(No Model.) 2 Sheets—Sheet 1.

J. B. SHELDON & D. J. MURNANE.

ELECTRIC RAILWAY.

No. 462,595. Patented Nov. 3, 1891.

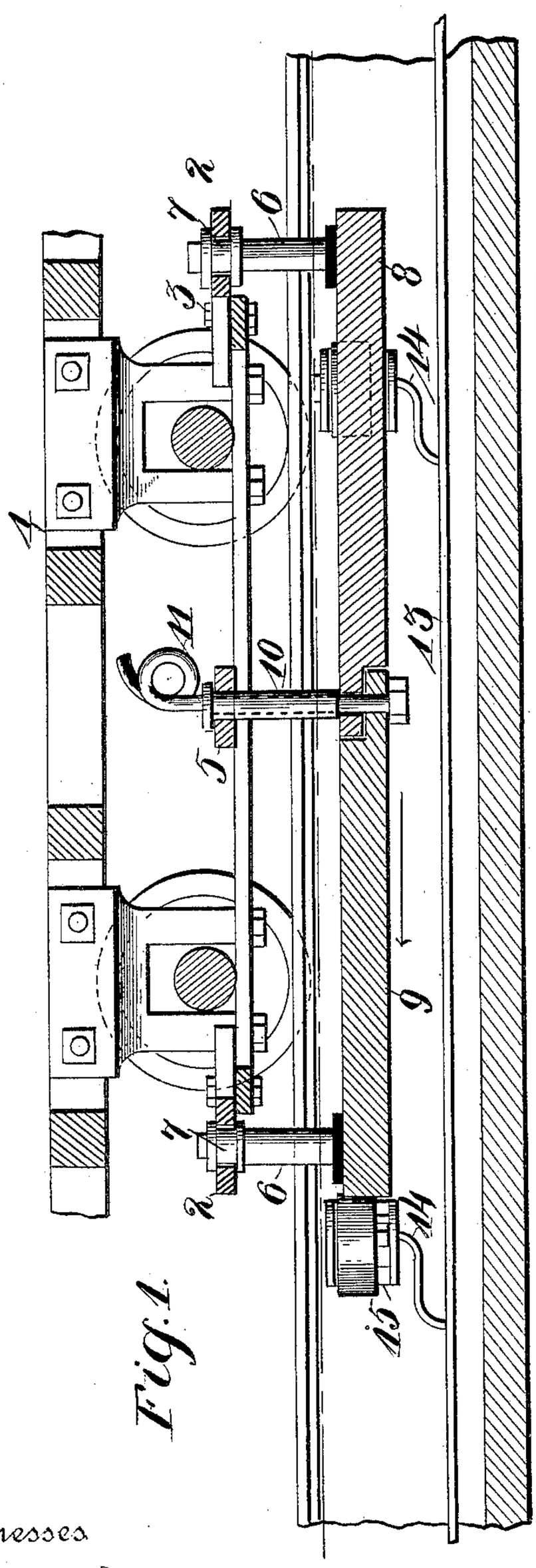

Fig. 1.

