

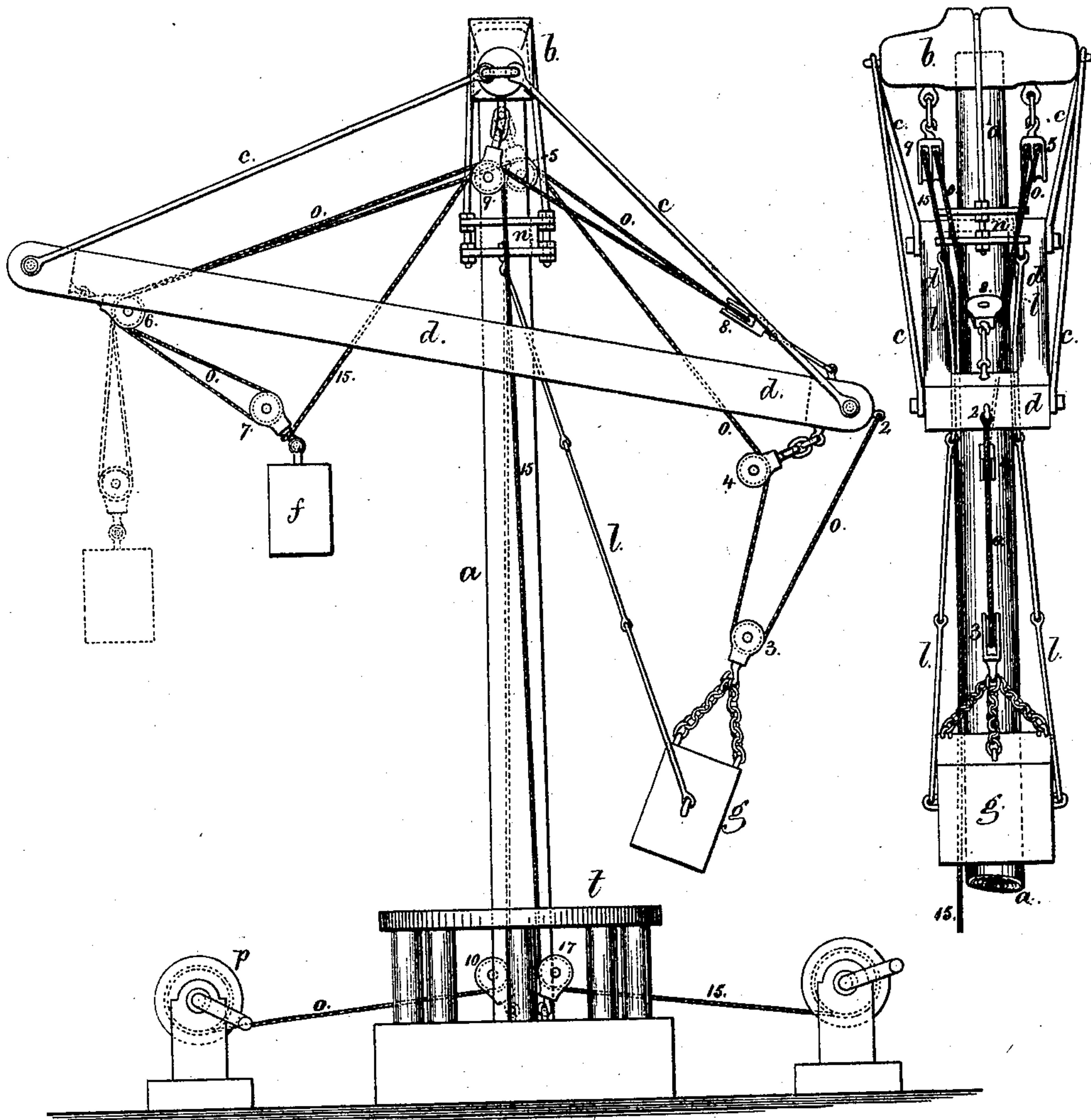
J. E. SERRELL.
Derricks.

