No. 669,608. Patented Mar. 12, 1901.

J. R. WILLIAMS.

TOOL FOR EXPANDING AND APPLYING SPLIT RING NUT LOCKS.

(Application filed Dec. 8, 1900.)

(No Model.)

Fig. 1.

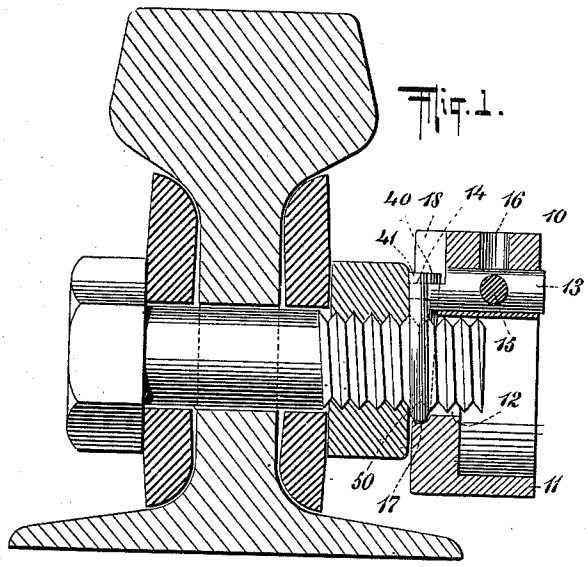


Fig. 5.

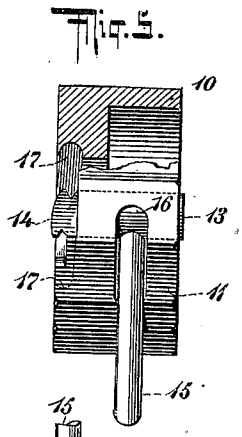


Fig. 2.

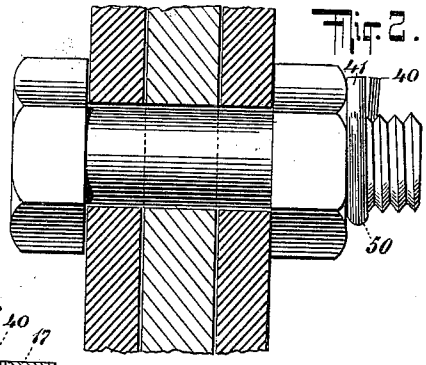


Fig. 6.

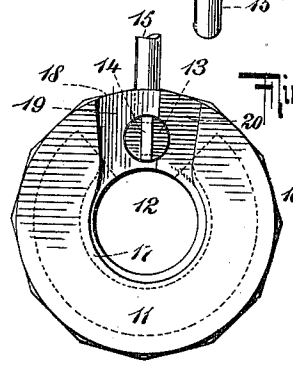


Fig. 9.

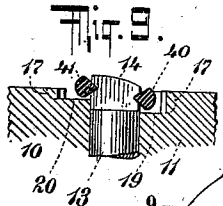


Fig. 3.

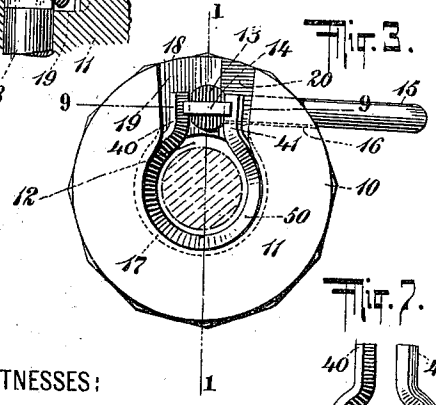


Fig. 4.

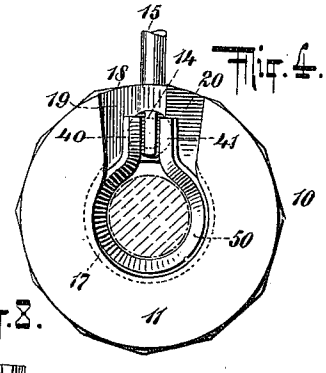


Fig. 7.

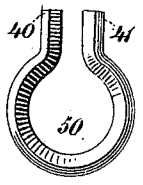
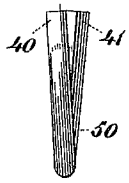


Fig. 8.



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UNITED STATES PATENT OFFICE.

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TOOL FOR EXPANDING AND APPLYING SPLIT-RING NUT-LOCKS.

SPECIFICATION forming part of Letters Patent No. 669,608, dated March 12, 1901.

Application filed December 8, 1900. Serial No. 39,141. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. WILLIAMS, a citizen of the United States, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Tools for Expanding and Applying Split-Ring Nut-Locks, of which the following is a specification.

