(No Model.)

J. E. BARRY.

HYDRAULIC ELEVATOR.

No. 480,486. Patented Aug. 9, 1892.

Fig. 3.

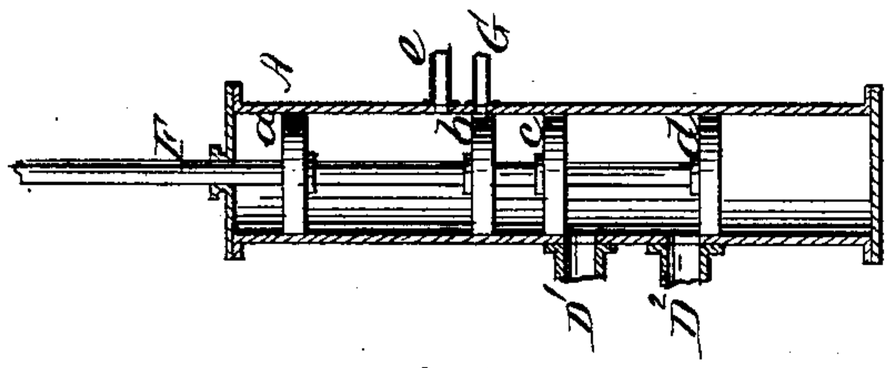


Fig. 2.

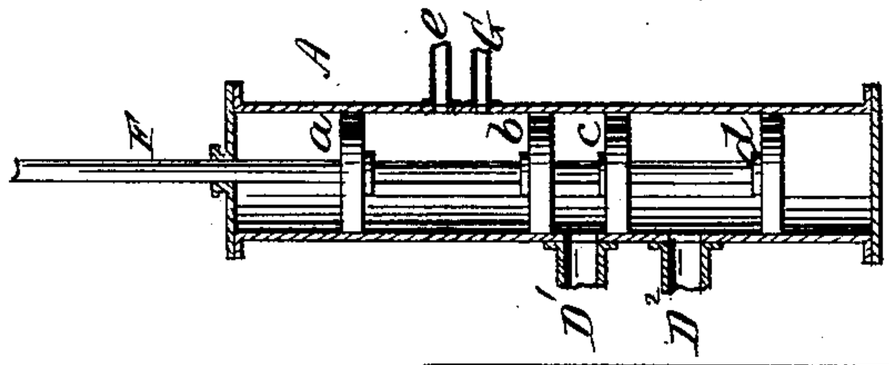
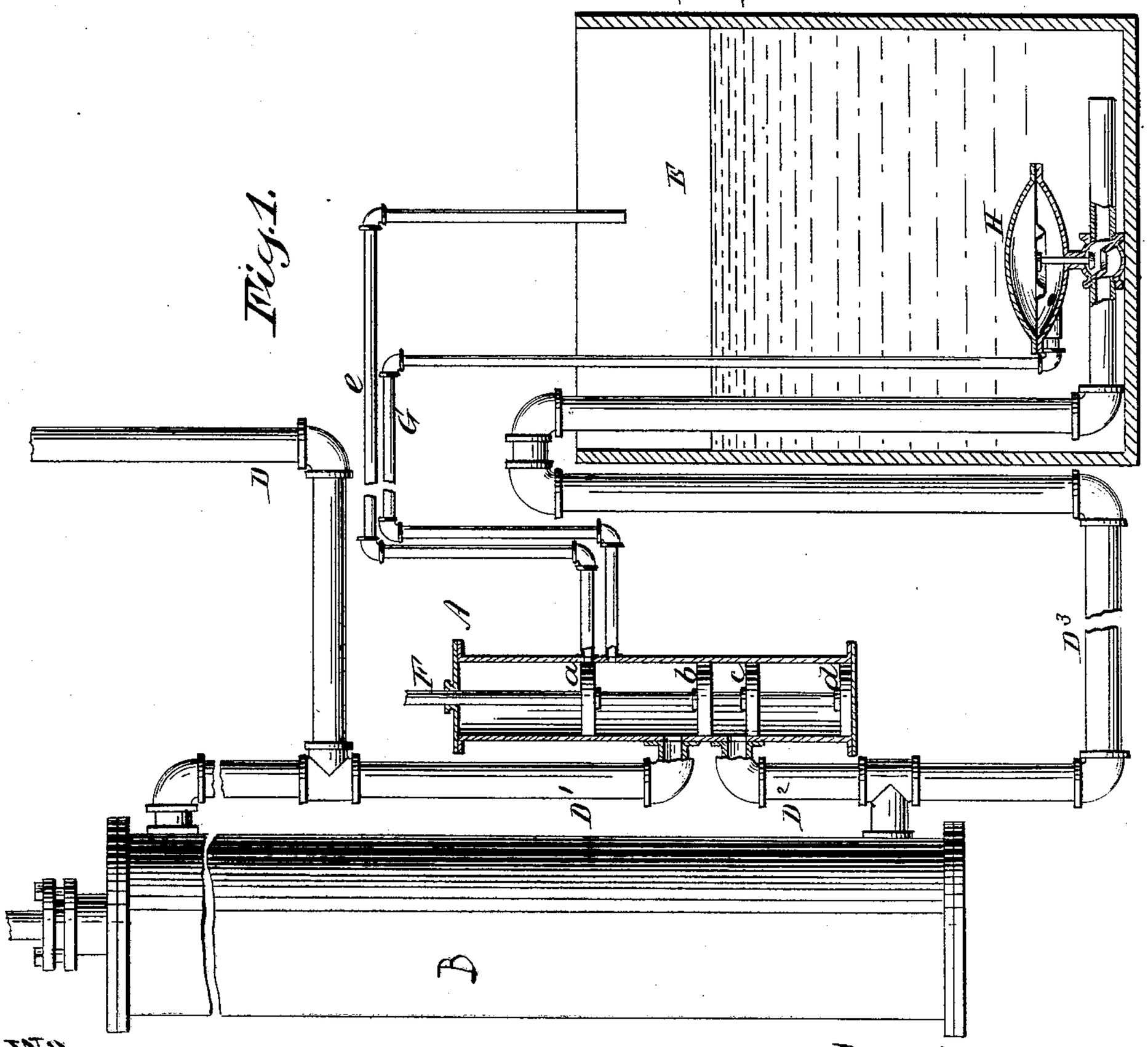


