United States Patent [19]

Collister

[11] **3,861,267**

[45] **Jan. 21, 1975**

[54] **KEY BOLT**

[76] Inventor: **Frank C. Collister**, 3641 North Dorko Dr., Port Clinton, Ohio 43452

[22] Filed: **Dec. 27, 1971**

[21] Appl. No.: **212,329**

Related U.S. Application Data

[62] Division of Ser. No. 872,658, Oct. 30, 1969, Pat. No. 3,673,910.

[52] **U.S. Cl.** ..... **85/3 R**
[51] **Int. Cl.** **F16b 21/00**
[58] **Field of Search** ..... 85/3 S, 3 R

[56] **References Cited**

UNITED STATES PATENTS

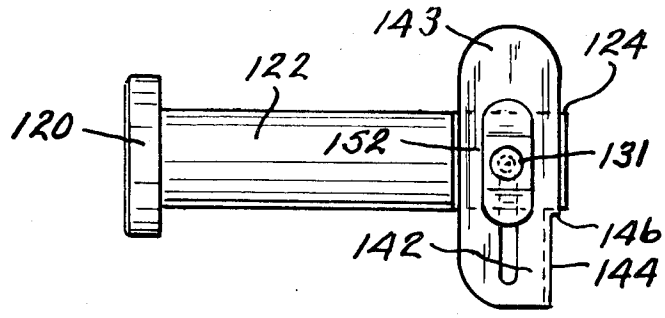
1,396,279	11/1921	Paine et al.	85/3 S
1,820,840	8/1931	Smith	85/3 R
1,963,514	6/1934	Wherren	85/3 R
3,279,302	10/1966	Modrey	85/3 S
3,476,007	11/1969	Collister	85/3 R

Primary Examiner—Edward C. Allen
Attorney, Agent, or Firm—Baldwin, Egan, Walling & Fetzer

[57] **ABSTRACT**

A key bolt including a shank having an open transversely disposed bolt slot at one end with an elongated planar key slidably disposed in the bolt slot. The key has end portions and spaced side walls forming a closed elongated key slot disposed intermediate the ends of the key. A pin is transversely disposed in the bolt shank and passes through the bolt slot and through the key slot at substantially right angles thereto to slidably retain the key within the bolt slot. The key is slidable in the bolt slot to an unlocked position wherein the key extends directly outwardly of the shank and forms an extension thereof and is slidable to a locked position wherein the key is substantially perpendicular to the shank. In one form of the invention, at least a portion of one of the side walls of the key is severed or partially severed or slotted intermediate the ends thereof with one severed portion having its free end portion offset from and protruding out of the plane of the key to form a key lock abutting the bolt shank to retain the key in locked position. Such severed portion is yieldable to a position within the plane of the key to enable the key to be moved from locked position to unlocked position.

