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Trimmer et al.

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[54] **SECURITY SYSTEM FOR SECURING AN ARTICLE AGAINST UNAUTHORIZED REMOVAL**

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[52] **U.S. Cl.** ..... **70/58,** 70/231, 70/395, 81/53 R, 179/189

[51] **Int. Cl.** **E05b 73/00**

[58] **Field of Search** ..... 179/189; 70/34, 57, 58, 70/231, 431, 393, 395, 398; 292/251; 248/1; 85/45; 81/53 R

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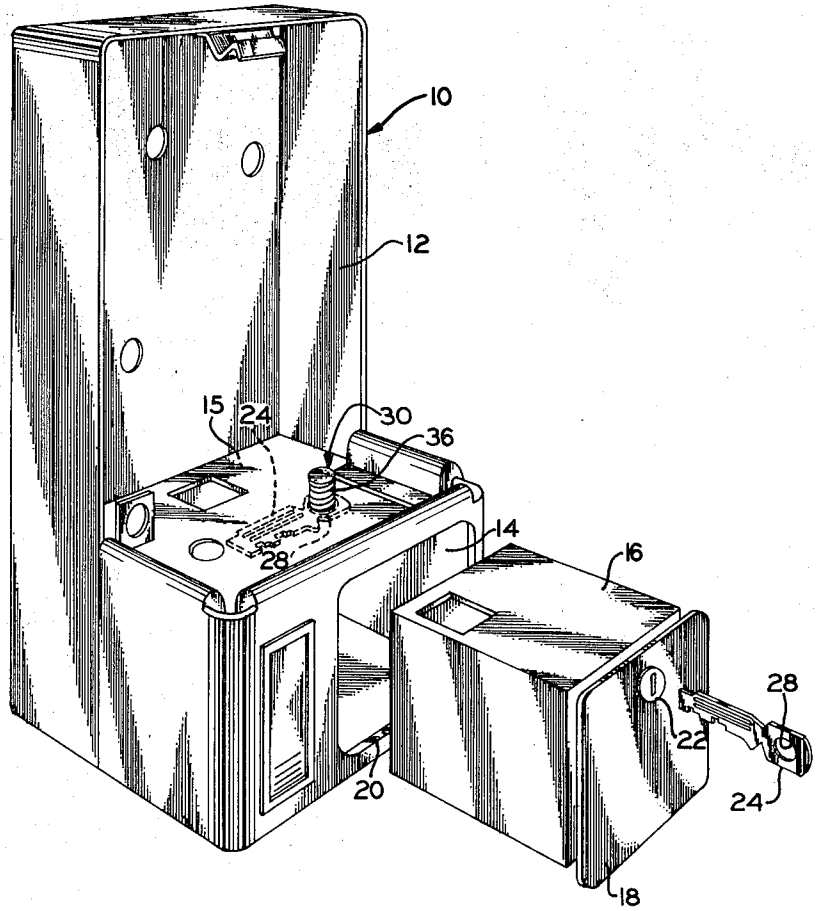
Primary Examiner—Robert L. Wolfe

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[57] **ABSTRACT**

A security system for securing an article, shown in the form of a key, against unauthorized removal, the system including a threaded fastener having a driving surface enveloped by a free-spinning collar and a tool for engaging the collar for rotation while frictionally coupling the collar with the threaded fastener to enable rotation of the fastener with the collar and removal of the article only by the authorized person in possession of the tool.

