

July 2, 1963

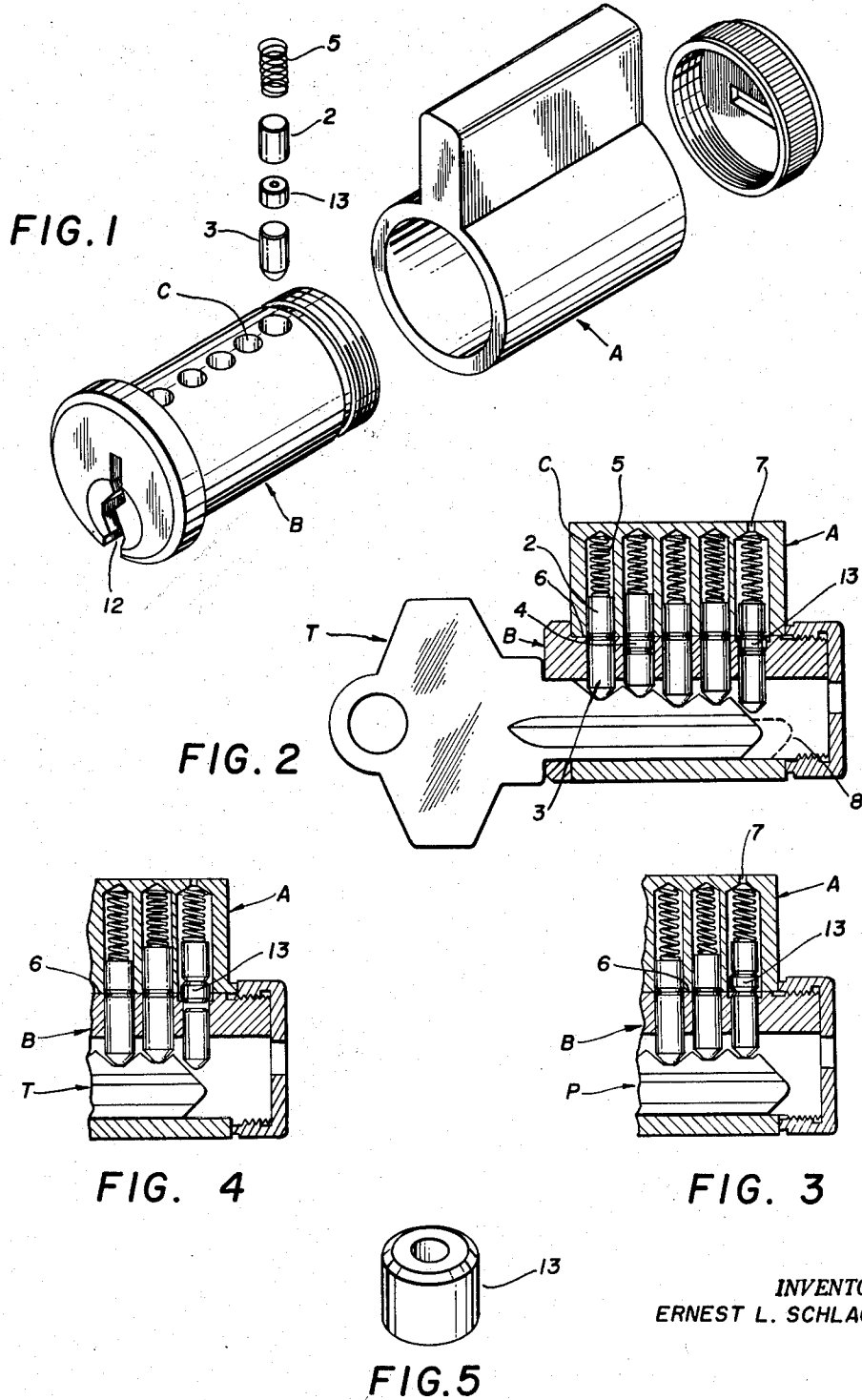
E. L. SCHLAGE

3,095,726

PIN TUMBLER CYLINDER KEY SYSTEM

Filed Jan. 23, 1961

2 Sheets-Sheet 1



July 2, 1963

E. L. SCHLAGE

3,095,726

PIN TUMBLER CYLINDER KEY SYSTEM

Filed Jan. 23, 1961

2 Sheets-Sheet 2

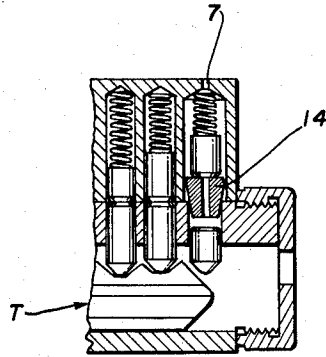


FIG. 6

FIG. 7

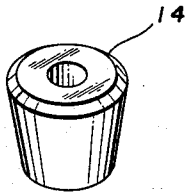
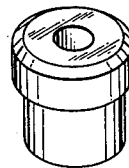


