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(56) Documents Cited:
GB 2364095 A **US 6142720 A**
US 4823921 A
KR 20100131799 (HWANG)
Semi Tubular Rivets, Valley Fastener Group available online <http://www.valleyfastener.com/semi-tubular-rivets.html> [accessed 21 October 2013]

(58) Field of Search:
INT CL **E05C, E05D, F16B**
Other: **Online: EPODOC TXTE WPI**

(54) Title of the Invention: **Hinge**
Abstract Title: **Parallel hinge**

(57) A hinge 10 comprising first and second arms 11, 12 are inter-connected by an intermediate pivot 13, which passes through their centres, so that they can be moved together and apart in a scissor-like action. Arm 12 is split into two portions 14, 15, which lie above and below the arm 11 to sandwich the arm. The arm 11 is connected between a fixed pivot 16 and a sliding or movable pivot 17, whilst correspondingly the arm 12 extends between a fixed pivot 18 and a slideable pivot 19. The pivot 13 is formed by a rivet 40 having a square section 40b and a hollow cylindrical extension 40c for forming a rolled rivet to allow control of the compression at the pivot. The square cross section of the pivot drivingly engages in square holes in the first and second halves of arm 12.

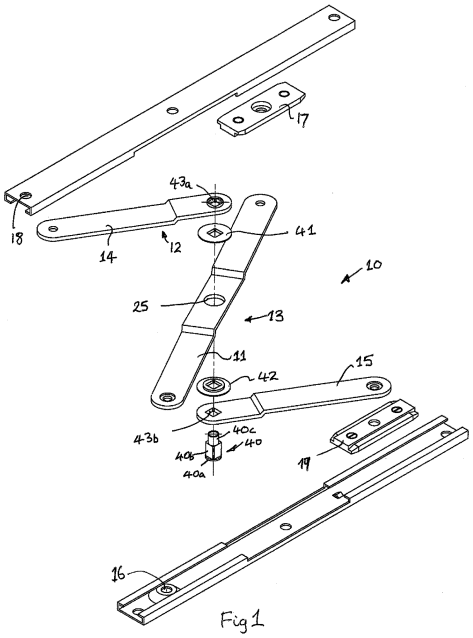

Fig 1

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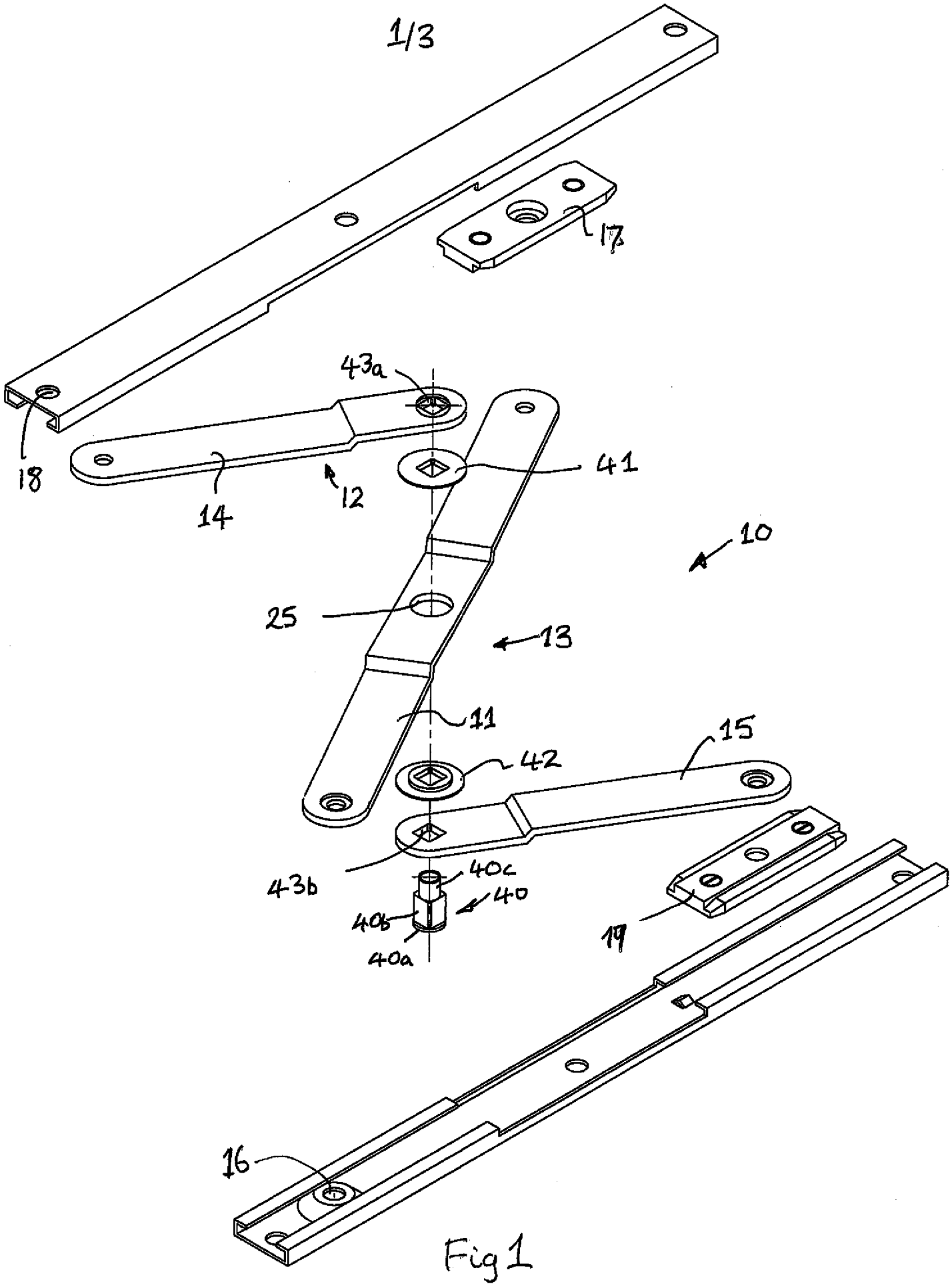

