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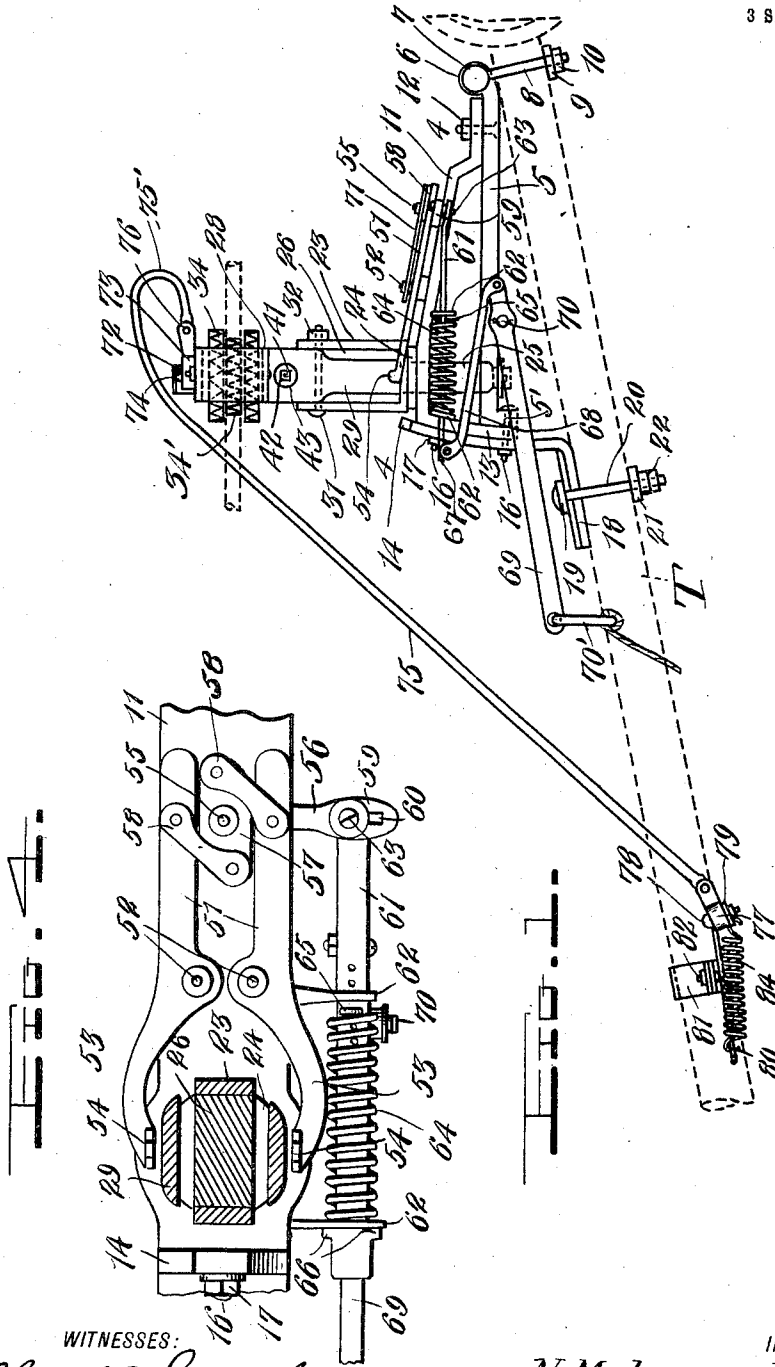
TROLLEY WIRE CLEANING DEVICE.

APPLICATION FILED MAY 6, 1911.

1,030,670.

Patented June 25, 1912.

3 SHEETS—SHEET 1.



WITNESSES:

Chas. L. Grustauer
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INVENTORS

