

(12) **UK Patent Application** (19) **GB** (11) **2 406 365** (13) **A**

(43) Date of A Publication **30.03.2005**

(21) Application No: **0322527.3**

(22) Date of Filing: **26.09.2003**

(71) Applicant(s):
Business Lines Limited
(Incorporated in the United Kingdom)
The Old Motor House, Underley,
Kearstwick, KIRKBY LONSDALE, Cumbria,
LA6 2DY, United Kingdom

(72) Inventor(s):
Michael Marczynski
John Marriott

(74) Agent and/or Address for Service:
Harrison Goddard Foote
Orlando House, 11c Compstall Road,
Marple Bridge, STOCKPORT, SK6 5HH,
United Kingdom

(51) INT CL⁷:
F16B 41/00 // B60B 3/16

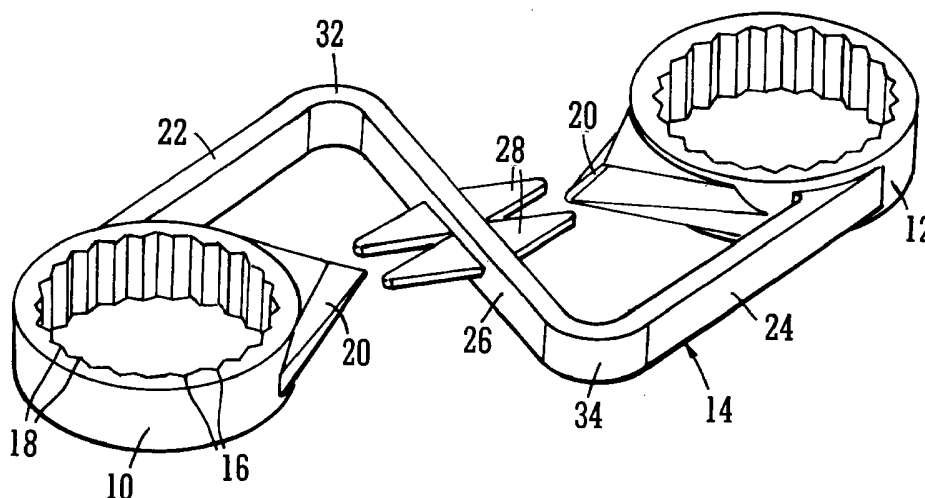
(52) UK CL (Edition X):
F2H HCP HTE

(56) Documents Cited:
GB 2325505 A **FR 002794822 A**
US 5624218 A **US 1725790 A**
US 20020031416 A1

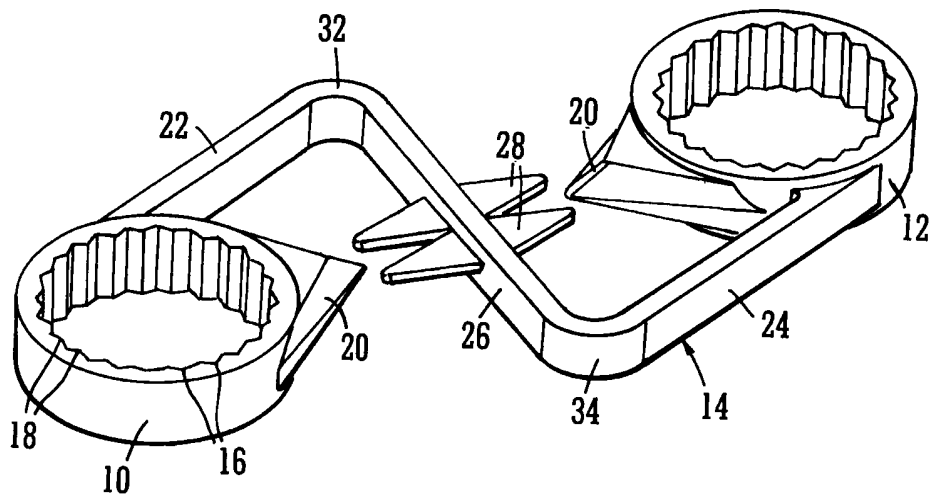
(58) Field of Search:
UK CL (Edition W) **F2H**
INT CL⁷ **B60B, F16B**
Other: **Online: EPODOC, WPI, JAPIO**

