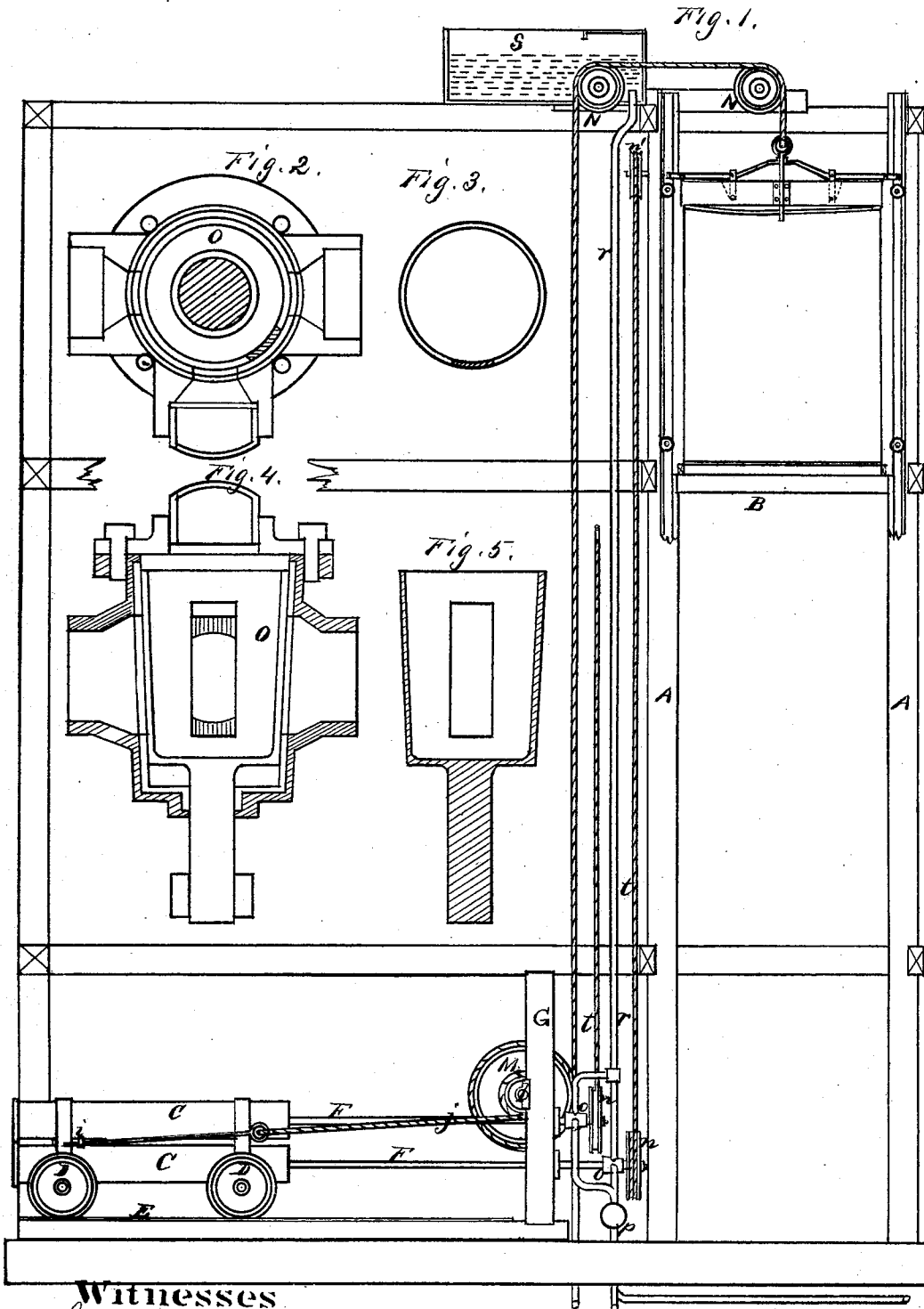


P. HINKLE.
Hydraulic Hoisting Apparatus.

No. 140,502.

Patented July 1, 1873.



