

(No Model.)

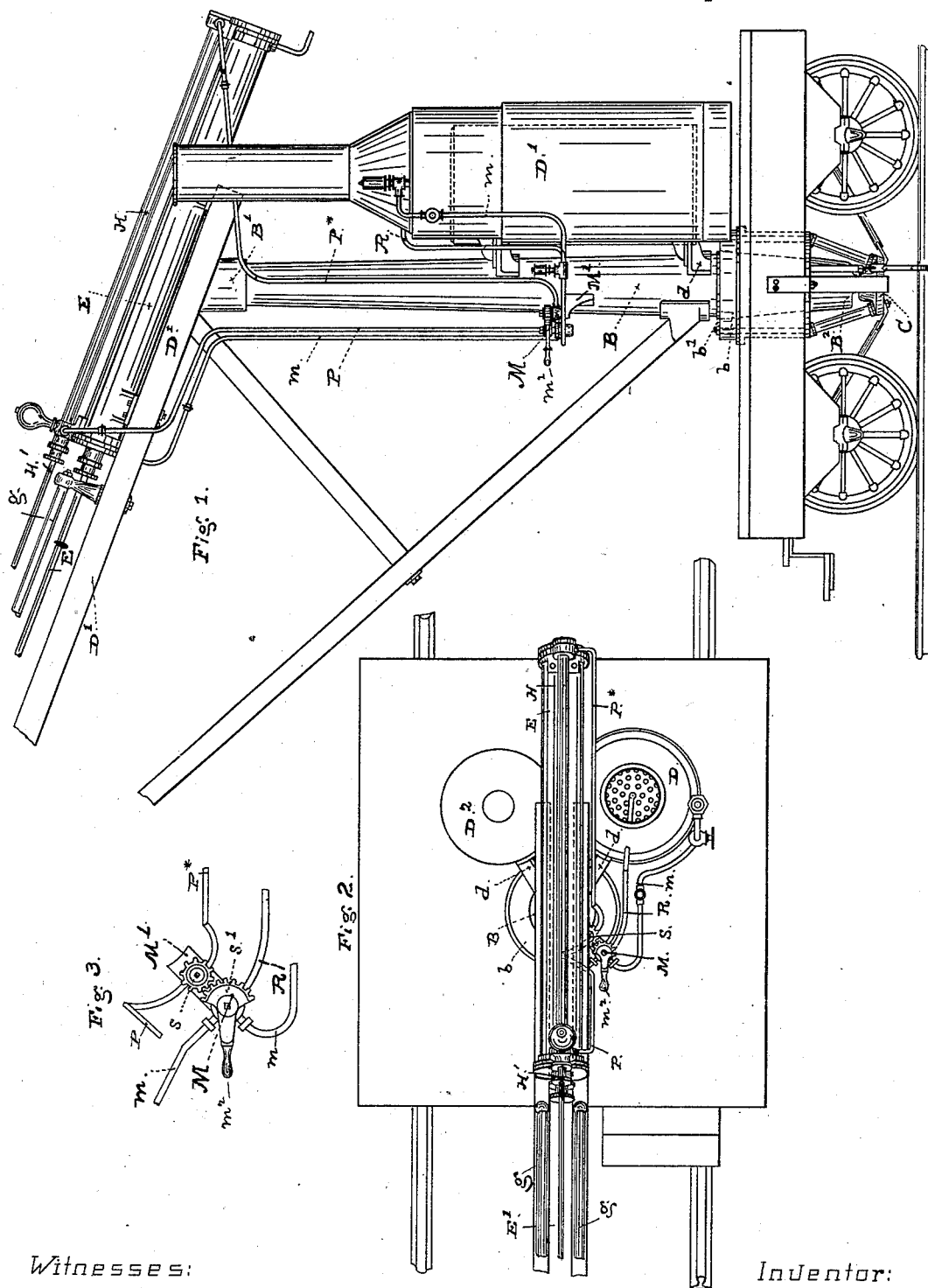
2 Sheets—Sheet 1.

