No. 711,806. Patented Oct. 21, 1902.

# A. E. WHITE.

## HOISTING APPARATUS.

(Application filed Apr. 1, 1902.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1

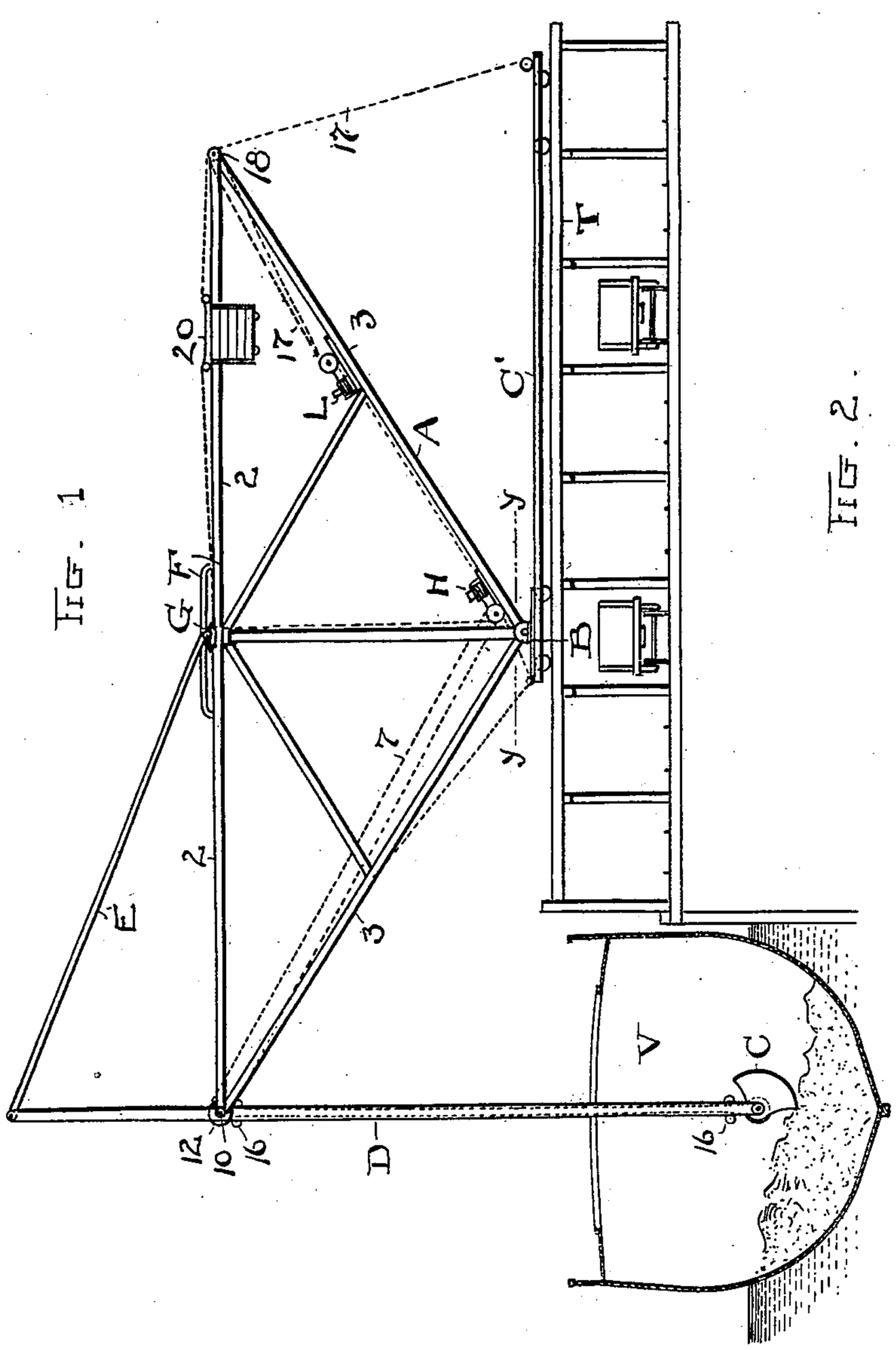



FIG. 2.

