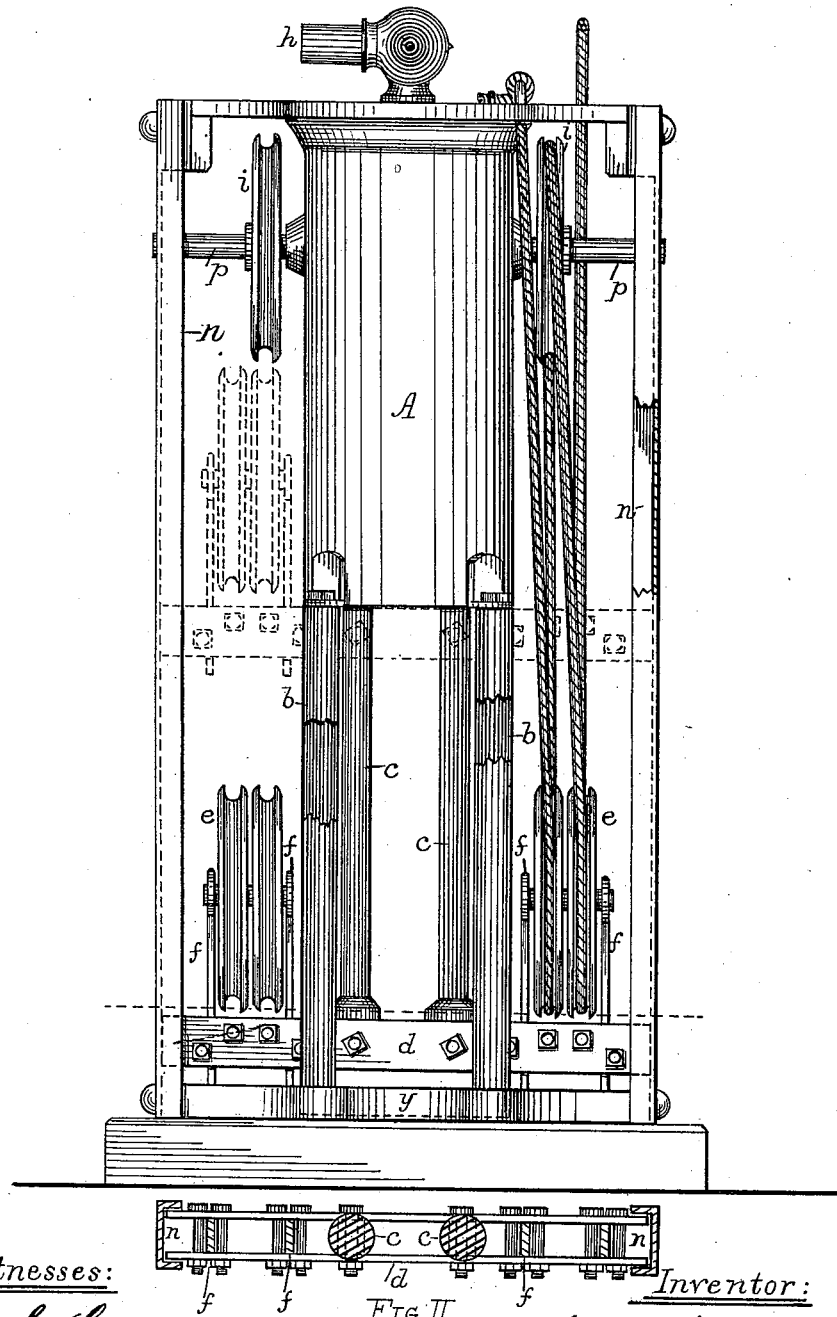


H. SNOWDEN.  
Hydraulic-Elevator.

No. 215,985.

Patented May 27, 1879.

FIG. I.



Witnesses:

Chas. E. Lewis  
Chas. B. Mann

Inventor:

Henry Snowden.