21 Claims, 3 Drawing Figures



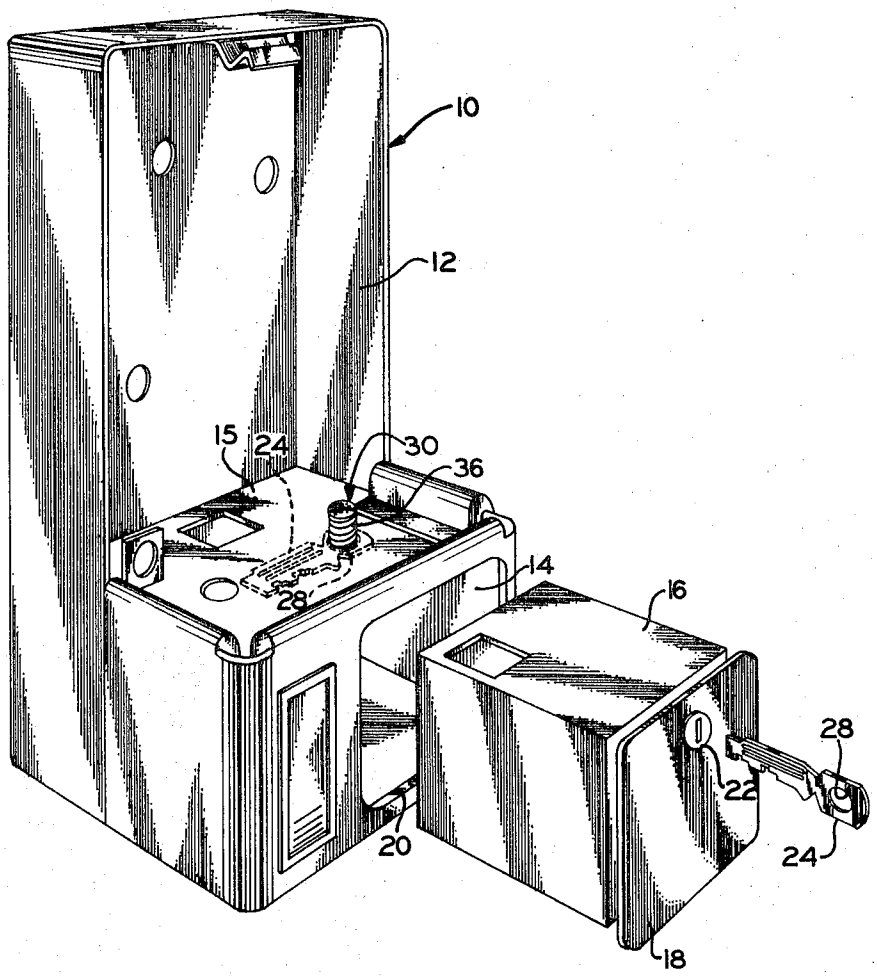


Fig_1

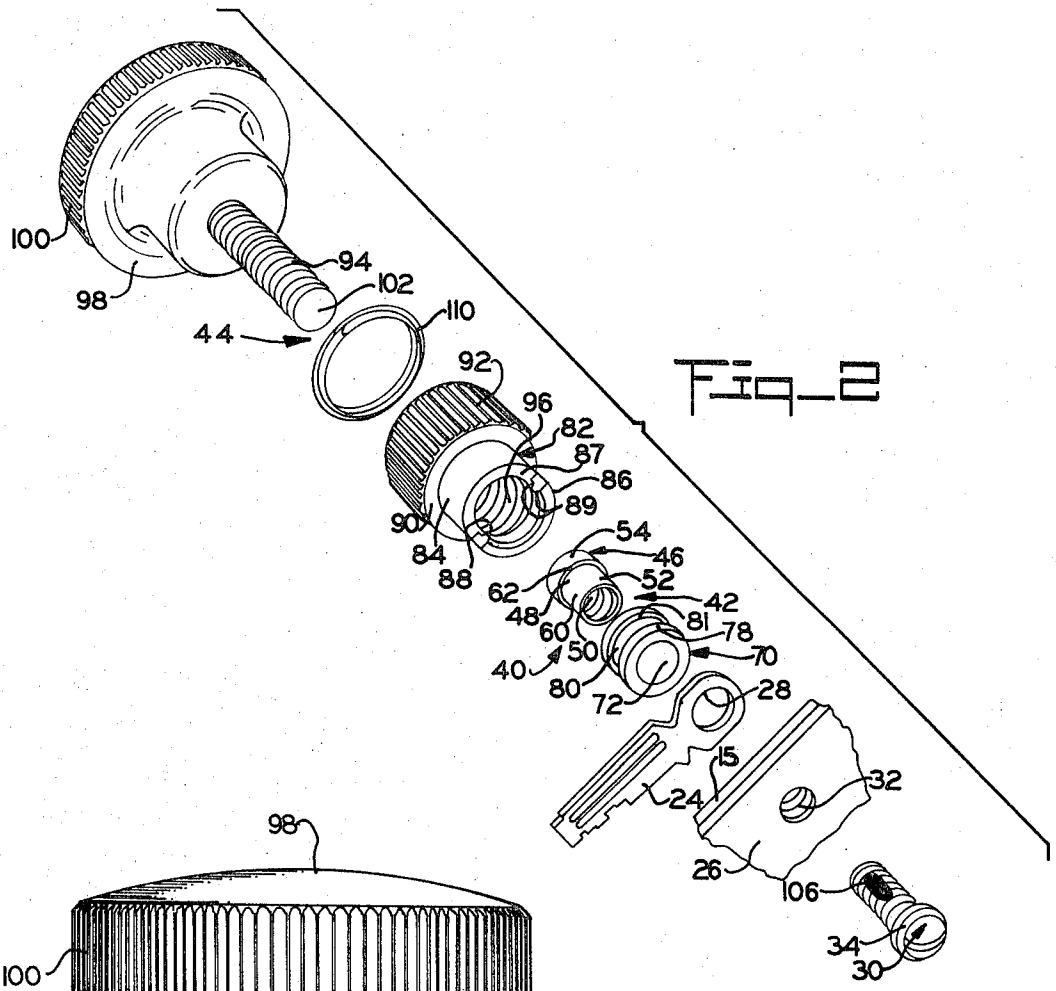

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Fig_2

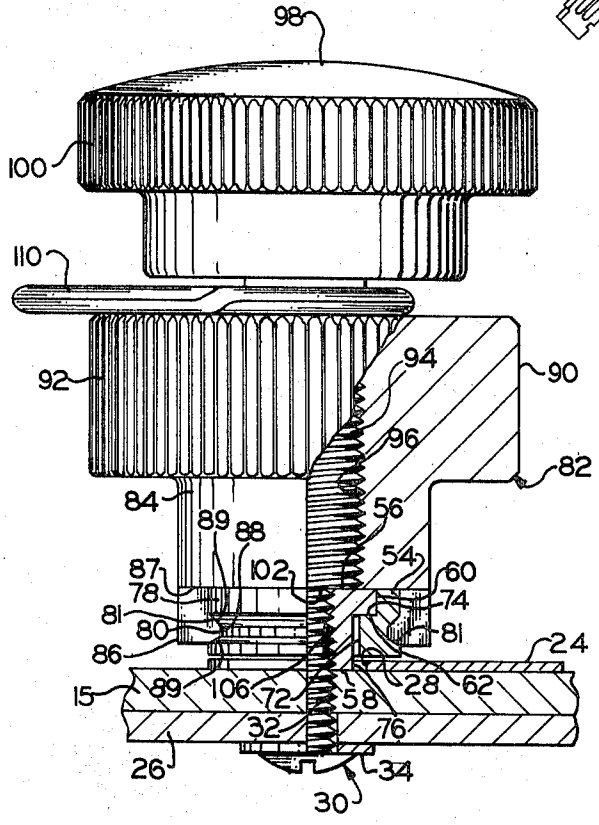

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Fig_3

SECURITY SYSTEM FOR SECURING AN ARTICLE AGAINST UNAUTHORIZED REMOVAL

The present invention relates generally to systems for securing articles against theft or other unauthorized removal and pertains, more specifically, to a security system for use in connection with a coin-operated telephone in which a coin compartment in the telephone housing is locked with a key and the key is to be secured to the housing against unauthorized removal.

Many coin-operated public telephones presently are installed by a procedure which, for security purposes, requires two men. An installer is responsible for the installation and proper hook-up of the telephone, while a coin collector installs the coin receptacle and locks the coin compartment of the telephone. The reason for the two-man requirement is that the installer must insert mounting screws through apertures in the rear wall of the telephone housing which can be reached only through the coin compartment. After these screws are installed, the coin collector locks the coin compartment not only to secure later collected coins against theft, but to close-off access to the screws behind the coin compartment so as to prevent theft of the telephone itself. In order to maintain adequate security, the installer is not provided with a key to the coin compartment; hence, the requirement for two men in accomplishing each installation.