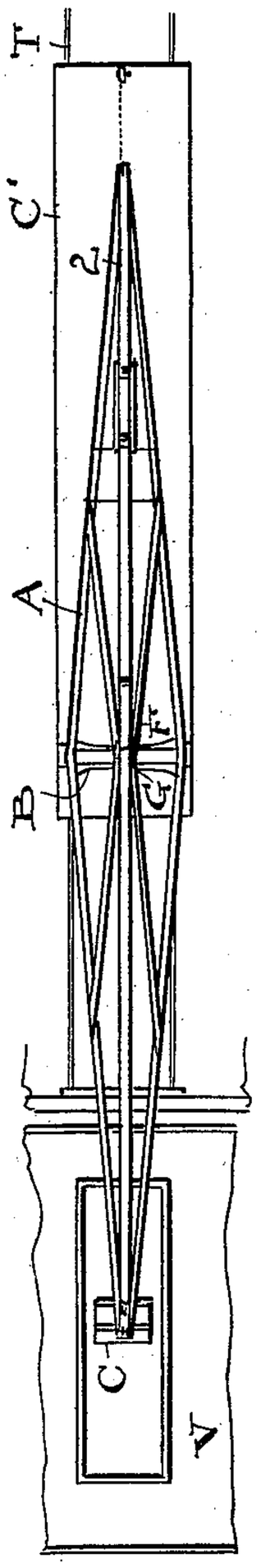
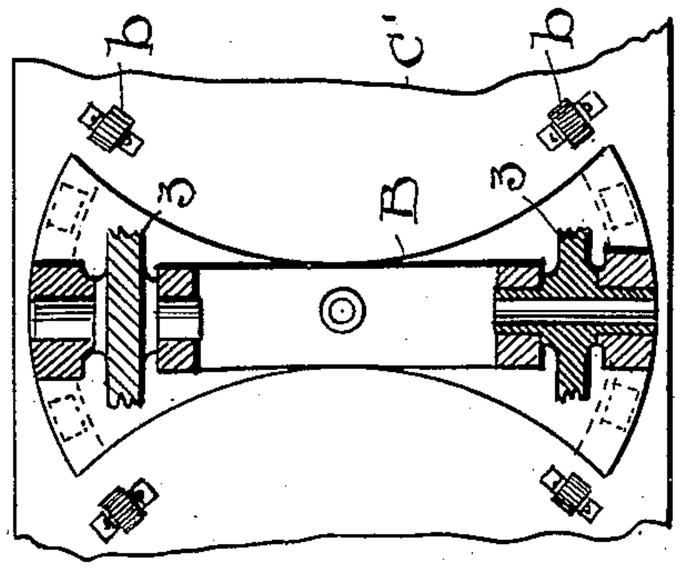



FIG. 3.




ATTEST

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(No Model.) 2 Sheets—Sheet 2.

FIG. 4.

