

(No Model.)

A. FOUGÈRE.
NUT LOCK.

No. 567,267.

Patented Sept. 8, 1896.

Fig. 1.



Fig. 2.

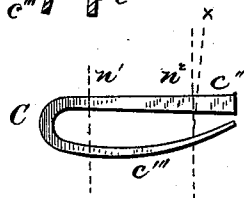
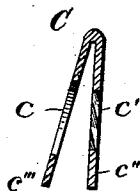


Fig. 3.

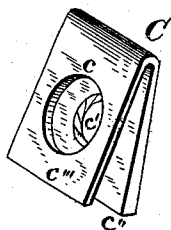


Fig. 7.

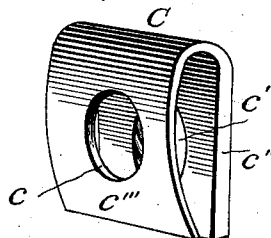


Fig. 6.

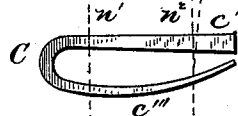


Fig. 4.

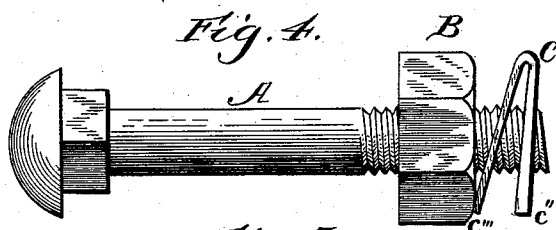
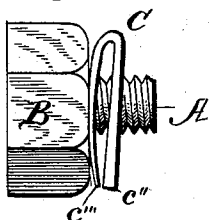


Fig. 5.



Witnesses:

J. B. McGirr.
Jos. F. Bourque

Inventor.
Angus Fougère.
By Joseph Harris,
Attorney.

UNITED STATES PATENT OFFICE.

ANGUS FOUGÈRE, OF MONCTON, CANADA, ASSIGNOR TO JOSEPH A. HARRIS,
OF SAME PLACE.

NUT-LOCK.

SPECIFICATION forming part of Letters Patent No. 567,267, dated September 8, 1896.

Application filed October 26, 1891. Serial No. 409,927. (No model.)

To all whom it may concern:

Be it known that I, ANGUS FOUGÈRE, a subject of the Queen of Great Britain, residing at Moncton, in the Province of New Brunswick, Canada, have invented a certain new and useful Improvement in Nut-Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present improvement in nut-locks relates more particularly to that class in which the retainer or lock is of the compound variety, that is, the retainer or lock has inner and outer arms. The outer arm has a threaded bolt-hole, the threads being generated on an axis inclined to the vertical axis of said hole, which construction causes the lock to exert a compound pressure upon the threads of the bolt and the face of the nut to which said retainer or lock is applied. This inclined thread, generated on an axis inclined to that of the bolt-hole in the outer arm of the spring-metal retainer, is an important improvement in my nut-lock, because it tends to give to the arms of the plate a deflection from their normal position, which greatly assists the tightening process and secures a more uniform and constant pressure on the nut and gives less rigidity on the bolt. The yielding quality of the plate serves to relieve the threads from overstrain resulting from improper tightening of the lock, and this is advantageous wherever machinery is subject to jars.

The accompanying drawings fully illustrate my appliance.

Figure 1 is the plate as it is first cut, showing the position and relative sizes of both openings. Fig. 2 is a sectional view of the plate after it has been bent into V shape. Fig. 3 is a perspective view of the device, showing both openings. Fig. 4 represents the locking plate or washer on a bolt and nut ready to be screwed home to lock the nut on the bolt. Fig. 5 shows the nut-lock when set in position. Fig. 6 shows the nut-lock in edge view, showing the normal position of said spring-metal washer or retainer before it is applied to the bolt and nut, its threaded arm in horizontal

position, the lines n' n^2 indicating the proper direction in which the inclined thread is cut, having reference to the heel or bend, the opposite ends or edges of the plate, and the size of the bolt used. Fig. 7 is a perspective view of the plate shown by Fig. 6.

Similar letters of reference denote similar parts in all the figures of the drawings.

A designates an ordinary bolt, and B is the nut, which is screwed on the bolt in the usual manner, so that the faces of the nut are at right angles to the horizontal axis of the bolt.

