

(No Model.)

2 Sheets—Sheet 1.

M. G. HUBBARD.

CAR TRUCK.

No. 384,317.

Patented June 12, 1888.

FIG - I -

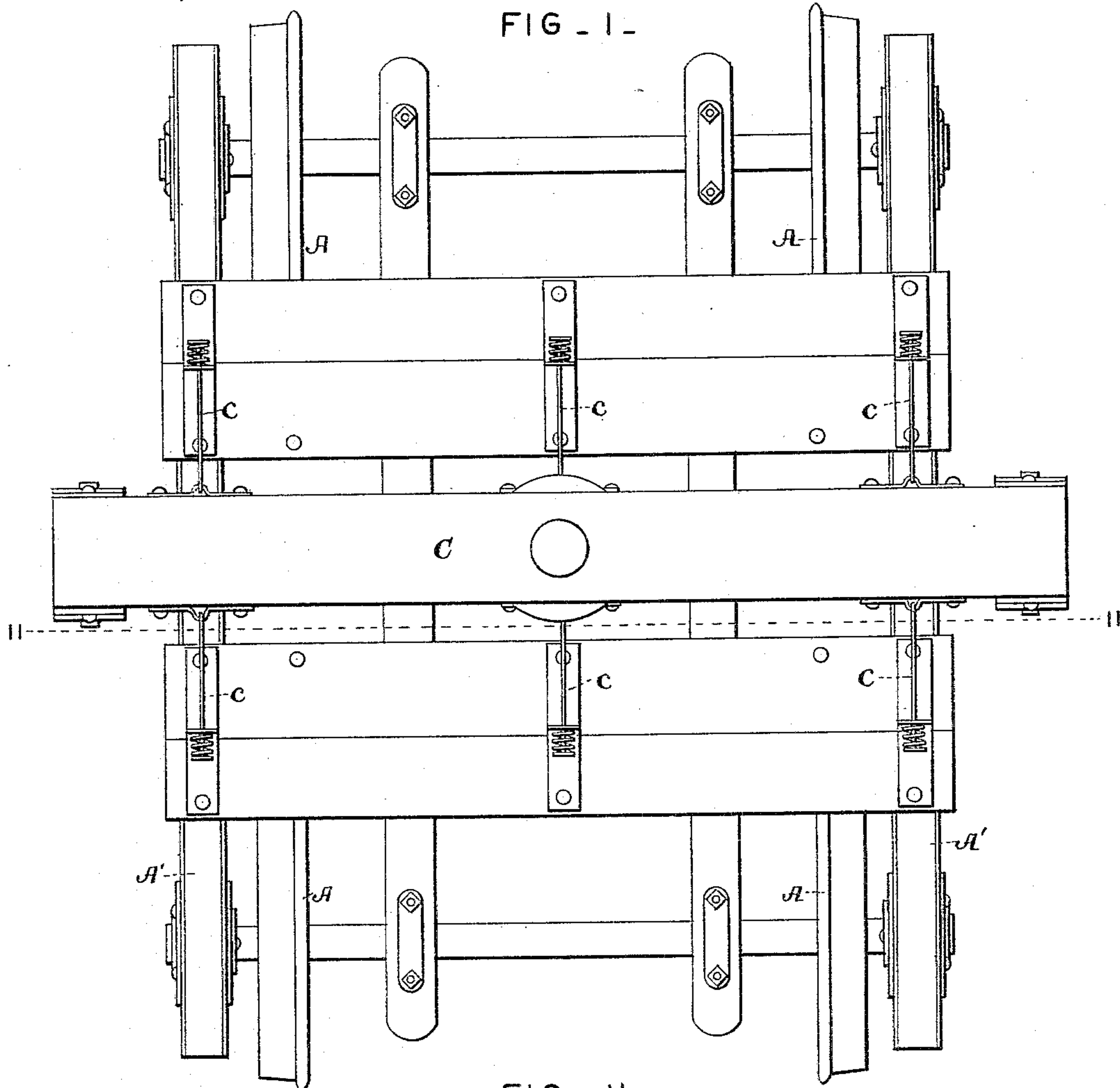
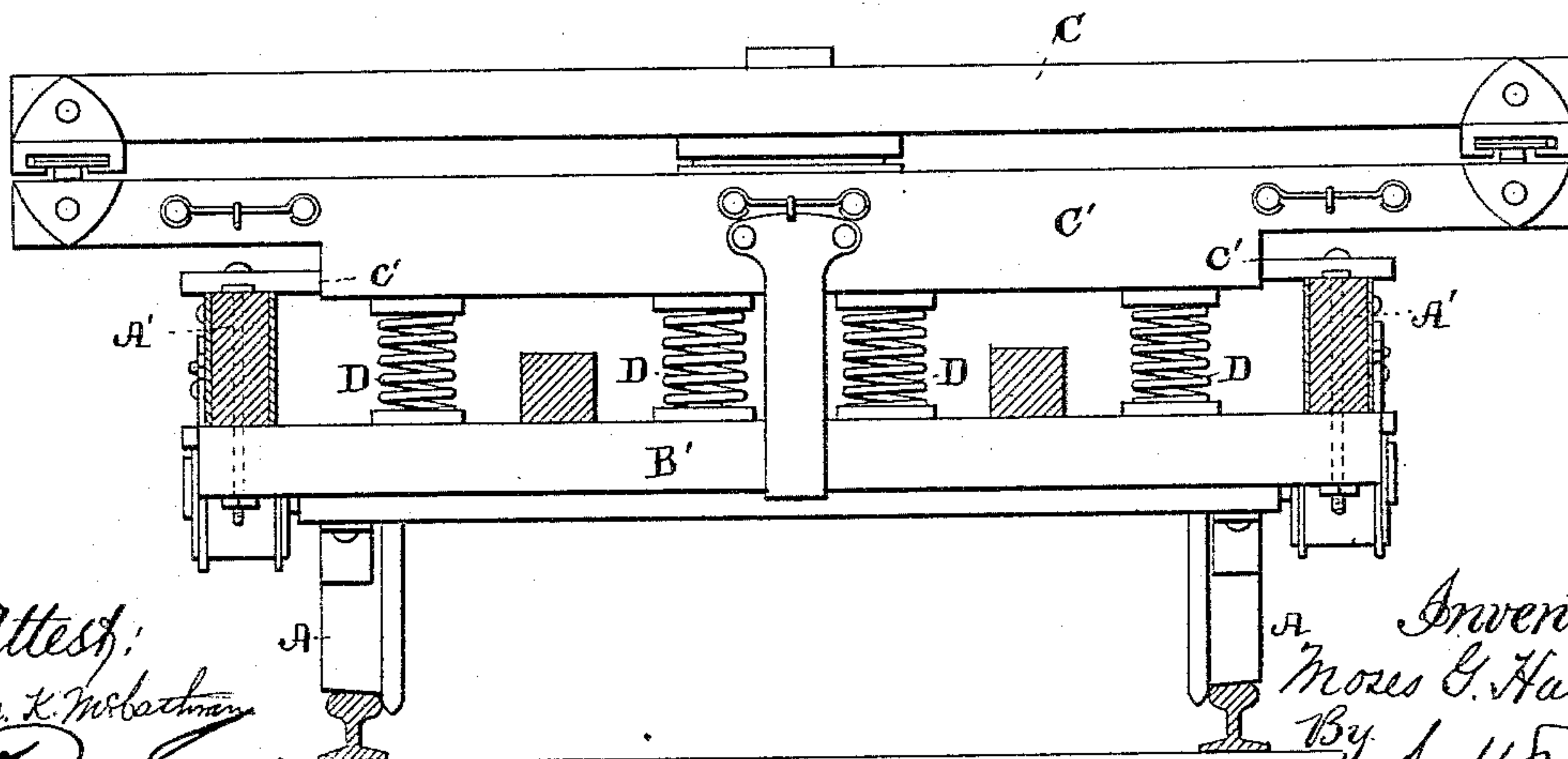


