

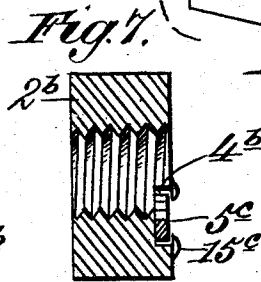
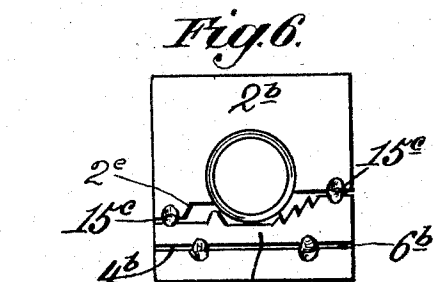
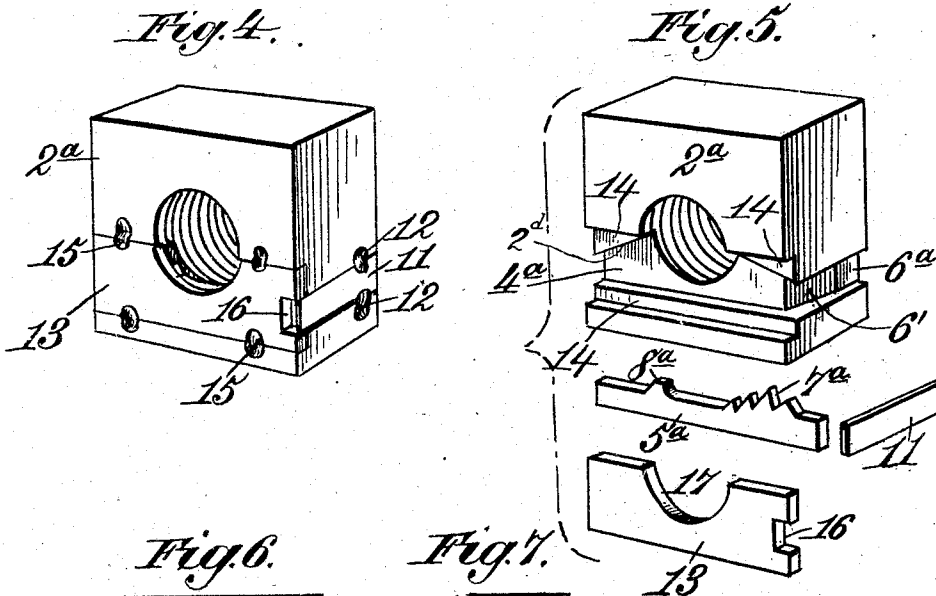
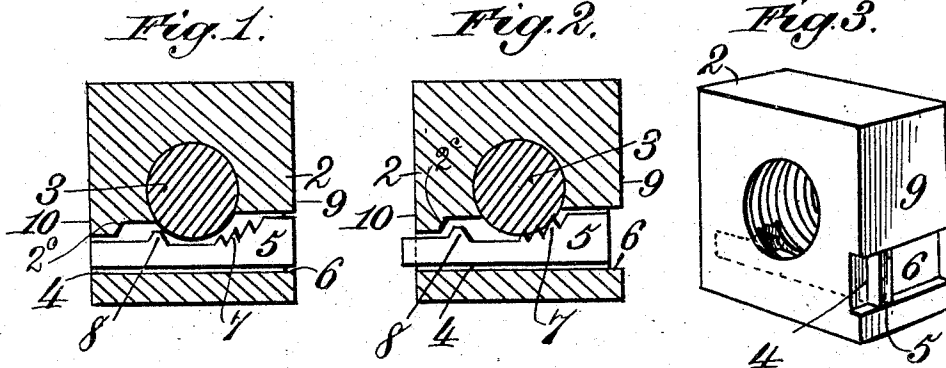
D. H. MILLER.

NUT LOCK.

APPLICATION FILED AUG. 30, 1907. RENEWED MAY 24, 1909.

947,080.

Patented Jan. 18, 1910.



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UNITED STATES PATENT OFFICE.

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NUT-LOCK.

