

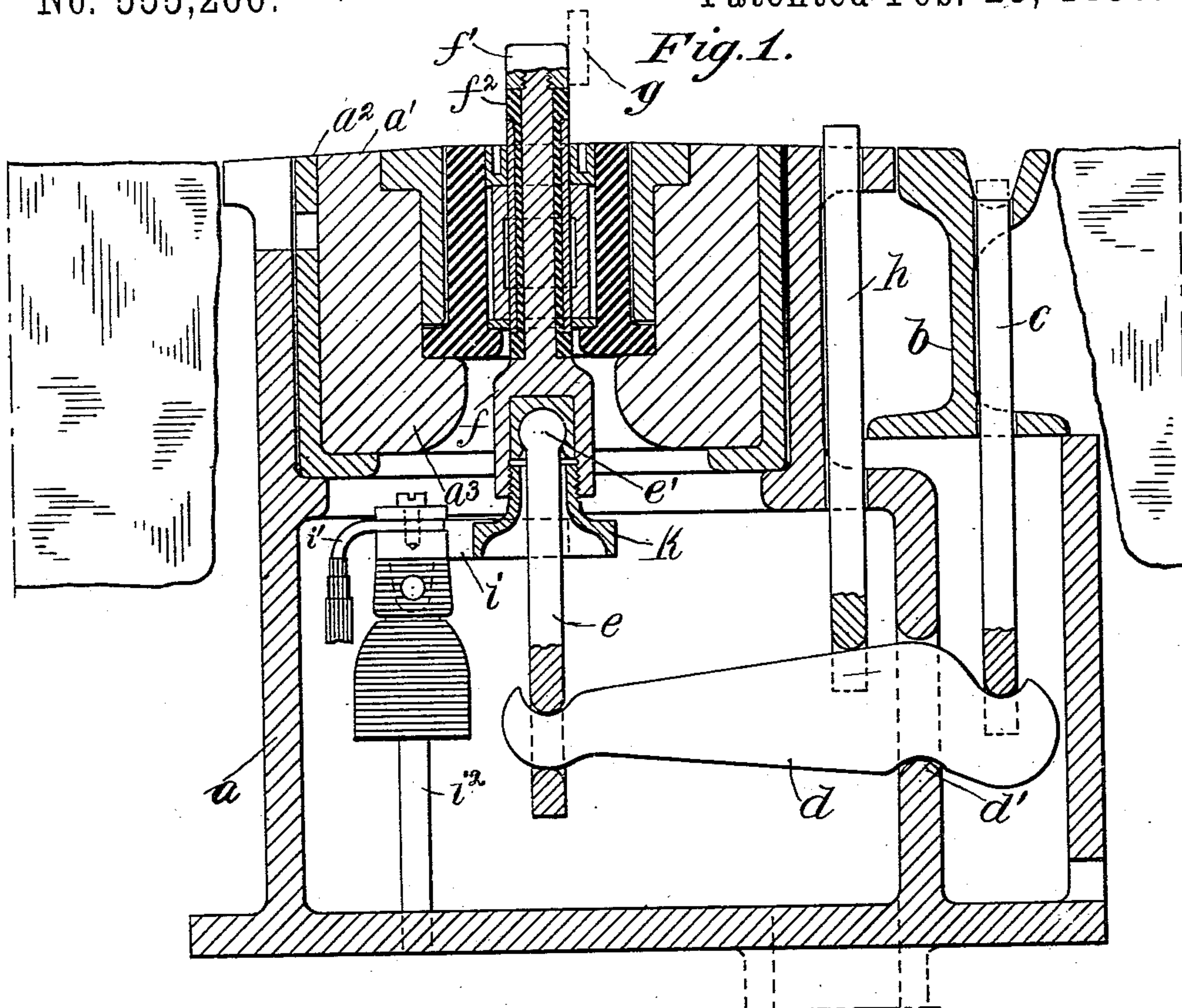
(No Model.)

