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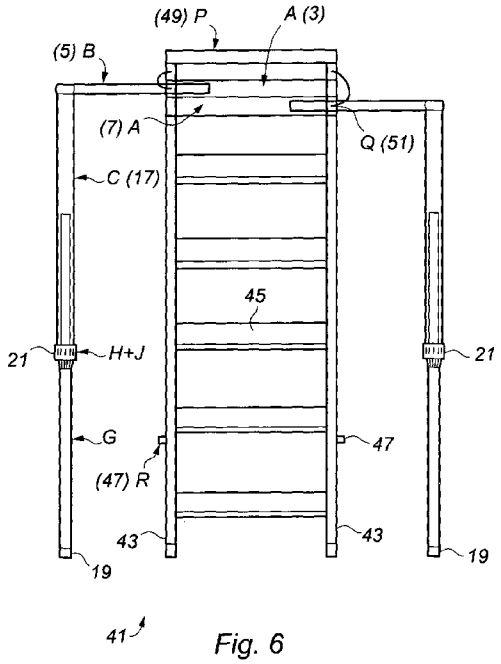


Fig. 6

(57) Abstract: A support for a height access such as a ladder, extension ladder, access tower, scaffold, trestle or step up platform. It has an extendible first section attached to an extendible second section, the first section is perpendicular to the second section. IN use, the first section is laterally extendible from the side of the height access apparatus and the second section is extendible to allow ground engaging means located remote from the first section to contact the ground, The present invention provides a support for a height access apparatus which greatly improves the stability of the height access apparatus thereby greatly improving its safety.

WO 2012/168684 A1

Support Apparatus and Improved Height Access Apparatus

Introduction

The present invention relates to a support apparatus which facilitates an improvement in safety for those using height access apparatus. It also relates to improved height access apparatus.

Background

There are many types of height access or working apparatus for example step ladders, extension ladders, podium steps, access towers, scaffolds, trestles and step up platforms. This type of apparatus is used by tradesmen such as electricians, plumbers, painter and joiners when working on areas of a building which are out of reach. In addition, much domestic use of step ladders and extension ladders is made for a wide range of tasks. With all work conducted up a ladder or on a platform, there is an inherent risk of injury from falling off the height access apparatus.

In many cases, accidents occur because the weight of the user or movement of the user causes a force and resultant destabilising movement in the height access apparatus. Four types of destabilising movement commonly occur:

1. Base slip may occur where the person is located towards the top of the height access apparatus and the downward force of weight or movement causes the base to lose its grip on the floor or ground below;
2. Loss of top contact may occur when movement on the height access apparatus causes it to flex. It can also occur where the user exerts a force on the ladder away from a supporting wall;
3. Topside slide may occur when a lateral force is applied by the user as a result of the user stretching away from the ladder; and
4. Flip may occur when weight or movement of the ladder causes it to flip over.

Some height apparatus need to have external stabilizers which are separate items of apparatus which are connectable to the height access apparatus. This makes it bulky and cumbersome for storage and transportation.

Summary of the Invention

In accordance with a first aspect of the invention there is provided a support for a height access apparatus, the support comprising:

an extendible first section attached to an extendible second section, the first section being substantially perpendicular to the second section, wherein the first section is adapted to be laterally extendible from the side of the height access apparatus and the second section is extendible to allow ground engaging means located remote from the first section to contact the ground, in use.

Preferably, the first section comprises a sleeve which accommodates an arm which is movable along at least part of the length of the sleeve to extend and retract the first section.

Preferably, the arm is rotatably mounted in the sleeve.

Preferably, the arm is fixedly connected to the extendible second section.

Preferably the sleeve extends laterally at least partly through the height access apparatus at or near the top thereof, in use.

Preferably, the sleeve is provided with a collar which is inserted into a lateral member of the height access apparatus.

Optionally, the sleeve is rotatably mounted in the collar.

Optionally, the first section is provided with a locking mechanism to prevent rotational and/or lateral movement of the sleeve and the arm.

Optionally, the locking mechanism is a locking pin receivable by one or more hole in the sleeve and/or arm.

Optionally, the locking mechanism is located on the collar.

Preferably, the second section comprises a sleeve which accommodates a leg which is moveable along at least part of the length of the sleeve to extend and retract the second section.

Preferably, the leg of the second section has a locking mechanism which fixes the length of the second section.

Preferably the locking mechanism is a compression fitting situated between the sleeve and the leg.

Alternatively, the first section is a telescopic member connectable to a lateral member of the height access apparatus.

Alternatively, the second section is a telescopic member.

The term substantially perpendicular means any and all angles around 90° which allow the support apparatus to function effectively.

Preferably, the angle between the first section and the second section is 90° +/- 20°.

Preferably, a pair of supports is connectable one on either side of a height access apparatus.

Optionally the first sections of said supports are mounted coaxially.

Optionally the first sections of said supports are mounted axially offset.

Preferably, the second section is connectable to a lateral member of a height access platform to allow easy storage of the support apparatus.

Preferably, the second section of the support apparatus is parallel to the lateral member of the height support apparatus.

Optionally, the second section of the support apparatus is curved.

Alternatively, the second section comprises at least two sleeves with corresponding legs, the sleeves being rotatably mounted at the connection with the arm of the first section, such that, in use, the legs may be positioned in front of and behind the height access apparatus.

Preferably, the second section may further comprise a pressure sensor to warn the user of overleaning and/or overloading.

Preferably, the pressure sensor can be fitted at or near the end of the second section remote from the first section.

In accordance with a second aspect of the invention there is provided a step ladder with a support as defined with respect to the first aspect of the invention.

In accordance with a third aspect of the invention there is provided an extension ladder with a support as defined with respect to the first aspect of the invention.

In accordance with a fourth aspect of the invention there is provided a fixed ladder with a support as defined with respect to the first aspect of the invention.

In accordance with a fifth aspect of the invention there is provided an extension ladder with a support as defined with respect to the first aspect of the invention.

The present invention provides a support for a height access apparatus which greatly improves the stability of the height access apparatus thereby greatly improving its safety.

It can be made from any cross sectional shape that suits telescopic movement. In this instance they will be described by a tubular shape which enables the legs when

the arms are retracted to be swivelled to a storage position and held snugly against the stiles of step ladders and extension ladders or the frames of any other height apparatus making storage and transportation easy.

Brief Description of the Drawings

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

figure 1 is a side view of a horizontal sleeve with an inner extendable arm attached to the vertical sleeve in accordance with the present invention;

figure 2 is a side view of a horizontal sleeve with inner extendable arm attached to an outer vertical sleeve and freely rotating inner vertical sleeve;

figure 3a is a front view and figure 3b a side view of a vertical sleeve with one inner extendable leg with a compression fitting;

figure 4 is a side view and elevated view of a stile fitting to be fitted in a suitable position both sides of a step ladder or extension ladder to accommodate the horizontal sleeves;

figure 5 is a side view and elevated view of a fitting for a tubular frame to accommodate the horizontal sleeves;

figure 6 is a front view of a step ladder with parallel stiles and the supports in use mode;

figure 7 is a side view of a step ladder with supports in accordance with the present invention;

figure 8 is an opposite side view to that shown in figure 7 of a step ladder in use;

figure 9 is a side view of a step ladder incorporating supports of the present invention in a different suitable position;

figure 10 is a side view of a step ladder with the supports in a storage position;

figure 11 is an end view of a section of an access tower frame incorporating supports of the present invention;

figure 12 is a side view of an example of double supports in accordance with the present invention;

figure 13 is a side view of an extension ladder incorporating double supports;

figure 14 is a side view of supports in kit form suitable for use on access towers;

figure 15 shows the supports in kit form for steps and extension ladders;

figure 16 is a front view of an access tower having a support in accordance with the present invention;

figure 17 is a front view of an upper section of an access tower with extendable horizontal arms;

figure 18 is a perspective view from the top of an access platform with supports in accordance with the present invention, in use;

figure 19 is a plan view of an access platform with horizontal sleeves and arms removeably connected to the platform; and

figure 20 is a side view of an access platform in use with supports in accordance with the present invention.

Detailed Description of the Drawings

In the following drawings, identical reference numerals have been used to describe similar or identical features where appropriate.

Figure 1 is a side view of the top part of an embodiment of a support apparatus in accordance with the present invention. The support apparatus 1 comprises a first section which comprises horizontal sleeve 3 which, in use is fitted inside the upper section of the height apparatus. The sleeve is adapted to receive an extendible arm 5 which can slide in and out of the sleeve 3. The arm 5 also has a stopper 9 which can cooperate with abutment 11 to prevent the arm 5 from being completely removed from the sleeve 3 or from being overextended. The arm 5 of the first section is fixedly attached to the second section at joint 13 and is free to rotate in sleeve 3. In this figure the top–most part of the second section, comprising the sleeve 7 is shown.

Figure 2 shows another embodiment of the present invention. In this example, the arm 5 is provided in a sleeve 3 as with figure 1. However, the second section comprises a pair of vertically extending sleeves 7, 15 which are rotatably mounted such that the legs can be in contact with the ground at positions to the front and the rear of the height apparatus.

