(12) UK Patent Application (19) GB (11) 2 300 031 (13) A

(43) Date of A Publication 23.10.1996

(21) Application No 9508133.7

(22) Date of Filing 21.04.1995

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(51) INT CL^6
F16B 19/10

(52) UK CL (Edition O)
F2H HKX H16E H16F1 H16F2 H16F4

(56) Documents Cited
GB 2171772 A **GB 1497010 A** **GB 1424065 A**
GB 0997003 A **EP 0336808 A1** **US 4934885 A**

(58) Field of Search
UK CL (Edition N) **F2H**
INT CL^6 **F16B 19/10 37/04**

(54) Retainer for a blind rivet nut assembly

(57) A blind rivet nut assembly 2, 7 is retained by passing a resilient adaptor 10 in to a hole 21 in a second workpiece 20, the blind rivet nut 2 is passed through a hole in a first workpiece 30, the threaded rivet mandrel 7 is pulled to set the blind rivet nut 2, and the threaded mandrel 7 is screwed into the blind rivet nut 2 to releasably secure the workpieces together.

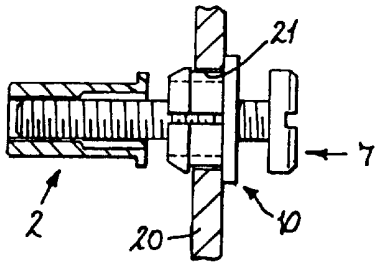

FIG.3

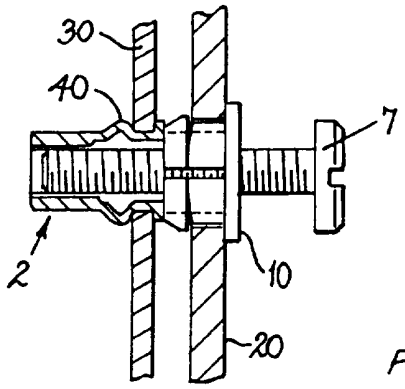

FIG.5

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

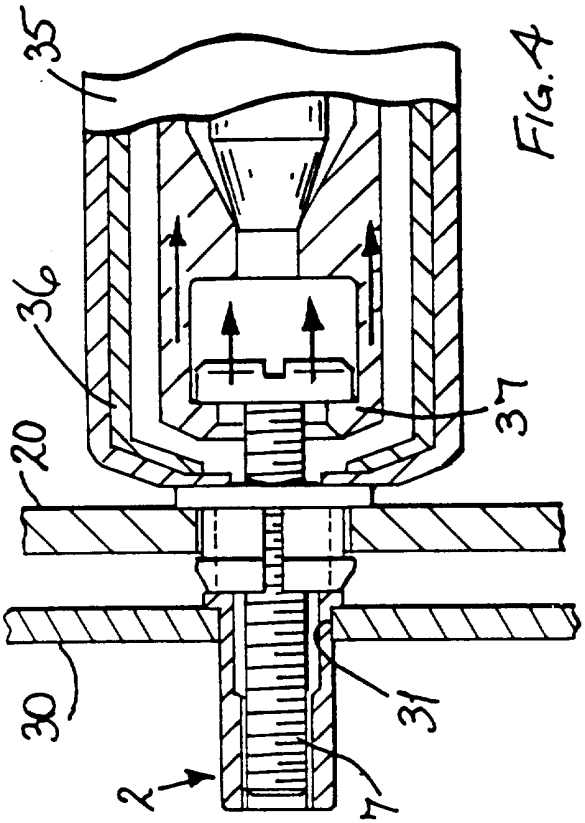

FIG.4

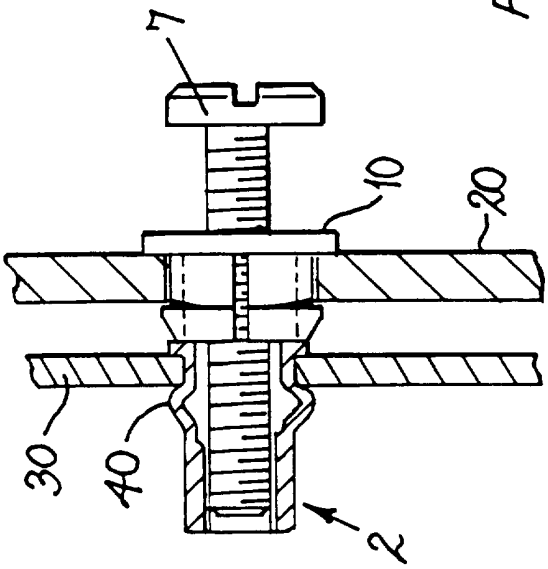

FIG.5

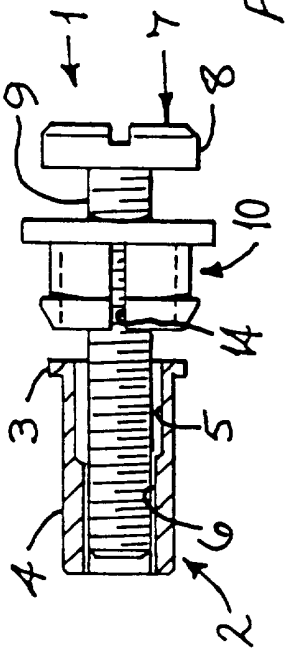

FIG.1

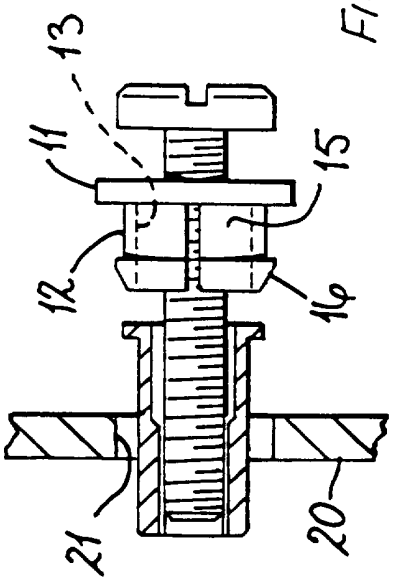

FIG.2

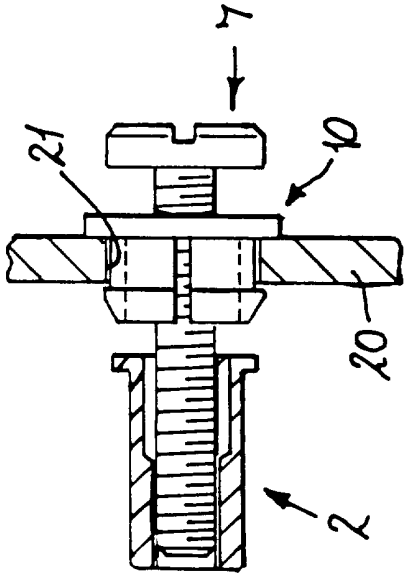

FIG.3

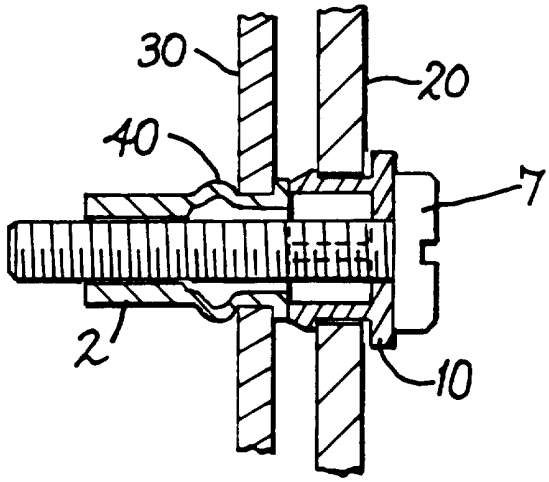

FIG. 6

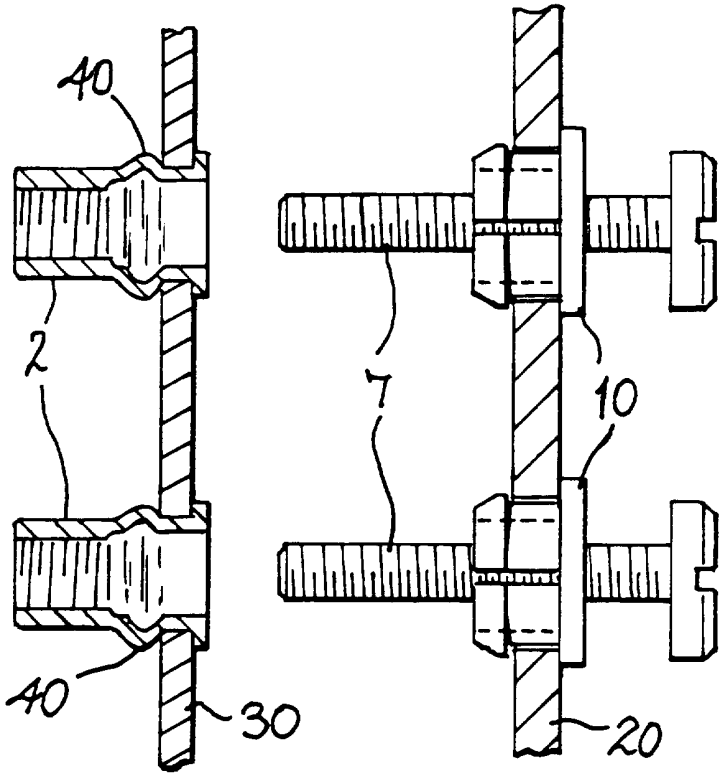

FIG. 7

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FASTENER ASSEMBLY

This invention is concerned with fastener assemblies which are useful in securing, but not necessarily permanently, one workpiece to another.

