No. 684,675. Patented Oct. 15, 1901.

T. A. COFFIN.

HOISTING APPARATUS.

(Application filed Aug. 2, 1901.)

(No Model.)

2 Sheets—Sheet 1.

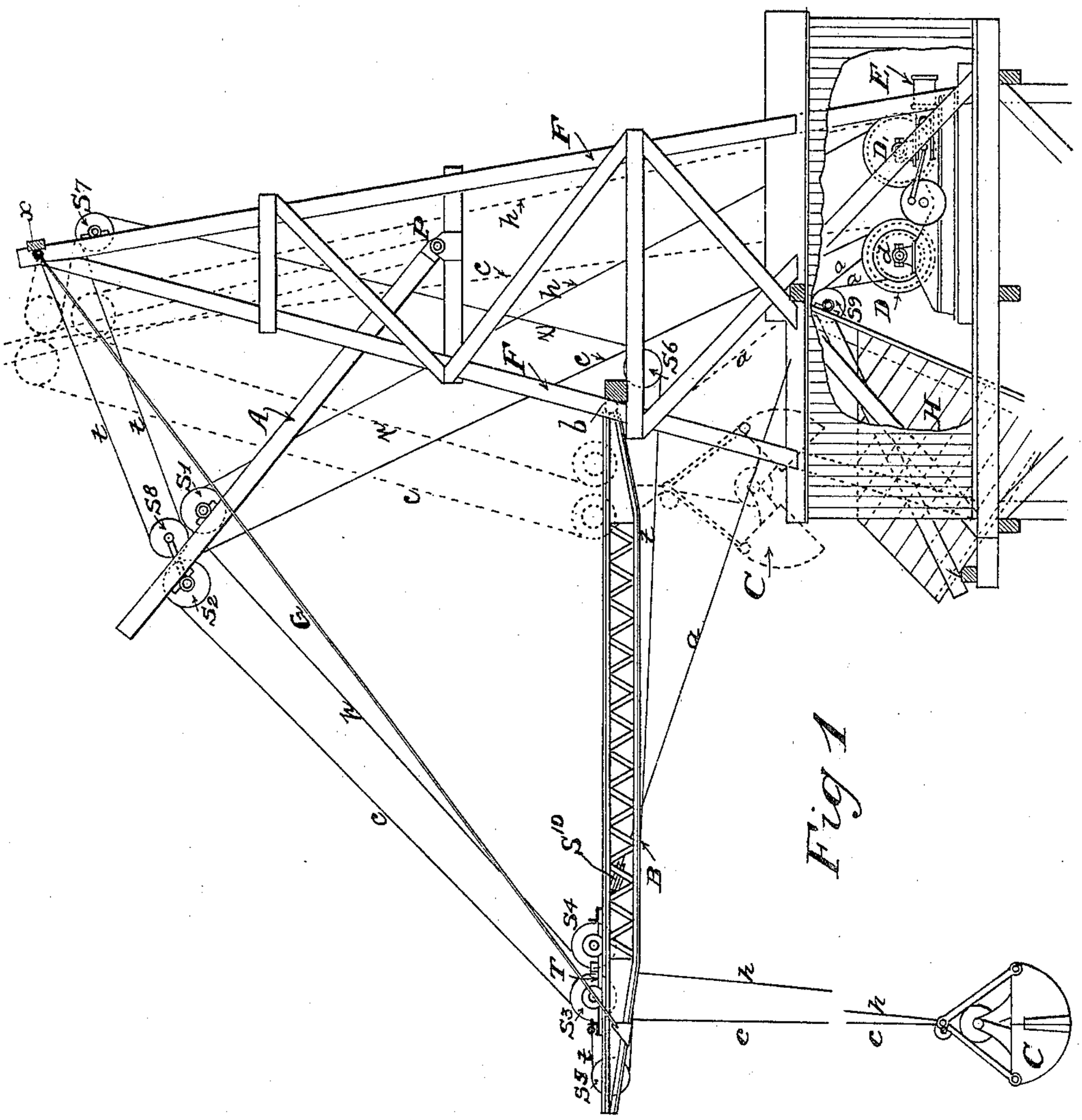

Fig. 1.

