

No. 685,231.

Patented Oct. 22, 1901.

I. H. VENN.

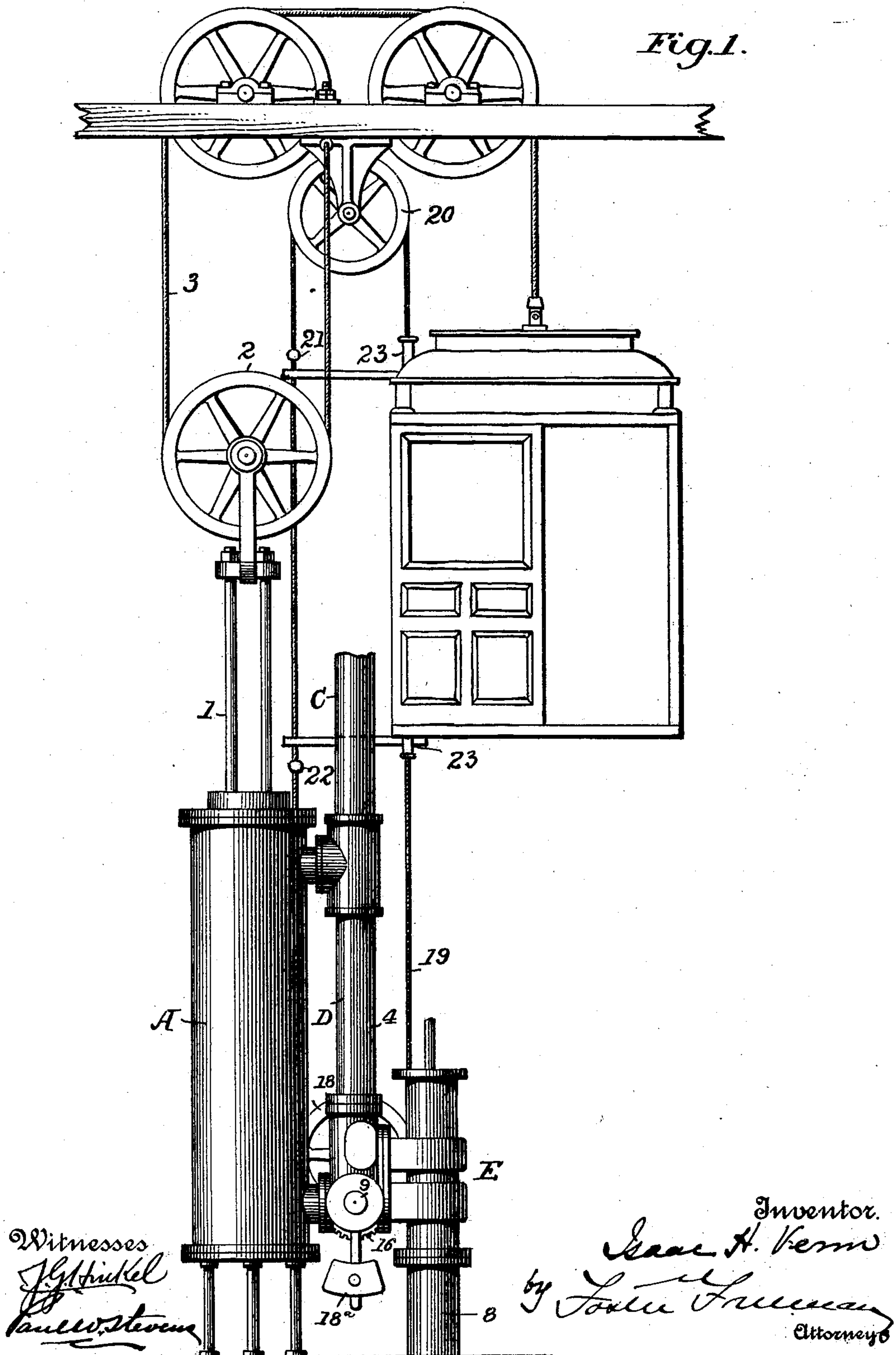
AUTOMATIC STOP VALVE FOR HYDRAULIC ELEVATORS.