Witnesses

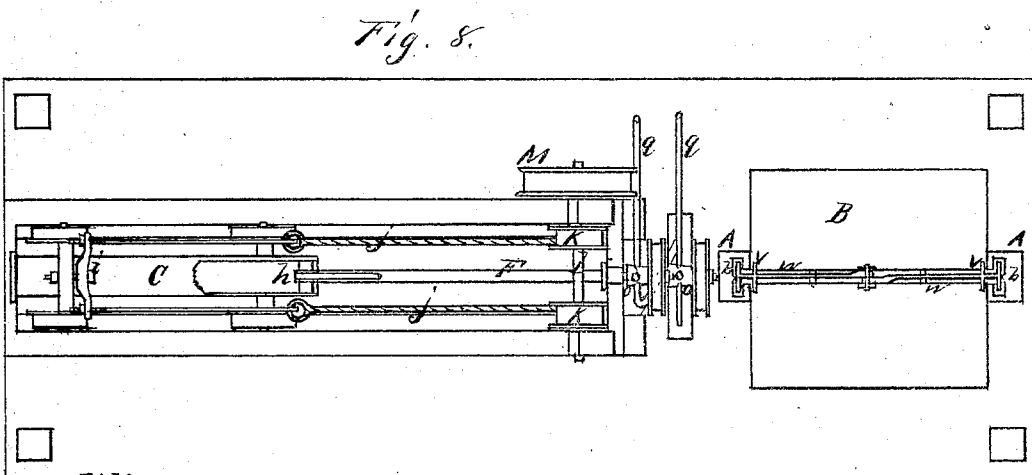
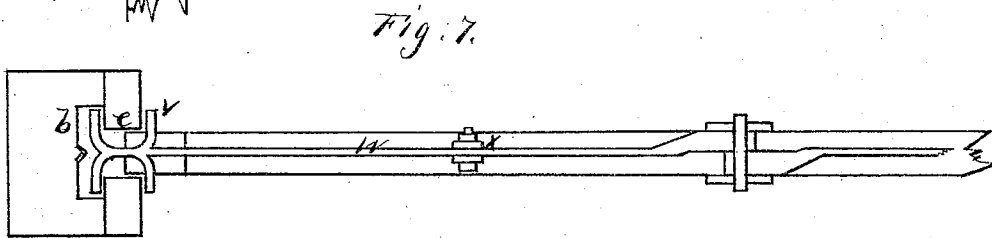
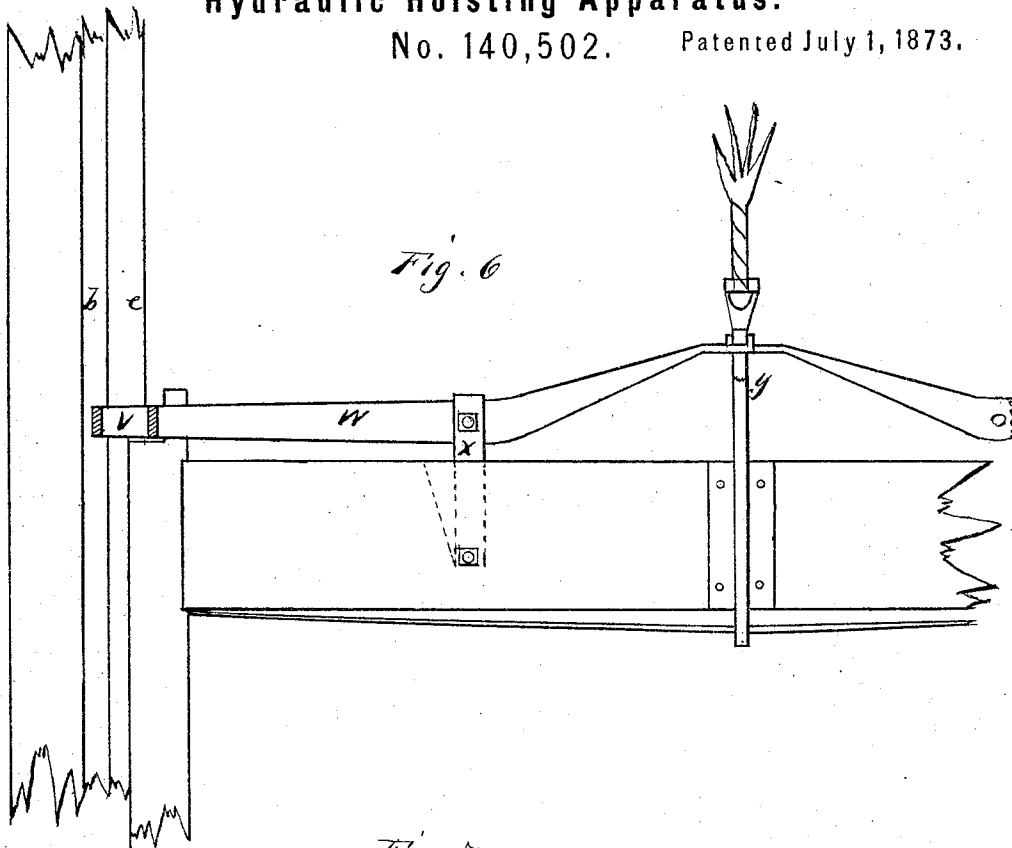
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UNITED STATES PATENT OFFICE.