C. T. H. SCHWIEGER.

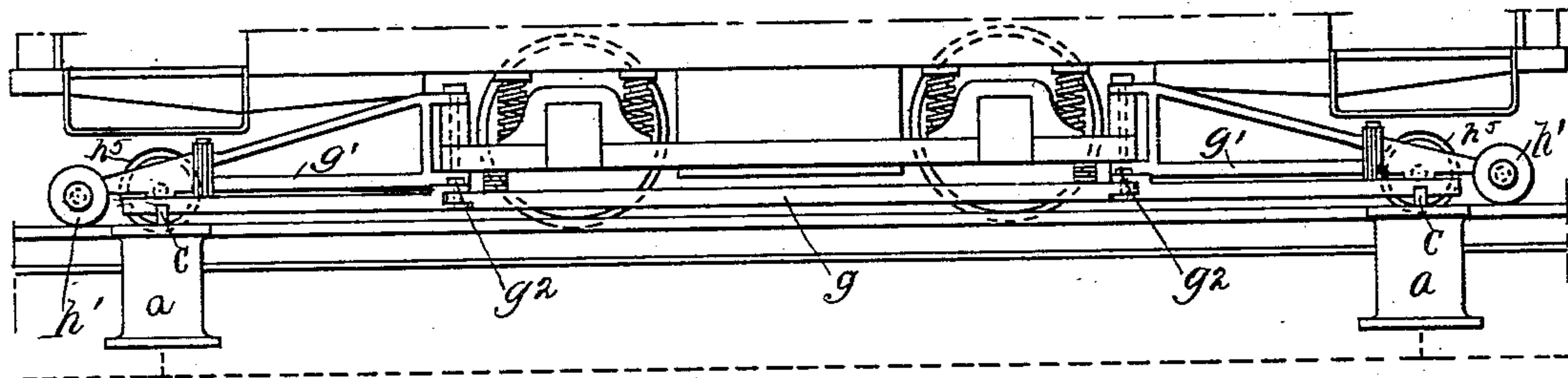
UNDERGROUND CONDUCTOR SYSTEM FOR ELECTRIC RAILWAYS.

No. 555,266.

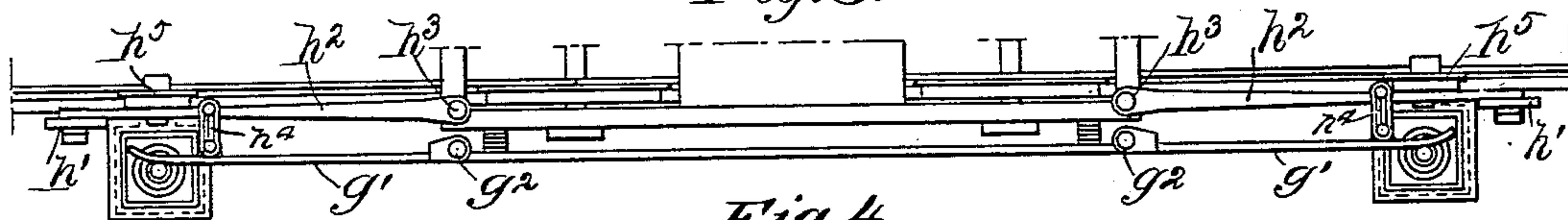
Patented Feb. 25, 1896.