(Application filed Oct. 31, 1896.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



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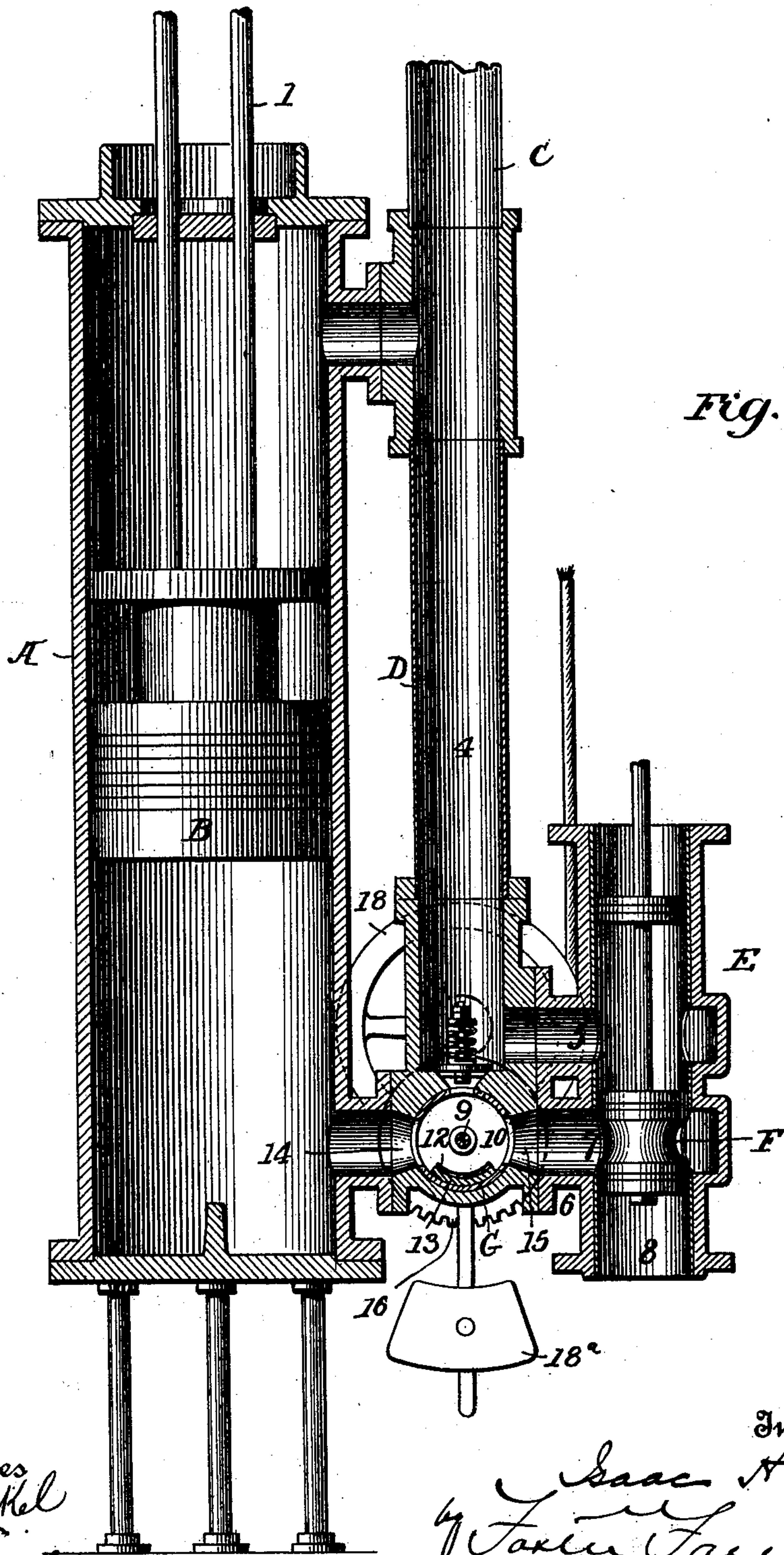
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3 Sheets—Sheet 2.



Witnesses
J. H. Hinkel
R. W. Stevens

Inventor
Saac H. Venn
by Foster Freeman
Attorneys

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Fig. 3.

