

No. 786,725.

PATENTED APR. 4, 1905.

A. V. BRYCE.
LOCKING NUT.

APPLICATION FILED MAY 25, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

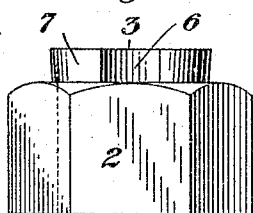


Fig. 4.

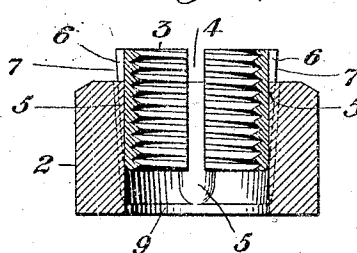


Fig. 2.

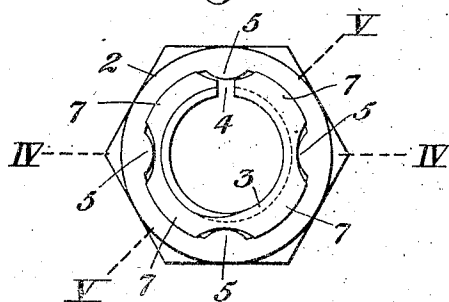


Fig. 5.

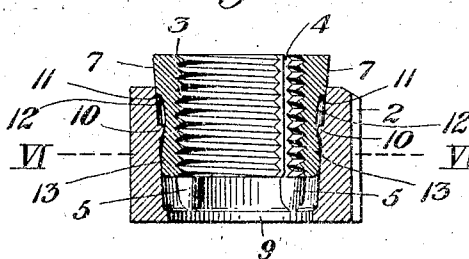


Fig. 3.

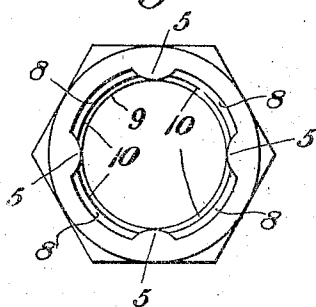


Fig. 6.

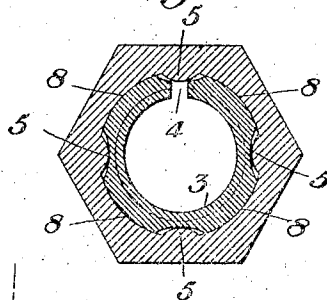
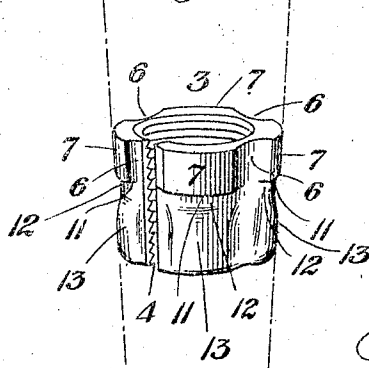


Fig. 7.