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To all whom it may concern:

Be it known that I, DONALD H. MILLER, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented new and useful Improvements in Nut-Locks, of which the following is a specification.

This invention relates to nut-locks, the object of the invention being to provide a device of this character which is simple in construction, which can be inexpensively made and by means of which the nut is firmly held on the bolt against accidental removal. While the nut lock can be put to advantageous use in many different connections it is of especial utility when employed as part of a rail joint which in practice is subjected to such an amount of vibration as to loosen ordinary or plain nuts from their bolts.

In the drawings accompanying and forming a part of this specification, I show a few of the several effective forms of embodiment of the invention which to enable those skilled in the art to practice the same will be fully set forth in the following description, while the novelty of the invention will be included in the claims succeeding such description.

My invention contemplates forming cross-wise of a nut, a passage in which is fitted a nut-locking key. This passage may be formed in a variety of ways; for example, it might consist of a slot, or it might be in the form of a channel or groove. The key preferably has several teeth which are ordinarily arranged upon an arc and which by an endwise movement of the key are adapted to bite into the bolt on which said nut is fitted. In addition to these teeth the key has on its working side a shoulder, the shoulder and teeth being separated from each other, the shoulder serving to limit the endwise movement of the key in one direction, while the teeth limit the movement of the key in the opposite direction. The key can be put into locking engagement with the bolt by a blow upon said key, or by the action of a spring and the spring may be of any desirable type. I have set forth in a general way some of the characteristics of a nut-lock involving my invention; others will appear in the description to which I have alluded.

Referring now to the drawings, Figure 1 is a sectional view of a nut and the bolt, the

nut involving a lock constructed in accordance with my invention, the key being shown in its retracted or inoperative position. Fig. 2 is a like view showing said key in its operative position. Fig. 3 is a perspective view of the nut separated from the bolt. Fig. 4 is a view corresponding with Fig. 3 of a modified form of lock. Fig. 5 is a perspective view of the parts of the device shown in Fig. 4 separated from each other. Fig. 6 is a face view of a modified form of lock, and Fig. 7 is a cross sectional view of the parts shown in Fig. 6.

Referring initially to Figs. 1 to 3 inclusive, the nut thereby represented is designated by 2. In Figs. 1 and 2 the nut is shown as encircling a bolt 3. A slot 4 is shown as extending from one side of the nut 2 to the other and this slot receives the locking key 5 which is capable of endwise or longitudinal movement along the slot. This slot intersects tangentially the bolt-receiving opening of the nut 2 as clearly indicated in Figs. 1 and 2. One end of the slot 4 opens into a passage as 6 shown as extending from front to rear of the nut 2, and this passage 6 preferably consists of a groove or channel. On the inner side of the locking key I have shown a plurality of teeth or prongs 7, the tips of which are preferably arranged in an arc. On said inner side I have also shown a non-biting projection or shoulder 8 separated from the teeth 7 longitudinally of the locking key 5. When the locking key is in its retracted position as indicated in Figs. 1 and 3 the head end thereof will be located in the groove or channel 6 by virtue of which the extreme outer surface of said head end will not project beyond the face 9 of the nut. At this time the tail portion of the locking key will not project from the opposite face 10 of said nut. When therefore the locking key is in its retracted position, the nut 2 can be run onto the bolt 3 without possibility of the pointed ends of the teeth engaging with the threaded portion of the bolt 3, as in case there was such an engagement said threaded portion might be defaced or otherwise affected; that is to say, neither end of the locking key projects outwardly beyond the side faces 9 and 10 of the nut so as to be encountered by a wrench. When, therefore, the nut 2 is turned home the teeth 7 are not in contact with the threaded portion of the bolt 3. As soon as the nut has been set up, however, the locking

key will be advanced by a blow on the head end of the same, so as to project the sharpened portions of the teeth 7 into the stock of the bolt 3, so as to preclude all possibility of the nut 2 being accidentally turned off the bolt. In view of the presence of the groove 6, the head end of the locking key 5 can be easily reached by an instrument; this instrument may be the wrench which had been used for putting the nut in place. When the locking key is driven to its advanced position, as shown in Fig. 2, with the teeth 7 in biting engagement with the bolt 3 the tail end of the locking key will project beyond the tail portion of the passage 4 so that the tail portion of the locking key can be engaged by an implement in such a way as to forcibly retract the same by a longitudinal thrust, following which it becomes an easy matter to unscrew the nut 2. The teeth 7 and shoulder 8 limit endwise movement of the locking key 5.

