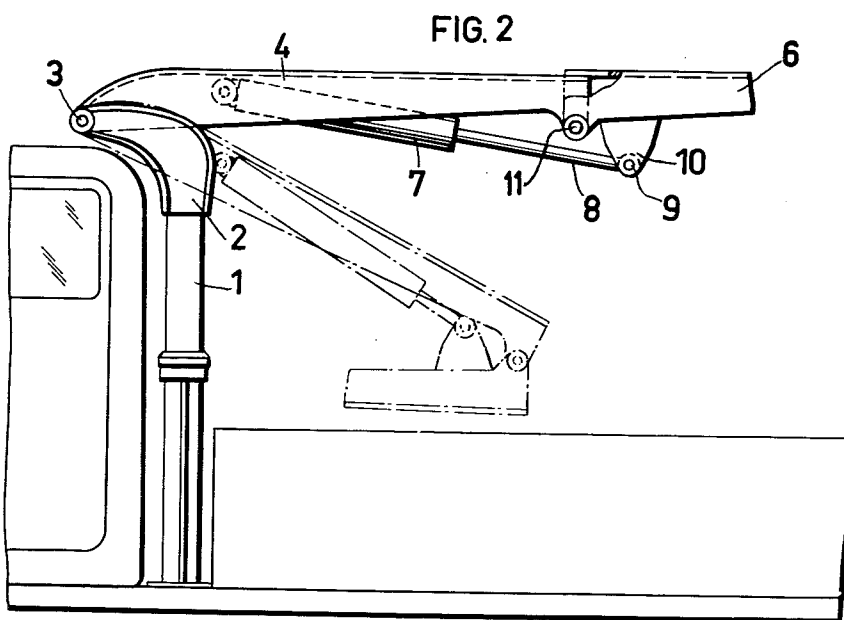
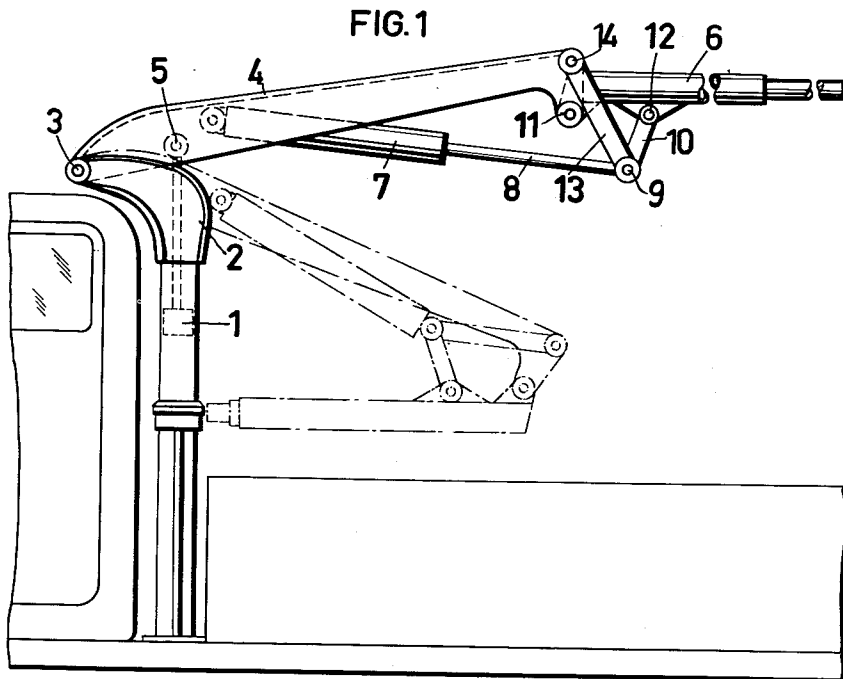


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HYDRAULIC PILLAR-TYPE ROTARY CRANES, PARTICULARLY
FOR MOTOR TRUCKS
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HYDRAULIC PILLAR-TYPE ROTARY CRANES, PARTICULARLY FOR MOTOR TRUCKS

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The present invention relates to cranes particularly for use on motor trucks and of the type comprising a pillar and a boom swingable relative to the pillar both vertically and horizontally, and whose angular movement in the vertical sense is effected, in part at least, by a hydraulic motor comprising a fluid power cylinder and an associated power piston, said piston being arranged to act on the boom near the inner end thereof which is pivoted to the pillar, and the boom being provided with an extension arm at its outer end which is vertically swingable by a second power cylinder and an associated power piston.

The invention has for its object to provide for a considerably larger range of angular movement of the extension arm than could be attained with prior-art cranes of this kind, and particularly to enable the boom-extension arm to be moved into an angular position above the longitudinal axis of the boom.

This has been realized, according to the main features of the invention, by connecting the second power cylinder-and-piston device to the extension arm through the intermediary of an auxiliary arm which is either rigidly or pivotally connected to the tiltable extension arm, the extension arm and the boom being so designed as to enable the angle through which the extension arm is movable relative to the boom, to be very wide. This can be best accomplished by forming the tiltable extension arm and/or the boom with a forked end adjacent the pivot shaft interconnecting the same, as well as by constituting this pivot shaft as two separate trunnions between which said second power cylinder or its piston rod, respectively, is accommodated and may pass freely. Preferably both the boom and its extension arm, in a manner known per se, are invertedly channel-shaped in cross-section.

