(No Model.) 3 Sheets—Sheet 1.

J. F. BOWER.

SIGNALING APPARATUS FOR ELEVATORS.

No. 406,423. Patented July 9, 1889.

Fig. 1.

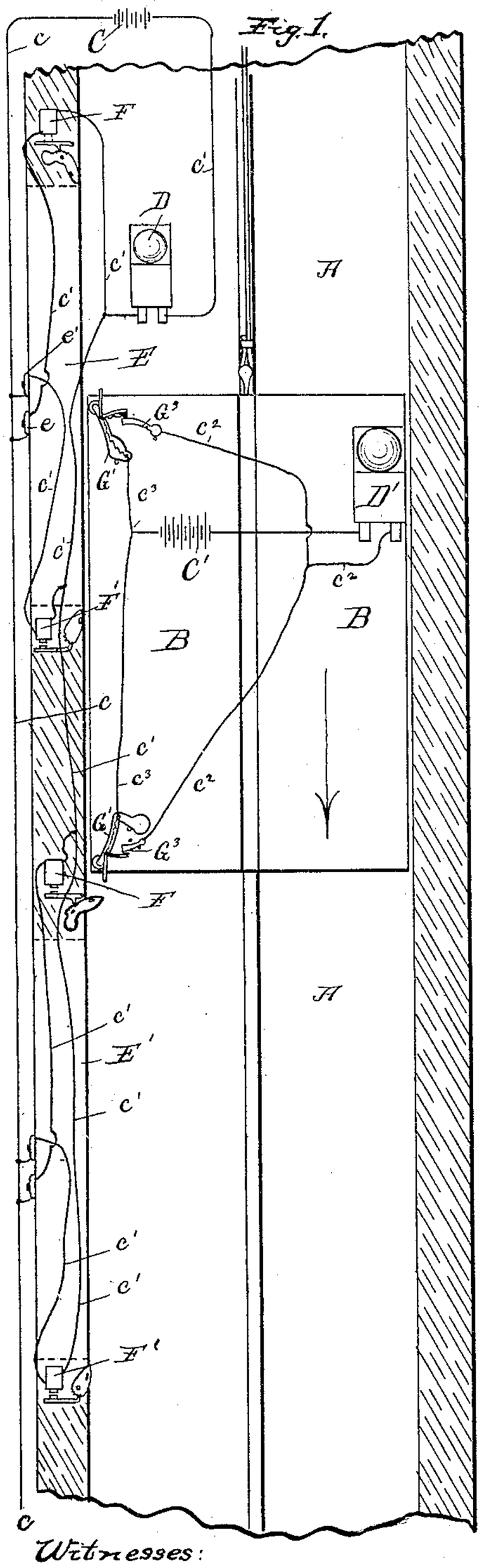


Fig. 7.

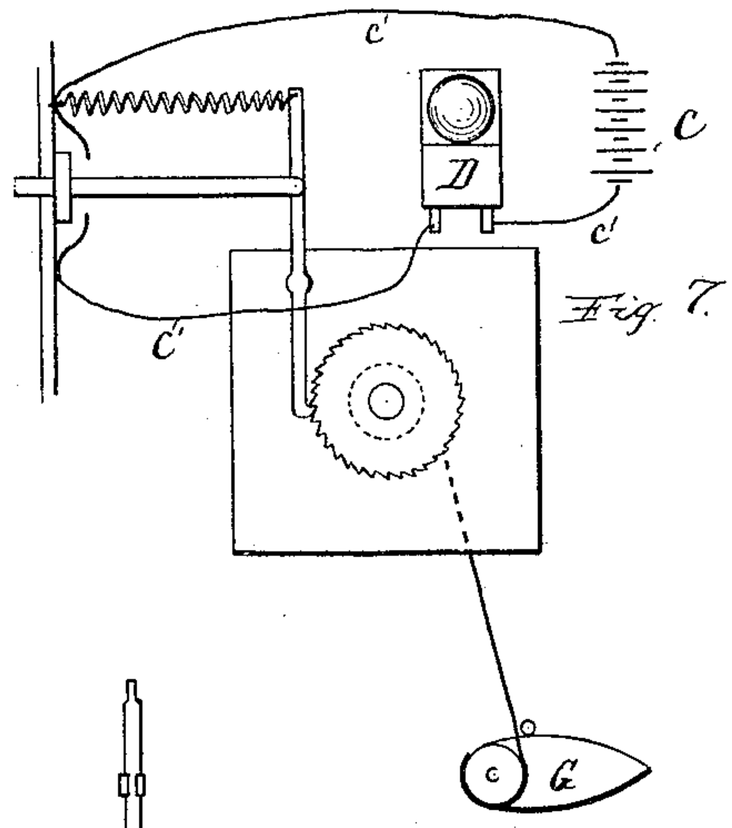


Fig. 8.