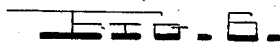
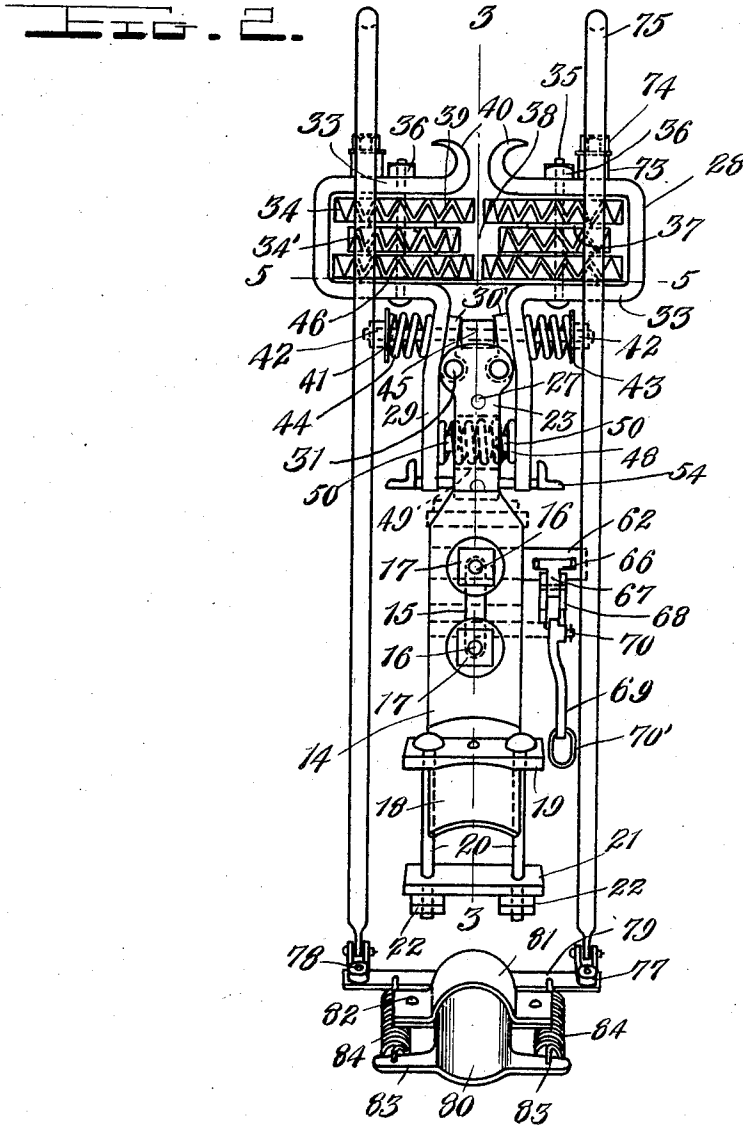
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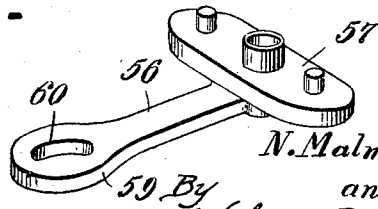
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3 SHEETS-SHEET 2.



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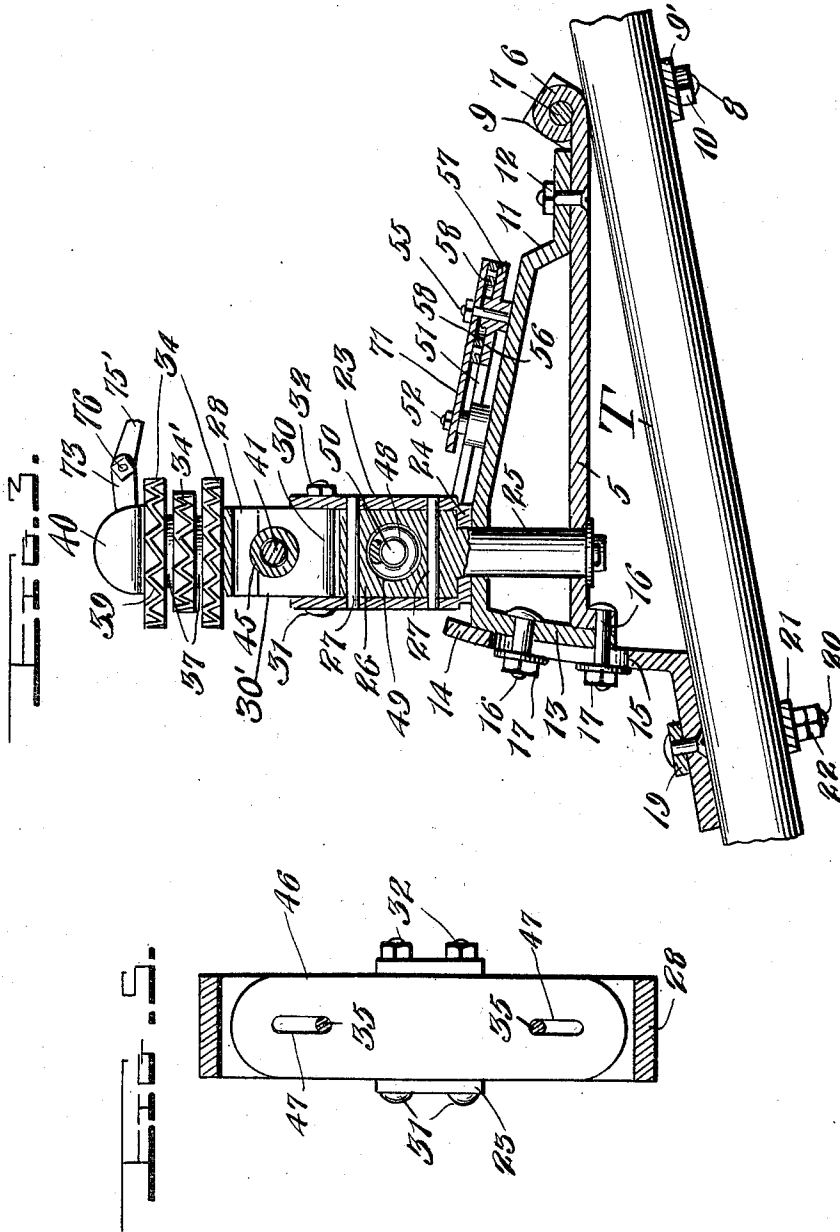
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3 SHEETS-SHEET 3.



