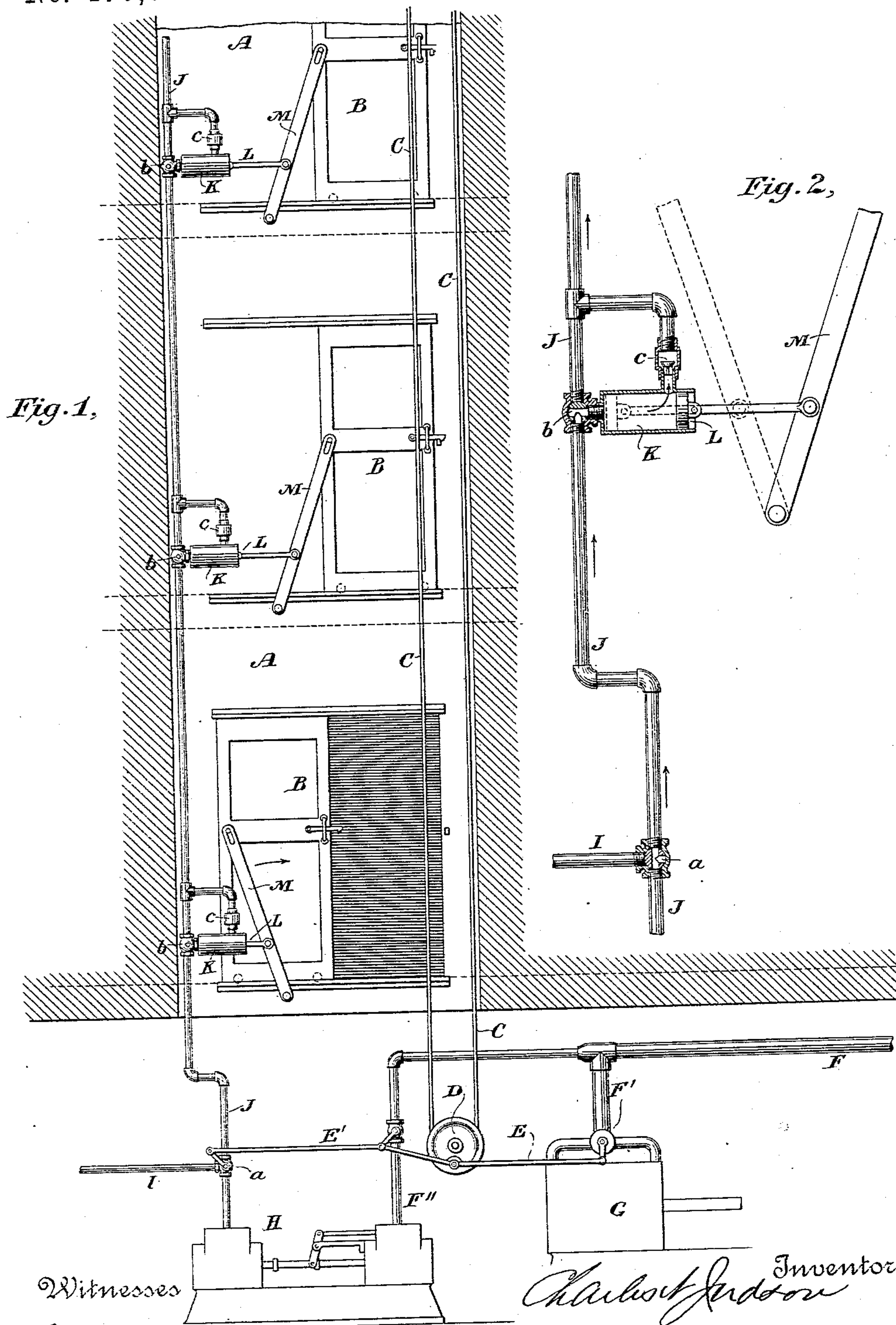


(No Model.)

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DEVICE FOR CLOSING ELEVATOR GATES.

No. 476,386.

Patented June 7, 1892.



Witnesses

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DEVICE FOR CLOSING ELEVATOR-GATES.