Fig 1

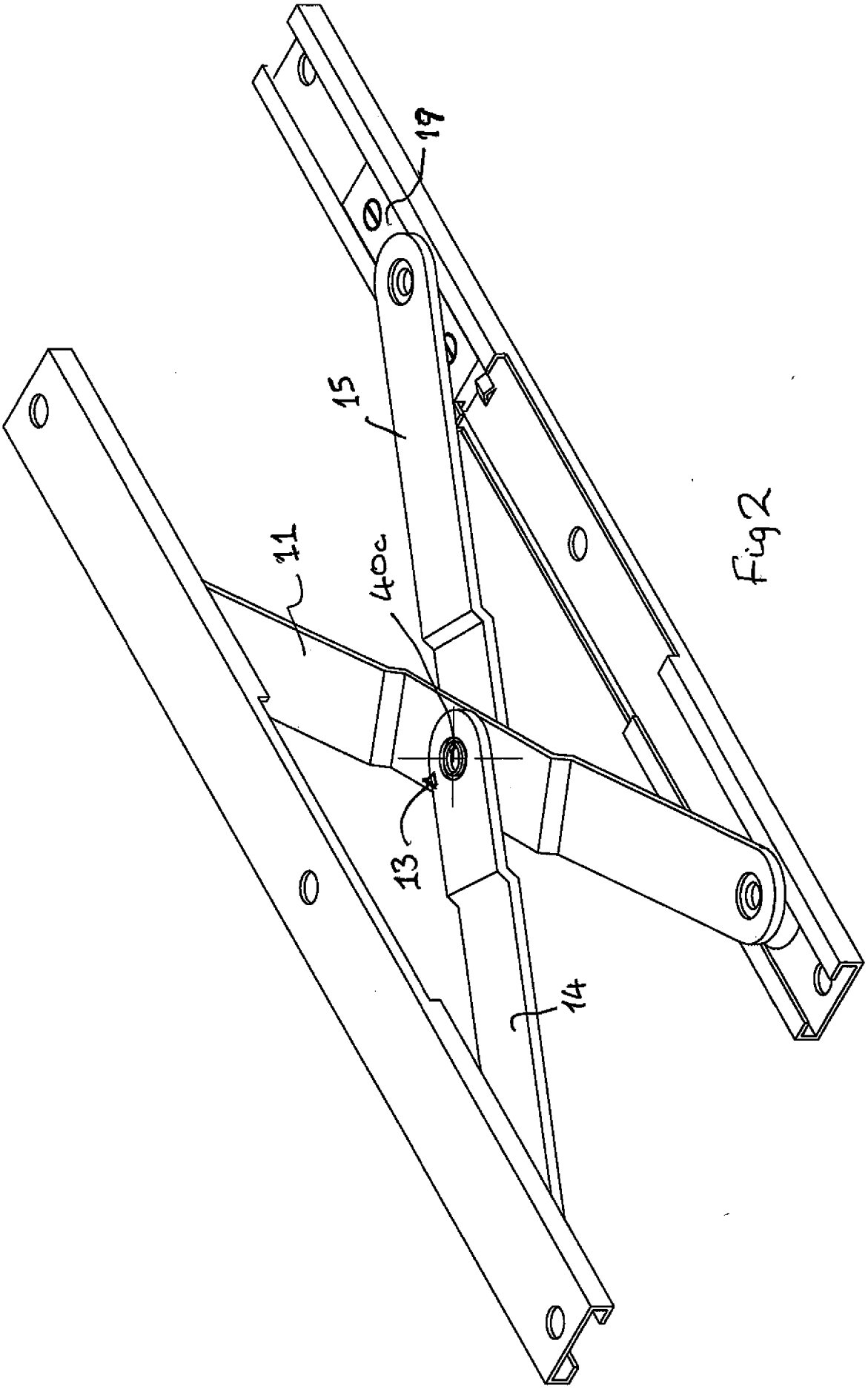

Fig2

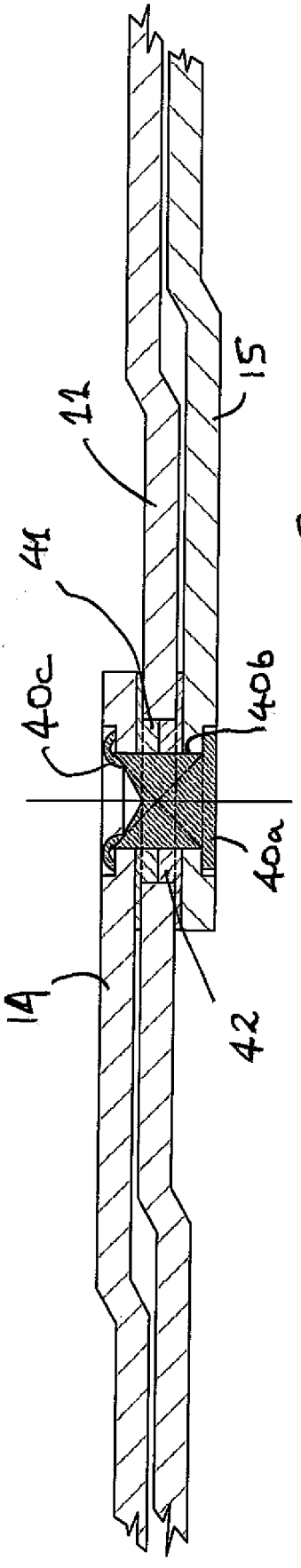

Fig 3

Hinge

This invention relates to a parallel hinge for holding an opening member in a frame. As is usual in this field, the term parallel hinge indicates one in which the opening member moves out of the frame in a manner in which it is maintained generally parallel to its closed position.

Known parallel hinges typically include a pair of arms pivoted together at their centres to form a scissor-like structure, each arm having one end connected to one of the frame or opening member and the other end connected to the other of the frame or opening member. Typically one end of each arm is fixed and the other is movable. The connections on the frame or the member are usually formed on a single track, with the movable connection being in the form of a slider, which can move along the track, bearing a pivot.

Such hinges can be used in a vertical or horizontal orientation. If one considers them in the horizontal orientation, then it will be understood that one arm passes over the other, but each arm has a connection to each track. A known scissor stay of this general type removes problems of interference by providing a driving connection at the central point. This is in the form of a square section shaft that is swaged to retain the arms together. It is very difficult to achieve repeatability in this operation with the result that there is little control over the friction in the stay. As the maximum tension required to open a supported window is laid down by British Standards a stay having the advantage of “overlying” but with controllable friction is required.

The present invention consists in a parallel hinge for holding an opening member in a frame, including a first arm connected between a fixed pivot mountable on one of the member and frame and a movable pivot mountable on the other of member and frame, and a second arm connected between a fixed

