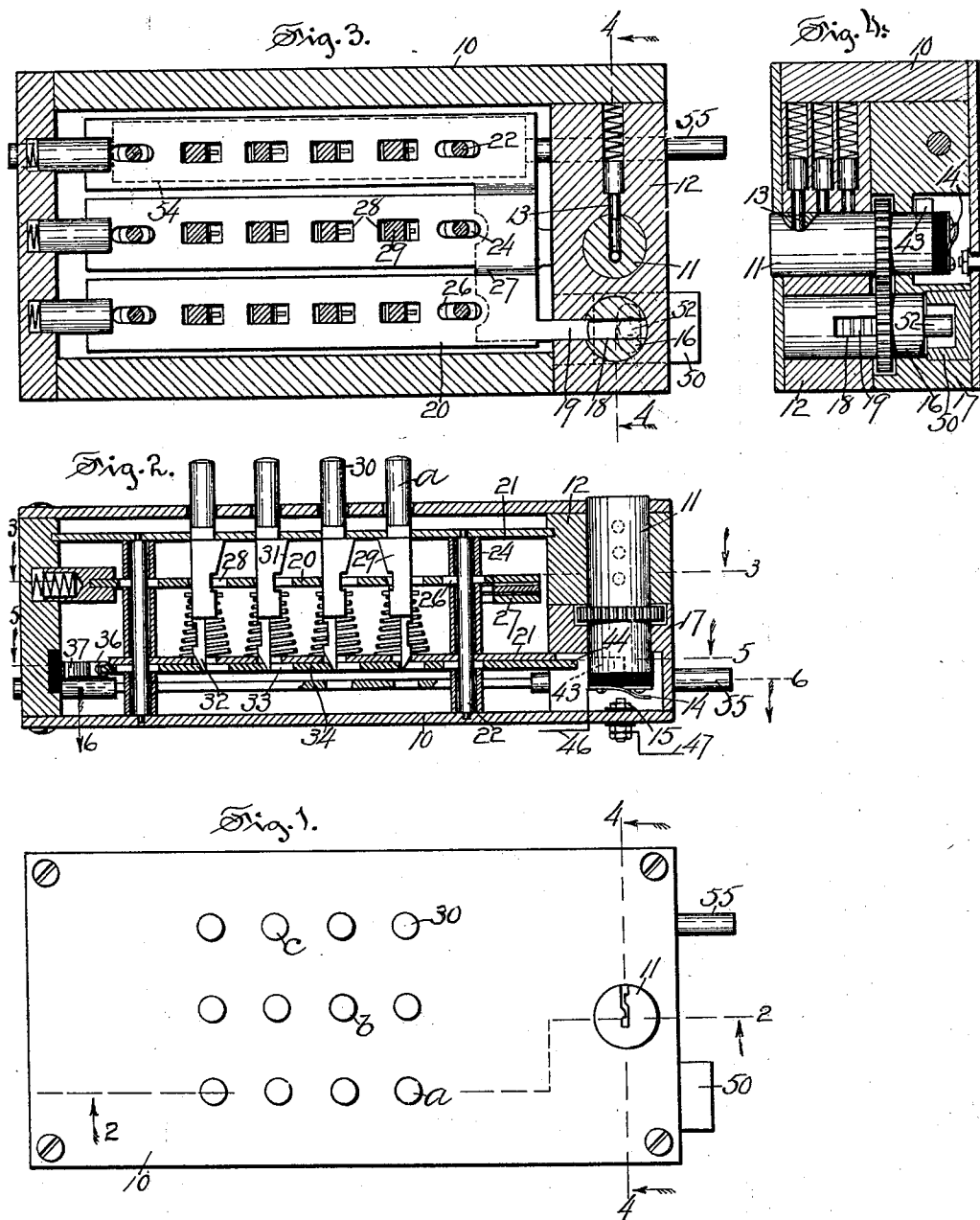
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LOCK

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LOCK

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My invention relates to that class of devices which are employed to prevent unauthorized use of various mechanisms or devices, such as means for controlling flow of electric current, means for securing doors or other closures, and the like, and an object of my invention, among others, is to produce a lock which, when compared with the results attained, will be comparatively simple in construction and particularly efficient in operation.

One form of a lock embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained, is illustrated in the accompanying drawings, in which—

Figure 1 is a face view of my improved lock.

Figure 2 is a view in section on a plane denoted by the dotted line 2—2 of Figure 1.

Figure 3 is a view in section on a plane denoted by the dotted line 3—3 of Figure 2.

Figure 4 is a view in cross section on a plane denoted by the dotted line 4—4 of Figure 3.

