June 29, 1965 C. V. SPON 3,191,407

DE-MASTER KEY CYLINDER ASSEMBLY

Filed Nov. 29, 1963

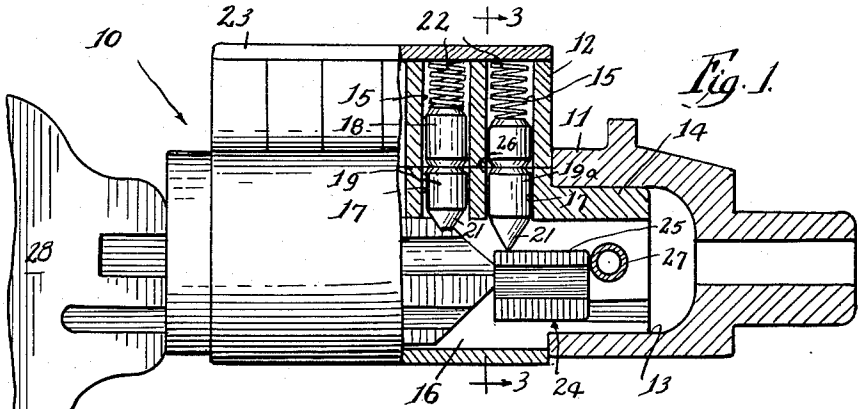


Fig. 1.

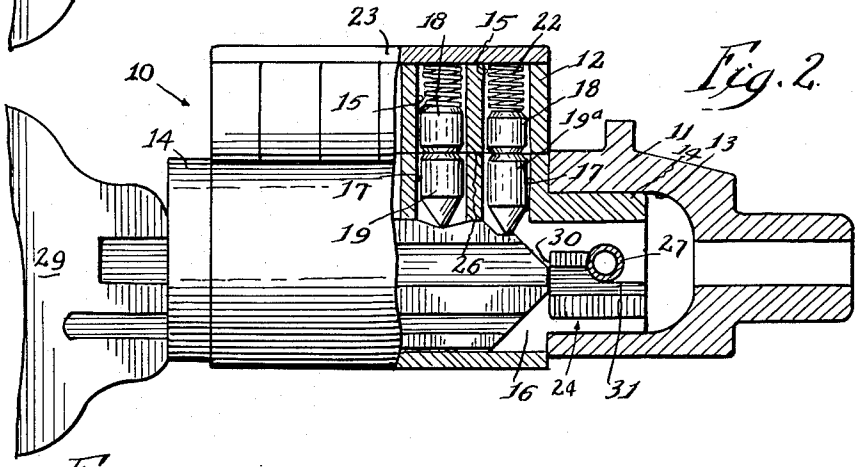


Fig. 2.

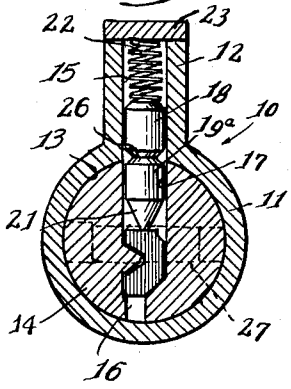


Fig. 3.

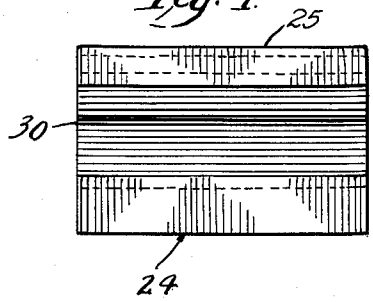


Fig. 4.

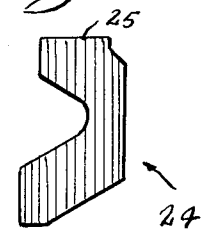


Fig. 5.

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DE-MASTER KEY CYLINDER ASSEMBLY

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The present invention relates to key operated tumbler locks and more particularly to a cylinder lock which may be opened by a temporary key and at a later time by a permanent key; with the permanent key when inserted and removed from the plug rendering the temporary key inoperative.

