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(54) Title: A FASTENING ARRANGEMENT FOR BUS BAR AND JUMPER AND A METHOD FOR FASTENING THEREOF

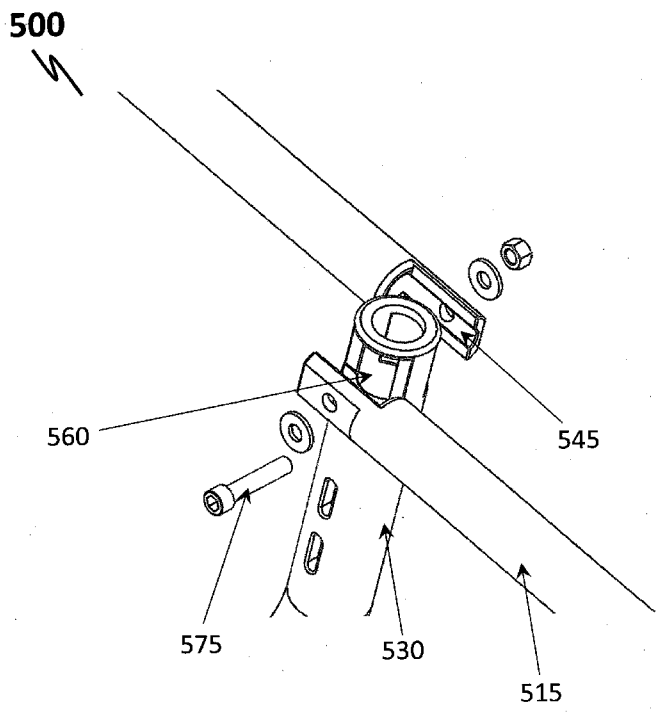


Fig. 5

(57) Abstract: The invention relates to a fastening arrangement for a bus bar and a jumper. The fastening arrangement comprises at least one bus bar having at least one milled section, at least one jumper having at least one milled section and a fastening means. The fastening means is provided for fastening the said at least one bus bar and the said at least one jumper together. The invention also relates to a method for fastening at least one bus bar and at least one jumper to obtain a fastening arrangement in accordance with the aforementioned fastening arrangement. The method comprises the steps of aligning at least one bus bar with at least one milled section and at least one jumper with at least one milled section, with respect to each other and then fastening the said at least one bus bar and the said at least one jumper aligned thereto, by an appropriate fastening means.

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— *with international search report (Art. 21(3))*

A FASTENING ARRANGEMENT FOR BUS BAR AND JUMPER AND A METHOD FOR FASTENING THEREOF

FIELD OF THE INVENTION

The present invention relates to the field of fastening arrangement, more particularly to fastening arrangement for a bus bar and a jumper.

BACKGROUND

Bus bars play a critical role in electrical systems for the purpose of conducting electricity. They are commonly implemented in electrical apparatuses such as switch boards, distribution boards, sub-station systems *etc.* In order to hold these bus bars in place, generally, a jumper is used. The said bus bar and jumper are aligned with respect to each other and fastened together by appropriate fastening means. Such an arrangement is referred to as a fastening arrangement.

Different fastening arrangements for bus bars and jumpers are used in the industry. A simple example of such fastening arrangement involves bus bar and *'T- off type'* jumpers which are aligned and then fastened by appropriate fastening means such as nuts, bolts *etc.* Other examples of such fastening arrangements make use of additional components such as adapter connectors, adapter pieces, Baumen Springs, Helicoils *etc.*., in order to fasten the bus bar and jumper together.

Fastening arrangements, as mentioned in the foregoing paragraph, have a common technical problem *i.e.* all of them either require the usage of additional components or require additional skill by the operator or manufacturer, in order to achieve a desirable alignment of the bus bar and the jumper. Therefore, the solution to the said technical problem lies in a fastening arrangement that facilitates easy and precise alignment of a bus bar and a jumper, without any extra skill of the operator or manufacturer or any additional component. The instant invention aims at realizing and resolving the said technical problem and provides a fastening arrangement in line with the solution offered.

