Dec. 16, 1930. A. LAWRENCE 1,785,634

CYLINDER LOCK

Filed May 27, 1927

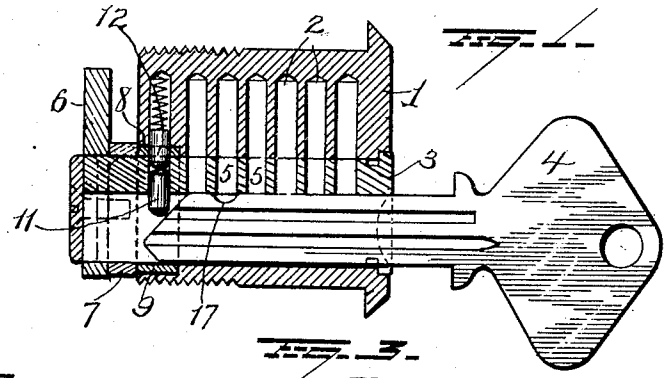


Fig. 1.

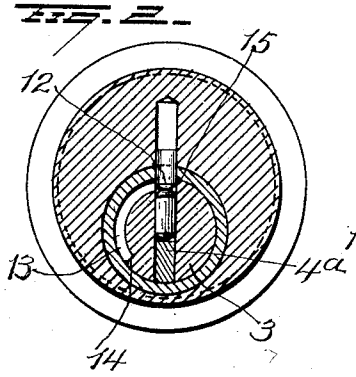


Fig. 2.

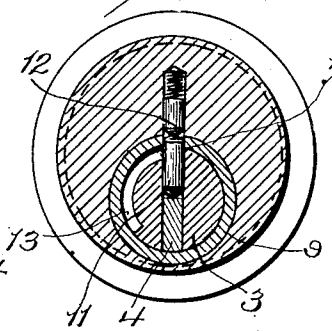


Fig. 3.

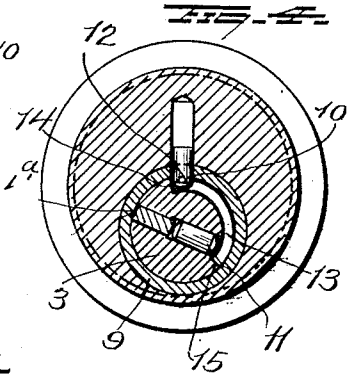


Fig. 4.

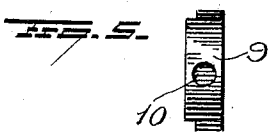


Fig. 5.

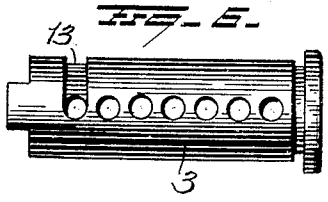


Fig. 6.

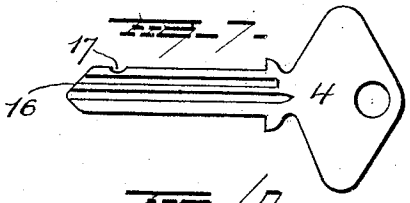


Fig. 7.

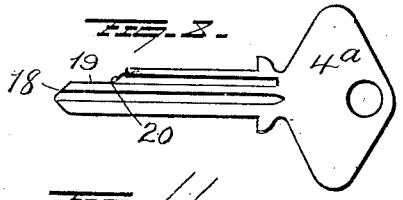


Fig. 8.

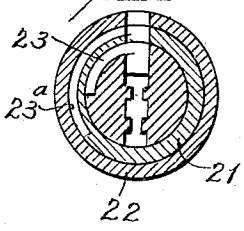


Fig. 9.

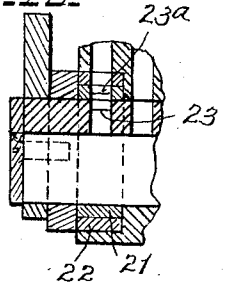


Fig. 10.

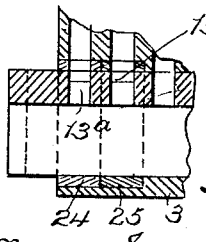


Fig. 11.

