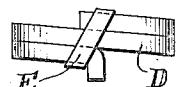
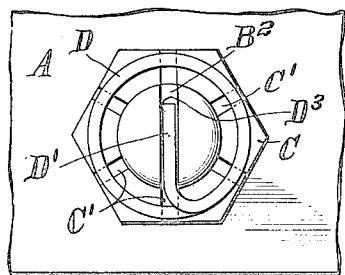
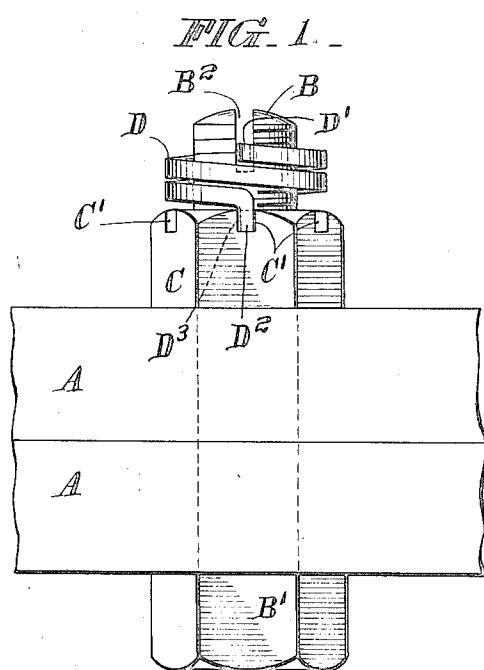


C. M. MENDENHALL.  
NUT AND BOLT LOCK.  
APPLICATION FILED OCT. 20, 1916

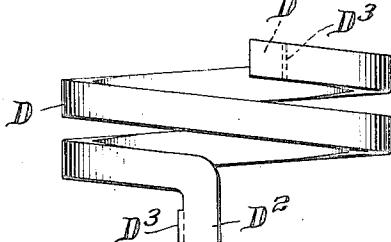
1,301,958.

Patented Apr. 29, 1919.

2 SHEETS—SHEET 1.



*FIG. 5.*



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2 SHEETS—SHEET 2.

FIG. 6.

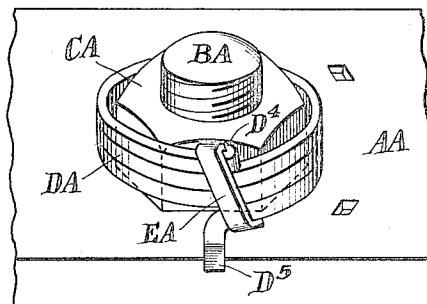


FIG. 8.

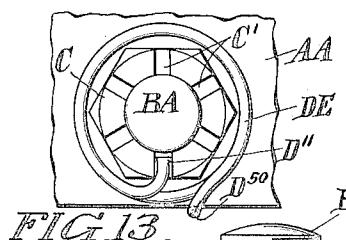
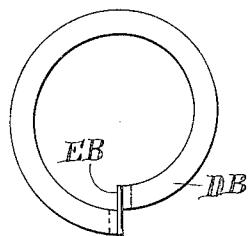


FIG. 12.

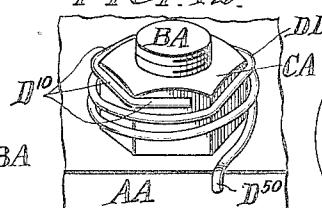


FIG. 9.

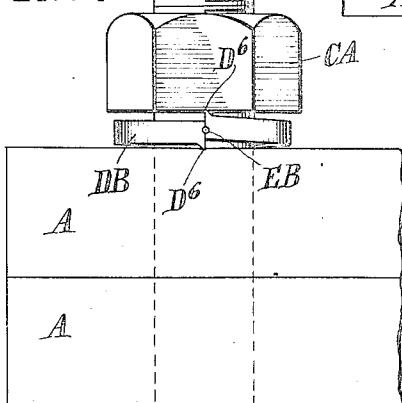
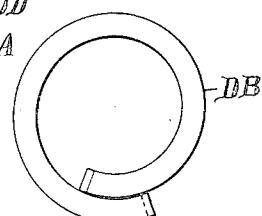
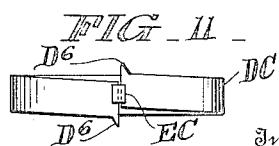
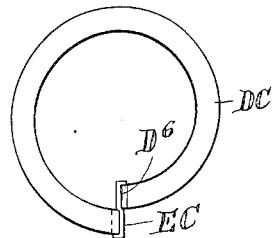


FIG. 7.

FIG. 10.



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# UNITED STATES PATENT OFFICE.

CLARENCE M. MENDENHALL, OF NEW ROCHELLE, NEW YORK.