Figures 3a and 3b are front and side views of an embodiment of a second section of a second section in accordance with the present invention. Described in relation to both figures, a rotatable mounting 13 is provided at the top of the second section where it is coupled to the first section. The vertical sleeve 7 extends downwards from the rotatable mounting 13 and is adapted to receive an extendible leg 17. The lowermost part of the extendible leg 17 comprises a foot 19. The second section further comprises a locking mechanism to ensure that once the second section is firmly placed upon the ground, the weight and movement of the height apparatus

does not cause the extendible leg 17 to move further into the sleeve 7. In this example a compression fitting 21 is provided. The compression fitting comprises a thread 23 attached to the lowermost part of the sleeve 7 and compression rings 25 and a threaded ring 27 movably mounted upon the leg 17. In use, when the leg is at the appropriate height, the ring 27 will be screwed onto the thread 23 to secure the position of the leg within the sleeve.

Figures 4a and 4b show top and side views respectively of a sleeve or collar 29 for fitting the first section to a lateral member of a height apparatus. In this example the sleeve or collar is fitted to the stile of a ladder. Holes 31, 32 are for receiving first sections which are offset along the lateral portion of the height apparatus.

Figures 5a and 5b show top and side views respectively of a tubular frame 33 for fitting the first section to a lateral member of a height apparatus. In this example the sleeve or collar is fitted to the stile of a ladder. Holes 35, 36 are for receiving first sections which are offset along the lateral portion of the height apparatus.

Figure 6 shows an example of a height support apparatus in accordance with the present invention, in use on a set of step ladders.

In this example, the first section and the second section are substantially as described in relation to figures 1 to 3. The step ladder comprises lateral members known as stiles 43, treads 45 positioned between and supported by the stiles and a platform 49 at the top of the ladder. A clip 47 is situated towards the bottom of the style and is designed to receive the leg 17 or sleeve of the support apparatus such that when not in use, the leg 17 may be secured to the side of the stile 43. The clip may be situated at any convenient location on a stile. In this example, the second section comprising sleeve 7 and leg 17 are straight, as are the ladder stiles 43 which make the legs easier to store against the side of the stiles. In addition a pin fastener 51, 52 is provided below the platform 49 on the styles 43. This is designed to lock the second section in position to prevent rotation when its position is set.

Figure 7 is a side view of the support and ladder shown in figure 6. This figure further shows the brace 49 which extends between the front and rear sections of the ladder

44, 46. The first sections 5, 6 on either side of the stile are slightly offset in height. Figure 8 shows the ladder and support of figure 7 from the other side.

Figure 9 shows another embodiment of the present invention where the support apparatus is attached to a ladder. In this example a first support apparatus 66 is connected to the front of the ladder 62 and a second support apparatus 68 is connected to the back 64 of the ladder. The support apparatus are laterally extendible as shown in figure 6 however the offset in position 70 of the legs 17 which occurs can be beneficial to the overall stability of the ladder and support. In this example of the present invention, sensors are positioned in the feet 76 and these sensors provide an alarm to warn the user of overleaning and/or overloading.

Figure 10 shows the second section in its stowed position, clipped onto the stile of the ladder 41 using clip 47.

Figure 11 shows an embodiment of the present invention where the height apparatus is the frame of an access tower having rungs 95 and a top-most working platform 97. The platform 81 is provided with a pair of support apparatus positioned at either side of the platform 81. Each support comprises a horizontal sleeve 83 which contains a laterally extendible arm 85 which is coupled to a second section which comprises a vertical sleeve 87 and a leg 91 which are joined by a compression fitting 89.

Figure 12 shows a set of vertically extending sleeves and legs 101 which are connected to a single laterally extending arm in a manner similar to that shown in figure 2. In this example the vertically extending sleeves 105, 106 are fixedly attached to the arm (not shown) which is free to rotate in the horizontal sleeves of the first section (not shown) This allows the legs to be angled away from one another in use. Once a suitable position is found, the legs111 and sleeves can be fixed in position to prevent further rotation or vertical extension/contraction. This arrangement will provide stability to the front and rear of a ladder. Figure 13 shows the apparatus of figure 12 connected to an extension ladder 113. It will be noted that the angle of the sleeves 105, 106 and corresponding legs 111 and the position of the legs in the sleeves may be set to adjust the position and height of the legs, thereby providing greatly improved stability to the extension ladder.

Figure 14 is a side view of a pair of supports in kit form suitable for use on access towers. The kit comprises sleeves 123, laterally extendible arms 125, a joint127 which connects the first section to the second section 128 The lower part of the apparatus is not shown.

Figure 15 shows the supports in kit form for steps and extension ladders. The kit comprises sleeves 133, laterally extendible arms 135, a joint 137 which connects the first section to the second section 139. The lower part of the apparatus is not shown.

Figure 16 shows an emdbodiment of the present invention when used with an access tower. The access tower 141 is of typical construction with a ladder 143, in this case, the access tower is provided with supports 145, 148 in accordance with the present invention. The supports 145, 148 are extendible in horizontal 146, 149 and vertical 147, 150 directions.

Figure 17 is a front view of an upper section of an access tower 151 having a ladder 153 . The access tower 151 is of typical construction with a ladder 153, in this case, the access tower is provided with supports 155, 158 in accordance with the present invention. The supports 155, 158 are extendible in horizontal direction but not in the vertical direction where they are of fixed length.

Figare 18 is a perspective view from the top of an access platform as shown in figure 16, with supports in accordance with the present invention, in use.

In figure 19 the support platform 161 is shown from the top as a plan view. The supports 163, 165 are attached to the platform about pivots 167, 169 to allow them to swing around into a Storage position where they are connected to the platform with clips 171, 173.

Figure 20 is a side view of the access platform of figure 19 in use.

The above embodiments of the present invention provide extendible supports which can be extended laterally a suitable distance from a height access apparatus to provide additional stability for the user. The fact that the supports are extendible

allows a user to position them for an appropriate amount of additional stability even in enclosed spaces, particularly because each support is separately extendable. Varying the vertical length of the support is of particular use on uneven ground. Attaching the supports to the side of the height access apparatus means that they do not take up much additional space when not in use.

Improvements and modifications may be incorporated herein without deviating from the scope of the invention.

Claims

1. A support for a height access apparatus, the support comprising:
an extendible first section attached to an extendible second section, the first section being substantially perpendicular to the second section, wherein the first section is adapted to be laterally extendible from the side of the height access apparatus and the second section is extendible to allow ground engaging means located remote from the first section to contact the ground, in use.

2. A support as claimed in claim 1 wherein , the first section comprises a sleeve which accommodates an arm which is movable along at least part of the length of the sleeve to extend and retract the first section.

3. A support as claimed in claim 2 wherein, the arm is rotatably mounted in the sleeve.

4. A support as claimed in claim 2 or claim 3, wherein, the arm is fixedly connected to the extendible second section.

5. A support as claimed in claim 2 wherein the sleeve extends laterally at least partly through the height access apparatus at or near the top thereof, in use.

6. A support as claimed in claim 2 or claim 5 wherein, the sleeve is provided with a collar which is inserted into a lateral member of the height access apparatus.

7. A support as claimed in claim 6 wherein, the sleeve is rotatably mounted in the collar.

8. A support as claimed in any preceding claim wherein, the first section is provided with a locking mechanism to prevent rotational and/or lateral movement of the sleeve and the arm.

9. A support as claimed in claim 8 wherein, the locking mechanism is a locking pin receivable by one or more hole in the sleeve and/or arm.

10. A support as claimed in claim 8 or claim 9 wherein, the locking mechanism is located on the collar.

11. A support as claimed in any preceding claim wherein, the second section comprises a sleeve which accommodates a leg which is moveable along at least part of the length of the sleeve to extend and retract the second section.

12. A support as claimed in claim 11 wherein, the leg of the second section has a locking mechanism which fixes the length of the second section.

13. A support as claimed in claimed in claim 12 wherein the locking mechanism is a compression fitting situated between the sleeve and the leg.

14. A support as claimed in any preceding claim wherein, the first section is a telescopic member connectable to a lateral member of the height access apparatus.

15. A support as claimed in any preceding claim wherein, the second section is a telescopic member.

16. A support member as claimed in any preceding claim wherein, the angle between the first section and the second section is 90° +/- 20°.

17. A support member as claimed in any preceding claim wherein, a pair of supports is connectable one on either side of a height access apparatus.

18. A support member as claimed in claim 17 wherein the first sections of said supports are mounted coaxially.

19. A support member as claimed in claim 17 wherein the first sections of said supports are mounted axially offset.

20. Preferably, the second section is connectable to a lateral member of a height access platform to allow easy storage of the support apparatus.

21. A support member as claimed in any preceding claim wherein, the second section of the support apparatus is parallel to the lateral member of the height support apparatus.

22. A support member as claimed in any preceding claim wherein, the second section of the support apparatus is curved.

23. A support member as claimed in any preceding claim wherein, the second section comprises at least two sleeves with corresponding legs, the sleeves being rotatably mounted at the connection with the arm of the first section, such that, in use, the legs may be positioned in front of and behind the height access apparatus.