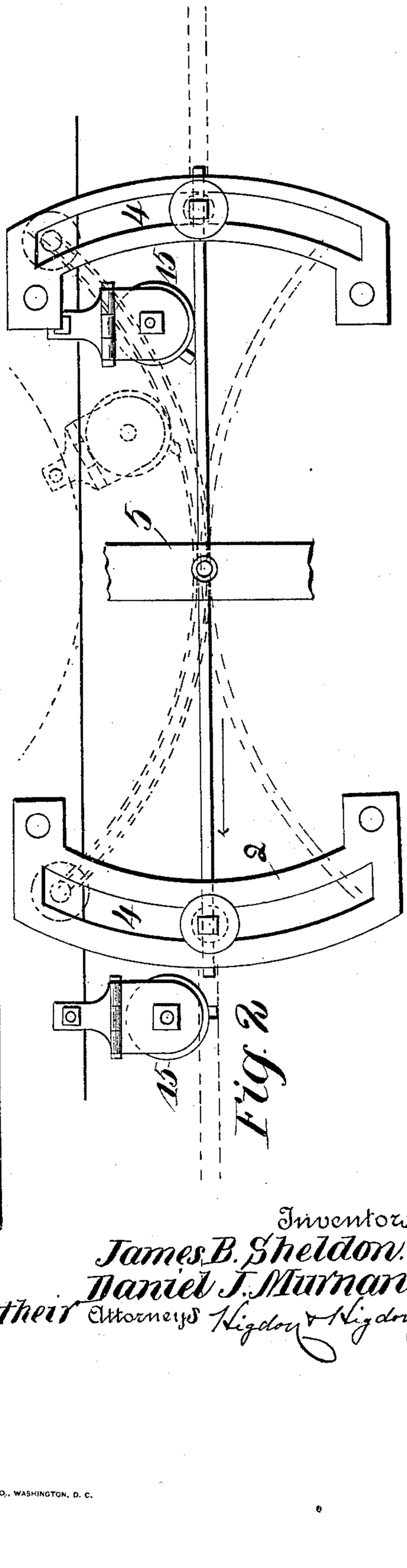

Fig. 2.

Witnesses.
C. F. Keller.
Edward Everett Longan.

Inventors.
James B. Sheldon.
Daniel J. Murnane.
By their Attorneys Higdon & Higdon

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

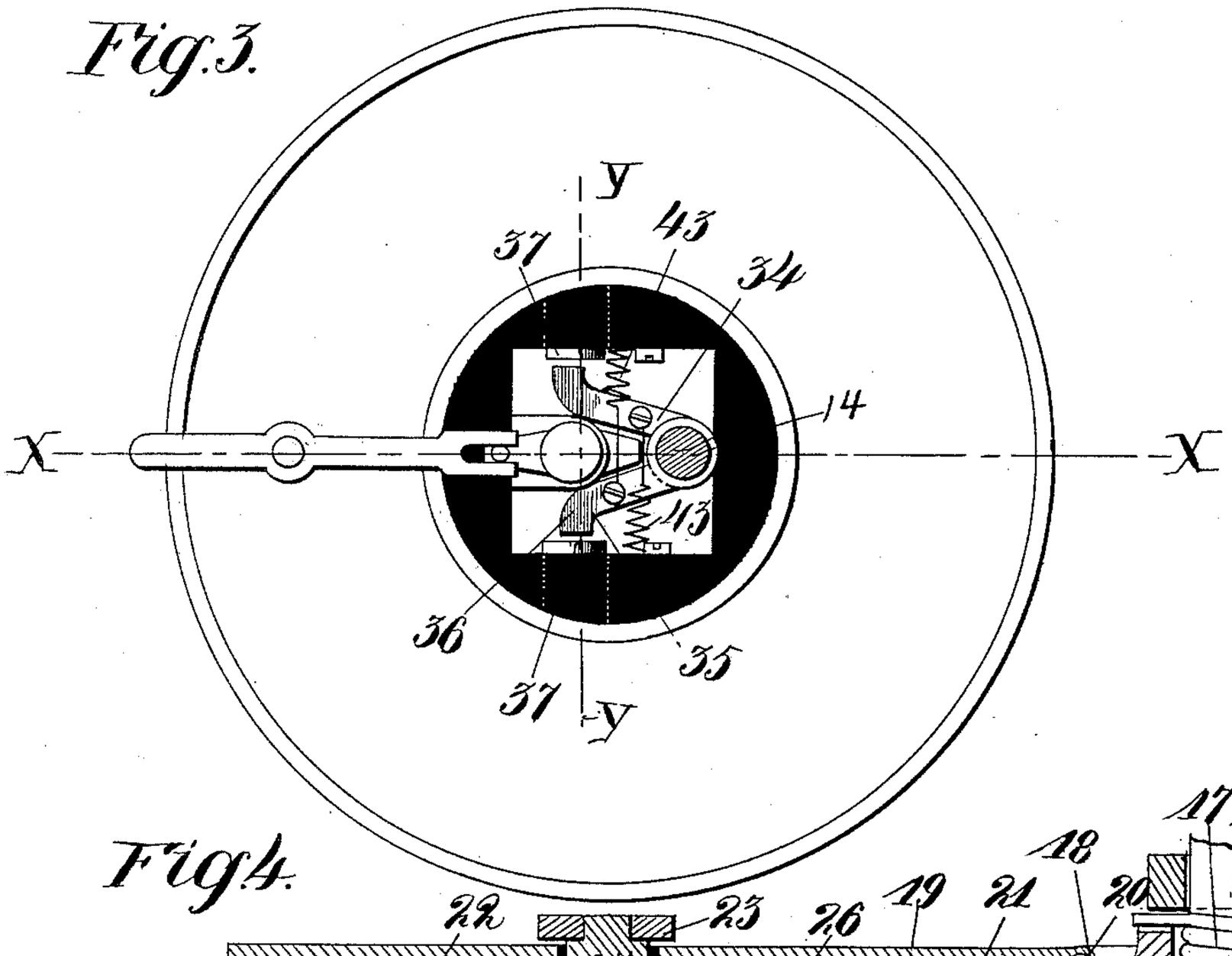


Fig. 4.

