C. R. ROOF.

METHOD OF MANUFACTURING GRIP NUTS.

APPLICATION FILED JUNE 1, 1915. RENEWED SEPT. 25, 1916.

1,204,491. Patented Nov. 14, 1916.

Fig. 1.

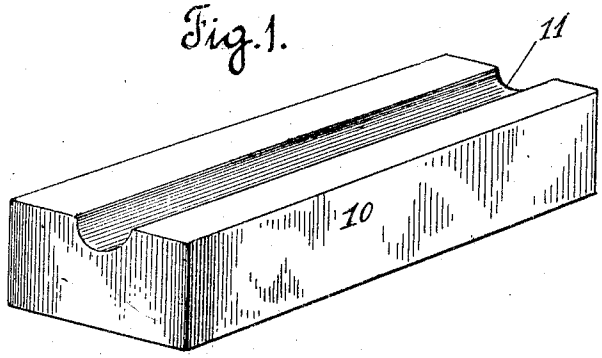


Fig. 2.

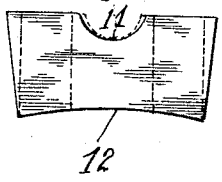


Fig. 5.



Fig. 3.

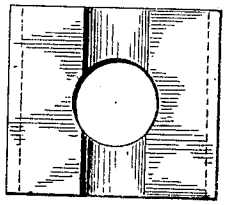


Fig. 6.

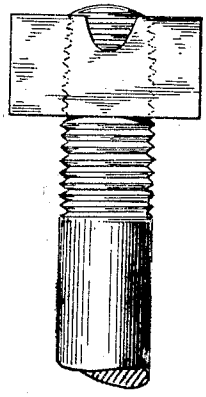
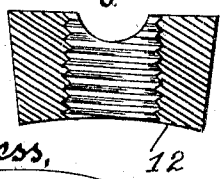


Fig. 4.



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UNITED STATES PATENT OFFICE.

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METHOD OF MANUFACTURING GRIP-NUTS.

1,204,491. Specification of Letters Patent. Patented Nov. 14, 1916.

Application filed June 1, 1915, Serial No. 31,369. Renewed September 25, 1916. Serial No. 122,132.

To all whom it may concern:

Be it known that I, CHARLES R. ROOF, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Methods of Manufacturing Grip-Nuts, of which the following is a specification.

This invention relates to improvements in methods of manufacturing grip nuts and the objects of the invention are to reduce the cost of manufacturing and to enable the greater part of the formation of the nut to be performed by a pressing or rolling operation and it consists particularly in the improved process of forming nuts of accurately threaded bores notwithstanding the fire waste on the bar.

The present invention is an improvement on the process of manufacturing grip nuts described in U. S. Letters Patent granted to Frederick William Wright and myself, Number 1,112,879, dated October 6, 1914. In the patented process a steel or iron bar with a suitable groove is cut and punched, then tapped, and the upper portions on opposite sides of the recesses are pressed toward each other, causing the diameter of the bore to be narrower at the top than at the bottom, whereby a secure locking action is produced when the upper or outer portion of the nut is screwed on to a bolt.

The process, to be commercially valuable, must produce nuts in large quantities by practically automatic machinery. The last step in the manufacture of the nut is the pressing together of the upper portions on opposite sides of the recesses, whereby the diameter of the upper threads is reduced. This reduction of the diameter of the threads does not exceed one-sixty-fourth or one-thirty-second of an inch, depending upon the size of the nut. This step of compression is effected by two co-acting jaws which approach each other a certain predetermined distance and engage the upper part of the nut. It is obvious that in order to produce nuts with openings of uniform size after compression it is essential that the width of the nut be uniform. If for instance, the nuts before compression vary in width even as little as one-sixty-fourth part of an inch, the diameter of the upper threads will not be uniform and in those cases where the nut, through fire waste of the bar or any other reason, is below the standard width of the nut, no such uniform compression of the sides thereof will take place.

The principal object of this invention is to improve the process described in the patent by so modifying the same that an absolutely full sized nut, prior to its compression, is produced. The last step of compression will then effect an absolutely uniform nut with the upper threads reduced in diameter to the desired extent. This and other objects of the invention will appear as the description proceeds and will be pointed out in the claims.

In the drawings which form a part of this specification, Figure 1 is a perspective view of the rolled bar from which the nut may be made. Fig. 2 is a side view of the nut blank before tapping. Fig. 3 is a top plan view of the blank shown in Fig. 2. Fig. 4 is a vertical cross section of the tapped nut before compression. Fig. 5 is a similar view after compression showing a finished nut. Fig. 6 is a perspective view of the finished nut engaging a bolt.

A bar 10 provided with a suitable longitudinal semi-cylindrical groove 11 on its upper face is heated red hot and nut blanks are cut or punched off therefrom. This cutting operation is performed in an apparatus which forms no part of this invention. It is therefore, unnecessary to describe the same but it may be stated that the tool shearing off the end section of bar 10 is slightly convex in the shape of an arch, whereby the bottom of the nut blank is formed of a correspondingly concave shape 12 transversely to the direction of the groove. The cutting tool presses the blank nut against a tool provided with a crowning rib or projection of semi-cylindrical shape which is slightly larger than the semi-cylindrical groove in the nut blank, causing the blank nut to spread and expand laterally, as clearly shown in Fig. 2 where the original size of the groove and the sides is indicated by dotted lines.

Walls suitably spaced apart, limit the spreading or expansion of the top of the nut to the desired extent. With larger nuts, such as over one-half inch in size, the semi-cylindrical groove or recess may be pressed into the nuts by the nut machine while they are hot, but the essential step is to expand the top of the nut to the de-

sired width by means of walls suitably spaced apart. After punching out the slug to form the central opening in the nut, the latter is screw threaded in the usual manner. The next step is to press the upper portions on opposite sides of the recesses toward each other by any suitable means, such as co-acting jaws which approach each other within a predetermined distance and engage the upper portion of the nut referred to. This compression straightens the bottom and the lateral sides of the nuts so that their plane surfaces are at right angles to each other. The upper portions of the threads are slightly reduced in diameter, usually one-sixty-fourth to one-thirty-second of an inch, depending upon the size thereof.

The nut produced is of the same shape as the normal nut with the exception that the upper threads are of reduced diameter whereby a locking action between said threads and the threads of the bolt on which the nut is screwed is secured.

I claim:

1. A method of making grip nuts comprising cutting a nut from a bar provided with a longitudinal groove, simultaneously expanding said groove and spreading the top of the nut transversely to said groove to a predetermined amount, piercing and tapping said nut and then pressing the sides of the groove toward each other whereby the diameter of the bore through the nut is smaller on one end than on the other.

2. A method of making grip nuts comprising cutting a nut from a bar provided with a longitudinal groove, pressing the bottom of the nut in the shape of an arc transversely to said groove, expanding said groove and spreading the top of the nut transversely to said groove to a predetermined amount, piercing and tapping said nut and then pressing the sides of the groove toward each other, whereby the diameter of the bore through the nut is smaller on one end than on the other.

3. A method of making grip nuts comprising pressing a recess into the upper side of the nut and forming filleted corners on said recess, spreading the upper end of the nut transversely to said recess to a predetermined amount, and pressing the sides of the recess toward each other, whereby the diameter of the bore through the nut is smaller on one end than on the other.

In witness that I claim the foregoing I have hereunto subscribed my name this 24th day of May, 1915.

CHARLES R. ROOF.