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(54) **Jointing means.**

(57) The invention relates to jointing means between roof and leg members of squarework supports of the type to be employed in retreat mining where the joint needs to be disconnected to allow the roof and leg members to be removed. Thus, pin joints are known, where castings are secured to the end of roof and leg members, to interfit and be connected by a removable pin. To provide strength, the castings are large and heavy, and being secured by welding to the ends of the roof and leg members hence the problem that weld shear results in the total collapse of the joint. The invention has for its object to avoid those disadvantages mentioned above, and which objective is met by a construction comprising two securing members, one said member being secured between the flanges of a roof member and extending beyond the end of the roof member to engage between the flanges of an adjacent leg member, and the other securing member being secured between the flanges of the leg member to the opposite side of the securing of the securing member to the roof member, the other said securing member extending beyond the end of the leg member to fit between the flanges of the roof member, and there being corresponding holes

through the centre lands of the securing members for the passage of a pin to secure the securing members and hence the roof and leg members, to each other.

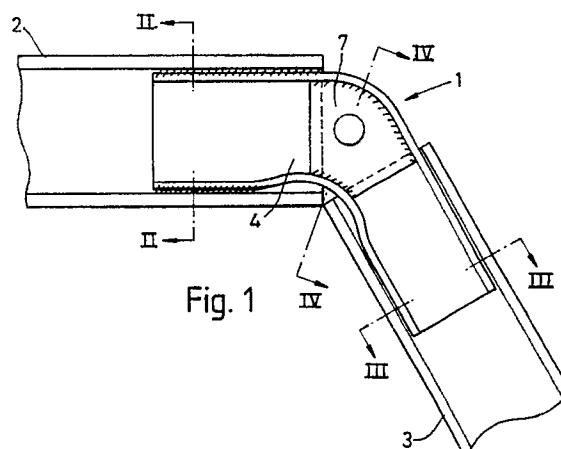


Fig. 1

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JOINTING MEANS

This invention relates to jointing means and is particularly concerned with the provision of a joint as between adjacent members of a roof support system for example a roof member and a leg member of a squarework support; or adjacent members of archwork.

In underground mining there is the need to provide support for such as a roadway roof, for the safety of the operatives and the nature of the squarework supports or archwork ordinarily employed must be of a character that facilitates its ready transport underground and is readily easily assemblable. Thus it is already well-known to transport such squarework supports or archwork in dismantled form to its point of use and where the members are erected and suitably secured together.

The advent of so-called retreat mining has introduced the added requirement that not only must the squarework support or archwork be readily assemblable, it must also be readily dismantlable, and this has led to the development of so-called pin joints as between for example the leg members and the roof support members of squarework supports or archwork.

To provide such a pin joint it is known to cast two joint members that are suitably secured to the ends of e.g. a respective roof and leg member, the castings being such that they can interfit one with the other to provide an alignment between through holes in the castings through which is passed a connecting pin. The difficulty with such cast pin joint structures is that to ensure adequate strength the castings have an appreciable bulk and hence weight, and as a consequence of that the roof support and leg members of the squarework support to which the castings are secured inevitably have a noticeably increased weight that is not conducive to the easy handling of the archwork members during their transportation and their erection.

It is the object of the present invention to provide a joint of the type generally discussed above that embodies a considerably improved weight to strength ratio than that embodied in the prior art constructions.

According to the present invention, a jointing means comprises in association with adjacent members of a roof support system two securing members, one said member being secured between the flanges of a first member and extending beyond the end of the first member to engage between the flanges of an adjacent second member, and the other securing member being secured between the flanges of the second member to the

opposite side of the securing of the securing member to the first member, the other said securing member extending beyond the end of the second member to fit between the flanges of the first member, and there being corresponding holes through the centre lands of the securing members for the passage of a pin to secure the securing members and hence the adjacent members, to each other. Thus, the first and second members may be the roof members and leg members of squarework supports or the adjacent members of archwork.