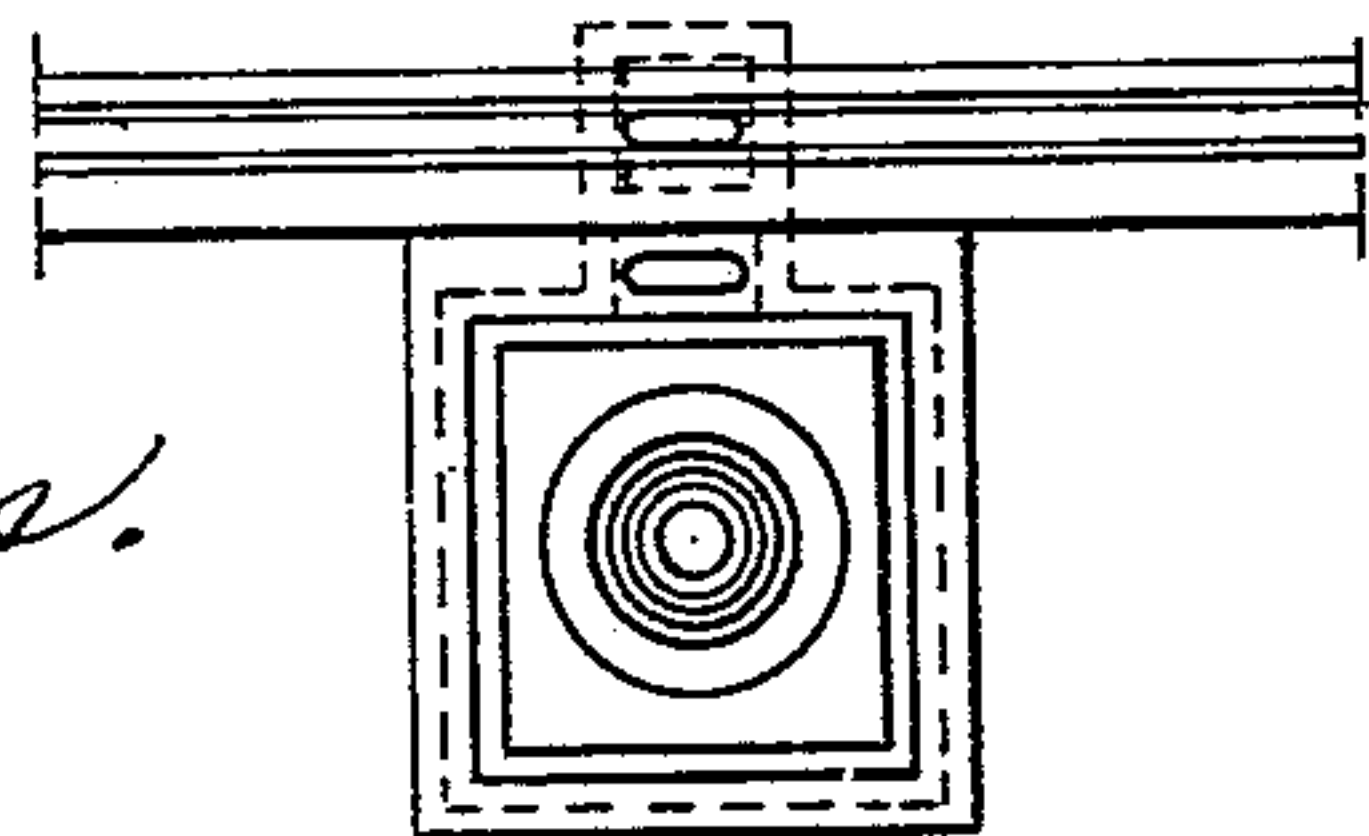
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



WITNESSES:

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INVENTOR

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# UNITED STATES PATENT OFFICE.

CARL THEODOR HEINRICH SCHWIEGER, OF BERLIN, GERMANY, ASSIGNOR  
TO THE SIEMENS & HALSKE ELECTRIC COMPANY OF AMERICA, OF CHI-  
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## UNDERGROUND CONDUCTOR SYSTEM FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 555,266, dated February 25, 1896.

Application filed November 15, 1895. Serial No. 569,049. (No model.) Patented in Italy September 28, 1895, No. 39,627.

*To all whom it may concern:*

Be it known that I, CARL THEODOR HEIN-  
RICH SCHWIEGER, a subject of the Emperor  
of Germany, residing at Berlin, Germany,  
5 have invented new and useful Improvements  
in Underground Conductor Systems for Elec-  
tric Railways, (Case No. 625,) of which the  
following is a specification, and for which  
Letters Patent have been granted in Italy,  
10 No. 39,627, dated September 28, 1895.

My invention relates to an underground  
conductor system for electric railways, and  
more particularly to that class of under-  
ground conductor systems in which the work-  
15 ing conductor is made in sections which are  
adapted to be successively connected into cir-  
cuit as the car advances, the object of the  
present invention being to provide mechan-  
ical means for cutting the sections into and  
20 out of circuit whereby the employment of  
electromagnetic devices may be dispensed  
with and a certainty of operation obtained  
which has not been secured in constructions  
heretofore employed.