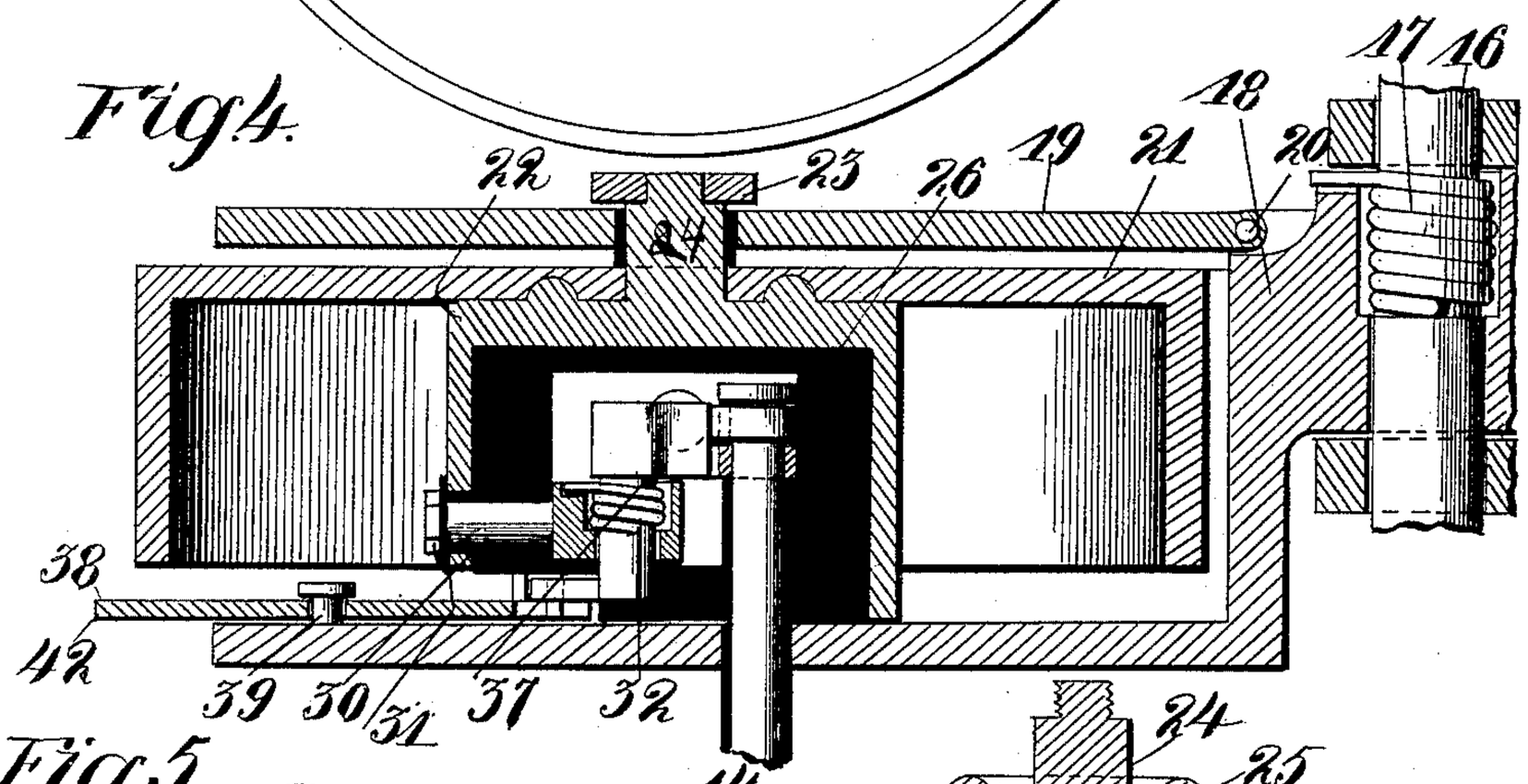


Fig. 5.

