(No Model.)

E. M. TURNER, G. L. VAN BEEK & L. A. BROWN.

MOTOR TRUCK FOR ELEVATED RAILWAYS.

No. 456,103. Patented July 14, 1891.

Fig. I.

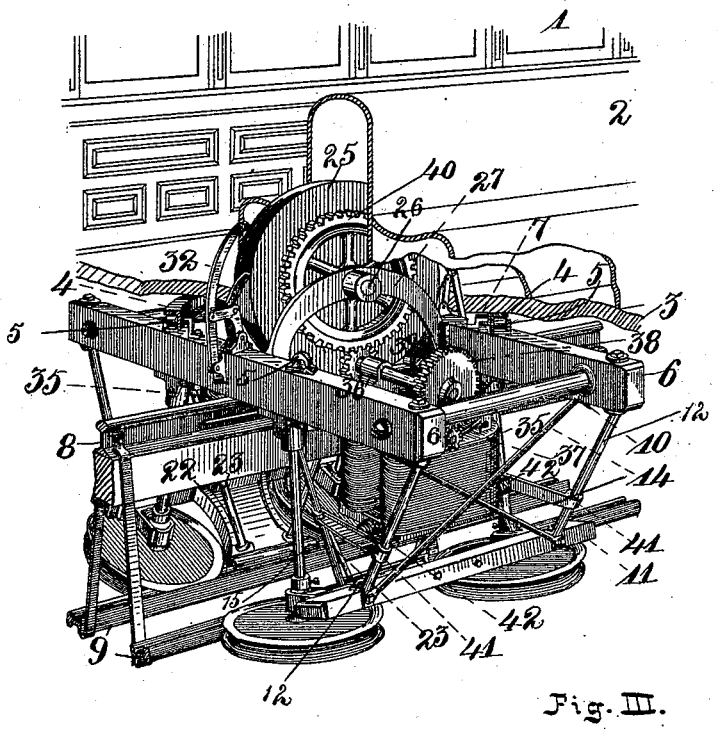


Fig. III.

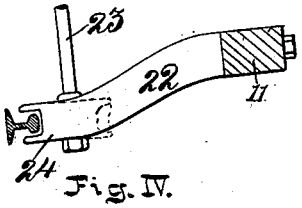


Fig. II.

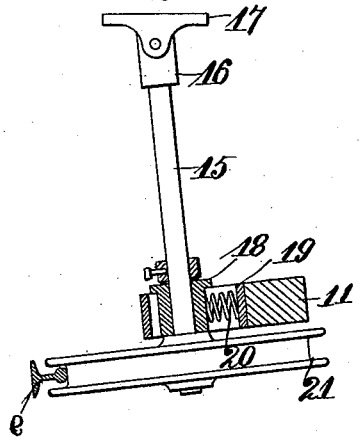
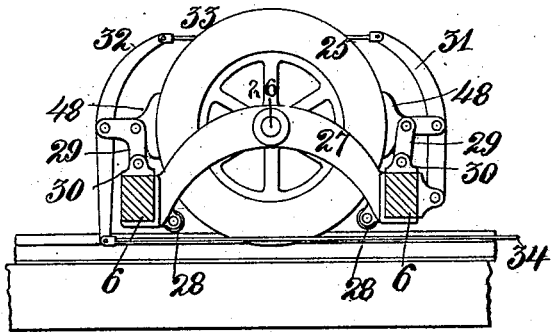


Fig. IV.



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UNITED STATES PATENT OFFICE.

EPHRAIM M. TURNER, GEORGE L. VAN BEEK, AND LEWIS A. BROWN, OF ST. LOUIS, MISSOURI, ASSIGNORS TO THE NATIONAL UNICYCLE ELEVATED RAILWAY CONSTRUCTION COMPANY, OF EAST ST. LOUIS, ILLINOIS.

MOTOR-TRUCK FOR ELEVATED RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 456,103, dated July 14, 1891.

Application filed October 2, 1890. Serial No. 366,874. (No model.)