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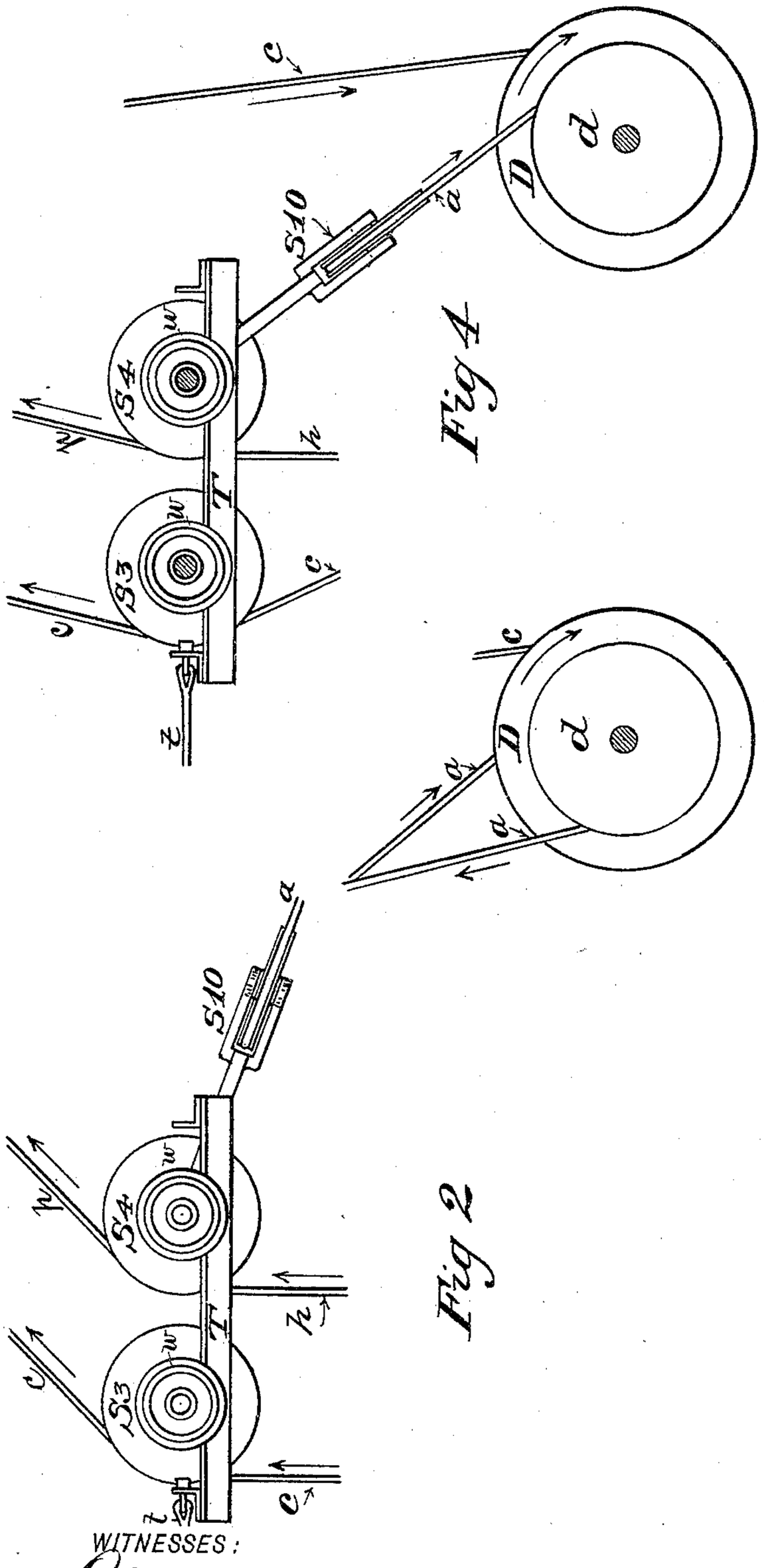

Fig 2

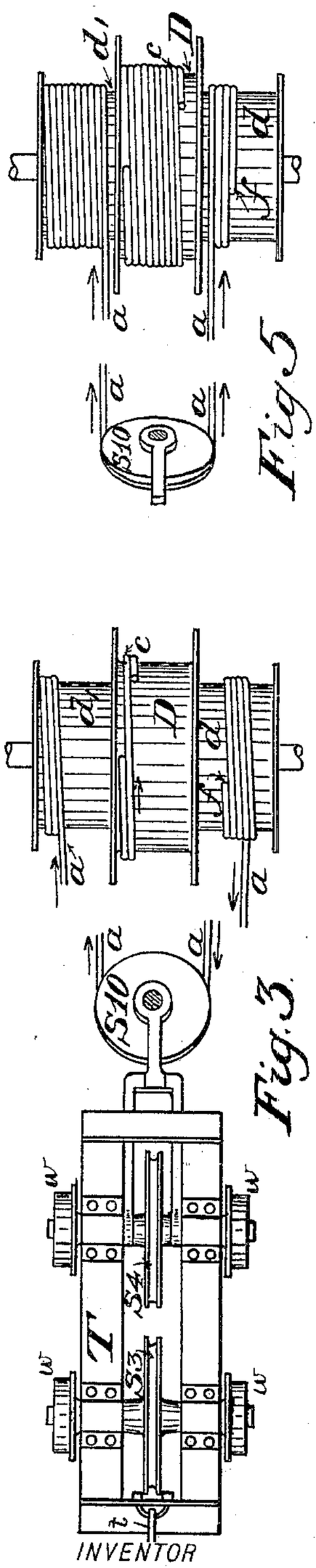

Fig 3

Fig 4

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UNITED STATES PATENT OFFICE.