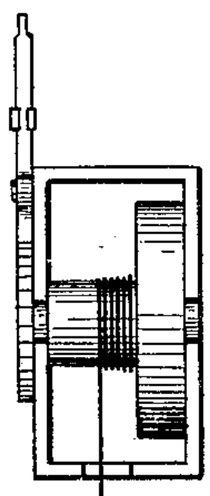
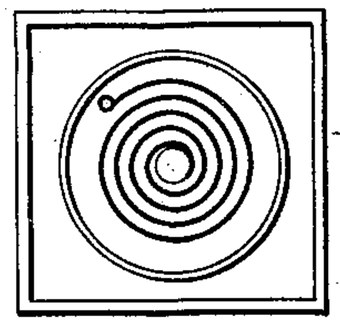


Fig. 9.



Witnesses:
Lew. C. Curtis.
H. M. Munday.

Inventor:
John F. Bower:
By Munday, Evarts & Adcock
his Attorneys.

(No Model.) 3 Sheets—Sheet 2.

J. F. BOWER.

SIGNALING APPARATUS FOR ELEVATORS.

No. 406,423. Patented July 9, 1889.

Fig. 3

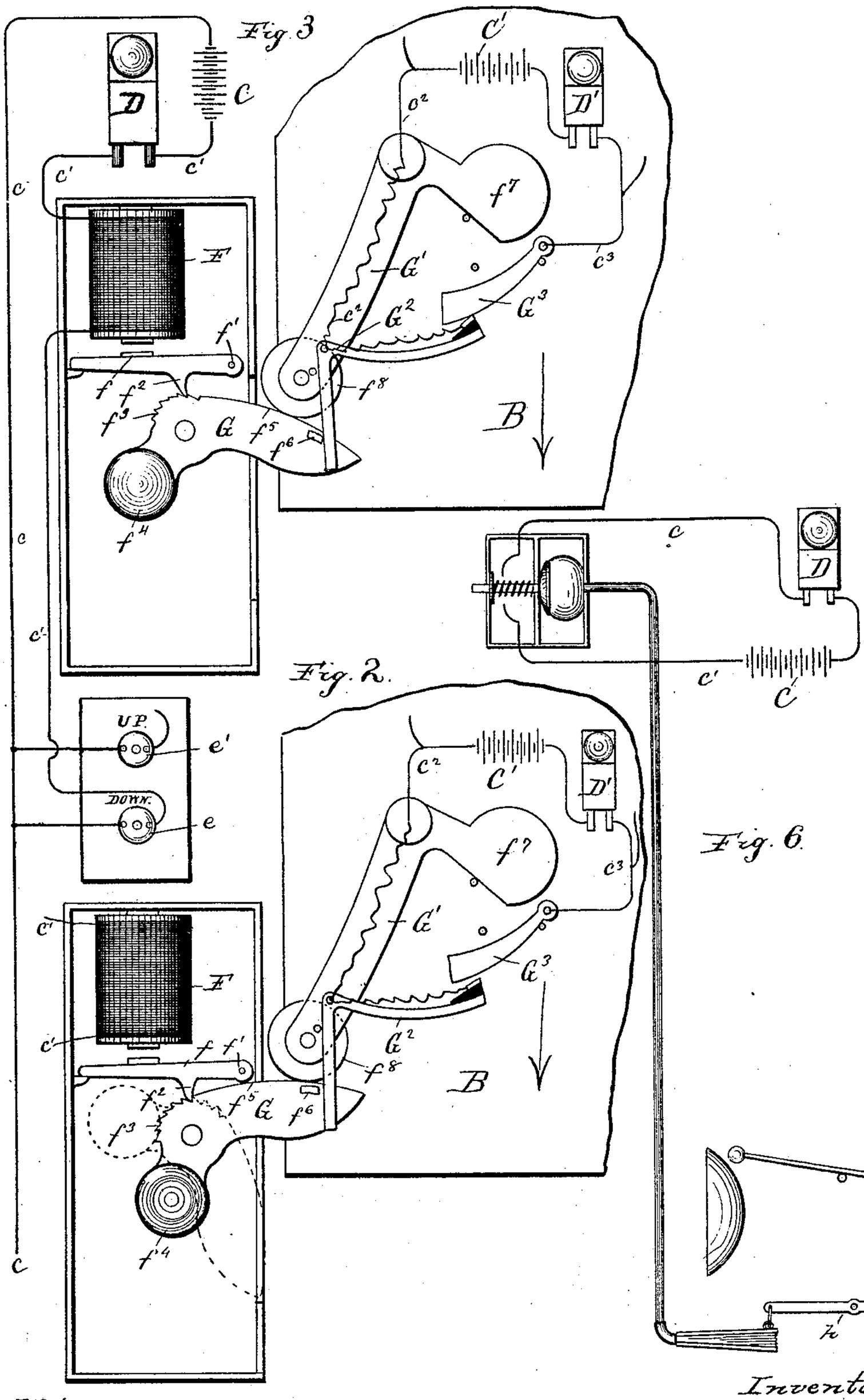


Fig. 2.

Fig. 6.

Witnesses:
Lew. B. Curtis.
A. W. Munday.

Inventor:
John F. Bower:
By Munday Evarts & Adcock
His Attorneys.

(No Model.) 3 Sheets—Sheet 3.

J. F. BOWER.

SIGNALING APPARATUS FOR ELEVATORS.

No. 406,423. Patented July 9, 1889.

