

No. 609,987.

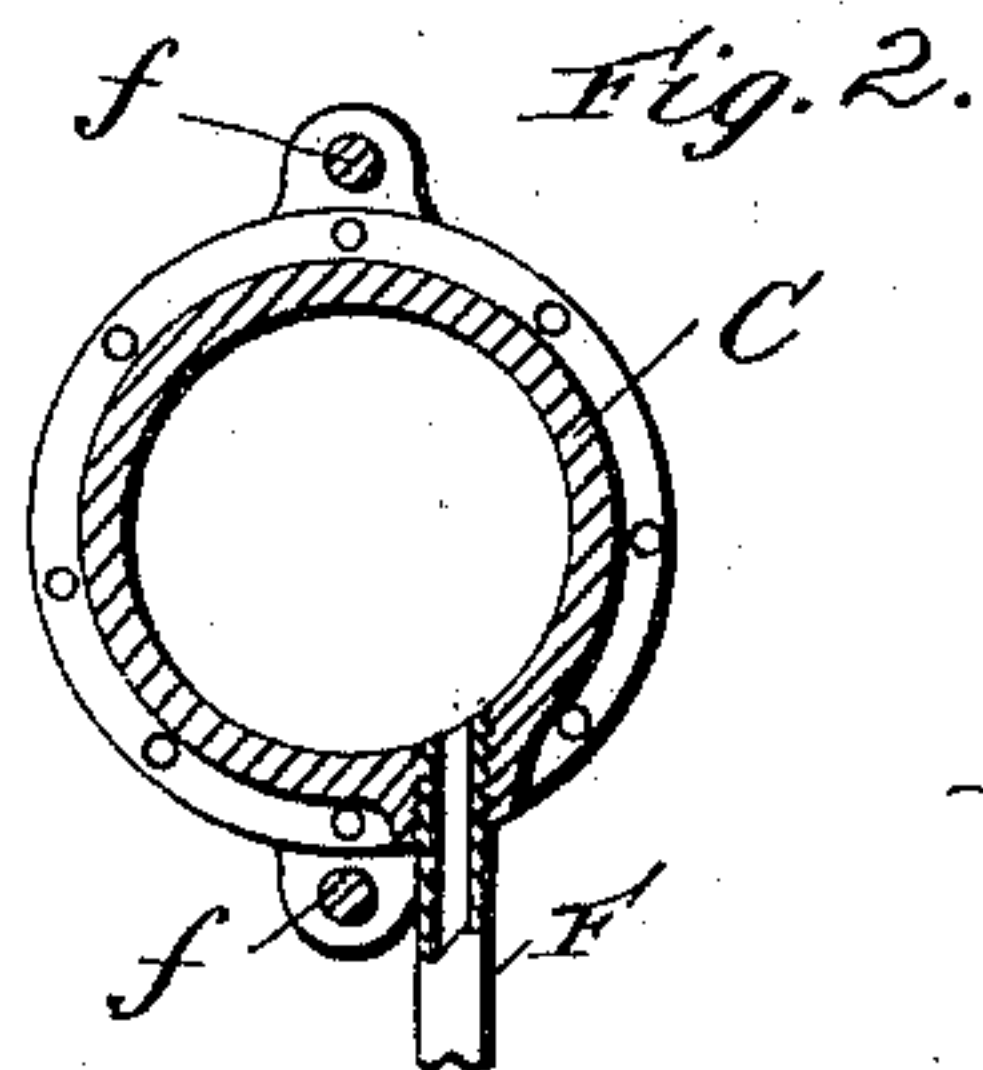
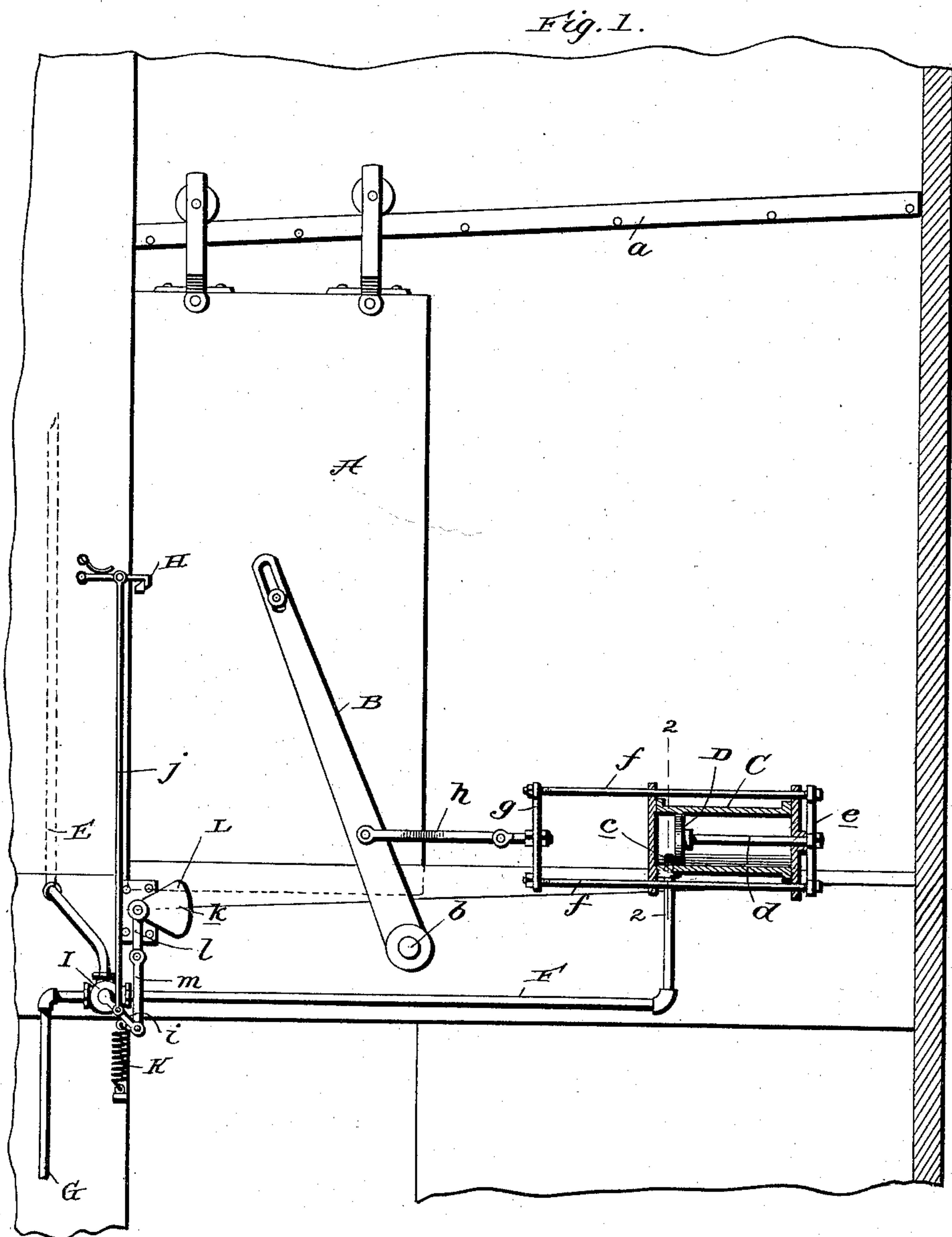
Patented Aug. 30, 1898.

