

[54] NUT LOCK

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[51] Int. Cl.F16b 41/00, E05b 73/00

[58] Field of Search.....70/232, 260, 166, 209, 211, 70/1.5, 422, 416; 248/203

[56] References Cited

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1,912,872 6/1933 Trautner.....70/232 X
2,800,601 7/1957 Martin et al.70/232 UX

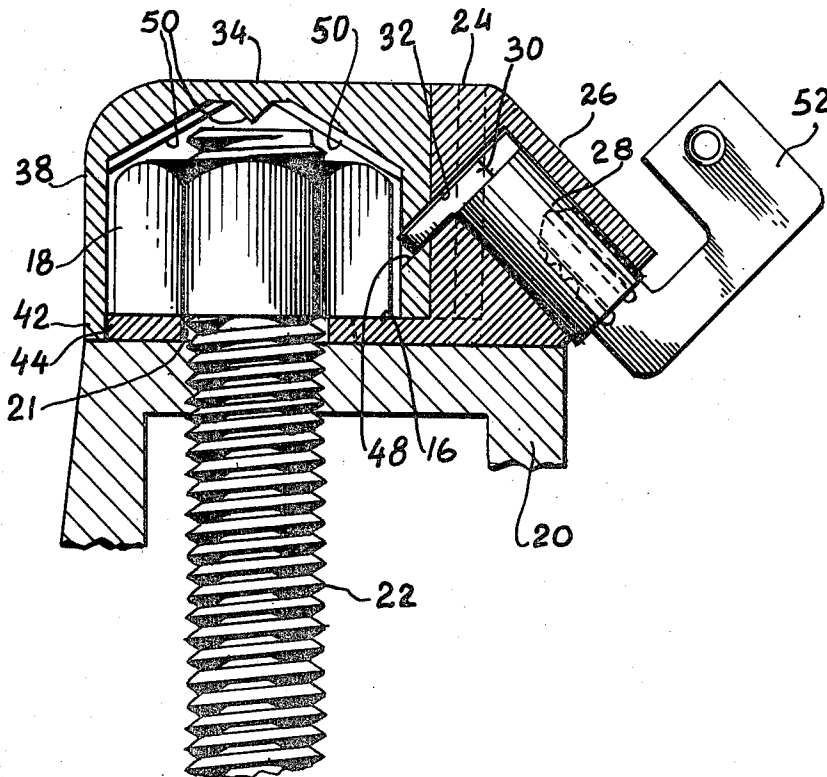
1,279,509 9/1918 Burks et al.....70/232 X

