

367

Dec. 25, 1945.

T. H. JOHNSTONE

2,391,832

REMOVABLE CORE CYLINDER

Filed Feb. 5, 1943

2 Sheets-Sheet 1

Fig. 1.

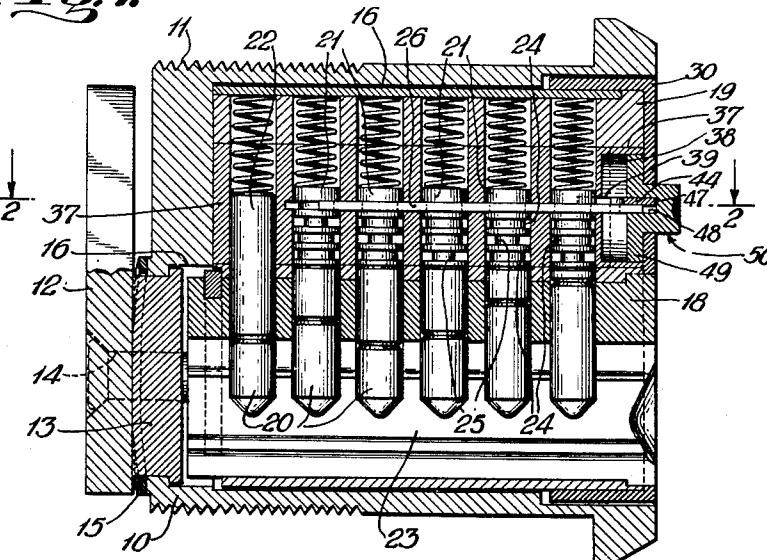
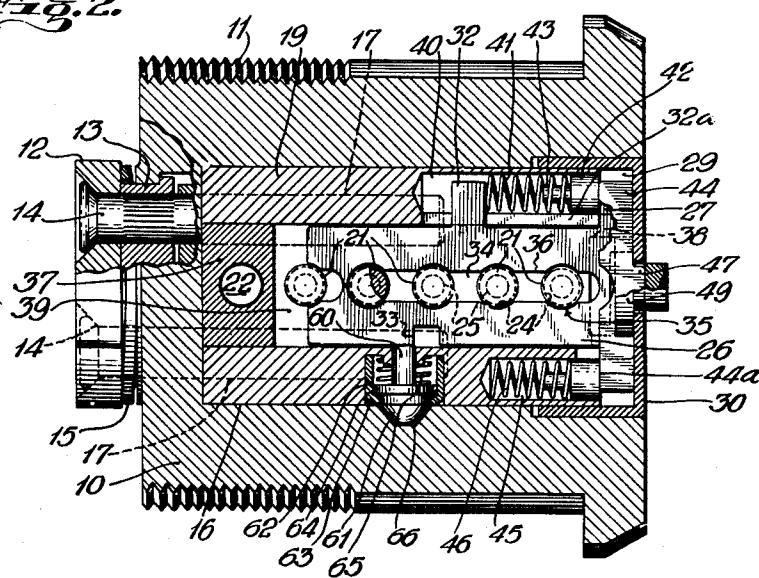


Fig. 2.



INVENTOR

INTERVIEW

BY

Y *F. J. Golden*

ATTORNEY

367

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2 Sheets-Sheet 2

Fig. 3.

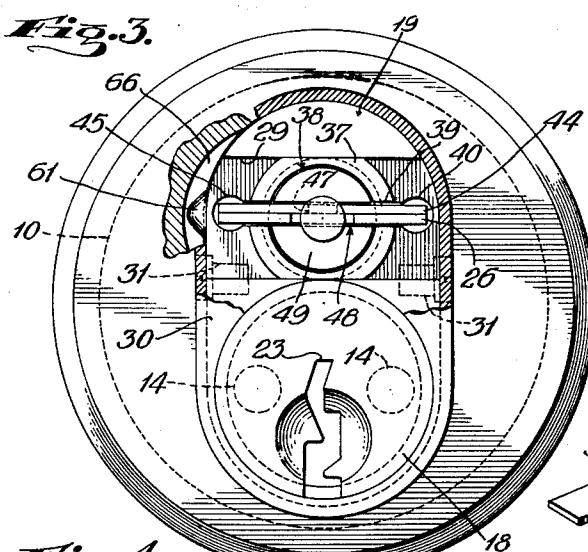


Fig. 4.

