

adapted to be swung to substantially a horizontal position to lie in a plane with the bottom of the ash-pit for the purpose set forth.

5 6. In a range, the combination of a base comprising an end-sill formed in its top with a recess extending the greater portion of the length thereof, an ash-pit having its bottom disposed above the bottom of the recess and  
10 formed at its adjacent edge-portion with a horizontal channel U-shaped in cross-section and lying in the recess, and a drop-door having a suitable hinged connection and formed at its hinged end with a bearing  
15 seated in the said channel and shaped correspondingly therewith as set forth.

7. In a range the combination of a base comprising side- and end-sills and a plate mounted upon the sills, one end-sill formed  
20 in the top with a recess extending the greater portion of its length, the base-plate having the adjacent end-portion depressed and forming the bottom of the ash-pit, and terminating in a downward deflection dis-  
25 posed in the recess of said end-sill, and provided with sockets at opposite ends thereof, and a drop-door seated on the deflected portion of the ash-pit bottom and formed with trunnions by which it is hinged in the said  
30 sockets as set forth.

8. In a range, the combination of a base, a plate mounted on the base and having one end portion depressed and constituting the bottom of the ash-pit, the range-body com-  
35 prising side-walls and an end-frame suitably united and supported upon the base-plate, said end frame being formed at its upper portion with a transverse bar provided with a jamb, and a drop-door hinged at the jun-  
40 tion of the bottom of the ash-pit and frame and having its free edge adapted to engage said jamb when the door is in closed position as set forth.

9. In a range, the combination of a base, a  
45 plate mounted upon the base, and the range-

body supported upon the plate and composed of side-walls and an end-frame, said base-plate having a depressed end portion forming the bottom of the ash-pit, the end-frame comprising a pair of standards formed  
50 with downward extensions terminating at the front edge of the base plate, and a drop-door formed with a pair of trunnions by which it is hinged between the standard extensions and base-plate as set forth. 55

10. In a range, the combination of a base comprising side and end-sills, one end-sill being formed in its top with a recess extending the greater portion of the length thereof, a plate mounted upon said sills and having  
60 one end portion depressed and forming the bottom of the ash-pit, said depressed portion terminating in a channel extending throughout the length of the recess and the said channel disposed below the plane of the bot-  
65 tom of the ash-pit, the range-body supported upon the base plate and comprising side-walls and an end-frame, the end-frame composed of standards formed with downward ex-  
70 tensions terminating at the channel, the adjacent portions of the extensions and channel being correspondingly shaped to produce sockets, and a drop-door seated in the chan-  
nel and formed at opposite sides with trunnions by which it is hinged in the said sockets  
75 as set forth.

11. In a range, the combination with the body having one end consisting of an upright frame composed of standards provided at their lower ends with sockets, one of the  
80 standards formed with a longitudinal groove leading to the socket thereof, of a detachable drop-door formed with a pair of trunnions inserted into said sockets, one of the said trunnions being adapted to pass through the  
85 groove for the purpose set forth.

WILLIAM REID.

Witnesses:

