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(54) **Title**: CAGED NUT

(57) **Abstract**: ABSTRACT A CAGED NUT, of the type formed by the composition of a container housing (2) and a nut (1) accommodated therein, wherein said nut (1) is formed by a planar base (3) from which emerges a threaded cylinder (4) linked to said base by means of a connection vault (5); said housing or cage (2) being formed by a stamped clip that clasps said nut (1) between flexed lateral arms (9) and folds (7) at the ends of said clip; tabs (8) for engaging with the panel where said assembly is to be fastened emerging from said end folds (7).

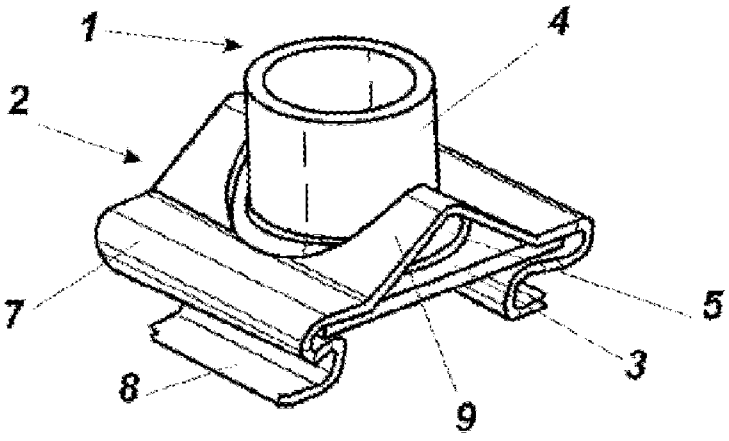

Fig. 1

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CAGED NUT

FIELD OF THE INVENTION

The present invention relates to a nut assembly and retention cage therefor configured in order to optimize the performance thereof and to obtain a significant reduction in the material used to make same.

PRIOR ART

There are many situations in which an industry requires preinstallation of a nut in an orifice in a panel, a bodywork, a surface, etc., with a view to mechanizing subsequent mounting of other additional components or accessories.

The present invention relates to a type of such nuts allowing slight clearance therein in terms of the anchoring thereof, with a view to allowing final adjustment thereof, while at the same time being of the type of nut that has to withstand high tightening forces when in the final use position.

One of such type of nuts is that represented by patent US6595732, in which a female part or nut of non-circular cross section is incorporated into an open retainer housing with skirts or closure tabs, one thereof having an adjustment screw that secures the nut, which is square and raised; said assembly suitable for receiving a fastening screw in said nut. The nut has a broad width in order to accommodate the forces it has to withstand.

In industry, in the case of this type of nut, there are known variations that incorporate tabs for engagement on

a panel such that the housing is not free but secured to the panel, fastening the nut thereto.

Said aforementioned nuts are relatively heavy and incorporate a fair amount of material in their formation. However, current technology allows the production of much lighter nuts with performance levels that are even higher than is the norm in terms of the work they are to perform.

European patent EP2423079, from the same applicant, relates to different anchoring-plate assemblies that incorporate lightweight vaulted nuts offering high performance levels that can be placed on panels and surfaces, providing an excellent result in terms of their performance.

However, a problem arises when this type of nut, with anchorings envisaged for welding, is to be used with panels that are thick, for example, and/or in situations where the large raised square knots of the prior art were used. Their relative slenderness and the absence of material in terms of height prevent their being used as a substitute.

It is therefore the principal object of the present invention to provide a caged nut which, made from lightweight, strong materials, can be used with thick panels and as substitutes for the former raised square nuts, which results in a significant weight reduction.

This and other objects of the present invention will become more apparent in the course of the following description.

BRIEF EXPLANATION OF THE INVENTION

The present invention relates to a caged nut, of the type formed by the composition of a container housing and a nut accommodated therein, wherein development of the housing has been optimized with a view to accommodating a nut of vaulted type and allowing the use thereof in thick panels.

The nut is formed by a planar base from which emerges a nut in the form of a threaded cylinder linked to said base by means of a connection vault.

