Oct. 14, 1930. N. MONNIER 1,778,368

NUT LOCK DEVICE

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Fig.1

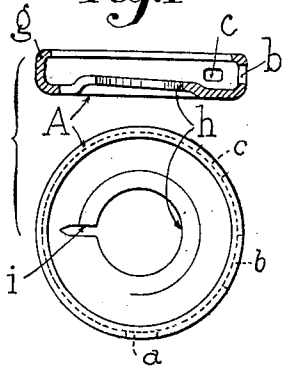


Fig.3

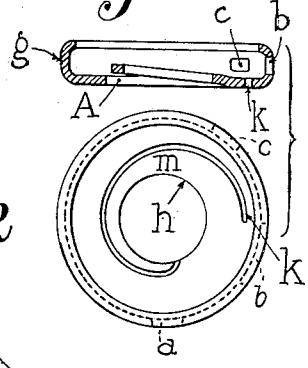


Fig.2

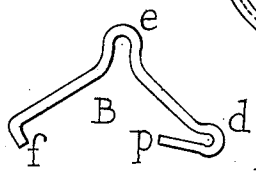


Fig.4

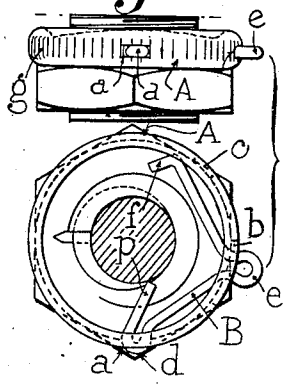


Fig.5

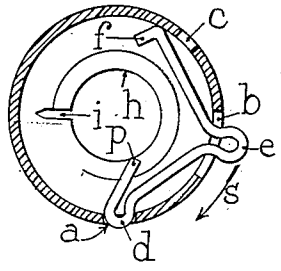


Fig.7

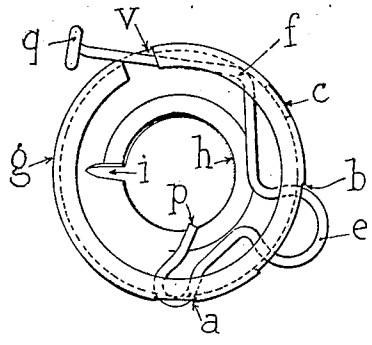
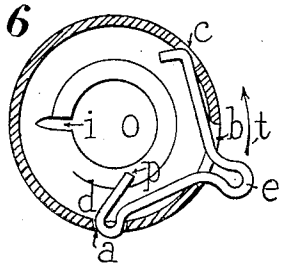


Fig.6



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Fig. 8

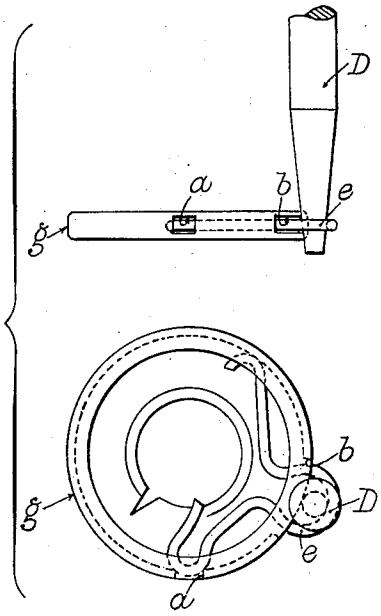


Fig. 9

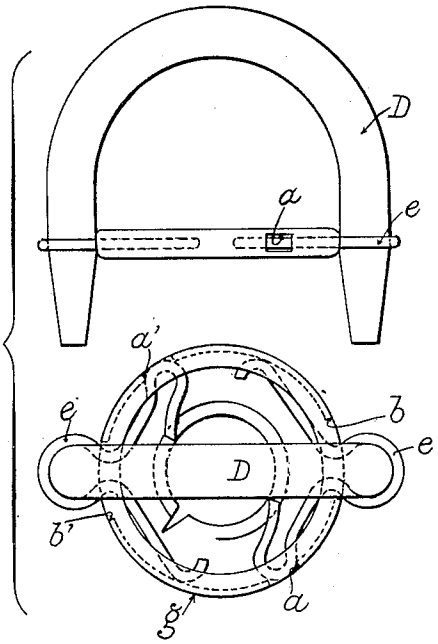
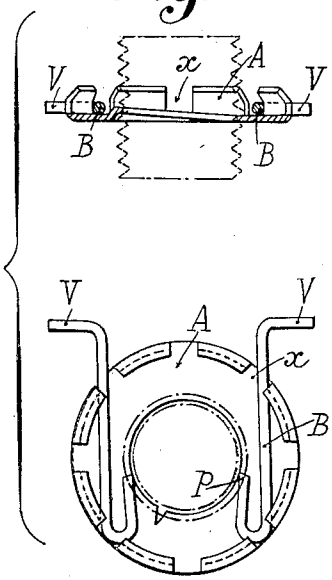


