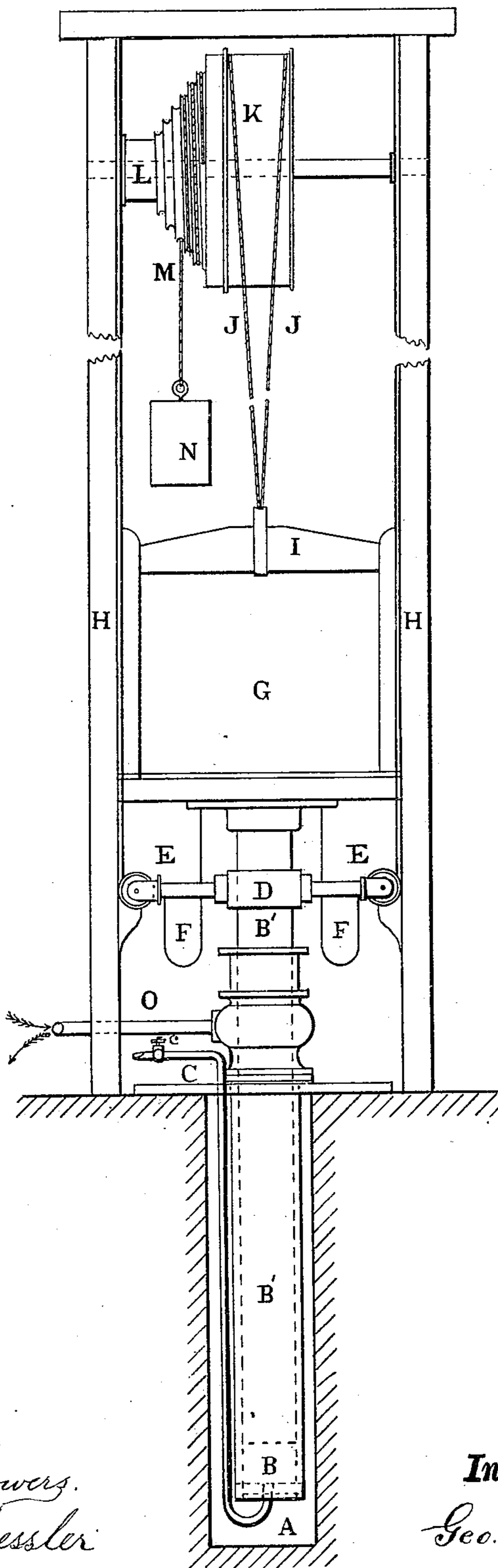


(No Model.)

G. L. PIERCE.
HYDRAULIC ELEVATOR.

No. 252,966.

Patented Jan. 31, 1882.



Witnesses:

A. B. Bowers.
Geo. Pressler

Inventor.

Geo. L. Pierce

UNITED STATES PATENT OFFICE.

GEORGE L. PIERCE, OF OAKLAND, CALIFORNIA.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 252,966, dated January 31, 1882.

Application filed September 6, 1881. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. PIERCE, of the city of Oakland, in the county of Alameda and State of California, have invented certain
5 Improvements in Hydraulic Elevators, of which this, with the accompanying drawing, is a specification.

The object of this invention is to reduce the cost and increase the efficiency, safety, and
10 durability of the hoist.

It consists in the combination, with a hydraulic-ram hoist, first, of an automatically-graduated counterbalance; second, of a device for blowing out sediment deposited at the bottom of the hydraulic cylinder; third, of a guide
15 to prevent springing of the ram.

Referring to the drawing, A is a well that contains the hydraulic cylinder and blow-off pipe. It is usually bored and lined with tubing, like an Artesian well.
20

B is a hydraulic cylinder containing the ram B'.

C is a blow-off pipe for discharging any sediment that may collect at the bottom of the cylinder B. It is provided with a valve, c, for the
25 purpose hereinafter specified.