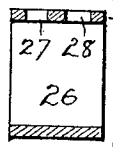


Fig. 12.

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UNITED STATES PATENT OFFICE

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CYLINDER LOCK

Application filed May 27, 1927. Serial No. 194,717.

This invention relates to improvements in locks and particularly to those of the "cylinder" type,—one object of the present invention being to provide a simple cylinder lock construction which may be operated and controlled with the use of any one of a plurality of differently formed keys,—the construction being such that when a certain key is used, an unlimited rotary movement may be imparted to the plug so that the plug may be given a complete rotation and so that when another key is employed, a limited rotary movement only of the plug will be permitted.

With this and other objects in view, the invention consists in certain novel features of construction and combinations of parts as hereinafter set forth and pointed out in the claims.

In the accompanying drawings;

Figure 1 is a longitudinal sectional view showing a cylinder lock and illustrating an embodiment of the invention;

Figures 2, 3 and 4 are transverse sectional views showing different positions which the controlling elements may assume;

Figure 5 is a view in elevation of the pin sleeve 9;

Figure 6 is a side view of the plug;

Figures 7 and 8 are views of two differently formed keys, each capable of use in operating the lock, and

Figures 9, 10, 11 and 12 are sectional views showing certain modifications.

A lock cylinder is shown at 1 and provided with sockets 2 for the accommodation of drivers as is well understood in the art. The cylinder is made with a suitable bore for the accommodation of the plug member 3 of the lock and said plug is provided as usual with a keyway for the accommodation of a proper key 4 or 4^a to manipulate tumblers mounted in chambers 5 of the plug and so align the tumblers and drivers that the plug may be turned.

The plug 3 projects beyond one end of the cylinder and carries a cam arm 6 which is spaced from the end of the cylinder by a collar 7. The inner end of the cylinder is provided with an annular recess 8 surrounding the plug 3 and in this recess, a sleeve 9 is loosely mounted so as to be capable, under certain conditions, of rotating with the plug, and said sleeve is provided with a hole 10 for the passage of one of the pin tumblers (11) or its driver 12, as hereinafter more fully explained. It will be observed that outward displacement of the sleeve 9 will be prevented by the spacing collar 7.

That portion of the plug which is encircled by the sleeve 9, is provided with a segmental peripheral groove 13 and the chamber in the plug which receives the pin tumbler 11 communicates with the groove at one end thereof. It will be observed that the end walls of the groove 13 form shoulders 14 and 15.

Normally when the plug is in locked relation to the cylinder, the driver 12 will project through the hole 10 in the sleeve 9 and enter the adjacent plug chamber which receives the tumbler 11, as shown in Figure 1.

The bitting of the key 4 is such that when said key is inserted into the key-way of the plug and moved forwardly from the position shown in Figure 1, engagement of the beveled end 16 of the key with the pin tumbler 11 will cause the latter and the driver 12 to be raised sufficiently high to carry the break between said tumbler and driver slightly above the top of the sleeve 9. As the key reaches the limit of its movement, the tumbler 11 will drop into a notch 17 in the key and the break between the tumbler 11 and driver 12 will be at the outer face of the sleeve 9 and the tumbler will act to couple said sleeve with the plug, as shown in Figure 3. Should turning movement be now imparted to the plug with the use of the key 4, the sleeve 9 will turn with it and the plug

may be rotated through any angle and may therefore be given a complete rotation.

Should a key of a different order, such as the key 4ª Figure 8, for example, be employed, a limited rotary movement only may be imparted to the plug. It will be observed that the bitting of this key is such that the movement of the pin tumbler 11 and driver 12 will be limited. When the key 4ª is inserted into the key plug, its beveled end 18 will serve to raise the tumbler and driver to such extent that the break between them will occur at the bottom of the groove 13 in the plug, the driver entering said groove as shown in Figure 2. During continued movement of the key 4ª to complete its inward thrust, the ledge 19 of the key (which ledge extends forwardly from the shoulder 20) will ride under the tumbler. The plug may now be turned from the position shown in Figure 2 to the position shown in Figure 4,—limited rotary movement of the plug being permitted by the driver 12 which enters the groove 13 and is cooperable with the shoulders 14 and 15 at respective ends of said groove.