F. T. ELLITHORPE.
ELEVATOR DOOR OPENING APPARATUS.

(Application filed May 19, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 3.

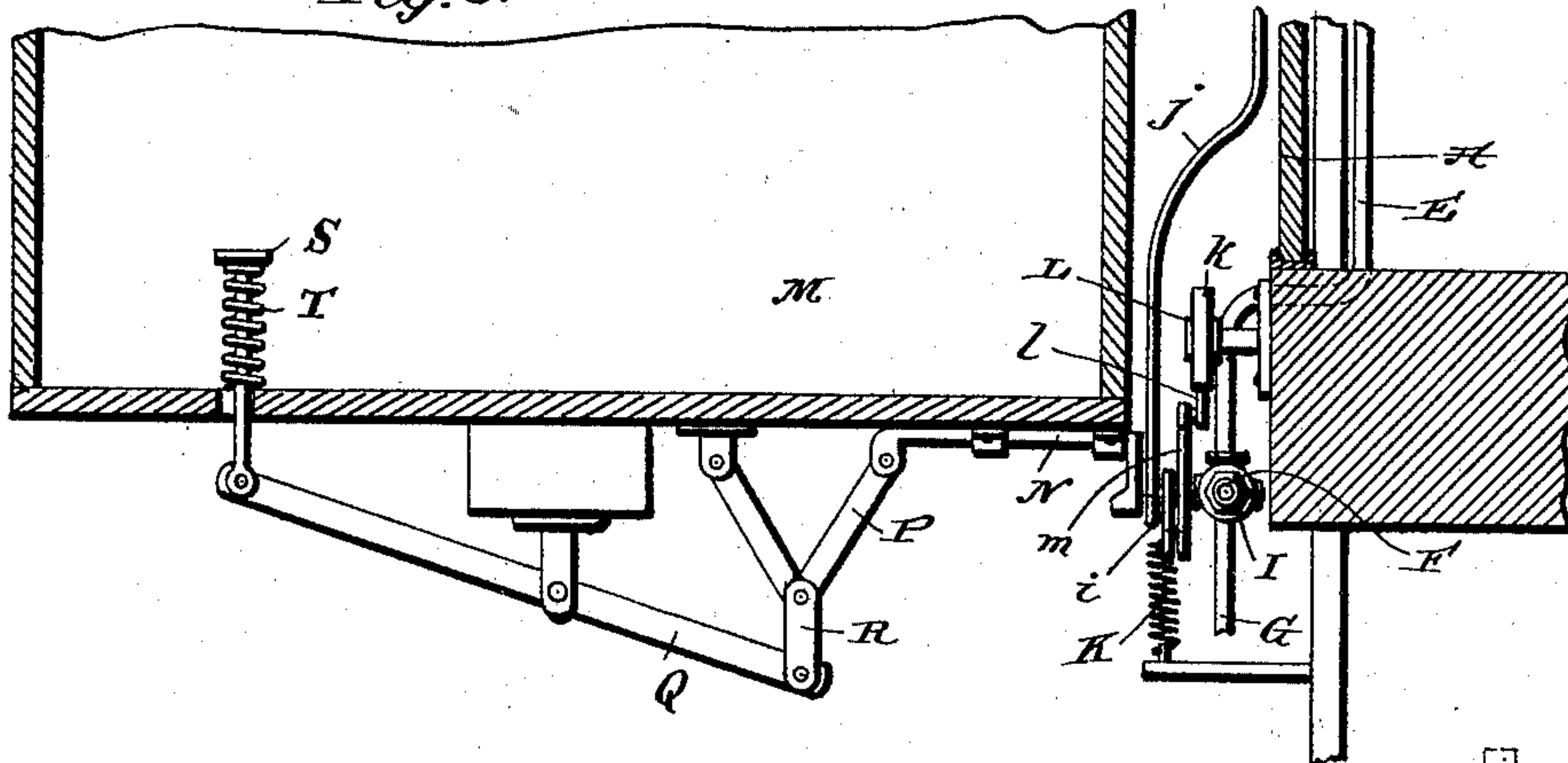


Fig. 4.

