

No. 685,604.

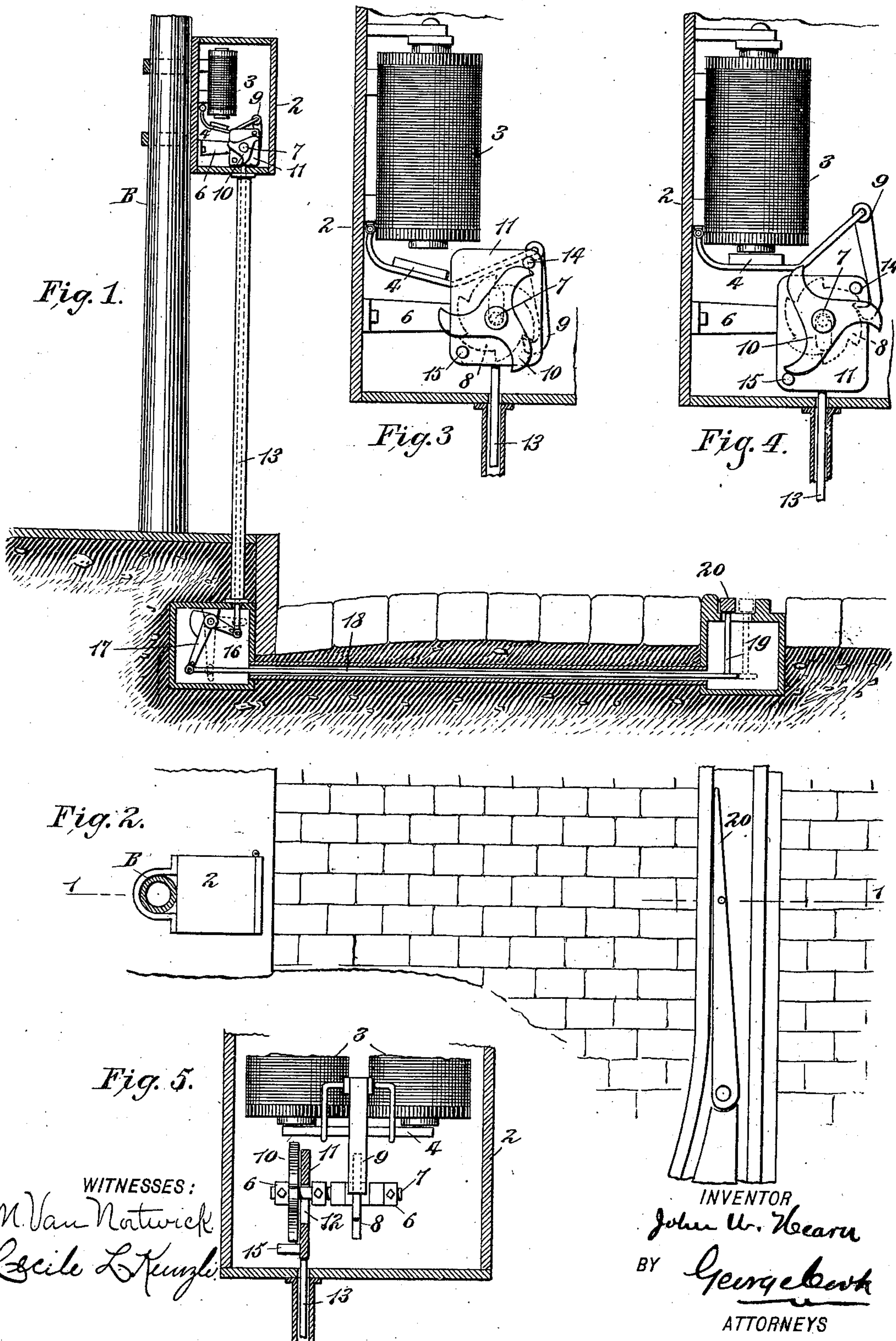
Patented Oct. 29, 1901.

