(No Model.) 2 Sheets—Sheet 1.

S. A. HILL.

TRAVELING HOIST.

No. 456,326. Patented July 21, 1891.

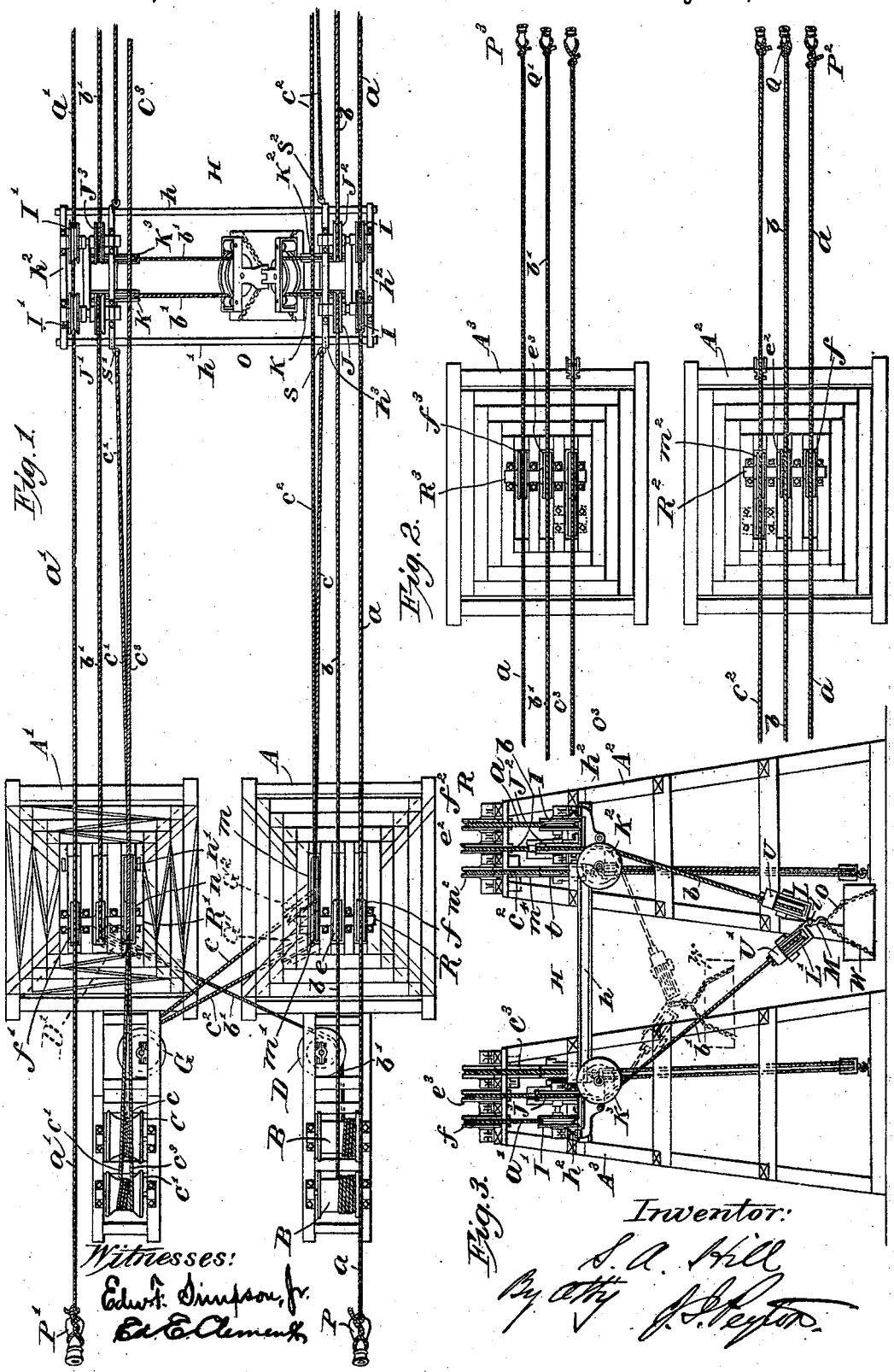

Fig. 1.

