(No Model.) 3 Sheets—Sheet 1.

A. E. BROWN.

HOISTING AND CONVEYING MACHINE.

No. 300,690. Patented June 17, 1884.

FIG. 1.

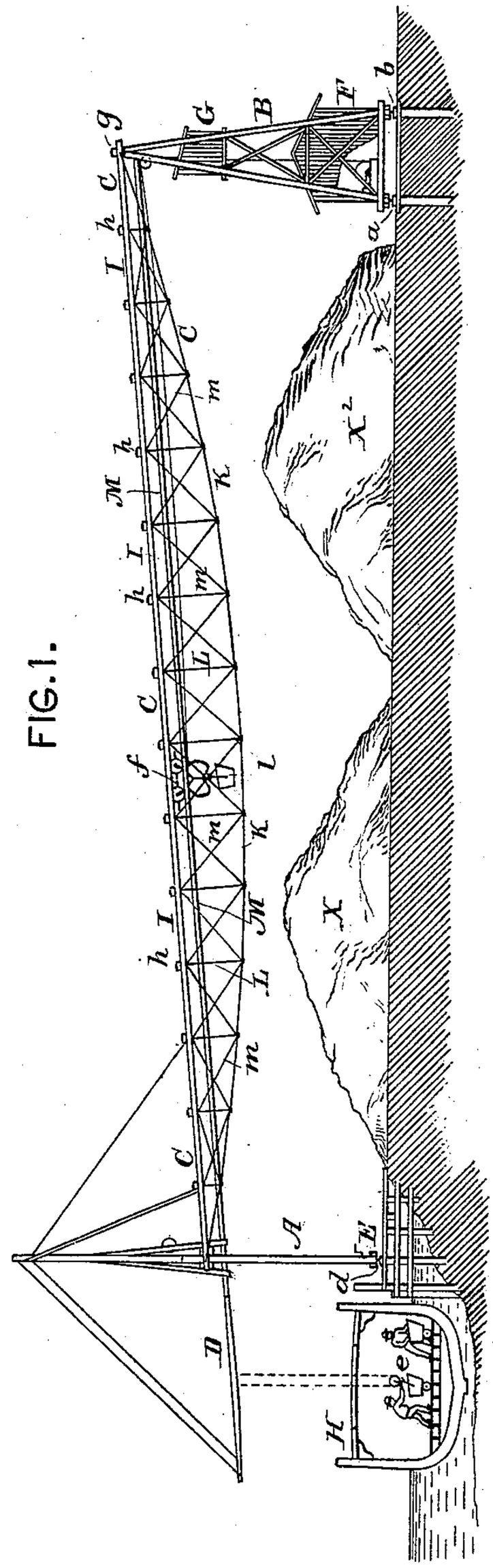
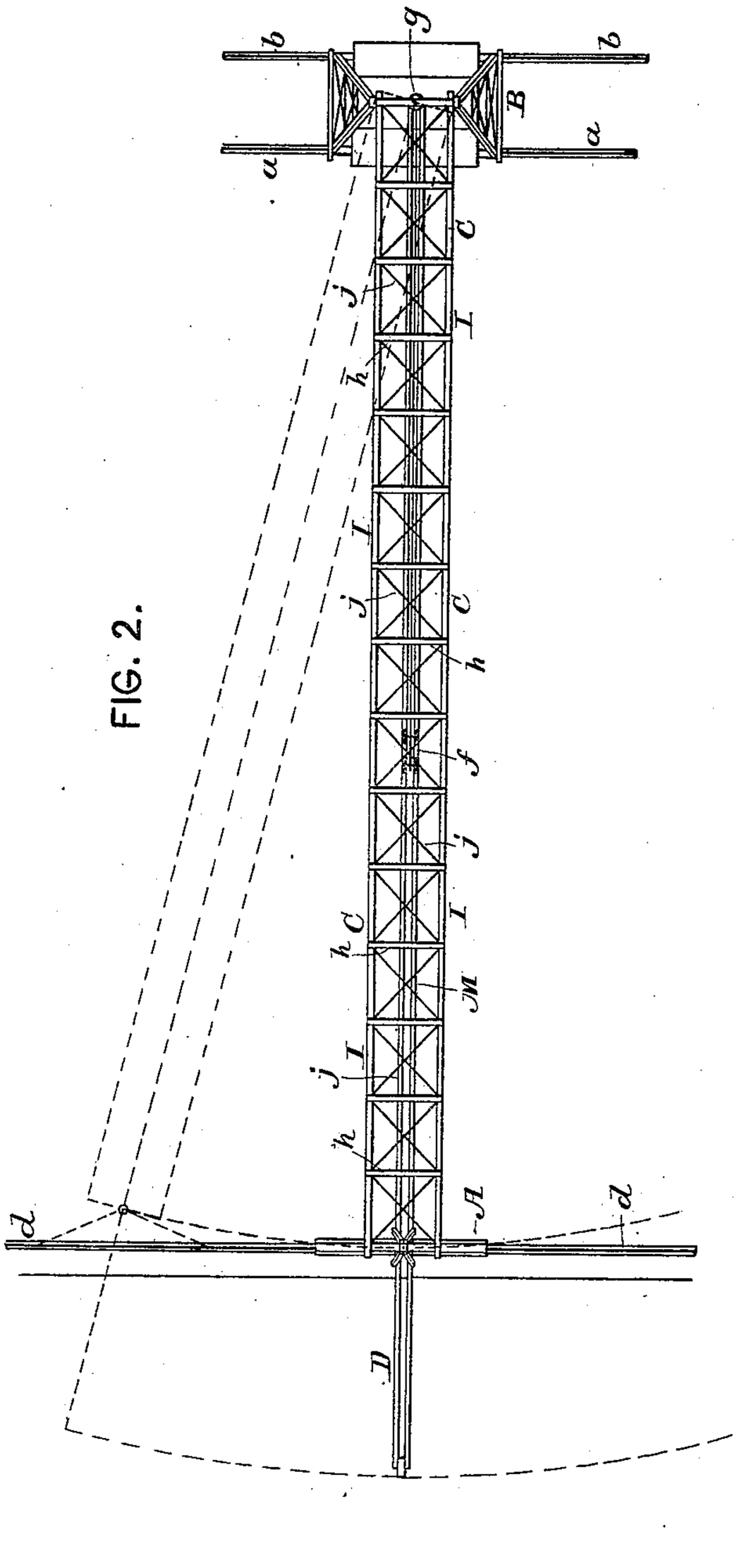


