(No Model.) 2 Sheets—Sheet 1.

S. C. STICKLE.

ELECTRIC SIGNAL APPARATUS FOR ELEVATORS.

No. 564,344. Patented July 21, 1896.

Fig. 1.

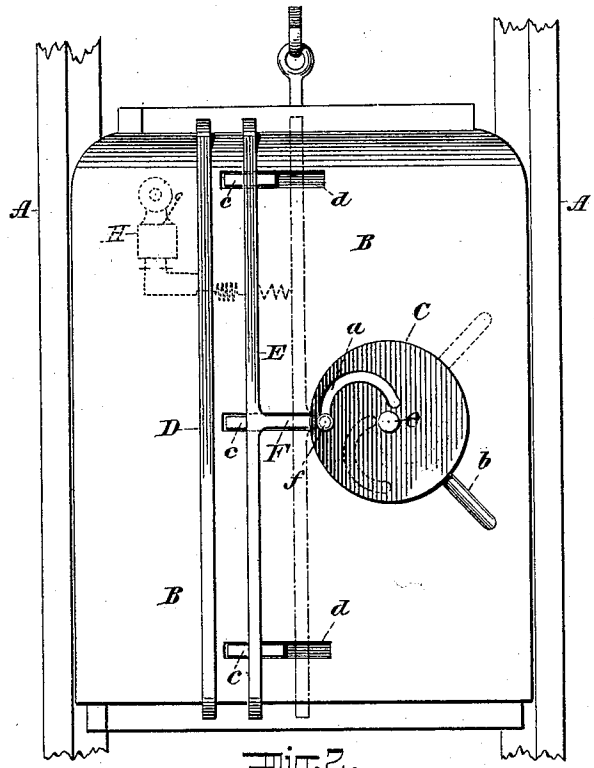


Fig. 4.

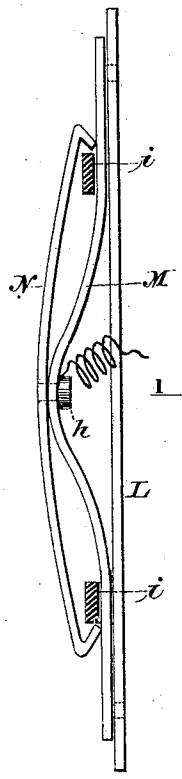


Fig. 3.

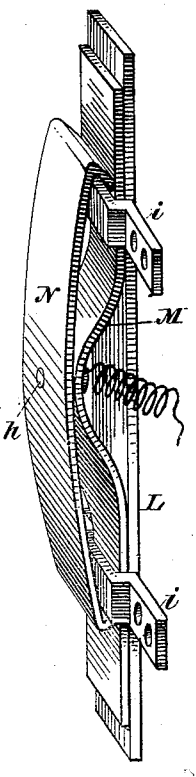
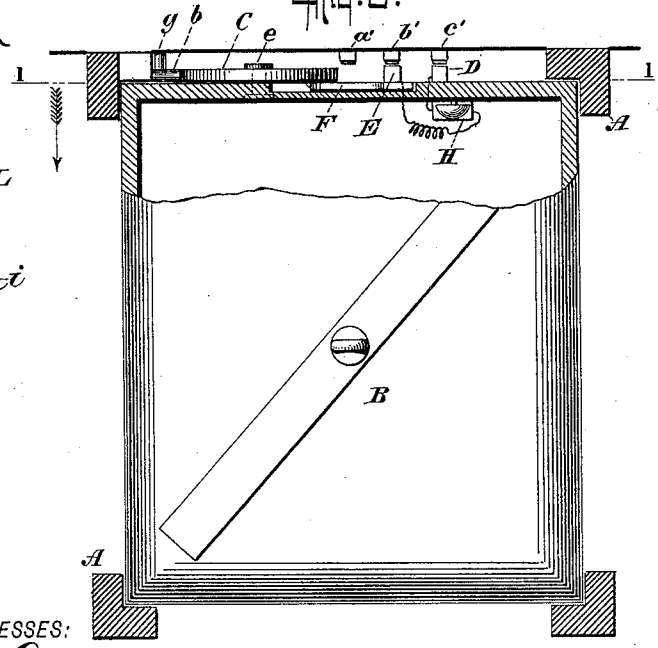


Fig. 2.