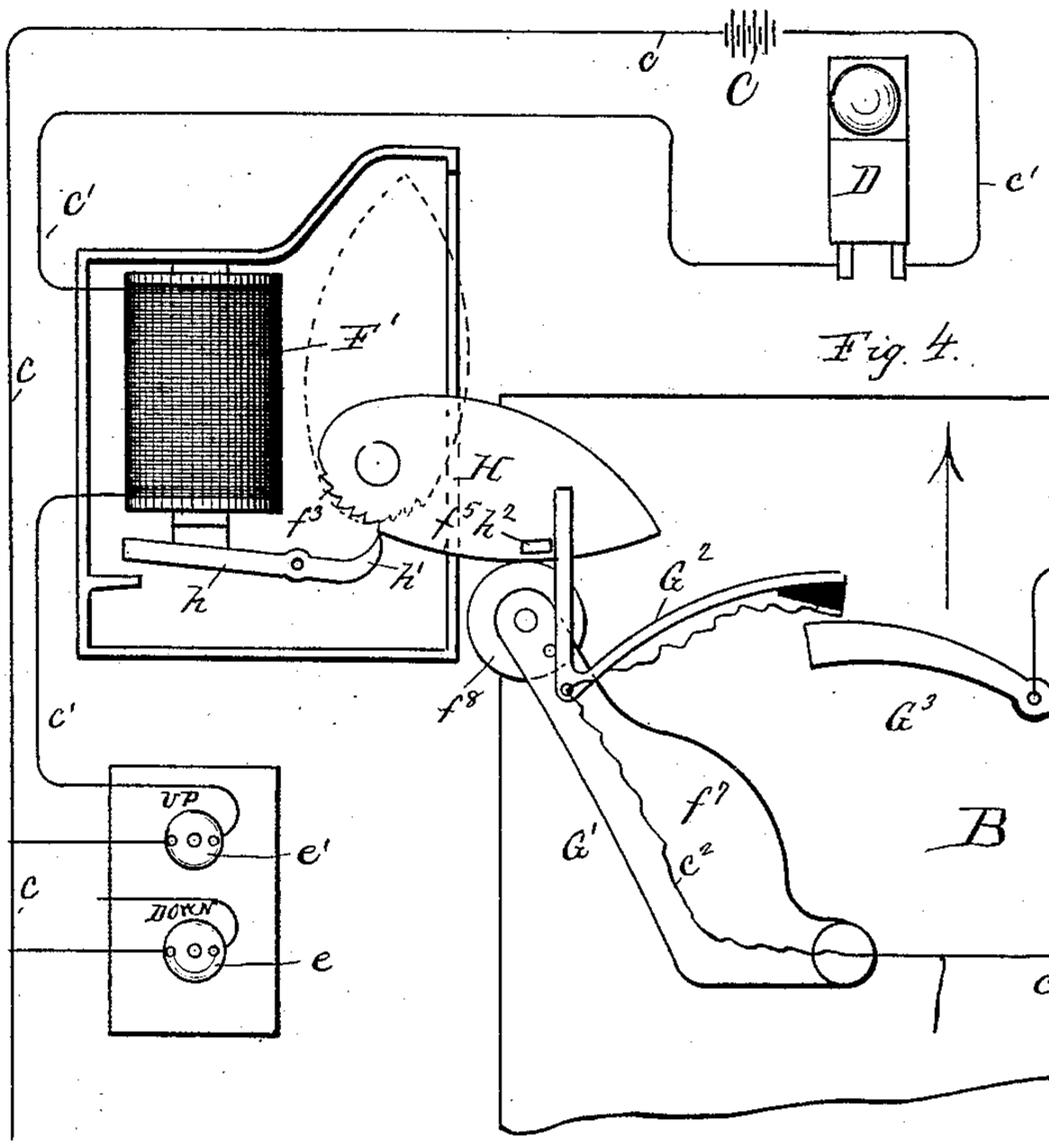


Fig. 4.

