

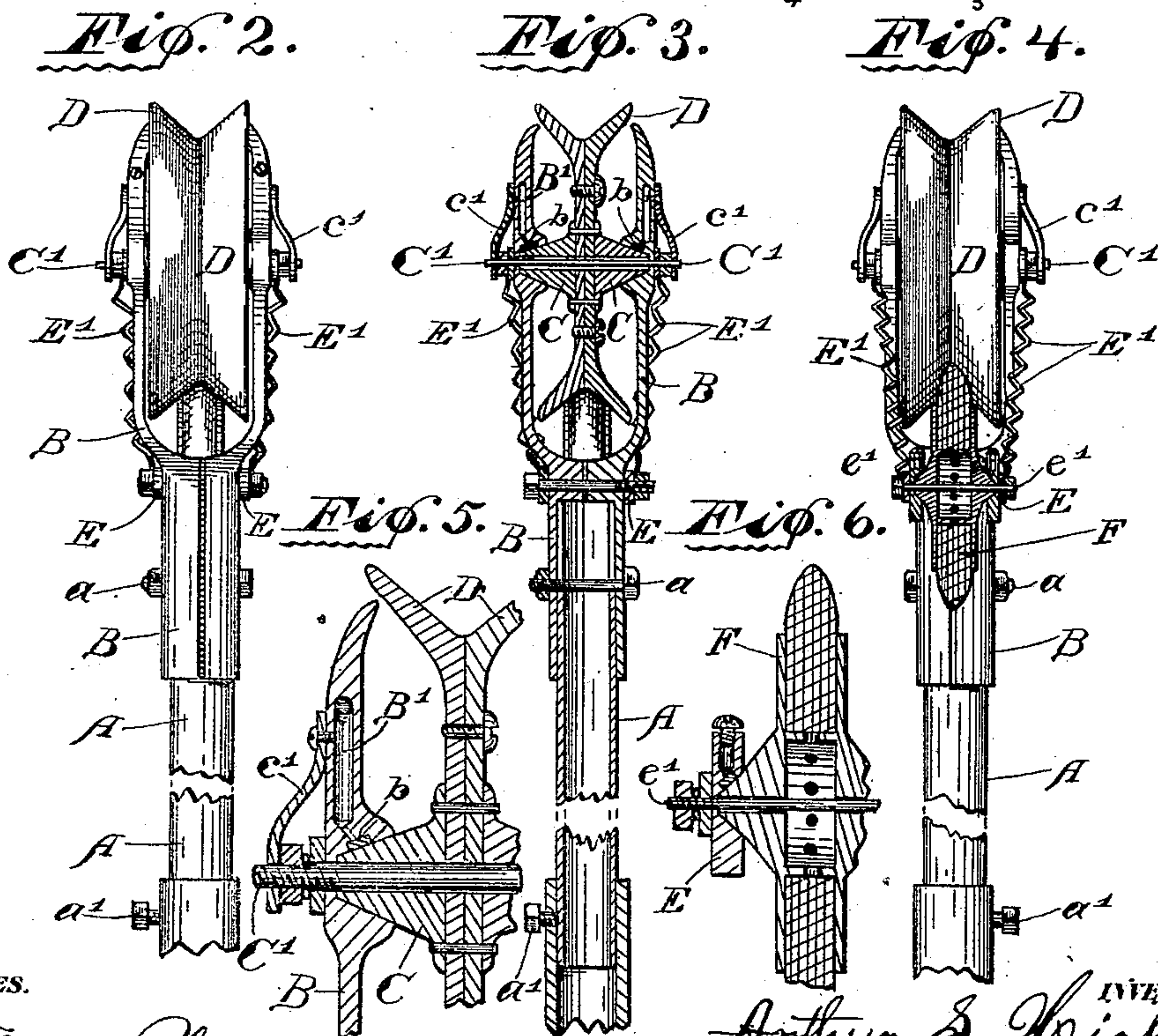