OBJECTS OF THE INVENTION

It is now, therefore, an object of the present invention to provide a fastening arrangement for a bus bar and a jumper which has lesser number of components.

It is also an object of the invention to provide a fastening arrangement for a bus bar and a jumper in which, the bus bar and the jumper are aligned with more ease and precision.

Another object of the invention is to provide a fastening arrangement for a bus bar and jumper which is simple in construction.

Yet another object of the invention is to provide a fastening arrangement for a bus bar and a jumper which is economical.

SUMMARY OF THE INVENTION

Accordingly the present invention provides a fastening arrangement for a bus bar and a jumper. The fastening arrangement of the invention comprises at least one bus bar having at least one milled section, at least one jumper having at least one milled section and a fastening means. The fastening means is provided for fastening the said at least one bus bar and said at least one jumper together

Accordingly the present invention also provides a method for fastening at least one bus bar and at least one jumper to obtain a fastening arrangement in accordance with the fastening arrangement of the invention. The method of the invention comprises the steps of aligning at least one bus bar with at least one milled section and at least one jumper with at least one milled section, with respect to each other. Fastening the said at least one bus bar and the said at least one jumper aligned thereto, by an appropriate fastening means.

BRIEF DESCRIPTION OF THE DRAWINGS

With reference to the accompanying drawings in which:

Fig.1 shows an exemplary embodiment of a fastening arrangement for a bus bar and jumper comprising screws as fastening means, in accordance with the prior art

Fig.2 shows an exemplary embodiment of a fastening arrangement for a bus bar and jumper comprising flattened bus bar, helicoils and a single screw as fastening means, in accordance with the prior art

Fig.3 shows an exemplary embodiment of a fastening arrangement for a bus bar and a jumper comprising an adaptor piece as fastening means, in accordance with the prior art.

Fig.4 shows an exemplary embodiment of a fastening arrangement for a bus bar and a jumper comprising a special adaptor connector and Baumen Springs as fastening means, in accordance with the prior art.

Fig.5 shows an exemplary embodiment of the fastening arrangement in accordance with the invention.

DETAILED DESCRIPTION

The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of preferred embodiments of the invention as defined by the claims and their equivalents. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the invention. Person skilled in the art would appreciate that the exemplary embodiments of the present invention are provided for illustration purpose only and not for the purpose of limiting the invention as defined by the appended claims and their equivalents.

The descriptions of well-known functions and constructions are omitted for clarity and conciseness. Furthermore, the terms and words used in the following description and claims are not limited to the bibliographical meanings, but, are merely used by the inventor to enable a clear and consistent understanding of the invention. It is to be understood that the plural referents in the claims will include singular as well as plural forms, unless and until the contrary is stated expressly. Thus, for example, reference to "projections" would include a reference to one or more projections.

Fig.1 refers to an exemplary fastening arrangement in accordance with the prior art **[100]**, comprising four screws for obtaining the fastening arrangement. As shown in figure, this

fastening arrangement involves a bus bar **[120]** and *'T-off'* type jumpers **[140]** which are aligned and then fastened by appropriate fastening means **[160]** such as nuts, bolts *etc.*. It can manifestly be seen that such fastening arrangement would possess low reliability and require the need of a skillful manufacturer or operator.

Fig.2 refers to another fastening arrangement in accordance with the prior art **[200]**, comprising flattened bus bars **[220]** and cylindrical jumpers **[240]**. The said bus bars and jumpers are aligned with respect to each other and are fastened using a hardware set, **[260]** essentially consisting of a spacer, helicoil and a suitable fastening means. As is evident from the figure, such fastening arrangements require additional mandatory pieces *viz.* Bus bar, Jumper, Helicoil and fastening means, in order to obtain the fastening arrangement

Fig.3 refers to a variation of the fastening arrangement in accordance with the aforementioned prior art **[300]**. This fastening arrangement comprises a hardware set, **[320]** essentially consisting of adaptor connector and helicoils. The said hardware set is used to fasten a bus bar fitted with an adapter piece **[340]** and a jumper **[360]**. A fastening *arrangement* of this kind, therefore, requires additional mandatory pieces *viz.* Bus bar, Jumper, Helicoil, Adaptor piece and three sets of fastening means, in order to obtain the fastening arrangement. Further, such arrangements also require the usage of a special tapping for fixing the helicoil in the fastening arrangement.