The invention relates to improvements in tools for expanding and applying split-ring nut-locks; and it consists in the novel features and combinations of parts hereinafter described, and particularly pointed out in the claims.

When nut-locks in the form of spring-rings less in diameter than the diameter of the bolt to which they are to be applied have been made use of, difficulties have been encountered in devising adequate means for expanding such rings to the diameter of the bolt and applying them upon the bolt. The difficulties incident to the expanding of the spring-ring nut-locks and the application of such nut-locks to bolts are well understood and probably require no special mention in this specification.

It is the purpose of my invention to overcome the difficulties which have heretofore existed in the application of spring-ring nut-locks to bolts; and to this end my invention provides a tool adapted to receive and permit the expansion therein of the spring-ring nut-lock and then to hold said ring nut-lock while expanded and serve as a convenient means for applying the same upon the bolt. In accordance with the preferred form of my invention the body of the tool is somewhat in the general outline of a nut and is provided with a central opening, a recess at one end of said opening to receive the spring nut-lock in its normal condition, and an oscillatory expanding device connected with a hand-lever for its movement and normally disposed intermediate the ends of the spring-ring nut-lock, said expanding device being capable of being turned by means of the lever, so that its ends may operate as a wedge between the ends of the spring-ring and press said ring outward to its proper predetermined expanded position, the walls of the recess which receive said ring preventing its undue expansion, and said expanding device when in position holding the ring in its expanded condition, becoming automatically arrested and aiding in preventing the escape of the spring-ring from the body of the tool. The aperture or hole through the body of the tool is greater in diameter than the inner diameter of the expanded spring-ring, and hence the said tool, holding the said ring in its expanded condition, may pass upon the bolt and be used as a convenient handle or means for screwing the expanded ring up against the nut on the bolt. After the spring-ring, while held in its expanded condition by the tool, has reached its proper position on the bolt the operator will by reversing the movement of the lever connected with the expanding device cause the latter to leave the ends of the spring-ring and permit the said ring to close upon the bolt, whereupon the tool may be withdrawn in a direct line from the bolt, leaving the nut-lock on the latter.

The invention and satisfactory means for carrying the same into effect will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical transverse section through a railway-rail, fish-plates, and bolt and illustrates, in a similar section, the tool made the subject of this application in position applying a split-ring nut-lock to said bolt. Fig. 2 is a similar view of a portion of same, showing the nut in side elevation and the split-ring nut-lock applied to the bolt and against said nut, the tool having been moved outward and removed from said bolt. Fig. 3 is a front view of the tool with the split-ring nut-lock therein and held in its expanded condition, and Fig. 3 by the dotted line 1 1 indicates the section on which Fig. 1 is taken. Fig. 4 is a view corresponding with Fig. 3, showing the split-ring nut-lock as having been applied upon the bolt and permitted to contract by the release of the expander-head from the inner facing sides of the ends of said ring. Fig. 5 is a top view, partly broken away and partly in section, of the tool, this figure being presented to illustrate the recess for the split-ring nut-lock. Fig. 6 is a front elevation of the tool in its normal

condition ready to receive the split-ring nut-lock preparatory to expanding the same in the manner indicated in Fig. 3. Fig. 7 is a side elevation of a split-ring nut-lock. Fig. 8 is an edge view of same; and Fig. 9 is a transverse section, partly broken away, of the tool and nut-lock on the dotted line 9 9 of Fig. 3.

In the drawings, 10 designates the tool as a whole; 11, the body thereof; 12, the hole or aperture extending through said body and of a size to readily pass upon the bolt without engaging the threads thereof; 13, a rotary bar mounted in said body at one side of said aperture and having at one end an expander-head 14, and 15 a lever-arm connected with said bar 13 and extending outward through the slot 16 in said body 11, the purpose of said lever being to effect an axial oscillatory motion in said bar.

The body 11 of the tool at its outer face and encompassing the outer end of the hole 12 therein is formed with the spiral recess 17, which merges into the throat 18, centrally within which is disposed the expander-head 14. The recess 17 is, as above described, on a spiral line, and this line will correspond with the line of the thread of the bolt to which the nut-locks are to be applied. In view of the fact that the recess 17 is on a spiral line one end of the said recess will naturally be higher than the other end thereof when the outer face of the tool is considered as being in a horizontal position, and hence the floor of the throat 18 is on the two levels (numbered for convenience 19 20) corresponding with the depth at the two ends of the recess 17. The levels 19 20 of the throat 18 constitute tables to receive the ends 40 41 of the spring-ring nut-lock 42.

The expander-head 14 is in the form of a narrow bar recessed at its ends to engage and firmly hold the ends 40 41 of the nut-lock 50, and said expander-head 14 is made narrow in one direction, so that it may stand between the ends 40 41 of the nut-lock prior to the expansion of the latter and also after the latter has been expanded and allowed to contract upon the bolt, as shown in Fig. 4.

