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PROVISIONAL SPECIFICATION.

Improvements in and relating to Cranes of Tubular Construction, or otherwise.

I, ARTHUR GEORGE GRICE, of George Anderson & Co. Ltd., Taymouth Engineering Works, Carnoustie, in the County of Forfar, Scotland, Managing Director, do hereby declare the nature of this invention to be as follows:—

This invention relates to cranes of tubular construction, or otherwise, the objects being to so design and construct them that they will be light, strong, easily operated, free from vibration and safe, that the jib barrel, the heaving barrel and the mechanism for slewing the crane will be positively operated in either direction, or if desired that while the jib barrel and the slewing mechanism can be positively operated, the heaving barrel may be free when unwinding; that the jib can be elevated to stand vertically; that the three operations of actuating the jib, the load and the slewing mechanism can be conducted at one and the same time, if required, and that no brakes may be used except in connection with the heaving barrel if it is designed to freely unwind.

In carrying out my invention I preferably make all the members of hollow tubes, that is to say the mast may be composed of four upright tubes, braced together by suitable rectangular and diagonal bracing, the jib may be similarly constructed while the spurs and the sleepers may each be composed of single hollow tubes, or otherwise.

The axes of the jib and the heaving barrels are in line with the axis of the jib while the driving shaft lies between such barrels and parallel to them. One advantage of placing these barrels in the position described is that each rope or chain as they are wound along their respective barrels move in the same plane as the pulleys on the jib rotate, the ropes merely embracing such pulleys to a greater or a lesser extent according to the position they occupy on the drums. In existing cranes the axes of the barrels are placed at right angles to the jib with the result that the jib and heaving ropes chafe against the sides of the grooves in the pulleys except when the ropes are directly in the plane of rotation of the pulleys.

On the driving shaft are three sets of friction cones and between each set is a shaft which carries a cone and a worm. By causing the one or the other cone of each set to bear against its central cone each driven shaft may be made to rotate in the one direction or the other and as each worm gears into a worm wheel the jib or heaving barrels may be made to positively rotate in the one direction or the other as may be desired. The worm on the slewing shaft gears with a worm wheel on a vertical shaft which also carries a spur pinion gearing into a spur wheel on the platform of the crane. If it is desired to allow the load to be freely lowered the worm wheel of the heaving barrel may not be directly attached to it but may be caused to gear with it by means of a clutch.

While I have described how the driving shaft may operate the driven shafts by means of friction cones yet I may operate these by any other suitable known equivalent means.

It will be understood that if worms and worm wheels are used no brakes will be required.

The driving shaft may be operated by a non-reversible or a reversible elec-

trical motor gearing with it by means of a spur pinion and spur wheel or by means of bevel wheels, according as the axis of the motor is parallel to the driving shaft or at right angles to same. If the motor is reversible only one set of friction cones or equivalent mechanism will be required. Petrol or steam motors may also be used to actuate the driving shaft. Each set of cones is controlled by a separate operating handle.

As the whole of the operating mechanism is compact and placed low down it can be protected by a cover over which the operator can easily look, and thus obtain, in many cases, a view of the load which is being dealt with.

Although I have described a tubular crane yet the mechanism previously referred to and as arranged may be applied to any other suitable type of crane.

Owing to the barrels being situated in the positions described the jib can be elevated until it is quite vertical, a result which cannot be obtained in ordinary cranes as their barrels are in the way.

Dated this 7th day of April 1905.

GEO. C. DOUGLAS & Co:—
41 Reform Street, Dundee,
Chartered Patent Agents.
Agents for the Applicant.

COMPLETE SPECIFICATION.

Improvements in and relating to Cranes of Tubular Construction, or otherwise.

I, ARTHUR GEORGE GRICE, of George Anderson & Co;—Ltd. Taymouth Engineering Works, Carnoustie, in the County of Forfar, Scotland, Managing Director, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to cranes of tubular construction, or otherwise, the objects being to so design and construct them that they will be light, strong, easily operated, free from vibration and safe, that the jib barrel, the heaving barrel and the mechanism for slewing the crane will be positively operated in either direction, or if desired that while the jib barrel and the slewing mechanism can be positively operated, the heaving barrel may be free when unwinding, that the jib can be elevated to stand vertically, that the three operations of actuating the jib, the load and the slewing mechanism can be conducted at one and the same time, if required, and that no breaks may be used except in connection with the heaving barrel if it is designed to freely unwind.

