

**PAPER A: PREPARATION OF A PATENT SPECIFICATION**

**9 October 2006, Monday**

**1400 – 1800 hrs**

Maximum Time: 4 Hours (includes reading time)

Maximum Marks: 100



INTELLECTUAL PROPERTY  
OFFICE OF SINGAPORE

**INSTRUCTIONS TO CANDIDATES**

1. This Paper consists of 11 pages, including this cover page.
2. Write your answers in English. Answers in any other language will not be marked. Answers in illegible handwriting will not be taken into consideration.
3. Two copies of the question paper are provided, one is for your reading and the other is for your use (optional) when answering the question(s) in the Answer Booklet(s).
4. Only your answers and/or drawings to the question(s) written or glued in the Answer Booklet(s) provided by the Examination Secretariat will be considered. You are to write on one side of each sheet in the Answer Booklet(s).
5. Information provided in the question(s) may be obtained from actual situations or modified therefrom for the purpose of this examination. You should accept the facts given in the paper. Assume also that the prior art given is exhaustive.
6. The documents provided in this question are:
  - (a) Document A – Client's write-up of his invention (3 pages of description and 3 pages of drawings); and
  - (b) Document B – US Patent 3,934,729 (Extract) (2 pages of description and 2 pages of drawings).

End

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**Document A – Client’s write-up of his invention (1/6)**

5 Your Client writes as follows,

“As you know we are manufactures of tower cranes for use particularly in the construction industry. Tower cranes are well known and usually comprise a tower and a jib extending from the top of the tower. The jib can be rotated in a horizontal plane and is provided with a crab  
10 movable towards and away from the tower for lifting and lowering loads.

An example of a tower crane that we currently produce is attached and marked “A”. As you can see this consists of a tower 7 made up of a number of sections 8 that are connected together. The tower rests on a base 2. At the top of the tower is a jib 3 with a crab 4 for lifting and  
15 lowering loads. The jib is rotatably mounted at 5 on the tower head 6.

When the construction where the tower crane has been used is completed it is necessary to dismantle the crane for transport to the next site where it is needed. With our tower crane this means removing the jib from the tower and then separating the tower sections so that the tower  
20 is reduced to manageably sized pieces which can be transported. However this disassembly procedure is complicated and time consuming and usually needs another crane in order to lift the jib off the tower and to separate the tower sections one from another.

In order to deal with this problem I have devised a new form of crane and method of use. The  
25 new crane is of simple construction and its operation is straightforward so that it can easily be moved from one place to another. The new crane is illustrated in the drawings which I have marked Figs. 1, 2 and 3. The principle of my invention is that the tower preferably consists of two or more sections which can be telescoped together and the jib can be folded to lie alongside the tower. The tower and jib are mounted on a trailer instead of being mounted on the ground.  
30 Thus the crane can be moved from the use position shown in Fig.1 to the folded position in Fig. 2 in which position it can be easily transported for use in another location.

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**Document A (2/6)**

I think there are different ways of putting my invention into practice. One way which I have designed is the arrangement illustrated in Figs. 1 to 3 but I think there may well be other ways.

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The specific arrangement shown in the drawings comprises a two part tower 20 with the upper part 30 being capable of being telescoped into the lower part 31. The tower can be pivoted about pivot 22 between the vertical position shown in Fig. 1 and the horizontal position illustrated in Fig.2 by means of ram 24 fixed at one end to the tower at 25 and at its other end to the flatbed of a trailer at 26.

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A platform 46 is mounted at the top of the tower and is pivotable about a horizontal axis by means of pivots 41.( see the detail of the top of the tower shown in Fig.3). A cab 40 is provided on the platform 46 and a jib 50 is pivotally mounted on the tower axis at pivot 52 on brackets 49 fixed to the top of the cab whereby the jib can be raised and lowered in a vertical plane by ram 51. In the illustrated embodiment the pivot 52 lies on the central longitudinal axis of the tower 7. The pivot 52 could, however be located anywhere within the outer periphery of the tower. The jib 50 consists of a number of telescoping sections so that it can be retracted from the extended position in Fig.1 to the position in Fig.2.