(54) Abstract Title: **Security Device**

(57) A security device comprises a pair of sockets 10, 12, for fitting onto a pair of adjacent nuts or bolts. The sockets are permanently connected to each other by an intermediate link 14. Preferably, each socket is provided with a pointer 20 and the intermediate link with at least one pointer 28 as indicator means. The pointers on the sockets and the intermediate link co-operate to provide means to indicate whether a socket has rotated from an initial mounting position i.e. loosened. Ideally, the intermediate link is z-shaped and the sockets and link formed as a one piece unit. The sockets are coupled through the link such that, in use, loosening pressure on one nut is transferred as tightening, restrictive, pressure to the other nut. The device is ideally for fitting to adjacent wheel nuts on a vehicle to provide a visual warning of any nuts working loose.



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SECURITY DEVICE FOR ADJACENT NUTS OR BOLTS

This invention concerns a security device for fitting to a pair of adjacent nuts or bolts,
5 such as adjacent wheelnuts on a vehicle wheel.

Various prior art devices have been proposed to inhibit the loosening of vehicle
wheel nuts by linking together adjacent pairs of such nuts, for example by a looped
wire device, which encircles the respective nuts, as described in GB2132301 and
10 GB2283551 or by securing together, by means of a strap or wire, respective sockets
which fit over the respective nuts, for example as described in GB2260177 and also
in GB2132301.

An object of the present invention is to provide an alternative device which will
15 inhibit the accidental unscrewing and loosening of either of the nuts or bolts of an
adjacent pair, but more importantly will indicate whether any such unscrewing or
loosening has taken place.

According to the invention a security device is provided which comprises a pair of
20 sockets, for fitting onto a pair of adjacent nuts or bolts, the sockets being permanently
connected to each other by an intermediate link, characterised in that at least one of
the sockets and the intermediate link include means which co-operate to indicate
whether that socket has rotated from an initial mounting position.

The indicator means most suitably comprises a pointer on each of the sockets and respective references marks or pointers on the intermediate link. However, it may be possible to have just marks on both or to have marks on the sockets and pointers on
5 the intermediate link. In either case a series of marks may be provided to facilitate comparison between pointer positions, or the relative positions of marks.

Obviously, the indication of rotation of a socket is indicative that the nut or bolt upon which it is non-rotatably mounted has itself rotated and loosened, and remedial action
10 (i.e. re-torquing) can then be undertaken.

The invention will be described further, by way of example, with reference to the accompanying drawing in which the single figure is a perspective view of a practical embodiment.
15

As shown, this embodiment of the security device of the invention comprises two substantially identical sockets in the form of closed annular bodies or rings 10, 12 connected together by a permanent connection in the form of a generally Z-shaped strip of material providing a link 14. The rings 10, 12 each have a series of
20 alternating grooves 16 and teeth 18 around their respective internal surfaces and respective outwardly directed pointers 20. The Z-shaped link 14 comprises first and second end sections 22, 24 attached to the respective rings 10, 12 and a central section 26 linking to the end sections 22, 24 by respective acute angle but rounded

bends 32, 34. The pointers 20 on the rings 10, 12 are directed towards a middle region of that central section 26 of the Z-shaped link 14.

A pair of pointed fingers 28 project laterally from each side of the central section 26 of the strap 14 in the middle region thereof. There is a gap between the points of the fingers 28 at each side of the link 14. The finger pairs 28 are arranged symmetrically, back to back. In an unstressed condition of the device, as shown, the tip of the respective pointers 20 are directed into the respective gaps, substantially midway between the points of each pair of fingers 28.

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The entire device is formed in one piece by injection moulding of suitable plastics material.

In use, the rings 10, 12, are fitted over adjacent nuts, such as vehicle wheel nuts (not shown) once these nuts have been fully tightened to their manufacturer's recommendations. The internal grooves and teeth 16, 18 of the rings 10, 12 enable the rings to be fitted onto the nuts in any relative positions of the nuts, which will usually be hexagonal in shape, and also in a substantially non-rotatably manner, i.e. rotation of the nuts relative to the rings 10, 12 is substantially prevented.

20 The Z-shaped link 14 is configured to transfer any loosening rotational pressure occurring from either one of the nuts as a tightening and resisting rotational pressure on the other nut.