THOMAS AMORY COFFIN, OF WEST NEW BRIGHTON, NEW YORK.

HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 684,675, dated October 15, 1901.

Application filed August 2, 1901. Serial No. 70,667. (No model.)

To all whom it may concern:

Be it known that I, THOMAS AMORY COFFIN, a citizen of the United States of America, residing in West New Brighton, in the borough of Richmond, State of New York, have invented an Improved Hoisting Apparatus, of which the following is a specification.

My invention relates to hoisting apparatus of that class in which a tower or other like structure is provided with an overhanging boom on which travels a trolley or truck, with a sheave or sheaves for the hoisting rope or ropes and working in combination with means to hold the sheave-trolley at or near the outer end of the boom during the hoisting or lowering of the bucket or other carrier and to cause the said sheave-trolley to travel inward or outward on the boom when desired.

The main object of my invention is to provide such an apparatus with an efficient means for controlling the inboard and outboard travel of the sheave-trolley on the boom without requiring an extra attendant at the hoisting-drums.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a hoisting apparatus provided with my improvements. Fig. 2 is a side view, and Fig. 3 a plan view, drawn to a larger scale, of the sheave-trolley and one of the hoisting-drums near the beginning of the inboard travel of the trolley; and Figs. 4 and 5 are similar views at or near the end of the inboard travel of the trolley.

Referring to Fig. 1, F is the framework of the tower, which may be of any suitable construction and adapted to be arranged in any suitable place or position—as, for instance, along the edge of a wharf.

B is a horizontal boom, which may be made adjustable in any known way, either in a vertical or a horizontal direction; but in operation it is held stationary in a practically horizontal position, as illustrated in Fig. 1. The inner end of the boom is suitably supported at *b* on the framework F, while the outer end is suitably supported from the top of the tower or framework by guy-rods G. Upon suitable tracks on this boom B there is mounted to travel inward and outward a sheave trolley or truck T, Figs. 1, 2, and 3, by means of wheels *w*. This trolley is provided with a sheave or sheaves for the guidance of the hoisting rope or ropes, on which is suspended the load-carrier. In this case I have represented the load-carrier as a clam-shell bucket C, and accordingly there are provided two ropes *h* and *c*, passing over two sheaves S^3 S^4 upon the trolley T. The rope *h*, which may be spoken of as the "holding-rope," passes from the pulley S^4 on the trolley T to and over a sheave S′ on the back of a frame A, preferably an A-frame, pivoted at P to the tower F. This rope *h* thence passes to the hoisting-drum D′. The other rope *c*, which may be spoken of as the "closing-rope" of the clam-shell bucket, after passing over the sheave S^3 on the trolley passes over a sheave S^2 on the pivoted sheave-frame, and thence it may pass directly to the other hoisting-drum D, which, with the hoisting-drum D′, may be operated by an engine E.

I support the upper end of the pivoted sheave-frame A by means of a rope *t*, secured at *x* to the upper part of the tower and passing around a swinging sheave S^8 on the A-frame and thence around the sheave S^7 on the tower, and I utilize the weight of the load on this pivoted sheave-frame A to counterbalance the tendency of the sheave-trolley T to travel inward on the boom. For this purpose the rope *t* after passing around the pulley S^7 near the top of the tower is passed around a sheave S^6 at a lower point in the tower and thence around a sheave S^5 at the outer end of the boom, the end of this rope *t* being secured to the trolley T, Figs. 1 and 3. The positions of the sheaves and the relations of the parts are so proportioned and arranged that under normal conditions the strain upon the trolley-rope *t* through the pivoted frame A, drawing the trolley out to the end of the boom, will more than counterbalance and overcome the inward tendency of the trolley, due to the load to be hoisted, and hold the trolley at the outer end of the boom.

