

(No Model.)

2 Sheets—Sheet 1.

T. MASON.
ELEVATOR HOIST.

No. 599,618.

Patented Feb. 22, 1898.

Fig. 1.

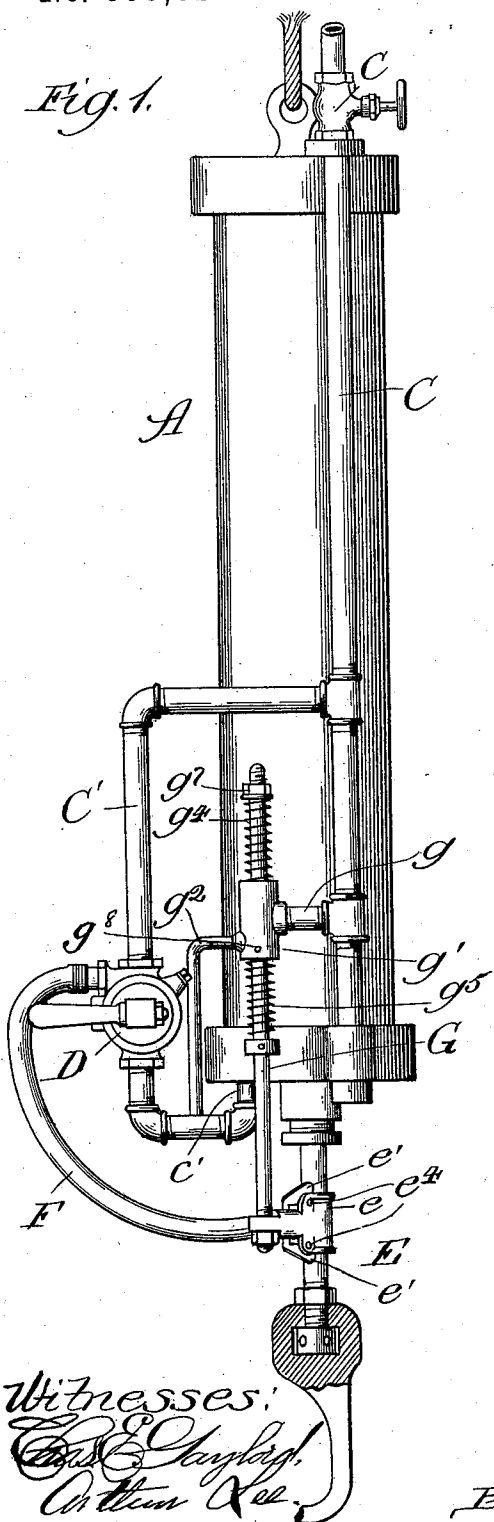
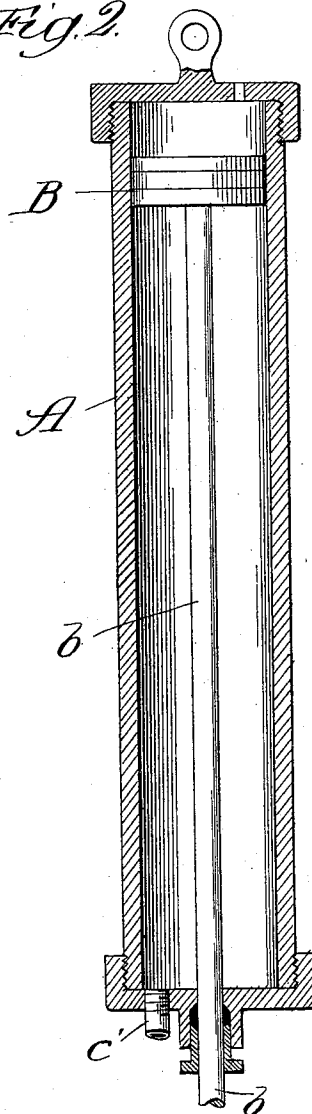


Fig. 2.