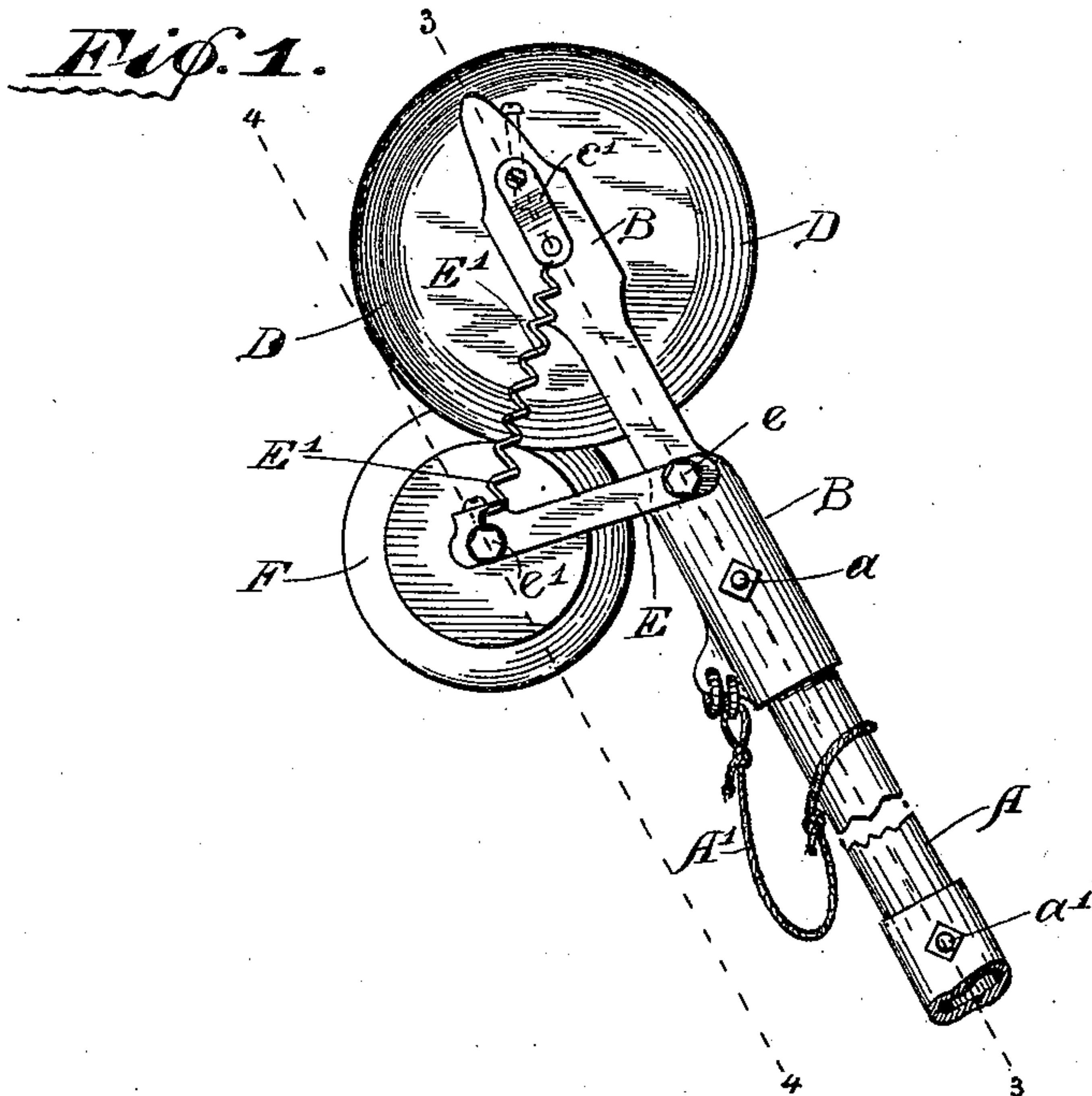
(No Model.)