Fig.4 refers to yet another exemplary fastening arrangement in accordance with the prior art **[400]**. This fastening arrangement comprises a hardware set, essentially consisting of Baumen Springs and adaptor connector to fasten the bus bar and jumper together. This figure shows a fastening arrangement wherein two bus bars **[420, 440]** are fastened to a single jumper **[460]** by hardware set **[480]** having four Baumen Springs which are placed within an adaptor connector. In such arrangements additional, therefore, mandatory pieces are required *viz.* Bus Bar, Jumper, Helicoil, adapter connector and Baumen Springs, Special tapping for fixing the helicoils and a fastening means, in order to obtain the fastening arrangement. Furthermore, the fastening arrangement of this kind also requires extra skill of the manufacturer or operator, in order to fix the adaptor piece and achieve proper alignment.

It can clearly be seen that all of the aforecited prior arts have a common technical problem i.e. all of them either require the usage of additional components or require additional skill by the operator or manufacturer, in order to achieve a desirable alignment of the bus bar and the

jumper. Therefore, the solution to the said technical problem lies in a fastening arrangement that facilitates easy and precise alignment, without any additional component or extra skill of the operator or manufacturer.

The instant application aims at realizing and resolving the said technical problem and provides for a fastening arrangement in accordance with the aforementioned solution. It proposes a fastening arrangement wherein, the bus bar and the jumper possess milled sections and the said milled sections accommodate each other so as to facilitate easy and precise alignment, without any additional component or extra skill of the operator or manufacturer.

Fig.5 refers to a preferred embodiment of the fastening arrangement in accordance with the invention **[500]**. This invention effectively addresses the technical problem and provides a reliable solution in the form of a fastening arrangement wherein, the alignment of the bus bar and the jumper neither requires the usage of additional components nor requires extra skill of the manufacturer or operator. The invention, as shown in the figure, refers to a fastening arrangement comprising a bus bar **[515]**, a jumper **[530]** and a fastening means such that the milled sections of the jumper consist of projections **[560]** and the milled sections of the bus bar consist of slots **[545]**. The alignment of bus bars and jumpers is easily achieved in the instant case as the projections on the jumper are accommodated into the slots of the bus bar and further restricts the rotation of the bus bar. The alignment thus obtained, is then fastened together, by a bolt as the fastening means **[575]**. The figure clearly shows that this fastening arrangement does not require any extra component such as an adaptor piece, adaptor connector with Baumen springs *etc.*. or any extra skill of the manufacturer or operator to align the bus bar and jumper. Furthermore, the fastening arrangement in accordance with the invention has the advantage of being simple in construction and economical.

WE CLAIM:

1. A fastening arrangement for a bus bar and a jumper comprising:

at least one bus bar having at least one milled section;

at least one jumper having at least one milled section; and

a fastening means for fastening the said at least one bus bar and said at least one jumper together;

2. The fastening arrangement as in claim 1 wherein, the said at least one milled section include projections or slots or both.

3. The fastening arrangement as in claim 1 and claim 2 wherein, the said at least one bus bar and the said at least one jumper are in alignment with respect to each other.

4. The fastening arrangement as in claim 1 to 3 wherein, the said alignment of the said at least one bus bar and the said at least one jumper purports to accommodation of the projections into the slots correspondingly.

5. The fastening arrangement as in claim 1 wherein, the said fastening means includes one or more of pinions or bolts or rivets or screws or combination thereof.

