(No Model.) 3 Sheets—Sheet 1.

H. L. PHELPS.

BEARING FOR STREET CARS.

No. 384,782. Patented June 19, 1888.

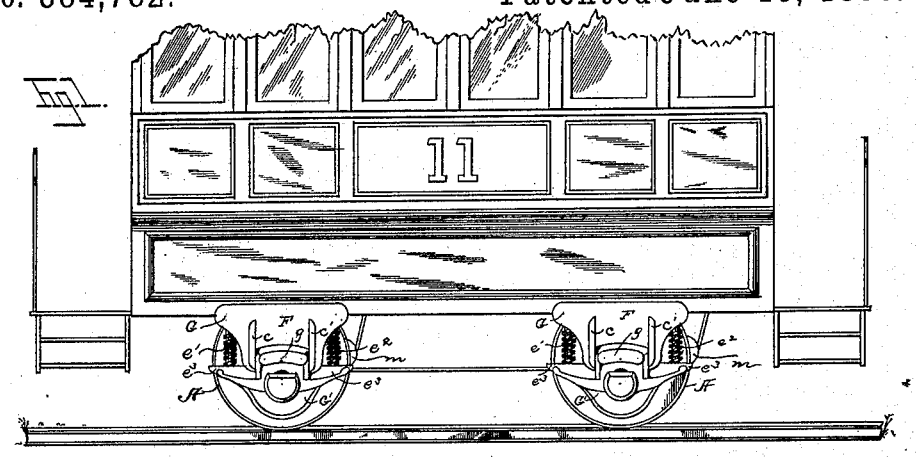

Fig. 1.

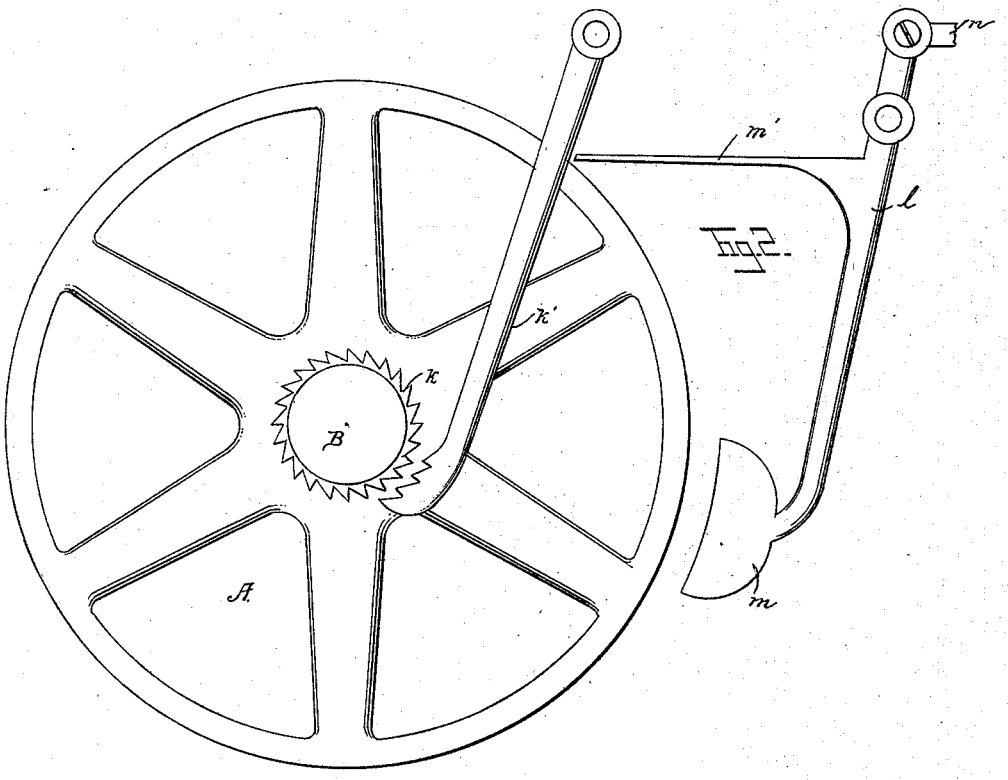

Fig. 2.

Witnesses.
Edward H Berry.
F. L. Dyer.

Inventor.
Homer L Phelps.
by Geo. W. Dyer.
Attorney.

