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Greenwald et al.

[11] **3,727,440**

[45] **Apr. 17, 1973**

[54] **TUMBLER LOCK CODE PIN AND KEY CODING SET AND METHOD OF CODING A LOCK AND COMPLEMENTARY KEY**

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[52] **U.S. Cl.** **70/411**

[51] **Int. Cl.** **E05b 19/18**

[58] **Field of Search** ..... 70/411, 363, 394, 70/395, 398; 81/3; 33/174 F, 174 P, 174 H

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[57] **ABSTRACT**

This disclosure is directed to a method of coding a tumbler lock and key adapted therefor, and to a tumbler lock code pin the key coding set. The coding set comprises a support for holding a tumbler lock to permit ready access to the code pins. Identifying indicia are located on the support to identify the respective positions of each lock code pin. A key adapted to fit the keyway of the lock is formed with a series of complementary flutes, each being adapted to receive a similarly constructed key blade. An identifying member is removably positioned on the key to identify the complementary, corresponding key flutes adapted to receive the respective code pins of the lock. A gage is provided to effect the adjustment of the "set-back" distance of the respective key blades within their respective key flutes. The gage includes a series of selective gaging edges to effect displacement or adjustment of the respective key blades in the "set-back" position a distance equal to the displacement of the complementary code pin necessary to effect the operation of the lock. A locking collar located in the key is then tightened to maintain the key blades in their respective "set" or coded position

6 Claims, 8 Drawing Figures

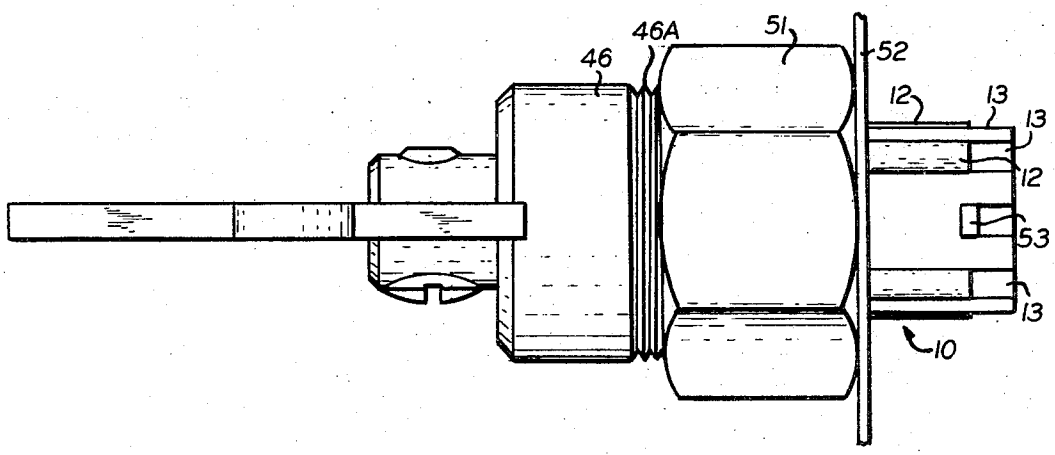


FIG. 1.

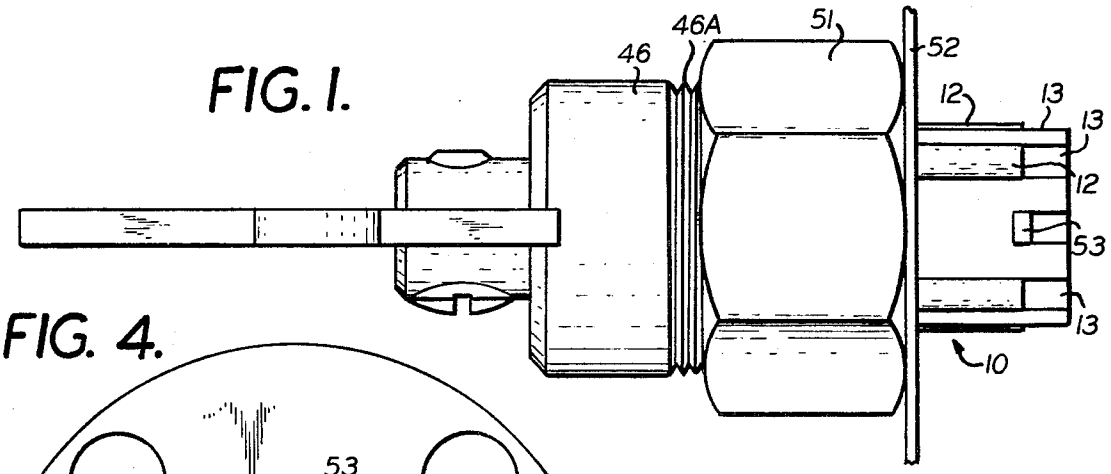


FIG. 4.