Two embodiments of the invention will be described hereinafter by way of example with reference to the accompanying drawings, in which:

FIG. 1 is a diagrammatic elevation of a crane according to the first embodiment of the invention in which the auxiliary arm is pivotally connected to the tiltable boom extension arm;

FIG. 2 similarly shows a diagrammatic elevation of a crane according to the second embodiment of the invention in which the auxiliary arm is rigidly connected to the tiltable boom extension arm.

In both figures of the drawing, the crane is illustrated as mounted on a heavy-duty truck, parts of the chassis, load-carrying platform and driver's cabin of this truck being indicated in the drawing. Numeral 1 designates the stand or pillar of the crane, this pillar being suitably in the form of a large-diameter tube serving at the same time as a power cylinder forming part of the hydraulic motor by which the boom 4 is swingable in the vertical sense. The pivoting of the boom in the horizontal sense is effected by means not illustrated in detail in the drawing. The top end of the pillar 1 is terminated by a rotatable supporting arm 2 which is angularly curved and which carries at its extreme end a horizontal pivot shaft 3 for the boom 4. Numeral 5 designates a point of articulation for the piston rod of the hydraulic motor housed within the pillar 1. The apparatus further com-

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prises a vertically swingable boom extension arm, or tilting arm, 6 which is actuated by means of a second hydraulic motor comprising a hydraulic power cylinder 7 articulated to the boom 4, and a piston rod 8 the extreme end of which is articulated to a pivot shaft 9 serving also to mount one end of the auxiliary arm 10 associated with the tiltable boom extension arm 6. The extension arm 6 is mounted on a horizontal pivot pin 11 for pivotal movement relative to the boom.

In the embodiment shown in FIG. 1, the auxiliary arm 10 is pivotally connected to the tiltable extension arm 6, being mounted on a horizontal pivot pin 12 thereon. In addition, a link 13 is provided having one end mounted on the pivot shaft 9, in common with the piston rod 8 and the auxiliary arm 10, while its opposite end is mounted on a pivot pin 14 secured to the boom 4. It is obvious that, by designing the boom and the tiltable extension arm in the manner indicated in the preamble of this specification, it is possible to attain a very wide range of elevation angles for the extension arm. In particular, it will be possible also to move the tiltable boom extension arm into angular positions above the longitudinal axis of the boom, thereby highly increasing the maximum lifting height of the crane and thus also its applicability. The broken lines indicate the positions of the various components in the retracted position of the boom assembly of the crane.

The embodiment shown in FIG. 2 is slightly simplified in that the items 12, 13 and 14 are dispensed with and the auxiliary arm 10 is rigidly, rather than pivotally, connected with the tilting boom extension arm 6. Obviously, the advantages above referred to will be obtained in this construction also, since auxiliary arm 10 extends sufficiently below the boom extension arm 6 to permit the piston rod 8 to clear pivot 11 throughout a substantial upward angular movement of arm 6 above the longitudinal axis of the main boom 4. Moreover if as previously mentioned, pivot shaft 11 is constituted by two separate trunnions spaced to clear the piston rod the range of movement is even greater. The boom extension is shown articulated to the main boom to permit such range of hinging and this is facilitated in FIGURE 2 by cutting back the web of the extension whose flanges straddle those of the main boom, for clearance purposes.

The invention is not restricted to the embodiments here illustrated but may be varied in many respects without departing from the scope of the appended claims.

What is claimed is:

1. In a crane adapted for use on heavy-duty motor trucks and the like, in combination an upright pillar, a main boom, means pivoting said main boom near one end thereof adjacent the upper end of said pillar for swinging vertically, a hydraulic cylinder and piston with rod interposed between and connected to the pillar and to the main boom adjacent the pivoting means to swing said main boom in a vertical plane, a boom extension for said main boom, means pivoting one end of the boom extension about the free end of the main boom for vertical swinging of the boom extension through an arc extending both above and below the longitudinal axis of the main boom, a first link having one end articulated to said boom extension beyond the means pivoting said boom extension, a second link of greater length than said first link and having one end articulated to the free end of the main boom, the free ends of both links being pivotally joined to each other, a second hydraulic cylinder and piston with rod connected between the main boom and the pivotal joint formed by the free end of the two links whereby the boom extension is movably hydraulically into position both above and below the longitudinal axis of the main boom.

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2. The invention as described in claim 1 wherein the main boom is of inverted channel shape to partially house the second hydraulic cylinder, and said means pivoting one end of the boom extension about the free end of the main boom comprises two separate trunnions between which the second hydraulic cylinder and piston rod is accommodated.

3. The invention as described in claim 2 wherein the two separate trunnions are spaced downwardly from the

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point where the second link is articulated to the free end of the main boom.

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