Fig. 12



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Fig.10

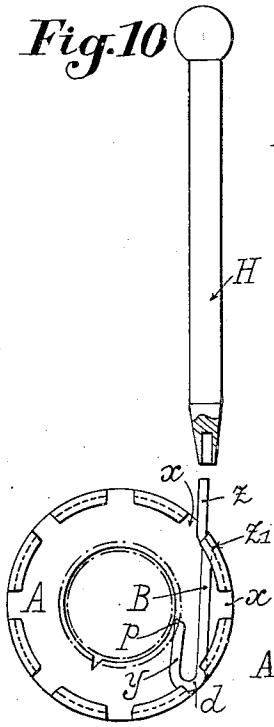


Fig.10a

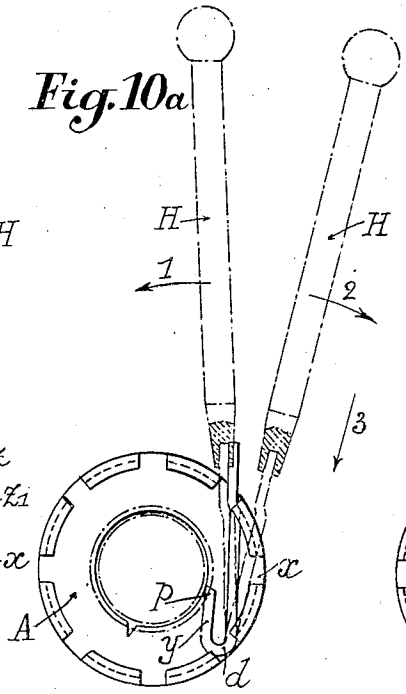


Fig.10b

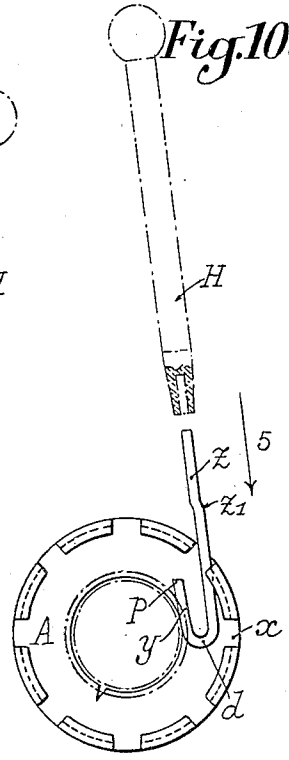


Fig.13

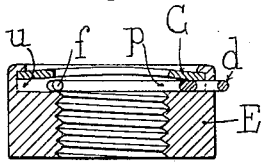


Fig.11

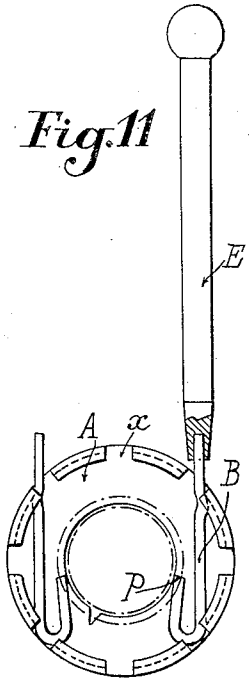
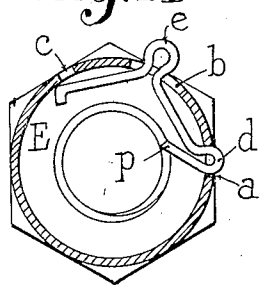


Fig.14



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Patented Oct. 14, 1930

1,778,368

UNITED STATES PATENT OFFICE

NICOLAS MONNIER, OF VALENCE, FRANCE

NUT-LOCK DEVICE

Application filed October 28, 1927, Serial No. 229,508, and in France May 25, 1927.