In the form of the invention shown in Figs. 4 and 5 the locking key receiving passage in the nut takes the form of a groove or channel 4^a formed across the nut 2^a. The locking key 5^a shown particularly in Fig. 5 is practically a duplicate construction of the locking key 5, the teeth thereof being denoted by 7^a and the shoulder by 8^a. The locking key 5^a, however, is not moved into locking relation with the bolt by a blow, but a spring as 11 is preferably provided for this purpose, the spring 11 being preferably seated in a groove as 6^a formed in one side of the nut and bearing at its free end against the head portion of the locking key 5^a. In applying the nut 2^a the locking key 5^a is held in retracted position by a finger, thumb, or a wrench, so as to prevent the pointed portions of the teeth 7^a from coming into contact with the threads of the bolt. As soon as the nut 2^a is on, the locking key 5^a is released and the spring 11 then under compression drives the locking key into working relation with the points of the teeth 7^a into biting engagement with the bolt. The tail portion of the locking key 5^a when the latter is in its operative position extends beyond the corresponding portion of the passage 4^a so that such tail portion or end can be engaged by hand or by an ordinary wrench for the purpose of positively retracting the key 5^a when it becomes necessary to remove the nut 2^a. While the spring 11 may be held in position in any desirable manner, I have shown for this purpose lugs as 12 which may consist of some of the stock punched from the nut 2^a, as clearly shown in Fig. 4, said lugs overlying one end of the spring to hold the same firmly in position. One end of the groove 6^a, or what is the outer end thereof, is on a slant as shown at 6', so as to accommodate the free portion of the spring when the lat-

ter shoots the locking key 5^a forward to lock the nut 2^a in place. I may, if desired, provide a cover as 13 for the key 5^a, the side portions of the cover fitting in rabbets each denoted by 14 formed in the outer face of the nut 2^a, the outer face of the cover or plate 13, when the latter is in assembled position, being flush with the corresponding portion of the nut 2^a. This cover or plate 13 may be held in position in any desirable way, for example, by lugs as 15 overlying the lateral portions thereof and which lugs may be punched from the stock of the nut 2^a, as clearly shown in Fig. 4. One end of the fixed cover or plate 13 may have a notch as 16 to receive the free portion of the spring 11 when the latter has exercised its function of advancing the locking key 5^a, while the upper side of said cover or plate 13 has a semi-circular opening or aperture as 17 to receive the bolt to which the nut 2^a is applied.

In Figs. 6 and 7 the nut 2^b has formed across the outer face thereof a passage as 4^b which receives the locking key 5^c, said passage consisting preferably of a groove which opens at the head end thereof into a groove 6^b, the equivalent of the groove 6 as shown in Figs. 1 to 3 inclusive. The locking key 5^c is the same in construction and mode of operation as that shown in Figs. 1 to 3 for which reason these points need not be here repeated. The principal difference between the form of the device shown in Figs. 1 to 3 and that shown in Figs. 6 and 7 is that the first key extends through a slot, while in the second case the locking key is in a groove or channel. The locking key 5^c may be held in place by lugs as 15^c.

In will be seen that the nut 2 has an internal projection 2^c formed in the present case on one of the walls of the passage 4 and which is disposed in the path of movement of the locking key 5. This projection 2^c performs an important function in that it prevents the complete movement of the key through said passage 4 when the nut is removed from the bolt. The nut 2^a has a similar projection 2^a, while the same statement applies to the nut 2^b, the internal projection of the latter being designated by 2^e.

