Nov. 26, 1968 A. R. BREED 3,412,773

LOCK NUT

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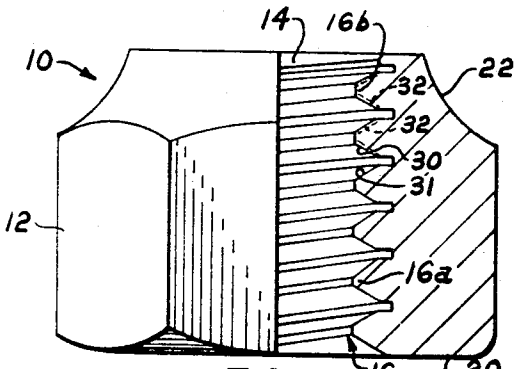

FIG. 2

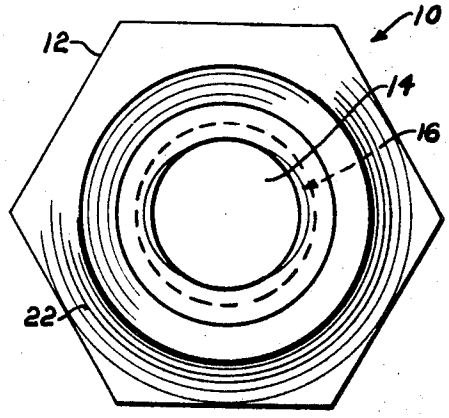

FIG. 1

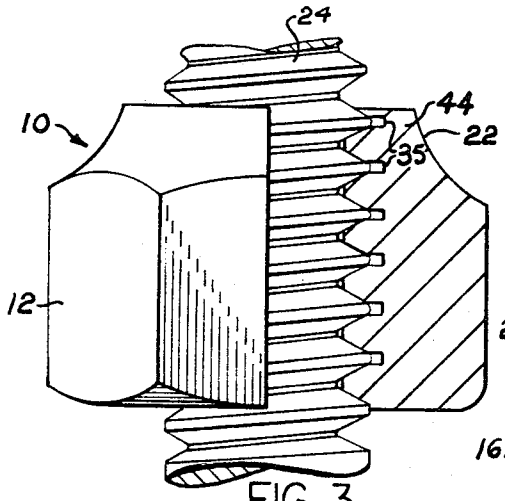

FIG. 3

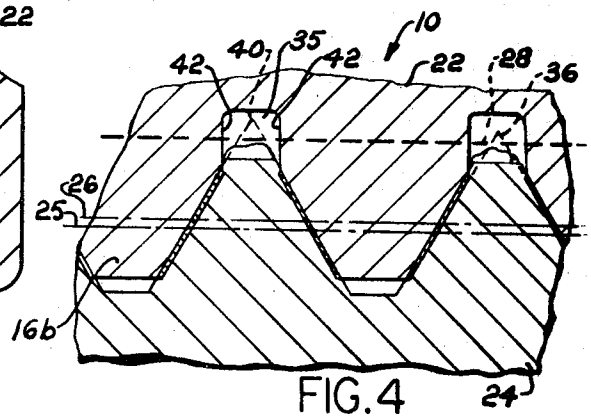

FIG. 4

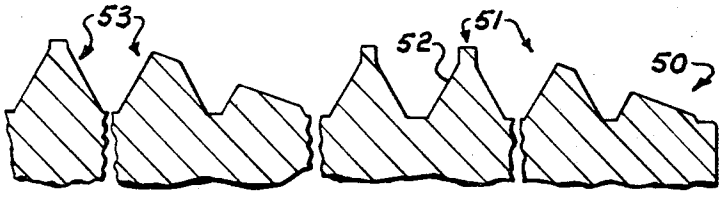

FIG. 5

INVENTOR.
ARTHUR R. BREED
BY Hoffmann and Yount
ATTORNEYS

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LOCK NUT

Arthur R. Breed, Euclid, Ohio, assignor to The Lamson & Sessions Co., Cleveland, Ohio, a corporation of Ohio