In order to eliminate the need for two men at each installation, and thereby realize a saving in labor costs as well as increased convenience, installation devices and procedures have been evolved which require only one man, the installer, to be present at the installation. The coin compartment is sealed and locked at the factory and remains locked until the coin collector arrives for the first collection of coins after the telephone has been in use. However, not having been present at the installation of the telephone, the coin collector may not have in his possession the proper key for the particular telephone which is being serviced. Therefore, along with the benefits gained from the newly devised one-man installation procedure there arises a need for accommodating the coin collector when he later commences his appointed rounds.

It is therefore an object of the invention to provide a security system which enables the attachment of the coin compartment key of a particular telephone to the housing of the telephone itself in such a way that the key cannot be removed by unauthorized persons. In this manner, the authorized coin collector can obtain the key for each new telephone at the telephone itself, thereby precluding any confusion which might otherwise defeat the coin collector's ability to gain access to the coin compartment of every newly installed telephone. At the same time, the installer, or any other unauthorized person, cannot remove the key and security is assured.

Another object of the invention is to provide a security system of the type described which can be used with present telephone housings without modification of the existing housing structure.

Still another object of the invention is to provide a fastener system for use in a security system wherein an article is secured against unauthorized removal, the fastener system being simple in construction and use and virtually fool-proof.

A further object of the invention is to provide a driving tool for use in a security system of the type described, the driving tool being rugged and easy to use, while the function of the tool is not readily duplicated by ordinary, readily available tools.

A still further object of the invention is to provide a security system of the type described which will discourage theft or unauthorized removal of a secured article by virtue of the ability of the system to withstand efforts to defeat the system with conventional implements and tools.

The above objects, as well as still further objects and advantages, are attained by the invention which may be described briefly as a security system for use in connection with a coin-operated telephone in which a coin compartment in the telephone housing is locked with a key, the system securing the key to the housing against unauthorized removal, the security system comprising a fastener member having a body with a screw-threaded portion and an axially extending portion with a radial surface and an outer peripheral surface portion including a radial shoulder, a collar having a bore generally complementary to the outer peripheral surface portion of the axially extending portion of the fastener member body for receiving the axially extending portion in free-spinning relationship therewith and enveloping the outer peripheral surface portion while leaving the radial surface exposed, the bore including a radial ledge complementary to the radial shoulder of the fastener member body, and the collar having an outer peripheral surface including a circumferential recess therein, means for capturing the key upon the housing when the fastener member is affixed to the housing by means of the screw-threaded portion with the collar enveloping the outer peripheral surface portion of the fastener member body, a driving mechanism for selectively affixing and releasing the fastener member from the housing, the driving mechanism including a gripping member having a jaw for engaging the recess of the collar, and an actuator mounted upon the gripping member for axial movement relative thereto, the actuator having abutment means for engaging the radial surface of the fastener member such that upon engagement of the abutment means with the radial surface and engagement of the jaw of the gripping member with the recess of the collar, subsequent relative axial movement of the actuator and the gripping member will urge the jaw against the recess to frictionally couple the collar with the driving mechanism and will urge the radial ledge against the radial shoulder to frictionally couple the collar with the fastener member thereby permitting rotation of the fastener member in response to rotation of the driving mechanism.

The invention will be more fully understood, while still further objects and advantages thereof will become apparent, by reference to the following detailed description of an embodiment of the invention illustrated in the accompanying drawing, in which:

FIG. 1 is an exploded perspective view of a conventional telephone housing;

FIG. 2 is an exploded perspective view of a security system constructed in accordance with the invention; and

FIG. 3 is an enlarged elevational view, partially sectioned, of the security system in operation.

Referring now to the drawing, and especially to FIG. 1 thereof, a telephone housing of the type used in connection with conventional public, coin-operated telephones is illustrated generally at **10**. Housing **10** has an

upper compartment 12 which receives the telephone instrument itself (not shown) and a lower compartment 14, which is a coin compartment. The compartments 12 and 14 are separated by a partition 15. A coin collection box 16 is normally placed within the coin compartment 14 and the coin compartment is sealed with a cover plate 18 which is placed over an access opening 20 and locked in place by means of a lock 22. Lock 22 is operated by a key 24.