pivot mountable on the other of the member and frame and a movable pivot mountable on the one of the member and frame, the arms being pivotally connected intermediate their ends to allow a scissor action, wherein one of the arms has two portions such that one portion lies above the other arm at the intermediate pivot and the other portion lies below, such that on closing the arms can overlie one another; the portions are interconnected by the intermediate pivot having a square section driving portion for drivingly engaging with the arms characterised in that the pivot has a head at one end and a cylindrical extension at the other end, the cylindrical extension being rolled to complete a rolled rivet.

It will be understood that the terms “above” and “below” refer to the parallel hinge being in a horizontal orientation, although in use the hinge may have any appropriate orientation.

Preferably the intermediate pivot is conveniently at the centre of each arm.

The arms may be cranked such that for each arm the ends lie in a single plane.

In the preferred embodiment, the fixed pivot and the movable pivot are separately located on their respective frame or member, in contrast to having a continuous track. This reduces both cost and weight and also prevents the intermediate pivot interfering with a track.

Although the invention has been defined above, it is to be understood that it includes any inventive combination of the features set out above or in the following description.

The invention may be performed in various ways and a specific embodiment will now be described with reference to the accompanying drawings, in which;

Figure 1 is an exploded perspective view of a hinge;

Figure 2 is a plan view of an assembled hinge in its open position; and

Figure 3 is a longitudinal section through the hinge in its closed position.