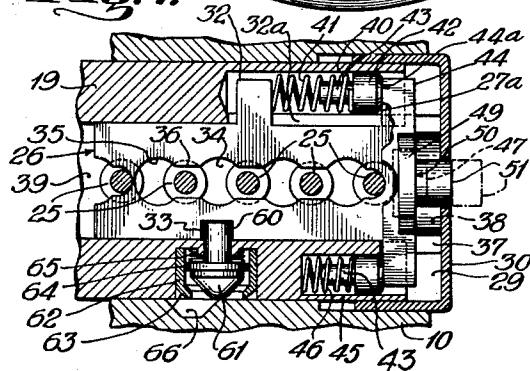


Fig. 7.

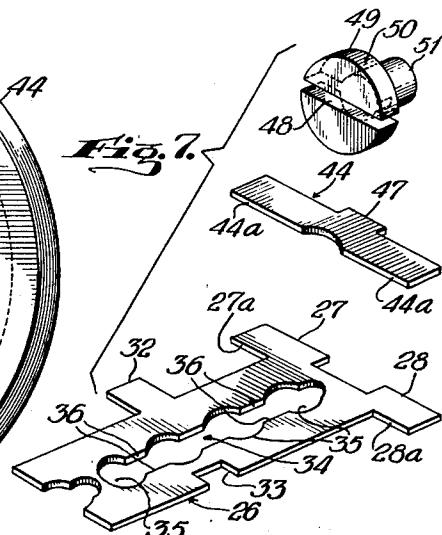


Fig. 6.

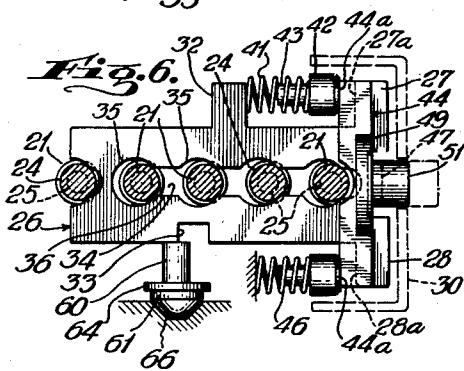
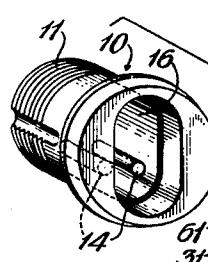
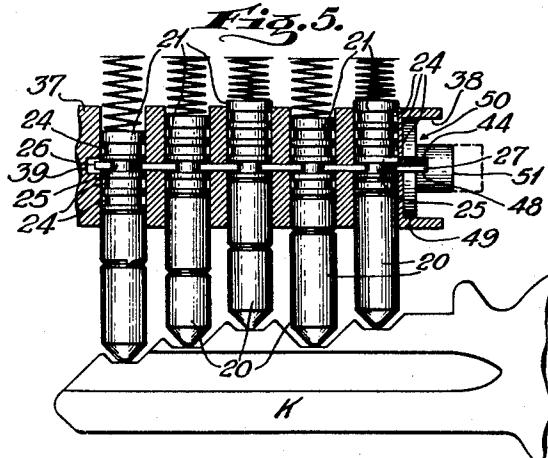


Fig. 5.



INVENTOR
T. H. Johnstone
BY
A. H. Golden
ATTORNEY

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UNITED STATES PATENT OFFICE

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REMOVABLE CORE CYLINDER

Theodore H. Johnstone, Detroit, Mich., assignor to The Yale & Towne Manufacturing Company, Stamford, Conn., a corporation of Connecticut

Application February 5, 1943, Serial No. 474,805

27 Claims. (Cl. 70—367)

This invention relates to a lock mechanism known in the art as a removable core cylinder. A lock mechanism of the particular type may comprise a core housing that is formed with screw threads whereby to be screwed into assembled relation to a lock casing, and with a cam thereon adapted for rotation by a removable cylinder lock core. This cylinder lock core is adapted for insertion into the core housing, and means are provided for retaining it in the core housing and for readily releasing it for removal from said core housing.

