No. 725,618. PATENTED APR. 14, 1903.

# S. FIERBAUGH.

## TROLLEY HEAD.

APPLICATION FILED DEC. 6, 1902.

NO MODEL.

Fig. 1.

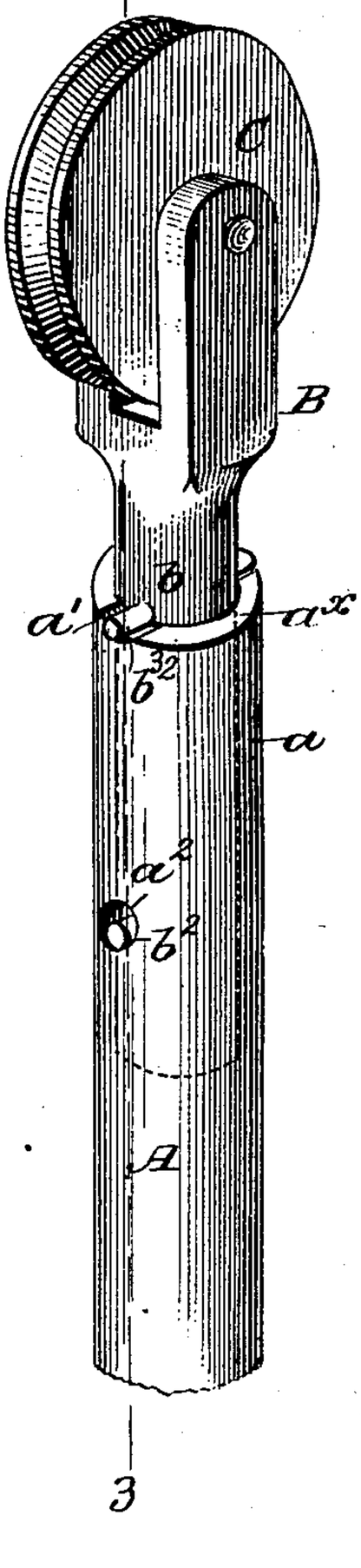



Fig. 2.

