

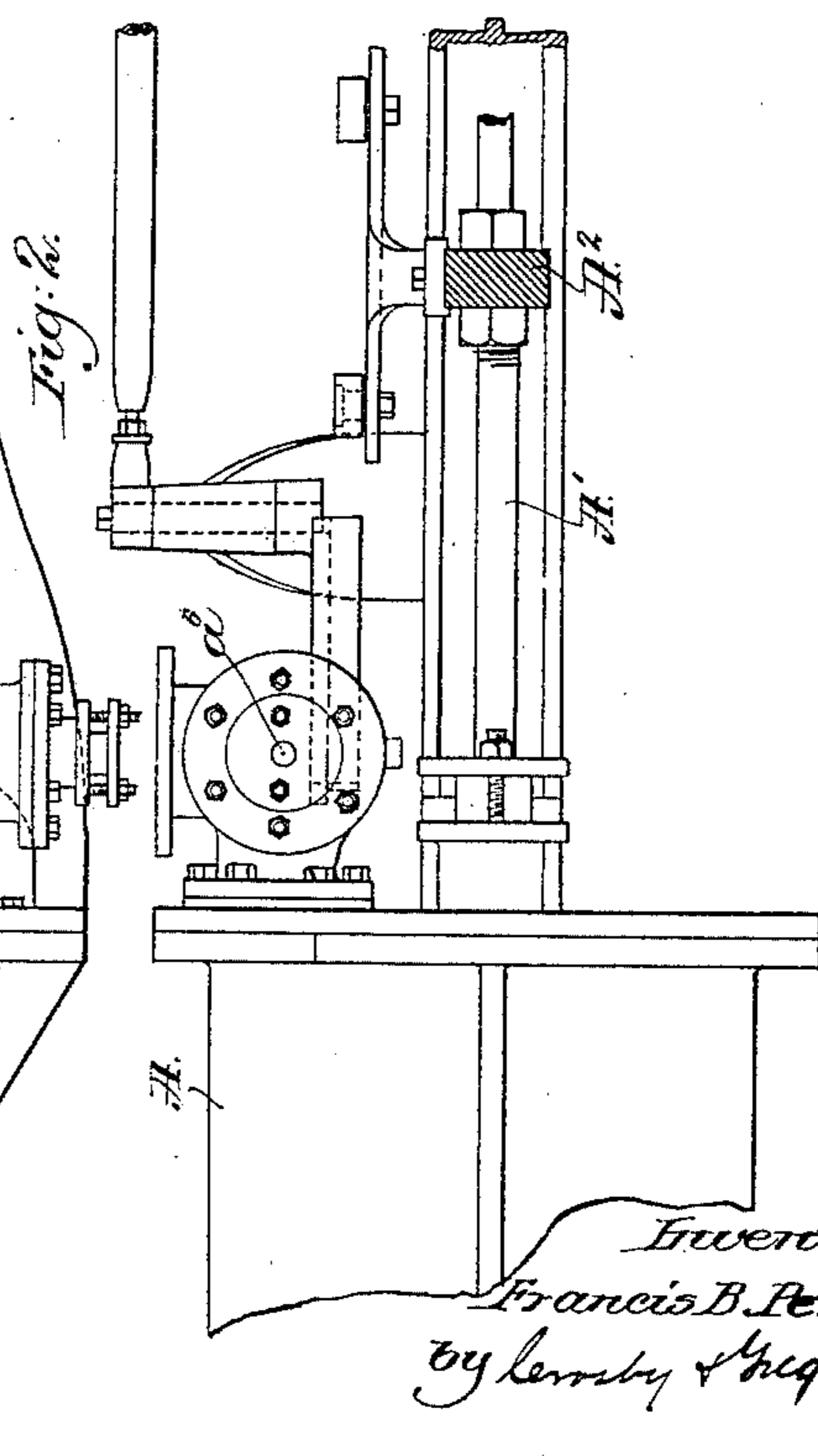
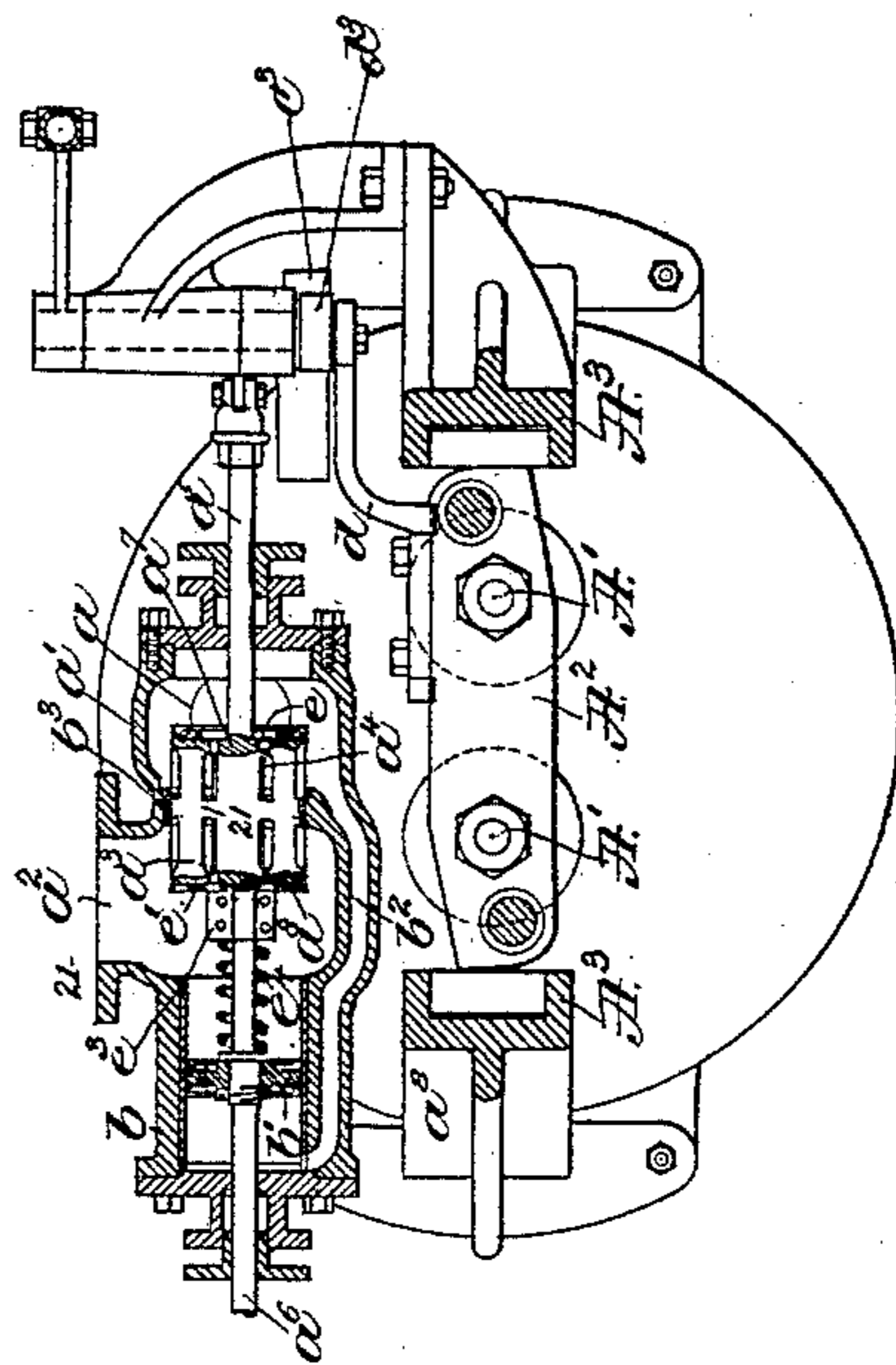