One fastener assembly which is conveniently used in securing, detachably, one workpiece to another is often referred to as a rivet nut. A rivet nut comprises a rivet body comprising a head and a shank extending from the head, a bore extending from the head in the body, which bore comprises at least a portion which is threaded. A screw, comprising a head and a threaded shank, is engaged into the threaded portion of the bore; in use, the rivet body is inserted in a hole in a workpiece, a tool is caused to engage the head of the rivet body, thus to force it against the workpiece, and the head of the screw, thus to draw it away from the rivet body to cause setting of the rivet body in the hole in the workpiece.

Once such a rivet nut has been set, a further second workpiece can be secured to the first workpiece. This can be done by removing the screw from the rivet body and using it to attach the second workpiece in a conventional way - a procedure which entails removing the screw, replacing it through the second workpiece and tightening it up. Such an operation is somewhat time consuming and inconvenient.

An alternative way of securing a second workpiece is to provide a keynote slot in the workpiece, slide the larger part of the keyhole slot over the screw head, slide the workpiece transversely so that the narrow part of a slot surrounds the shank of the screw and then tighten the screw. This has the disadvantage that the punching of keyhole slots in a workpiece is comparatively expensive, and if the

workpiece is to be attached at more than one point very careful positioning and orientation of the keyhole slots is essential.

According to a first aspect of the invention an adaptor for use with a blind rivet nut is provided comprising a head and a shank, a bore extending from the head, the shank being provided with a number of longitudinal slots extending towards the head to form a number of fingers, the fingers being provided with detent means.

Preferably the fingers are identical.

Preferably the fingers are equidistant.

Preferably the adaptor is made from metal, for example from steel.

