

(No Model.)

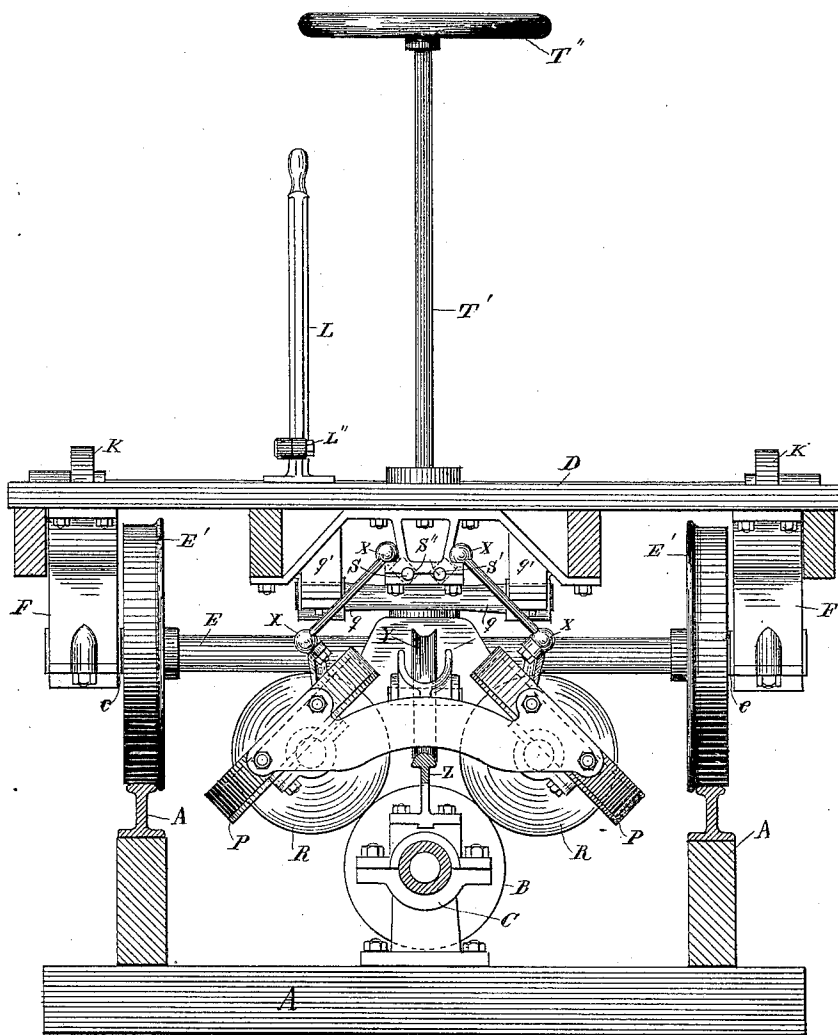
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W. L. JUDSON.
STREET RAILWAY.

No. 423,871.

Patented Mar. 18, 1890.

Fig. I.



Witnesses
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Inventor
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By his Attorney
Gas. F. Williamson