If there should be any loosening of either nut, the corresponding ring 10 or 12 mounted on that loosened nut will be rotated slightly, whereupon the other ring 12 or 10, respectively, will try to rotate in the opposite direction as tangential pressure is transferred to it through the Z-shaped link 14 which couples the rings 10, 12. Any rotation will be apparent as the pointer 20 of the rotated ring 10 or 12 (ie the ring on the loosened nut) will no longer be directed towards the gap between its facing pair of fingers 28, but will have moved so as to be located outside the gap between the fingers 28. Thus, any loosening of a nut is visually indicated and readily apparent upon inspection.

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The device will, of course, also have an inhibiting effect on the loosening of the respective nuts to which it is fitted, and should prevent either nut spinning off, possibly to cause an accident, before any loosening is noticed and remedied.

15 The illustrated embodiment should be understood to be only one example, namely the practical embodiment which is currently preferred for its effectiveness in use and ease of manufacture. Although it has been described for use on adjacent nuts it can equally well be used on the heads of adjacent bolts.

Many other variations are possible within the scope of the invention. For example, 20 the sockets need not be identical and need not be closed rings. They could be looped or C-shaped and have an opening. The intermediate link connecting the sockets could be a substantially straight strip, eg diagonally between opposing locations on respective sockets, when the centres of the sockets are considered spaced apart on a

straight line. Alternatively the intermediate link could be a curving strip of material, or it could be bent to a U or V shape. The indicator means need not be pointers although these are preferred as being such easily noticed visual indicators. Simple marks or other forms of reference tabs could replace either, and a series of such

5 marks or projections could be provided on either one of the socket or the link. Single back to back pointers, rather than pairs of pointers could be provided on the Z shape link in a modified version of the illustrated example.

CLAIMS

- 5 1. A security device comprising a pair of sockets, for fitting onto a pair of adjacent nuts or bolts, the sockets being permanently connected to each other by an intermediate link, characterised in that at least one of the sockets and the intermediate link include means which co-operate to indicate whether that socket has rotated from an initial mounting position.
- 10 2. A device according to claim 1 wherein each of the sockets comprises an annular body having internal grooves enabling it to be releasably and non-rotatably mounted onto a respective one of the adjacent pair of nuts or bolts.
- 15 3. A device according to claim 1 or 2 wherein the or each socket is provided with a pointer as its indicator means.
4. A device according to any preceding claim wherein the intermediate link is provided with at least one pointer as its indicator means.
- 20 5. A device according to any preceding claim wherein the intermediate link is a bent connector link.

6. A device according to any preceding claim wherein the intermediate link is a generally Z-shaped connector link.
- 5 7. A device according to any preceding claim wherein the respective sockets and the intermediate link are formed in one piece.
8. A security device substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

Amendments to the claims have been filed as follows :**CLAIMS**

- 5
1. A security device comprising a pair of sockets, for fitting onto a pair of adjacent nuts or bolts, the sockets being permanently connected to each other by an intermediate link, characterised in that the intermediate link and at least one of the sockets include respective indicator means which co-operate to indicate whether that socket has rotated from an initial mounting position.
- 10
2. A device according to claim 1 wherein each of the sockets comprises an annular body having internal grooves enabling it to be releasably and non-rotatably mounted onto a respective one of the adjacent pair of nuts or bolts.
- 15
3. A device according to claim 1 or 2 wherein the or each socket is provided with a pointer as its indicator means.
- 20
4. A device according to any preceding claim wherein the intermediate link is provided with at least one pointer as its indicator means.
5. A device according to any preceding claim wherein the intermediate link is a bent connector link.



INVESTOR IN PEOPLE

Application No: GB 0322527.3
Claims searched: 1 - 8

Examiner: Heather Scott
Date of search: 3 February 2004

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, 2, 5	US 5624218 A (DAUWALTER) see column 3 lines 46 - 65; figures 1 - 3.
X	1 & 2	FR 2794822 A (STRACK) see abstract and figure
X	1 & 2	US 1725790 A (HALAGARDA) see figures
A		US 2002/0031416 A1 (ILLES et al) see para [0018] & figures
A		GB 2325505 A (BUSINESS LINES) see 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^w:

F2H

Worldwide search of patent documents classified in the following areas of the IPC⁷:

B60B; F16B

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

EPODOC, WPI, JAPIO