

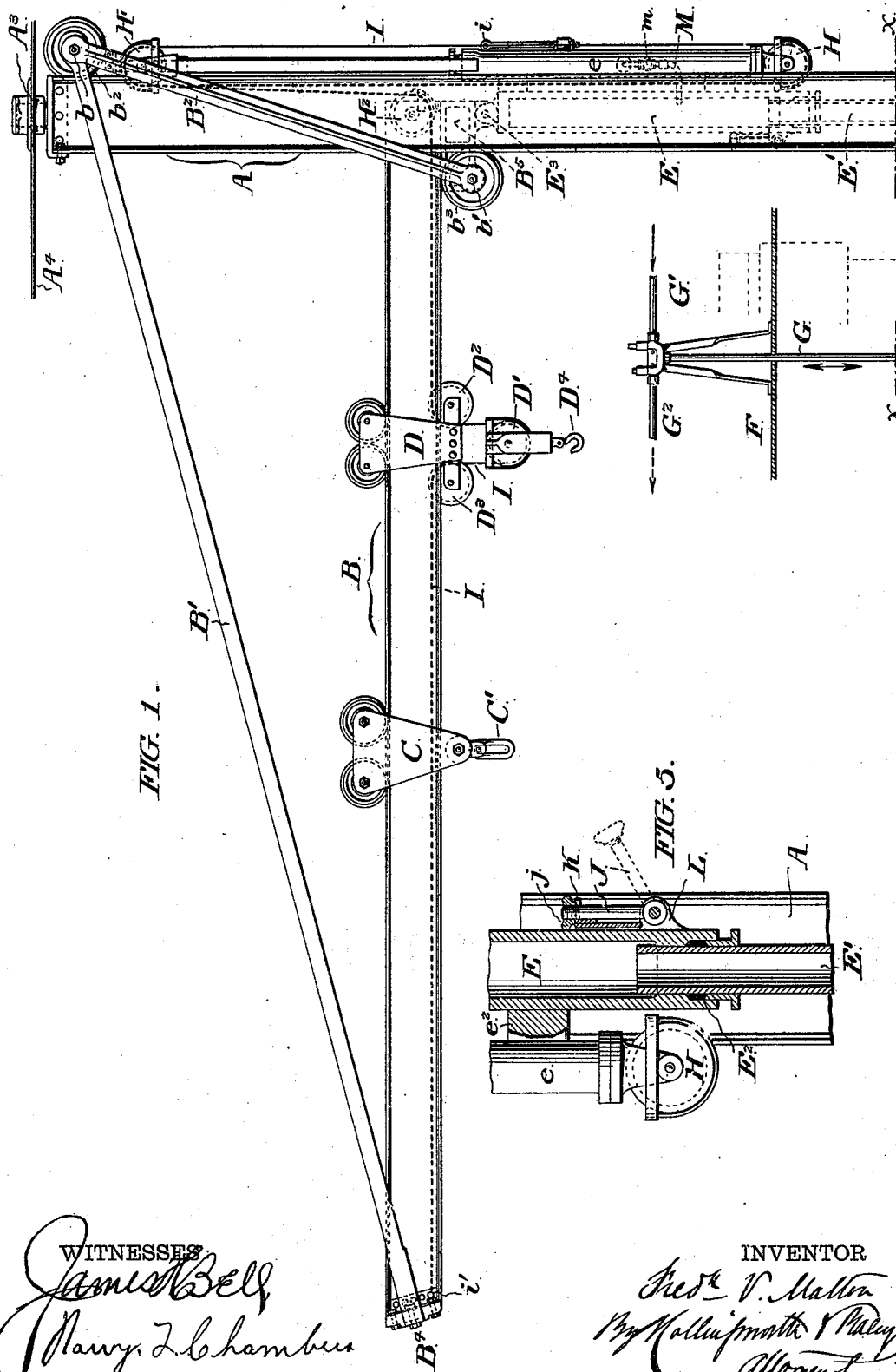
(No Model.)

2 Sheets—Sheet 1.

F. V. MATTON.
HYDRAULIC CRANE.

No. 517,008.

Patented Mar. 20, 1894.



WITNESSES

WITNESSES
James Bell
Harry L. Chambers

INVENTOR

INVENTOR
Fred V. Malton
By Mallinmorth & Phaley
Attorneys

(No Model.)

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FIG. 2.

