

No. 753,569.

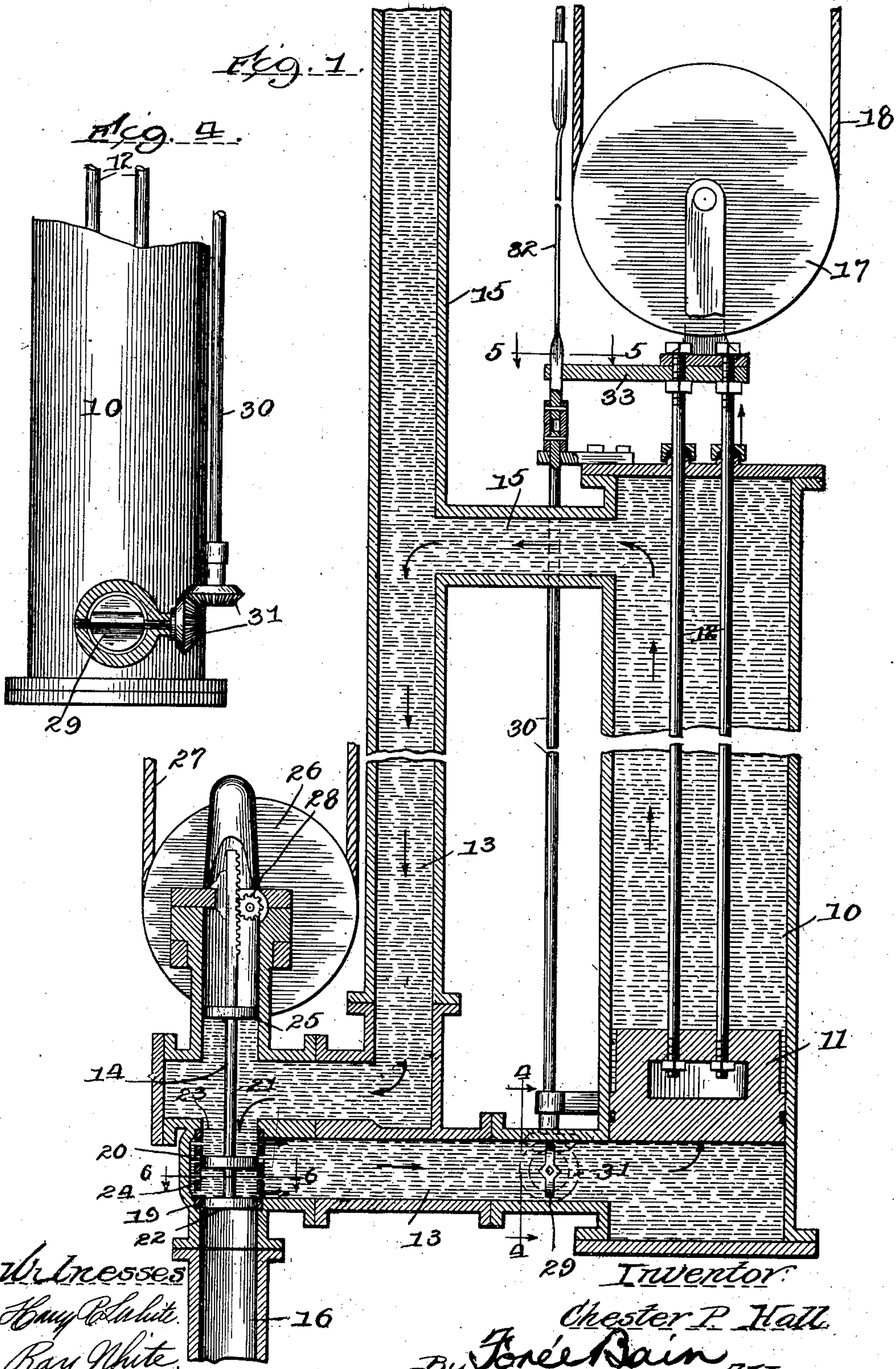
PATENTED MAR. 1, 1904.