Witnesses

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UNITED STATES PATENT OFFICE.

NELS MALMGREN, LUTHER N. TODD, AND SAMUEL J. WATSON, OF CANTON, ILLINOIS.

TROLLEY-WIRE-CLEANING DEVICE.

1,030,670.

Specification of Letters Patent.

Patented June 25, 1912.

Application filed May 6, 1911. Serial No. 625,436.

To all whom it may concern:

Be it known that we, NELS MALMGREN, LUTHER N. TODD, and SAMUEL J. WATSON, citizens of the United States, residing at Canton, in the county of Fulton and State of Illinois, have invented certain new and useful Improvements in Trolley-Wire-Cleaning Devices, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to trolley wire cleaning devices and has for its object to provide a device of this character which will remove sleet and ice from the wire and act as an emergency conductor of the electric current.

Another object of the invention is to provide a plurality of corrugated cleaning wheels, said wheels being arranged in groups or series and adapted to receive the wire between them, and means for yieldingly holding the cleaning wheels in contact with the wire, such means permitting of the passage of the wheels over splices or other protuberances or obstructions, without disengaging the same therefrom.

A further object of the invention is to provide new and novel means for mounting the cleaning wheels so as to permit of their bodily movement on the trolley pole whereby the same retain their positions on the wire when the car is rounding a curve.

Still another object of our invention resides in the provision of simple and efficient mechanism for easily and quickly disengaging the opposed series of cleaning wheels from the wire.

A still further object is to provide a cleaning device of the above described character which may be easily and quickly secured to the trolley pole, and is strong, durable and efficient in practical operation.

With the above and other objects in view, the invention consists of the novel features of construction, combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of our improved wire cleaning device showing the same in operative position on a trolley pole; Fig. 2 is a front elevation of the device re-

moved from the pole; Fig. 3 is a section taken on the line 3—3 of Fig. 2; Fig. 4 is a section taken on the line 4—4 of Fig. 1; Fig. 5 is a detail section taken on the line 5—5 of Fig. 2; and Fig. 6 is a detail perspective view of one of the parts.