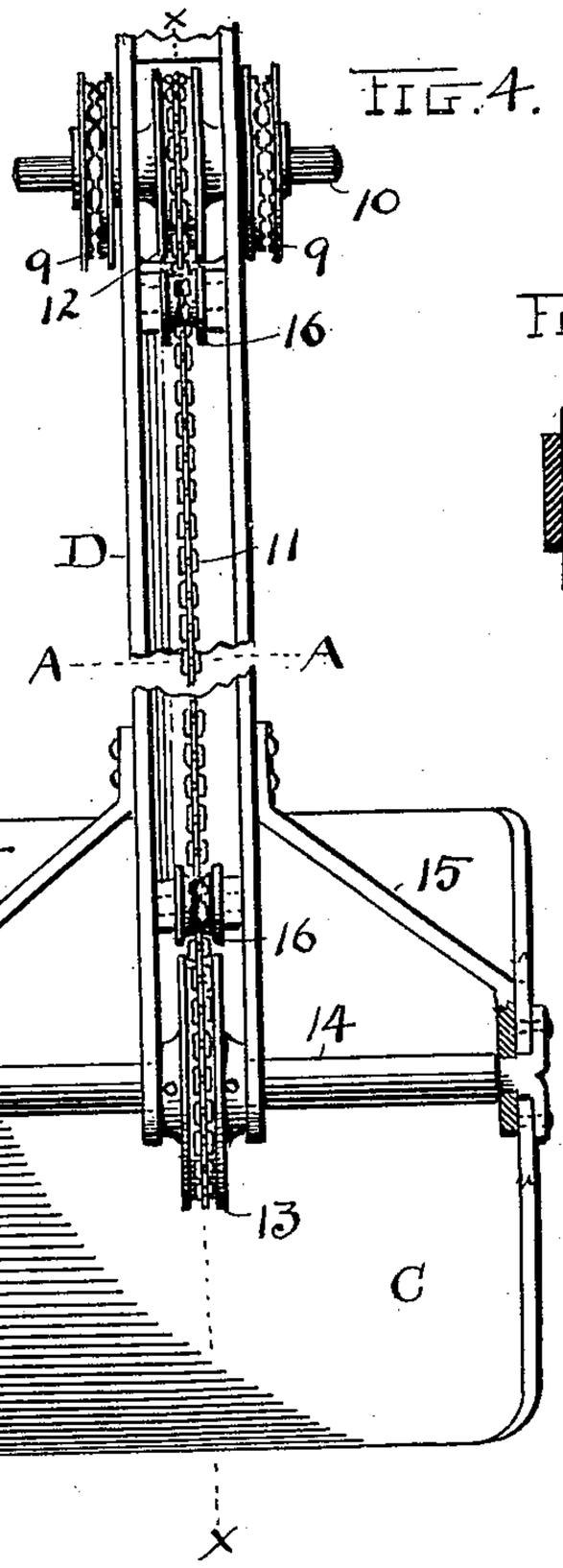



FIG. 6.

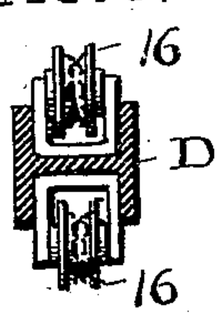



FIG. 5.