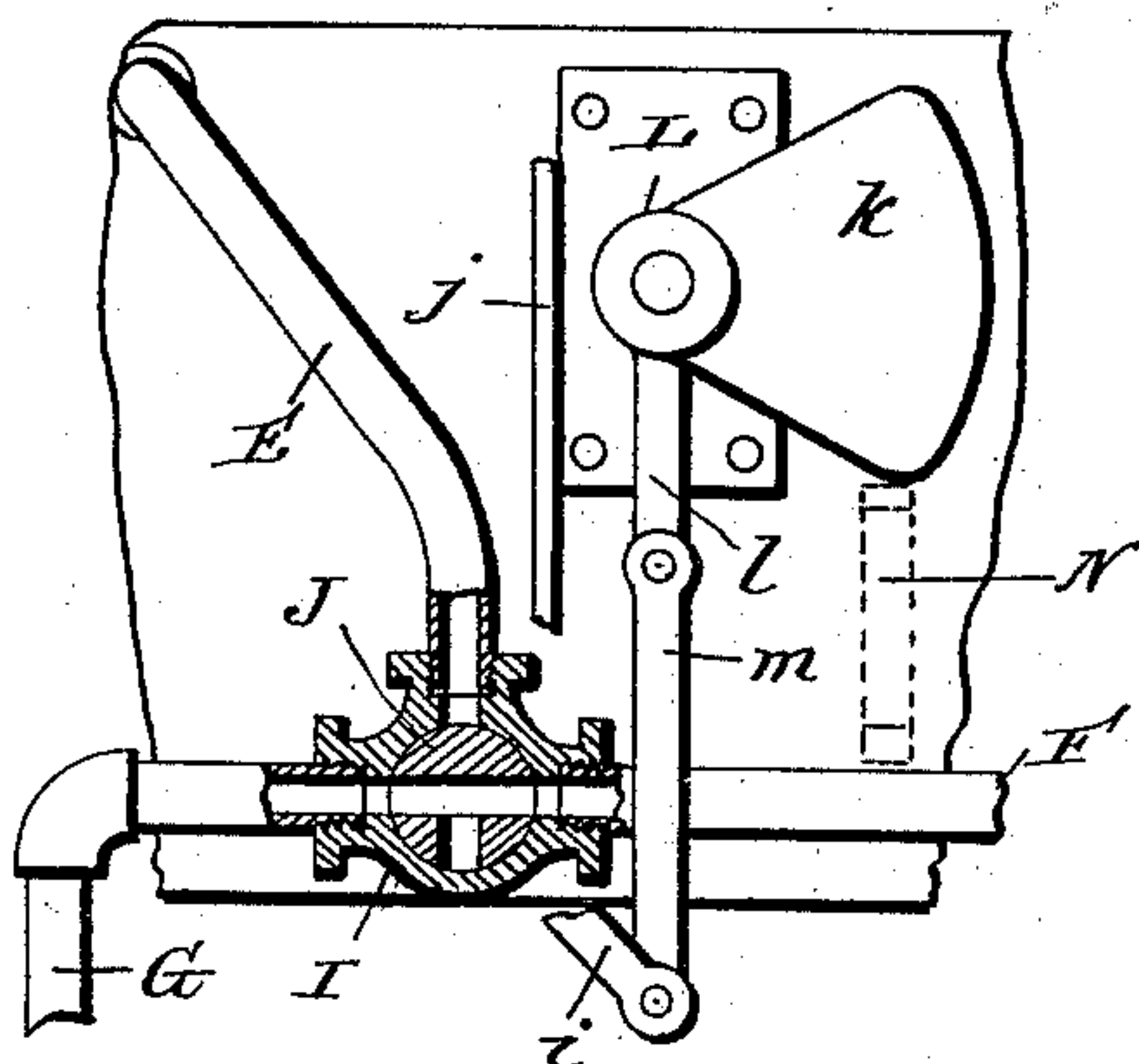


Fig. 5.