Fig. 1.



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UNITED STATES PATENT OFFICE.

JOSEPH E. BARRY, OF NEW YORK, N. Y.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 480,486, dated August 9, 1892.

Application filed April 10, 1891. Serial No. 388,410. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. BARRY, of the city, county, and State of New York, have invented a new and useful Improvement in Hydraulic Elevators, of which the following is a specification.

My invention relates to elevators which are operated by means of a piston passing up and down through a long cylinder under the pressure of water, the different operations being effected by the movement of a valve-rod, with several disks upon it, operating in an operating-valve, which is connected with the top and bottom of the cylinder. A fault connected with such hydraulic elevators not hitherto overcome has been the scraping or sawing noise heard at the stopping and starting of the elevator during its ascent. The cause of this noise is the passage of the water under high pressure through the narrow opening at some one of the ports of the operating-valve as the edge of a disk on the valve-rod passes such port. The noise occurs just after the elevator starts in ascending and just before it stops in ascending—that is, while the port through which the water is passing under high pressure is throttled. It is not feasible to operate the valve-rod quickly enough to prevent this noise.

My invention consists, in general, of the combination, with the operating-valve, of a positively-operated valve placed in the discharge-pipe—that is, such valve being operated in connection with the operating-valve itself, but by some means independent of the discharge-water; also, of certain apparatus and arrangement thereof by which such valve in the discharge-pipe may be operated by the main water-pressure. By this means the point at which the noise is caused is removed from the operating-valve to the valve in the discharge-pipe, and so may be placed at any convenient point in the building where it will not cause annoyance, and, also, by this means the noise may be greatly lessened by the form of valve to be used in the discharge-pipe.

In the accompanying drawings, in which the same characters indicate analogous parts, Figure 1 represents the apparatus complete with the operating-valve in the position for ascent. Figs. 2 and 3 represent the same operating-valve in the two other positions—viz., for stopping and for descent, respectively.

Figs. 1, 2, and 3 show the operating-valve by means of the different positions of which the elevator is made to ascend, stop, or go down. In Fig. 1 the operating-valve is in the position it takes in order to cause the piston to descend and the elevator to ascend. Fig. 2 is the position which the operating-valve is made to take in order to cause the piston and the elevator to stop, and in Fig. 3 the position is that the operating-valve is made to take in order to cause the piston to ascend and the elevator to descend.

B is the ordinary water-cylinder full of water and connected through the pipe D to the tank on the roof or other water-supply under pressure and having within it a piston and piston-rod attached to one end of a rope, the other end of which supports the elevator, so that as the piston descends the elevator ascends and as the piston ascends the elevator descends. The pipe D′, open both to the upper part of the water-cylinder B and to the inlet-pipe D, opens into the operating-valve A. The pipe D^2 connects the bottom of the water-cylinder B and the operating-valve A. The pipe D^3 is the discharge-pipe and is open to the bottom of the water-cylinder B. This pipe D^3 is shown in this drawing as passing into the discharge-tank E.