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When the crane is to be transported the jib is retracted and then pivoted in the direction of arrow 53 through about 90° about pivot 52 so that it is vertically aligned with, or parallel to, the central longitudinal axis of the tower. The tower is also collapsed so that upper section 30 is telescoped into lower section 31. Then the platform 46 and with it the cab 40 and jib 50 is pivoted (clockwise as shown in Figure 1) about pivots 41 through about 180°. This is effected by pinion 42 on the platform 46 being driven around the gear ring 43 mounted on the tower 20 (see particularly Fig.3) As a result the jib and cab become positioned alongside the tower. The collapsed tower is pivoted about pivot 22 to the horizontal position with the jib lying above it by ram 24 as shown in Fig 2. The crane can then be readily transported. Erection of the crane from the folded position to the use position merely involves carrying out the above steps in reverse order.

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**Document A (3/6)**

By the way I have called the gear 43 a ring gear although it only extends over a segment of a circle – about 180° in the illustrated embodiment.

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I would ask you to prepare a patent application for my new idea as soon as possible”

You make a novelty search for relevant prior art and discover US Patent 3,934,729. Figures 7 to 10 and associated description seem relevant.

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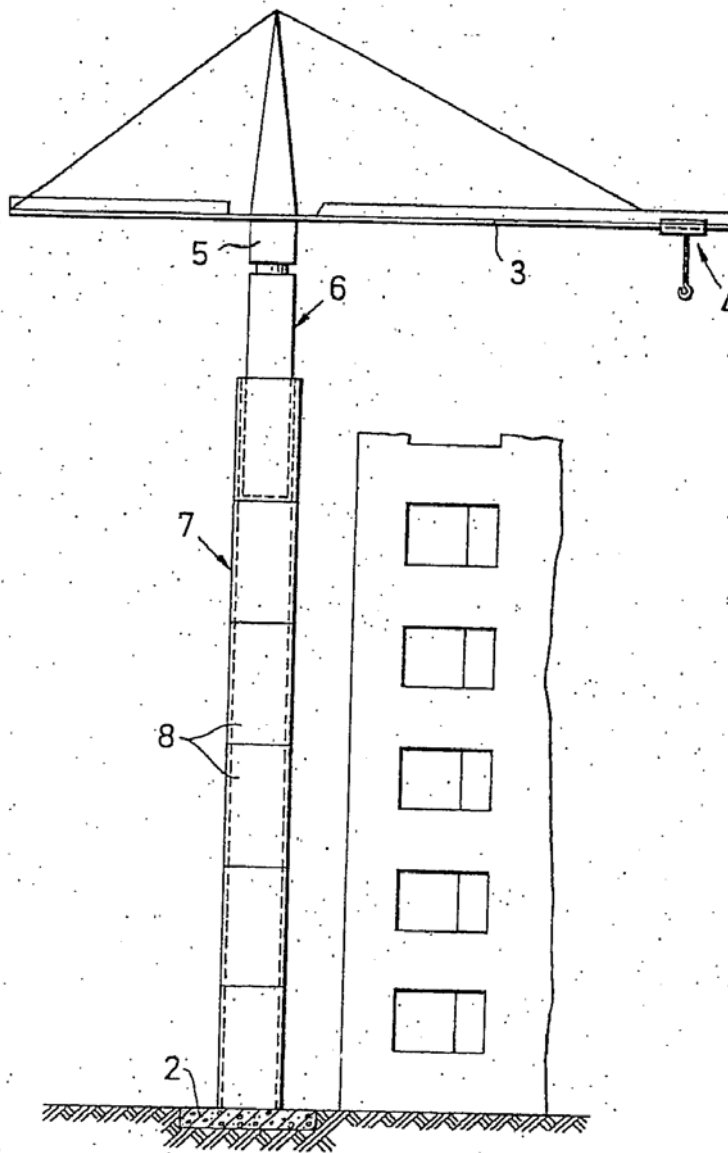
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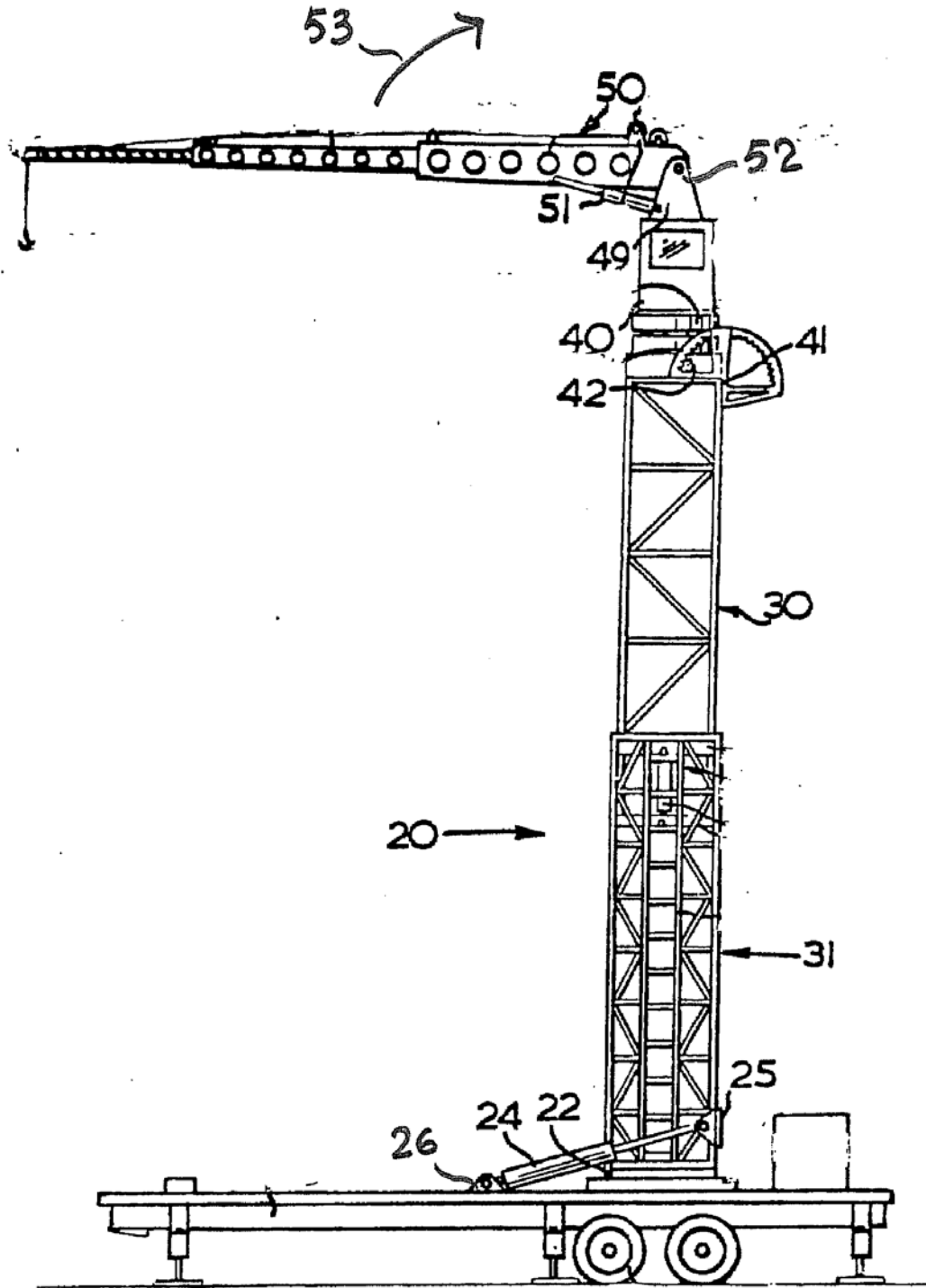