To all whom it may concern:

Be it known that we, EPHRAIM M. TURNER, GEORGE L. VAN BEEK, and LEWIS A. BROWN, of St. Louis, Missouri, have invented certain new and useful Improvements in Car or Motor Trucks for Elevated Electric Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to improvements in "three-rail" elevated electric-railway construction, particularly to a novel form of motor-truck for this class of railways; and it consists in the devices and combination and construction of devices hereinafter set forth, and pointed out in the claims.

The invention may be said to be an improvement upon the construction described in United States Patent No. 424,693, granted to Ephraim M. Turner and James P. Taylor April 1, 1890.

In the drawings, Figure I is a perspective view, partly in section and having parts broken away, of the improved motor-truck. Fig. II is a detail view, partly in section, of a vertically-swinging guide-wheel used in making up the invention. Fig. III is an end view of a safety-guard and its mountings. Fig. IV is a detail side elevation, partly in section, of the mountings of the main supporting-wheel.

The usual elevated three-rail structure having a single central main rail and two oppositely-located guide-rails is adapted for our invention, now to be described.

1 represents the car-body, having its seats 2 arranged back to back, (if a passenger-car,) so that the space beneath may be utilized for reception of the motor mechanism, and also to locate the weight as low down as possible. Although two trucks are usually employed under each car, (one near each end thereof,) yet in this specification we do not deem it necessary to speak of the trucks or their parts in plural, and therefore shall describe but a single truck.

Upon the under surface of the floor 3 of the car is fixed a grooved ring or annulus 4, secured in place by means of suitable fastenings, such as bolts, screws, or the like, which ring forms a circular track, the depression or groove of which rests over a series of anti-friction rollers 5, which are radially arranged upon the upper sides of two main cross-beams 6 of the truck, and a series of ⌐-shaped clips or similar securing devices are also radially mounted upon and fixed to said beams in such a manner that their free ends will project over and engage above the inner flange of said grooved ring, and thereby lock the car-body securely to the truck and yet permit a rotary movement of the truck, as is brought about in running the truck over a short curve in the road.

6 represents the two or more main cross-beams of the truck, which beams are supported just above the main rail 8, and form what we may term the "timbers" of the "roof" of the two oppositely-located "pockets" containing the motor, which latter we now proceed to describe.

10 represents the side beams, which connect the cross-beams 6 at the outer ends thereof, and 11 indicate the lower side beams, which are rigidly connected to said cross-beams and suspended therefrom by the hanger-rods 12 on the crossed braces 14.

15 represents an almost vertical and normally-inclined guide-wheel shaft, of which a series may be employed on each side of the truck, said shaft having its upper journal-box 16 pivotally connected to a bracket 17, secured to the under side of the cross-beam at a point between that at which the hanger-rod of that beam is secured and the rail 8; or these "swinging shafts" may be hung from any other suitable point upon the roof of the truck, as may be required, and their lower ends, or rather portions, some distance from their lower ends, are provided with suitable boxes 18, which boxes are yieldingly connected with the lower side beams 11. A suitable strap or housing 19 is secured to the inner edge of said lower side beam, and the box 18 is mounted therein, and is thereby connected to said lower side beam. A suitable spring, such as 20, is located within the housing between the box and the beam 11, sufficient

space being left therein to permit relative movement of the shaft and beam during operation, and normally tends to urge said shaft and said beam apart, causing the guide-wheel carried by the shaft to always "hug" the rail closely.

21 represents a double flanged or grooved wheel rigidly secured upon the lower end of shaft 15, so that its tread may engage the guide-rail 9. By thus mounting these guide-wheels, which we may term "spring-mounted" wheels, we secure relative transverse movement of the swinging shafts and the truck, bringing about flexibility with safety, which we have found desirable in this class of devices, particularly in turning curves and meeting unevenness in the guide-rails.

