

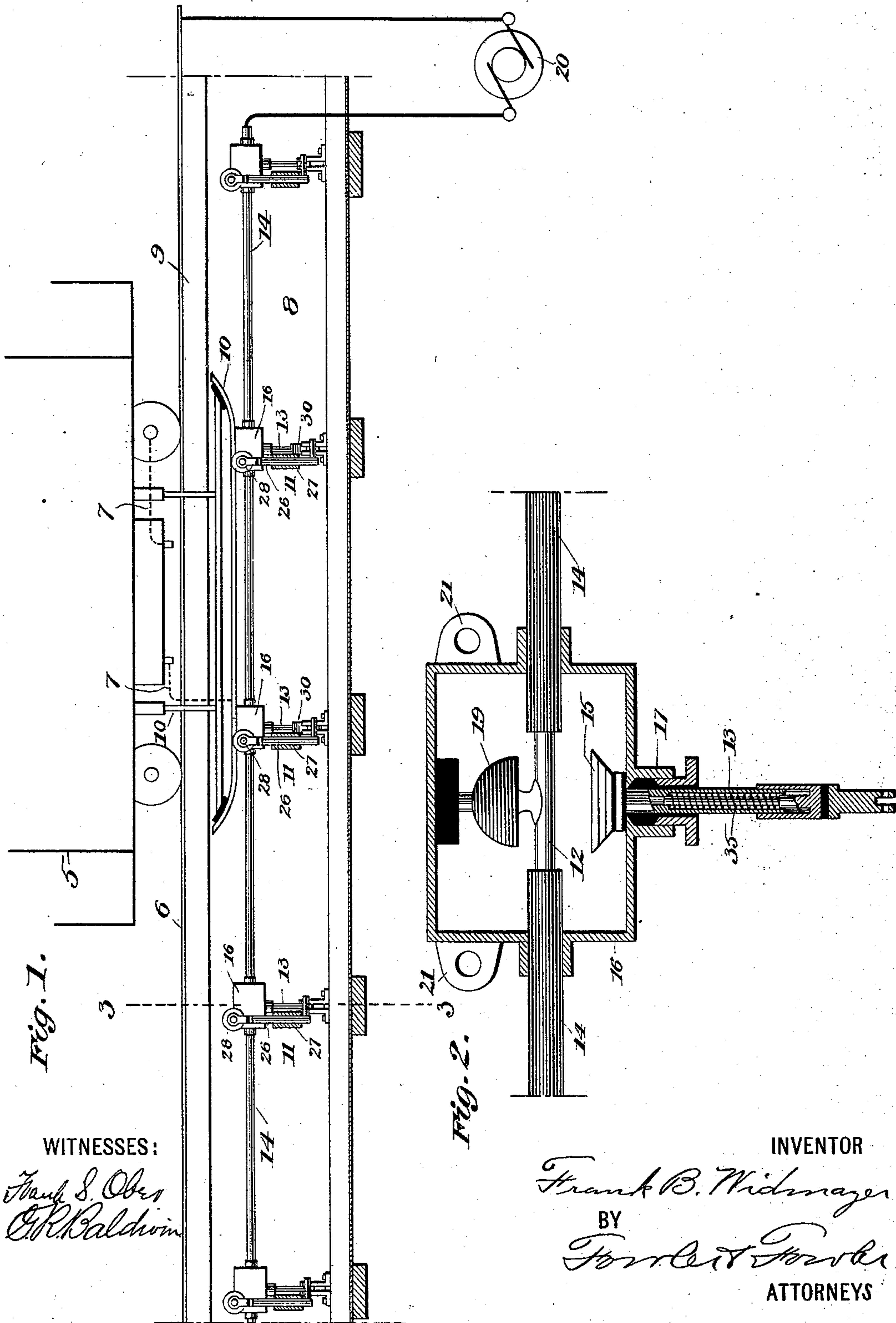
(No Model.)

2 Sheets—Sheet 1.

F. B. WIDMAYER.  
CONDUIT ELECTRIC RAILWAY.

No. 540,010.

Patented May 28, 1895.



