

Jan. 19, 1937.

A. STOLL

2,068,613

LOCK NUT

Filed July 8, 1935

Fig. 1.

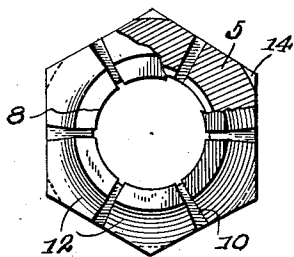


Fig. 5.

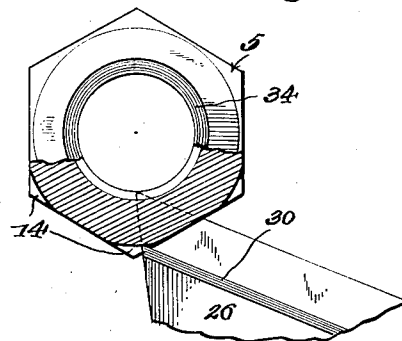


Fig. 2.

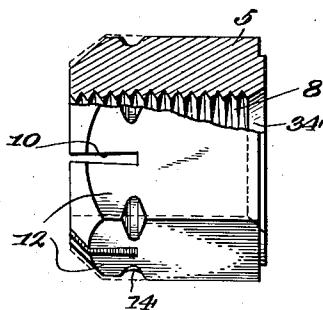


Fig. 6.

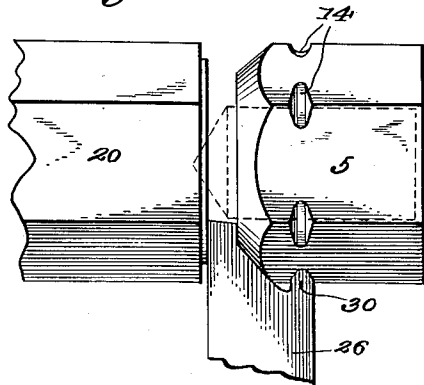


Fig. 3.

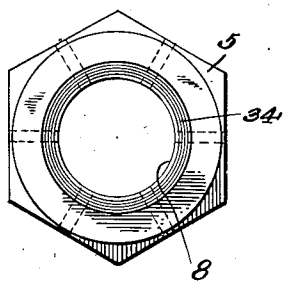


Fig. 7.

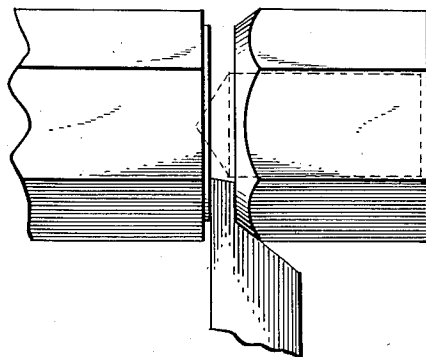
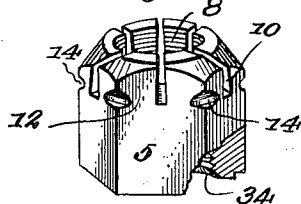


Fig. 4.



334

INVENTOR
ALBERT STOLL
W. C. Quasada
Attorney

UNITED STATES PATENT OFFICE

2,068,613

LOCK NUT

Albert Stoll, Detroit, Mich., assignor to Clare L. Brackett, Detroit, Mich.

Application July 8, 1935, Serial No. 30,360

5 Claims. (Cl. 151-21)

This invention relates to lock nuts and aims to provide novel and efficient means by which the nut is held firmly in place against the contrary influences incident to use.

More particularly, a nut embodying the invention will be found to have a plurality of approximately radial slots opening out through the upper end or crown of the nut and the peripheral walls thereof to form an annular series of segmental locking sections for pressure engagement with the threaded member embraced thereby and the base portions of such locking sections will be found to have external cuts or grooves adding to the resiliency of the locking sections and thus allowing the same to have full pressure engagement with the adjacent portion of the associated threaded member, the location of the external cuts or grooves in the base portions of the segmental locking sections being such that the same may be formed purely as an incident to the manufacture of the nut without increasing the cost of manufacture and without an appreciable weakening of the points of connection of the locking sections with the body of the nut.