3 Claims, 47 Drawing Figures



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SHEET 1 OF 3

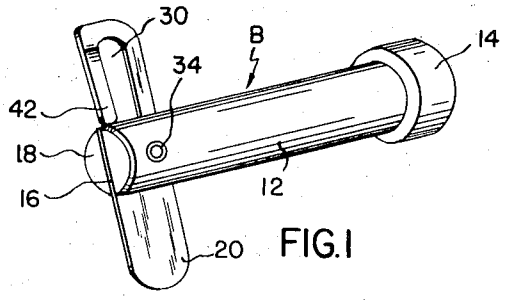


FIG.1

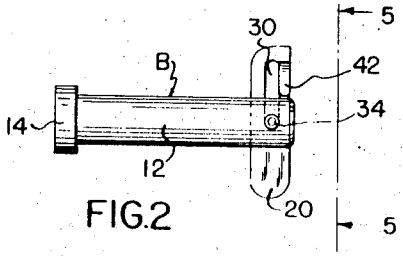


FIG.2

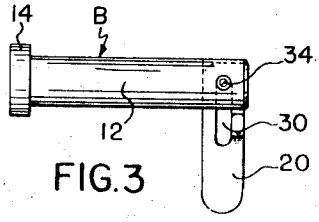


FIG.3

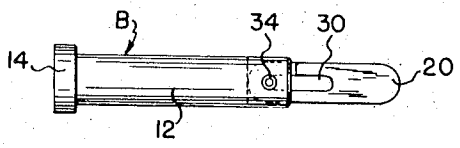


FIG.4

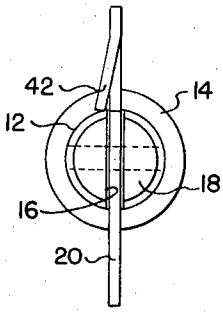


FIG.5

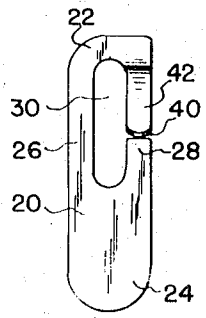


FIG.6

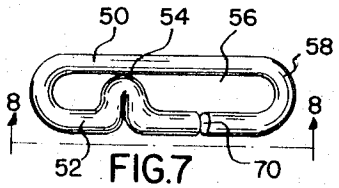


FIG.7

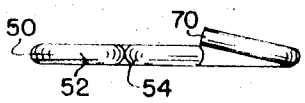


FIG.8

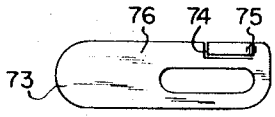


FIG.9

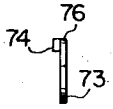


FIG.10

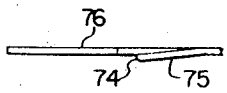


FIG.11

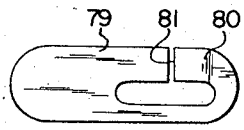


FIG.12

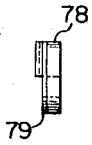


FIG.13

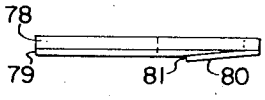


FIG.14

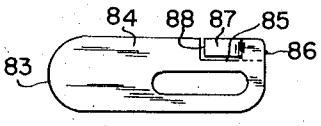


FIG.15

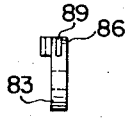


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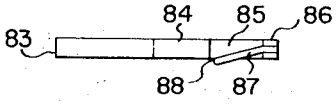


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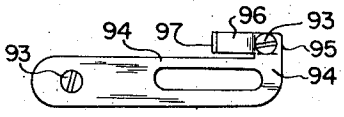


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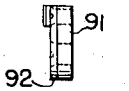


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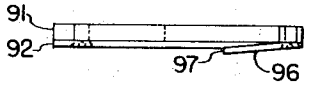


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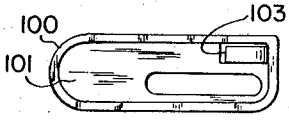


FIG.21

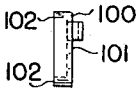


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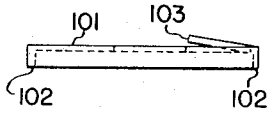


FIG.23

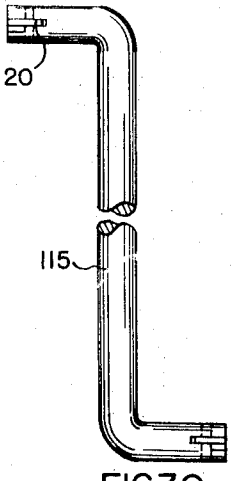


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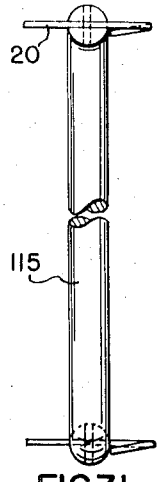


FIG.31

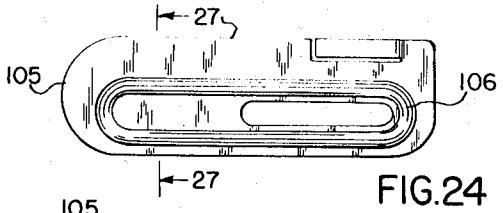


FIG.24



FIG.25

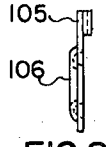


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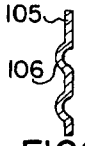


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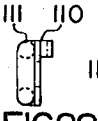


