

- [54] PUBLIC WORKS APPARATUS
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[57] **ABSTRACT**  
A public works machine comprises a frame on which a telescopic jib is pivotally mounted, means for controlling pivotal movement of the jib connected between the frame and a first section of the jib which is pivotally mounted on the frame, means for controlling sliding movement of the section of the jib connected between the first and a second section slidable relative to the first section, wherein a member is pivotally mounted on the first section for pivotal movement about an axis parallel to that of the mounting of the jib on the frame, and a working tool is freely supported from the member, pivotal movement of the member being controlled by the sliding control means and an arm pivotally connected between the member and the second section of the jib.

2 Claims, 2 Drawing Figures

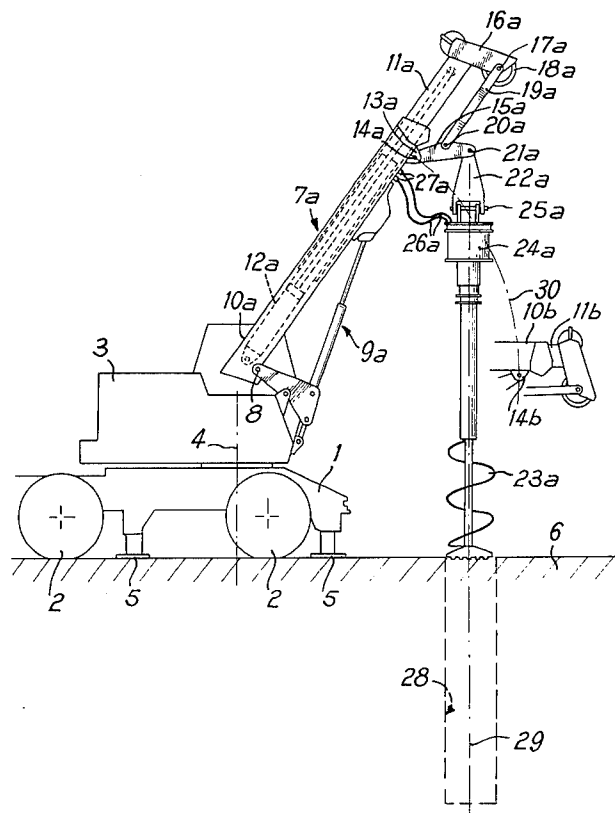


FIG. 1

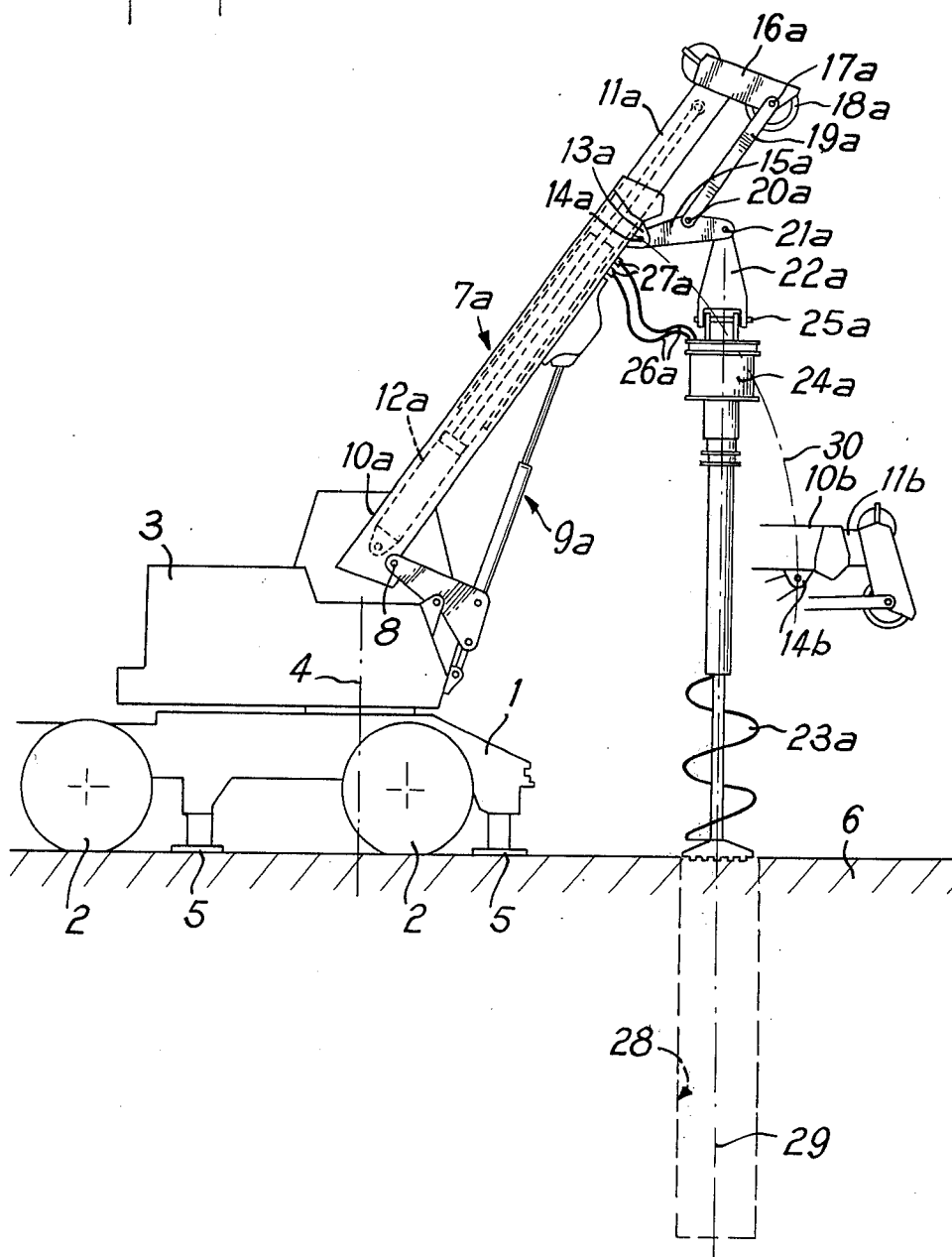
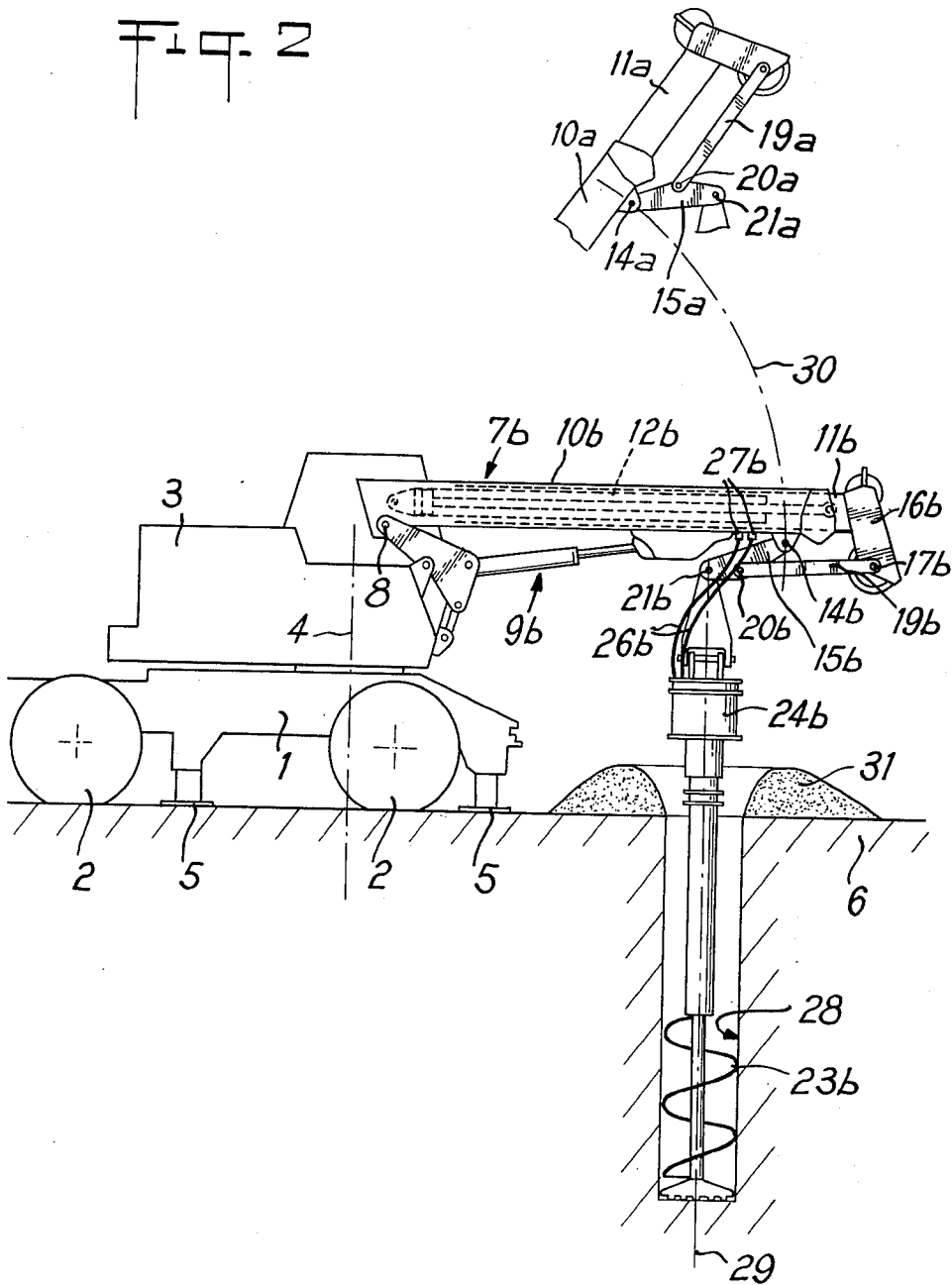


