(No Model.)

A. GRANVILLE.

HYDRAULIC ELEVATOR.

No. 259,848. Patented June 20, 1882.

Fig. 1

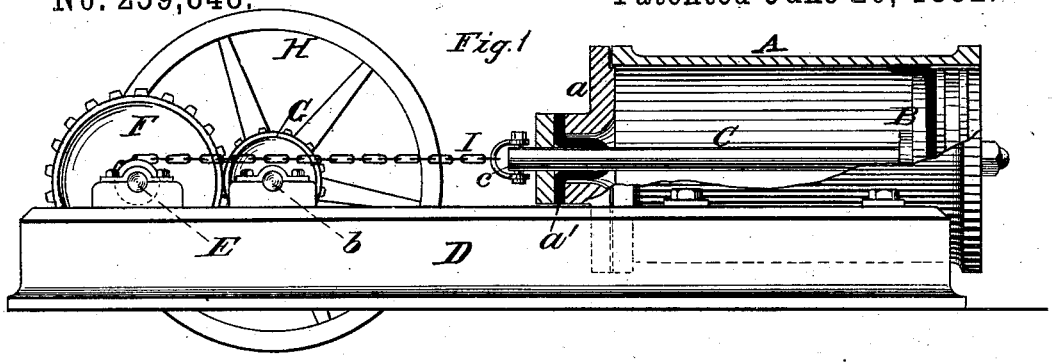


Fig. 2

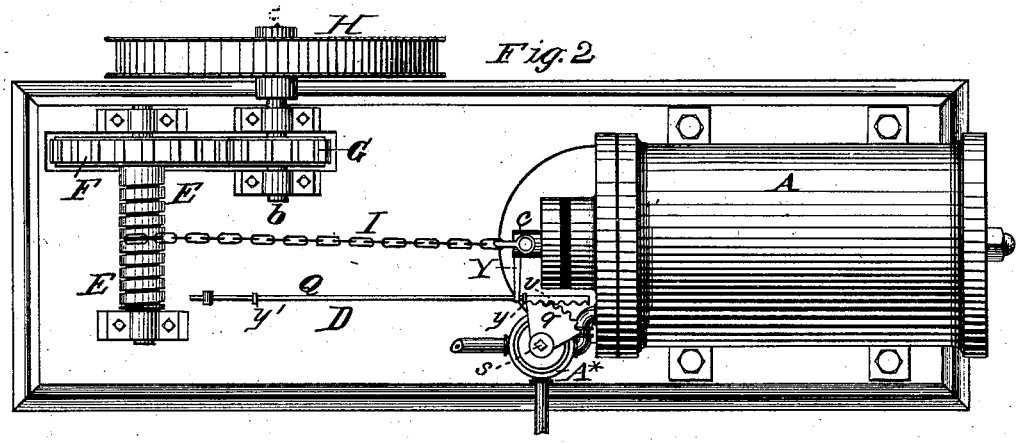


Fig. 3

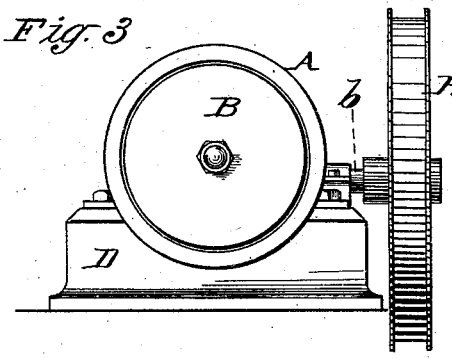


Fig. 4

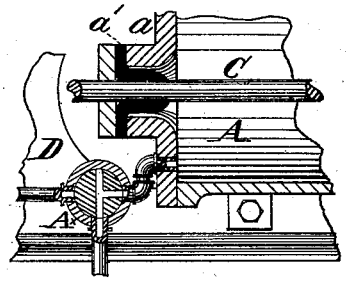
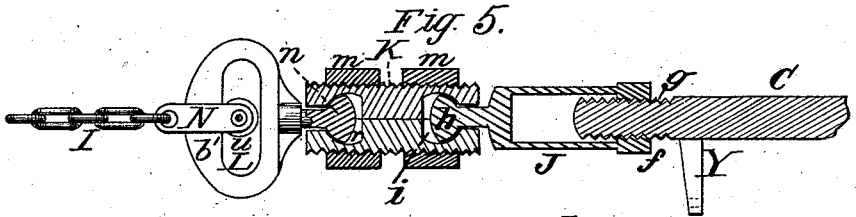


Fig. 5.