The present invention relates to a nut lock or braking device which may be employed with all types of nuts without requiring any treatment of the bolt or nut. The said device consists of two parts, firstly a disc which is formed by the pressing process into a hollow device comprising a central aperture whose edge is given a helical form having the same pitch as the nut, the periphery of said device being pierced with apertures cooperating with the spring piece which the said device contains, and secondly a steel wire spring piece whose shape is such that one end will be jammed against the bolt and that it will be provided with the several parts which are necessary to separate it. In a modified construction, the nut itself is cut out, by milling, in the same shape as the interior of the said hollow device, whereby the said device may be eliminated and the spring may be disposed in the hollow part thus formed.

The said nut lock or braking device is of a most effective character. It securely holds the nut, and the latter, when in any position on the bolt, is held against unscrewing in an approved maner. The device can be inserted and removed by hand and without the use of tools, and it has a small size with reference to the nut. Its cost is much less than that of the self-locking nuts in current use, especially since all trimming of the nut or the bolt is dispensed with, such as drilling, slotting, milling and the like.

Further characteristics and advantages of the invention will be specified in the following description with reference to the appended drawings which are given solely by way of example.

Fig. 1 is a cross section on a diameter and a plan view of a hollow member for the braking device in which a screw thread shape is given to the edge of the central aperture by the pressing process.

Fig. 2 shows the braking spring.

Fig. 3, which corresponds to Fig. 1, shows a modified form of the hollow device in which the edge portion of the central aperture is slotted and is raised in helical shape for the obtainment of the screwthread.

Fig. 4 is an elevational and plan view showing the two parts assembled.

Fig. 5 is a plan view showing the braking element in the jammed position, and

Fig. 6 is a like view with said element released.

Fig. 7 shows a modified form of braking device in which the end of the spring opposite the jamming point is lengthened and formed into a loop extending outside the hollow member, whereby the spring may be controlled.

Fig. 8 is an elevational and plan view of a braking device in which the third aperture of the hollow member is eliminated.

Fig. 9 shows a device similar to Fig. 3 but containing two symmetrical springs.

Fig. 10 is a plan view showing a modification comprising a hook shaped spring.

Figs. 10^a and 10^b relate to the functioning of the modification shown in Fig. 10, and

Fig. 11 shows a like device provided with two springs.

Fig. 12 shows a like device, in elevational and plan views, in which the spring comprises a bent operating branch.

Figs. 13 and 14 relate to a modification in which the braking device forms part of the nut itself.

As herein represented, the said braking device or nut lock consists essentially of two parts.

1.—A hollow device A whose outer periphery g is preferably milled to facilitate hand screwing, and which has formed therein in the apertures, a, b, c of unequal size. The edge h of the central aperture of the said member is given the form of a helix having the same pitch as the nut with which the device is to be used; this form can be given to the edge h by the pressing process, after making a slight radial slot l whereby the said form may be produced, or by making a spiral slot k in the bottom part of the device and raising the metal part m thus cut so as to produce a helical shape, or by like means. In all cases the edge h which is thus shaped is given the outline of a helix having the same pitch as the corresponding nut. Fig. 1 indi-

cates the first method and Fig. 3 the second method of constructing the device.

2.—A pressure spring B of piano wire which has the form shown in Fig. 2, or the like, and chiefly comprises an end part or point *p* which is adapted to be be jammed upon the thread of the nut, a bent portion *d* which may be pivoted in the aperture *a* of the device, a loop *e* whose motion in the slot *b* limits the motion of the spring, and a bent part *f* which is situated near the end opposite to the part *p* and is adapted to fit into the aperture *c*.

The operation of the said device is as follows:

In Fig. 6, the spring B is shown in the open position, i. e. the spring or braking element B will not act upon the thread of the bolt, and the bent part *d* of said spring is engaged in the aperture *a* of the device A; the guiding loop is placed in the aperture *b* and bears against the nearest end of the aperture *a;* the end part *f* of the spring is placed in the aperture *c* and the point *p* is separated from the thread of the bolt. In this position, the nut can turn freely on the bolt and can be screwed or unscrewed at will.