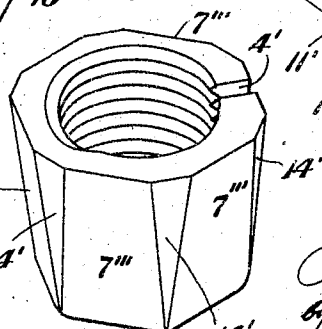
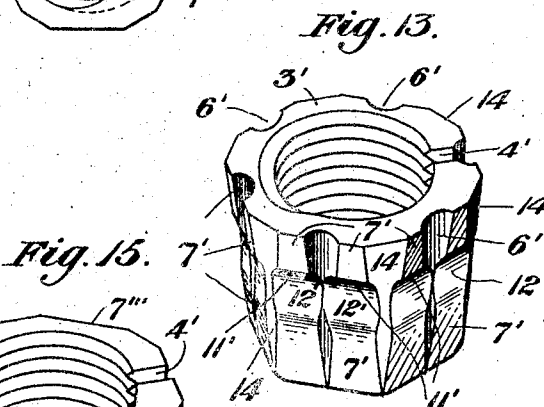
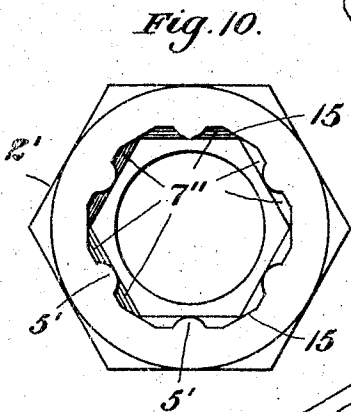
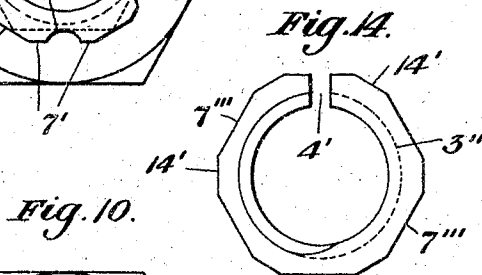
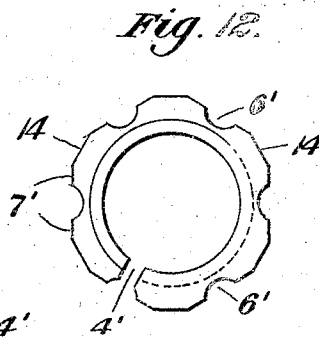
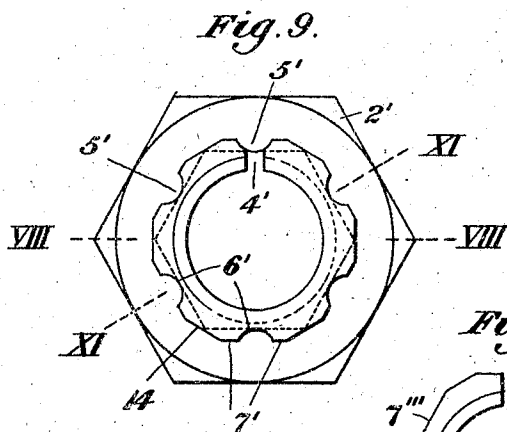
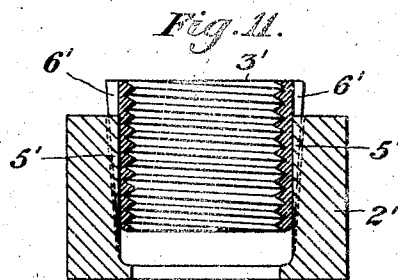
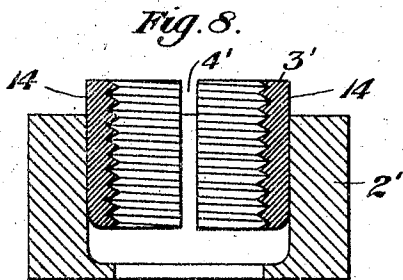
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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LOCKING-NUT.

SPECIFICATION forming part of Letters Patent No. 786,725, dated April 4, 1905.

Application filed May 25, 1904. Serial No. 209,810.

To all whom it may concern:

Be it known that I, ANDREW V. BRYCE, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Locking-Nuts, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view in side elevation of my improved locking-nut assembled. Fig. 2 is a plan view thereof. Fig. 3 is a plan view of the nut, showing the interior bushing. Fig. 4 is a vertical cross-section on the line IV IV of Fig. 2. Fig. 5 is a similar view on the line V V of Fig. 2. Fig. 6 is a horizontal sectional view on the line VI VI of Fig. 5. Fig. 7 is a perspective view, detached, of the threaded bushing. Fig. 8 is a vertical sectional view on the line VIII VIII of Fig. 9, illustrating a modified construction of nut and bushing having angular interior and exterior faces, respectively. Fig. 9 is a plan view of Fig. 8. Fig. 10 is a plan view of the nut detached. Fig. 11 is a vertical sectional view on the line XI XI of Fig. 9. Fig. 12 is a plan view of the bushing. Fig. 13 is a perspective detail view of the bushing detached. Fig. 14 is a plan view of a similar bushing, omitting the longitudinal turning recesses adapted to be turned by the flat tapered faces. Fig. 15 is a perspective view of the bushing.