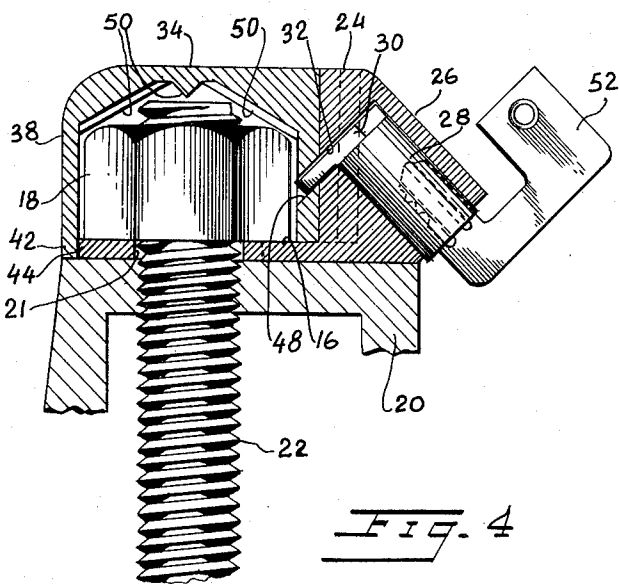
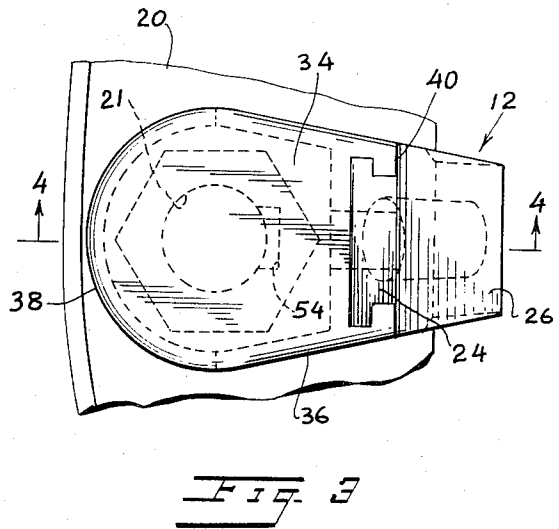
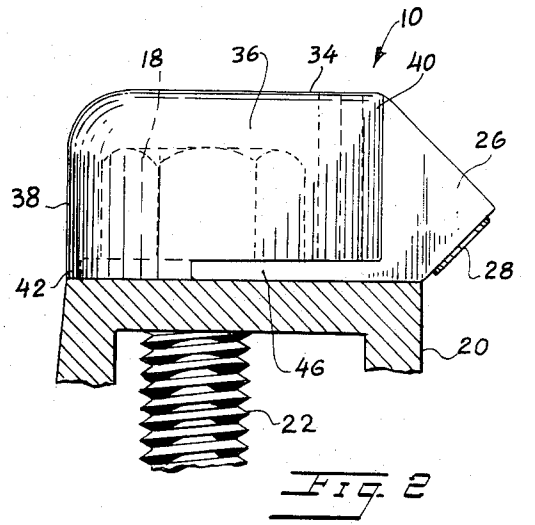
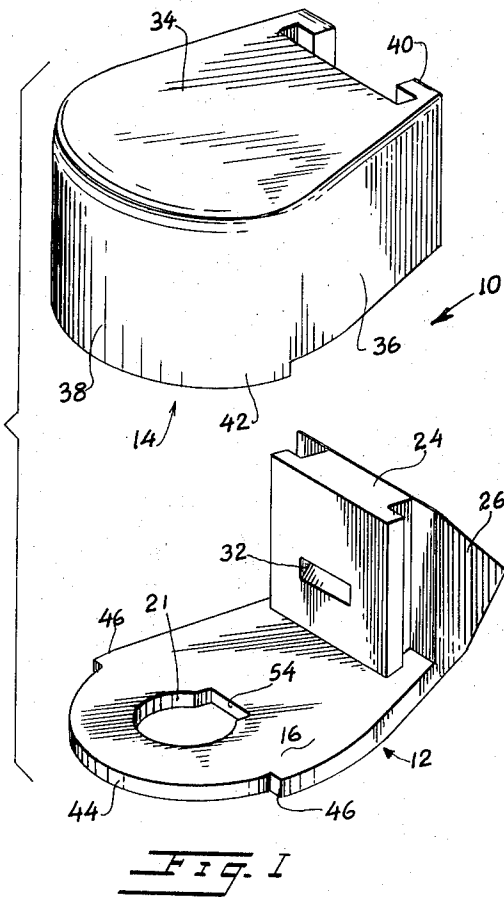
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[57] ABSTRACT

A locking device for locking a nut onto its bolt to resist unwanted removal of the nut, comprising a locking base and a securable cover for the locking base. The locking base is secured by the nut and the cover encloses the nut and is joined to the locking base by a tongue and groove joint. A locking bolt operated by a lock cylinder secures the cover to the base. V-shaped projections angled toward the nut on the inside of the cover cut and jam the nut onto the bolt under extraordinary force such as a hammer blow.