C. P. HALL.
AUTOMATIC ELEVATOR RETARDING DEVICE.

APPLICATION FILED JAN. 24, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses
Harry White
Ray White

Inventor:
Chester P. Hall
By *J. E. Bain* Attorney

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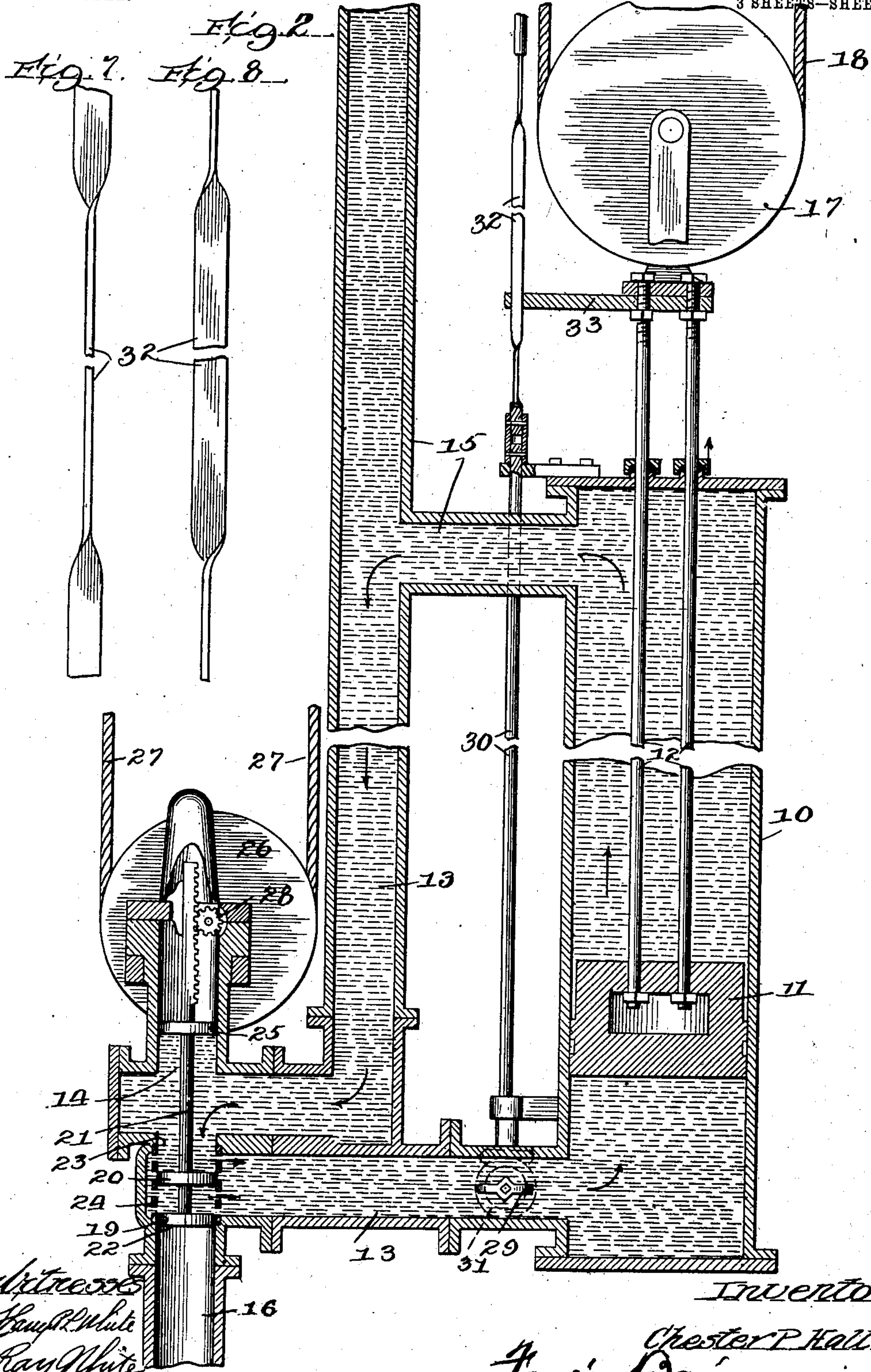
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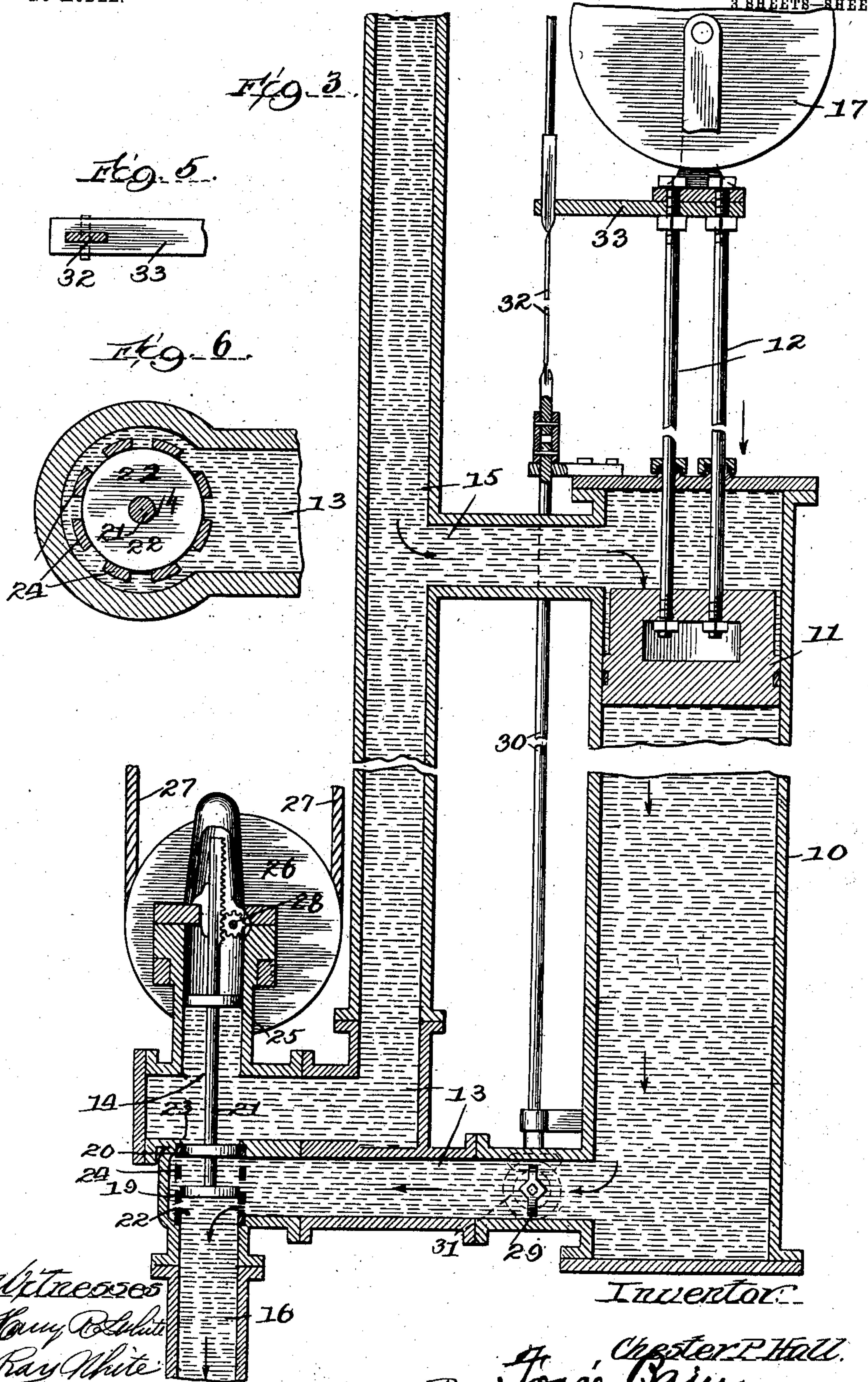
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3 SHEETS-SHEET 3.