FIG.28

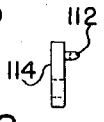


FIG.29

FIG.32

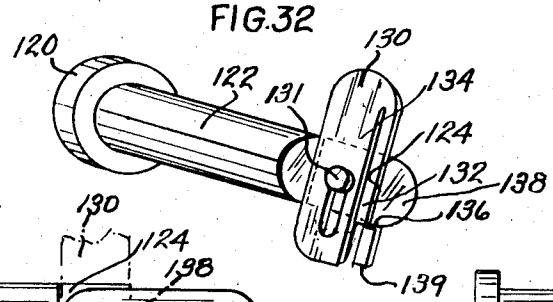


FIG.33

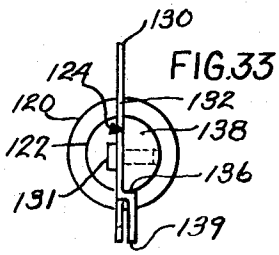


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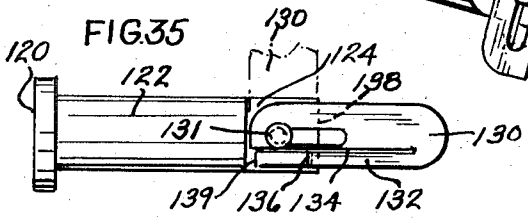
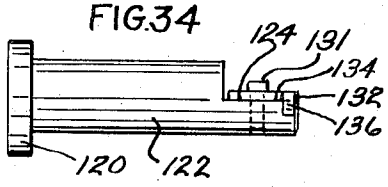


FIG.34



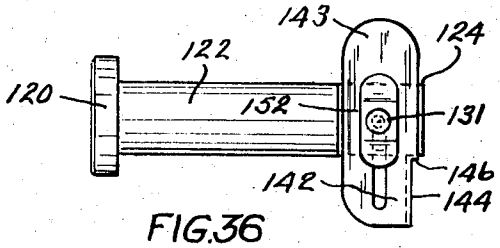


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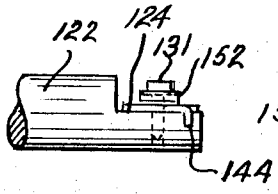
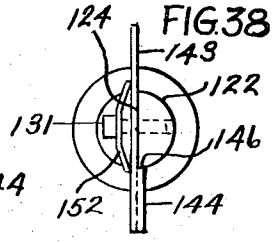


FIG.37

FIG.38



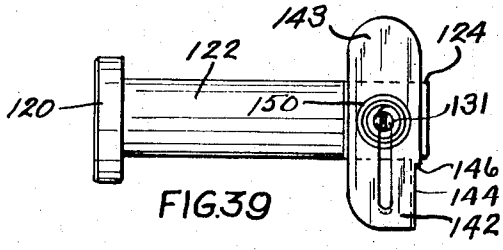


FIG.39

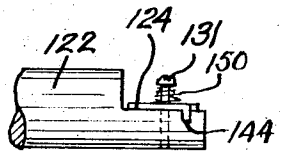


FIG.40

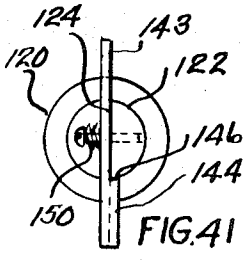


FIG.41

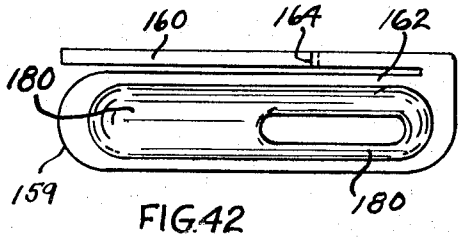


FIG.42

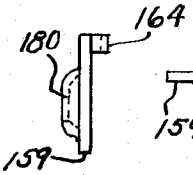


FIG.43

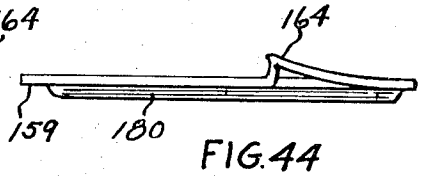


FIG.44

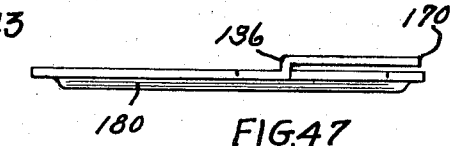


FIG.47

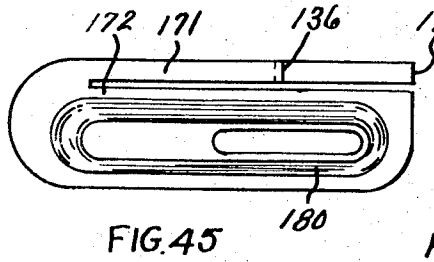


FIG.45

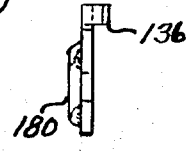


FIG.46

KEY BOLT

This application is a division of application Ser. No. 872,658, filed Oct. 30, 1969, which issued July 4, 1972, as Pat. No. 3,673,910.