# UNITED STATES PATENT OFFICE

HENRY SNOWDEN, OF BALTIMORE, MARYLAND.

## IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **215,985**, dated May 27, 1879; application filed April 9, 1879.

*To all whom it may concern:*

Be it known that I, HENRY SNOWDEN, of Baltimore, in the county of Baltimore and State of Maryland, have invented a new and useful Improvement in Hydraulic Elevators, of which the following is a specification.

This invention relates to hydraulic elevators, and has for its object to so construct the vertical engine that it will occupy less vertical space than ordinary—a very important consideration in cellars or basements of ordinary depth.

The subject-matter hereinafter claimed will now be designated.

Figure 1 is an elevation of the engine. Fig. 2 is a cross-section through *x x*.

The letter *A* represents the cylinder, which is supported by columns *b*, having their foundation at *y*. The height of the supporting-columns must be sufficient to permit the stroke of the piston in a downward direction. *c c* are the piston-rods, two in number, to which are attached the cross-head *d*. This latter carries at each end and upon its upper side the sheaves *e*, each set of which is supported on a horizontal shaft, sustained by the standards *f*.

On each side of the apparatus is a vertical iron guide or channel, *n*, for the cross-head, which also gives stability to the engine, and supports the shaft *p* for the stationary sheaves *i*. These latter are mounted below the upper end of the cylinder.

The cross-head is composed of two straight bars of iron placed horizontally, one on each side of the standards *f*, and the ends of the two piston-rods are secured by means of bolts, so as to clamp these parts, thus forming an inexpensive cross-head, possessing the advantages of simplicity and strength.

When the car is down and the cylinder is empty the upper and lower sheaves occupy a position along the sides of the cylinder and within the limits of its length, as indicated by dotted lines.

The water enters the cylinder through the port *h* in the upper end, and, acting against the piston-head, depresses it, thereby forcing

the cross-head downward, carrying the sheaves *e*, and, through the medium of ropes in a well-known manner, raising the car or platform to the desired height, the extreme limit of which, it will be understood, is regulated by the number of sheaves used.

It will be seen that by the construction just described the vertical space needed for the operation of the engine is exactly twice the length of the cylinder, being less in the vertical direction than is required by machines having the same power and stroke of other forms. It is also easy of access below for repairs or for other purposes. I am enabled to dispense with one stationary sheave on each side.

As the car or platform is raised the lifting power of the engine is increased in consequence of the greater weight of water on the piston-head in the cylinder. An incidental advantage is the weight of the movable cross-head, and the set of sheaves which it carries, together with the piston-rods and piston-head, serve as a counter-balance for the weight of the car or platform.

I consider my arrangement of two piston-rods on one piston-head, especially when employed in a vertical hydraulic engine, where the stroke is from the lower end of cylinder downward, as very advantageous, in that the two rods divide the strain upon both the piston-head and cross-head, prevent vibration of these parts, and permit of easy access to the packing, &c.

Having described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A vertical hydraulic engine consisting of cylinder *A*, supported endwise upon columns *b*, and having the sheaves *i* attached at the sides and below the upper end, the piston having its stroke from the lower end and carrying the cross-head *d*, which is provided on its upper side, at each end, with sheaves *e*, whereby the upper and lower sheaves may occupy space on the sides and within the length of cylinder, as set forth.

2. In a hydraulic engine, the combination of

a vertical cylinder having its piston-head provided with two piston-rods and a cross-head, the ends of which slide in vertical guides and carry sheaves, as set forth.

3. The cross-head *d*, consisting of two horizontal bars having between them the standards *f* and piston-rods, which are clamped, as set forth.

4. In a hydraulic engine, the combination of two piston-rods connecting one piston-head and a transverse bar forming a cross-head to carry the sheaves, as set forth.

HENRY SNOWDEN.

Witnesses:

R. HIPKINS,

JOHN W. TAYLOR.