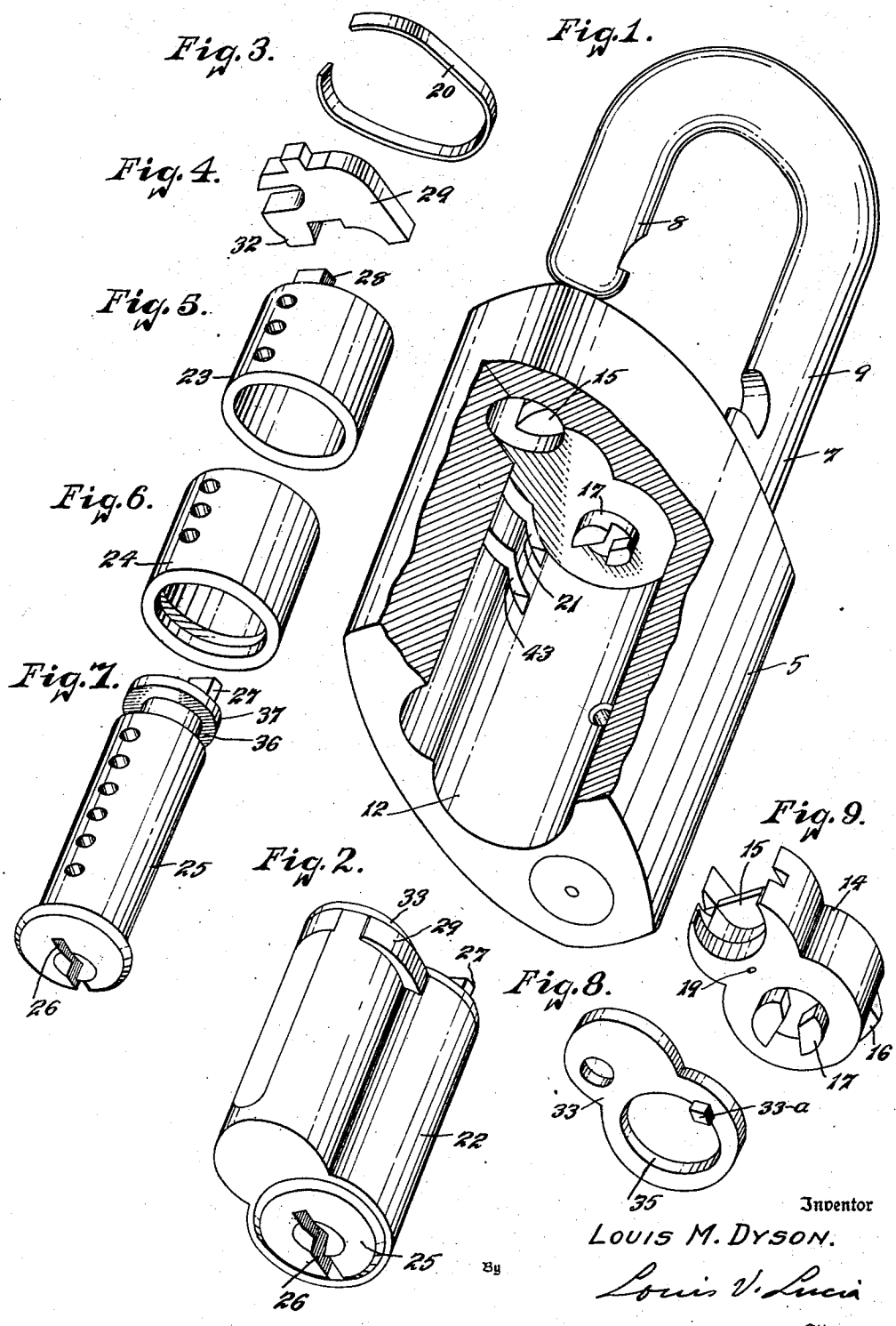
Dec. 28, 1948. L. M. DYSON 2,457,650

LOCK

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Fig. 10.