PHILIP HINKLE, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN HYDRAULIC HOISTING APPARATUS.

Specification forming part of Letters Patent No. **140,502**, dated July 1, 1873; application filed May 23, 1873.

To all whom it may concern:

Be it known that I, PHILIP HINKLE, of San Francisco city and county, State of California, have invented an Improved Hydraulic Hoisting Apparatus; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

My invention relates to improvements in that class of hydraulic elevators in which one or more horizontal cylinders are employed upon the hydrostatic-pressure principle for transmitting the power required for hoisting the load. The first part of my invention consists in mounting the cylinder or cylinders upon wheels, which move upon a track or tracks, so that the cylinder or cylinders thus mounted can move back and forth upon the track or tracks for the purpose of giving the requisite motion for hoisting the load. Each cylinder is provided with a fixed hollow piston-rod, upon the end of which is the piston-head which moves in the cylinder in the usual manner of a piston. The water is admitted into the hollow piston-rod by suitable cocks, from which it passes into the cylinder between the cylinder-head and piston, so as to cause the cylinder or cylinders to travel back and forth upon the track or tracks as the water is admitted and discharged from them.

The second part of my invention consists in connecting the hollow piston-rods or cylinders with a tank or tanks located above the hoist-way by a pipe or pipes, so that the force of the descent of the cage or elevator-platform can be utilized by causing it to force the water in the cylinder or cylinders up the pipes into the tank or tanks, so that it can be used again for hoisting the empty cage or light loads.

In order to more fully illustrate and explain my invention, reference is had to the accompanying drawings forming a part of this specification, in which—

Fig. 1 is a side elevation of my invention. Figs. 2, 3, 4, and 5 are detailed views of the three-way cock. Figs. 6 and 7 are enlarged views of the safety-clutch. Fig. 8 is the plan or top view of the elevator.

A A represent the two upright guide-tim-

bers, between which the cage or elevator-platform B moves. C C are two cylinders placed horizontally, one upon another, and mounted upon wheels D D, which move upon tracks E on the lowest level to which the cage B descends. F F are the two hollow rods which are firmly secured at one end in a frame-work, G, so as to extend out horizontally at the proper height to form fixed piston-rods for the cylinders C C. A piston, h, is secured to the extremity of each rod, and these pistons fit water-tight in the cylinders. The hole which passes through the piston-rods also passes through the piston. A strong metal bar, i, has its middle pivoted to the cylinders near their rear end, so that its extremities extend out upon each side of the cylinders in the manner of attaching double-trees to the pole of a wagon, and one end of a cord, rope, or chain, j, is secured to each extremity of this bar, as shown. These cords extend forward, and have their opposite ends secured to pulleys k on the transverse shaft l. The bar i serves to equalize the strain upon the ropes, cords, or chains.

A large pulley, M, is secured to the end of the shaft l, to which the hoisting-rope is attached, and upon which it is wound in order to hoist the platform. This rope passes up from the pulley M to the highest part of the building, where it passes over other pulleys N, and thence down to the cage, to which its opposite end is attached. To the fixed end of each of the piston-rods is secured a three-way cock, o, with the shell of which the pipe p, which leads to the water-main or other reservoir, communicates. The plug of this cock has a hole leading through its end into the hollow piston-rod, so that, when the plug is turned so as to take water from the pipe p, the water will pass through the plug into the hollow piston-rod, and thence into the cylinder; but when the plug is further rotated so as to close the opening from the pipe p and establish communication with either the waste-pipe q opposite or with the vertical water-pipe r which leads to the tank S above, the water will be driven out of the cylinders by the force of the descent of the cage. The plug of each water-cock is operated by an endless cord, t, which passes around a pulley, n, on the end of the plug, and around another pulley, n', above, so that by drawing upon this cord the entire

work of operating the hoist is accomplished. The shell of the cocks *o* will be made of cast-iron and lined inside with Babbitt or other soft metal, while the plugs will be made of brass, thus providing a cheaply-constructed and effective cock. Two or more tanks, *S*, may be employed at different altitudes, if desired, or a single tank may be used in the manner shown. As the loaded cage descends, its weight, acting upon the cylinder-carriage, will cause the water in the cylinders to be driven out through the hollow piston-rod and up the pipe *r* into the tank or tanks above, where it will remain until it is again required. This water can then be used for lifting the empty cage or a light load, and thus avoid the necessity of resorting to the water-main every time a light load is to be lifted.