As a part of the installation system employed for installing telephones which utilize housing 10, the coin collection box 16 is placed in coin compartment 14 and the compartment is closed and locked by cover plate 18 and lock 22 in the factory. When it is time to collect the coins accumulated in the coin collection box 16, a coin collector visits the site of the telephone, unlocks the lock 22, opens the coin compartment 14, removes the coin collection box 16 and collects the coins therein. In order to execute his function, the coin collector must have the proper key 24. In view of the large number of telephone installations and variations in the keys, it can become difficult to assure that the coin collector always has the proper key for a particular telephone.

In the past, the telephone housing was installed by an installer with the coin compartment open and the coin collection box removed. The coin collector would be present at the installation and would insert the coin collection box and lock the coin compartment. While that procedure guaranteed that the coin collector would have the proper key in his possession, it also required the presence of two men at each installation; namely, the installer and the coin collector. For security reasons, it is not deemed desirable to supply the installer with a key to the coin compartment.

The present invention enables use of the new installation system, with its requirement for only one man at the installation, while assuring that the coin collector is provided with the proper key, and without making the key available to the installer or any other unauthorized person. The invention accomplishes this without the necessity for modification of housing 10, but utilizes the structure already available in the housing. Thus, whereas ordinarily a coin box guide 26 (see FIG. 3) is affixed to the partition 15 within the coin compartment 14 by a screw (not shown) so that the coin collection box 16 is properly located within the coin compartment, that screw has been replaced, at the factory, by a longer screw 30 which is threaded into a threaded opening 32 in partition 15 and affixes the coin box guide 26 in place. A lock washer 34 secures the screw 30 against rotation once the screw is properly seated. Screw 30 is long enough so that a portion of the screw provides a threaded stud 36 projecting upwardly into the upper compartment 12.

After the coin collection box 16 is placed within the coin compartment 14 and the compartment is sealed and locked, the key 24 is placed over the stud 36, with the stud projecting through an opening 28 in the key, as shown in phantom in FIG. 1. As best seen in FIGS. 2 and 3, the key 24 is then secured to the stud 36 by a security system constructed in accordance with the invention and illustrated generally at 40. Security system 40 includes a fastener system 42 and a driving mechanism shown in the form of a driving tool 44.

The fastener system 42 includes a fastener member 46 having a body 48 with a screw-threaded portion illustrated in the form of a threaded aperture 50 and an axially extending portion in the form of a generally cylindrical wall 52 with a radially extending flange 54 at one end thereof. The uppermost surface of the flange 54 provides a radially extending bearing face 56 while the lowermost surface of the wall 52 provides a clamping face 58. The outer peripheral surface portion 60 of the body 48 is cylindrical and includes a radial shoulder 62 located between the bearing face 56 and the clamping face 58.

A collar 70 has a bore 72 which is generally complementary in configuration to the outer peripheral surface portion 60 of the body 48 of fastener member 42 and envelopes the outer peripheral surface portion 60 in free-spinning relationship with the body 48. The bore 72 includes a radial ledge 74 complementary to and confronting the radial shoulder 62 in the surface portion 60 of body 48. Preferably, the axial length of collar 70 is somewhat shorter than the axial length of body 48 to provide means in the form of an extension 76 of the body 48 beyond the collar 70 for passing through the opening 28 in the key 24 such that the clamping face 58 can bear against the partition 15, as seen in FIG. 3. Collar 70 has an annular configuration with a generally cylindrical outer peripheral surface 78 with a circumferential recess in the form of an annular groove 80 located intermediate the ends of the collar. Groove 80 is provided with angled confronting surfaces 81.

The driving mechanism serves to drive the assembled fastener member 46 and collar 70 into threaded engagement with the stud 36, as illustrated in FIG. 3. Thus, driving tool 44 includes a gripping member 82 which has a portion in the form of a sleeve 84 extending downwardly and carrying a jaw 86 projecting from the lower end 87 thereof. Jaw 86 includes a rib 88 spaced from the lower end 87 and projecting radially inwardly, the rib 88 having a semi-annular configuration including angled faces 89 so as to be complementary to the annular groove 80 of collar 70. Rib 88 extends around no more than approximately one-half the circumferential extent of the annular groove 80, i.e., no more than approximately 180°, so that jaw 86 can be engaged with the collar 70 by moving the sleeve 84 laterally to insert rib 88 into groove 80. The gripping member 82 further includes a hand-grip 90 which is knurled at 92 so that an operator can grasp the gripping member for manipulating the member into engagement with the collar.