The housing or cage of said nut is formed by a stamped clip that clasps said nut between flexed lateral arms and folds at the end of said clip from which emerge tabs for engaging with the panel where it is to be fastened.

The objectives envisaged by the invention have thus been achieved. For example, the nut thus created offers high levels of performance in terms of the working tightening forces thereof and affords a significant reduction in terms of material and weight for the component as a whole. The configuration thereof allows the engagement of the nut in the assembly and prevents the nut from being lost once it has been installed where it is to be used.

The nut of the invention can be used in thick panels and as a substitute for known caged nuts of much greater thickness and weight.

BRIEF EXPLANATION OF THE DRAWINGS

For a better understanding of the invention, the present description is accompanied by a sheet of drawings provided solely by way of non-limiting illustrative example.

Figure 1 shows a perspective representation of a preferred embodiment of the caged nut of the present invention in plan view.

Figure 2 shows an elevation of the caged nut of the preceding figure.

Figure 3 shows a perspective representation of the caged nut of the preceding figures, from underneath.

DETAILED EXPLANATION OF THE INVENTION

The present invention comprises a caged nut of the type produced by the composition of a container housing (2) and a nut (1) accommodated therein, wherein said nut (1) is formed by a planar base (3) from which emerges a nut in the form of a threaded cylinder (4) linked to said base by means of a connection vault (5).

The nut (1) may be produced from any appropriate material suitable for providing a higher capacity for work and which is lightweight. This is the case, for example, of boron steel or heat-treated C45 or C67

steel. In fact, the invention also envisages the possibility of the cage (2) or the nut (1) potentially being made from different materials.

As may be seen from Figure 3, the nut (1), seen from below, incorporates a vaulted opening (6) that facilitates the positioning of the fastening screw (not shown) to be used with the application.

In addition to a vaulted opening (6), said connection vault (5) confers on the nut an elastic reserve capacity when the fastening screw is tightened onto the threaded cylinder (4), which can withstand a high tightening torque.

The housing or cage (2) of said nut is formed by a stamped clip that clasps said nut (1) between flexed lateral arms (9) and folds (7) at the end of said clip. Tabs (8) for engaging with the panel where said assembly is to be fastened emerge from said end folds (7).

As shown in the drawings, the planar base (3) engages between the curves of the returns (7) of the cage (1). These returns or folds (7) are located on opposite sides of said planar base (3) and are the starting point for said tabs (8). The tabs (8) in the preferred embodiment comprise a further fold (8) in the opposite direction from that of the returns (7), configured for engagement in the opening in the panel to be used.

The component as a whole has, in said tabs (8), a degree of flexibility such that, at the time of installation of

the component, one of the tabs can be engaged in the panel, allowing flexing of the other tab (8) so that it can be inserted into the opening and likewise engaged in the lateral part of the opening in the panel.

In the preferred embodiment shown in the figures, not only the end fold (7) but also the flexible tabs (8) occupy the entire extent of the side of said clip (2).

The nut (1) is engaged laterally, furthermore, by flexed arms (9) that lend height to the housing (2), center the nut vertically and protect it against unsuitable lateral manipulation. Said arms confer on the clip (2) and the assembly of the caged nut of the present invention an additional elastic reserve capacity when it is applied on the installation panel, making it possible for the component potentially to be suitable for a wide range of panel thicknesses.

In terms of the relationship of one with the other, it is possible to construct the component as a whole so that there is a relative clearance between nut (1) and cage (2), in both orthogonal and/or vertical directions, with a view to it being possible for it to be adapted to applications requiring a final adjustment, at the installation site, when the fastening screw is received. Without becoming over-specialised, it is also possible for the component to be produced with practically no clearance, simply by adjusting the flexed arms (9) and the end folds (7) in order that they tightly engage not only the base (3) of the nut but also the threaded cylinder (4).

The invention can therefore be presented in various embodiments that do not modify the essential features thereof. It is understood that in the present case details of finish or form may be changed provided these do not modify the essential nature of the invention.