This invention relates to key bolts and more particularly to such bolts having a key with locking means thereon.

In applications requiring the use of key bolts, it is highly essential that the pins be securely locked against accidental or inadvertent removal or displacement, yet be readily removable when desired. Prior pins fail to provide a positive, infallible locking means for releasably retaining the pin in such loked position.

Therefore, it is an object of the invention to provide a key bolt or clevis pin having a releasable locking means thereon that unfailingly retains the pin in locked position.

A further object of the invention is to provide a clevis pin of the above type that is simple in construction, inexpensive to manufacture, and highly effective in operation.

A further object of the invention is to enable locking, unlocking and removal from and insertion of the pin, bolt, rod etc., in an aperture without assembling or disassembling the locking key from the pin bolt rod etc., and without the use of tools.

Briefly the foregoing objects are accomplished by the provision of a key bolt including a shank having a bolt head at one end thereof. The shank has an open, transversely-disposed bolt slot at its other end to form a bifurcated end thereat. An elongated planar key is slidably disposed in the bolt slot and has end portions and spaced side walls forming a closed elongated key slot intermediate the ends of the key. A pin is transversely disposed in the shank at the bifurcated end and passes through the bolt slot and the key slot at substantially right angles thereto to slidably retain the key within the bolt slot. The key is slidable in the bolt slot to an unlocked position wherein the key extends directly outwardly of the shank and forms an extension thereof and is slidable to a locked position wherein the key is substantially perpendicular to the shank. One of the side walls of the key has at least a portion thereof severed intermediate the ends of the key with the severed portion having its free end portion offset from and protruding out of the plane of the key to form an abutment or key lock which abuts the bolt shank adjacent its bifurcated end to retain the key in locked position. At least the portion forming the abutment is formed of partially resilient material and thus such abutment is yieldable to a position within the plane of the key to enable the key to be moved from locked position to unlocked position.

In a modification of the invention, the key is formed of spring wire and one of the side walls has a protuberance extending inwardly of the key and in the plane thereof with the key slot being bounded at one end by the end portion of the key and at the other end by the protuberance.

In other modifications of the invention, to add strength in heavy duty applications and not loose ease and efficiency of operation, a key made of thin resilient material may be embossed, formed, or shaped of a thick material, too thick for the severed portion to be yieldable. In such instance, the key may have the offset protruding portion made of a thin resilient material affixed to it by any suitable means, such as welding, clipping rivets, bolts, screws, etc.

Thus there is provided a key bolt having a key with a positive lock means that retains the bolt in locked position under all conditions of use. One of the main advantages of the key and bolt or pin of the invention is they do not have to be disassembled to remove or replace the pins. This eliminates the problem of lost cotter keys, jessus clips etc. It also eliminates the need for purchasing, storing or assembling more than one part such as is the case with clevis pins and cotter keys.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the drawings wherein:

FIG. **1** is a perspective view of a key bolt constructed in accordance with the invention;

FIG. **2** is a side elevational view of the key bolt shown in FIG. **1**, and showing the key in locked position;

FIG. **3** is a view similar to FIG. **2**, but showing an intermediate step in removing the key from locked position;

FIG. **4** is a view similar to FIG. **2**, but showing the pin in unlocked position;

FIG. **5** is a view taken along the line **5**—**5** of FIG. **2**;

FIG. **6** is a side elevational view of the bolt key shown in FIG. **1**;

FIG. **7** is a side elevational view of a modified bolt key;

FIG. **8** is a view taken along the line **8**—**8** of FIG. **7**;

FIGS. **9** through **29** illustrate further modifications of the key of the invention;

FIG. **30** is a side elevational view of a connecting rod embodying the invention; and

FIG. **31** is an end view of the connecting rod shown in FIG. **30**.

FIGS. **32** through **47** illustrate further modifications of the invention.

Although the invention is shown and described herein with respect to key bolts or clevis pins, it will be understood that it may be employed on any type of bolt, yoke pin, clevis pin, draw bar pin, connecting rod, linkage, or elongated shank that must be locked in an aperture.

The terms and expressions which have been employed are used as terms of description, and not of limitation, and there is no intention, in the use of such terms and expresssions, of excluding any equivalents of the features shown and described or portions thereof, but is is recognized that various modifications are possible within the scope of the invention claimed.