WITNESSES:

Frank S. Ober  
C. R. Baldwin

INVENTOR

Frank B. Widmayer

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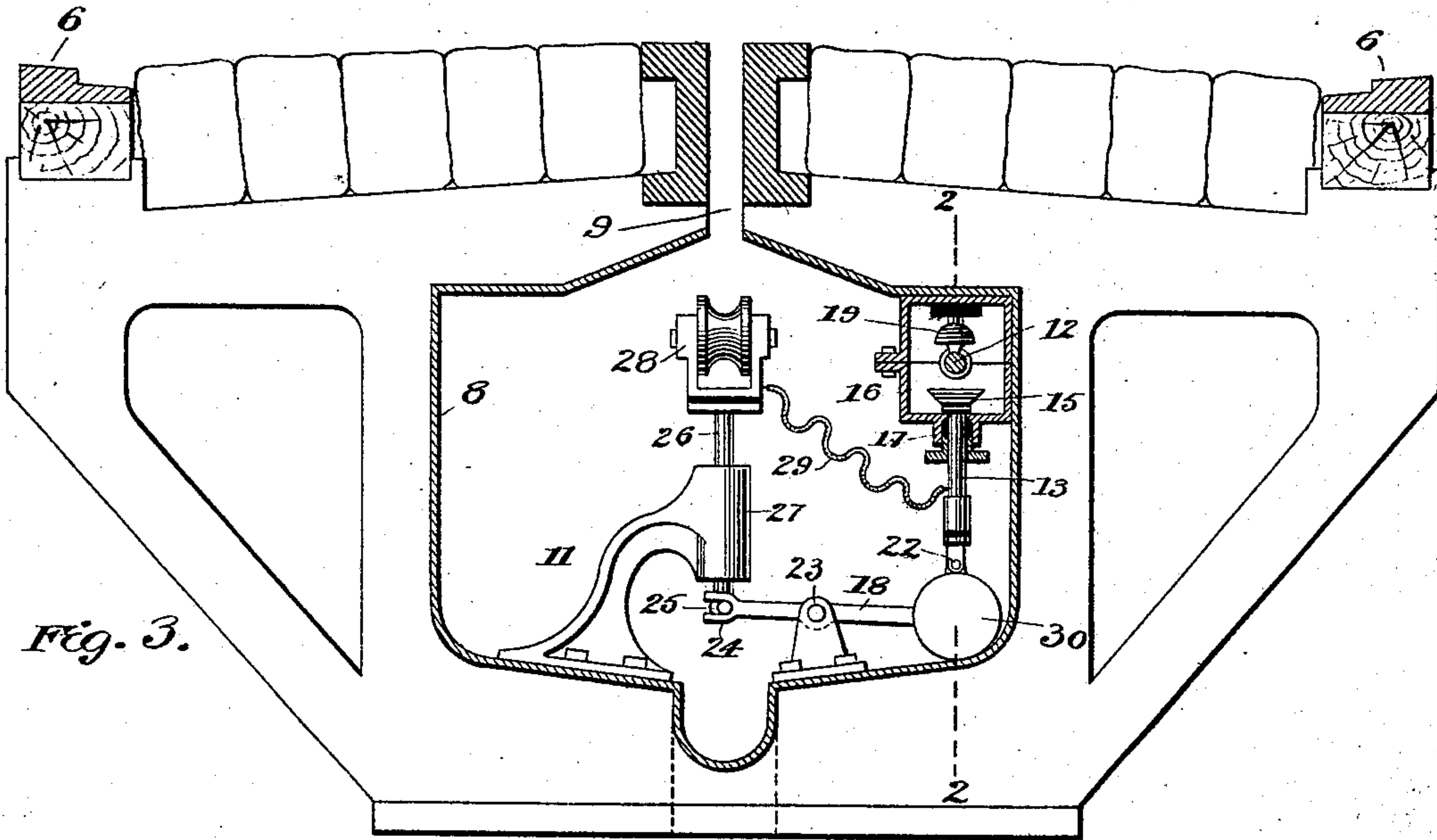


Fig. 3.