FIG. 1

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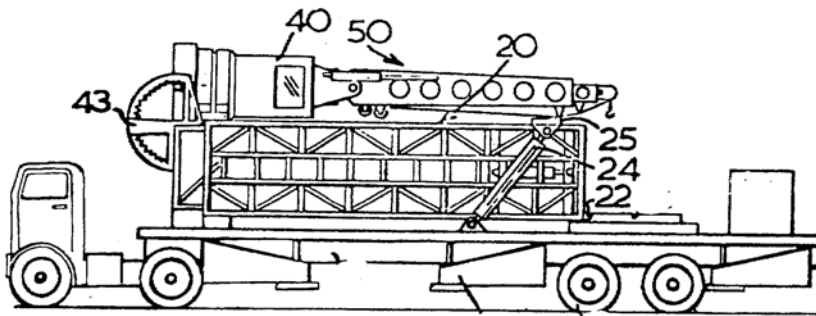


FIG.2

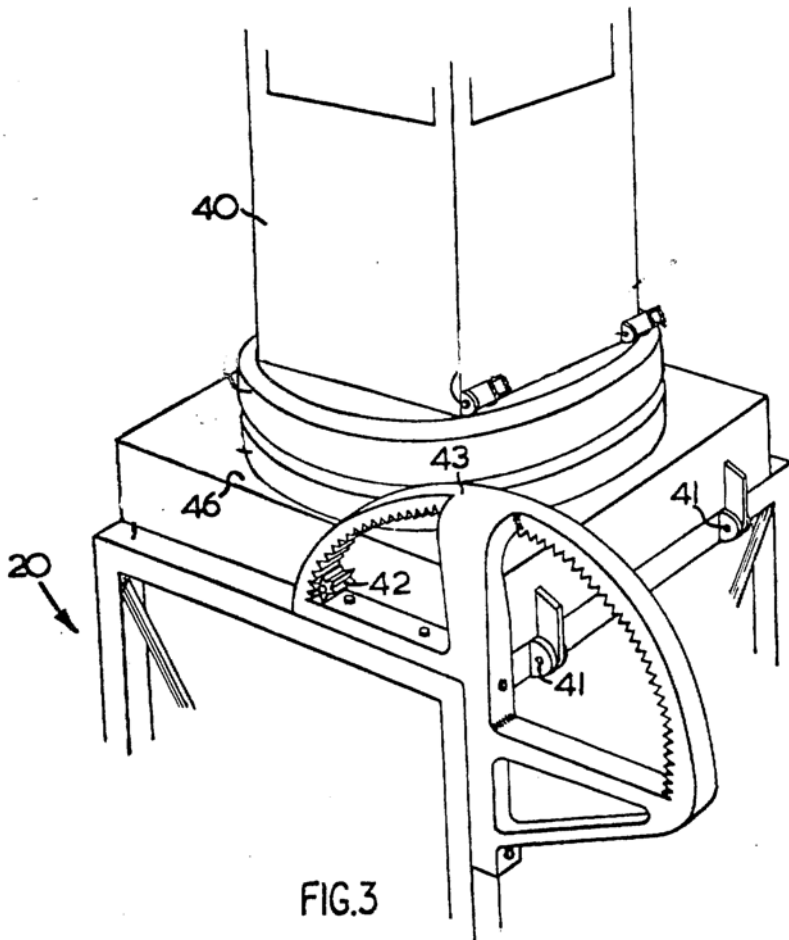


FIG.3

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**Document B – US Patent 3,934,729 (Extract) (1/4)**

**5 US Patent 3,934,729 (Extract)**

Fig.7 shows an embodiment of a crane in the erected, operative condition,

Fig. 8 shows the crane of Fig. 7 in the travelling condition,

10 Figs. 9 and 10 show detailed side views of the jib support means of the crane of Figs. 7 and 8 in the operative and folded conditions respectively.

Referring to Figs. 7 to 10 these show a tower crane supported on a mobile platform in the form of a truck having a chassis 110. Near to the front of the chassis there is a base mounting for the  
15 tower 114 of the crane. The base mounting includes pivot means 115 connecting the base of the tower to the mounting. The pivot means 115 comprise hinge pins which pass through plate members 116 which are fixed to each lateral side of the base of the tower.

The tower is tiltable between the horizontal travelling position of Fig. 8 and the vertical operating  
20 position of Fig. 7 by means of hydraulic rams 120, one on each side of the tower.