24. A support member as claimed in any preceding claim wherein, the second section may further comprise a pressure sensor to warn the user of overleaning and/or overloading.

25. A support member as claimed in claim 24 wherein, the pressure sensor can be fitted at or near the end of the second section remote from the first section.
In accordance with a second aspect of the invention there is provided a step ladder with a support as defined with respect to the first aspect of the invention.

26. An extension ladder with a support as defined in claims 1 to 25.

27. A fixed ladder with a support as defined in claims 1 to 25.

28. An extension ladder with a support as defined in claims 1 to 25.

29. A support as hereinbefore described with reference to the accompanying drawings.

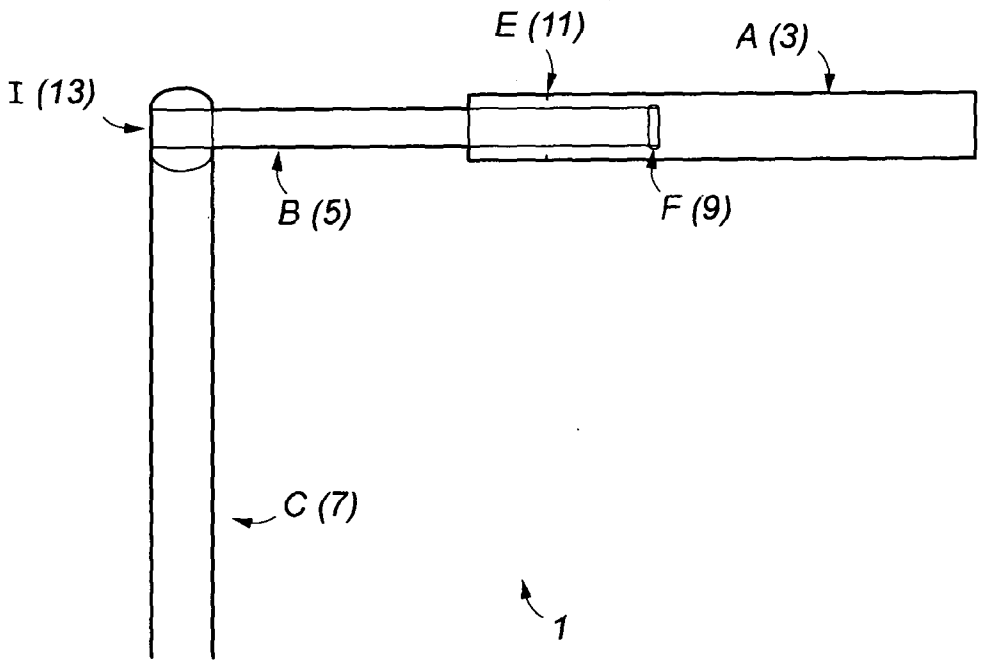


Fig. 1

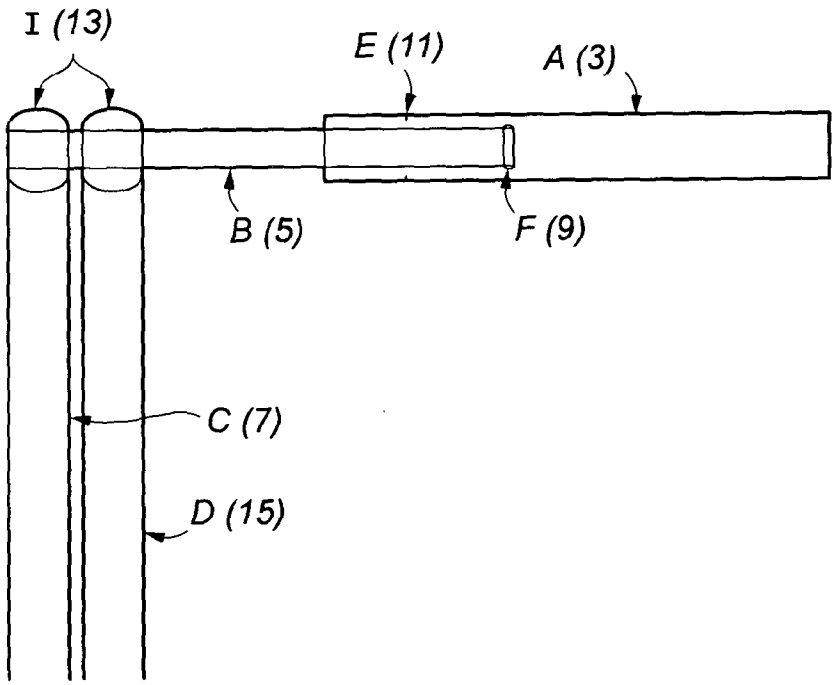


Fig. 2

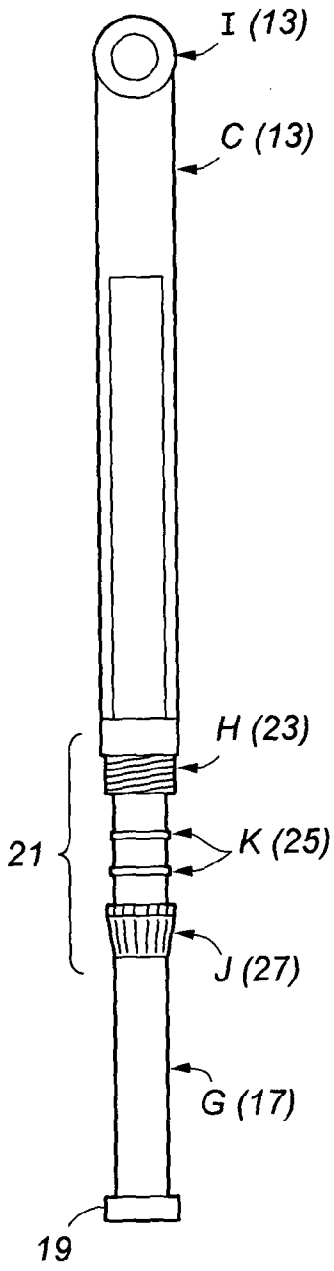


Fig. 3a

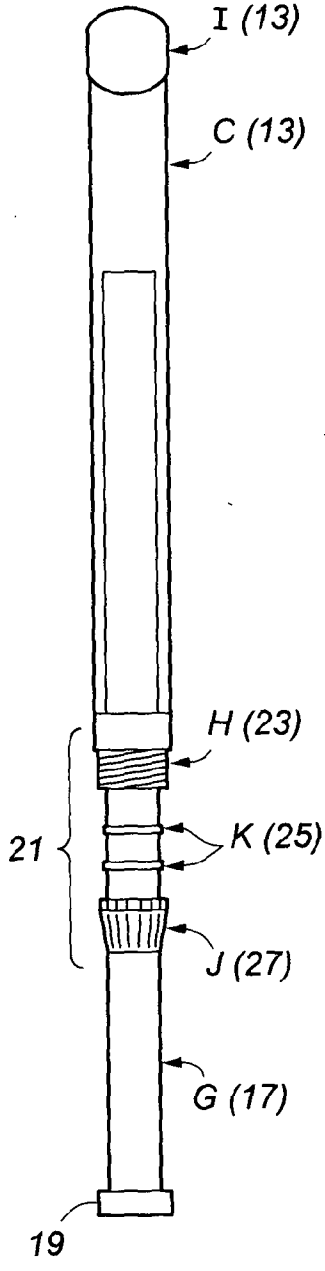


Fig. 3a

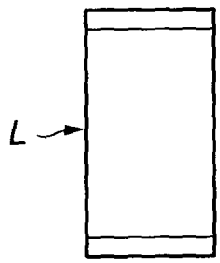


Fig. 4a