FIG - II -



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(No Model.)

2 Sheets—Sheet 2.

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FIG - III -

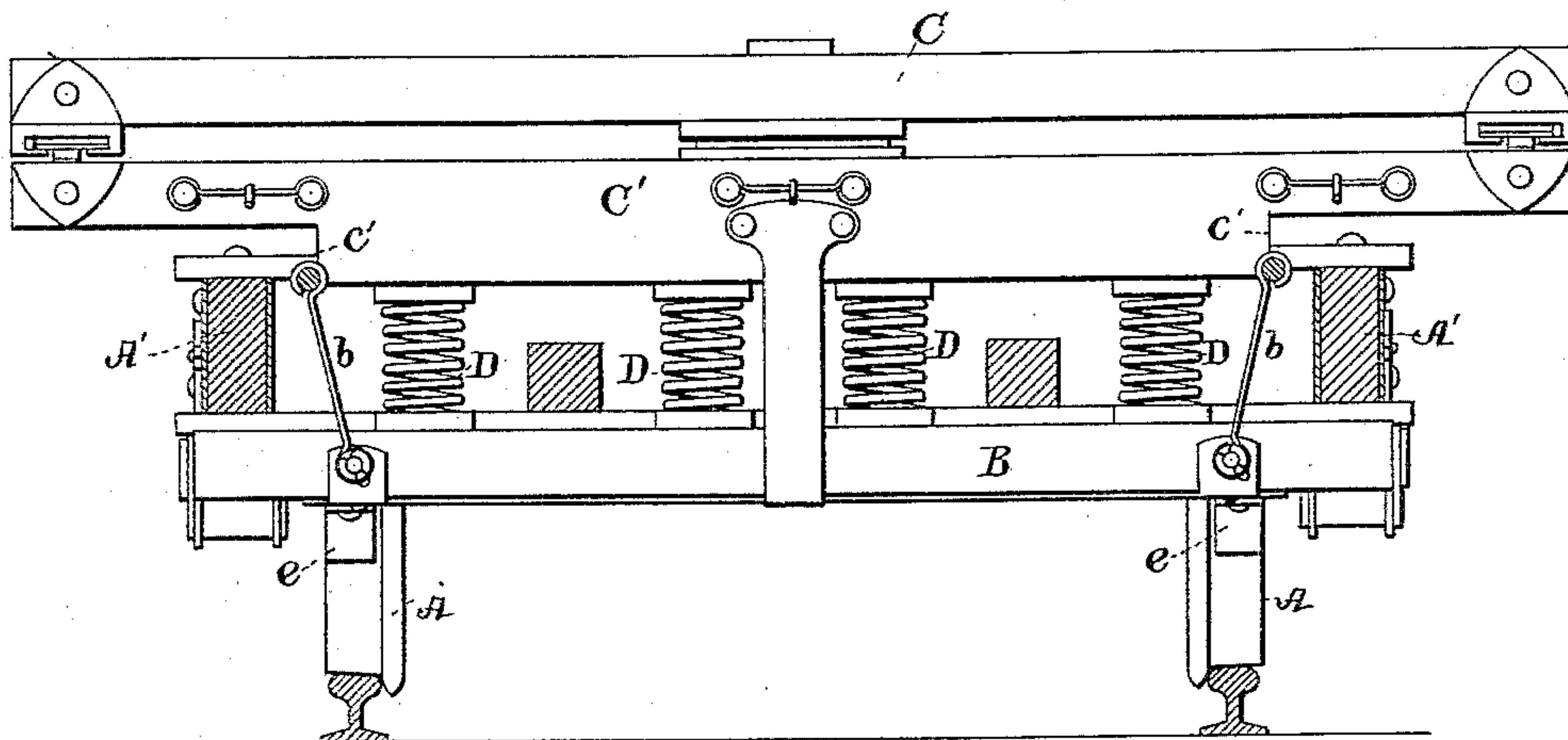
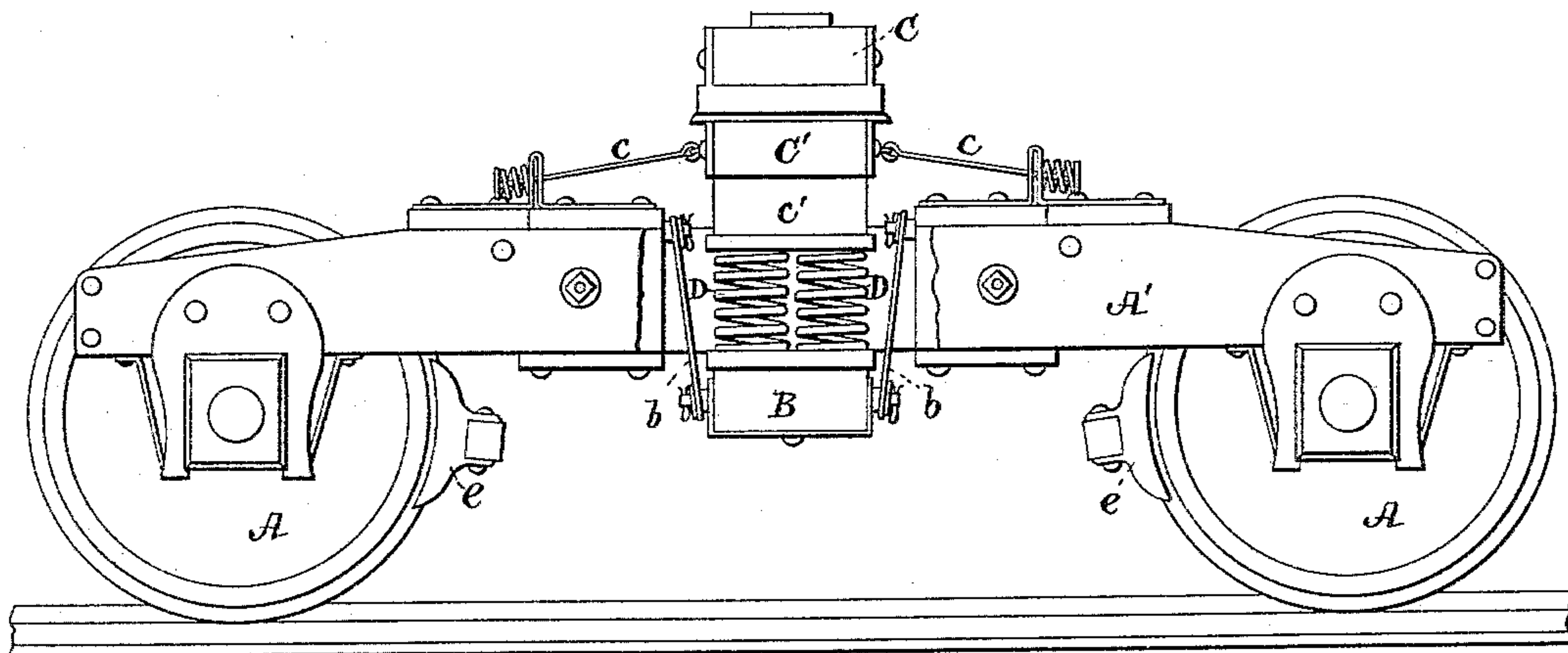