Referring in detail to the drawings 5 indicates the body or supporting plate of our improved cleaning device upon which the mechanism is mounted. This plate at one end is provided with a sleeve 6 to receive a bolt 7. Upon this transverse bolt 7, the eye bolts 8 are loosely mounted, a nut 9 being threaded upon one end of the bolt 7 to retain the same in the sleeve 6. When the device is arranged in position upon the trolley pole T as shown in Fig. 1, the bolts 8 extend upon opposite sides of the pole and have arranged upon their lower ends a clamping plate 9' which is forced into clamping engagement with the pole by the nuts 10 threaded on the ends of the bolts 8. A base plate 11 is rigidly fixed at one end to the supporting plate 5 as indicated at 12. This plate extends forwardly and upwardly from its rear end at a slight inclination to the plate 5 as clearly shown in Fig. 1. The forward end of the plate 11 is disposed downwardly at right angles and is slightly curved as indicated at 13. This forward end of the plate 11 is adjustably mounted upon the main current conducting plate 14 which is provided with a longitudinal slot 15 through which the bolts 16 extend, said bolts having suitable nuts 17 threaded upon their ends to rigidly secure the plates 5 and 11 in their adjusted positions, one of the bolts 16 also extending through a flange 5' formed upon the forward end of the plate 5. The lower end of the conducting plate 14 is angularly disposed and of concavo-convex form as shown at 18 for engagement upon the trolley pole, such concavo-convex plate providing an extensive bearing surface and insuring the continuity of the electric current from the trolley wire to the controller of the car. A transverse plate 19 is rigidly secured upon the end 18 of the plate 14 and projects beyond the opposite edges thereof. Bolts 20 are disposed through the ends of this plate and extend upon opposite sides of the trolley pole. A clamping plate 21 is arranged on

the lower ends of these bolts, nuts 22 being threaded on the bolts for engagement with the ends of said plate.

A vertically disposed yoke member 23 is mounted upon the forward end of the plate 11, said member having a bearing plate 24 formed thereon and a pivot stud 25 which is rotatably mounted in the plates 5 and 11. Between the arms of the yoke member 23 a block 26 is arranged and is rigidly secured by means of the bolts 27 which extend through and have their ends fixed in the arms of the yoke. On the upper end of this yoke member and upon opposite sides thereof a U-shaped wheel carrying bar 28 is pivotally mounted, said bars having their lower ends vertically extended as indicated at 29. To the opposed faces of the lower ends 29 of the bars 28 the sleeves 30 are secured and through these sleeves the pivot bolts 31 extend, said bolts being mounted in the upper ends of the arms of the yoke 23 and removably secured therein by means of suitable nuts 32. Between the parallel arms 33 of the members 28, the horizontally disposed cleaning wheels 34 are rotatably mounted upon the vertical bolts 35 which extend through said arms and are removably secured therein by means of the nuts 36. Three of the cleaning wheels are mounted in each of the members 28 and between the opposed faces of said wheels suitable washers 37 are arranged on the bolts 35 to maintain said wheels in spaced relation. It will be observed that the intermediate wheel 34' of each series of cleaning wheels is of less diameter than the other wheels 34, thereby providing a central space 38 between the adjacent peripheral portions of the wheels 34'. In this space the trolley wire is received. Each of the cleaning wheels is of the same form and consists of a radially fluted or corrugated disk or plate, the ends 39 of such corrugations constituting the periphery of the wheels and engaging the trolley wire to cut or scrape the sleet or other accumulations therefrom. The projecting edge portions of the larger cleaning wheels 34 which extend above and below the space 38 prevent the trolley wire from lifting out of said space in the operation of the device. The series of cleaning wheels are, however, capable of bodily movement together with the members 28 in which they are mounted in opposite directions, as will more fully appear from the following description. The extremities of the upper arms 33 of the member 28 are bent or curved in opposite directions as indicated at 40 and are spaced from each other so as to permit of the entrance of the trolley wire.

A bolt 41 is loosely disposed through the upper ends of the vertical portions 29 of the members 28 adjacent to the lower arms 33, said bolt having a nut 42 threaded on each

end thereof. Washer plates 43 are also arranged on the ends of this bolt to provide bearing surfaces for the outer ends of the coiled springs 44, the inner surfaces of which bear against the members 28 above the pivot bolts 31. A collar 45 is loosely disposed upon the intermediate portion of said bolt and with the ends of this collar the sleeve plates 30' engage to limit the inward or closing movement of the members 28. A plate 46 is arranged between the lower cleaning wheels 34 and the lower arms 33 of the members 28, the ends of said plate being provided with longitudinal slots as indicated at 47 through which the vertical bolts 35 extend. The engagement of these bolts with the outer ends of said slots limits the outward movement of the members 28. The lower ends of said members are yieldingly held in spaced relation to the yoke member 23 by means of a coiled spring 48 which extends through an opening 49 in the block 26 and bears at its ends against the opposed faces of the lower end portions 29 of the wheel carrying members. A pin 50 is fixed to each of said members and extends into the opposite ends of the spring 48 to retain the same in position.