C is my improved compound spring-metal V-shaped plate or washer. It is stamped or cut in rectangular flat form, with two openings or holes cc' , the former hole c of larger diameter than the latter hole c' , as indicated in Fig. 1 of the drawings. The smaller hole c' is screw-threaded, as shown, the threads being generated on an axis inclined to that of the hole, and threads being at an angle of from two to five degrees from the square, in order to make the upper arm of the washer or plate assume a diagonal position when it is screwed on the bolt, as indicated in Figs. 4 and 5 of the drawings. After the plate has been cut or stamped and the smaller hole c' has been threaded in the manner described the plate is doubled or bent so as to assume the shape of a V in cross-section, and thus having the holes $c c'$ in line with each other, the plate or washer thus formed consisting of an inner arm or member c'' , having a plain bolt-hole c of larger diameter than the threaded opening c' in said outer arm or member c'' of the plate, or the thread may be cut after the plate is bent.

The spring-metal plate or washer is fitted on the bolt so that the inner arm c'' bears at one edge against the nut B while the thread in the opening c' engages with the thread of the bolt. The V-shaped plate or washer assumes the diagonal or inclined position to the axis of the bolt indicated in Figs. 4 and 5, and as it is screwed on the bolt and forced home against the nut the inner arm or member c'' is deflected or forced toward the outer arm, and thus the spring joint or hinge between said members is brought into play, whereby the plate or washer exerts an increased or

compound frictional contact with the nut and produces torsional spring resistance on the bolt.

The nut-lock is made preferably of spring-steel or such metal as will give the required strength and resiliency, and its general dimensions are such as to suit the size of the bolt and the work it is called upon to perform.

The threaded arm of the V-spring should be cut at an angle of from two to five degrees and always diagonally from the heel or bend of the V toward the extremities thereof downward.

In large nut-locks the incline or angle of the thread is less, the thread being longer, while in small ones the thread is shortened and the angle increased according to the diameter of the bolt. This angle or incline is important for it causes the proper oblique position of the nut-lock on the bolt which is required to prevent reverse movement of the nut, while it serves as a check for the inner arm, which forcibly bears or impinges against the face of the nut and permits the closing of the V-spring, as in Fig. 5, when the device is set in locking position.

It will be seen at once that the direction in which my inclined thread is cut forms a very important element, for in order that the V-shaped plate may assume its proper incline on the bolt it is necessary that it be cut diagonally from the heel or bend of the V toward the two extremities downward, and in cutting the thread in the V-shaped plate the heel or bent portion should be raised from a horizontal position to the desired angle before tapping.

With a spring-metal bent plate constructed as described I attain a solid permanent fastening, inasmuch as the nut cannot by any jar or vibration take a reverse movement and the two (the nut and V spring or washer) cannot be moved together; but the V-shaped spring-plate may always be removed or taken off by a quick movement without injury to the thread of the bolt and may be replaced at pleasure.

I may here remark that in heavy work, such as in rail-bolts on fish-plates, if the inner arm of the V-spring should be too rigid to close and give the desired spring, it may be made thinner than the upper or outer arm containing the inclined thread, and for this purpose the rectangular plate may be tapered, or it may be stamped or cut, so that the outer threaded arm may be thicker than the inner member c''' , which is the preferred method.

In constructing the nut-lock the plate should be turned over in bending so as to leave an opening at the heel, as shown in Figs. 2 and 3, and when applying the device an important feature is to be observed, as follows: In moving the nut-locks toward the nut to lock it the pressure should be gradually exerted, so as to cause the spring-plate or inner arm c''' to

bend easily until its outer edge touches or nearly touches the edges of the inclined threaded arm c'' , so that when set in proper locking position the inner arm c''' will be concaved or bent, as shown in Fig. 5, the outer edges or extremities of the arm coming almost in contact, while the bent portion or heel of the plate will be still open or only partially closed from its initial position and will stand off from the nut, leaving a space between the bend or heel and the face of the nut, which position is caused by the proper cutting of the inclined thread in the direction indicated herein.

In Fig. 6 of the drawings I have shown a modified form of my compound locking-plate, which represents the same normally U-shaped, with its inner thin arm curved so as to approach at its extremities the outer thick arm. This curvature to the inner arm is secured by making the V-shaped plate, (shown in Figs. 1 to 5 inclusive,) with the thin inner arm of the U-shaped plate in Fig. 6, the proper curvature in bending the same, so that the said U-shaped plate of Fig. 6 will normally remain in the position herein shown.