FIG. 2



## PUBLIC WORKS APPARATUS

The present invention relates to improvements in public works apparatus.

On public works sites, the need to carry out numerous handling operations leads to the use of mobile cranes, in particular with telescopic jibs.

In addition, numerous holes have to be bored in the ground, e.g. for setting piles which are either prefabricated or cast in situ. Augers or grabs, possibly provided with extension frames, are often employed for boring. In these two cases, the boring tool is freely suspended from the jib of a public works apparatus.

It would naturally be advantageous to be able to suspend the boring tool from the telescopic jib of the crane which is actually present on site. However, trials which have been carried out up to the present time have not given entirely satisfactory results. Two methods have been employed.

In one method, the tool is suspended from the end of that section of the telescopic jib which is pivoted on the frame of the apparatus. In this way the need to supply the fluid motor for operating the tool — the ram of a grab or rotary motor of the auger — by means of a flexible fluid conduit winder is avoided, this being necessary when the tool is suspended from a section of the jib which slides relative to that section which is pivoted on the frame. However, there is a considerable disadvantage in that progressively as the jib is inclined to allow the tool to be lowered, the point of suspension of the tool describes an arc of circle, so that the tool is not maintained vertical and therefore cannot bore a vertical hole.

To remedy this disadvantage, it has been proposed to suspend the tool not from the section which is pivoted on the frame, but from a sliding section. In this configuration, change in the telescoped length of the sliding section, effected in correspondance with the inclination of the pivoted section, enables the point of suspension of the tool to be made to describe a vertical line so that an effectively vertical hole can be bored. The disadvantage of this proposal is that it is then necessary to use a winder for the flexible conduits which connect the fluid motor for operating the tool to the pivoted section. Such a winder is heavy, bulky and expensive.

According to the invention there is provided public works apparatus comprising:

- a frame;
- a jib mounted on the frame, comprising at least two telescopic sections, of which a first section is mounted on said frame for pivotal movement about a first axis and a second section is slidable relative to said first section;
- means for controlling pivotal movement of said jib and connected between said first section of said jib and said frame;
- means for controlling relative sliding of said two sections and connected therebetween;
- a member mounted on said first section of said jib for pivotal movement about a second axis parallel to said first axis;
- a working tool freely suspended from said member; and
- an arm pivotally connected to said second section of said jib and said member;
- wherein pivotal movement of said member is controlled by said sliding control means and said arm.

Preferably the working tool is driven by pressurized fluid, the fluid source being arranged on the frame.

The invention will be more fully understood from the following description of an embodiment thereof, given by way of example only, with reference to the accompanying drawings, in which:

FIG. 1 is an elevation of an embodiment of an apparatus in accordance with the invention, in the configuration presented prior to boring a hole; and

FIG. 2 is an elevation of the apparatus of FIG. 1, but in the configuration presented after boring the hole.

The apparatus shown in FIG. 1 comprises a chassis 1, which is as shown provided with wheels 2, and a turret 3, which is pivotally mounted on the chassis 1 for movement about an axis 4. Stabilizer means 5, e.g. jacks, are attached to the chassis 1 and, in use, contact the ground 6.

A telescopic jib 7a is mounted on the turret 3 for pivotal movement about an axis 8, a ram 9a being connected between the jib and the turret. As shown, the jib 7a comprises two sections 10a and 11a, section 10a being pivoted on the turret for movement about the axis 8 and section 11a being slidably mounted within the section 10a. A ram 12a is connected between the sections 10a and 11a to control their relative positions.