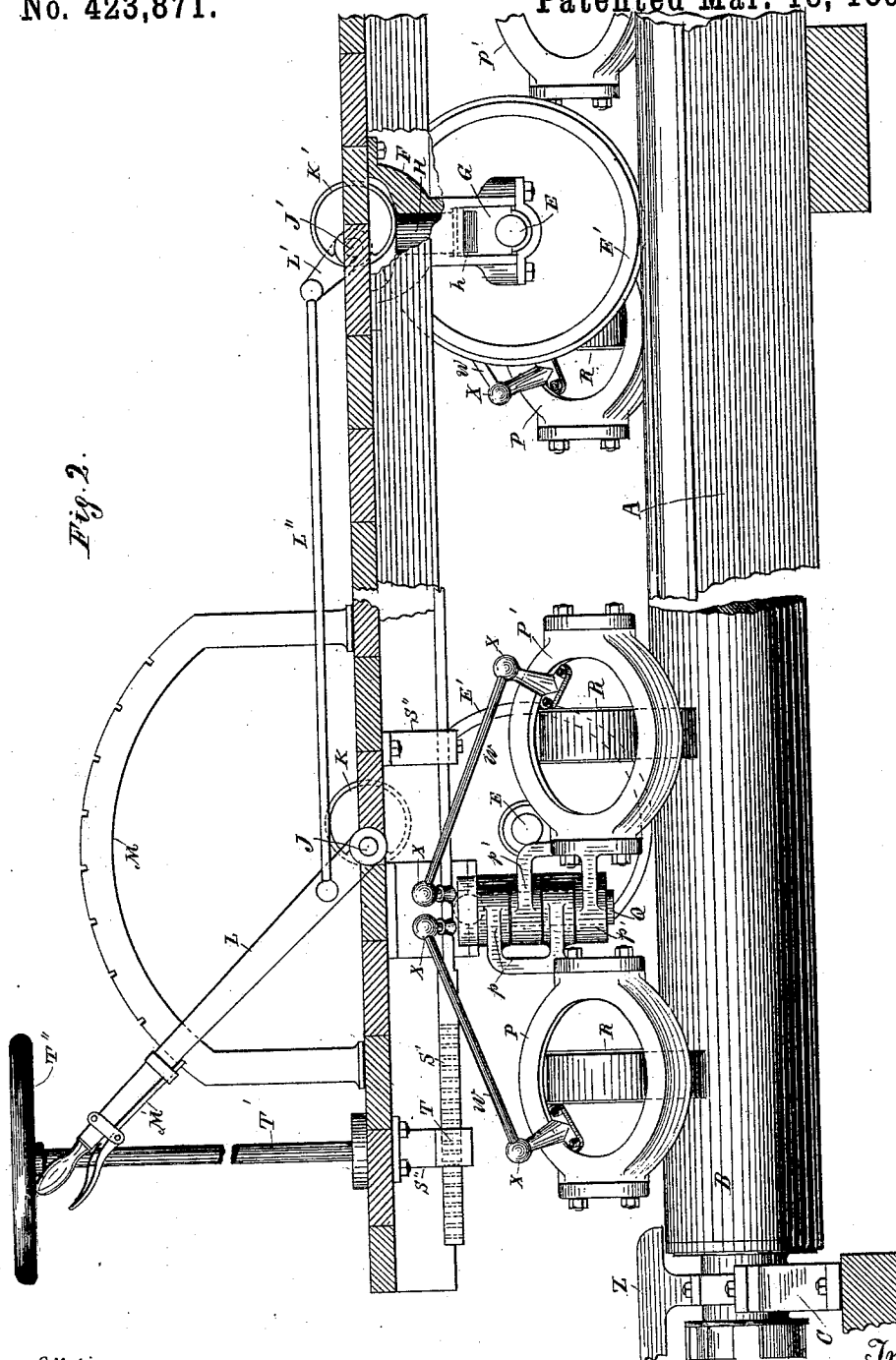
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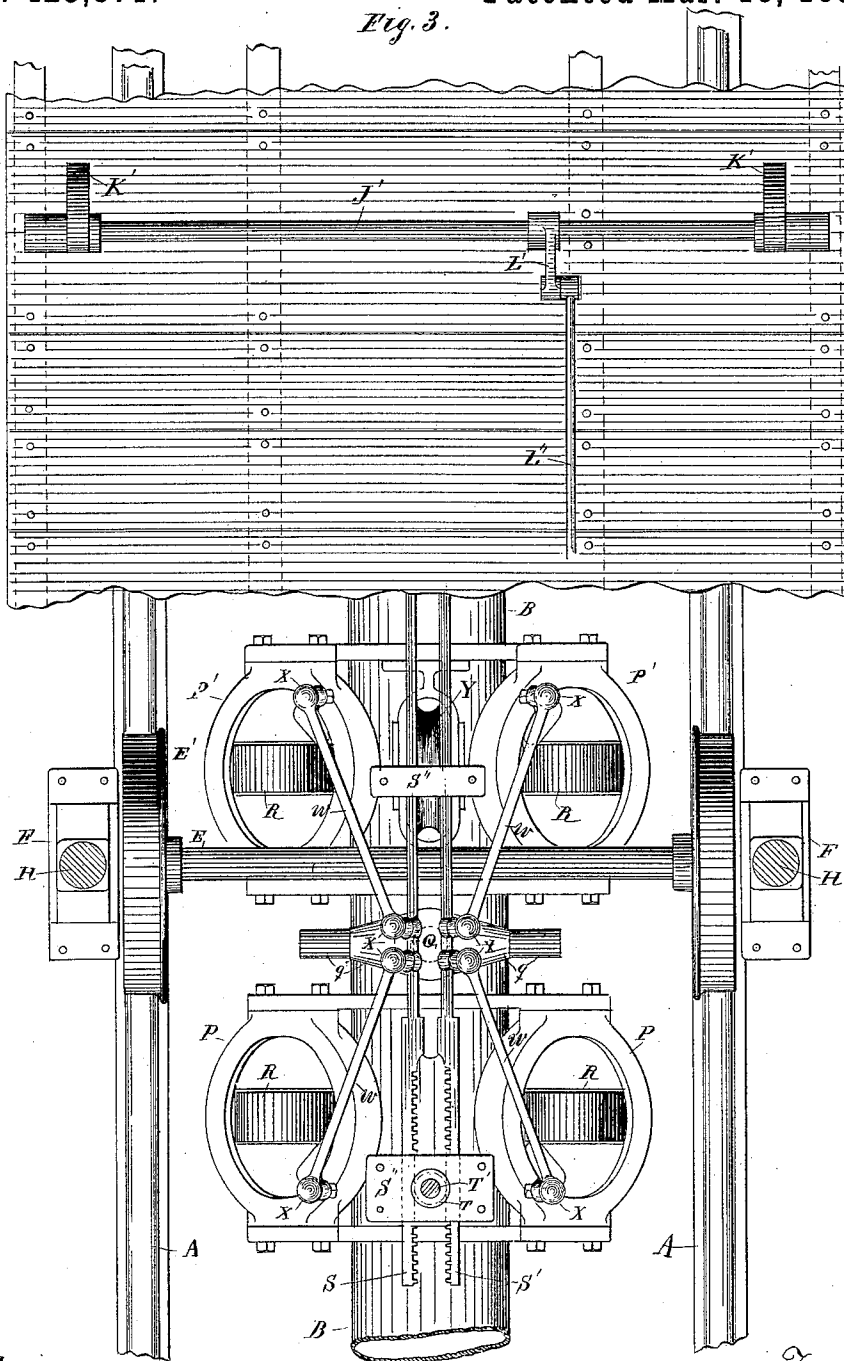
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Fig. 3.