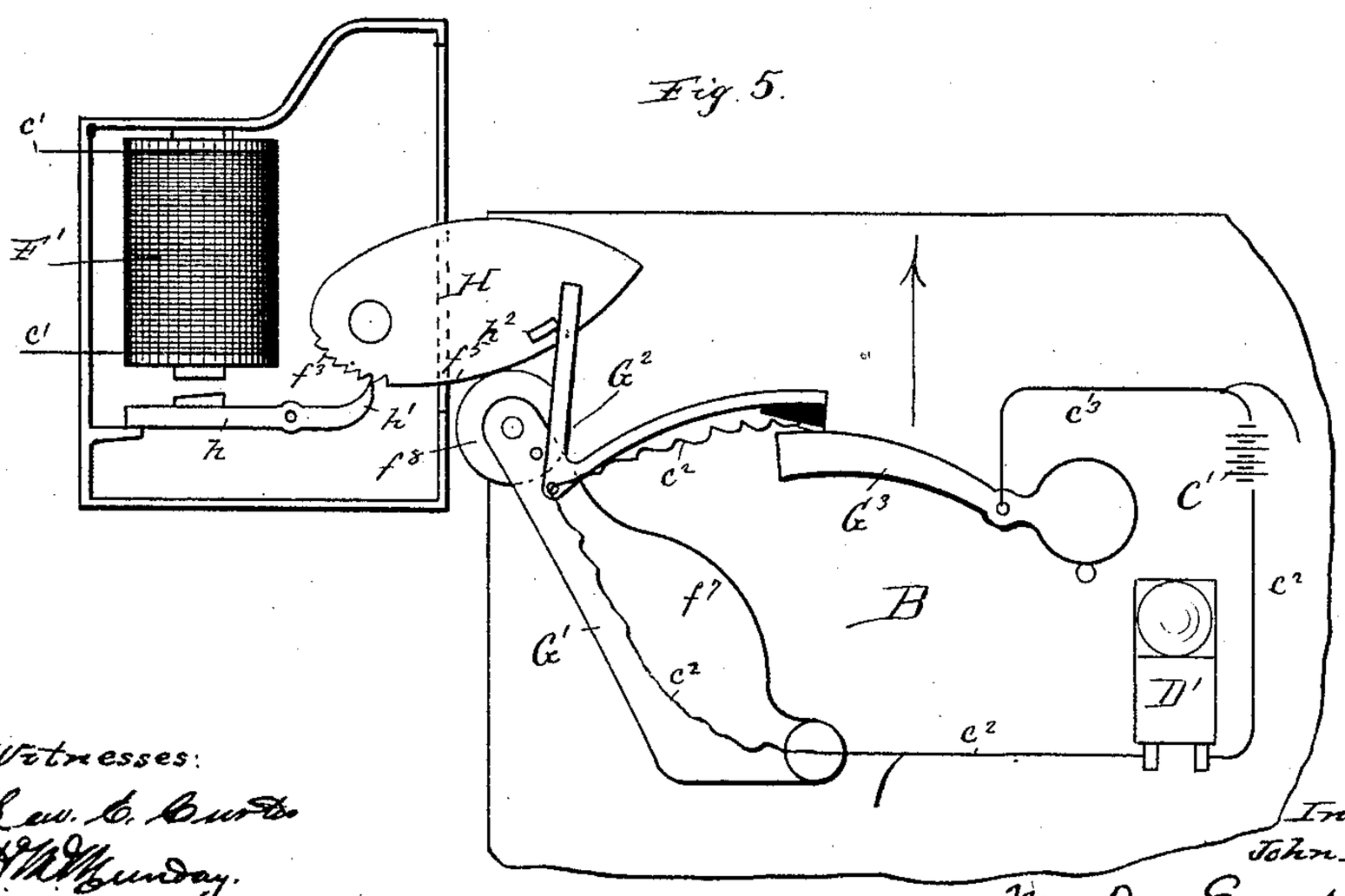


Fig. 5.

Witnesses:
Lew. C. Curtis
H. M. Munday.

Inventor:
John F. Bower
By Munday, Evarts & Adcock
his Attorneys.

UNITED STATES PATENT OFFICE.

JOHN F. BOWER, OF CHICAGO, ILLINOIS.

SIGNALING APPARATUS FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 406,423, dated July 9, 1889.

Application filed October 19, 1887. Serial No. 252,804. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. BOWER, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Signaling Apparatus for Elevators, of which the following is a specification.

The purpose of the present invention is to provide passenger-elevators with a signaling apparatus by means of which a passenger at any floor or station may be able to give a signal which will notify the conductor or person operating the elevator that a passenger is waiting to be carried, and also at what floor and in what direction he desires to be carried, whether up or down. This I accomplish by providing at each floor or station passed by the elevator, excepting the top and bottom floors, a trip device in the elevator-shaft—one above and one below the station—so contrived that the elevator-car will, in ascending, engage the trip below the station, and sound a bell upon the car, thus indicating to the operator that the passenger desires to be carried up from that floor, and if the trip above the station be set it will not engage the car until the same is descending, and will thus indicate to the operator upon the descending car, just before he reaches the station, that a passenger is waiting at that floor who desires to be carried down. I also contrive this apparatus so that the setting of any signal-trip at either station will cause a bell to ring in the elevator-shaft, so that the operator upon the car will be apprised that a passenger is waiting somewhere, so that if he shall be at the bottom he will start the car upward, and if at the top he will start the car downward. If, for example, he is at the bottom and gets the general signal that a passenger is waiting, and there is no passenger at the bottom station who has given the general signal, the operator will start his car upward. If no signal is sounded