Once the collar 70 is engaged by the jaw 86 of the gripping member 82, as illustrated in FIG. 3, an actuator, shown in the form of threaded shaft 94, is advanced downwardly relative to the sleeve 84 by rotation of the shaft 94 within a complementary threaded internal surface 96 in the sleeve. Such rotation of the shaft 94 is facilitated by the inclusion of knob 98 affixed to one end of the shaft 94 which is also knurled at 100 and serves as a hand-grip. An abutment surface 102 is provided at the other end of the shaft 94.

By virtue of the relative dimensions of the abutment surface 102 of shaft 94 and the bearing face 56 of the fastener member 46, continued downward movement of shaft 94 relative to sleeve 84 will engage the abutment surface 102 with the bearing face 56 to discontinue relative movement between the shaft 94 and the fastener member 46. Continued rotation of the shaft in the same direction will raise the collar 70 relative to the fastener member 46, thereby engaging the confronting

ledge 74 and shoulder 62. Sufficient tightening of the ensuing connection between the collar and the fastener member by further rotation of the shaft relative to the sleeve will give rise to a frictional force between shoulder 62 and ledge 74 sufficient to couple the fastener for rotation with the collar. Likewise, the collar will be coupled with the sleeve 84 by frictional forces established between the jaw 86 and the collar 70 so that simultaneous rotation of the gripping member 82 and the actuator shaft 94 will rotate the fastener member 46 in either direction to selectively engage or disengage the fastener member with the stud 36.

Once the fastener system 42 is installed to secure key 24 in place within upper compartment 12 of housing 10, the driving tool 44 is released and removed from the fastener system by releasing the clamping force between the jaw 86 and the abutment surface 102, leaving collar 70 exposed and fastener member 46 enveloped within the collar 70, with the exception of the bearing face 56 of the fastener member body 48. A limited amount of clearance between the collar 70 and the body 48 of the fastener member allows the collar to turn freely relative to the fastener member which now cannot be turned without the tool 44. Thus, the fastener system will resist attempts to saw, chisel, jimmy, wrench or hammer off the fastener system. In order to enhance the securement of fastener member 46 on stud 36 the stud is provided with a self-locking mechanism in the form of a free-form plastic patch 106. Alternately, the threaded aperture 50 of the fastener member body 48 can be provided with a self-locking mechanism.

All of the component parts of the fastener system 42, and especially the collar 70, are preferably fabricated of tough materials having hard, tempered surfaces. The use of such materials, coupled with the ability of the collar 70 to rotate free of rotation of the fastener member 46 and the particular configuration of groove 80 which includes angled confronting surfaces 81, aids in defying attempts at removal by standard cutting, wrenching or pulling instruments which might be employed by an unauthorized person.

Tool 44 is available at the factory to install the fastener system 42 after the coin compartment 14 is locked and key 24 is placed on stud 36. The housing 10 is then delivered to the installer who installs the housing and the telephone instrument itself. Since the installer does not have a tool 44, he cannot remove key 24 and thus cannot open the coin compartment. After coins have been accumulated in the coin collection box 16, a coin collector who is supplied with a tool 44 can make his visit to the telephone, open the telephone instrument to expose the key 24 and use tool 44 to remove the fastener system 42 and the key 24. The coin collector can then keep the key for future collections and return the fastener system to the factory for re-use. In order to facilitate carrying of the tool 44 by the coin collector, a free swiveling ring 110 is provided on the tool and enables the tool to be attached to a belt chain carried by the coin collector. Thus, the security system 40 enables only authorized persons to have access to key 24 and the coin compartment 14.