FIG. 8

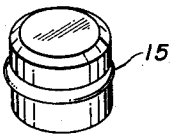


FIG. 9

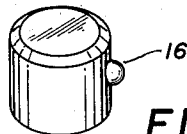


FIG. 10

INVENTOR.
ERNEST L. SCHLAGE

1

3,095,726

PIN TUMBLER CYLINDER KEY SYSTEM

Ernest L. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, a corporation
Filed Jan. 23, 1961, Ser. No. 84,378
5 Claims. (Cl. 70—383)

This invention relates to a pin tumbler cylinder lock and especially to a lock which may be opened by a temporary key, and later on by a permanent key. Said permanent key, when inserted and removed from the plug, thereafter renders the temporary key inoperative.

At a certain stage during the construction of a building such as a residence, a hotel, a school, an office building, or the like, doors and key-operated locks are installed to insure the security of the building, particularly certain rooms where tools and materials are stored. Master keys are usually issued to the contractor and to workmen such as carpenters, plumbers, electricians, and the like, during the construction period. If one or more of these keys are lost, stolen, or duplicated, and the key system is one not embodying this invention, then the security of the entire building is destroyed. If, on the other hand, a key system embodying this invention were employed, then the keys issued to the contractor and workmen would be of only temporary utility since the owner, when taking possession of the building, or at any time he elects, can, by simply inserting his permanent key into the locks, render all keys previously issued inoperative and of no utility.

A key system of this character may also be employed when a contractor builds one or more homes for sale and gives a listing of the homes to a number of realtors or real estate agents. Each agent is given a key of the temporary type so that he may show the homes to prospective buyers. When a home is sold, the contractor hands the new owner the permanent keys and, when they are inserted into the locks, all the temporary keys are thereby rendered inoperative, and neither the contractor nor the new owner need worry about collecting the temporary keys previously handed out to workmen and agents.

The key system described above in which a second key, when inserted into the lock renders the first key inoperative, may be modified so that a third key, when inserted into the lock, will render both previous keys inoperative. The system may be further extended to incorporate four, or even more, keys if such are desired by landlords or others wishing to shut out previous tenants. Such modifications, however, must be incorporated into the mechanism of the pin tumbler cylinder lock at the time of its assembly.

The object of the present invention is accordingly that of providing a pin tumbler cylinder key system in which a temporary key is used initially, and which later on is replaced by a permanent key which, when inserted and removed from the plug, renders the temporary key or keys inoperative.

The invention is shown by way of illustration in the accompanying drawings in which

FIG. 1 is an exploded view of a pin tumbler cylinder lock showing the essential parts.

FIG. 2 is a central, vertical, longitudinal section of a pin tumbler cylinder lock embodying the present invention and in which a short temporary key is inserted.

FIG. 3 is a similar fragmentary view showing a long permanent key inserted.

FIG. 4 is also a fragmentary view showing the short temporary key reinserted.

2

FIG. 5 is an enlarged perspective view of the intermediate tumbler shown in FIGS. 2, 3 and 4.

FIG. 6 is a view similar to FIG. 4 showing a modified form of intermediate tumbler.

FIG. 7 is an enlarged perspective view of the modified form of intermediate tumbler shown in FIG. 6.

FIGS. 8, 9 and 10 show other modified forms of the intermediate tumbler.

Referring to the drawings in detail and especially FIGS. 1 and 2, A indicates the cylinder body of a pin tumbler lock, B the plug which is rotatably mounted in the cylinder body, and C the drilled holes or columns in which the pin tumblers move. There are upper tumblers 2 and lower tumblers 3, and there may be master tumblers 4, particularly if the key system is to be masterkeyed. All the tumblers are actuated by compression springs 5 in the usual manner.

The plug has the usual longitudinal broached passage or keyway 12 formed therein for the reception of a key. In this instance, a short or temporary key, indicated by T in FIG. 2, which actuates the tumblers of the first four columns, is employed during the construction period of a building. When this key is inserted, it lifts these tumblers to the shear line of the plug indicated at 6, and inasmuch as the tumblers in the fifth or last column have already been positioned on the shear line by other means, the plug may be rotated and the door opened; however, if a long blank key or permanent key is once fully inserted, the short or temporary key will thereafter be rendered inoperative. This is accomplished as follows.