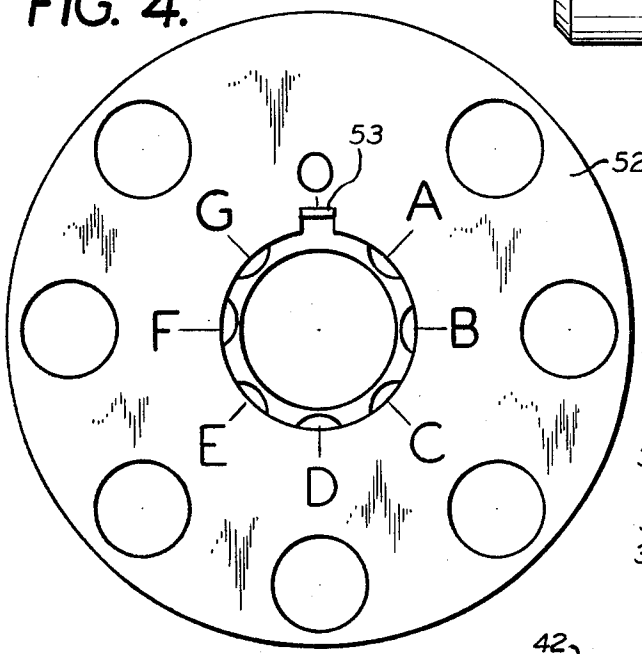


FIG. 2.

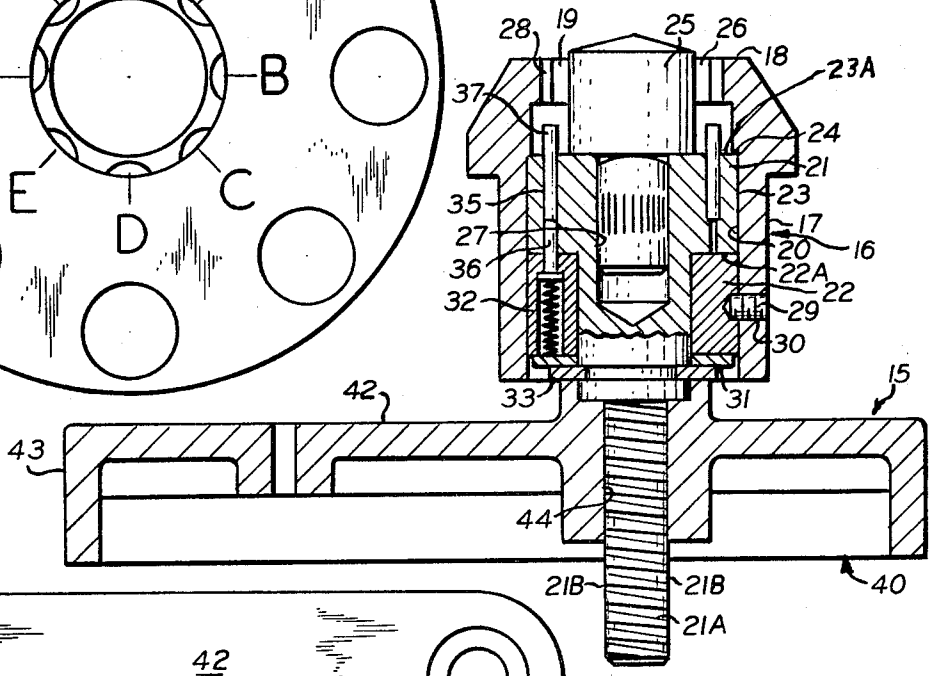
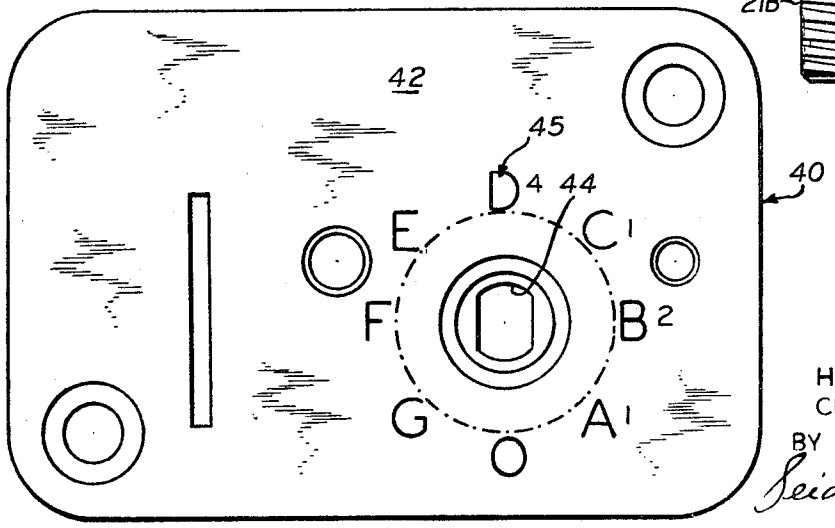