The cylinder lock core is generally of the type having a key plug mounted for rotation therein, the key plug being adapted to actuate the cam on the core housing through a connection that is effected when the lock core is inserted into the core housing. Tumblers are provided to lock the key plug relatively to the cylinder portion of the cylinder lock core, and these tumblers are adapted to be set by a key inserted in the keyway of the key plug. My invention relates more particularly to a new and novel means for retaining the cylinder lock core within the core housing, and for effecting its removal from said core housing.

An understanding of the more prominent prior art constructions will be helpful in leading to an understanding of my invention. In one construction of the prior art, a sleeve is mounted about a portion of the key plug and is adapted for rotation with the key plug when the tumblers are set in a particular position. The movement of the sleeve with the key plug is adapted to move a retainer to and from retaining position. In another construction of the prior art, a retainer is adapted to be moved out of retaining position by rotation of the key plug to a predetermined position by a predetermined key, the key being cut away to permit the said movement of the retainer. The structure of my invention is novel in that it uses unique movable means within the cylinder lock core adapted for movement independently of the key plug to effect the withdrawal of the retainer from retaining position when the tumblers are set in a predetermined position, and preferably by a key inserted into the keyway of the key plug.

More particularly, it is a feature of my invention that the movable means are not movable except when the tumblers are set in a position other than that in which the tumblers must be set to release the key plug for movement. In other words, one setting of the several tumblers effects the release of the key plug for rotation, or for push pull movement as the case may be, while a second setting of the tumblers makes it possible

to move the retainer out of retaining position independently of any movement of the key plug.

As a more detailed feature of my invention, tumblers and drivers are utilized for controlling both the movement of the retainer and the key plug, and preferably the drivers are equipped with grooves, it being a requisite that the grooves be particularly aligned prior to the release movement of the retainer.

10 As a further feature of my invention, the release movement of the retainer is effected through manual means operable from the outside of the front of the cylinder lock core on proper setting of the tumblers.

15 It is still a further feature of my invention that the means that are movable upon proper alignment of the tumblers and drivers are only moved by the outside manually operated means through the medium of one or more springs. In other 20 words, it is only through spring mechanism capable of absorbing the motion of the manually operated means that the part which cooperates with the several drivers is moved into cooperative engagement with the drivers and preferably into 25 the grooves thereof.

As still a further feature of my invention the drivers are formed with shallow and deep grooves and the shallow grooves are utilized to lock the said drivers against movement when pressure is 30 applied to the manually operated means prior to the proper positioning of the drivers, thus preventing effectively any motion thereafter of the tumblers and drivers, as by a picking tool.

35 It is a further very important feature of my invention that the locking of the tumblers and drivers by the entry of means into the deep grooves effects the locking of that key which has previously set the tumblers and drivers. Because of this relationship of the parts, the key may be 40 utilized to withdraw the cylinder lock core from the housing.

In the general description of my invention, and in the more detailed description that follows, I shall describe my cylinder lock core as retained 45 in a core housing of the type adapted to be assembled to a door lock casing. However, the cylinder lock core of my invention is adapted for assembly in a core housing that is part of a night latch cylinder, or part of a padlock casing as will be quite apparent to those skilled in the art. As a matter of fact, an important reason for the adoption of the cylinder lock core and housing combination in commercial locks resides in the adaptability of a cylinder lock core for mounting within 50 any one of a series of different types of locks, all

as will be fully appreciated by those skilled in the art.

While I have thus described my invention generally, and have pointed out certain important features of its construction, additional important features will be apparent upon a reading of the specification that follows, and these additional features will be covered in the claims appended hereto. It should also be understood that the conception on which my invention is based may readily be embodied in structures other than those that I shall herein show and describe, so that the claims to be allowed me should not be limited to said structures.

Referring now to the drawings,

Fig. 1 is a vertical section of cylinder lock core and core housing, the core housing being of that particular type adapted for assembly to a door lock plate.

Fig. 2 is a section taken along lines 2—2 of Fig. 1.

Fig. 3 is a view of the front end of the cylinder of Figs. 1 and 2 with certain parts cut away.

Fig. 4 is a view similar to Fig. 2 of certain of the parts of Fig. 2.

Fig. 5 is a partial view of the parts of Fig. 1 showing the tumblers and drivers set by a key.