Figure 5 is a view in section on a plane denoted by the dotted line 5—5 of Figure 2.

Figure 6 is a view in section on a plane denoted by the dotted line 6—6 of Figure 2.

Figure 7 is a detail view illustrating the construction of the setting plugs.

The lock illustrated and described herein and which embodies my invention is equipped for use in connection with the ignition mechanism of an automobile and means are also illustrated whereby the lock may be used for securing a door or other closure. In the accompanying drawings the numeral 10 denotes the lock case that may be of any ordinary construction and composed of any suitable material to contain the lock mechanism. In order to render the lock extremely difficult to operate, except in the manner indicated, I have embodied two types of lock mechanism therein, to wit: one of the combination type and one of the pin tumbler type, each to perform certain functions but both of which must be operated before the final action of the lock takes place. In the structure herein shown the combination section of the lock so controls the pin tumbler section that the latter cannot

function for releasing operation until it has been released by the combination section, and the latter cannot function in a locking operation until the members of the pin tumbler section have been properly positioned.

The pin tumbler section of the lock comprises a plug 11 fitted in a socket in a block 12 at one end of the case, this block being of any ordinary construction embodying pin tumblers 13 arranged in the plug and block as is usual in this type of lock. The lock herein shown is equipped with means for protecting the ignition mechanism as of an automobile and the plug is therefore provided with a contact 14 arranged, in the rotation of the plug, to contact with a terminal 15 for making and breaking an electric circuit. It will be obvious that the plug may readily be provided with any ordinary means for operating locking bolts or similar devices, an illustration of one of such mechanisms being hereinafter set forth in connection with another rotatable member to be hereinafter described. It will, of course, be understood that the plug has the usual slot to receive a key for positioning the tumblers and rotating the plug.

Operation of the plug 11 is governed by means of a controller 16 rotatably mounted at one end in the block 12 and at its opposite end in a filling block 17, said blocks being secured against each other, as shown in Figures 2 and 4, and the inner end of the plug 11 also being mounted in the block 17. Inter-meshing gears on the plug 11 and on said controller effect operation of the latter by the former. The controller has a plug holder recess 18 for the reception of tumblers 19 projecting from tumbler actuating plates 20 in a manner to be hereinafter described.

The combination section of the lock comprises supporting plates 21 for guide posts 22, which plates are secured in any suitable manner to the sides or ends, or both, of the case, these plates being spaced a suitable distance from the top and bottom of the case and as shown in Figure 2. Said posts 22 extend across the case in the direction of depth thereof and have supporting sleeves 24 mounted

thereon for the support of plates now to be described.

The tumbler actuating plates 20 hereinbefore referred to are supported upon and guided in sliding movements of the plates by the posts 22, said plates having slots 26 to permit such sliding movement. In the lock shown herein there are three tumblers 19 and consequently there are three plates 20 located side by side and as shown in Figure 3, and each of said plates, with the exception of that located opposite the controller 16, has an extension 27 from which the tumbler projects in position for entrance into the recess 18. Each of the plates 20 has a set of slots 28, in this special structure there being three sets of slots with four slots to a set, these to receive setting plugs 29 arranged in three sets to correspond with the sets of slots 28, and each plug being operated by means of setting pins 30 of the push pin type, each pin being rigidly connected with a setting plug and projecting through the face of the case, as shown in Figure 1 of the drawings.

The plugs 29 are all duplicates of each other and are peculiar in that they are simply reversed in position to effect the intended result. Each plug has a tumbler actuating cam 31 and a latch 32 in the form of a hook projecting from the end and adapted to hook under a catch plate 34 through one of a number of holes 33 therein, and as shown in Figure 2 of the drawings. It will be noted that the tumblers are arranged so that some will be active tumblers, that is, will act in the unlocking operation, and others will be inactive, in that they will not act in such unlocking operation, and in the latter case they will pass freely through the slots 28 without effect on the plate 20, these inactive tumblers or plugs being the three located at the left in Figure 2 and the tumbler or plug located at the right being active, as to the set shown in this figure. Similarly, the second tumbler from the right in the next row back and the third from the right in the next or back row of tumblers or plugs are the active tumblers (see Figure 3) the rest of the tumblers in said two rows being inactive. It will thus be seen that these plugs, a portion of each of which acts as a tumbler, are all of duplicate construction, thereby tending to reduce the cost of production.