FIG. 2.



ATTEST.

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FIG. 3.

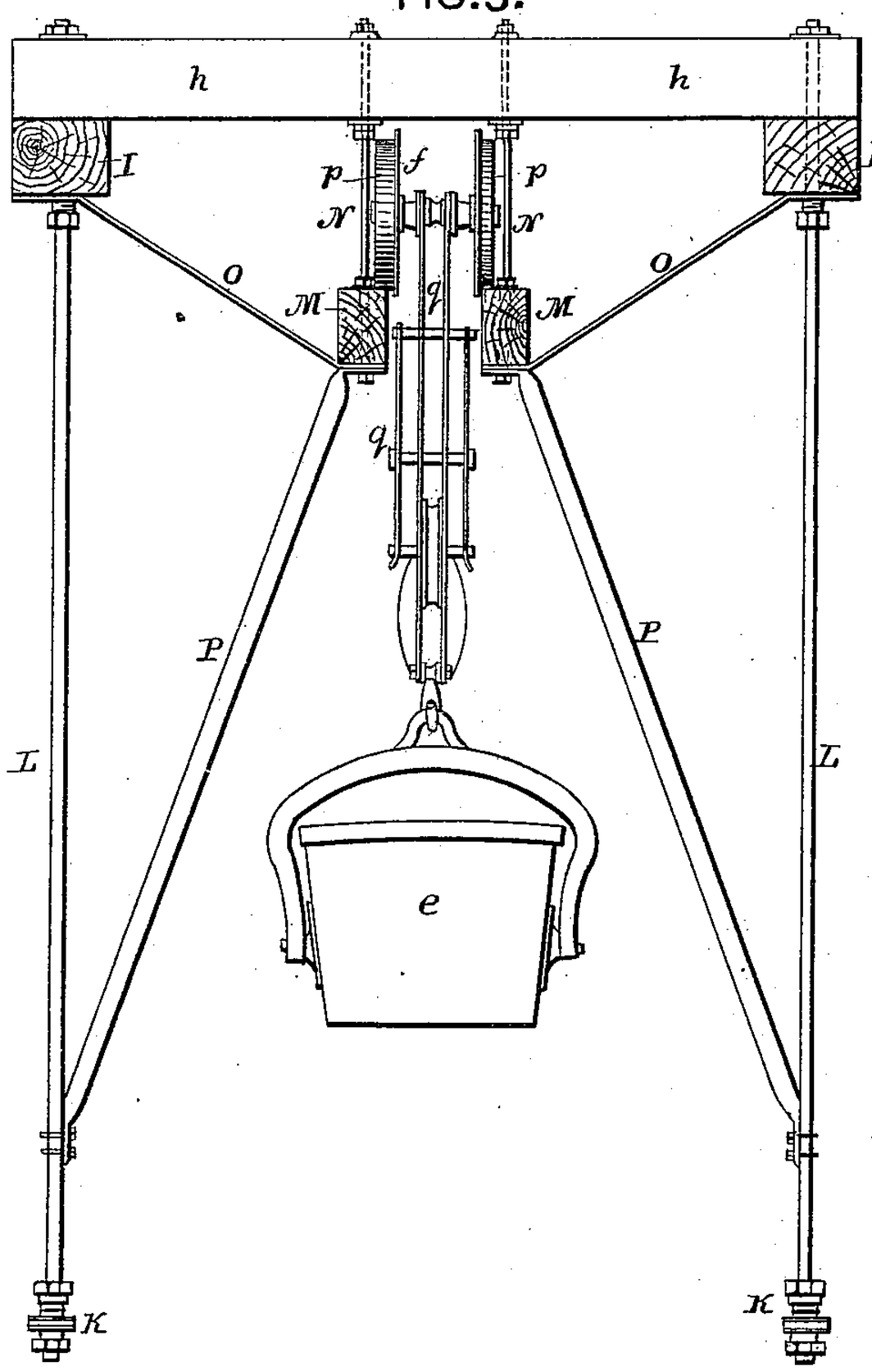

FIG. 5.