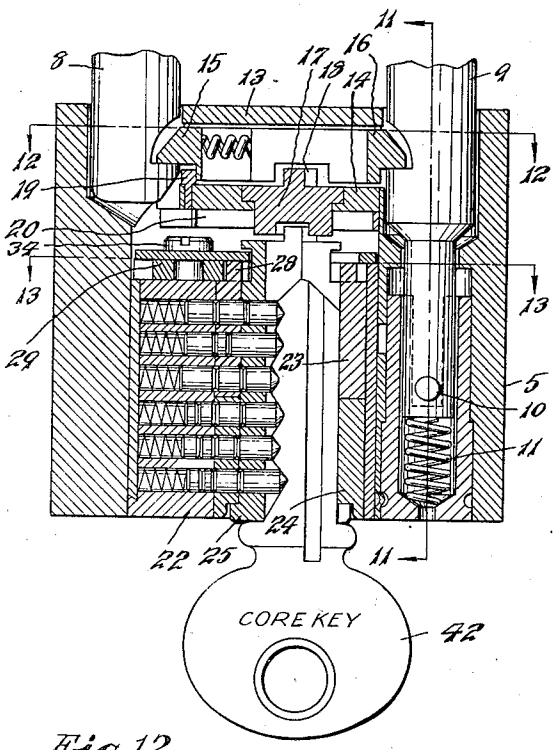



Fig. 11.

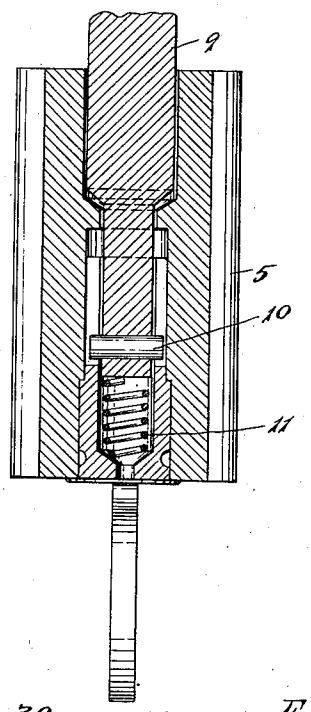



Fig. 12.

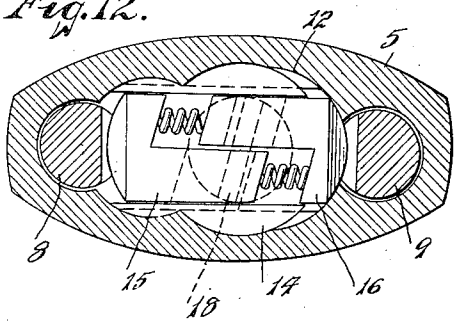
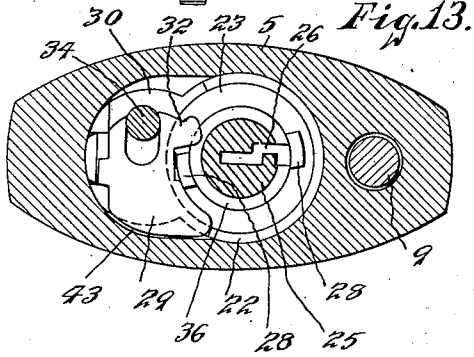



Fig. 13.




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Fig. 14.

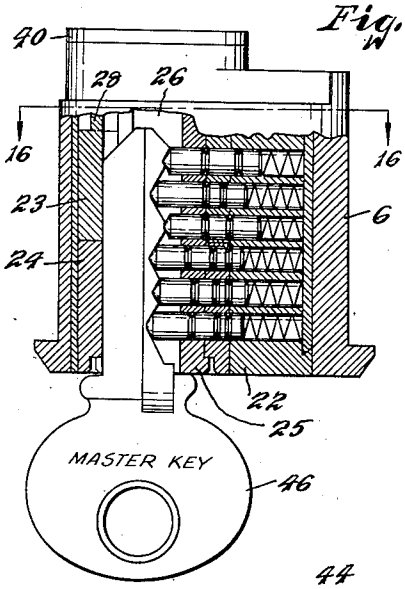



Fig. 15.