SPECIFICATION forming part of Letters Patent No. 476,386, dated June 7, 1892.

Application filed April 29, 1891. Serial No. 390,960½. (No model.)

To all whom it may concern:

Be it known that I, CHARLES N. JUDSON, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement for Closing the Gates or Doors to Elevator-Shafts, of which the following is a specification.

It is well known that elevator-shafts are a great source of danger to the public from the fact that through the negligence or carelessness of the attendant or through faulty construction the doors or gates of such shafts are either left open or are permitted to open by the action of gravity at one landing or floor while the elevator cage or car is positioned at some other, and thereby persons are permitted to fall through the shaft and either be killed or badly injured. Accidents are likewise caused by the car-door being left open, especially when the car is in motion.

The object of my invention is to insure the closing of such doors or gates by means of the ordinary controlling device of the elevator-car acting upon means connected with said doors or gates for closing the same without imposing any work upon the car itself and without additional attention or movement on the part of the attendant or conductor of the car.

In order to accomplish my object, I place in the basement or cellar of a building in which the elevator is located an air-compressor, which is set in motion by the conductor of the elevator-car by means of the controlling device or valve-rope of the elevator. This air-compressor when so operated is arranged to close the several doors through the length of the shaft. It will be seen that by well-known modifications any pneumatic system—such as steam or a vacuum—can be used to perform the function of compressed air in my invention.

In the accompanying drawings, A, Figure 1, represents the ordinary shaft for an elevator, which is shown as extending from the basement through three stories of a building, with the elevator-car (not shown) in supposed position at the first floor above the basement, and B the ordinary sliding door or gate at that floor open to admit passengers, but in the

act of closing with the start of the elevator-car.

Fig. 2 is a drawing in detail of the compressed-air pipe J, with one of its branches, 55 and a sectional view of *a*, the three-way cock in the basement, and of one of the three-way cocks with a gate-cylinder and its piston-head and rod and gate-lever attachment as positioned when the gate is closed and of the by-port valve and return-pipe at a landing. C is an ordinary controlling device or valve-rope passing through the elevator, by means of which the attendant operates the motor-valve, causing the elevator to rise or descend, 65 as may be desired. H is an air-compressor operated in any of the well-known ways through connections with the elevator-motor and so adapted and adjusted to the valve-rope and pulley D that the movement of this rope to start the elevator-car in either direction will start the compressor and the stopping of the car will stop the compressor and will also cut off its connection with the gate-cylinders through the compressed-air pipe. 75 J is a pipe running from the compressor through each landing or floor of the building adjacent to the shaft. In this pipe at the basement and at each end of the landings or stories of the shaft and conveniently near the shaft-doors I place three-way cocks. The three-way cock in the basement is so adjusted to the valve-rope that the movement of the rope in starting the elevator opens the passage from the compressor through the pipe to the cylinder on the first floor. The three-way 85 cocks *b* at each landing or floor I shall hereinafter describe, merely mentioning here that in its normal position each acts as a part of the branch pipe to convey the compressed air from the main pipe to the cylinder to operate the door-closing device proper. At each landing or floor and conveniently close to the shaft-gate I place an air-tight cylinder K, having a piston-head L, having hinged to it at its 95 outer side a piston-rod, whose other end is hinged to a lever M, which operates to close the shaft-gate when the piston-head is at its extreme outer reach of stroke in any ordinary way. If desired, said cylinder may be closed 100 at its outer end by a perforated cap, through which said piston-rod may work, so as to pre-

