

(No Model.)

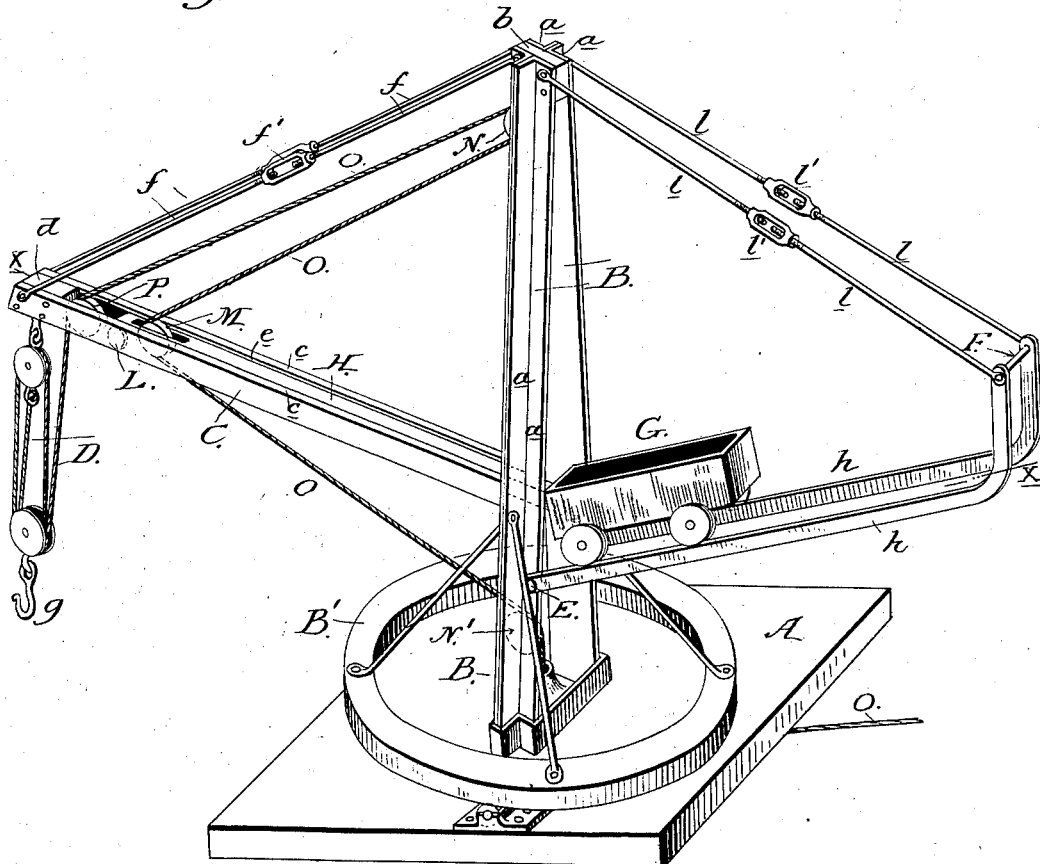
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J. N. STURM.
CRANE OR DERRICK.

No. 524,619.

Patented Aug. 14, 1894.

Fig. 1.



WITNESSES
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(No Model.)

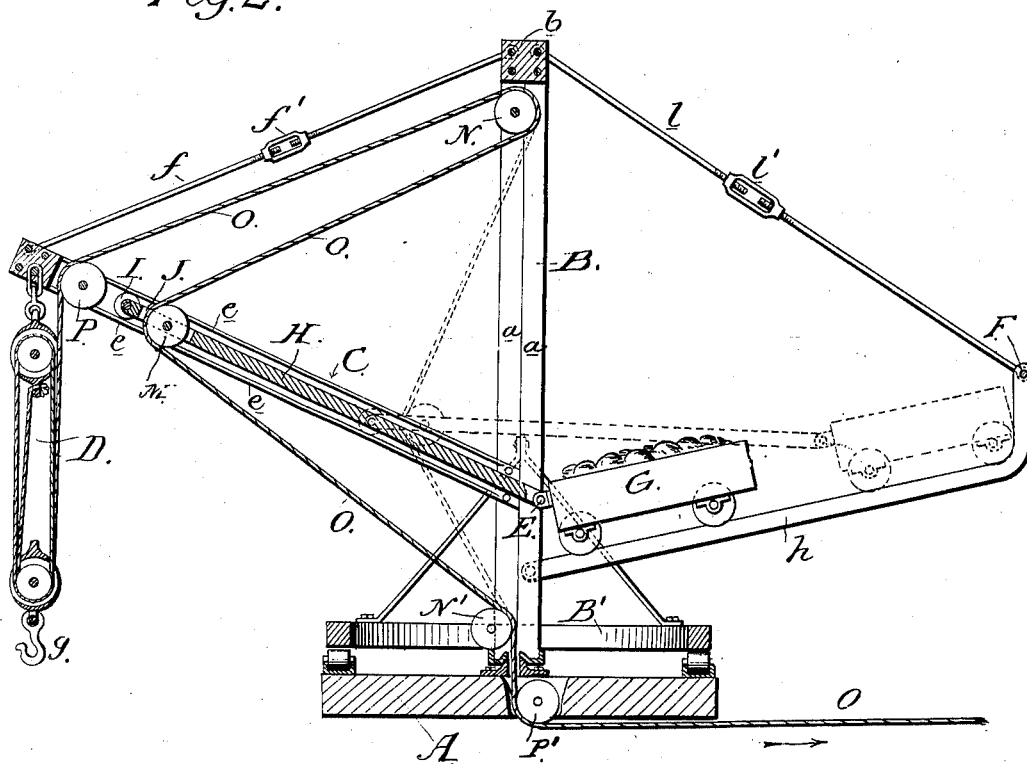
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J. N. STURM.
CRANE OR DERRICK.