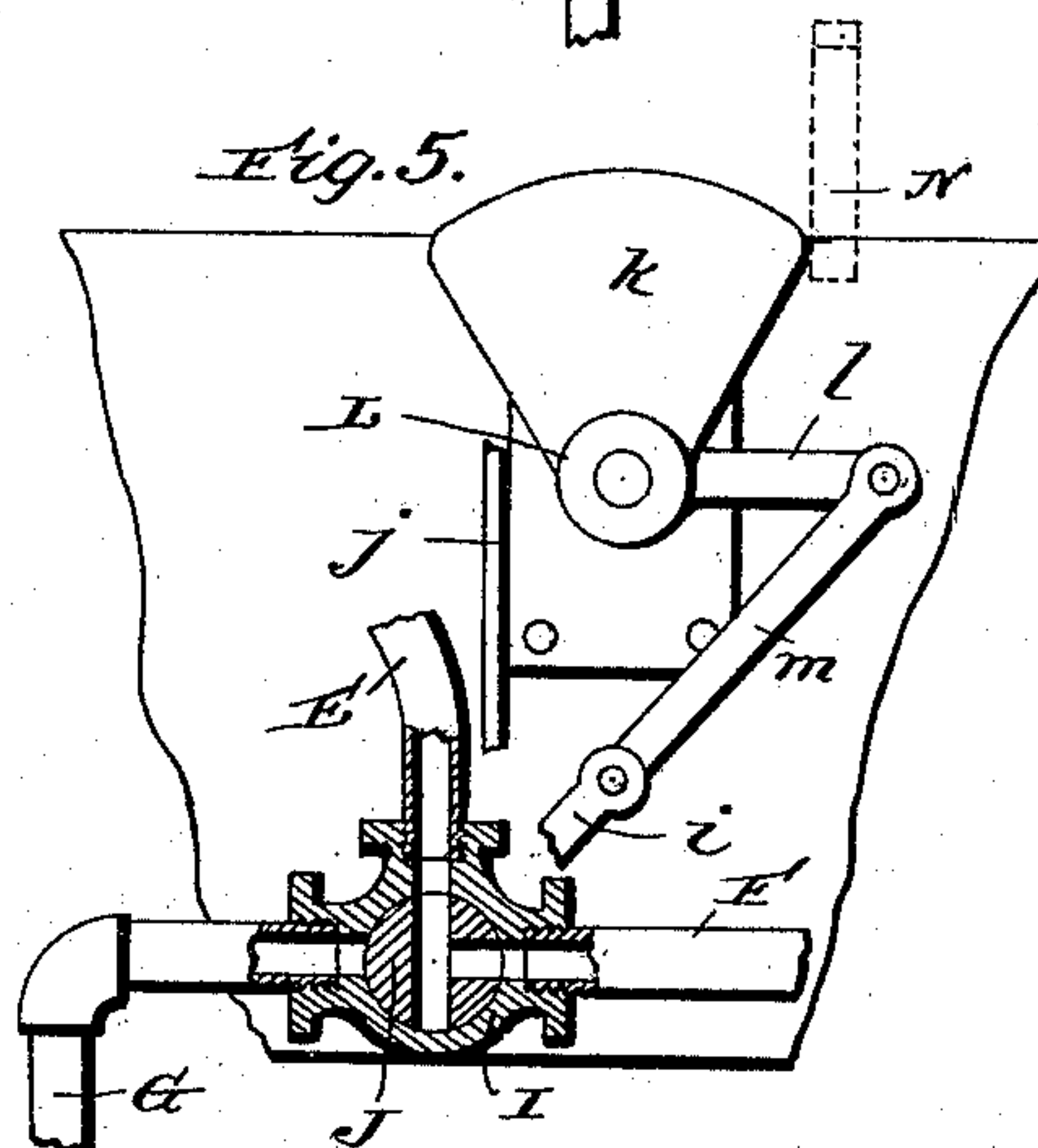