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ABSTRACT OF THE DISCLOSURE

A locking thread convolution for a thread having a theoretical basic thread form. The locking thread convolution has a thread angle and pitch which is the same as that for a standard thread of the same basic thread form and a metal flank thickness which is wider than the maximum metal flank thickness of a standard thread of the basic thread form to provide for uniform thread interference along the flanks of the locking thread convolution when the latter is applied to a mating standard thread. The locking thread convolution also has a recess space between adjacent threads thereof which is larger in an axial plane than that defined by the triangle between adjacent threads of the locking thread convolution to freely accommodate metal swaged due to the thread flank interference. The locking thread convolution is preferably embodied in a lock nut and formed so as to provide a continuation of a plurality of free running threads in the lock nut.

The present invention relates to a locking thread convolution for a thread and in particular to a lock nut having such a locking thread convolution therein which interferes with a mating external thread on a stem when applied thereto. The present invention also relates to a method of making a lock nut.

The present invention provides a new and improved locking thread convolution for a thread having a theoretical basic form, the locking thread convolution having a thread angle which is the same as that for the basic thread form and a metal flank thickness which is wider than that for the basic thread form to provide for uniform thread interference along the flanks of the locking thread convolution when the latter is applied to a mating standard thread and having a recess space between adjacent threads thereof which is larger in an axial plane than that defined by the triangle between adjacent threads of the locking thread convolution to freely accommodate metal swaged due to the thread interference so that seizure between the locking thread convolution and the mating thread does not occur.

The present invention further provides a new and improved locking thread convolution of the character described and in which the recess space between adjacent threads of the locking thread convolution is larger than that defined by the fundamental triangle of the basic thread form, and wherein the recess space preferably extends to a depth greater than the maximum depth for the standard thread of the same basic thread form and preferably deeper than the sharp root of the basic thread form.

The present invention additionally provides a new and improved locking thread convolution of the character referred to and in which the recess has a generally radially extending wall means which is angularly related to the flanks of the thread and preferably intersects the flank of the thread convolution at a location intermediate the crest and bottom of the mating standard thread.

The invention also provides a locking thread convolution which provides a high locking power when applied to a mating standard thread, is not particularly sensitive

to tolerance variations, and develops the high locking power with little or no tendency to jam or seize.

The present invention also provides a new and improved lock nut having a plurality of thread convolutions along a portion of its length for freely engaging a threaded stem having a standard thread thereon and locking thread convolutions at its trailing end which interfere with the thread on the stem to produce a locking, action, the locking thread convolutions having a recess space between adjacent thread convolutions thereof which is greater in an axial plane that that defined by the triangle between adjacent convolutions and which preferably extends to a depth which is greater than the maximum major diameters for the standard nut thread for freely mating with the threads on the stem for freely accommodating metal swage by the interfering threads so that seizure between the nut and the stem does not occur when the nut is applied thereon.

The present invention additionally provides a new and improved lock nut wherein the locking thread convolutions have the same thread angle as the theoretical basic form for the thread convolutions and a flank width which is wider than that of the basic thread form to provide uniform interference along the flanks thereof when applied to a threaded stem and wherein the recess space between adjacent locking thread convolutions in an axial plane is preferably greater than the fundamental triangle of the basic thread form and preferably extends deeper than the sharp root of the basic thread form.

The present invention further provides a new and improved lock nut, as defined in the preceding paragraphs, and wherein the locking thread convolutions are formed within a radially resilient portion, preferably a collar portion, of the nut which is radially expanded outwardly due to the thread interference and which exerts a self-contracting force due to the radial expansion thereof to effect a further locking action.

