(12) UK Patent Application (19) GB (11) 2464308 (13) A

(43) Date of A Publication 14.04.2010

(21) Application No: 0818629.8

(22) Date of Filing: 10.10.2008

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(51) INT CL:
F16B 37/04 (2006.01)

(56) Documents Cited:
GB 0684740 A
EP 0971137 A1
FR 002491170 A2
US 3035624 A
US 2678075 A

(58) Field of Search:
INT CL **F16B**
Other: **Online: WPI, EPODOC**

(54) Title of the Invention: **Fasteners**
Abstract Title: **Nut cage device**

(57) A device 10 for positioning a threaded nut 12 relative to an aperture comprises a cage having a nut receiving part and a pair of tongues 18 extending from the cage and locatable relative to the aperture to hold the nut over the aperture. There may be an inwards protrusion 24 on one or both of the tongues 18 for retaining the nut 12 in the cage.

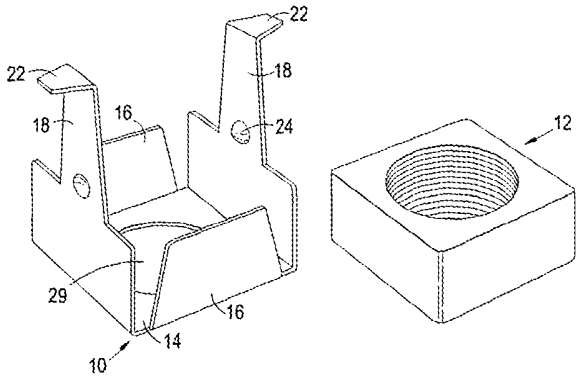

Fig.1

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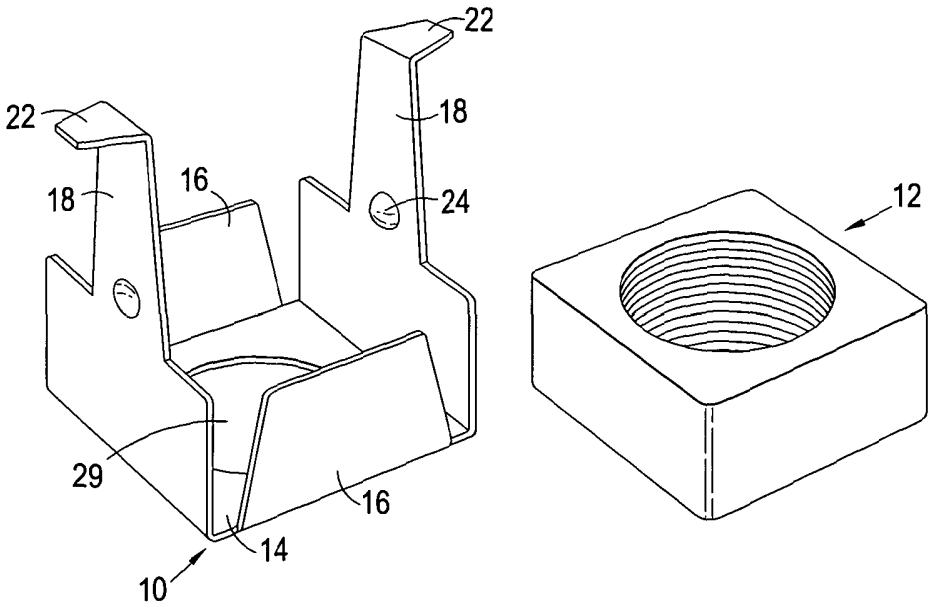