Witnesses:

Edw. C. Claydon,
Arthur A. Lee.

Inventor:

Thomas Mason

By Running & Running & Sheridan,

Attys.

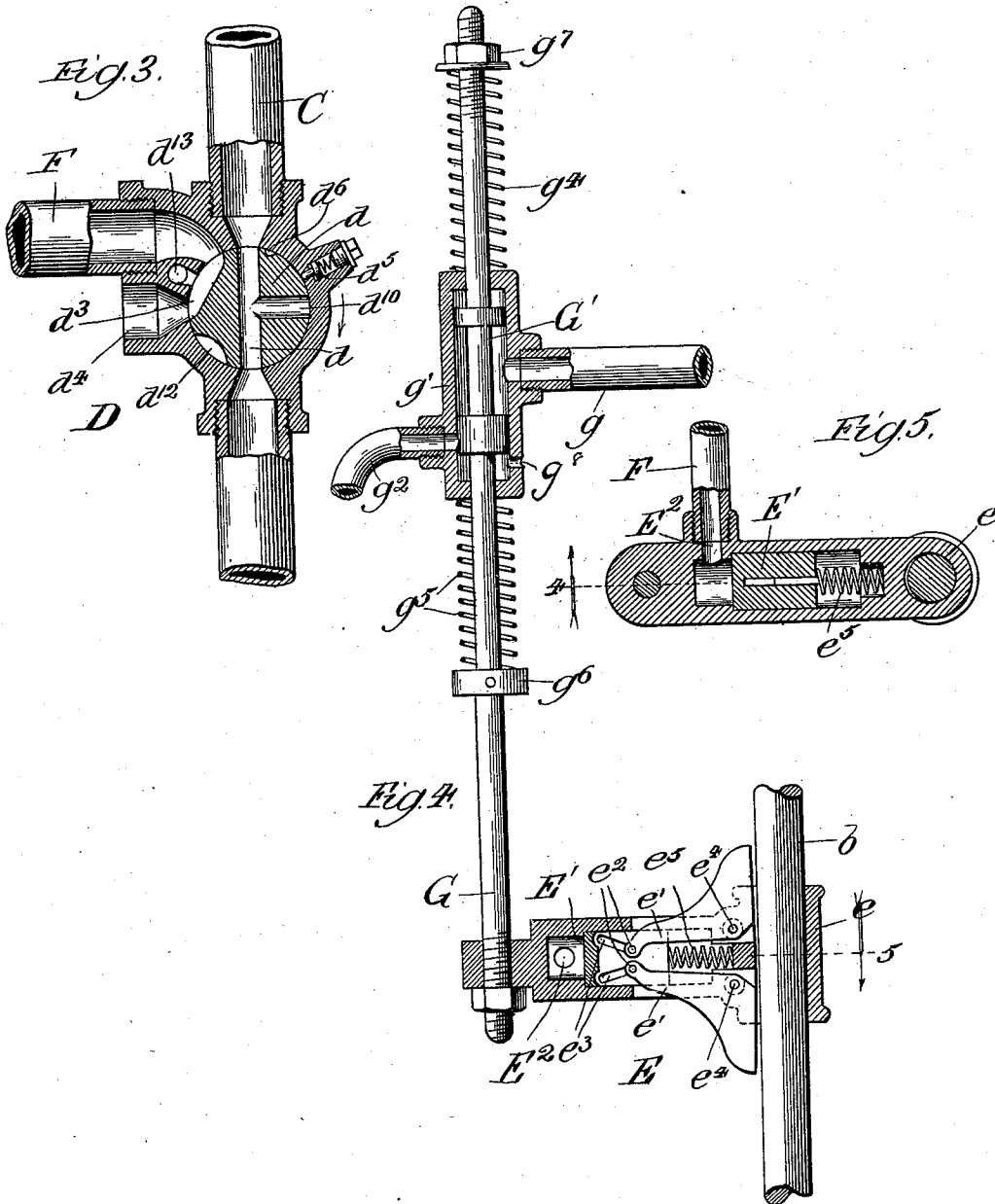
(No Model.)