The present invention also provides a new and improved method for making a lock nut of the character described from a nut blank having an axially extending opening therethrough by first tapping the opening to form a locking screw thread convolution on its side wall which has wider flanks than a standard thread screw convolution of the same theoretical basic form and a recess space between adjacent threads located outwardly of the theoretical basic form for the thread which is larger in an axial plane than the maximum recess space located outwardly from the basic thread form for the standard thread, and further tapping the locking screw thread convolution along a portion of the length of the opening to remove metal from the side flanks thereof to reduce the width therebetween to that of the standard thread along said portion while leaving the remaining portion of the locking thread convolution intact.

Other objects, novel characteristics and advantages of this invention will be apparent in the following detailed description and in the accompanying drawings forming a part of this specification, and in which similar reference numerals designate corresponding parts throughout the several views of the drawings, and in which:

FIG. 1 is an end elevational view of a lock nut embodying the present invention and showing the nut as viewed from the locking end thereof;

FIG. 2 is a side elevational view of the nut showing the same in partial axial section, the view being taken as indicated by the section line 2—2 of FIG. 1;

FIG. 3 is a side elevational view of the nut showing the same in partial axial section and applied to a threaded stem;

FIG. 4 is an enlarged fragmentary sectional view show-

ing the engagement between the threads on the stem and the locking end of the nut; and

FIG. 5 is an enlarged fragmentary axial sectional view of a cutting tap for making the lock nut.

The present invention provides a novel locking thread convolution which deviates from the theoretical basic form of the thread in a particular manner to provide an improved locking action. The locking thread convolution will provide a high locking power, is not particularly sensitive to tolerance variations and develops the high locking power with little or no tendency to jam. The locking action is obtained by making the threads of the convolution wider than the basic thread form to provide a uniform interference along the flanks thereof when applied to a standard mating thread and by providing a recess space between adjacent threads of the thread convolution which is larger in an axial plane than the recess space defined by the triangle between the adjacent threads thereof to freely accommodate metal swaged by the interfering threads. In the preferred and illustrated embodiment, the recess space is larger than the fundamental triangle of the basic thread form and preferably extends deeper than the sharp root of the basic thread form, and preferably has sides which extend generally radially of the axis of the locking thread convolution and preferably intersecting the flanks thereof at a location intermediate the basic major and minor diameters of the basic thread form.

The basic theoretical design or form of a thread convolution generally provides for a truncation of the fundamental triangle for the thread convolution to provide a flat between adjacent threads at the base of the threads. This flat lies along the surface of an imaginary cylinder coaxial with the thread convolution. For example, in the basic thread design for the screw threads set forth in the National Bureau of Standards Handbook H28 (1957) entitled Screw Thread Standards for Federal Services, published by the U.S. Dept. of Commerce, the basic length of the flat between adjacent threads in an axial plane of an internal thread convolution is given by the formula 1/8P, where P is the pitch of the thread. In accordance with established standards for an internal thread convolution, the truncations of the fundamental triangle may occur from a maximum in which the base lenght of flat is 1/8P to a minimum such that the base length of the flat is 1/24P. The flat between adjacent threads in an axial plane will lie along what is referred to as the major diameter in an internal thread convolution with the maximum major diameter permitted by the established standards occurring when the base length of the flat is 1/24P.

In accordance with the preferred embodiment of the present invention, the basic thread angle of the thread convolution is maintained, the thread angle being the angle defined in an axial plane by the converging sides of flanks of the thread convolution, but the width of the thread convolution is uniformly wider than that for the basic thread design so as to provide a uniform depth of interference along the flanks of the thread convolution with the standard mating thread. The recess space between the adjacent threads of the thread convolution is preferably larger in an axial plane than the space defined by the fundamental triangle of the basic thread and preferably has a side wall means which extends generally radially of the axis of the locking thread convolution and which intersects the flank of the thread at a radial location which is intermediate the crest and bottom of the standard mating thread when applied thereto and preferably extends to a depth which is greater than the maximum depth permitted between the crest and bottom or root for a standard thread of the same basic thread form. This construction enables a high locking interference to be effected and the extent of the locking interference to be readily controlled, and enables a high locking power to be effected with little or no tendency to jam or seize.