The above detailed description of an embodiment of the invention is provided by way of example only. Various details of design and construction may be modified without departing from the true spirit and scope of the invention as set forth in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A security system for use in connection with a coin-operated apparatus in which a coin compartment in the apparatus housing is locked with a key and the housing is provided with a screw-threaded stud, said system securing the key to the housing against unauthorized removal, said security comprising:

a fastener member having a body with an axially extending screw-threaded aperture engageable with said stud and an axially extending portion with a radial surface and an outer peripheral surface portion including a radial shoulder;

a collar having a bore generally complementary to the outer peripheral surface portion of the axially extending portion of the fastener member body for receiving said axially extending portion in free-spinning relationship therewith and enveloping said outer peripheral surface portion while leaving said radial surface exposed, said bore including a radial ledge complementary to the radial shoulder of the fastener member body, and said collar having an outer peripheral surface including a circumferential recess therein;

means for capturing the key upon the housing when the fastener member is affixed to the housing by engagement of the screw-threaded aperture with the screw-threaded stud, with the collar enveloping the outer peripheral surface portion of the fastener member body;

a driving mechanism for selectively affixing and releasing the fastener member from the housing, said driving mechanism including

a gripping member having a jaw for engaging the recess of said collar; and

an actuator mounted upon the gripping member for axial movement relative thereto, said actuator having abutment means for engaging the radial surface of the fastener member such that upon engagement of the abutment means with the radial surface and engagement of the jaw of the gripping member with the recess of the collar, subsequent relative axial movement of the actuator and the gripping member will urge the jaw against the recess to frictionally couple the collar with the driving mechanism and will urge the radial ledge against the radial shoulder to frictionally couple the collar with the fastener member thereby permitting rotation of the fastener member in response to rotation of the driving mechanism.

2. The invention of claim 1 wherein the fastener member body has an annular configuration with said outer peripheral surface portion being generally cylindrical and the radial surface and radial shoulder being generally annular.

3. The invention of claim 2 wherein the fastener member body has opposite ends, the radial surface is located at one of said ends and the radial shoulder is located intermediate said ends.

4. The invention of claim 3 wherein the fastener member body includes a clamping face at the other of said ends for engaging the housing and said means for capturing the key upon the housing includes a further portion of the fastener member body located between the outer peripheral surface portion and said clamping face.

5. The invention of claim 1 wherein the collar has a generally annular configuration with said outer peripheral surface being generally cylindrical and said circumferential recess being an annular groove.

6. The invention of claim 5 wherein the annular groove has angled confronting surfaces.

7. The invention of claim 5 wherein the gripping member includes a sleeve portion having opposite ends and said jaw includes a radially inwardly projecting rib spaced from one end of the sleeve portion and having a circumferential extent of no more than approximately one-half the circumference of the annular groove in the collar such that engagement of the jaw with the recess is accomplished by lateral movement of the rib into the groove.

8. The invention of claim 7 wherein the sleeve portion includes a threaded internal surface and the actuator includes a threaded shaft having opposite ends and engaged with the threaded internal surface of the sleeve portion such that rotation of the shaft relative to the sleeve will advance and retract the shaft relative to the jaw.

9. The invention of claim 8 wherein said abutment means include a face at one end of the shaft complementary to the radial surface of the fastener member body and engageable therewith in response to rotation of the shaft relative to the sleeve portion when the jaw is engaged in the recess of the collar.

10. The invention of claim 9 wherein:

said sleeve portion includes a hand-grip portion adjacent the other of the opposite ends thereof; and

said shaft includes a hand-grip portion adjacent the other of the opposite ends thereof.

11. In a security system for use in connection with a coin-operated apparatus in which a coin compartment in the apparatus housing is locked with a key and the housing is provided with a screw-threaded stud, a fastener system for securing the key to the housing against unauthorized removal, said fastener system comprising:

a fastener member having a body with an axially extending screw-threaded aperture engageable with said stud and an axially extending portion with a radial surface and an outer peripheral surface portion including a radial shoulder;

a collar having a bore generally complementary to the outer peripheral surface portion of the axially extending portion of the fastener member body for receiving said axially extending portion in free-spinning relationship therewith and enveloping said outer peripheral surface portion while leaving said radial surface exposed, said bore including a radial ledge complementary to the radial shoulder of the fastener member body, and said collar having an outer peripheral surface including a circumferential recess therein;

means for capturing the key upon the housing when the fastener member is affixed to the housing by engagement of the screw threaded aperture with the screw-threaded stud, with the collar enveloping the outer peripheral surface portion of the fastener member body;

said collar being capable of being gripped at the circumferential recess thereof while the radial surface of the fastener member body is engaged so as to enable the collar to be urged axially relative to the fastener member in a direction to frictionally couple the radial ledge of the collar with the radial shoulder of the fastener member body thereby permitting rotation of the fastener member in response to rotation of the collar.