Fig.1

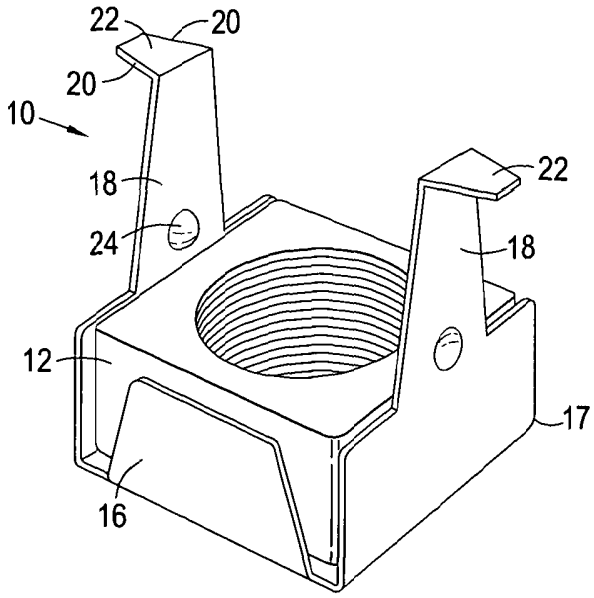

Fig.2

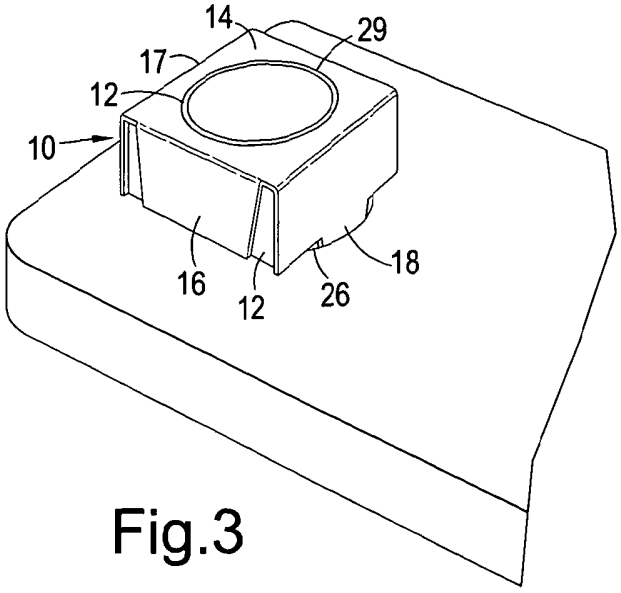

Fig.3

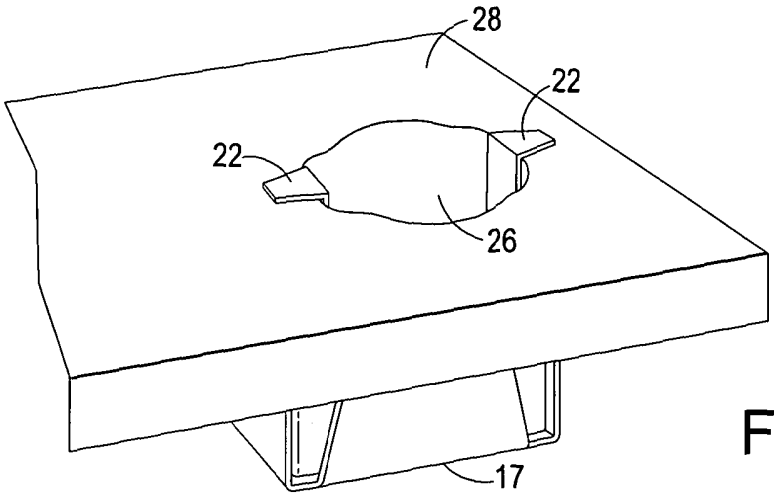

Fig.4

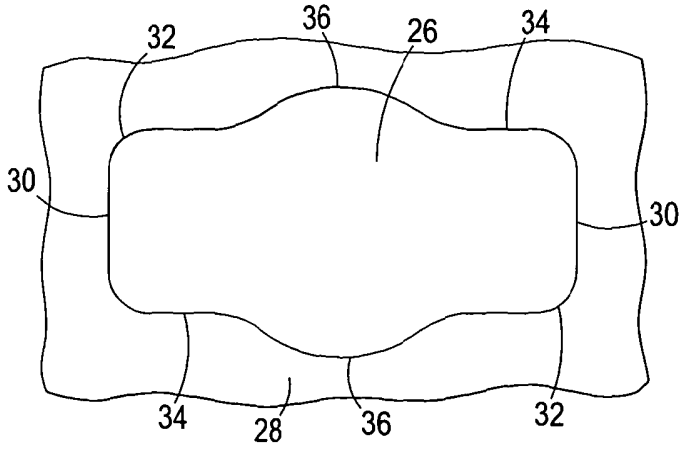

Fig.5

Title: Fasteners

Description

This invention concerns fasteners.

