

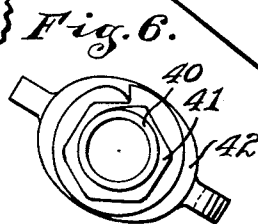
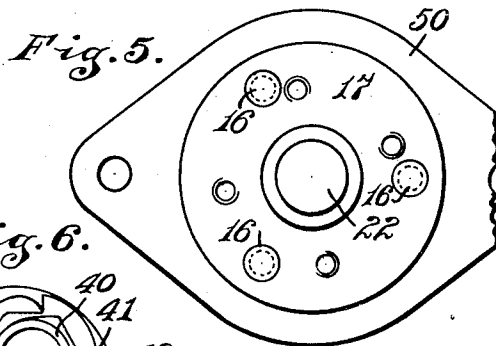
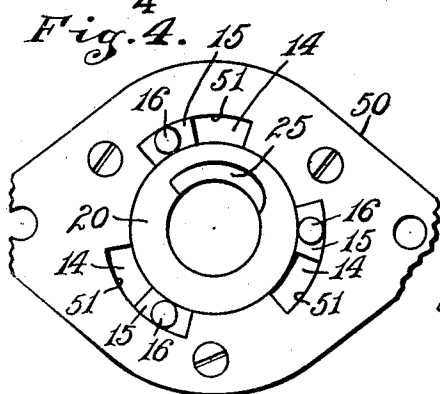
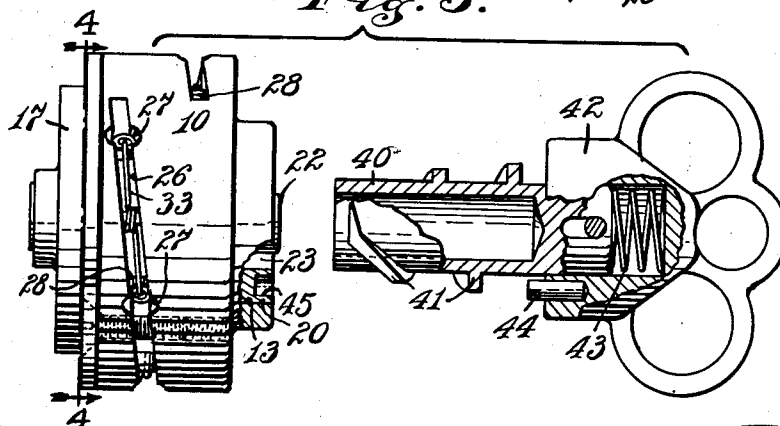
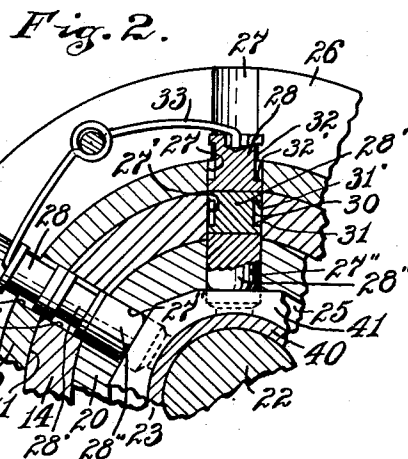
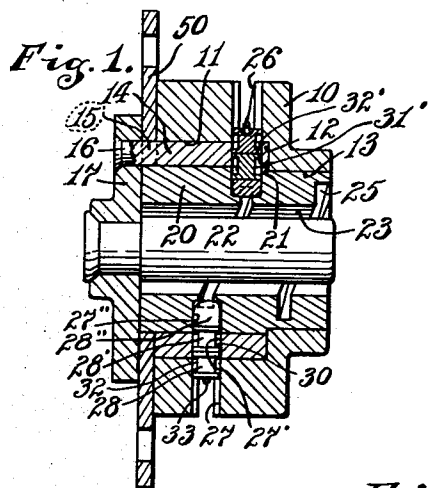
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2,062,010

PIN TUMBLER CYLINDER LOCK

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## UNITED STATES PATENT OFFICE

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## PIN TUMBLER CYLINDER LOCK

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5 Claims. (Cl. 70—47)

The object of my invention is to provide an improved form of pin-tumbler lock which shall be more nearly pick-proof than previous forms of locks of that type.