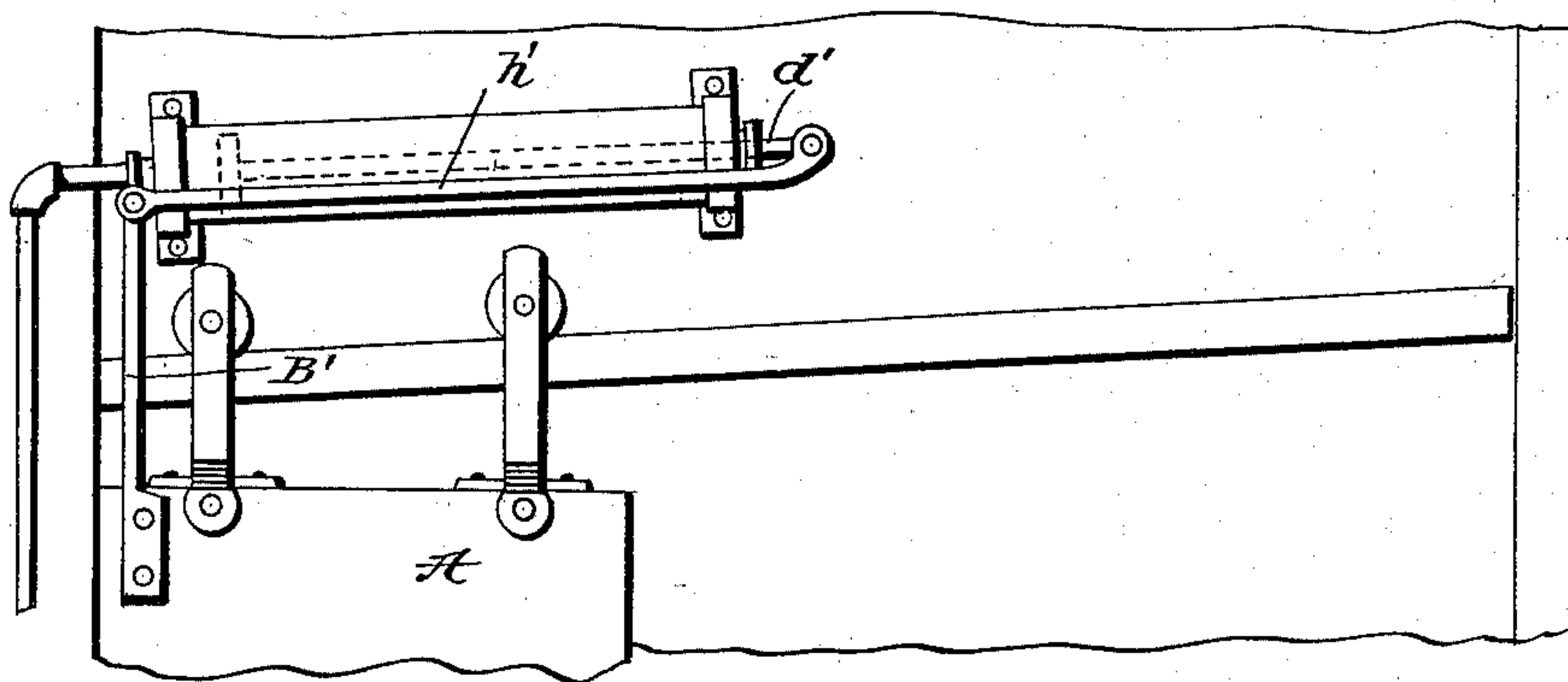