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UNITED STATES PATENT OFFICE.

WHITCOMB L. JUDSON, OF MINNEAPOLIS, MINNESOTA.

STREET-RAILWAY.

SPECIFICATION forming part of Letters Patent No. 423,871, dated March 18, 1890.

Application filed July 30, 1889. Serial No. 319,185. (No model.)

To all whom it may concern:

Be it known that I, WHITCOMB L. JUDSON, a citizen of the United States, and a resident of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented a certain new and useful Improvement in Street-Railways, of which the following is a specification, reference being had to the accompanying drawings.

10 My invention relates to that system of power street-railways invented by me upon which Letters Patent of the United States were issued May 7, 1889, under No. 402,933, entitled "Street-Railway," and is in the nature
15 of improvements in certain features of the construction for the better application of the system therein described. In that system, as will appear on reference to said former patent, I use a sectional driving drum or shaft
20 extending along the line of the car's travel, and revolve the same by stationary motors located at suitable intervals. The rotary motion of the drum is converted into a rectilinear motion on the car by friction-wheels
25 connected with the car adapted to engage with the drum at an angle to its axis, the wheels being adjustable to different angles for varying the speed, power, and direction of the car. The drum-sections are all straight,
30 the necessary curvature and grades being secured by angular adjustment at the coupling-spaces. In other words, the curve-sections of the drum are relatively short and are arranged tangentially to the curve. To render
35 this peculiar converting mechanism most effective, all the friction-wheels should be capable of continuous and equably-distributed traction regardless of the curvature or grades of the track and drum, except when passing
40 the coupling-spaces. The traction should be uniformly variable at will from a common source, and the friction-wheels in all their adjustments should always take a common pitch-line when all on the same straight section
45 of the drum, and as near an approximation thereto as is possible when the car is traversing curves, with some of the friction-wheels on one straight section and some on another straight section, and at an angle thereto.
50 As the wheels are mounted in couples engaging opposite sides of the drum, the wheels on the opposite sides must swing in opposite di-

rections to take like pitch-lines. The adjustment should be made from a common source.