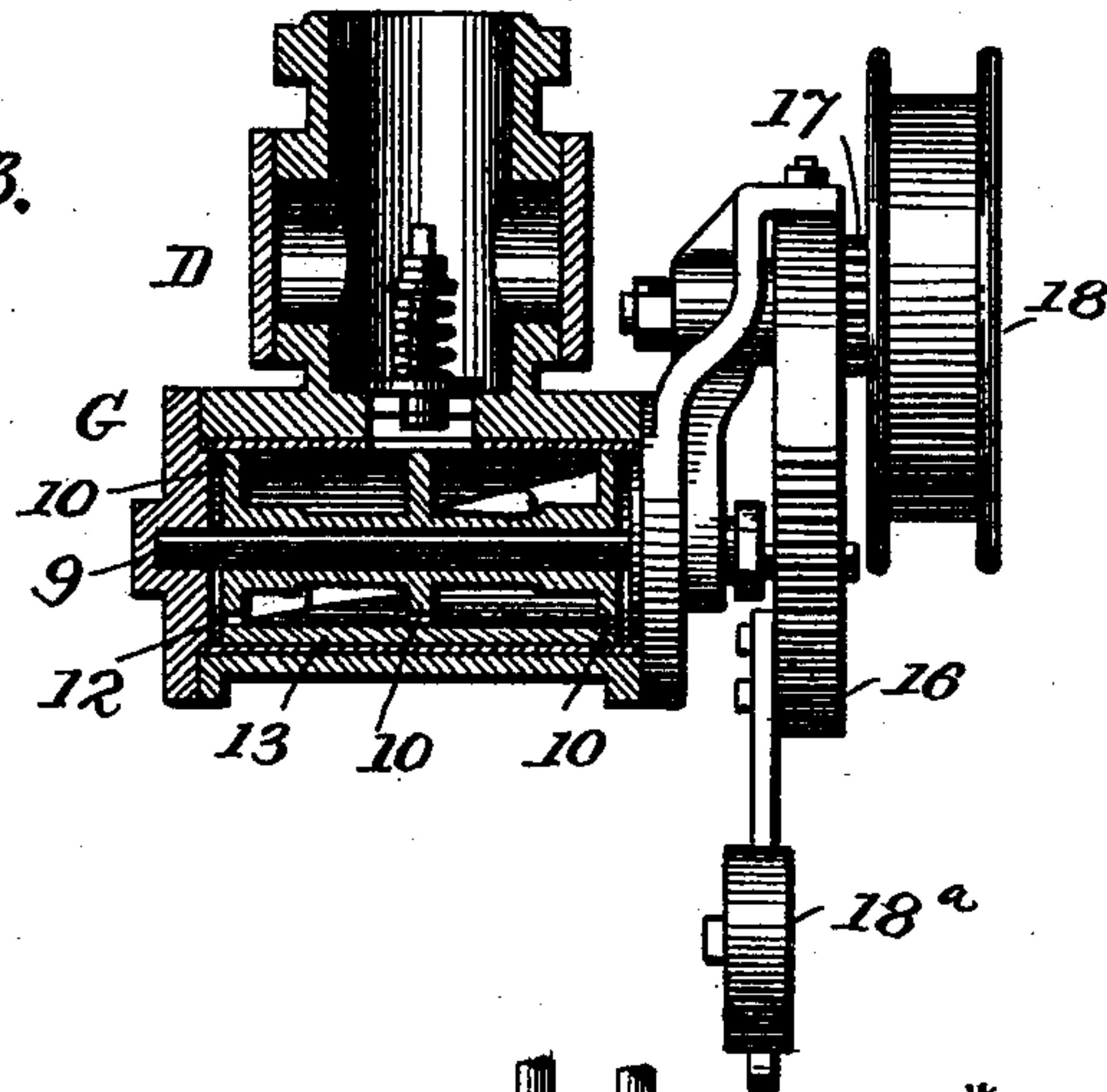
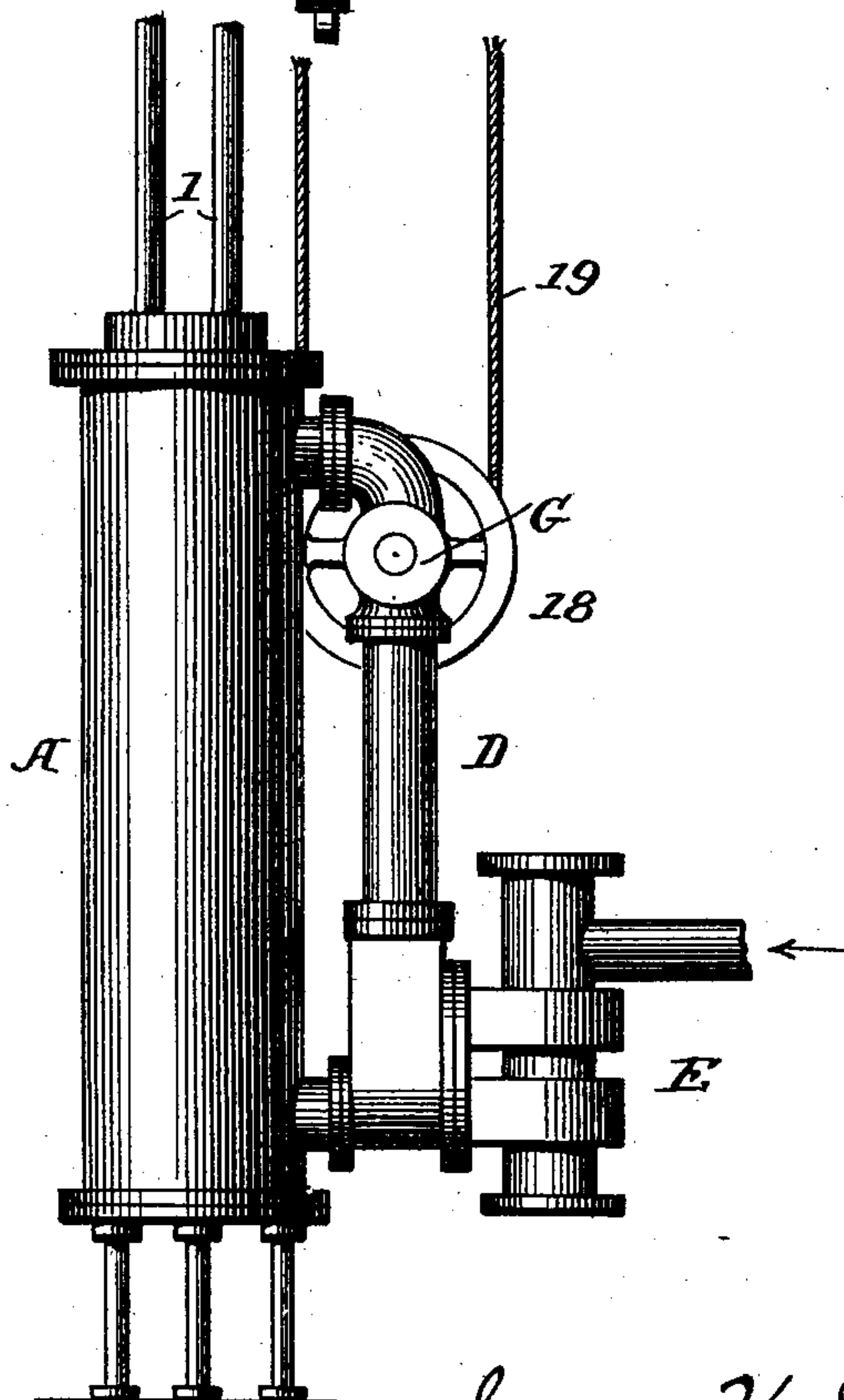