D is a guide, through which the ram slides freely until the slack of the lines F F is taken up, after which it rises and falls with the ram. Its office is to prevent springing of a long slender ram, and it may be applied to a horizontal
30 as well as perpendicular ram.

E E are rollers on the ends of the guide D to keep it in position and reduce friction as it rises and falls with the ram.

F F are ropes, one end of each of which is fastened to the bottom of the cage or to the head of the ram, the other end being attached to the guide D.
35

G is a cage for passengers or freight. It is
40 securely fastened to the head of the ram.

H H are guide-posts for keeping the cage in line with the axis of the ram.

I is a cross-bar or the roof of the cage.

J J are wire ropes, the upper ends of which are secured to the drum K and the lower ends to the cross-bar or roof I.
45

K is a drum, upon which the lines J J are wound by the action of the counter-weight N as the ram ascends.

L is a fusee, to which the line M is attached, and upon which it winds as the ram descends.
50

This fusee may be detachable, so that a larger or smaller one may be substituted should it be desirable to vary the size or power of the counter-balance N. The office of this fusee is, in
55 connection with the weight N, to provide an automatically variable or graduated counter-balance to the cage and ram by increasing or diminishing the leverage and power of said weight as it rises and falls with the winding
60 and unwinding of the line M. Other devices for securing an automatically variable or graduated counter-balance may be substituted, and therefore I do not confine myself to this form of construction, though it is probably as simple
65 and efficient as any that can be applied. The size and proportions of the fusee should be such as exactly to compensate for the loss or the increase of buoyancy of the ram caused by its emersion or immersion as it rises and falls in the water
70 contained in the cylinder B, so that any pressure or any weight capable of starting the ram will carry it to the end of its stroke, notwithstanding this loss or this increase of buoyancy.

M is a line, by which the counter-weight is
75 suspended, its upper end being firmly secured to the larger end of the fusee.

N is a partial counter-balance to the ram and cage, but leaving them sufficiently unbalanced to let the empty cage descend freely when water
80 is allowed to escape from the cylinder B. By carrying the line M over a pulley the weight N may be placed wherever desired.

O is the supply and discharge pipe for water, by which the hoist is worked. It is provided with the usual valves and levers or ropes.
85

The operation of this apparatus is as follows: Water being admitted under suitable pressure to the cylinder B through the pipe O, the ram rises, carrying the cage G, taking up the slack
90 of the ropes F F, and then raising the guide D, which, being needed only on the long strokes, is permitted by the slack of these ropes to remain at rest during all short strokes of the ram. As the ram ascends, the lines J J are wound
95 upon the drum K by means of the descending counter-weight N, hanging from the constantly-increasing radius of the fusee, whereby the power of the counter-weight is made to increase in exact ratio with the loss of buoyancy of the
100 ascending ram. When water is allowed to escape from the cylinder B the converse follows,

the ascending counter-weight hanging from a radius decreasing in exact ratio with the increasing buoyancy of the descending ram. When sediment collects at the bottom of cylinder B it is blown out through the pipe C by opening the valve *c*, instead of the usual valve, when lowering the ram.

Having thus illustrated and described my invention, what I deem new, and claim as my invention, is—

1. An automatically-varying or self-compensating counterpoise, in combination with a hydraulic elevator having a platform or cage resting upon, secured to, and operated by a vertical ram.

2. A hydraulic elevator having a platform or cage resting upon, secured to, and operated by

a vertical ram, in combination with the ropes T J, drum K, fusee L, ropes M, and weight N, substantially as and for the purpose described. 20

3. A hydraulic elevator having a platform or cage resting on, secured to, and operated by a vertical ram, in combination with a device for blowing out sediment from the cylinder containing the ram. 25

4. The ram B, operated by hydraulic pressure, in combination with the guide D and lines F F, substantially as and for the purpose specified.

G. L. PIERCE.

Witnesses:

A. B. BOWERS,
GEO. TRESSLER.