Although the novel locking thread convolution of the present invention could be used in various members or fasteners to provide a locking action with a cooperating or mating threaded member, it is particularly useful in a nut to provide a lock nut, and is herein shown as embodied in a lock nut. The lock nut is usable in conjunction with fastening elements having threaded stems, such as bolts or screws, provided with standard screw thread convolutions, such as the screw thread standards set forth in the aforementioned National Bureau of Standards Handbook H28.

As representing a preferred embodiment of the present invention FIGS. 1 and 2 of the drawings show a lock nut **10** comprising a metal body **12** having an opening **14** extending axially therethrough and provided with a screw thread **16** on the side wall **18** of the opening **14**. At one end thereof the body **12** has an annular bearing surface **20** in surrounding relation to the opening **14**. The nut body **12** is preferably provided at the other end thereof with a radially and circumferentially resilient portion or section which is here shown as being in the form of a collar portion or crown **22** having a reduced transverse dimension. The opening **14** extends entirely through the lock nut **10** including the collar portion **22** thereof.

The screw thread **16** formed on the side wall **18** of the opening **14** comprises a plurality of fully formed, free running screw thread convolutions **16*a*** which are adapted to freely run on or engage the conventional standard thread convolutions on a threaded stem **24** and a plurality of undistorted, nonstandard locking thread convolutions **16*b*** which are adapted to interfere with the standard threads on the stem **24** to produce a locking action therebetween. The thread convolutions **16*a*** define a continuous free running thread or thread convolution which extends from or adjacent the end **20** along the opening **14** for the major portion of the length thereof and terminates adjacent the collar portion **22**. The thread convolutions **16*a*** are standard thread convolutions of the theoretical basic form so as to have a free running engagement with the standard thread on the stem **24**, except that they are here shown as having a major diameter which is greater than the maximum major diameter for the standard thread convolutions to facilitate manufacture of the nut **10**. Also, tests have indicated that the provision of a major diameter which is greater than the maximum major diameter for a standard thread gives an improved fatigue life for the mating external thread.

The screw thread convolutions **16*b*** form a continuation or extension of the thread convolutions **16*a*** and define a continuous interfering locking thread or thread convolution which extends along the remaining portion of the side wall **18** of the opening **14** and preferably for the full length of the collar portion **22**. The locking thread convolutions **16*b*** deviate from the standard thread convolutions of the theoretical basic form for the thread convolutions in that they have a pitch diameter, as indicated by the phantom line **25**, which is less than the minimum pitch diameter of the standard thread convolutions of the basic form or the thread convolutions **16*a***, as indicated by the phantom line **26**, and preferably have a major diameter which is greater than the maximum major diameter for the standard thread convolutions of the basic form, the latter major diameter being indicated by the dotted line **28**. The thread convolutions **16*b*** are here shown as having planar leading and trailing side flanks **30** and **31**, respectively, which have the same flank angle as the leading and trailing side flanks of the thread convolutions **16*a*** and which have an axially extending width at any given radial location which is greater than the corresponding maximum width within established tolerance limits of the standard thread convolution of the basic form or the thread convolutions **16*a***, as indicated by the dotted lines **32** on the thread convolutions **16*b***. When

flank angle is used in the present specification, it refers to the angle that the line of intersection of the flank with a plane through the nut axis defines with the nut axis. The screw thread convolutions **16***a* and **16***b*, in the preferred embodiment, have a standard crest diameter.

