

(No Model.)

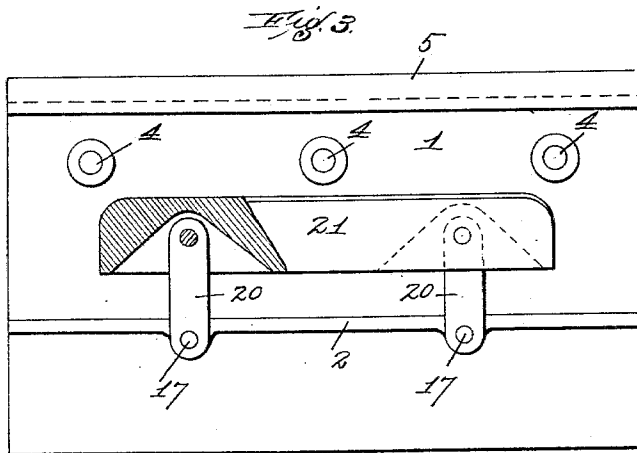
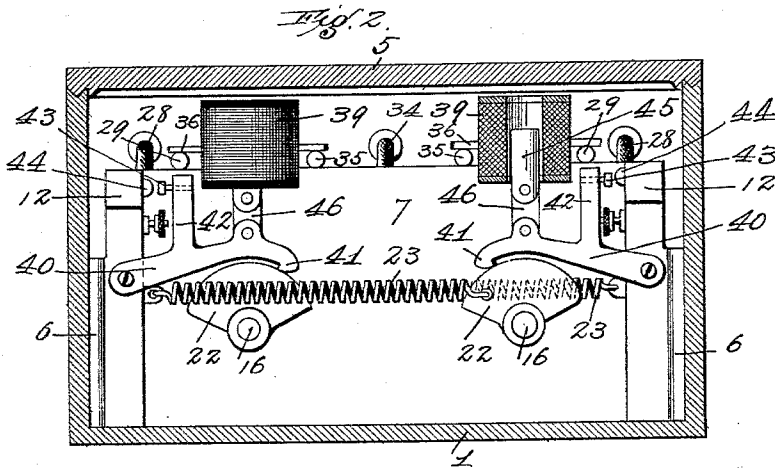
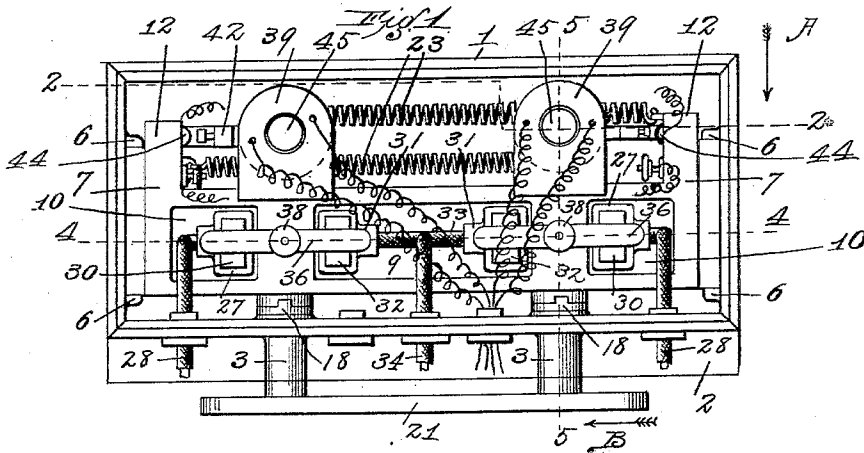
3 Sheets—Sheet 1.

J. L. HORNIG.

SWITCH FOR CONDUIT SYSTEMS OF ELECTRIC RAILWAYS.

No. 566,714.

Patented Aug. 25, 1896.



Attest
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J. M. P. Smith

Inventor
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(No Model.)