A hinge, generally indicated at 10, includes arms 11 and 12, which are inter-connected by a pivot, generally indicated at 13, which passes through their centres, so that they can be moved together and apart in a scissor-like action. For reasons that will be explained below in more detail, the arm 12 is split into portions 14, 15, which respectively lie above and below the arm 11, in the hinge orientation illustrated.

The arm 11 is connected between a fixed pivot 16 and a sliding or movable pivot 17, whilst correspondingly the arm 12 extends between a fixed pivot 18 and a slideable pivot 19. In use the pivots 17 and 18 will be attached to one of an opening member or frame (not illustrated), whereas the pivots 16 and 19 will be connected to the other of the window and frame.

As has already been touched upon, the portions 14, 15 lie above and below the arm 11. This transforms the construction of the parallel hinge, because now the arms 11, 12 can be moved into a position in which they are in line, and this is illustrated in Figure 3. Further, by suitably cranking the arms 11 and 12, the ends of each respective arm can be located in a single horizontal (in this orientation) plane so that, in the closed position, the pivots 16 and 18, and 19 and 17, are effectively touching. This means that the opening member can be fully and tightly closed within the frame, providing both increased security and a particularly pleasing aesthetic arrangement.

It will be seen that the pivots 16 and 18 are split from the pivots 17 and 19, rather than using a single track. This enables there to be sufficient room for the somewhat enlarged pivot arrangement at 13. The pivots 17 and 19 are constructed as sliding pivots in the conventional manner, which is well-known in the art. Any alternative movable pivot arrangement which provides suitable

linear movement could be used and, indeed, all the pivots may be slideable.

The pivot 13 in detail, comprises an axle rivet 40, a washer 41 and holding washer 42. The axle rivet 40 has a head region 40a, an elongate shaft 40b and a cylindrical extension 40c. The shaft 40b is preferably of a square cross section, although other cross sections, such as hexagonal or triangular cross sections can be used. What is important is that the cross section allows for driving linkage of the arms 14, 15 and 11. The shaft passes through an aperture in split arm 14 and then through aligned washer 41 which has an aperture shaped to accommodate the cross section of the shaft 40b. The head of the axle rivet maintains the rivet in position. The axle rivet shaft in turn passes through alignment aperture 25 in the arm 11 and then through aligned holding washer 42. Again, the holding washer has an aperture which is dimensioned to receive the cross section of the shaft 40b. The arm 11 is joined to split arms 15 via the axle rivet shaft which passes through aperture 43b in arm 13. The extension 40c is then rolled to produce a rolled rivet to secure in place the components that make up pivot arrangement 13, as shown in Figure 2.

The elongate shaft 40b has a length which takes it just proud of the upper arm 12 with the result that the compression, and hence the friction, at the intermediate pivot 13 is determined by the length of the extension 40c, when a controlled rolling operation is applied. The result is well illustrated in Figure 3.

Claims

1. A parallel hinge for holding an opening member in a frame, including a first arm connected between a fixed pivot mountable on one of the member and frame and a movable pivot mountable on the other of member and frame, and a second arm connected between a fixed pivot mountable on the other of the member and frame and a movable pivot mountable on the one of the member and frame, the arms being pivotally connected intermediate their ends to allow a scissor action, wherein one of the arms has two portions such that one portion lies above the other arm at the intermediate pivot and the other portion lies below, such that on closing the arms can overlie one another; the portions are interconnected by the intermediate pivot having a square section driving portion for drivingly engaging with the arms characterised in that the pivot has a head at one end and a cylindrical extension at the other end, the cylindrical extension being rolled to complete a rolled rivet.

2. A parallel hinge as claimed in any one of the preceding claims wherein the fixed pivot and the movable pivot are separately located on their respective frame or member.

3. A parallel hinge for holding an opening member in a frame substantially as herein before described with reference to the accompanying drawings.

Application No:	GB1305016.6	**Examiner:**	Ben Munns
Claims searched:	1-3	**Date of search:**	22 October 2013

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
Y	1-3	GB 2364095 A (COTSWOLD ARCHITECTURAL) see the entire document.
Y	1-3	US 6142720 A (EDWARDS) see the entire document, particularly the figures, semi-tubular rolled rivet 11.
Y	1-3	KR 20100131799 (HWANG) See the figures, rivets 6a, 6b, 6c.
Y	1-3	US 4823921 A (BOSCO) see particularly figure 5
Y	1-3	Semi Tubular Rivets, Valley Fastener Group available online <http://www.valleyfastener.com/semi-tubular-rivets.html> [accessed 21 October 2013]

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

E05C; E05D; F16B

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

EPODOC, TXTE, WPI

International Classification:

Subclass	Subgroup	Valid From
E05D	0015/34	01/01/2006
E05D	0015/46	01/01/2006