J. W. HEARN.
ELECTRIC SWITCH.

(Application filed Jan. 22, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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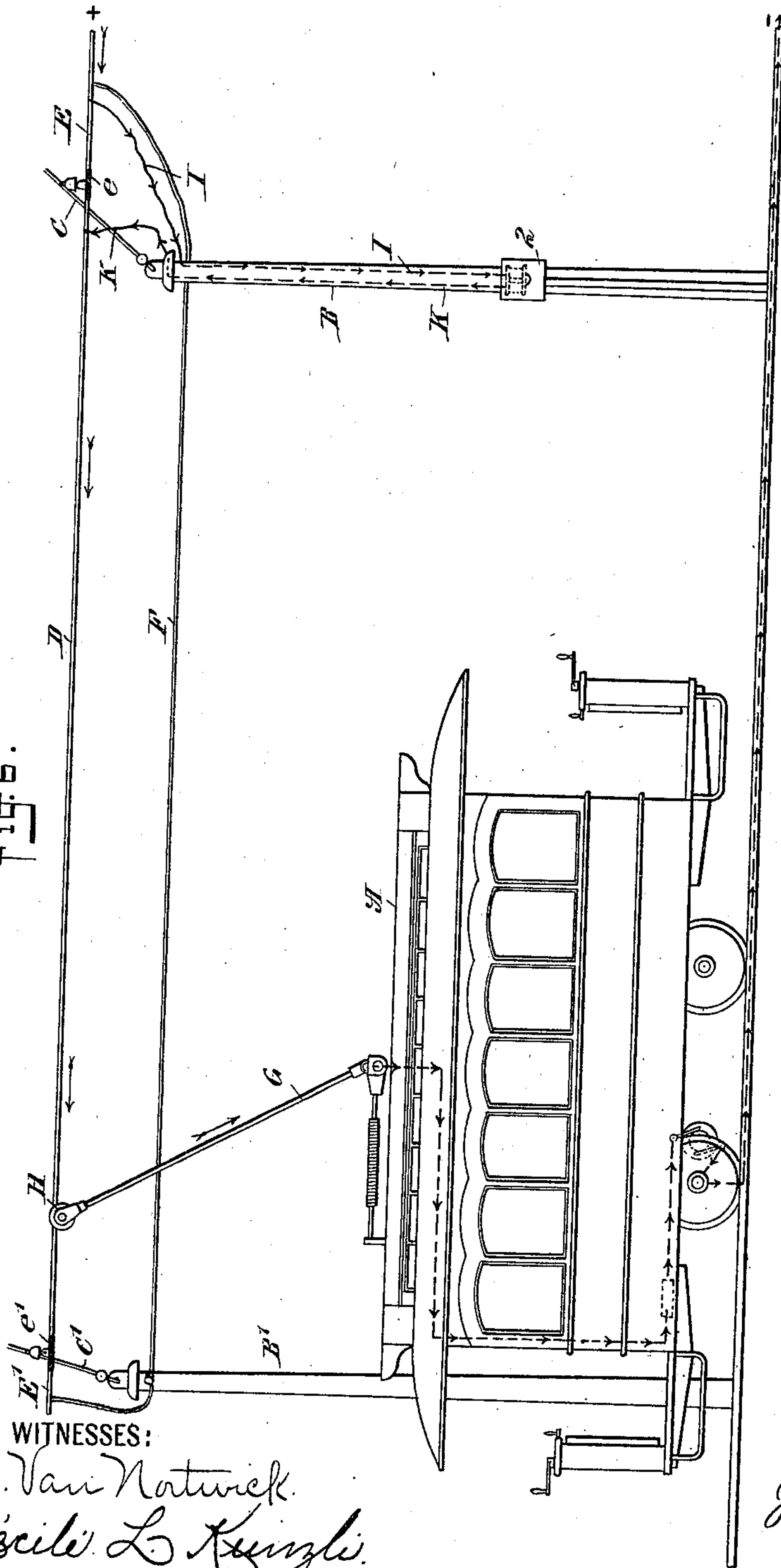
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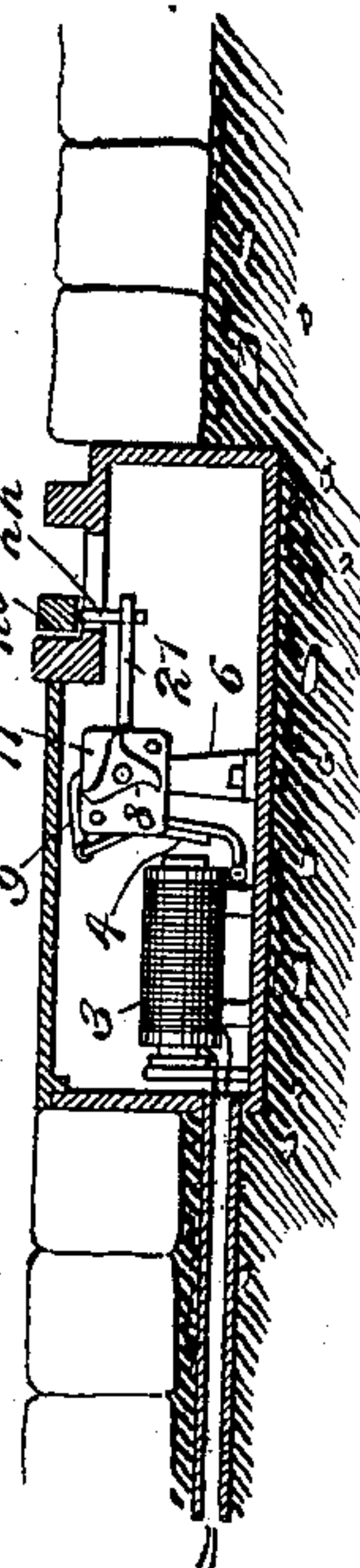
Fig. 6.



