No. 646,458.

H. A. PEDRICK. Patented Apr. 3, 1900.

PNEUMATIC HOISTING APPARATUS.

(No Model.) (Application filed Apr. 24, 1899.)

Fig. 1

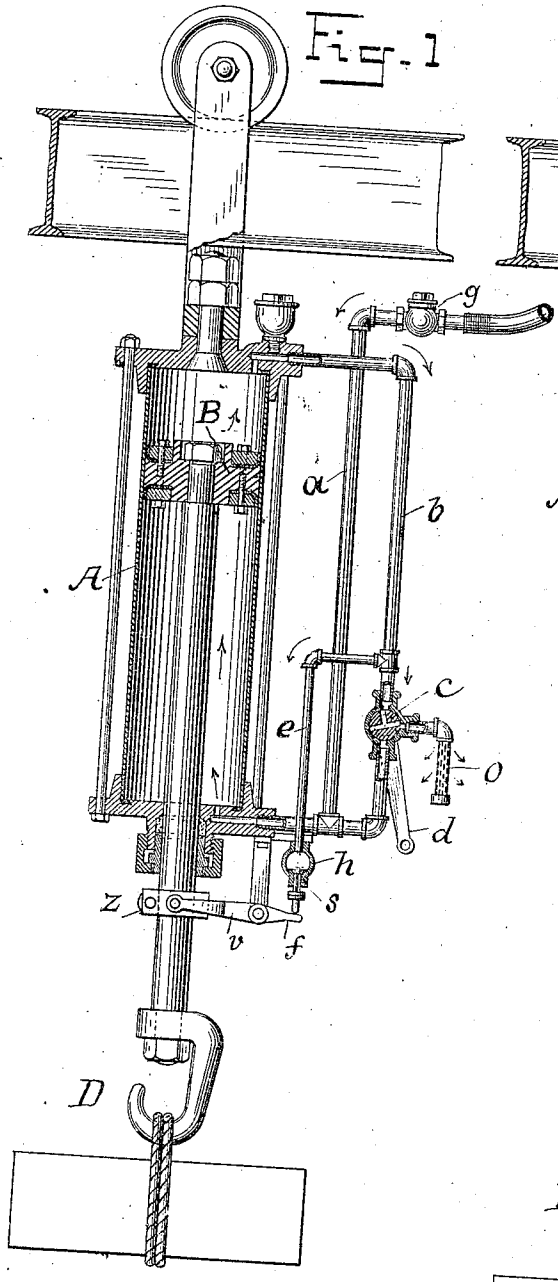
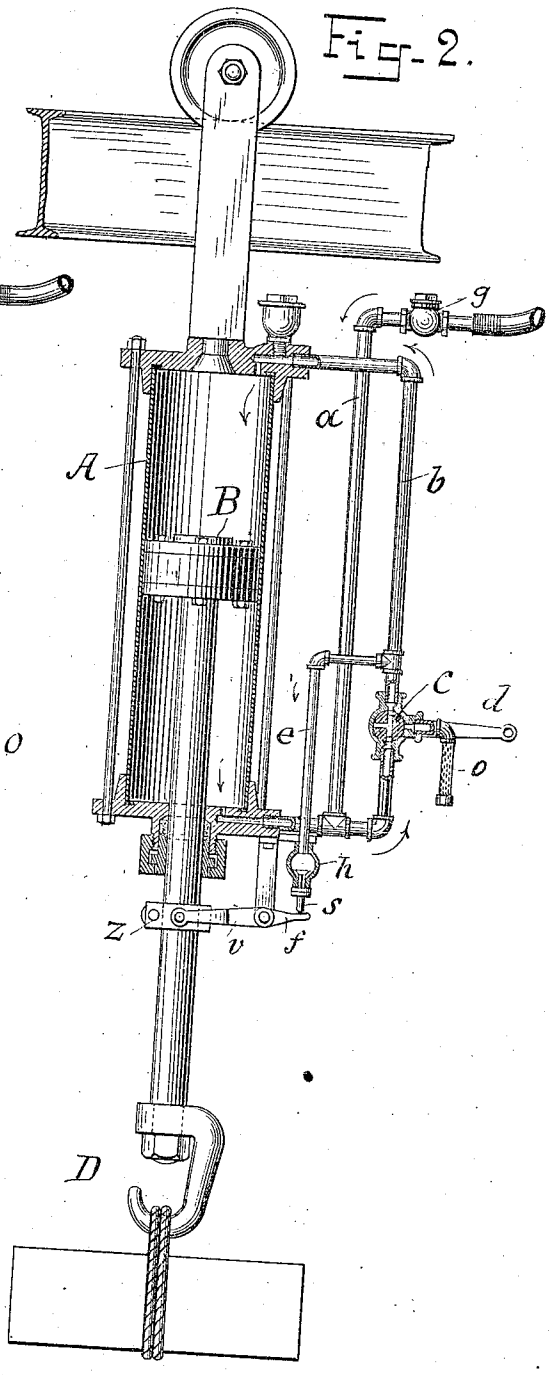


Fig. 2.



Witnesses
Charles Hanimann
George A. Powell.

Inventor
Howard A. Pedrick
By his Attorney
Chas. H. Parker

UNITED STATES PATENT OFFICE.

HOWARD A. PEDRICK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE PEDRICK & AYER COMPANY, OF SAME PLACE.

PNEUMATIC HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 646,458, dated April 3, 1900.