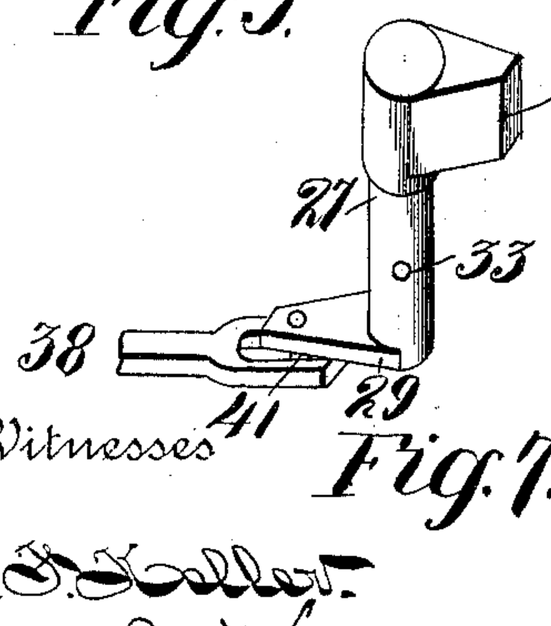


Fig. 6.

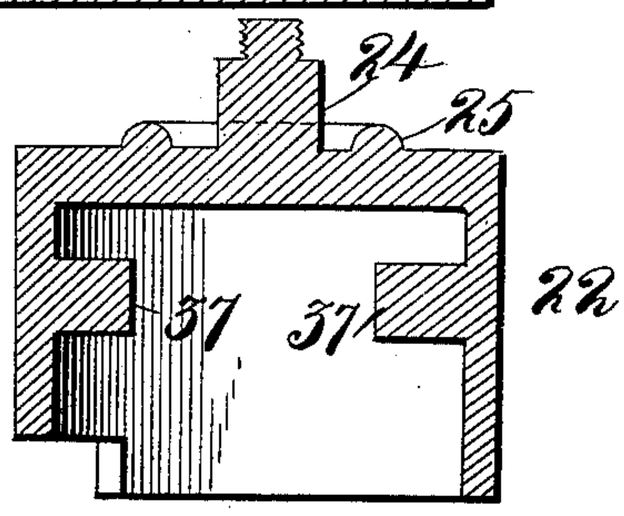
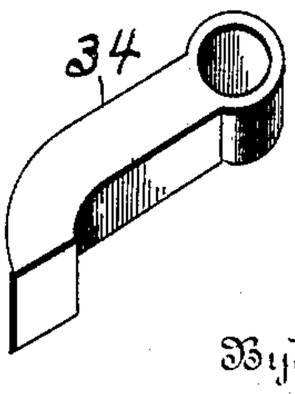


Fig. 7.



Witnesses

D. H. Keller.

Edward Everett Longan

Inventors.

James B. Sheldon.

Daniel J. Murnane.

By their Attorneys. Higdon & Higdon

UNITED STATES PATENT OFFICE.

JAMES B. SHELDON AND DANIEL J. MURNANE, OF ST. LOUIS, MISSOURI, ASSIGNORS TO THE UNDERGROUND ELECTRIC TRACTION COMPANY, OF MISSOURI.

ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 462,595, dated November 3, 1891.

Application filed February 12, 1891. Serial No. 381,218. (No model.)

To all whom it may concern:

Be it known that we, JAMES B. SHELDON and DANIEL J. MURNANE, of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to improvements in electric railways; and it consists in the novel arrangements and combination of parts, as will be more fully hereinafter described, and designated in the claims.

In the drawings, Figure 1 is a side elevation of our invention. Fig. 2 is a top plan view of switches, contact-plates, and attachments which we employ in carrying out our invention. Fig. 3 is a top plan view of an electric switch which we employ in carrying out our invention. Fig. 4 is a diametrical cross-section of the same. Fig. 5 is a detailed perspective view of a crank-arm of the switch. Fig. 6 is a diametrical vertical section of an inner shell or casing of the switch, and Fig. 7 is a detailed perspective view of an arm located in said inner shell or casing for making electrical contact.