And in order that my said invention and the manner of performing or carrying the same into effect or practice may be properly understood, I have hereunto appended three explanatory sheets of drawings in which the same reference numerals are used to indicate corresponding parts in all the figures where shown, that is to say:—

Figure 1 (Sheet 1) is a side elevation of a crane constructed in accordance with my invention.

Figure 2 (Sheet 2) is a part side elevation—on an enlarged scale—showing the general arrangement of the gear.

Figure 3 (Sheet 3) is an elevation looking in the direction of the arrow A. (Figure 4) and

Figure 4 (Sheet 3) is a plan of Figure 3.

In carrying out my invention, I preferably make all the members of hollow tubes 5 that is to say the mast 6 may be composed of four upright tubes braced together by suitable rectangular and diagonal bracing 7 the jib 8 may be similarly constructed while the spurs 9 and the sleepers 10 may each be composed of single hollow tubes or otherwise.

The axes 11 and 12 of the jib and of the heaving barrels are in line with the axis of the jib that is to say with the plane in which the jib can vibrate, while the driving shaft 13 lies between such barrels and parallel to them. One advantage of placing these barrels in the position described is that each rope or chain 14 and 15 as they are wound along their respective barrels move in the same plane as the pulleys 16 on the crane rotate, the ropes merely embracing such pulleys to a greater or a lesser extent according to the position they occupy on the drums. In existing cranes the axes of the barrels are placed at right angles to the jib with the result that the jib and heaving ropes chafe against the sides of the grooves in the pulleys except when the ropes are directly in the plane of rotation of the pulleys.

On the driving shaft 13 are three sets of friction cones 17 18 and 19 and between each set is a shaft which carries a cone 20 21 or 22 and a worm. By causing the one or the other cone of each set 17 18 or 19 to bear against its central cone 20 21 or 22 each driven shaft may be made to rotate in the one direction or the other and as each worm gears into a worm wheel 23 24 or 25 the jib or the heaving barrels may be made to positively rotate in the one direction or the other as may be desired.

The worm 26 on the slewing shaft gears with a worm wheel 25 on a vertical shaft which also carries a spur pinion 27 gearing into a spur wheel 28 on the platform of the crane. If it be desired to allow the load to be freely lowered the worm wheel of the heaving barrel may not be directly attached to it but may be caused to gear with it by means of a clutch.

While I have described how the driving shaft may operate the driven shafts by means of friction cones yet I may operate these by any other suitable known equivalent means.

It will be understood that if worms and worm wheels are used no brakes will be required.

The driving shaft 13 may be operated by a non-reversible or a reversible electrical motor 29 gearing with it by means of a spur pinion 30 and spur wheel 31 or by means of bevel wheels, according as the axis of the motor is parallel to the driving shaft or at right angles to same. If the motor is reversible only one set of friction cones or equivalent mechanism will be required. Petrol or steam motors may also be used to actuate the driving shaft. Each set of cones is controlled by a separate operating handle each handle engaging with a cone by means of the groove 32. In the drawings I have not shown the handles as they are of the usual type.

As the whole of the operating mechanism is compact and placed low down it can be protected by a cover over which the operator can easily look and thus obtain in many cases a view of the load which is being dealt with.

Although I have described a tubular crane yet the mechanism previously referred to and as arranged may be applied to any other suitable type of crane.

Owing to the barrels being situated in the positions described the jib can be elevated until it is quite vertical, a result which cannot be obtained in ordinary cranes as their barrels are in the way.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

(1) In cranes the construction and arrangement of parts whereby the axes of the jib and of the heaving barrels are in line with the axis of the jib that

is to say with the plane in which the jib can vibrate, as described and illustrated on the drawings annexed.

(2) In cranes, the construction, combination and arrangement of parts, as described and illustrated on the drawings annexed.

Dated this 4th day of October 1905.

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