Preferably, each securing member consists of a pressing of a generally flat plate into corrugated generally W-shape to provide a centre land spaced from two bearing surfaces, and are secured between the flanges of the respective roof and leg members with the bearing surfaces in contact with the web of the roof member. Further preferably strengthening plates are secured to opposite sides of the securing members at the positions of the aligned holes for the pin.

Thus, with one securing member, e.g. welded or bolted to one side of a first member, and the other securing member welded or bolted to the opposite side of a second member, the projecting portions of each securing member can be correspondingly longitudinally shaped and whereby with the respective projecting portions fitted between the flanges of the respective other member, the second member is automatically set at a required disposition to the first member.

With pin joints of the prior art, and where castings are welded to the ends of the e.g. roof and leg members or externally of a flange, if a weld should tear, then there is a complete failure of the joint. With the invention, the locating of the securing members between the flanges of a respective adjacent members provides not only substantial protection from weld tear or from bolt shearing, but also has the important advantage that if weld tear or bolt failure occurs the location of the securing members between the flanges of the adjacent members ensures that the pin joint does not fail completely.

The pin means securing the securing members together can simply be a threaded bolt passing through the aligned holes in the securing members and the strengthening plate when provided. To ensure the correct assembly of roof and leg members, it is preferred to provide the pin with a square section behind its head to engage a square hole in its respective securing member, leading to a circular threaded section to pass through a circular hole in the other respective securing member to be

engaged by a nut. Thus, the bolt is prevented from rotating when tightening the nut on the outbye side of the squarework support.

The inherent nature of the securing members is such that the jointing means of the invention exhibits considerable advantages over the prior art in terms of weight without loss of strength, which can be improved still further by the selection of an appropriate alloy steel for the securing members.

Two embodiments of the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a side elevation of a pin joint in accordance with one embodiment of the invention;

Figure 2 is a section on the line II-II of Figure 1;

Figure 3 is a section on the line III-III of Figure 1;

Figure 4 is a section on the line IV-IV of Figure 1;

Figure 5 is a side elevation of a pin joint in accordance with a second embodiment of the invention;

Figure 6 is a section on the line VI-VI of Figure 5;

Figure 7 is a section on the line VII-VII of Figure 5; and

Figure 8 is a section on the line VIII-VIII of Figure 5.

In Figures 1 to 4, a pin joint 1 to connect a roof member 2 to a leg member 3 has two securing members 4, 5, the securing members 4, 5 being of generally W-shaped cross-section to lie between the flanges of the respective roof and leg members, and with their ends set at an angle to each other and such as to set the leg member 3 at the required angle to the roof member 2. One end of the securing member 4 is welded to the roof member between its flanges, as is shown in Figures 1 and 2, the opposite angled end extending beyond the end of the roof member, and to lie between the flanges of the leg member, and as is shown by Figure 3, one end of the other securing member 5 is welded to the opposite side of the leg member between its flanges, the other end of the securing member 5 extending beyond the end of the leg member to lie between the flanges of the roof member 2 to the opposite side of the roof member to the securing member 4.

As is shown by Figures 1 and 4, generally centrally of the securing members, a bolt 6 is provided passing through respective co-operating holes in the securing members 4, 5, and for added security, strengthening plates 7, 8 are secured such as by welding across the flanges of the securing members and against which the bolt head and nut abuts. The bolt 6 has a square section 9 behind the head to engage a square hole in the securing

member 4, and a circular stem 10 to pass through a circular hole 10 in the securing member 5.

In Figures 5 to 8, like parts are given like reference numerals. Here, in place of welding the respective securing members 4, 5 to opposite sides of the respective roof member 2 and leg member 3, the securing member 4 is bolted between the flanges of the roof member 2 by bolts 11 extending through the web of roof member and the centre land of the securing member 4, and the securing member 5 is secured between the flanges of the leg member 3 to the opposite side, by bolts 12 extending through the web of the leg member and the centre land of the securing member 5. Here again, generally centrally of the securing members 4, 5, a bolt 6 is provided passing through respective co-operating holes in the securing members, and for added security strengthening plates 7, 8 are provided, welded across the flanges of the securing members.