Having now described the manner in which the opposed series of cleaning wheels are mounted, we will now proceed to set forth in detail the mechanism whereby the wheel carrying members are actuated to position the cleaning wheels on the trolley wire. This mechanism is substantially as follows. Upon the base plate 11, a pair of presser bars 51 are mounted upon the pivot studs 52 which are fixed in the plate 11. These bars are more clearly illustrated in Fig. 4 of the drawings and at their forward ends beyond their pivotal points they are outwardly curved as indicated at 53 and have the vertically disposed foot plates 54 formed upon their extremities for engagement with the lower end of the vertical portions 29 of the wheel carrying members 28. In the rear end of the plate 11 a pivot stud 55 is rigidly fixed and upon the same the member 56 is mounted. The body portion 57 of this member is in the form of a rectangular block which is disposed between the rear ends of the presser bars 51 and is normally disposed in parallel relation thereto. A link 58 pivotally connects each of the presser bars with one end of the body 57 of the member 56. A transversely projecting arm 59 is integrally formed with the body block 57 and is provided in its outer end with a short longitudinal slot 60. A longitudinally movable bar 61 is supported in the transversely disposed slotted plates 62 which are rigidly secured to the plate 11. The rear end of this bar extends beneath the slotted end of the arm 59 and a pin 63 fixed in said bar has sliding move-

ment in the slot 60. A coiled spring 64 is arranged upon the sliding bar 61, between the supporting plates 62 and one end of said spring engages one of the plates 62, the other end thereof engaging a pin 65 which is adjustable in a series of openings provided in the bar 61 whereby the tension of said spring may be regulated. The forward end of the bar 61 has formed thereon the shoulders 66 which engage the plates 62 and limit the rearward movement of the bar 61. A depending ear 67 is formed on the end of the bar 61 and to this ear the forward ends of a pair of parallel link bars 68 are pivoted, the rear ends of said bars being pivotally connected to the end of an operating lever 69 which is pivotally mounted upon a stud 70 fixed to the under side of the supporting plate 5 and projecting from one side thereof. To the forward end of the lever 69 a link 70' is secured to which a suitable operating cord is adapted to be connected. As thus described, it will be readily seen that when the operating cord is pulled, the lever 69 will be moved upon its pivot, thereby forcing the link bars 68 forwardly and also sliding the bar 61 forwardly in the supporting plates 62. The member 56 is thus moved upon its pivot to force the links 58 in opposite directions and thereby cause the forward ends of the presser bars 51 to move inwardly into contact with the lower ends 29 of the wheel carrying members 28. Continued pull upon the operating cord moves the lower ends of the members 28 inwardly against the tension of the springs 44 and 48 and moves said members upon the pivot bolts 31, thereby causing the upper U-shaped wheel carrying portions of said members to move in opposite directions or away from each other. After the trolley wire has been located in the space 38, the pull upon the operating cord is released so that the wheel carrying members will immediately return to their normal positions, and the spring 64 will also return the presser bars to their former positions out of contact with the lower ends 29 of the members 28. The upper ends of the pivot studs 52 and 55 are threaded and upon the same a cover plate 71 is arranged, said studs receiving suitable nuts to secure the plate thereon. This plate serves as a protection for the connecting links 58 between the bars 51 and prevents ice and sleet from accumulating and preventing the proper operation of the mechanism.

Upon the upper arms 33 of the members 28, the vertical pivot bolts 72 are arranged upon which the swivel eyes 73 are disposed, suitable nuts 74 being threaded on said bolts. To these swivel eyes the rearwardly and forwardly curved upper ends 75' of the rods 75 are pivotally connected as indicated at 76. The parallel rods 75 extend diagonally and downwardly and have their lower ends pivotally connected to the swivel eyes 77 which are mounted upon the stud bolts 78 fixed in the opposite ends of the transverse plate 79 which extends beneath the trolley pole T. This plate is centrally and pivotally mounted upon one end of a T-shaped plate 80. This plate is longitudinally disposed upon the under side of the trolley pole and is of concavo-convex form to closely engage therewith. Clamping plates 81 rigidly secure this T-shaped plate to the pole, the ends of said plates being laterally disposed and rigidly secured together by means of suitable bolts 82. The arms 83 of the plate 80 extend beyond opposite sides of the trolley pole and to the same one end of a pair of springs 84 is connected, the other ends of said springs being connected to the transverse plate 79 upon opposite sides of its pivot point.