Fig. 6.



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UNITED STATES PATENT OFFICE.

FREDERICK T. ELLITHORPE, OF NEWARK, NEW JERSEY.

ELEVATOR-DOOR-OPENING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 609,987, dated August 30, 1898.

Application filed May 19, 1898. Serial No. 681,154. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK T. ELLITHORPE, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Elevator-Door-Opening Apparatus, of which the following is a specification.

My invention relates to fluid-pressure apparatus for automatically effecting the opening of elevator-doors; and it consists in the simple, practical, and highly-efficient construction hereinafter described, and particularly pointed out in the claims appended.

In the accompanying drawings, Figure 1 is a view, partly in elevation and partly in section, illustrating my improvements as applied to a well-door of an elevator. Fig. 2 is an enlarged transverse section taken in the plane of line 2 2 of Fig. 1. Fig. 3 is a section taken in a plane at right angles to Fig. 1 and illustrating the mechanism on the car and wall of the well. Fig. 4 is a detail view illustrating the position of the valve-opening lever when the valve is in its normal position. Fig. 5 is a similar view illustrating the position which the lever and valve assume when the former is engaged by the car-tappet on the up movement of the car, and Fig. 6 is an elevation illustrating a modification in the arrangement of the piston-cylinder and the manner in which the piston is connected with the door.

Referring by letter to said drawings, and more particularly to Figs. 1 to 5 thereof, A is an elevator-well door which is preferably hung from an inclined track *a* and is consequently enabled to gravitate to its closed position. (Shown in Fig. 1.)

B is a lever fulcrumed at *b* on one wall of the elevator-well and connected with the door A.

C is a piston-cylinder suitably mounted in the elevator-well and having a port *c*, and D is a piston arranged in the cylinder C.

Arranged on the rod *d* of piston D is a head *e*, which is connected by guide-rods *f*, extending through the cylinder-heads, with a head *g*, which is connected in turn by a pitman *h* with the lever B. In virtue of this construction when sufficient fluid-pressure is let into

the cylinder C through port *c* the door A will be moved to its open position and will be held in such position so long as the pressure is retained in the cylinder. When, however, the pressure is exhausted from the cylinder C, the door is free to gravitate to its closed position. In lieu of the arrangement just described the piston-cylinder may be placed as shown in Fig. 6, in which event the lever B is dispensed with and a pitman *h'* is interposed between the piston-rod *d'* and an arm B' on the well-door.

E is a pipe which may lead from a street-main, the pressure-cylinder of a hydraulic-elevator apparatus, or other source affording not less than five pounds of pressure to the square inch.

