Jan. 1, 1952 O. A. BLOHM 2,580,882

CYLINDER LOCK

Filed July 10, 1950

Fig. 1

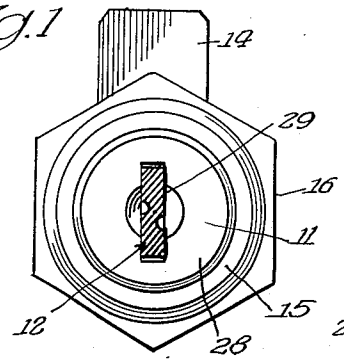
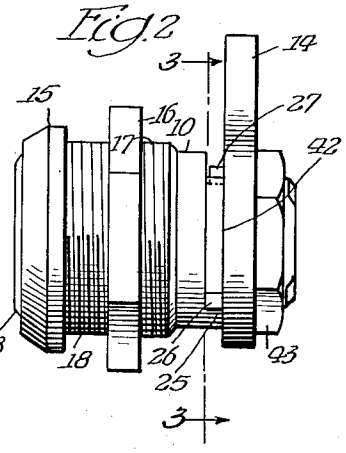


Fig. 2



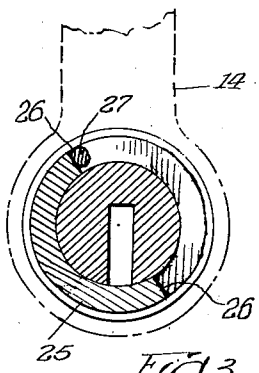


Fig. 3

Fig. 4

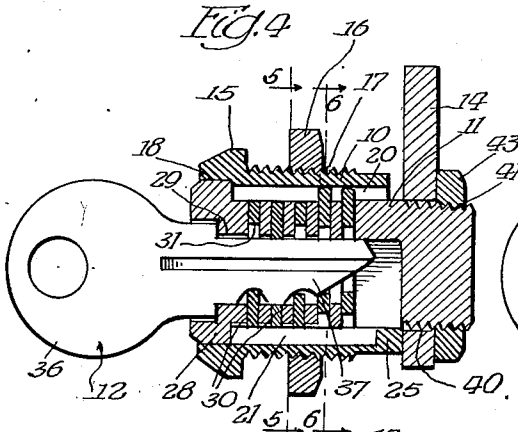


Fig. 7

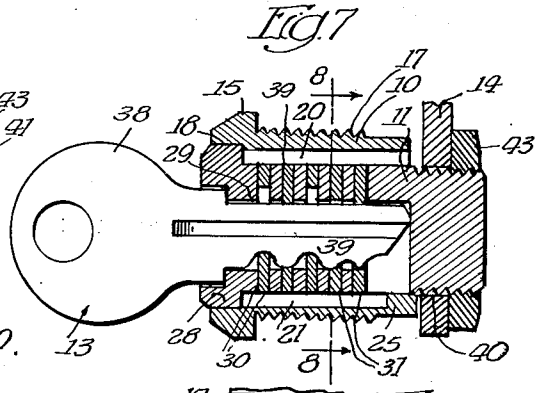


Fig. 5

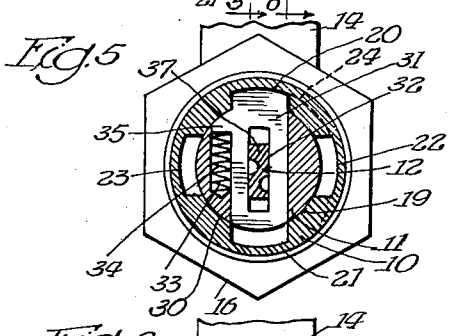


Fig. 8

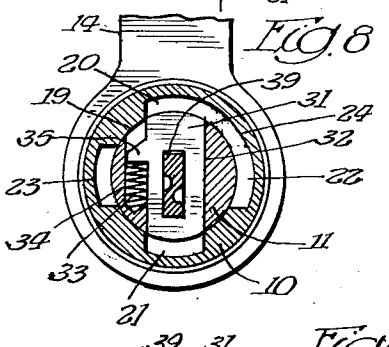


Fig. 6

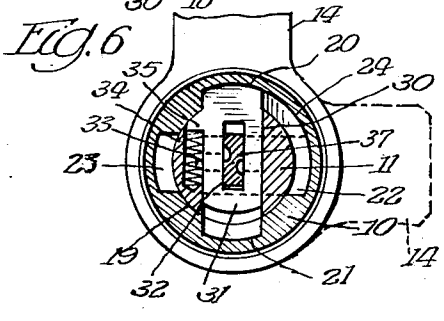
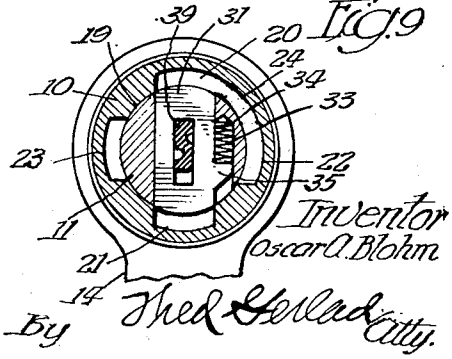


Fig. 9



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UNITED STATES PATENT OFFICE

2,580,882

CYLINDER LOCK

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Application July 10, 1950, Serial No. 172,912

4 Claims. (Cl. 70—340)

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The present invention relates generally to key operable locks. More particularly the invention relates to that type of lock which, as its principal parts or components comprises: (1) an elongated barrel which is adapted to be mounted fixedly in place and has a longitudinal bore therein and in addition four longitudinally extending equidistantly spaced tumbler receiving grooves in communication with the bore; (2) a cylindrical plug which is mounted rotatably in the bore of the barrel, embodies a longitudinal key slot, has a longitudinal series of transversely extending slidably mounted spring pressed plate tumblers, and is adapted when a proper key is inserted into the key slot to have the tumblers retracted against the force of their springs in order to free the plug so that it is rotatable back and forth between locked and unlocked positions; and (3) a lock-element which is operatively connected to the rear end of the plug in such manner that it is shifted into an operative position when the plug is turned into its locked position and is shifted into an inoperative position when the plug is turned into its unlocked position.

It is now common practice in connection with time payment sale of an article such, for example, as a television receiver or a domestic refrigerator, to furnish an article with a coin chute and a removable coin box in order that the purchaser of the article may periodically drop coins of a given denomination into the box in order to meet the different installments on the purchase price when they fall due. It has heretofore been proposed to have an agent for the seller of the article go where the article is located and remove the coins from the box in order to satisfy the particular installment that