By drawing upon the outer loop *e* of the spring, it can be turned in the device in the direction of the arrow *t*, about the aperture *a;* the end part *f* will thus leave the aperture *c;* the loop *e* then makes contact with the other edge of the aperture *b;* the end *p* will bear upon the thread of the bolt and will be jammed therein when an attempt is made to unscrew the nut. The end part *p* which forms a point is given a length such that when it makes contact with the thread of the bolt, it will make a very small angle with the line *a o* connecting the aperture *a* with the centre *o* of the bolt, so that the end part will have the proper jamming effect to prevent all unscrewing of the device A. This jammed position of the braking element is shown in Fig. 5.

To unscrew the nut, the spring B is turned in the contrary direction, i. e. according to the arrow *s*, so as to bring the end part *f* into the aperture *c*, thus separating the point *p* from the thread of the bolt.

In an improved construction which is shown in Fig. 7, the spring B may be lengthened at the other end from the point *p*, so as to traverse the device A through a suitable aperture *v;* this end can be provided with a loop *q*, a knob or the like, by which the spring can be drawn upon in order to jam the point *p* into the thread of the bolt, or on the contrary to drive it in such manner as to remove the said point and to allow the nut to be unscrewed.

The braking device can be employed with equal facility by the use of the construction shown in Fig. 8; this differs from Fig. 6 only by the elimination of the aperture *c* of the device A. In this manner, the spring B will always be urged into engagement with the thread of the bolt or screw. To unscrew the nut, a tapered spindle D is inserted into the loop *e*.

A like construction is shown in Fig. 9, but herein the device comprises two symmetrical springs or braking elements, and the releasing spindle has the form of a horseshoe whose ends are inserted at the same time into the respective loops *e* of the said springs.

Fig. 10 shows a simplified form which is chiefly suitable for heavy bolts such as the bolts for railway fish-plates. Herein the periphery of the device A is cut out so as to form the multiple apertures *x*. The piano wire spring B has the form of a simple hooked piece with two unequal branches *y*—*z*, a small boss or shoulder z^1 being provided on the branch *z*.

The operation is as follows. With the braking device mounted in place, as shown in Fig. 10, the branches *y* and *z* will tend to move apart; the point *p* is jammed into the thread of the bolt; the boss z^1 of the branch *z* will bear upon the groove of the device and against the edge of one of the apertures *x* whilst the branch *d* bears against the edge if another aperture *x*. To remove the braking device, I dispose (Fig. 10^a) the pierced end of the spindle H upon the end of the branch *z* and operate the device by three movements: (1) the branch *z* is bent in the direction of the arrow 1 so as to disengage the boss z^1 from the edge of the aperture; (2) due to its elasticity the branch *z* will move in the other direction according to the arrow 2 and is thus removed by its own action from the groove of the device; (3) I push upon the hook according to the arrow 3, and said hook will be at once released from the screw thread.

To place the device in position (Fig. 10^b) I first screw the device A upon the bolt until it makes contact with the nut, and then operate by hand to dispose the hook as represented, with the large branch *z* extending from one of the said apertures, the small branch *y* being engaged in the thread of the bolt; I then use the spindle H to drive the branch *z* in the direction of the arrow 5 so as to bring the loop *d* into one of the apertures, and some force must be used, since the two branches of the hook are to be brought together in this movement.

As shown in Fig. 11, the device may comprise two braking springs in the symmetrical position, and in this manner the device A cannot be screwed or unscrewed.

Fig. 12 shows a like construction having one or two braking springs, but herein the branches *z* are bent at right angles at V to allow hand operations of the device by means of its bent ends, without requiring the use of the spindle H.

Figs. 13 and 14 show another construction, in which the braking device forms part of the nut itself, so that no separate hollow device A need be employed, the nut E itself serving the same purpose. At the upper part of the nut is formed—by milling—the recess *u* which has the same form as the device A, and in like manner comprises the apertures *a*—*b*—*c* for operating the spring B. The nut is preferably closed by means of a washer C. The functioning of this arrangement is the same as that of a two-part braking device, as above specified.