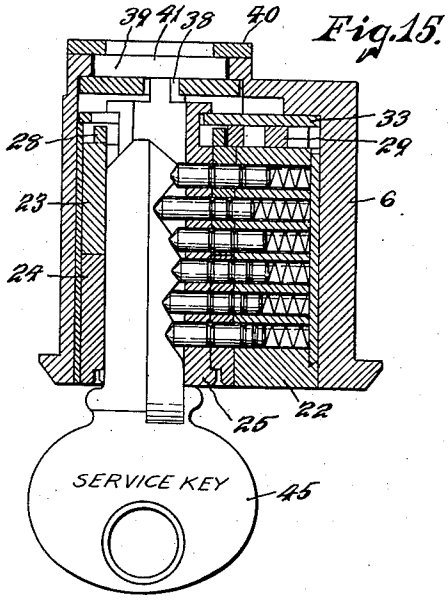



Fig. 16.

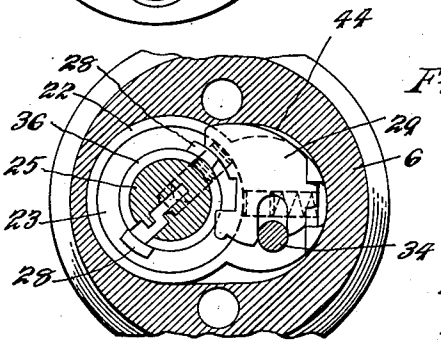



Fig. 17.

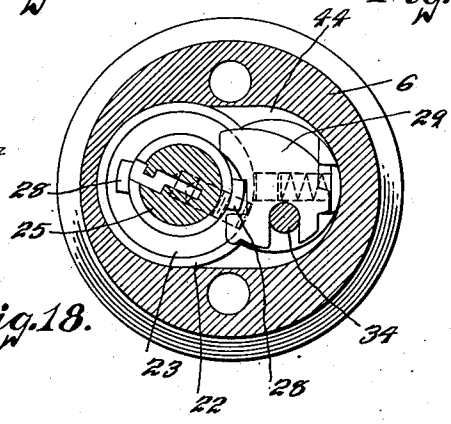
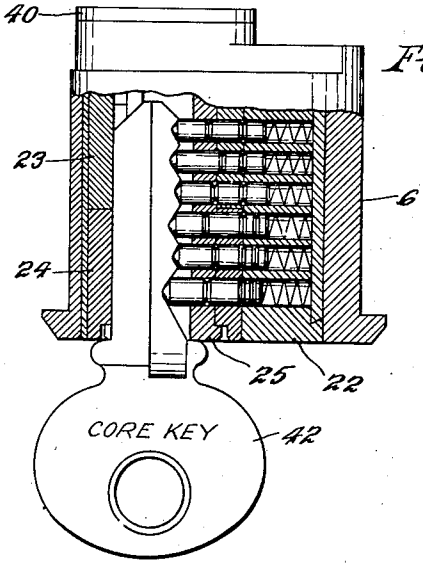



Fig. 18.




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# UNITED STATES PATENT OFFICE

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## LOCK

Louis M. Dyson, New Britain, Conn., assignor to The American Hardware Corporation, New Britain, Conn., a corporation of Connecticut

Application February 19, 1946, Serial No. 648,589

9 Claims. (Cl. 70—38)

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This invention relates to locks and more particularly to cylinder locks having a removable core or insert, as clearly shown and described in my co-pending application Serial Number 617,953, filed September 22, 1945.

Such removable cores have heretofore been provided for padlocks; the said cores being removable from the padlock for the purpose of permitting exchange of the cores or the transfer thereof from one padlock to another, which padlocks are commonly operatable by partial rotation of the key plug, or master sleeve, to operate a locking bolt for releasing the usual shackle member of padlocks.

It will be clearly understood that, unless a complete rotation of the key plug or master sleeve is permitted, the lock would necessarily have to be returned to its normal position, which is usually the locked position, before the tumblers of the cylinder lock would be in position to permit removal of the key. Partial rotation would require reverse movement of the mechanism and this would return the bolt to its normal position, such as done in the operation of an ordinary padlock of the snap type where the bolt is biased to locking position by spring action and it is only required that it be released and then permitted to return to its normal position so as to engage the shackle when it is again returned to locked position.