vent the too quick closing of the gate; but in that event a hinge should be placed in said piston-rod at some point between said cap and the gate-lever. In this cylinder and to be
 5 uncovered when the piston is at its farthest reach of stroke I place a port *c*, opening into a branch pipe which is united with the main pipe above the three-way cock last spoken of. A similar three-way cock, branch pipe, and
 10 cylinder with its port, piston-head, rod, and lever are placed conveniently adjacent to the door or gate at each landing or floor. The three-way cocks at the several landings or floors of which I have spoken in their normal
 15 positions cause the compressed air to pass from the main pipe through the side pipe into the cylinder, whence it passes through the port when uncovered by the piston-head back to the main pipe. When it is desired for the
 20 purposes of repairs or the like to have any one of the shaft doors or gates open during the movement of the elevator, a quarter-turn is given to the three-way cock, so as to permit the compressed air to pass directly through the
 25 main pipe and not through the cylinder and branch pipe at that floor. In order to prevent the return of the compressed air backward through the branch pipe and port, I place in the pipe above this port at *C* a flat or conical valve, which is capable of opening upward
 30 only. The three-way cock in the basement is so adjusted that when the elevator-car is moving the way shall be opened for the compressed air through the main pipe to the cylinders, but when the elevator is stopped by the attendant a quarter-turn backward is given to the
 35 three-way cock, entirely closing the passage from the compressor, or, better, opening a passage into a chimney or the like; but it is evident
 40 that when desirable an ordinary two-way cock may be substituted for this three-way cock, and in that event a safety-valve of any well-known construction should be inserted in the compressor-pipe below the two-way cock in
 45 order to furnish relief if the pressure becomes too great on the closing of the passage to the gate-cylinders. Each gate of the shaft is provided with a latch and hasp so adjusted that when the gate is closed by the compressed air
 50 the latch shall be caught by the hasp and hold the gate closed until released by the attendant. *G* is an ordinary steam-cylinder, with its steam-pipe *F* furnishing the motive power to the elevator and operated through its valves in
 55 a well-known way by the conductor of the elevator-car by means of the valve-rope *C* through the pulley *D* and cranks *E* and *E'*. This steam-pipe *F* also furnishes motive power to the steam-chest *F''* of the compressor *H*.
 60 The operation of my device is as follows: The pulling of the controlling device or valve-rope by the attendant for the purpose of starting the car at the same time starts the engine to the compressor and also gives to the three-
 65 way cock *a* in the basement adjacent to the compressor a quarter-turn. This opens a passage-way for the compressed air up the main

pipe to the first three-way cock above the basement, which is normally in position to allow the compressed air to pass into the branch
 70 pipe and cylinder. If now the gate has been opened to permit the entrance or exit of passengers or accidentally, the piston-head will be at the end of the cylinder nearest the three-way cock. In this position the compressed
 75 air, acting upon the piston-head, will force it outward, and this in turn, acting upon the lever, closes the door, causing the latch to fall over its hasp, where it will be held until released by the attendant. The compressed air
 80 in the cylinder now finds its way through the open port back to the main pipe, and if the door on the second floor is open it will in the same manner close this door, and so on, closing each open door in the series and finally passing
 85 off through the roof or into the chimney. Thus it is obvious that in the operation of the elevator the moment the elevator is started by the action of the controlling device or valve-rope the compressed air will also begin
 90 to act, and if any of the doors is open it will close such door. When in the movement of the elevator any landing or floor is reached and it is desired to stop and either discharge or load, the attendant, pulling upon his valve-
 95 rope, causes the compressor to cease moving. At the same time he gives a quarter-turn to the three-way cock in the basement, which will allow any compressed air in the compressor-cylinder to pass off into the chimney
 100 and relieve the compressor-pipe from any pressure and the shaft-door to be opened. Sometimes it is necessary to hold a door of the shaft open for the purposes of repairs or the like while the elevator is being operated.
 105 For this purpose I place upon the valves of each of the three-way cocks above the basement a square post adapted to receive a key in an escutcheon upon the frame-work of the shaft. This key can be applied by a proper
 110 person having it in possession and turned so as to allow the compressed air to pass directly up the pipe instead of by way of the cylinder. In that event the gate adjacent to that cylinder can be opened and will remain
 115 open without interfering with the action of the compressor on the other gates in the series.

It is evident that by a slight and well-known mechanical change my improvement
 120 may be used upon a swinging gate.

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

1. The combination, with an elevator comprising a shaft and car and a controlling device for the car, of one or more doors and connections intermediate the same and said car-controlling device, whereby upon starting the car said door or doors may be automatically closed.
 130

2. The combination, with an elevator-shaft and the doors or gates thereof at the landings, of a controlling device for controlling

the elevator-car and connections intermediate the device and the said doors or gates, whereby any and all of said doors or gates may be closed upon the movement of the said controlling device.