The locking screw thread convolutions **16***b* of the screw thread **16** define a continuous interfering locking thread portion on the nut which interferes with the threaded stem **24** to produce a locking action therebetween and effects a swaging of metal when the nut **10** is screwed onto the stem **24**. Since the screw thread convolutions **16***b* have a pitch diameter which is less than the minimum pitch diameter of the standard screw thread convolutions, the width of the grooves between adjacent thread convolutions **16***b* thereof is less than the width between the side flanks of the standard screw thread convolutions on the stem **24**. Therefore, when the standard thread convolution on the stem **24** engage the thread convolutions **16***b* on the nut **10** they interfere with each other, as indicated in FIG. 4 by the double cross-hatched areas, and cause metal to be swaged. Since the flank angle for the locking thread convolutions **16***b* is the same as for the standard thread on the stem **24**, the locking threads have a uniform depth of interference along the thread flanks.

If the lock nut **10** is of a softer material than that of the threaded stem, the major portion of the metal which is swaged due to the thread interference will be swaged from the thread convolutions **16***b* of the nut **10** and flow into cavities or recesses **35** extending radially inwardly from the bottom of the thread convolutions **16***b*. The recesses **35** are larger in an axial plane than the recess space defined by the triangle between the adjacent threads **16***b*, i.e., the triangle whose sides are coplanar with the flanks **30** and **31** and whose apex is the projected point of intersection of the flanks, as indicated by reference numeral **36**. The recesses **35**, in the preferred embodiment, extend radially outwardly to a depth which is greater than the depth defined by the maximum major diameter for the standard thread of the same basic thread form and preferably to a depth greater than the sharp root of the basic thread form, the sharp root being indicated by reference numeral **40**. The recesses **35** preferably have opposite side wall portions **42** which extend generally radially outwardly of the axis of the nut and which intersect the interfering flanks of the threads **16***b* preferably at a location radially inwardly of the basic major diameter of the basic thread form or radially inwardly of the crest of the standard thread on the stem **24**, as best shown in FIG. 4. It is thus apparent that each of the recesses **35** includes a clearance space or recess portion extending outwardly from the basic thread form which is substantially larger in an axial plane than the maximum clearance space extending outwardly from the basic thread form for the standard thread within established tolerances so that the metal swaged is freely accommodated or received in the recesses **35** to insure that seizure between the nut **10** and the stem **24** due to insufficient clearance space for the swaged metal will not occur. By providing generally radially extending sides **42** for the recesses **35** which preferably intersect the flanks of the thread convolutions **16***b* at a location radially inwardly of the crests of the threads on the stem **24**, metal is swaged from the flanks of the thread convolutions **16***b* along their entire extent so that a maximum locking action is achieved. This latter provision also insures that free access to the recesses **35** is provided for the swaged metal.

If the nut **10** is of a harder material than the threaded stem **24** metal will be swaged from the threads of the stem **24** into the cavities **35** and into the normal clearance space provided between the crests of the threads **16***b* of the nut and the root or bottom of the threads on the stem, this latter clearance space being usually sufficient to freely accommodate that portion of the metal which is swaged thereinto due to the thread interference. If additional clearance space between the crests of the threads **16***b* of the nut and the root of the threads on the stem is necessary or desired, such as may be necessary in extreme hard-soft material combination, the crest diameter of the threads **16***b* can be made greater than the maximum crest diameter for the standard thread to provide extra clearance space between the crests of the threads **16***b* and the root of the threads on the stem.

A locking action between the threads **16***b* and the threads on the stem **24** is also produced, in the preferred embodiment, by the self-contracting forces exerted by the collar portion **22** due to the latter being expanded circumferentially and radially outwardly as a result of the thread interference therein. That is, the collar portion **22** due to its resilient or flexible nature will tend to return to the position which it had prior to being expanded radially outwardly by the threads of the stem **24** and thus, will exert a self-contracting or radially inward force on the threads on the stem **24**. By forming the locking thread convolutions **16***b* in the radially resilient collar portion **22** of the nut **10**, a locking portion on the nut **10** is provided which is of a sufficient flexibility to accommodate the tolerance variations of the standard threads on the stem **24** and the threads **16***b* in the locking portion of the nut **10**.