It is an object of this invention to provide a removable core for locks, which is interchangeable between padlocks, where the mechanism is operated only with a partial rotation for simply releasing the locking bolt, and conventional door locks where complete rotation of the mechanism is required in order that the bolt may be left either in locked or in unlocked position; the said complete rotation being necessary in order to permit withdrawal of the key after the bolt has been operated to unlocked position, or when the bolt is to be returned from unlocked to locked position.

A further object of this invention is to provide novel mechanism which is practical, highly efficient in its operation, durable, and easy to use.

Further objects and advantages of this invention will be more clearly understood from the following description and from the accompanying drawings, in which:

Figure 1 is a perspective view, partly broken away and showing a padlock embodying my invention.

Figure 2 is a perspective view of the removable core assembly.

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Figure 3 is a perspective view showing the bolt mechanism retaining spring.

Figure 4 is a perspective view showing the core retaining latch.

Figure 5 is a similar view showing the inner portion of the master sleeve.

Figure 6 is a similar view showing the outer portion of said sleeve.

Figure 7 is a similar view showing the key plug.

Figure 8 is a perspective view of the plug retaining plate.

Figure 9 is a perspective view of the locking bolt unit.

Figure 10 is a view in central vertical section through a padlock showing my improved removable core in position therein.

Figure 11 is a side view in central vertical section on line 11—11 of Fig. 10.

Figure 12 is a plan view in section on line 12—12 of Fig. 10.

Figure 13 is a similar view on line 13—13 of Fig. 10.

Figure 14 is a plan view, partially in central vertical section and showing a lock cylinder with my removable core in position therein.

Figure 15 is a plan view, in central vertical section, of said lock cylinder and showing a service key in position therein.

Figure 16 is an end view, in section on line 16—16 of Fig. 14, showing the retainer in locked position.

Figure 17 is a similar view showing the retainer in unlocked position.

Figure 18 is a plan view, partly in central vertical section, showing the lock cylinder assembly with a core key in position therein.

As shown in the drawings, the numeral 5 denotes the body, or shell, of a padlock and 6 denotes a cylinder of a lock such as commonly used on doors wherein it may be desired to remove the key after the locking bolt has been moved into either locked or unlocked position, and wherein a complete rotation of the key plug is required in order to permit removal of the key wihout first turning it in a reverse direction.

The padlock illustrated in Fig. 1 is provided with a conventional form of shackle 7, having a short leg 8 and a long leg 9 which is slidably rotated in the body 5 by suitable means, such as a retaining pin 10; a spring 11 being provided to move the shackle outwardly in the body when it is released by an unlocking operation of the bolt.

The said body is provided with a recess 12, preferably in the form of a figure 8, which extends upwardly from the bottom thereof to a

point close to the top of the body, leaving an upper wall 13 at the top of said recess. A locking bolt assembly unit, such as also shown in Fig. 9 of my said co-pending application, consists of a casing 14 having therein a pair of oppositely slidable bolt members 15—16 adapted to engage notches in the long and short legs of the shackle. The said bolts are operable by means of a connector member 17 which is rotatable in the casing 14 and has an operating boss 18 projecting into slots in the said bolt members for actuating them by rotation of said connector member. A stop pin 19 is provided in the casing 14 to retain the locking bolt 15 within the said casing, when the shackle is in open position, and a retaining spring 20 is provided to fit within notches 21 in the opposite sides of the body for retaining the complete bolt assembly unit in position within the recess 12, as clearly shown in Fig. 10 of the drawings.

The present invention has to do particularly with the provision of the removable core assembly, as plainly illustrated in Fig. 2 of the drawing and which consists of a shell 22 having rotatably mounted therein, on a single axis, a retainer operating sleeve 23 and a master sleeve 24. A key plug 25 is rotatably mounted within and co-axially with said sleeves and has the usual slot 26 to receive the different keys about to be described. The said plug is provided wth tenons 27, which fit within a slot in the bottom of the connector member 17, for rotating the said connector through the rotation of the key plug.