Should it be desired to adapt the lock for operation by more than two different keys, this may be accomplished by the provision of more than one pin sleeve, and such sleeves 21—22 may be placed one within the other as shown in Figures 9 and 10. In this construction, the plug is provided with a short groove 23, and the first sleeve 21 is provided with a little longer groove 23ª while the outer sleeve has no groove at all. In this way, three different extents of movements of the cam may be obtained. If desired, two pin sleeves 24, 25 may be located side by side as shown in Figure 11 and the plug provided with two grooves, 13ª, 13ᵇ for cooperation of two tumblers. Or, if desired the two sleeves may be displaced by a single wide sleeve 26 having two holes 27, 28 as shown in Figure 12. If found desirable, the arrangement could be used without a sleeve in order that only a limited plug movement might be obtained at all times.

Having fully described my invention what I claim as new and desire to secure by Letters-Patent, is:—

1. In a pin-tumbler lock, a key plug having a groove leading from a pin-tumbler bore, a pin-tumbler and driver in said bore, said tumbler, driver, and groove being adapted to confine the movement of the plug to the length of said groove.

2. In a pin-tumbler lock, a key plug having a pin-tumbler chamber and also having a groove leading from said pin-tumbler chamber, a pin-tumbler and driver in said chamber, a key adapted to set up the pin-tumbler so as to allow rotation of the plug, said groove cooperating with the driver to limit this rotation.

3. In a pin-tumbler lock, the combination with a cylinder casing of a grooved key plug and a superimposed sleeve mounted therein, a pin-tumbler cooperating with said groove and sleeve so that when raised to varying heights, it will act to control the possible movements of said key plug.

4. In a pin-tumbler lock, the combination with a cylinder casing of a grooved key plug, a sleeve rotatably mounted thereon, and a pin-tumbler and driver adapted to cooperate with said sleeve and groove to limit the movement of said key plug.

5. In a pin-tumbler lock, a key plug having a pin-tumbler chamber and also having a segmental grove leading from said pin-tumbler chamber, a sleeve mounted about the plug in the plane of the groove and having a bore in alignment with the plug pin-tumbler chamber, said pin-tumbler being adapted to be raised in said chamber by a key to the level of the groove whereby limited movement only of the plug will be obtained, said tumbler being adapted to be raised to the outer periphery of the sleeve by a second key whereby unlimited movement of the plug will be obtained.

6. In a lock, the combination of a cylinder and plug, a sleeve loose on the plug within the cylinder and having a hole, and a key operated tumbler in the plug to enter the hole in the sleeve and couple the latter to the plug and permit rotation of both through any angle, and means cooperable with the driver of said tumbler to limit the extent of rotary movement of the plug.

7. In a lock, the combination of a cylinder and a plug, the latter being grooved circumferentially throughout a limited distance of its circumference and communicating with tumbler receiving means, sleeve means loosely encircling the circumferentially grooved portion of the plug and perforated for the passage of tumbler or driver means, and tumbler and driver means to engage the perforated sleeve means.

8. In a lock, a key plug having a groove leading from a pin tumbler bore, a pin tumbler and driver in said bore, said driver being operable by a key to rest at the groove level of said tumbler bore to limit the plug movement.

9. In a pin-tumbler lock, a key plug having a pin-tumbler chamber and also having a segmental groove leading from said pin-tumbler chamber, a pin-tumbler in said chamber, a sleeve mounted about the plug in the plane of the groove and having a bore in alignment with the plug pin-tumbler chamber, said pin-tumbler being adapted to be raised in said chamber by a key, to the level of the grove, whereby limited movement only of the plug will be obtained, the pin-tumbler being adapted to be also moved by a second key to the outer periphery of the sleeve,

whereby unlimited movement of the plug will be obtained.

10. In a lock, the combination of a cylinder and plug, the plug having a segmental peripheral groove communicating with a tumbler chamber of the plug, a sleeve freely encircling the plug within the cylinder and having a hole to receive the driver of said tumbler or said tumbler itself, according to the particular key used to operate the lock.

In testimony whereof, I have signed this specification.

ALFRED LAWRENCE.