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Fig. 7.



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JOHN W. HEARN, OF BROOKLYN, NEW YORK.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 685,604, dated October 29, 1901.

Application filed January 22, 1901. Serial No. 44,296. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HEARN, a citizen of the United States, and a resident of New York, borough of Brooklyn, in the county of Kings and State of New York, have made and invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

My invention relates to an improvement in switches, and more particularly to those in use upon roads employing the electric-trolley system, the object of the same being to provide a device of this character which may be controlled by the motorman while upon his car, and this without the addition of any levers or fixtures other than those usually employed upon trolley-cars.

With these and other ends in view my invention consists in certain novel features of construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view, partly in section and partly in elevation, of my improved switch and taken upon the line 1 1 of Fig. 2. Fig. 2 is a view showing in plan the construction and arrangement of parts as illustrated in Fig. 1. Figs. 3 and 4 are enlarged views of the magnets and operating cams and levers in their several adjustments. Fig. 5 is a front view of a portion of those devices shown in Fig. 4 and in the same adjustment. Fig. 6 is a diagrammatic view, and Fig. 7 a view, partly in section and partly in elevation, showing the operating parts placed in a box or receptacle below the surface of the ground.

Referring to the drawings, Fig. 6, A represents a trolley-car of the usual style and construction; B B', poles or standards having the arms or brackets C C' extending therefrom for holding or supporting the trolley-wire D, the section D of said trolley-wire being insulated from the remainder of the line or wire E E' at the points e e'.

F represents a loop-wire around the section of wire D and electrically connecting the portions E E' of said trolley-wire and so arranged as not to interfere with the travel of the trolley-pole G and rolling contact H along the wire D. From the part E of the trolley-wire leads the conducting-wire I down the pole B, from which it is properly insulated, into the

box or receptacle 2, secured to said post, where said wire connects with the switch- 55
operating mechanism, to be hereinafter described, and from which mechanism leads the conducting-wire K, the upper end being electrically connected to the wire D. In the receptacle 2 is located the switch-operating 60
mechanism, which consists of the magnets 3, rigidly secured to said receptacle and having the armature 4 pivoted at a suitable point in order that it may drop by gravity and be raised or lifted by the magnets when the latter are excited. To the receptacle 2 are secured the brackets 6, in the outer ends of which rotates the shaft 7, to which latter is secured the ratchet 8, constructed and arranged to be engaged and operated by the 65
pawl 9, the upper end of the latter being pivoted to the outer end of the armature 4. The effect of this construction and arrangement of parts is that when the magnets 3 are excited the armature 4 is raised, thereby raising the 75
pawl 9, which in turn engages with a tooth on the ratchet 8 and turns the same with its shaft 7, the parts occupying the positions as illustrated in Fig. 4. On the outer end of the shaft 7 is secured the cam 10, having the 80
outline or contour as illustrated in Figs. 3 and 4—that is, provided with three arms having their ends rounded or curved. On the shaft 7 and adjacent to the cam 10 is mounted the plate 11, provided with an elongated slot or opening 12, through which passes 85
said shaft 7, and to this plate 11 is secured the rod or lever 13, indirectly connected with the switch-tongue 20 for the purpose of moving or shifting the same when said plate 11 is 90
raised and lowered, as hereinafter described. To the plate 11 and at diagonally opposite corners are secured or formed the outwardly-extending pins or lugs 14 15, with which engage the rounded ends of the arms forming 95
said cam 10 as the shaft 7 is rotated. When the magnets 3 are excited and the shaft 7 rotated by means of the ratchet and pawl 8 9, as before described, the cam 10 will also be rotated. One of the arms coming in contact 100
with the lug 15 on the plate 11 forces the plate downwardly, as illustrated in Fig. 4, whereby the rod 13 is also forced downwardly. The current being cut off from the magnets 3, the armature 4 drops into the position as 105
illustrated in Fig. 3, and upon the magnets

being again excited the armature 4 is raised and the cam 10 again rotated, one of the arms thereof coming in contact with the pin or lug 14 and raising the same, as illustrated in Fig. 3, whereupon the current being cut off from the magnets the armature drops, leaving the parts in the position as illustrated in Fig. 3.