In the operation of the device thus far described it will be noted that if the three push pins specifically denoted as *a-b-c* be pushed in each of the plates 20 will be slid back, thereby disengaging the tumblers 19 thereon from the plug holder recesses 18 in the controller 16. This operation releases the controller so that it may be operated by insertion of a proper key in the plug 11, this rotation effecting the unlocking action of the lock. If any inactive plug be pushed in the cam on the latch 32 engaging an edge of

a hole 33 in the catch plate 34 will slide said plate and permit the hook on the latch to pass through said hole, whereupon springs 35 will promptly return the plate to catching position, thereby holding the plug in its inward position.

This plate 34 has a contact 36 adapted, in the movement just described, to touch a contact 37, thereby completing an electric circuit through said contact and the arms supporting them, along a wire 38, alarm 39, wire 40, battery 41, and ground 42, the arm bearing the contact 36 also being grounded. This will set the alarm 39 in action. If a second inactive plug in the same set be pushed in the plate 34 will be slid in the manner hereinbefore described, thus disengaging the plug being held; just described, but engaging the latter plug and holding it in its inward position. The alarm will thus continue to sound until the plate 34 is released, and this can be accomplished only by action of a resetting cam 43 on the plug 11 against a resetting finger 44 on said plate, this requiring operation of the entire lock mechanism in order to release the alarm.

When the device is equipped for controlling the ignition of a combustion engine a wire 46 may be connected with the contact 14 on the plug 11, and the terminal 15 may be connected by a wire 47 with the ignition mechanism conventionally illustrated at 48, which mechanism is grounded as at 49 common with the ground 42, and in a manner well understood in devices of this class.

For operation as a lock for a door or other closure I have shown herein a bolt 50 mounted for sliding movement in the block 17, this bolt having a slot 51 to receive a crank pin 52 projecting from the inner end of the controller 16, and as shown in Figures 4 and 6 of the drawings. Any ordinary form of keeper, it will be understood, may be adapted to receive the bolt 50 and it will also be obvious that the bolt, as hereinbefore mentioned, may be directly connected with the block 11.

One or more of the holes 33 in the plate 34 are elongated as at 53 on that side facing the shouldered portions of the latches 32 when positioned to catch underneath the plate 34, and as shown in Figure 5 of the drawings. This provides for inward movement of some of the inactive plugs 29 without operation of the alarm and one cannot, therefore, learn just what the active plugs are by reason of the fact that they are the only ones that will sound the alarm. These elongated holes may be aptly called "dummies".

In order to set the lock, as from the inside of a door, so that it may not be operated, a stop bar 54 is slidably mounted in the case underneath the catch plate 34, this bar having openings adapted to register with the openings 33 in the catch and supporting

plates to permit entrance of the latches 32. When said bar, however, is moved to the left from the position shown in Figure 6, openings in the bar will be moved out of registry with the openings in the plate 21 and 34 and downward movement of the plugs 29 to an effective extent will be prevented and it will not now be possible to operate the lock. The bar 54 is provided with a push pin 55 that may have a spring pressed detent 56 to engage notches in the pin for the purpose of releasably holding it in its barring or unbarring positions.

It will be noted from an examination of Figure 2 that the pins 30 do not have a bearing in the outer wall of the case, but the bearing is in the upper plate 21. This prevents one from determining by wear on the pins which pins are operated to actuate the lock, for the reason that the bearing is in the plate 21 and out of sight and, therefore, the wearing points on the pins are out of sight.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim—

1. A lock comprising a rotary key operated member having pin tumblers, a controlling rotary member coupled to the key operated member, rotatable therewith, and formed with a slot for the reception of the tumblers of a combination lock section, the combination lock section comprising a series of slotted plates arranged in side by side relation and carrying tumblers adapted to engage with the slot in the controlling member, plugs engaging with the slotted portions of said plates to move the latter, other plugs adapted to be moved in said slots without actuating the plates, and means for locking said non-actuating plugs in position.

2. A lock of the character described, comprising a pin tumbler unit and a combination unit, the pin tumbler unit including a rotary key operated element and the combination unit including a rotary element geared to the key operated element, rotatable therewith, and slotted for the reception of combination lock tumblers, a series of slotted plates each carrying a tumbler and arranged in side by side relation, cam carrying plugs by which said plates are moved, other plugs adapted to move without actuating the plates, and latching devices to hold said last named plugs in position when moved.

3. A lock comprising a pin tumbler unit and a combination unit, said pin tumbler unit including a rotatable member adapted

to be operated by means of a key, another rotatable member operatively engaged with the first named member, one of said rotatable members adapted to operate a bolt, a combination lock section comprising a series of slotted plates arranged in side by side relation and carrying tumblers adapted to engage with a slot in one of said rotatable members, plugs engaged with the slotted portions of said plates to move the latter, plugs adapted to be moved in said slots without actuating the plates and means for locking said non-actuating plugs in position when moved.

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