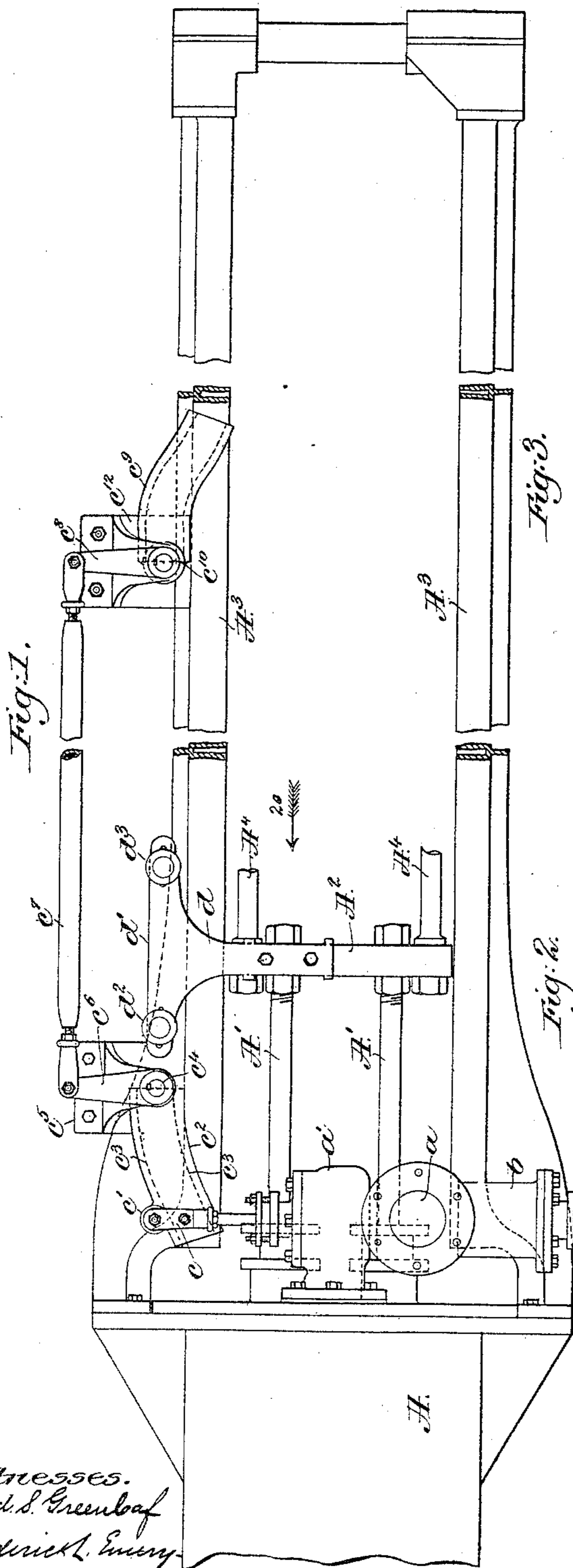
(No Model.)