In the operating-valve A the valve-rod F moves, having the four disks or pistons *a*, *b*, *c*, and *d* attached thereto. From the upper part of the operating-valve A a small pipe G connects the operating-valve A with a valve H at the end of the discharge-pipe D^3. The valve H may be placed at any other convenient point in the discharge-pipe, the object being to remove it from any place where the noise would cause annoyance.

In the drawings the valve H is shown as operated by a flexible diaphragm, the pressure of the water underneath the diaphragm pressing it and with it the valve upward, and the elasticity of the diaphragm returning the parts and closing the valve when the water-pressure under the diaphragm is removed, the operation being such that when the pressure of the water is open through the pipe G to the diaphragm in the valve H the valve H

in the discharge-pipe is open, so that the water may be discharged from the water-cylinder B into the tank E.

In order to allow the valve H to be closed by the resilience of the diaphragm alone, the diaphragm should be made of resilient material of appropriate strength. The space in the valve-chamber above the diaphragm may also be made air-tight, so as to act as an air-cushion, the pressure of the air compressed by the upward movement of the diaphragm tending to press down the diaphragm and thus close the valve when the pressure of the water through the pipe G underneath the diaphragm is removed. A device equivalent to the diaphragm would be a spiral spring around the valve-rod compressed by the upward movement of the valve. A pipe *e* is also connected with the operating-valve A for the purpose of relieving the pressure under circumstances to be explained. The pipe G, I shall call the "diaphragm-pressure" and the pipe *e* the "diaphragm-relief."

The apparatus operates in the following manner, namely: When the elevator is to be made to ascend, the valve-rod F and pistons *a*, *b*, *c*, and *d* in the operating-valve A are placed in the position shown in Fig. 1. In such position the pressure of the water from the tank or other source of supply is open through the pipe D′, the operating-valve A, and the diaphragm-pressure G to the valve H. This opens the valve H in the discharge-pipe, and the water then discharges through the pipe D^3 from below the piston in the water-cylinder B, and this causes the elevator to ascend. When the motion is to be stopped, the operating-valve is placed in the position shown in Fig. 2. In such position the pressure of the water is shut off from the diaphragm-pressure G, and the pressure is also relieved through the diaphragm-relief *e*, so that the valve H closes and stops the outflow of the water. As there is therefore no escape for the water underneath the piston within the water-cylinder B, the piston and elevator stop. When the elevator is to be made to go down, the operating-valve is placed in the position of Fig. 3. In such position the water has free circulation through the pipes D′ and D^2 and the operating-valve A, the pressure being also shut off in that position from the diaphragm-pressure G. The valve H is kept closed and prevents the escape of water from the discharge-pipe, and the elevator descends by gravity.

Any appropriate means of positively operating the valve H so that it will be opened when the elevator is made to ascend and shut at all other times may be used. By the form shown the water-pressure is used as the operating force; but other methods will easily suggest themselves—such, *e. g.*, as some positive connection with the operating-rope.

This invention is entirely distinct from those devices which operate to throttle the discharge-pipe—such, *e. g.*, as a valve in the discharge-pipe automatically operated by the pressure of the discharge-water. Such devices only accomplish the purpose by a proportionate loss of power which is necessarily involved in throttling the discharge-opening; but the valve H in my invention does not throttle the pipe D^3 at all, but allows the full opening whenever the water discharges. At all other times it entirely prevents all discharge of water.

I claim as my invention—

1. In hydraulic elevators, the combination of an operating-valve, a separate valve in the discharge-pipe, and means, substantially as described, whereby the valve is controlled by the fluid under pressure from the primary source of supply.

2. In hydraulic elevators, the combination of an operating-valve and a separate positively-operated valve in the discharge-pipe, a pipe connecting such valve in the discharge-pipe with the operating-valve, through which the water-pressure is applied to operate such valve, and a relief-pipe connected with the operating-valve to relieve the pressure upon the valve in the discharge-pipe.

3. In hydraulic elevators, the combination of an operating-valve having four disks or pistons and having no discharge-pipe directly connected therewith, a separate positively-operated valve in the discharge-pipe, a pipe leading from the operating-valve to the valve in the discharge-pipe to operate such valve by the main water-pressure, and a relief-pipe connected with the operating-valve to relieve the pressure upon the valve in the discharge-pipe.

In witness whereof I have hereunto set my name, this 21st day of March, 1891, in the presence of two witnesses.

JOSEPH E. BARRY.

Witnesses:
CHARLES W. COLEMAN,
SALTER S. CLARK.