is due. In most instances the purchaser of the article will object to the agent entering his or her home or other establishment for obvious reasons. With the view of coping with this situation it has now been proposed to have the coin box provided with a lock which will permit the purchaser of the article, by use of a particular key, to remove the box from the article without gaining access to the coins within the box so that he or she may take the box to a depository of the seller of the article, and which will also permit the box, when at the depository, to be opened by a different key for removal of the collected coins therein.

It is therefore one object of this invention to provide a novel lock which is adapted primarily for use in connection with the coin box of an article that is sold on a time payment basis and is so designed and constructed that when a particular key is inserted into the key slot by the purchaser of the article the plug may be turned from its locked position through such a predetermined arc that the lock-element releases the box for removal from the article without, however, unlocking the box and permitting access to the coins therein, and when a different key is inserted into the key slot by the depository agent the plug may be turned throughout such an additional arc that the lock-element unlocks the box in order to provide access to the coins in it. It is contemplated that in connection with use of the lock the depository agent, after removal of the coins from the box with which the lock is associated, will, by the different key, return the plug to the position in which it was originally turned by the purchaser in order that the purchaser, by the use of the particular key, may return the box to its normal position and lock it to the article.

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Another object of the invention is to provide a lock of the type under consideration in which the design and construction are such that a short key serves as the particular key for use by the purchaser of the article with which the lock is associated and is adapted when inserted into the key slot in the plug to retract only the frontmost tumblers in order to permit the plug to be turned throughout a 90° arc with respect to the barrel and a long key serves as the different key for use by the agent of the seller's depository and is adapted when inserted into the key slot in the plug to retract all of the tumblers in order that the plug may be turned throughout a 180° arc with respect to the barrel.