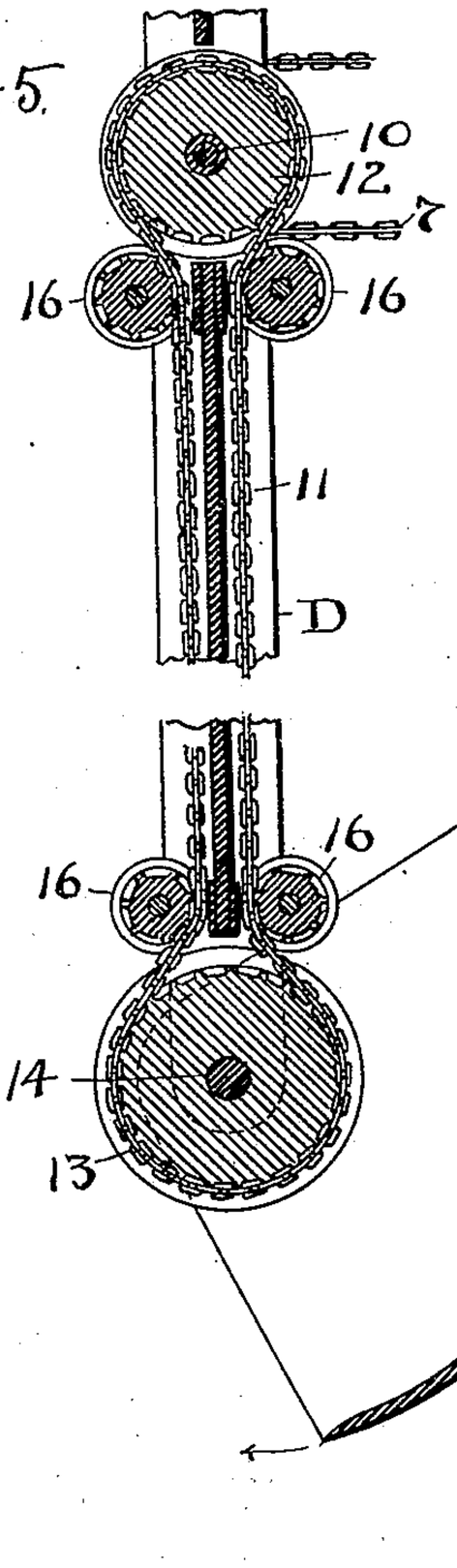
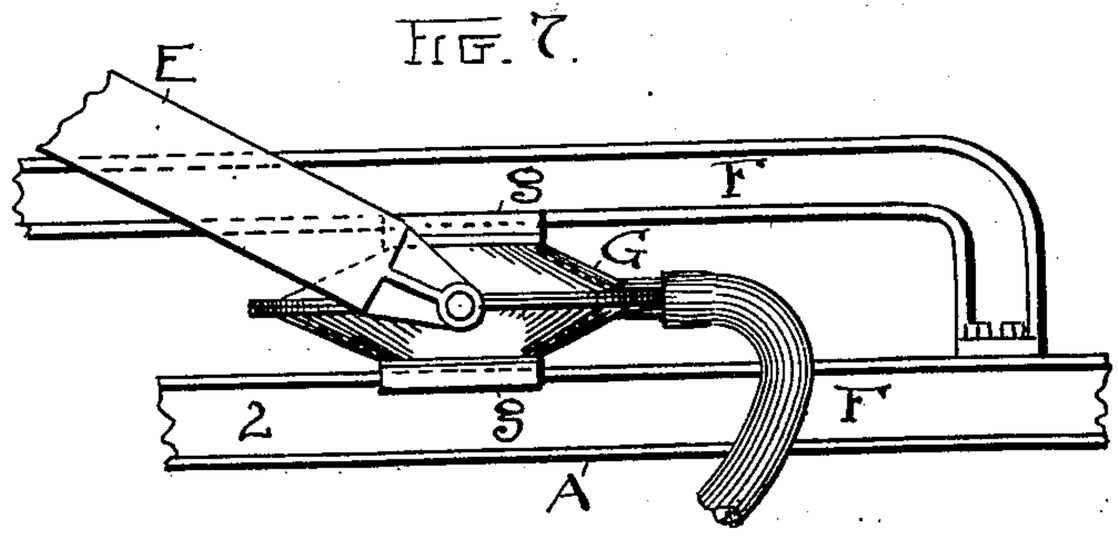



FIG. 7.

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# UNITED STATES PATENT OFFICE.

ALBERT E. WHITE, OF CLEVELAND, OHIO.

## HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 711,806, dated October 21, 1902.

Application filed April 1, 1902. Serial No. 100,922. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT E. WHITE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hoisting Apparatus; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to hoisting apparatus; and the invention consists more particularly in a mechanism or apparatus which is adapted to the large and heavy work of loading and unloading vessels, barges, and the like carrying ore, coal, and other like heavy and bulky freight and wherein there is usually a transfer to or from a car and in connection with which the apparatus serves to perform practically all the work through power appliances, substantially as shown and described, and particularly pointed out in the claims.