My invention consists of an improvement in locking-nuts for bolts, &c., of the class wherein a turning-nut is provided with an internal-threaded bushing adapted to engage the bolt under turning action of the nut and to gradually tighten upon it, so as to prevent its loosening. Heretofore in devices of this character no efficient means having been provided for retaining the bushing within the nut, so as to prevent separation during shipment or handling, nor to limit the inward travel of the bushing by means entirely within the nut cavity.

My invention has for its object to provide a more efficient device as to these features to

strengthen the parts and improve their operation, together with various other details of improvement, as will be more fully hereinafter set forth.

Referring now to the drawings, 2 is a turning-nut, of any suitable outside form, in the inner cavity of which is mounted the threaded bushing 2, having a longitudinal slot 4, adapted to allow the bushing to be compressed inwardly against the bolt-threads. The nut is provided with one or more inwardly-extending projections 5, extending for a portion or for the full depth of the nut on its inner sides, adapted to engage corresponding inward depressions or recesses 6, formed in the upper edge of the bushing. The bushing is also provided with one or more annular projections 7 at its upper side, and these depressions and projections preferably alternate, the projections being of the normal increased diameter of the upper edge of the bushing. The nut 2 is also provided with corresponding depressions 8, alternately arranged between the projections 5, and when assembled the projections and depressions of the nut and bushing respectively interfit with each other, sufficient clearance being provided, as shown, to allow for ample movement of the bushing, due to contraction or expansion when applied to or removed from the bolt.

For the purpose of limiting excessive inward travel of the bushing under the turning operation and feed of the threads the nut is provided with an annular limiting-shoulder 9, against which the lower edge of the bushing will abut when it has been drawn down flush with the top of the nut. Additional limiting means are also provided by the inwardly-extending lugs 10, formed in the inner face of the nut 2 between the vertical projecting lugs 5. These shoulders 10 are so located as to engage at 11 beneath the annular projections 7 of the bushing at or about the time when the bushing is screwed down flush with the top and are designed to come into engagement only immediately after engagement with the annular shoulder 9 should the bushing be forced past such shoulder. A further advan-

tage of these limiting-lugs 10 is that they positively arrest the inward travel of the bushing, and thereby relieve the nut from the lateral bursting strain due to the wedging action of the bushing as it is forced downwardly on the bolt under excessive pressure. By these means the limiting device positively checks the inward travel of the bushing when it has reached the extreme limit of travel, so that it is impossible for the bushing to bear against the same surface upon which the nut 2 bears.

The body portion of the bushing beneath the shoulder 11 of the annular projection 7 is slightly recessed, as indicated at 12, to provide clearance of the locking projections 10, while the lower portion of the bushing is preferably brought outwardly, as at 13, beneath such depression 12 into alinement with the slanting face of the upper portion 7, such projecting portion 13 being adapted to extend slightly beyond the inwardly-extending edges of the locking projections 10. The object of this construction is that the bushing may be pressed downwardly into the nut with sufficient force to insert its swelled extremity beyond the locking projections 10, the slot 4 allowing for sufficient contraction to accomplish the insertion, while the resiliency of the bushing will cause it to spring outwardly when thus inserted, and it will be thus maintained in fixed connection with the nut. In this position it is ready for application, and upon turning the nut motion will be imparted to the bushing by means of the interfitting lugs and depressions, and it will be screwed upon the bolt, tightening its grip with each revolution. The tightening effect is secured, like all devices of this type, by means of the sloping walls of the nut and bushing, respectively, and it will be observed that the upper and lower portion of the nut and bushing, respectively, conform to the line of taper desired, while the intervening portions of both the nut and bushing conform to the other functions already described.

