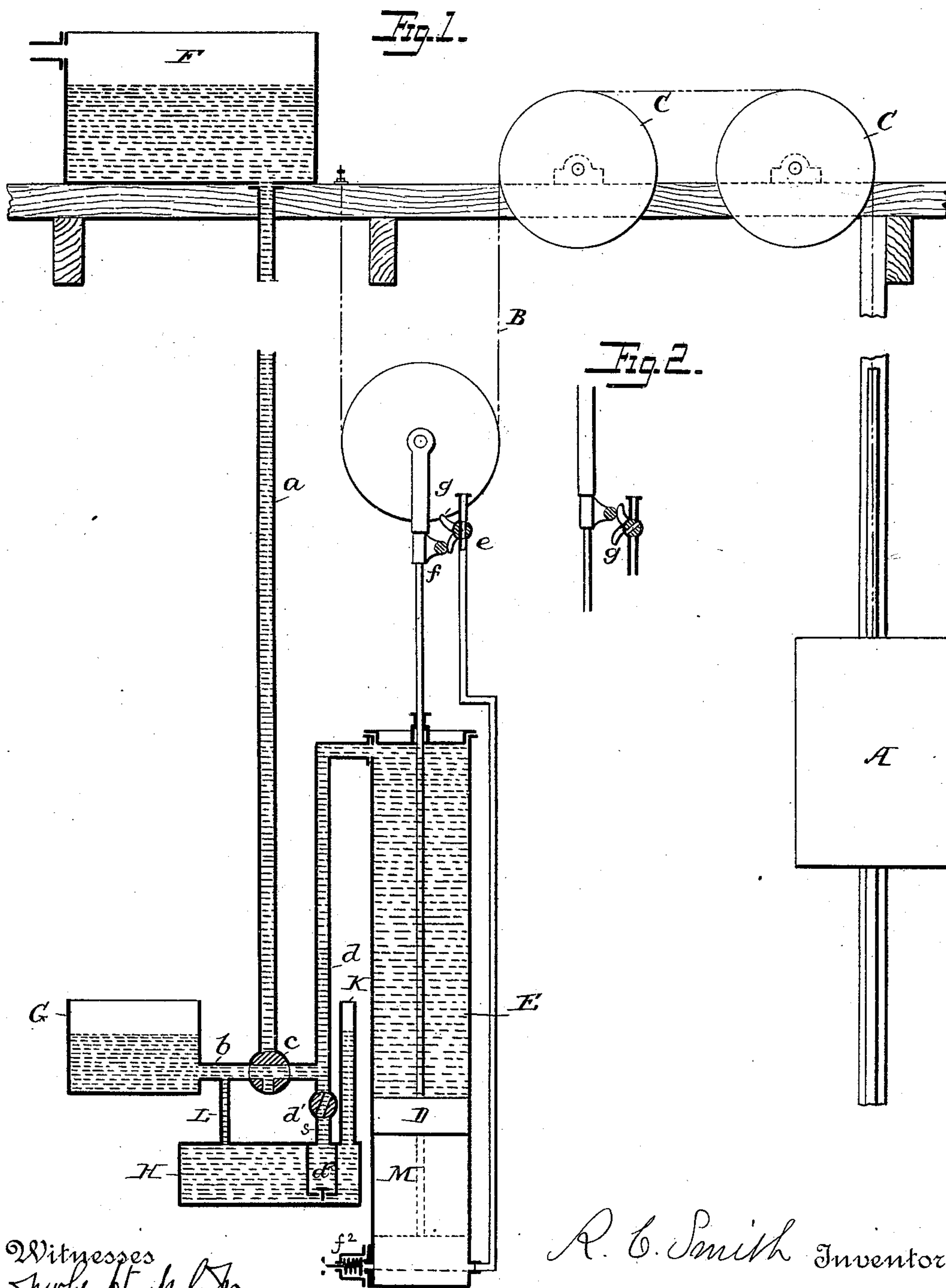


(No Model.)

R. C. SMITH.
HYDRAULIC ELEVATOR.

No. 420,549.

Patented Feb. 4, 1890.



Witnesses
July. Hinkel Jr.
A. E. J. Farnham.

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UNITED STATES PATENT OFFICE.

RUDOLPH C. SMITH, OF YONKERS, NEW YORK.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 420,549, dated February 4, 1890.