2 Sheets—Sheet 1.

A. S. HICKLEY.  
TROLLEY FOR ELECTRIC RAILWAYS.





No. 450,153.

Patented Apr. 14, 1891.



**WITNESSES.**

F. Dean Rhodes.  
James A. Walsh.

74    INVENTOR.  
Arthur S. Hickley,  
per  C. & E. W. Bradford,  
ATTORNEYS.

(No Model.)

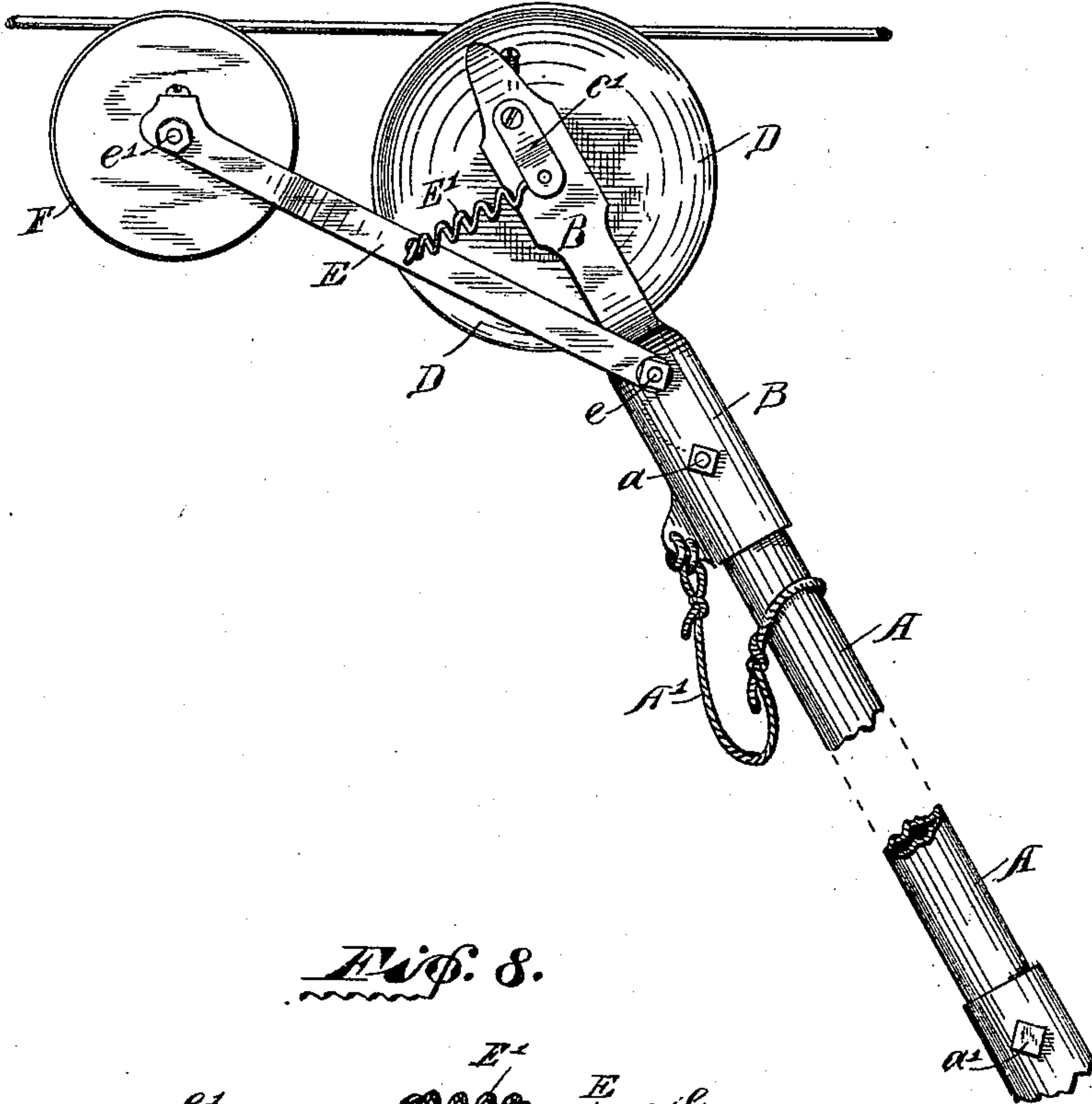
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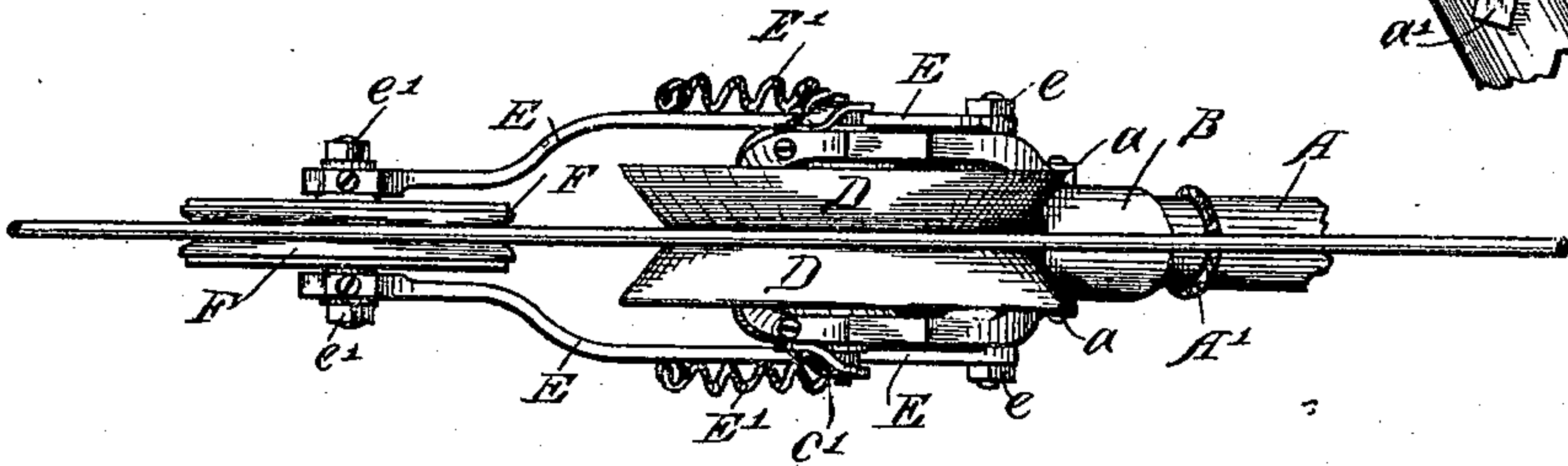
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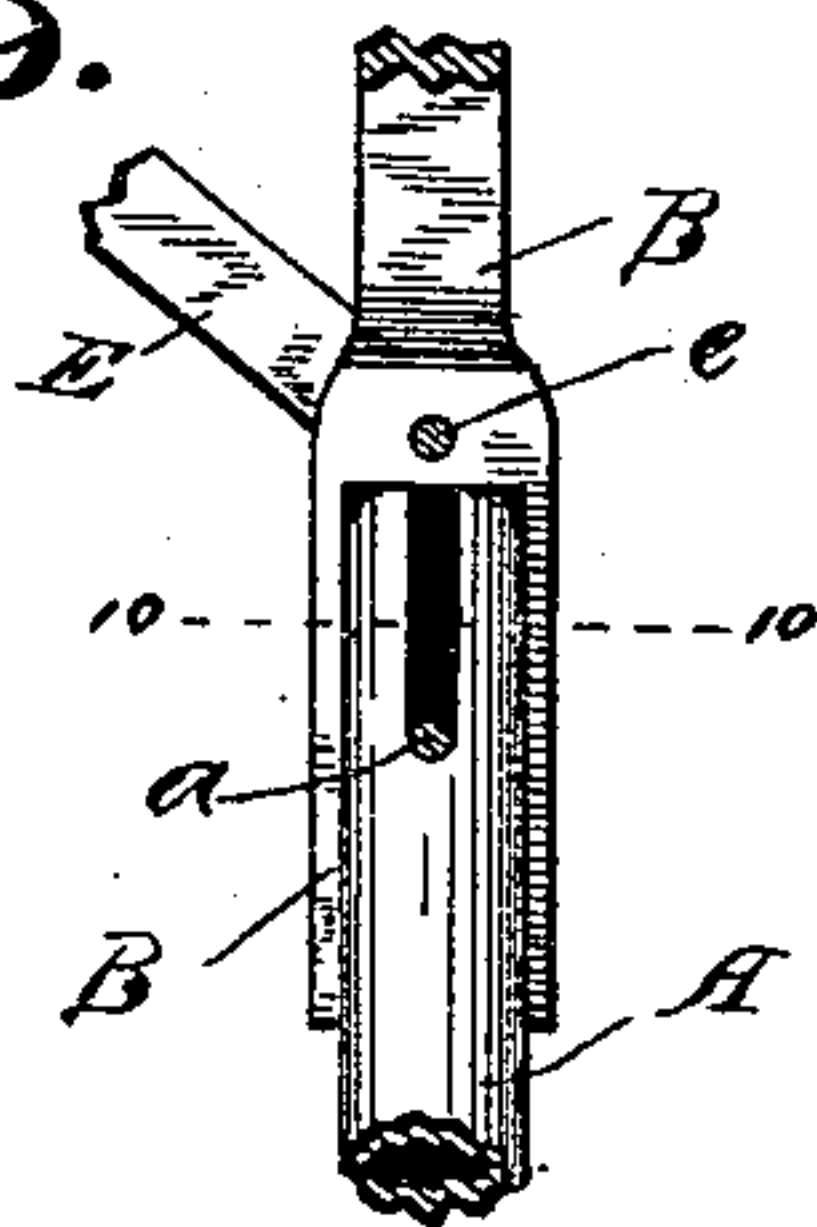
*Fig. 7.*



