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C. G. BOLLINGER  
COMBINATION KEY SLOT AND RETAINER FOR BLIND  
BOLT CONNECTIONS  
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3,279,518

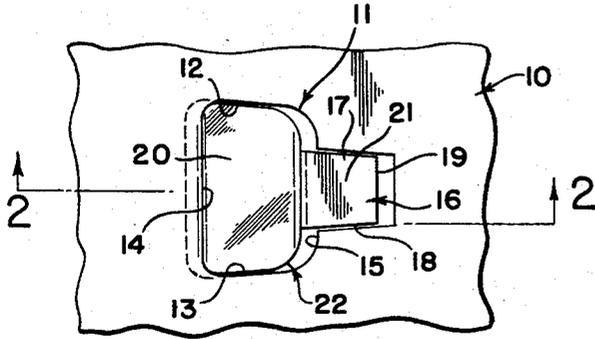


FIG. 1

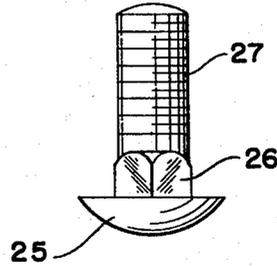


FIG. 3

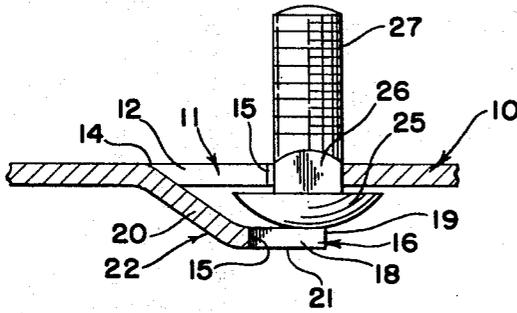


FIG. 2

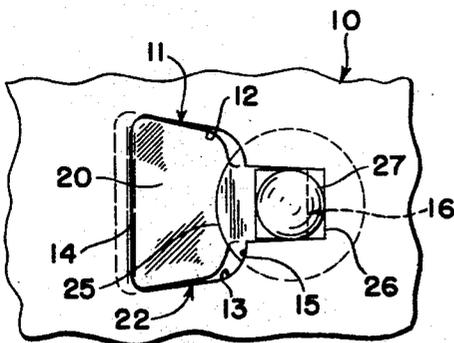


FIG. 4

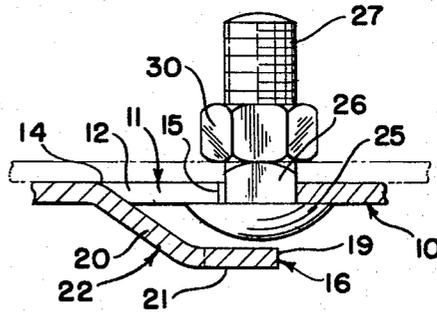


FIG. 5

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**COMBINATION KEY SLOT AND RETAINER FOR  
BLIND BOLT CONNECTIONS**

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2 Claims. (Cl. 151-41.7)

This application, relating as indicated to a combination key slot and retainer for blind bolt connections, is particularly directed to key slots for sliding doors for railway box cars particularly where the configuration of the door necessitates a post or other member on which hardware is secured to attach the door in position in connection with cranks. Many blind connections require a bolt to be fastened on the door and some component of hardware to be attached to the door by means of a blind bolt with a nut fastened thereto. This invention is directed to a new and different combination of a key slot and retainer for blind bolts wherein the assembly technique for blind bolt is greatly improved and standard carriage bolts may be used instead of special bolts.

In general, in connection with many blind bolt connections, there is indeed a need for improvement over some of the prior art. Torburn, Patent No. 2,393,431, for example, necessitates special flat-neck bolts and special washers. This invention is directed to a key slot and retainer which consists of a tongue of metal pressed from a keyhole slot with the tongue of metal in a closely adjacent position to said key slot. Thus, a standard carriage bolt having a rounded head and a square shank on a portion adjacent to the head may be positioned in the enlarged portion of the key slot and slipped down in the slot to the square shank which fits in a mating portion of the key slot so that washers, nuts, and other hardware may be attached thereto, as by means of a nut runner attached onto said bolt. It does not matter if the position of the bolt be upside down or right side up because the bolts will not be lost into the cavity or blind connection. In this way there is a reasonable assurance of a good connection being made on every assembly operation without the loss of parts.

This invention relates to a combination keyhole slot and retainer in which a tongue of metal from said opening of the cavity is pressed from a keyhole slot to form a retainer for the bolt; the tongue of metal from the opening of the cavity being depressed behind the key slot at an angle, flattened to form a retainer or back-up for the key slot portion of the aperture.

The object of this invention is to provide a new and improved combination keyhole slot and retainer for blind bolt connections wherein metal is pressed from a single sheet in a downwardly and outwardly direction leaving an aperture therein in the form of a keyhole and in which the retainer or pressed metal is sloped downwardly and has a position generally parallel to the aperture.

It is a further object of this invention to provide a new and improved combination keyhole slot and retainer adaptable for standard carriage bolts which have a round head, threaded member with a square shank thereon.

A further object of this invention is to provide a new and improved connection consisting of a combination keyhole slot and retainer in which a tongue of metal is depressed from the sheet in the form of a keyhole slot and is behind the slot by about the thickness of the rounded head of a standard carriage bolt of appropriate dimensions for said slot.

