(No Model.)

2 Sheets—Sheet 1.

H. SAWYER.
CRANE.

No. 486,412. Patented Nov. 15, 1892.

Fig. 1.

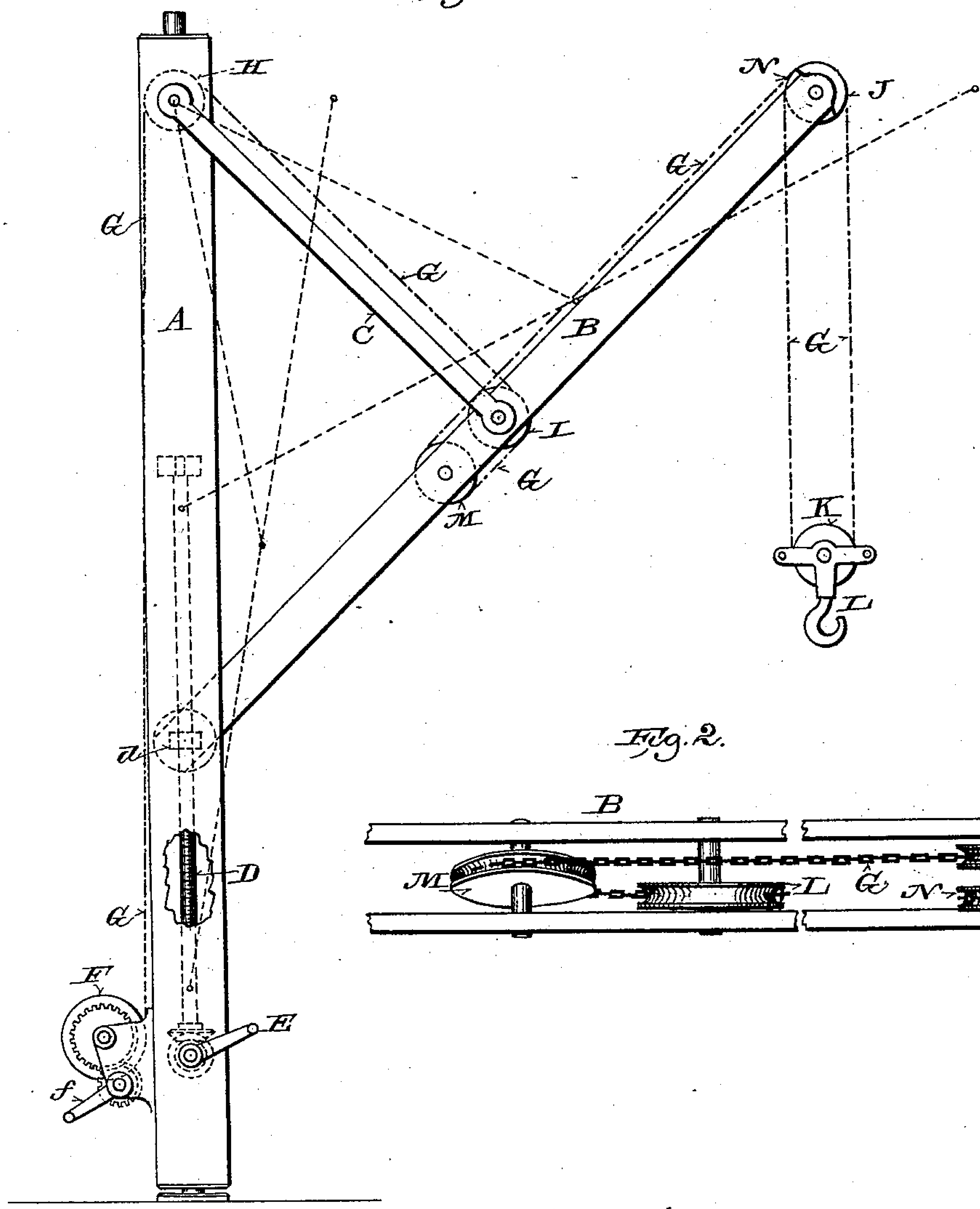
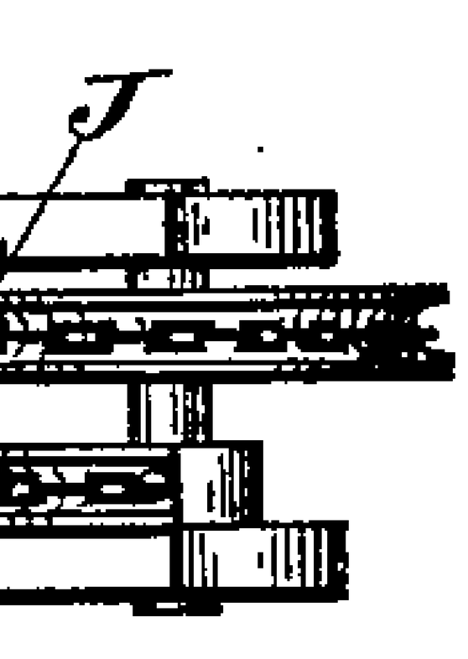