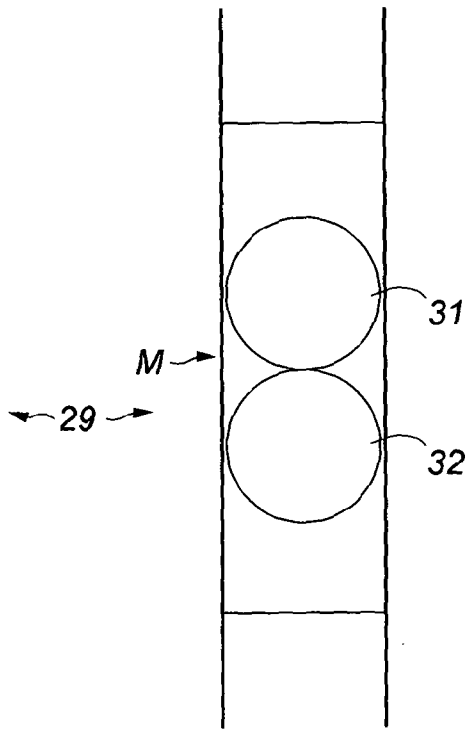


Fig. 4b

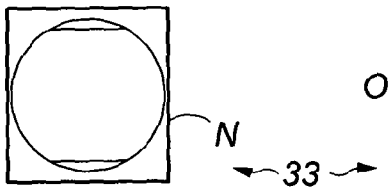


Fig. 5a

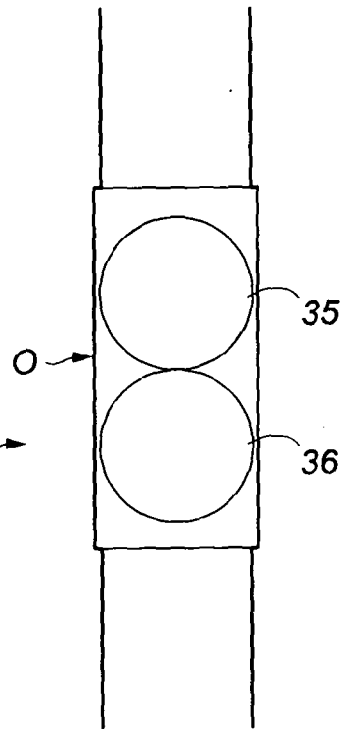


Fig. 5b

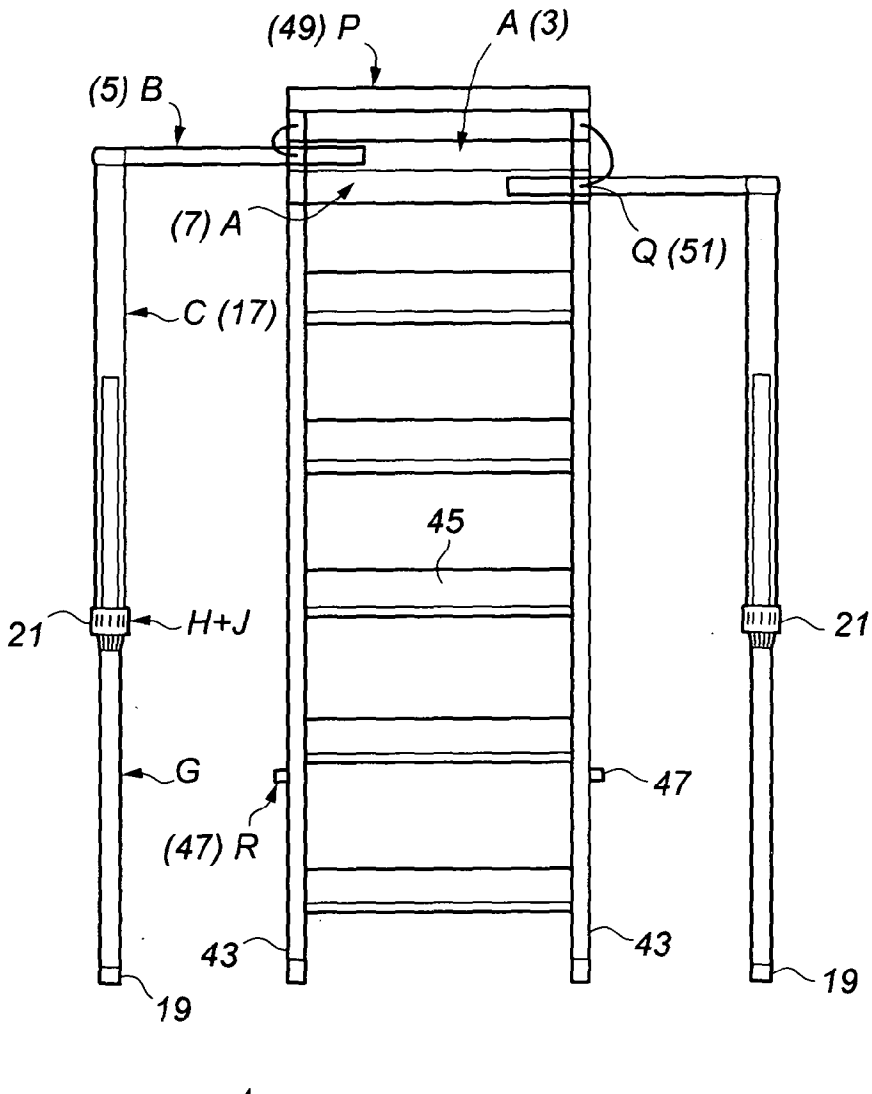


Fig. 6

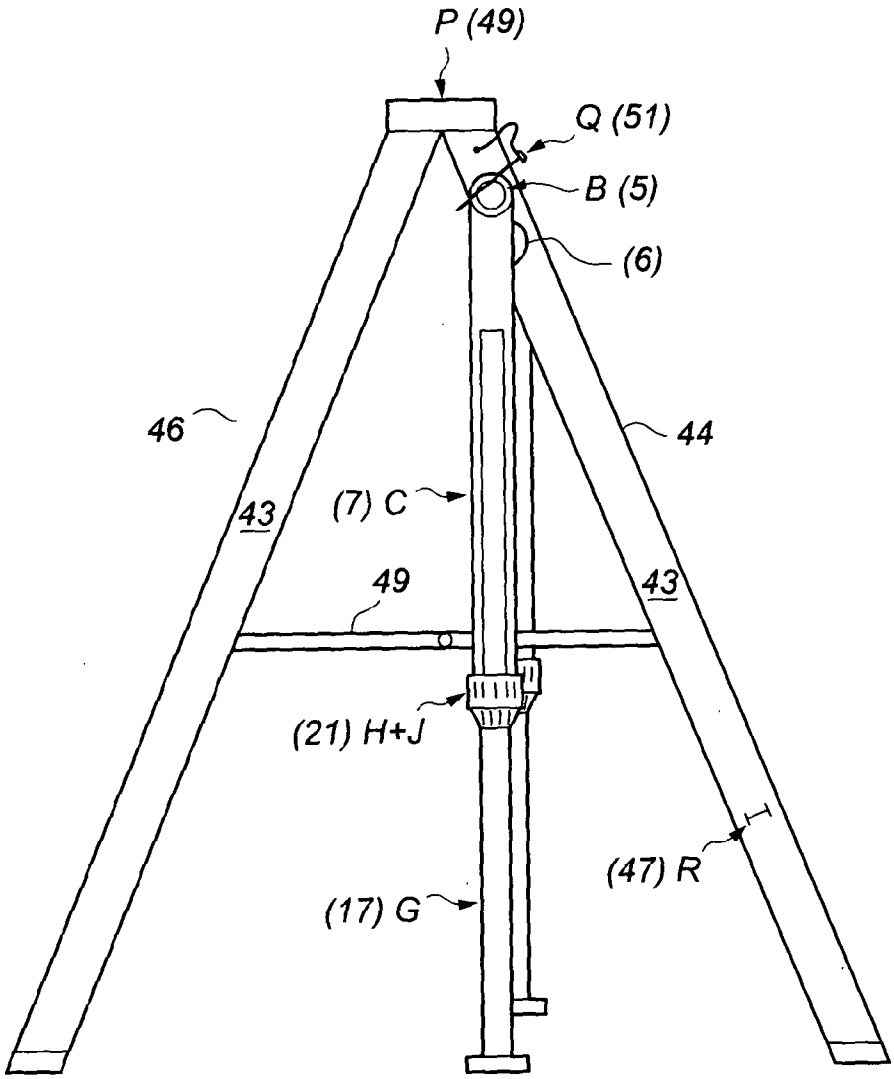


Fig. 7

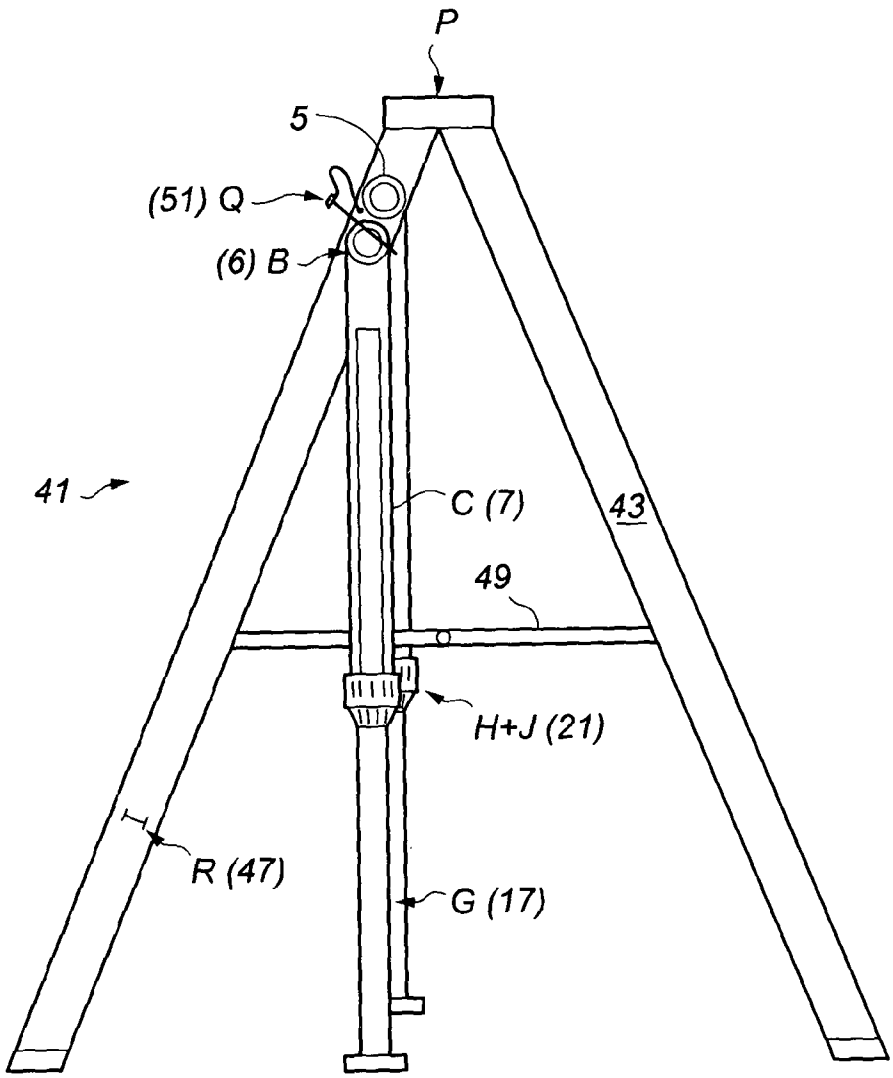


Fig. 8

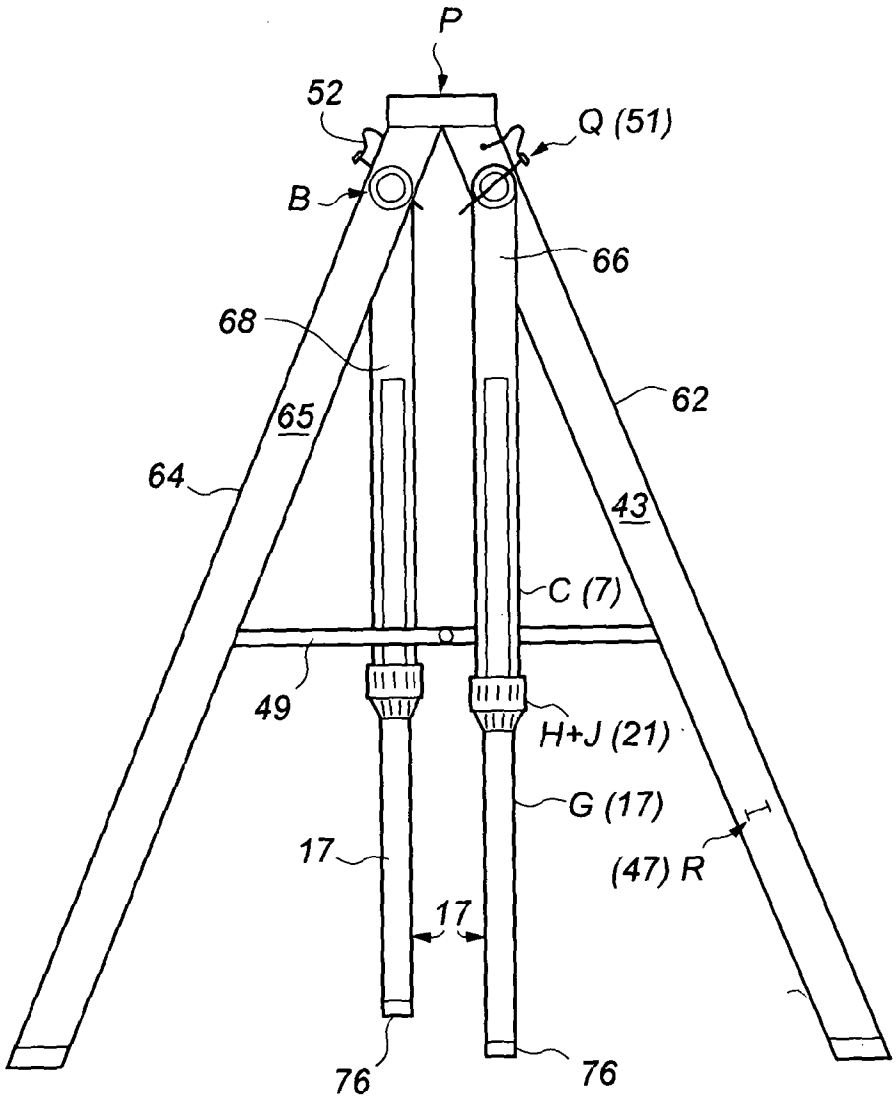


Fig. 9

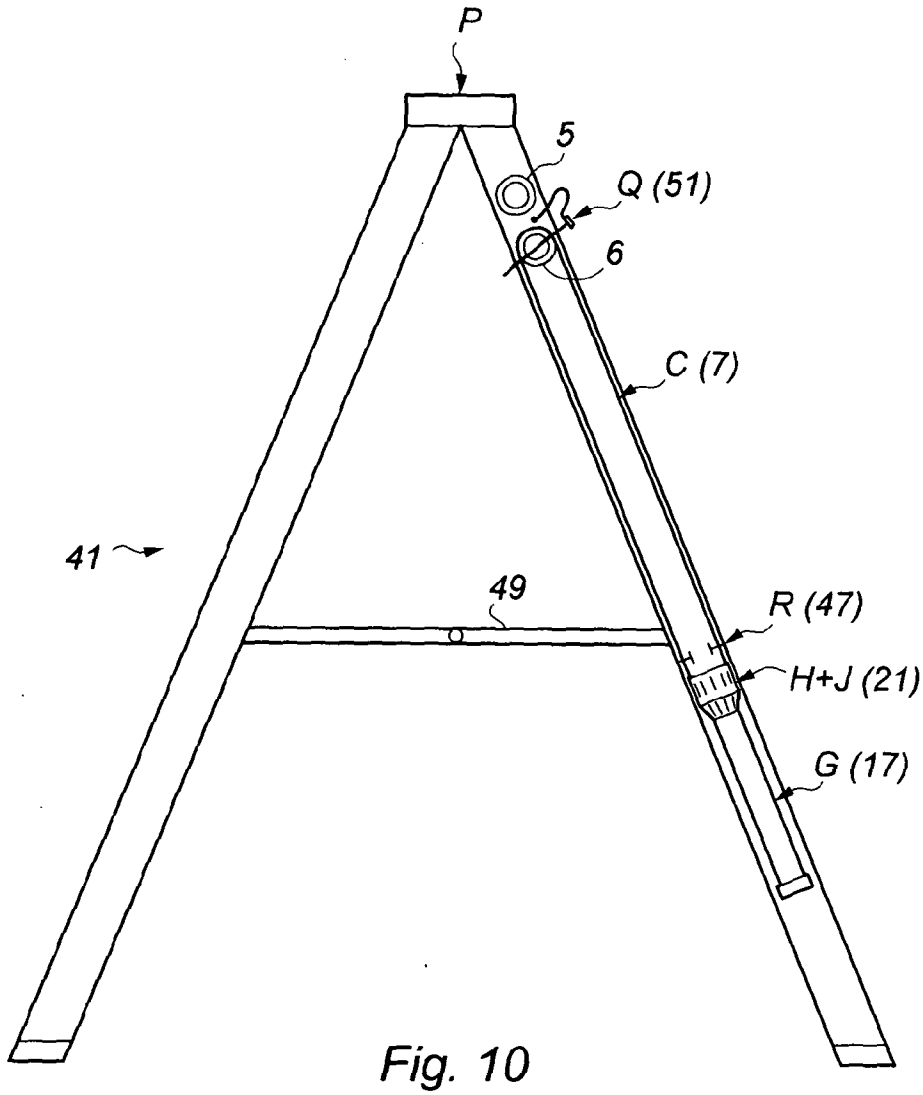


Fig. 10

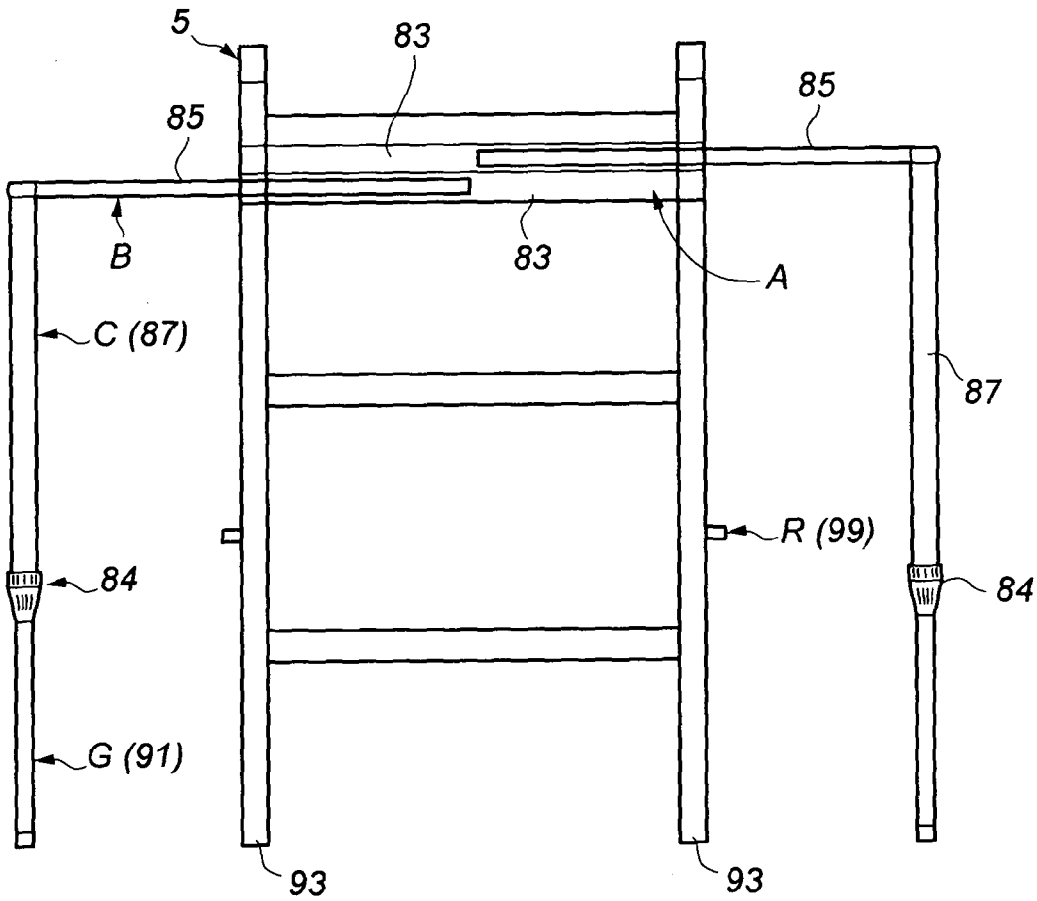


Fig. 11

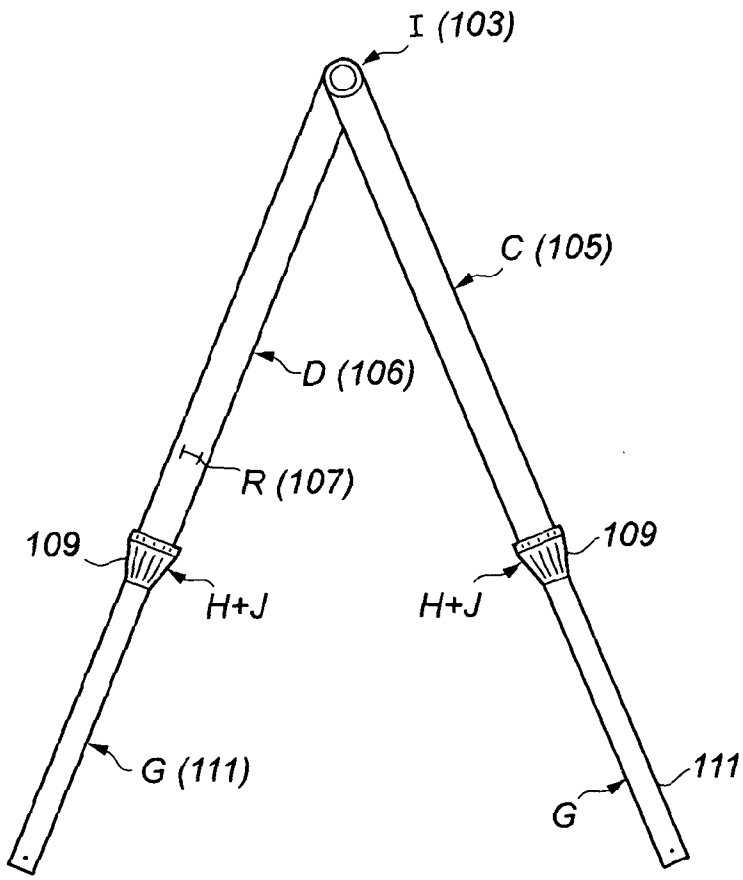


Fig. 12