A. J. STEVENS.

## HOISTING CRANE.

No. 305,248.

Patented Sept. 16, 1884.



Witnesses:

Ino Taggard  
Wm Mayer

Inventor:

By his Atty., Andrew J. Stevens  
E. J. Deane

(No Model.)

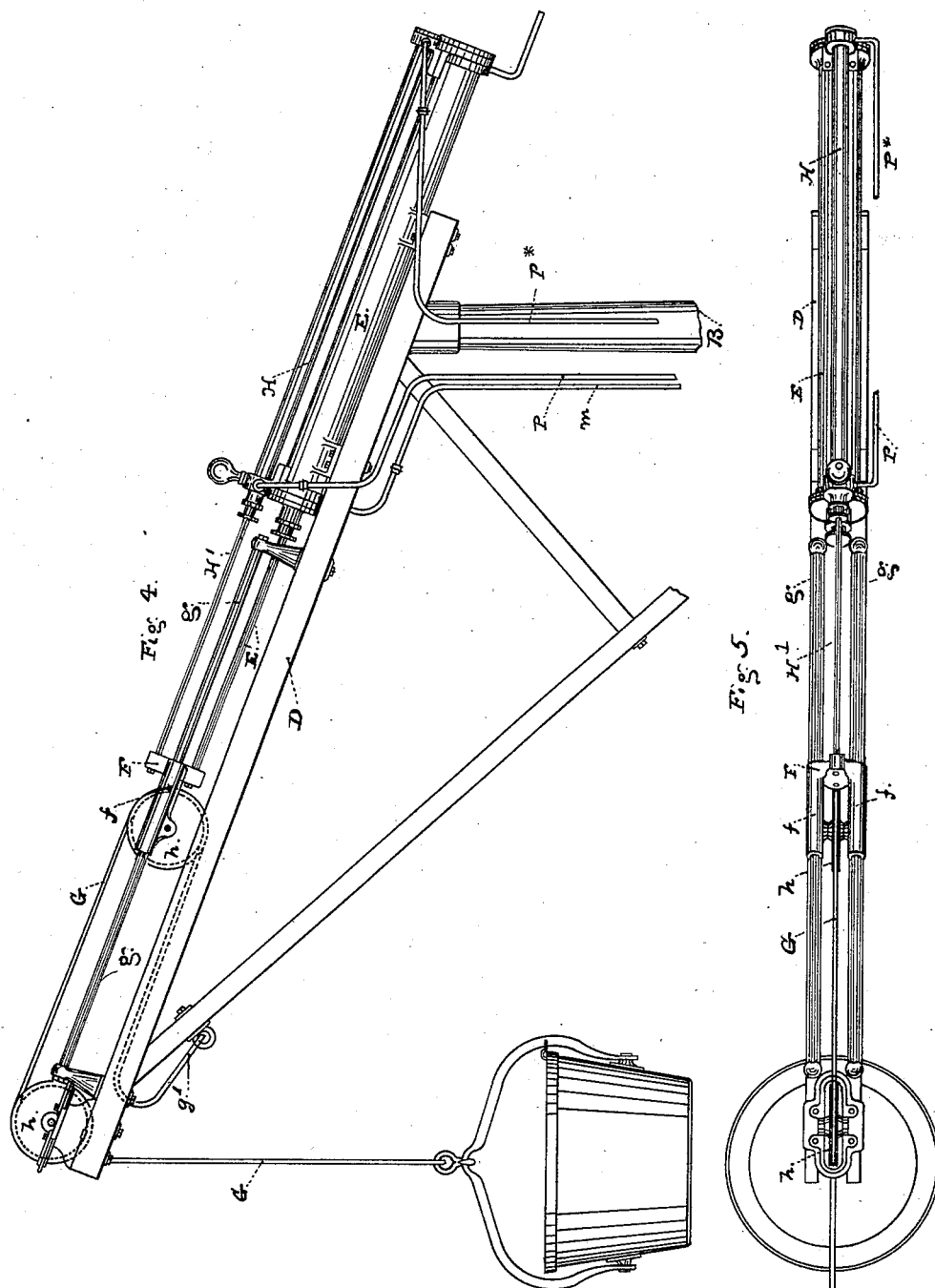
2 Sheets—Sheet 2.