## NUT AND BOLT LOCK.

Specification of Letters Patent. Patented Apr. 29, 1919.

1,301,958.

Application filed October 20, 1916. Serial No. 126,654.

To all whom it may concern:

Be it known that I, CLARENCE M. MENDENHALL, a citizen of the United States of America, residing in New Rochelle, in the county of Westchester, in the State of New York, have invented a certain new and useful Improvement in Nut and Bolt Locks, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

The general object of my present invention is to provide improved means for preventing parts threaded together, as a nut and bolt, from unscrewing and thus working loose when subjected to vibration or other forces tending to unscrew them when they should stay tight. More specifically, the object of my invention is to provide simple and effective means which may be quickly and easily applied to various ordinary forms of threaded connections and which will not only effectively check any tendency of the parts to unscrew, but will also tend to screw the parts together in case vibration, shrinking or wear of the parts makes the screwing up necessary to keep the threaded connection tight.

In carrying out my invention, I employ a spring which acts directly between the nut and bolt or other parts threaded together, or between one of these parts and some third part and is applied to these parts under tension and in such manner that it resists any tendency of the parts to unscrew and tends to screw them tight. To facilitate the application of the spring under tension, I first put the spring under tension and then apply to the spring a removable clip or other reusable bond which holds the spring under tension preparatory to and during its application to the parts to be locked together. After the spring is put in place, the clip is removed or the bond otherwise released. The locking spring and the clip or other bond holding it under tension form a unit which may readily be transported or kept in stock and which may form an article of commerce.

The various features of novelty which characterize my invention are pointed out in the annexed claims forming a part of this specification. For a better understanding of the invention, however, and of its advantages and the specific objects obtained, refer-

ence should be had to the accompanying drawings and descriptive matter, in which I have illustrated and described preferred embodiments of the invention.

### Of the drawings:

Figure 1 is an elevation of a structure in which one form of my invention is employed;

Fig. 2 is a plan view of the apparatus shown in Fig. 1;

Fig. 3 is an elevation of the spring employed in Figs. 1 and 2, and clip applied thereto to hold the spring under tension;

Fig. 4 is a perspective view of the clip shown in Fig. 3;

Fig. 5 is an elevation of the spring shown in Fig. 3 in its expanded condition;

Fig. 6 is a perspective view illustrating a modified form of my invention;

Fig. 7 is an elevation illustrating a third form of my invention;

Fig. 8 is a plan view of the spring employed in Fig. 7 and the means for holding the spring under tension;

Fig. 9 is a plan view of the spring shown in Fig. 8 when in its tension-released or free condition;

Fig. 10 is a plan view of a slightly modified form of lock spring and clip for holding it under tension; and

Fig. 11 is an elevation of the spring and clip shown in Fig. 10.

Fig. 12 is a perspective view illustrating a modification of the construction shown in Fig. 6; and

Fig. 13 is a plan view of a further modification of the construction shown in Fig. 6.

In the drawings and referring first to the construction shown in Figs. 1 to 5 inclusive, AA represents two structural plate or bar like parts secured together by a bolt B having a head B' at one end, and having its opposite end threaded to receive a nut C. The latter is shown, as of the ordinary castellated type—that is, it is formed with a plurality of radial slots in its outer or exposed end. The bolt B is formed with a diametral slot B<sup>2</sup> in its threaded end. In the form shown in Figs. 1 to 4 inclusive, the nut and bolt are prevented from unscrewing by a helical spring D having one end D' in-turned and received in the bolt slot B<sup>2</sup>, and having its opposite end offset and received in a correspondingly located slot C' in the nut C. The spring D is put in place, under ten-

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sion, and not only resists any tendency of the nut C and bolt D to unscrew, but effects a relative rotation of the nut and screw which will tighten up the structure as a whole if the parts tend to loosen under vibration or wear. Preparatory to its application, to the nut and bolt or other parts to be coupled, the lock spring D is put under tension, then has applied to it a bridle or clip E which holds the lock spring under tension. The lock spring may be put under tension and have its tension-holding clip applied thereto by means of suitable mechanism or tools not necessary to describe herein. Each spring and its tension-holding clip, when assembled as shown in Fig. 3, form a unit which may form an article of commerce and may be shipped and stored indefinitely in condition for use.