2 Sheets—Sheet 2.

T. MASON.
ELEVATOR HOIST.

No. 599,618.

Patented Feb. 22, 1898.



Witnesses:
E. E. Chylo,
C. H. Allen & Co.

Inventor:
Thomas Mason
By Ranning O. Ranning & Sheridan,
Attys.

UNITED STATES PATENT OFFICE.

THOMAS MASON, OF TOPEKA, KANSAS.

ELEVATOR-HOIST.

SPECIFICATION forming part of Letters Patent No. 599,618, dated February 22, 1898.

Application filed August 25, 1896. Renewed July 12, 1897. Serial No. 644,346. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MASON, a citizen of the United States, residing at Topeka, Shawnee county, Kansas, have invented certain new and useful Improvements in Elevators and Hoists, of which the following is a specification.

My invention relates particularly to elevators and hoists that are used in combination with mechanism adapted to be operated with fluid-pressure; and it relates especially to the mechanism by which the load is automatically sustained in any desired or predetermined position.

The object of my invention is to provide a simple, economical, and efficient elevator or hoisting machine; and the invention consists in the features, combinations, and details of construction hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a hoist fitted with my improvements; Fig. 2, a vertical sectional elevation of the same, showing the reciprocating piston and rod; Fig. 3, an enlarged sectional elevation of the main valve; Fig. 4, an enlarged sectional elevation of the gripping mechanism and other parts hereinafter described, taken on line 4 of Fig. 5; and Fig. 5, a transverse sectional elevation of the same, taken on line 5 of Fig. 4.

In illustrating and describing my improvements I will only describe and illustrate them in connection with one form of hoist; but I do not desire to be limited strictly thereto, as by mere mechanical changes, such as persons skilled in the art are capable of making, my improvements are applicable to many forms of pressure-elevators.

In constructing my improvement I make a cylinder A of the desired size, shape, and strength to hold the operative parts in position. In this cylinder I arrange the reciprocating piston B, having a piston-rod b extending out through the lower end of the cylinder. This piston-rod is preferably provided at its lower end with a hook b', which may be secured to the load or any desired mechanism for the purpose of operating the same.

In order to raise the load and maintain it in the desired position, I provide a service-

pipe C, leading to any desired source of fluid-pressure, preferably compressed air. This service-pipe is provided with an ordinary globe-valve c, arranged at a convenient location for shutting off the fluid-pressure to prevent the working of the machine.

Connecting with the service-pipe is a branch pipe C', having a rotary valve D located thereon intermediate its connection with the service-pipe and its entrance, as at c', into the lower portion of the cylinder. This rotary valve is provided with a plug or rotatable portion d, having the desired number of passages and by-passes in the same. When the parts are in the position shown in Figs. 1 and 3, the plug has its main passage d in such position as to form a continuous passage from the service-pipe through the branch pipe to the cylinder to admit fluid-pressure to the same. By turning the rotary valve-plug in the desired direction the passage of the branch pipe is obstructed and direct pressure shut off from the cylinder portion.

To maintain the load, or, more properly speaking, the piston, in the desired position, I provide gripping mechanism E, consisting of a casing e, arranged to encircle the piston-rod and having a pair of gripping-jaws e' and an actuating-plunger E'. The outer ends of the gripping-jaws are provided with pins e², that enter grooves or recesses e³ in the plunger, so that when such plunger is pushed inwardly the outer ends of the jaws are spread apart, and, being pivoted at e⁴, their opposite ends grasp or clamp the piston-rod firmly, so that the gripping mechanism partakes of the same movement as the piston-rod. A pipe F leads from the rotary valve to an opening E² in the gripping mechanism back of the plunger, so that fluid-pressure entering the same forces the plunger in to grip the parts, as above described, while a small coiled spring e⁵ acts to restore them to their normal unlocked position when fluid-pressure is removed.