From the construction of the preferred embodiment lock nut **10** as shown in FIGS. 1 and 2 in the drawings and described above, it can be seen that the thread convolutions **16***a* provide for free running engagement with the threads of the stem **24** and that gripping of the threaded stem by the nut **10** for producing a desired locking action is achieved, first, by the thread flank interference between the threads of the stem **24** and the locking threads **16***b* in the collar portion **22**. A locking action is also achieved, as explained above, by the self-contracting flexibility of the collar portion **22** by which the screw threads **16***b* are pressed against the threads on the threaded stem **24**. The locking action achieved between the nut **10** and the threaded stem **24** will accordingly be very effective for preventing undesired loosening between the nut **10** and the stem **24**. The provision of the cavities **35** permits a thread interference type locking action to be achieved without causing seizure between the nut **10** and the stem **24** and will permit unscrewing therebetween as well as the reapplication thereof in which a locking action is again achieved to a substantial degree due to the self-contracting flexibility of the collar portion **22**.

The collar portion **22** is here shown as comprising an annular side wall **44** having a radial wall thickness which is substantially less than the radial wall thickness of the side wall of the nut body **12**. The collar portion **22** defines a closed wall means which encompasses or completely surrounds the opening **14** and which is integral with the nut body **12** for the entire circumferential and a transverse extent of the annular side wall **44**.

If a collar portion having a greater radial resiliency than the collar portion **22** were desired, the collar portion **22** could be provided with a pair or pairs of grooves at diametrical opposite locations therein. The grooves would extend axially of the collar portion for the entire length thereof and preferably extend through the side wall of the collar portion. The grooves would open into the opening and be of a sufficient width between their adjacent side wall portions thereof so that their axially extending corner edges formed at the junction with the opening **14** in the nut would not act as cutters when the nut is applied to the threaded stem **24**. The provision of grooves would also provide additional recess means for receiving metal swaged due to the thread interference between the locking threads in the collar portion and threads on the stem **24**.

The lock nut **10** can be suitably formed as by a cold

working operation on a metal blank in a suitable die apparatus whereby a nut blank having a central opening and a desired external shape, such as a hexagonal shape shown in the drawings, is provided and wherein the external shape formed by the die apparatus includes the collar portion **22**. The die apparatus used for thus forming the nut blank is of such a character that the formed shape of the collar portion **22** on the nut body **12** is of a reduced transverse dimension as referred to above.

After the nut blank is so formed, the screw thread **16** is formed on the side wall **18** of the opening **14** by a tapping operation. The screw thread **16** can be formed by an in and out operation of a cutting tap **50** having a forward section **51** provided with cutting teeth which are undercut along their flanks, as indicated by reference numeral **52** and which preferably have a crest diameter which is substantially greater than the maximum allowable for cutting the standard thread and a rearward section **53**, here shown as being axially spaced from the forward section, provided with cutting teeth for cutting a standard thread. As the forward section of the cutting tap moves into the opening **14** from the bearing end **20**, it cuts threads on the side wall of the nut blank like the thread convolutions **16***b* and when the rearward end of the cutting tap moves into the opening **14** it removes the excess metal left on the flanks of the thread convolutions **16***b* because of the undercut flanks of the cutting teeth at the forward end of the tap to provide thread convolutions like the thread convolutions **16***a*. The cutting tap is moved into the opening **14** until the forward end of the rearward section is located at approximately the start of the collar portion **22** of the nut **10** and then backed out, thus leaving the thread convolutions **16***b* cut by the forward section of the tap in the collar portion **22** intact. The cutting teeth at the forward ends of the forward and rearward sections **51** and **53**, respectively, are preferably chamfered or tapered with the cutting teeth at the forward end of the rearward section **53** providing a smooth or gradual transition between the cross-sectional shape of the cutting teeth of the two sections.