Fig. 6 is a view of the parts in a position somewhat similar to that of Fig. 4.

Fig. 7 is an exploded view of certain of the parts for controlling the release of the retainer.

Fig. 8 is an exploded view of a cylinder lock core and core housing.

Referring now more particularly to the drawings and especially Figs. 1, 2 and 8, a usual form of core housing is designated by reference numeral 10 and is shown threaded at 11 so that it may be screwed into a usual form of lock plate. An operating cam 12 is assembled to a shouldered sleeve 13 by a pair of pins 14, the shouldered sleeve 13 being rotatable on the core housing and adapted to hold the cam 12 against movement to the left of the housing in Figs. 1 and 2. A spring 15 is placed between the cam 12 and the body of the core housing 10 so as to hold the cam against vibration and in its extreme left position of Figs. 1 and 2. The pins 14 extend into an opening 16 in the core housing 10 and are adapted to enter bores 17 of the key plug 18 of the cylinder lock core 19. Rotation of the key plug will naturally rotate the cam 12 through the said pins 14 when the cylinder lock core 19 is within the opening 16. The construction of the parts so far described is not per se my invention and is the usual type of construction well known in this art.

The invention of this application relates particularly to the means hereinafter described for retaining the cylinder core 19 within the opening 16 of the core housing 10.

In Fig. 1, the key plug 18 is shown locked relatively to the cylinder core 19 by a series of locking pins, the lower ones of which are designated by reference numeral 20 and are called tumblers. The first five upper pins are designated by reference numeral 21 and are called drivers, the last driver 22 being of a different type. Those skilled in the art will of course appreciate that when a key is inserted into the keyway 23 of the plug 18 and sets the tumblers and drivers so that their parting lines coincide with the periphery of the key plug 18, the key plug may be rotated to rotate the pins 14 and the cam 12. This is the usual operation by the usual key of the lock.

The drivers 21, it will be noted, have each a series of shallow grooves 24, and one deep groove 25. For cooperation with the grooves of the

drivers I utilize a control member in the form of a slide plate 26 best shown in Fig. 7. The slide plate 26 has forward arms 27 and 28 extending laterally into an opening 29 between the front end of the cylinder core 19 and an escutcheon plate 30 held assembled to the cylinder core 19 by screws 31 (Figs. 3 and 8). A lug 32 is formed on the plate 26 at one side thereof while a notch 33 is formed in the said plate at the other side thereof. Longitudinally and centrally of the plate 26 there is an opening 34 having portions 35 for the normal passage of the drivers 21, and surfaces 36 adapted to enter the grooves 24 and 25 of the drivers 21 in certain positions of the plate 26.

To facilitate construction, the plate 26 is mounted in a slot of a cylindrical part 37 that is slipped into a bore of the cylinder core 19 so as to form, in effect, an integral part of said cylinder core 19. The front end of the cylindrical part 37 is counterbored at 38 (Fig. 1) and is slotted at 39 (Fig. 3) for the passage of the arms 27 and 28 of the plate 26, the said arms extending into the opening 29. The cylindrical part 37 is formed with a slot 32a for the passage of the lug 32 of the slide plate 26, the said lug 32 extending into a bore 40 of the cylinder core 19.

In the bore 40 there is housed a spring 41, one end of which rests against the lug 32 while the other end presses against the head 42 of a pin 43. A bar 44 (Fig. 7) is housed in the slot 39 of the front end of the cylindrical part 37 in superimposed relation to the arms 27 and 28 of the plate 26 as best seen in Fig. 1 and its ends 35 extend into the opening 29. The head 42 of the pin 43 presses against the arm 27 and one side of the bar 44 to hold the inner edge 44a of the bar 44 in alignment with inner edge 27a of the arm 27.

40 The cylinder core 19 has a second bore at 45 in which is mounted a spring 46 that through a second headed pin 43 presses against surface 44a of the bar 44 and the surface 28a of the slide plate arm 28 so as to maintain both the plate 45 26 and the bar 44 in the position of Fig. 2.