By providing the diagonally extending rods 75 and mounting the ends thereof upon the wheel carrying members 28 and connecting the same to the trolley pole in the manner above described, the series of wheels are at all times held in proper engagement with the trolley wire and the pivotally mounted yoke member 23 to which the members 28 are pivoted is caused to rotate when the car rounds a curve, the rods 75 remaining in substantially their normal positions. In this manner liability of the trolley wire forcing the opposed series of wheels apart so that they are disengaged from the wire is overcome. These rods also obviate all liability of the cross wires or supports for the trolley wire catching in the cleaning wheels, said supporting wires riding over the upper curved ends of said rods.

From the foregoing it will be observed that we have provided a device which may be easily and quickly arranged upon the trolley wire and will thoroughly clean the same so that there will be no interruption of the electric current. Upon striking a point where the wire has been spliced or two ends connected, the series of wheels will simply be spread apart sufficiently to allow of the passage of such obstructions, and will immediately close again upon the wire after passing the same. The device is not provided with a view to dispensing with the ordinary trolley wheel but simply as an emergency device which is adapted to be mounted upon the trolley pole to act as a conductor and also remove sleet and other accumulations from the wire.

A cleaning device of the character set forth when constructed in the manner above described is extremely efficient in practical use, may be easily and quickly mounted in its operative position and comprises comparatively few elements which are extremely strong and durable.

While we have shown and described the preferred construction and arrangement of the various parts, it will be understood that the device is susceptible of considerable modification without departing from the essential feature or sacrificing any of the advantages thereof.

Having thus described the invention what is claimed is:—

10 1. In a trolley wire cleaning device, two series of wire cleaning members each consisting of upper and lower members extending over and beneath the trolley wire and engaging therewith and intermediate
15 members disposed between the upper and lower members and engaging upon one side of the wire, each of the members of each series being independently movable on the wire.

20 2. A trolley wire cleaning device comprising a support, two series of cleaning wheels rotatably mounted thereon in opposed relation, and means for moving each of said series of wheels as a unit, the units moving
25 in opposite directions, one wheel of each series being of less diameter than the remaining wheels, said latter wheels being adapted to receive the wire between their opposed peripheral portions and engage the same at
30 opposite points.

3. A trolley wire cleaning device comprising opposed series of wire cleaning members, each of said series consisting of upper and lower corrugated cleaning wheels extending over and beneath the trolley wire and engaging therewith, and intermediate
35 wheels, the latter wheels of the respective series having their peripheries engaged upon opposite sides of the trolley wire, each wheel of each series having rotative movement independently of the remaining wheels of the same series.

4. A trolley wire cleaning device comprising a support, two series of rotatable wheels
45 mounted on said support for bodily movement and arranged in opposed relation, one wheel of each series being of less diameter than the remaining wheels, said latter wheels being disposed in the same plane
50 with the trolley wire in the operative position of the device and engaging said wire on opposite sides thereof, means for holding said series of wheels in engagement with the wire, and means for bodily moving the
55 respective series of wheels in opposite directions to disengage the same from the wire.

5. A trolley wire cleaning device comprising two series of cleaning wheels arranged in opposed relation, each of said series consisting of upper and lower wheels having
60 their opposed faces corrugated, the corresponding wheels of the respective series having their corrugated faces engaged with the wire, and an intermediate wheel arranged between the upper and lower wheels of the

respective series, the peripheries of said intermediate wheels being corrugated and engaging opposite sides of the trolley wire, each of the wheels in each series being rotatable independently of the remaining wheels of said series. 70

6. A trolley wire cleaning device comprising a support adapted to be removably secured on a trolley pole, opposed series of corrugated cleaning wheels rotatably mounted upon said support, each of said series of wheels being bodily movable on the support, one wheel of each series being of less diameter than the remaining wheels to provide a space between their opposed peripheral portions in which the trolley wire is adapted to be received, means yieldingly holding said series of wheels in engagement with the wire, and spring controlled means mounted on the support to move the respective wheel series in opposite directions and disengage the same from the trolley wire. 75 80 85

