

1,163,470.

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UNITED STATES PATENT OFFICE.

REINHOLD SCHOELL, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE YALE & TOWNE MANUFACTURING COMPANY, OF STAMFORD, CONNECTICUT.

CYLINDER-LOCK.

1,163,470.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, REINHOLD SCHOELL, a citizen of the United States, and a resident of Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Cylinder-Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in pin tumbler locks and keys for the same, and it consists in the parts and combination of parts as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in perspective of the cylinder; Fig. 2 is a view in longitudinal section of the same; Fig. 3 is a view in transverse section; Figs. 4 and 5 are views of the connecting bar plug detached; Figs. 6 and 7 are views of the key plug; Fig. 8 is a view in end elevation of same; Fig. 9 is a view of the key and Fig. 10 is a diagram showing the manner of laying out the pin holes or pockets in the key; Fig. 11 is a view showing the sleeve for locking the cylinder to the door and Fig. 12 is a view of the escutcheon plate.

The cylinder consists of a tube 1 having a flanged end 2 to which the struck up face plate or escutcheon 3 is riveted. This face plate is provided with a key slot 4 the central portion of which is enlarged and rounded as at 5, so that when the key 7 has been properly entered in the cylinder, the reduced neck 6 of the key will be within said rounded portion of the key slot and free to turn therein. The shank 8 of the key is of greater width than the enlarged rounded part 5 of the key slot, hence the key cannot be turned until it has been fully entered in the lock.

The tube 1 of the cylinder has a portion of its wall pressed outwardly as at 9, forming a pocket 10 which extends lengthwise of the cylinder, in which the outer ends of the pins 11 normally rest. The side walls of the pocket are curved or beveled as shown in Fig. 3, so that when the key plug 12 is turned by the key, the beveled ends of the pin tumblers 11 engaging said side walls, will be pushed inwardly into the plug thus permitting the latter to turn.

The plug 12 is located within the cylinder,

and consists simply of two disk shaped ends 14 and a body portion 15, the latter being provided with a series of recesses 16 for the pin tumblers 11, and also with a key slot, which also passes through the ends 14 of the key plug. The recesses 16 for the pins 11, communicate with the key slot, and when the key plug is so turned that the outer ends of the pins are within the pocket 10 in the cylinder, the inner ends of the pins will be clear of the key slot thus leaving the latter unobstructed for the free entrance of the key, as shown in Fig. 3.

Mounted to turn in the rear end of the cylinder, and at the rear of the plug 12, is the connecting bar plug 17, to which the connecting bar 18 is secured. The connecting bar plug is free to turn in said cylinder and is independent of the plug, and is provided at its inner end with a recess 19 in which the reduced end 20 of the key 7 rests, and with the slot 21 in which the shoulders 22 of the key rests when the latter is fully inserted, so that said connecting bar plug 17 is turned directly and positively by the key and not by the plug 12, the latter being wholly disconnected from the plug 17 and free to turn independently of the latter.

The connecting bar plug 17, as shown in Figs. 4 and 5, is provided at its front end with the flange 23 which rests between the rear plate 24 and the rear end of the plug 12, so that it is free to rotate independently of the plug.

The key 7 is a flat key and is of such length that when its neck 6 is within the key slot in the face plate of the cylinder, its reduced end 20 and its shoulders 22 will be in engagement with the connecting bar plug 17. It is also provided with a series of holes or pockets 25 which correspond in position to the pin tumblers, so that when the key is inserted and turned to either the right or the left, the movement of the plug 12 will carry the pin tumblers inwardly, their inner ends entering the pockets 25 in the key. If a key or instrument not provided with pockets for the end of the pin tumblers be inserted in the key slot of plug 12 and pressure applied in a direction to turn the same, such key or instrument will block the movement of the pin tumblers into the key slot and thus absolutely prevent the key plug 12 from being turned consequently preventing the key from turning, hence in order to turn

the connecting bar plug 17, which is connected directly to the lock, the key must have a pocket for each pin tumbler so as to permit the latter to move inwardly to clear the side walls of the pocket 10 in the cylinder 1.

The connecting bar 18, which as before explained is carried by the connecting bar plug 17, is connected to the roll back of the lock of the rim latch type in the well known manner, and operates to retract the bolt of the lock when the key is turned.

The combination of the lock may be changed by reversing or changing the position of any two pin tumblers, and for convenience in illustrating the method of changing the combination, I have shown in Fig. 8, a key divided into five pin tumbler spaces by the longitudinal lines *a-b-c-d-e* and *e* and transverse lines 1-2-3-4 and 5.

The pockets 25 in the key, are located at the intersection of the longitudinal and transverse lines, and if the first recess 25 and its corresponding pin 11 now at the intersection of the lines *a*¹ be moved to the intersection of the lines *d*¹, the fourth pocket 25 and its corresponding pin, must be moved up to the intersection of the lines *a*⁴. If the pocket at the intersection of the lines *b*² be changed to *e*², the pocket at *e*⁵ would be changed to *b*⁵, and so on throughout the entire series, the proper changes of course being also made in the location of the pins.