By referring to FIG. 2, and specifically to the five holes C drilled into the cylinder body A, it will be noted that the hole in the fifth or last column is slightly larger in diameter. The corresponding hole directly below in the plug B is also drilled to this slightly larger diameter but only for a short distance into the plug. Below this depth, the hole has the same standard diameter found in the holes in all the other four columns.

Situated between the top and bottom tumblers in the last column is an intermediate tumbler 13. This tumbler is of larger diameter than the other tumblers but it can, nevertheless, move freely in the large diameter portion of the drilled holes in the fifth column. This tumbler cannot freely enter the smaller diameter hole which exists below the counterbore in the plug; however, it can be forced to enter if some downward pressure is applied. This intermediate tumbler is preferably made of a deformable material such as plastic, and if, as shown in FIG. 5, it is furnished with a central hole, its entry into the small hole in the plug is somewhat facilitated, and furthermore, it will be frictionally held in position.

By referring to FIG. 2, it will be noted that a hole 7 is formed at the upper end of the last column. During the assembly of the pin tumbler cylinder lock at the factory, a rod is inserted in the hole 7. It passes through the spring and engages the upper tumbler. By applying downward pressure it forces the intermediate tumbler 13 down into the plug and partially into the small diameter hole below the counterbore where it is frictionally retained and where its upper surface aligns with the shear line 6 of the plug as clearly shown in FIG. 2. The short temporary key T may now be used to open the lock since only the first four columns of tumblers need be raised to the shear line by the key.

The permanent key, as indicated by P in FIG. 3, is somewhat longer than the temporary key, and when inserted into the plug B its tip contacts the bottom tumbler

3

in the fifth column and cams or raises it, and the tumblers above it, to a position when the lower surface of the intermediate tumbler 13 aligns with the shear line 6 of the plug, thus permitting rotation of the plug and consequent opening of the door. When the permanent key P is removed from the plug, and the short temporary key T is reinserted, the conditions illustrated in FIG. 2 no longer prevail. The intermediate tumbler 13, having been forcibly ejected by the permanent key from its frictionally held position in the plug, now rests in the counterbore, as shown in FIG. 4, and is contained partially in the cylinder body and partially in the cylinder plug, thereby preventing relative rotation of the latter.

FIGURE 6 illustrates a modified form of the invention in which the hole drilled into the plug corresponding to the fifth or last column is not counterbored, but has the same standard diameter throughout its length as is found in the other four columns. The corresponding hole directly above in the cylinder body, however, is drilled oversize as before. The intermediate tumbler 14, shown in FIG. 7, is tapered so that it may be readily forced down into the plug flush with the shear line, but when it is raised into the cylinder body by the permanent key and then allowed to drop by the removal of this key, it will assume the position shown in FIG. 6. By virtue of its taper, its small end will be contained in the small diameter hole in the plug and its large end will be contained in the large diameter hole in the cylinder body, and it will prevent the rotation of the plug in a manner analogous to that shown in FIG. 4 except that the counterbore is omitted.

The stepped tumbler shown in FIG. 8 is made of a deformable material as is tumbler 14, and it likewise carries a central hole to facilitate its large diameter being compressed or squeezed into the smaller hole in the cylinder plug. In FIG. 9 the intermediate tumbler is made of metal but is surrounded by a deformable and resilient band or O-ring 15, and in FIG. 10 the intermediate tumbler is also made of metal but is fitted with a cross-pin 16 made of nylon or a like plastic. Either the O-ring or the nylon cross-pin will serve the same purpose as the tapered plastic intermediate tumbler 14, to wit, that of frictionally and temporarily holding the tumbler in the plug until raised by the cam action of the permanent key, and upon removal of the permanent key, holding the tumbler midway across the shear line.

If, after the permanent key has been employed, it is desired to reset the cylinder so that the temporary key can again rotate the plug, it is necessary merely to insert a rod through hole 7 and push the intermediate tumbler flush with the shear line 6 as previously described.

Although, for convenience, the temporary key T has been characterized as a short key, obviously it could be as long as the permanent key P, provided that its tip were sufficiently reduced in height so that when this key is inserted into the plug, it would not lift the intermediate tumbler from the frictionally held flush position shown at 8 in dotted lines in FIG. 2.