A further object of the invention is to provide a lock of the type and character last mentioned in which the portion of the barrel between the rear end of the notch which receives and interlocks with the tumblers when the plug is in its locked position and the rear end of the next groove that is in the direction of turning of the plug from its locked position is cut away or removed in order that when the short key is used to turn the plug throughout a 90° arc from its locked position the rearmost tumblers which are not retracted by the short key are permitted to swing freely between the rear ends of the aforesaid grooves while at the same time they serve, after 90° turning of the plug from its locked position by the short key, to prevent further turning except when retracted by use of the long key.

A still further object of the invention is to provide a lock which is generally of new and im-

proved construction, effectively and efficiently fulfills its intended purpose and is so designed that it may be produced at a comparatively low cost.

Other objects of the invention and the various advantages and characteristics of the present lock will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawing which accompanies and forms a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a front elevation of a lock embodying the invention;

Figure 2 is a side view illustrating the manner in which the lock-element is operatively connected to the rear end of the rotatable plug in order to turn therewith;

Figure 3 is a vertical transverse section taken on the line 3—3 of Figure 2 and showing in detail the pin and stop arrangement whereby rotation or turning of the plug relatively to the barrel is limited to an arc of 180°;

Figure 4 is a vertical longitudinal section of the lock showing the short key inserted into the key slot in the plug and illustrating the manner in which the bitted portion of the key serves to retract the frontmost tumblers without, however, retracting the rearmost tumblers;

Figure 5 is a vertical transverse section on the line 5—5 of Figure 4;

Figure 6 is a vertical transverse section taken on the line 6—6 of Figure 4 and showing by dotted lines the position of the plug after it has been rotated by the short key 90° from its locked position and also illustrating the manner in which the rearmost tumblers which are not retracted by the bitted portion of the short key function to prevent turning of the plug more than 90° from its locked position by the short key;

Figure 7 is a vertical longitudinal section of the lock showing the long key inserted into the key slot in the plug so as to retract all of the tumblers and thus free the plug so that it is capable of being turned from its locked position throughout an arc of 180°;

Figure 8 is a vertical transverse section on the line 8—8 of Figure 7; and

Figure 9 is a vertical transverse section similar to Figure 8 except that it shows the plug after it has been turned or rotated from its locked position 180° by the long key and the long key has been removed from the key slot in the plug.

The lock which is shown in the drawing constitutes the preferred form or embodiment of the invention. It has many capabilities of use, although it is primarily designed for use in connection with a coin box (not shown) of the type that is employed in connection with a coin chute on an article that is sold on a time payment basis. As its principal parts the lock comprises a barrel 10, a rotatable plug 11, a short key 12, a long key 13 and a lock-element 14. It is contemplated that the purchaser of the article with the coin box to which the lock is applied will possess the short key which will enable him or her to turn the plug from an unlocked position through a 90° arc in order to release the coin box when it is desired to take the latter to the depository for the seller of the article. It is also contemplated that the depository's agent or representative will possess the long key 13 in order that he or she may turn the plug of the lock 180° from its locked position in order to unlock the box in connection with removal of deposited or collected coins therefrom.