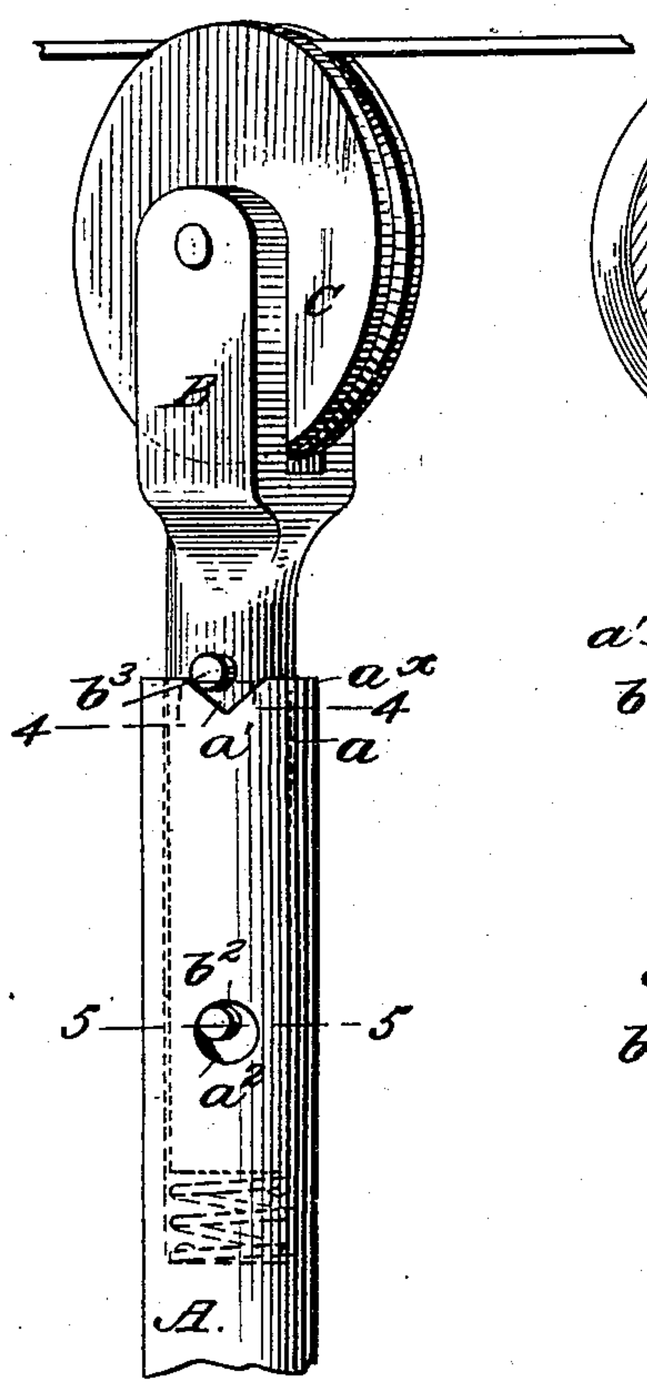



Fig. 3.

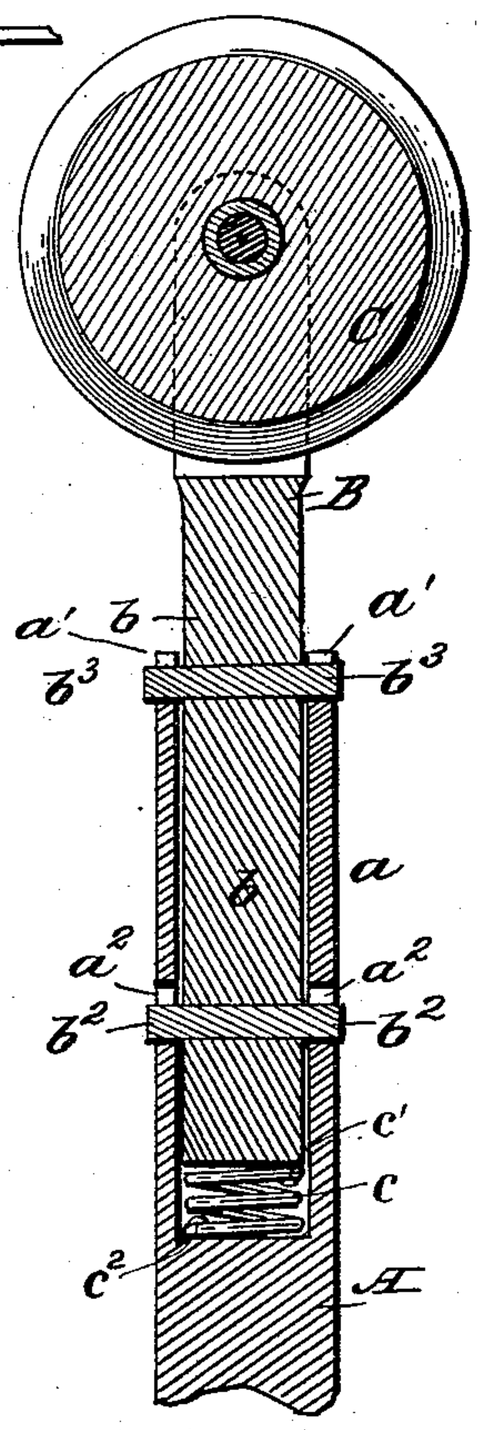



Fig. 4.

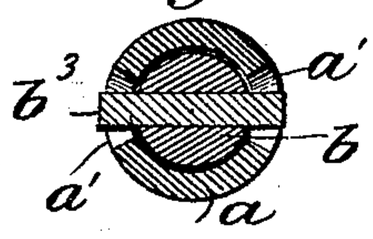
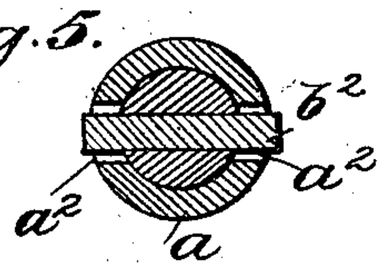



Fig. 5.

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# UNITED STATES PATENT OFFICE.

SAMUEL FIERBAUGH, OF HUNTINGTON, WEST VIRGINIA, ASSIGNOR OF NINE-TWENTIETHS TO L. V. WAUGH, OF HUNTINGTON, WEST VIRGINIA.