The turning action of the bushing is done by engagement with the recesses 6 and projections 7 of the upper portion only. The projection 5 of the nut is preferably extended clear to the base, so that by a single operation of reaming the interior of the nut may be finished and also the faces of the projections 5 finished in one operation.

It will be observed that the inner faces of the projections 5 correspond with the normal internal diameter of the nut at the bottom and are parallel with each other, so that the operation of reaming is thus all that is required to finish these projections, avoiding the necessity of broaching these portions of the nut.

Another advantage of providing the projections 5 on the interior of the nut is that the walls are not weakened, as by the more usual construction of grooves cut into the

wall; but my construction tends to strengthen and reinforce the nut.

In Figs. 8 to 13, inclusive, I have shown a modified construction for large-size bolts, wherein the bushing 3' is made in polygonal form, having angular exterior-tapered faces 7', adapted to interfit with and be engaged by corresponding angular interior-tapered faces 7'' of the nut 2'. The bushing is provided with external grooves or depressions 6', adapted to be engaged by corresponding internal projections 5' of the nut or with merely plane sloping or tapered faces 7''', and with either construction the bushing will be engaged and turned by the nut in the same manner already described. As shown in the drawings, also the corners of the bushing formed by the adjacent tapered faces 7' are faced off from top to bottom, providing faces 14, adapted to be engaged by corresponding faces 15 of the nut, and it will be observed that these faces 14 and 15 are parallel with the axial center of the bolt-opening and parallel throughout. The faces 15 form strengthening-fillets in the nut, while these faces and the faces 14 being non-tapering have no wedging action, but merely engage each other laterally and have a relative movement to each other longitudinally. A special advantage in the faces 14 is that they facilitate the manufacture of the bushing, which I propose making of a rolled or cast threaded blank bent around into form, in which the thickness is uniform along the faces 14. These advantages of manufacture will more clearly appear in a later application covering the method of making the bushings. It will be seen, therefore, that both the faces 14 and 15, as well as the bottoms of the grooves 6' and exterior of projections 5', are all parallel with each other and with the axial center of the bolt-opening. This is of especial advantage in assembling the nut and bushing, facilitates their interengagement, and contributes to the strength of the parts and their effective action.

It will be understood that the nut 2' is provided with inwardly-extending shoulders or abutments across the tapered faces, and the bushing is provided with shoulders 11' and recesses 12' underneath said shoulders, whereby the shoulders abut against said abutments to limit the inward travel of the bushing in the same manner as already described. The recesses 12' allow the bushing to be forced down past the abutments, thus binding the nut and bushing together to prevent disengagement after being assembled. In other respects the nut and bushing are similar to the form first described as to the turning and tightening operations, due to the tapered faces and the longitudinal slot, identified by the numeral 4'.

In Figs. 14 and 15 I show a bushing 3'' merely provided with tapered flat faces 7''' and faced corners 14' without any other turn-

ing means, as the grooves 6', and good results may be had with this form of bushing. It will be understood that the shoulders 11' and recesses 12' are also present and desirable, though not shown in the drawings.

The advantages of my invention will be readily appreciated by all those accustomed to this class of devices. It is comparatively simple in construction and effective in operation, the loss or displacement of the different parts is entirely prevented, the excessive inward travel of the bushing is rendered impossible, and the device as a whole is very powerful and effective in taking and retaining a binding hold upon the bolt.

Changes and variations may be made by the skilled mechanic in the design, proportion, and various other details without departing from the invention, the number and location of the projections and depressions may be changed at will to suit different sizes or other conditions, or the bushing may be made of a circular blank or may be formed of a malleable casting or rolled blank provided with threads and bent up into circular form; but all such changes and variations are to be considered as within the scope of the following claims.

