D. Bickford,

Hydraulic Jack,

No. 51,129. Patented Nov. 28, 1865.

Fig: 1

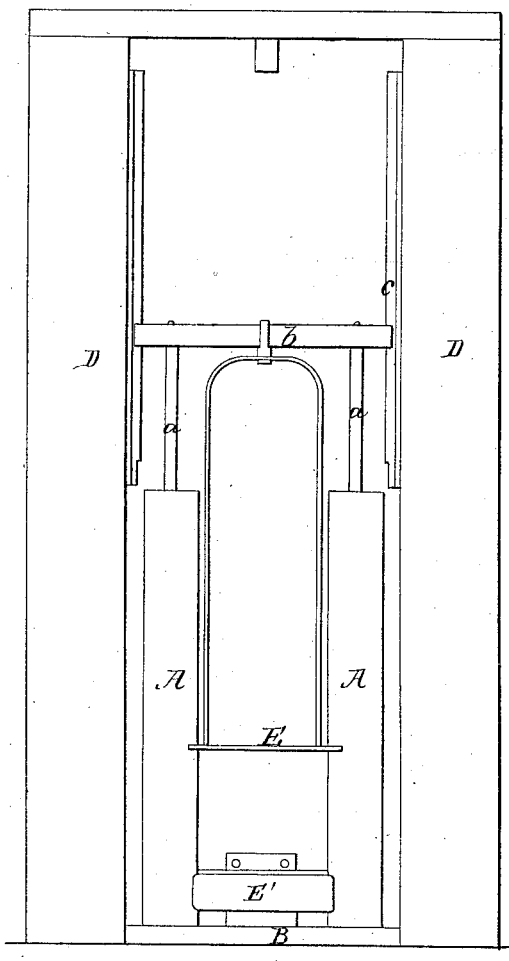


Fig: 2.

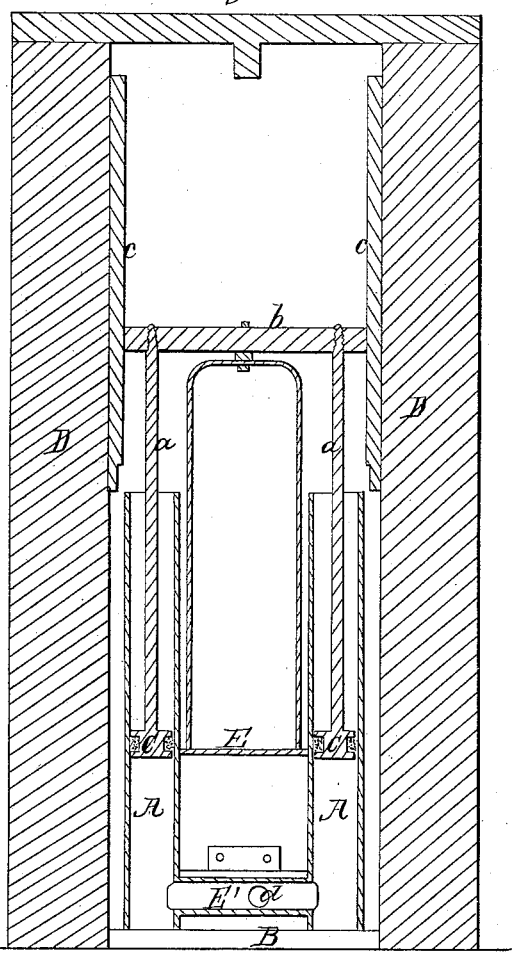
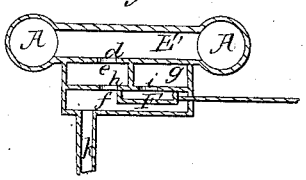


Fig: 3.



Inventor;
Dana Bickford
by his attorney.
R. W. Eddy

UNITED STATES PATENT OFFICE.

DANA BICKFORD, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN HYDRAULIC ELEVATORS.

Specification forming part of Letters Patent No. **51,129**, dated November 28, 1865.

To all whom it may concern:

Be it known that I, DANA BICKFORD, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Elevator for Raising Weights or Bodies or Articles of Various Kinds from one Level or Position to Another or Higher one; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a front elevation, and Fig. 2 a vertical section of it. Fig. 3 is a horizontal section of its valve-chest and air-conduits.

In the said drawings, A A denotes two vertical cylinders projecting upward from a base-plate, B, and having a piston, C, in each of them. These cylinders are open at their upper ends. Their piston-rods *a a* are connected by a cross-head or bar, *b*, which is furnished with vertical guides, *c c*, applied to the posts of a frame, D. A platform, E, is suspended from the cross-bar *b* and between the two cylinders.

A pipe, E′, connects the two cylinders at their lower parts and opens into both of them. The said pipe also has an opening, *d*, leading into a chamber, *e*, which, by a passage or port, *h*, opens into a valve-chamber, *f*. The said chamber *f* also opens by a port, *i*, into a chamber, *g*, which communicates freely with the external atmosphere. A chambered valve, F, is arranged in the chamber *f* so as to operate with the ports *h i*. A pipe, *k*, serves to conduct air from an air-forcing pump or its equivalent into the valve-chamber *f*.

When the port *h* is uncovered by the valve the air will pass into the cylinders and below their pistons, and by its pressure upward against the latter will force them upward and cause the platform to be lifted to a higher position.

On moving valve F over the two ports *h i* the compressed air within the cylinders will escape into the atmosphere and allow the pistons and the platforms to fall to their lowest positions.

A modification of my apparatus, or another mode in which I have contemplated the application of the principle thereof, may be thus described:

Instead of having rods to the pistons and a cross-head connecting them, there may be wire ropes or their equivalents, with one end attached to the piston, then passing over guide-pulleys placed at the top of the cylinders and connecting at the other end with the platform or spinner-frame. In this case the valve-chest E will be placed at the top, and the compressed air or liquids will be let in there, and the pistons forced down, in order to raise the platform; or, by passing the rope over the top pulleys and from them to another set at the bottom, the air or its equivalent can be let in as in the first case, and operate the same.

What I claim as my invention, and wish to secure by Letters Patent, is—

The cylinders A, the frame *b*, the rods *a*, the platform E, the valve-chest E′, and guides *c*, or their equivalents, all arranged and operated as and for the purposes described and set forth in the foregoing descriptions.

DANA BICKFORD.

Witnesses:

R. H. EDDY,

F. P. HALE, Jr.