

(No Model.)

3 Sheets—Sheet 1.

A. E. BROWN.

HOISTING AND CONVEYING MACHINE.

No. 474,494.

Patented May 10, 1892.

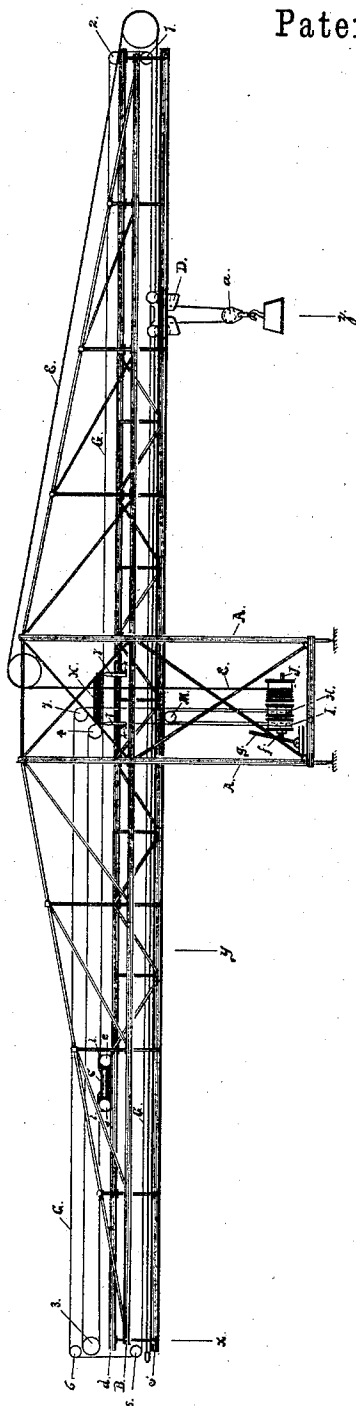


Fig. 1.

WITNESSES,

A. Becker

M. E. Foster

INVENTOR.

Alex. C. Brown

J. N. McIntire

ATTORNEY.

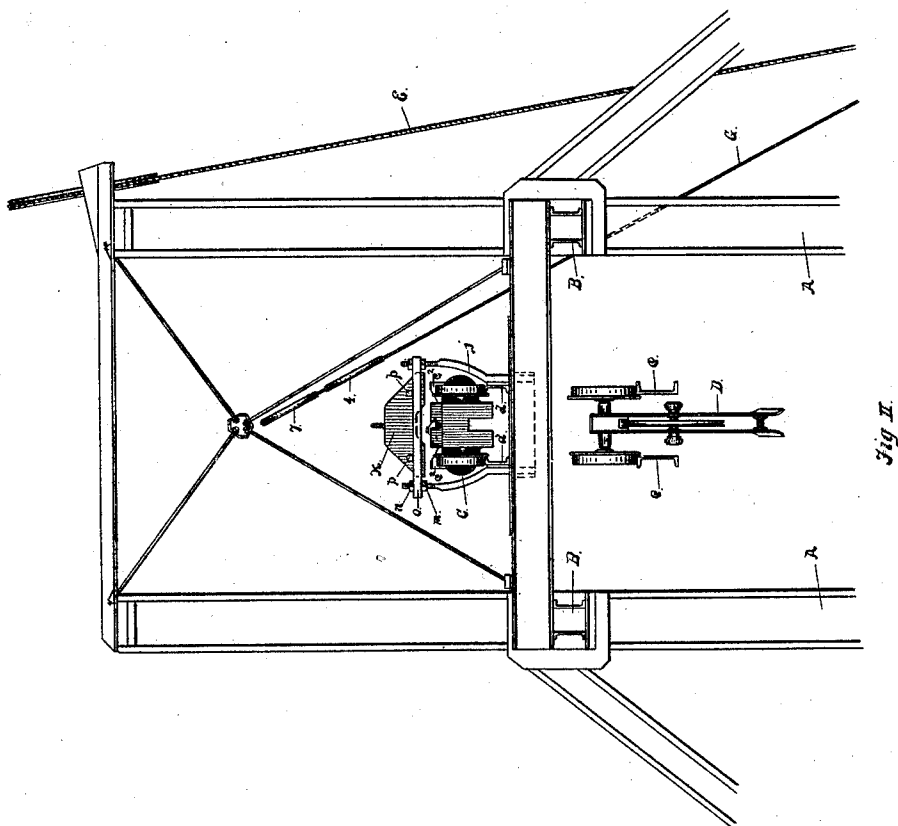
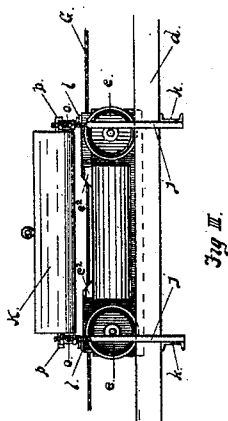
(No Model.)