For convenience, the intermediate tumbler has been illustrated only in the last column of the cylinder lock. Obviously, it could be placed in the next to the last column, or in the last two columns, or in any column or columns, provided only that the combinations are so chosen that the intermediate tumblers are not prematurely activated by the insertion of temporary keys.

When the intermediate tumblers are placed in more than one column, then several different permanent keys may be fashioned, each progressively or sequentially activating the individual intermediate tumblers, thereby rendering inoperative some or all of the keys previously inserted into the lock.

Having thus described my invention what I desire to claim and secure by Letters Patent is:

1. In a pin tumbler cylinder lock having a cylinder body, a key receiving rotatable plug, and a single row of

4

aligned pin tumbler columns with upper and lower spring actuated pin tumblers in each column, the improvement comprising insertion of an intermediate pin tumbler disposed between an upper and a lower tumbler in one of the columns, means on the intermediate pin tumbler for temporarily securing said intermediate pin tumbler in the plug in a position where its upper surface aligns with the shear line of the plug, thereby permitting opening of the lock by a temporary key which actuates only the pin tumblers in the other columns, said intermediate pin tumbler being raised to a position where its lower face aligns with the shear line of the plug upon insertion of a final key, said final key actuating all of the pin tumblers in all of the columns to open the lock, and means on the intermediate pin tumbler for positioning said intermediate pin tumbler where it intersects the shear line of the plug upon withdrawal of the final key, thereby rendering the temporary key permanently inoperative.

2. In a pin tumbler cylinder lock having a cylinder body, a key receiving rotatable plug, and a single row of aligned pin tumbler columns with upper and lower spring actuated pin tumblers in each column, the improvement comprising insertion of an intermediate pin tumbler disposed between an upper and a lower tumbler in one of the columns, frictional means carried by the intermediate pin tumbler for temporarily securing the intermediate pin tumbler in the plug in a position where its upper surface aligns with the shear line of the plug, thereby permitting opening of the lock by a temporary key which actuates only the pin tumblers in the other columns, said intermediate pin tumbler being raised to a position where its lower face aligns with the shear line of the plug upon insertion of a final key, said final key actuating all of the pin tumblers in all of the columns to open the lock, said intermediate pin tumbler assuming a position where it intersects the shear line of the plug when the final key is removed, thereby rendering the temporary key permanently inoperative.

3. In a pin tumbler cylinder lock having a rotatable plug, and a single row of aligned tumbler columns with upper and lower spring actuated pin tumblers in each column, an intermediate pin tumbler disposed between an upper and a lower tumbler in one of the columns, an enlargement on the intermediate tumbler for frictionally securing said intermediate tumbler in the plug with its upper surface aligned with the shear line of the plug, the tumblers in the other columns being liftable by a key to the shear line, thereby permitting rotation of the plug.

4. In a pin tumbler cylinder lock having a rotatable plug, and a single row of aligned tumbler columns with upper and lower spring actuated pin tumblers in each column, an intermediate pin tumbler disposed between an upper and a lower tumbler in one of the columns, resilient means on the intermediate tumbler for temporarily securing said intermediate tumbler in the plug with its upper surface aligned with the shear line of the plug, the tumblers in the other columns being liftable by a temporary key to the shear line, thereby permitting rotation of the plug, and a final key for lifting the intermediate tumbler and freeing it from its secured position, so that when the final key is removed, the intermediate tumbler will assume its normal position intersecting the shear line, thereby permanently preventing rotation of the plug by the temporary key.

5. In a lock having a key actuated plug and a single row of aligned pin tumbler columns, one of said columns containing an upper, an intermediate and a lower tumbler, said intermediate tumbler carrying means for frictionally and temporarily securing it in the plug in a position where its upper surface aligns with the shear line of the plug, a key for raising the tumblers to a position where the lower surface of the intermediate tumbler aligns with the shear line of the plug, and means acting upon withdrawal of said key to position the intermediate tumbler at a point where it intersects the shear line of the plug,

and stop means on the intermediate tumbler for holding the intermediate tumbler in said intersecting position.

References Cited in the file of this patent

UNITED STATES PATENTS

1,190,686 Teich ----- July 11, 1916 5

1,650,564
1,650,568
1,796,098
2,007,143
2,591,652
2,818,723

Wolff ----- Nov. 22, 1927
Hurd ----- Nov. 22, 1927
Hardy ----- Mar. 10, 1931
Keil ----- July 2, 1935
Ziegliss ----- Apr. 1, 1952
Levin ----- Jan. 7, 1958