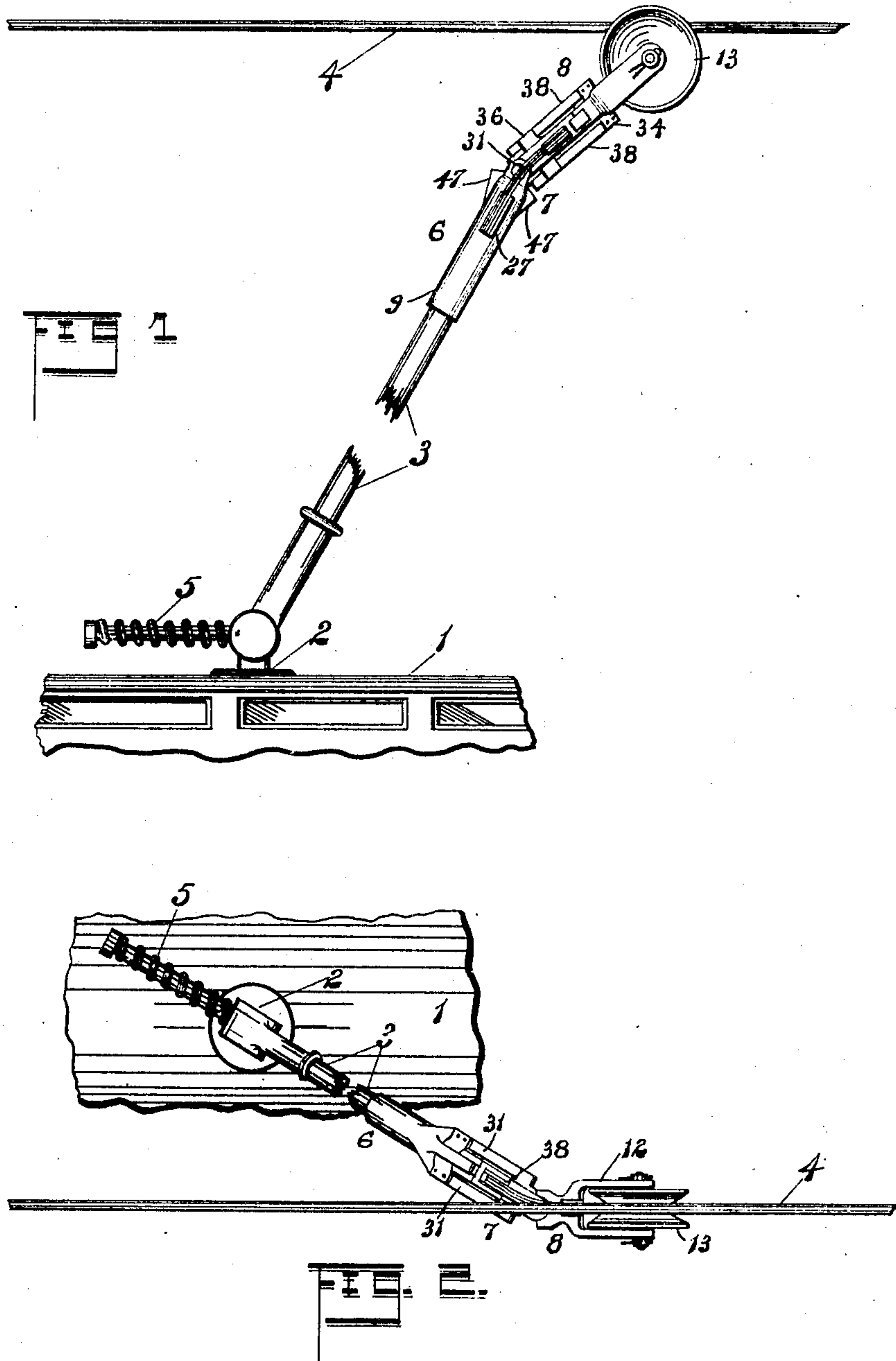
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No. 871,442.

PATENTED NOV. 19, 1907.

