No Model.)

2 Sheets—Sheet 1.

# P. F. MOREY.

## HYDRAULIC ELEVATOR.

No. 332,418. Patented Dec. 15, 1885.

Fig. 1.

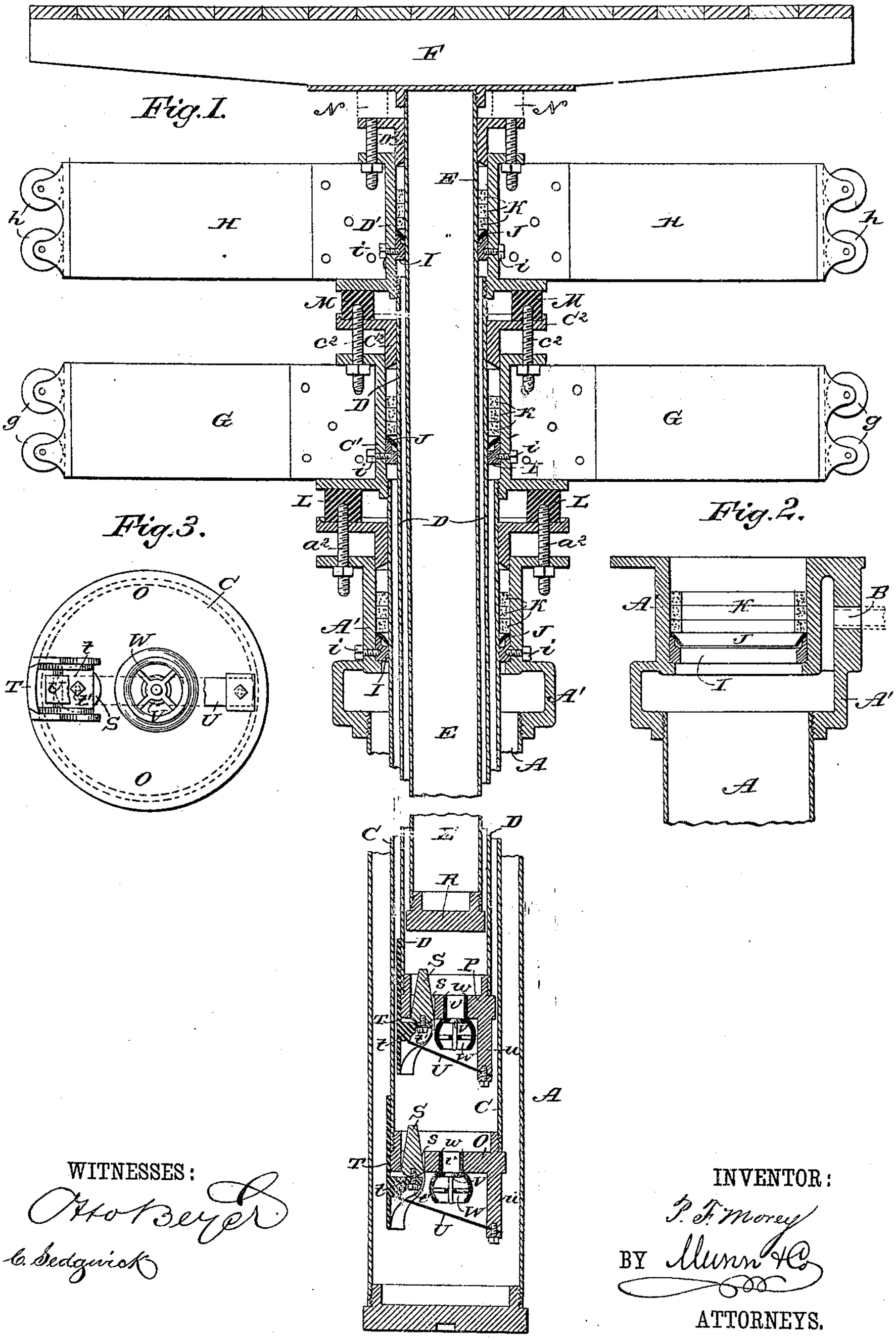


Fig. 2.