No. 524,619.

Patented Aug. 14, 1894.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES N. STURM, OF BELPRE, OHIO.

CRANE OR DERRICK.

SPECIFICATION forming part of Letters Patent No. 524,619, dated August 14, 1894.

Application filed March 30, 1894. Serial No. 505,757. (No model.)

To all whom it may concern:

Be it known that I, JAMES N. STURM, a citizen of the United States, residing at Belpre, in the county of Washington and State of Ohio, have invented certain new and useful Improvements in Cranes or Derricks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains 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.

My invention relates to cranes, derricks and analogous devices and structures adapted for the raising and lowering and loading and unloading of heavy weights and bodies of material.

My invention consists of the parts and constructions and combinations of parts which I shall hereinafter fully describe and set forth in the claims.

In the accompanying drawings, Figure 1, represents a perspective view of a crane or derrick embodying my invention. Fig. 2, is a vertical sectional view of the same on the line $x-x$ of Fig. 1.

The construction set forth in said drawings may be designed as a permanent structure to be located in the yards of railroad systems or other places where it is desired to raise and lower or handle heavy and cumbersome objects and weights; or it may represent a portable structure to be carried upon a wheeled frame, flat car or truck so that it may be transported from place to place. As a portable structure it is very useful for wrecking crews of railroads and for bridge and other construction.

Upon a suitable base or foundation A is a vertically disposed mast or standard B the lower end of which is suitably stepped upon the base or foundation so that the mast may be turned axially; this movement being facilitated by a turn table B' of any desired form and construction. The mast B may be of any desired construction, but is preferably composed of angle-iron plates *a* bolted or riveted together in pairs with an open central portion, and with the upper ends of the pairs of plates bolted together and to an interposed

block *b*; the lower portions of the pairs of plates being also connected to each other in any well known and appropriate manner.

Projecting from the mast at a suitable angle is a boom C composed, preferably, of two separated and spaced angle-iron plates *c*, the lower ends of which are securely bolted to the inner walls of the plates forming the mast, and the upper ends being united by a block *d* bolted in position substantially as shown; while the inwardly turned flanges *e* of said plates *c* are designed to serve as guides and track surfaces as I shall hereinafter fully set forth. The outer or free end of the boom is suitably stayed and braced by rods *f* and turn-buckles *f'* as shown, and said free end also carries the falls D common to this class of structures, and which have a hook *g* to which the load to be suspended is attached.

From the side of the mast opposite to the boom, extends an inclined plane herein shown as composed of two separated and spaced plates *h* set on edge, having the lower ends pivotally secured to the mast by means of a heavy bolt E, and having their outer ends united by a rod or bar F, said outer ends being connected with the upper portion of the mast and suitably stayed by means of rods *l* and turn buckles *l'*. By thus securing the outer free ends of the inclined plane, and mounting the lower end upon a pivot bolt, I am enabled to increase or decrease the degree of inclination of the inclined plane by simply adjusting the turn-button.

The inclined plane serves as a track and guide for a movable counter-balance G, which is herein shown as being in the form of a truck or car adapted to be weighted in any suitable manner. To one end of this movable counter-balance is hinged or pivotally connected a bar H, which extends through the open center of the mast and projects upwardly in the opening formed by the spaced bars of the boom, this bar H carrying at or near its upper end the wheels or rollers I adapted to be confined between, and to travel in the guide or track surface formed by the inwardly projecting flanges of the angle-iron plates constituting the boom. Near the end of the bar H is formed therein an opening or slot J, in which is mounted a sheave or grooved pulley M, and within the open center of the mast,

near its upper and lower ends, are mounted other sheaves or grooved pulleys N and N', respectively.