From the foregoing it will be seen that in order to actuate the bolt of the lock, a key having a pocket for each of the pin tumblers, and an end to engage the connecting bar plug must be used. If any one of the pockets in the key does not aline with its pin tumbler the plug with the key therein cannot be turned, consequently the connecting bar plug cannot be turned to retract the bolt.

In order to prevent the plug from accidentally turning, or rather to yieldingly hold it with its key slot in alinement with the key slot in the escutcheon, I have provided it with a spring pressed plunger 26, at the rear end thereof, which enters a seat in the cylinder as at 27, when the key slot in the plug alines with the key slot in the escutcheon.

By entering the key in the plug and turning same, the plunger will be forced into the plug and will again seat itself in the recess after the latter has been turned to its normal position. The lock thus constructed is secured to the door by the sleeve 28, which is adapted to engage lugs 29 on the cylinder 1. This sleeve is of slightly greater diameter than the diameter of the cylinder 1, so that its inner open end may receive and embrace the inner end of the cylinder, and it is provided at diametrically opposite sides with the longitudinal slots 30, which latter start

from the inner end of the sleeve and are open at said end, and terminate preferably just short of the outer face plate 31 of the sleeve. Communicating with each longitudinal slot 30, at opposite sides of the latter, are the cam slots 32, the cam slots at one side of each longitudinal slot being located intermediate the cam slots at the opposite side of said longitudinal slot, so that one of the series of cam slots of each longitudinal slot will always be in a position to engage the lugs 29 on the cylinder.

In applying the cylinder to a door, a hole greater in diameter than the cylinder is bored through the door and the cylinder placed therein with its face plate or escutcheon against the outer face of the door, and the prongs 33 are driven into the face of the door and operate to prevent the cylinder from turning. The sleeve 28 is then entered into the hole at the rear side of the door and turned, if necessary to enter the lugs 29 on the cylinder, in the longitudinal slots in the sleeve, after which the sleeve is turned in a direction to cause the lugs 29 to enter the cam slots with which the lugs aline, and then by continuing the turning movement of the sleeve, the lugs 29 moving in contact with the walls of the cam slots pull the cylinder and sleeve toward each other, thus firmly securing the parts to the door.

After the parts have been drawn toward each other so as to tightly clamp the face plates of the cylinder and sleeve against the opposite faces of the door, the sleeve is locked against turning movement by pins passing through the face plate and into the door.

It is evident that many slight changes might be resorted to in the relative arrangement of parts shown and described without departing from the spirit and scope of my invention. Hence I would have it understood that I do not wish to confine myself to the exact construction and arrangement of parts shown and described but,

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

1. In a pin tumbler lock, the combination of a cylinder, a key plug mounted in the cylinder and provided with a key slot, pin tumblers carried by the key plug, means against which the outer ends of the tumblers bear when the key plug is turned for projecting the tumblers into the key slot, yielding means for holding said plug against accidental turning movement, and a bolt actuating device movable with the key and plug when the latter is actuated by the key.

2. In a pin tumbler lock, the combination of a cylinder, a key plug mounted in said cylinder and provided with a key slot, pin tumblers carried by said key plug and movable into the key slot, means against which the outer ends of the tumblers bear for mov-

ing the tumblers longitudinally into the key slot when the key plug is turned, a key having a pocket for the end of each pin tumbler, and a bolt actuating device carried by the cylinder and actuated directly by the key.

8. In a pin tumbler lock, the combination of a cylinder, a bolt actuating device movably mounted in the rear end thereof, a key plug mounted to turn in said cylinder and provided with a key slot, a series of pin tumblers carried by the plug, means for moving said tumblers into the key slot when the said plug is turned by the key, and a key having a pocket for the end of each pin tumbler, the said key engaging the bolt actuating device for turning the same.

4. In a pin tumbler lock, the combination with a cylinder having a pocket therein, a key plug mounted in said cylinder and provided with a key slot, a series of pin tumblers carried by said plug, the outer ends of said tumblers movably resting in the pocket in the cylinder and their inner ends movable across said key slot when the cylinder is turned, a bolt actuating device rotatably mounted at the inner end of the cylinder and a key adapted to engage said bolt actuating device for rotating same, and provided with pockets to receive the inner ends of the tumblers as the latter are moved inwardly by the rotation of the key plug.

5. In a pin tumbler lock, the combination

of a cylinder, the face plate of which is provided with a key slot, a key plug mounted to rotate in said cylinder, a bolt actuating device mounted in said cylinder, at the rear of the key plug, but disconnected from the latter, a plurality of pin tumblers carried by the key plug, and a flat key constructed to engage the bolt actuating device for actuating the same, and also provided with pockets to receive the inner ends of the pin tumblers as the latter are moved into the key slot.

6. In a pin tumbler lock, the combination of a cylinder, a key plug mounted in said cylinder and provided with a key slot, pin tumblers carried by the key plug and movable into the key slot when said plug is turned, means for positively moving the pin tumblers longitudinally during the rotation of the plug, a bolt actuating device having a rotary movement independent of the key plug and operated directly by the key, and a key constructed to permit of the longitudinal movement of the tumblers.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

REINHOLD SCHOELL.

Witnesses:

SCHUYLER MERRITT,
E. M. CROZIER.