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ATTORNEYS.

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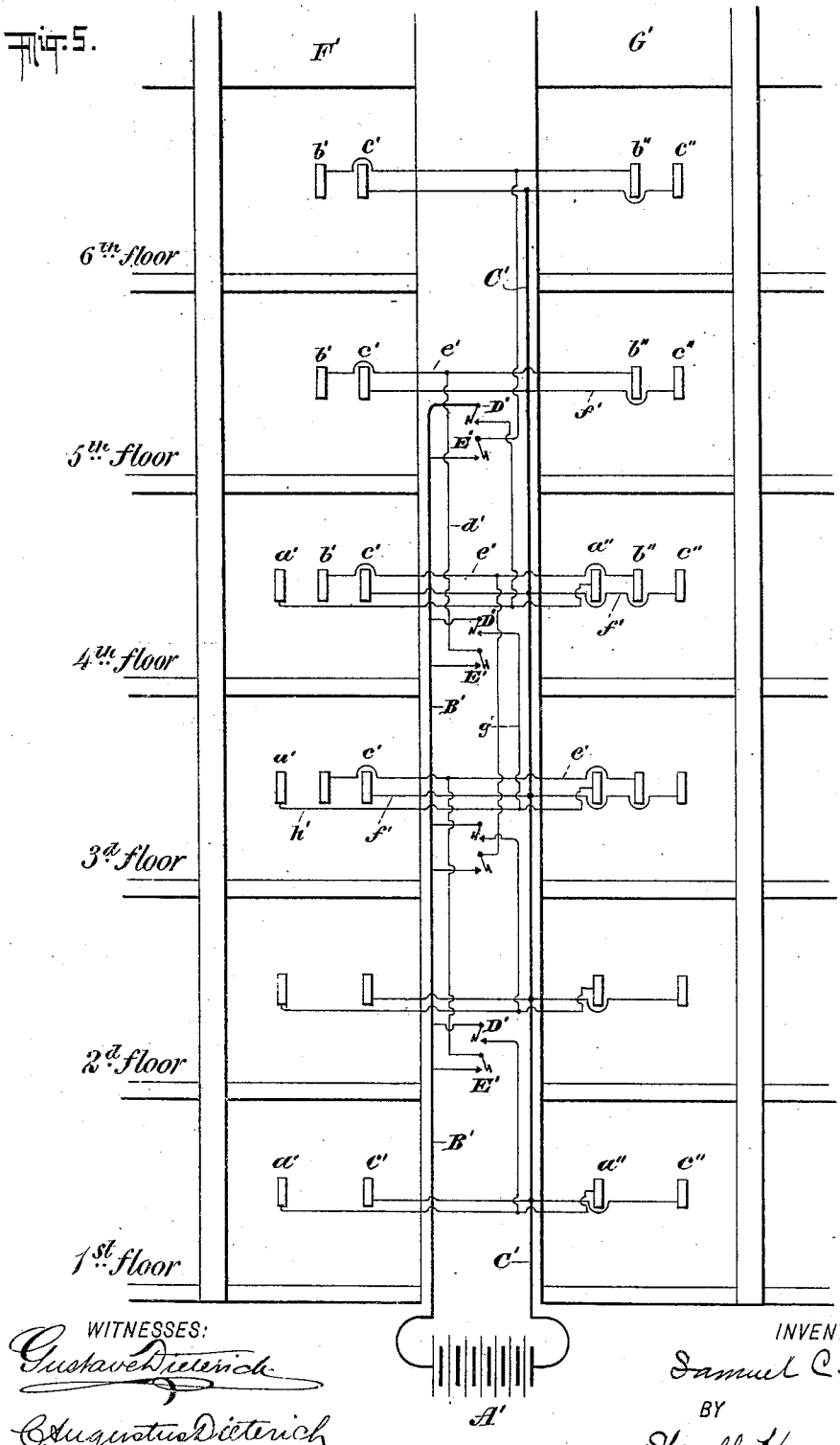
Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTRIC SIGNAL APPARATUS FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 564,344, dated July 21, 1896.