By virtue of the cross-sectional shape of the securing members, notable strength characteristics are provided in combination with relatively low weight and particularly so when an appropriate alloy material is selected for the securing members. However, the principal advantage achieved by the invention is the security of the whole joint. By locating the W-sectioned security members between the flanges of the respective roof and leg members, both the weld connection and the bolt connection of the securing members to the roof and leg members is subjected to considerable protection, by the contact between the flanges of the securing members and the flanges of the roof and leg members, but more than that, in the unlikely event of weld tear or bolt shear, the flanges of the securing members are trapped between the flanges of the roof and leg members respectively, and whereby the roof and leg members are held in place, and the likelihood of a sudden and total collapse of the joint substantially eliminated.

Claims

1. A jointing means between adjacent members of a roof support system, characterised by two securing members (4, 5), one said member (4) being secured between the flanges of a first member (2) and extending beyond the end of the first member to engage between the flanges of an adjacent second member (3), and the other securing member (5) being secured between the flanges of the second member (3) to the opposite side of the securing of the securing member (4) to the first member (2), the other said securing member (5) extending beyond the end of the second member (3) to fit between the flanges of the first member

(2), and there being corresponding holes through the centre lands of the securing members (4, 5) for the passage of a pin (6) to secure the securing members (4, 5) and hence the adjacent members (2, 3), to each other.

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2. A jointing member as in Claim 1, characterised in that each securing member (4, 5) consists of a pressing of a generally flat plate into corrugated generally W-shape to provide a centre land spaced from two bearing surfaces, and are secured between the flanges of the respective roof (2) and leg members (3) with the bearing surfaces in contact with the web of the roof member.

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3. A jointing means as in Claim 1 or Claim 2, characterised in that strengthening plates (7, 8) are secured to opposite sides of the securing members (4, 5) at the positions of the aligned holes for the pin (6).

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4. A jointing means as in any of Claims 1 to 3, characterised in that the securing member (4) is welded between the flanges of the first member (2) and the securing member (5) is welded between the flanges of the second member (3) to the opposite side.

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5. A jointing means as in any of Claims 1 to 3, characterised in that the securing member (4) is bolted between the flanges of the first member (2) and the securing member (5) is bolted between the flanges of the second member (3) to the opposite side.

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6. A jointing means as in any of Claims 1 to 5, characterised in that the pin means (6) is a threaded bolt.

7. A jointing means as in Claim 6, characterised in that the bolt (6) has a square section (9) behind its head to engage a square hole in its respective securing member (4), leading to a circular threaded section (10) to pass through a circular hole in the other respective securing member (5) to be engaged by a nut.