Witnesses
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UNITED STATES PATENT OFFICE.

CHESTER P. HALL, OF CHICAGO, ILLINOIS.

AUTOMATIC ELEVATOR-RETARDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 753,569, dated March 1, 1904.

Application filed January 24, 1903. Serial No. 140,441. (No model.)

To all whom it may concern:

Be it known that I, CHESTER P. HALL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Elevator-Retarding Devices; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

The object of my invention is to provide an automatic elevator-retarding device adapted to be set into operation by the means employed for raising and lowering the elevator-car in its shaft, whereby the velocity of the car may be checked or retarded at a time in its excursion just previous to stopping the car in the ending of its trip and whereby the car will be caused to move slowly for a correspondingly-short distance at the time of beginning of its excursion.

A further object of my invention is the construction of an elevator-retarding device which will be positive and reliable in its action at all times.

With these and other objects which may hereinafter appear and become apparent to those skilled in the art my invention consists in the arrangement and combination of parts, as will be more specifically described, and pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation in section of an elevator-cylinder, showing the controlling-valve in place with my improvements applied thereto and showing the position of the parts at the time when the car is in the upper end of the shaft and when the controlling-valve has been moved for starting the car on its down trip. Fig. 2 is a similar view showing the position of the parts after the car has been started on its down trip and is moving at its normal velocity. Fig. 3 is a similar view showing the position of the parts when the car has arrived at the bottom of the shaft. Fig. 4 is a broken-away portion of the cylinder, taken on line 4 4 of Fig. 1, showing my retarding device in place. Fig. 5 is an enlarged broken-away detail of the arm fixed to the piston-rods of the piston just below the sheaves carrying the hoisting-

ropes, taken on lines 5 5 of Fig. 1. Fig. 6 is an enlarged section of the valve and valve-cage, taken on lines 6 6 of Fig. 1. Figs. 7 and 8 are enlarged elevations of the cam-rod, shown also in section in full and dotted lines in Fig. 5.

The same numerals of reference indicate similar parts in all of the views.

10 is an elevator-cylinder; 11, a piston; 12, piston-rods; 13, a transfer or by-pass pipe connecting the two ends of the cylinder through the controlling-valve 14.

15 is a supply-pipe from the source of pressure and water supply, and 16 a waste-pipe to empty the lower end of the cylinder 10.

17 represents the usual multiplying-pulleys, and 18 the wire hoisting-rope extending to the cage or load to be raised and lowered.

19 and 20 are valves fixed to the stem 21 and which are adapted to close the ports 22 and 23, respectively.

24 is the cage surrounding the valve, and 25 is a valve upon the upper end of the valve-stem 21 for holding and guiding the valves in a vertical position.

26 is a sheave around which the valve-controlling rope 27 passes and which raises and lowers the valve 14 by means of the pinion 28 when the said sheave is rotated.

It will be noticed from the diagram that the action of the water in the impelling-cylinder is to maintain the cylinder above the piston constantly at the static or working pressure of the water from the pipe 15. When the controlling-valve 14 is placed in the position shown in Fig. 1, then the upper and lower sides of the piston are exposed to the static pressure due to the water in the pipe 15, and when the controlling-valve is placed in the position shown in Fig. 3 only the upper side of the piston is exposed to the pressure and the water contained in the cylinder below the piston escapes through the valve-port 22 and the waste-pipe 16. Considering the position of the parts which I have thus far described in Fig. 1, both sides of the piston are now exposed to the pressure of the water contained in the pipe 15, or the pressure thereon is equalized, and the elevator-car is about to descend on its journey down the shaft. The

weight of the car is sufficient to lift the piston, and the controlling-valve being opened the water will flow in through the pipe 13 from above the piston in the cylinder 10 through the controlling-valve into the cylinder below the piston. The pressure on each side of the piston now being equalized, the piston will move to the position shown in Fig. 3 with but little resistance and the velocity at which the piston will move throughout the entire range of its movement will be uniform. Therefore the car attached by the hoisting-ropes 18 and the piston-rods 12 and piston will move at a corresponding rate of velocity.

My improved attachment is designed to retard the speed of the elevator-car at a time just previous to that at which it reaches its destination at the bottom or the top of the shaft and at the time immediately after it starts in its movement either down or up in the elevator-shaft. This I accomplish by placing a choke or butterfly valve in the pipe 13 to be turned automatically at a suitable time so as to restrict the passage and retard the flow of the water through the pipe 13 to and from the piston 11.

29 is a butterfly-valve which does not entirely fill the interior of the pipe 13 when turned to the position shown in Figs. 1 and 4.

30 is a rod for turning the valve operatively connected with the stem of the valve by a miter-gear 31.

32 is a double cam fixed to the upper end of the rod 30, which is made of a strap of iron or like material provided with a quarter-turn near each of its ends. (Shown in elevation in Figs. 7 and 8 and in section in Fig. 5.)