5. More specifically, my invention relates to improvements in construction of the type of lock disclosed in my Patent 1,932,706 dated October 31, 1933.

The accompanying drawing illustrates an embodiment of my invention in a lock wherein the pin-tumblers are arranged in a helical series:

- Fig. 1 is an axial section on an enlarged scale;  
Fig. 2 a fragmentary section on line 2—2 of Fig. 1 with the key in place;  
Fig. 3 a side elevation, on a smaller scale and including an appropriate key;  
Fig. 4 an end elevation, in the plane of line 4—4 of Fig. 3;  
Fig. 5 an end elevation on the scale of Fig. 3;  
and  
Fig. 6 an end elevation of the key shown in Fig. 3.

In the drawing, 10 indicates the main shell of the lock having the main bore 11, intermediate shoulder 12 and entrance bore 13.

Rotatably sleeved within bore 11 is a cylindrical secondary tumbler-sleeve 14 seated at one end on shoulder 12 and with its other end in the main flush with the inner end of shell 10 but having extended stop-blocks 15 and anchor pins 16, the purpose of which will appear.

Nonrotatively secured to sleeve 14, by anchor pins 16, and spaced from the adjacent end of casing 10 by blocks 15, is a disk 17 provided with various eccentric perforations by means of which said disk may be connected to a bolt to be retracted through the medium of my mechanism.

Rotatively sleeved within the secondary tumbler sleeve 14 is a primary cylindrical tumbler sleeve 20 shouldered at 21 to seat on shoulder 12. The key-entry end of sleeve 20 is flush with one end of shell 10 and its other end is flush with the ends of blocks 15.

Freely rotatively mounted axially in disk 17 is a pin 22 which is axially anchored in the disk and has a diameter less than the bore of sleeve 20 so as to provide an annular key pocket 23.

The bore of sleeve 20 is provided with a helical groove 25 and the exterior of shell 10 is provided with a radially-registering helical groove 26.

Extending radially through shell 10 and sleeve 14 and into sleeve 20, respectively, between the helical grooves 26 and 25, are pin registering pockets 27, 27' and 27'' and slidably mounted in

each pin pocket group 27, 27', 27'' is a tumbler-pin group 28, 28', 28''.

The pins 28' have flat ends and variable lengths and, as an additional precaution against picking, these pins may be waisted, as indicated at 30, to provide deception shear planes 31, 31'. The pins 28'' have flat outer ends to receive the adjacent pin 28' and rounded inner ends to engage the key fin to be described. These pins 28' will vary in length to correspond with the key fin so that, when key-raised, their upper ends will lie at the arc of the periphery of sleeve 20 and bore of sleeve 14.

The pins 28 may be of uniform length, falling short of the exterior of shell 10 and may be waisted, as indicated at 32, to provide the deception shear plane 32'.

The pin groups 28, 28', 28'' are yieldingly urged inwardly by light springs 33 in a well known manner, as in the structure shown in my Patent 1,932,706.

A plate 50 overlies the inner end of sleeve 14 and is notched at 51 to receive blocks 15 and limit the angular movement of sleeve 14.

The key, appropriate to this lock, comprises a tubular stem 40 sized to enter the annular space 23 and carrying a helical fin 41 sized to enter groove 25 and peripherally flattened at appropriate points to engage and control the radial position of the tumbler-pin groups so that, when the key is fully screwed into sleeve 20, the outer ends of all of the pins 28' will lie at the periphery of sleeve 14 so that this sleeve may be freed to rotate within shell 10.

The pins 28' may be variable in length, if desired but each group 28', 28'' must have an overall length such that, when key-positioned, the outer ends of pins 28' will lie at the periphery of sleeve 14 and some or all of the junctions between pins 28' and 28'' will be within or without the periphery of sleeve 20 so that sleeves 14 and 20 will be rotatively interlocked.