on the upward passage, he will know that the passenger who gave the general signal desires to go down, and he will therefore start his car down. In its passage downward the car will engage any trip that may be set and will inform the operator just before he reaches the particular floor or station where to stop for the down passenger who made the signal. For the operation of the signals any power may be employed, electric, pneumatic, or mechanical, or combinations of these, and it will not be necessary to connect the power from the shaft or stations to the elevator-car by means of cables, tubes, or cords, as has been customary heretofore. The apparatus, although somewhat difficult to explain in a few words, is extremely simple in its operation and easily understood by the passenger and the operator. All that the passenger is required to do is to push a button, say, or set a signal marked "up" or "down," and await the arrival of the car. All that the operator has to do is to start the car from the bottom or top station when he gets the general signal, and stop it at any floor where he may get, in passing, the signal to stop, which had been previously set by the passenger by the same operation which gave the general signal.

In the accompanying drawings, which form a part of this specification, and in which similar letters of reference indicate like parts, Figure 1 is a vertical section of an elevator-shaft, showing the car and signaling apparatus. Figs. 2 and 3 are views of the trip device for communicating a signal to the downwardly-moving car. Figs. 4 and 5 are views of the trip device for communicating a signal to the upwardly-moving car. Fig. 6 is a view of a modification in which compressed air is employed to set the trip. Figs. 7, 8, and 9 are views of the modification, in which a spring-motor power is used to set the trip.

In said drawings, A represents the elevator-shaft or walls thereof, and B is the moving elevator-car.

I will proceed to describe that form of the apparatus for embodying my invention which I deem the best, and which is illustrated in Figs. 1 to 5, and in which I make use of the electric currents as a means of carrying the power for the signaling apparatus.