6. A method for fastening at least one bus bar and at least one jumper to obtain a fastening arrangement in accordance with claim 1, wherein the said method comprises the steps of:

aligning at least one bus bar with at least one milled section and at least one jumper with at least one milled section, with respect to each other; and

fastening the said at least one bus bar and the said at least one jumper aligned thereto, by an appropriate fastening means;

7. The method as in claim 6 wherein the said aligning of at least one bus bar and at least one jumper purports accommodating of the milled sections into each other correspondingly.

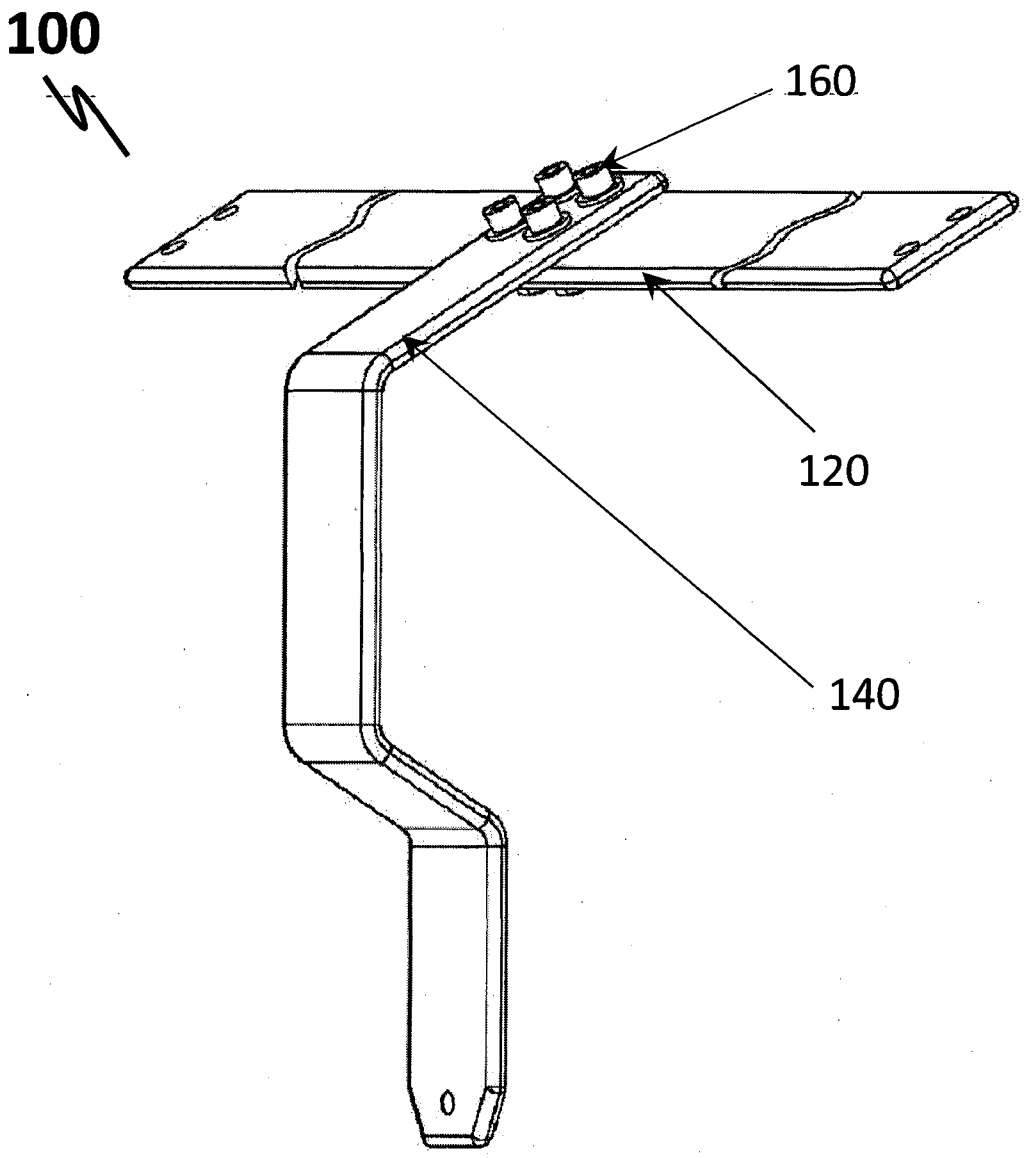


