May 14, 1957 T. W. NIELSEN 2,792,127

HOISTING CRANE FOR PERMANENT MOUNTING UPON A LORRY CHASSIS

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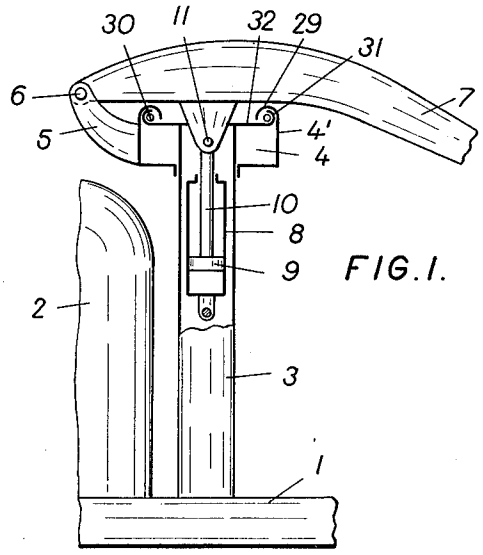
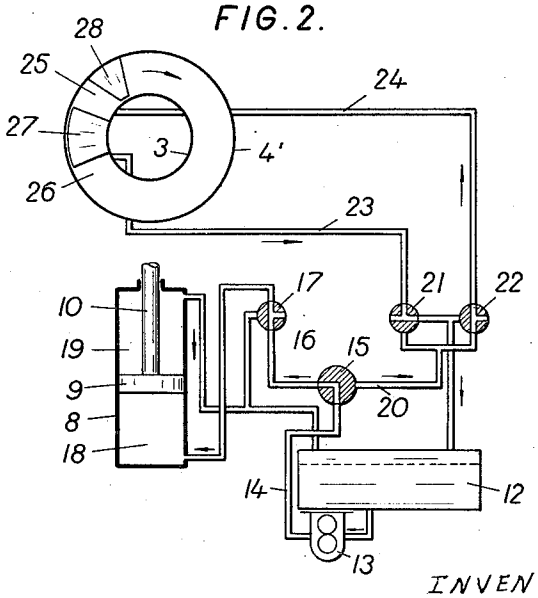


FIG. 1.

FIG. 2.



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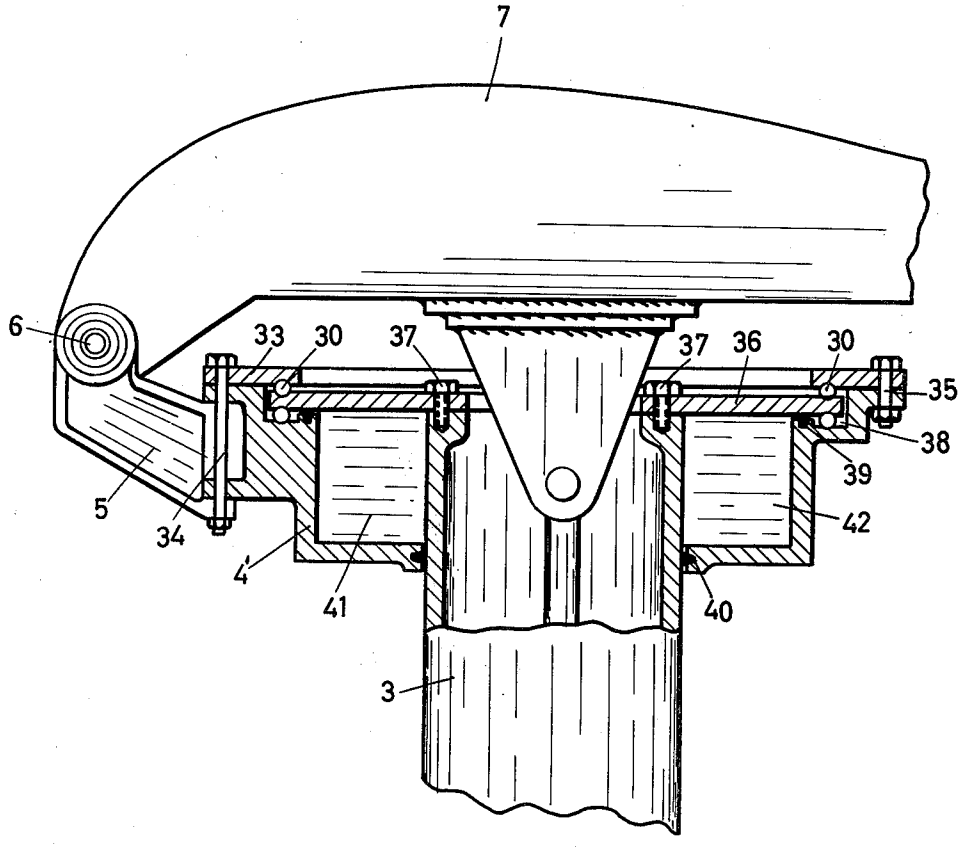