3 Sheets—Sheet 2.

A. E. BROWN.
HOISTING AND CONVEYING MACHINE.

No. 474,494.

Patented May 10, 1892.



WITNESSES,

A. Becker

M. E. Feltner

INVENTOR.

Alex. E. Brown

J. N. McIntire

ATTORNEY.

(No Model.)

3 Sheets—Sheet 3.

A. E. BROWN.
HOISTING AND CONVEYING MACHINE.

No. 474,494.

Patented May 10, 1892.

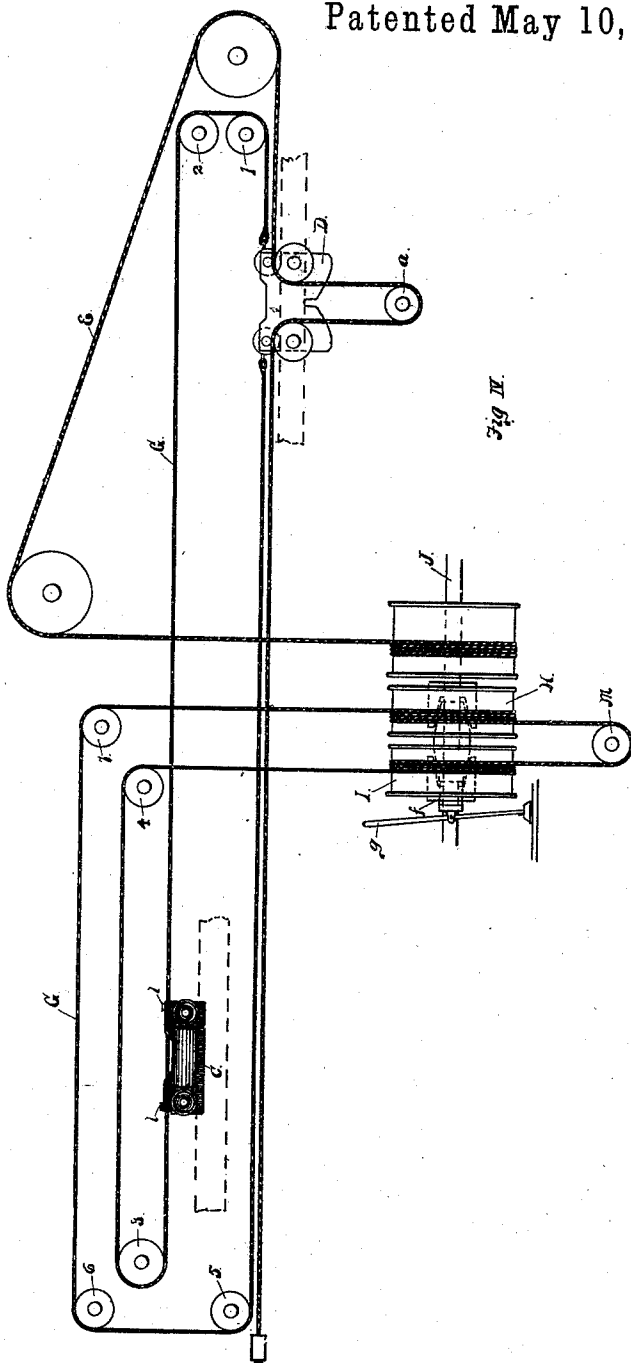


Fig. IV.

WITNESSES,

a. Bickel

W. E. Hoffman

INVENTOR.

A. E. Brown

J. N. McIntire

ATTORNEY.

UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO.

HOISTING AND CONVEYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 474,494, dated May 10, 1892.

Application filed June 30, 1891. Serial No. 397,961. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful
5 Improvement in Hoisting and Conveying Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this
10 specification.

My invention relates to that type or kind of hoisting and conveying machine which comprises a tramway mounted at about its middle lengthwise on a suitable pier or supporting-column (sometimes stationary and sometimes arranged to travel on a railroad-track) after the fashion of a cantalever-derrick, and has for its object to provide means for counterbalancing the load suspended from and
15 carried along by the trolley by a suitable weight, which will travel back and forth in accordance with the extent of the movements the trolley may make, but moving always in an opposite direction to that in which the trolley may travel.
20 25

To these ends and objects my invention may be said to consist, essentially, in the combination, with the tramway and the hoisting and conveying trolley and attachments of a
30 cantalever-derrick, of a counterbalancing-weight adapted to move in opposite directions, but to the same extent as the trolley, and suitable means for causing such movements of said counter-weight, all as will be hereinafter
35 more fully explained, and as will be more particularly pointed out in the claims of this specification.