A. J. STEVENS.

HOISTING CRANE.

No. 305,248.

Patented Sept. 16, 1884.



Witnesses:

*John A. Taggart*  
*Wm. May Jr.*

By his Atty.

Inventor:

*Andrew J. Stevens*  
*R. L. Dalton*

# UNITED STATES PATENT OFFICE.

ANDREW J. STEVENS, OF SACRAMENTO, CALIFORNIA.

## HOISTING-CRANE.

SPECIFICATION forming part of Letters Patent No. 305,248, dated September 16, 1884.

Application filed June 20, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW J. STEVENS, a citizen of the United States, residing in Sacramento, Sacramento county, State of California, have invented certain new and useful Improvements in Steam-Cranes; and I do hereby declare that the following is a full, clear, and exact description of the said invention, reference being had to the drawings accompanying and forming a part of this specification.

My invention relates to a novel construction of power-crane wherein steam is employed as the lifting agent. It embraces certain construction and combination of lifting-cylinder and connected parts for raising the load and a locking mechanism of novel character for holding the load at any point and relieving the lifting mechanism of the suspended weight. It includes, also, the combination and general arrangement of parts and mechanism, as hereinafter described and pointed out, producing a light and powerful crane for use upon a track.

Referring to the drawings, Figure 1 is a side elevation of a portable crane constructed in accordance with my invention. Fig. 2 is a top view, the outer end of the boom being broken off in both figures, but shown more in detail with the parts in Figs. 3 and 4, which are side elevation and top view, respectively, of this outer end, as well as of the cylinders and mechanism carried by the boom. Fig. 5 is a detail view, in plan, of the valve-gear.

While these improvements are applicable to hoisting-cranes generally, my invention contemplates the production of a light, powerful, and easily-operated crane for use upon railroads, to coal locomotives, load cars, and other work. For such purposes the crane is mounted upon a movable platform. The truck has flanged wheels, and in the center of the frame a socket, *b*, consisting of a cast-iron plate with a heavy rim surrounding the central opening, affords a support for the mast *B* in the truck. A collar, *b'*, on the mast fits within the rim, and has rollers set under it to reduce friction and permit the mast to turn freely. Underneath this socket is a step-box, *C*, suspended from the truck by rods or long stay-bolts. The mast is a tubular sheet-iron

column with a cap, *B'*, upon which the boom *D* is set, and a foot, *B''*, on the other end that sets into the step-box and forms the pivot on which the crane swings. A steam-boiler, *D'*, and a water-tank, *D''*, are fixed to the mast by brackets *d d* in such manner that they are supported clear of the truck-platform, and their weight is opposed to the weight of the load at the outer end of the boom. Steam is carried from the boiler to the hoisting-cylinder through the pipe. The piston of this cylinder is directly connected with the hoisting-rope *G*, and has a length of stroke sufficient to raise the load a given distance. The movement is multiplied, however, by the arrangement of fixed and traveling pulleys at the end of the boom, and a short cylinder is thereby obtained.

The steam-cylinder *E* is fixed on top of the boom at the tail end and directly over the end of the mast. Its piston-rod *E'* is directly connected to the moving cross-head *F*, of which the tubular slides *f* are fitted on two parallel guide-rods, *g g*, that are fixed at the ends in short posts on the boom. This cross-head carries a sheave, *h*, around which the hoisting-rope is turned and brought to the front to the fixed sheave *h* on the end of the boom, by which it is bent to the perpendicular or into the required direction to take the load at the end. To the same cross-head, *F*, is also connected the piston-rod *H'* of the locking-cylinder *H*. This is a cylinder of equal length with, but of smaller diameter than, the steam-cylinder, and mounted upon it so that the two piston-rods shall move parallel and with equal stroke. The space on both sides of its piston is filled with some suitable liquid, and the two bodies thus divided by the piston are brought into connection by means of a pipe or tubular passage, *P P'*, having a valve or stop-cock, *S*, interposed at some convenient point, by the action of which the passage of the fluid is cut off or allowed to take place from one side to the other of the piston. This valve, by controlling the movement of the confined fluid, enables the piston to be locked and held at any point or released to move regularly with the hoisting-piston. As the liquid fills the entire space in cylinder and pipe or passage, it resists the strain on the piston-rod as long

