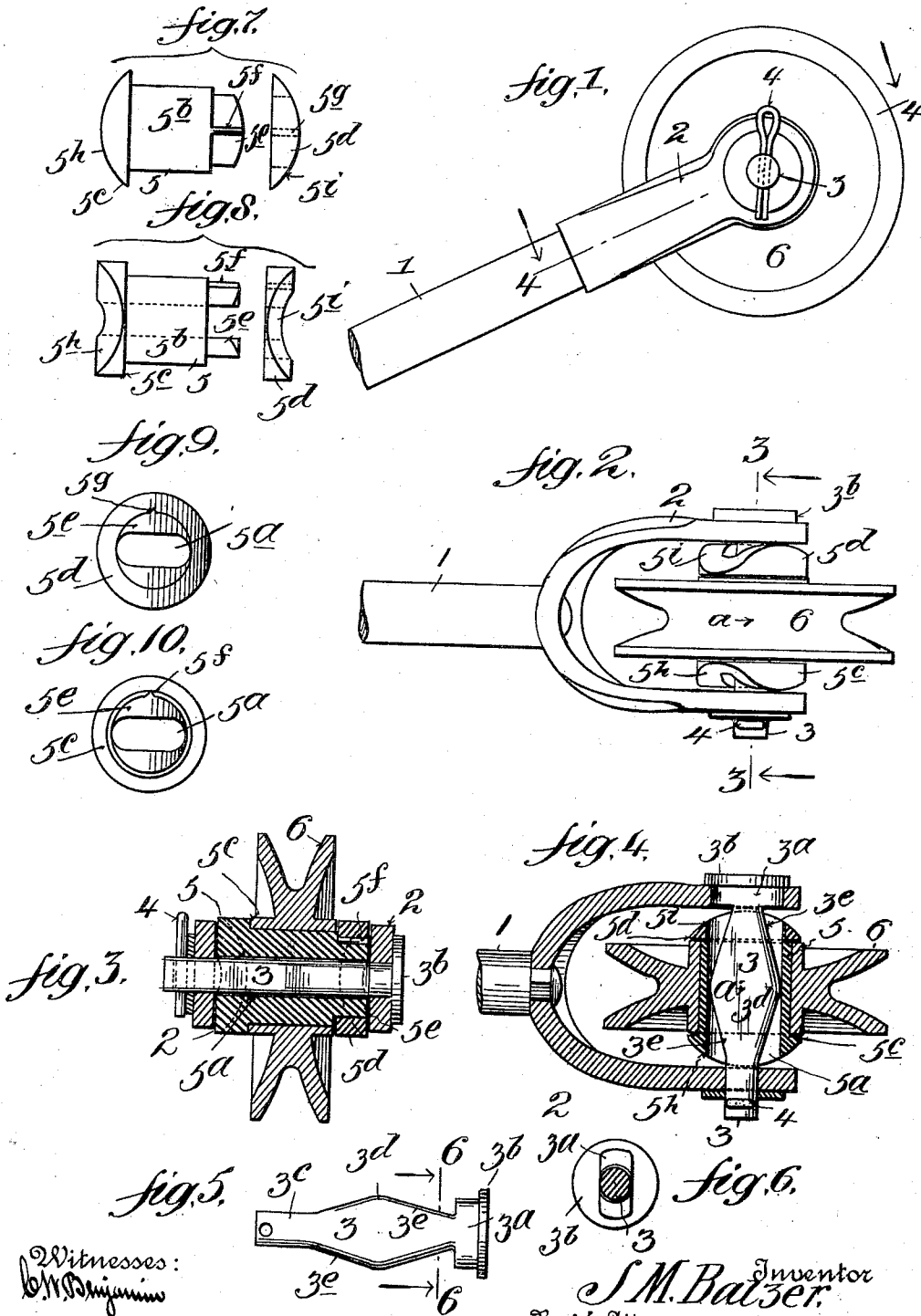


S. M. BALZER.
TROLLEY.

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Witnesses:
W. H. Bainbridge
M. J. Trainright

Inventor
S. M. Balzer.
By his Attorney
J. F. Bourne

UNITED STATES PATENT OFFICE.

STEPHEN M. BALZER, OF ANDOVER, NEW JERSEY.

TROLLEY.

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To all whom it may concern:

Be it known that I, STEPHEN M. BALZER, a citizen of the United States, and resident of Andover, in the county of Sussex and State of New Jersey, have invented certain new and useful Improvements in Trolleys, of which the following is a specification.

My invention relates to trolleys or wheels adapted to travel along conductors, such as trolleys used on electric railway cars and the like, and the invention has for its object to provide improved means for causing the trolley to follow the conductor in such manner as to reduce the liability of the trolley jumping from the conductor, and to more readily follow curves in the conductor and the switches.

In carrying out my invention I provide a support or shaft adapted to be attached to a trolley pole and upon said support a bearing is mounted in such manner that the same may have lateral or swinging motion in a plane more or less substantially parallel with respect to the plane of the conductor, as upon a substantially vertical or upright axis, and a trolley mounted upon said bearing, whereby the trolley may have pivotal movement with respect to the conductor against which it rides independent of various movements of the trolley pole.