As shown in Figs. 1 and 3 of the drawings, the passage from the gripping mechanism is opened by means of the by-pass d³, so that pressure will exhaust from the gripping mechanism through pipe F, by-pass d³, and out through the opening d⁴ into the open air. To operate the gripping mechanism, the rotary

valve is turned about one-eighth in the direction indicated by the arrow in Fig. 3, so that a spring-stop d^5 enters a notch d^6 in the rotary valve and holds the rotary valve in such position that pressure is shut off from the main valve and the passage opened through branch pipe C' to the by-pass d^3 of the valve and through pipe F to the chamber of the gripping mechanism to operate its plunger and securely fasten the grip.

Should the pressure in the main cylinder decrease at any time, so that the load tends to descend and the gripping mechanism is secured to the piston-rod, the descending load carries with it the valve-rod G in such manner that it depresses or operates the valve G', by means of which an emergency-passage is opened from the service-pipe through the pipe g, the valve-casing g', and the small branch pipe g², through the pipe c', so that pressure may enter the cylinder and cause the load to resume its desired position. The ascending of the load again moves with it the valve-rod G and carries the valve to the position shown in Fig. 4, shutting off the emergency-passage. Helical coiled springs g⁴ and g⁵, located one on each side of the valve-casing, contact collars or adjustable nuts g⁶ and g⁷, so as to keep the valve normally in the position shown in Fig. 4 when the gripping mechanism is not in use.

In operation the load is secured to the hook b' and the rotary valve D moved to the position shown in Fig. 3 of the drawings, so that fluid-pressure passes through the branch pipe through the rotary valve into the cylinder to raise the load. When the load reaches the desired elevation, the rotary valve is turned one-eighth to the right, so that its by-pass d^3 connects the pipes C' and F and furnishes fluid-pressure to the gripping mechanism, thus causing it to effectually grip the piston-rod and be operated thereby. If the piston-rod descends, it carries with it the valve D', so as to open an emergency-passage through such valve into the branch pipe and furnish pressure to again raise the load to the desired position. When it is desired to cause the load to descend, the rotary valve is moved ninety degrees to the right from original position, so that fluid-pressure passes out from the cylinder through the branch pipe c', through the passage d^{10} of the rotary valve and d', and out through the passage or opening d^4 in the valve-casing. At the same time the by-pass d^{12} connects the pipe F with the exhaust-opening d^{13} , so that the fluid-pressure passes from the grip mechanism through the pipe F, by-pass d^{12} , and opening d^{13} into the outer air.

In Fig. 4 the casing of the emergency-valve has an opening g⁸ so arranged that when the pressure in the cylinder is increased to any extent either by lessening the load or otherwise the valve-rod rises with the piston-rod, and the valve is operated so as to open a passage from the cylinder through branch pipe

c', pipe g², through valve and opening g⁸ in the casing into the outer air until pressure is reduced and the parts resume their desired position.

While I have described my invention with more or less minuteness as regards details and as being embodied in certain precise forms, I do not desire to be limited thereto unduly any more than is pointed out in the claims. On the contrary, I contemplate all proper changes in form, construction, and arrangement, the omission of immaterial parts, and the substitution of equivalents, as circumstances may suggest or necessity render expedient.

I claim—

1. In mechanisms of the class described, the combination of motor mechanism for raising and sustaining a load, controlling mechanism for stopping and starting the motor, and grip mechanism arranged to be actuated by fluid-pressure and automatically grip the controlling mechanism to sustain the load in a desired position, substantially as described.