In case of breakage of the guide-wheels 21, we avoid accident by providing safety-guards 22 on each side of the truck, and which guards may be in the form of a plate or casting rigidly secured at its outer end to the lower side beam and supported at its inner end at proper relation to the guide-rail by means of brace-rods 23, depending from the roof of the truck, the particular location of this guard being preferably between two guide-wheels and one on each side of the truck. The inner end of the guide 22 is grooved or forked in the direction of the length of the guide-rail, the groove being made wider than the head of the rail, and the grooved portion is located astride of, but not in contact with, said rail, the adjustment being such that no part of said guard shall normally come in contact with the rail.

In some cases we may mount a grooved roller, such as 24, upon or in the inner end of the guide 22 and omit the groove in said end, so that said roller will fit over the guide-rail in a manner similar to that in which the groove in the guard fits.

The entire weight of the truck and car is supported upon main wheels 25, (one at each end of car,) the same being grooved or double-flanged and resting on main rail 8. The supporting-wheel 25 is fitted with a short axle 26, upon the projecting ends of which are mounted in boxes the two parallel _⌒_-shaped yokes 27, and the cross-beams 6 are mounted on the ends of said yokes, and the mechanism before described is suspended from the cross-beams. In front and rear of the main wheel 25 and between the yokes 27 are mounted in suitable brackets or bearings safety-rollers 28, which are directly over the main rail, but normally out of contact therewith, and which are adapted to perform the supporting function of the said main wheel, in case of breakage thereof said rollers being also double flanged or grooved.

On the beams 6, diametrically opposite each other, we mount brake-blocks 48 and pivotally support them in such position as will enable their shoes to make contact with the tread of said wheel by means of links 29, the upper ends of said links being pivoted to the brake-blocks and their lower ends being mounted in brackets 30, which in turn are secured to the cross-beams 6.

31 is a vertical lever pivoted at its lower end to one of the cross-beams and having one of the brake-blocks 48 fulcrumed thereto at a point intermediate of its length, and 32 is another vertical lever pivoted at its upper end to a coupling bar or rod 33, which connects the upper ends of both levers and is fulcrumed at a point below its upper end to the link or brake-block on its side of the frame.

34 is a brake-operating rod connected to the free end of lever 32, and when a pull is exerted thereon both blocks will be applied to the tread of the wheel 25 by reason of the upper ends of said levers being so connected, as before described.

By the above construction it will be observed that we construct the truck-frame in the form of what we may term a "saddle," having, as it were, pockets on either side depending from the main supporting-axle, in which pockets we mount two electric motors, or rather suspend them therein, the motor on one side balancing the weight of that on the other side, as will now be explained.

35 represents an electric motor having suitable electrical connections for operation by the trolley or other systems and suspended in the pocket formed in one side of the truck, the armature-shaft of said motor lying transversely to the rails of the road and carrying a pinion 37 on its outer end meshing with a gear-wheel 38, carried by an additional shaft mounted immediately above said armature-shaft, and it in turn having a pinion on its inner end meshing with the large gear-wheel 40 on the axle of the supporting-wheel 25. Each side of the truck is likewise fitted with a motor and connections, although, if desired, we may dispense with such on one side and substitute therefor a corresponding weight of storage-batteries or other material. However, we prefer to mount a motor and connections in the pockets of each side, as by so doing should one become disabled the other can be immediately used to advantage; and at any rate we propose to operate the motors in each pocket simultaneously whenever occasion requires.

42 indicate springs interposed between the lower swinging ends of the motor in each pocket and the portion 41 of the ends of the pockets at each end of the motors and at each end of each pocket.

The motor connections with the main shaft or axle 26 may be of any desired style capable of permitting the lower ends of said motors to "swing" in a direction that is longitudinal to the length of the pockets.

We are aware that some styles of motors, particularly those commonly known as the "Sprague," have been mounted on trucks of surface roads so that one end may vibrate or swing in a vertical plane; but we are not

aware of any such construction, which we here show and describe, which permits the lower swinging ends of the motors to vibrate in a horizontal plane or in the arc of a circle having a central point located directly over and above the motors; and it will also be noted that all our toothed gearing is located directly above and substantially in a vertical line with the armature-shaft of our motors, the main supporting-wheel itself being so located and mounted.