Fig. 2.

Fig. 3.

Witnesses:
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Ed. E. Clements

Inventor:
S. A. Hill
By atty
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(No Model.) 2 Sheets—Sheet 2.

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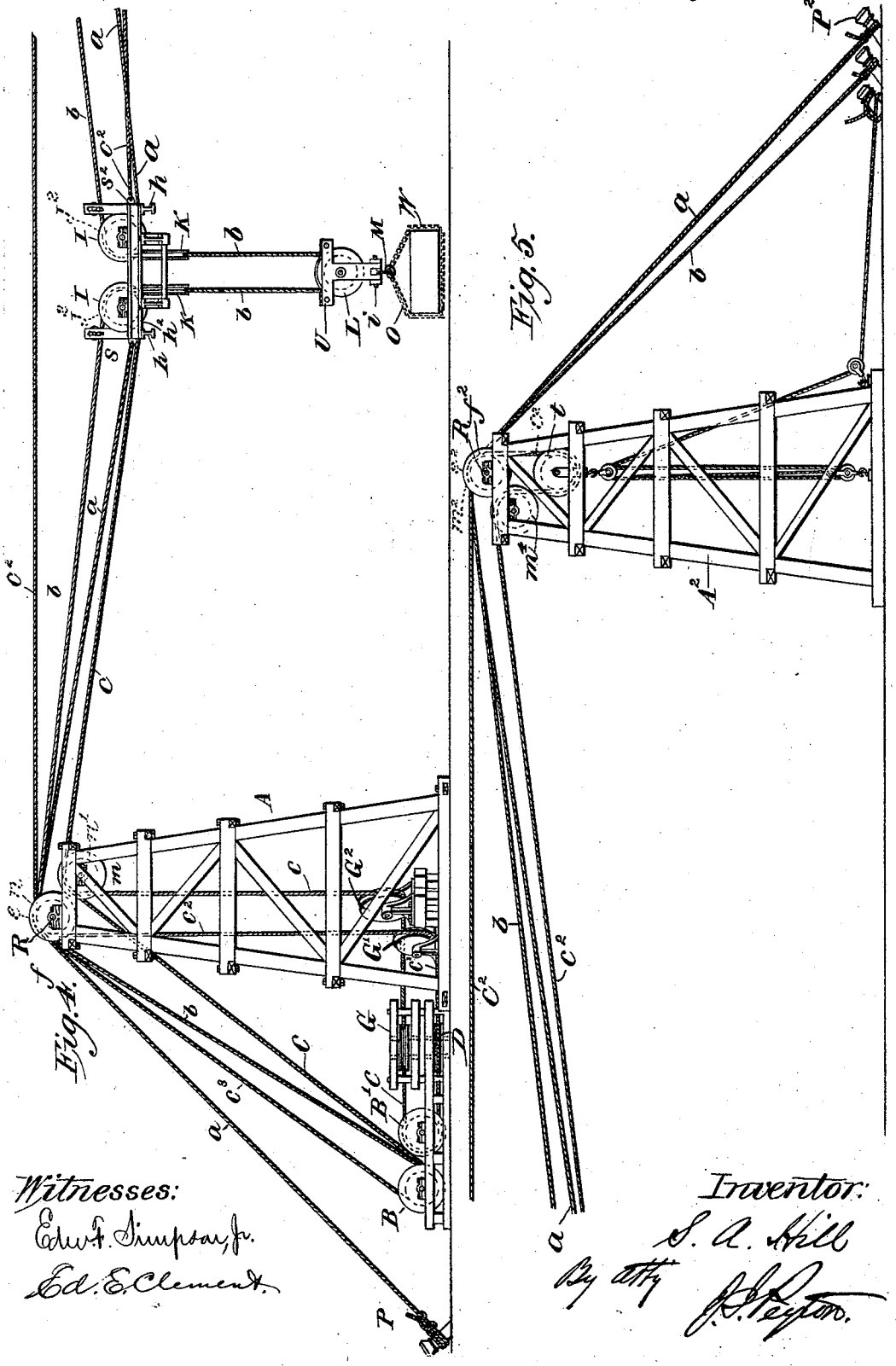

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

SAMUEL A. HILL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO WALTER WOOD, OF SAME PLACE.