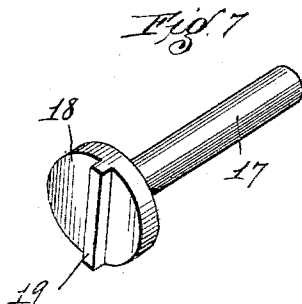
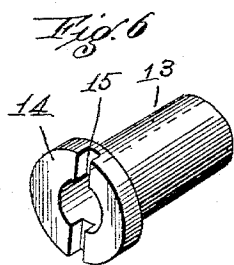
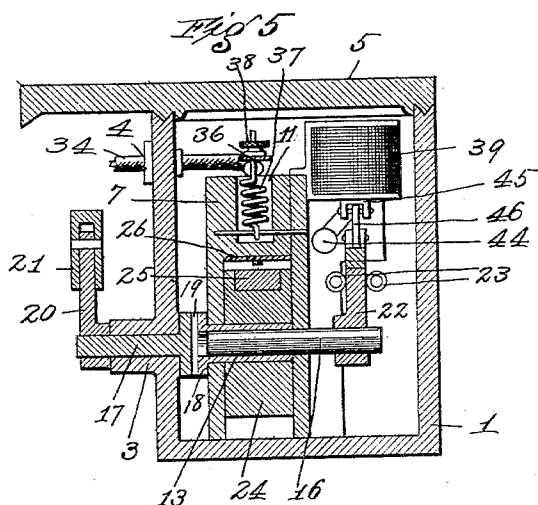
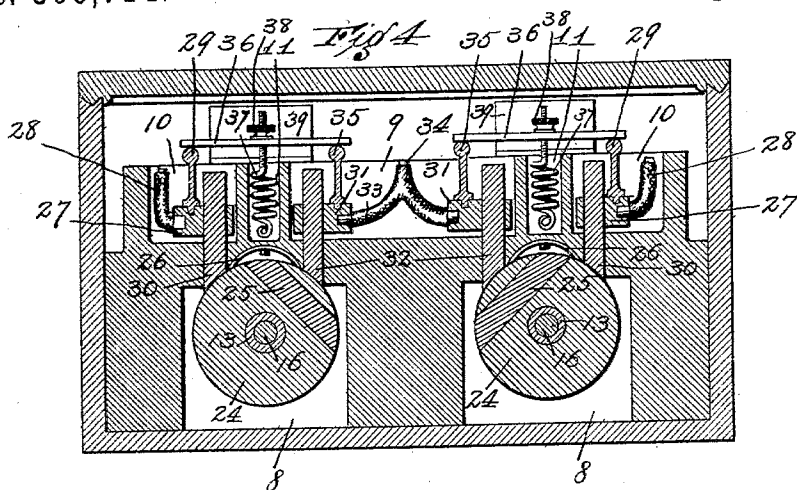
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J. L. HORNIG.

SWITCH FOR CONDUIT SYSTEMS OF ELECTRIC RAILWAYS.

No. 566,714.

Patented Aug. 25, 1896.