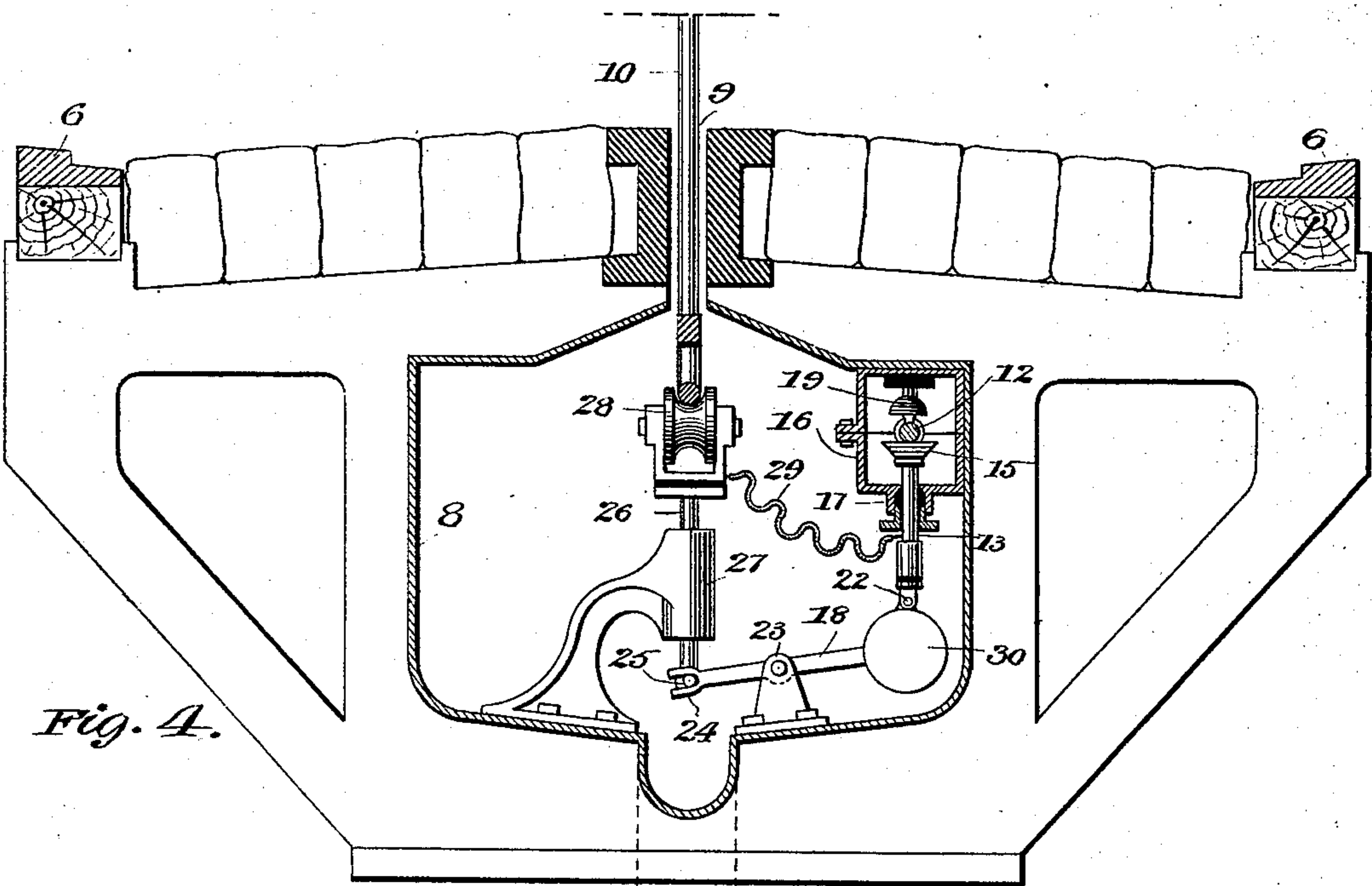


Fig. 4.

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# UNITED STATES PATENT OFFICE.

FRANK B. WIDMAYER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO  
CHARLES E. BALL, OF SAME PLACE.

## CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 540,010, dated May 28, 1895.

Application filed August 3, 1894. Serial No. 519,340. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK B. WIDMAYER, a citizen of the United States, and a resident of New York city, county and State of New York, have invented certain new and useful Improvements in Electric Railways, of which the following is a specification.

The principal objects of my invention are to provide a simple and efficient system of electric-railways, the successful operation of which cannot be defeated by water flooding the mechanism and thereby short-circuiting the current.

To these and other ends my invention consists in the various novel and peculiar arrangements and combinations of the several parts of the apparatus, all as hereinafter fully described and then pointed out in the claims.

I have illustrated a type of my invention in the accompanying drawings, wherein—

Figure 1 is a sectional view of an electric-railway system embodying my improvements, the section being taken on a plane extending vertically and longitudinally through the conduit. Fig. 2 is an enlarged detail view of one of the contact-boxes shown in section on a vertical plane parallel with the main conductor, as indicated by line 2 2, Fig. 3. Figs. 3 and 4 are sectional views, on a transverse vertical plane, through one of the contact-boxes, as indicated by line 3 3, Fig. 1, the former showing the circuit-completer in normal open position, while Fig. 4 shows it in closed position.

Referring to the drawings, in which like numbers of reference designate like parts throughout, 5 indicates an ordinary electrically-propelled car moving on the usual tracks 6, 6. A conduit 8, extends continuously along the road parallel therewith and is provided with a slot 9, into which projects a contact-plow or shoe 10 adapted to travel through the conduit as the car moves. This contact-plow is connected by a circuit 7 with the motor which propels the car,—the motor itself not being shown as such illustration is not necessary to the understanding of my invention as any of the well known forms of motors may be used. From the motor the current is led by circuit 7 to the wheels of the car from

which it returns by the car track or an earth return to the source of electricity or dynamo indicated at 20. In the present construction this plow serves the double function of a current conductor and means for actuating successively a series of normally open circuit-completers 11, 11, and thereby completing the circuit between the car motor and the main-conductor or feeder 12, but it is manifest that these two functions may be performed each by a separate part instead of both by one part.

The main-conductor 12 is arranged along the interior of the conduit at a suitable point therein and is of course thoroughly insulated, and in addition it is completely incased within a water-tight covering, tube or duct 14, through which at certain intervals are passed reciprocating-rods 13 of the circuit-completers. Each of the circuit-completers comprises one of these rods 13 which carries at its inner end a contact-member 15 adapted to make good electric contact with the main-conductor 12, which is laid bare or exposed at particular points for this purpose.

The water tight covering or tube 14 may be of uniform size throughout if preferred, though I have shown it as provided with enlargements or boxes 16 at the points where the circuit-completers are to have access to the conductor—the design being in any case to have the insulated main-conductor housed in a water-tight casing with certain points of access thereto by the circuit-completers.

At the point where the reciprocating-rod 13 enters the covering or casing, there is provided a water-tight joint or stuffing box 17, as shown clearly in Fig. 2, in order to exclude water from the casing at the same time permitting free movement of the reciprocating-rod of the circuit-completer.

Within each of the enlargements or boxes 16 is arranged an insulated supporting bracket 19, to which the main-conductor is securely fastened, and the boxes themselves may be made fast to the interior of the conduit by means of suitable bolts passing through the perforated ears 21 on the boxes as indicated in Fig. 2.

The lower end of the reciprocating-rod 13, is connected, preferably by means of a pivot



22, to one end of a rock-lever 18, which tilts on a horizontal axis 23. The other end of the rock-lever is forked at 24 so as to loosely receive a pin 25 projecting laterally from the foot of a vertically-reciprocating bar 26 which works in a suitable bearing 27 and is provided at its head with a contact-piece or wheel 28.

The contact-piece 28 which is to be rubbed over or in case a wheel be used as shown, is to be rolled over by the contact-plover 10, is electrically connected in a suitable manner with the contact-member 15 which closes on the main. In the present construction this connection is made by means of an insulated wire 29 that is slightly flexible. However, if preferred the contact-piece 28 and the reciprocating-rod 13 may be in electrical communication through means of the bar 26 and the rock-lever 18, instead of being insulated from such parts and connected by a flexible wire as shown.