Application filed August 4, 1894. Serial No. 519,453. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL C. STICKLE, a citizen of the United States, residing at the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Electric Signal Apparatus for Elevators, of which the following is a full, clear, and exact description.

My invention, while applicable to a single elevator, is more particularly adapted to a series of elevators, and especially to those which ascend and descend with great rapidity.

The object of my invention is to provide a means whereby a person on any specified floor of a building may signal to or communicate with the elevator-car, or to any elevator-car in a series, traveling in the direction he may desire to go, at a point sufficiently above or below the floor at which he desires to enter the car to enable the man operating the car to stop the same without causing it to stop with a sudden jerk. This sudden stopping of the car, as is well known, is the cause of quite an item of expense, when the wear and tear to the elevator machinery occasioned thereby is taken into consideration.

I accomplish the above-described objects by the system of connections and the combination, connection, and arrangement of parts hereinafter more fully set forth.

In the accompanying drawings, forming part of this specification, wherein like letters indicate like parts, Figure 1 is a rear view of an elevator-car on the line 1 1 of Fig. 2, looking in the direction of the arrow, showing the positions of the fixed and movable contacts and means for operating said movable contact. Fig. 2 is a top view of the car, partly in section, showing the fixed and shifting contacts engaging with the compensating contacts secured on the side of the elevator-shaft. Fig. 3 is a detail perspective view of one of the compensating contacts, showing the bands or staples for supporting the same. Fig. 4 is a detail side view thereof, and Fig. 5 is a diagram showing the various circuits for signaling in a six-story building.

In the accompanying drawings, A A designate the vertical guides within which the car B travels, said car being shown as having just left the top of the shaft. Upon the rear outer side of the car B is a circular disk C, revolving upon a pin *e* in the car, having a cam-groove *a* and a projecting arm *b*, adapted to engage with suitable projections arranged in the side of the shaft at or near the top and bottom thereof. The pin *g* near the bottom of the shaft is seen in the top view, Fig. 2.

D is a strip of metal, preferably German silver, said metal being one of the best known conductors of electricity, permanently secured to the side of the car B.

E is a strip of similar metal provided with guide-blocks *c*, moving in the horizontal guide-ways *d*. From about the middle of said strip E projects an arm F, having a pin *f* fixed in the end thereof, which extends through the cam-groove *a* in the disk C.

At specified places within the shaft, opposite to the several floors, and adjacent to the side of the car on which the contact-strips D and E are secured, are arranged the series of compensating contacts *a' b' c' a'' b'' c''*, with two of which the contacts D and E are adapted to engage and form a circuit through the electric bell H within the car, one of the wires of said bell connecting with the fixed contact D and the other with the shifting contact E.

The corresponding compensating contacts of each series opposite to the same floor in the several shafts are connected with each other, and the wires connecting one set of said correspondingly-situated contacts opposite each floor connected with one of the main lines of the battery, and the wires connecting the remaining sets of compensating contacts connected with the push-buttons, through which a circuit with the opposite pole of the battery is formed when one of said buttons is pressed, and the remaining break in the circuit closed by the contacts on the side of the car engaging with the compensating contacts situated opposite to the floor above or below the push-button.

The car in Fig. 1 is shown as having just left the top of the shaft, where the projecting arm *b* of the disk C and the shifting contact E, which were in the position indicated by the dotted line, were shifted by the arm *b* striking the pin (not seen) corresponding to the pin *g* near the bottom of the shaft,

thereby causing said contacts D and E to assume the positions for receiving the "down signal."