FIG. 3.



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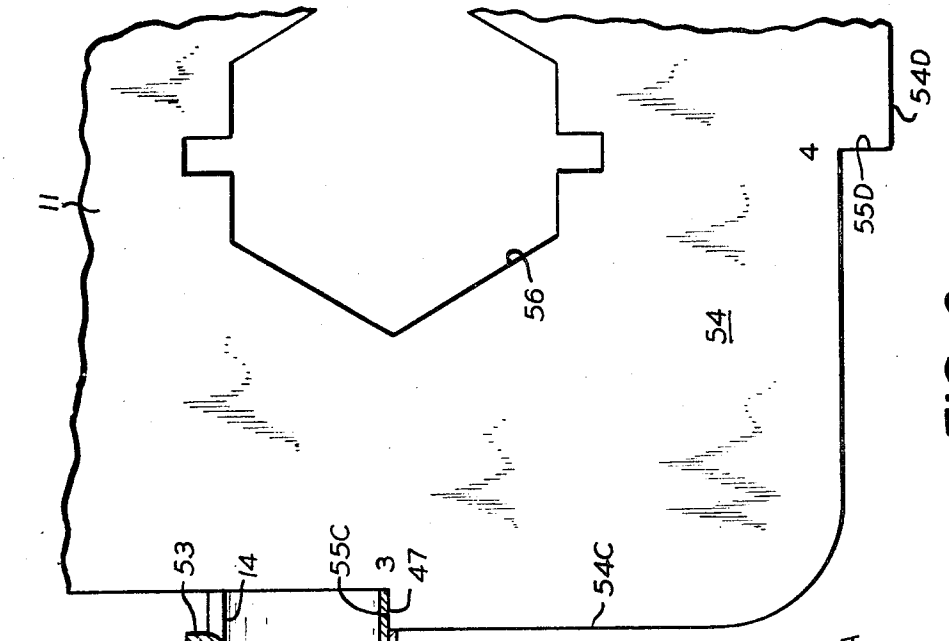


FIG. 7.



FIG. 6.

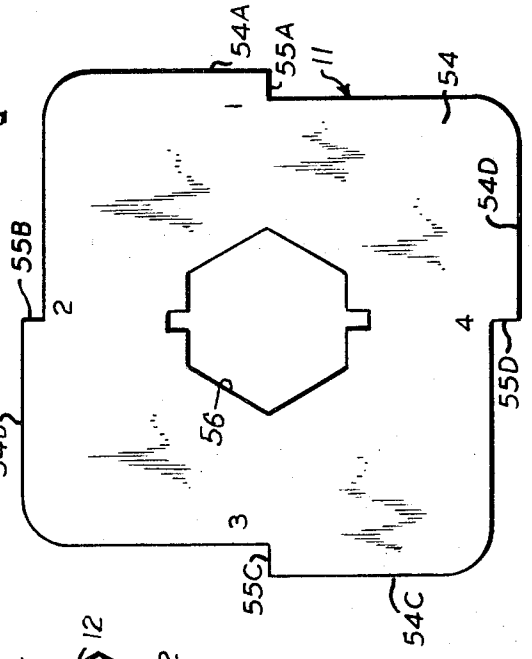


FIG. 5.