2 Sheets—Sheet 1.

F. B. PERKINS.
ELEVATOR.

No. 442,199.

Patented Dec. 9, 1890.



Witnesses.
Fred. S. Greenleaf
Indrick L. Emery.

Inventor.
Francis B. Perkins
by Lemmy & Gregory
Attys

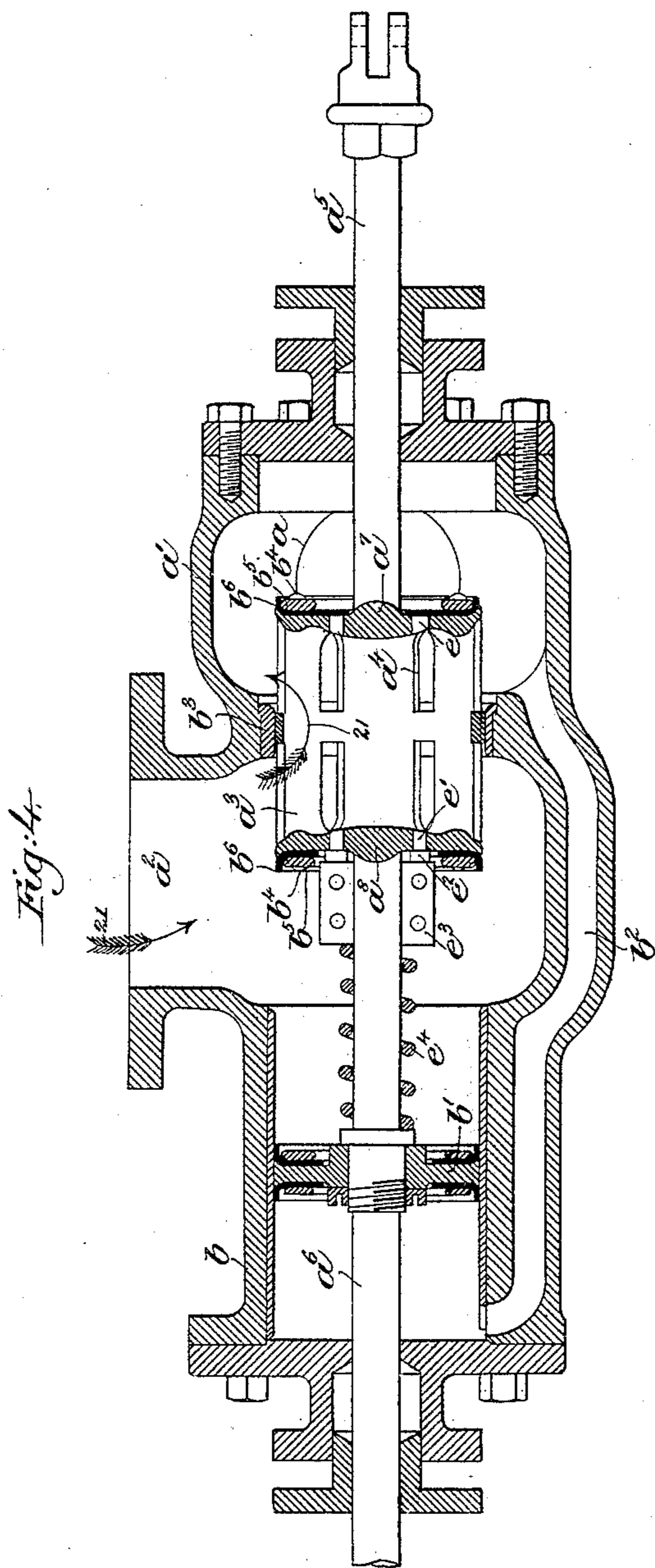
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UNITED STATES PATENT OFFICE.

