F. LAURENCE.

HYDRAULIC AIR-COMPRESSOR.

No. 172,751. Patented Jan. 25. 1876.

Fig: 1.

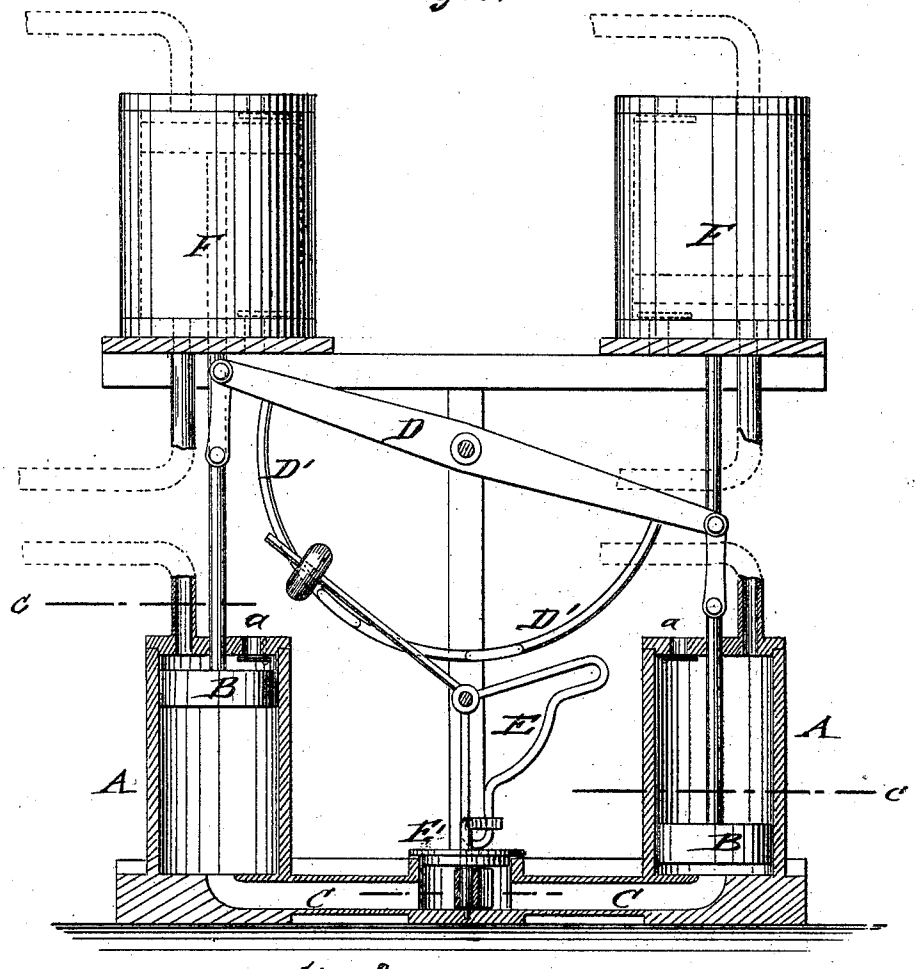
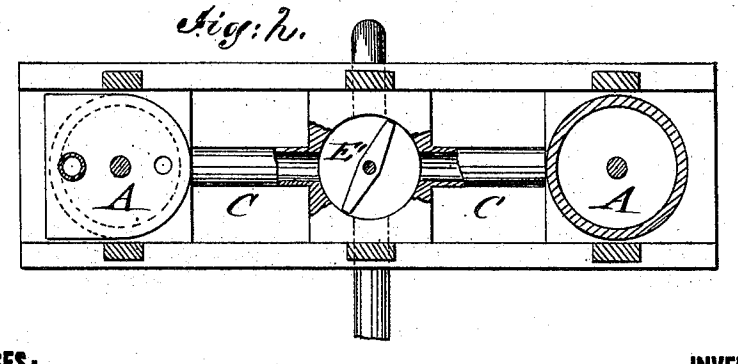


Fig: 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK LAURENCE, OF WASHINGTON, KANSAS.

IMPROVEMENT IN HYDRAULIC AIR-COMPRESSORS.

Specification forming part of Letters Patent No. **172,751**, dated January 25, 1876; application filed October 29, 1875.

To all whom it may concern:

Be it known that I, FRANK LAURENCE, of Washington, in the county of Washington and State of Kansas, have invented a new and Improved Hydraulic Air-Compressor, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a sectional front elevation of my improved hydraulic air-compressor, and Fig. 2 is a horizontal section of the same on the line *c c*, Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention relates to an improved air-compressor, which is operated by the direct hydraulic pressure of a limited quantity of water, so that a uniform power may be stored up for various working purposes.

The invention consists of two cylinders, to which water is alternately supplied from the supply-pipe, so as to work the pistons, which are connected by a walking-beam that operates the supply-valve. A compressing-cylinder is arranged above each of the lower cylinders, and operated by valves and pistons at the upper ends of the piston-rods. The cylinders are connected, by pipes, with a receiver into which the air is compressed.

In the drawing, A represents the lower cylinders, and B the pistons, which are operated by a water-head of suitable power, the water being introduced alternately into the cylinders by means of pipes C which branch out from the main supply-pipe.

The piston-rods are connected to a walking-beam, D, that operates by a curved semicircular part, D′, a weighted lever, E, which is fulcrumed below the beam to engage a regulating-valve, E′, of the supply-pipe for supplying alternately the cylinders with water after each downward stroke. When one piston is forced up by the hydraulic pressure of the water, the water in the other passes off through the branch pipe and valve to the exit-pipe.

The cylinders A have air-supply valves *a*, and air-pipes *b*, for conveying the air to the receiver. The valves at the top part of cylinder A are closed by the upward motion of the pistons, while the pipes convey the compressed air directly to the engine or to a receiver for storing the power.

The downward stroke of the piston admits air to the cylinder by the opening of valve *a*, while the other piston forces at the same time the air into the receiver.

Above the lower cylinders A are supported the compressing-cylinders F, which are provided with air-valves and exit-pipes at top and bottom, which lead in the same manner as the lower pipes to the receiving-reservoir. The air is compressed in the cylinders F by pistons at the upper ends of the piston-rods of the lower cylinders. Each stroke of the lower piston compresses three bodies of air—namely, one at the upper part of the lower cylinder, one at the upper part of the upper cylinder above it, and one at the lower part of the opposite upper cylinder.

In similar manner compression is effected by the alternating stroke of the other piston. The entrance and pressure of air from above on the lower piston accelerates the descending motion of the same while the water is flowing off freely through the exit-pipe, and assists thereby the effective working of the piston when the water leaves the lower cylinder. The air compressed in the receiver by the double system of cylinders furnishes a uniform source of power to be employed for driving machinery and for other purposes.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

A hydraulic air-compressor, composed of alternately-working lower cylinders and pistons operated by hydraulic force and regulating mechanism of the supply-pipes, in connection with compressing-cylinders above the lower cylinders having air-valves and exit-pipes, and being worked by pistons at the upper ends of the piston-rods of the lower cylinders for compressing, with each stroke of the pistons, air in one lower and two upper cylinders and conveying the same to a receiving-reservoir, substantially in the manner and for the purpose set forth.

FRANK LAURENCE.

Witnesses:
A. M. HALLOWELL,
WM. SHULL.