The tower is of lattice type structure of a type generally known. The tower is of telescopic form incorporating a lower outer section 125 and an inner outer section 126 slidably arranged to be  
25 movable into the outer section 125.

The top portion of the tower 126 as shown in Figs. 9 and 10 incorporates a cab 130 and the jib structure including jib support means mounted on top of the cab. The jib support means includes a plate 132 forming the roof of the cab and which carries the lower portion of a large diameter ball bearing 133. The upper portion of this bearing forms a turntable for the rotatable  
30 part of the jib support. The turntable carries a fixed support plate 135 and the remainder of the jib support is constituted by a tiltable unit 136 carried by tiltable support plate 137 pivotally mounted by hinge 138 on support plate 135.

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5 The tiltable support plate 137 carries a jib mounting bracket 143 defining a recess for the inner end of jib 144 and carrying jib pivot 145. The jib projects outwardly over the front side of the jib support means (i.e. towards the left as viewed in Figs. 7 and 9). The jib pivot 145 is positioned to the rear of the tower axis. Cylinder 147 is provided for moving the jib in a vertical plane about the jib pivot 145. The jib 144 itself is a three section telescoping jib which includes means to cause telescoping movement of the sections.

10 The jib mounting bracket 143 also carries a pivot mounting 150 for the outer end of a second cylinder 151 the other end of which is connected to a lug 152 on the plate 135. This second cylinder 151 can be used to tilt the tiltable unit 136 about pivot mounting 138 from the operative position shown in Fig. 9 to the folded position shown in Fig. 10. This movement involves tilting  
15 the unit 136 through a folding angle of about 60°. Accordingly with the jib positioned at the front of the tower (i.e. as illustrated) the jib may be folded alongside the tower by firstly operating cylinder 147 to bring the jib down to its lowermost operating position and then operating the second cylinder 151 to tilt the unit 136 anticlockwise through about 60° and bring the jib into alignment with the tower as shown in Figs 8 and 10.

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**Document B (3/4)**

U.S. Patent

Jan. 27, 1976

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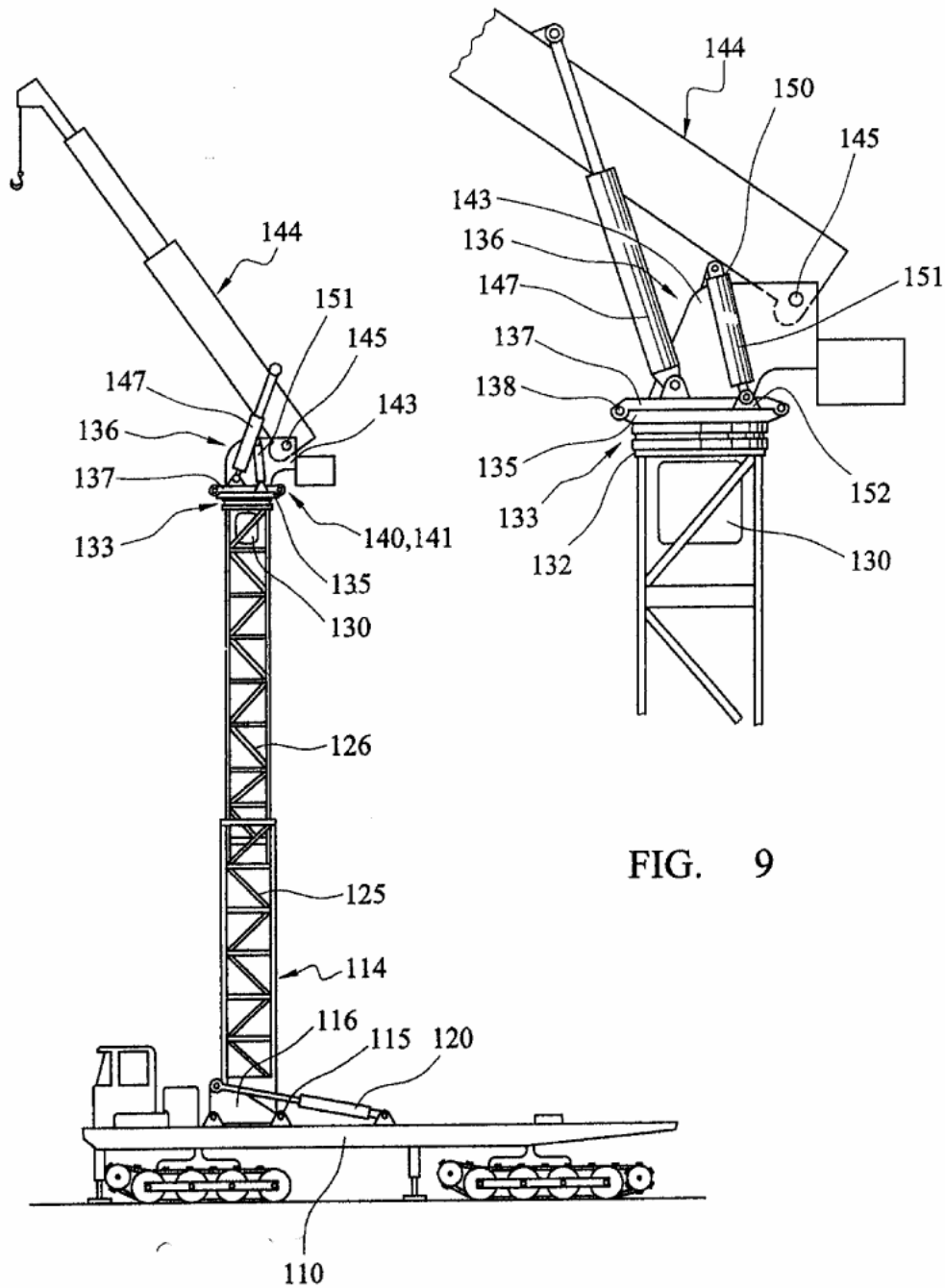