Referring first to FIGS. **1** through **6**, there is shown a key bolt B constructed in accordance with the invention and including a shank **12** having a bolt head **14** at one end thereof. The shank **12** has an open, transversely disposed bolt slot **16** at its other end to form a bifurcated end **18** thereat. An elongated planar key **20** is slidably disposed in the bolt slot **16** and has end portions **22, 24** (FIG. **6**) and spaced side walls **26, 28** forming a closed elongated key slot **30** intermediate the ends **22, 24** thereof. A pin **34** is transversely disposed in the shank **12** at its bifurcated end **18** and passes through the bolt slot **16** and said key slot **30** at substantially right angles thereto to slidably retain the key **20** within the bolt slot. The key **20** is slidable in the bolt slot **16** to an unlocked position wherein the key extends directly outwardly of the shank and forms an extension thereof as shown in FIG. **4** in which position the bolt

may be inserted or removed from an aperture, and is slidable to a locked position wherein the key is substantially perpendicular to the shank as shown in FIG. 2. FIG. 3 shows the key in an intermediate position between locked and unlocked positions.

One of side walls 28 (FIG. 6) of the key is severed as at 40 intermediate the ends 22, 24 thereof, with one severed portion of the wall having the free end portion offset from and protruding out of the plane of the key as best shown in FIG. 5 to form an abutment or key lock 42 abutting the bolt shank 12 adjacent its bifurcated end 18 to retain the kay in locked position. The severed portion or lock 42 is yieldable to a position within the plane of the key 20 to enable the key to be moved from locked position to unlocked position, that is from the position shown in FIG. 2, thence to the position shown in FIG. 3, and thence to the position shown in FIG. 4, and back again, if desired.

Referring now to FIGS. 7 and 8 there is illustrated a modification of the invention wherein the key 50 is formed of spring wire, and one of the side walls 52 thereof has a protuberance 54 extending inwardly of the key and in the plane thereof. Here, the key slot 56 is bounded at one end by the end portions 58 of the key and at the other end by the protuberance 54. In this modification there is a free end portion or lock 70 similar in structure and function to the lock 42 aforedescribed.

In the modification shown in FIGS. 9, 10 and 11, the key 73 has an abutment 74 formed by a (partially) severed portion 75 of at least a part of the side wall 76. The severed portion 75 is formed so that its free end portion 74 is offset from and protrudes out of the plane of the key 73 to form a key lock or abutment 74. The severed portion 75 is yieldable to a position within the plane of the key 73 to enable the removal of such key from locked to unlocked position, or vice versa, as aforedescribed.

In the modification shown in FIGS. 12, 13 and 14, the key 78 is formed of substantially rigid material (for use in heavy-duty applications) and includes a flat resilient member 79 having a planar configuration substantially similar to that of the key 78. The member 79 may be secured to the key 78 by any suitable means, such as by welding, in juxtaposed relation to coincide with the key 78 and form a mirror image therewith, such member 79 having a severed portion 80 forming an abutment 81 of the invention.

In the modification shown in FIGS. 15, 16 and 17, there is shown a key 83 of substantially rigid material and including a side wall 84 having an open-sided elongated recess 85 formed in the outer edge portion thereof. The recess 85 is bounded at one end by a projection 86 extending outwardly from the side wall 84. The projection has a groove 89 therein. An elongated resilient tab 87 is secured in the groove 89 of the projection 86 and extends into said recess and forms an abutment 88 of the invention, said tab 87 protruding out of the plane of the key 83 to form a key lock abutting the bolt shank to retain the key in locked position within the plane of the key to enable the key to be moved from locked position to unlocked position.

In the modification shown in FIGS. 18, 19 and 20, the key 91 is formed of rigid material and includes a flat resilient member 92 having a planar configuration similar to that of the key 91. The member 92 may be secured to the key 91 by any suitable means such as the scres 93, in juxtaposed relation. The side wall 94 has a projection 95 extending outwardly from such wall. The member 92 has an elongated resilient tab 96 extending out from the projection 95 and extends along the side wall 94 to form an abutment 97 of the invention. The tab 96 normally protrudes out of the plane of the key 91 and is yieldable to a position within the plane of the key. It will be noted that the projection 95 extends laterally out from the side wall 94 at one end of the key.

In the modification shown in FIGS. 21, 22 and 23, the outer peripheral edge 100 of the key 101 is formed into an outwardly extending endless flange 102 to strengthen the key, such key containing an abutment 103 of the invention.

In the modification shown in FIGS. 24, 25, 26 and 27, strengthening of the key 105 is effected by an elongated, annular, endless ridge 106 embossed lengthwise on the key.