Referring to the drawings, 1 indicates the frame-work of an ordinary car, to the bottom of which and the ends thereof are secured segmental plates 2. Said segmental plates are secured to the ends of said frame-work by means of bolts or rivets 3. Said segmental plates are provided with curvilinear slots 4.

5 indicates a bar which passes transversely across and the ends thereof are secured to the truck-frame. Said bar 5 is located preferably in the median portion of the truck-frame.

6 indicates vertical arms or posts, the upper terminal portions of which are provided with grooved rollers 7, between the flanges of which rollers the contact portions of the segmental plates are interposed, and said arms or posts are so located in the curvilinear slots of said segmental plates that the same are free to move therein. The lower ends of said arms or posts 6 are mechanically secured to flexible contact-plates 8 and 9, respectively. Said contact-plates 8 and 9 are hinged together at their inner ends, forming a pivotal connection between the same. Said plates are secured pivotally together by means of a tube 10, passing through the ends of said plates 8 and 9 and mechanically secured to bar 5.

11 indicates an insulated conducting-wire which is in electrical contact with plates 8 and 9 and also is suitably and electrically connected to the motor of the car. Posts or arms 6 pass down through slots formed in the subway and are movable along in the same as the car moves. By the pivotal connection between the plates 8 and 9 the same are allowed to turn and give when the car goes around a curve, as shown in dotted lines in Fig. 2. The united length of plates 8 and 9 is about the length of the frame of the street-car or motor.

13 indicates the main conducting-wire, which is suitably secured in the subway and at one side thereof.

14 represents the branch conductors which lead from the main conducting-wire 13 to the switches 15, as will be more fully hereinafter specified. Said electric switches 15 are yieldingly secured to the frame-work of the subway by means of a shaft 16, the yielding connection being effected by means of a spiral spring 17, which encircles said shaft, with one end rigidly secured thereto, and the other end of said spring is secured to the frame-work 18 of the switch.

19 represents a hinged lid, which is secured to the frame-work 18 by means of a bolt or rivet 20. Said lid may be elevated or opened up as desired, thereby permitting the inspection of the interior mechanism of the switch, if desired.

The switch proper, exclusive of the frame-work, as hereinbefore stated, consists of two inverted shells 21 and 22, and shell 21 is free to rotate over shell 22 when acted upon by the contact-plates, as shown in Figs. 4 and 2, and is secured therein by means of nut 23, which is adapted to be secured on the end of a stud 24, integrally cast or formed with the

inner shell 22. The inner shell 22 is insulated from the lid 19, and consequently from the frame of the switch.

25 indicates a circular projection which is formed on the top of the inner shell 22 and is adapted to fit in a corresponding circular depression formed in the top of shell 21, thereby effecting a good electrical connection between the two. Inner shell 22 is provided on its internal surface with a coat of insulating material 26. The electric current transmitting and transferring device by which it is changed as desired for functional purposes is as follows, to wit: A crank-arm 27 is provided with arms 28 and 29. Said crank-arm 27 is secured in the inner shell 22 by means of stud 30, one end of which stud is provided with a perforation in which said crank-arm is adapted to be inserted, and the other end of said stud is secured to inner shell 22 by means of a nut 31, but insulated therefrom. The restoration of said arm 27 to its normal position after it has been turned in either direction is effected by means of a spiral spring 32, one end of which is rigidly secured in a perforation 33, formed in said crank-arm 27, and the other end of said spring 32 is immovably located while in functional use in stud 30. By this construction it will be readily seen that when said arm has been turned in either direction in forming contact the spring will immediately restore it to its normal position.

34 and 35 indicate contact-arms, one end of which is provided with a perforation, as shown in Fig. 7, and through said perforations branch conductors 14 may be inserted and secured. Said arms and said conductors are in electrical contact. The other ends of said arms are provided with bent extensions 36, which extensions are adapted to be brought in contact with contact projections 37, formed on the inner surface of shell 22.

38 indicates a switch-lever, which is pivotally secured to frame-work 18 of the switch by means of a headed bolt 39. The inner arm 40 of said lever is bifurcated, and between the bifurcations thereof a stud 41, formed on arm 29, is interposed. The outer arm 42 of said lever projects a little way beyond the exterior surface of the outer shell 21, thereby permitting the same to be struck by contact-plates 9 and 8, respectively, as the car advances or goes in an opposite direction. By the shells 21 and 22 being inverted the water, which is liable to accumulate in the subway, cannot rise up in the interior space thereof and affect or interfere with the electrical connection or weaken the electrical energy. The inner shell 22, in which is located the detailed mechanism of the switch, fits closely against the bottom of the frame-work, thereby preventing the introduction or access of any foreign substance—such as water or dust—into the interior space and preventing or retarding the electric connection and lessening the electrical energy.