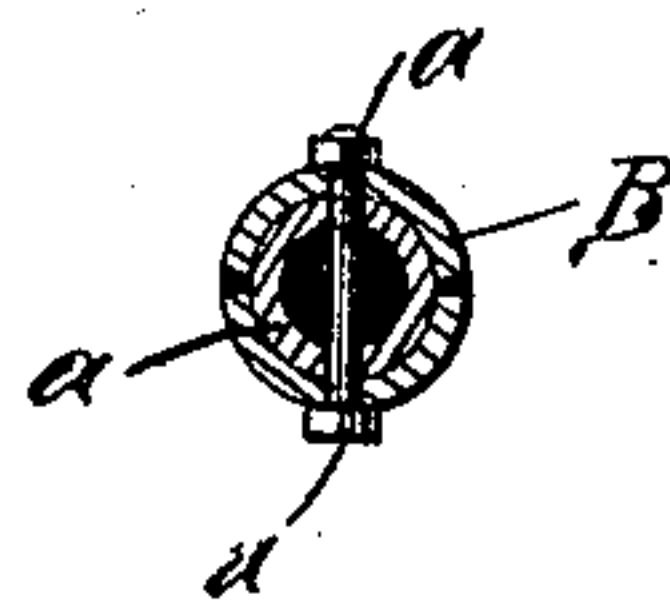
*Fig. 8.*



*Fig. 9.*



*Fig. 10.*



WITNESSES.

H. Dean Rhodes,  
L. E. Tallentire.

PER

Arthur S. Hickley, INVENTOR.  
C. E. W. Bradford, ATTORNEYS.



# UNITED STATES PATENT OFFICE.

ARTHUR S. HICKLEY, OF RICHMOND, ASSIGNOR OF ONE-HALF TO JOHN C. SHAFFER, OF INDIANAPOLIS, INDIANA.