Fig. 4



Witnesses

J. G. Hinkel

H. M. Gillman, Jr.

Inventor

Isaac H. Venn.

By

Fisher & Freeman,

Attorneys

UNITED STATES PATENT OFFICE.

ISAAC H. VENN, OF YONKERS, NEW YORK, ASSIGNOR TO OTIS ELEVATOR COMPANY, OF EAST ORANGE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

AUTOMATIC STOP-VALVE FOR HYDRAULIC ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 685,231, dated October 22, 1901.

Application filed October 31, 1896. Serial No. 610,756. (No model.)

To all whom it may concern:

Be it known that I, ISAAC H. VENN, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Automatic Stop-Valves for Hydraulic Elevators, of which the following is a specification.

This invention relates to certain new and useful improvements in elevators; and it has for its object to provide simple and efficient means for automatically arresting the movement of the elevator at predetermined points, usually at the top and bottom of the shaft; and with these objects in view the invention consists in the novel construction, combination and arrangement of parts hereinafter more particularly described.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts, Figure 1 is an elevation of an elevator and its operating devices embodying the invention. Fig. 2 is a vertical sectional elevation of the elevating apparatus, parts being broken away. Fig. 3 is a detail sectional view of the stop-valve. Fig. 4 is an elevation of a modification.

