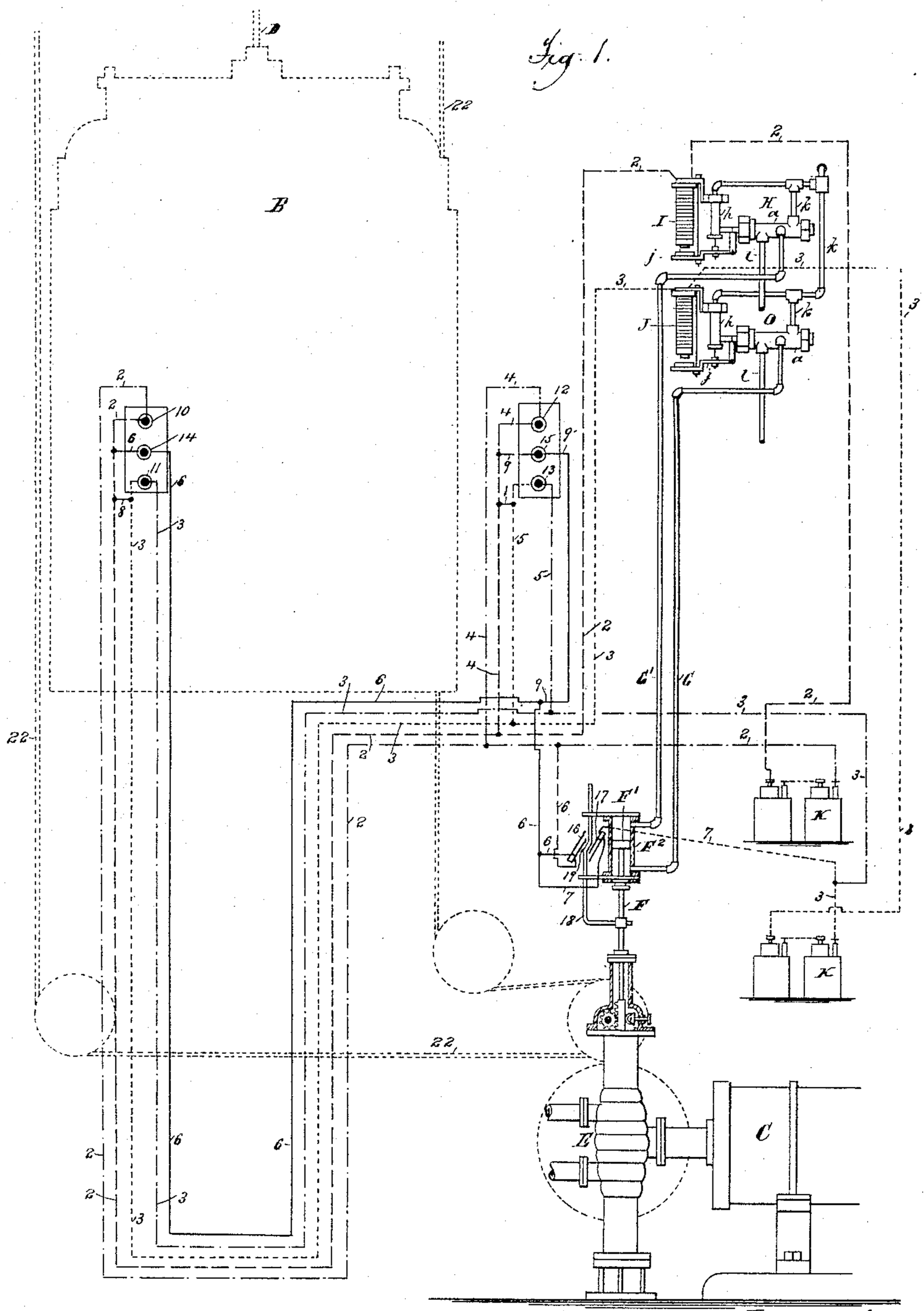
(No Model.) 2 Sheets—Sheet 1.

C. E. ONGLEY.

ELECTRICALLY CONTROLLED ELEVATOR.