No. 142,740.

Patented September 9, 1873.

Fig. 1.

Fig. 2.



Witnesses,
Chas. H. Smith
Harold Serrell

Inventor
James E. Serrell
per *Lemuel W. Serrell* atty.

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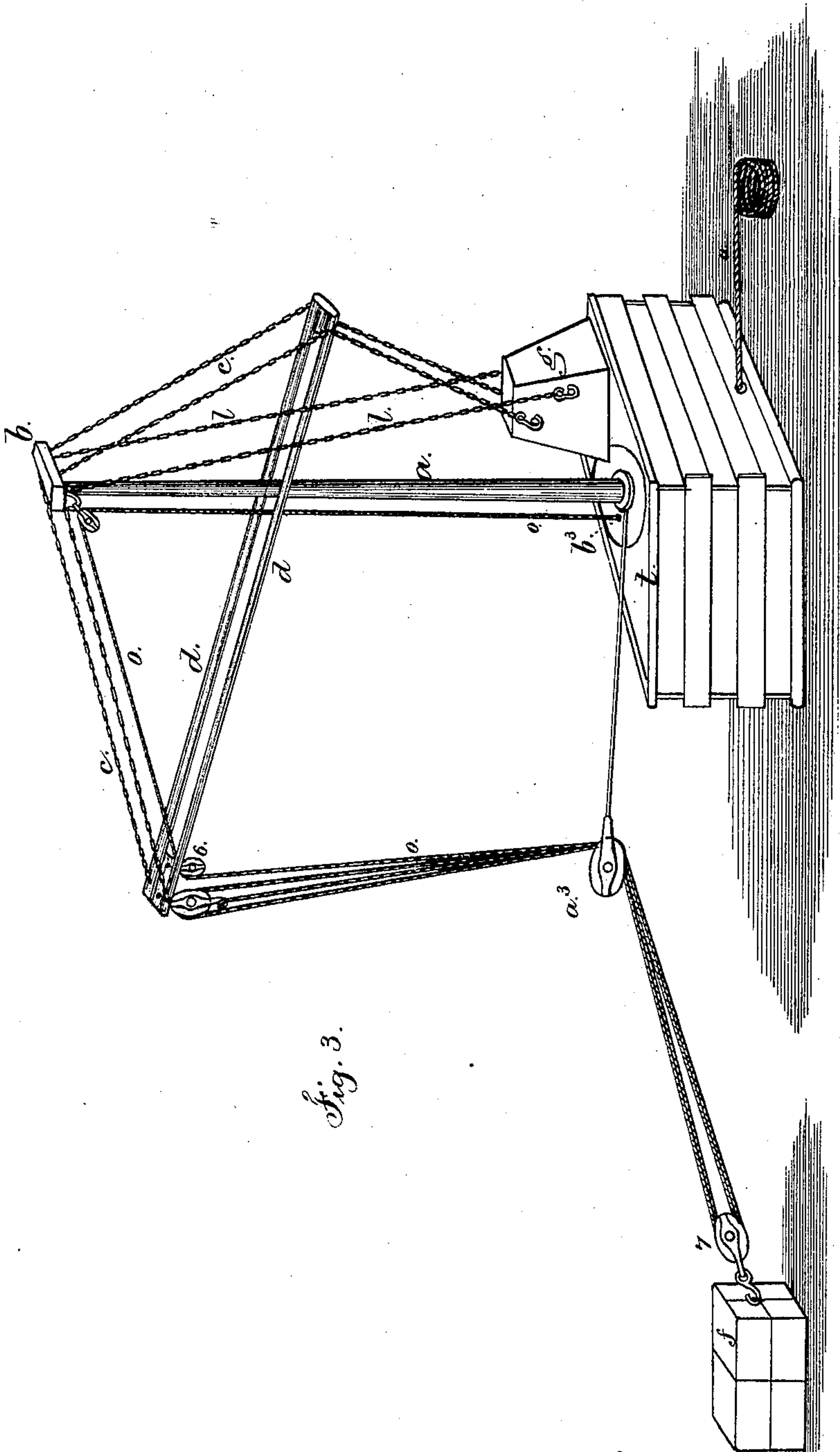


Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES E. SERRELL, OF NEW YORK, N. Y.