CLAIMS

1.- A CAGED NUT, of the type formed by the composition of a container housing (2) and a nut (1) accommodated therein, CHARACTERIZED in that it comprises said nut (1) formed by a planar base (3) from which emerges a threaded cylinder (4) linked to said base by means of a connection vault (5); said housing or cage (2) being formed by a stamped clip that clasps said nut (1) between flexed lateral arms (9) and folds (7) at the ends of said clip; tabs (8) for engaging with the panel where said assembly is to be fastened emerging from said end folds (7).

2.- THE CAGED NUT as claimed in the preceding claim, CHARACTERIZED in that in its lower part said nut (1) has a vaulted opening (6).

3.- THE CAGED NUT as claimed in either of the preceding claims, CHARACTERIZED in that said tabs (8) have a fold in the opposite direction from that of said returns (7), designed in order to engage in the orifice in the panel with which the component is to be used.

4.- THE CAGED NUT as claimed in any one of the preceding claims, CHARACTERIZED in that not only the end folds (7) but also the flexible tabs (8) occupy the entire extent of the side of said cage (2).

5.- THE CAGED NUT according to any one of the preceding claims, CHARACTERIZED in that said planar base (3) of said nut (1) is engaged with variable, slight or tight, clearance between the curves of the returns (7) of the

cage (1) and said flexed arms (9), and also in the vertical direction, allowing play in three directions.

6.- THE CAGED NUT as claimed in any one of the preceding claims, CHARACTERIZED in that said nut (1) is made from heat-treated C45 or C67 boron steel.

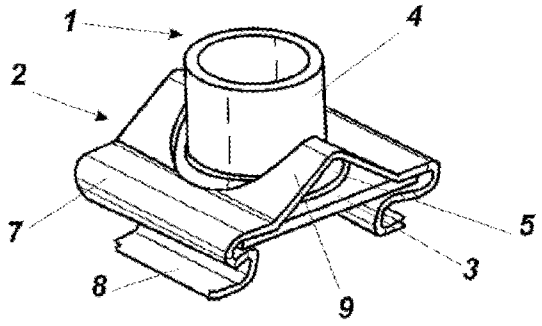

Fig. 1

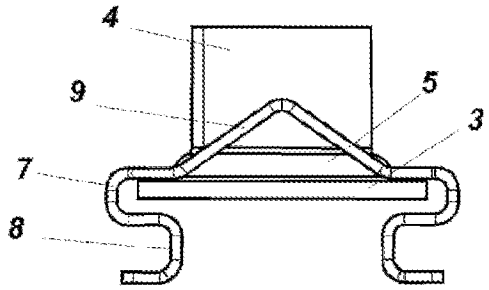

Fig. 2

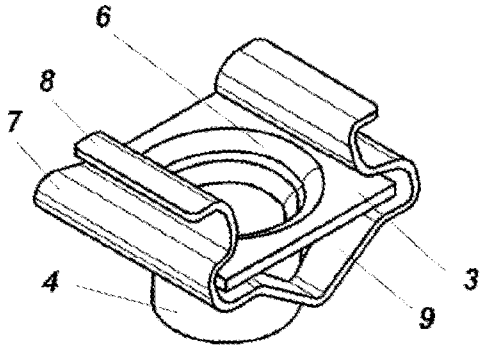

Fig. 3

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER
INV. F16B37/04
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F16B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 217 585 A (MUNSE ROBERT A) 16 November 1965 (1965-11-16) figures 1-4 column 1, line 9 - column 2, line 27	1-3,5
A	US 3 189 076 A (ADAMS JAMES E) 15 June 1965 (1965-06-15) the whole document	1-6
A	US 3 314 465 A (BIEN ALFRED A) 18 April 1967 (1967-04-18) the whole document	1-6
A	US 3 192 823 A (MUNSE ROBERT A) 6 July 1965 (1965-07-06) the whole document	1-6

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 October 2013	24/10/2013

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INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 12 22 321 B (BISHOP & BABCOCK CORP) 4 August 1966 (1966-08-04) the whole document -----	1-6

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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