Obviously, the invention is not limited to the details of construction herein specified and represented, which are given solely by way of example. The several parts composing the braking device may be varied in any suitable manner as to shape, size and disposition. The periphery of the hollow device may be round or polygonal (for instance hexagonal). I may provide a covering disc for the device A, it being apertured for the insertion of the bolt.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination of a threaded rod, a nut on said rod, a spring wire disposed in a plane perpendicular to said rod and having a substantially V-shaped portion formed with a loop at the vertex, an inner portion connected by an elbow to said V-shaped portion and forming an acute angle with the adjacent branch of said V-shaped portion, a hollow supporting member for said spring, adapted to bear on said nut and having a recess for said elbow, the free end of said V-shaped portion bearing on said supporting member, said loop extending through an elongated opening of said supporting member whereby the spring wire may be turned from an operative position wherein said inner portion is resiliently pressed against said rod, into an idle position wherein said inner portion is out of jamming contact with said rod.

2. The combination of a threaded rod, a hollow member adapted to be screwed thereon, a spring wire arranged within said hollow and provided with a hook shaped bent, the apex of which rotatably engages an opening in the wall bounding said hollow, while one branch engages the threaded rod in such a manner as to be jammed against the latter for a determined direction of rotation and the other branch resiliently engages said wall for pressing said jamming end against the threads.

3. The combination of a threaded rod, a member adapted to be screwed thereon, a recess in said member adjacent said rod, a spring wire arranged in said recess and having a hook-shaped portion whose apex pivotally engages an aperture in the wall limiting said recess, the end of one branch of said hook engaging the threaded rod so as to be jammed against the latter for a determined direction of rotation, the other branch having a V-shaped portion whose apex extends outwardly through an opening in the wall limiting the recess, thus providing a grip for pivoting at will the spring, the end of said branch being bent and slidably engaging said wall in such a manner that the V-shaped portion is resiliently deformed, the point of contact being such disposed with relation to the apex of the hook that the reaction of the wall opposite the elastic force due to said deformation will give a component urging the whole spring to turn within the recess, whereby the jamming end is pressed against the threads.

4. The combination of a screwthreaded rod, a screw-threaded member engaging said rod and having an inner recess adjacent said rod, a spring wire in said recess having a substantially U-shaped portion with the elbow facing outwardly and engaging an aperture of said screwthreaded member, the inner branch of said U-shaped portion engaging said rod to be jammed against the latter for a determined direction of rotation, the outer portion of said wire resiliently engaging said screwthreaded member and being formed with a bent resiliently engaging the inner face of said recess, said inner face having a further opening wherein said bent is adapted to snap when said wire is turned by hand about said elbow, thus locking said wire in an inoperative position out of contact with said rod.

5. The combination of a screwthreaded rod, a screwthreaded member engaging said rod and having an inner recess adjacent said rod, a spring wire in said recess having a substantially U-shaped portion with the elbow facing outwardly and engaging an aperture of said screwthreaded member, the inner branch of said U-shaped portion engaging said rod to be jammed against the latter for a determined direction of rotation, the outer portion of said wire resiliently engaging said screwthreaded member and being formed with a projection extending through an aperture of said screw-threaded member and with a bent resiliently engaging the inner face of said recess, said inner face having a further opening wherein said bent is adapted to snap when said projection is actuated by hand to cause the elbow to turn in its bearing aperture, thus locking said wire in an inoperative position out of contact with said rod.

6. The combination of a threaded rod, a nut on said rod, a spring disposed in a plane perpendicular to said rod and having an elbow, an outer portion and an inner portion whose end is adapted to engage said rod and to be jammed against said rod for a determined direction of rotation of said wire with

respect to said rod, a hollow supporting member for said wire adapted to bear on said nut, a recess in said supporting means and in which said elbow is adapted to rest, said outer wire portion bearing on said hollow member, and a portion of said wire extending outwardly of said supporting member whereby it may be actuated to move said wire end out of jamming engagement with said rod.

7. The combination of a threaded rod, a hollow screw-threaded member engaging said rod, a spring disposed within said hollow member in a plane perpendicular to said rod and having an elbow, an outer portion and an inner portion whose end is adapted to engage said rod and to be jammed against said rod for a determined direction of rotation of said wire with respect to said rod, a recess in the side wall of said hollow member and in which said elbow is adapted to rest, said outer wire portion bearing on said hollow member, and a portion of said wire extending outwardly of said hollow member, whereby it may be actuated to move said wire end out of jamming engagement with said rod.

In testimony whereof I have signed my name to this specification.

NICOLAS MONNIER.