The hauling cable or line O, passes over a sheave or pulley P in the outer end of the boom and thence extends to and around the sheave N. From this point it extends forward to and around the sheave M in the bar H, and thence extends inwardly and downwardly to and over the sheave N', and thence through an opening in the center of the step and under a sheave or pulley P' to any suitable point; the outer or free end of the cable being connected with a windlass, gipsy, or any other well known power device, not shown, by which it is wound and unwound to raise and lower the load to be lifted.

The operation of my invention is substantially as follows: The parts being in the position shown in Fig. 2, and the hook being attached to the load to be lifted, the pull upon the hauling line or cable will be transmitted to the bar H and through it to the movable counter-balance, to cause the latter to move upward along its inclined plane. In the full line position shown in said Fig. 2, the hauling line, in passing over the pulleys or sheaves M, N and N', is in a position where it can exert the greatest leverage or force upon the movable counter-balance, therefore, if the weight to be lifted exceeds the weight of the counter-balance and the resistance to the movement of the same offered by the inclined plane upon which it travels, this counter-balance will be moved along said inclined plane until the resistance offered by the counter-balance overcomes the resistance offered by the weight or load to be lifted. When this occurs the movable counterbalance will have counterbalanced the weight upon the boom, and the weight and strain upon the opposite sides of the mast will be approximately equalized, thereby enabling the mast to be turned axially without difficulty. If the weight of the counterbalance and the resistance it and its inclined plane offer, is approximately equal to the weight to be lifted, the counterbalance will be moved nearly or quite to the outermost limit of the inclined plane; and if the weight to be lifted is less than the resistance offered by the counterbalance, the latter will be moved only a distance proportionate to the weight of the load being lifted. As the bar H is forced downward by the action of hauling upon the cable, it is caused to occupy a position substantially as indicated by dotted lines in Fig. 2, the cable shortening and coming more nearly straight between the sheaves N and N' as the limit of outward movement of the counterbalance is reached.

Upon raising and lowering the free end of the inclined plane, by the means before described, the surface presented to the travel of the counterbalance is of greater or less inclination and corresponding resistance.

In lowering a weight or load the counter-

balance maintains its position on the inclined plane to equalize the weight of the suspended load, but when the weight is partially reduced, as when the suspended load first touches the ground or place of deposit, the counterbalance moves down its incline to compensate for the reduced weight suspended, and when the load finally settles upon its place of deposit, the counterbalance will have returned to its normal position.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a crane, derrick or analogous structure, the combination with a mast, a boom and means for suspending a load therefrom, of a track projecting in opposition to the boom, a weighted body adapted to travel on said track and having a connection projecting beyond the vertical plane of the mast, and a hauling line adapted to act against said connection to move the weighted body automatically upon its track surface.

2. The combination with a mast, a boom, the hauling line and means for suspending a load, of an inclined plane projecting in opposition to said boom, a weighted body adapted to travel on said inclined plane, and a connection from said body extending into the boom and provided with a sheave or pulley over which the hauling line or cable passes.

3. The combination with a mast, of a boom secured thereto and formed of spaced plates with inwardly turned flanges forming a guide or track, a hauling line, a movable body on the side of the mast opposite to said boom, and a bar hinged or pivoted to the body and projecting through the mast and into the boom between the spaced plates, said bar carrying a roller adapted to engage and be guided by said flanges, and having a sheave over which the hauling line or cable passes whereby the body and its connections are actuated by the line.

4. The combination with a mast, a boom, a hauling line and means for suspending a load, of separated spaced plates projecting from the mast in opposition to the boom, a weighted body adapted to travel on said plates, a bar jointed to the body and extending along the boom, and provided with a sheave over which the hauling line passes.

5. In a crane, derrick or analogous structure, the combination of a mast, a boom on one side thereof and a pivotally secured track projecting from the opposite side, a means adjustably connecting the free end of the track to the mast, a means for suspending a load from the boom, a weighted body adapted to travel on said track having a connection projecting through the mast, and a hauling line adapted to pass over and act against the outer portion of said connection to actuate the weighted body, substantially as herein described.

6. A crane, derrick or like structure com-

prising a mast suitably stepped and provided
with an open center, and guide sheaves for
the cable or line, a boom formed of spaced
plate and provided with means for suspend-
5 ing a load, a turn table, spaced track plates
pivotally connected with the mast at their in-
ner ends and thence extending in opposition
to the boom, a movable body adapted to travel
on said track plates, having a bar jointed to
10 it and passing through the mast into the boom,

the cable or hauling line, a sheave in said bar
over which the cable or line passes, and an
adjustable connection between the track
plates and upper portion of the mast.

In testimony whereof I affix my signature in 15
presence of two witnesses.

JAMES N. STURM.

Witnesses:

S. A. TERRY,
T. WALTER FOWLER.