FIG. 9

FIG. 7

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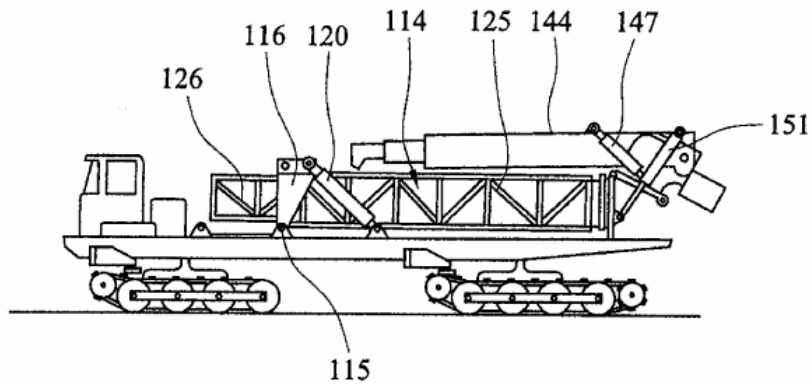


FIG. 8

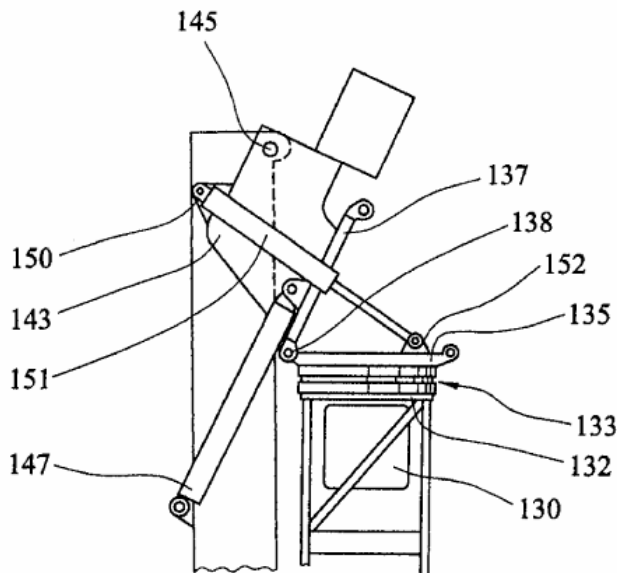


FIG. 10