Fig. 2.



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NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

H. SAWYER.

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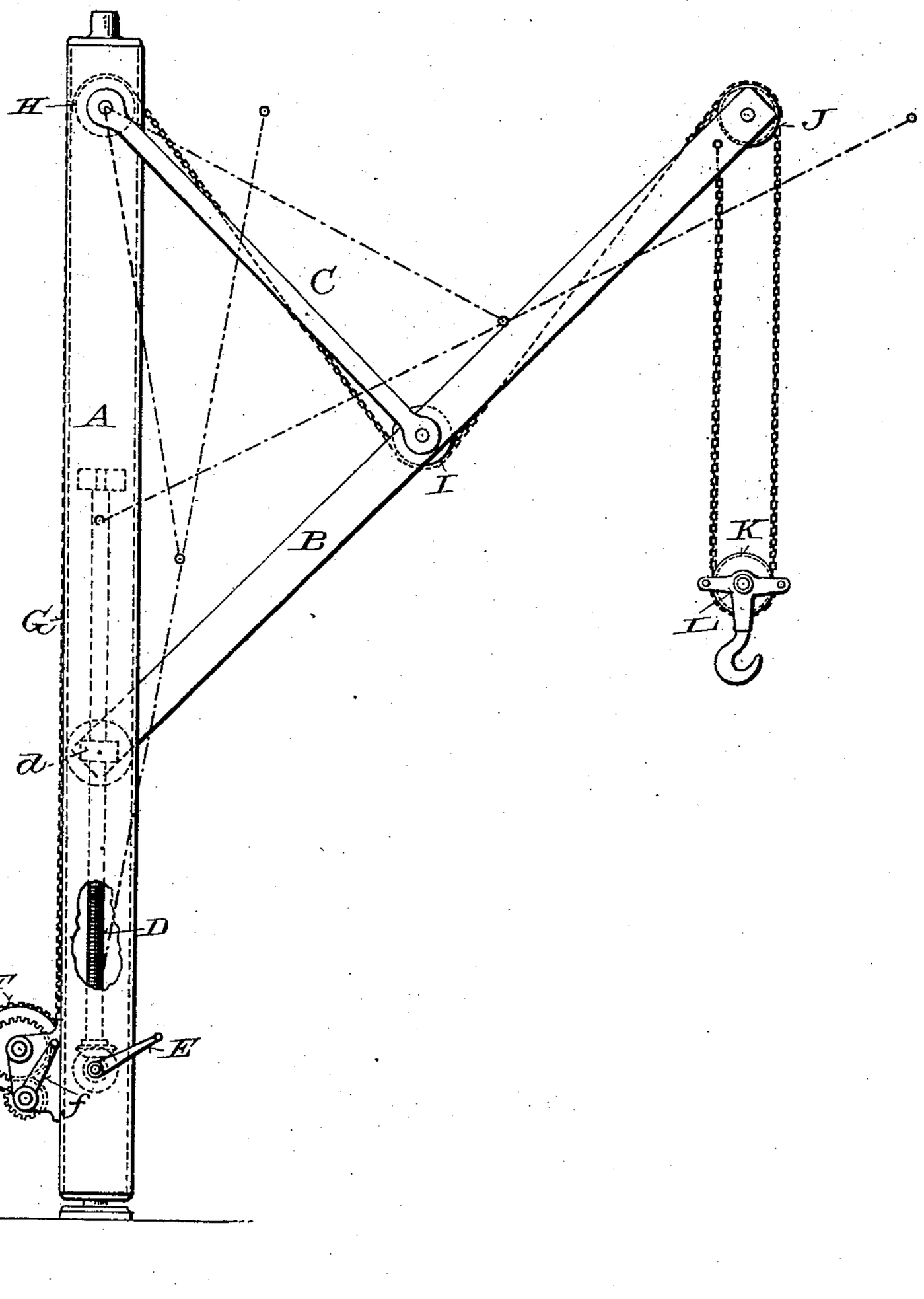
Fig. 3.