A further object of this invention is to provide a new and improved combination of a keyhole slot and retainer to make hardware connections on a fast repetitive assembly operation in which said keyhole slot is punched, or die-cut from a metal and in which a standard carriage

bolt is slipped in said keyhole slot and tightened up securing the metal components thereto. This provides a tight connection with a solid abutment on the square shank of the bolt in the keyhole slot preventing rotation when a nut runner runs up a nut on said bolt.

A further object of this invention is to provide an improved keyhole slot and retainer which lends itself to rapid assembly operations and to easy insertion of the bolt without loss of bolts in the opening of the keyhole slot and in which there is improved torque holding power against the run-up of a nut runner where the square shank of a carriage bolt is fully engaged against the sides of the slot.

In the drawings,

FIG. 1 is a plan view of the combination keyhole slot and retainer;

FIG. 2 is a section along the lines 2-2 of FIG. 1 showing the head of a bolt in full lines;

FIG. 3 is a view of said bolt separated from said slot;

FIG. 4 is a plan view of FIG. 2, similar to FIG. 1, but showing the bolt in assembled relationship in its slot;

FIG. 5 shows a completed assembly illustrating a blind bolt in said keyhole slot and retainer and a nut tightening up said bolt.

In FIG. 1, 10 shows a sheet of metal having a generally rectangular aperture therein at 11, having opposite faces 12 and 13 and a top edge 14 and a lower edge 15. In the lower edge 15 there is a tongue of metal in the form of a keyhole, generally indicated at 16, having sides 17 and 18 slightly tapered to an end portion 19. This aperture or keyhole slot is formed by pressing downwardly at 20 as shown in FIG. 2. A portion of the tongue as indicated generally at 16, is flattened to the position shown at 21. The tongue is positioned behind said slot by a distance greater than that of the head of the bolt, as may be seen in FIG. 2. The tongue of metal is pressed downwardly as seen in FIG. 1, generally at 22, and the end of the tongue is seen at 19. The sides of the aperture are substantially in registry with the edge of the tongue that is cut from the aperture or slot.

FIG. 4 shows the view of one of the blind bolts. The head of the bolt is indicated at 25, the head of the tongue is seen at 16 and the square shank of the carriage bolt is seen at 26 with the threaded portion at 27. Note how the shank fits squarely in the tapered substantially square end of the keyhole slot or aperture so that the entire surface of the slot serves as a bearing surface against the torque movement as for example with a nut runner.

FIG. 5 shows the same combination in which the bolt has been tightened up and in which the head 25 is tight against the under-surface of the aperture or keyhole slot and firmly secures the edges of the aperture between the nut 30, which is threaded onto the shank 27 of said bolt, and the square shank 26 of the carriage bolt. The square shank 26 of the carriage bolt is firmly wedged in the tapered substantially rectangular opening in the key slot retainer so that as torque is provided from the nut to the bolt, the sides of the shank press against the rectangular sides of the aperture.

Note how there is no possibility in rapid assembly of the nut slipping into the blind cavity. There is no way even when improperly assembled for the bolt to slip through the opening as is true of some of the prior art devices. This is particularly important when the blind connections are being assembled in a horizontal position wherein a number of elements of hardware have got to be assembled at one time by means of an assembly operation and there is considerable vibration which might cause the bolts to pass into the openings into the door.

Having thus disclosed the broad concepts of the inven-

tion, it will be appreciated that standard carriage bolts may have round or square heads; however, the shank must be square in order to provide resistance to rotational torque in the take-up process on the bolt. Further, it will be appreciated that the width of the keyhole slot needs to be wider than the head of the bolt but that the length does not have to be wider than the head of the bolt. The bolt can be slipped in sideways at a slight angle into its opening in the retainer. This provides for smaller keyhole slots under the circumstances.

For ease of description the principles of the invention have been set forth in connection with but a single illustrated embodiment showing a combination key slot and retainer for blind bolt connections. It is not applicant's intention that the illustrated embodiment nor the terminology employed in describing it be limiting inasmuch as variations in these may be made without departing from the spirit of the invention. Rather, applicant desires to be restricted only by the scope of the appended claims.

I claim:

1. In a combination bolt and key slot retainer for blind bolt connections in sheet material having a key slot aperture therein, said key slot having an enlarged portion of greater width than length, the width being wider than the head of the bolt which is adapted to use said key slot, said length having a tapered aperture extending from the approximate center outwardly therefrom, the sides of said tapered aperture forming a key slot for a squared shank of said blind bolt, the mouth of said aperture being wider than said squared shank and tapering to a width less than that of said squared shank so that said squared shank is easily received and wedged into position by said tapered aperture, a tongue of sheet material behind said aperture and integral with and depending from one side of said sheet material, said tongue being substantially the

same shape as said aperture and the end of said tongue being behind said aperture by an amount greater than the thickness of the bolt to be positioned into the key slot aperture.

2. A combination bolt and key slot aperture and retainer for blind bolt connections comprising sheet material having a first enlarged aperture therein, said aperture being of greater width than length and having a smaller tapered aperture extending from the center of said length outwardly therefrom, the sides of said tapered aperture forming a key slot for the square shank of said bolt, the mouth of said aperture being wider than said square shank and tapering to a width less than that of said square shank so that said square shank is easily received and wedged into position by said tapered aperture, a tongue of sheet material extending downwardly with a portion of same in substantial parallel alignment with and integral with and depending from one side of said sheet material, said tongue positioned below said tapered aperture providing a retainer for said bolt, said tongue of metal providing a sloped aperture in said sheet material whereby said bolt may be inserted in said enlarged aperture with the head of the bolt underneath the sides of the tapered aperture so that the square shank of the bolt may contact the tapered sides of the latter aperture of said key-hole slot whereby improved retaining power is provided by said key-hole slot and retainer.

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