Application filed April 24, 1899. Serial No. 714,291. (No model.)

To all whom it may concern:

Be it known that I, HOWARD A. PEDRICK, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Pneumatic Hoisting Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to pneumatic hoists having a cylinder and piston with a projecting piston-rod that is connected to lift the load and a valve system that regulates the admission and exhaust of the motive fluid.

The present invention is designed to utilize compressed air as a motive agent; and it consists in admitting the air directly to one end of the cylinder and through a regulating-valve to the opposite end and maintaining an equilibrium of pressure on opposite sides of the piston, and then releasing the pressure from either side of the piston by suitable valve mechanism when operating it in raising or lowering the load.

In the accompanying drawings, forming part of this specification, I have illustrated a hoist embodying my invention, in which—

Figure 1 is a side view, partly in section; and Fig. 2, a similar view showing the various parts and operating devices in their relative operating positions in raising or lowering the load.

A is the cylinder; B, the piston with depending piston-rod and hook D, that engages with the load; *a*, the air-supply pipe, and *b* a pipe communicating therewith and with both ends of the cylinder A through a valve C, operated by a handle *d*.

O is an exhaust-pipe leading from the valve C, and *e* an auxiliary exhaust-pipe communicating with the pipe *b* and provided with a check-valve *h*, that is automatically operated by devices connecting with and operating coincident with the descending movement of the piston, all as hereinafter referred to.

The air-supply pipe *a* communicates through a stop-valve *g* directly with the inlet-pipe *b*, leading to the cylinder beneath the piston and through the valve C above the piston.

The valve C on the pipe *b* is a three-way operating-valve, which regulates the communication with the respective ends of the cylinder above and below the piston and the exhaust-pipe *o*, leading to the atmosphere, the valve being adjusted, as shown in Fig. 1, to throttle the passage in pipe *b*, and whereby the pressure above the piston is reduced an amount equal to the load lifted and sufficient to permit the piston to rise. When the piston has raised the load to the desired height, the operating-valve is turned to close the exhaust *o* to the atmosphere and communication with the upper end of the cylinder, pressure being constantly applied from the supply-pipe *a* directly to the lower side of the piston.

When it is desired to lower the load, the operating-valve C is turned to the position shown in Fig. 2, which opens communication between each end of the cylinder and closes the exhaust *o* to the atmosphere. The piston B is then forced downward by reason of the greater pressure on its upper side due to its greater superficial area. A branch or auxiliary exhaust-pipe *e* is also provided, which communicates directly with the upper end of the cylinder and the atmosphere and is fitted with a check-valve *h*, opening inwardly. This valve is provided with a depending stem *s* and always held seated, except when opened by the free arm *f* of a pivoted lever, the opposite arm *r* being connected by a friction-collar *z* to the piston-rod shown. The object of this attachment is to maintain the balanced pressure on both sides of the piston during the suspension of the load, the tendency of the piston being to settle downwardly, due principally to leakage past the piston from its lower side. As the piston settles the friction-collar *z* on its rod rocks the pivoted lever *r*, connected with it, causing the free or opposite end *f* to contact with and automatically raise the depending stem *s* of the auxiliary exhaust-valve *h*, open the latter, and permit the pressure from above the piston to escape, and when sufficient air has escaped to balance the pressure and load the piston then rises slightly and releases the connection with the auxiliary exhaust-valve *h*, which is instantly seated by the internal pressure.

Among the advantages derived in the present invention are the following: The piston being thus maintained under a balance of forces prevents its sudden rise or fall at all

times. The piston cannot rise until the reduction of pressure above it equals the load to be lifted. The time in equalizing the pressure after reduction is comparatively shortened. The area on the top of the piston being greatest, it lowers more quickly under the compressor-pressure.

I am aware that hydraulic hoists in which pressure is admitted to both ends of the cylinder and an equilibrium of pressure created on opposite sides of the piston are not new, the operation of the piston in this instance being effected by forcing water alternately from one side of the piston to the other; but I am not aware that a pneumatic hoist has heretofore existed wherein an equilibrium of pressure is admitted and maintained in both ends of the cylinder and on the opposite sides of the piston and exhausted alternately from the upper end of the cylinder to the atmosphere and from the lower end of the cylinder to its upper end to operate the piston in either respective direction, as desired, and constantly maintain the load at any position upon closing the exhaust-passage.

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

1. The combination with the cylinder, piston and piston-rod of a pneumatic hoist having a motive-fluid-supply pipe communicating with one end of the cylinder, and a branch pipe communicating with the opposite end of the cylinder, whereby the motive fluid is admitted to both sides of the piston and an equilibrium of pressure established, of a valve interposed in the passage between the respective ends of the cylinder for exhausting the fluid from the upper end of the cylinder to the atmosphere and from the lower end of the cylinder to its upper end, to operate the piston in either direction, substantially as described.

2. In a pneumatic hoist consisting of a cylinder, piston, piston-rod and motive-fluid-supply pipe, communicating directly with one end of the cylinder and intermediately with its opposite end, and an interposed controlling-valve adapted to admit the direct pressure to both sides of the piston simultaneously, and to release the same from either side alternately substantially as described, and a relief-valve opening communication with the atmosphere and the cylinder above the piston; operated automatically and coincidently with any downward movement of the piston from any position in which it may be held, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HOWARD A. PEDRICK.

Witnesses:

JNO. J. BENNETT,

WALTER F. HENLY.