It will be noted that the end of the section 10a remote from the axis 8 is provided with flanges 13a on which a lever or dipper-stick 15a is pivoted for movement about an axis 14a. On a head 16a at the free end of the section 11a a rod 19a is pivoted for movement about axis 17a of an idler pulley 18a. The pulley 18a is mentioned because it is provided on the telescopic jib but it has no particular function as far as the present invention is concerned. The rod 19a is pivoted on the dipper-stick 15a for movement about an intermediate axis 20a, and a support 22a of an auger 23a is suspended from the said dipper-stick 15a for movement about an end axis 21a.

The auger is provided with a hydraulic rotary drive motor 24a, which is itself suspended from the support 22a for movement about an axis 25a perpendicular to the axis 21a. This motor 24a is connected by two short, flexible conduits 26a to unions 27a arranged on the section 10a adjacent the flanges 13a.

It will be noted that, as shown, the section 11a is only partially contained in the section 10a, so that the dipper-stick 15a forms an obtuse angle with the section 10a. As shown, the auger 23a is bearing on the ground 6 by its free end, but has not yet started to bore. It is arranged facing the position of the hole 28 which is to be bored, which hole has a vertical axis 29.

In a second configuration of the jib, which is also partially shown in FIG. 1, it will be noted that the sections 10a, 11a of the said jib have come to 10b and 11b respectively, the axis 14a having come to 14b after describing an arc of circle 30, due to the pivoting motion of the section 10a about the axis 8, in the course of which motion the section 10a has come to 10b.

The various components of the apparatus which have already been described with reference to FIG. 1 are again shown in FIG. 2. Those of the components which have changed position continue to be marked by the same reference numbers, but followed by the letter *b* instead of *a*. Thus the jib 7a has come to 7b under the action of the ram 9b. Its two sections are at 10b and 11b respectively, their control ram being at 12b, in the entirely withdrawn position, so that the section 11b has

been substantially entirely retracted into the section 10b, except of course for its head 16b. The dipper-stick 15b now forms an acute angle with the section 10b.

The retraction of the section 11b into the section 10b has caused the rod 19a to come to 19b and the dipper-stick to 15b, the various axes coming to 17b, 14b, 20b and 21b. The flexible conduits have come to 26b and connect the unions 27b to the motor 24b of the auger 23b. It will be noted that the latter has bored the hole 28 with an effectively vertical axis 29. The waste material is arranged in a heap 31 around the opening of the hole 28.

Adoption of the auxiliary dipper-stick 15a and of the rod 19a has therefore, without any other modification of the apparatus, very simply enabled the suspension axis 21a of the auger to be kept on the vertical passing through the axis 29 of the hole 28. Progressively as the section 10a is inclined, the horizontal displacement of the axis 14a is compensated for by an equal and opposite horizontal displacement of the axis 21a, caused by the retraction of the section 11a into the section 10a and the pivoting which results from this of the dipper-stick from 15a to 15b. The axis 21a thus remains permanently on the vertical passing through the axis 29 until it reaches 21b.

It is to be noted that no additional ram has been necessary, the retraction of the section 11a into the section 10a resulting from the action of the ram 12a connected between the two sections to control their relative positions.

It will be appreciated that the auger could be replaced by any other suspended tool, for example a grab. Similarly, the jib could have more than two telescopic sections. It would then be sufficient to pivot the

dipper-stick 15a on the section pivoted on the turret and the rod 19a on any other section to obtain the operation described above.

There is thus provided an apparatus in which the working tool is suspended from that section of the telescopic jib which is pivoted on the frame of the apparatus while, in a simple manner, enabling the tool to bore vertically.

I claim:

1. Public works apparatus comprising:

- a frame;
  - a jib mounted on the frame, comprising at least two telescopic sections, of which a first section is mounted on said frame for pivotal movement about a first axis and a second section is slidable relative to said first section;
  - means for controlling pivotal movement of said jib and connected between said first section of said jib and said frame;
  - means for controlling relative sliding of said two sections and connected therebetween;
  - a member mounted on said first section of said jib for pivotal movement about a second axis parallel to said first axis;
  - a working tool freely suspended from said member; and
  - an arm pivotally connected to said second section of said jib and said member;
  - wherein pivotal movement of said member is controlled by said sliding control means and said arm.
2. Apparatus as claimed in claim 1, wherein said working tool has a pressurised fluid drive, the fluid source therefor being supported on said frame.

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