## TROLLEY FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 450,153, dated April 14, 1891.

Application filed April 14, 1890. Serial No. 347,872. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR S. HICKLEY, a subject of the Queen of Great Britain, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Trolleys for Electric Railways, of which the following is a specification.

My said invention relates to that class of devices for conveying the electric current from the line-wire to the motor on a moving vehicle, known as "trolleys for electric railways."

Said invention consists in so constructing such devices that in case of encountering an obstruction they may be separated from the supporting arm or rod without breaking.

It further consists in providing means whereby when said devices are so separated they will be secured from loss or falling into the road or street.

It further consists in providing, in combination with such trolleys, lubricating devices for the wheel and wire.

It further consists in the construction and arrangement of parts of the device, all as will be hereinafter more particularly described and claimed.

Referring to the accompanying drawings, which are made a part hereof, and upon which similar letters of reference indicate similar parts, Figure 1 is a side elevation of a trolley and accompanying devices embodying my said invention; Fig. 2, an edge elevation of the same; Fig. 3, a central vertical sectional view, looking toward the right from the dotted line 3 3 in Fig. 1; Fig. 4, a similar view, looking toward the left from the dotted line 4 4 in Fig. 1; Fig. 5, a detail view similar to a portion of Fig. 3 on an enlarged scale; Fig. 6, a view similar to a portion of Fig. 4, also on an enlarged scale; Fig. 7, a view similar to Fig. 1, illustrating a construction wherein the lubricating-wheel comes in contact with the wire instead of with the trolley-wheel; Fig. 8, a top or plan view thereof; Fig. 9, a fragmentary elevation of the upper end of the arm A with one-half of the head carrying the trolley-wheel removed; and Fig. 10, a horizontal sectional view, looking downwardly from the dotted line 10 10 in Fig. 9.

In said drawings the portions marked A

represent the arm upon which the trolley is mounted; B, a bifurcated head on said arm in which the spindles to the trolley-wheel are directly mounted; C, said spindles; D, said trolley-wheel; E, arms pivoted to said bifurcated head, and F a lubricating-wheel mounted in said arms E.

The trolley-carrying arm A is or may be, generally speaking, of any ordinary or desired construction. As the method of attaching it to the car and the construction of the lower end are no part of my present invention, they will not be shown or described herein. Its upper end is slitted, as shown most plainly in Fig. 3, and through this slit the bolt *a* passes, which prevents the head from turning thereon. At a point near the lower end the trolley-carrying arm is divided and the two parts are united in "telescope" fashion and held together by suitable means, preferably a set-screw or set-screws *a'*. This is so that the arm can be adjusted when desired, both longitudinally, which is not often necessary, and axially, which frequently becomes necessary because of a slight twisting or bending of some of the parts in use.

The bifurcated head B is socketed at the lower end and fits over the upper end of the trolley-carrying arm A. Its weight and the slight friction between the parts keep it in position upon said arm during the ordinary use of the device, but when an extraordinary strain comes, such as might be occasioned by an obstruction on the wire or an encounter with any broken or disarranged parts, said head will be drawn off said arm without injuring any of the parts to the manifest advantage of the structure. The bolt *a*, as before indicated, simply keeps the head from turning on the arm. The head B is further secured to the arm A by a cord *A'*, as shown most plainly in Fig. 1, and thus, when said head has been separated from the normal attachment to the upper end of the arm and has fallen from the wire, it will be prevented from falling into the street and from becoming broken or lost by said cord *A'*, and when the breakage is repaired or obstruction removed the head can thus be easily recovered and replaced in position. The arms of said head, which extend up alongside the trolley-wheel, incline inwardly under the flange of



said wheel, as shown most plainly in Fig. 3. By this means the line-wire is prevented from catching on said arms, as will be readily understood.