An electric battery C has one of its poles connected to the wire *c*, which runs up and down the full length of the elevator-shaft. The other pole *c'* is connected to an electro-magnetic call bell or gong D, so that whenever the circuit of this battery is completed the gong D is made to sound within the ele-

vator-shaft, or at some point where it may be heard in said shaft. This gong I call the "general" signal.

E E′ are supposed to represent the door-openings at two stations in the shaft of the elevator.

e e′ are two electric buttons at each doorway, connected to the wire *c* by one terminal and connected by the other terminal to the wire *c′*, so that when the circuit is completed by pressing upon any one of the buttons *e* or *e′* the gong D will ring.

Above the door E, and also above the door E′, is an electro-magnet F, and below these doors are similar magnets F′, and these magnets are so connected, as will be seen by reference to Fig. 1, that when contact is made at the button *e* (marked "down") at any particular station, the current passes through the magnet F—*i. e.*, the one above the door at this station—and so through the gong D to the battery; and when contact is made at the button *e′* (marked "up") the current passes through the magnet F′—*i. e.*, the one below the door at that station—and so through the gong D to the battery.

The magnets F operate a trip device more particularly shown in Figs. 2 and 3, while magnets F′ operate a trip device more particularly shown in Figs. 4 and 5, both of which will be presently more fully described.

Upon the car of the elevator is a battery C′, connected at one pole to an electro-magnetic gong D′ upon the elevator-car and at the other pole to two terminals c^2 c^3, one at the upper edge of the car and one at the lower edge of the car, where are located trip devices, more particularly shown, the lower ones at Figs. 2 and 3 and the upper ones at Figs. 4 and 5, and so contrived that when contact is made at either terminal a current is sent through the gong D′ on the elevator-car, as will be understood from the diagram, Fig. 1.

I will now proceed to describe the magnets F and the trip devices operated thereby, in conjunction with the trip arrangements upon the elevator that operate in connection therewith, by special reference to Figs. 2 and 3, and which apparatus is intended to give the down-signal. *f* is the armature of this magnet pivoted at *f′*, and carrying a pawl f^2, which engages teeth f^3 in a toothed segment of the trip G. This trip is weighted at f^4, and has a curved surface at f^5, and a stop-pin at f^6. Upon the elevator-car is pivoted a lever G′, weighted at the inner end by the weight f^7, and provided at the outer end with a friction-roller f^8. Pivoted to the lever G′ is a bent lever G^2. Supposing the trip G to be in the position shown in Fig. 2, and that the elevator-car is descending, the roller f^8 of the lever G′ will come in contact with the upper surface of the trip and press it down, bringing the stop f^6 in contact with the vertical arm of the bent lever G^2, which will throw the horizontal arm of said lever up into contact with the pivoted arm G^3. One terminal from the battery C′ is carried upon the lever G^2, and the other terminal upon the arm G^3, and consequently the contact of the lever G^2 with the arm G^3 will complete the circuit and ring the gong D′. As the car continues to descend, the trip G is still further tilted until it is entirely out of the path of the car and in the position shown in dotted lines in Fig. 2, and is held in this position by the pawl of the armature. When in this position, the elevator-car will pass up and down without affecting it. When, however, the button *e* is pressed and a current sent through the magnet F, the armature will be raised, the pawl released, and the weight on the inner end of the trip will cause it to swing up into position in the path of the car.

I shall now proceed to describe the magnet F′ and its appliances by particular reference to Figs. 4 and 5 of the drawings. These appliances are of the same general character as those just described, differing chiefly in being inverted. I have marked the armature *h*, the pawl *h′*, the trip H, its stop h^2, and the other parts with the same letters as the corresponding parts in Figs. 2 and 3. It will be noticed that the arm G^3 in this case is weighted while the lever G′ is not weighted. The reason will be obvious. This apparatus operates when the car is moving in an upward direction precisely as the former apparatus when the car is moving in a downward direction.