TRAVELING HOIST.

SPECIFICATION forming part of Letters Patent No. 456,326, dated July 21, 1891.

Application filed March 3, 1890. Serial No. 342,327. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL A. HILL, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Traveling Hoists, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to that class of hoisting apparatus commonly known as "traveling cranes," wherein a bridge or frame is adapted to run upon two parallel supports, said bridge being provided with mechanism whereby the weight to be lifted can be directly hoisted and can be shifted lengthwise with the bridge.

Heretofore it has been usual to effect the traveling movement of the bridge upon its supports either by means of a gearing mounted upon the bridge and actuated from a point independent of the structure or sometimes by attaching cables directly to the bridge itself and actuating them by means of drums or other devices conveniently placed. The other necessary movements—that is to say, the lifting movement and the shifting of the weight lengthwise with the bridge (which for purposes of convenience I will hereinafter refer to as "lateral movement")—were accomplished by mechanism mounted on and controlled from a point upon the bridge itself.

The object of my present invention is to provide a system whereby all three movements—to wit, travel of the bridge, lateral shifting of the weight, and hoisting of the weight—can be effected from any desired point independent of the structure, and, furthermore, the movements themselves are rendered absolutely independent of one another.

In the accompanying drawings I have illustrated the invention as applied to an apparatus for constructing the piers of bridges across ravines, &c., the supports for the traveling frame or bridge being indicated as cables mounted upon suitable derricks, which are situated in pairs on opposite sides of the ravine.

Referring to the drawings, Figure 1 is a top or plan view showing the traveling bridge, the derricks at one end of the line, and the actuating mechanism. Fig. 2 is a similar plan view, in conjunction with Fig. 1, representing the derricks at the other end of the line. Fig. 3 is a sectional view through the bridge, showing in elevation the pair of derricks indicated in plan in Fig. 2. Fig. 4 is a side elevation of the parts shown in Fig. 1, and Fig. 5 is a similar side elevation of the parts shown in Fig. 2.

Owing to the fact that in the side views certain of the parts in the rear member of the pair of derricks and system of cables would be nearly in line with those of the front member, I have endeavored to avoid confusion by showing only those which would be visible from one side if said parts were exactly in line.

The pair of derricks at one end of the line are represented by A A′ and those at the other end of the line by A^2 A^3. Said derricks are provided at their tops with suitably-mounted horizontal shafts R R′ R^2 R^3, respectively, which constitute the bearings for a system of independently-mounted pulleys, whose function will be described hereinafter.

The supporting-cables upon which the bridge is to travel are represented by a a'. The cable a is securely anchored at one end at P, whence it rises, passes over the pulley f upon the derrick A, crosses to the pulley f^2 upon the derrick A^2, and descends to an anchorage at P^2. The other cable a' is similarly anchored at P′ P^3 and passes over the pulleys f' f^3 upon the derricks A′ A^3.

The bridge H, which may consist of a rectangular frame-work formed of two longitudinal pieces h h', connected near each end by the pieces h^2 h^3, is provided with a pair of pulleys or rollers at each end, one pair I I running upon the suspension-cable a, while the other pair I′ I′ run upon the other suspension-cable a'.

By means of proper shifting apparatus it is thus obvious that the bridge can be caused to travel along said cables, and thus be made to cross the ravine or other space between the respective pairs of derricks. Said traveling motion of the bridge is produced by the system of ropes or cables which will now be described.