20 After the spring D with its retaining clip E is put in place, the clip may be readily removed, as by a hammer blow or by prying it off with a screw-driver or chisel, and when removed, the force of the spring is directly applied to the nut and bolt by the ends of the spring in contact therewith. Advantageously, the spring ends D' and D<sup>2</sup> may be formed with sharpened edges D<sup>3</sup> adapted to bite into the adjacent surfaces of the bolt and nut. As shown in Fig. 4, the clip E is formed of a metal strip having ends bent to engage the edges of the spring D. Advantageously, one end of the clip E is formed with a shoulder E' adapted to engage the inner surface of the spring adjacent to the end portion D' thereof. In case it is desirable to remove the nut at any time, this may be easily accomplished by prying the spring out of place with a chisel or the like, or by forcing it out with a hammer. When thereafter the parts are re-assembled, a new lock spring and tension-holding clip unit may be applied as before, or the previously used lock spring may again be used by first putting it under tension and applying a tension-holding clip thereto.

25 In the construction shown in Fig. 6, CA represents a nut threaded on a bolt BA passing through a plate AA against which one end of the nut CA bears. A nut lock spring DA acts between the nut and the plate and exerts a force on the nut tending to tighten it up on the bolt BA. The spring DA is formed with a sharpened edge D<sup>4</sup> adapted to bite into a flat side of the nut CA and is formed as its other end with a portion D<sup>5</sup> adapted to bear against the edge of the plate AA. The tension-holding clip EA, in this form of my invention, may be analogous in character to the clip E already described. In applying the spring DA in Fig. 6, the sharp edge D<sup>4</sup> of the spring may advantageously be forced to bite into the nut by a hammer blow, before the clip EA is re-

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In the modified construction illustrated in Figs. 7, 8 and 9, the lock spring DB acts between the nut CA and the adjacent plate A, but in this case, the nut lock spring DB is interposed between the end of the nut CA and the adjacent face of the plate A. The spring DB is a spiral spring as distinguished from a helical spring, and is put under tension by expanding it into the form shown in Figs. 7 and 8. When free, the spring contracts to the form shown in Fig. 9. In its expanded condition, the spring forms one complete spiral turn, and its two ends are formed with oppositely directed edges D<sup>6</sup> adapted to bite into the adjacent faces of the nut CA and adjacent plate A. Associated with each spring DB, when the latter is in condition for application, is a tension-holding device EB which is shown as consisting of a piece of easily sheared wire EB which is received in grooves formed in the end surfaces of the spring. The nut construction shown in Figs. 7, 8 and 9, is of especial utility where conditions permit the bolt BA to be rotated, as by means of a wrench applied to its head B', in tightening up the nut. When so used, the bolt may be tightened up until the axial compression of the spring DB causes the wire section EB to be sheared off, thus freeing the spring from the restraining effect of the bond previously formed by the piece of wire EB, permitting the spring to exert its tightening effect between the nut CA and the adjacent plate A. The tightening up of the bolt and nut in this manner will cause the shoulders D<sup>6</sup> to bite into the nut and plate before the shearing of the wire EB is completed sufficiently to prevent relative movement between each sharpened spring edge or shoulder D<sup>5</sup>, and the adjacent part into which it bites.

The lock spring DC shown in Figs. 10 and 11 is a spiral spring, generally like the lock spring DB of Figs. 7, 8 and 9, but is used with a different form of tension-holding clip EC. The clip EC is in the form of a metal strip or bar which engages the two end surfaces of the ring and is shown as formed with shoulders at its ends, one engaging the outer surface of the inner end of the ring and the other engaging the outer surface of the outer end of the ring. When the lock spring DC is used in place of the spring DB in the construction shown in Fig. 7, either the nut or the bolt may be turned to tighten the structure, and after the parts are sufficiently tightened, the clip may be released by a blow with a hammer or, if need be, it may readily be cut in two with a chisel. In the use of the forms of my invention shown in Figs. 6 to 11 inclusive, it may sometimes be desirable to cut notches with a cold chisel, or the like, in the nuts or plates to receive the biting edges of the lock spring.

The construction shown in Fig. 12 differs from that shown in Fig. 6 in that the upper portion of spring DD replacing the spring DA of Fig. 6 is bent into hexagonal form to fit snugly about the periphery of the nut CA to thereby secure the upper end of the spring D to the nut.

The construction shown in Fig. 13 differs from that shown in Fig. 6 only in that the upper end of the spring DE is connected to the castellated nut C as the spring and nut are connected in Figs. 1 and 2.

While in accordance with the provisions of the statutes, I have illustrated and described the best forms of my invention now known to me, it will be apparent to those skilled in the art that changes can be made in the form of my invention without departing from its spirit, and that some features

of my invention can be used without a corresponding use of other features.

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

A device adapted for application to a structure comprising parts threaded together, to keep said parts screwed tight, consisting of a coiled spring having provisions at its ends for engaging and thereby tending to relatively rotate parts of said structure 30 relatively rotatable about an axis parallel to the axis about which the spring is coiled, and in combination with said spring a bond for holding said spring under tension during its application to said structure and 35 readily releasable after such application.

CLARENCE M. MENDENHALL.