25 The underground electric-railway systems  
as usually constructed are quite expensive,  
as they require a spacious conduit with a slot  
opening into the roadway, and furthermore  
they are objectionable, as it is found difficult  
30 to properly insulate the working conductors.  
It has, therefore, been proposed to form the  
working conductors in sections and to pro-  
vide mechanism, usually electromagnetic in  
character, for cutting the sections into cir-  
35 cuit as the car advances, and for cutting the  
sections out again after the car has passed.  
The sectional-conductor system, when carried  
to the extreme, comprises a number of con-  
tact-terminals arranged along the roadway  
40 with which an elongated conductor carried  
longitudinally upon the car is adapted to en-  
gage, the terminals being cut into circuit as  
the car advances and cut out again after the  
passage of the car.

45 The present invention relates to sectional-  
conductor systems of the latter type, and the  
terminals are adapted to be cut into and out  
of circuit through the agency of a rod or bolt  
which extends into the groove of one of the  
50 rails upon which the car travels, the rod be-

ing engaged and depressed by the flange of  
the wheel as the vehicle passes, thus operat-  
ing intermediate mechanism to elevate the  
contact-terminal whereby the same may be  
engaged by the contact device carried upon 55  
the vehicle. A roller upon the rear of the  
vehicle is adapted to engage a second rod or  
bolt to depress the contact-terminal as the  
car is leaving the section, the contact-termi-  
nal normally resting flush with the road-bed. 60  
An electric switch is operated by the move-  
ment of the contact-terminal to cut the same  
into circuit, the contact-terminal being cut  
into circuit when raised and cut out of cir-  
cuit when depressed. 65

Referring to the accompanying drawings,  
Figure 1 is a sectional view of a switch-box  
embodying my invention. Fig. 2 is a view  
illustrating my invention in connection with  
a passing vehicle. Fig. 3 is a view illustrat- 70  
ing the contact-terminals arranged along the  
roadway in connection with the collecting  
conductor carried upon the car. Fig. 4 is a  
plan view of the switch-box.

Like letters refer to like parts in the several 75  
figures.

The box *a* is situated with the surface flush  
with the road-bed, the box being preferably  
secured to the under side of the rail *b* by  
means of a flange bolted to the rail. A rod 80  
or bolt *c* passes through holes provided in  
the head and flange of the rail and is adapted  
to normally rest with its end extending into  
the groove of the rail, the opposite end being  
bifurcated and engaging the end of a lever *d*, 85  
fulcrumed at *d'* and engaging by its opposite  
end a rod *e*, carrying upon its end a ball *e'*,  
engaging a socket in the end of the verti-  
cally-moving contact-rod *f*, carrying upon its  
upper end the contact-terminal *f'*, adapted 90  
when the contact-rod is raised to be engaged  
by the collecting-conductor *g*, carried upon  
the vehicle. A rod *h* extends through open-  
ings provided in the casing *a* and is adapted  
to normally rest flush with the roadway, but 95  
is moved into a position with its end project-  
ing above the surface when the lever *d* is  
rocked by the depression of the rod *c*. A  
roller *h'*, carried upon the rear of the vehicle,  
is adapted to engage and depress the rod *h*, 100