3 Claims, 9 Drawing Figures





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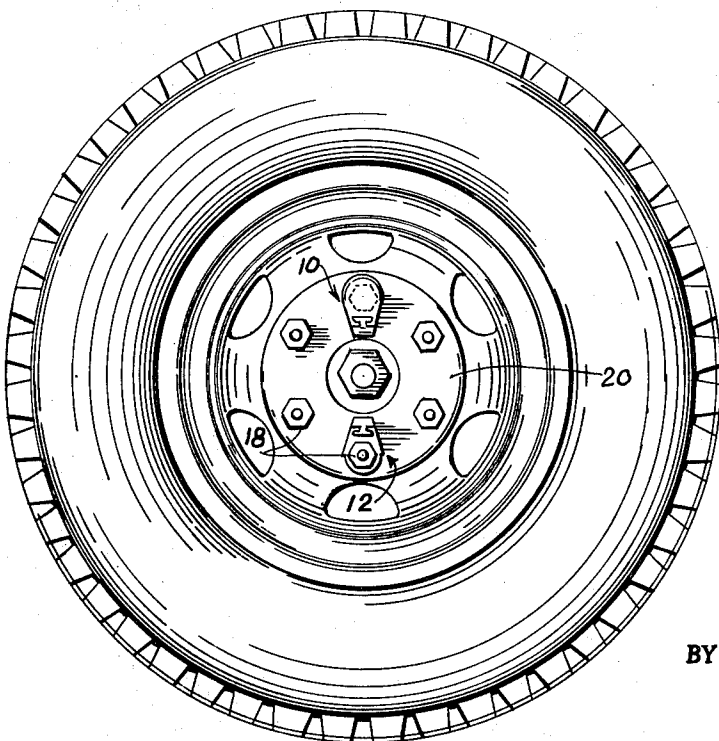
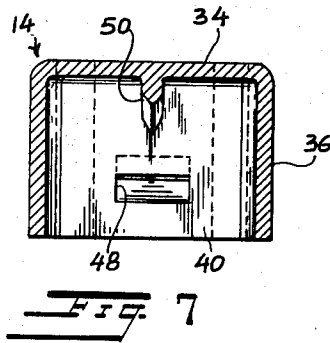
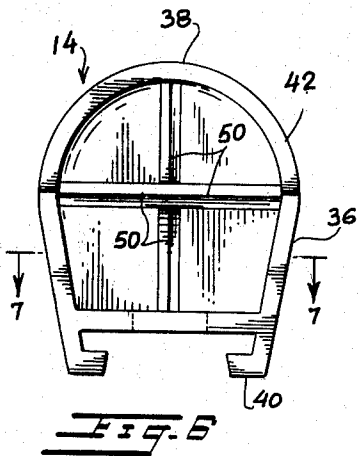
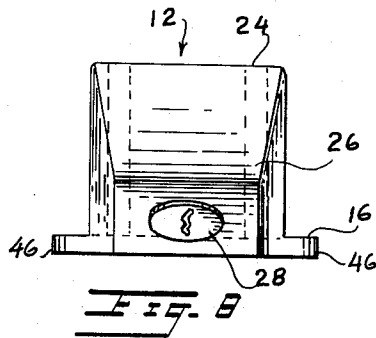
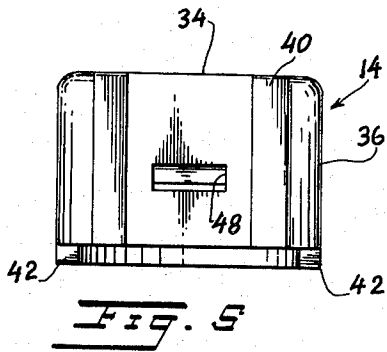


FIG. 9

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NUT LOCK

BACKGROUND OF THE INVENTION

Truck wheels are commonly secured to truck axles by means of a plurality of threaded studs mounted on the axle and nuts which thread onto the studs. Simple wrenches are sufficient to permit thieves to unlawfully remove the wheels including the valuable tires mounted thereon from the truck.

Efforts in the past have been made to provide systems to prevent unwanted removal of the nuts from wheel studs. The following U.S. Pats. indicate the extent of such efforts:

Number	Name	Date
2,043,872	Wise	June 9, 1936
2,315,245	Collier	March 30, 1943
2,323,058	Lambert-Carez	June 29, 1943
2,377,542	Crew	June 5, 1945
2,337,627	Schatzman	December 28, 1943
2,345,949	Robbins	April 4, 1944
2,350,633	Obenauer	June 6, 1944
2,469,973	Malluk	May 10, 1949

SUMMARY OF THE INVENTION

The present invention provides a novel lock to secure a nut on its stud. Briefly, and not by way of limitation, the present invention provides a locking base which has a bottom plate secured between the nut and the wheel and a tongue upstanding from the plate. Mounted on the side of the tongue opposite the nut is an angularly disposed lock cylinder having an extendable locking bolt. The bolt moves in a plane which is perpendicular to the axis of the cylinder and which extends downwardly toward the nut. An angular aperture through the tongue permits extension of the bolt therethrough.