In all three cases the nut-locking key has stepped teeth arranged in the present case on an arc by virtue of which said teeth commencing with the innermost one can successively bite into the bolt. Said key in each case, as will be understood, is slidable toward and from its operative position and it has a series of biting teeth which penetrate the bolt and, in addition to this, has a non-biting projection, a portion of the periphery of the bolt being located in the space between said teeth and projection. Preferably said key is flat, by reason of which it can be inexpensively made and, for simplicity,

the side faces of the teeth and projection are in the planes of the side faces of the body of the key.

What I claim is:

5 1. The combination of a nut having a channel across the same, a bolt-locking key slidable in said channel, a plate for the channel to hold the key in position, the plate having an arcuate bolt-receiving aperture, and
10 a spring acting against the key to impart an advancing movement thereto, the nut having a channel transverse to the other channel, for receiving said spring.

15 2. The combination of a nut having a channel extending fully across the same from one side to the other and also fully open at its opposite extremities, the channel being provided with an abutting shoulder adjacent to one extremity, and a flat bolt locking
20 key slidable in said channel and provided with a plurality of teeth on the inner edge, the key being also provided with a non-biting projection to engage the shoulder of the channel, the opposite extremities of the key
25 forming impacting terminals and both adapted to be exteriorly exposed for engagement with a driving device to secure the teeth of the key in the threads of the bolt or to release said key.

30 3. The combination of a nut having a channel across the same, a bolt-locking key slidable in said channel, a plate fitted in said channel to hold the key in place, the nut having means to hold the plate in position, and the plate having an arcuate bolt-receiving aperture, and a spring connected
35 with the nut for imparting an advancing movement to said key.

4. The combination of a nut having a
40 channel extending fully across the same and communicating with the bolt opening in the nut, and a flat bolt locking key slidable in reverse directions in the said channel and provided with a plurality of teeth at its
45 inner edge and having their pointed terminals arranged in arcuate form to gradually project into the bolt opening of the nut, the opposite extremities of the key adapted to be exposed at opposite sides of the nut to
50 serve as impacting terminals for engagement therewith of a driving device to cause the teeth to bite into the threads of a bolt or to release the said teeth from the bolt threads, stop means being provided in part
55 carried by the key and in part located in the channel to limit the movement of the key in the direction in which the teeth bite into the bolt threads.

5. A nut lock comprising a nut having a
60 channel extending entirely across the same and fully opening through opposite sides, and a flat bolt locking key endwise movable

in reverse directions in said channel and adapted to enter the same from one end thereof, said key being provided with teeth
65 at its inner edge for engaging the threads of a bolt and also with a projection spaced from the said teeth and adapted to engage a portion of the channel to limit the movement of the key in one direction, the space
70 between the projection and the teeth for engaging the threads of a bolt permitting the bolt to have unrestricted insertion through the nut, the key adapted to have its opposite ends exposed through the terminal
75 openings of the channel at opposite sides of the nut to serve as impacting terminals to drive the key in opposite directions for the purpose of securing and releasing the nut with relation to a bolt.

80 6. A nut lock comprising a nut having a channel entirely across the same and also having a projection in said channel, a bolt-locking key provided with a toothed portion and also with a projection, the latter and
85 the toothed portion being separated from each other to provide a bolt-receiving space therebetween, and the last mentioned projection serving, by engaging the first mentioned projection, to prevent said key pass-
90 ing entirely through said channel.

7. A nut lock comprising a nut having a channel extending entirely across the same and opening through opposite sides and also having a projection in said channel adjacent
95 to one side of the nut, and a bolt locking key provided with an inner toothed portion and also with a projection spaced from each other to provide a bolt receiving recess therebetween, the opposite ends of the key being
100 exposed and at times projected through the terminal openings of the channel to serve as key-impacting terminals for engagement with a driving device to shift the key in opposite directions longitudinally through the
105 channel, the projections on the key and in the channel cooperating to prevent the key from passing entirely through the channel.

8. A nut lock comprising a nut having a channel extending entirely across the same
110 and projections punched out of the face of the nut and extending over a portion of the channel from reverse sides of the latter, and a flat locking key means freely movable in reverse directions in the channel and held in
115 operative position by the said punched out projections.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

DONALD H. MILLER.

Witnesses:

HEATH SUTHERLAND,
W. W. BURLEW.