To secure the required inboard travel of the sheave-trolley T when the load has been elevated, and in order that the carrier C may be then brought over and its contents discharged into the receiving-hopper H, Fig. 1, as indicated by the dotted lines, I prefer to provide the following actuating devices: On the same shaft with the hoisting-drum D, I provide two

supplementary drums *d* and *d'*, Figs. 3 and 5. On these two drums *d* and *d'* I wind in opposite or reverse directions the ends of an actuating-rope *a*, whose intermediate loop is passed around a swinging sheave S^{10} upon the trolley. The end of the rope *a* is secured, as at *f*, to the drum *d*, and when the trolley is at the outer end of the boom, as in Figs. 1, 2, and 3, and the bucket or other carrier C is in its lowered position there will be several turns of the rope wound upon the drum *d*, as shown in Fig. 3. The hoisting-drums D D' being set in operation to hoist the carrier C, the drum D will revolve in the direction of the arrows, Figs. 2 and 3, and so pay off the rope *a* from the drum *d;* but the drum *d'*, which is of the same diameter as the drum *d*, will simply take up the rope *a* at the other end at the same rate. By the time the carrier C and its load have been elevated to the desired height, however, the rope *a* will have been wholly uncoiled from the drum *d*, and as the revolution of the latter continues that end of the rope *a* will be wound up on the drum *d*, as well as the other end on the drum *d'*, Figs. 4 and 5, thereby immediately causing the inboard travel of the trolley T until it reaches a position over the hopper H ready to be discharged. As the trolley moves inward the pivoted sheave-frame A will be moved accordingly from the position shown by full lines in Fig. 1 to that shown by dotted lines, carrying the hoisting-ropes with it, as also indicated by the dotted lines.

The sheave S', over which the trolley-rope *t* passes, is put at the upper or back side of the sheave-frame A in order that when the latter has been moved to the dotted-line position and the strain has to be put upon the holding-rope *h* to open the clam-shell bucket the resulting strain tending to lower the frame A and allow the trolley T to move outboard will be more than balanced by the strain in the rope *t*, which will hold the frame A in the dotted position while the bucket discharges into the hopper H. When the bucket has been discharged, the strain on the holding-rope *h* is relieved and strain is applied to the rope *c*, closing the bucket and causing the sheave-frame A to turn downward on its pivot and accordingly causing the sheave-trolley T to travel outward on the boom through the overbalancing pull of the sheave-frame upon the rope *t*.

I claim as my invention—

1. In a hoisting apparatus, the combination of a framework and overhanging boom with a sheave-trolley to travel on the latter, a sheave-frame pivoted to the framework, a hoisting rope or ropes passing over sheaves on the said trolley and pivoted frame and a rope connecting the framework, trolley and pivoted frame whereby the strain of the load on the sheave-frame is made to counterbalance the inboard tendency of the trolley on the boom.

2. In a hoisting apparatus, the combination of a framework and overhanging boom with a sheave-trolley to travel on the latter, a sheave-frame pivoted to the framework, a hoisting rope or ropes passing over the sheaves on the said trolley and pivoted frame, and rope connecting the framework, trolley and pivoted frame whereby the strain of the load on the sheave-frame is made to counterbalance the inboard tendency of the trolley on the boom, and means for drawing the trolley inward at the proper time.

3. In a hoisting apparatus, the combination of a tower and overhanging boom and a sheave-trolley traveling on the latter with a hoisting rope or ropes, a sheave-frame pivoted to the tower and a trolley-rope connected at one end to the trolley and at the other end to the upper part of the tower with sheaves on the sheave-frame, boom and tower over which the said trolley-rope passes whereby the inward tendency of the trolley on the boom is counterbalanced by the load through the pull of the latter on the pivoted frame.

4. In a hoisting apparatus, the combination of a tower, and boom, with a sheave-trolley traveling on the boom, a sheave-frame pivoted to the tower, a hoisting rope or ropes passing over the sheaves on the sheave-frame and trolley and means whereby the inboard tendency of the trolley on the boom is counterbalanced by the pull of the load on the sheave-frame.

5. In a hoisting apparatus, the combination of a tower and overhanging boom, with a sheave-trolley to travel on the boom, a pair of hoisting-ropes and a bucket with a frame pivoted to the tower and having two sheaves for the two ropes from the bucket, one sheave being on one side of the pivoted frame and the other sheave being on the other side thereof and a rope connecting the tower, sheave-frame and trolley whereby the inboard tendency of the trolley is counterbalanced by the load on the pivoted frame, and means for drawing the trolley inward at the proper time.

6. In a hoisting apparatus, the combination of a tower and boom and a sheave-trolley traveling on the boom with a hoisting-rope and a hoisting-drum, two supplementary drums controlled by the latter, an actuating-rope having its ends to be wound in reverse on the two supplementary drums, to one of which one end of the actuating-rope is secured, a sheave on the trolley around which the loop of the actuating-rope passes and means for normally holding the sheave-trolley at the outer end of the boom, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS AMORY COFFIN.

Witnesses:
WM. J. HASKINS,
HUBERT HOWSON.