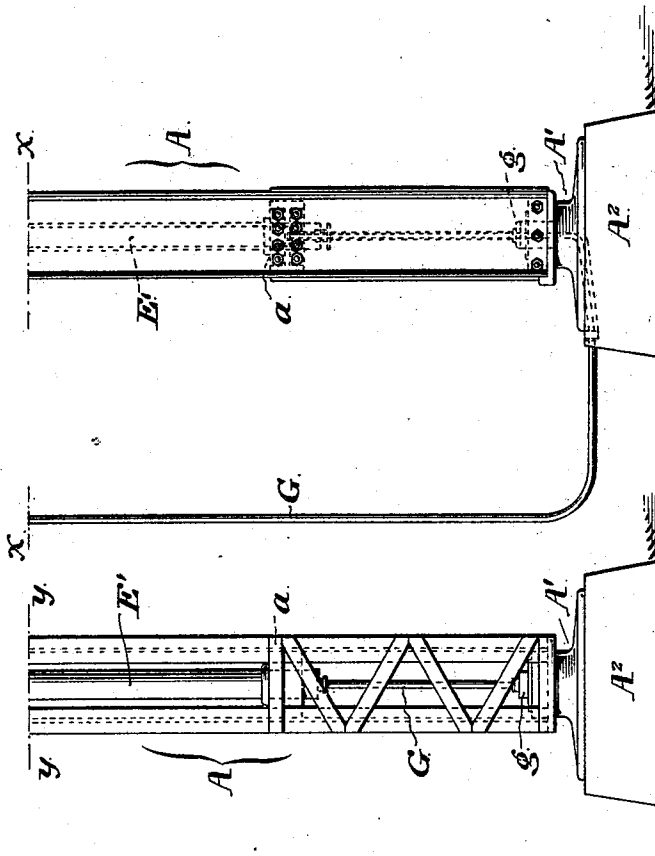


FIG. 4.

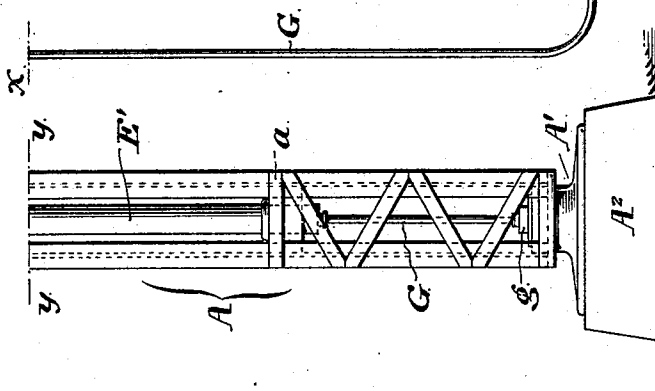
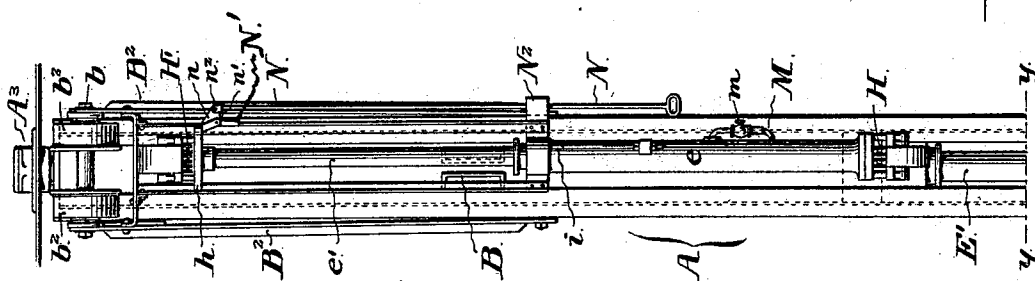


FIG. 3.



~~WITNESSES~~

WITNESSES
James Belf
Harry L. Chamberlain

INVENTOR

Jno. V. Matton
 By Matton & Matton, Attorneys
 Matton -

UNITED STATES PATENT OFFICE.

FREDERICK V. MATTON, OF CAMDEN, NEW JERSEY, ASSIGNOR TO THE
CAMDEN IRON WORKS, OF SAME PLACE.

HYDRAULIC CRANE.

SPECIFICATION forming part of Letters Patent No. 517,008, dated March 20, 1894.

Application filed June 26, 1893. Serial No. 478,845. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK V. MATTON, of Camden, in the State of New Jersey, have invented certain new and useful Improvements in Hydraulic Cranes, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to jib cranes having horizontal jibs, which, as heretofore constructed, have belonged to one of two distinctive types. In one of these types, known as the "lifting jib," the raising or lowering of the load was effected by bodily moving the jib itself with relation to the mast, without however causing the other to deviate from its horizontal position. In the other type, known as the "fixed jib," the jib was permanently attached to the mast, and the raising or lowering of the load was effected by means of a lifting rope or chain leading from the jib to an actuating device situated at some fixed point exterior thereto.