## TROLLEY-HEAD.

SPECIFICATION forming part of Letters Patent No. 725,618, dated April 14, 1903.

Application filed December 6, 1902. Serial No. 134,108. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL FIERBAUGH, residing at Huntington, in the county of Cabell and State of West Virginia, have invented a new and Improved Trolley-Head, of which the following is a specification.

My invention seeks to provide an improved construction of trolley for overhead electric-railway systems, the primary object of which is to produce a simple, cheap, and effective means for sustaining the trolley-fork without the aid of springs or other cushioning devices and in which the said fork is automatically adjustable to maintain the trolley-wheel in a proper alinement or contact with the wire conductor under the varying conditions of the said conductor or wire; and to these ends my invention consists in the peculiar construction and novel combinations of parts hereinafter described in detail and specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a trolley-head embodying my invention. Fig. 2 is a front elevation thereof, the trolley-fork being shown turned at an angle and slightly elevated from the lower normal position. Fig. 3 is a vertical section on the line 3 3 of Fig. 1. Fig. 4 is a horizontal section on the line 4 4 of Fig. 2, and Fig. 5 is a similar view on the line 5 5 of Fig. 2.

In the ordinary construction of trolley pole and wheel head it is common to mount the trolley-head in the end of the pole-socket for vertical adjustment under spring action, whereby to cause the trolley-head to rise up to keep the wheel in proper contact with the trolley-wire under its varied conditions. Trolley-heads have also been provided in which the wheel-carrier is rotatably mounted within the head-socket and said carrier and socket provided with opposing cam-like members, whereby as the trolley-wheel carrier is axially secured it will be caused to rise vertically whereby to produce a more perfect contact of the wheel with the wire in rounding curves and whereby when lowered into longitudinal alinement with the car to assume a depressed position. Trolley-heads constructed on the lines indicated, so far as are known, have not met all the requirements desired, as the cost of manufacture and maintenance has been excessive, and by reason of necessity of careful adjustment of the several parts their use has not been found to possess the required degree of effectiveness and positiveness of operation.

My invention belongs to that type of trolley-heads in which opposing cam-like surfaces of the trolley-wheel holder or fork and the socket are provided and in which the peculiar arrangement of said opposing surfaces lies the essentials of my invention.

In my construction the trolley-pole A may be tubular in its length or have its upper end provided with a tubular socket $a$, in which is fitted for freely sliding therein the shank $b$ of the wheel holder or fork B, said fork and the socket forming the trolley-head. The wheel C is of the usual construction and is journaled in the upper end of the fork in any approved manner. The socket A at a suitable point below the upper end has a pair of diametrically oppositely disposed apertures $a^2$ $a^2$, and the upper end $a^\times$ has a pair of oppositely-disposed radical V-shaped depressions $a'$ $a'$ in vertical alinement with the apertures $a^2$ $a^2$, as clearly shown in the drawings and for reasons presently explained.

The wheel-holder B has a pair of oppositely-disposed lateral studs or members $b^2$ $b^2$ at a point near the lower end thereof and a similar pair of bearing-studs $b^3$ $b^3$ near the forked upper end, and the said studs $b^3$ $b^2$ are arranged in the same vertical alinement and project at right angles to the axis of the trolley-wheel C. The studs $b^2$ $b^2$ project into the apertures $a^2$ $a^2$ of the socket A and have lateral and vertical play therein. The studs or bearings $b^3$ $b^3$ are provided to engage and cooperate with the V-shaped seats or cam-bearings in the upper end of the socket, and the two sets of studs $b^2$ $b^3$ are spaced apart relatively to each other and the seats $a'$ and apertures $a^2$, that when the holder B is at its lowermost adjustment the studs $b^3$ bear solidly in the apex or bottom of the seats $a'$. The studs $b^2$ bear on the bottom edges of the apertures $a^2$, and thereby provide two distinct contacting surfaces between the holder B and the socket, thus distributing the downward

strain on the trolley-wheel holder to the upper and lower ends of the shank of the holder and providing a more solid and firm bearing for the holder than is possible with but one contact or bearing point between the holder and the socket. It will be noticed the diameter of the apertures $a^2$ and the distance between the extreme ends of the diverging walls of the seats $a^2$ are the same, such correlative arrangement of said parts being provided to effect a positive limitation of the rotary movement of the holder-shank in the socket in either direction and prevent the studs $b^3$ from rising entirely out of the seats $a^2$.