What I claim is—

1. A locking-nut comprising an outer unthreaded portion having interior turning projections and tapered bearing portions, and an inner threaded portion provided with annular projections at its upper edge adapted to be rotatively engaged by the projections of the unthreaded portions, substantially as set forth.

2. A locking-nut comprising an outer unthreaded portion having interior turning projections and bearing portions, and an inner threaded portion provided with annular projections at its upper edge adapted to be rotatively engaged by the projections of the unthreaded portion, and capable of being forced down flush with the top of the nut, substantially as set forth.

3. A locking-nut comprising an outer unthreaded portion having interior turning projections and tapered bearing portions, and an inner threaded portion provided with annular projections and recesses at its upper edge adapted to be rotatively engaged by said turning projections, substantially as set forth.

4. A locking-nut comprising an outer unthreaded portion having interior turning projections, intervening depressions and tapered bearing portions, and an inner threaded portion provided with annular projections at its upper edge adapted to be rotatively engaged by the said turning projections, and to pass downwardly between them flush with the upper surface of the nut, substantially as set forth.

5. A locking-nut comprising an outer unthreaded portion having turning devices, tapered bearing portions and interior limiting-

abutments, and a slotted inner-threaded tapered portion provided with upper annular projections adapted to be turned thereby, and to engage said limiting-abutments, and lower outwardly-expanding binding portions adapted to be forced past said limiting-abutments and to bind against them to prevent displacement, substantially as set forth.

6. In a locking-nut, the combination of an outer unthreaded portion provided with vertical inwardly-extending turning projections, intervening tapered portions, and an annular limiting-shoulder; and an inner slotted threaded portion having corresponding tapered bearing portions and portions adapted to be engaged by said turning projections; said inner portions being adapted to be contracted by the outer portion to bind inwardly upon a threaded bolt and to pass down flush with the upper surface of the outer portion, substantially as set forth.

7. In a locking-nut, the combination of an outer unthreaded portion provided with vertical inwardly-extending turning projections and interior limiting-abutments; and an inner slotted threaded portion having corresponding tapered bearing portions and portions adapted to be engaged by said turning projections, with corresponding limiting-abutments; said inner portions being adapted to be contracted by the outer portion to bind inwardly upon a threaded bolt and to pass down flush with the upper surface of the outer portion, substantially as set forth.

8. A locking-nut comprising an outer unthreaded portion having interior turning portions and tapered faces, and an inner threaded portion provided with exterior portions adapted to be engaged by the turning portions, and tapered faces; said outer and inner portions having interfitting surfaces extending longitudinally throughout their length parallel with the axis of the bolt-cavity, substantially as set forth.

9. A locking-nut comprising an outer unthreaded portion having interior turning portions and tapered faces, and an inner threaded portion provided with exterior portions adapted to be engaged by the turning portions, and tapered faces; said outer and inner portions having interfitting projecting and recessed surfaces extending longitudinally throughout their length parallel with the axis of the bolt-cavity, substantially as set forth.

10. A locking-nut comprising an outer unthreaded portion having interior turning portions and tapered faces, and an inner threaded portion provided with exterior portions adapted to be engaged by the turning portions, and tapered faces; said outer and inner portions having interfitting flat surfaces extending longitudinally throughout their length parallel with the axis of the bolt-cavity, substantially as set forth.

11. An internal threaded slotted bushing

for a locking-nut provided with parallel inner and outer sides, outer tapered wedging-faces, and upper rotating projections, substantially as set forth.

- 5 12. An internal threaded slotted bushing for a locking-nut provided with outer projecting and outer recessed bearing-surfaces parallel with the inner sides, outer tapered wedging-faces, and rotating projections formed by
10 said faces, substantially as set forth.

13. An internal threaded slotted bushing

for a locking-nut provided with exterior surfaces extending longitudinally throughout its length parallel with the axis of its bolt-cavity, with intervening wedging-faces, substantially as set forth.

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

ANDREW V. BRYCE.

Witnesses:

JAS. J. McAFEE,

C. M. CLARKE.