A cover consisting of an enclosure and an upstanding groove adapted to slidably mate with the base tongue is provided to encapsulate the nut on its stud. The tongue and groove cooperate to permit movement of the cover only axially of the tongue and in the preferred case in which the tongue is substantially parallel to the stud, the cover may slide on and off the base only axially of the stud. All other movement of the cover relative to the base, nut and stud is prevented by the tongue and groove. An angled aperture within a wall of the cover groove cooperates with the aperture through the tongue to provide a continuous path for extension of the locking bolt. When extended, the locking bolt prevents removal of the cover from the base and securely prevents tampering with the nut.

Chisel-like projections on the inside of the cover are positioned closely adjacent the top of the nut and its stud. In the event of a forcible attempt to remove the nut, such as a hammer blow directed to break the cover, the projections cut, gouge, and jam the nut and stud sufficiently to prevent threaded removal of the nut.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an exploded perspective view of the nut lock of the present invention showing the cover in position to be joined to the base.

FIG. 2 is a side view of the nut lock of the present invention shown mounted on a portion of a wheel. The encapsulated nut is shown in phantom.

FIG. 3 is a top view of the nut lock of FIG. 2 showing the encapsulated nut and locking cylinder in phantom.

FIG. 4 is a partial cross-sectional view taken across line 4-4 of FIG. 3.

FIG. 5 is a front view of the cover of the present invention showing the aperture in the groove.

FIG. 6 is a bottom view of the cover of the present invention showing the groove and the cutting wedges within. The aperture at the groove is shown in phantom.

FIG. 7 is a cross-sectional view taken across line 7-7 of FIG. 6.

FIG. 8 is a front view of the base of the present invention showing the locking cylinder.

FIG. 9 is a plan view of a tire and wheel mounted on an axle showing preferred use of the nut lock of the present invention. For purposes of illustration, the cover has been removed from one piece. It should be noted that preferred practice would be to oppositely place a pair of nut locks on each wheel for purposes of balance and improved security.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to the drawing, the nut lock 10 of the present invention comprises a locking base 12 and a mating cover 14. Locking base 12 has a substantially flat mounting plate 16 which is adapted to be secured between a wheel nut 18 and a wheel 20 of a vehicle. For this purpose, plate 16 is provided with a hole 21 adapted to pass a wheel stud 22 to which nut 18 is threaded.

Upstanding from plate 16 on one side of stud hole 21 is a tongue 24 which in the preferred embodiment is in the form of a T in cross-section. The head of the T faces stud hole 21 and the base of the T, facing away from stud hole 21, is formed integrally with a lock housing 26. Tongue 24 and lock housing 26 are, in the preferred embodiment, formed in one unit together with plate 16. Within lock housing 26 is a lock cylinder 28 having a bolt 30. Cylinder 28 is angularly disposed with respect to the plane of plate 16 and is located at an upward angle in a direction toward stud hole 21. Bolt 30 operates in a plane which is substantially perpendicular to the axis of cylinder 28 and therefore extends and retracts angularly downwardly in a direction toward stud hole 21. An aperture 32 through tongue 24 is adapted to permit extension and retraction of bolt 30 and accordingly lies in the same plane as does bolt 30.

Cover 14, which is intended to fully enclose nut 18 when mounted on locking base 12, is provided with a top 34, a pair of downwardly extending sides 36 joined at one end by curved end wall 38 and a downwardly extending grooved end 40 which is adapted to slidably receive tongue 24. The bottom of cover 14, open to receive stud 22 and nut 18, closes against plate 16 when groove 40 and tongue 24 are mated. The dimensions of the tongue and groove combination is such that no lateral play is permitted in cover 14 relative to base 12. The only movement permitted is axial of the tongue and groove to slidably remove the cover from the base. To assist in preventing unwanted movement of the cover on the base and to improve the structural integrity of the cover-base combination, curved end wall 38 is extended downwardly relative to side walls 36 to form a curved flange 42 which secures around a correspondingly curved edge 44 of plate 16 opposite tongue 24.