FRANCIS B. PERKINS, OF BOSTON, MASSACHUSETTS.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 442,199, dated December 9, 1890.

Application filed March 16, 1889. Serial No. 303,566. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS B. PERKINS, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Elevators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to elevators of that class known as "hydraulic elevators," and has for its object to provide a dead or absolute stop at either the top or bottom, or both, of the elevator well or shaft, whereby the travel of the elevator is stopped independently of the usual shipper mechanism. In accordance with my invention I employ an auxiliary balanced piston-valve controlling the passage of water to and from the main cylinder to operate the piston therein and effect movement of the elevator-car. The auxiliary balanced piston-valve referred to is preferably provided with suitable packing to render the same water-tight when seated, and is also provided with a relief, shown as a port or ports, by which the pressure upon the said auxiliary valve may be relieved on the movement of the elevator-car in either direction, as will be described.

The particular features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 represents in elevation a sufficient portion of a hydraulic elevating mechanism to enable my invention to be understood. Fig. 2 is an under side view of a portion of the mechanism shown in Fig. 1; Fig. 3, a sectional detail of the auxiliary valve, and Fig. 4 an enlarged detail to be referred to.

The cylinder A, provided with a piston (not shown) having the piston-rods A', connected to a cross-head A², movable in guides A³, is and may be such as commonly used in hydraulic elevators—such, for instance, as the well-known Whittier elevator. The cross-head A² is connected by rods A⁴ to a second cross-head, (not shown,) but by which are carried the movable sheaves upon which the elevator hoisting-ropes are wound, as usual with this class of elevators. The cylinder A is provided with an inlet-port a, communicating with the interior of an auxiliary valve-chest a', provided with an inlet-port a² and contain-

ing an auxiliary balanced hollow piston-valve a³, provided with circumferential ports a⁴. The piston-valve a³ is provided with valve stems or rods a⁵ a⁶, extended from its heads a⁷ a⁸. The valve-chest a³ is provided with a cylindrical extension b, as shown, in which reciprocates a piston b' on the valve-stem a⁶, the said cylindrical extension being connected by a passage b² with the valve-chest a³ beyond the valve-seat b³. Each head of the piston-valve has secured to it, as by screws or bolts b⁴, a washer b⁵ and a packing-ring b⁶, extended above or beyond the head of the piston-valve, so that when the piston-valve is seated a water-tight joint is effected and the supply to the cylinder A absolutely cut off. It will be seen that a balance of the auxiliary valve is effected by means of the passage b².

The valve-stem a⁵ is connected, as by link c, to pin or rod c', herein shown as resting upon the upper side of a guide-arm c², provided with a double cam-surface c³. (See Fig. 2 and dotted lines, Fig. 1.) The guide-arm c² is pivoted, as at c⁴, to a casting or bracket c⁵, and has connected to or forming part of it an arm c⁶, joined by an adjustable connecting-rod c⁷ with a similar arm c⁸, connected to a second cam-arm c⁹, similar to the cam-arm c², the cam-arm c⁹ being pivoted, as at c¹⁰, to a bracket c¹², secured to the guide A³. The cross-head A² has secured to it a substantially-T-shaped arm d, having mounted upon the opposite ends of the horizontal arm d' rollers d² d³, which enter the cam-grooves in the arms c² c⁹. The inlet-port a² of the auxiliary valve-chest a³ is connected to the outlet-port of the main valve, (not shown,) but which is operated by the usual shipper mechanism.