My invention also further consists in certain novel devices and combinations of devices by
40 means of which the traveling counterbalancing-weight may be increased or diminished, according to circumstances and at the pleasure of the operator or manager of the machine, all as will be presently more fully described,
45 and as will be more specifically defined in the claims of this specification.

To enable those skilled in the art to make and use a hoisting and conveying machine or cantalever-derrick embracing the novel features of my invention, I will now proceed to
50 more fully describe the latter, referring by

letters to the accompanying drawings, which form part of this specification and in which I have shown all the features of my invention carried out in the forms in which I have so far practiced them, though of course as to each of the novel features of construction variations may be made in the details of the machine without varying the novel principles of construction and modes of operation which
55 60 are peculiar to my invention.

In the drawings, Figure I is a side elevation of a cantalever-derrick or hoisting and conveying machine embodying all the features of my invention. Fig. II is a vertical
65 cross-section, on an enlarged scale, of the tramway, showing better the relative arrangement of the tracks on which travel, respectively, the movable counterbalancing-weight and the trolley, the former being mounted to
70 pass over the latter whenever the two may have to pass each other at or near the middle of the tramway during the traveling or load-conveying movements of the trolley. Fig. III is a partial side elevation on the same
75 scale as Fig. II, showing merely the weight-carriage, the supplemental weight, and connected devices. Fig. IV is a skeleton or diagrammatical view drawn out of proper proportion, in order to illustrate the entire relative arrangement and movements of all the
80 operative parts of my means for counterbalancing the load that is suspended from the trolley during the hoisting and the conveying operations.
85

In the several figures the same part will be found designated by the same letter of reference.

A is the central column or supporting-pier of the cantalever-derrick, and B the boom-like bridge-tramway, on which are mounted
90 and travel on two tracks *c* and *d* the trolley D and the counterbalancing-weight C, as clearly shown.

E is the usual hoist-rope, which, when acted upon by the winding drum of the engine, operates to raise the hoist-block *a*, from which
95 the load to be elevated, carried along, and lowered is supposed to be suspended.

G is an endless cable, which is driven in
100 either direction, as may be necessary, by means of (in the case shown) one or the other

of the two winding-drums H and I, that are mounted loosely on the drive-shaft J, with which they can be thrown into engagement, one at a time, by means of a clutching mechanism *f*, so arranged and operating that by moving the pivoted hand-lever *g* in one or another direction one or the other of said drums will be clutched to shaft J and at the same time the other unclutched therefrom.

M is an idler mounted on a suitably-located fixed axis of motion and around which the endless cable G makes a partial turn. This idler may be located to turn in a plane at right angles to that in which the drum H rotates, and may be placed laterally of the winding-drums; but in the diagrammatical or skeleton view, Fig. IV, I have shown it located below the winding-drums to get a better sight of it and to render this figure more clearly illustrative of the whole arrangement of cable, carriages, drums, and wheels. By reference to this figure it will be seen that the ends of the cable G substantially meet at the trolley D, to which they are secured, and that the cable G runs thence around a series of idlers 1 2 3 4 and down to the winding-drum I, and also thence around another series of idlers 5 6 7 to the other winding-drum H. Around each of the drums H and I the cable makes a series of complete turns, (I have in practice found three turns sufficient and desirable,) and in passing from one drum to the other makes a half-turn on the periphery of the idler M.

By means of suitable clamps or gripping devices *l l* on the traveling weight carriage the cable G is secured thereto at such point in the run or length of the cable as may be desired, and by releasing and re-engaging these clamps *l* the run or path of travel of the weight C may be varied or adjusted, as and for a purpose to be presently explained.

The counterbalancing traveling weight C is mounted on or in a truck to run easily on the truck-wheels *e*, that travel on the track *d*, and when occasion may require said traveling weight may be supplemented by the addition of another weight K, (see Figs. 2 and 3,) that is adapted to be carried on top of the usual weight C when desired, or be left in a state of disuse, as will be presently explained.

J are a series of curved metallic standards, which are bolted, as shown, near their lower ends to the outer sides of the track-beams *k* of the track, on which travel the truck-wheels *e* of weight C, and which are threaded at their upper portions for the accommodation of nuts *m* and *n*, (see Fig. 2,) by means of which, through the medium of supporting (and removable) cross-bars *o*, the supplemental weight *k* may at the pleasure of the attendant be either maintained in a state of disuse or placed on top of the wheeled weight C, so as to increase its gravity and travel with it.