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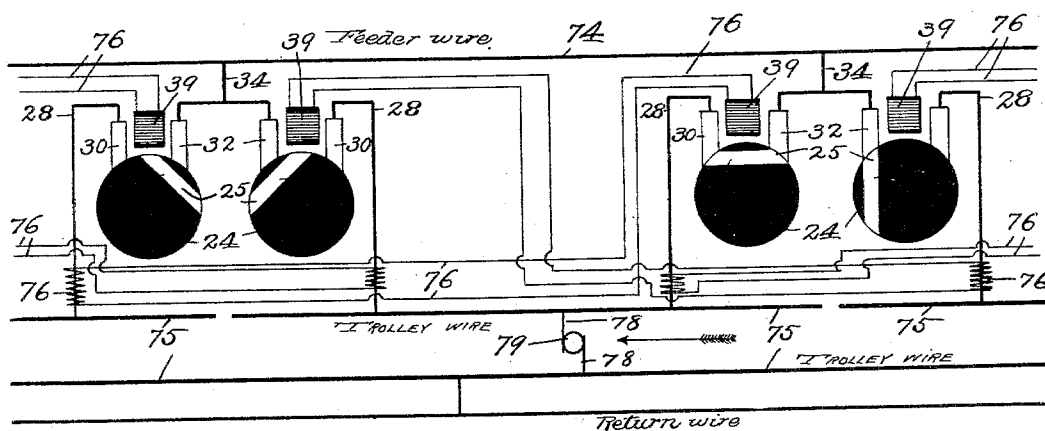
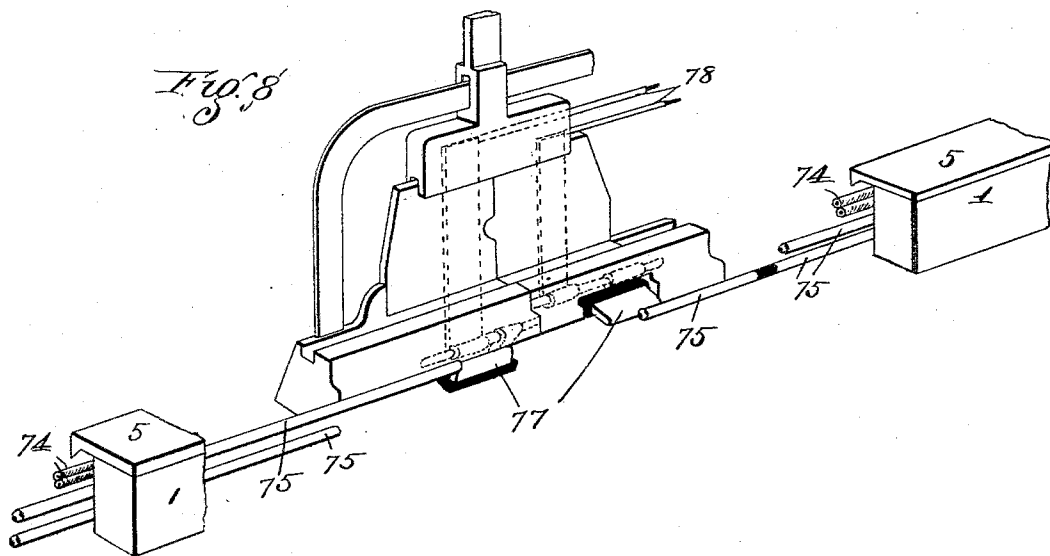
3 Sheets—Sheet 3

J. L. HORNIG.

SWITCH FOR CONDUIT SYSTEMS OF ELECTRIC RAILWAYS.

No. 566,714.

Patented Aug. 25, 1896.



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UNITED STATES PATENT OFFICE.

JULIUS L. HORNIG, OF ST. LOUIS, MISSOURI.

SWITCH FOR CONDUIT SYSTEMS OF ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 566,714, dated August 25, 1896.

Application filed August 26, 1895. Serial No. 560,823. (No model.)

To all whom it may concern:

Be it known that I, JULIUS L. HORNIG, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Switches for Conduit Systems of Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improved electric switch for conduit systems of electric railways; and it consists in the novel construction, combination, and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a top plan view of my improved switch, the top plate thereof being removed. Fig. 2 is a longitudinal sectional view taken approximately on the indicated line 2 2 of Fig. 1 and looking in the direction as indicated by the arrow A. Fig. 3 is a side elevation of my improved switch. Fig. 4 is a longitudinal sectional view taken approximately on the indicated line 4 4 of Fig. 1. Fig. 5 is a cross-sectional view taken approximately on the indicated line 5 5 of Fig. 1 and looking in the direction as indicated by the arrow B. Fig. 6 is a view in perspective of a portion of a sleeve having a clutch-face. Fig. 7 is a view in perspective of a stub-shaft having a head thereon which is formed with a clutch-face that engages the clutch-face of the sleeve shown in Fig. 6. Fig. 8 is a perspective view of two switch-boxes and the contact device which is to be carried by a car and connections for said parts in relative position. Fig. 9 is a diagrammatic view illustrating the operation of my invention.