In the FIG. 28 modification, the key 110 has an elongated annular endless wire 111 secured lengthwise on the key to strengthen the same.

In the FIG. 29 modification, the abutment 112 of the invention is formed of an elongated piece of wire secured to the key 114.

FIGS. 30 and 31 illustrate a key (20) of the invention applied to a connecting bar 115.

With the above described structures, there is provided a key bolt having a positive locking means that unfailingly retains the bolt in locked position under all operating conditions. No tools are needed to lock or unlock or remove the pin. No assembly or disassembly is required such as with cotter keys, jessus clips, etc. The problem of looking on the floor for lost cotter pins and clips is eliminated. A single part is all that is to be purchased, stored and inventoried.

A modified type of key bolt 120 (FIGS. 32–41) may be used wherein the shank 122 thereof has a key-receiving shelf-type recess 124 formed at one end thereof for slidably receiving a key thereon in a manner aforedescribed.

Referring now to the modified key 130 shown in FIGS. 32–35, such key is slidably retained on the recess 124 by the pin 131 as heretofore described and the abutment is formed by a longitudinally severed portion 132 of at least a part of the side wall 134, said severed portion having a bent offset stepped portion or abutment 136 disposed intermediate its ends and normally offset from and protruding out of the plane of the key 130 to form said abutment which abuts the bolt shank 122 adjacent its one end 138 to retain the key 130 in locked position. The severed portion 132, with the stepped portion 136 thereon, is yieldable to a position substantially within the plane of the key 130 to enable the key to be selectively moved from locked position to unlocked position as aforedescribed. In FIGS. 32–35, the stepped portion 136 is disposed adjacent the free end 139 of the severed portion 132 of the side wall 134.

In the FIGS. 36–41 modification, the side wall 142 of the key 143 has at least a portion of its outer edge formed into a downwardly turned flange 144 having its inner end forming the abutment 146. Resilient means is disposed between the free end of the pin 131 and the key 143 to bias the key against the recess 124, such resilient means being either a compressed coil spring 150 (FIGS. 39, 40, 41) or a leaf spring 152 (FIGS. 36, 37, 38).

In the key **159** of FIGS. **42, 43, 44,** the abutment is formed by a longitudinally severed portion **160** of at least a part of the side wall **162,** said severed portion having a bent offset raised portion or abutment **164** intermediate its ends and normally offset from and protruding out of the plane of the key **159** to form such abutment **164** which abuts the bolt shank adjacent its one end to retain the key in locked position. The severed portion **160,** with the raised portion **164** thereon, is yieldable to a position within the plane of the key **159,** to enable the key to be selectively moved from locked position to unlocked position as aforedescribed.

In FIGS. **42, 43, 44** the raised portion **164** is disposed adjacent the attached end of the severed portion **160** of the side wall **162.**

In the structure of FIGS. **45, 46, 47** the abutment **136** is disposed adjacent the free end **170** of the severed portion **171** of the side wall **172.**

Thick material in the form of strengthening ridges **180** may be provided as shown in FIGS. **42–47** to strengthen the key as aforedescribed. Such thick material or ridges is also shown in FIGS. **12–20** and in FIGS. **21–27.** This structure permits use of a wider bolt slot **16** (FIG. **1**) which allows clearance for offset raised portions **164** (FIG. **44**) and **136** (FIG. **47**).

What is claimed is:

1. A key bolt including a shank having a key-receiving shelf-type recess formed at one end thereof, an elongated planar key slidably disposed on said recess and having end portions and spaced side walls forming a closed elongated key slot intermediate the ends of the key; and a pin transversely disposed in the shank at said one end thereof and passing through said recess and said key slot at substantially right angles thereto to slidably retain the key within the recess, said key being slidable on said recess to an unlocked position wherein the key extends directly outwardly of the shank and forms an extension thereof and being slidable to a locked position wherein the key is substantially perpendicular to the shank, one of said side walls of the key including an abutment protruding out of the plane of the key to form a key lock abutting the bolt shank adjacent its one end to retain the key in locked position, said key being yieldable to a position spaced from the recess to enable the abutment to be moved from locked position to unlocked position, said one side wall having at least a portion of its outer edge formed into a downwardly turned flange having its inner end forming said abutment, and resilient means disposed between the free end of the pin and the key to bias the key against the recess.

2. The structure of claim **1** wherein said resilient means is a compressed coil spring.

3. The structure of claim **1** wherein said resilient means is a leaf spring.

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