FIG. 3

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HOISTING CRANE FOR PERMANENT MOUNTING UPON A LORRY CHASSIS

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2 Claims. (Cl. 212—35)

The present invention relates to a hoisting crane adapted for being permanently mounted on the chassis of a lorry or automobile freight carriage.

Hoisting cranes of this nature usually comprise a supporting column secured to the chassis, the hoisting arm of such a crane being mounted at the top end of said column and being adapted to be swung in a horizontal plane as well as in a vertical plane. Usually such hoisting cranes are driven by fluid pressure, mostly by oil pressure obtained by means of a suitable pump, which is driven from the gear box of the carriage.

It is important that hoisting cranes of this nature are of the simplest possible construction, so that they can be manufactured and mounted at low costs, even if they are made strong and robust.

The present invention aims at providing hoisting crane of the said type, which is of a very simple although effective construction. According to the invention there is on the top of the stationary supporting column arranged a rotary chamber provided with a bracket extending laterally and forming support for one end of the hoisting arm. This rotary chamber takes the shape of an annular pressure chamber having a closing element secured to the outer wall, upon which the bracket is mounted. By introducing of pressure fluid, e. g. pressure oil, on either side of the wall it is possible to produce turning of the outer sheath of the rotary chamber, together with the bracket, and thereby of the hoisting arm, in a horizontal plane.

For turning of the hoisting arm in a vertical plane there is, according to the invention, within the supporting column provided a cylinder, one end of which is swingably attached to the supporting column. Within the cylinder is provided a piston having a piston rod connected to the hoisting arm. Said cylinder is provided with inlet and outlet for pressure fluid. Acting upon the piston by means of the pressure fluid, it thus is possible to cause the hoisting arm to swing in a vertical plane.

Thus the invention consists in a hoisting crane adapted for permanent mounting upon the chassis of a lorrry and comprising a hoisting arm swingable about a vertical axis and a rigidly mounted supporting column for said hoisting arm, and the invention is characterized in that there is mounted upon the top of the supporting column a rotary chamber having inlet and outlet for pressure fluid and provided with an extending bracket adapted to swingably support an end of the hoisting arm, and within the supporting column a tiltably supported hoisting cylinder having inlet and outlet for pressure fluid, and within said cylinder a piston with piston rod attached to the hoisting arm and adapted to control the movements of said arm vertically.

In order that the invention may be easily understood it will below be described in connection with the drawings illustrating an embodiment by way of example and in which:

Fig. 1 is a side view of a hoisting crane according to the invention, shown diagrammatically and partly in section, and

Fig. 2 is a diagrammatical view showing how pressure oil is supplied to the several driving organs.

Fig. 3 is a section, with parts in elevation, through the upper end of the column between the piston elements and showing one practical design of the hoisting crane according to the invention.

On Fig. 1 numeral 1 indicates the chassis frame of the lorry and numeral 2 the driver's housing. Upon the chassis frame 1 is rigidly mounted a supporting column 3, the top end of which carries an annular chamber 4 which is rotatable about a vertical axis and is provided with an extending bracket 5, to which an end of the hoisting arm 7 is swingably attached at 6. Within the supporting column 3 is tiltably supported a cylinder 8, provided with a piston 9 having a piston rod 10 attached to the hoisting arm 7 at 11.

In Fig. 2, showing how pressure fluid is supplied to the several driving organs of the hoisting arm 7, numeral 12 indicates a reservoir for oil, communicating with a pump 13 from which a conduit 14 extends to a main distributing valve 15. From the valve 15 a branch 16 extends to a valve 17, adapted to guide the pressure oil to the lower side 18 or to the top side 19 of the piston 9 within the cylinder 8. By adjusting the positions of the valves 15 and 17 respectively it thus is possible to cause raising or lowering of the hoisting arm 7.