Fig. 3.




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(No Model.) 2 Sheets—Sheet 2.

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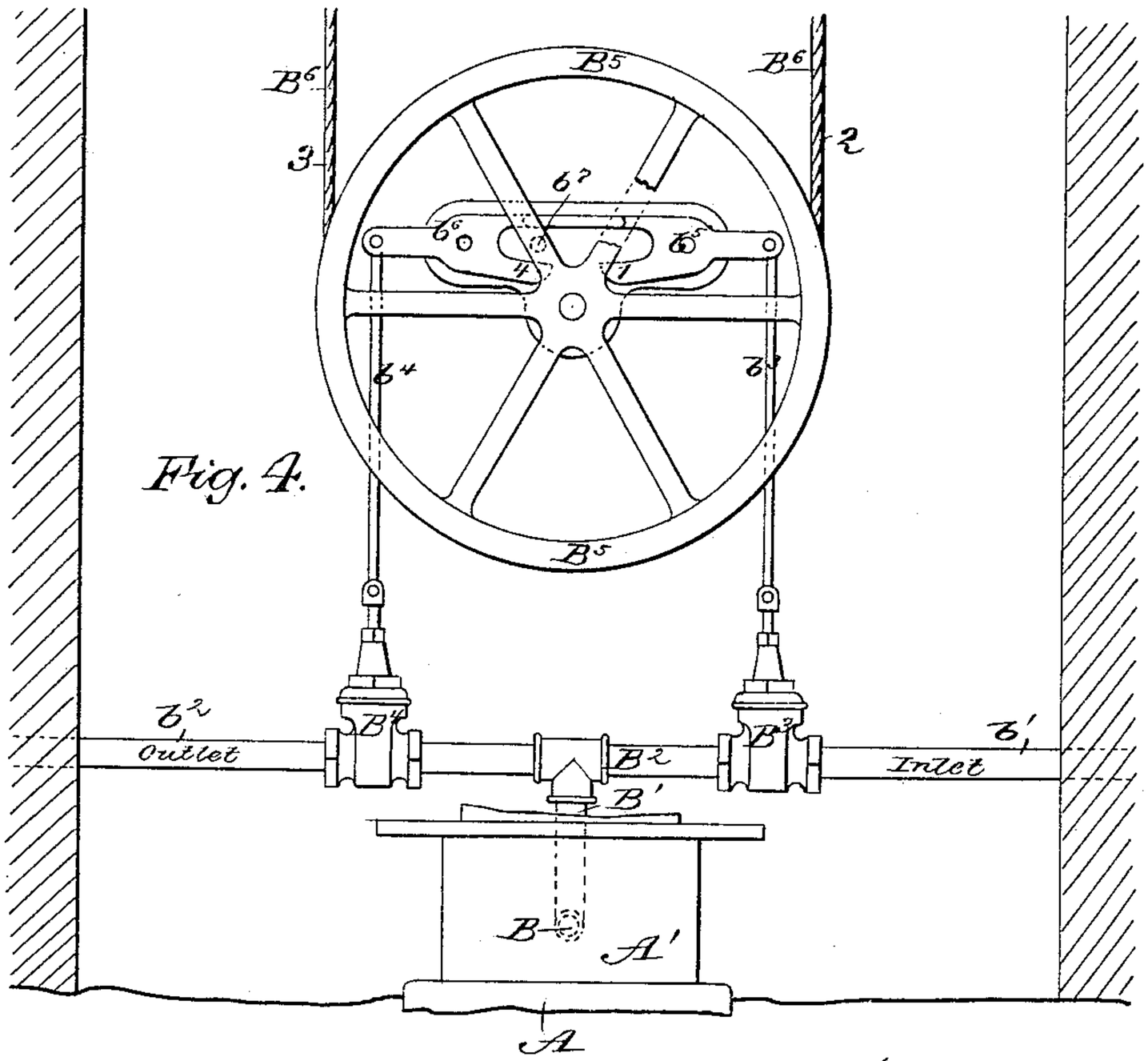



Fig. 4.