During construction of a building, such as a residence, hotel, school or office building, it is now customary to provide a tumbler cylinder lock assembly that can be operated by a temporary key, generally called a construction key, used by the builders, carpenters, electricians, etc., for access to the interior of the building while construction is in progress. Once construction has been completed and the owner or tenant takes possession, the lock must be altered in some manner so that the owner or tenant of the building may have access thereto and thereafter prevent unauthorized access by any person having acquired one of the temporary keys. The present invention provides for a simple and effective method and means of rendering such construction or temporary key inoperative when the owner or tenant takes possession.

Among the objects of the present invention is the provision of a tumbler lock system utilizing a temporary or construction key for the use of the builder, contractor or his workmen and a permanent key to be used by the owner or tenant of the building upon completion. The temporary key is utilized to actuate the tumbler lock as installed in the building and the permanent key provides for an alteration or conversion in the tumbler lock system so that the temporary key will no longer be effective.

Another object of the present invention is the provision of a deformable wafer which is positioned in the tumbler lock assembly to render one of the tumblers, for example the last or innermost tumbler, ineffective and maintain this tumbler in its inoperative position. The temporary key is shorter than the permanent key so as to actuate the first four tumblers without disturbing the position of the wafer. This wafer is inserted and retained in its preliminary position during construction of the building after which the permanent key, which is longer than the temporary key, is forcibly inserted in the lock to a sufficient depth to displace the deformable wafer from beneath its tumbler and actuate all the tumblers of the lock.

A further object of the present invention is the provision of a tumbler lock assembly with a deformable wafer contoured to be readily inserted through the key hole or slot into position for rendering one of the tumblers ineffective to lock the assembly. The permanent key must be inserted into the lock cylinder keyway to a depth to forcibly dislodge the wafer from under the tumbler. The wafer is forced against a stop pin and must be forcibly deformed to permit the wafer to move relative to and under the stop pin so that the tumbler deactivated by the wafer is freed from its inoperative position after which the permanent key is capable of operating the tumbler lock assembly and the temporary key becomes thereafter ineffective.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawing:

FIGURE 1 is an enlarged side elevational view partly in vertical cross section showing the de-master cylinder lock with the deactivating wafer positioned under the innermost tumbler, and showing the temporary key inserted to operative position in the lock.

FIG. 2 is a view similar to FIG. 1 showing the longer permanent key inserted in the tumbler lock and the deactivating wafer forcibly shifted by insertion of this key to its second or inactive position.

FIG. 3 is a vertical cross sectional view taken on the line 3—3 of FIG. 1 and viewed in the direction of the arrows but with the construction key removed.

FIG. 4 is an enlarged side elevational view of the deactivating wafer.

FIG. 5 is an end elevational view of the wafer of FIG. 4 showing the contour thereof.

Referring more particularly to the drawings wherein is shown an illustrative embodiment of the present invention, FIG. 1 discloses a tumbler lock assembly **10** having a cylindrical housing **11** and an integral, radially extending tumbler housing **12**. The cylindrical housing **11** has an axially or longitudinally extending opening or passage **13** adapted to accommodate a key plug **14**.

The tumbler housing **12** includes a plurality of generally equally spaced pin-tumbler openings **15** which extend through the housing **12** and into the cylindrical housing **11**. The key plug **14** has a keyway **16** of an irregular cross section as seen in FIG. 3, to conformably receive a key, which keyway extends longitudinally through the plug and a plurality of generally equally spaced radially extending openings **17** which are adapted to be aligned with the openings **15** in the housing **12**. Each opening **15** contains an upper or driver pin **18** and a lower or key tumbler pin **19** with a lower tapered and rounded end **21**; said pins **18** and **19** forming a column in openings **15** and **17**. A compression spring **22** is loaded between each driver pin **18** and the cover **23** for the tumbler housing **12** to yieldably urge the tumblers downwardly to their locked position.