Towbars, for example, widely use fixed nuts or threaded inserts that are welded or fixed to the towbar. Typically they are welded to towbar components to align with a hole in the component. The fixed nut or threaded insert is used commonly because there is limited access for using a loose nut and bolt.

A problem with using a welded or otherwise fixed threaded nut or insert is that when painted the threads of the nut or insert are contaminated by the paint, such as a polyester powder coating. This leads to bolts becoming obstructed when inserted into the nuts, whereby the joint can be ineffective and fail.

Thread protection or masking using silicone rubber inserts in the nuts is possible and at least partially effective. However, after painting it is necessary to carry out a further operation of cleaning the threads with a tap. This is a slow and hence costly process.

Another complication can arise from any pre-treatment of components prior to painting, such as shot blasting. This pre-treatment provides a better surface for painting, so that an excellent paint finish can be achieved. However, blast treatment materials can become lodged in threads and subsequently become embedded in the paint. These blast grit particles are extremely hard and make the removal of paint from threads even more difficult, so that thread jamming is almost inevitable.

An object of the present invention is to provide a means for adding threaded nuts to components after any finishing treatment.

According to a first aspect of the invention there is provided a device for positioning a threaded nut relative to an aperture in a component for attachment of a

threaded bolt comprising a cage having a nut receiving part and a pair of tongues locatable relative to the aperture to hold the nut over the aperture.

According to a second aspect of the invention there is provided a combination of a device for positioning a threaded nut relative to an aperture in a component for attachment of a threaded bolt comprising a cage having a nut receiving part and a pair of tongues locatable relative to the aperture to hold the nut over the aperture and a threaded nut.

Preferably the cage has a base and upstanding sides. One pair of opposed preferably have the tongues extending therefrom. The tongues preferably have outwards lips. The tongues are preferably resiliently deformable, whereby the tongues can be inserted through the aperture and the lips are provided to assist retention of the cage to the component.

The device of the invention preferably also has means for retaining a nut therein. Said retaining means preferably comprises an inwards protrusion on one or both of the tongues.

The device of the invention is preferably made as a pressed metal component, especially as a pressed steel component. The sides of the cage are preferably folded up from the base.

The tongues preferably constitute or extend from one pair of opposed sides.

The device of the invention is particularly suitable for use with square nuts and the cage is preferably shaped to accommodate such.

The present invention further provides a component having an aperture and a combination of a device for positioning a threaded nut relative to the aperture for attachment of a threaded bolt comprising a cage having a nut receiving part and a pair of tongues locatable relative to the aperture to hold the nut over the aperture and a threaded nut.

The aperture of the component is preferably generally rectangular. However, it is preferred that the aperture be shaped to provide wider bearing surfaces for corners of the threaded nut. The longer sides of the aperture preferably have outwardly extended curved bulges. The central part of the aperture is preferably shaped and sized to accommodate a bolt for the threaded nut.

This invention will now be further described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a fastener according to the invention;

Figure 2 shows a fastener with nut fitted according to the invention;

Figure 3 shows the fastener and nut combination of Figure 2 fitted to a component;

Figure 4 shows the underside of the component of Figure 3;

Figure 5 is a plan view of the component aperture for fitting the combination of Figure 2.

Referring to the accompanying drawings, a fastener 10 for a nut 12 is a pressed steel component shaped and sized to accommodate a square nut 12. The fastener 10 has a square base 14 and sides folded up from the base. One pair of opposed sides 16 are relatively short extending just below the height of a nut 12. The other pair of opposed sides have first parts that are approximately the width and height of a nut 12. Extending from the first parts are second narrower tongues 18 that have convergent sides 20 near their free ends, which are also bent outwards to provide lips 22. The tongues 18 each have a small inwards protrusion 24, past which protrusions a nut 12 can be pushed into the fastener 10 but which will prevent the nut from falling out of the fastener, when it is turned over in order to fit the nut and fastener to an aperture 26 of a component 28.

The size of the base 14 of the fastener and the spacing of the protrusions 24 from the base are intended to allow for axial and lateral movement of a nut 12 in the

fastener 10 to cope with any displacement of misalignment of the fixing or component, with which it is to be used.