My invention relates more particularly to that class of elevators which are operated by hydraulic pressure acting in a cylinder upon a piston connected to the elevator-car, the movement of the car in the proper direction being controlled by means of a valve or valves operated from within the car and which serve to direct the pressure upon one side of the piston or upon both sides, accordingly as it is desired to raise or lower the car.

Referring to the drawings, which illustrate a simple and well-known form of hydraulic elevator, A designates the cylinder, which may be either vertically or horizontally arranged. Within this cylinder is a piston B, connected to a rod or rods 1, carrying at their ends a traveling sheave 2, around which passes the hoisting-cable 3, connected at one end to a stationary support and at its opposite end to the elevator-car.

Communicating with the upper end of the cylinder is a fluid-supply pipe C. The oppo-

site ends of the cylinder are connected by means of a circulating-pipe D, comprising an operating-valve casing E, a pipe 4 communicating with said casing through a port 5, and a pipe 6 communicating with the valve-casing through a port 7. Leading from the valve-casing E is a discharge-pipe 8, and within the casing is a suitable operating-valve F, adapted to be shifted below the port 7 to open communication between the ends of the cylinder A, to be shifted to close the port 7, and to move above said port to open communication between the discharge-pipe 8 and the bottom of the cylinder. The position of the valve F may be controlled from within the elevator-car by any of the usual and well-known hand or electrical operating devices.

In the ordinary operation of the above-described devices when the car is at the top of its shaft the piston B is at the bottom of the cylinder A, and when it is desired to descend the operating-valve F is shifted below the port 7, permitting the fluid to circulate around into the lower part of the cylinder, filling up the cylinder and exerting an upward pressure, which neutralizes the downward pressure above the piston, and consequently allows the car to descend by its own weight, the descent being arrested by shifting the operating-valve to close the port 7. If now it is desired to again elevate the car, the valve F is elevated above the port 7, throwing the pipe 6 into communication with the discharge-pipe and allowing the fluid below the piston to be discharged freely as the pressure above the piston moves it downward. Instead of depending upon the operator to shift the operating-valve to arrest the elevator when it reaches either terminal of its movement it is desirable that means be provided for automatically effecting this, thereby obviating any liability of injury to the operating devices resulting from the failure or neglect of the operator to actuate the operating-valve at the proper time. In order to accomplish this result, I arrange at a suitable point in the line of circulation of the fluid a stop-valve, which will operate to automatically cut off the flow of the fluid in one direction as the piston approaches either end of the

cylinder, but permit the flow of the fluid in the opposite direction. This valve may be constructed and operated in various ways, and it may be arranged at different points; 5 but I prefer to employ a valve adapted to co-operate with one or the other of two separated ports to close the same and prevent the passage of liquid therethrough in one direction, but at the same time being capable of 10 a limited movement away from said ports to permit the flow of the liquid in the opposite direction. Thus, as shown in Figs. 1 to 3, a rotary reciprocating stop-valve G is arranged in the pipe 6, which forms part of the circulating-pipe. This valve comprises two parts, 15 one a spindle 9, from which project two or more separated flanges or supporting-guides 10, provided in their peripheries with alining segmental recesses 12 for the reception of the 20 other part, which is a plate or valve-seat 13. The depth of these recesses 12 is greater than the thickness of the plate 13, and consequently said plate is loosely held and capable of moving radially in said recesses. This 25 valve G is adapted to be actuated to bring its plate to close either one of two ports 14 15 of the pipe 6, and while this actuation of the stop-valve may be effected in various ways I prefer to employ the mechanism which I will 30 now describe.

Mounted upon the valve-spindle 9 is a gear 16, with which meshes a pinion 17 upon the shaft of a sheave 18. Secured to the gear 16 is a center return-weight 18^a, adapted to re- 35 turn the gear to its normal position when it is moved in one direction or the other. Passing around the sheave 18 and secured thereto is a rope 19, which extends upward and passes over a sheave 20. Upon one run of 40 the rope 19 are two separated bearings 21 22, arranged in position to be engaged by projections 23 of the car as the car approaches the upper and lower ends of its shaft.