No. 410,184. Patented Sept. 3, 1889.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

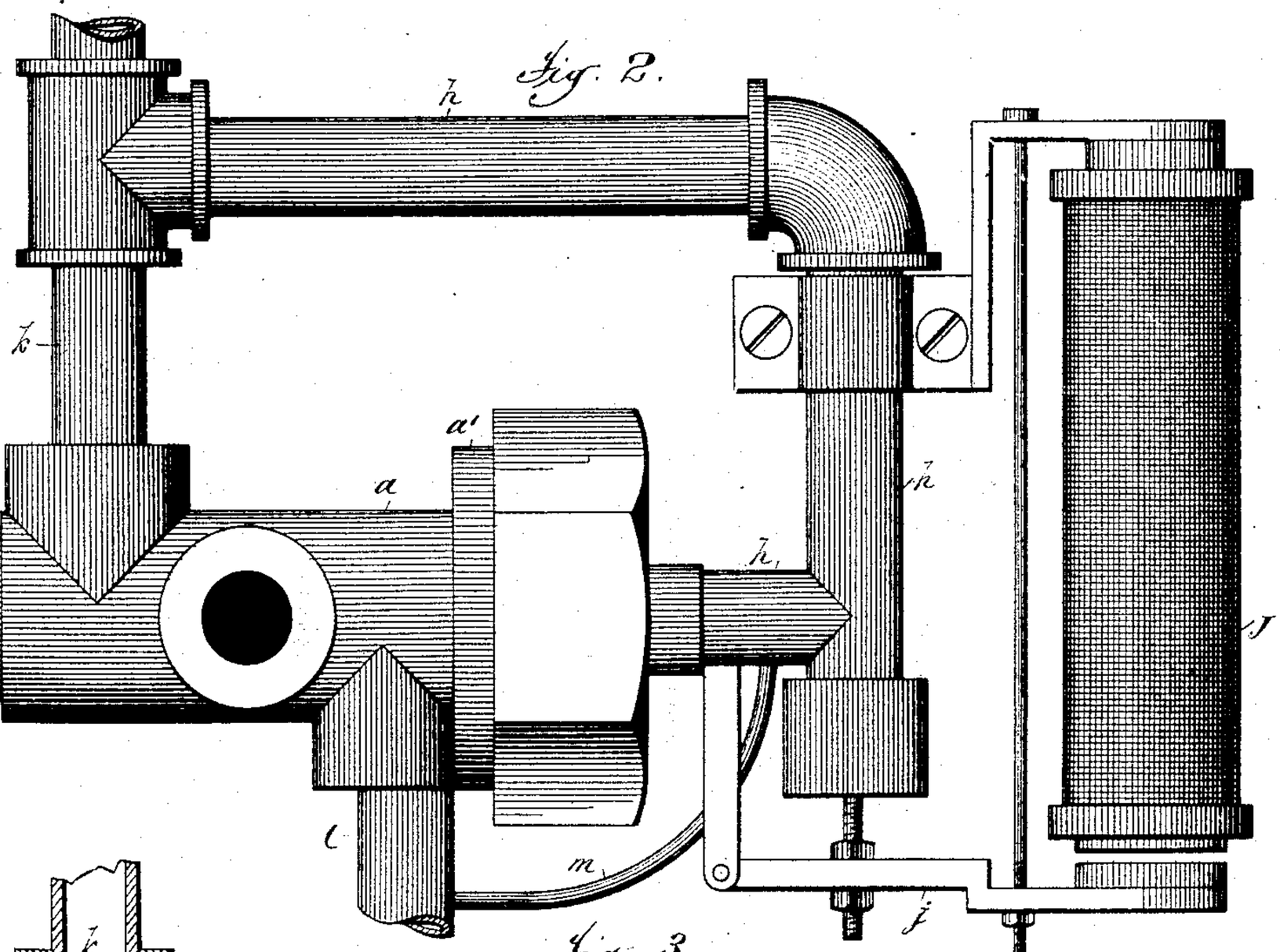
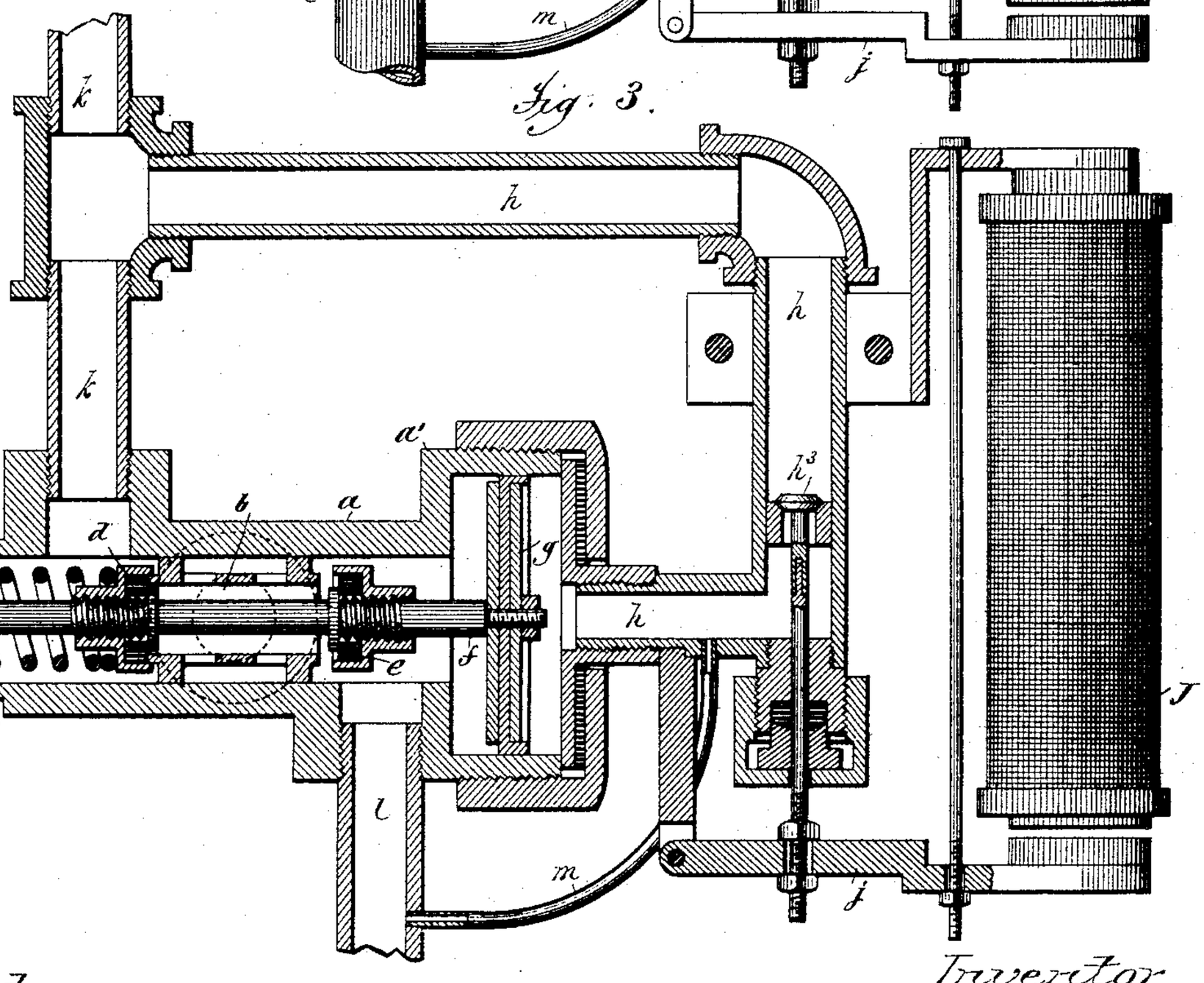