The nature of the invention will probably be more fully understood from a consideration of the operation or use of the tool. When the tool is in its normal condition ready for use, the lever 15 will extend outward at right angles from the body of the tool and the expander-head 14 will be substantially in line with said lever and also in line with the throat 18, as shown in Figs. 4 and 6, and thereupon the spiral-ring nut-lock 50 will be freely applied to the recess 17 in the position shown in Fig. 4, with its arms 40 41 at the opposite sides of the expander-head 14, and then the operator will by pulling the lever 15 to one side, as shown in Fig. 3, cause the rotary bar 13 to turn and carry the expander-head 14 to a position at right angles to and between the arms 40 41 of the nut-lock, said expander-head 14 during this operation engaging with its notched ends the said arms 40 41 and moving said arms 40 41 in a direction outward from one another, whereby the nut-lock ring becomes expanded until it completely fills the recess 17, in which position it is held by the expander-head 14, which upon reaching its right-angular position with respect to the arms 40 41 becomes automatically held in such position by the spring tension of said arms. The expander-head 14 also becomes arrested when arriving at its right-angular position with respect to its arms 40 41 by reason of the fact that at such time the lever 15 will reach the end of the slot 16, the end of the latter serving as a stop for said lever. When the nut-lock is first introduced into the recess 17, it will very loosely occupy said recess, but after its expansion by the operation of the expander-head 14 the said ring will completely fill said recess and be very firmly held therein. It is to be observed at this point also that since the recess 17 is on a spiral line and the nut-lock ring 50 is also on a spiral line one end of the ring 50 will be slightly below the outer face of the body 11 and that from said end the edge of the said nut-lock ring will gradually appear on an ascending plane, whereby substantially one-half of the nut-lock ring has a part of its outer face exposed beyond the face of the body 11, as shown in Fig. 1. The nut-lock having been applied to the tool and expanded, the said nut-lock and tool will be screwed upon the bolt until that portion of the nut-lock ring which is exposed beyond the face of the tool engages the outer face of the nut on the bolt, and thereupon by reversing the motion of the lever 15 the expander-head 14 will be restored to its position in line with the throat 18 and release the arms 40 41 of the nut-lock ring, the latter being thus of its own tension allowed to contract upon the thread of the bolt and become substantially freed from the tool, whereupon the latter will be withdrawn directly from the bolt, leaving the nut-lock on the bolt and close up against and locking the nut. When the nut-lock ring in its expanded condition is being screwed upon the bolt, it will engage the thread of the bolt, but will do so so loosely that the said nut-lock ring may be very quickly screwed home against the nut on the bolt with the minimum amount of exertion—practically no exertion at all—on the part of the operator. The hole or aperture 12, extending through the body of the tool, is greater in diameter than the bolt to which the nut-lock is to be applied, and hence when the nut-lock ring is in the recess 17 in its expanded condition the inner edges of said ring then substantially describing a circle of the same diameter as the bolt may readily engage the thread of the bolt, the body of the tool remaining free from said thread.

During the expanding of the nut-lock ring by means of the expander-head 14 said ring is prevented from flying outward from the

recess 17 by reason of the fact that said recess is throughout a portion of its length undercut and effectually engages the outer edges of the said ring. The ring nut-lock is also aided in retaining its seat within said recess 17 by reason of the fact that the ends of the expander-head 14 are formed with the notches which engage the outer surfaces of the inner edges of the arms 40 and 41, whereby said expander-head 14 may not only operate to drive the arms 40 41 apart, but to hold said arms against the base of the throat 18. The inner portion of the body 11 of the tool may be left hollow, as shown in the drawings, so as to save metal and avoid having the tool possess too much weight.

By means of the tool hereinbefore described the split-ring nut-lock, normally less in diameter than the bolt, may be expanded and held in its expanded condition while being applied upon the bolt, and it is a desirable feature of the tool when in its best form that it permits the nut-lock not only to be quickly applied upon the bolt, but enables it to be moved home against the nut prior to its contraction to hug the bolt. The tool also occupies a limited amount of space and this is a desirable feature, since in many instances the nut-lock could not be applied at all for want of room if the tool for applying it projected laterally to any great extent from the bolt.

The tool in its most desirable form known to me has been hereinbefore described, and in this form it only expands the nut-lock ring far enough to enable the ring to be very quickly and freely screwed upon the bolt, which condition is desirable especially when the rings possess a substantial body of tempered crucible steel, since under such circumstances the tool will not be in danger of breaking the rings. The tool described is also especially adapted for handling split rings having a spiral form corresponding with the screw-thread of a bolt, which is the most difficult form of ring to expand and control on account of its tendency to twist and fly from an expanding instrument. The tool of my invention having the recess 17 to hold the nut-lock ring and being on the line of the thread of the bolt very effectually holds the ring in its true position necessary to enable it to be screwed upon a bolt freely and without danger of injury to the thread of the bolt.