The bar 44 is formed with a lug 47 that lies within a slot 48 of a disc 49 of a push piece 50 having a portion 51 extending outwardly of the escutcheon plate or scalp 30. The disc 49 lies 50 within the counterbore 38 of the cylindrical part 37 as is best shown in Fig. 1 with the lug 47 of the bar 44 against the end of the slot 48. The relationship of the parts is such in Fig. 1 that movement to the left of the push piece 50 will 55 move the bar 44 to the left, there being no engagement whatsoever between the push piece 50 and the arms 27 and 28 of the slide plate 26. When the push piece 50 and the bar 44 are moved to the left from the position of Fig. 1, 60 the springs 46 and 41 will be compressed. Because the spring 41 has its inner end resting against the lug 32 of the slide plate 26, the compression of the spring 41 will tend to move the plate 26 from its position of Fig. 2 to its position of Fig. 4.

Such movement will of course be impossible if the tumblers are in their position of Fig. 1, since the surfaces 36 of the plate 26 will merely enter the shallow grooves 24 as is well illustrated in 70 Fig. 6. Once the surfaces 36 of the slide bar 26 contact the surfaces of the drivers defined by the shallow grooves 24 in Fig. 6, further movement to the left by the push piece 50 and bar 44 will merely act to compress further the springs 75 41 and 46 but will not effect any movement what-

soever of the slide plate 26. In other words, any movement which is imparted to the slide plate 26 by the push piece 50 is imparted through the medium of the spring 41. Because of this relationship of the parts, it is obvious that only that pressure than can be imparted through spring 41 may be applied against plate 26 and then against the drivers. This is an important safeguard and forms a valuable feature of my invention.

It will be further apparent that when the slide plate 26 is within the narrow grooves 24 of the several drivers, those drivers are locked against any movement whatsoever so that it will be impossible to manipulate the drivers and tumblers by a picking tool or otherwise. This action of the parts is also of considerable importance as will be appreciated by those skilled in the art.

In Fig. 5, I show the several tumblers 20 positioned by a key K so that the several drivers 21 are placed with their deep grooves 25 in alignment with the surfaces 36 of the slide plate 26. With the parts so positioned, it is obvious that inward movement of the push piece 50 will move the plate 26 through spring 41 so as to place the surfaces 36 of the plate 26 entirely within the deep grooves 25 as is illustrated in Fig. 4. When the slide plate 26 is thus positioned, the notch 33 thereof is in alignment with the pin portion 60 of a retainer 61.

This retainer 61 is mounted within a ring 62 forced into an opening of the core 19 and therein retained to form an integral portion of core 19. The ring 62 is rimmed at 63 to cooperate with the flange 64 of the retainer 61 so as to maintain that retainer against movement out of the ring 62 under the influence of a spring 65 that normally tends to press the retainer into its position of Figs. 2 and 6. It will of course be appreciated that with the retainer 61 in its position of Figs. 2 and 6, the cylinder core 19 cannot be moved out of the core housing 10 because the head of the retainer 61 is within the depression 66 formed in the core housing 10 and is prevented from movement out of the said depression by the edge of the slide plate 26.

With the slide plate 26 in the release position of Figs. 4 and 5, outward pull exerted on the cylinder core 19 will cam the retainer 61 out of the depression 66, its pin portion 60 entering the notch 33 as seen in Fig. 4 to permit full outward movement of the cylinder core 19 to its position of Fig. 8 relatively to the core housing 10. This outward movement of the core housing may best be effected through the key K, it being obvious that the key K is held by the tumblers 20 within the key plug 18 through the locking of the drivers 21 by the entrance of the plate 26 into the deep grooves 25 of the said drivers. Since the key K is locked in the plug 18 outward pull thereon will pull the cylinder core 19 from the opening 16 in the core housing 10. Thereafter, this cylinder core may be inserted in the opening 16 of another core housing, all as is customary in this art.