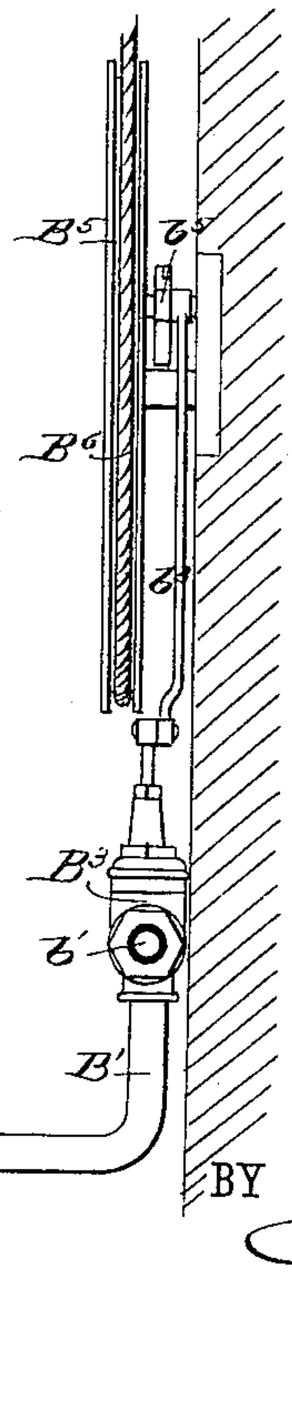
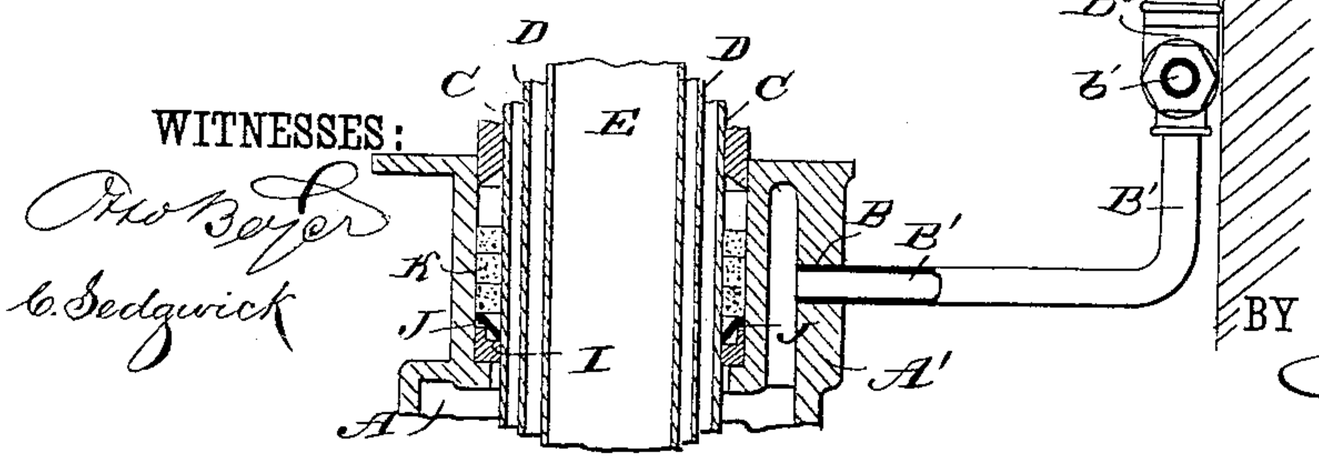



Fig. 5.

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# UNITED STATES PATENT OFFICE.