(No Model.) 3 Sheets—Sheet 2.

H. L. PHELPS.

BEARING FOR STREET CARS.

No. 384,782. Patented June 19, 1888.

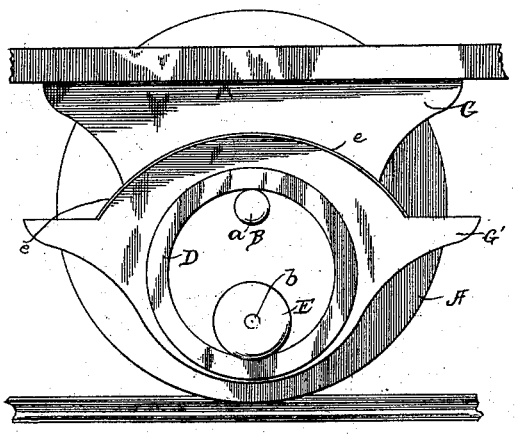

Fig. 3.

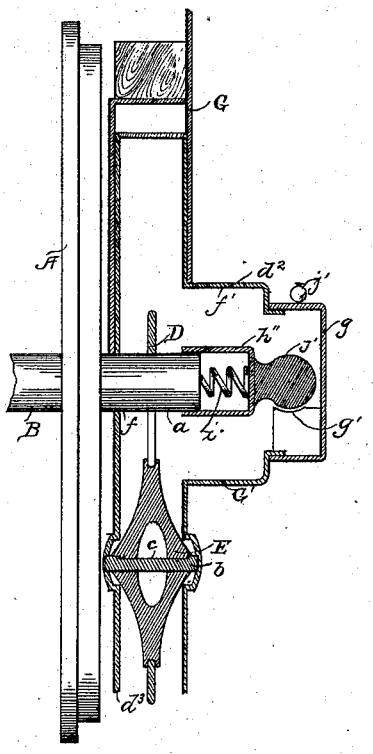

Fig. 4.

Witnesses,
Edward A. Perry,
H. B. Dyer.

Inventor,
Homer L. Phelps,
by Geo. W. Dyer.
Attorney.

(No Model.) 3 Sheets—Sheet 3.

H. L. PHELPS.

BEARING FOR STREET CARS.

No. 384,782. Patented June 19, 1888.

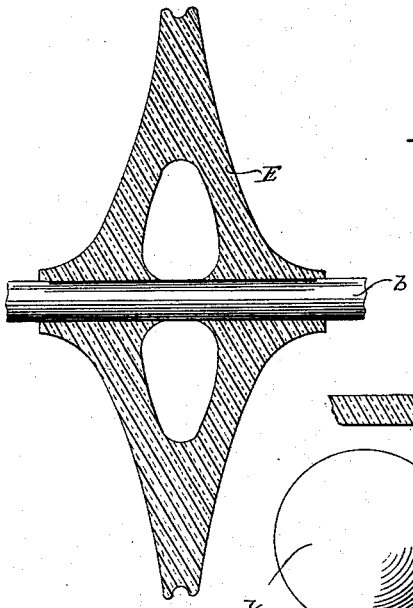

Fig. 5.

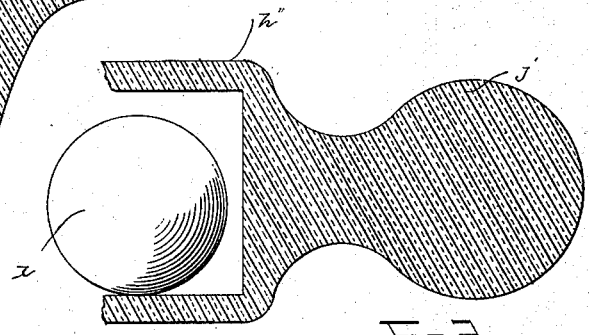

Fig. 6.