Supposing all the trips in the elevator-shaft to be pushed in out of the path of the car, then the operation of the signaling will be as follows: The passenger at any floor desiring to be carried up or down will push one of the buttons, which, completing the circuit through the gong D in the elevator-shaft, will immediately ring that gong and give the general signal. At the same time the contact will have completed the circuit through one of the magnets F or F′, and will have released one of the trips G or H. The elevator will be started by the operator either up or down, as the case may be, and depending whether he is at the top or bottom of the shaft, and in passing the floor at which the signal has just been given, and just before it reaches said floor, the car, if going in the direction for which the signal has been set, will cause contact between the arms G^2 and G^3 by riding the trip and produce a signal in the car, as explained. If the car is not going in that direction, no signal will be given, because the arm G′ will ride over or under the trip H or G and simply swing by it, and the signal will be translated into the car upon a return-trip when the car is going in the right direction.

It will be noticed that the construction and arrangement of the several devices are such that I employ no springs whatever in the entire apparatus, but rely solely upon weights to return the several parts to their position. This is an important feature in signaling apparatus for elevators where the apparatus is

not always readily accessible for repairs, and it is desirable that it should be always in practical working order. Of course at the buttons *e e'* the ordinary springs are employed; but these are readily accessible, and also are not liable to get out of order.

In Fig. 6 I show a modification in which the magnets F and F' are dispensed with and a pneumatic tube substituted. An air-ball is compressed by the pressure of the signaling-button, which inflates a bellows, that in turn operates a pawl to release the trip and cause it to fall into the path of the elevator-car. The upward movement of the elevator-car throws the trip back into place and causes an elastic arm attached thereto to strike a gong located on the elevator-shaft for the special signal. This modification dispenses with the gong upon the car, but renders the employment of several gongs in the shaft necessary. The general signal in this modification I prefer to give by an electric gong, the circuit to which is completed by the pressure upon the button that operates the air-bulb.

In Figs. 7, 8, and 9 I shown a modification in which a spring-barrel is substituted for the magnets F and F'. The motion of the car in one direction throws the strip out of the path and by a cord attached thereto winds up a spring-drum. The pressure of the button in this case mechanically releases the pawl from a ratchet upon the spring-drum and causes it to wind up the barrel and bring the trip into position in the path of the car. Fig. 7 shows a side view of this modification, Fig. 8 an end view, and Fig. 9 a sectional view of the barrel and spring.

I claim—

1. The combination, with an elevator-car and its shaft, of a stationarily-located signal-trip device, as a trip-lever operated by the car when going down, a second stationarily-located signal-trip device, as a trip-lever operated by the car when going up, an electric circuit embracing magnets for setting said trip devices, and buttons or switches *e e'*, placed at the elevator stations or landings, substantially as set forth.

2. The combination, with the elevator-car, the shaft, and the trip devices, and an electric circuit in the shaft for operating said trip devices, of an electric circuit on the car for operating a signal thereon and controlled by contact with the trip devices in the motion of the car, and a sound-signal, as a bell, connected with said first-mentioned circuit and operated by the setting of the trip devices to give the general call-signal, substantially as set forth.

3. The combination, with an elevator-car and its shaft, of a trip-lever located and stationary in the shaft, an electric circuit or its equivalent located and stationary in the shaft, and a sound-signal, as a bell, located stationarily in the shaft and operated by the electric circuit, said circuit being controlled by the setting of the trip-lever, substantially as specified.

4. The combination of magnet F, its armature *f*, pawl f^2, trip G, swinging arm G', lever G^2, arm G^3, gong D', and electric circuit upon the elevator-car for operating said gong, substantially as specified.

5. The combination of the battery C, gong D, magnets F and F', operating-armatures *f* and *h*, the trips G and H, the circuit from the battery C, with the battery C', gong D', and contact devices on the elevator-car, together with the circuit thereon, substantially as specified.

6. The combination, with an elevator-shaft and its car, of a signal-giving trip stationarily located in the shaft and operated by the car, a sounding call-signal, and electrical devices whereby the passenger may simultaneously set the trip and sound the call, the same consisting of the magnet and the circuit including said magnet, the push-button, the sound-signal and battery, or the equivalents of such electrical devices, substantially as set forth.

7. The combination, with an elevator-shaft and its car, of a signal-giving device, as a trip-lever, located at a stopping-station and operated by the car as it approaches such station, a sound-signal, as a bell, a button to be used by the passenger, and an electrical circuit embracing both the trip-signal and the sound-signal, whereby the passenger sets the lever of the first signal and sounds said bell at the same time, substantially as set forth.

JNO. F. BOWER.

Witnesses:
H. M. MUNDAY,
LEW. C. CURTIS.