Witnesses
Thomas E. Crossman
Chas. P. Dinn

Inventor
Arthur Granville
per James A Whitney atty

UNITED STATES PATENT OFFICE.

ARTHUR GRANVILLE, OF NEW YORK, N. Y.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 259,848, dated June 20, 1882.

Application filed April 17, 1882. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR GRANVILLE, of the city, county, and State of New York, have invented certain Improvements in Hydraulic Elevators, of which the following is a specification.

This invention relates more particularly to that class of elevators commonly known as "sidewalk" elevators, but may in some cases be applied to other elevators. Its object is to insure the economy of time, labor, and space by the application of certain principles of hydrostatics in connection with the mechanical parts of a machine, and to this end it comprises certain novel combination of parts by which said objects are secured.

Figure 1 is a side view and partial vertical sectional view, showing a hydraulic elevator, embracing certain of the features of my said invention. Fig. 2 is a plan view thereof, and Fig. 3 an end view looking from the rear. Fig. 4 is a detail view showing the parts more immediately concerned in operating the cock or valve of the hydraulic cylinder. Fig. 5 is a plan view and partial horizontal section representing certain other features of my said invention.

A is the hydraulic cylinder, in which B is the piston and C the piston-rod, the piston being provided with a leather cup-packing or with any other suitable packing and the piston-rod passing through a similar cup or other packing, A′, suitably provided in the inner end, *a*, of the cylinder, A.

Suitably supported upon the bed-plate D of the apparatus is a spirally-grooved drum, E, to the axis of which is fixed a spur-wheel, F, which gears into a spur-pinion, G, upon the shaft *b* of which is a winding-drum, H, to which the usual hoisting or draft rope or chains of the elevator platform or cage are attached. The draft-rope, together with its attachment to the winding-drum H and the platform or cage, being matters within the common knowledge of machinists and mechanical engineers, require no specific description here.

I is a chain or rope, one end of which is attached to the end *c* of the piston rod C, while the opposite end of said chain or rope is suitably attached to the drum E in such manner that when the said drum is rotated the chain will wind in and traverse the spiral groove, which extends continuously around said drum from one end toward the other thereof to an extent proportioned to the stroke of the piston, as indicated in Fig. 2.

In the simpler forms of the apparatus the chain or rope I may be attached directly to the end *c* of the piston-rod C. In others it will be connected thereto by the intermediate devices represented in Fig. 5 and hereinafter more fully set forth.

In the operation of the apparatus the hydrostatic pressure—that is to say, the water under pressure—is admitted in the ordinary or in any suitable manner to the cylinder A between the inner end, *a*, and the piston B thereof, thereby tending to force the said piston outward away from the end *a* of said cylinder. Preparatory to this—that is to say, when the piston B is moved inward to the head *a*—the chain or rope I is coiled upon the drum E and in the grooves thereof, as hereinbefore explained. Such being the position of the parts the outward movement of the piston B, acting through the piston-rod C and chain I, unwinds the said chain from the drum E, and consequently rotates the same, the rotatory motion being transmitted through the spur-wheel F and spur-pinion G to the winding-drum H, and thence to the draft rope or chains and cage to raise the latter. The reverse or downward movement of the platform or cage is of course secured by the exit of the water in the usual or any suitable manner from the cylinder A, which permits the platform or cage to descend by its own gravity. Under many conditions the apparatus constructed as above may be used without the devices represented in Fig. 5; but in many others the lateral movement of the chain or rope I as it unwinds from one end of the drum E toward the other will exert too much lateral strain upon the end of the piston-rod C, and consequently cause leakage and derangement of the packing; and to obviate this I provide the devices represented in Fig. 5 and constructed as follows:

J is a yoke, one end of which is formed with a female screw, *f*, which is passed upon a screw-threaded portion, *g*, provided upon the end of the piston-rod C. The opposite end of the yoke J is provided with a knob, *h*, which fits

into a cavity, *i*, in the body K of a turn-buckle, the said body K being composed of two longitudinal halves externally threaded and held together by two nuts, *m m*.