43 indicates spiral springs, one end of which is secured to arms 34 and 35, respectively, and the other end of the same is secured to the insulation 26 of the inner shell 22. Said springs have only mechanical functions—to wit, normally holding said arms out of contact with contact projections 37.

Having given an explicit description of the mechanical parts substantially embodied in our invention, we will now proceed to describe the manner in which the electric connections are made between the main conducting-wire and the motor as the car advances or goes in an opposite direction.

Referring to Fig. 1 and conceiving that the car is going in a forward direction, as indicated by the arrow, the connections are as follows: The switches 15 are so situated in the subway and situated at such a relative distance apart relative to the united length of contact-plates 8 and 9 that while the rear switch or the one at the right in Fig. 1 is still in direct contact with plate 8 the forward switch or the one at the left is brought in contact with plate 9; or, in other words, one switch is always in direct contact when the other switch is in partial contact, thereby utilizing the electrical energy only as needed. As the car advances, still referring to Fig. 1, as contact-plate 9 strikes arm 42 of the switch-lever said lever will turn crank-arm 27 and throw arm 28 against arm 34, which results in throwing said arm 34 in contact with contact projection 37, which results from arm 34 being in electrical contact with branch conductors 14 in transmitting or transferring the current to projection 37, thence in the shell 22 of the switch, then in shell 21, and as shell 21 is brought in contact with contact-plates 8 and 9 the current will pass from said shell into said plates and from said plates is conducted by wire 11 to the motor of the car. Of course when the car goes in an opposite direction the connection will be the same, but will be effected through arm 35, which results from an opposite motion of the switch-lever 38.

Having fully described our invention, what we claim is—

1. In an electric railway, a series of yieldingly-secured rotating stationary switches located in the conduit and having connection with a source of electricity and devices on the motor-car adapted to conduct the current from said switches to the motor, substantially as set forth.

2. In an electric railway, a series of yieldingly-secured rotating switches having connection with a source of electricity, and contact-plates adapted to be carried by the car and having connection with the motor and also with the switches, said switches being situated at relative distances apart corresponding to the united length of the contact-plates, substantially as set forth.

3. An electric railway consisting of a motor-car, plates secured to the end of the frame

thereof and movable therewith, posts or arms movably secured to said plates, contact-plates secured to said posts or arms and movable therewith, a conducting-wire, and switches located in the conduit in connection with said conducting-wire, adapted to be operated by said contact-plates, whereby the current is conducted from the main conducting-wire through said plates, substantially as set forth.

4. The combination, with a motor-car, segmental plates provided with segmental slots secured to the ends of the frame of said motor-car, posts or arms movably secured in said slots, contact-plates the inner terminal portions of which are pivotally secured together and the other ends secured to said posts or arms, the pivotal connection permitting the posts to turn relative to each other in the curve of the road, a bar 5, secured to the truck-frame, a tube 10, connecting said plates to said bar, a conducting-wire located in the conduit, and switches also located in the conduit in electrical contact with the conducting-wire, said switches adapted to be operated by said plates for connecting the current from the main conducting-wire through said plates and into the motor, substantially as set forth.

5. An electric switch adapted to be secured to the frame of the subway of an electric railway, the same consisting of a frame-work 2, inverted shells in the same, a crank-arm located in one of said shells, and contact-arms likewise located in said shell and adapted to be acted upon by said crank-arm, substantially as set forth.

6. An electric switch adapted to be secured to the frame of the subway of an electric railway, consisting of a frame-work, two inverted shells of different diameters, the smaller of which is concentrically placed in the other, a stud 31, secured to said shell, a crank-arm 27, secured to said stud, contact-arms 34 and 35, secured to the branch conducting-wire 14, and a switch-lever 38 for operating said crank-arm for effecting electrical connection, substantially as set forth.