According to a second aspect of the invention an assembly is provided comprising a blind rivet nut, which nut comprises a mandrel having a head and a threaded shank and a rivet body comprising a rivet head and a shank having a threaded bore, the mandrel being engaged in the threaded bore and an adaptor according to the first aspect of the invention is assembled between the head of the rivet body and the head of the mandrel.

According to a third aspect of the invention, a method of securing a second workpiece to a first workpiece is provided, the first and second workpieces each comprising a hole in which an assembly is positioned in the hole in the second workpiece by the adaptor, the assembly is positioned in the hole in the first workpiece by the shank of the rivet body, a setting operation is performed to set the rivet body in the hole in the first workpiece, and the mandrel is

screwed into the rivet body, thereby securing the second workpiece to the first.

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

Figure 1 shows a side view of an assembly according to the second aspect of the invention;

Figure 2 shows the assembly of Figure 1 and a second workpiece;

Figure 3 shows the assembly of Figure 1 in position with respect to the second workpiece;

Figure 4 shows the assembly, first and second workpieces and a setting tool;

Figure 5 shows a set assembly;

Figure 6 shows the final step of the third aspect of the invention; and

Figure 7 shows how the second workpiece may be removed from the first workpiece.

Referring to Figure 1 there is shown a known fastener or rivet nut assembly 1 fitted with an adaptor. The rivet nut assembly comprises a rivet body 2 comprising a head 3 and a shank 4 extending from the head, a bore 5 extending from the head, which bore comprises at least a portion 6 which is threaded. A mandrel, in the form of a screw 7, comprising a head 8 and a threaded shank 9 is engaged into the threaded portion of the bore.