Referring by numerals to the accompanying drawings, 1 indicates a rectangular box or receptacle, along the front face of which extends an integral flange 2. At suitable distances apart on this flange are formed bearings 3. Formed in the front wall of said box or receptacle is a series of apertures 4.

5 indicates a plate that is arranged to close and cover the receptacle 1, and said plate is made somewhat wider than said receptacle in order to extend over the side on which the flange 2 is formed. Formed integral with the inner faces of the opposite ends of the box or receptacle 1 are vertical flanges 6. Removably located in the box or receptacle 1 between these pairs of vertical flanges 6 is a

block 7 of suitable insulating material, and formed in the under side of said block 7 is a pair of rectangular recesses 8. Formed in the top of said block 7 and at the center thereof is a rectangular recess 9, and on each side of said recess 9 in the top of the block 7 are formed recesses 10. Formed in the walls between the recesses 10 and 9 are vertical bores 11.

Extending rearwardly from the block 7 at each end thereof are integral projections 12. Journaled transversely in the walls on each side of the recesses 8 and approximately in the centers thereof are sleeves 13, the same being provided with integral heads 14, in the faces of which are formed vertical slots 15. These sleeves are passed through the block 7 from the front, and shafts 16 are fixed in said sleeves 13 and extend rearwardly from the block 7.

Passing through the bearings 3, which are in alinement with the sleeves 13, are shafts 17, the forward ends of which are provided with heads 18, on the faces of which are formed integral tongues 19, that are normally located in the slots 15 in the faces of the heads 14. Fixed upon the ends of the shafts 17 that extend through the bearings 3 are vertically-arranged arms 20, to the upper ends of which are pivoted the ends of a horizontally-movable plate 21. Fixed upon the ends of the shafts 16 that project rearwardly from the block 7 are segments 22. Retractable coil-springs 23 are fixed to these segments 22, and extend in opposite directions, and are fixed to the rearwardly-projecting portions 12 of the block 7. These coil-springs 23 normally hold the segments 22 in an upright position.

Located upon the sleeves 13 within the recesses 8 are disks 24 of suitable insulating material, and located in said disks 24 are metallic plates 25, that are so arranged as that their ends appear upon the peripheries of said disks at slight distances apart. Sections of mica or analogous material 26 are arranged in the block 7 above the disks 24 in such a manner that the ends of said mica will ride upon the peripheries of said disks and lie between the exposed ends of the plates 25 when said plates are in horizontal positions.

Located in each of the recesses 10 is a brush-holder 27, to which the terminals of suitable conducting-wires 28 are fixed. Fixed to and

extending upwardly from said brush-holders 27 are standards 29. Passing through said brush-holders 27 and through the partitions in the block 7 between the recesses 10 and 8 are vertically-arranged brushes 30, the lower ends of which are concaved in order to conform with the curvature of the peripheries of the disks 24. The lower ends of said brushes 30 ride directly upon the peripheries of said disks.

Located in each end of the recesses 9 is a brush-holder 31, through which and through the partitions between the recesses 9 and 8 pass vertically-arranged brushes 32, in every way similar to the brushes 30, the lower ends of the brushes 32 riding upon the peripheries of the disks 24. The branch ends 33 of a suitable conductor 34 are carried by these brush-holders 31. Standards 35 are fixed to and extend upwardly from the brush-holders 31. Plates 36 bear upon the upper ends of each pair of standards 29 and 35. Coil-springs 37 have their lower ends fixed in the lower ends of the bores 11, and the upper ends of said coil-springs 37 pass through the centers of each of the plates 36, and said upper ends are screw-threaded and receive thumb-nuts 38. By this construction proper tension for the brush-holders is obtained. The standards 29 and 36 and the plates 35 are preferably made of insulating material in order that the current will be prevented from being short-circuited therethrough.