From the main distributing valve 15 another branch 20 extends to two valves 21, 22, which through pipes 23 and 24 respectively communicate with either side 25 and 26 respectively of a stationary dividing wall 27 situated within the annular chamber 4.

The outer wall 4' of the annular chamber 4 is attached to the column 3 by means of an inwardly folded edge 29, which in combination with a series of balls 30 and an upwardly folded edge 31 of the circular plate 32—which latter is secured to the column 3—forms a seal between the annular chamber 4 and the column 3, which seal permits rotation of the annular chamber 4 but does not permit movement of said chamber in axial direction. The annular chamber 4 carries the bracket 5 which supports one end of the hoisting arm 7. To the inside of the outer wall 4' of the annular chamber 4 is secured a dividing wall 28, which forms a piston within the annular space 25, 26.

If pressure from the oil pump is supplied through the valves 15 and 22 to the space 25 the dividing wall 28 and the outer wall 4' will rotate clockwise, and such rotation is transferred to the hoisting arm 7. If pressure from the pump is supplied to the space 26 the outer wall 4' and accordingly also the bracket 5 and the hoisting arm 7 will rotate anticlockwise.

In the working example shown in Fig. 3 the supporting column 3 supports the chamber 4 which is rotatable about the column by means of a ball bearing consisting of a ring 33 forming the inwardly folded edge 29 of Fig. 1, the ring being secured to the chamber 4 by means of suitable bolts 34 and 35. The bolt 34 will also secure the bracket 5 to which the hoisting arm 7 is pivoted at 6.

A circular plate 36 is attached to the top end of the column 3 by means of bolts 37 and extends into an annular groove 38 formed between the chamber 4 and the ring 33. Balls 30 are positioned between the plate 36 and the ring 33, thus forming a ball bearing supporting the chamber 4 and the crane jib on the top of the column 3. The chamber 4 is thus rotatable around the column 3. The plate 36 and the chamber 4 are provided with packing means 39, 40 at their faces where relative movement between the chamber and parts of the column take place.

The stationary piston element 27 extends into the chamber 4 and is secured to the column 3. The inlets and outlets for the pressure fluid shown on Fig. 2 are not shown on Fig. 3, but it should be evident for anyone skilled in the art that the inlets and outlets are positioned

on both sides on the stationary piston element 27. The chamber 4 is provided with a movable piston 28 dividing the chamber 4 into two compartments as shown at 25 and 26 in Fig. 2. The free sides of the piston 27 and the piston 28 fit very closely against the adjacent surfaces of the walls of the chamber 4 and the column 3 and plate 36, respectively. If fluid 41 is admitted to one side of the stationary piston element 27, the pressure will be increased on the fluid 42 on the other side of piston 27, and the chamber 4 with the crane jib 7 will move under the effect of the pressure of fluid 41 on piston 28, forcing fluid 42 from between piston 28 and piston 27.

The above description shows, that a simple construction has been found for hoisting cranes for use on lorries.

I claim:

1. In a hoisting crane for a permanent mounting upon a vehicle chassis, a hoisting arm swingable about a vertical axis and a stationary supporting column therefor, an annular chamber rotatably mounted around the top of said supporting column around the vertical axis thereof, a stationary piston element in said chamber attached to said column, said chamber having a movable piston element therein attached to the wall thereof and having inlet and outlet means for a pressure fluid between said

movable and stationary piston, a bracket on said chamber extending laterally of said supporting column on the free end of which said hoisting arm is pivotally mounted for movement in a vertical plane, and a hoisting cylinder pivotally supported within said column having an inlet and an outlet for pressure fluid, and a piston within said cylinder, said piston being provided with a piston rod pivotally attached to said hoisting arm.

2. The combination as claimed in claim 1 in which said column has a circular plate mounted on the top thereof, said annular chamber having an outer circular wall with an inwardly folded edge at the top thereof extending inwardly over the edge of said plate, and a plurality of balls between said edge and the edge of said plate, and a seal between said plate and the outer circular wall of said chamber, permitting relative movement between said plate and said annular chamber.

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