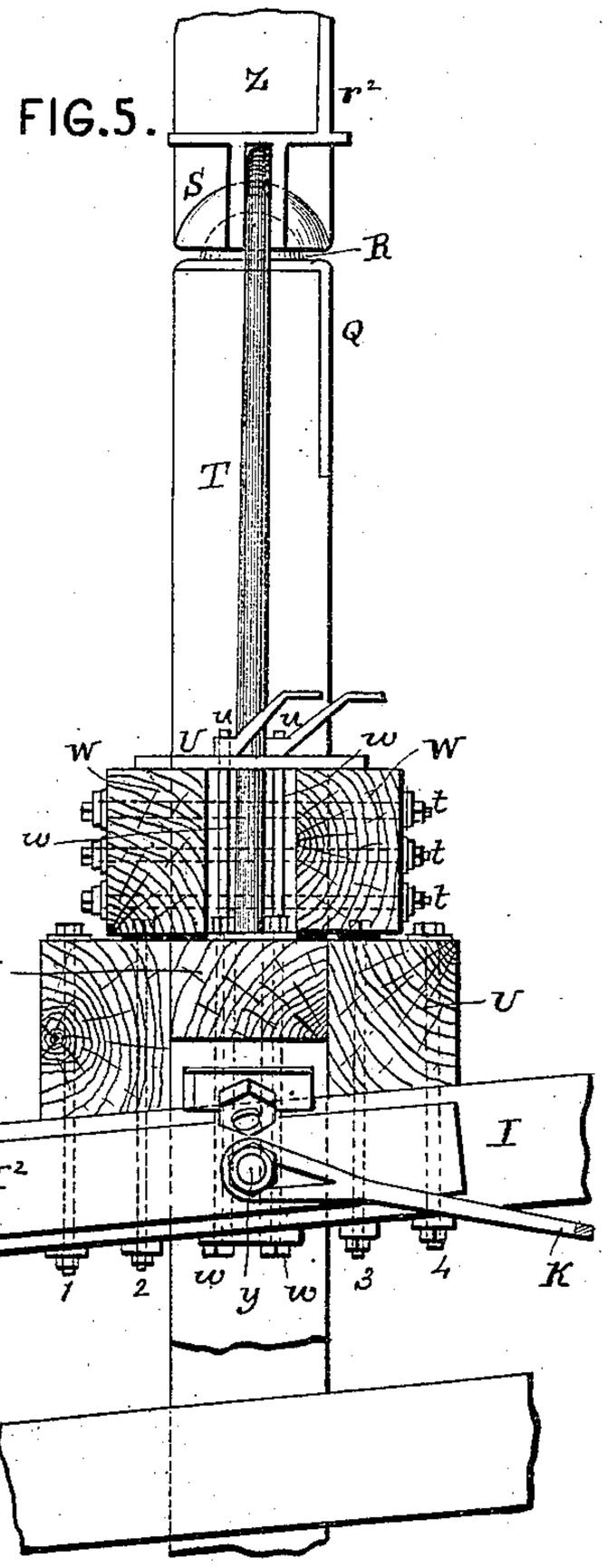

FIG. 6.