R. P. REVER.  
TROLLEY POLE ATTACHMENT.  
APPLICATION FILED NOV. 26, 1906.

3 SHEETS—SHEET 1.



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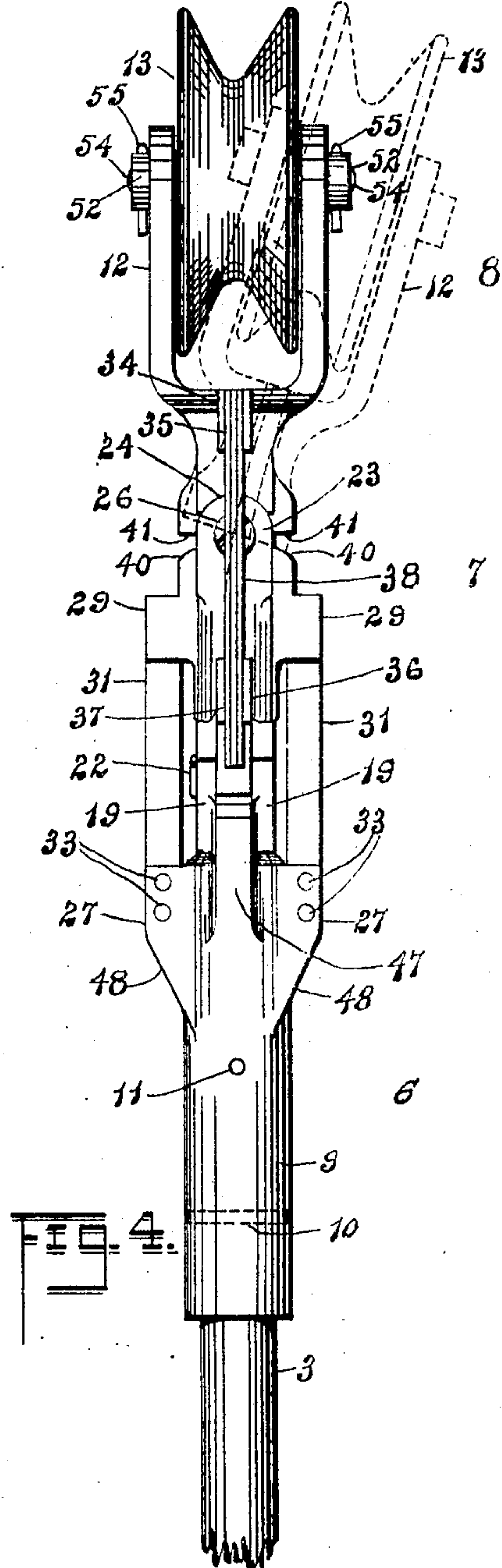
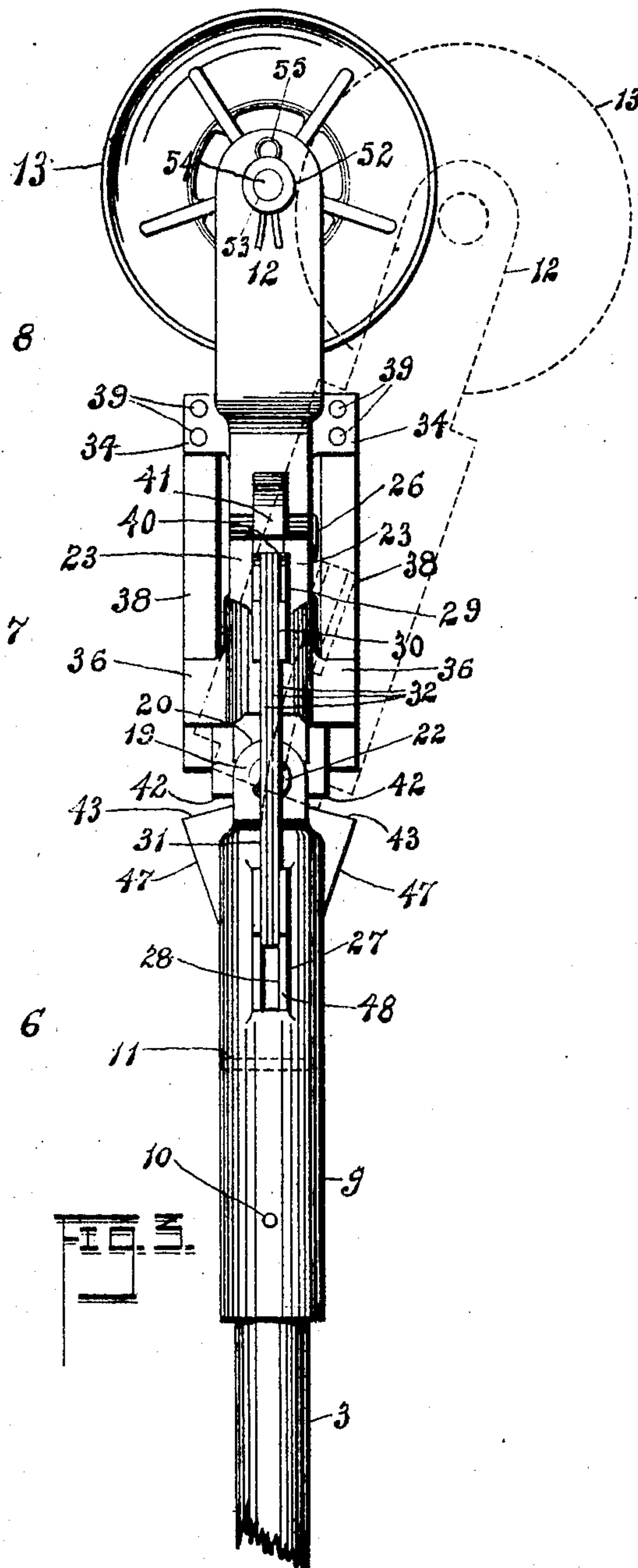


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3 SHEETS—SHEET 2.