PARKER FARNSWORTH MOREY, OF PORTLAND, OREGON.

## HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 332,418, dated December 15, 1885.

Application filed June 18, 1885. Serial No. 169,132. (No model.)

*To all whom it may concern:*

Be it known that I, PARKER FARNSWORTH MOREY, of Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved Hydraulic Elevator, of which the following is a full, clear, and exact description.

My invention relates to telescoping hydraulic elevators, and has for its principal object to improve their construction, so as to insure a practically uniform steadiness of movement of the platform or carriage both ways.

The invention consists in certain novel features of construction and combinations of parts of the elevator, all as hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical sectional elevation of a hydraulic elevator embodying my improvements and partly broken away. Fig. 2 is a detail sectional view of the head of the main stand-pipe. Fig. 3 is an enlarged bottom view of one of the telescoping rams of the elevator, with the valve-closing spring broken away. Fig. 4 is a side elevation of the valves and their operating devices which control the water-supply to and from the telescoping rams of the elevator, and shows also a portion of the main stand-pipe and the adjacent walls of the elevator-shaft; and Fig. 5 is a view taken at a right angle to the same parts in Fig. 4, and with the head of the stand-pipe and the rams in vertical transverse section.

The letter A indicates the main fixed stand-pipe of the elevator, in the upper end or head portion A′ of which pipe is made an opening, B, Figs. 2 and 5, into which opening is fitted the end of a pipe, B′, which is connected at its other end with a pipe, $B^2$, to the opposite ends of which are connected the water-inlet valve $B^3$ and water-outlet valve $B^4$, with which valves, respectively, are connected the water-supply pipe $b'$, which is to be connected with a water-supply, and the waste-pipe $b^2$, which may lead to any point at which the water is to be discharged. (See Figs. 4 and 5.) The stem $b^3$ of the disk of valve $B^3$ is connected to a lever, $b^5$, which is pivoted in the elevator-shaft, the inner end of which lever is forked, and the stem $b^4$ of the disk of valve $B^4$ is connected to a like pivoted lever, $b^6$, so that a wheel, $B^5$, also pivoted in the elevator-shaft, and to which the attendant's pull-rope $B^6$ is connected, may be turned to carry its pin $b^7$ over and downward upon the lower limb, 1, of the fork of lever $b^5$ by pulling down on the side 2 of the rope $B^6$, to open the valve $B^3$ and admit water through pipe $b'$ to the stand-pipe A, to lift the telescoping rams and elevator-carriage, and when the side 3 of the rope $B^6$ is pulled down or the side 2 is pulled up the pin $b^7$ of wheel $B^5$ will be caused to lower the limb 4 of lever $b^6$, to lift the stem $b^4$ and open the outlet-valve $B^4$, to let the water escape from the rams and stand-pipe to allow the elevator-carriage to descend. The contact of the pin $b^7$ with the upper limbs of the forked levers acts to close either valve which may be open. By this arrangement of valves and operating devices therefor the water-distribution to and from the stand-pipe A, and the telescoping rams therein may be controlled at pleasure by the attendant to start and stop the carriage, and by stops put on the pull-rope, the motion of the wheel $B^5$ will be reversed to shut off the water when the carriage reaches the extreme limit of its ascent or descent, and in a well-known manner.

The elevator shown in the drawings, Fig. 1, has three telescoping water tubes or rams, C D E, arranged to rise successively from the stand-pipe and from each other, to lift the platform or carriage F, which is fixed to the head of ram E, and may have any approved size or construction. Arms G H, fixed to flanges on the heads or upper portions of the rams C D, respectively, carry rollers $g$ $h$, respectively, at their outer ends, which rollers are to run in slots or guideways of the elevator-shaft, to steady the rams and platform F as they move up and down in the shaft. In the head A′ of the stand-pipe A is fixed, by set-screws $i$ or otherwise, a ring, I, above which is arranged a cup-leather packing, J, which inclines downward, and is intended to pack the joint between the stand-pipe A and the first ram, C, and over the cup leather J a few rolls of hemp or other fibrous packing, K, may be placed to prevent escape of water to and past the gland $A^2$, which is held to the cap or head A′ of pipe A by set-screws $a^2$,

which also secure to the top of the gland $A^2$ an elastic buffer or buffers, as at L, on which the head C′ may strike, to limit its descent without shock.