From the accompanying drawings and the foregoing detailed description, it will now be readily recognized that this invention provides a novel locking thread convolution which deviates from the theoretical basic form of the thread in a particular manner to provide an improved interference-type locking action when applied to a mating threaded member without causing seizure between the interfering threads thereof. It will also be seen that the present invention provides a novel lock nut which is of a simple and economical construction and which provides a thread interference-type locking action without causing seizure between the nut and a threaded stem. It will additionally be recognized that a novel lock nut has been provided in which the thread flank interference takes place within a collar portion of reduced transverse dimension so that an additional locking action due to the radial expansion of the collar is effected and that due to the flexible nature of the collar portion further assurance against seizure between the threads on the nut and the threads on the stem is provided.

Although the subject matter of this invention has been illustrated and described herein to a somewhat detailed extent, it will be understood, of course, that the invention is not to be regarded as being limited correspondingly in scope but includes all changes and modifications coming within the terms of the claims hereof.

Having described my invention, I claim:

1. A locking thread convolution for a thread having a theoretical basic form and standard tolerances from the basic form and which is adapted to interfere with a standard mating thread to provide a locking action therebetween, the locking thread convolution having a thread angle which is the same as that for the basic thread form and a metal width between its flanks which is greater than the maximum width for a standard thread of the same basic thread form to provide for uniform interference with a standard mating thread substantially along the flanks of the locking thread convolution, said locking thread convolution having a pitch between adjacent threads thereof which is the same as that for a standard thread of the same theoretical basic thread form, said locking thread convolution having a recess space between adjacent threads thereof for freely accommodating metal swaged due to the thread interference, said recess having side wall portions extending transversely to the longitudinal axis of said locking thread convolution and which intersect the adjacent flanks of the thread at locations intermediate the crest and bottom of the mating standard thread and a bottom which is radially spaced from the crest of the mating standard thread to provide clearance between the crest of the standard mating thread and the bottom of said locking thread convolution, said locking thread convolution having a crest radially spaced from the root of the standard mating thread to provide clearance between the crest of the locking thread convolution and the root of the standard mating thread.

2. A locking thread convolution, as defined in claim **1**, wherein said recess space extends radially to a depth greater than the sharp root for the basic thread form.

3. A lock nut for cooperating with standard screw thread convolutions on an externally threaded stem comprising; a metal nut body having an axially extending opening therethrough, a screw thread formed on the side wall of said opening comprising first screw thread convolutions having a given pitch diameter extending inwardly from the end of said opening and terminating at a location spaced axially inwardly from the other end of the opening and which are adapted to freely engage the standard screw thread convolutions on said stem, and second locking screw thread convolutions which are adapted to interfere with the threads on said stem and effect a swaging of metal when the nut is threaded onto the stem, said second thread convolutions forming an extension of said first screw thread convolutions and extending from said location toward the other end of said opening, said second screw thread convolutions being truncated and having the same pitch and thread angle as standard screw thread convolutions of the same theoretical basic thread form, said second screw thread convolutions having a minor diameter no less than the minor diameter of standard screw thread convolutions of the same theoretical basic thread form, said second screw thread convolutions deviating from standard screw thread convolutions of the same theoretical basic thread form in that they have a width between their flanks in an axial plane which is greater than the maximum width for the standard thread convolutions and a recess space between adjacent convolutions thereof for freely accommodating metal swaged due to the thread interference, said recess between adjacent locking thread convolutions having a side wall portion extending transversely to the longitudinal axis of said lock nut and angularly related to the flanks thereof and intersecting one of the flanks at a location intermediate the crest and root of the standard thread convolutions on the stem and a bottom which is located radially outwardly of the maximum major diameter of the standard screw thread convolutions on said stem to provide clearance between the crests of the threads on said stem and the bottoms of the second locking thread convolutions.

