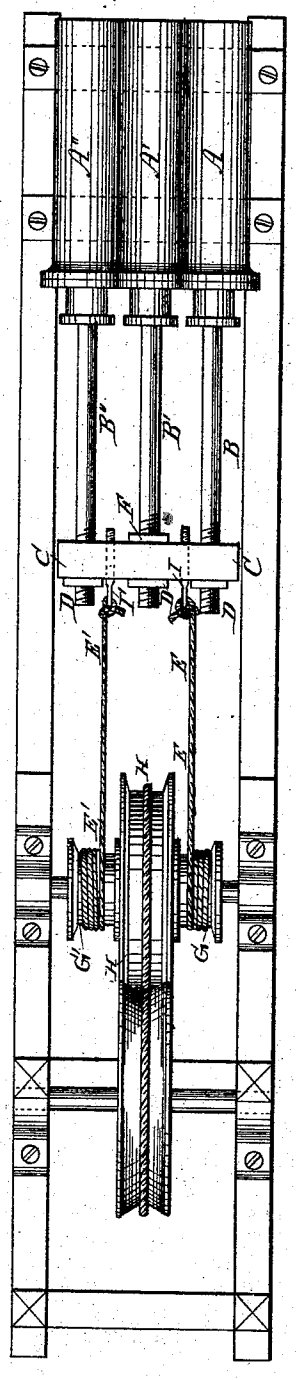
W. H. BIRCH.

Hydraulic-Elevators.

No. 157,570. Patented Dec. 8, 1874.



Witnesses

George Pardy

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WILLIAM H. BIRCH, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **157,570**, dated December 8, 1874; application filed September 28, 1874.

To all whom it may concern:

Be it known that I, WILLIAM H. BIRCH, of the city and county of San Francisco, State of California, have invented an Improvement in Hydraulic Elevators, of which the following is a specification:

This invention relates to a mode of arranging the water-cylinders, and constructing and arranging the connections communicating the power from these cylinders to the winding-drum of the hoist.

The figure of the drawing is a plan, which illustrates my invention completely.

With reference to this drawing, A A′ A″ are three long cylinders of common construction, having the usual inlets and outlets for water. These cylinders may set vertically, although I have shown them set horizontally as being a more desirable arrangement. They are supplied with pistons, bed-frame, and other parts in common fashion. The piston-rods B B″ of the outside cylinders pass loosely through the cross-head C, and have screw-nuts with lock-nuts at D. The middle cylinder's piston-rod does not loosely pass through the cross-head C, but is firmly secured thereto by screwing up the nuts at D and F. The two ropes E E′ are connected with the cross-head by means of the joint-bolts I I′, and wind around their respective drums G G′, which drums are grooved, as shown, to accommodate the ropes. On the shaft which carries the drums G G′ there is placed the elevator-drum H, around which the usual rope for hoisting is wound.

The operation is simple, and as follows: When it is desired to hoist, if the load is small and one cylinder's power is sufficient, the water is admitted to the middle cylinder A′, the piston-rod of which, being secured to the cross-head rigidly, is always operative, the other two cylinders remaining idle, and the cross-head slipping over their respective piston-rods. Now, if the load requires two cylinders' power to lift it, the water is admitted to and operates the second cylinder A″, which now assists to pull back the cross-head. Again, if the power of the third cylinder is needed, it too can be supplied with water, and immediately it will assist in revolving the drums, as do the other two cylinders.

The object of using these independent auxiliary cylinders is to economize water, a little being used in one cylinder when a little is sufficient.

The drums G G′ should bear a proportionate diameter to the main hoist-drum H as the length of the cylinders A to the height of elevation—that is, if the cylinders are, say, ten feet long, and the hoist is forty feet high, then the drums G G′ should be one-fourth the diameter of the drum H.

The valves or cocks admitting water to cylinders will be operated by any common method suitable, and I need not here describe that part of the apparatus.

There are machines operating with more than one cylinder; but no machine is known to the inventor which has the advantages of construction and operation which is claimed belong to this machine.

What I claim as my invention is—

1. The combination of the ropes E E′ with the cross-head C and the piston-rods B B′ B″, connected to the cross-head, substantially in the manner and for the purpose specified.

2. The combination of two or more cylinders arranged side by side, having each independent piston-rods working independently or in connection with each other, as and for the purpose described.

WM. H. BIRCH.

Witnesses:
GEO. PARDY,
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