thus returning the parts to their normal positions with the contact-terminal  $f'$  flush with the roadway and the rod  $c$  projecting into the groove of the rail. The contact-rod  $f$  is  
 5 mounted in a bearing provided in the cover  $a'$  of the box  $a$ , the cover comprising, preferably, a cast-iron frame  $a^2$  filled with cement  $a^3$  and supporting at the middle the bearing for the rod  $f$ . The surface of the rod  $f$  is covered with insulation  $f^2$  to thoroughly insulate  
 10 the same. A conducting portion  $k$  is carried upon the rod  $f$  and is adapted when the rod  $f$  is raised to make contact with the spring  $i$ , which is electrically connected with the main  
 15 conductor by rubber-covered cable  $i'$ , the spring  $i$  being mounted upon a standard  $i^2$ . The conductor  $g$  carried upon the vehicle is of such length that it makes contact with one of the terminals  $f'$  before breaking contact  
 20 with the preceding terminal. In order to round curves, the conductor  $g$  is formed with pivoted end portions  $g'$   $g'$ , adapted to be swung upon pivots  $g^2$   $g^2$ . Likewise, the rollers  $h'$   $h'$ , which are adapted to engage and  
 25 depress the rods  $h$ , are mounted upon arms  $h^2$   $h^2$ , pivoted at  $h^3$   $h^3$ . The arms  $g'$  and  $h^2$  are joined together by a link  $h^4$ , which causes them to move together. Upon the arms  $h^2$  are provided flanged wheels  $h^5$   $h^5$ , the flanges  
 30 being adapted to move within the groove of the rail and thus maintain the swinging conductors  $g'$   $g'$  in position to engage the contact-terminals and the rollers  $h'$   $h'$  in position to engage the rods  $h$ .  
 35 As the vehicle advances, the forward wheel of the truck engages and depresses the rod  $c$ , thus rocking the lever  $d$  upon its fulcrum and moving the rod  $f$  upward to bring the contact-terminal  $f'$  in position to be engaged  
 40 by the conductor  $g$  carried upon the car. Before the conductor  $g$  breaks contact with the contact-terminal thus moved into operative position contact is made with the next succeeding terminal, the conductor upon the  
 45 car being thus continuously in engagement with the contact-terminals. As the car passes a section, the roller  $h'$  carried upon the rear of the car engages and depresses the rod  $h$ , thus moving the contact-terminal  $f'$  into its  
 50 lowered position and moving the end of rod  $c$  into the groove of the rail, whereby it may be engaged by a subsequently passing car. The flanged wheels  $h^5$   $h^5$  engaging the groove of the rail maintain the swinging portions  $g'$   
 55  $g'$  of the conductor  $g$  and the traveling wheels  $h'$   $h'$  in proper position to engage the contact-terminals and the rods  $h$ , respectively, whether the car be upon a straight track or be rounding a curve.

Having described my invention, what I 60 claim as new, and desire to secure by Letters Patent, is—

1. In an underground conductor system for electric railways, the combination with a series of contact-terminals adapted to normally 65 rest in a depressed position, of an operating rod or part the end of which normally projects into the path of a wheel or other part of the vehicle, mechanism between the contact-terminals and the rods for raising the contact-terminals when the rods are depressed, a rod 70 or part provided in connection with each contact-terminal adapted to occupy an elevated position when the contact-terminal is raised, and a wheel or other part carried on the vehicle adapted to engage and depress said rod 75 to return the contact-terminal to its normal position; substantially as described.

2. In an underground conductor system for electric railways, the combination with a series of contact-terminals adapted to normally 80 rest in a depressed position with their ends flush with or beneath the surface of the roadway, of a bolt or rod provided in connection with each of said contact-terminals and having 85 its end projecting into the groove of one of the rails upon which the car travels, mechanism between the contact-terminals and the rods for raising the contact-terminals when the rods are depressed, a rod provided in connection 90 with each contact-terminal adapted to project above the surface of the roadway when the contact-terminal is raised, and a wheel or roller carried upon the rear of the vehicle adapted to engage and depress said 95 rod to return the contact-terminal to its normal position; substantially as described.

3. In an underground conductor system for electric railways, the combination with the rod  $c$  extending into the groove of the rail, of 100 the fulcrumed lever  $d$  engaging said rod  $c$  at one end, rod  $e$  engaging said lever  $d$  at the opposite end and carrying a ball upon its end, the contact-terminal having a socket adapted to engage the ball provided upon the rod  $e$ , 105 the rod  $h$  engaging the lever  $d$  upon the side of the fulcrum opposite the point of engagement of the rod  $c$ , the conducting portion  $k$  carried upon the contact-terminal, and the contact  $i$  adapted to be engaged thereby when 110 the contact-terminal is raised; substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

CARL THEODOR HEINRICH SCHWIEGER.

Witnesses:

OSCAR NIELEFELD,

THEODOR STÜDEMANN.