In order that sleeve 20 may be positively key rotated in either direction, the key is provided with an actuating head 42 splined to stem 40 and yieldingly backed by spring 43. Head 42 is provided with a pin 44 projectable into a pocket 45 in the outer end of sleeve 20 so that the key and said sleeve may be rotatively interlocked.

The lock shown in my Patent 1,932,706 has been on the market for several years and, until recently, successfully baffled pickers, but skillful pickers have recently been able to successively push the inner tumblers to shear position and hold them by successive slight angular move-

ments of the tumbler sleeve. Pickers found that they could get the "feel" of the lock due to the fact that the main shell must be, of course, firmly anchored and the central pin (over which the  
5 key is sleeved) was rotative with the tumbler sleeve.

In my present structure, it will be noted that the core pin 22 is at all times freely rotative so that a picker cannot get any "feel" of the lock  
10 through the medium of this pin. It will be possible for a picker to outwardly displace all of the inner pins 28' with their outer ends in the shear line between the primary sleeve 20 and the secondary sleeve 14 (though the presence of the  
15 deception shear-planes 31 will impede the operation) but when this has been successfully accomplished, sleeve 20 is merely freed for rotation while sleeve 14 remains locked to shell 10.

If the several pin groups 28'—28'' be so proportioned as to length that, when the outer ends of pins 28' are properly in the shear plane between sleeve 14 and shell 10, some of the pins 28'' will project into sleeve 14 and some of the pins 28' will project into sleeve 20, the chances of  
25 successful picking will be enormously less than would be the case where, when key-positioned to free sleeve 14 from shell 10, all of pins 28' project into sleeve 14.

I claim as my invention:

30 1. A lock comprising a main shell, a cylindrical sleeve rotatably mounted in the shell, a second cylindrical sleeve rotatably mounted in the first-mentioned sleeve, a disk secured to and capping one end of the first-mentioned sleeve, a pin carried by said disk and projected into the second-  
35 mentioned sleeve and rotative relative to the disk, registrable radial tumbler-pin pockets in the shell and each of said sleeves, and a tumbler-pin group comprising three alinable and contactible pins mounted in said pockets, the several pins of the group having such relative lengths that the group may be positioned to afford a free  
40 shear between the two sleeves and an interlock between the first-mentioned sleeve and the shell, or positioned to afford a free shear between the

first-mentioned sleeve and the shell and an interlock between the two sleeves.

2. A lock of the character specified in claim 1 wherein the shell and two sleeves are provided with helically arranged registrable tumbler-pin  
5 pockets with each pocket group containing a tumbler-pin group.

3. A lock comprising a main shell, a cylindrical sleeve rotatively mounted in the shell, a disc secured to and capping one end of said sleeve, a pin  
10 journaled in said disc and projected axially through said sleeve, registrable radial tumbler-pin pockets in the shell and sleeve, and a tumbler-pin group comprising two contacting pins mounted in each of said pockets, said tumbler-  
15 pin groups being key engageable from the angular space immediately surrounding the aforesaid journaled pin.

4. A lock comprising a main shell, a tumbler-carrying sleeve journaled in said shell and carrying a helical series of radially movable tumblers, and an axially-anchored freely rotatable pin arranged axially within the bore of said sleeve and radially spaced from the bore wall.

5. A lock comprising a main shell, a primary  
25 tumbler-carrying sleeve, a secondary tumbler-carrying sleeve interposed between the shell and the primary tumbler sleeve and adapted for connection with an element to be actuated thereby, the said shell, primary sleeve and secondary  
30 sleeve having registrable pockets therein, a three-pin tumbler group mounted in said pockets and so proportioned that when the pins in the primary and secondary sleeves are positioned for the shear plane between said sleeves the pins in  
35 the secondary sleeve and shell will be positioned to interlock the secondary sleeve with the shell, and when the pins in the secondary sleeve and shell are positioned for the shear plane between the secondary sleeve and the shell the pins in the  
40 primary and secondary sleeves will be positioned to interlock said sleeves, and a pin arranged axially within the primary sleeve and freely rotatable and axially anchored relative to said  
45 primary sleeve and shell.

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