So far as described it is evident the peculiar arrangement of the fork, with its lateral studs, the socket, with its cam-seats $a^2$ and its apertures $a'$, will admit of the wheel-holder rotating freely and sufficiently, so that the wheel C can accommodate itself to the ordinary varying curves of the conductor-wire, so that the groove or peripheral bearing of the trolley-wheel will be sustained in a proper contact with the trolley-wire and the danger of its leaving said wire reduced to the minimum, and by reason of the peculiar construction of the holder, with its lateral studs, the pole-socket, with its seats $a'$ and apertures $a^2$, the tension of the trolley-head against the trolley-wire will increase in proportion to the turn of the wheel C to accommodate itself to the curve of the trolley-wire, it being obvious that if the curvature is slight the trolley-holder will be slightly elevated from its lower or normal position, and if considerable it will be further elevated until its lugs $b^3$ $b^3$ reach the upper ends of the inclines of the V-shaped bearings $a^2$, when further elevation of the member B and rotary movement thereof are prevented by the contact of the studs $b^2$ $b^2$ with the side edges of the apertures $a^2$ $a^2$.

It will be understood that in practice the opposing bearing-surfaces of the socket A and the studs $b^3$ $b^2$ may be case-hardened or otherwise constructed to prevent wear and undue friction.

I am aware that a trolley-head including a socket member having a cam-formed slot and a wheel-holding shank for engaging the socket having a stud for fitting the slot is old; but such type of trolley-head does not provide for a rigid contact or bearing of the wheel-holder and the socket, as the entire strain is on the single stud, and the neck of the shank portion of the holder is under said construction subjected to a torsional or twist strain to such extent that the wheel-holding end frequently snaps or breaks off at the said neck. In my construction this danger of breaking off is overcome, as the bearing strain produced by the down pressure of the trolley-wire is divided and is partly at the neck and partly at the lower end of the wheel-holder shank, and the said neck portion is held in a rigid bearing contact irrespective of the vertical adjustments of the holder incident in the lowering of the holder in the socket when force is applied during passing over curves.

To assist in holding the member B, with the trolley-wheel C, in its normal position, as shown in Fig. 3, I may apply a retractile spring *c*, fastened to the socket A at $c^2$ and to the shank *b* of the wheel holder or fork B in any approved manner, it being understood that in fastening the spring in the manner shown in Figs. 2 and 3 the spring is of sufficient length to allow of it being stretched out sufficiently to permit of its being fastened to the socket A and then pulled out and fastened to the shank *b* before the shank *b* is inserted in the socket, or I may first fasten a spring to the shank *b* and then pass a pin (not shown) through the socket A and over the first coil of the spring to hold same in position.

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

1. A trolley-head, comprising a socket, a trolley-wheel holder having a shank rotatable and vertically shiftable in said socket, said shank and socket having shiftable opposing bearing or contacting surfaces, one set of said surfaces being at the upper edge of the socket and the other set at a point below the said upper edge, and disposed in a plane at right angles to trolley-wheel axis, as set forth.

2. A trolley-head, comprising a socket having a pair of oppositely-disposed apertures, a wheel-holder having a shank provided with oppositely-projecting bearing-studs adapted to project into the apertures and freely movable therein and a second pair of oppositely-projected studs on said holder arranged to engage and ride at the upper edge of the socket, substantially as shown and for the purposes described.

3. A trolley-head, comprising in combination; a socket having a pair of diametrically, oppositely disposed apertures, having a pair of V-shaped cam-seats in its upper edges, said seats being in vertical alinement with the apertures, of a forked holder having a pendent shank, a trolley-wheel journaled in the fork thereof, said shank having a pair of oppositely-disposed lateral studs $b^3$ $b^3$, adapted to extend into and have free lateral and vertical movement in the socket-apertures, and a second pair of studs $b^2$ adapted to engage with the V-shaped cam-seats in the socket, said studs $b^2$, $b^3$ being projected from the shank at right angles to the axis of the trolley-wheel, all being arranged substantially as shown and for the purposes described.

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