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES E. ONGLEY, OF YONKERS, NEW YORK, ASSIGNOR TO THE HYDRAULIC ELEVATOR COMPANY, OF ILLINOIS.

ELECTRICALLY-CONTROLLED ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 410,184, dated September 3, 1889.

Original application filed November 22, 1887, Serial No. 255,857. Divided and this application filed January 22, 1889. Serial No. 297,127. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. ONGLEY, a citizen of the United States, residing at Yonkers, county of Westchester, and State of New York, have invented certain new and useful Improvements in Electrically-Controlled Elevators, fully described and represented in the following specification, and the accompanying drawings, forming a part of the same.

This invention relates to an organized apparatus for operating electrically the main valve or other mechanism which controls the movements of an elevator from the landings of the elevator-shaft and also from the elevator-car.

The invention consists, primarily, in an organized system of electrical connections by which the movements of the elevator-car can be controlled from the landings of the elevator-shaft, and also in an organized system of electrical connections by which the movements of the car can also be controlled from within the car.

In the accompanying drawings, Figure 1 is a diagram illustrating the several electric circuits and the means by which the movements of the elevator are controlled through said circuits either from the car or from the landings of the elevator-shaft. Fig. 2 is an enlarged elevation of the auxiliary-valve apparatus and its electro-magnet, by which the main valve or other controlling mechanism of the elevator is moved in one direction. Fig. 3 is a sectional view of the same.

Referring to said drawings, it is to be understood that B represents the elevator-car, C a hydraulic cylinder or other motor by which the car is raised, and D the hoisting-cable, which is connected to the motor in the usual manner, all of these parts being organized in the usual and well-known way.

E represents the mechanism for controlling the movements of the elevator, which in the case shown is the main valve of the cylinder C, and is of any suitable form to allow water to be admitted to the cylinder to cause the car to ascend, to allow the water to escape from the cylinder to cause the car to descend, and to close both the admission and discharge to stop the car when the valve is in an intermediate or mid position. Such cylinders and valves being in common use, their construction is well known, and it is not, therefore, necessary to further illustrate or describe the same. It is to be understood, however, that the cylinder C may, if preferred, be arranged vertically instead of horizontally, and may be provided with the well-known circulating-pipe, or it may be a motor of any of the forms common in elevators. The mechanism for controlling the movements of the motor, and through it the movements of the car, is therefore herein termed the "main valve," and this term is to be understood as including any suitable form of mechanism for controlling the movements of the motor, which mechanism will be determined in each case by the character of the motor employed.

The main valve is operated by means of a piston F′, which works in a cylinder F^2 and is connected by a rod F to the main valve. The cylinder F^2 is provided with induction and exhaust pipes G G′, forming ports through which the water is allowed to flow into and out of the cylinder upon the opposite sides of the piston, moving it and the connected main valve in the required direction.

The pipes G G′ are controlled by means of what I term "auxiliary-valve mechanisms" H O, which are operated by electro-magnets under the control of the conductor or of a person at any landing. Ordinary electro-magnets are herein shown for actuating the valves, but the term "magnet" as herein used is to be understood as including any form of electro-motor which can be energized by an electric current.

The valve mechanisms H O are alike in construction and operation, and have for convenience a common water-supply, one valve controlling the pipe G and the other the pipe G′. These valves are controlled by electro-magnets I J, which are energized through electric circuits which include batteries K and appropriate circuit-closers located at the different landings and on the car. The two mechanisms H O being exact duplicates, a description of one will apply to both.

Referring particularly to Figs. 2 and 3, it is to be understood that *a* is a valve-cylinder containing two valve-seats formed upon the ends of a bushing *b*, having perforations and two heads which are securely fastened in the cylinder. The auxiliary valve consists of two heads *d e*, which are connected by a rod *f*, to which a spiral spring *f'* is applied to hold the head *d* against its seat and the head *e* away from its seat. The valve-cylinder is enlarged at one end to form what I term a "primary cylinder" *a'*, in which is fitted a piston *g*, which is attached to the rod *f*. Communicating with the primary cylinder is a pipe *h*, which is controlled by a primary valve h^3, the rod of which is adjustably connected by nuts to a lever *j*, carrying at its free end the armature of the electro-magnet J or I, as the case may be. The water-supply pipe *k* communicates with the cylinder *a* and also with the pipe *h*, and the pipes G G' communicate with the cylinders *a* of the respective valve apparatuses H O between the valve-seats formed by the bushing *b*. Each of the cylinders *a* is provided with a waste-pipe *l*, which communicates with the space between the head *e* and the piston *g*, and each of the pipes *h* is provided with a small open waste-pipe *m* or other vent which affords communication between the opposite sides of the piston *g*.

