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ARRANGEMENT IN STATIONARY LUFFING AND SLEWING JIB CRANE

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2 Claims. (Cl. 212-70)

The present invention relates to an arrangement in stationary luffing and slewing jib cranes and is a further development of the crane described in United States Patent No. 2,860,789, dated November 18, 1958.

The crane according to the main application is especially designed for use on ships and comprises a fixedly mounted mast or frame, a turntable rotatably supported on said frame, winding drums for load-hoisting and jib luffing ropes and a jib or boom preferably of V-shape hinged on said turntable. According to the main application said ropes being led from the load and the jib over swinging guide pulleys into paths in or parallel and adjacent to the axis of the turntable, said pulleys being mounted in the plane of the jib in a bracket rotatable about the axis of the turntable.

According to the present invention between the said swinging guide pulleys there is provided an intermediate pulley which is also arranged for rotation in the bracket and against which the hoisting rope bears when the jib is raised past a steep angle with the horizontal line.

Two embodiments of the invention are to be described with reference to the accompanying drawings in which:

Fig. 1 shows the upper portion of a modified form of the crane described in the main application, and

Fig. 2 a somewhat modified form of the whole crane in reduced scale.

In both the forms illustrated a vertically arranged ventilating pipe A1 serves simultaneously as a crane mast. Said pipe has a recessed wall portion A2 from the back of which extend two horizontally arranged brackets or arms T, T, forming the fixed parts of two hinges the pintles of which are designated by I1 and I2. The other hinge parts U, U, are made in one piece with a frame D rotatable about the axis of the turntable K shown in Fig. 2 only. This bracket B corresponds with the bracket D of the main application and is of substantially triangular shape and forms a bearing member for four (Fig. 1) or five (Fig. 2) guide pulleys E, F, M, N and M1 respectively.

According to Fig. 1 the jib luffing rope H is fixed at one end to the upper end (not visible) of the jib C and is passed around the uppermost guide pulley E which is rotatable about the axle 10 fixed to the frame D. From said pulley the rope H is passed upwardly within the mast A1, over a pulley P rotatably mounted within the ventilator cowl or hood B. Said cowl or hood may be turned in the usual way on the flange L forming the upper strengthened portion of the pipe A1.

The load hoisting rope G may pass in the usual way around a pulley arranged for rotation in the upper end of the boom or jib C, and over a guide pulley M rotatable about an axle 12 carried by the frame D, as well as a further guide pulley F rotating about an axle 13 which is also carried by the frame D. From the pulley F the rope G passes downwardly inside the mast A1 parallel with the upwardly extending portion of the jib luffing rope H.

As is well known the jib of cranes of this type has

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a critical angle which is reached when the bisecting line of the angle formed by the two parts of the load hoisting rope meeting at the upper end of the jib falls together with the longitudinal axis of the jib. In this position the jib is in a sort of unstable equilibrium, and as soon as said position is passed in the upward direction the load will cause the jib to swing further upwardly into parallel relationship with the mast A1 if not prevented therefrom by any stop or the like.

The object of this invention is to solve this problem in another way, namely by means by which said critical point is reached later during the heaving up of the jib. This is attained by the provision of a further guide pulley N also arranged for rotation on a bolt 11 carried by the frame D, against which pulley N the load hoisting rope bears in a high position of the jib, as indicated by a dotted line designated by G'.

The pulley may form an ordinary single block but may also be in the form of a double block with the load hoisting rope G running from the top of the jib first around one of two pulleys M which are arranged for rotation on a common axle, then up to the top of the boom or jib as shown by G'', and back again and around the second pulley M and from same around pulley F and down through the crane mast. Obviously, in this case, the block arranged in the top of the jib has also to be a double-block. No purchase action is thereby obtained during hoisting and lowering of the load but during raising and lowering of the jib so that the jib rope H is partly relieved and, consequently, a reduction of the power consumption of the jib raising winch is obtained.

In the modified embodiment according to Fig. 2 one end of the jib rope is fixed to an ear on an annular clamp L1 placed around the uppermost portion of the ventilating pipe A1 forming the crane mast. To an ear at the opposite side of said clamp is fixed one end of a guy rope a the other end of which is fixed to the shelterdeck S of the ship, as indicated. From said clamp L2 the jib rope H1 runs to the top of the jib C, around a pulley and back to the pulley E as shown by H, and from said pulley E around the guide pulley P as in Fig. 1. Thereby is obtained a single purchase action for the jib rope.

Between the top of the jib and the frame D the load hoisting rope, as described above, is arranged in a double loop, that is, with three rope reaches G, G1 and G2 located between the frame D and the jib, there being arranged two pulleys or sheaves in the top of the jib and a further pulley M1 in the frame D, which further pulley is free rotating and located at the outer corner portion of the frame in place of the pulley M in Fig. 1. In Fig. 2 the other load hoisting rope pulley M is arranged between the pulleys N and M1.

As appears from Fig. 2 this embodiment of the crane is provided with a crane operators cabin A4 made as a balcony on the lower portion of the frusto-conically shaped crane mast A3 the base of which is fixed to the deck S and surrounded by the rim K serving as a turntable and supporting the lower ends of the legs of the V-shaped jib C.

By the arrangements described with reference to the drawings and consisting in the arrangement of the pulley M located considerably off center of the crane mast in the direction of the jib, the jib practically never will attain a position in which the two angles between the load hoisting rope and the jib becomes critical.

An important feature of the invention is the possibility of using the crane frame or mast as a ventilating pipe making special ventilating pipes ordinarily used on ships superfluous.

I claim:

1. In a stationary turnable crane, particularly for use on ships, the combination of a stationary crane mast having a fixed axis, a turntable rotatably encircling said mast at its bottom portion, a boom operably connected with said turntable so as to be turned therewith in a horizontal plane, and having a pulley mounted at its free end portion, a mounting frame turnably connected with said mast by means of a vertically extending pintle, a boom line guide pulley rotatably mounted on said frame, a load-hoisting line guide pulley rotatably mounted on said frame, a hoisting line and a boom line extending over said pulleys on said frame respectively, and extending therefrom toward the free end of said boom, the improvement comprising the provision of an additional load hoisting line guide pulley rotatably mounted

on said mounting frame, and being located above said first-mentioned load-hoisting line guide pulley and positioned to be engaged by said load-hoisting line when the boom is raised past a steep angle with horizontal.

2. A crane as claimed in claim 1 and comprising a further pulley arranged between the two first-mentioned pulleys of the load-hoisting line and mounted for rotation in said frame adjacent to the said additional pulley, around which further pulley the load-hoisting line is arranged so that, at smaller angles of the boom relative to horizontal said load hoisting line passes from the pulley arranged in the free end portion of said boom around said additional pulley and from same around the lowermost load-hoisting pulley.

No references cited.