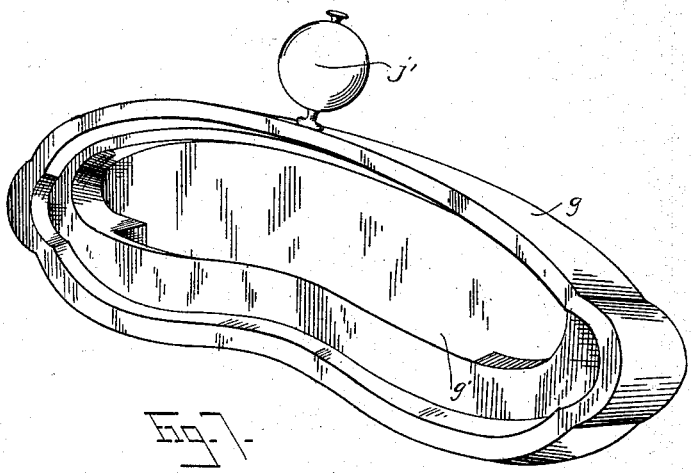

Fig. 7.

Witnesses.
Edward K. Berry.
Frank L. Dyer.

Inventor.
Homer L. Phelps.
by Geo. W. Dyer.
Attorney.

UNITED STATES PATENT OFFICE.

HOMER L. PHELPS, OF ATHENS, PENNSYLVANIA.

BEARING FOR STREET-CARS.

SPECIFICATION forming part of Letters Patent No. 384,782, dated June 19, 1888.

Application filed February 16, 1888. Serial No. 264,270. (No model.)

To all whom it may concern:

Be it known that I, HOMER L. PHELPS, a citizen of the United States, residing at Athens, in the county of Bradford and State of Pennsylvania, have invented certain new and useful Improvements in Bearings; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in the mounting of cars upon bearings, particularly street-railroad cars, which will at the same time greatly lessen the draft of such cars and serve as car-starters; and the novelty of my invention therein consists, principally, in providing the car-body with hangers rigidly attached to the same, each hanger having a friction-roller at its lower end, which friction-roller rests on the inner periphery of a ring, which ring is suspended upon the outer end of one of the car-wheel axles and is rotated by the rotation of the same, thence giving rotation to the ring, and the ring giving rotation to the friction-roller, whereby the car-body in effect is mounted upon such ring with a certain capacity for horizontal and vertical movement produced by the swinging of the ring out of its normal vertical plane. This swinging of the ring out of its vertical plane is effected by the momentum of the car-body when the movement of the car-wheels is arrested, and the ring thus moved out of its vertical plane is held in position by the brakes on the wheels. When the brakes are released the weight of the car-body forces the ring to resume its normal vertical position, and in so doing exerts power on the axle, causing it to turn and start the car, its action in this respect being assisted by a ratchet-bar pivoted to the car-body and provided with teeth which engage with teeth upon the end of the axle.

My invention accordingly consists in the construction, combination, and arrangement of the various parts which produce the above movements, and are more fully hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the lower part of a street-railroad car; Fig. 2, a side elevation of a car-wheel, showing the ratchet-bar in position; Fig. 3, a side elevation of a car-wheel with the outer casing removed, showing the various bearings in position; Fig. 4, a vertical central cross-section of a car-wheel and the hanger and its casings with the various parts within the same; Fig. 5, a vertical central cross-section of the friction-roller with its axle; Fig. 6, a central vertical cross-section of the axle-cup, and Fig. 7 a perspective view of the cap to the axle-arm chamber.

Like letters of reference indicate similar parts in each figure.

A represents one of the wheels of an ordinary railroad-car truck, made integral with the axle B, which extends a short distance outside of the wheel in the form of a cylindrical lug or projection, *a*, as is usual. Hung loosely on this projection, and free to rotate on the same, is a ring, D, made of a flat piece of hard and rigid material, preferably steel. By making the ring D of this form great strength with but little weight and bulk is insured. Rotating within the inner periphery of this ring is a self-oiling wheel, E, and ordinarily it will be found advantageous to provide this wheel with a square groove to retain the ring in its proper place and also serve to guide the same. It is usually advantageous to make the diameter of this wheel E as large as possible, and consequently when these parts are arranged as shown in Fig. 3 this wheel should just turn conveniently beneath the projection *a*. This wheel E is provided with an axle, *b*, the ends of which are preferably secured in the hanger F, which will be fully described presently. In order that this wheel E may be automatically lubricated, it is advisable, though not absolutely necessary, to chamber the same radially from the axle *b*, as shown in Fig. 5, in which chamber or chambers may be deposited the oil or other lubricant, so as to drip on the axle constantly when in motion, and in order that this oil may be distributed evenly and smoothly I provide the axle *b* with a longitudinal slot or groove, *c*, into which the oil flows. As above mentioned, the ends of this axle are secured in the hanger F. This hanger is composed, essentially, of two parts, G G′, each made, preferably of iron or steel, of the form shown. The upper part, G, is fastened