It will thus be understood from the foregoing that as the armature is raised the rod 13 will be alternately raised and lowered, accordingly as the respective pins or lugs 14 and 15 are engaged by the arms of the cam 10. Near the lower end of the standard B, and preferably below the surface of the ground, is located a receptacle 16, in which is contained a pivoted bell-crank lever 17, to the horizontal arm of which is pivoted the lever or rod 13 and to the vertical arm of which is connected the horizontal lever or connecting-rod 18, the latter in turn being pivotally secured to the depending lug 19, secured to or formed on the switch-tongue 20. As the rod 13 is raised and lowered the bell-crank 17 and rod 18 will be caused to shift the switch-tongue from side to side for the purpose of allowing the car to continue on the main line or switch off onto the branch in the ordinary way.

In the event that the switch-tongue is not in the proper position for the car to continue on the main line it will be unnecessary for the motorman to do anything, for the moment the rolling contact of the trolley-pole leaves the trolley-wire or conductor E' and contacts with the insulated section D the current will pass from the wire E through the wire I and excite the magnets 3, thereby raising the armature 4 and, as before described, shift the switch to the opposite side, the current passing out through the wire K, wire D, and down through the trolley-pole and into the ground-wire in the usual way. In the event, however, that the switch-tongue is in the proper position for the car to continue on the main line it will be changed to the improper position as soon as the rolling contact H of the trolley-pole strikes the insulated section D, whereupon it will be necessary for the motorman to cut off the current momentarily, thereby cutting off the current from the magnets 3 and allowing the armature to fall. Upon the current being again turned on by the motorman the magnets will be again excited, the armature raised, and the switch-tongue shifted back to its proper position—that is, into the position in which it was prior to the time that the rolling contact H came into contact with the insulated section D. In other words, if the switch-tongue comes into the proper position when the rolling contact H strikes the insulated section of the trolley-wire D the motorman simply continues on his way; but should the switch-tongue come into the wrong position when he strikes said insulated section D it will only be necessary for him to momentarily cut off his current and again

turn it on, whereupon the switch-tongue will assume the proper position, or in the latter instance—that is, if the switch-tongue is in its proper position—the motorman may simply cut off his current prior to striking the insulated section D and keep the current so turned off until after the rolling contact leaves said insulated section D and contacts with the wire E. In other words, he may simply turn off his current and coast across the insulated section D, this being possible by reason of the fact that the section D is comparatively short in length.

It will be understood that many changes may be made in the detail construction and arrangement of parts from those shown and described without departing from the spirit of my invention—as, for instance, instead of placing the receptacle for containing the operating mechanism upon the pole or standard B it may be located in the ground, as illustrated in Fig. 7, and in close proximity to the switch-tongue. In such instance a rod or lever 21 may directly connect the pin or lug 22, extending down from the switch-tongue 20, with the plate 11 without the intervention of the bell-crank and connecting-rods before referred to. I do not, therefore, limit my invention to the exact construction and arrangement shown; but,

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

1. The combination with a switch-tongue, of a magnet having an armature pivoted in proximity thereto, a shaft carrying a ratchet and cam, as described, a pawl connected with said armature and engaging with said ratchet, a plate loosely mounted on said shaft and provided with pins or lugs to engage with said cam, and levers connecting said plate and switch-tongue, whereby the latter is shifted as the cam is rotated, substantially as described.

2. In an electric switch, the combination with a switch-tongue, of a magnet and armature, a ratchet mounted on a shaft connected with said armature and engaging with said ratchet, a cam mounted on said shaft and rotating therewith, and with said ratchet, a plate loosely mounted on said shaft and provided with pins or lugs at diagonally opposite corners to engage with said cam, whereby said plate is moved in opposite directions by said rotating cam, a rod or lever connected with said plate, and indirectly connected with said switch-tongue, whereby the latter is shifted when said armature is raised and the cam and ratchet rotated, substantially as described.

Signed at New York, in the county of New York and State of New York, this 21st day of January, A. D. 1901.

JOHN W. HEARN.

Witnesses:

GEORGE COOK,
M. VAN NORTWICK.