2. In mechanism of the class described, the combination of a cylinder portion having a piston movably mounted therein, a piston-rod extending out of the cylinder, a controlling-valve for admitting and shutting off fluid-pressure from the cylinder portion, gripping mechanism arranged to be actuated by fluid-pressure when the controlling-valve is in its closed position to clasp the movable part, and a second valve connected with a source of fluid-pressure arranged to be actuated as the gripping mechanism is operated to admit or exhaust pressure to and from the cylinder and automatically sustain the load in the desired position, substantially as described.

3. In mechanism of the class described, the combination of a cylinder provided with a reciprocating piston and piston-rod, a controlling-valve for admitting and shutting off fluid-pressure from the cylinder portion, gripping mechanism arranged to grasp the piston-rod and be operated by fluid-pressure, a pipe connecting the gripping mechanism with the chamber of the controlling-valve, whereby as the valve is turned to its closed position fluid-pressure is admitted through the pipe to actuate the gripping mechanism, an emergency-valve and chamber which is connected with the source of fluid-pressure and with the cylinder portion and having its valve-rod connected with the gripping mechanism, whereby as the piston is operated an emergency-passage is opened through this valve and fluid-pressure furnished or exhausted from the cylinder portion to automatically sustain the load, substantially as described.

4. In mechanism of the class described, the combination of a cylinder having a reciprocating piston and rod, a service-pipe connected with a source of fluid-pressure, a branch pipe connecting the service-pipe with the cylinder, a controlling-valve on said branch pipe for

shutting off pressure from or admitting fluid-pressure to the cylinder, gripping mechanism arranged to grasp the piston-rod and be actuated by fluid-pressure, a pipe connecting the gripping mechanism with the chamber of the controlling-valve, a movable part in the controlling-valve provided with passages whereby when in one position fluid-pressure is admitted direct to the cylinder and exhausted from the gripping mechanism, when in the second position fluid-pressure is shut off from the cylinder and admitted to the gripping mechanism, and when in the third position fluid-pressure is shut off from the gripping mechanism and the cylinder and allowed to exhaust from the same through the valve into the outer air, substantially as described.

5. In mechanism of the class described, the combination of a cylinder provided with a reciprocating piston and piston-rod arranged to be actuated by fluid-pressure, a service-pipe for furnishing fluid-pressure, a branch pipe connecting the service-pipe with the cylinder portion, a rotary controlling-valve located thereon, gripping mechanism consisting of a pair of pivoted jaws adapted to grasp the piston-rod and a plunger adapted to be actuated by fluid-pressure to operate the jaws, a pipe connecting the chamber of the gripping mechanism with the controlling-valve, a plug in the controlling-valve provided with passages, whereby when in one position fluid-pressure may be admitted to the cylinder and shut off from the gripping mechanism, when in the second position admitted to the gripping mechanism and shut off from the cylinder, and when in the third position shut off from both the cylinder and gripping mechanism and allowed to exhaust out through the valve, and a second slide-valve having its rod connecting with the gripping mechanism, whereby during the movements of the gripping mechanism and piston-rod fluid-pressure is admitted through such valve into the cylinder to raise the load, again close the valve and automatically sustain the load in the desired position, substantially as described.

ton-rod and a plunger adapted to be actuated by fluid-pressure to operate the jaws, a pipe connecting the chamber of the gripping mechanism with the controlling-valve, a plug in the controlling-valve provided with passages, whereby when in one position fluid-pressure may be admitted to the cylinder and shut off from the gripping mechanism, when in the second position admitted to the gripping mechanism and shut off from the cylinder, and when in the third position shut off from both the cylinder and gripping mechanism and allowed to exhaust out through the valve, and a second slide-valve having its rod connecting with the gripping mechanism, whereby during the movements of the gripping mechanism and piston-rod fluid-pressure is admitted through such valve into the cylinder to raise the load, again close the valve and automatically sustain the load in the desired position, substantially as described.

THOMAS MASON.

Witnesses:

ARTHUR LEE,
S. L. SEABROOK.