Fixed upon the rear side and top of the block 7 and immediately above each of the segments 22 are magnet-coils 39. Pivoted to the rearwardly-projecting portions 12 are gravity-dogs 40, the forward ends of which are formed into hooks 41, that normally ride upon the peripheries of the segments 22. These dogs 40 are provided with integral vertical arms 42, in the upper ends of which are fixed heads 43.

44 indicates suitable contact-buttons that are fixed upon the projecting portions 12 immediately in the rear of the heads 43, and to said contact-buttons are attached in the usual manner the ends of suitable conducting-wires that lead to an annunciator located at any suitable point.

45 indicates the movable cores of the magnet, and said cores are connected to the dogs 40 by pivoted links 46.

The connections 28 and 34 extend out of the box or receptacle 1 through the apertures 4.

The operation of my improved switch is as follows: A series of switches are located at suitable distances apart in the conduit of the railway, as indicated in Figs. 8 and 9, and the main feeder 74 or conductor that supplies the current to the trolley or line wire 75 is connected to the branch conductor 34. The trolley-wire or conductor 75 is connected to the ends of the connections 28. The magnet-coils 39 are properly connected from one section to another by wires 76. When the

switches are not in use, the various parts are in the positions as seen in Figs. 1 to 4, inclusive, the conductor-plates 25 being out of contact with the brushes and the dogs 40 riding on the tops of the segments 22. I preferably make use of two bare trolley-wires 75, as shown, one of them being used as a supply and the other as a return. Assuming that the car approaches one of the switch-boxes in the direction as indicated by the arrow in Fig. 9, the trolley or contact device 77 on said car, which may be of any suitable construction, strikes and rides over the plate 21, and in so doing throws said plate forwardly and downwardly. This movement will partially rotate the shafts 17, on which the lower ends of the connecting-links 20 are fixed, and, said shafts 17 being connected to the shafts 16, said shafts 16 will be rotated. The disks 24 being rigidly fixed upon the sleeves 13, that are fixed upon said shafts 16, will be rotated a sufficient distance to throw the conductor-plate 25 in the right-hand disk 24 seen in Fig. 4 into a position in which the lower ends of one of the brushes 32 and one of the brushes 30 contact with its ends. With this same movement the segment 22 seen at the right hand in Fig. 2 will have moved a sufficient distance to allow the hooked end 41 of the dog 40 riding on said segment to engage over the end of said segment 22. This will hold the various parts in their proper positions after the contact device has passed off of the plate 21. The conductor-plate 25 on the left-hand side of the switch-box will now be out of contact in a vertical position. Current from the feeder 74 now passes through the right-hand branch of the connection 34, through the brush-holder 32, conductor-plate 25, brush 30, brush-holder 27, and conductor 28, all at the right hand of the switch shown in Fig. 4, said conductor 28 leading to the trolley-wire section 75 adjacent thereto. The current thus being passed through said trolley-wire or other conductor will be transferred through the trolley 77 and usual connections 78 to the motors 79 of the car. Said current will be supplied to this particular section of the trolley-wire or other conductor until the trolley of the car passes over the plate 21 on the next adjacent switch-box, and as said trolley passes over said plate the following operation takes place: As the trolley passes over the plate 21 the various parts are partially rotated in the manner as previously described and connection between the second section of the trolley-wire or conductor and the feeder is made. As the current passes into the second section of the trolley-wire or conductor an induced momentary current from said second section of the trolley-wire will pass through the conductors 76 leading to the magnet-coil 39 seen at the right hand in Fig. 2, and with this action the movable core 45 of said magnet will be drawn upwardly and the hook 41 on the end of the dog 40 will be disengaged from the end of the segment 22. The coil-spring

23 will act as soon as said hook is disengaged and said segment, shafts 17, and various other parts will reassume their normal positions and be set and in readiness to be acted upon by the trolley-wheel carried by the next car. As the trolley passes from the second section and onto the third the induced current to the magnet on the first switch-box will cease and the hooks 41 on the ends of the dogs 40 will reassume their normal positions on the peripheries of the segments 22. By constructing the heads 14 and 18 in the manner as described the entire block 7 and contiguous parts may be removed at any time from the casing for the purpose of inspection or repair.