A pair of drums C C′ are provided with

suitable driving mechanism and conveniently mounted close together, as shown. Upon the drum C is coiled a rope or cable, one end of which c is brought around the horizontal pulley G, and thence across to the bottom of the derrick A, where it passes around a pulley G^2, and thence rises to a pulley m near the top of the derrick and to a point of attachment S upon the proximate side of the bridge H. The other end of said rope c^2 passes around a horizontal pulley immediately beneath the pulley G and independent thereof, whence it crosses also to the bottom of the derrick A, passes under a pulley G′, rises over the pulley m', and crosses directly over to the corresponding derrick A^2 at the other end of the line. There it passes (see Fig. 5) over a pulley m^2 and around a tightening-pulley t, after which it returns over a pulley m^4 to a point of attachment S^2 upon the bridge H, opposite to the other point of attachment S. The other drum C′ has a similar rope or cable coiled thereon, one end of which c' rises up over a pulley n' and passes thence to a point of attachment S′ on the proximate side of the bridge H. The other end of said rope c^3 rises up over a pulley n, and thence passes to the corresponding derrick A^3 at the other end of the line, whence, after passing around a similar system of pulleys to that described in the case of its fellow, it returns to a point of attachment S^3 upon the bridge H, opposite to the point of attachment S′.

It is obvious that if the drums C C′ are both actuated in opposite directions they will wind up one pair of ends and pay off the other pair, and thus by revolving said drums together in one direction or the other the bridge H will be shifted bodily toward or from them, its pulleys I I′ running freely upon the supporting-cables a a'.

The lifting and lateral movements for the weight W will now be described. Said weight may be suspended by means of chains o from the hook M. A pair of sheaves L L′ are provided with suitable frames or housings U U′, which are hinged or pivoted together at their lower portions by means of a horizontal pivot l, upon which pivot the hook M is also pivotally supported. By reason of this pivotal attachment the hook M is permitted to hang perpendicular, no matter what may be the angle of said sheaves to one another. This pair of sheaves with their pivoted housings I term, for purposes of convenience, the "lifting" and "shifting" carriage. Each of said sheaves is provided with its independent supporting and lifting rope, (represented at b b', respectively,) and these ropes are supported and actuated in the following manner:

A pair of drums B B′ are conveniently mounted in proximity and provided with any suitable actuating mechanism. The rope b is attached to and coiled around the drum B. Thence it rises over a pulley e upon the top of the derrick A and passes to the bridge, where it descends over a pulley J and down under a pulley K, mounted on the lower side of the bridge at one end thereof. Thence it descends on the sheave L and again rises to a pulley K^2 in line with the pulley K, after passing which it rises over the pulley J^2, and thence runs to the derrick A^2, where, after passing over a pulley e^2, it descends to an anchoring-point Q at that end of the line. The rope b' is coiled around the drum B′, whence it passes around a horizontal pulley D and crosses over to the bottom of the derrick A′. There it passes under a pulley D′ and rises to the top of the derrick, where it passes over a pulley e', running thence to the bridge. At the bridge it passes around a pair of pulleys J′ K′ (similar to the pulleys J K) down to the sheave L′, after passing around which it returns up by the pulleys K^3 J^3, (similar to the pulleys J^2 K^2,) and thence runs to the derrick A^3, where, after passing over a pulley e^3, it descends to an anchoring-point Q′ at that end of the line. It is obvious that so long as the drums B B′ are stationary the length of the ropes b b' will be constant, and hence whatever may be the position of the bridge the weight will remain at the same vertical height and at the same lateral point with reference to the bridge. If, however, both the drums B B′ be so actuated as to wind up their respective ropes b b', the weight will be lifted vertically without lateral movement relatively to the bridge. If one of the drums B be actuated so as to coil up its rope, while the other drum B′ be actuated so as to uncoil its rope, the weight will not be moved vertically, but will be shifted laterally or from one end of the bridge toward the other. If, again, one of the drums B remain stationary while the other is actuated so as to wind up its rope, the weight will be hoisted vertically and shifted laterally at the same time, or if one of said drums remains stationary and the other is actuated to unwind its rope the weight will be lowered and shifted laterally at the same time. Furthermore, all three movements—to wit, travel of the bridge, lateral shifting of the weight, and hoisting or lowering of the weight—or any two of said movements, may go on simultaneously without in any way affecting one another, and all of them may be controlled from practically a single point.