Figure 1 is a side elevation and measurably diagrammatic view of a complete apparatus shown in connection with a vessel out of which freight is being transferred, presumably to cars in waiting. Fig. 2 is a plan view of the apparatus alone. Fig. 3 is an enlarged section of the immediate base on which the tilting frame or crane rests and has a limited rotation on the carriage beneath. Fig. 4 is a plain front elevation of the hoisting bucket or scoop and its supporting and operating mechanism; and Fig. 5 is a vertical sectional elevation thereof on a line corresponding substantially to line X X, Fig. 4. Fig. 6 is a cross-section of the bucket supporting and operating beam and of sheaves thereon looking down on line A A, Fig. 4. Fig. 7 is a plan view of the friction-clutch or locking mechanism for the top controlling brace or arm of the bucket-beam, serving and operating as hereinafter fully described.

In the foregoing views, Figs. 1 and 2, A represents a centrally-pivoted and balanced crane, the same having the shape of an irregular triangle, with its longer side 2 on top and its pivot-point at the apex or angle of the two shorter but equal sides 3. In construction I make this preferably a truss-frame and of a size and strength proportioned to its use. In some instances it is a hundred feet extreme length, and it is poised or balanced on its apex in such a way that even when loaded the counterbalancing element will assert itself and be a prominent factor in the raising and handling of the load. As here shown, the frame A rests on a turn-table base B, enlarged in Fig. 3 and having a limited rotation on rollers or wheels *b* beneath the same and themselves resting on the platform-car C'. The said car travels, as here shown, on a raised track T of any length commensurate with its use, and the said track has such elevation as will enable a train of cars to run beneath. In other cases it may be desired to lay the said track directly upon the ground, which may be done, or over a bridge or the like, as occasion may demand.

In Fig. 1 I show a cross-section of a vessel V, from which presumably a cargo of loose freight is being transferred to cars in waiting beneath track T. To effect this transfer, I employ a bucket C of a semiscoop shape, adapted to work from either edge and pivoted for operation on a suspensory rigid beam D. The said beam is preferably made of angle iron or steel, (shown in cross-section, Fig. 6,) so as to be inflexible and strong and do positive work, especially in the loading of the shovel. It has a fixed length and a fixed pivot-shaft 10 on the end of frame A, on which it is adapted to swing within limits as the work may require, and its upper end extends above the shaft 10 and is controlled by a rod or bar E. This bar or arm is designed to have a shifting engagement with the top of the tilting frame A, and any suitable means may be employed for this purpose. In the present construction I employ a bellows-sided inflatable holder G, having friction-bearings *g*, adapted to engage the parallel rails F in any position between their ends, and the said bar or arm E is pivoted to or on said holder. This mechanism serves to hold the beam D rigidly in any chosen position for filling the shovel and so that it cannot move while the shovel is taking its load. Then the holder

G may be released, and it may be made to grip at any time necessary in swinging the load or the empty shovel out or in. If free and the frame A is tilted to take the load out for discharge, the beam will hold a vertical position all the time by reason of the weighted shovel thereon, and it can only be given an inclined position by locking holder G for this purpose. Whether locking is needed depends entirely on conditions—as, for example, the place from which the bucket is to be withdrawn or to which it is to be delivered. In some cases the beam may have to be inclined to get in or out. The bucket itself is controlled from a suitably constructed and located engine H, preferably on the frame A, working with sprocket-chains 7 over wheels 9 on short shaft 10 and thence by chain 11 to sheaves 12 and 13, Figs. 4 and 5. The sheave 13 is rigid with shaft 14, which is rigid with bucket C, so that when said sheave is rotated it forcibly rotates the shovel also, and the shaft has its bearings in the lower end of beam D and in the braces 15 at its ends. The extremity of beam D is bifurcated to receive the wheel 13 between its forks and confine it centrally on its shaft, and the chain 11 works within confining-sheaves 16 above and below. The wheels 9 are outside the beam D on shaft 10, and the wheel 12 is located within the beam in line with wheel 13 below and also rigid with its shaft. Thus it occurs when the engine or motor H is operated power is transmitted by said chains and wheels to the bucket C first to give it tilted position to set it to take a load and then to forcibly drive it into the material and give it a load. This done, and it is the work of an instant, the load is carried away and discharged by again tilting the shovel through its power-actuating mechanism, and so on. In all the work the grip or holder G is used at such times as it is needed; but the manipulation of the bucket is chiefly through its power connections from engine or motor H. The tilting and handling of the carrying frame or crane A is controlled by another engine or motor L, likewise located on said frame and working by chain 17 from the drum thereon to the car C′, to which the chain is attached. A suitable sheave or roller 18 on the point of frame A carries chain 17. Thus it occurs that whenever the frame A may be on the car which carries it the conditions under which engine L is working will always be the same.