IMPROVEMENT IN DERRICKS.

Specification forming part of Letters Patent No. **142,740**, dated September 9, 1873; application filed August 16, 1873.

To all whom it may concern:

Be it known that I, JAMES E. SERRELL, of the city and State of New York, have invented Improvement in Derricks for Poising, Raising, Lowering, and Dragging Weights, of which the following is a specification:

It is now usual in the construction of derricks to have the boom attached to the mast, and to swing upon or around with the mast, which mast is sustained by four or more guys attached to a cap or plate, through which a journal passes, and allows the mast and boom to turn around as required; but in case of one of these guys breaking the entire derrick is almost certain to fall, and the consequences are often fatal to the workmen attending the same.

The object of this invention is to dispense with guys by use of a balance-weight, that is raised by the weight to be lifted in such a manner that it will hang balanced without lateral strain upon the mast or central support. The boom of the derrick is hung from a cap at the upper end of the mast. This boom is made double, and the parallel pieces are outside and swing free from the mast. When the weights at each end are not equal, the boom swings endwise until the equilibrium is obtained. I make use of a counterpoise, hung from the mast-head, and drawn outwardly and upward by the strain of the rope or chain employed to raise the weight. When applying power to raise the weight, this counterpoise is drawn gradually outward and upward until its weight and leverage upon the boom are equal to the weight to be raised; then such weight is raised or lowered perpendicularly, or nearly so, and in lowering the weight the parts are so balanced that a stone or other article can be moved with facility by hand or other means, slightly up or down, to position the same or bed it in the mortar, and after the strain on the hoisting-line is decreased by the further slackening of the ropes of the derricks the counterpoise swings downward and inwardly toward the base of the mast until the strain is relieved.

In the drawing, Figure 1 is a side view; Fig. 2 is a view at right angles to Fig. 1 of said derrick; and Fig. 3 is a perspective view of a modification of said derrick.

The mast *a* is suitably supported at the base, and at the upper end is a cap-piece, *b*, upon a pintle, so that the cap and parts supported by it can be turned around. The boom *d* is made of two poles or bars united together at the ends, so as to pass freely at each side of the mast *a*; and *c c* are sustaining rods or chains passing from the ends of the boom *d* to the cap-piece *b*, so as to suspend such boom *d* from the cap, and at the same time allow an endwise movement to such boom *d*, to vary the relative lengths that the boom projects at the opposite sides of the mast, in order that there may be a perfect counterpoise between the weight *f* to be lifted and the counterpoise *g*, for the reason that if both weights were the same and simultaneously raised, and at equal distances from the center of the boom, such boom would remain level; but if one weight is greater than the other there will be an endwise motion of the boom until the leverage produces an equilibrium at the time the weight required to be lifted is first raised off the ground.

I avail of this mode of balancing the weight to be raised by moving the counterpoise away from the mast to a greater or less distance. The counterpoise *g* hangs by the slings *l* from the cap *b*, and a guide-collar, *n*, may be used around the mast, if desired. The rope *o*, that is used to raise the weight, is attached to the boom at 2, passes through the block 3 of the counterpoise, over the pulley 4, thence by the pulleys 5 and 6 to the pulley 7 of the weight *f*, back again through the pulley 6, and by the pulleys 9, 8, 5, and 10, to any suitable hoisting mechanism, such as a winch-barrel, *p*.

It will be evident that the rope or chain *o* is under nearly the same actual tension throughout; hence it will act to draw the counterpoise *g* away from the mast *a* until the resistance thereof is sufficient to strain the rope *o* enough to lift the weight *f*, and thus a counterpoise is attained of the weight required to be raised, and any weight can be raised within the capacity of the apparatus.