Grooved end 40 is provided with an aperture 48 which is so located and angled as to form, when the cover is seated on the base, a continuation and extension of tongue aperture 32. Tongue aperture 32 and groove aperture 48 accordingly form an elongated bolt hole to receive bolt 30 which, when in locked position, extends from the tongue to the grooved end of cover 14. The angular orientation of the bolt, as above described, prevents cover 40 from sliding upwardly of base 12 and prevents disassembly of the cover-base combination.

It is now clear that the present invention provides a cover and base combination having a tongue and groove joint together with a locking cylinder which prevents unwanted removal of the cover.

To prevent extreme force from being used to remove nut lock 10 so as to expose nut 18, permit its removal from stud 22 and allow theft of wheel 20 together with its tire, cover 14 is provided with internal chisels 50 which are elongated wedge-shaped members formed on the inside of top 34 extending from side to side and from groove end 40 to curved end 38. Chisels 50 are angled downwardly toward the sides and ends of cover 14 and form a sharp-edged lattice above nut 18 and stud 22. A hammer blow sufficient to deform or break cover 14 will drive chisels 50 into the nut and stud to permanently deform the threads and lock the nut in place. In addition to deformation, chisels 50 will bridge from nut to stud and act as wedges to prevent rotation of the nut on the stud.

While the foregoing is illustrative of a preferred embodiment of the invention, it is clear that other embodiments and modifications may be had within the teachings hereof. For example, the interior of cover 14, formed by the insides of side walls 36, tongue end 40 and end wall 38, may be formed into a hexagon to closely follow the contour of nut 18. In this configuration, to prevent the entire lock from being used as a wrench to turn nut 18, flange 48 may be extended over each of wheels 20 to prevent rotation of the lock.

The angle described for lock cylinder 28 will direct the key hole inwardly toward wheel 20. To permit entry of a key, it may be necessary to provide a U-shaped key 52 as shown in FIG. 4. Such a shape will allow the key to clear the wheel.

The type of lock intended to be utilized by the present invention may be any of a number of commonly used cylinder locks such as those in which the bolt slides perpendicularly of the cylinder axis or rotates off-center about the cylinder axis to permit extension and retraction in a direction perpendicular to the axis. Alternatively, a lock cylinder having a bolt which extends and retracts along the axis of the cylinder may be used, in which case the lock cylinder will be angled downwardly in a direction toward the

stud 22 to permit the bolt to move as above described. The nature of the lock is secondary providing that it cooperates with the angled apertures of tongue and groove to prohibit removal of the cover from the base. However, a primary advantage of the inwardly facing key hole as mentioned above is the difficulty which it presents to insertion of a pick; additional security against unlawful removal is accordingly provided.

Tongue aperture 32 is a blind recess angled downwardly toward plate 16. For ease in making this aperture, stud hole 21 may be formed with a notch 54 to permit straight line entry of a boring bit through the stud hole to the correct angle and position on tongue 24 for boring the required aperture.

It is understood that the nut lock of the present invention must be manufactured from suitably strong and corrosion-resistant material. For example, both base and cover members may be made of steel, adequately painted. Other materials, such as forged brass or bronze may be utilized. Chisels 50 should be adequately hardened if not otherwise sufficiently strong.

What is claimed is:

1. A nut lock for securing a nut onto its bolt, comprising:
 - a. a base, said base being provided with a plate for securement by the nut onto the bolt, and a tongue upstanding from said plate;
 - b. a cover, said cover having a groove defined by an end wall thereof adapted to slidably mate with said tongue, said cover being provided with internal chisels; and
 - c. locking means to lock said cover to said base, comprising:
 - i. a tongue aperture defined in said tongue, said tongue aperture being disposed at an angle with respect to the plane of said plate;
 - ii. a groove aperture defined in said end wall containing said groove, said groove aperture being disposed at an angle corresponding to that of said tongue aperture and forming a linear extension thereof; and
 - iii. a lock having an extendible bolt, said bolt being extendible and retractable in said tongue aperture and said groove aperture to lock said cover to said base.
2. A nut lock for securing a nut onto its bolt in accordance with claim 1, wherein:

said chisels comprise a lattice of extended wedge shaped members.
3. A nut lock for securing a nut onto its bolt in accordance with claim 1, wherein:

said chisels are angularly disposed with respect to the plane of said plate, when said cover is mounted on said base.

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