The heads C′ D′ of rams C D each are fitted with a ring, I, and cup-leather packing J, and it may be with fibrous packing K, as in Fig. 1, to center the rams and guide the movements of ram D in ram C, and of ram E in ram D, and to pack the joints of the rams, substantially as above described, for the stand-pipe A and ram C. A buffer or buffers, M, are fixed to the gland $C^2$ of ram C, and it may be by the gland-fastening screws $c^2$, and, if desired, a buffer or buffers, N, may be fixed to the gland $D^2$ of ram D, to limit the descent of the ram E in ram D, as in dotted lines in Fig. 1, but for this latter purpose buffers may be arranged in the elevator-shaft, so as to be struck by the platform F, or on the platform to strike the floor of the shaft.

The rings I serve not only to guide one ram in the other and the lower ram in the stand-pipe, but they serve to operate the water-inlet foot-valves at the proper time, as presently explained.

The cup-leathers, owing to their downward incline toward the rams which they pack, will be forced closely to the rams by the pressure of the water passing the rings I, so that practically tight joints around the rams will be secured by means of the water pressure or head by which the rams are lifted.

Each of the rams C D E is fitted with a foot piece or block screwed or otherwise secured to its lower end, the foot-blocks O P of rams C D, respectively, being fitted with water inlet and outlet valves, presently described, and the foot-block R of the ram E being solid or imperforate and valveless, as the water merely lifts said ram and does not enter or pass through it. The valves of the rams C D have like construction, and consist of an inlet-valve, S, which is held, preferably, by a loose connection, to a lug, *t*, of a plate, T, which is fitted, preferably, by a dovetailed joint, as seen in Fig. 3, to the foot-block of the ram, so as to slide up and down in or on the block to allow the valve S to seat itself in an aperture, *s*, of the foot-block through which aperture the water enters the ram when the valve is opened. I prefer to make the valves S with a convexed outer end and hold them to the lugs *t* of slides T by screws *t′*, passed upward through said lugs into the centers of their outer ends, as shown clearly in Fig. 1. The valves S have a tapering form, so they in opening will allow a gradual entrance of the water to the interior of the rams, and springs U, fixed suitably to projections *u* of the foot-block O P, close the valves S by fitting the valve-slides T when the slides are out of contact with the ram-head rings I, which open the valves.

The outlet-valves consist of ordinary check-valves V, seating upward to close the water-outlet passages *v* in the foot-blocks of the rams, said valves V being supported each in a suitable spider frame or case, W, which has a neck or collar, *w*, fitted to a hole in the ram foot-block, the opening through the collar *w* forming the outlet-passage *v*.

The operation of the elevator is as follows: We will suppose the carriage or platform F is fully down, as in Fig. 1. When the water is admitted to stand-pipe A through the inlet-pipe at B the lowest and outer ram, C, will be lifted by the pressure of the water on its foot block O, and will carry the upper rams with it until the valve-slide T on ram C strikes the ring I at the head of stand-pipe A and moves said slide downward, which opens valve S of ram C gradually, so that the water will flow from the filled stand-pipe A into the ram C and act on the foot-block P of ram D to lift it from ram C until the valve-slide T of ram D strikes the ring I at the head of ram C, to open the valve S of ram D and allow the water to act on the foot-block R of ram E to give the maximum lift to the carriage F. To lower the carriage, the water-inlet valve being closed, the discharge-valve will be opened. The water flows from the stand-pipe, and the ram C descends until the buffers L are struck by the head C′ of ram C to limit its descent, and the check V of ram C then will fall open to let the water flow from ram C until the head D′ of ram D strikes the buffers M, whereupon the outlet-valve V of ram D will open to allow discharge of water from ram D and permit ram E to fall with the water. The valves S of the rams are closed by the springs U immediately as the valve-slides T leave the rings I.