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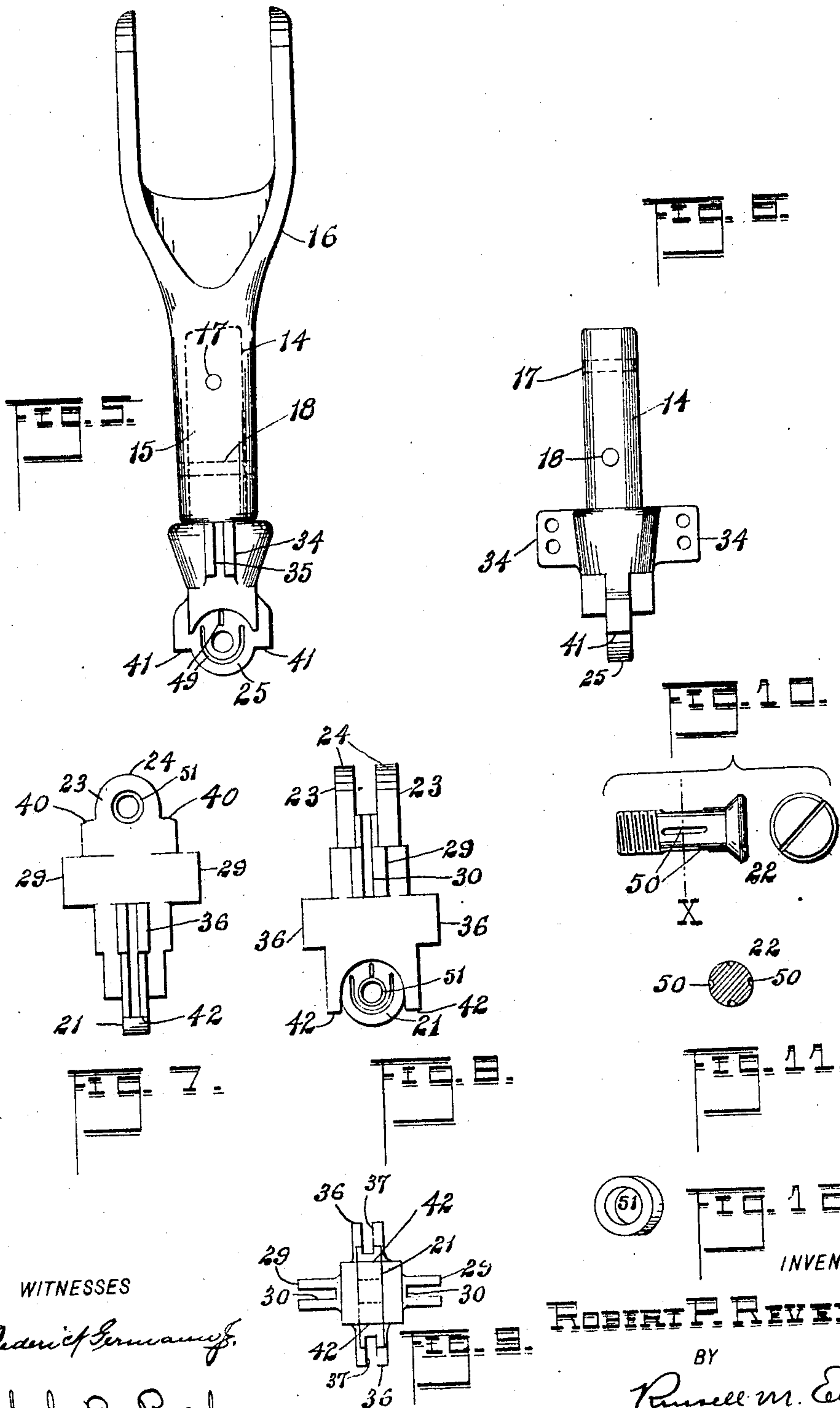
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

ROBERT P. REVER, OF NEWARK, NEW JERSEY, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF TWO-FIFTHS TO EVERETT IRVING REVER, OF NEWARK, NEW JERSEY, AND ONE-FIFTH TO FRANCIS VAN WINKLE, OF BROOKLYN, NEW YORK.