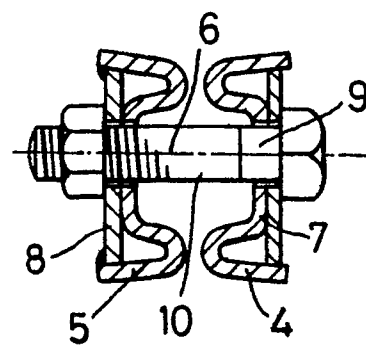
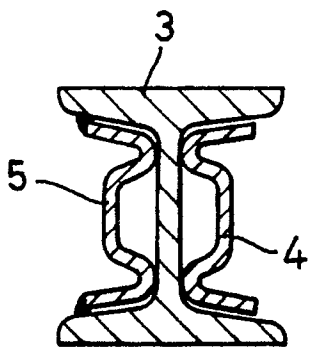
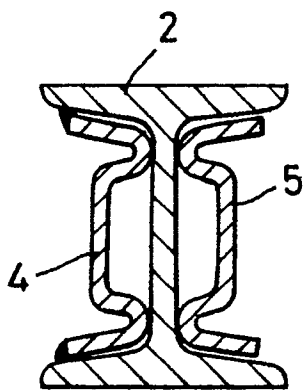
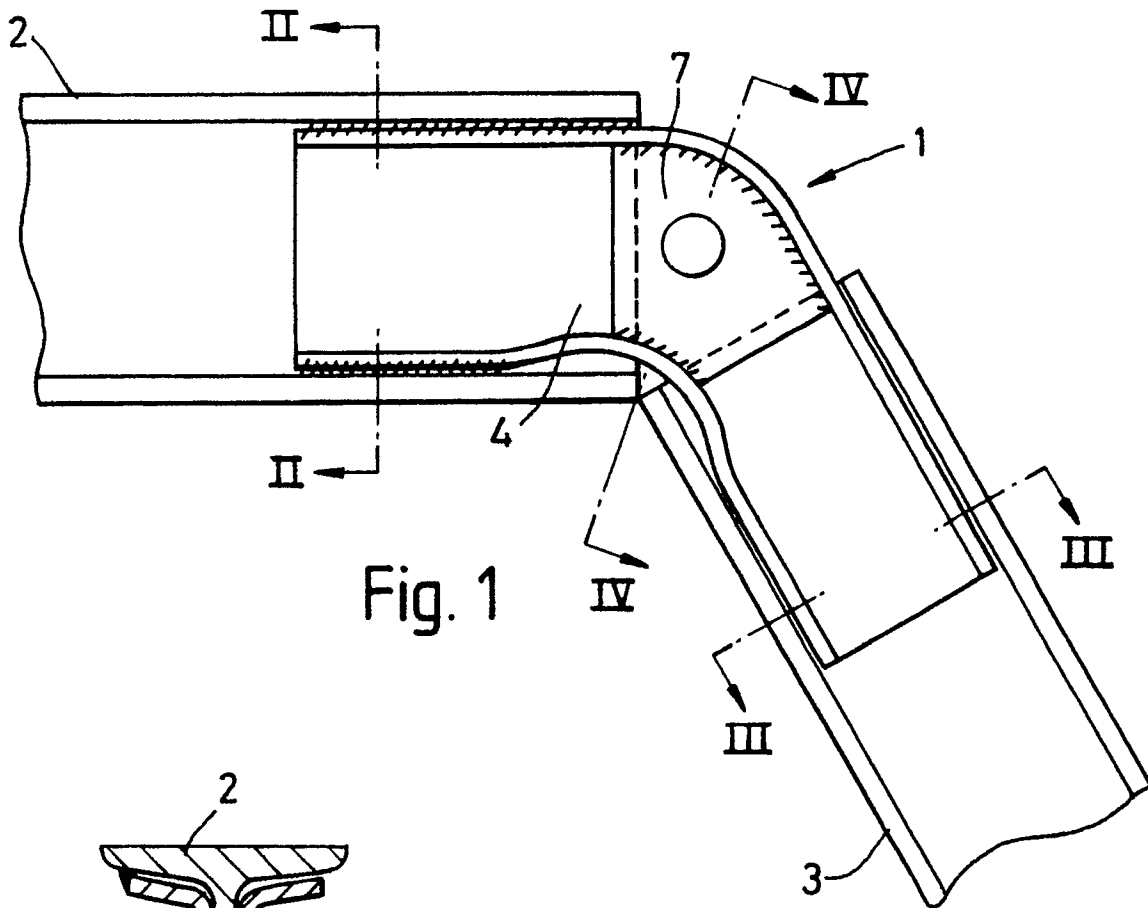
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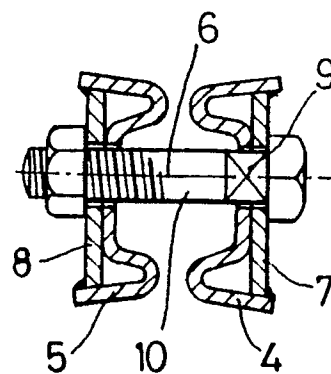
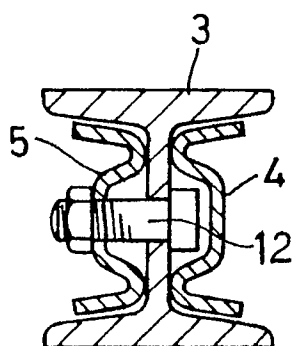
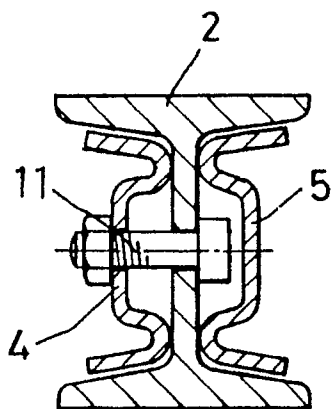
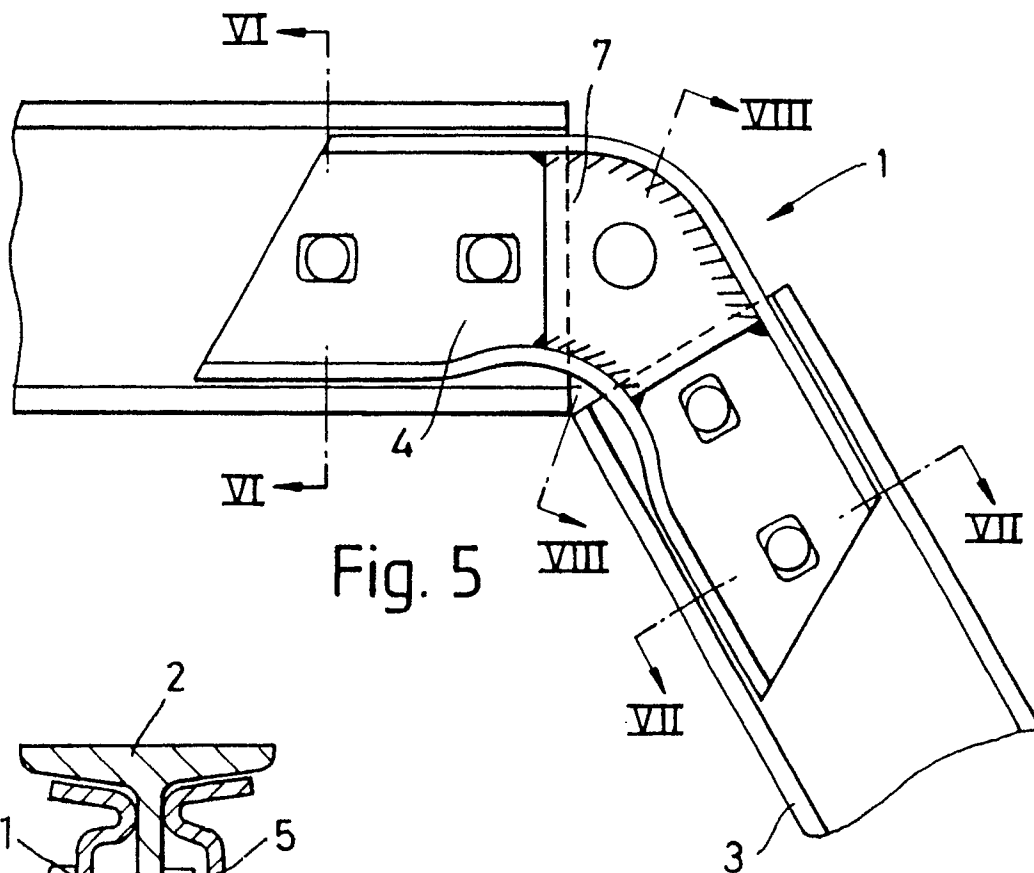
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EUROPEAN SEARCH REPORT

Application Number

EP 90 11 6087

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	NL-C-6 449 1 (REUSS) * Page 2, lines 36-76; figures * - - -	1,4,6	E 21 D 11/34 E 04 B 1/58 // E 01 B 11/40
Y		2,7	
Y	GB-A-2 213 183 (TOOL & STEEL) * Figure 1 * - - -	2	
A		5	
Y	GB-A-1 534 297 (METAL SECTIONS) * Page 2, lines 48-53; figure 4 * - - - - -	7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 21 D E 04 B E 04 C E 01 B
The present search report has been drawn up for all claims			
Place of search		Date of completion of search	Examiner
The Hague		29 November 90	RAMPELMANN J.
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons &: member of the same patent family, corresponding document			