I believe that my invention will now be clearly understood by those skilled in the art but it may be helpful to describe one complete operation thereof. When a usual form of key is placed in the key plug 18, it sets the tumblers in position to release the plug 18 for rotation, the plug 18 acting to rotate the cam 12 through the pins 14. The said pins 14 are assembled relatively to the bores 17 of the key plug 18 when the cylinder core 19 is inserted into the opening 16 of the

core housing 10 as is best appreciated from Fig. 8. If a special key K is inserted into the keyway 23 of the key plug 18, the drivers are set in their position of Figs. 4 and 5 with their deep grooves 25 in alignment. If the push piece 50 is now pushed to the left from its position of Fig. 2, it will press against the bar 44 through lug 47 and will compress springs 41 and 46 and through the said spring 41 urge the slide plate 26 to its position of Fig. 4. In the said position the slide plate surfaces 36 are within the deep grooves 25 of the drivers 21 and the notch 33 is in alignment with the pin 60 of the retainer 61. The key K is now locked within the key plug because the tumblers and drivers are locked against movement by the plate 26. Therefore, outward pull on the key K will act to move the entire cylinder core 19 out of the opening 16 of the core housing 10.

Release of plate 26 when the cylinder lock core 19 is outside the core housing 16, will naturally release the tumblers and drivers so that key K may be withdrawn from the key plug 18. To reinsert the cylinder lock core 19 into the core housing 16, it is necessary to realign the drivers 21 by key K. Thereafter, the depression of plate 26 by push piece 50 will allow the retainer 61 to move inwardly of the core 19 so that core 19 may be inserted into the core housing 10. When retainer 61 enters depression 66, the plate 26 may be released to lock retainer 61 in depression 66 and to release key K. I believe the structure and operation of my invention will now be apparent.

I now claim:

1. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent movement of said key plug until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, control means movably mounted in said cylinder and having a portion extending outwardly of the front face of said cylinder, said control means effecting the release of said retainer when moved relatively to said cylinder, and means whereby said tumblers prevent the release of said retainer by said control means until said tumblers are set in a predetermined position by a control key.

2. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent movement of said key plug until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, control means movably mounted in said cylinder and having a portion extending outwardly of the front face of said cylinder, said control means effecting the release of said retainer when moved relatively to said cylinder, and means whereby said tumblers prevent the release of said retainer by said control means until said tumblers are set by a control key in a predetermined position other than the position in which said tumblers release said key plug for movement relatively to said cylinder.

3. In a lock of the class described, a housing, a lock cylinder in said housing having a front face, a key plug movable in said lock cylinder, tumblers and drivers for interlocking said key plug and lock cylinder to prevent movement of said key plug until said tumblers are properly posi-

tioned by a change key, a retainer for retaining said lock cylinder in said housing, control means in said cylinder for releasing said retainer as a prerequisite to the movement of the cylinder out of said housing, a part of said control means extending outwardly of said cylinder through the front face thereof, and said control means being blocked against movement until said tumblers and drivers are positioned by a control key in a position other than that in which they release the key plug for movement in said cylinder.

4. In a lock of the class described, a housing, a lock cylinder in said housing having a front face, a key plug movable in said lock cylinder, tumblers and drivers for interlocking said key plug and lock cylinder to prevent movement of said key plug until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, control means in said cylinder for releasing said retainer as a prerequisite to the movement of the cylinder out of said housing, a part of said control means extending outwardly of said cylinder through the front face thereof, and surfaces of said drivers blocking movement of said control means until said tumblers and drivers are positioned by a control key in a position other than that in which they release the key plug for movement in said cylinder.

5. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said cylinder, tumblers and drivers in aligned openings in said cylinder and key plug for locking said key plug to said cylinder except when said tumblers are properly positioned by a key in the key way of said key plug, a retainer for retaining said cylinder in said housing, and specially formed surfaces on each of said drivers positioned in alignment within an opening of said cylinder by key operation of said tumblers and drivers for controlling the operation of said retainer.

6. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said cylinder, tumblers and drivers in aligned openings in said cylinder and key plug for locking said key plug to said cylinder except when said tumblers are properly positioned by a change key in the key way of said key plug, specially formed surfaces on said drivers adapted for alignment within an opening of said cylinder when said tumblers and drivers are properly positioned by a control key, and means cooperative with said surfaces when aligned for controlling the retention of said cylinder in said housing.

7. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said cylinder, tumblers and drivers in aligned openings in said cylinder and key plug for locking said key plug to said cylinder except when said tumblers are properly positioned by a change key in the key way of said key plug, specially formed surfaces on said drivers adapted for alignment when said tumblers and drivers are properly positioned by a control key, and a slide in said cylinder movable relatively to said cylinder and key plug and released for said movement when said driver surfaces are in alignment.

8. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said cylinder, tumblers and drivers in aligned openings in said cylinder and key plug for locking said key plug to said cylinder except when said tumblers are properly positioned

by a change key in the key way of said key plug, specially formed surfaces on said drivers adapted for alignment when said tumblers and drivers are properly positioned by a control key, and a slide in said cylinder movable relatively to said cylinder and key plug and released for said movement when said driver surfaces are in alignment, said slide cooperating with said driver surfaces for locking said tumblers and drivers against the control key.

9. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said cylinder, tumblers and drivers in aligned openings in said cylinder and key plug for locking said key plug to said cylinder except when said tumblers are properly positioned by a change key in the key way of said key plug, a retainer for retaining said cylinder in said housing, said drivers having grooves adapted for alignment when said tumblers and drivers are positioned by a control key other than in the position in which the key plug is released for rotation, and a device in said cylinder movable into said grooves when aligned and adapted through said movement to effect the release of said retainer as a prerequisite to the removal of said cylinder from the housing.

10. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said cylinder, tumblers and drivers in aligned openings in said cylinder and key plug for locking said key plug to said cylinder except when said tumblers are properly positioned by a change key in the key way of said key plug, a retainer for retaining said cylinder in said housing, said drivers having grooves adapted for alignment when said tumblers and drivers are positioned by a control key other than in the position in which the key plug is released for rotation, a device mounted for movement in said cylinder, means for moving said device extending outwardly of said cylinder, said device being movable by said means into said grooves when aligned and adapted through said movement to effect the release of said retainer as a prerequisite to the removal of said cylinder from the housing.

11. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said lock cylinder, tumblers and drivers in aligned openings in said cylinder and key plug for locking said key plug to said cylinder except when said tumblers are properly positioned by a change key in the key way of said key plug, a retainer for retaining said cylinder in said housing, said drivers having grooves adapted for alignment when said tumblers and drivers are positioned by a control key other than in the position in which the key plug is released for rotation, a slide in said cylinder, an operating member for moving said slide having a portion thereof extending outwardly of said cylinder for manual manipulation, a spring between said slide and operating member through which said member imparts movement to said slide, said slide being movable by said member into said grooves when aligned and adapted through said movement to effect the release of said retainer as a prerequisite to the movement of the cylinder from the housing.

12. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said lock cylinder, tumblers and drivers in aligned openings in said cylinder and key plug for locking said key plug to said cylinder except when said tumblers are properly positioned by a

change key in the key way of said key plug, a retainer for retaining said cylinder in said housing, control means for said retainer movably mounted in said cylinder and adapted for movement when said drivers are particularly positioned whereby to effect the release of said retainer as a prerequisite to the movement of said housing, an operating member for moving said control means and having a portion thereof extending outwardly of said cylinder for manual manipulation, and a spring between said member and control means through which said member imparts movement to said control means.

13. In a lock of the class described, a cylinder, key set tumblers in said cylinder, means within said cylinder released for movement relatively to said cylinder when said tumblers are in a predetermined position, operating means for said means having a portion extending outwardly of said cylinder for manual manipulation, and a spring between said means and said operating means and through which said operating means imparts movement to said means.

14. In a lock of the class described, a cylinder, key set tumblers in said cylinder having grooves, a slide member slidably mounted in said cylinder for movement into said grooves when said grooves are aligned, operating means for moving said slide member into said grooves and having a portion extending outwardly of said cylinder for manual manipulation, and a spring between said operating means and said member through which said operating means moves said member into said grooves.

15. In a lock of the class described, a cylinder, a key plug in said cylinder, tumblers and drivers for locking said key plug against movement in said cylinder, said key plug having a key way into which a key is inserted for setting said tumblers and drivers, a member mounted for movement in said cylinder upon a predetermined setting of said tumblers and drivers by said key, and adapted to lock said tumblers and drivers against movement as said member is itself moved relatively to said tumblers and drivers, whereby through said tumblers and drivers to lock the said key within said key way.

16. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent movement of said key plug in said cylinder until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, means in said cylinder extending outwardly thereof for manual manipulation whereby to render said retainer movable relatively to said key plug and lock cylinder while said tumblers are held in a predetermined position by a control key, and said key plug having a key way for the entrance of said change and control keys to position said tumblers.

17. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent movement of said key plug in said cylinder until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, means in said cylinder extending outwardly thereof for manual manipulation to effect the release of said retainer, and the said means being released for movement by the setting of said tumblers into a predetermined position by a control key.

18. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent movement of said key plug in said cylinder until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, means in said cylinder extending outwardly thereof for manual manipulation when said tumblers are set in a predetermined position by a control key, the movement of said means being a requisite to the movement of said retainer to release position.

19. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said cylinder, key set elements for locking said key plug to said cylinder except when said key set elements are properly positioned by a change key in the key way of said key plug, a retainer for retaining said cylinder in said housing, said key set elements having grooves adapted for alignment when said key set elements are set by a control key in a position other than that in which said key plug is released for rotation, and a device movable into said grooves when aligned and adapted through said movement to effect the release of said retainer as a prerequisite to the removal of said cylinder from the housing.

20. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug rotatable in said cylinder, key set elements for locking said key plug to said cylinder except when said key set elements are properly positioned by a change key in the key way of said key plug, a retainer for retaining said cylinder in said housing, said key set elements having grooves adapted for alignment when said key set elements are set by a control key in a position other than that in which said key plug is released for rotation, means normally locking said retainer against movement to release position, and said means moving into said grooves of said key set elements when aligned whereby to effect the release of said retainer.

21. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent movement of said key plug until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, a control slide for said retainer adapted to enter grooves in said tumblers upon the positioning of said tumblers by a control key in a position other than that in which they are set by the change key, the entry of said control slide into said grooves releasing said retainer for movement to permit withdrawal of said cylinder from the housing.

22. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent movement of said key plug in said cylinder until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, and means whereby said retainer is movable relatively to said key plug and lock cylinder when said tumblers are set in a predetermined position by a control key, said tumblers locking said key plug to said cylinder when set in said predetermined position.

23. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent

movement of said key plug in said cylinder until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, means in said cylinder extending outwardly thereof for manual manipulation as a prerequisite to the movement of said retainer relatively to said key plug and lock cylinder to release the lock cylinder for removal from said housing, and the setting of said tumblers to a second position by a control key releasing said means in said cylinder for said manual manipulation.

24. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers for interlocking said key plug and lock cylinder to prevent movement of said key plug until said tumblers are properly positioned by a change key, a retainer for retaining said lock cylinder in said housing, and means whereby said retainer is rendered movable relatively to said key plug and lock cylinder when said tumblers are set by a control key in a predetermined position in which said tumblers lock said key plug against movement relatively to said cylinder.

25. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers and drivers operating in aligned openings in said key plug and cylinder, said key plug having a key way through which said tumblers and drivers are positioned by a key to release said key plug for movement relatively to said cylinder, a retainer for retaining said cylinder in said housing, and means released by the positioning of said tumblers and drivers in a position in which said key plug is held locked by said tumblers and drivers relatively to said cylinder, said means in turn releas-

ing said retainer as a prerequisite to the removal of the cylinder from said housing.

26. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers and drivers operating in aligned openings in said key plug and cylinder, said key plug having a key way through which said tumblers and drivers are positioned by a change key to release said key plug for movement relatively to said cylinder, a retainer for retaining said cylinder in said housing, means movable relatively to said cylinder and key plug upon the positioning of said tumblers and drivers by a control key in a control position in which they lock the key plug to the cylinder, the movement of said means releasing said retainer for movement to release the cylinder for movement outwardly of said housing.

27. In a lock of the class described, a housing, a lock cylinder in said housing, a key plug movable in said lock cylinder, tumblers and drivers operating in aligned openings in said key plug and cylinder, said key plug having a key way through which said tumblers and drivers are positioned by a change key to release said key plug for movement relatively to said cylinder, a retainer for retaining said cylinder in said housing, means movable relatively to said cylinder and key plug upon the positioning of said tumblers and drivers by a control key in a control position in which they lock the key plug to the cylinder, whereby to release said retainer as a prerequisite to the removal of the cylinder from said housing, and said means locking said tumblers and drivers against movement when said means releases said retainer, whereby to lock said control key in said key plug.

THEODORE H. JOHNSTONE.