securely to the side beam of the car-body and is provided with guiding-arms *c c'*, fitting nicely over the section G' and securely prevented from lateral movements by means of suitable guides or tracks on the same. The lower portion, G', is composed of a front and back piece, *d'' d'''*, respectively, separately cast and fastened securely together on a brace, *e*, forming the top for the same, by means of bolts at each end; and in order that the ring D may be at liberty to swing backward and forward between the two it is necessary to dispense with the bottom and leave the whole lower portion entirely unobstructed. These sections are elastically connected by means of the coiled springs *e' e''*, mounted between the shoulders *e'''*, and which exert a constant pressure upward. This hanger F is located entirely on the outside of the wheel A of the car and occupies the same position as the hanger for the axle-boxes now used. Within the lower section, G', of this hanger are situated the ring D and wheel E, the projection *a* extending through the slot *f* on the inner face of the hanger through to the hollow projection *f'* on the other face. This projection *f'* should be provided with a cap, *g*, held securely in position by means of screw-bolts, and on the inside of this cap is a trough or groove, *g'*, for containing oil or any other suitable lubricant.

When all the parts are in position, Fig. 4, it will be evident that should the car-body and hanger oscillate from side to side from any cause the projection *a* would be liable to strike against the cap *g*, thereby tending to dislodge the same. To prevent any such casualty, a cup, *h''*, is fitted over the end of the projection *a*, and within this cup is placed a rubber or elastic ball, *i*, as shown in Fig. 6, to take up the shock, or, instead of this, a spring, *i'*, can be substituted, as shown in Fig. 3. This cup *h''* is provided with a spherical head, *j*, which is partly immersed in the oil of the groove *g'*; and in order that this trough may be readily replenished any suitable form of an automatic feeder, *j'*, is placed above the same.

To insure strength and rigidity, it is preferable to make the wheel E with as wide a hub as possible; and in order that this hub may be accommodated the section G' is enlarged at this point, as shown.

Directly in the rear of the hanger F and rigidly fastened to the projection *a* is a ratchet-wheel, *k*, and adapted to engage with this wheel at certain intervals is a ratchet-bar, *k'*, pivoted at any convenient point on the car-body near its center.

The lever *l* is pivoted at any convenient point to the car-trucks, preferably to the braces connecting the fore and rear axles, and is provided at its lower end with the brake-shoe *m* and near its upper end with the projection *m'*. The upper part of this lever *l* is attached to a rod, *n*, connected in any suitable manner to another lever or to a wheel or equivalent mechanism under the control of the driver or conductor on the car.

When all the parts are properly arranged, the weight of the car will rest on the upper part, G, of the hanger, elastically connected to the lower section, G'. This lower section will bear on the axle of the friction-wheel E, and this wheel will be suspended through the medium of the ring D beneath the axle *a*, upon which the weight of the car will ultimately rest.

The action of the device is as follows: The car being moved along the tracks, the wheels A of the same will rotate in a like direction. The wheel A in revolving will transmit its motion through its axle to the ring D, which, by reason of the small size of this axle, will revolve very slowly in comparison with the revolutions of the wheel A. The motion of the slowly-revolving ring will be communicated to the wheel E, which will turn in correspondence. Now, as there is little or no friction on the rolling surface of the ring D, the friction will only occur at the wheel E, and consequently, by reason of the almost perfect lubrication and the extremely slow revolutions of the same, this friction will hardly be appreciable. It will be evident that by enlarging the ring D and friction-wheel E and decreasing the size of the projection *a*, the friction will be diminished greatly. When it is necessary to stop the car, the driver, by turning the ordinary hand-crank or by moving a lever, will withdraw the rod *n*, which will move the brake-shoes toward the periphery of the wheels and the ratchet-bar *k'* toward the ratchet-wheel *k*, by reason of the projection *m'* coming in contact with the same. As soon as the brake-shoes come in contact with the wheels, the progress of the latter will be checked; but the car-body by the momentum acquired will be thrown forward and upward, pendulum like, by the ring D, swinging on the projection *a*, and will be held in such elevated position by means of the brakes and the ratchet-bars engaging with the ratchet-wheels *k*. As soon as the brake-shoes are withdrawn, the ratchet-bars are prevented from disengaging with the ratchet-wheels by reason of the heavy weight of the car-body on them, which will tend to bear them downwardly and exert a pressure on the periphery of the ratchet-wheels, thereby turning them and starting the car. When the car-body has thus resumed its normal position, the ratchet-bars will swing away from engagement with the ratchet-wheels *k*.