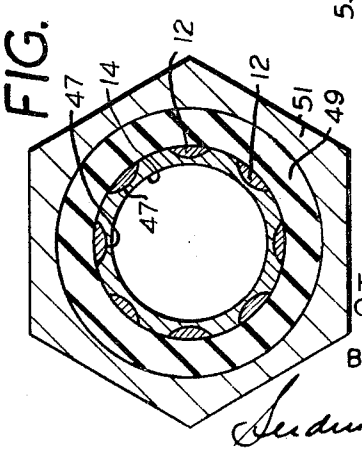


FIG. 8.

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TUMBLER LOCK CODE PIN AND KEY CODING SET AND METHOD OF CODING A LOCK AND COMPLEMENTARY KEY

PROBLEM AND PRIOR ART

Whenever the code pin combination of a predetermined rotary type tumbler lock was required to be changed or modified, it was heretofore necessary to call in a lock specialist to change the pin combination and to construct a new key therefor. For this reason the proprietor or the owner of a piece of equipment on which such tumbler locks were utilized, would normally have to await the arrival of the lock specialist to recode the tumbler lock. Frequently a considerable period of time lapsed before such lock could be recoded. In many instances this would work a considerable hardship and inconvenience on the proprietors of equipment utilizing such tumbler locks, each time the combination of such locks was required to be changed or altered. For these reasons many operators and/or owners of such machines tended to neglect the recoding of the lock, thereby placing the security of such mechanisms in jeopardy as vandals and/or other unauthorized individuals would then be provided with a greater opportunity in familiarizing themselves with a given lock combination and thereby rendering such locks subject to frequent pilfering and/or theft.

OBJECTS

It is an object of this invention to provide a lock code pin and key coding set useful in effecting the recoding of rotary type tumbler locks by the owner or proprietor of such mechanisms, at regular predetermined intervals to prohibit and/or deter pilfering and/or theft.

Another object of this invention is to provide a method for coding or recoding a tumbler lock, and a lock and key coding set wherein a proprietor may readily effect the recoding of a tumbler lock without resorting to the skills of a skilled lock technician.

Another object of this invention is to provide a lock coding method, and coding pin set which greatly facilitates the manner of coding a tumbler lock in an effective and positive manner.

Another object is to provide an improved resettable key construction which can be readily recoded to complement the recoding of a particular tumbler lock.

Another object is to provide a lock code pin and key coding set having complementary identifying indicia for establishing corresponding code pins and complementary key flutes to facilitate the recoding of a given resettable key to a given coded tumbler lock.

BRIEF SUMMARY OF THE INVENTION

The foregoing objects and other features and advantages of this invention are attained by the utilization of a resettable key which can be readily recoded to complement the recoding of a tumbler type lock. This is made possible by a lock and key coding set comprising essentially of a support or jig for supporting the lock in a position permitting ready access to the code pins. Indicia means are located on the jig or support for identifying the specific code pin positions. Accordingly, an operator can effectively recode the lock simply by interchanging the relative positions of the respective code pins and recording new position of the respective code pins in accordance to the indicia means. A removable identifying means complementing the indicia means on the lock support is provided for positioning about the barrel portion of a resettable key so that the respective flutes adapted to accommodate the code pins when the key is inserted into the lock are correspondingly identified to the position of the code pins. A key blade is disposed in each of the flutes, and the set-back position of the respective key blade, in accordance to the coding of the respective code pins, determined by a gage which is included in the set.

The gage means comprises a plate member having a series of edges, each edge being provided with a shoulder to define a predetermined "set-back" distance for the key blade. With the key blades disposed in the respective flutes of the key and with the positions of the respective code pins of the lock ascertained, the individual key blades are individually set back to their adjusted position by utilization of the proper gage shoulder to define in the end portion of the key, a seat or notch adapted for accommodating the appropriate code pin. Upon the setting of each of the respective key blades in their recoded set-back position, the respective key blades are secured in position by a lock collar circumscribing the barrel portion of the key.