The barrel 10 is adapted to extend through a hole in one of the walls of the coin box and embodies at its front end an integral outwardly extending annular flange 15. A clamp nut 16 coacts with the outwardly extending annular flange 15 to clamp the barrel in place. As shown in Figures 2 and 4 of the drawing, the nut 16 is mounted on an external screw thread 17 which is formed on the central portion of the outer periphery of the barrel and extends rearwards from the outwardly extending flange 15. The barrel 10 is provided with a counter-bore 18 and a bore 19. The counter-bore 18 is formed in the front end of the barrel and, as shown in Figures 4 and 7, is comparatively shallow. The bore 19 is coaxially positioned with respect to the counter-bore 18 and leads rearwards from the latter to and through the rear end of the barrel. Within the barrel are four longitudinally extending tumbler-receiving grooves 20, 21, 22 and 23. These four grooves communicate with, and extend throughout the length of, the bore 19. The groove 20 is located in the upper portion of the barrel and receives the upper ends of the hereinafter described tumblers when the plug 11 of the lock is in its locked position. The groove 21 is located in the lower portion of the barrel. It is disposed diametrically opposite the groove 20 and, as shown in Figure 9, receives the tumblers after the plug has been rotated 180° by the long key 13 and such key is thereafter removed. The groove 21 also permits sliding of the tumblers in connection with insertion of either the short or long key when the plug is in its locked position as shown in Figures 4 to 8, inclusive. The groove 22 is located in the right hand side of the barrel as viewed in Figures 5, 6, 8 and 9, receives the tumblers when the plug is turned by the short key 12 90° from its locked position and such key is thereafter removed. The groove 23 is located in the left hand side of the barrel. It is positioned diametrically opposite the groove 22 and permits sliding of the tumblers in connection with removal or insertion of either key when the plug has been turned in a counterclockwise direction 90° from its locked position. The rear end of the barrel is cut away or relieved to form an arcuate groove 24 which extends between and serves to connect the rear ends of the grooves 20 and 22 (see particularly Figures 5, 6, 8 and 9). The purpose of the groove 24 will appear hereafter. As shown in the drawing, such groove is the same in depth as the grooves 20 and 22. The rear end of the barrel 10 is provided with a rearwardly extending integral arcuate flange 25. The latter extends throughout an arc of slightly less than 180° and defines at its ends stop surfaces 26 which coact with a pin 27 on the lock-element 14 to limit back and forth turning of the plug to an arc of 180°.

The plug 11 of the lock is cylindrical and fits rotatably within the bore 19 in the barrel. It embodies at its front end an integral outwardly extending annular flange 28 which fits within the counter-bore 18 in the front end of the barrel and serves to hold the plug against rearward axial displacement with respect to the barrel. Within the central portion of the plug is a horizontally extending key slot 29. The latter intersects and extends rearwards from the

front end surface of the plug and is adapted slidably to receive the bitted parts of the keys 12 and 13, as shown in Figures 4 and 7. Within the central portion of the plug 11 is a longitudinal series of equidistantly spaced transversely extending recesses 30. The latter extend completely through the plug and intersect the key slot 29. Plate type key operable tumblers 31 are slidably mounted in the recesses 30. They are provided with central openings 32 for slidably receiving the bitted parts of the keys 12 and 13 and have associated therewith coil or helical compression springs 33 for urging them outwards into interlocking relation with the groove 20, the groove 22 or the groove 21, depending upon the angular position of the plug with respect to the barrel. The central openings 32 are so shaped or designed that when the bitted part of the long key 13 is inserted therethrough the tumblers are retracted into the recesses against the force of the springs 33, thus releasing the plug so that it is capable of being turned relatively to the barrel. When the key is removed after the plug is positioned so that the tumblers thereof are in alignment with any of the three last mentioned grooves the springs 33 eject the tumblers so that certain ends thereof are disposed in the adjacent groove thus locking the plug against rotation or turning with respect to the barrel. The springs 33 are disposed in sockets 34 at the sides of the recesses 33 and bear against integral laterally extending lugs 35 on the tumblers. It is contemplated that when the tumblers are in interlocked relation with the groove 20 the plug will be in its locked position. The flange 25 and the pin 26 are so arranged that they permit the plug to be rotated from its locked position 180° in a clockwise direction as viewed from the front. Although five tumblers are shown in the plug it is understood that more or less may be employed, if desired. As shown in the drawing the arcuate groove 24 which extends between, and serves to connect, the rear ends of the barrel grooves 20 and 22, is aligned with the two rearmost tumblers and permits such tumblers, even though not retracted, to swing from the groove 20 into the groove 22 in connection with a quarter or 90° turn of the plug from its locked position.