It is to be understood that when a counterpoise is effected, then the weight can be raised and lowered vertically, as illustrated by dotted lines. The weight raised often has to be drawn in toward the base of the derrick. This

is effected by the chain or rope 15 passing through the pulleys 17 and 9 and connecting with the pulley 7 at the weight. By these means the weight can be lowered at any point within the range described by the boom *d*; and it will be evident that the equilibrium will be maintained and the counterpoise will descend nearer to the mast as the leverage distance of the weight from the mast is lessened.

For quarrying and hoisting materials into buildings I use the form of derrick shown in Fig. 3, which has not any hoisting-line attached to the counter-weight, the counter-weight balancing and swinging according to the relative weight which is to be lifted. I also use a mast supported in a movable box which can be taken apart for transportation or put together and loaded with stone or other weight, or the mast can be held in place between the beams of a building in progress and raised with each story. The block *a*³ is connected by the bridle *b*³ to the base of the mast *a*, and the ropes from the derrick pass through this block to the weight *f*, so that the weight can be dragged along without any tendency to injure the mast, and when the weight is raised the bridle will swing up with it while being lifted upon a cart or truck.

The mode of constructing the mast and double boom can be varied according to the uses to which the same are to be applied.

It is preferable to allow the counterpoise *g* to rest upon the platform *t* when the derrick is not in use, so as to prevent continued strain on the top of the mast.

If the counterpoise *g* is attached or suspended at one end of the double boom, it will be moved with that boom to a greater or less distance from the mast, according to the weight that is raised, the parts coming to an equilibrium or balance.

The double boom allows all the ropes to pass between it and free from each other, and also free from the mast and boom.

When this derrick is mounted on wheels adapted to a railway-track, the article raised may be lowered upon the platform. In this case the counterpoise will balance the weight raised, and swing inwardly and rest upon the platform as the weight is lowered.

With a weight suspended either from a derrick upon a car-platform, or under any other circumstances, the attendant can, by the exercise of very little power, draw upon the rope 15 until it is of such a length between the pul-

leys 7 and 9 that it will draw the weight in and cause it to rest upon the platform as the rope *o* is slackened. Of course the rope 15 has to be made fast after it has been adjusted, before the weight is lowered, and the weight is gradually transferred from *o* to 15 until the weight hangs by the rope 15 against the mast or is landed upon the platform.

In cases where the derrick is upon a platform-car the said car may be weighted sufficiently to render the derrick steady, and the rope *o* may pass off to a stationary engine. In this case the wheels of the car will require to be blocked while the weight is being raised. The car may be drawn along by this rope or chain *o* by clamping the same, or otherwise connecting the same with the platform.

The counterpoise applied in connection with this derrick in the manner shown may be availed of as a means for indicating the weight of the article raised. For this purpose a dial or index applied upon the boom may be employed to denote the weight raised, according to the position of the counterbalancing-weight.

The counter-balance may be of any suitable material, but with floating derricks it will be preferable to employ water in a box or vessel, so that it may be easily emptied when not in use, or filled more or less, according to the purpose to which the derrick is to be used.

I claim as my invention—

1. A derrick, made with a double boom passing at each side of a vertical mast and suspended from a saddle that rests upon the top of the mast, in combination with a counterpoise to balance the weight, substantially as set forth.

2. A counterpoise suspended from the top of the mast, in combination with a boom and blocks or pulleys arranged substantially as set forth, so that the weight of the article raised shall act to draw the counterpoise upward and away from the mast until an equilibrium is obtained, substantially as set forth.

3. A block connected by a bridle to the base of the mast, in combination with the hoisting-tackle, double boom, and counterpoise, substantially as and for the purposes set forth.

Signed by me this 17th day of July, A. D. 1873.

JAMES E. SERRELL.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.