FEATURES

A feature of this invention resides in the provision of a method and arrangement which includes a jig or supported bar supporting a lock to facilitate recoding of the pins and a resettable key having adjustable key blades which can be readily reset to complement the recoded pins of the tumbler lock.

Another feature of this invention resides in the provision of a coding set for both the lock and the key to facilitate the complementary recoding thereof.

Another feature of this invention resides in the provision of a gage means for effecting the set-back position of the respective key blades so as to complement the recoded series of tumbler code pins when the key is inserted into the lock.

Another feature of this invention resides in the provision of a tumbler lock and key coding set which is relatively simple in construction, easy to use, and positive in operation.

Other features and advantages will become more readily apparent when considered in view of the drawings and specification in which:

FIG. 1 is a plan view of a resettable key embodying the present invention.

FIG. 2 is a sectional view illustrating the tumbler lock supported in operative position on a support means embodying the present invention.

FIG. 3 is a plan view of the lock support means of FIG. 2.

FIG. 4 is a plan view of a removable indicia means adapted to be located on the barrel portion of a resettable key.

FIG. 5 is a plan view of a gage means embodying the present invention.

FIG. 6 is an end view of the gage means of FIG. 5.

FIG. 7 is a side elevation view partly in section illustrating the manner in which the gage means is adapted to the key to attain the "set-back" position of the key blades.

FIG. 8 is a sectional view taken along line 8—8 on FIG. 7.

DETAILED SPECIFICATION

Referring to the drawings, there is shown therein a tumbler lock code pin and key coding set comprising a resettable key construction **10**, a gage means **11** utilized in effecting the "set-back" position of a plurality of key blades **12** for defining a code pin seat **13** formed on the end of the barrel portion **14** of the key **10**, and a jig or support **40** for tumbler lock **16**.

The present invention is particularly applicable for effecting the recoding of a rotary type tumbler lock **16**, of the type disclosed in U. S. Pat. No. 3,330,141 and in patent application, Ser. No. 469,601 filed July 6, 1965 and now U.S. Pat. No. 3,339,384. As best seen in FIG. 2 such a tumbler lock **16** comprises essentially of a tubular housing **17** having a front faced portion **18** which terminates in an inturned flange to define a front opening **19**. Between the opposed ends of the housing **17** is a bore **20** for containing the component parts **21**, **22** of the lock. Component part **21** comprises a plug member having an extended connected stem portion **21A** generally provided with opposed flattened surfaces to which a latching or locking means not shown is connected. The plug **21** has a head end portion **23** provided with an outer periphery which is sized to be received within the bore **20** of the housing with the front face **23A** of the head end portion **23** disposed in abutting relationship to an internal shoulder **24** formed in the housing **17**. The arrangement is such that the plug member **21** is rendered free to rotate within the bore **20** of the housing as the appropriate key is turned. Connected to the head end portion **23** of the plug **21** is a key guide **25**. As shown, the enlarged end portion of the key guide **25** is provided with a circumference which is spaced from the circumference defined by the opening **19** of the housing. The annular space **26** thus defined between the exterior circumference of the key guide **25** and the inner circumference of the inturned flange or opening **19** defines a circular keyway for receiving a cylindrical or barrel portion **14** of a key. The key guide **26** is retained to the plug **21** by force fitting the guide **25** into a bore **27** formed in the end of the plug member **21**. The inturned flange defining the front opening **19** of the housing may be further provided with a notched portion **28** to provide a means for aligning the key in the keyway **26**. As will be described, the guide **28** provides the means by which the key **10** is orientated with respect to the lock.

Component member **22** comprises annular member is mounted on the stem portion of the plug **21** within the bore **20** of tubular housing **17**. The arrangement is such that the front facing **22A** of the annular pipe member **22** is disposed contiguous to the bottom face of head end portion **23** of the plug **21**. The annular pipe member **22** in turn is fixed against relative rotation with respect to the housing **17** by means of a set screw **29** which is threaded through a tapped opening **30** of the housing.

A washer **31** is positioned on the stem **21A** of the plug member **21** contiguous to the rear facing of the pipe member **22** to form a base or bottom for a series of bores **32** extending through the pipe member **22**. A retainer ring **33** secures the annular pipe **22** and associated washer **31** in position on the stem **21A** of the plug member **21**. The extended end portion of the stem may be threaded for receiving a suitable lock washer or lock nut, not shown, by which the lock is secured in position to a wall portion of a coin box or the like, in a vending machine.