33 is an arm slotted near its free end and fixed to the piston-rods 12. The outer end of the arm surrounds the cam 32 and moves with the piston-rods. When the arm 33 moves over the vertical cam 32 at the points where the quarter-turn is made, the rod 30, which connects the miter-gear to the cam, is thereby rotated and the valve 29 is moved to the position shown in Fig. 1 or in Fig. 2, as the case may be. When the elevator-cage is traveling at its normal speed, the valve 29 is in the position shown in Fig. 2; but as the elevator-cage approaches nearer the end of its destination in either direction the valve 29 is automatically turned to the position shown in Fig. 1 by the instrumentality of the vertical cam 32 and the arm 33 in a manner readily understood by the construction shown. When the valve 29 has been turned to the position desired, the construction is such that it will be automatically held and maintained in that position without danger of accidental displacement until it has again been automatically moved into a different position by the operation of the cam-and-arm device.

In the position shown in Fig. 1 the elevator-cage is supposed to be at the top of the ele-

vator-shaft, and the piston 11 is about to begin its flight upwardly. The passage-way through the pipe 13 is now restricted by the valve 29, and the movement of the piston will be governed by the reduced flow of the water through the restricted passage-way provided in the pipe 13 by means of the valve 29 until the arm 33 has passed above the quarter-turn of the cam 32, when the valve 29 will be thereby automatically turned to the position shown in Fig. 2. Then at this time the passage-way through the pipe 13 will be unrestricted by the valve and the piston 11 will be permitted to move through the cylinder at its normal velocity, which will continue until the arm 33 reaches the upper cam or the quarter-turn of the cam 32 when the cage is nearing its destination at the bottom of the shaft. Then the choke or butterfly valve 29 will be again automatically turned to the position shown in Fig. 1 and the movement of the piston 11 will again be retarded and the cage will be caused to move at a much slower velocity than its normal speed.

One of the advantages arising from the use of my automatic retarding device is the fact that the normal speed of the elevator may be materially increased with safety when the speed at which the cage moves when nearing the destination of its flight is positively and automatically retarded. The distance that the elevator will move before its velocity is automatically changed by my device may be varied by the formation and position of the cam 32.

The valve 29 may be placed in any pipe supplying the motive fluid for moving the elevator-cage. For instance, instead of the water-pipe, as shown in the drawings, it may be in a steam-pipe leading to a steam-engine which supplies the power for moving the elevator-cage, whereby the supply of steam to the engine-cylinder may be restricted for the purpose of reducing the speed of the motor for retarding the velocity of the car when it approaches near the destination of its flight in the same manner and for the same purpose as illustrated in connection with a hydraulic elevator without departing from the spirit and scope of my invention.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an elevator, the combination with a motor having a cylinder, a piston therein, a source of pressure-supply having piping connections to the cylinder on both sides of the piston, a waste-pipe, and a valve controlling the communication of the piping on one side of the piston with the waste-pipe and the source of pressure-supply, to vary the pressure on the corresponding side of the piston, a rotatable choke-valve in the piping on the variable-pressure side of the piston, a rotatable operating-rod associated with said choke-

valve to move the latter, a cam-rod secured to the operating-rod, for movement therewith, and means carried by a moving element of the elevator mechanism, coacting with said
5 cam-rod to turn the latter at predetermined points in the movement of said moving element of the elevator mechanism.

2. In an elevator, the combination with a hydraulic motor having a cylinder, a piston
10 therein, piston-rods, a source of pressure-supply, a constant-pressure connection between the cylinder and the source of supply on one side of the piston, a variable-pressure-pipe
15 connection between the source of supply and the cylinder on the other side of the piston, a rotary choke-valve in said variable-pressure pipe, a twisted cam-rod parallel with the cylinder, operative connections between the cam-rod and valve to transmit movement from the
20 said rod to the valve, and an arm carried by the piston-rods adapted and arranged to coact with the cam-rod to turn the same at predetermined points in the travel of the elevator.

3. In an elevator, the combination of a hy-

draulic cylinder, a piston therein, piston-rods 25 therefor, conductor-pipes communicating with the cylinder on opposite sides of the piston, a source of fluid-supply having constant connection with one conductor-pipe and variable
30 connection with the other conductor-pipe to produce constant pressure on one side of the piston and variable pressure on the other, a rotatable butterfly choke-valve 29, in the variable-pressure conductor-pipe, a rotatable rod
35 30 extending to the end of the cylinder, miter-gears 31 connecting the rod 30 and valve 29, an elongated cam-rod 32 connected to the rod 30, and extending in parallelism to the piston-rods, and an arm 33 carried by the piston-rod
40 arranged in sliding engagement with said cam-rod 32.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHESTER P. HALL.

In presence of—

FORÉE BAIN,

MARY F. ALLEN.