4. A lock nut, as defined in claim **3**, and wherein said recess space between adjacent locking thread convolutions extends radially outwardly to a depth greater than the sharp root for the basic thread form for the thread convolution.

5. A lock nut, as defined in claim **3**, wherein said recess also has a radially extending side wall portion which intersects the other of the flanks of the second thread convolutions.

6. A lock nut, as defined in claim **3**, wherein said nut body has a radially resilient portion at one end and where-

in said second locking screw thread convolutions are located in said radially resilient portion, said radially resilient portion expanding radially due to the thread interference and exerting a self-contracting force when radially expanded to further increase the locking action between the interfering thread convolutions.

7. A lock nut, as defined in claim **6** wherein said radially resilient portion comprises an annular collar having a side wall thickness which is substantially less than the side wall thickness of the nut body.

8. A lock nut, as defined in claim **7**, wherein said collar portion comprises a closed wall means encompassing said opening, said closed wall means being integral with said nut body for the entire circumferential and transverse extent of said closed wall means.

9. A lock nut for cooperating with standard screw thread convolutions on an externally threaded stem comprising a metal nut body having an axially extending opening therethrough, a screw thread formed on the side wall of said opening comprising first screw thread convolutions having a given pitch diameter extending inwardly from one end of said opening and terminating at a location spaced axially inwardly from the other end of the opening and which are adapted to freely engage the standard thread convolution on said stem, and second locking thread convolutions forming an extension of said first screw thread convolutions and extending from said location to the other end of said opening and which are adapted to interfere with the threads on said stem and effect a swaging of metal when the nut is threaded onto the stem, said second screw thread convolutions having the same flank angle and pitch as said first thread convolutions and a minor diameter no less than the minor diameter of standard screw thread convolutions of the same theoretical basic thread form, said second screw thread convolutions deviating from standard screw thread convolutions of the same theoretical basic thread form in that they have a width between their flanks in an axial plane which is greater than the maximum width for the standard screw thread convolutions to provide a uniform interference with a standard mating thread along the flanks of said second thread convolutions and a recess space between adjacent thread convolutions thereof for freely accommodating metal swaged due to the threaded interference, said recess space between adjacent locking thread convolutions being larger in an axial plane than the space defined by the triangle between the adjacent locking thread convolutions for freely accommodating the metal swaged due to the thread interference, said recess having side portions which intersect the adjacent flanks of said second screw thread convolutions at locations intermediate the crest and bottom of the mating standard thread convolutions and which extend transversely of a longitudinal axis of said lock nut and a bottom which is located radially outwardly of the maximum major diameter of the standard screw thread convolutions on said threaded stem to provide clearance between the crest of the threads on said stem and the bottom of said second locking thread convolutions.

10. A lock nut as defined in claim **9**, and wherein said second locking screw thread convolutions have a major diameter which is greater than the maximum major diameter for standard screw thread convolutions for freely engaging the threads on said stem.

11. A locking thread convolution for a thread having a theoretical basic form and standard tolerances from the basic form and which is adapted to interfere with a standard mating thread to provide a locking action, the locking thread convolution having a thread angle which is the same as that for the basic thread form and a metal width between its flanks which is greater than the maximum width for a standard thread of the same basic thread form to provide a uniform interference with a standard mating thread substantially along the flanks of the locking thread convolution, said locking thread convolution having a recess space between adjacent threads thereof which is larger in an axial plane than the space defined by the triangle between adjacent threads of said locking thread convolution, said recess having a side wall portion extending transversely to the longitudinal axis of said locking thread convolution and a bottom which is radially spaced from the crest of the mating standard thread to provide clearance between the crests of the mating standard thread and the bottom of said locking thread convolution, said locking thread convolution having a crest radially spaced from the root of the standard mating thread to provide clearance between the crest of the locking thread convolution and the root of the standard mating thread.

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CARL W. TOMLIN, *Primary Examiner.*

RAMON S. BRITTS, *Assistant Examiner.*