My invention herein described is directed 55 to these results. To this end, instead of mounting the sets of friction-wheels on a common spider frame or truck, all the parts of which are rigid with each other, as shown in my former patent, I divide the truck into 60 two parts and mount one couple of wheels on each half of the truck. I then connect the half-trucks by a vertical pivot in such a manner as to permit either to turn independently of the other in the horizontal, but not in the 65 vertical, plane. The vertical pivot-shaft or king-bolt is in turn pivotally connected to the car-body, so that it may swing in the vertical plane; hence the wheels will readily adapt themselves to curves and grades. 70

The car-body is vertically adjustable on the car-axes from a single lever, thus uniformly varying the traction. To effect this adjustment in the construction shown, the car is provided with hollow hangers having 75 sliding boxes, in which the axles are journaled, and a vertically-movable block above the same, preferably spring-seated on the boxes. On the car are mounted shafts having eccentrics bearing against said sliding 80 blocks operated from a common lever. Other constructions might be used. To effect the angular adjustment of the wheels, I employ a pair of draw bars or rods mounted in guides under the car-body provided at the same ends 85 with racks on the interior opposing faces engaging with a pinion on a vertical shaft mounted on the car and provided with a hand-wheel for operating the same. Separate reach- 90 rods extend from the draw-bars to each of the wheels, the connection being made by ball-and-socket joints, and all the wheels on the same side of the drum being connected to the draw-bar on that side; hence on turning the hand-wheel the draw-bars will be moved 95 in opposite directions, and in virtue of the ball-and-socket joints of the reach-rods and the pivotal connection of the trucks, the wheels will take common pitch-lines or angles in their different adjustments. 100

In the accompanying drawings I have illustrated the above-described forms of my invention as applied to a mine road or tramway. Therein, like letters referring to like

parts throughout, Figure 1 is an end elevation; Fig. 2, a view partly in side elevation and partly in longitudinal vertical section, with some parts broken away; and Fig. 3 is a plan with some parts removed.

A is the road bed or track. B is the drum; C, the bearing supporting the same.

D is the car-body; E, the car-truck axles, and E' the car-wheels. The axles are provided with extensions *e* beyond the outside of the wheels.

F are the hollow hangers rigidly secured to the car-body. G are the sliding boxes therein for the extension *e* of the car-axles.

H is the vertically-movable block in the hollow hangers.

h is the spring between the boxes and the blocks.

J J' are the shafts on the car-frame provided with eccentrics K and K'.

L is a hand-lever on the shaft J, and L' is a crank-arm on the shaft J'. L'' is a connecting-rod uniting the two.

M is a notched segment, and M' a pawl on the lever-arm L for locking the same together.

P P' are the two-part or divided trucks, provided with hinged jaws *p* and *p'*.

Q is the king-bolt or vertical shaft pivotally connecting the double truck. The king-bolt is T-shaped or provided with right-angled extensions *q* at its top journaled in suitable bearings *q'*, fixed to the car-body.

R are the friction-wheels swiveled in the trucks P and P'.

S S' are the right and left draw-bars, respectively provided with rack-faces on their forward ends.

S'' are the guides fixed to the under side of the car-body, in which the draw-bars are mounted.

T' is the vertical shaft on the front end of the car, provided with pinion T, engaging with the racks of the draw-bars, and the hand-wheel T'' for operating the same.

W are the reach-rods connected to the friction-wheel and the draw-bars by ball-and-socket joints X.

Y is a carrying-roller on the truck P P', and Z is a coupling-space bridge on the boxes of the drum-bearing C.

The ball and sockets constitute universal joints. Any other universal joints would answer equally well.

The operation is evident from the description already given.

What I claim, and desire to secure by Letters Patent, is as follows:

1. The combination, with a movable car and a driving-drum extending along the line of travel, of a two-part or divided friction-wheel truck pivotally connected together and having a common connection with the car, and friction-wheels on said truck engageable with the drum at an angle to its axis.

2. The combination, with a movable car and

a driving-drum, of a two-part friction-wheel truck pivotally connected together and having a common connection with the car, and friction-wheels on said truck angularly adjustable with reference to said drum and engageable therewith.

3. The combination, with a movable car and a driving-drum, of a pivotally-connected two-part truck having a common connection with the car, and friction-wheels mounted on said truck in couples, one couple on each part of the truck, engageable with the opposite sides of said drum.

4. The combination, with a movable car and a driving-drum, of a two-part truck pivotally connected together and having a common connection with the car, and sets of angularly-adjustable friction-wheels mounted in couples on said truck, one couple on each part thereof, engageable with the opposite sides of said drum.

5. The combination, with a movable car and a driving-drum, of a two-part truck, a pivot bolt or shaft pivotally connecting the two parts of the truck and pivotally connected to the car, and friction-wheels mounted on said truck, engageable with said drum, substantially as described.