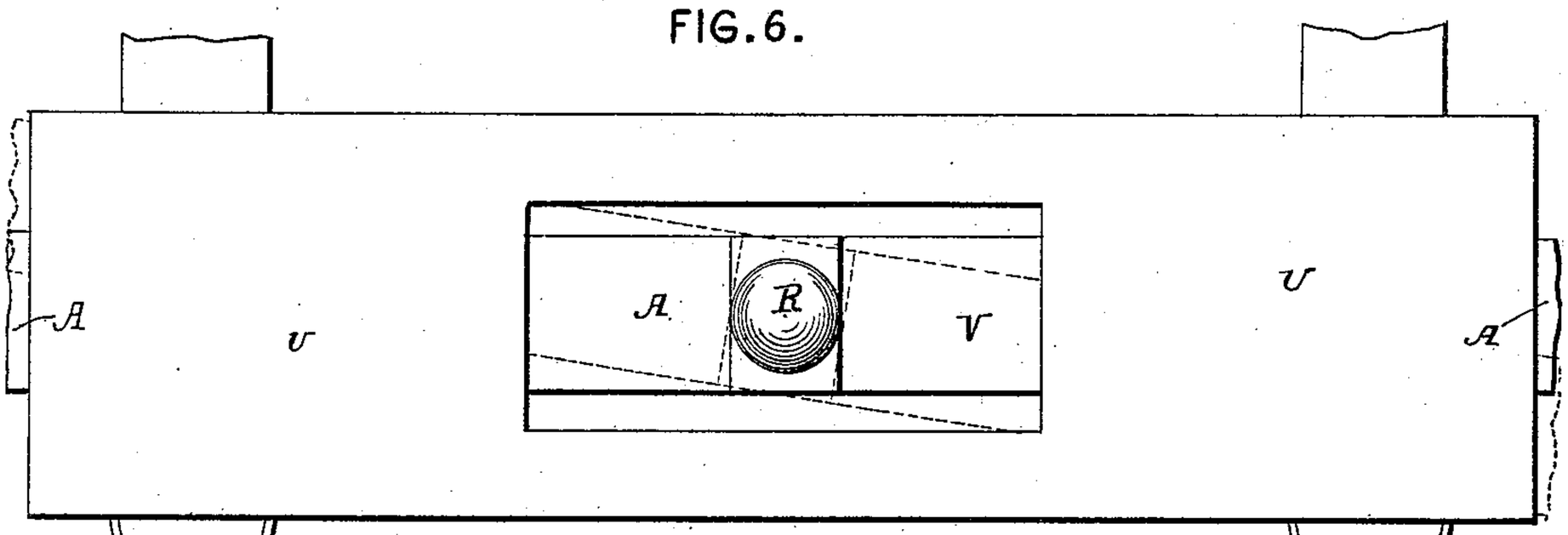

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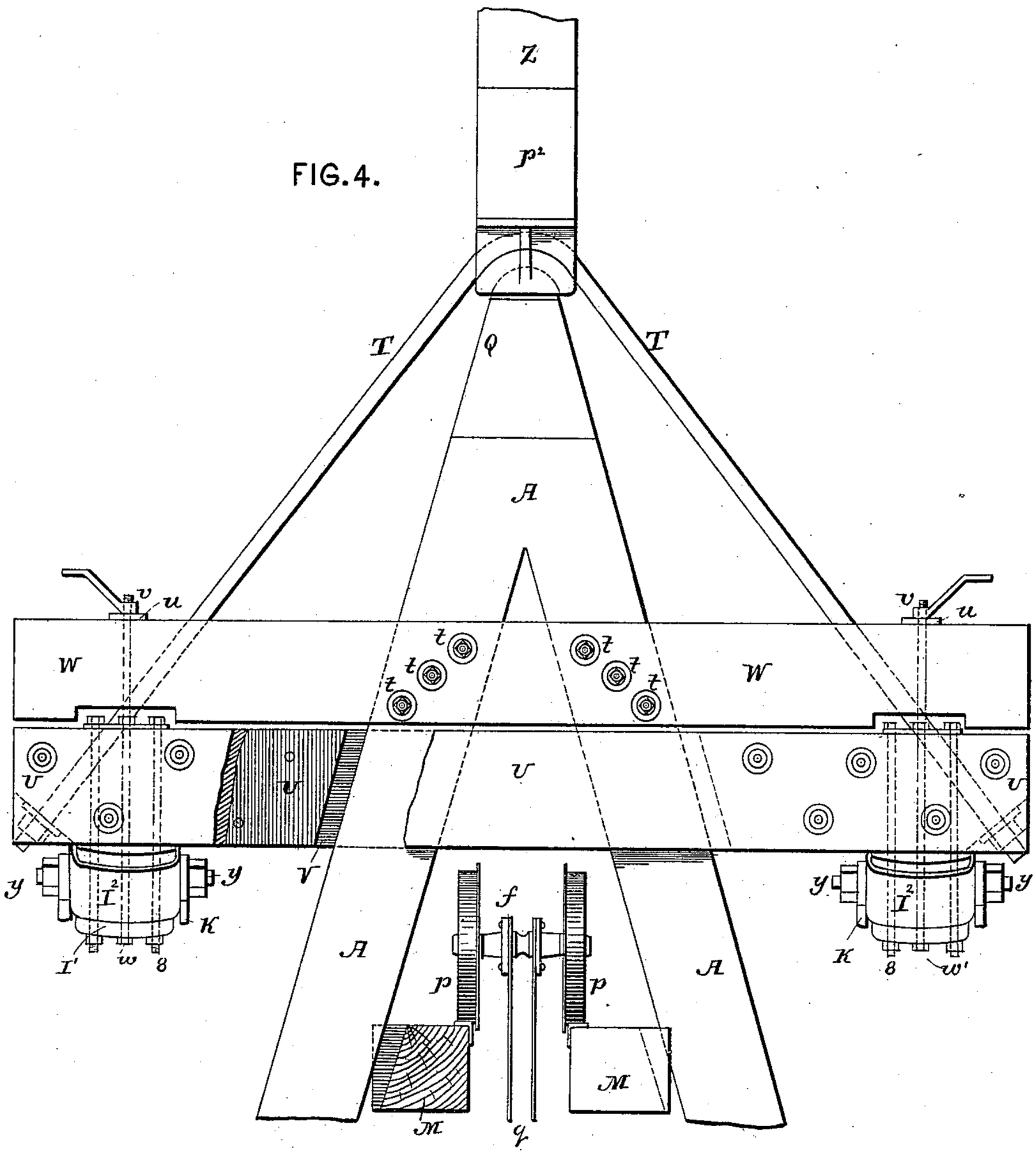
FIG. 4.



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UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO.

HOISTING AND CONVEYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 300,690, dated June 17, 1884.

Application filed December 7, 1883. (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 certain new and useful Improvements in Hoisting and Conveying Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this application.