Application filed March 4, 1887. Serial No. 229,725. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH C. SMITH, of Yonkers, in the county of Westchester and State of New York, have invented a new and
5 useful Improvement in Hydraulic Elevators, of which the following is a specification.

My invention relates to improvements in hydraulic elevators having the operating or driving side of the cylinder connected to a
10 source of supply of fluid under pressure and the idle side to a closed air-reservoir, wherein air is compressed and expanded for the purpose of equalizing the motive power, an arrangement for which Letters Patent No.
15 357,345, dated February 8, 1887, have been granted to me.

The object of my invention is to save the extra space of the reservoir and yet gain part of the equalization of the motive power due
20 to the use of a separate reservoir of proper proportions, as fully described in said Letters Patent, No. 357,345, dated February 8, 1887.

In carrying out my invention in an elevator-engine in which the car is raised by a
25 fluid admitted to the top of the cylinder above the piston and under pressure from any suitable source—as an elevated tank, an accumulator, or weighted plunger—I provide a valve *e* for opening or closing the idle end
30 of the cylinder. For convenience' sake, I lead a pipe from the idle end to a proper location near the moving parts, so as to get the above-mentioned valve in proper position to be actuated by means of a toe at-
35 tached to the piston-rod. It is clear that the valve may be placed close to the bottom of the cylinder, and that a proper connection attached to the traveling parts and extending down to the location of the valve may be
40 used instead.

In the accompanying drawings, Figure 1 represents a sectional elevation of my improved hydraulic elevator, illustrating the operating-cylinder with the pipe leading to
45 the traveling parts. Fig. 2 is a detached sectional view.

A designates the elevator car or cage fitted to travel along vertical guides or ways and connected by hoisting-cables B, which pass
50 over overhead sheaves C, with a piston D fitted to travel in an operating-cylinder E,

which may be arranged either vertically or in any inclined position.

F designates an elevated tank, which represents a source of supply for water under
55 pressure, and from which a supply-pipe *a* leads downward to the upper portion of the cylinder E above the piston. With the upper end of the cylinder is also connected a discharge-pipe *b*, which leads to a discharge-
60 tank G. The communication between the supply-pipe *a* and cylinder and between the cylinder and discharge-pipe is controlled by any suitable valve, a three-way cock or plug-
65 valve *c* being shown here as a simple illustration of such valve.

The parts above described may be embodied in elevators of different constructions having other features and appliances, if de-
70 sired. As shown, there is, in addition, an open tank H, a pipe *s* communicating with said tank and with the pipe *d*, and provided with a cock *d'* and check-valve *d''*, the said parts operating to secure a water-column
75 brake, substantially as the corresponding parts set forth in my aforesaid Letters Patent No. 357,345. A spring-weighted valve *f''*, opening outwardly, serves to relieve excessive pressure in the cylinder E.

For counterbalancing a part of the pressure and weight on the top of the piston, air is employed below said piston for this purpose.

The cylinder is made of sufficient length to allow the proper travel for the piston.
85 The valve *e* is open, while the piston travels upward from the lowermost position until the toe *f* on the piston-rod strikes the lever *g*, actuating the valve, thereby closing it. The part of the cylinder below the piston
90 acts now for the rest of the stroke as an air-reservoir, and the increased weight of ropes and water-column are partly counterbalanced by the varying pressure of the air, as described in Letters Patent No. 357,345, dated
95 February 8, 1887. At the return-stroke the valve *e* is opened as soon as the toe *f* strikes the lever *g*, and the last part of the return-stroke is made against the uniform pressure
100 of the atmosphere.

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

The combination of an elevator car or cage,
an operating-piston, ropes or cables connect-
ing the cage with the piston, a lifting-cylin-
der to which a liquid under pressure is sup-
plied at one side only of the piston, a pipe
5 communicating with the opposite end of the
cylinder, to which air or other elastic gas is
supplied, a valve in said pipe, and mechan-
ism operated by the moving parts of the ele-
10 vator for opening or closing said valve at a

determined position of the piston, and keep-
ing it closed during the remaining part of
the discharge-stroke of the piston and until
the corresponding part of the return-stroke
of the piston is completed, substantially as 15
set forth.

RUDOLPH C. SMITH.

Witnesses:

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