## TROLLEY-POLE ATTACHMENT.

No. 871,442.

Specification of Letters Patent.

Patented Nov. 19, 1907.

Application filed November 26, 1906. Serial No. 345,001.

*To all whom it may concern:*

Be it known that I, ROBERT P. REVER, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Trolley-Pole Attachments, of which the following is a specification.

This invention relates to certain improvements in that class of trolley poles represented by the one shown in my prior patent, No. 820,440, issued May 15, 1906, the objects of the present improvements being to avoid the use of collars and secure an improved mounting of the springs; to save labor and expense, and to obtain a free effectual action of said springs; to provide suitable stops to limit the bending of the joints and means for preventing the device catching upon overhead wires; to secure a more practical construction both in manufacture and operation; to subserve the same general objects as set forth in the prior patent above referred to and enable the trolley wheel to always stand in a position parallel with the direction of the wire, even under abnormal conditions; to thus obviate any tendency on the part of the trolley wheel to leave the wire; to enable the tension upon the trolley pole and pressure of the trolley wheel against the wire to be decreased thus lessening wear upon all said parts; to adapt the device to trolley poles already in use, and to obtain other advantages and results as may be brought out in the following description:

Referring to the accompanying drawings, in which like numerals of reference indicate corresponding parts in each of the several drawings, Figure 1 is a side elevation of the upper portion of a trolley car, its trolley pole and the overhead wire, showing my improved attachment as it appears in use, and Fig. 2 is a plan of the overhead wire, trolley pole and portion of the car top illustrating the sidewise yielding of my attachment to permit the trolley wheel to remain perfectly parallel with the wire, even though the car and pole be out of alinement with said wire; Fig. 3 is a view of my attachment in side elevation, looking against the side of the trolley wheel, and Fig. 4 is an-

other view of the attachment from a position at right angles to the view point in Fig. 3, or looking edgewise at the trolley wheel; Fig. 55 5 is a side view of a form of the upper member of my attachment which is adapted to be connected to, and employed with, the trolley wheel harps which are now already in use, and Fig. 6 is another view of the same at right angles to the first, and detached from the harp; Figs. 7 and 8 are side views taken at right angles to each other, of the middle member of my attachment, and Fig. 9 is an end view of the same; Fig. 65 10 shows in side and end view, a certain pivotal screw which connects the members of my attachment, and Fig. 11 is a cross section of the said screw on line *x*, Fig. 10; Fig. 12 illustrates a certain bushing for my 70 improved device.

In said drawings, 1 indicates a portion of the roof or top of a trolley car having pivotally mounted thereon, as at 2, a trolley pole 3, said pole being adapted to be held upward 75 against the overhead wire 4 by means of the usual spring 5 near its point of mounting on the car body.

My improved attachment consists of lower, middle and upper members, 6, 7, and 8, respectively, the said lower member 6 being 80 socketed at its lower end 9 to slip telescopically upon the end of the trolley pole 3, and be secured thereto as by cross pins or rivets 10, 11. The middle member 7 is hinged to 85 the lower member to swing or bend in a vertical plane with respect thereto, and the upper member 8 is in turn hinged to the middle member to bend or swing laterally or in a direction at right angles to the lower bending. This upper member 8 preferably has 90 formed integral with itself, a harp 12 to receive the trolley wheel 13, although under some conditions I may form at the upper end of the member a shank 14, as shown in Figs. 95 5 and 6, which is adapted to enter the lower tubular part 15 of the trolley wheel harp 16, now in common use, and be pinned thereto as at 17, 18. This enables my improved attachment to be utilized in connection with 100 trolley wheel harps which are already used, and avoids the expense and waste of throwing them away.