The retainer operating sleeve 23 is provided with tenons 28 which engage with a core retainer 29 that is slidably mounted upon the surface 30 in a depression at the end of the shell 22. The said retainer is held slidably in place by a guide screw 34 and has a projection 32 which is engaged by one of the tenons 28 on the operating sleeve 23.

An end plate 33 is secured to the end of the shell 22 by means of the screw 34. This plate has an opening 35 permitting it to be passed over the end of the key plug and positioned to extend into a groove 36 so as to engage the annular lip 37 at the end of said plug and rotatably retain the plug in operative position with the master and operating sleeves. The said plate is provided with a projection 33—*a* which extends in the path of the tenons 28 and limits the rotation of the operating sleeve 23 so as to prevent disengagement of the operating tenon from the retainer 29, particularly when the core is removed from a lock and the said sleeve 23 is rotated.

It will be noted that, when the core is inserted into a padlock as shown in Fig. 10, the tenons 27 at the end of the key plug will engage and rotate the member 17; thus operating the locking bolt members 15 and 16 to release the shackle. When the said core is removed from the padlock and inserted in the cylinder 6, as shown in Fig. 15, the said tenons 27 will project into a slot 38 in a connector 39 that is rotatably mounted in the end of the cylinder 6 and retained in position by means of a washer 40 that is suitably secured to said disk and has a slot 41 to receive a connecting bar, such as commonly used in door locks between the key plug in the lock cylinder and the mechanism which operates the locking bolt.

The operation of the mechanism comprising my invention is as follows:

Assuming that the lock core is in position within the padlock, as illustrated in Fig. 10, and that it is desired to remove the said core from the body of the padlock for the purpose of transferring



it to a door lock having the cylinder 6; the core key, indicated at 42, is inserted into the key plug. This key will cause the tumblers in the lock mechanism to register so that there will be a break through said tumblers, between both sleeves 23 and 24 and the shell 22 of the tumbler mechanism. This will permit counter-clockwise rotation of the operating sleeve, which in turn carries the tenons 28, and one of said tenons will engage the extension 32 of the retainer 29 and withdraw said retainer from the notch 43 in the body of the lock; thus permitting withdrawal of the core from the recess 12 in said body.

The core may then be transferred to the recess in the cylinder 6 of the door lock in which it is desired to use said core. Upon inserting the core into the recess in said cylinder, as shown in Fig. 18, the core key may be rotated in clockwise direction and this will cause the retainer 29 to be moved into a recess 44, similar to the recess 43 in the padlock body, and thereby secure said core in the cylinder 6. The core key may then be turned counter-clockwise into the position where the tumblers will be in register, and removed, leaving the core within the cylinder 6.

As shown in Fig. 15, when the core is in the cylinder 6 of a door lock and the service key 45 is used, the tumblers will break between the key plug and the operating and master sleeves, permitting complete rotation of the key plug which will operate the door lock bolt from locked position to unlocked position and bring the key back to the starting position where it can be removed from the core and leave the bolt in the unlocked position. Likewise, the key may be completely turned in an opposite direction to move the bolt from unlocked to locked position and also bring the key back to starting position so that it can be removed from the lock, leaving the bolt in the locked position.

As shown in Fig. 14, when the master key 46 is used, the tumblers will break between the key plug 25 and the operating sleeve 23, and also between the outer portion of the master sleeve 24 and the core shell 22; thus permitting complete rotation of the key plug with the master sleeve and preventing rotation of the operating sleeve and thereby preventing removal of the core through the operation of the mechanism with the master key.

It will be noted from the above description that complete rotation of the key plug may be obtained, by the use of either the master key or the service key, so that the core can be used in common door locks where it is desired that the key may be withdrawn after the locking bolt has been moved in one direction only. It will also be noted that, when the core key is used, only a partial rotation of the retainer operating sleeve is permitted by the boss 33—*a* on the plate 33.

From the above it will be seen that my invention provides a lock having a removable core in which there is a sleeve for operating a retainer for the core through the use of a core key only, a key plug for operating the locking bolt with a service key, and a master sleeve permitting the rotation of said key plug for operating said locking bolt through the use of a master key.