Fig. 1

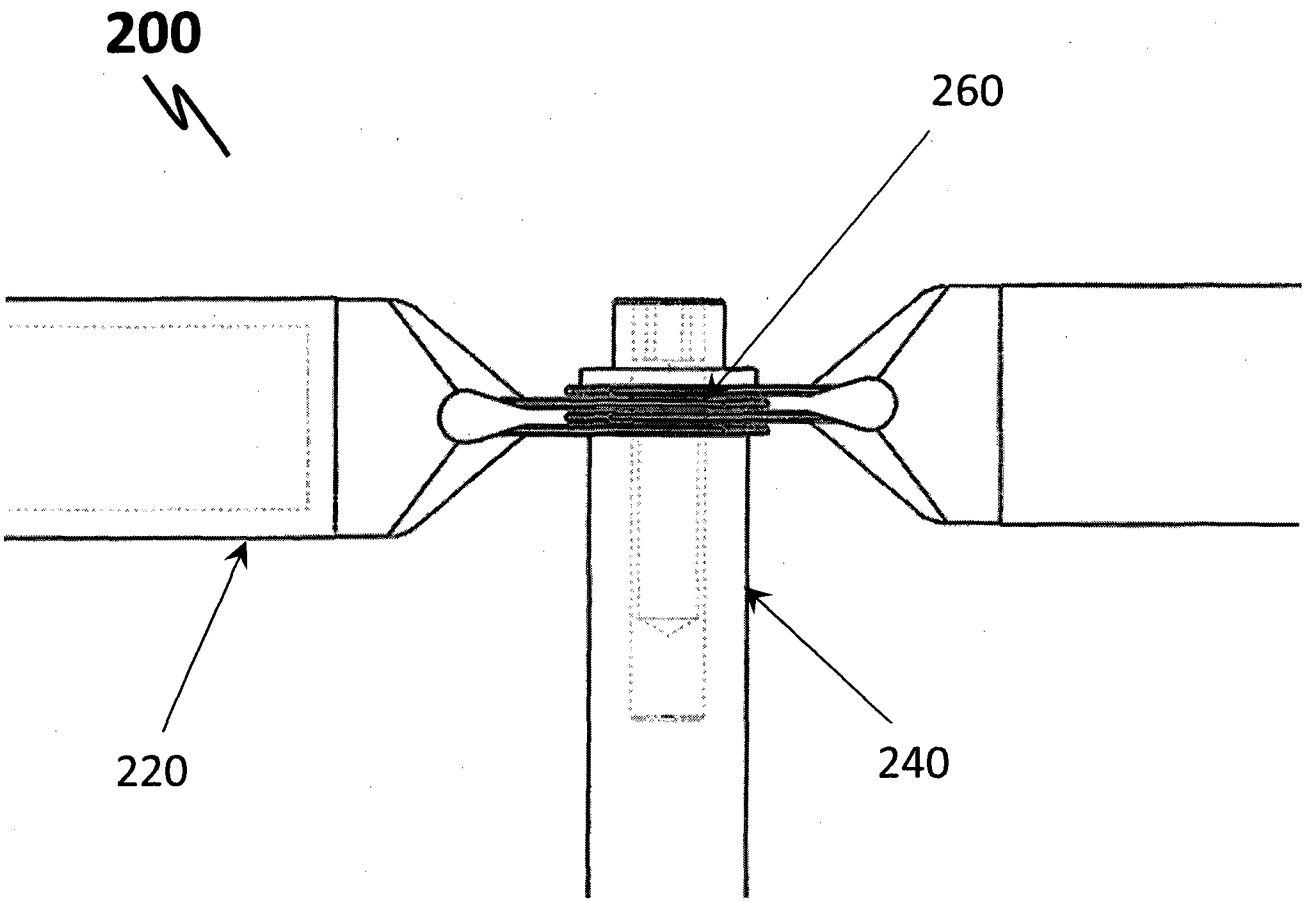


Fig. 2

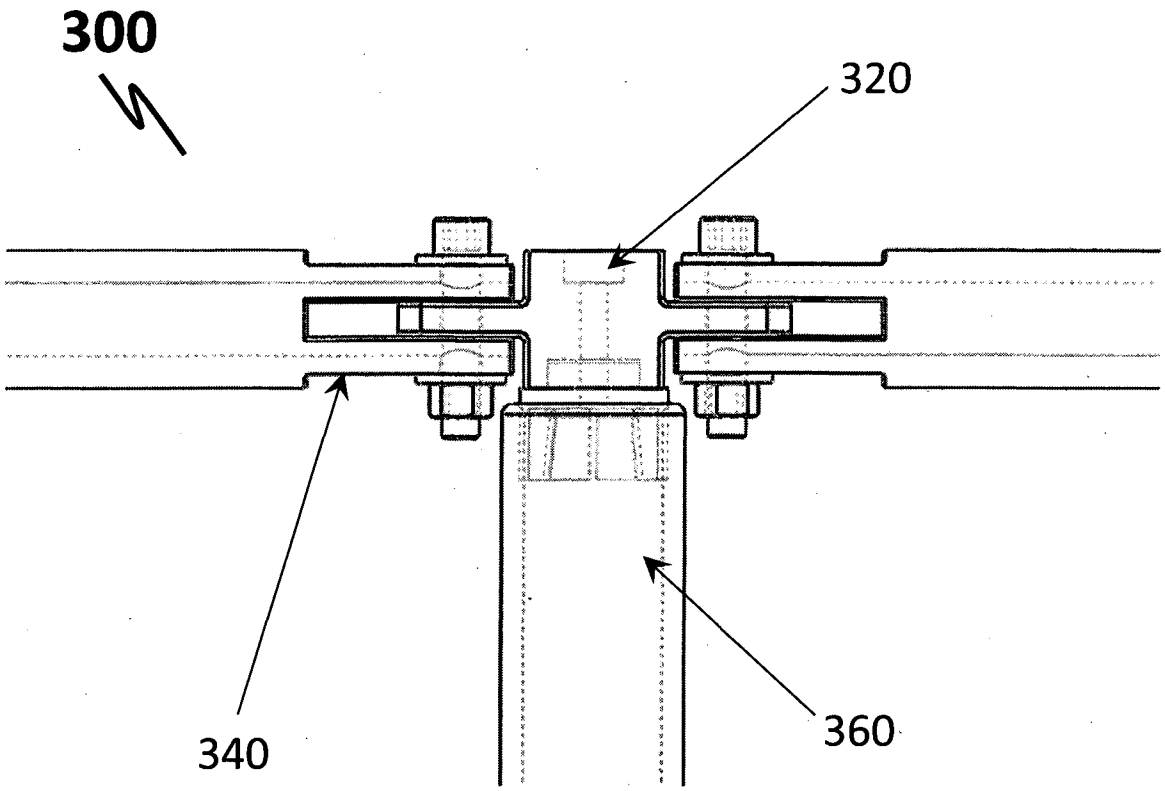


Fig. 3

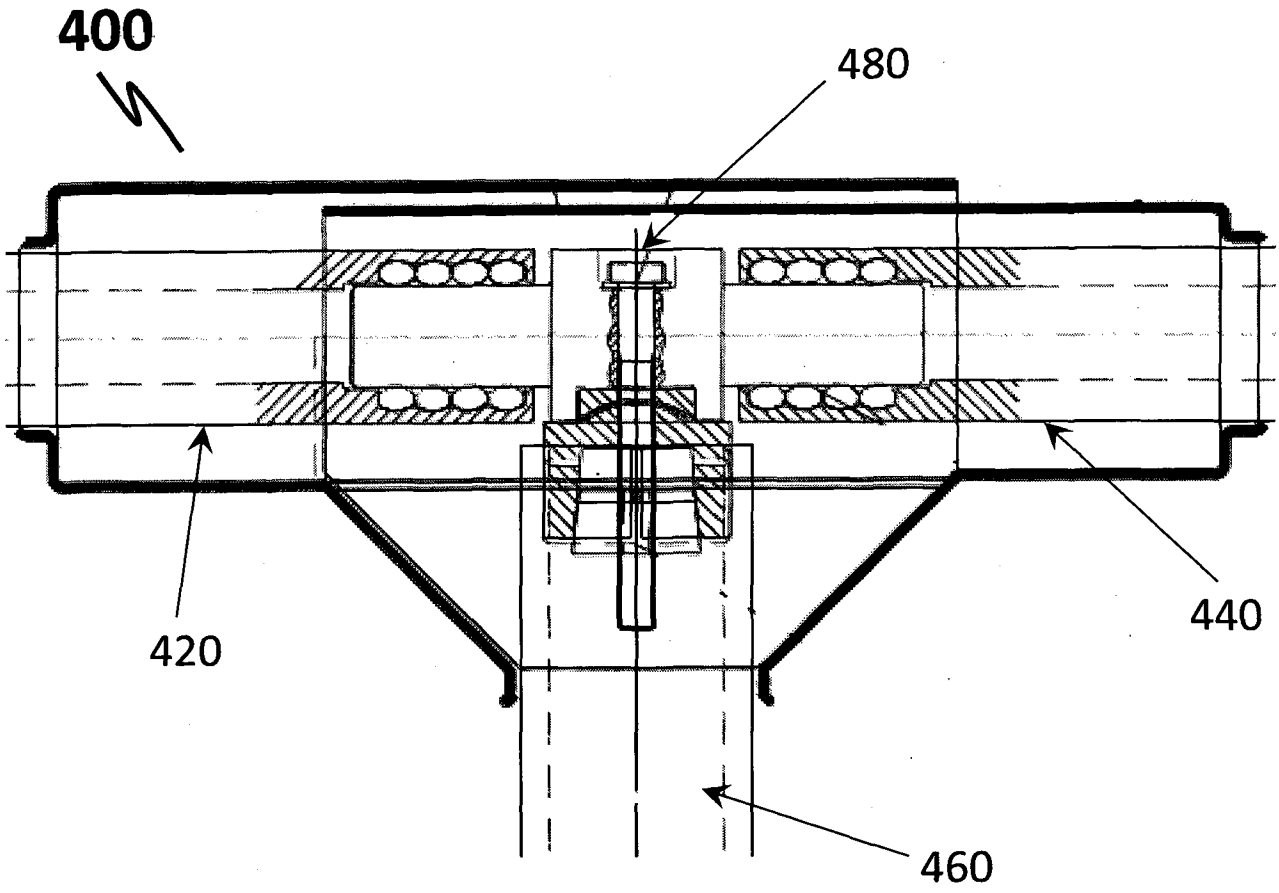


Fig. 4

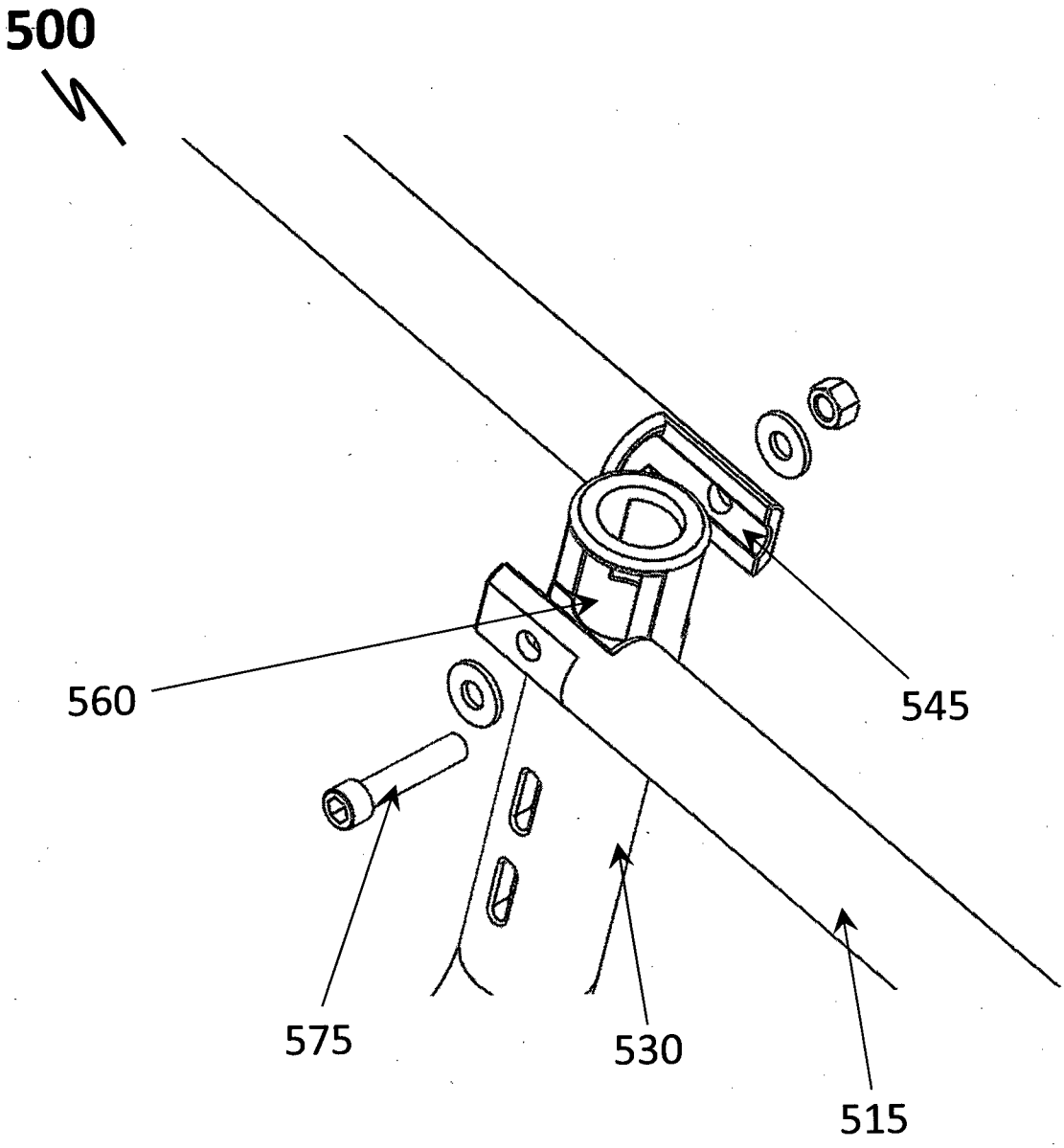


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/001185

A. CLASSIFICATION OF SUBJECT MATTER
INV. H01R4/30 H01R25/16 H02G5/02
ADD. H02B13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H01R H02G H01B H02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 305 991 B1 (GERSTER MAX [CH]) 23 October 2001 (2001-10-23) the whole document	1-7
X	FR 2 760 908 A1 (LOH KG RITTAL WERK [DE]) 18 September 1998 (1998-09-18) figures 1,2	1-3,5,6
A	DE 93 16 832 U1 (SIEMENS AG [DE]) 24 March 1994 (1994-03-24) figure 1	1-7

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 September 2013	16/09/2013

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2013/001185

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6305991 B1	23-10-2001	EP 1014494 A1	28-06-2000
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