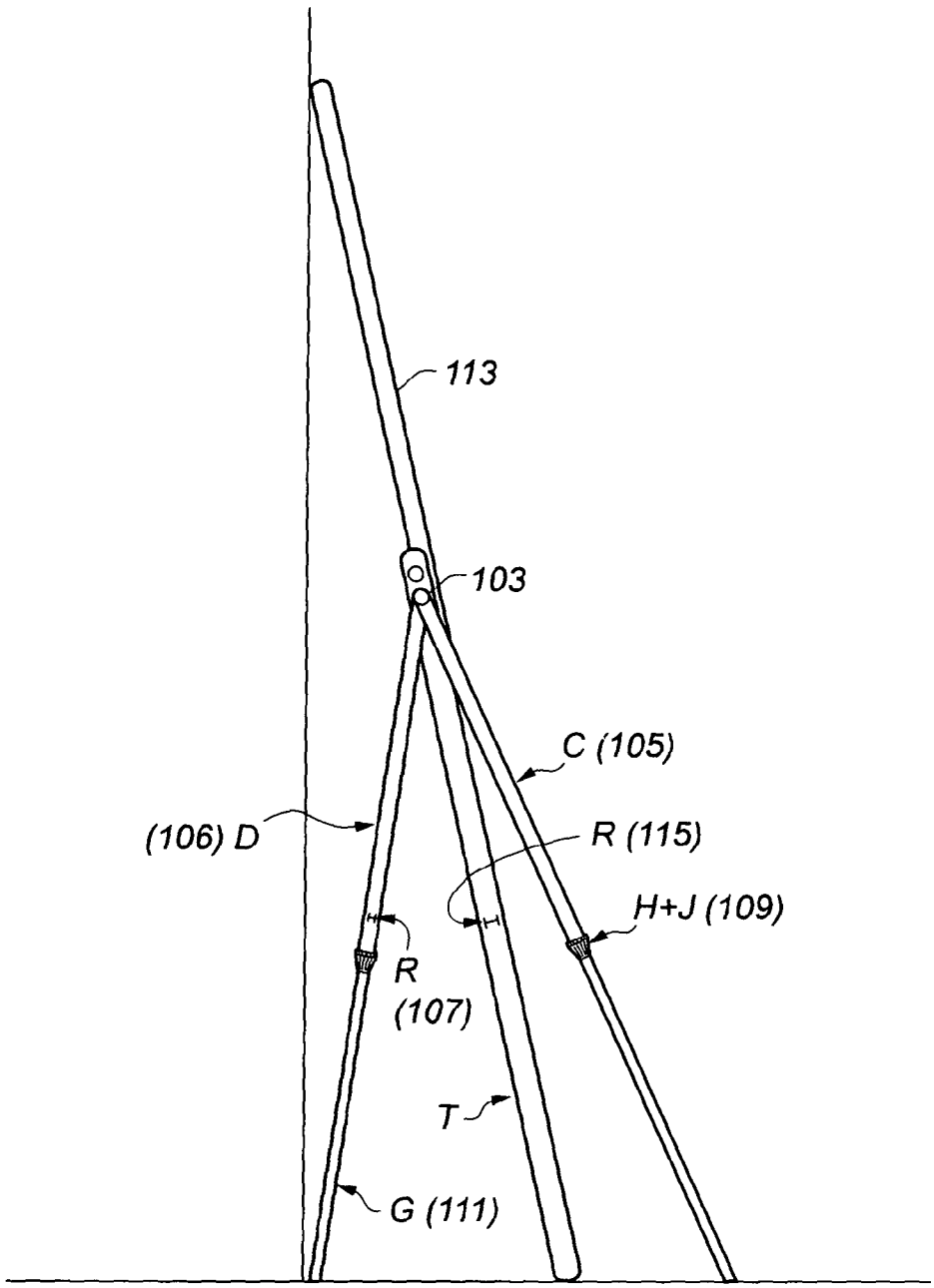


Fig. 13

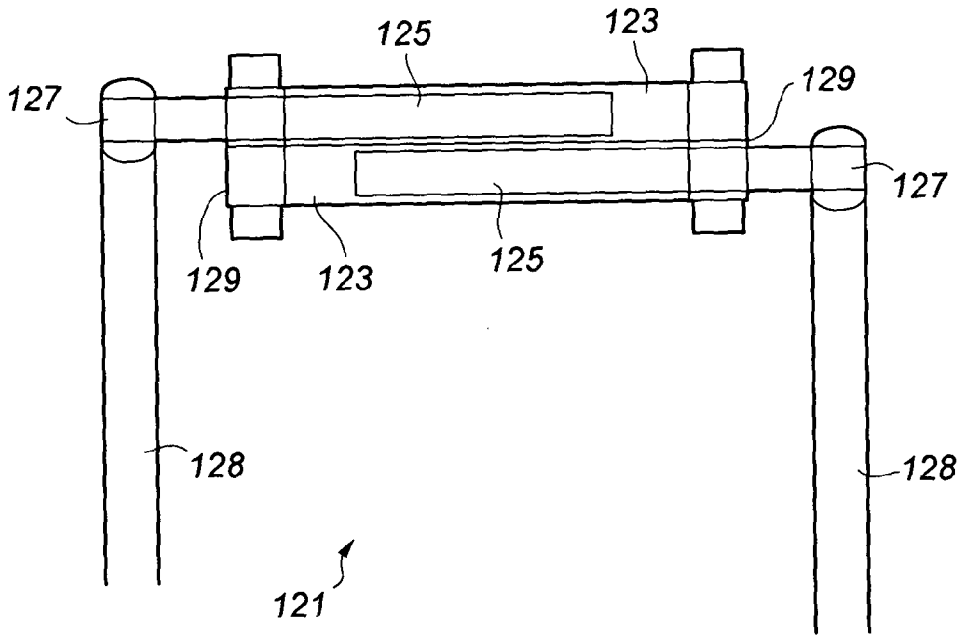


Fig. 14

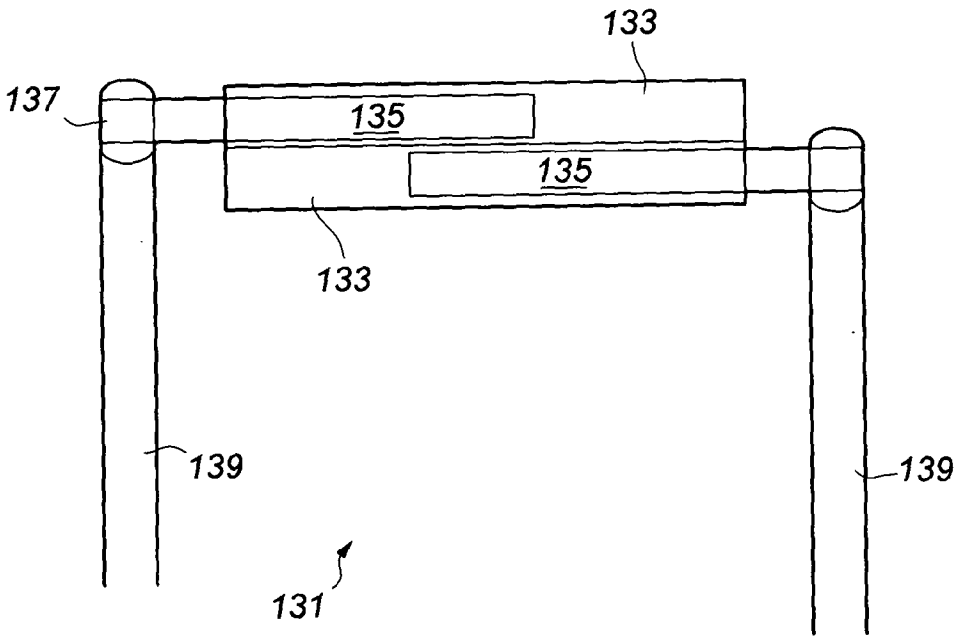


Fig. 15

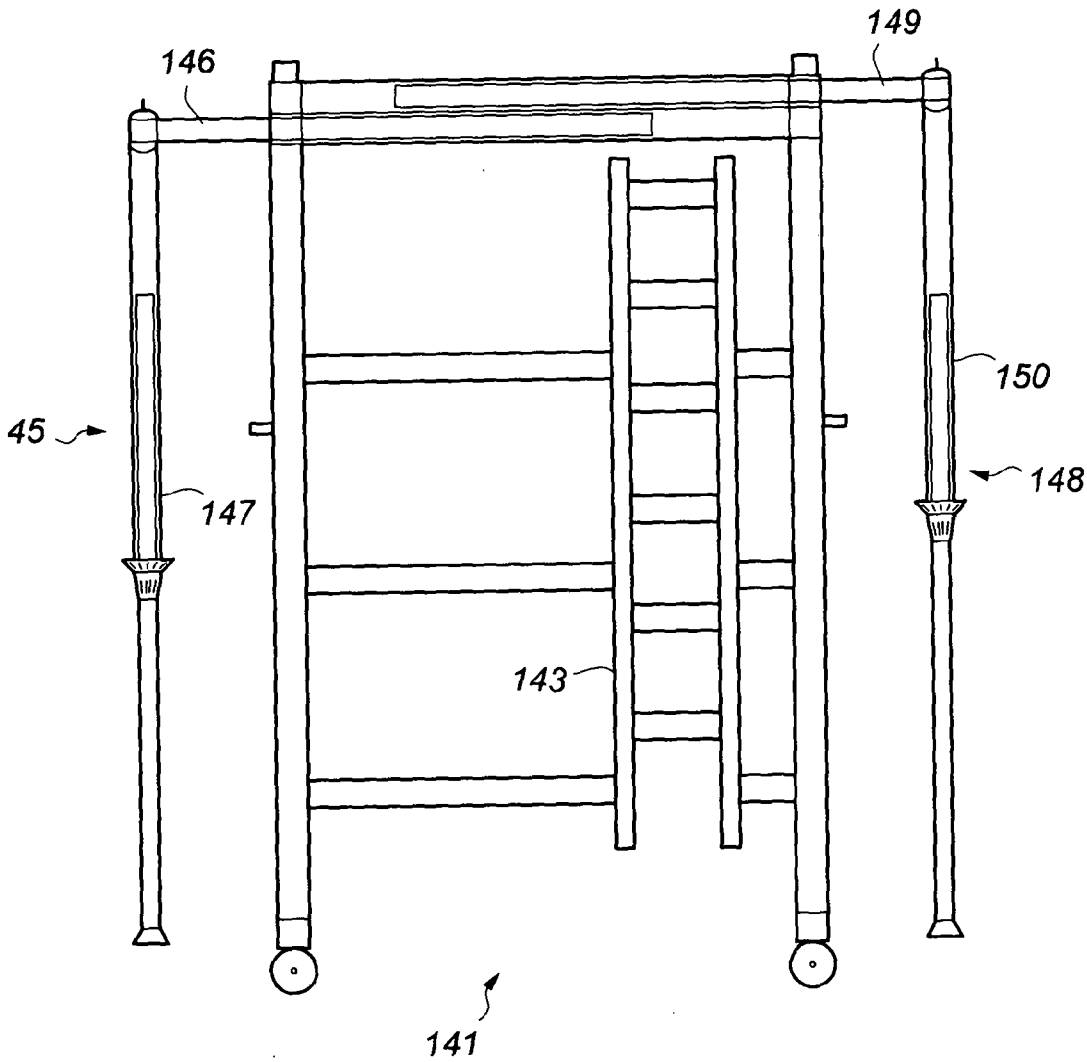


Fig. 16

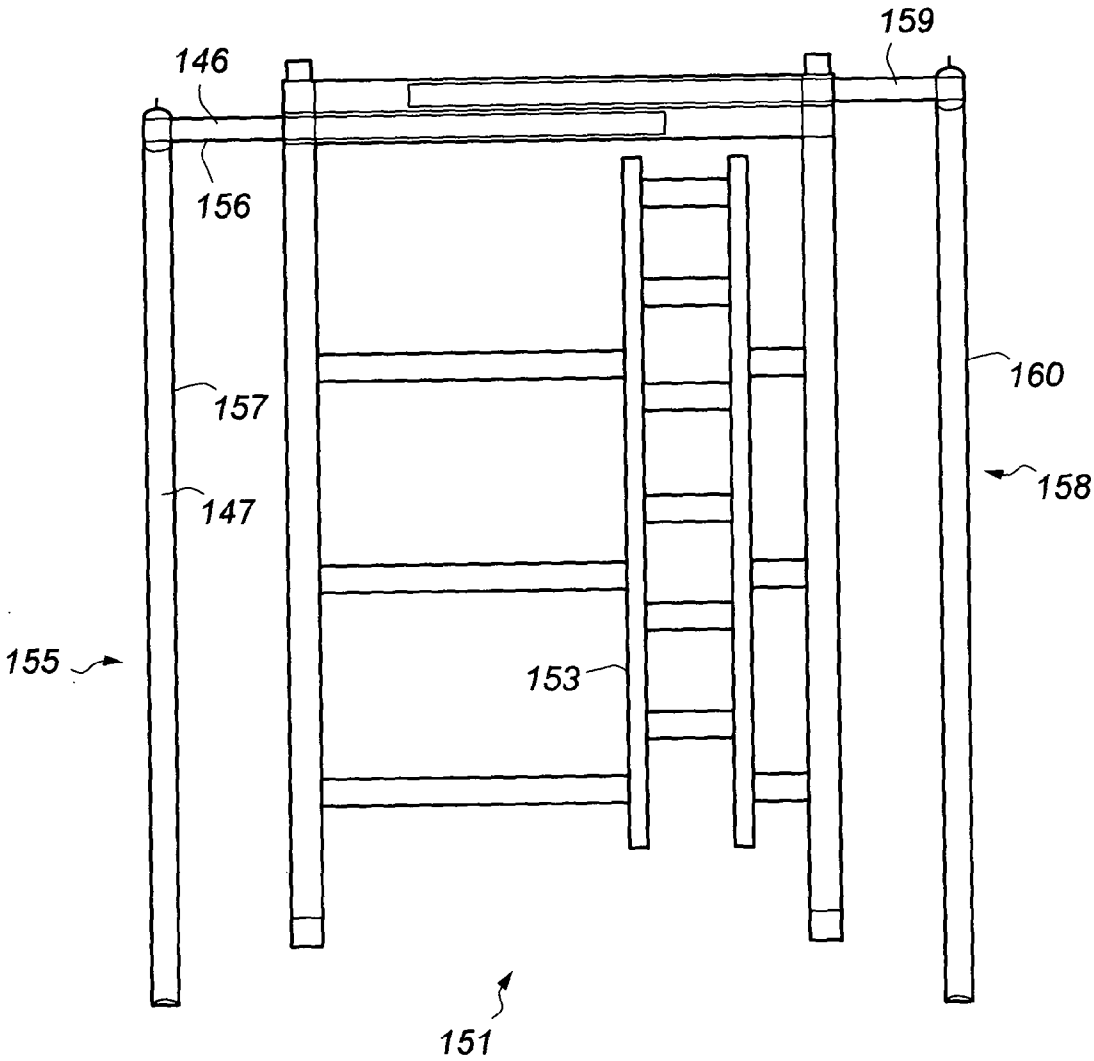


Fig. 17

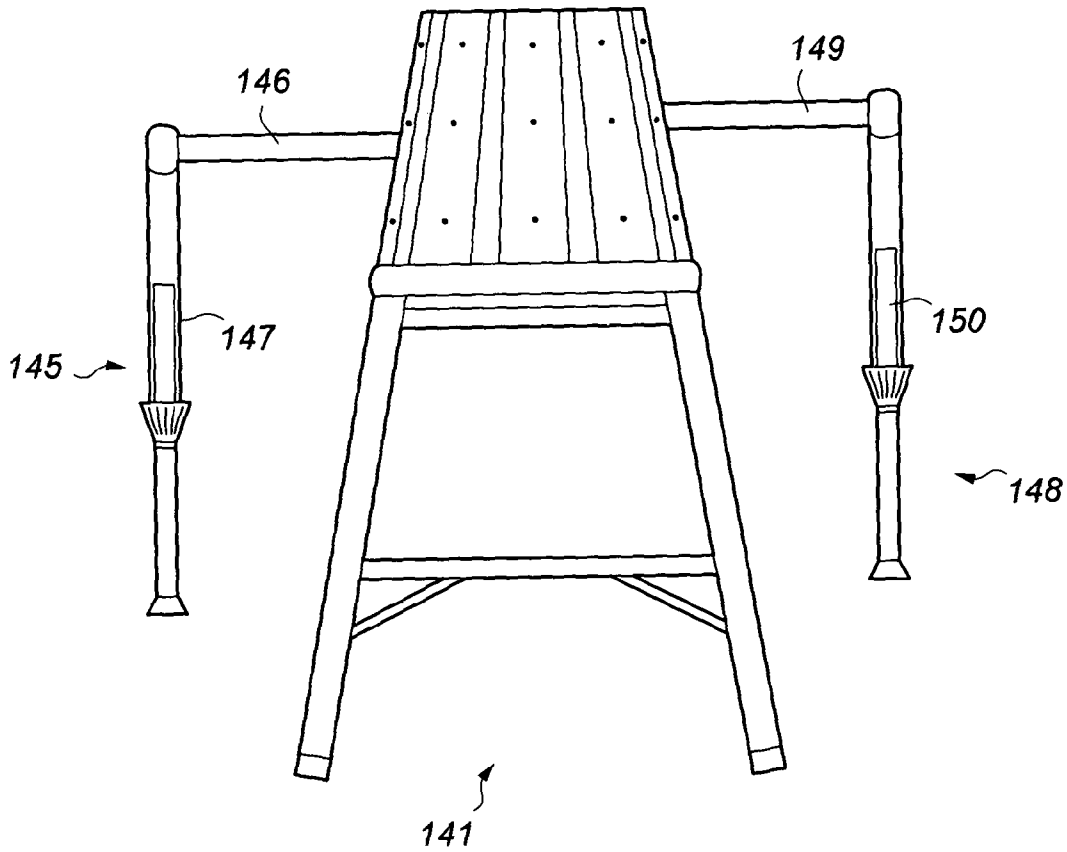


Fig. 18

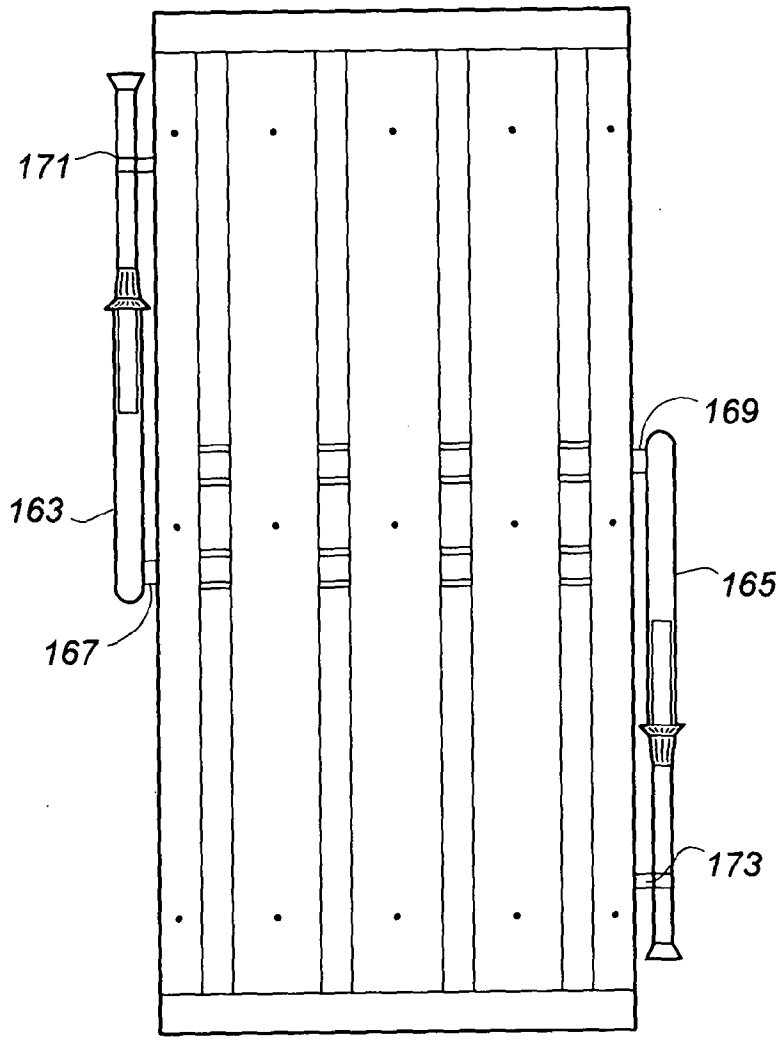


Fig. 19

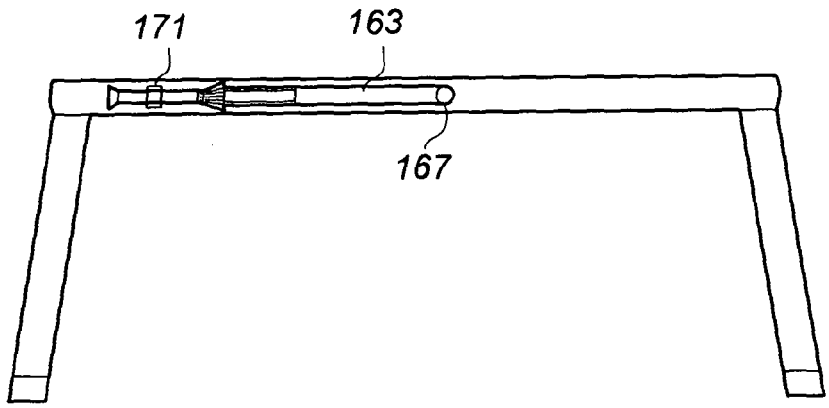


Fig. 20

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/000497

A. CLASSIFICATION OF SUBJECT MATTER
INV. E06C7/00 E06C7/42 E06C7/44 E04G1/24
ADD.

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)
E06C E04G

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 6 167 989 B1 (JUNG KOOCK ELAN [US]) 2 January 2001 (2001-01-02)	1-6,8, 11,12, 14-18, 26-29
Y	figures 1, 3A, 15, 19	7,10,22, 24,25

X	AU 2005 200 664 A1 (WILLIAM COOPER; ROSEMARY COOPER ROSEMARY COOPER; WILLIAM COOPER) 1 September 2005 (2005-09-01)	1-5, 11-13, 15, 17-21, 23,26-29
	figures 9-18	

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search	Date of mailing of the international search report
19 September 2012	26/09/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Bauer, Josef

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/000497

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 83/02796 A1 (SMITH SAMUEL DAVID) 18 August 1983 (1983-08-18) figures 1, 3, 4	1-5,8,9, 11,12, 14-18, 21,26-29

X	US 2008/000720 A1 (PORCH JOHN [US] ET AL) 3 January 2008 (2008-01-03) figure 2	1,2,4,8, 9,11-16, 20,26-29

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