Each of the rocking circuit-completers is counterweighted by means of a suitable weight 30, which is shown as formed on the end of the rock-lever 18, so that when in normal position the contact wheel or member 28 stands at its highest position of vertical movement and the reciprocating-rod remains at its lowest limit of movement thereby keeping the same normally open as shown more particularly in Fig. 3.

When now the contact-plover traveling through the conduit its curved or rounded end collides with the contact wheel or device 28 lying in the path thereof, it depresses the bar 26 and elevates the reciprocating-rod thereby completing the circuit from the main to the motor. This condition continues during the time that the plover or shoe is in engagement with the contact 28. Upon the disengagement of these parts by the traveling movement of the plover, the circuit-completer is restored to normal position by the force of gravity since the construction is such that when the contact 28 is disengaged from the plover the counterweight will at once cause the reciprocating-rod to gravitate into its lowest position and cause the contact member to fall away from the main-conductor.

In order to guard against the lack of proper adjustment causing the circuit-completers to fail in making good contact, I make a part of the circuit-completer telescopic and provide it with a spring. The parts selected for this purpose in order to illustrate it is the reciprocating-rod 13 as shown in Fig. 2. This rod is made so as to telescope on its length and is provided with a spring 35 which normally holds the telescoping parts extended. When the circuit-completer is forcibly moved the contact 15 will be held against the main-conductor by a yielding pressure which will compensate for any lack of adjustment of the parts.

From the foregoing description the operation of my invention will be readily under-

stood. The main conductor being connected with the dynamo 20 it is continually supplied with current and normally the circuit-completers are open. The circuit-completers are arranged at equi-distant points apart and at such intervals that the contact-plover which may be fifteen or thirty feet in length as desired, can engage not more than two nor less than one of the circuit-completers. In this way the plover keeps the circuit on the motor since there is at all times at least one of the circuit-completers closed by the presence of the plover which passes in succession over the series of them, they each being automatically brought into circuit by the plover and then after it has passed allowed to automatically cut itself out of the circuit and remain dead or inert until it is again actuated by a plover. Since never more than two of the circuit-completers can be closed at the same time, the conduit can be nearly filled with water which may be the result of accident or flood and yet the system will be operative. If a low potential be used the conduit and track can be completely filled with water without preventing the system from working.

I wish to be understood as not limiting my invention to the specific construction herein shown as the same may be variously modified without departing from the spirit of the invention.

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

1. In an electric railway, the combination of an electrically-propelled car provided with means for depressing and actuating successively a series of normally disconnected circuit-completers, a main conductor incased in a waterproof covering or tube, a series of normally open circuit-completers located at intervals along the railway and each comprising a horizontally-pivoted lever 18, a vertically-reciprocating rod 13 suitably counterweighted and connected at its lower end with the lever 18, the upper end of said rod working through a stuffing-box 17 and projecting into the interior of said waterproof covering or tube and provided therein with a contact 15 for closing on the main, a vertically-reciprocating bar 26 connected with the other end of said lever 18 and provided upon its upper end with a contact roller 28 for engaging with said depressing device on the car, an insulated electrical connection 29 connecting said contact on the bar 26 with the upper end of the reciprocating rod 13, substantially as and for the purpose set forth.

2. In an electric railway, the combination of a main conductor incased in a waterproof covering or tube, a series of circuit-completers normally open and arranged at intervals along the road, an electrically-propelled car provided with means for successively throwing into operation said circuit-completers each of which comprises a horizontally-piv-



oted lever 18, having a vertically-moving bar  
26 connected to one end thereof and a verti-  
cally-reciprocating telescoping rod 13 con-  
nected to the other end of said lever and work-  
5 ing through a stuffing-box 17 in said covering  
or tube and provided therein with a contact  
15 for closing on the main, substantially as  
and for the purpose set forth.

In testimony that I claim the foregoing as  
my invention I have signed my name, in pres- 10  
ence of two witnesses, this 1st day of August,  
1894.

FRANK B. WIDMAYER.

Witnesses:

GEORGE R. BALDWIN,  
WILLIS FOWLER.