My invention relates to certain new and useful improvements in that kind of hoisting and conveying apparatus in which a rigid or bridge tramway is employed, (in contradistinction of a cable tramway.)

As heretofore constructed, this kind or type of hoisting and conveying machine, though most desirable on some accounts, has had numerous and serious defects in practical operation; and to cure most or all of these objections and provide for use an apparatus of this type that shall be more efficient and desirable than any heretofore made is the main purpose of my present invention, which, to this end, consists in the several novel features of construction which will be found hereinafter more fully described, and which will be more particularly pointed out in the claims of this specification.

To enable those skilled in the art to which my improvements relate to more fully understand my invention and practice the same, I will now proceed to describe it by reference to the several figures of the accompanying drawings, in which I have shown a bridge-tramway hoisting and conveying machine embracing my invention carried out in that form in which I have so far successfully practiced it.

In the drawings, Figure 1 is a side elevation of a machine made according to my invention. Fig. 2 is a top view of the same. Fig. 3 is a vertical cross-section drawn on an increased scale. Fig. 4 is a partial end view or end sectional view on a still larger scale; and Fig. 5 is a side view (same scale) of the devices shown at Fig. 4, while Fig. 6 is a top or plan view of what is shown at Fig. 4.

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

A is the outer and B the inner one of the two piers, on top of which are supported the ends of the truss or bridge C of the tramway, (see Figs. 1 and 2,) which, as usual, is supplemented with an apron at D, adapted to extend out over boats to be unloaded at the dock E. In the rear pier is located, by preference, the engine-house containing the hoisting machine or engine, and also, higher up, the house or stand G, for the accommodation of the operator or attendant, who, by means of the usual appliance manipulates the hoist-engine from a locality from which he can readily observe the out-of-door operations, signals, &c. The inner pier, B, is adapted to rest and to be adjusted or moved sidewise (as occasion may require) on a double track, *a b*, about in the usual manner; but the outer pier, A, is composed of a single sort of A-frame, and rests and is adjusted laterally upon only a single rail-track, *d*.

At Fig. 1 I have illustrated the machine as at work discharging material from a boat at H.

The carriage of the machine and its dumping-bucket *e* are shown on a small scale at *f* of Figs. 1 and 2, and more plainly (on a larger scale) at Fig. 3, where, as well as in Figs. 4, 5, and 6, may be better seen also the detailed construction of the truss and other parts of the contrivance.

The inner or rear pier, B, is composed, as shown, of a suitable frame-work, of either iron or wood, (in the instance shown of wood,) of sufficient base area to properly rest upon the usual track-wheels, that run on the rails *a b*, and afford a steady support to the inner end of the truss or bridge C, which, as shown, rests at its rear end on top of the uppermost cross bar or beam of said pier, and is there pivoted (see *g*, Fig. 2) so that its forward end may vibrate horizontally about such point of pivotal connection to pier B in a manner and for purposes to be presently explained. The forward end of bridge C is suspended from a sort of ball-and-socket bearing at the top of the outer pier, A, which, as seen, is composed of an A-frame in such a manner that said bridge or truss C, at its forward end, and the upper end of the said outer pier, are capable of a sort of universal-joint movement relatively.

The upper straight chord of the truss or bridge is composed, as seen, of two stringers or beams, I, arranged parallel with each other at a suitable distance apart, and tied or braced together by the horizontal cross-bars *h*, (ar-

ranged parallel to each other and at right angles to I,) and the diagonally-arranged brace-rods *j*. (See Figs. 2 and 3.)

The lower and curved chord of the truss or bridge is composed of two plate-like curved bars, K K, (see Figs. 1 and 3,) of considerable width and little thickness comparatively, which extend from end to end of the straight upper chord, and are secured thereto by means of a series of upright rods, L, and diagonal brace-bars *m*. So far the structure, it will be seen, presents a shape in cross-section (see Fig. 3) resembling somewhat that of an inverted letter **U**.

A short distance below the level of the bottom of the upper chord of the truss are arranged centrally and a short distance apart the track-beams M for the truck or wheels of the hoisting and conveying carriage or machine proper to run on. These track-beams M run, of course, parallel with each other, and parallel with the upper chord or top of the truss, and are suspended and supported from the top chord by tie-rods N. (See Fig. 3.)