The operation of this part of the mechanism is as follows: The pressure of the water in the pipe *k*, aided, if necessary, by the springs *f'*, operates to normally maintain the auxiliary valves in such position that no water is permitted to pass from the pipe *k* to the pipes G G' to act upon the piston F' and operate the main valve. When the valves are in this position, however, free communication is afforded between the pipes G G' and the pipes *l*, so that any water contained in the cylinder F^2 can readily flow out of the cylinder, thereby preventing the piston F' from being water-locked and permitting it and the connected main valve to be moved freely in either direction. As soon, however, as either one of the magnets I J is energized its armature will be attracted, thus opening the valve h^3 and allowing the water from the pipe *h* to enter the cylinder *a'* and act upon the piston *g*, and as the area of the piston *g* exceeds that of the head *d* of the valve the valve will be moved so as to shut off communication between the pipe *l* and the pipe G or G', as the case may be, and at the same time open communication between the pipe *k* and said pipe G or G', and allow the water to pass from the pipe *k* into the cylinder F^2 to move its piston and the connected main valve. As soon as the magnet is de-energized the valve h^3 will be restored to its closed position and the water contained in the cylinder *a'* in front of the piston *g* will gradually escape through the pipe *m*, thereby allowing the water-pressure and the spring *f'* to restore the auxiliary valve to its normal position and shut off the further flow of water to the cylinder f^2, and thereby arrest the movement of its piston and the main valve. By closing the circuit through the other magnet the same operation will take place, thereby moving the main valve in the opposite direction, and, this being continued, the valve will be reversed and the car caused to move in the opposite direction; or, if it is desired to simply stop the car the magnet will be de-energized as soon as the main valve arrives at its mid-position. As the piston F' is moved in either direction the water in the cylinder in front of the piston will find an unobstructed escape to the pipe *l*. The pipes or vents *m* are always open; but these pipes being of small size as compared with the pipes *h* the water will not escape with sufficient rapidity to prevent the pistons *g* from operating properly.

The system of electrical connections by which the magnets I J are energized to effect the operation just described will now be explained. In this explanation it will be assumed that the apparatus H, which includes the magnet I, controls the ascent of the car, and that the apparatus O, including the magnet J, controls the descent of the car. In the organization herein shown the two magnets are energized by separate batteries K. This is preferable, but is not in all cases necessary, as a single battery may be employed for both magnets. The magnet I is located in an electric circuit formed by wires or other electrical conductors 2, which circuit includes one of the batteries and a push-button 10, located upon the car. The course of this circuit and also of the other circuits to be referred to can readily be traced by reference to Fig. 1. The term "push-button" is herein used for convenience, and it is to be understood as including any means of making and breaking circuits. The magnet J is located in a similarly-arranged circuit 3, which includes the other one of the batteries and a push-button 11 upon the car.

From the description of the operation of the auxiliary-valve apparatus which has been given it will readily be seen that by operating the push-button 10 to close the circuit 2 and energize the magnet I the car will be caused to ascend, and that by releasing said button, so as to break the circuit 2 and de-energize the magnet I, and then operating the button 11 to close the circuit 3 and energize the magnet J, the car will be stopped or caused to descend, according to the length of time the circuit is kept closed, and vice versa.

There are many cases where it is desirable, in addition to controlling the movements of the car from within the car, that there should also be provided means by which a person at any landing can cause the car to ascend or descend to that landing. To enable this to be accomplished, the circuits 2 3 are respectively provided with branch circuits or loops 4 5, which include push-buttons 12 13, located at each landing, as indicated in Fig. 1. By this means a person at any landing can by

operating the button 12 or 13 cause the car to ascend or descend, as the case may be, to that landing, and can then arrest the car by operating the other button in the same manner as already described in connection with the buttons upon the car.

The push-buttons for only one landing are indicated in the drawings; but it will readily be understood that the buttons at any number of landings can be arranged and connected to the circuits 2 3 in the same manner.