The short key 12 is in the form of a one-piece stamping and consists of a handle part 36 and a single bitted part 37. The bitted part 37 is adapted to enter the key slot 29 in the rotatable plug 11 and is so shaped and of such length that when it is inserted to its fullest extent into the key slot it operates to retract the three frontmost tumblers only. When the bitted part 37 of the short key 12 is inserted into the key slot the plug 11 may be turned from its locked position 90° in a clockwise direction. In connection with clockwise turning of the plug by the short key the two rearmost tumblers which are not retracted by the bitted part of the key swing from the rear end of the groove 20 through the arcuate groove 24 into the groove 22. Turning of the plug by the short key is limited to 90° as the result of the two rearmost tumblers striking against the portion of the barrel 10 that defines the rear end of the groove 22, as shown by dotted lines in Figure 6 of the drawing. After the plug 11 has been turned 90° from its locked position by the short key such key may be removed from the key slot 29. If the lock is employed in connection with a coin box as heretofore indicated it is contemplated that the purchaser of the article with which the coin box is associated will possess the short key 12 only. It is also contemplated that when the plug is turned 90° from its locked position by the short key the box will be released without, however, permitting the possessor of the short key obtaining access to the coins in the box. Upon release of the box the purchaser of the time payment article may take the box to the sellers depository in order that the agent for the latter may remove the coins.

The long key 13, like the short key 12, is in the form of a one-piece stamping. It comprises a handle part 38 and a single bitted part 39 and is to be retained and utilized by the agent of the depository. The bitted part 39 of the long key is adapted to be inserted into the key slot 29 in the plug and is of such length and so shaped that when it is inserted into the key slot it operates to retract all five tumblers, as shown in Figure 7. When all five tumblers are retracted as the result of complete insertion of the bitted part of the long key 13 into the key slot the plug 11 may be turned in a clockwise direction throughout a 180° arc from its locked position. After turning of the plug throughout such an arc by the long key 13 the key may be removed. Upon removal of the bitted part of the key from the key slot the springs 33 eject the tumblers into the groove 21 in the lock barrel 10. It is contemplated that 180° turning of the plug from its unlocked position will unlock the coin box with which the lock is associated in order that the depository's agent who possesses the key may have access to the box interior for purposes of removing the accumulated or collected coins therein. It is further contemplated that after removal of the coins the agent by use of the long key 13 will either return the plug to its locked position or to its quarter turn position in order that the possessor of the short key may return the coin box to its normal position in the article and lock it in place by use of the short key.

The lock-element 14 is in the form of an arm and has in one end thereof an opening 40 through which extends the rear end of the plug 11. Such end of the plug has an external screw thread 41 and embodies shoulder portions 42. A nut 43 on the rear extremity of the plug serves to clamp the lock-element 14 against the aforementioned shoulder. It is contemplated that when the plug is in its locked position the lock-element 14 will lock the coin box in place with respect to the article with which the box is associated. It is also contemplated that when the plug is rotated a quarter turn or 90° from its locked position by the small key 12 the lock-element will release the box for removal from the article and when the plug is turned or rotated 180° by the long key 13 the lock-element 14 will unlock the box. As shown in Figures 2 and 3 of the drawing the pin 27 which serves with the rearwardly extending arcuate flange 25 to limit rotation or turning of the plug with respect to the barrel, is connected to, and projects forwards from, the central portion of the lock-element 14.

The herein described lock is essentially simple in design or construction and is capable of being produced at a comparatively low cost.

Whereas the lock has been described in connection with a coin box it is understood that it has other capabilities of use and may be employed in any instance where it is desired that

partial turning of the plug may be accomplished by an individual possessing only the short key and full turning of the plug may be accomplished by an individual possessing the long key. It is also to be understood that the invention is not to be restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

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

1. As a new article of manufacture, a lock comprising a barrel provided with means for securing it in place and having formed therein a longitudinal cylindrical bore and two spaced apart tumbler-receiving grooves facing onto, and extending lengthwise of, the bore, a cylindrical plug mounted rotatably in the bore, provided with a longitudinal slot for receiving the bitted parts of two differently shaped keys and having recess forming means in intersecting relation with the key slot, and a series of transversely extending operable tumblers mounted slidably in the recess forming means, provided with spring means for urging them outwards into interlocked relation with either of the grooves depending upon the position of the plug with respect to the barrel, and having formed therein key receiving openings of such character that when the bitted part of one of the keys is inserted into the key slot some of the tumblers are retracted and others are not and when the bitted part of the other key is inserted into the key slot all of the tumblers are retracted and the plug is released for free turning relatively to the barrel, said barrel being provided with arcuate groove means between the two tumbler-receiving grooves whereby when the bitted part of the one key is inserted into the key slot the non-retracted tumblers are permitted in connection with turning of the key to swing from one groove into the other groove while at the same time they serve to limit turning of the plug with respect to the barrel.

2. As a new article of manufacture, a lock comprising a barrel provided with means for securing it in place and having formed therein a longitudinal cylindrical bore and two spaced apart tumbler-receiving grooves facing onto, and extending lengthwise of, the bore, a cylindrical plug mounted rotatably in the bore, provided with a longitudinal slot for receiving the bitted parts of two differently shaped keys and having formed therein a series of spaced apart transversely extending recesses in intersecting relation with the key slot, and key operable plate tumblers mounted slidably in the recesses respectively, provided with spring means for urging them outwards into interlocked relation with either of the grooves depending upon the position of the plug with respect to the barrel, and having formed therein key receiving openings of such character that when the bitted part of one of the keys is inserted into the key slot some of the tumblers are retracted and others are not and when the bitted part of the other key is inserted into the key slot all of the tumblers are retracted and the plug is released for free turning relatively to the barrel, said barrel being provided with an arcuate groove between the two tumbler-receiving grooves whereby when the bitted part of the one key is inserted into the key slot in the plug the non-retracted tumblers are permitted in connection with turning of the key to swing from one tumbler-receiving groove into the other tumbler-receiving groove, while at the same time they serve to limit turning of the plug with respect to the barrel.

3. As a new article of manufacture, a lock comprising a barrel provided with means for securing it in place and having formed therein a longitudinal cylindrical bore and two spaced apart tumbler-receiving grooves facing onto, and extending lengthwise of, the bore, a cylindrical plug mounted rotatably in the bore, provided with a longitudinal slot for receiving the bitted parts of a short key and of a long key and having formed therein a series of spaced apart transversely extending recesses in intersecting relation with the key slot, and key operable plate tumblers mounted slidably in the recesses respectively provided with spring means for urging them outwards into interlocked relation with either of the grooves depending upon the position of the plug with respect to the barrel, and having formed therein key receiving openings of such character that when the bitted part of the short key is inserted into the key slot the foremost tumblers are retracted and the rearmost tumblers are not and when the bitted part of the long key is inserted into the key slot all of the tumblers are retracted and the plug is released for free turning relatively to the barrel, said barrel being provided with an arcuate groove between the rear ends of the two tumbler-receiving grooves whereby when the bitted part of the short key is inserted into the key slot in the plug said rearmost tumblers are permitted in connection with turning of the key to swing from one tumbler-receiving groove into the other tumbler-receiving groove while at the same time they limit turning of the plug with respect to the barrel.

4. As a new article of manufacture, a lock comprising a barrel provided with means for securing it in place and having formed therein a longitudinal bore, a first tumbler-receiving groove facing onto, and extending lengthwise of, the bore, a second tumbler-receiving groove facing onto, and extending lengthwise of the bore and disposed diametrically opposite the first groove, and a third tumbler receiving groove facing onto, and extending lengthwise of, the bore and disposed midway between the first and second grooves, a cylindrical plug mounted rotatably in the bore, provided with a longitudinal slot for receiving the bitted parts of a short key and a long key, and having formed therein a series of spaced apart transversely extending recesses in intersecting relation with the key slot, and key operable plate tumblers mounted slidably in the recesses, provided with spring means for urging them outwards into interlocked relation with any of the three grooves depending upon the position of the plug with respect to the barrel, and having formed therein key receiving openings of such character that when the bitted part of the short key is inserted into the key slot the foremost tumblers are retracted and the rearmost tumblers are not and when the bitted part of the long key is inserted into the key slot all of the tumblers are retracted and the plug is released so that it is free to be turned throughout a 180° arc from a position wherein the groove engaging portions of the tumblers are aligned with the first groove to a position wherein said groove engaging portions of the tum-

blers are in alignment with the second groove, said barrel being provided with an arcuate groove between the rear ends of the first and third grooves wherein when the bitted part of either key is inserted into the key slot the non-retracted rearmost tumblers are permitted in connection with turning of the key to swing from the first groove into the third groove while at the same time limiting turning of the plug to a 90° arc with respect to the barrel.

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