The head end portion **23** of the plug member **21** is also provided with a plurality of bores **35** circumferentially spaced therearound for receiving the end of a locking pin **36** disposed in each of bores **32** in the pipe member **22**. The plug bores **35** are normally disposed in axial alignment with the bores **32** of the annular pipe member in the locked position.

Disposed within each of the aligned plug bores **35** in the head end portion **23** is a code pin **37**. It is understood that the code pins **37** are of different lengths, a portion of which extends beyond the front face of the plug **21**. In operation the code pins are required to be axially displaced a predetermined amount by the insertion of a key **10** to effect corresponding displacement of the lock pins **36**. When properly displaced to permit opening of the lock, the adjacent abutting end portion of the respective cooperating lock pins and code pins are disposed in alignment with the respective contiguous face portions of the head end portion of the plug member and annular pipe member. With the code and lock pins displaced, and accordingly, by effecting rotation of the plug member **21** relative to the pipe member **22** upon the turning of the key as will be hereinafter described, the lock can be readily opened. Thus the coding of the lock is determined by the length of the code pins **37**. A particular lock can thus be recoded simply by interchanging the relative positions of the code pins and/or by substituting other code pins having greater or lesser lengths and adjusting the key blades **12** accordingly.

In accordance with this invention a coding set is provided whereby an operator can readily recode at regular intervals a given tumbler lock **16** to thereby deter would-be vandals and other unauthorized persons for acquiring familiarity with a particular coded lock. This is attained by providing a lock holding fixture **40** in the form of a base member having a top wall **42** having connected thereto a circumscribing depending wall portion **43** for spacing the top wall **42** from a suitable supporting surface. The top wall **42** is formed with an opening **44** therein for accommodating the stem portion **21A** of the lock **16**. Whenever it is decided to effect a recoding of the lock, the lock **16** is removed from the equipment secured thereby and is supported in an upright position on the fixture **40** by extending the stem portion **21A** through the opening **44** formed in the lock holding fixture **40**. In this position the lock housing **17** is removed by loosening the set screw **29**. With the housing **17** thus removed, the operator is provided with access to the code pins **37** mounted in the head end portion of the plug member. As best seen in FIG. **2** indicia means **45** are circumferentially spaced about the opening **44** formed in the top wall **42** of the support member **40** for identifying the respective code pins positions of the lock **16**. As best seen it will be noted that the code pin positions are identified by symbols A-G. It will be understood that the respective code pins **37** are also identified by appropriate identification according to length, e.g. 1 to 4. To effect a recoding of the lock **16**, the operator simply randomly positions

In view of the foregoing description it will be understood that variations and modifications may be made without departing from the scope or spirit of the invention.

What is claimed is:

1. A rotary tumbler lock code pin and key coding set comprising:
- a means adapted for supporting a rotary tumbler lock to permit access to the lock code pins,
- indicia means on said support means for identifying the relative positions of the respective code pins,
- a key means having a barrel portion adapted to be received in the keyway of the lock,
- said barrel portion having a plurality of circumferentially disposed longitudinally extending key flutes formed in the surface thereof,
- a plurality of similarly constructed resettable key blades adapted to be adjustably disposed in each of said key flutes,
- readily removable identifying means adapted to be disposed about said barrel portion and having indicia means formed thereon to identify the respective key flute and associated resettable key blade complementing the respective code pins,
- the indicia means of said identifying means complementing the indicia means on said support means,
- gage means adapted for setting the set back position of the respective key blades within their respective key flutes to complement the coding of the respective code pins,
- and means on said key means for locking said key blades in their respective set back position.

2. A rotary tumbler lock code pin and key coding set comprising:
- a means adapted for supporting a rotary tumbler lock to permitaccess to the lock code pins,
- indicia means on said support means for identifying the relative positions of the respective code pins,
- a key means having a barrel portion adapted to be received in the keyway of the lock,
- said barrel portion having a plurality of circumferentially disposed longitudinally extending key flutes formed in the surface thereof,
- a plurality of similarly constructed resettable key blades adapted to be adjustably disposed in each of said key flutes,
- indicia means adapted to be disposed about said barrel portion to identify the respective key flute and associated resettable key blade complementing the respective code pins,
- gage means adapted for setting the set back position of the respective key blades within their respective key flutes to complement the coding of the respective code pins,
- and means on said key means for locking said key blades in their respective set back position,
- and said gage means comprising:
- a plate member having a plurality of edge portions,
- each of said edge portions having a lateral offset shoulder defining a predetermined gage distance by which said key blade can be set back within its key flute.