Extending from the lower side of each of the beams M is a set of obliquely-ascending braces, *o*, and a set of obliquely-descending brace bars or supports, P, the former of which are fastened at their upper ends to one of the beams I, and the latter of which are bolted at their lower ends to the lower portions of the rods L, and act to sustain the lower chords, K K, against side sway.

The carriage *f*, with its wheels *p*, bucket *e*, and other appliances at *q*, is supposed to be made and to operate about the same as these parts of other hoisting and conveying machines—such, for instance, as have heretofore been patented to me—and, as they form no part of my present invention, need not be further described herein.

By reference now to Figs. 4, 5, 6, it will be seen that at the apex of the **A**-shaped frame composing the outer pier is mounted a casting, Q, which is formed or provided at its top with a hemispherical bearing, R, on which rests and over which fits a socket-like casting, S, that acts as a sort of saddle-piece to support the strap or suspender-rod T, that extends thence obliquely down to and has its ends secured in the ends of the cross-beam (see Figs. 4, 5, 6) or block U, which is formed, preferably, of three timbers or pieces, with an oblong hole through it at V for the accommodation of the upper portion of the **A**-frame A, as shown. It will be understood that this perforated block or beam U is suspended by the device T from the saddle S, and that the upper portion of the frame A has sufficient play within the aperture V, through which it passes, to permit of the requisite movement of said frame (in different directions) relatively to said block or beam U, for purposes to be presently explained.

W is another block or cross-head, (composed, preferably, of pieces bolted together,) arranged immediately over U, and securely fastened near its middle to the frame A by bolts and nuts, as shown at *t*, Figs. 4 and 5. Crosswise of this beam or block W, near each end, is arranged (on top of it) a plate, *u*, to afford bearings for nuts *v*, which preferably have handles, as shown, and which are used to draw up the bolts *w*, which extend from said nuts down through the beam or block U, and which, when drawn home, (by turning the nuts *v*,) operate to clamp the beam W (and the **A**-frame bolted thereto) in a given position with and immovably relative to the beam or block U.

Immediately beneath the cross-head or block U, near either end thereof, are arranged the forward ends of the beams I of the truss or bridge, each of which is securely fastened to said block U by means of bolts 1, 2, 3, 4, &c., (see Figs. 4 and 5,) which pass through and through the parts fastened together, all as clearly illustrated. The ends of the beams or stringers I (being shown as of wood) are preferably bound with iron straps I^2, that overlie the sides of the beams for some distance, to strengthen and protect the stick ends and to re-enforce the holes for and strengthen the support of the trunnions or pins *y*, to the ends of which are secured the ends of the lower curved metallic chords, K, of the bridge. The socket-like casting S is by preference formed so as to seat the lower end of the vertical beam Z, as shown, and with a vertical plate-like portion, V^2, to form a lateral bearing for said beam Z.

At Fig. 6 (in which the upper beam or block, W, is supposed to be removed) will be best seen, by the full and dotted lines, the manner and extent of movement of the upper part of the frame A relatively to the beam or block U, from which are supported the forward ends of the bridge-beams I I.

From what has been so far explained in connection with the drawings the following will suffice to explain the operation of my improved structure of bridge-tramway apparatus: The usual carriage or machinery at F is caused to travel back and forth to any desired extent on the rails or track laid on the track-beams M, and the bucket *e* being raised, lowered, and dumped by suitable means (as usual) under the control of the operator or attendant, (stationed at G,) the material to be handled is conveyed from a boat at H and deposited, as at X X^2, on shore; or may be otherwise disposed of, as circumstances may require. Both of the piers A and B may be moved along on their respective tracks to materially change the location of the bridge as may be necessary, as usual; but if it be desired to move only the outer pier, A, more or less sidewise—*i. e.*, along on its track *d*—without changing the position of the inner one, B, this may be done without difficulty and without any undue strain on any portion of the structure by reason of the capacity of the bridge or truss to swivel