6. The combination, with the movable car and the driving-drum, of the two-part truck provided with hinge-jaws, the T-shaped king-bolt or pivot-shaft uniting said jaws and having its angular extensions journaled on the car, and the sets of angularly-adjustable friction-wheels mounted in couples on said truck, one couple on each part of the truck and engageable with the opposite sides of said drum, substantially as described.

7. The combination, with a movable car and a driving-drum, of friction-wheel trucks connected to the car, angularly-adjustable friction-wheels mounted in couples on said truck, engageable with opposite sides of the drum, pairs of oppositely-movable draw-bars on the car-body, and connections from the draw-bars to the wheels, all the wheels on one side of the drum being connected to the draw-bar on that side, substantially as described.

8. The combination, with a movable car and a driving-drum, of friction-wheel trucks connected to the car, angularly-adjustable friction-wheels mounted on said truck in couples, engageable with opposite sides of said drum, pairs of draw-bars on the car provided at the same ends with racks on their interior opposing faces, a shaft on the car provided with a pinion engaging both of said racks, and connections from said draw-bars to said wheels, substantially as described.

9. The combination, with a movable car and a driving-drum, of friction-wheel trucks connected to the car, angularly-adjustable friction-wheels on said trucks engageable with the drum, and adjusting-rods from the wheels to the car connected to one or both by universal joints.

10. The combination, with a movable car and a driving-drum, of friction-wheel trucks connected to the car, angularly-adjustable friction-wheels mounted on said trucks in couples engageable with oppositesides of said drum, a pair of oppositely-movable draw-bars on the car, and reach-rods from the respective draw-bars to the wheels on the same side connected to the same by ball-and-socket joints, substantially as described.

11. The combination, with the car and the drum, of the friction-wheel trucks connected to the car, the angularly-adjustable friction-wheels in couples on the truck, the oppositely-movable draw-bars on the car provided at the same ends with opposing racks, the shaft on the car provided with a pinion engaging said racks, and the reach-rods from the draw-bars to the wheels on same sides, connected to both by ball-and-socket joints, substantially as described.

12. The combination, with the car and the drum, of the pivotally-connected two-part truck having a common connection with the car, the adjustable friction-wheels in couples, one couple on each part of said truck, the oppositely-movable draw-bars on the car, and the reach-rods from the bars to the wheels connected to the same by universal joints, substantially as described.

13. The combination, with the car and the drum, of the two-part truck, the pivot-bolt connecting the parts of the truck and pivotally connected to the car, the adjustable friction-wheels in couples, one each on each part of the truck, the oppositely-movable draw-bars on the car, and the reach-rods from the respective bars to the friction-wheels on the same side connected to the same by universal joints, substantially as described.

14. The combination, with a car-track and a driving-drum, of car-trucks movable on said track, a car-body on said trucks adjustable at right angles thereto, and friction-wheel trucks secured to said car-body provided with

friction-wheels engageable with said drum at an angle to its axis, substantially as described.

15. The combination, with a car-track and a driving-drum, of car-trucks movable on said track, a car-body on said truck adjustable at right angles thereto, friction-wheel trucks secured to said car-body having friction-wheels engageable with said drum at an angle to its axis, and a system of levers on the car having its base of resistance on said trucks for adjusting said car-body to vary the traction of the friction-wheels, substantially as described.

16. The combination, with the car-track, the driving-drum, and the car-trucks, of the car-body having hangers provided with adjustable axle-boxes in which the car-truck axles are journaled, eccentrics on the car-body having their base of resistance on said axles for adjusting the car-body, and friction-wheel trucks secured to the car-body, and friction-wheels on said trucks engageable with said drum, substantially as described.

17. The combination, with the track, the drum, and the car-trucks, of the car-body provided with hangers having car-axle boxes adjustably mounted therein, the sliding blocks spring-seated on said boxes, the eccentric-shafts on the car provided with eccentrics bearing against said blocks, the common lever with connections to said shafts for operating the same, the friction-wheel trucks secured to the car, and the friction-wheels on said friction-trucks engageable with the drum, substantially as described.

18. The combination, with a movable car, of a driving-drum extending along the line of travel, a friction-wheel truck having a pivotal connection with the car permitting a swinging movement lengthwise of the drums, and friction-wheels mounted on said track engageable with said drum.

WHITCOMB L. JUDSON.

In presence of—

JAS. F. WILLIAMSON,
EMMA F. ELMORE.