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UNITED STATES PATENT OFFICE.

HARRY SAWYER, OF MUSKEGON, MICHIGAN, ASSIGNOR TO THE SHAW ELECTRIC CRANE COMPANY, OF SAME PLACE.

CRANE.

SPECIFICATION forming part of Letters Patent No. 486,412, dated November 15, 1892.

Application filed July 20, 1892. Serial No. 440,686. (No model.)

To all whom it may concern:

Be it known that I, HARRY SAWYER, of Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Jib-Cranes; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The main object of my invention is to secure a horizontal movement of the suspended load in extending or withdrawing the upper end of the jib more or less as to the mast and in turning it about the mast.

It consists, essentially, of certain novel features in the arrangement of the hoisting mechanism by which the foregoing object is attained.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a side elevation of a jib-crane to which my improvements are applied. Fig. 2 is a plan view of a portion of the jib; and Fig. 3 is a side elevation of a crane, showing a modification of the arrangement of the sheaves and hoisting chain or cable.

My improvements relate to that class of jib-cranes in which the jib has a vertically-adjustable pivot or hinge connection at its lower end and an intermediate link connection with the mast, such as are shown in United States Letters Patent No. 254,941, dated March 14, 1882.

A represents the upright post or mast of a jib-crane, which may be of the usual or any suitable construction. It is supported at the lower end or at both ends in any suitable manner, which will hold it securely in place and permit of its turning on a vertical axis.

B is the jib, which has a vertically-adjustable pivot or hinge connection at its lower end with the mast, and is connected therewith at an intermediate point by one or more links C, pivoted or hinged thereto and to the upper part of the mast, so as to permit of raising and lowering the lower end of the jib and thereby carrying its upper end from which the load is suspended in a horizontal line toward or from the mast, as desired. Any suitable means may be employed for raising and lowering the lower end of the jib and for securely connecting the same with the mast. I have shown for the purpose a vertical screw D, which has suitable bearings in the mast and engages with a nut *d*, swiveled in the lower end of the jib, so as to permit of the variation of the angle which the jib makes with the mast in raising and lowering the former, as above mentioned, and is indicated by dotted lines illustrating different positions of the jib with reference to the mast. For turning the screw D, I have shown a crank E, which has bearings in the lower portion of the mast, and the shaft of which is provided with a bevel-pinion working with a similar pinion or gear on the lower end of the screw.

F is a hoisting-drum supported in suitable bearings formed in or attached to mast A at any convenient point, ordinarily near the base, and arranged to be operated by hand through a crank *f* or by any other suitable power. It is obvious that a chain-wheel or other device for hauling in and letting out the chain or cable can be substituted for the winding-drum.

G is the hoisting chain or cable attached to and arranged to wind upon drum F.

Referring now to Figs 1 and 2, the chain or cable G passes upwardly from drum F over a sheave H, journaled in the upper end of the mast concentric with the pivotal connection of link C therewith, thence in the same direction around a sheave I, journaled in jib B, concentric with the pivotal connection of link C therewith, thence under and over a sheave M in jib B between its lower end and link C, thence over a sheave J in the upper end of the jib, thence around a sheave K in the hook or lifting block L, and thence upwardly to a point at or near the upper end of the jib, where it is attached to a drum or segment of a drum N, concentric with and of the same radius as sheave J and rigidly attached to said jib. The sheave M is set at a slight angle to a vertical plane through jib B, with

its lower side in line with sheave I. This allows the chain or cable to pass from the top of sheave M to sheave J without interference or contact with sheave I or that portion of the chain or cable between it and sheave H. By this arrangement of the sheaves and hoisting chain or cable the parts of said chain or cable leading from one sheave to another are in every case parallel with lines connecting the centers of those sheaves. The extra wrap of the chain or cable G on sheave H, caused by lowering the lower end of jib B and moving its outer end in on a horizontal line toward the mast A, is exactly compensated for by less wrap on sheave I, and the extra wrap on sheave J, caused by a like change in position of jib B, is compensated for by less wrap on the segment N. This secures a perfectly-horizontal movement of the load in extending or withdrawing the outer end of jib B more or less from or toward the mast. Consequently by means of a crane of this class provided with my improvements a load may be elevated to the desired height and then swung horizontally around the axis of the mast and carried horizontally toward or from the mast into any desired position without raising or lowering it.