The compensating contacts secured to the side of the elevator-shaft consist of a base-plate L, adapted to be secured to the wall or side of the shaft by screws or other suitable means, a metal strip M, having flat ends and a central raised portion through which passes a screw *h*, having a wire attached thereto, and a curved strip N of similar material, secured to the strip M by the screw *h*, having the ends thereof bent over to engage with the flat staples *i*, passing over the base-plate L and strip M and secured to the side of the shaft for supporting the strips M and N. These flat staples *i* are intended to support the strips M and N and prevent the same from being drawn out of place by the ascending or descending car. When the car ascends, it will, while passing the strips M and N, flatten the same out, and they will then move upwardly until the lower bent-over end of the strip N strikes the lower flat staple *i*, thereby arresting further movement, and as soon as the car has wholly passed the point the strips will again resume their normal position.

When the car descends, the bent-over upper end of the strip N engages with the upper flat staple *i* and prevents it being carried downwardly out of place.

The distance between the place where the compensating contacts are situated and the place where the means for giving the signal is located is variable, and must in all cases depend upon the speed with which the elevator travels—viz., for an elevator traveling very rapidly the distance between the signal-point and the place within the shaft where the signal is receivable would have to be much greater than it would where the elevator traveled very slowly.

The operation of my improved signal apparatus will be most easily understood with reference to the diagram Fig. 5. In this diagram I have shown my improved signal apparatus as applied to a six-story building having two separate elevator shafts and cars, and the signal apparatus arranged to notify the elevator-man about one floor above and below the floor from which the signal is sent.

It will be observed that I have shown no means for signaling from the ground or first floor and from the sixth or top floor of the building for the reason that the same, while being possible, is not necessary, as the elevator-car must go to the extreme top and bottom of the shaft in order that the projecting arm *b* of the disk C may strike against the pins at or near the top and bottom of the shaft to shift the movable contact E on the rear of the car.

In the diagram, A′ indicates the battery having the main lines B′ C′ connected to the opposite poles thereof and extending between the two elevator-shafts through the several floors of the building.

D′ indicates the push-buttons for signaling to the ascending cars, and E′ those for signaling to the descending cars. One of the wires leading from each of these push-buttons is connected to the main line B′, and the other wire leading from said buttons connected with the line connecting the correspondingly-situated contacts of each set opposite to the same floor in both shafts. To the other main line C′ are connected the lines *f′*, connecting the contacts C′ C″ opposite to each floor. According to these connections the circuit for signaling to the ascending and the circuit for signaling to the descending car is normally broken in two places—viz., at the button from which the signal is to be sent and at the point within the shaft where the signal is to be received.

Now, if a person on the fourth floor of the building desired to reach the ground floor, he would press the button E′ on said floor, and thereby close the line at that point. This would then leave the line open at the compensating contacts *b′ c′* and *b″ c″*, opposite to the fifth floor. Assuming both cars to be descending in the shafts, the one first to come opposite to the compensating contacts on the wall of either shaft would complete the circuit by means of the contacts D and E, arranged at the side of the car, and cause the electric bell within said car to ring. It must of course be understood that the elevator-man knows that when the bell in his car rings he must stop, according to the direction in which his car is traveling, either a floor above or below the point at which he received the signal. In this case the course of the current would be as follows: from battery A′, through main line B′, button E′, line *d′*, line *e′*, and, if the car receiving the signal be descending in shaft G′, thence through compensating contact *b″*, opposite the fifth floor, shifting contact E on the rear of the car B, through the electric bell H, fixed contact D, compensating contact *c″*, line *f′*, and thence through main line C′ to the battery, or vice versa.

Should the person, still at the same floor, desire to ascend instead of descend, he would then press the button D′, and the contact-strips D and E on the car first coming opposite to the compensating contacts *a′ c′ a″ c″*, according to the shaft in which said car is ascending, will complete the circuit and cause the bell to ring. Assuming the car to have been ascending in the shaft F′, the course of the current would be as follows: from battery A′, through main line B′, button D′, lines *g′ h′*, compensating contacts *a′* opposite the third floor, shifting contact E on the car B, through the electric bell H, fixed contact D, compensating contact *c′*, line *f″*, and main line C′ to the battery, or vice versa.