The adaptor 10 comprises a head 11 and a shank 12 extending from the head, a bore 13 extending from the head. The adaptor 10 is passed over the shank 4 of the rivet body, prior to the engagement of the shank 9 and the threaded portion 6 of the rivet body 2. The shank 12 of the adaptor is preferably provided with a plurality of slots 14 to form preferably a plurality of arms 15 on the adaptor.

Preferably, four equidistant slots are used to form four equal arms. The ends of the arms 15 remote from the head 11 of the adaptor are provided with detent means 16.

The completed assembly comprising the rivet body 2, the screw 7 and the adaptor 10 can now be inserted into a suitable hole 21 in a second workpiece 20, such as a cover plate (Figure 2).

The head of the adaptor 10 is larger than the hole 21 in the workpiece and cannot pass through. The detent means 14 while being larger than the hole can deflect inwards and pass through the hole. In Figure 3, the adaptor can be seen with the second workpiece being held on the shank 12 of the adaptor between the head of the adaptor and the detent means.

Once an appropriate number of adaptors have been secured to the second workpiece in this way, the second workpiece can now be placed in position for fastening to a first workpiece 30.

The various rivet nut assemblies secured to the second workpiece by their respective adaptors are now already in the correct position relative to one another for insertion in corresponding holes in the first workpiece. The shank of each rivet body 2 is passed into a hole 31 in the first workpiece 3 until the head 3 abuts the first workpiece. The rivet nut assembly can now be set by the use of a suitable setting tool as seen in Figure 4.

The setting tool 35 has two sets of jaws; a first 36 locating on the head of the adaptor to push towards the workpieces to keep the adaptor in position (and to provide a

reaction force) and a second 37 locating under the head of the screw to pull away from the workpieces.

The rivet nut assembly is then set, the shank of the rivet body deforming to form a clinch zone 40 on the blind side of the first workpiece. In this way, the first workpiece is held in position relative to the rivet body by the clinch zone on the blind side and by the head of the rivet body on the other. (Figure 5)

The second workpiece is free to move along the screw between the head of the rivet body and the head of the screw. To prevent this, the screw can simply be tightened such that the second workpiece is held securely in relation to the first workpiece by the rivet nut assembly and the adaptor.

Should it become necessary to remove the second workpiece, for example for inspection of components mounted on the first workpiece, the screws can be unscrewed and the second workpiece removed (Figure 6). The second workpiece can subsequently be replaced by placing it in position in relation to the first workpiece and re-inserting and tightening the screws.

CLAIMS

1 An adaptor for use with a blind rivet nut comprising a head and a shank, a bore extending from the head, the shank being provided with a number of longitudinal slots extending towards the head to form a number of fingers, the fingers being provided with detent means.

2 An adaptor according to Claim 1, characterised in that the fingers are identical.

3 An adaptor according to Claim 1 characterised in that the fingers are equidistant.

4 An adaptor according any previous claims, characterised in that the adaptor is made from plastics.

5 An assembly comprising a blind rivet nut, which nut comprises a mandrel having a head and a threaded shank and a rivet body comprising a rivet head and a shank having a threaded bore, the mandrel being engaged in the threaded bore and an adaptor and an adaptor according to any previous claim assembled between the head of the rivet body and the head of the mandrel.

6 A method of securing a second workpiece to a first workpiece, the first and second workpieces each comprising a hole in which an assembly according to claim 5 is positioned in the hole in the second workpiece by the adaptor, the assembly is positioned in the hole in the first workpiece by the shank of the rivet body, a setting operation is performed to set the rivet body in the hole in the first workpiece, and the mandrel is screwed into the rivet body.

Patents Act 1977 Examiner's report to the Comptroller under Section 17 (The Search report)	Application number GB 9508133.7
Relevant Technical Fields (i) UK Cl (Ed.N) F2H (ii) Int Cl (Ed.6) F16B 37/04 19/10	Search Examiner P M WELLER Date of completion of Search 5 JULY 1995
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii)	Documents considered relevant following a search in respect of Claims :- 1-6

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X: Document indicating lack of novelty or of inventive step.

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P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2171772 A	(GULISTAN) Figures 2, 4	1-4
X	GB 1497010 A	(FORD) Figure 1	1-4
X	GB 1424065 A	(SANGAMO) Figure 2	1-4
X	GB 0997003 A	(DARE-INGLIS) Figures 1a, 2	1-3
X	EP 0336808 A1	(AEROSPATIALE) Figure 4	1-3
X	US 4934885 A	(WOODS) Figures 4-6	1-3

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).