A car equipped with friction devices of this character is capable of turning extremely short curves, and is equally applicable for either horse, cable, or steam railroads.

It will of course be understood that one of the friction devices is to be placed at every wheel, and that in the case of "double cars," or cars which are adapted to be moved both forward and backward, two sets of brakes and ratchet bars and wheels would be necessary.

It is not absolutely necessary to use the ratchet bars and wheels with the bearing

proper. Neither is it necessary to use the bearing with the car-starting device, as each can be used entirely independent of the other.

It is not necessary to make the car-starting device precisely as shown. The car-body might be so supported as to slide up an incline when the brakes are applied or to swing on a simple pendulum rod or link; but this would require mere mechanical skill and would involve substantially the same idea. Neither is it absolutely necessary to use the precise construction of the car-trucks shown. The wheel might be made separate from its axle, as is now generally the case.

Having now described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination, with a railroad-car body, of sectional hangers whose upper parts are rigidly attached and whose lower parts are elastically attached to the car-body and provided with friction-rollers, rings supported by the outer ends of the wheel-axles and supporting in turn said hangers, whereby, by the swinging of said ring, the car-body is capable of longitudinal and vertical movement independent of the movement of the trucks.

2. In combination with a railroad-car body, hangers rigidly attached to the same and provided with friction-rollers, rings supported by the outer ends of the wheel-axles and supporting in turn said hangers, a suitable car-starting device in the rear of the hangers, and brake-shoes whereby when the brakes are applied the momentum of the car-body swings the ring and carries the car-body forward and upward, the brakes holding both body and wheels, and when the brakes are released the weight of the car-body causes the ring to swing back and cause the car-starting device to start the car.

3. In combination with a railroad-car body, hangers rigidly attached to the same and provided with friction-rollers, rings supported by the outer ends of the wheel-axles and supporting in turn said hangers, brake-shoes attached to the car-trucks, and ratchet bar and wheel whereby when the brakes are applied the momentum of the car-body swings the ring and carries the car forward and upward, the brakes and ratchet-bar holding both body and wheels, and when the brakes are released the weight of the car-body causes the ratchet-bar to engage with and rotate the ratchet-wheel and start the car.

4. The combination, with the outer end of a car-axle, of the unelastic ring D and friction-wheel E, substantially as set forth.

5. The combination, with the outer end of a car-axle and a ring and friction-wheel supported thereby, of a hanger, F, made in sections, and springs *e* and *e'*, connecting the same, substantially as set forth.

6. The combination, with the axle, of a hanger, F, elastically attached to the car-body, the unelastic ring D, and friction-wheel E, substantially as set forth.

7. The combination, with the axle, of the ring D and hollow friction-wheel E, substantially as set forth, and for the purpose herein mentioned.

8. The combination, with the main axle B, of the ring D and wheel E, rotating on the slotted axle *b*, substantially as set forth.

9. The combination, with the main axle B, of the cup *h*, fitting over the end of said axle, substantially as described.

10. The combination, with the axle B, of the hanger F and removable cap *g*, substantially as described.

11. The combination, with the axle B, of the hanger F, cap *g*, and slot or trough *g'*, substantially as set forth.

12. The combination, with the axle B, of the hanger F, cap *g*, trough *g'*, and feeder *j'*, as set forth.

13. The combination, with the axle B, of the ratchet-wheel *k* and ratchet-bar *k'*, substantially as described.

14. The combination, with the axle B and wheel A, of the ratchet-wheel *k*, ratchet-bar *k'*, lever *l*, brake-shoe *m*, projection *m'*, and rod *n*, all arranged substantially as herein set forth, and adapted to operate as described.

15. The combination, with the projection *a*, of the cup *h''* and a cushioning device therein, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HOMER L. PHELPS.

Witnesses:
JAMES L. DYER,
SETH ELSBREE.