While the tool hereinbefore described constitutes the preferred embodiment of my invention, I desire it to be understood that my invention is not in every instance specifically limited to the special construction of tool described, since several changes may be made therein without departing from the spirit of my invention in its broader scope. For instance, it may even without change be used to expand a ring to such extent as to enable the latter to be moved on the bolt and up to the nut in a direct line—that is, without screwing or turning the same on the bolt—the ring upon reaching its position being permitted to contract, as above explained. Again, the recess 17 is described as made on a spiral line, so as to hold the ring on a spiral line; but if it be preferred to employ a ring having parallel parts, so that it may contract to the thread of the bolt and exert a lateral torsion against the sides of the said thread, the recess 17 will be given parallel side walls instead of the spiral walls. The invention is not, therefore, in its broader scope limited to all the details of construction shown.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A tool for expanding and applying split-ring nut-locks, which consists of a body portion having a hole through it adapted to pass on the bolt and provided in its face around said hole with a recess to receive the split ring, combined with means carried by said body for pressing and holding apart the open ends of said ring, whereby said ring may be expanded within said recess and while held expanded readily applied upon the bolt; substantially as set forth.

2. A tool for expanding and applying split-ring nut-locks, which consists of a body portion having a hole through it adapted to pass on the bolt and provided on its face around said hole with a spiral recess to receive the split ring, combined with means carried by said body for pressing and holding apart the open ends of said ring, whereby said ring may be expanded within said recess and while held expanded readily applied upon the bolt; substantially as set forth.

3. A tool for expanding and applying split-ring nut-locks, which consists of a body portion having a hole through it adapted to pass on the bolt and provided on its face around said hole with a spiral recess to receive the split ring, said recess being so near the face of said body as to leave a part of the face of the ring exposed for contact with the nut on the bolt, combined with means carried by said body for pressing and holding apart the open ends of said ring, whereby said ring may be expanded within said recess and while held expanded readily applied upon the bolt; substantially as set forth.

4. A tool for expanding and applying split-ring nut-locks, which consists of a body portion having a hole through it adapted to pass on the bolt and provided in its face around said hole with a recess to receive the split ring, combined with means carried by said body for pressing and holding apart the open ends of said ring, whereby said ring may be expanded within said recess and while held expanded readily applied upon the bolt, the said hole through said body being of greater diameter than the split ring when expanded; substantially as set forth.

5. A tool for expanding and applying split-ring nut-locks, which consists of a body portion having a hole through it adapted to pass on the bolt and provided in its face around said hole with a recess to receive the split

ring and at one side of said hole with the throat for the arms at the ends of said ring, combined with a rotary expander-head within said throat and adapted to freely lie between said arms, and means for turning said head so that its ends will press and hold apart said arms, whereby said ring may be expanded within said recess and while held expanded readily applied upon the bolt; substantially as set forth.

6. A tool for expanding and applying split-ring nut-locks, which consists of a body portion having a hole through it adapted to pass on the bolt and provided on its face around said hole with a spiral recess to receive the split ring and at one side of said hole with the throat for the arms at the ends of said ring, combined with a rotary expander-head within said throat and adapted to freely lie between said arms, and means for turning said head so that its ends will press and hold apart said arms, whereby said ring may be expanded within said recess and while held expanded readily applied upon the bolt; substantially as set forth.

7. A tool for expanding and applying split-ring nut-locks, which consists of a body portion having a hole through it adapted to pass on the bolt and provided on its face around said hole with a spiral recess to receive the split ring and at one side of said hole with the throat for the arms at the ends of said ring, said recess being so near the face of said body as to leave a part of the face of the ring exposed for contact with the nut on the bolt, combined with a rotary expander-head within said throat and adapted to freely lie between said arms, and means for turning said head so that its ends will press and hold apart said arms, whereby said ring may be expanded within said recess and while held expanded readily applied upon the bolt; substantially as set forth.

8. A tool for expanding and applying split-ring nut-locks, which consists of a body portion adapted to pass on the bolt and provided with a recess to receive the split ring, combined with means carried by said body for pressing and holding apart the ends of said ring, whereby said ring may be expanded and while held expanded applied upon the bolt; substantially as set forth.

9. A tool for expanding and applying split-ring nut-locks, which consists of a body portion adapted to pass on the bolt and provided with a spiral recess to receive the split ring, combined with means carried by said body for pressing and holding apart the ends of said ring, whereby said ring may be expanded and while held expanded applied upon the bolt; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 30th day of November, A. D. 1900.

JOHN R. WILLIAMS.

Witnesses:

CHAS. C. GILL,

GUNDER GUNDERSON.