I claim:

1. A lock mechanism comprising a core adapted to be inserted within a lock casing for operating a locking bolt in said lock; said mechanism comprising a shell, a retainer for retaining said shell within said casing, a sleeve rotatable for operating said retainer, a key plug rotatable for

operating said bolt, and a master sleeve for permitting rotation of said key plug with a master key.

2. A lock mechanism for a lock comprising a locking bolt, a casing, a key operated mechanism insertable in said casing; said mechanism comprising a shell, a key plug rotatable in said shell for operating said bolt, a master sleeve surrounding said key plug, a retainer for retaining said shell within said casing, and a separate sleeve surrounding said key plug for operating said retainer.

3. For a lock mechanism comprising a casing and a locking bolt, a removable core including key operated mechanism having a shell, a key plug rotatable in said shell, a master sleeve rotatable in said shell and surrounding said key plug, a retainer for removably securing said key plug in said shell, a sleeve surrounding said key plug and connected for operating said retainer, a plate for securing said key plug in operative position relative to said operating sleeve, and means on said plate engaging said sleeve to limit rotation thereof.

4. For a lock comprising a casing and a locking bolt, a key operated mechanism comprising a removable core having a shell, a retainer for retaining said shell within said casing, a key plug rotatable in said shell, a master sleeve rotatable in said shell, an operating sleeve for operating said retainer, and a series of tumblers operable with a key to permit complete rotation of said plug independently of said sleeves.

5. For a lock comprising a casing and a locking bolt, a key operated mechanism comprising a removable core having a shell, a retainer for retaining said shell within said casing, a key plug rotatable in said shell, a master sleeve rotatable in said shell, an operating sleeve for operating said retainer, and a series of tumblers operable with a key for permitting complete rotation of said plug and master sleeve independently of said operating sleeve.

6. For a lock comprising a casing and a locking bolt, a key operated mechanism comprising a removable core having a shell, a retainer for retaining said shell within said casing, a key plug rotatable in said shell, a master sleeve rotatable in said shell, an operating sleeve for operating said retainer, and a series of tumblers operable with a key for permitting rotation of said operating sleeve with said key plug and master sleeve.

7. For a lock comprising a casing and a locking bolt, a removable core including a key operated mechanism having a shell insertable within said casing, a retainer for retaining said shell in said casing, a key plug rotatable in said shell, a master sleeve surrounding said key plug and also rotatable in said shell, an operating sleeve for operating said retainer, and a series of tumblers extending through said key plug, master sleeve,



operating sleeve and shell; the said plug and master sleeve being rotatable for a full turn to permit withdrawal of a key from said mechanism after a one-directional operation of the bolt, and said operating sleeve being permitted only a partial rotation for operating said retainer.

8. For a lock comprising a casing and a locking bolt, a removable core including a key operated mechanism comprising a shell insertable in said casing, a retainer for securing said shell within said casing, said shell having an aperture extending therethrough, a master sleeve rotatable in said aperture, an operating sleeve also rotatable in said aperture for operating said retainer, a key plug co-axial with and rotatable in said sleeves, and a series of tumblers connecting said sleeves and key plug to said shell and operable by a service key to break connection along said key plug to permit rotation thereof independently of said sleeves, by a master key to break connection between said key plug and operating sleeve and said master sleeve and shell to permit combined rotation of the key plug and master sleeve, and by a core key to break connection between said sleeves and shell and permit rotation of the operating sleeve with said key plug and master sleeve.

9. A key operated lock mechanism adapted to be transferred between a padlock, having a locking bolt biased towards locking position and operable in one direction only for unlocking a shackle in said padlock, and another lock having a bolt requiring an operation for moving said bolt from locked to unlocked position and a separate operation for moving the bolt from unlocked to locked position; the said mechanism including a shell, a retainer for retaining said shell within either the said padlock or the said other lock, a plug rotatable in said shell, a master sleeve surrounding said plug and rotatable in said shell, an operating sleeve surrounding said plug and rotatable in said shell for operating said retainer, and a series of tumblers operable by different keys to permit rotation of said plug independently of said sleeves, combined rotation of said plug with said master sleeve independently of the operating sleeve, and combined rotation of said plug with the said master sleeve and operating sleeve.

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