By way of further brief preliminary reference to the locking sections constituting the crown of the nut, it is pointed out that the upper or outer terminal portions thereof are externally chamfered or cut away to further add to the resiliency of such locking sections in order that the same might have the desired restraining action with the threaded member of whatever nature the latter happens to be.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawing, forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a top plan view of the improved nut, partly in section,

Figure 2 is a side elevation of the nut, partly in longitudinal section,

Figure 3 is a bottom plan view of the nut,

Figure 4 is a perspective view of the nut, partly in section,

Figure 5 is an end view, partly in section, of the nut during the process of manufacture, the view illustrating the means by which the nut is externally relieved or grooved at circumferentially spaced points to diminish the cross-sectional areas of the base portions of the locking sections of the nut and thus add to the resiliency of these parts,

Figure 6 is a side elevation of the nut in one

step of manufacture, this view also illustrating the means by which the nut is externally grooved or cut at the base portions of the locking sections thereof,

Figure 7 is a side elevation disclosing a conventional nut and one of the forming tools therefor.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of the invention, the numeral 5 generally designates the body of a hexagonal or other nut, the same being formed with a longitudinal bore 8 having conventional screw threads for mating engagement with a threaded male member of any type.

The hexagonal nut 5 is shown in Figure 4 to have a plurality of radial slots 10 opening out through the crown or upper end of the nut and out through the peripheral walls thereof to define an annular series of inherently resilient, complementary, segmental, radially located, locking sections 12 for pressure engagement with the associated threaded member, of whatever nature the latter happens to be. It is illustrated in Figure 2 that the crown portion of the nut is compressed or directed inwardly somewhat to constrict the outer portion of the bore to the nut so that concurrently with and purely as an incident to the advance of the nut on the associated stud or the like, the segmental locking members will be forced outwardly and thus loaded for firm pressure and restraining engagement with the threaded stud or the like.

Of course, I am aware of the fact that I am not the first to provide a polygonal nut having a plurality of more or less spaced saw or other cuts to define an annular series of segmental locking members, but I do believe that I am the first to provide such an arrangement in which the base portions of the segmental locking sections are formed with circumferentially spaced grooves or indentations 14 diminishing the cross sectional areas of these locking sections or members at the points where the same join the body of the nut and to cause such grooves or indentations to terminate short of the slots between the locking members.

That is to say, the circumferentially spaced grooves 14 will be found to be uniformly spaced between the radial side walls of the locking members 12 and to break through the outer corners of such locking members to give to the locking members the resiliency so necessary for effective restraining action of the same with the associated stud or other threaded member.

It is clearly illustrated in Figure 1 that the

grooves 14 are in those parts of the locking members 12 having the greatest radial dimensions and in this way the circumferential grooving of the nut leaves undiminished the initial minimum radial dimensions of the locking members. In other words, even after the members 12 have been circumferentially grooved at the center corner portions thereof and at points spaced uniformly inward of the radial sidewalls thereof, the greatest radial dimension of a particular locking member is through the circumferentially grooved portion thereof. This is an important consideration because it avoids a possibly fatal weakening of the locking member.

More specifically, the circumferentially extending grooves 14 break through the centrally located outside corner portions of the locking members 12 and diminish in depth toward the ends thereof and terminate short of the slots 10, leaving uncut substantial portions of the outside walls of the nut.

This important aspect of my invention prompts me to further explain that the segmental locking members 12 are formed with outside angular corners at points midway of the radial edges of the locking members and it is at these outside corners that the nicks or grooves 14 occur to add to the resiliency of the locking members 12 without an appreciable weakening of the connection of the same with the body of the nut.

In Figure 4, it is illustrated that the upper or outer terminal portions of the segmental locking members 12 are externally chamfered to reduce the cross-sectional areas of such locking members as the same approach the crown of the nut so as to further add to the resiliency of the locking members. In other words, the external chamfer reduces the wall thickness of the locking members from points adjacent the grooves 14 to the top of the nut to augment the resiliency of the locking members.

In summarizing the invention as thus far described, it will be seen that in a polygonal nut made in accordance with this invention, the radial cuts 10 open out through the flat faces thereof and at uniformly spaced points between the corners of the nut, to define an annular series of inherently resilient, individually acting, locking members for pressure engagement with a threaded stud or the like and that at the outside corner portions of the locking members thus formed, there are circumferentially spaced grooves terminating short of the said radial cuts and produced without an appreciable increase in cost of manufacture and augmenting the resiliency of the locking members so as to allow of full restraining action on the part of the same without an appreciable weakening of the connection of the locking members with the body of the nut.

It is shown in Figures 5 and 6 that the nut 5 is formed from a bar of stock 20 of a cross-sectional form corresponding to that of the nut. The stock 20 is presented to a forming tool 26.

Figures 5 and 6 also illustrate that the forming tool 26 is provided with a cutting tooth or portion 30 for cutting or grooving engagement with the corner portions of the nut at the points where the locking members 12 joint the body of the nut. It is in this way that the grooves or relief cuts 14 are formed in the nut purely as an incident to manufacture and without adding to the cost of the nut, because no additional operations are required for the forming of the circumferentially spaced grooves and while there may be some very

slight additional cost of the forming tool 26, due to the presence of the additional cutting portion or tooth 30, this is negligible and is not discernible in the cost of the nuts when made on a large production basis.