Experiments have demonstrated that if the inner arm of the plate assumes the curved or bent position, as shown in Figs. 5 and 6, it will greatly assist the tightening process and render the pressure more even on the nut and less rigid on the bolt, and the friction on the two threads, which have an inclination to cross, combined with the increasing tension or pressure of the inner arm of the nut-lock, will effectually prevent any reverse movement of the parts. This yielding quality is an important advantage secured by my improvement, inasmuch as it relieves the threads from any overstrain which might result from improperly tightening the nut-lock. Furthermore, a yielding lock is provided, which is of the utmost importance in all cases where the parts held together are subjected to jars, as in rail-bolts on fish-plates, trip-hammers, and the like.

I do not strictly confine myself to a plate or washer made with two arms or members at an acute angle to each other in V form, as I may make the plate or washer with a curve at the end where the arms or members are joined, and thereby give the plate nearly a U shape, as indicated in Fig. 6 of the drawings.

Having now fully described and explained the nature of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a nut-lock, such as herein described, the combination with a bolt and nut, of the spring-metal plate bent or doubled upon itself, and provided on its outer arm with a threaded bolt-hole, the threads of which are generated on an axis inclined to that of said bolt-hole, whereby the outer arm of said plate fits the bolt on a slight incline to the axis of

the same and the plate exerts a compound pressure upon the threads of the bolt and the face of the nut, substantially as described.

2. As an article of manufacture, a compound spring-plate doubled or bent upon itself to form the inner and outer arms, the inner arm having an enlarged bolt-opening, and the outer arm provided with a threaded bolt-hole, the threads of which are generated on an axis inclined to that of said opening, substantially as and for the purposes described.

3. As an article of manufacture, the compound spring-metal plate or washer having the inner and outer arms and its inner arm of less thickness than its outer arm, and provided with the enlarged bolt-hole in the inner member, and the threaded opening in the outer member, the threads of which are generated on an axis inclined to that of the opening, substantially as described.

4. The combination of the bolt and nut, of the spring-metal retainer independent of the nut, formed of a single piece of spring metal bent to produce two arms, and having in its outer arm or portion a threaded opening, the threads in which are generated on an axis inclined to that of said opening and which engage with the threads of the bolt in a manner to cause said outer arm of the plate to stand at an angle to the axis of the bolt, substantially as described.

5. The combination with a bolt and nut, of a spring-metal retainer or locking-plate having the inner and outer arms, the inner arm being deflected or curved and the free arm thereof being in close juxtaposition to the outer arm, substantially as shown and described, for the purpose set forth.

6. In a nut-lock, the combination with a bolt and nut, of a spring-metal retainer or plate having the inner and outer arms, the outer arm of the plate having in its bolt-hole the threads which are generated on an axis inclined to that of said hole, and engaging with the threads of the bolt, and the inner arm bowed or curved to bring its inner face

in contact with the nut and its free end in juxtaposition or contact with the free edge of the outer arm, substantially as described.

7. In a nut-lock, the combination with a bolt and nut, of a spring-metal retainer or plate having the inner and outer arms provided in their bolt-holes with threads generated on an axis inclined to that of said holes, and the inner arm bowed or curved as described, the end of the plate or retainer where the two arms thereof are joined being open or separated to permit the inner arm to have a limited play, for the purpose described, substantially as set forth.

8. In a nut-lock, the combination with a bolt and nut, of the spring-metal retainer or locking-plate having the inner and outer arms, the outer arm having its bolt-hole provided with threads which incline from the bend or jointed end of the plate toward the ends of the arms, said threads being generated on an axis inclined to that of the bolt-hole, whereby the inclined threads of the outer arm engage the bolt-threads to cause the retainer to lie at a proper incline on the bolt and produce a torsional spring resistance thereon and secure a yielding frictional contact between the inner arm and face of the nut, substantially as described.

9. As a new article of manufacture, the compound plate or washer herein described for locking nuts, made of a single piece of metal bent upon itself and forming the inner and outer arms, the inner arm being of less thickness than the outer arm and bowed or deflected, and the thicker outer arm having a bolt-hole provided with a thread or threads adapted to engage the threads of a bolt, the inner arm having an enlarged bolt-hole, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

ANGUS FOUGÈRE.

Witnesses:

A. MCNAUGHTON,
HARRY MOSS.