My invention also comprises novel details of improvement that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming part hereof, wherein,

Figure 1 is a side view of a trolley and trolley pole equipped with my improvements; Fig. 2 is a plan view thereof; Fig. 3 is a section on the line 3, 3, in Fig. 2; Fig. 4 is a section on the line 4, 4, in Fig. 1; Fig. 5 is a detail of the trolley support; Fig. 6 is a section on the line 6, 6, in Fig. 5, looking in the direction of the arrows; Fig. 7 is a detail of the trolley bearing; Fig. 8 is a plan view thereof; Fig. 9 is an end view of the trolley bearing, looking from the right in Fig. 8, and Fig. 10 is a similar view, the detachable cam being removed.

Similar numerals of reference indicate corresponding parts in the several views.

In the drawings the numeral 1 indicates a portion of a trolley pole, and at 2 is a fork at the outer end thereof, which may be of suitable or usual construction.

At 3 is a support or shaft carried by fork

2 and shown provided with a flattened portion 3^a held in a corresponding opening in one of the arms of fork 2 to keep support 3 from rotating, the head 3^b bearing against said fork, the opposite end 3^c of said support being shown tubular to pass through a suitable opening in the adjacent arm of fork 2, a cotter-pin 4 or other suitable fastening device retaining support 3 in position. Support 3 is enlarged at its central portion 3^d and is shown generally of substantially flat form, and its edges at 3^e on opposite sides converge outwardly, as shown in Figs. 4 and 5.

At 5 is a bearing whose bore 5^a receives support 3 whereby said bearing may swing or turn on a substantially vertical axis around the enlarged part 3^d of support 3, the converging edges 3^e of said support permitting such movement of the bearing, see Fig. 4, while the relatively flat bore 5^a of said bearing is kept from rotating upon support 3. A trolley or grooved wheel 6, of suitable or usual construction, is journaled upon the cylinder surface 5^b of bearing 5, and said bearing at one end has a shoulder 5^c against which one side of the trolley bears, and said bearing also has a detachable cam or stop 5^d which fits upon the reduced or projecting portion 5^e of the bearing and keeps the trolley in place upon the conductor. A key 5^f on the bearing receiving a groove 5^g on stop 5^d keeps said stop from rotating on the part 5^e. Stop 5^d is detachable from the bearing to permit the trolley to be mounted upon the bearing. The outer or end surfaces of the bearing 5 are curved or made cam shaped at 5^h, and the outer surface of said stop 5^d is similarly shaped at 5ⁱ, said curves being shown described around the axis *a* of bearing 5, and said curved surfaces are adapted to fit against the inner walls of fork 2, whereby bearing 5 is retained within the fork to have lateral swinging or pivotal movement substantially around axis *a* to permit the trolley to swing upon such axis, while the curved surfaces 5^h, 5ⁱ, of the bearing retain the latter and the trolley in proper operative position with relation to the electric conductor against which the trolley runs.

With a trolley pole equipped with my improvements the trolley will bear against the overhead or other conductor and revolve upon its bearing 5, but when the trolley meets a bend in the conductor, or travels

around a curve, or passes a switch, the trolley is free to turn or swing around the axis *a* because the bearing 5 may swing upon said axis to a limited extent upon support 3, and as the trolley travels in one direction the wall of the bore of bearing 5 bears against one corner of the enlarged part 3^a permitting the trolley to have an angular movement in one direction or the other along support 3, and when the trolley travels in the reverse direction the opposite wall of its bearing 5 may bear against the opposite corner of support 3 permitting the trolley to have an angular movement in either direction, thereby enabling the trolley to more accurately follow the conductor than if the trolley were limited in its swinging movements to a positive vertical axis or relatively so, and thereby the trolley will more readily follow inequalities in the conductor against which it travels, and the liability of the trolley jumping from the conductor is reduced.

The trolley may be readily detached from the pole and replaced by removing support 3, then detaching bearing 5 from the trolley, replacing the bearing and its step 5^a in a new trolley, and inserting support 3 through the fork and the bearing. The main wear of the trolley comes upon bearing 5 which may be hardened and thus continued in use as the trolleys or wheels wear out.

Changes may be made in the details of construction shown and described without departing from the spirit of my invention.

Having now described my invention what I claim is:

1. The combination of a trolley, with a bearing rotatively supporting the trolley, and a support for the bearing having an intermediate enlarged portion of less depth than width receiving the bearing and having reduced portions extending in converg-

ing straight lines on opposite sides of the enlarged portion to permit the bearing to swing in angular relation to its support.

2. The combination of a trolley, with a bearing having a relatively flat straight bore, and a support receiving said bearing and having relatively flat opposite sides, said support having an enlarged intermediate portion wider than its thickness and having reduced portions converging outwardly, on straight lines, on opposite sides thereof to permit the bearing to swing on a transverse axis.

3. The combination of a trolley, with a bearing on which the trolley rotates and having curved end portions, and shoulders near opposite ends, a support for the bearing, and a fork carrying said support adapted to co-act with said curved portions of the bearing, said bearing being fitted upon said support to swing on a transverse axis and limited in endwise movement by the fork.

4. The combination of a trolley pole provided with a fork, a support carried by said fork and having an enlarged intermediate portion, and sides converging outwardly in opposite directions, a bearing having a bore receiving said enlarged portion of the support, whereby the bearing may swing bodily on a transverse axis on said support, and means to keep the bearing from rotating on the support, said bearing having means on its ends to permit it to swing and retain its position between the arms of the fork.

Signed at the borough of Andover in the county of Sussex and State of New Jersey this twenty-third day of September, A. D. 1907.

STEPHEN M. BALZER.

Witnesses:

SAMUEL S. WILLS,

CHARLES T. STACKHOUSE.