In some cases it will be found advantageous to incline the track upon which the carriage moves, so that it will move down hill as the platform descends, thus giving greater effectiveness on account of the loss of friction to the force required to raise the water into the tanks.

Either one or more cylinders can be employed. In case the load to be lifted is a light or ordinary one only one cylinder need be used, but if the load is a heavy one then two or more cylinders will be used, according to the weight to be raised.

A plug or cock will be employed at the rear end of each cylinder, through which the accumulations of sand or dirt can be drawn off or forced out, as occasion may require.

In some cases, especially in a passenger-elevator, I shall employ a vertical tube, which extends the entire length of the hoist-way, passing directly through the cage or car. This pipe will be slotted on one side, and a graduated hand-wheel will be arranged upon it, having a feather fitting in the slot, so that the wheel will travel up and down along the tube, and yet permit of the turning of the tube at any point. The lower end of this tube will be provided with a wheel, which will be so arranged as to operate the cocks by the turning of the tube.

The inner side of the guide-timbers *A A*, along which the frame of the cage moves, is grooved its entire length, as shown at *e*, Fig. 7, and a wider recess, *b*, is made inside of the timbers, with which the groove communicates. The side timbers of the cage-frame move in the outer groove, while the safety-clutch which I employ has *H*-shaped clutch-arms *V* at its end, two of which move inside the chambered recess in the timber, while the other two move outside. The lever-arm *W*, to which these clutch-arms are attached, is secured to the cross-timber by a swinging bar, *X*, which is pivoted at one end in the upper cross-timber of the cage-frame, and at the other end to the middle of the lever-bar. One lever-arm and *H*-shaped clutch are used on each side of the point at which the rope is attached to the cross-bar, and their meeting ends pass inside

of the spring-yoke *Y*, to which the rope is attached in the usual way.

In case the hoisting-rope should break, the yoke will be forced downward by the spring so as to throw the outer ends of the lever-bars upward, thus causing the clutches to cramp against the opposite faces of the timber and stop the descent of the cage.

By the above-described arrangement I provide a simple, cheap, and effective hoisting apparatus, which can be easily operated and regulated according to circumstances.

My arrangement for utilizing the descending force of the cage to raise the water into the tanks will be especially valuable in stores and warehouses, where it is frequently necessary to lower heavy weights or bodies while the cage is elevated in an empty condition. In this case the water in the tanks, if a sufficient head is provided, can be used over and over again to lift the empty cage, while the extra descending weight forces it again into the tanks above.

As many cylinders may be mounted upon the carriage as desired, and they can be placed in any convenient position parallel with each other; but usually two cylinders will be all that is required.

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

1. One or more horizontal cylinders, *C C*, mounted upon wheels *D D*, and arranged to reciprocate upon the hollow piston-rods *F F*, substantially as and for the purpose above described.

2. The traveling horizontal cylinders *C C*, in combination with the fixed hollow piston-rods *F F* and perforated piston-head *h*, substantially as and for the purpose above described.

3. The fixed hollow piston-rods *F F* with their perforated piston-heads *h*, in combination with the three-way cocks *o*, the plug of which has an end delivery into the hollow piston-rods, substantially as and for the purpose above described.

4. In combination with the cage and traveling cylinders with their fixed pistons *h* or equivalent device, the upright pipe or pipes *r* and tank or tanks *S*, substantially as described, for the purpose specified.

5. The traveling cylinders *C C* with their centrally-pivoted pull-bar *i*, in combination with the cord, rope, or chain *j* and pulleys *k*, for the purpose specified.

6. The guide-timbers *A A* of an elevator-frame having the groove *e* and inside recess *b*, in combination with the *H*-shaped cramp-arms *V* and lever-bar *W*, substantially as and for the purpose above described.

In witness whereof I hereunto set my hand and seal.

PHILIP HINKLE. [L. S.]

Witnesses:

JOHN L. BOONE,
C. M. RICHARDSON.