7. A switch adapted to be secured in the subway of an electric railway, consisting of a frame 18, a lid 19, hinged to the same, an inverted insulated shell 22, secured to said lid and insulated therefrom, a shell 21, concentrically placed over said inner shell and adapted to be rotated thereon, a stud 31, secured to shell 22, a crank-arm 27, secured to said stud, a spiral spring 32, encircling said arm for restoring the same to its normal position when moved, contact-arms 34 and 35 to branch wires 14, and a bifurcated switch-lever 38 for operating said crank-shaft, substantially as set forth.

8. A switch adapted to be secured in the subway of an electric railway, consisting of a frame 18, a lid 19, hinged to the same, an inverted insulated shell 22, provided with contact projections 37, secured to said lid and insulated therefrom, a shell 21, concentrically placed over said inner shell and adapted to be rotated thereon, a stud 31, secured to shell 22, a crank-arm 27, secured to said stud, a spiral spring 32, encircling the said arm for restoring the same to its normal position when moved, contact-arms 34 and 35, secured to branch wires 14, and a bifurcated switch-lever 38 for operating said crank-shaft and bringing the arm 28 of the same against contact projections 37, substantially as set forth.

9. A switch adapted to be secured in the subway of an electric railway, consisting of a frame 18, a lid 19, hinged to the same, an inverted insulated shell 22, provided with contact projections 37 and circular projection 25, secured to said lid and insulated therefrom, a shell 21, provided with a circular depression, in which said circular projection 25 is adapted to fit, concentrically placed over said inner shell and adapted to be rotated thereon, a stud 31, secured to shell 22, a crank-arm 27, secured to said stud, a spiral spring 32, secured to said arm for restoring the same to its normal position when moved, contact-plates 34 and 35, secured to branch wires 14, and a bifurcated switch-lever 38 for operating said crank-shaft and bringing projections 28, formed thereon, in contact with arms 34 and 35, substantially as set forth.

10. A switch adapted to be secured in the subway of an electric railway, consisting of a frame 18, a lid 19, hinged to the same, an inverted insulated shell 22, secured to said lid and insulated therefrom, a shell 21, concentrically placed over said inner shell and adapted to be rotated thereon, a stud 31, secured to shell 22, a crank-arm 27, secured to said stud, a spiral spring 32, encircling said arm for restoring the same to its normal position when moved, contact-arms 34 and 35, secured to branch wires 14, and springs 43, secured to said arms for holding said arms out of contact only when operated on by a bifurcated lever 38, operating said crank-shaft, substantially as set forth.

11. The combination of segmental plates 2, provided with segmental slots 4, secured to the ends of the truck-frame, posts or arms 6, secured and movable in said segmental slots, contact-plates 8 and 9, the inner terminal ends thereof pivotally secured together by means of a tube 10 and the other terminal portions thereof secured to said arms or posts 6, a bar 5, to which said tube 10 is secured, an insulated conducting-wire 11 in electrical contact with plates 8 and 9, a switch or switches consisting of a frame-work 18, adapted to be yieldingly secured to the frame-work of the subway by means of a shaft 16 through the agency of a spiral spring 17, encircling said shaft, one end of which is rigidly secured to said shaft and the other end of said spring secured to the frame-work 18, a lid 19, hinged to said frame-work, an inverted insulated inner shell 22, provided with contact projections 37 and circular projection 25, secured to an outer shell 21, provided with a circular

depression, which shell is concentrically placed over said inner shell and adapted to be rotated thereon, a stud 31, secured to said inner shell, a crank-arm or shaft secured to said stud, a spiral spring 32, encircling said shaft, one end of which is rigidly secured to the same and the other to stud 31 for restoring said shaft to its normal position, contact-arms 34 and 35, secured to branch wires 14 and movable thereon and in electrical contact therewith, springs 43, secured to said arms for holding the same normally out of contact with projections 37, a switch-lever 38, pivotally secured to frame-work 18, said switch-lever provided with a bifurcated arm 40, adapted to act upon arm 29 of crank-shaft 27, and with an arm 42, normally projecting beyond the exterior surface of shell 21, adapted to be acted upon and moved by contact-plates 8 and 9 when the car moves in either direction, substantially as set forth.

12. In an electric switch, an inverted insulated inner shell immovable relative to its own axis, provided with contact projections 37, and having a closed upper end provided with a screw-threaded stud 24 and circular projection 25, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES B. SHELDON.
DANIEL J. MURNANE.

Witnesses:
C. K. JONES,
C. F. KELLER.