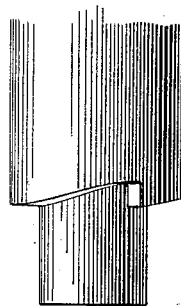
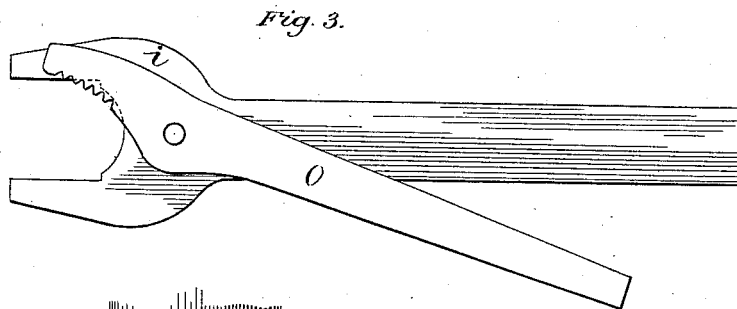
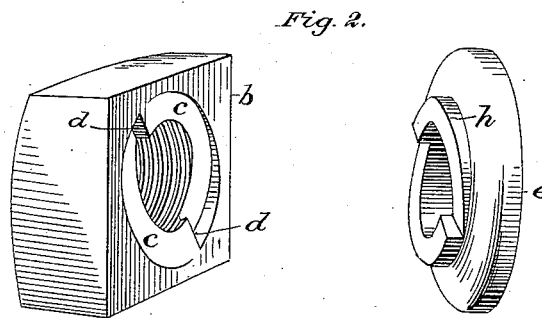
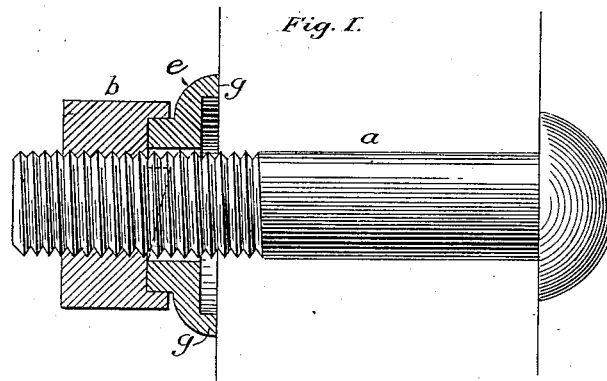


W. GRAY.  
Nut-Lock.

No. 221,299.

Patented Nov. 4, 1879.



Attest:  
Clarence Pool  
F. L. Middleton

Inventor:  
William Gray.  
By his atty Eli Spear

# UNITED STATES PATENT OFFICE.

WILLIAM GRAY, OF BEARDSTOWN, ILLINOIS.

## IMPROVEMENT IN NUT-LOCKS.

Specification forming part of Letters Patent No. **221,299**, dated November 4, 1879; application filed August 9, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM GRAY, of Beardstown, Cass county, Illinois, have invented an Improvement in Nut-Locks, of which the following is a specification.

My invention relates to nut-locks of that class in which the nuts are held in place against the loosening effect of jarring, such as occurs in the running of heavy machinery or on railways, by frictional contact, without any external appliance—such as pawls, catches, bent plates, wires, and the like.

The object of the invention is to produce at once a simple and efficient device, which shall be sufficiently cheap to make, and can be as readily applied as an ordinary nut, and is equally applicable to all situations.

In the drawings hereto attached and forming part of this specification, Figure 1 is a central section of the nut and washer, taken longitudinally through the perforation. Fig. 2 represents the nut and washer in perspective. Fig. 3 shows the wrench for removing the nut and washer, and Fig. 4 the form of die adapted to form the nut.

In these figures a bolt, *a*, is represented as of ordinary construction, such as are commonly used in the splicing of railway-rails. The nut *b* is also of ordinary construction, except that on the under surface and around the threaded hole are two inclined rabbets, *cc*, commencing on the lower surface of the nut and extended each half around the hole, and terminating in a vertical face, *d*. These two countersunk inclines are both alike, sloping uniformly in the same plane, and having both vertical faces of equal height.

The other part of the nut-locking device consists of the washer *e*. It is made circular in form, with a rim, *g*, the edge of which bears upon the surface of the fish-plate or other object through which the bolt passes. Although the washer is shown as hollow underneath, obviously the under surface may be a wholly plane surface, and may bear against the surface on which it rests throughout the entire extent of the washer. On the upper surface of this washer, around the perforation, is a neck, *h*, which is cut with inclined surfaces and vertical faces exactly corresponding in extent and shape to the inclined rabbets in the nut, but

in opposite directions, as the faces are brought together, so that this neck may fit snugly within the said rabbets, and permit the nut to come down upon, or nearly upon, the upper surface of the washer.

The diameter of the washer is greater than that of the nut, it being requisite that the bearing-surfaces of the washer against the fish-bar should be greater than the bearing-surfaces between the nut and washer, because as the distance of bearing-surface from the center of the bolt increases a correspondingly-increased amount of power is necessary to overcome it, and thus the nut cannot be started before the washer.

The operation of my nut-lock is apparent from the description. When the bolt is in place the washer is first slipped upon the bolt and the nut turned on in the usual manner. When the nut advances far enough to bring the vertical faces *d* into contact with the corresponding vertical faces on the washer the latter will be turned with the nut, and both advance together until the washer bears against the surface of the object through which the bolt passes. The washer is then held by the pressure of the nut against such surface, and requires the greater force to turn it in proportion as its bearing-surface is farther from the center of the nut than the bearing-surfaces between the nut and washer. When, therefore, the nut is thrown backward by any jar or pressure upon the nut itself, the inclined rabbeted surfaces move upon the corresponding inclined surfaces on the neck of the washer, and tend, by the movement itself, to hold the parts more securely—that is to say, the nut moving on the inclines holds the washer with greater pressure against its bearing-surface, and is itself held from turning on the washer by reason of the inclines. Thus it is impossible to remove the nut without first overcoming the frictional contact of the washer and fish-bar, and as the washer is circular, this cannot be done with an ordinary wrench. I therefore use the tool shown in Fig. 3, which has combined with an ordinary wrench, *i*, an auxiliary lever, *o*. When the wrench *i* is applied to the square nut the lever *o*, which has a serrated jaw, as shown, grasps the washer, and by friction loosens it to a sufficient extent.

The number of inclines shown by me is altogether best, though possibly one might operate in some situations; but the liability would be to bend the bolt.

Both nut and washer may be swaged out in the same manner as nuts are ordinarily swaged; or the washer may be made of malleable cast iron or steel.

In forming the nut I propose to use a die such as is shown in Fig. 4, by which the hole and inclined rabbets may be formed at one stroke.

I am aware that nuts have heretofore been shown divided on a plane inclined to the bolt-hole, so that one part could not turn on the other, but with nothing to prevent the whole nut from jarring loose, like ordinary entire nuts.

I am also aware that nut-locking devices have been shown having an inclined surface between the nut and washer, the washer being

of the same shape and size as the nut, and having a serrated under surface, as in the patent of J. Wetmore, No. 135,052, granted January 21, 1873.

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

The combination, with the nut *b*, having inclined rabbets *c c*, of the circular washer *e*, having corresponding inclines, and being of larger diameter than the nut, substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. GRAY.

Witnesses:

C. CLARENCE POOLE,  
FRANK L. MIDDLETON.