The ascent and descent of the carriage may be controlled, so as to stop the carriage at any place desired by a proper manipulation of the water inlet and discharge valves in the stand-pipe A, as will readily be understood.

The arrangement and operation of the long tapering inlet-valves S are important features of my invention, as the gradual opening of said valves due to their taper controls the flow of the water to the successive rams to cause the rams to start upward without jar, and so that the initial lifting movements of the successive rams can scarcely if at all be felt as the carriage rises, which is an important consideration with elevators of this character, as inlet-valves opening suddenly to admit the water to the successive rams in considerable volume at once would give sudden starts to the carriage as each successive ram commenced to move, while, by the use of the tapering foot-valves in the rams, the carriage always will be lifted with a practically unbroken smoothness of movement.

The long tapering inlet-valves S, working within an opening, *s*, of practically uniform diameter or area for its whole length, are not to be confounded with the ordinary short-headed or shallow valves having quick beveled or tapered faces which close upon correspondingly quick beveled seats, and such as

are used in hydraulic rams or in pumps, engines, and other machinery, as it is evident that the long taper of the valve is necessary to give the valve a comparatively long continued opening movement or withdrawal from the base of the opening *s* at the same rate of speed as the elevator-carriage has while being lifted, so that the gradual flow of the water into the next higher ram will be assured, and which would not be the case if the shallow quick-tapered valve above named were used, as the speed of the rising ram would fully open the valve much too quickly, and the water would rush into the ram with an impetus which would jar the carriage, and which my long tapering valve is specially designed to avoid.

By placing the downwardly-opening check-valves V in the foot-blocks of the rams the outer telescoping rams will successively be lifted and let fall, and the lowering of the carriage will be effected with a smoothness of movement not attained in hydraulic elevators having the outlet-valves otherwise arranged, or placed above the foot of the rams, which allows air to trap into the rams and causes unsteady lowering of the carriage, all of which is obviated by my arrangement of the outlet-valves.

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

1. In hydraulic elevators, the combination, with the foot-block of a telescoping ram, provided with an opening or valveway, *s*, formed substantially as specified, of a valve, S, made in long tapering form and adapted to opening S, and arranged to be opened as the ram rises by contact of a device to which the valve is attached, with a stop fixed at or near the head of the pipe in which the ram moves, substantially as herein set forth.

2. In hydraulic elevators, the combination, with the telescoping rams, of downwardly-opening inlet-valves fitted to slides guided on the rams, stops in the stand-pipe positioned to be struck by the valve-slides to open the valves as the rams are lifted, and springs acting to close the valves, substantially as herein set forth.

3. In hydraulic elevators, the combination, with the telescoping rams, of downwardly-opening inlet-valves fitted to slides guided on the rams, and rings I in the stand-pipe, and successive rams serving as stops to be struck by the valve-slides to open the valves, and serving also as guides to the moving rams, substantially as herein set forth.

4. A hydraulic elevator, comprising a main stand-pipe connected with water-distributing inlet and outlet valves, substantially as specified, a telescoping ram fitted in the stand-pipe and provided with opening *s* and long tapering inlet-valve S, adapted to said opening *s*, and arranged to be opened as the ram rises by contact of a device to which the valve is attached, with a stop fixed at or near the head of the pipe in which the ram moves, a spring adapted to close the tapering valve S as the ram first falls, and a downwardly-opening outlet-valve fitted in the foot-block of the ram, substantially as herein set forth.

PARKER FARNSWORTH MOREY.

Witnesses:
JOHN CATLIN,
FRED. V. HOLMAN.