The base of the fastener has a hole 28 therethrough for a bolt to be threadedly fastened to a nut in the fastener.

The fastener with nut fitted as shown in Figure 2 is intended to be fitted to an aperture 26 in component 28, particularly but not exclusively of a towbar for a motor vehicle. The aperture 26 is shown in Figure 5 of the accompanying drawings and is generally rectangular. The aperture has a pair of narrower parallel ends 30 that have rounded corners 32 necessitated by the ease of punching the aperture. The aperture has a pair of longer sides 34, each of which has an outwardly curved bulge 36. The region bordered by the bulges is to accommodate a bolt for the nut 12.

In use, a nut 12 is inserted into the fastener 10 past the protrusions 24 of the tongues 18. The nut will then remain in place in the fastener when it is turned over for fitting to an aperture. The tongues 18 of the fastener are inserted through the aperture 26 of the component 28. Some resilient bending of the tongues 18 will facilitate this. The lips 22 at the ends of the tongues then retain the fastener in the aperture by overlapping the component beyond the ends of the aperture.

Then a bolt or the like can be screwed into the bolt from the opposite side of the component to the fastener, which draws the nut onto the component.

The shape of the aperture is such that the corners of the nut will bear on the areas of the component either side of the bulges as well as beyond the bulges on opposite sides of the aperture. Thus the load on the nut is spread over a wider area than would be the case for a parallel-sided aperture.

Furthermore, the shape of the aperture in the component provides for a more secure retention of the fastener, as it resists the turning tightening force required for high load and torque applications, such as of towbars.

Claims:

1. A device for positioning a threaded nut relative to an aperture in a component for attachment of a threaded bolt comprising a cage having a nut receiving part and a pair of tongues locatable relative to the aperture to hold the nut over the aperture.

2. A device as claimed in claim 1, wherein the tongues are resiliently deformable.

3. A device as claimed in claim 1 or 2, wherein the cage has a base and upstanding sides.

4. A device as claimed in claim 1, 2 or 3, wherein one pair of opposed sides have the tongues extending therefrom.

5. A device as claimed in any one of claims 1 to 4, wherein the tongues have outwards lips.

6. A device as claimed in any one of claims 1 to 5 having means for retaining a nut therein.

7. A device as claimed in claim 6, wherein said retaining means comprises an inwards protrusion on one or both of the tongues.

8. A device as claimed in any one of claims 1 to 7, wherein the cage is made as a pressed metal component.

9. A device as claimed in claim 8, wherein the cage is of pressed steel.

10. A device as claimed in claim 8 or 9, wherein the cage has a base and folded up sides.

11. A device as claimed in claim 10, wherein one pair of opposed sides has the tongues extending therefrom.

12. A device as claimed in any one of claims 1 to 11 shaped to accommodate a square nut.

13. A combination of a device as claimed in any one claims 1 to 12 and a threaded nut.

14. A component having an aperture and a combination as claimed in claim 13 fitted thereto.

15. A component as claimed in claim 14, wherein the aperture is generally rectangular.

16. A component as claimed in claim in claim 15, wherein longer sides of the aperture have outwardly extended curved bulges.

17. A device for positioning a threaded nut relative to an aperture in a component for attachment of a threaded bolt substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

18. A combination of a device for positioning a threaded nut relative to an aperture in a component for attachment of a threaded bolt and a threaded nut substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

19. A component having an aperture and a combination of a device for positioning a threaded nut relative to an aperture in a component for attachment of a threaded bolt and a threaded nut substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

Application No: GB0818629.8 **Examiner:** Peter Macey

Claims searched: 1 - 19 **Date of search:** 11 February 2009

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1 - 15	US 3035624 A (JAWORSKI) see all figures
X	1 - 15	FR 2491170 A2 (RAPID) see all figures
X	1 - 6, 8 - 15	GB 6685885 A (TINNERMAN) see all figures
X	1 - 6, 8 - 15	GB 684740 A (UNITED CARR) see all figures
X	1 - 6, 8 - 15	EP 0971137 A1 (URAMA) see all figures
X	1 - 6, 8 - 15	US 2678075 A (MURPHY) see all figures

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

F16B

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
F16B	0037/04	01/01/2006