At Fig. 2 the supplemental weight K is shown as supported by the cross-bars *o*, (one at each end of the weight,) each of which rests

at one end on one of the nuts *m* of one of the standards J, each of said cross-bars *o* having its upper edge in contact at certain points with the projecting lugs *p p* of the weight. It will be understood of course that the weight thus supported by the cross-bars is held at an elevation such that the top of the traveling weight C will clear the under side of weight K or travel back and forth beneath it without interference. To bring the supplemental weight into use, the wheeled weight C is placed or run to the proper position immediately beneath it, then the four nuts *m* are turned down on the threaded portions of the four standards J, thus lowering the cross-bars *o*, in which the weight rests, until the latter is lowered onto the top of the weight C, which, as shown, is formed preferably with four upward projections *C²*, on which the base of weight K comes to bearings. After the weight K shall have been thus lowered onto, or, so to speak, deposited on top of the wheeled weight C, and the cross-bars *o* removed, the latter will carry it whenever it may itself be caused to travel by the action of the cable G.

The general operation of the machine or mechanical contrivance may be thus explained: In the use of the machine in the usual manner for hoisting and conveying loads the trolley D is caused to travel back and forth on its track *c* to any desired or requisite extent for the proper handling of the load being conveyed by it, and as the wheeled counterbalancing-weight C is coupled or attached to the endless cable G, to which the trolley is also secured, it follows that the said weight must travel or move on its track *d* whenever the trolley moves on track *c*, and to the same extent; but by reason of the arrangement of the runs of said cable the weight C will always travel in a direction opposite to that in which the trolley moves. As the weight-truck and trolley are mounted on tracks located one over the other, as shown, it follows that whenever the trolley has to pass over the point at which the boom or cantilever is centrally supported the wheeled weight will pass over the trolley, the latter moving toward one end of the boom, while the weight travels toward the other end. Thus will the counter-weight be always located at a point the same distance from the middle (or pier-supported point) of the boom as that at which the trolley with its suspended load may be located. In other words, the counterbalancing-weight will move toward and away from the middle or fulcrum point of the boom in perfect accordance with the similar movements of the trolley. As it may, however, sometimes be desirable to have the leverage of the counterbalancing-weight multiplied beyond that of the load, so as to increase the effectiveness of said weight when a certain kind of work has to be done requiring the trolley to travel back and forth over one-half only of the entire length of its track, I have provided for this contingency and for

a modified action of the mechanism, under which mode of action the counterbalancing-weight will, for instance, travel back and forth between one end x of the boom and the point y on the same arm of the boom, while the trolley travels back and forth from about the middle of the boom and the point z of the other arm. This different relative action of the trolley and wheeled weight I bring about by disconnecting the clamps ll of the weight-carriage from the cable G , and after having adjusted the trolley relatively to the weight, resecuring the weight to the cable. For certain kinds of work this capability of the machine to thus have the weight travel from the extreme end of one arm of the boom to a point near the middle of said arm, while the trolley moves from the middle, say, of the other arm to the middle of the boom, is quite important, and hence the feature of adjustment by which I am enabled to gain this end (whether the detailed construction be such as shown or modified) I consider important in my improved machine. The weight of the counter-balance C and also that of the supplemental or auxiliary device K may of course be varied according to the size, proportions, and relative base area of the derrick, and are matters within the judgment of the engineer or skilled mechanic.

It will be seen that my present invention may be carried into effect under many modifications as to the structural details of the machine and that the main and secondary features of improvement herein described need not necessarily be used together, though to get all the fruits of my invention it is desirable to embody all these separable features in one machine, as then the machine will possess not only the capacity to have the load suspended from and carried by the trolley always peripherally and thoroughly counterbalancing on the boom, but will also be capable of a variation in the gravity of the counterbalancing-weight to suit various loads to

be handled, and also capable of a variation in the comparative leverages of the weight and trolley load on the centrally-supported boom, as hereinbefore specified.

Having now so fully described the construction and operation of my improved machine that those skilled in the art can make and use machines embracing either wholly or in part my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a cantilever-derrick or hoisting and conveying machine, the combination, with the trolley, of a counterbalancing-weight which travels back and forth on the boom or centrally-supported tramway to about the same extent as, but in opposite directions to, the movements of the trolley, as specified, and suitable means operating to produce the said relative movements of the trolley and counterbalancing-weight, all substantially as and for the purposes hereinbefore set forth.

2. In a hoisting and conveying machine of the type shown and described, the combination, with a traveling counterbalancing-weight, of an auxiliary weight and means by which said auxiliary weight can be either held in a state of disuse or can be placed upon the traveling weight, so as to move therewith, all substantially in the manner and for the purposes hereinbefore set forth.

3. In combination with the double-tracked boom or tramway of a hoisting and conveying machine, the trolley, the traveling counterbalance, and means for moving the trolley and counterbalance corresponding distances, as specified, means for varying the path of travel of the counterbalance, so as to multiply its leverage over the opposing weight at the trolley, all substantially as set forth.

In witness whereof I have hereunto set my hand this 11th day of June, 1891.

ALEX. E. BROWN.

In presence of—

E. T. SCOVILL,
M. MILLARD.