3. The combination, with an elevator comprising a shaft and a car, of one or more doors and individual actuating mechanism connected with each door, a controlling device for controlling the starting and stopping of the elevator-car, and connections intermediate the same and said door-actuating mechanisms, whereby any and all of the doors may be closed upon the movement of the controlling device of the car.

4. The combination, with an elevator comprising a shaft and a car, of one or more doors and individual fluid-actuated or pneumatic mechanism for each door, a pneumatic chamber or compressor and pipe connections intermediate the same and said actuating mechanisms, a controlling device for starting and stopping the elevator-car, and means intermediate the same and said pneumatic chamber or compressor for controlling the latter.

5. The combination, with an elevator comprising a shaft and a car, of one or more doors and mechanism connected with all of said doors and acting when thrown into operation to close them, a controlling device for the car, and connections intermediate the same and said mechanisms for throwing the latter into operation at the starting of the elevator-car.

6. The combination, with an elevator comprising a shaft and a car, of one or more doors, each provided with a cylinder having a piston connected with and operating the door to close the same, a pneumatic chamber or compressor, a pneumatic or fluid-supply pipe connected with said chamber or compressor and normally opening into the supply end of each cylinder and out from the exhaust ends thereof, and means remote therefrom for controlling the supply of fluid to the cylinders, whereby the fluid may pass through the cylinders in succession.

7. The combination, with an elevator comprising a shaft and a car, of one or more doors, each provided with a cylinder having a piston connected with and operating the door to close the same, a pneumatic chamber or compressor and a pneumatic or fluid-supply pipe connected therewith and connected with one end of each cylinder, so that the fluid acts upon one side of the piston thereof, a branch pipe provided with a valve for preventing a backflow and connecting the other end of each cylinder with the supply-pipe, thereby making the cylinders normally continuous with the supply-pipe, and means for controlling the supply of fluid to the supply-pipe and cylinders.

8. The combination, with an elevator com-

prising a shaft and a car, of one or more doors, each provided with a cylinder having a piston connected with and controlling the door, a pneumatic or fluid-supply pipe communicating with one end of each cylinder and having a pneumatic chamber or compressor connected thereto, each cylinder provided at the end remote from the supply-pipe connection with a branch pipe and a valve located therein and controlling the connection between said end of the cylinder and the supply-pipe, whereby the cylinder may be made continuous with the supply-pipe by way of the said branch pipe, a controlling device for starting and stopping the car, and connections whereby the said device governs the supply of fluid to the supply-pipe.

9. The combination, with an elevator comprising a shaft and a car, of one or more doors, each provided with a cylinder having a piston connected with and operating the door, a pneumatic or fluid-supply pipe connected with each cylinder and a valve controlling such connection, whereby each cylinder may at will be cut off from the supply-pipe, a branch pipe connecting one end of each cylinder with the supply-pipe, a pneumatic chamber or compressor for the supply-pipe, and a controlling device for the elevator-car for governing the supply of fluid to the pipe.

10. The combination, with an elevator comprising a shaft and a car, of one or more doors, each provided with a cylinder K, having a piston L, connected with and controlling the door in closing it, of a pneumatic or fluid-supply pipe J, communicating with one end of each cylinder and a pneumatic chamber or compressor connected therewith, a branch pipe connecting the supply-pipe with the end of the cylinder K remote from where the supply-pipe is connected and a valve c located therein, and a controlling device C of the elevator-car for governing the supply of fluid to the pipe J and cylinders K, substantially as and for the purposes set forth.

11. The combination, with a series of doors, each provided with a cylinder having a piston connected with and operating the door, a supply-pipe connected with the supply end of each said cylinder, and a branch pipe for each cylinder, connecting its exhaust end with the said supply-pipe and provided with a valve to prevent a backflow, of a valve for each cylinder controlling the connection between the cylinder and supply-pipe and serving to cut out the portion of the supply-pipe between the valve and adjacent branch pipe or to cut out the cylinder at will.

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