7. A trolley wire cleaning device comprising a support adapted to be removably and adjustably mounted upon a trolley pole, a vertically disposed yoke member rotatably mounted on the support, wheel carrying members pivotally mounted between the arms of said yoke member, a series of cleaning wheels mounted in each of said carrying members, means yieldingly holding said members against pivotal movement to retain the wheels in engagement with the trolley wire, and additional means mounted on the support to engage and move said wheel carrying members in opposite directions to disengage the wheels from the trolley wire. 90 95 100

8. A trolley wire cleaning device comprising a support adapted to be removably secured to a trolley pole, said support including a base pivotally fixed to the pole at one end, a conducting plate rigidly secured to the pole and having a vertically extending slotted portion, said base being adjustable at its free end upon the slotted portion of said plate, two series of cleaning wheels mounted upon said base for movement as a unit with relation thereto, each of the wheels having independent rotary movement, each series of wheels having movement independent of the other series, means yieldingly holding the series of wheels in engagement with the trolley wire, and additional means mounted on the base to move the respective series of wheels in opposite directions to disengage the same from the wire. 105 110 115 120

9. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, opposed wheel carrying members pivotally mounted upon said support for movement in opposite directions and rotatable as a unit thereon, said members being normally disposed in a plane transverse 125 130

to the trolley wire, a series of wheels rotatably mounted in each of said members, the intermediate wheel of each series being of less diameter than the remaining wheels for engagement upon opposite sides of a trolley wire, means yieldingly holding said wheel carrying members against rotative movement on the support, means yieldingly retaining the cleaning wheels in contact with the wire, and additional means mounted on the support to move the pivotally mounted members in opposite directions and disengage the wheels from the wire.

10. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, a vertically disposed yoke member rotatably mounted upon the support, opposed transversely disposed wheel carrying members pivotally mounted between the arms of the yoke member for movement in a transverse plane with relation to the trolley wire, a plurality of cleaning wheels rotatably mounted in each of said members to engage upon opposite sides and above and below the wire, means yieldingly holding said yoke member against rotation, and means mounted upon the support to move the wheel carrying members in opposite directions and disengage the wheels from the trolley wire.

11. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, a pair of opposed wheel carrying members rotatably mounted on said support and pivotally movable in a plane transverse to the trolley wire, means yieldingly holding said members against rotation, a plurality of corrugated cleaning wheels rotatably mounted in each of said members, corresponding wheels of said series being of less diameter than the remaining wheels and adapted to receive the trolley wire between them, and means mounted upon the support to move the wheel carrying members in opposite directions and disengage the cleaning wheels from the trolley wire.

12. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, a pair of opposed wheel carrying members rotatably mounted on said support and pivotally movable in a plane transverse to the trolley wire, means yieldingly holding said members against rotation, a plurality of corrugated cleaning wheels rotatably mounted in each of said members, corresponding wheels of said series being of less diameter than the remaining wheels and adapted to receive the trolley wire between them, means mounted on said wheel carrying members normally acting to yieldingly retain the wheels in engagement with the trolley wire, and means mounted upon the support to move the wheel carrying members in opposite direc-

tions and disengage the cleaning wheels from the trolley wire.

13. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, a vertically disposed yoke member rotatably mounted on said support, wheel carrying members pivotally mounted in the arms of said yoke member for movement in a plane transverse to the trolley wire, opposed series of cleaning wheels rotatably mounted in said members, a spring arranged between the lower ends of said members to normally retain the wheels in engagement with the trolley wire, means for yieldingly holding said yoke members against rotation, and spring controlled means movably mounted on the support to engage said wheel carrying members and move the same in opposite directions to disengage the cleaning wheels from the trolley wire.

14. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, a pair of opposed wheel carrying members pivotally mounted upon the support for movement in a plane transverse to the trolley wire, a corrugated cleaning wheel rotatably mounted in each of said members for engagement upon opposite sides of the trolley wire, means yieldingly holding said members against pivotal movement to retain the wheels in contact with the wire, a pair of presser bars pivotally mounted on the support, and means for moving said bars upon the support to engage said wheel carrying members and move the same in opposite directions to disengage the cleaning wheels from the trolley wire.

15. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, opposed wheel carrying members pivotally mounted on said support for movement in a plane transverse to the trolley wire, a corrugated cleaning wheel rotatably mounted in each of said members for engagement with the wire, a bolt loosely disposed through said members, springs arranged on said bolt to yieldingly hold said members against pivotal movement, a pair of presser bars pivotally mounted upon the support, means movably mounted upon the support and connected to said presser bars to move the same in opposite directions and engage the bars with said wheel carrying members, and spring controlled means to actuate said last named means to disengage the cleaning wheels from the trolley wire.

16. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, opposed wheel carrying members pivotally mounted on said support for movement in a plane transverse to the trolley wire, a plurality of cleaning wheels rotatably mounted in each of said members

for engagement on opposite sides of the trolley wire, means to yieldingly hold said wheels in contact with the wire, a pair of presser bars pivotally mounted on the support, an operating element pivotally mounted on the support between said bars, links connecting said bars and the operating elements, and spring controlled means for actuating said operating elements to engage the presser bars with said wheel carrying members and move the same in opposite directions to disengage the cleaning wheels from the trolley wire.

17. A trolley wire cleaning device comprising a support adapted to be secured to a trolley pole, a yoke member rotatably mounted on said support, opposed wheel carrying members pivotally mounted on the yoke member for movement in a plane transverse to the trolley wire, a plurality of cleaning wheels rotatably mounted in each of said members to engage on opposite sides of the trolley wire, means yieldingly holding said members against pivotal movement to retain the wheels in contact with the wire, presser bars pivotally mounted upon said support, an operating element movable upon said support and connected to said presser bars, a longitudinally slidable bar mounted on the support, a slot and pin connection between one end of said bar and the operating element, a spring yieldingly holding said bar against sliding movement, and means mounted upon the support and connected to said bar to slide the same and engage said presser bars with the wheel carrying members to move said members in opposite directions and disengage the cleaning wheels from the trolley wire.

18. A trolley wire cleaning device comprising a support adapted to be removably mounted upon a trolley pole, opposed wheel carrying members pivotally mounted on the support for movement in a plane transverse to the trolley wire, a plurality of independently rotatable cleaning wheels mounted in each of said members, means yieldingly holding the members against pivotal movement to retain the wheels in contact with the wire, presser bars mounted on the support, an operating element movably mounted on the support between the presser bars, connections between said bars and said operating element, said operating element having a transversely disposed arm, a spring pressed bar slidably mounted on the support and movably connected at one end to said arm, an operating lever pivoted at one end on the support, and link bars connecting said lever with the other end of said sliding bar, the sliding movement of said bar actuating said operating element to engage the presser bars of the wheel carrying members

and move the same in opposite directions to disengage the cleaning wheels from the trolley wire.

19. A trolley wire cleaning device comprising a support adapted to be pivotally and removably attached at one of its ends to a trolley pole, means arranged upon the trolley pole to which the other end of said support is adjustably connected, a member rotatably mounted on said support, opposed wheel carrying members pivotally mounted upon said rotatable member for bodily movement therewith, a corrugated wire cleaning wheel rotatably mounted in each of said members, means normally holding said members yieldingly against pivotal movement, means connecting said members and limiting their pivotal movement in one direction, and additional means for overcoming the action of said holding means and forcing said members in opposite directions to disengage the cleaning wheels from the wire.

20. The combination with a trolley wire cleaning device rotatably and removably secured upon a trolley pole, of a transverse plate pivotally mounted intermediate of its ends upon the trolley pole and spaced from said cleaning device, diagonal rods pivotally connected at their lower ends to the respective ends of said plate and at their upper ends to said cleaning device, and springs connected to the ends of said plate to yieldingly hold said cleaning device against rotative movement.

21. The combination with a trolley wire cleaning device adapted to be removably secured to a trolley pole and having rotative movement thereon, of a longitudinal plate rigidly secured to the trolley pole in spaced relation to the cleaning device, a transverse plate pivotally mounted intermediate of its ends upon said longitudinal plate, diagonal rods pivotally connected at their lower ends to the ends of the transverse plate, the upper ends of said rods extending above the cleaning device and being bent upon themselves and pivotally connected to said device at its upper end, and coiled springs connected to said transverse plate and to the longitudinal plate to yieldingly hold said wire cleaning device against rotative movement upon the pole.

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

NELS MALMGREN.
LUTHER N. TODD.
SAMUEL J. WATSON.

Witnesses:

ALYCE BRICKER,
CHAS. E. WEED.