L is a clevis provided with a knob, *n*, which fits into a cavity, *r*, in the adjacent end of the turn-buckle K. The inner side, *b'*, of the clevis L is straddled by a link, N, attached to the inner end of the chain or rope I, and provided with a roller, *u*, which passes through the slot or inside of the clevis L, so as to move freely from one end to the other thereof. This movement of the link N—in other words, of the adjacent end of the chain I—permits the latter to accommodate itself to the grooves of the drum E while winding or unwinding in the said grooves from one end toward the other of the said drum.

The connection of the clevis L with the turn-buckle K by means of the knob *n* fitted into the cavity *r* permits the chain to turn in such manner as to avoid kinking or binding, this being supplemented by a similar action of the turn-buckle with reference to the knob *h* of the yoke J, this also permitting the said yoke J to be turned upon the screw *g* of the piston-rod C, in order to tighten or loosen the chain or rope I until it is brought to the requisite tension upon the drum E, by which means the perfect adjustment of the parts is very readily secured.

It is of course to be understood that certain parts may be omitted when it is only desired to provide for the automatic lateral adjustment of the chain or rope I as it is passed from one end to the other of the spirally-grooved drum E; also, that certain other parts may be omitted when it is only desired to provide for adjusting the tension of the draft rope or chain I in its relation with the drum E and the piston-rod C; but in general it will be found advantageous to use these two features of the invention in connection with each other and as represented in Figs. 1, 2, 3, and 4. I provide, further, an arrangement shown in Fig. 2, whereby the pressure is shut off automatically, thus controlling the stroke of the piston or action of the machine when necessary.

Q is a rod, one end of which has a rack, *v*, gearing into a toothed quadrant, *q*, which is affixed to the stem *s* of a three-way cock, (shown at A* in Fig. 4,) or a two-port slide-valve or a valve of any other suitable construction, which regulates the flow of the water in and out of the cylinder A.

Y is an arm extending from near the end of the piston-rod C, and *y y'* are two stops, fixed at proper intervals on the rod Q.

The action of this automatic arrangement of parts is as follows: When the stroke is nearly ended, as shown in Figs. 1 and 2, the arm Y will strike against the stop *y*, moving forward the rack *v*, gearing into quadrant *q*, turning the three-way cock by the stem S, and thus shutting off the induction of water and arresting the stroke and stopping the machine. The same action takes place when the arm Y shall strike the stop *y'*, which will pull back the rod Q, rack *v*, gearing into quadrant *q*, which will turn the stem of the cock the reverse way, closing the port and arresting the machine by stopping the outflow from the cylinder A of the eduction water.

What I claim as my invention is—

1. A hydraulic elevator having as its essential parts the cylinder A, piston B, piston-rod C, chain or rope I, spirally-grooved drum E, spur-wheel F, spur-pinion G, and hoisting-drum H, the whole constructed and combined for joint use and operation substantially as and for the purpose herein set forth.

2. The combination, with the rod C of the piston B, the cylinder A, chain or rope I, and spirally-grooved drum E, of the yoke J and turn-buckle K, having the nuts *m*, all substantially as and for the purpose herein set forth.

3. The combination of the clevis L and link N and roller *u* with the piston-rod C, the chain or rope I, the spirally-grooved drum E, the piston B, and cylinder A, all substantially as and for the purpose herein set forth.

4. The rod Q, having the rack *v*, the arm Y, attached to the piston-rod C, and toothed sector *q*, in combination with the cock or valve of the cylinder A, chain I, and winding mechanism, substantially as described, for operation in connection with the said mechanism, all substantially as and for the purpose herein set forth.

ARTHUR GRANVILLE.

Witnesses:
CHAS. P. BLINN,
ROBERT W. MATTHEWS.