From what has been said it will be seen that the two circuits 2 3 and their respective branches 4 5 are sufficient to enable a person to control the movements of the car. In order, however, to bring the car to rest and retain it at any point, it is necessary, as has been explained, to break the circuit as soon as the car stops, as if the circuit continues closed after the car has stopped the main valve will be moved onward past its mid-position, and thus cause the car to start in the opposite direction from which it was moving before it stopped. With an unskillful or inattentive operator this might occasion some trouble and annoyance, and it is therefore desirable to provide means by which, when it is desired to stop and retain the car in any position, the circuit will be automatically broken at the proper time to effect this result. For this purpose the circuit 2, which includes the magnet I, is provided with a branch 6, which includes a push-button 14, located upon the car, and also a pair of spring contact plates or brushes 16, located in the case illustrated near the cylinder F^2. This branch is in turn provided with a branch 7, which leaves the branch 6 between the button 14 and the brushes 16 and unites with the circuit 3 at a point between the battery and the button 11. This branch 7 is also provided with a pair of brushes 17, similar to the brushes 16. The circuits 2 3 are also connected by a branch 8, which connects the two circuits at a point between the buttons 11 14. The brushes 16 17 are located adjacent to a rod 18, which is connected to the rod F and reciprocates through guides secured to the side of the cylinder F^2, or this rod may be similarly reciprocated by some other moving part of the mechanism. This rod is provided with oppositely-inclined shoulders 19, forming a circuit-closer, which is so arranged that when the main valve is in its mid-position the circuits through the branches 6 7 will be both broken. When, however, the valve is moved upward from its mid-position, so as to cause the car to decend, the brushes 16 will be acted on by the circuit-closer 19, so as to be brought together, thereby closing the circuit through the branch 6, which circuit will then remain closed until the valve is moved back to its mid-position. As the valve is moved downward from its mid-position, so as to cause the car to ascend, the brushes 17 will be operated upon in the same manner, so as to close the circuit through the branch 7, which circuit will remain closed until the main valve is again moved back to its mid-position. It will thus be seen that as soon as the valve, moving in either direction, arrives at its mid-position the circuits through both the branches 6 7 will be automatically broken. From this it results that whenever it is desired to stop the car it is only necessary to press the button 14. The circuit will then be completed through the magnet I or J, depending upon the direction in which the car is moving, and the magnet will be energized and operate the auxiliary-valve mechanism to cause the main valve to be moved back to its mid-position, and as soon as the main valve arrives at its mid-position the circuit will be automatically broken, thereby arresting the main valve, whether the attendant breaks the circuit by releasing the button or not. To enable the same operation to be performed from any landing, it is only necessary to provide the branches 4 with branches 9, which connect with the branch 6, and in which are located push-buttons 15 at each landing, and to connect the branches 4 5, as indicated at 1.

In addition to the electrical appliances which have been described for actuating the main valve in the ordinary working of the elevator, there is shown in the drawings connections by which the main valve can also be operated by an ordinary hand-rope 22.

The particular form of auxiliary-valve mechanism which has been shown and described has been selected merely for the purpose of illustration, and may be widely departed from without departing from the present invention, which relates to the system of electrical connections in connection with which any suitable form of auxiliary-valve mechanism may be employed, and in some cases the auxiliary-valve mechanism may be entirely omitted, the electromotor being arranged to actuate the main valve without the interposition of an auxiliary valve.

The system of electrical connections which have been described by which the circuits are broken automatically, so as to prevent the movement of the car from being reversed after it has been stopped, also the combination, with electrical appliances for actuating the main valve, of a hand-rope or other mechanical connection for operating said valve, and also the particular auxiliary-valve apparatus herein shown and described, and the combination therewith of electrical appliances for actuating the main valve through said auxiliary-valve apparatus, are not herein claimed, as these features form the subject-matter of my prior applications for Letters Patent, filed November 22, 1887, Serial No. 255,857, and March 9, 1888, Serial No. 266,653, of which former application the present is a division.

What I claim is—

1. The combination, with an elevator-car, its motor, and main valve, of an electro-magnet for actuating said main valve, a circuit-

closer upon the car, which is in circuit with said magnet, and circuit-closers at the landings, also in circuit with said magnet, substantially as described.

2. The combination, with an elevator-car, its motor, and main valve for controlling its movements, of an electro-magnet for actuating said main valve, and circuit-closers located at the landings which are in circuit with said magnet, substantially as described.

3. The combination, with an elevator-car, its motor, and main valve for controlling its movements, of electro-magnets for actuating said main valve to cause the car to move in opposite directions, circuit-closers upon the car which are in circuit with said respective magnets, and corresponding circuit-closers at the landings, also in circuit with said respective magnets, substantially as described.

4. The combination, with an elevator-car, its motor, and main valve for controlling its movements, of electro-magnets for actuating said main valve to cause the car to move in opposite directions, and circuit-closers at the landings which are in circuit with said respective magnets, substantially as described.

5. The combination, with an elevator-car, its motor, and main valve for controlling its movements, of an auxiliary valve, an electro-magnet for actuating said auxiliary valve, and an electric circuit including circuit-closers at the landings, substantially as described.

6. The combination, with an elevator-car, its motor, and main valve for controlling its movements, of auxiliary valves for controlling the movements of the main valve in opposite directions, electro-magnets for actuating said auxiliary valves, and circuit-closers at the landings in circuit with said respective magnets, substantially as described.

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

CHARLES E. ONGLEY.

Witnesses:
J. J. KENNEDY,
E. M. BORST.