or turn on its pivotal connections to both piers and the capacity of the outer pier-frame, A, to tip over or inwardly at its upper end without getting out of perfect engagement and adjustment with the outer end of the bridge. It will be understood, of course, that when the outer pier or frame, A, shall be moved on its track, (in either direction,) so as not to be exactly opposite to pier B, the distance between the piers must be greater than when opposite to each other, and that hence the top of one or both piers must move toward the middle of the span, in order that both may keep in engagement (at their former points of attachment) with the bridge. This mode of operation is rendered possible by having one of the piers, A, mounted on a single rail, (so that it can tip over,) and by also having the end of the bridge suspended by the strap T, passing over the saddle S, resting on the half-ball joint or journal R, as I have already explained. Whenever any such movement of the frame A on its track occurs, said frame, near its upper end, moves relatively to the cross-head or beam U, from which the outer end of the bridge is supported, the opening at V, (in said cross-head,) through which the upper part of A passes, being sufficiently large, as I have before explained, to permit this relative movement of the parts; and the movement of the frame A relatively to the beam U is in two directions—one by which the plane of the frame A is changed, in the manner indicated by the dotted lines at Fig. 6, and another by which the topmost part (or the socket-joint portion) is shifted so as to be at a point vertically over one located more or less inside of the rail *d*, (or located somewhere between the rail *d* and the outer rail, *a*, of the other pier-track.) Whenever the outer frame, A, shall have been adjusted to any desired position, said frame and the outer end of the bridge are securely clamped together or secured in position relatively by turning home the handled nuts *v*, which draw up on the bolts *w*, that then clamp the cross-head U (which supports the outer end of the bridge) to the cross-beam W, which latter, as before explained, is bolted fast at *t* to the said frame A. By this means the structure, so far as the outer end of the bridge and the outer pier, swiveled or pivoted together, as explained, are concerned, is rendered stable, and prevented from shaking or vibrating unduly by reason of the pivotal connection explained. By simply loosening the nuts *v*, the frame A and bridge-supporting beam U are unclamped, so that the latter will be free to oscillate about the hemispherical joint at R S.

One of the great advantages of the construction of bridge shown, with the laterally-disconnected lower (curved) chords, K, and the track-beams M, located as shown and described, is the location of the track so that the truck or carriage runs along within the truss-frame, and the bucket travels above the lower part of the truss, thus gaining head room (for handling and piling stock) in comparison with structures in which the bucket has to travel much lower down. By making the lower curved chords, K, of broad thin metallic bars placed as shown, only the thin edges of the said chords are presented to the action of the wind, and hence, while possessing sufficient strength, these chords afford the least practical chance for wind-pressure sidewise of the bridge.

Of course many of the details of construction of my improved bridge-tramway apparatus may be varied without changing the novel principle thereof, and some one or more of the new features of the contrivance shown and described may be used with more or less advantage without the employment in the same apparatus of the other features. I do not therefore wish to be understood as limiting my claims of invention either to the precise form in which any or all of the novel features of construction shown have been carried out by me, or to the use together of all these novel features; but having so fully explained all the parts of my invention, carried out in the best forms now known to me, that those skilled in the art can understand and practice my invention, either in part or in whole, and either in the particular form in which I have so far used it or in some modified form,

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the two piers, a bridge pivoted to the upper portions of both of said piers, all substantially as and for the purposes hereinbefore set forth.

2. The combination, with the two piers and a bridge pivoted at one end to one of them, of a universal-joint coupling connecting the other end of said bridge and the other pier, all substantially as and for the purposes set forth.

3. The combination, with the bridge, of one pier resting on a double track, another pier resting on one track only, (so that it can be tipped toward or from the pier resting on the double track,) and couplings or connections between the bridge and piers, which will permit one of the piers to tip, as explained, without in the least straining its couplings to the bridge.

4. In combination with the pier capable of tipping (on a single track) and the bridge pivotally connected to said pier, means for clamping together the pier and the bridge-supporting beam, the whole constructed and operating substantially as hereinbefore set forth.

In witness whereof I have hereunto set my hand this 10th day of November, 1883.

ALEXANDER E. BROWN.

In presence of—
GOTTLIEB GEUDER,
CHAS. W. KELLY.