My invention has for its object the attainment, in a single apparatus, of advantages due to both these types of construction, and I will now proceed to describe the same by reference to the drawings.

In said drawings, Figure 1 represents a view, in side elevation, of the upper portion of a crane embodying my invention. Fig. 2 represents a similar view of the lower portion thereof, (said figures being continuations respectively one of the other, the line of separation being indicated at *x x*.) Figs. 3 and 4 are views, in rear elevation, of the upper and lower portions of the crane, respectively, the line of separation between the two figures being indicated at *y y*. Fig. 5 is a partial sectional view, on an enlarged scale, showing certain details of locking mechanism, which will be hereinafter more particularly described.

A indicates the mast of the crane, having its lower end pivoted at *A'*, in the base or pedestal, *A*², and its upper end at *A*³, in the ceiling, or other overhead support, *A*⁴. In the illustration selected, the mast of the crane is supposed to extend below and above a floor or platform, *F*, with relation to which the several movements about to be described are conveniently arranged. The jib, *B*, of the crane is secured to and rests upon a

rectangular block, *B*⁵, which is pivotally attached at *E*³ to the upper end of a vertically movable hydraulic cylinder, *E*, which I term the main cylinder, and which is preferably mounted within the mast, *A*.

To insure parallelism of movement in the jib, *B*, and support it against vertical strain, I combine with it a triangular frame, running upon the mast. Said frame consists of two pairs of stay-bars, *B'*, *B'*, and *B*², *B*², respectively, the former of which are secured at *B*⁴, to the outer end of the jib and extend thence to the axle, *b*, on which are mounted rollers, *b*², *b*², bearing against the rear face of the mast and adapted to run freely thereon. The bars, *B*², *B*², are secured at their lower ends to the block, *B*⁵, at points coincident with the axle, *b'*, of the rollers, *b*², *b*², which bear against and run freely upon the front face of the mast, *A*. From their points of attachment to the block, *B*⁵, the bars, *B*², *B*², extend to and are connected with the axle, *b*, of the rollers, *b*², running upon the rear of the mast, as previously described. I prefer to use two trolleys upon the jib, *B*, one of which, *D*, is provided with a lifting rope or chain, *I*, a fall block, *D'*, and hook, *D*⁴; the other trolley, *C*, dispensing with a fall block and having merely a depending link, *C'*. When it is necessary to distinguish these one from the other, the trolley *D* may be appropriately termed the "light load" trolley, and the trolley *C* the "heavy load" trolley.

The vertical movement of the jib, *B*, upon the mast, *A*, is effected as follows: The main hydraulic cylinder, *E*, is provided with a hollow plunger, *E'*, whose base is rigidly mounted upon the horizontal step or shelf, *a*, near the lower end of the mast. At the lower end of the cylinder, *E*, is a lug, *L*, to which is pivoted a bolt, *J*, threaded at its upper end to receive a wing-nut, *j*. Said bolt swings in a vertical plane between the two bars of the mast, and in the extreme upward position of the cylinder, *E*, the bolt when swung inward enters within a slot in the upper face of a bracket, *K*, secured to the mast. When in this position, the nut, *j*, resting upon the upper surface of the bracket, *K*, prevents the descent of the cylinder, *E*; when, however, the bolt is swung outward, into the position

indicated by the dotted lines in Fig. 5, it clears the bracket and the cylinder, E, is free to descend.

Communication between the cylinder and source of hydraulic pressure is effected by means of the pipe, G, connected with the pressure pipe, G', and the exhaust pipe, G², and leading down through the base, A², whence it leads to the interior of the hollow plunger, E', by means of a vertical extension, g, coincident with the axis of rotation of the mast, A, and suitably connected with the plunger to permit the rotation of the latter along with the mast.

Upon the rear face of the main cylinder, E, is mounted a second hydraulic cylinder, e, (which I term the secondary cylinder,) communication between the two cylinders being effected by means of the branch pipe, M, controlled by the valve, m. Said secondary cylinder is provided with a movable plunger, e', capable of being projected vertically upward to a point near the top of the mast.

At the lower end of the cylinder, e, and at the upper end or head of the plunger, e', are mounted sheaves, H, H', respectively, (each of which may have multiple grooves) and the lifting rope, I, anchored at one end at i, upon the cylinder, e, runs thence, after any desired number of turns around the sheaves, H and H', to a sheave, H², at the inner end of the jib, B, thence over the sheave, D², upon the rear face of the trolley, D, thence around the fall block, D', thence ascending over the sheave, D³, upon the front face of the trolley, D, and thence to an anchoring point, i', at the outer end of the jib, B. The lifting rope in its entirety is carried by the jib, thus rendering it possible to move the jib with relation to the mast without taking up or paying out the rope itself.