The lower member 6 is at its upper end



provided with flattened parallel tongues 19, 19 rounded at their extremities 20, and adapted to receive between themselves the correspondingly shaped single tongue 21 of the middle section. A pivotal pin or screw 22 is then put through the said overlapping tongues, so that a hinge action or swinging may thus occur. The upper end of the middle section is similarly provided with parallel tongues 23, 23 rounded at their tops 24 and adapted to receive between themselves the correspondingly shaped single tongue 25 of the upper or harp member, a transverse pivotal screw 26 uniting the said parts. It will be understood that the plane of the tongues 23 and 25 connecting the middle and top members is at right angles to the plane of the tongues connecting the middle and bottom members, or transverse with respect to the trolley wheel.

At opposite sides of the lower member 6, near its upper end and in a plane at right angles to the pivotal tongues 19, 19, are projections or bosses 27, 27, which are slotted radially inward from their outer edges, as at 28. The middle member 7 is provided near its upper end with bosses 29, 29, similar to those 27 just described and in alinement with the same, said bosses 29 being also radially slotted, as at 30. Leaf springs 31 are then inserted in the alined slots of the projections 27, 29, and on both sides of the intermediate joint, so that they tend to hold the said joint in straight or extended position. Preferably each spring consists of several thin springs 32 laid flatwise together, and said springs are secured only in the projection 27 of the lower member, as by transverse rivets 33, 33; this leaves the upper ends of the springs free to slide in their slotted seats without at the same time any possibility of escaping.

The upper member 8 is provided adjacent to its lower end and on opposite sides in a plane perpendicular to its tongue 25, with bosses or projections 34, which are slotted longitudinally, as at 35. The middle section 7 then has near its lower end integral lateral projections 36 in alinement with those 34, just described, and similarly slotted, as at 37. Leaf springs 38 similar to those already described are then arranged in said slotted bosses of the upper and middle members and held as by rivets 39, 39 in the upper member, being free to slide in the middle member. This last described set of springs, it will be understood, lies in a plane perpendicular to that of the springs first described, and performs exactly the same function with regard to the upper hinged joint of my attachment, as the first described springs do for the lower joint.

It will be noted that the slotted projections or bosses which receive the leaf springs can be cast integral with the members, and that

since their slots open radially outward, the springs are very readily and conveniently inserted, as well as labor and expense saved in manufacture. Furthermore by locating the slotted projections 36 for the upper springs near the lower end of the middle section, and the slotted projections 29 for the lower springs near the upper end of the middle section, obviously a saving of longitudinal space is secured in that the two sets of springs overlap, and the middle section or member 7 can be made shorter than would otherwise be possible. Again, this extreme end location of the slotted spring projections on the middle section enables them to be utilized at their ends next the joint to form stops to limit bending; that is, the upper slotted spring projections 29, 29 form at their extremities shoulders 40, 40, each of which is adapted to engage a cooperating shoulder 41 on the upper member 8 to limit hinge action. In the same way the slotted spring bosses 36, 36 at the lower end of the middle section, form shoulders 42, 42, each of which engages a stop 43 on the lower member 6.

Preferably the said stops 43, 43 on the lower member are extended radially outward and then sloped or inclined backward or downward at their outer edges to form guides 47 which will serve to carry a wire past the lower projecting ends of the springs 31, 31 in case the trolley pole should leave the overhead wire and strike against cross wires or the like. The slotted bosses 27, 27 upon the lower member 6 are correspondingly beveled at their lower ends, as at 48, and thus there are no sharp projections or corners upon my attachment to catch upon, or become entangled with, overhead wires should the trolley by any inadvertence or accident leave its wire, and the pole fly upward.

By my improved construction, however, the trolley is not likely to leave its wire, since the springs and joints will yield to compensate for considerable lateral and vertical deflection of the pole or car. Less spring pressure of the trolley wheel against its overhead wire is therefore required, and should the wheel escape there is less force to do damage among the overhead appliances.

Preferably the adjacent faces of the hinged tongues of the various members are provided with grooves 49 to receive graphite or similar lubricator, and the pivotal pins extending through said tongues have similar grooves for a like purpose. Furthermore, the bearings for said pins are preferably in case-hardened bushings 51, inserted in the tongues of the members, instead of directly in the tongues themselves, as shown in Figs. 8 and 12.

In my improved construction, the arms of the harp between which the trolley wheel is received, are preferably provided on the outer sides of their ends or extremities with