In the embodiment which I have selected to illustrate my invention the supports for the traveling bridge are shown in the form of cables; but obviously rigid supports, such as rails, might be substituted therefor in cases where the device is to be of a permanent character. So, also, instead of locating the traversing drums C C′ together upon one side of the apparatus and the lifting-drums B B′ together at the other side of the apparatus, and carrying the respective members across by the lateral pulleys G D, as described, each derrick of the pair might have its own traversing drum and its own lifting-drum, and when thus arranged the pair of lifting-drums might be mounted upon a single shaft and the pair

of traversing drums upon a single shaft, each of said shafts being provided with proper mechanism.

It will be observed that in the instance shown the hoisting of the weight, as well as the lateral shifting thereof, is effected by the same pair of ropes, the arrangement being permitted by reason of the fact that the carriage is not directly mounted upon the bridge; but obviously, if it be deemed desirable to mount the carriage so as to run upon the bridge, as is usual in traveling cranes, the lateral shifting of the carriage along the bridge would be effected by the same pair of ropes arranged as before described, and their principle of operation would not differ. In such case the hoisting of the weight would of course be effected by means of a separate rope arranged in any desired manner and operated from any convenient point.

While therefore the type of invention selected for illustration combines the lateral shifting and hoisting movements in such manner as to obtain them both from a single pair of ropes, I do not limit my claim to that particular application of the principle upon which said ropes act, but desire to secure such system irrespective of its double capacity and even though it be employed merely to derive the lateral shifting of the weight without vertical movement thereof.

The lightness and simplicity of construction which characterize the form shown in the drawings render such embodiment highly desirable for the particular work which I have mentioned—viz., the building of bridges across ravines—and I therefore consider it for this use the most highly developed form of my fundamental idea, which relates to the production of the lateral movement of the carriage in the manner described.

Having thus described my invention, I claim—

1. The combination of a pair of parallel longitudinal supports, a transverse bridge mounted to travel along said supports, ropes attached to said bridge upon one side thereof and leading thence to the proximate end of the line of longitudinal supports and thence to a point of actuation independent of the bridge, and said ropes attached to said bridge upon the side opposite to the first points of attachment and leading thence to the other end of the line and thence returning to the point of actuation, actuating mechanism, substantially as described, for said ropes, respectively, a lifting and shifting carriage having means, substantially as described, for suspending the weight, a pair of weight-lifting and weight-shifting ropes leading from a point independent of the bridge over suitable guiding and supporting pulleys to the bridge and passing freely around pulleys upon the bridge and sheaves upon the carriage to fixed anchoring-points independent of the bridge, and actuating mechanism, substantially as described, for said last-mentioned ropes, whereby the transverse motion of the bridge and the hoisting and shifting of the weight are independently effected from a point exterior to the bridge itself.

2. The combination, with a pair of parallel longitudinal supports, a transverse bridge traveling thereon, and actuating mechanism for said bridge, of a carriage capable of transverse movement along said bridge, a pair of sheaves mounted upon opposite sides of said carriage, a pair of ropes leading from a point exterior to said bridge to the respective ends thereof, thence to and around said sheaves, respectively, thence returning to the respective ends of the bridge, and thence passing to anchoring-points exterior to the bridge, said ropes being provided with suitable guiding and supporting pulleys upon the bridge, and actuating devices for said ropes, whereby the transverse shifting of the carriage along the bridge is effected, but the bridge movement is permitted without change of position of the carriage relatively to the bridge.

SAMUEL A. HILL.

Witnesses:
M. P. HALL,
R. HILL.