As shown in Fig. 1, let it be supposed that the elevator-car is ascending and that the cross-head A² is moving in the direction of arrow 20, the auxiliary valve being in the position shown in Figs. 3 and 4. The water is being admitted through the auxiliary valve into the cylinder, as indicated by arrows 21, Figs. 3 and 4. As the piston in the cylinder approaches the end of its stroke—that is, when the elevator is at or near the top of the elevator shaft or well—the roller d² enters the arm c², and, acting on the double cam groove or surface c³, gradually turns the said arm on its pivot and gradually closes the auxiliary

valve, so that when the piston has reached the end of its stroke the head a^8 of the auxiliary valve is seated and the admission of water to the cylinder A completely and absolutely cut off by the packing b^6 co-operating with the valve-seat b^3 . If now it is desired to have the elevator descend, the main valve is opened to the exhaust; but the auxiliary valve being balanced would not ordinarily open to permit the escape of the water in the cylinder, and in order that the said valve may be opened after being once closed a relief for the said auxiliary valve is provided, the said relief being herein shown as ports $e e'$ in the heads $a^7 a^8$ of the said valve. The relief-port e' is closed by a valve (shown as a washer e^2) pressed against the head a^8 by a spiral spring e^4 , encircling the valve stem or rod a^6 and having one end bearing against the piston b' and its other end against a collar e^3 , loose on the valve-stem a^6 and interposed between the valve e^2 and spring e^4 . The ports e are closed, as herein shown, by a valve forming part of the packing b^6 , secured to the head a^7 .

Let it be supposed that the elevator is at the top of its shaft or well and the auxiliary valve is closed, as described. The main valve is now operated through the shipper mechanism to connect the auxiliary-valve chest a^4 with the exhaust. When the pressure upon the head a^8 is withdrawn, the pressure of the water in the auxiliary valve opens the relief-valve e^2 and permits the escape of water. The auxiliary valve is thus unlocked or relieved from pressure, and the weight of the car moves the main piston. As the main piston and its connected cross-head A^2 are moved the roller d^2 is withdrawn from the cam-arm c^2 . As the roller d^2 is withdrawn from the cam-arm c^2 it turns the said arm on its pivot and opens the auxiliary valve, permitting the escape of water from the cylinder A through the said valve in a direction opposite to that indicated by arrow 21, Fig. 3. As the piston approaches the end of its stroke in the opposite direction the roller d^3 enters the cam-groove in the arm c^9 , and through the arm c^8 , rod c^7 , and arms $c^6 c^2$ closes the auxiliary valve—that is, seats the head a^7 . When the main valve is opened through the shipper mechanism to start the elevator upward, the water admitted into the auxiliary valve through the ports a^4 passes through the ports e and acts on the piston in the cylinder A to effect a gradual starting of the elevator until in the movement of the piston and cross-head A^2 the roller d^3 is withdrawn from the cam-lever c^9 and opens the auxiliary valve.

I claim—

1. In a hydraulic elevator, a cylinder, its piston, and cross-head connected to said pis-

ton, combined with an auxiliary balanced piston-valve to control the admission of water to the said cylinder, relief-ports $e e'$ in the heads of the said piston-valve, check-valves to control said relief-ports, and means, substantially as described, to operate said auxiliary-piston valve to open and close the same at the end of the piston-stroke, whereby an absolute stop is effected for the elevator independently of the shipper mechanism, substantially as described.

2. In a hydraulic elevator, the combination, with a cylinder, its piston, and a cross-head connected thereto, of an auxiliary balanced hollow piston-valve having circumferential ports a^4 , through which the water may flow into and from the said cylinder, relief-ports $e e'$ in the heads of the hollow piston-valve, check-valves to control said relief-ports, a cam-arm operatively connected to said auxiliary-piston valve, and an arm connected to the said cross-head and provided with a roller or projection to co-operate with said cam-arm, substantially as described.

3. In a hydraulic elevator, the combination, with a cylinder, its piston, and a cross-head connected thereto, of an auxiliary balanced valve to control the flow of water to and from the said cylinder and provided with a packing to render the valve water-tight when closed, and a relief port or ports in said balanced valve, and a check-valve to control said relief-ports, a pivoted cam-arm provided with double cam-surfaces and having its free end connected to said auxiliary valve, and an arm connected to the cross-head and provided with a roller or projection to act on the said double cam-surfaces, substantially as described.

4. In a hydraulic elevator, a cylinder, its piston, and cross-head connected to said piston, combined with an auxiliary-valve casing provided with a valve-seat, an auxiliary balanced hollow piston-valve located in said casing and provided with circumferential ports a^4 , a packing secured to the piston-heads to fit the said valve-seat water-tight, a relief for said auxiliary valve to permit the elevator to be started after the said valve is seated, and means, substantially as described, to operate said auxiliary valve to open and close the same at the end of the piston-stroke, whereby an absolute stop is effected for the elevator independently of the shipper mechanism, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANCIS B. PERKINS.

Witnesses:

JAS. H. CHURCHILL,
MABEL RAY.