Referring now to Figure 2, it will be seen that the bore 8 of the nut has the inner terminal portion thereof formed with a decided chamfer or flare 34 at an acute angle to the longitudinal axis of the nut so as to space this part of the nut from engagement with the work and thus look to a firm pressure engagement of the surrounding peripheral portion of the nut with the work and at the same time produce a more effective cantilever action by which the locking members 12 are forced radially inward into restraining relation with the stud or the like.

However, it is important to observe that the accentuated chamfer 34 leaves ample bearing area for the nut and does not render the nut prone to pancaking or spreading under pressure, such as would be the case were the base portion of the nut lacking in uniform pressure engagement with the work or were the base portion of the nut deprived of the major portion of the bearing surface thereof. By leaving a generous and unbroken circular area of the nut available for pressure engagement with the work, the nut is characterized by an absence of sharp corners which would be likely to cut into the work producing chips and, in general, damaging the surface against which the nut is clamped.

Having thus described the invention, what is claimed is:

1. In a nut, a hexagonal body having a plurality of external flat faces and corner portions at the meeting points of said faces, said body also being formed with a threaded bore and with a crown, the body of the nut being formed with radial slots opening through the bore and crown of the nut and through the flat external faces of the body at points uniformly spaced between the said corner portions to define an annular series of segmental locking members for pressure and threaded engagement with a complementary threaded member, said locking members being formed at the base portions thereof and at the said corner portions with circumferentially extending grooves diminishing in depth toward the ends thereof and terminating short of the said slots to add to the resiliency of said locking members, said locking members being directed inward at an acute angle to the longitudinal axis of the bore thereby constricting the bore at this point and causing the complementary threaded member to load the locking members as an incident to the advance of the nut.

2. In a nut, a polygonal body having a plurality of external flat faces and corner portions at the meeting points of said faces, said body also being formed with a threaded bore and with a crown, the body of the nut being formed with radial slots opening through the bore and crown of the nut and through the flat external faces of the body at points uniformly spaced between the said corner portions to define an annular series of segmental locking members for pressure and threaded engagement with a complementary male threaded member, said locking members being formed at the base portions thereof and at the said corner portions with circumferentially extending grooves diminishing in depth toward the ends thereof and terminating short of the said slots to add to the resiliency of the locking members, said locking members being reduced in wall

thickness from points adjacent said grooves to the top of the nut, said locking members being directed inward toward the longitudinal center of the bore to constrict the bore in the region of the locking members.

3. In a nut, a body of polygonal cross-section and having a threaded bore, said body being provided with a plurality of approximately radial circumferentially spaced slots defining an annular series of individual locking members for threaded engagement with a complemental threaded member, said individual locking members being increased in cross-sectional area toward the longitudinal centers thereof to define centrally located, longitudinally extending corner portions, said corner portions being provided with circumferentially extending grooves diminishing in depth toward the ends thereof and terminating short of the said slots, said locking members being directed inward at an acute angle to the longitudinal axis of said bore to constrict the bore in the region of the locking members and thus cause a complemental threaded member to load the locking members as an incident to the advance of the nut.

4. In a nut, a polygonal body having a threaded bore and a plurality of external faces defining angular outside corners at the meeting points of such faces, said body being provided at one end portion thereof and between said outside corners with radial slots defining circumferentially spaced individual locking members for pressure engagement with a threaded member, the said outside corners being formed with spaced circumferen-

tially extending grooves diminishing the cross-sectional areas of the locking members at the base portions thereof, said grooves terminating short of the said radial slots, said locking members being directed inward toward the longitudinal center of the bore to constrict the bore in the region of the locking members.

5. In a nut for threaded engagement with a complemental threaded member, a hexagonal body having a plurality of external flat faces and corner portions at the meeting points of said faces, said body also having a threaded bore and a crown, the body of the nut being formed with radial slots opening out into the bore of the nut and through the external flat faces of the body to define an annular series of segmental locking members having the greatest radial dimensions at the said corner portions thereof, said locking members being formed at the base portions thereof and at the said points of greatest radial dimension with circumferentially extending grooves diminishing in depth toward the ends thereof and breaking through said corners to add to the resiliency of said locking members and leaving undiminished in radial dimension the remaining portions of the locking members, said locking members being directed inward toward the longitudinal center of the bore, thereby constricting the bore at this point and causing the complemental threaded member to load the locking members as an incident to the advance of the nut.

ALBERT STOLL.