3. The invention as defined in claim 2 wherein said offset shoulders are proported to equal the distance a predetermined code pin is required to be displaced to permit operation of said lock.

4. The invention as defined in claim 3 wherein said gage plate member has a central cut-out portion to define a wrench opening adapted to complement the locking means of said key to facilitate the tightening and loosening of said blade locking means.

5. A rotary tumbler lock code pin and key coding set comprising a lock holding fixture,
- said lock holding fixture having a base member have a top wall with circumscribing depending wall portions for spacing said top wall from a supporting surface,
- said top wall having an opening therein for accommodating the plug end of a rotary lock,
- identifying means located on said top wall,
- said identifying means having indicia circumferentially spaced about said opening for identifying the code pins of a lock,
- a key means having a barrel portion adapted to be received in the keyway of the lock,
- said barrel portion having a series of longitudinally extending flutes circumferentially spaced about said barrel portion,
- a plurality of similarly constructed resettable key blades, said key blades being disposed in said flutes,
- said flutes being longer than said key blades,
- removably disposed indicia means adapted to be disposed about said barrel portion for identifying each flute corresponding to the identified code pins of said lock,
- a gage means adapted to adjust the set back of each of said key blades within their respective flutes to define code pin receiving notch on said barrel,
- said gage means including a plate member having a plurality of edge portions,
- a laterally extending shoulder formed on each edge portion,
- each shoulder being equal to the distance a predetermined code pin is required to be displaced to permit operation of said lock,
- and said key having a locking collar thereon for locking said key blades in the adjusted set back position,
- and said gage plate member having a cut-out portion to define a wrench opening to complement said locking collar to facilitate tightening and loosening of said collar about said key blades.

6. An improved resettable key comprising:
- a barrel portion adapted to be received in the keyway of a rotary tumbler lock,
- said barrel portion having a plurality of longitudinally extending flutes circumferentially spaced about said barrel portion,
- a lock body adapted to receive said barrel portion,
- said lock body having a bore which is circumferentially spaced about said barrel portion, and an externally threaded portion,
- a key blade adjustably positioned in each of said flutes,
- a securing means for securing said key blade in the adjusted position within said flute,
- said securing means including a resilient member circumscribing said key blades in said flute,
- and a locking collar having a threaded portion adapted to mate with the threaded portion of said key body,

new code pins and/or rearranges the code pins **37** at each of the respective stations A-G and records the code pin length at each of the respective code pin positions. For example, as noted in FIG. **3**, code pin position A, for purposes of description, may contain a code pin having a length identification of **1**. At position B there may be a code pin of a different length identified as **2**. Position C may have a code pin of **1**, or a length equal to code pin at A. D may be provided with a code pin identification of **4**, etc.

With the code pins **37** reset, as herein described, the operator must now provide a key **10** to complement the new code pin setting of the lock. This is attained by utilizing an improved resettable type key of the type disclosed in U.S. Letters Pat. No. 3,330,141. As best seen in FIGS. **1** and **7** the resettable key comprises a tubular barrel **14** which is suitably fitted to a key body **46**. As shown, the key body **46** is provided with a series of externally formed threads **46A** thereon. The barrel portion **14** of the key is provided with a series of longitudinally extending flutes **47** circumferentially spaced thereon. As best seen in FIG. **7**, the key body is counterbored at **48** to spatially circumscribe the flutes **47** defined on the key barrel **14**.

A key blade **12** is disposed in each of the flutes **47**. It will be understood that each key blade **12** is shaped to complement the flute **47**. Also the length of the respective key blades is uniform and made shorter than the length of the flutes. Accordingly the key blades **12** may be adjustably positioned within the flutes **47** as may be required.