The length of the rope, I, is such that when the plunger, e', is in its extreme outward position, the fall block, D', is raised into close proximity to the trolley, D, the range of downward movement being of course determined by the number of turns which said rope takes around the sheaves, H, H'.

To sustain the plunger, e', in its uppermost position (when not doing work) I provide the triangular latch, n, which is pivoted upon the guide strip, N', and is also pivotally connected with the upper end of a rod, N. The rod, N, is capable of a limited vertical movement in a guide, N², mounted upon the cylinder, e, and by shifting the rod up or down the point of the latch, n, may be thrown beneath the flange, h, of the plunger-head, or withdrawn so as to clear the same.

The operation of the device is as follows: When it is desired to move the jib vertically, as for instance, in the case of a short lift with a very heavy load, the heavy load trolley, C, and link, C', are employed. Communication between the secondary cylinder, e, and the main cylinder, E, is cut off. Pressure is applied within the main cylinder, E, and said

cylinder, carrying with it the jib, rises to any desired point within its range of vertical movement. The lowering of the jib is of course effected by means of the exhaust, and in either case the secondary cylinder rises or falls with the main one. For light loads, or where a greater range of lift is required, the main cylinder, E, should be raised to its uppermost position, as indicated in the figures, and should then be locked, by means of the bolt, J, and nut, j, the latter engaging with the bracket, K. Communication between the main cylinder, E, and the secondary cylinder, e, is then established through the pipe, M, and pressure is applied to the plunger, e', of the secondary cylinder, e. The outward movement of said plunger takes up the rope, I, and raises the fall block, D', to any desired point within the range capable of being effected by the movement of the plunger, e'. As the secondary cylinder is carried by the main cylinder, the maximum capacity of movement of the apparatus as a whole, is therefore the range of the vertical movement of the jib, plus the independent range of movement of the fall block, and either or both of these capacities may be utilized.

The object of providing a means for locking the secondary plunger, e', in its uppermost position, is to sustain the fall block in snug proximity to its trolley, in order that it, may not, by dangling, interfere with the workmen during the operation of the jib movement when the trolley, C, alone is employed.

In the foregoing description I have specified the main cylinder, E, as the moving member of the hydraulic apparatus by which the jib movement is effected, and have specified the plunger, e', as the moving member of the secondary hydraulic apparatus by which the movement of the fall block is effected; but obviously the movement of either or both might be otherwise effected, without affecting the identity of the device as a whole. In my claims, therefore, I employ the terms primary hydraulic apparatus and secondary hydraulic apparatus as comprehending respectively the two members which control the movement of the jib and of the fall block, respectively, without limitation to the precise arrangement of the cylinders and plungers shown.

Having thus described my invention, I claim—

1. The combination with the mast, of a horizontal jib adapted to move bodily with relation thereto; a primary hydraulic apparatus carried by said mast and having a moving member connected with the jib adapted to raise or lower the same; a secondary hydraulic apparatus carried by the primary hydraulic apparatus and moving in conformity with the movement of the jib; and a lifting rope which in its entirety is carried by the jib, said rope being in operative engagement with the moving member of said secondary hydraulic apparatus, substantially as set forth.

2. The combination, with the mast and with the jib adapted to move thereon, said jib having a heavy load trolley substantially as set forth; of a primary hydraulic apparatus
5 whose moving member is operatively connected with the jib; a secondary hydraulic apparatus mounted to move in conformity with the jib movement; a lifting rope operatively engaging with the moving member of
10 said secondary hydraulic apparatus; and a light load trolley and fall block arranged with relation to said rope, substantially as set forth.

3. The combination, with the mast and with
15 the jib adapted to move thereon, of a primary hydraulic apparatus whose moving member is operatively connected with the jib; a lock for securing the moving member of said primary apparatus in its extreme out-
20 ward position; a secondary hydraulic apparatus mounted to move in conformity with the jib movement; a lifting rope operatively

engaging with the moving member of said secondary hydraulic apparatus; and a trolley and fall block arranged with relation to said
25 rope, substantially as set forth.

4. The combination, with the mast and with the jib adapted to move thereon, of a primary hydraulic apparatus whose moving
member is operatively connected with the jib; 30 a secondary hydraulic apparatus mounted to move in conformity with the jib movement; a lock for securing the moving member of said secondary apparatus in its extreme out-
ward position; a lifting rope operatively en- 35 gaging with the moving member of said secondary hydraulic apparatus; and a trolley and fall block arranged with relation to said rope, substantially as set forth.

FRED V. MATTON.

Witnesses:

G. HUBED JENKINS,
JAMES H. BELL.