Assuming the piston to be at the top of its 45 cylinder and the elevator-car at the bottom of its shaft and that it is desired to elevate the car, the valve F is lifted above the port 7, permitting the fluid beneath the piston to be discharged as the piston descends. Now 50 if the operator neglects to properly actuate the operating-valve F to stop the car as the piston approaches the limit of its downstroke the upper projection 23 makes contact with the bearing 21 and through the rope 19 ro- 55 tates the sheave to the right or clockwise and the valve G to the left or counter-clockwise, so as to bring its face over the port 15 to close the same, the valve-plate being held against said port by the pressure of the fluid beneath 60 the piston, and in consequence of the discharge of said fluid being cut off the piston is brought to a stop. When it is desired to cause the descent of the elevator, the operating-valve is moved below the port 7, estab- 65 lishing a communication between the spaces above and below the piston, and the water

on entering the lower end of the cylinder presses the valve-plate 13 slightly away from the port 15, which is permitted by reason of the depth of the recesses 12. The stop-valve 70 plate is, however, rotated back to its normal position to wholly open the port by means of the center return-weight 18^a upon the disengagement of the projection 23 and the bearing 21. It will be seen from the above that 75 when the stop-valve is in position to close the port 15 it may be moved away from the port to permit fluid to flow to the bottom of the cylinder, but prevents the discharge of the fluid contained therein. When the pis- 80 ton approaches the upper end of its cylinder, the lower projection 23 engages with the bearing 22 and through the rope 19 and intermediate mechanism rotates the valve-plate 13 to close the port 14, it being held tightly 85 against its seat by the pressure of the fluid from above the piston, and thereby further upward movement of the piston is prevented. If, however, the operating-valve F is shifted 90 above the port 7, the pressure upon one side of the valve-plate is relieved and the pressure of the fluid beneath the piston presses the valve-plate from the port and permits said fluid to escape and the piston to descend, and after the piston has moved a short dis- 95 tance the center return-weight carries the stop-valve plate to its normal position in a manner which is obvious.

In the construction shown in Fig. 4 the stop- 100 valve G is located in the pipe 4 and the fluid is supplied through the valve-casing above the operating-valve, and instead of interposing gearing between the valve-spindle 9 and the sheave 18 the sheave is mounted directly 105 upon the valve-spindle. When thus arranged, it is necessary to secure the bearings 21 22 upon the opposite run of the rope to that shown in Fig. 1. With this exception the arrangement and operation of the parts stated are 110 such as to produce practically the same results as in the construction hereinbefore described.

As shown in Fig. 1, the rope 19 extends through the car, and it will be evident that the stop-valve may be operated from within 115 the car to stop it at any desired point. This is only necessary, however, in event of an emergency—as, for instance, when the operating-valve gets out of order and fails to work.

Without limiting myself to the particular 120 construction and arrangement of the stop-valves or to the particular construction of elevating devices shown and described, what I claim is—

1. In a stop-valve device, the combination 125 with a casing having two or more ports, of a stop-valve adapted to coöperate with either of the ports, the said valve comprising a spindle, having flanges provided with recesses, and a plate loosely held and capable of radial 130 movement in said recesses, to close the flow of fluid under pressure in one direction, and

to automatically open under reverse pressure to permit such flow in the opposite direction, substantially as described.

2. In a stop-valve device, the combination
5 with a casing having two or more ports, of a stop-valve adapted to cooperate with either of the ports, the said valve comprising a spindle, having separated supporting-flanges, provided in their peripheries with alining seg-
10 mental recesses, and a plate loosely held and capable of radial movement in said recesses, to close the flow of fluid under pressure in one direction, and to automatically open under reverse pressure to permit such flow in
15 the opposite direction, substantially as described.

3. In an elevator, the combination with the cylinder and its piston, of a circulating-pipe connecting the ends of the cylinder, provided

with two separated ports, an oscillating stop- 20
valve within the circulating-pipe adapted to cooperate with either one of the ports, the said valve comprising a spindle, having flanges provided with recesses, and a plate loosely held and capable of radial movement in said 25
recesses, to close the flow of fluid under pressure in one direction, and to automatically open under reverse pressure to permit such flow in the opposite direction, and means for automatically oscillating the stop-valve, sub- 30
stantially as described.

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

ISAAC H. VENN.

Witnesses:

I. J. BEAUDRIAS,

JOHN G. SCHAEFER.