as the passage from one side to the other of the piston is closed; but when the valve M' is opened the piston is free to move as fast as the liquid can be forced from one side to the other. Steam is supplied to the hoisting-cylinder through the pipe *m m* in two sections, with a two-way valve, M, interposed between them. This valve and that controlling the liquid-cylinder are set in a bracket in such close relation together that both can be moved by a single lever. One section or portion *m* of this pipe is always a conductor of steam, while the other portion *m* is supplying steam to the hoisting-cylinder in one position of the valve, and is a conductor for the waste steam when the valve is reversed. When the valve is thus opened in line with the waste-pipe R, there is a continuous discharge-passage through the pipe *m R* into the throat of the boiler-stack. These liquid and steam controlling valves are coupled together to be moved simultaneously, for the locking-piston must be released and free to move with the hoisting-piston.

The mechanism shown in Figs. 1 and 5 represents one mode of operating the valves with a single lever-handle. The stem of the oil-valve has a pinion, *s*, and the other valve-stem has a segment-gear, *s'*, with a handle, *m*<sup>2</sup>, in gear with it, so that movement of the handle in one direction brings the two passages *m m* together, and in the reverse direction connects the two *m* and R. In each position also the liquid-valve S is opened. As thus constructed, this locking device operates to hold the load at any point, and thereby relieve the steam-piston.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a hoisting-crane, the combination, with and upon the swinging boom, of the hoisting-cylinder, with connections for a supply and discharge of steam and a valve for controlling the same, a traveling cross-head connected to the rod of the hoisting-piston and moving on guides upon the boom, a hoisting-rope connected to said cross-head and turning over a sheave at the point of the boom, and a means for locking said cross-head to hold the hoist-

ing-rope and sustain the load when the hoisting-piston is at rest, substantially as herein described.

2. In a hoisting-crane, the combination, upon the swinging boom, of the hoisting cylinder and piston E, cross-head F, traveling on guides *g*, hoisting-rope, liquid-cylinder H, having connection of its piston with the traveling cross-head, the steam-pipes *m m*, the liquid-circulating pipes P P\*, connecting the ends of the liquid-cylinder together, and the steam and liquid controlling valves M S; substantially as herein described.

3. The combination, upon the swinging boom, of the traveling cross-head F, carrying a sheave, the fixed sheave *h*, the hoisting-rope G, the hoisting-cylinder E, and the locking-cylinder H, substantially as herein described.

4. In a hoisting-crane, the combination, with the hoisting mechanism, of a locking mechanism or device consisting of a liquid-cylinder, the piston whereof is connected to the hoisting-rope, and a communicating passage between the opposite ends of the cylinder, having a stop-cock or valve, substantially as herein described.

5. The combination of a suitable supporting-platform, the stepped mast, the boiler and tank secured to and carried by the mast, the boom with hoisting-cylinder mounted thereon, the traveling cross-head and hoisting-rope connected thereto, the locking-cylinder, and connections of its piston to the cross-head, the pipes P, P\*, R, and *m*, and the coupled valves M S, substantially as described.

6. The combination of a traveling cross-head movable upon guides, a hoisting-rope fixed thereto, a hoisting-cylinder connected with a steam-supply, a locking-cylinder filled with a liquid, and having the space at one side of its piston connected with the space at the opposite side, and a valve for establishing and shutting off communication between the spaces through such passage, substantially as herein described.

ANDREW J. STEVENS. [L. S.]

Witnesses:

CHAS. SCHMITT,

BERT. A. WORTHINGTON.