It will be noticed that the shovel-beam has a fixed operating length, is rigid throughout, and works positively at all times; also, that the shovel has its pivot on this beam and has all its operations about its pivot controlled by direct power appliances, suitable cable or chain mechanism serving the purpose, as here shown. Any kind of cable, whether chain or other kind that is practical, may be used.

A peculiarity of this construction lies in the balancing arrangement of the crane, whereby the weight of the beam and shovel at one end is substantially overcome by the weight of the engine and its accompanying mechanism on the other or on the other side of its pivot. This enables me to utilize nearly all my power for lifting the load and without expending it on the dead-weight of the shovel and beam, which in an apparatus of this kind may amount to several tons, and I not only economize in power, but also save time and greatly facilitate the handling of the load, owing to the absence of dead-weight, as above described. A shifting weight 20 on frame member 2 may be further utilized to balance the whole.

What I claim is—

1. In hoisting apparatus, a substantially counterbalanced crane of triangular shape pivoted on its middle angle, and a rigid carrying-beam and bucket suspended from one side of its pivot, and balancing mechanism on the other side of its pivot comprising an engine for operating the crane, substantially as described.

2. The bucket and the rigid beam supporting the same, a transverse shaft rigid with the bucket rotatable in said beam, and power connections to rotate said shaft and thereby operate the bucket, substantially as described.

3. The crane, a rigid beam pivotally supported thereon, the bucket and its shaft rotatably supported on the lower end of said beam, a power-engine and cable mechanism from the engine to said shaft for actuating the bucket, substantially as described.

4. The rigid beam and the frame on which it is pivoted, in combination with the bucket, a shaft extending through the lower end of the frame and having the bucket rigid therewith, a sprocket-wheel on said shaft and a sprocket-chain to rotate it, and power connections for said sprocket-chain, substantially as described.

5. In hoisting apparatus, a pivotally-supported bucket-carrying beam, a bucket having both its edges constructed to dip into the material and pivoted at its center and top on said beam, and power mechanism to rock the bucket on its pivot, substantially as described.

6. In hoisting apparatus, the crane and the bucket-supporting beam pivoted thereon, the bucket pivoted on the lower end of the beam, a set of sprocket-wheels and a chain operatively connected with the bucket and supported in said beam, and an engine and chains to convey power to said sprocket-wheels, substantially as described.

7. The pivoted tilting crane and the rigid beam pivoted thereon, a bucket on the lower end of said beam, a shifting controlling-bar connecting said beam and crane, a locking-

holder for said bar, and means to operate said holder to lock said bar, beam and crane rigidly together, substantially as described.

8. In hoisting apparatus, a tilting frame having a rigid beam pivoted thereon, a locking-bar connecting said beam and frame having mechanism to effect locking and unlocking, a bucket upon said beam adapted to be independently tilted, and separate power connections to operate said frame and beam and said bucket, respectively, substantially as described.

Witness my hand to the foregoing specification this 13th day of March, 1902.

ALBERT E. WHITE.

Witnesses:
R. B. MOSER,
JOSEPH R. OLDHAM.