12. The invention of claim 11 wherein the fastener member body has an annular configuration with said outer peripheral surface portion being generally cylindrical and the radial surface and radial shoulder being generally annular

13. The invention of claim 12 wherein the fastener member body has opposite ends, the radial surface is located at one of said ends and the radial shoulder is located intermediate said ends.

14. The invention of claim 13 wherein the fastener member body includes a clamping face at the other of said ends for engaging the housing and said means for capturing the key upon the housing includes a further portion of the fastener member body located between the outer peripheral surface portion and said clamping face.

15. The invention of claim 11 wherein the collar has a generally annular configuration with said outer peripheral surface being generally cylindrical and said circumferential recess being an annular groove.

16. The invention of claim 15 wherein the annular groove has angled confronting surfaces.

17. A driving tool for use in a security system wherein a key to a lockable coin compartment in the housing of a coin-operated apparatus is secured to the housing against unauthorized removal by means of a fastener system which includes

a fastener member having a body with a screw-threaded aperture and an axially extending portion with a radial surface and an outer peripheral surface portion including a radial shoulder;

a generally annular collar having a bore generally complementary to the outer peripheral surface portion of the axially extending portion of the fastener member body for receiving said axially extending portion in free-spinning relationship therewith and enveloping said outer peripheral surface portion while leaving said radial surface exposed, said bore including a radial ledge complementary to the radial shoulder of the fastener member body, and said collar having a generally cylindrical outer peripheral surface including an annular groove therein; and

means for capturing the key upon the housing when the fastener member is affixed to the housing by means of the screw-threaded aperture, with the collar enveloping the outer peripheral surface portion of the fastener member body, said driving tool comprising:

a gripping member including a sleeve portion having a jaw for engaging the groove of said collar; and

an actuator mounted upon the gripping member for axial movement relative thereto, said actuator having abutment means for engaging the radial surface of the fastener member such that upon engagement of the abutment means with the radial surface and engagement of the jaw of the gripping member with the groove of the collar, subsequent relative axial movement of the actuator and the gripping member will urge the jaw against the groove to frictionally couple the collar with the driving mechanism and will urge the radial ledge against the radial shoulder to frictionally couple the collar with the fastener member thereby permitting rotation of the

fastener member in response to rotation of the driving mechanism.

18. The invention of claim **17** wherein said sleeve portion has opposite ends and said jaw includes a radially inwardly projecting rib spaced from one end of the sleeve portion and having a circumferential extent of no more than approximately one-half the circumference of the annular groove in the collar such that engagement of the jaw with the recess is accomplished by lateral movement of the rib into the groove.

19. The invention of claim **18** wherein the sleeve portion includes a threaded internal surface and the actuator includes a threaded shaft having opposite ends and engaged with the threaded internal surface of the sleeve portion such that rotation of the shaft relative to the sleeve portion will advance and retract the shaft relative to the jaw.

20. The invention of claim **19** wherein said abutment means include a face at one end of the shaft complementary to the radial surface of the fastener member body and engageable therewith in response to rotation of the shaft relative to the sleeve portion when the jaw is engaged in the recess of the collar.

21. The invention of claim **20** wherein:

said sleeve portion includes a hand-grip portion adjacent the other of the opposite ends thereof; and

said shaft includes a hand-grip portion adjacent the other of the opposite ends thereof.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,851,503 Dated December 3, 1974

Inventor(s) Paul A. Trimmer and Fred M. Cirule

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 9, "security comprising" should read
--security system comprising--

The title page should indicate that the patent is assigned to Amerace Corporation

Signed and sealed this 15th day of April 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks