Jan. 23, 1962 P. P. KUBIK 3,017,762

KNOB RETAINER FOR LOCK

Filed Feb. 25, 1960

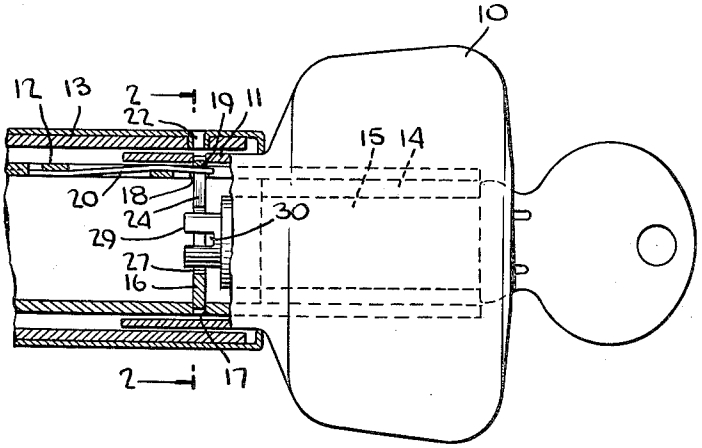


Fig. 1.

Fig. 2.

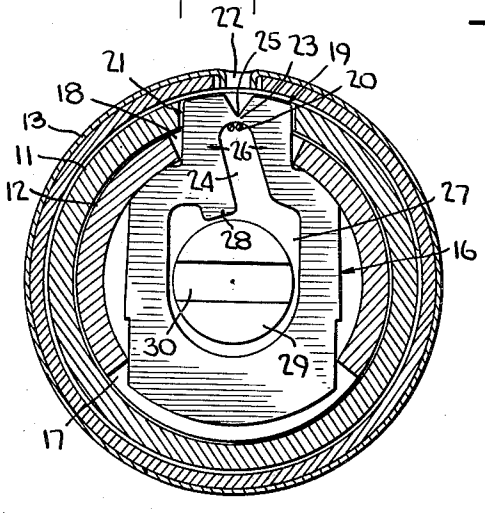
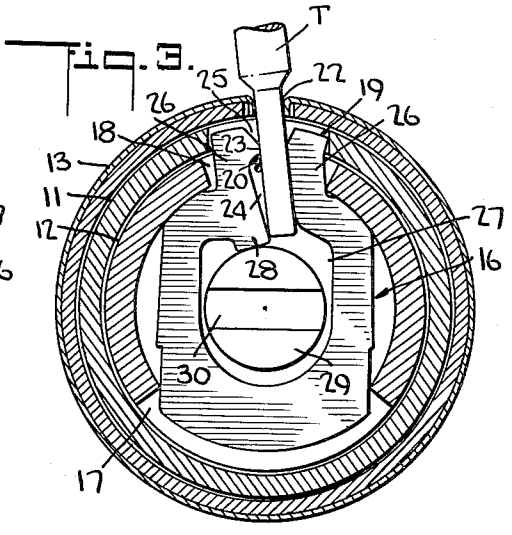


Fig. 3.



INVENTOR.
PAUL P. KUBIK
BY A. H. Golden
ATTORNEY

United States Patent Office 3,017,762 Patented Jan. 23, 1962

3,017,762

KNOB RETAINER FOR LOCK

Paul P. Kubik, Ambler, Pa., assignor to The Yale and Towne Manufacturing Company, Stamford, Conn., a corporation of Connecticut

Filed Feb. 25, 1960, Ser. No. 11,021
6 Claims. (Cl. 70—224)

This invention relates to a tamper-proof knob retainer for a cylindrical lock.

When a cylindrical lock has a knob that is locked against operation, it is important that the knob should not be removed by unauthorized persons, as will be appreciated. To prevent unauthorized removal of the knob, it is quite usual to equip the lock with a knob retainer that will be locked in a position holding the knob assembled. The knob retainer may, for example, be locked through a keyplug that is mounted on the knob, and that is utilized for controlling mechanism that locks the knob operation.

There are certain advantages in using a keyplug or equivalent means to lock a knob retainer, but I have found that the prior art constructions of that kind are vulnerable because the retainer can be moved to a release position through force. Thus, by striking the retainer, it is possible to deform parts of the retainer or keyplug, so that the retainer will move to a position in which it no longer holds the knob assembled. I have now conceived by may invention an exceedingly novel knob retainer that will be effective when locked to hold the knob in assembled position, despite an application of force to the retainer. Moreover, my novel retainer will show evidence of tampering, should an attempt be made to move it by force.

As a feature of my invention, I equip my novel retainer with a yieldable portion that will accept a predetermined amount of force that need normally be applied for moving the retainer to a release position. I particularly form the yieldable portion of the retainer to yield when a force is applied exceeding the amount that normally is necessary to move the retainer. Should an attempt be made to force the retainer when it is locked, the yieldable portion will yield, while the retainer remains in knob retaining position.

As a detailed feature of my invention, I prefer to make my novel retainer somewhat like those utilized in the prior art, the retainer being mounted in a transverse position in a spindle sleeve, and having an end part that projects from an opening in the side of the sleeve so as to enter an opening in a knob assembled on the sleeve. The retainer has a relatively large opening into which a key plug may extend, so that a portion of the key plug can move into opposed relation to a surface in the retainer opening to lock the retainer. I particularly form the end part of the retainer with a relatively thin portion, as by extending the retainer opening longitudinally between side portions on the end part of the retainer. When a tool is utilized to apply an excessive force to the end part of the retainer, the thin portion will yield and the tool will merely move between the side portions of the retainer. The tool then will not deform coacting surfaces of the retainer and key plug, and the key plug will continue to lock the retainer in knob retaining position.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of my invention, in order to prevent the appropriation of my invention by those skilled in the art.

Referring now to the drawings,

FIGURE 1 shows a longitudinal section of a portion of a cylindrical lock that utilizes my novel knob retainer.

FIGURE 2 is a cross section on the line 2—2 in FIGURE 1.

FIGURE 3 is like FIGURE 2, but shows the knob retaining position of my retainer after an application of force.

In order that my invention may be readily understood, I show in FIGURE 1 a knob 10 of a kind that is rather usual in cylindrical locks, with a sleeve portion 11 that slides to an assembled position on a spindle sleeve 12. The spindle sleeve 12 rotates within a lock mounting sleeve 13 that covers the sleeve portion 11 of the knob. When the knob 10 is assembled, the spindle sleeve 12 extends within the knob and supports a lock cylinder 14 having a rotating key plug 15 that may control mechanism in the lock. Further details of the lock are not important to an understanding of my invention and are not shown.

I indicate generally by the numeral 16 the novel knob retainer of my invention. In the construction that I have chosen to illustrate, my retainer 16 utilizes features that are somewhat conventional in retainers of the particular class, comprising a flat plate assembled in a transverse position within the spindle sleeve 12, and mounted to slide in slots 17, 18 formed in opposed sides of the spindle sleeve 12. As well shown in FIGURE 2, the retainer 16 has an end part 19 that is adapted to extend through the slot 18, and that by the sliding of the retainer will move between projecting and depressed positions relatively to the surface of the spindle sleeve 12. A spring 20 on the spindle sleeve 12 acts against the retainer 16 to press the end part 19 to projecting position, so that the end part will enter an opening 21 in the knob sleeve 11 to hold the knob 10 in assembled position. When the end part 19 is depressed out of the opening 21 in the knob sleeve, that being done by the insertion of a tool through an opening 22 in the mounting sleeve 13, as will be understood, the knob 10 can be removed from the spindle sleeve 12.

In the novel concept of my invention, I form the end part 19 of the retainer 16 with a relatively thin medial portion 23, well shown in FIGURE 2. To form that thin portion 23, I prefer to make an inclined slot 24 that extends longitudinally in the end part 19 of the retainer 16. Also, I form the end part 19 of the retainer 16 with a notch 25 extending into juxtaposed relation to the slot 24. That leaves the end part 19 with a pair of opposed side portions 26 that are adapted to project into knob opening 21, the thin portion 23 lying between those side portions 26. The thin portion 23 in my novel knob retainer will have sufficient strength to accept a force that normally need be applied for depressing the retainer 16. However, in the construction I have described, I so form the thin portion 23 as to yield, as shown in FIGURE 3, should a tool T apply a force that exceeds to any considerable extent the force that normally is necessary to depress the retainer 16. The tool T then may spread the side portions 26 of the retainer 16, with the tool moving between those portions 26 and then into the retainer slot 24. So that the importance of that arrangement may be understood, I shall now describe the locking of the knob retainer 16.

The knob retainer **16** has a relatively large opening **27**, with a lug **28** formed in an upper part of the opening **27**. The lug **28** is positioned out of aligned relation to the slot **24**, so that in my preferred construction I can form slot **24** in effect as an extension of opening **27** at one side of the lug **28**. A portion **29** on the key plug **15** extends into the retainer opening **27**, so as to lie in opposed relation to the lug **28** for locking the retainer **16** in knob retaining position. The key plug portion **29** has a slot **30** that can accept the lug **28** when key plug **15** is rotated, enabling the retainer **16** to be depressed to allow removal of the knob **10**.

Through the exceedingly novel construction that I have described, my knob retainer **16** will be very effectively locked by the key plug **15** and will not move to release position due to an application of force. Thus, as will be understood from FIGURE 3, an excessive force that may be applied by a tool T will merely cause the thin portion **23** on the retainer **16** to yield. The tool T then may pass between the side portions **26** of the retainer, and along the slot **24** at one side of the lug **28**. Thereby the tool T can not apply a force that will be sufficient to deform the coacting surfaces of the retainer lug **28** and the key plug portion **29**. Should a relatively long tool be used, the inclination of slot **24** will tend to deflect the tool to one side of the key plug. Thus it will be seen that the side portions **26** of the retainer when locked will remain in the opening **21** in the knob sleeve, so that the knob **10** cannot be removed from the spindle sleeve **12**. Moreover, the retainer **16** will bear evidence of tampering, and it will be possible merely by inspecting the retainer **16** to tell that an attempt has been made to remove the knob **10**.

I believe that the construction and operation of my novel knob retainer will now be fully understood. Through my invention, I am able to equip a cylindrical lock with a knob retainer that will be effectively locked in knob-retaining position, and that cannot be made to release the knob merely through an application of force to the retainer or locking means. I believe, therefore, that the very considerable value and merit of my invention will be appreciated by those persons skilled in the art.

I now claim:

1. In a combination of the class described, a spindle sleeve, a knob retainer mounted for movement to knob retaining and releasing positions on said spindle sleeve, a part on said knob retainer adapted to be engaged by a tool, said part having a portion that is formed to be relatively yieldable as compared with further parts of the retainer, said yieldable portion having sufficient strength to accept a predetermined amount of force that the tool need apply for normally moving the retainer to knob releasing position, a locking member mounted relatively to the spindle sleeve for movement into opposed relation to one of said further parts on the knob retainer to lock said retainer in knob retaining position, and the yieldable portion of said retainer part yielding when the tool applies a force exceeding said predetermined amount, so that the retainer when locked by said locking member will not be moved to knob releasing position through deforming of a part of said retainer or locking member.

2. In a combination of the class described, a spindle sleeve, a knob retainer having an end part projecting from a surface of said spindle sleeve for retaining a knob on said sleeve, and movable to a depressed position on said sleeve for releasing the knob, a portion on said end part formed to be relatively yieldable as compared with further parts of the retainer, said yieldable portion having sufficient strength to accept from a tool a force that normally may depress the knob retainer, a locking member mounted relatively to the spindle sleeve for movement into opposed relation to one of said further parts on the knob retainer to lock said retainer with its end part in projecting position, and the yieldable portion of said end part yielding when the tool applies a force exceeding that which will normally depress the retainer, so that the excessive force will not be effective to depress the end part of the retainer to release the knob through deforming of a part of the retainer or locking member.

3. In a combination of the class described, a spindle sleeve, a knob retainer having an end part projecting from a surface of said spindle sleeve for retaining a knob on said sleeve, and movable to a depressed position on said sleeve for releasing the knob, a portion of said end part being formed to be relatively thin and yieldable as compared with further parts of the retainer and adapted to be engaged by a tool, said relatively thin portion of the end part having sufficient strength to accept from the tool a force that normally may depress the knob retainer, a locking member mounted relatively to the spindle sleeve for movement into opposed relation to one of said further parts on the knob retainer to lock said retainer with its end part in projecting position, and the relatively thin portion of said end part yielding when the tool applies a force exceeding that which will normally depress the retainer, so that the tool will form an opening into which it will move and will not depress the retainer through deforming of a part of the retainer or locking member while said locking member locks the retainer.

4. In a combination of the class described, a spindle sleeve, a knob retainer having an end part projecting from a surface of said spindle sleeve for retaining a knob on said sleeve, and movable to a depressed position on said sleeve for releasing the knob, an opening extending longitudinally in said knob retainer and leaving a relatively thin medial portion on said end part of the retainer, said relatively thin portion having sufficient strength to accept from a tool a force that normally may depress the knob retainer, a locking member mounted relatively to the spindle sleeve for movement into opposed relation to a surface on the knob retainer to lock said retainer with its end part in projecting position, and the relatively thin portion of said end part being formed to yield when the tool applies a force exceeding that which will normally depress the retainer, so that the tool will move into the longitudinal opening in the knob retainer and will not depress the retainer through deforming of a part of the retainer or locking member while said locking member locks the retainer.

5. In a combination of the class described, a spindle sleeve, a knob retainer mounted in a transverse position in said spindle sleeve and having an end part projecting from an opening in the side of said spindle sleeve for retaining a knob on said sleeve, said knob retainer being movable to depressed position for releasing the knob, a medial notch formed in said end part of the knob retainer and adapted to be engaged by a tool for depressing the retainer, an opening extending longitudinally in said end part and into juxtaposed relation to said notch, so as to leave on said end part a relatively thin portion of sufficient strength to accept from the tool a force that the tool normally need apply to depress the knob retainer, a keyplug mounted for rotation relatively to the spindle sleeve, said keyplug having a portion rotating into opposed relation to a surface on the knob retainer to lock said retainer with its end part in projecting position, and said relatively thin portion of the end part of the retainer being formed to yield when the tool applies a force exceeding that which normally will depress the retainer, so that the tool will move between side portions of the end part and will not be effective to depress the retainer through deforming of a part of the retainer or keyplug while said keyplug locks the retainer.

6. In a combination of the class described, a spindle sleeve, a knob retainer mounted in a transverse position in said spindle sleeve and having an end part projecting from an opening in the side of said spindle sleeve for retaining a knob on said sleeve, said knob retainer being movable to depressed position for releasing the knob, a

medial notch formed in said end part of the knob retainer and adapted to be engaged by a tool for depressing the retainer, an opening formed between side portions of the retainer and its end part and extending longitudinally into juxtaposed relation to said notch, so that said opening leaves between the side portions of said end part a relatively thin portion of sufficient strength to accept from the tool a force that the tool normally need apply to depress the knob retainer, a keyplug mounted for rotation relatively to the spindle sleeve, said keyplug having a portion positioned in the retainer opening and rotating into opposed relation to a surface of the opening to lock said retainer in projecting position, and said relatively thin portion of the end part of the retainer being formed to yield when the tool applies a force exceeding that which normally will depress the retainer, so that the tool

will move between the side portions of the end part and will not be effective to depress the retainer through deforming a part of the retainer or keyplug while said keyplug locks the retainer.

References Cited in the file of this patent

UNITED STATES PATENTS

315,205	Young	Apr. 7, 1885
2,301,751	Schlage	Nov. 10, 1942
2,609,679	Bremer et al.	Sept. 9, 1952
2,801,123	Kubik et al.	July 30, 1957

FOREIGN PATENTS

587,940	Germany	Nov. 10, 1933