A switch of my improved construction is simple, inexpensive, very compact, is positive in action, and very efficient in use.

The device herein shown and described is made double, in order to allow a car or cars to move in both directions upon the track. Where the devices are used on double-track railways, it is obvious that the switches may be made single, or with one rotating disk and one set of brushes and connections thereto.

I do not broadly claim in this application the combination of the movable disks 24, their contacts 25, a pair of brushes for each disk, the sections of mica 26, and their operative connections, as I have made the same the subject-matter of the concurrent application filed August 26, 1895, Serial No. 560,622.

I claim—

1. In a device of the class described, a suitably-closed casing or receptacle, a block of insulating material removably located within said receptacle, disks arranged for rotation within said block, shafts passing through said disks to the exterior of the casing, links fixed to the outer ends of said shafts, a plate pivoted to the upper ends of said links, conductor-plates passing through the disks, brushes, the ends of which ride on the peripheries of the disks and are arranged to contact with the conductor-plates, and suitable electrical connections to said brushes.

2. In an improved switch, a suitable casing or receptacle, a block of insulating material removably located in said casing, separable shafts passing through the front wall of said casing and through said block, links fixed upon the outer ends of said shafts, a plate pivoted to the upper ends of said links, disks fixed upon said shafts within the blocks, conductor-plates passing through said disks in such a manner as that their ends appear adjacent each other on the peripheries, spring-actuated segments fixed upon the rear ends of said shafts, hooks for engaging the ends of said segments, vertically-arranged brushes, the lower ends of which ride upon the peripheries of the disks and are adapted to contact with the ends of the conductor-plates, and suitable electrical connections to said brushes.

3. In an improved switch, a suitable casing, a block removably located within said casing,

disks arranged for rotation within said block, conductor-plates located within said disks, brushes arranged within said block and adapted to contact with the ends of said conductor-plates, suitable electrical connections to said brushes, suitable means for rotating said disks so as to throw the conductor-plates in contact with the ends of the brushes, means for holding said disks in their turned positions, and magnet-coils having the proper connections for releasing said disks from their turned positions.

4. In an improved switch, a suitable casing or receptacle, a block of insulating material removably located within said casing, separable shafts journaled in said block, disks fixed upon said shafts within said block, conductor-plates passing through said disks, brushes vertically arranged in the block, the lower ends of which ride upon the peripheries of the disks, suitable electrical connections to said brushes, segments fixed upon the rear ends of the separable shafts, dogs having hooks formed at their forward ends adapted to engage the ends of the segments, magnet-coils arranged above said dogs and having the proper connections made thereto, removable cores for said magnets, and connecting links between said cores and dogs.

5. In an improved switch, a suitable casing or receptacle, a block of insulating material removably located within said casing and having recesses formed in the under side thereof, separable shafts passing transversely through the front wall of the casing and through the block, arms fixed to the outer ends of said shafts, a bar pivoted to the upper ends of said arms, a disk journaled upon each of the pair of separable shafts, conductor-plates located in each of the disks in such a manner as that their ends appear adjacent each other on the peripheries, suitable brush-holders arranged in recesses formed in the top of the block, tension devices for said brush-holders, brushes located in said brush-holders and passing vertically through the block, the lower ends of which ride on the peripheries of said disks, strips of mica arranged between said brushes and riding upon the peripheries of the disks, suitable conductors from the feeder to all of said brushes, and suitable conductors from the trolley-wire or other conductor to the remaining brushes, spring-actuated segments located upon the rear ends of the shafts, hooked dogs for engaging the ends of said segments when the same are partially rotated, magnet-coils arranged above said dogs and having the proper connections made thereto, movable cores for said magnets, and links connecting said magnet-coils and the dogs.

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

JULIUS L. HORNIG.

Witnesses:

MAUD GRIFFIN,
JOHN C. HIGDON.