5 The spindles C are conical in form, as shown most plainly in Figs. 3 and 5, and may be formed either integrally with the trolley-wheel or separately therefrom and afterward secured thereto by small rivets or bolts, as  
10 shown in said figures. The ends of these spindles rest in suitable bearings in the two forks of the bifurcated head B. A hole extends through the entire structure, and a bolt C' passes through said holes and preferably  
15 has nuts upon both ends. By means of these nuts the two halves of the bifurcated head can be drawn more closely together as the bearings wear away, and thus all looseness in said bearings prevented. Springs c' hold  
20 said nuts securely in place. Inside said bearings are preferably small pieces of felt or other suitable absorbent material b, and above said pieces of absorbent material are cham-  
25 bers B, containing a lubricant, from which chambers small orifices lead to said pieces of absorbent material. By this means the bearings are continually effectually lubricated, and by suitable adjustment of the parts the supply of the lubricant is not at any time  
30 excessive.

The trolley-wheel D, I prefer to make in two parts and secure them together, as shown most plainly in Fig. 3; but it may obviously be cast all in one piece, if desired, or in piece  
35 with the conical bearings C. In itself, as a whole, in general form and function, it is not dissimilar to many trolley-wheels already well known.

The arms E are secured to the head B by  
40 a bolt e, which passes through one end of said arms and the stem of said head, above the end of the trolley-arm A. At their outer ends these arms E carry the wheel F. The bearings in the outer ends of these arms for  
45 the shaft of said wheel F are similar in a general way to the conical bearings for the trolley-wheel proper, and are provided with similar lubricating devices, as shown most plainly in Fig. 6. To the ends of the bolt e,  
50 passing through said bearings or to some similar appropriate point, are secured springs E', which extend up to the bolts C' or near thereto, and which hold the outer ends of these arms and the wheel carried thereby up  
55 toward the trolley-wheel D.

The edges of the wheel F, I prefer to make of felt or some similar yielding and absorbent substance not too porous. The center of  
60 said wheel should be of metal and contain a cavity for the lubricant. This lubricant will keep the felt portion sufficiently saturated, so that it will lubricate the operating-surface of the trolley-wheel, which in turn will lubricate the wire and thus prevent wear, and  
65 particularly prevent sleet from collecting in

hard masses upon said wire during winter storms. This wheel might be grooved similarly to a trolley-wheel, in which case it would operate directly upon the wire.

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

1. The combination of a trolley-arm, a head thereto, having bearings for the trolley-wheel, said head being socketed to receive the upper end of said arm, and said arm resting and secured in said socket with sufficient strength to resist the ordinary strain thereon and capable of being removed therefrom by any unusual strain coming thereon, substantially  
80 as set forth.

2. The combination of a trolley-head and a trolley-carrying arm, one part having a socket into which the other part enters and one part being slitted, and a bolt passing  
85 through said parts and in said slit, whereby one part is prevented from turning on the other part, substantially as set forth.

3. The combination of a trolley-arm, a removable head mounted thereon and carrying  
90 the trolley-wheel, and a cord attached to said arm and said head, whereby when said head becomes accidentally removed from said arm it will be held from loss by said cord, substantially as set forth.

4. The combination of a trolley-wheel provided with conical spindles, a bifurcated head having corresponding bearings, and a hole passing through the whole structure, and a bolt in said hole, whereby said bearings  
100 may be adjusted, substantially as set forth.

5. The combination of a trolley-wheel having conical spindles, a bifurcated head having corresponding bearings, cavities or receptacles for a lubricant connected to said bearings, and pieces of felt or similar absorbent material located in said bearings, onto which the lubricant may be discharged from said cavities, substantially as set forth.

6. The combination, with a trolley-wheel,  
110 of a lubricating-wheel mounted on arms pivoted to the head carrying said trolley-wheel, and springs extending from said arms to said head, whereby said lubricating-wheel is held in contact with said trolley-wheel, substantially  
115 as set forth.

7. The combination, with a trolley-wheel, of a lubricating-wheel the edges whereof are formed of felt or other absorbent material, and which is provided with a central cavity  
120 containing a lubricant, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 8th day of April, A. D. 1890.

ARTHUR S. HICKLEY. [L. S.]

Witnesses:

CHESTER BRADFORD,  
JAMES A. WALSH.