Referring now to Fig. 3, illustrating a modification of the arrangement of the hoisting chain or cable and the sheaves over which it passes, the chain or cable G passes over the sheave H, thence under the sheave I, thence over the sheave J in the upper end of the jib, thence around the sheave K in the hook or lifting-block L, and thence back to the upper end of the jib, to which it is secured. It is obvious that in place of the single sheave in the lifting-block L and in the upper end of the jib a greater number of sheaves may be employed to multiply the power of the hoisting apparatus, or the chain or cable as it hangs from the sheave J may be attached directly to the hook without the sheave K. By this arrangement of the hoisting chain or cable and the sheaves around which it passes the jib may be extended more or less at its upper end from the mast without materially changing the vertical position of the lifting block L and the load suspended therefrom. The only variation occurring in the vertical position of the load in carrying it horizontally toward and from the mast by raising and lowering the lower end of the jib, as hereinbefore mentioned, is due to a slightly increased or decreased wrap of the chain or cable around the sheaves over which it passes. This variation, however, is entirely avoided by the arrangement of chain or cable and sheaves hereinbefore described and shown in Figs. 1 and 2.

I claim—

1. In a crane comprising a mast and jib, having a vertically-adjustable hinge or pivotal connection at one end and an intermediate link connection therewith, the combination of sheaves located at the joints of the link with the mast and jib, a sheave at or near the upper end of the jib, and a chain or cable passing over the sheave at the upper end of the link, around a sheave at the lower end of the link, and over the sheave at or near the upper end of the jib, substantially as and for the purposes set forth.

2. In a crane comprising a mast and jib, having a vertically-adjustable hinge or pivot connection at one end and an intermediate link connection therewith, the combination of sheaves located at the joints of the link with the mast and jib, a sheave at or near the upper end of the jib, a lifting-block provided with a sheave, a hoisting device, and a chain or cable connected with said hoisting device and passing over the sheave at the joint between said link and mast, around a sheave at the joint between said link and jib, over the sheave at or near the upper end of the jib, around the sheave in the lifting-block, and back to the jib, substantially as and for the purposes set forth.

3. In a crane comprising a mast and jib, having a vertically-adjustable pivot or hinge connection at one end and an intermediate link connection therewith, the combination of sheaves located at the joints of the link with the mast and jib, a sheave at or near the upper end of the jib, a sheave in the jib between its lower end and said link, and a chain or cable passing over the sheave at the joint of the link and mast, thence over the sheave at the joint of the link and jib, thence under the sheave toward the lower end of the jib, and thence over the sheave at or near the upper end of the jib, substantially as and for the purposes set forth.

4. In a crane comprising a mast and jib, having a vertically-adjustable hinge or pivot connection at one end and an intermediate link connection therewith, the combination of sheaves located at the joints of the link with the mast and jib, a sheave at or near the upper end of the jib, a drum or segment of a drum rigidly secured to the jib concentric with and of the same radius as the sheave at or near its upper end, a lifting-block provided with a sheave, and a chain or cable passing over the sheave at the joint of the mast and link, thence around the sheave at the joint of the link and jib, thence over the sheave at or near the upper end of the jib, thence around the sheave in the lifting-block, and back to said drum or segment, to which it is secured, substantially as and for the purposes set forth.

5. In a crane comprising a mast and jib, having a vertically-adjustable hinge or pivot connection at one end and an intermediate link connection therewith, the combination of sheaves located at the joints of the link with the mast and jib, a sheave at or near the upper end of the jib, a sheave in the jib between its lower end and the joint of the link with the jib, a drum or segment of a drum rigidly secured to the jib concentric with and of the same radius as the sheave at or near

its upper end, a lifting-block provided with a sheave, a hoisting device attached to the mast, and a chain or cable connected with said hoisting device and passing in the same direction over the sheaves at the joints of the link with the mast and jib, thence under and over the sheave toward the lower end of the jib, thence over the sheave at the upper end of the jib, thence around the sheave in the lifting-block, and thence back to said drum or segment of a drum, to which it is secured, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

HARRY SAWYER.

Witnesses:
A. J. SHAW,
J. G. EMERY, Jr.