The contact D on the rear of the car B is fixed and always engages with the series of

compensating contacts c', (if the car B traveled in the shaft F',) while the contact E is adjustable and adapted to engage with the series of contacts b' when the car is descending, and upon reaching the bottom of the shaft it is adapted to be shifted to engage with the series of contacts a' when ascending. This adjustable contact E is shifted at or near the top and bottom of the shaft by means of a pin or other suitable projection arranged in the side of the shaft and against which the arm b of the disk C, pivoted to the rear of car B, is adapted to strike when said disk comes opposite thereto and cause the disk to make a partial revolution, and the pin f in the arm F of the adjustable contact E, which extends through the cam-groove a, to be drawn nearer to the center of said disk, and the contact E to assume the position indicated by the dotted lines, Fig. 1.

The contact D and the contact E, when in the position indicated by the dotted lines, will engage with the compensating contacts a' c' or a'' c'', and thus be ready to receive the "up signals," and when the car reaches the top of the shaft the arm b will again strike against a projection in the side of the shaft and cause the contact E and disk C to assume the positions indicated by the full lines, Fig. 1. The contacts D and E are then in a position to engage with the compensating contacts b' c' or b'' c'', and upon reaching the bottom of the shaft the contact E is again shifted, as above described, this operation taking place at or near the top and bottom of the shaft with each complete trip of the car.

It must be understood that I do not wish to limit or confine myself to merely signaling to a point about one floor above or beneath the place from which the signal is sent, as I can so arrange the compensating contacts to signal to any given point in the shaft, and that the apparatus herein shown and described may be wholly reversed, *e. g.*, instead of placing compensating contacts upon the wall I can place the same upon the side of the car, making one rigid and the other adjustable and adapted to be shifted into position by the cam-disk C, and place upon the walls within the shafts, opposite to each floor, sets of solid metal strips and an electric bell for each set, and connect the same in the manner substantially as herein shown and described.

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

1. In an electric signal apparatus for elevators, the fixed contacts secured to the sides of the elevator-shafts, a battery and wires connecting with said fixed contacts, means for signaling arranged at the sides of the shafts upon the several floors, an electric bell within the elevator-car, and contacts on the side of said car adjacent to the fixed contacts within the shaft; one of the contacts on said car being movable and having guide-blocks secured thereto working in guideways in the side of the car, combined with means for shifting said movable contact at or near both termini of the shaft, substantially as specified.

2. In an electric signal apparatus for elevators the movable contact secured to guide-blocks and working in guideways in the side of the car; said movable contact having an arm projecting from the side thereof provided with a pin extending through a cam-groove in a circular disk pivoted to the outer side of said car, an outwardly-projecting arm secured to said disk adapted to strike against suitable projections arranged in the side of the shaft at or near both termini for causing said projecting arm, when it strikes against said projections, to partially rotate the disk, and shift the movable contact, substantially as specified.

3. In an electric signal apparatus for elevators, the compensating contact consisting of a metal base-plate, a metal strip, movable thereon, having flat end portions and a central bulged or raised portion to which is secured by a screw a connecting-wire and a curved face-strip having both ends thereof bent over, and flat bails or staples passing between said strips and adapted to be secured to the wall at each side of the base-plate for supporting said strips, substantially as specified.

4. An electric signal apparatus for elevators consisting of the sets of compensating contacts arranged on the sides of the elevator-shafts, contacts arranged on the elevator-car on the side adjacent to the fixed compensating contacts, and adapted to engage therewith; one of said contacts on the elevator-car being fixed to the side thereof, and the other being movable and provided with guide-blocks working in guideways in the side of the car and a projecting arm, having a pin secured thereto, a circular disk pivoted to the side of the car having a cam-groove adapted to receive the pin secured to arm of the movable contact, an outwardly-projecting arm secured in the side of the circular disk adapted to engage with projections in the side of the shaft, and cause said circular disk to be partially rotated, and an electric bell within the elevator-car, combined with means for actuating the same consisting of an electric battery having numerous circuit connections with the fixed compensating contacts opposite to the several floors, and push-buttons arranged at the side of the shafts at each floor, substantially as herein shown and described.

Signed at the city of New York, in the county and State of New York, this 1st day of August, 1894.

SAMUEL C. STICKLE.

Witnesses:
C. S. CONRAD,
WILLARD DEANE.