What we claim is—

1. In a three-rail elevated railway, the combination of a truck having a supporting or gear wheel which projects up above its upper surface through the floor of the car-body, floor 3, a grooved ring or annulus 4, secured in place upon the under side of said floor, a series of anti-friction rollers 5, which are radially mounted upon the upper side of said truck and adapted to be engaged by the groove or depression of said ring or annulus, and a series of securing devices, such as 7, also radially mounted upon the truck and adapted to engage said ring or annulus and thereby lock the car-body to the truck, substantially as described.

2. A motor-truck for three-rail electric railways, having a roofed body through which the main supporting-wheel projects upwardly, substantially vertical shafts pivotally connected at their upper ends to said body, and guide-wheels mounted upon the lower portions of these shafts and adapted to yieldingly ride against guide-rails, substantially as described.

3. The combination of a three-rail elevated truck having cross-beams 6 adapted to form a roof therefor, guide-wheels mounted upon substantially vertical shafts depending from said cross-beams, and one or more brackets 17, secured to the said beams, a journal-box 16, pivotally secured to said bracket, one of the substantially vertical shafts 15 having its upper end mounted in said journal-box and a guide-wheel mounted upon its lower end, and a springy or yielding connection between the lower portion of said shaft 15 and a portion of said truck, whereby relative transverse movement of said shaft and the truck is permitted and said guide-wheel is caused to yieldingly engage its guide-rail, substantially as specified.

4. The combination of a truck having a substantially vertical shaft pivotally connected thereto at its upper end, a wheel mounted upon the lower end of said shaft, a side beam 11, forming a portion of said truck and rigidly connected thereto, a housing 19, rigidly secured to said side beam and embracing the said shaft above the point at which said wheel is mounted, and a spring, such as 20, located between the shaft and the beam, substantially as specified.

5. In a three-rail truck for elevated railways, having a single supporting-wheel, guide-wheels mounted upon substantially vertical shafts to engage guide-rails, and a safety-guard, as 22, having a grooved or bifurcated portion and rigidly connected to the truck with its grooved or bifurcated portion astride but out of contact with one of the guide-rails, substantially as specified.

6. In a three-rail truck for elevated railways, having a single supporting-wheel adapted to support the entire weight of the truck, safety-rollers 28, mounted on said truck directly above the location of the main rail, but normally out of contact with such rail, substantially as specified.

7. In a three-rail elevated electric railway, having a single wheel which supports and drives the truck thereof, the combination of a series of cross-beams, such as 6, adapted to form a roof, pockets comprising depending rods and bracing located on opposite sides of the single supporting-wheel, and an electric motor mounted in either one or both of said pockets and operatively connected to the shaft or axle of said single supporting-wheel and adapted to propel the truck, substantially as specified.

8. In a three-rail elevated-railway truck, having a single supporting and propelling wheel, the combination of the cross-beams 6 of the truck, brake-blocks 48, pivotally mounted upon said cross-beams, one diametrically opposite the other, in position for contact with the tread of the wheel 25, a vertical lever 31, pivoted at its lower end to one of said cross-beams and fulcrumed to one of the brake-blocks, an additional lever 32, pivoted at its upper end to a coupling bar or rod 33, said coupling bar or rod connecting the upper ends of both levers, the opposite brake-block fulcrumed to this additional lever on its side of the wheel, and an operating rod or connection 34, secured to the free end of lever 32, whereby when a pull is exerted on said operating-rod both blocks will be applied to the tread of the wheel simultaneously, substantially as specified.

In testimony whereof we affix our signatures in presence of two witnesses.

EPHRAIM M. TURNER.
GEORGE L. VAN BEEK.
LEWIS A. BROWN.

Witnesses:
C. C. LOGAN,
GEO. F. BUGFELD.