A generally rectangular wafer **24** (see FIG. 1) is positioned within the key plug **14** with the upper edge **25** contacting the innermost key tumbler **19a** and to hold the tumbler in its unlocked or inoperative position, with the driver pin and tumbler pin contacting surfaces coinciding with the shear-line **26** of the key plug **14**. A transversely extending rigid pin **27** in the key plug **14** inwardly beyond the tumbler pins limits movement of the wifer **24** and aids in its positioning. The wafer as seen in end elevation in FIG. 5 conforms to the irregular contour of the keyway **16** to aid insertion of and movement of the wafer **24** into and through the key plug **14** to its position as shown in FIGS. 1 and 3. A construction key **28** (FIG. 1) may be inserted into the lock and actuate the first tumblers **19** to their unlocked position coinciding with the shear-line **26** so that the key **28** and key plug **14** may be turned to unlock the door or other closure. A permanent key **29** (FIG. 2) distributed after the building has been completed, cannot be fully inserted to actuate the lock assembly without forcibly dislodging the wafer **24** upon full insertion of this key.

The wafer is formed of a thermoplastic material, such as nylon, which may be dislodged and deformed under pressure. When it is desired to prevent further utilization of the construction key **28**, the longer permanent key **29** is inserted into the keyway **16** in the key plug **14** and its projected longer end is forcibly urged against the adjacent end **30** of the wafer **24** to dislodge and urge the wafer against the transverse pin **27**. Sufficient force must be exerted upon the longer key **29** to extend it to its fully inserted position and thereby cause the wafer **24** to deform under pressure with the deformation occurring at the portion **31** contacting the pin **27**. The wafer deforms sufficiently in the inner extended end of

the keyway to partially move and become lodged under the pin 27 to a second position as shown in FIG. 2 where it is retained.

When the key 29 is removed from the keyway 16, the key tumbler pin 19a is free to move downwardly under the action of the spring 22 acting on the corresponding driver pin 18 to cause all the driver pins 18 and key tumbler pins 19, 19a to move to a locked position. Then the insertion of the construction key 28 will be ineffective to move all of the free tumblers to unlocked position as the key tumbler pin 19a will not be elevated or actuated by the construction key.

Although the wafer is shown in the present illustrative embodiment as acting only in conjunction with the innermost key tumbler pin 19a, it is contemplated that the wafer may be utilized with more than one tumbler. It is not my desire or intent to unnecessarily limit the scope or the utility of the improved features by virtue of this illustrative embodiment.

Having thus disclosed the invention, I claim:

1. In a pin tumbler cylinder lock having a rotatable plug with a longitudinally extending keyway therein and a row of aligned and spring-actuated pin tumbler columns, each column containing an upper and a lower pin, a generally rectangular deformable wafer positioned in said plug underneath and supporting at least one pin tumbler column in a position permitting rotation of said plug by a key having bits actuating the other columns, a transverse pin in said plug adapted to be contacted by said wafer to locate said wafer under the pin tumbler of said one column, said plug being rotatable by a construction key which lifts the unsupported pin tumblers in their columns to the shear-line of the plug for unlocking the lock, and a second but longer key which when inserted in said plug dislodges and shifts the wafer to a position beneath the transverse pin to free said supported pin tumbler, said second key when fully inserted aligning the pin tumblers in all of the columns with the shear-line to permit rotation of the plug, and when withdrawn permitting a tumbler in each column to intersect said shear-line thereby rendering the construction key inoperative.

2. A pin tumbler cylinder lock as set forth in claim 1, in which said wafer is formed of a thermoplastic material capable of deformation under pressure of insertion of said second key so that the transverse pin engages and deforms the wafer to permit relative movement therebetween.

3. A pin tumbler cylinder lock as set forth in claim 2, in which the vertical cross section of the wafer conforms to the irregular contour of said keyway to permit ready insertion of the wafer longitudinally of the keyway.

4. In a pin tumbler cylinder lock having a rotatable plug with a longitudinally extending keyway and columns of upper and lower spring-actuated freely movable pin tumblers, an elongated deformable wafer extending longitudinally in said keyway having a vertical cross section corresponding to the contour of and positioned within the keyway below and supporting at least one lower pin tumbler in a position permitting rotation of the plug by a first key which lifts the other tumblers in their columns to the shear-line, a pin providing a rigid abutment in said plug against which the rear edge of said wafer abuts to aid in positioning the wafer in the keyway, and a second key which when inserted in the keyway engages and dislodges the wafer and moves it to a second extended position where the wafer is deformed and lodged under said pin to allow all the tumblers to intersect the shear-line upon withdrawal of the second key and render the first key inoperative.

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