A resilient O-ring **49** is disposed about the barrel portion **14** of the key and the key blades **12** disposed in the flutes. As seen in FIG. **7** the O-ring **49** is disposed between the end of the key body **46** and a washer **50**; and a locking collar **51** is threadedly engaged with the threads **46A** of the key body **46**. The locking collar **51** is provided with an inturned circumscribing flange **51A** to press against the washer to compress the O-ring **49** when the collar **51** is tightened to secure the position of the key blades within their respective flutes in the adjusted position.

It will be understood that the distance between the end of the key blade **12** and the end of the tubular barrel **14** defines a seat **13** for accommodating the projecting portion of the code pins extending beyond the face of the plug member **21**; as best seen in FIG. **2**. As each code pin is of a different length, it will be understood that the code pin seat **13** formed about the barrel of the key must be adjusted to complement the respective code pins **37** in the recoded position.

To attain complementary coding of the key seats **13** to the recoded pins **37** of the lock, an identifying means in the form of a ring **52** is removably disposed about the key barrel, and oriented thereon so that the position of the respective seats **13** is oriented to the position of the respective code pins adapted to be received therein when the key **10** is inserted into the keyway **26** of the lock **10**. This is attained by providing the ring **52** with indicia to identify the respective seat positions, e.g. by letters A to G. Thus seat position A will complement code pin at position A on the fixture or support **40**. Position B on ring **52** complements code pin B in lock support on fixture **40**, etc. A guide lug **53** serves to orientate the key barrel to the lock.

In order to effect the "set-back" position of the respective key blades **12** to accommodate the coded pins **37**, the coding set includes a gage means **54**. As seen in FIGS. **5** and **7** the gage means comprises a plate having a plurality of edges **54A**, B,C and D. Each edge is provided with a gage shoulder **55A**, **55B**, **55C**, **55D** respectively. It will be understood that each gage shoulder **55A–55D** is of a different length to define the respective "set-back" distance to accommodate the respective code pin lengths hereinbefore identified as **1** to **4**. Thus to determine the "set-back" distance of the respective key blades, the gage plate **54** is held against the edge of the tubular barrel, as seen in FIG. **7**, so that the gage shoulder extends into one of the flutes; it being understood that the gage shoulder of given identification, e.g., **1** be used to set back the key blade in the flute adapted to receive the code pin designated "1". Each key blade in each flute is similarly gaged to define the respective code pin seats **13** circumscribing the barrel **14**. Upon the setting of each key blade **12** to form the required code pin seat, the key blades are fixed in the adjusted or recoded set-back position by tightening the lock collar **51**. This is facilitated by using the gage plate **54** as a wrench. This is readily attained by providing the gage plate **54** with a central cut-out to define wrench opening **56** adapted to complement the hexagonal collar **51**.

With the key thus recoded and the key blades **12** locked in place in the flute **47**, the identifying ring **52** is removed from the key **10**, and the lock can then be reassembled into the machine secured thereby.

Thus in operation to recode the lock **16** at any time, the operator simply places the lock **16** on the fixture and exposes the code pins **37** by removal of the lock housing **17**. The pins **37** are repositioned, and their new positions noted.

The key blades **12** of the key are then reset accordingly. This is attained by positioning the identifying ring means **52** about the key to facilitate the orientation of the key blades to their respective code pin positions. The lock collar **51** is then loosened to permit readjustment of the "set-back" position of the respective key blades, in accordance to the new code pin positions of the lock. The readjustment of the "set-back" portion is attained by the gage means **54** which is formed with a series of gage shoulders **55A–55D** to correspond to the various length code pins identified as **1** to **4**. Actually the gage shoulders **55A–55D** correspond to the distance each code pin **1–4** is required to be displaced by the key to position the "break point", i.e., the inner end of the code pins in the plane defined by the contiguous faces of the complementary plug and pipe members **21**, **22** which will permit relative rotation therebetween when the key is turned. With each key blade readjusted, they are locked or secured by the lock collar **51**.

With the code set described it will be apparent that one can readily recode his own lock at will in a relatively simple, expedient and inexpensive manner. With the invention described one can now readily recode his locks and keys at frequent intervals and thereby deter any would-be vandals or thieves from gaining familiarity with the lock coding which in time could lead to frequent theft.

said locking collar having an inturned flange for effecting compression of said resilient member as said collar is tightened onto said body.

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