F is a pipe communicating with the port of the piston-cylinder.

G is a return or drain pipe.

H is a latch for retaining the door A in its closed position, and I is a three-port-valve casing interposed between and connected to the said pipes. In the said casing I is arranged a two-way-valve plug J, which has a crank *i*, connected by a pitman *j* with the door-latch H, the said ports being so arranged that on the initial movement of the valve-plug to establish communication between the supply-pipe E and the pipe F, leading to cylinder C, the latch will be disengaged from the door to permit of the subsequent movement of said door by the fluid-pressure entering the cylinder C. The latch and keeper on the well wall and door, respectively, are also so arranged that when the door returns to its closed position it will be automatically latched.

K is a spring connected to the crank *i* and having for its purpose to return the valve to and normally hold it in the position shown in Fig. 4, and L is the valve-operating lever, which is fulcrumed on the wall of the well. This lever is of the general bell-crank form and has a segment-shaped arm *k* and an arm *l*, connected by a pitman *m* with the crank *i* of the valve, whereby it will be seen that no matter in which direction the lever L is rocked from the position shown in Figs. 1 and 4 the valve J will be opened.

M is an elevator-car of the ordinary con-

struction. N is a slidable tappet thereon for engaging the segmental arm *k* of the valve-operating lever L.

P is a toggle-lever connected to the car M and tappet N.

Q is a lever fulcrumed on the car and connected by a link R with the toggle-lever P.

S is a pedal extending up through the floor of the car, and T is a spring interposed between the floor of the car and the head of the pedal and having for its purpose to normally hold the car mechanism in the position shown in Fig. 3, so as to enable the tappet N to pass the valve-controlling lever L without engaging the same. From this it follows that the car may pass the door without opening the same. When, however, it is desired to open the door, it is simply necessary for the car conductor to depress the pedal S and extend the tappet N, so that the lever L will lie in the path of said tappet. This being done, the tappet will engage the segment *k* of the lever and through the medium of the same throw the lever and open the valve. The manner in which the lever is thrown and held in its adjusted position on the up movement of the car is shown in Figs. 4 and 5, and from the same the manner of throwing and holding the lever in its adjusted position on the down movement of the car will be readily understood.

It will be seen that by reason of the arm *k* of the lever L being segment-shaped it will be engaged by the tappet N, and the valve will be fully opened on both the up and down movements of the car by the time the car reaches the landing, and in consequence the door will be opened. It will also be seen that the shape of the arm *k* enables the operator, through the medium of the tappet N, to hold the valve fully open and the door in its open position while the car remains at the landing.

In the practice of the invention I prefer to employ a gravitating door such as described. It is obvious, however, that a self-closing door of any suitable description may be employed without departing from the scope of

my invention. I also prefer to use water under at least five pounds pressure as means for actuating the piston and opening the door. I do not desire, however, to limit myself to the same, as any other suitable fluid-pressure may be employed.

Having thus described my invention, what I claim is—

1. In a fluid-pressure apparatus for opening elevator-doors, the combination of a door, a latch therefor, a piston-cylinder, a piston therein connected with the door, a fluid-pressure-supply pipe, a cylinder-pipe, a valve for effecting communication between the supply-pipe and cylinder-pipe and communication between said cylinder-pipe and an exhaust, a connection between the valve and the latch, and suitable means for operating the valve, substantially as specified.

2. In a fluid-pressure apparatus for opening elevator-doors, the combination of a door, a latch therefor, a piston-cylinder, a piston therein connected with the door, a fluid-pressure-supply pipe, a cylinder-pipe, a partially-rotatable valve provided with a crank-arm and arranged to effect communication between the supply-pipe and cylinder-pipe and communication between said cylinder-pipe and an exhaust, a pitman connecting the crank-arm of the valve and the latch, a spring connected to the crank-arm of the valve and adapted to normally hold said valve in a position to effect communication between the cylinder-pipe and the exhaust, and the bell-crank lever having the arm connected by a pitman with the crank-arm of the valve and also having the segment-shaped arm adapted to be engaged by a tappet on an elevator-car, substantially as specified.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FREDERICK T. ELLITHORPE.

Witnesses:

FRANK L. BOPPE,

THOMAS R. EDWARDS.