FIG - IV -



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UNITED STATES PATENT OFFICE.

MOSES G. HUBBARD, OF PHILADELPHIA, PENNSYLVANIA.

CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 384,317, dated June 12, 1888.

Application filed July 5, 1887. Serial No. 243,341. (No model.)

To all whom it may concern:

Be it known that I, MOSES G. HUBBARD, of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Car-Trucks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention consists in an improved arrangement and construction of passenger-car railroad-trucks; and it relates, first, to the combination of my double-plated wheel-pieces and other elements more fully described in my patent of September 7, 1886, with a modified form and construction of the springs, in order to get the torsional or circumferential action upon the steel rods of which they are made in a more compact and convenient form than can be attained by the use of long straight bars of steel.

In using the long straight torsion-springs described in my patent of May 22, 1855, and also the long recurved torsion-springs described in my patent of February 24, 1885, I find it very inconvenient to attain sufficient length of spring within the narrow limits of a car-truck, and I find it quite as effectual to construct the torsional spring in the cylindrical spiral form, in which any desired length of steel rod may be conveniently employed, and that in this form they may be located in such manner as to produce new and valuable results.

My invention further relates to the combination of this form of the spring with my flexible truck-frame, patented September 22, 1885, my anti-friction draft attachment, patented September 22, 1885, my outer bolster-bearings, patented September 7, 1886, and the extended bolster patented by me September 22, 1885.

To relieve the car from the jar and vibration of the wheels, it is necessary to introduce between them the most elastic and delicate support that it is possible to construct, while the great load to be carried requires great stiffness and strength in all of its supports. The elasticity and delicacy of a spring depends in such great degree upon its length, and the torsional or circumferential action upon the metal is much more favorable than a

transverse strain, and I have found the spiral form of torsion-spring the best for the purposes, because in this form a car may be conveniently and economically mounted upon several hundred feet of steel rod with a delicacy of vibration and aggregated stiffness which cannot within convenient limits be attained with straight or recurved torsion-springs, and when such great length and vibration can be utilized without the friction attending the rolling action of the straight torsion-springs in journal-bearings, and without the resistance to the vertical action of the springs or bolster encountered in all forms of car-trucks constructed without my anti-friction draft-links the effect of the vibrations of the car-wheels may be reduced to such an inconsiderable amount as to almost be imperceptible and comparatively harmless upon the car and upon the trucks or rails. This spiral form of the springs standing vertically is very elastic in all directions, which greatly aids in imparting lateral and longitudinal freedom of the truck, and for the best-constructed roads I prefer to support them on a spring-platform, B', permanently attached to my said double-plated wheel-pieces, as shown in Fig. 2; but when required by the peculiarities of a road—such as sharp curves, &c.—I suspend the spring-platform B upon pendent links, as shown in Fig. 3, to aid the springs in giving lateral freedom to the bolster, while for most roads the lateral elasticity of the springs in this form is ample to give all of the lateral elasticity and freedom of the bolster that is necessary.

When it is necessary to use the pendent links *b*, I find considerable advantage resulting from inclining their lower ends diagonally or inward and from the car-wheels A toward the center of the truck, as will be hereinafter more fully explained, and on such roads the spring-platform B may be extended beyond the wheel-pieces, if desired, and thereby aid in resisting the effect of the centrifugal force upon the car; but for ordinary roads I prefer to locate all of the springs inside of the truck-frame. It will be observed that by the arrangement of these springs in line transversely across the truck there would be less resistance to the vertical action of the truck-wheel than would result from any other location, and that

this effect would be increased by the movement of the upper end of a diagonally-inclined pendent link, because its action would tend to lengthen it instead of shortening it.

5 The general form and construction of my improved truck are shown in plan view in Figure I of the drawings, hereto attached, and which form a part of this specification. It is similar to my truck described in my said patent
10 of September 7, 1886, except in the form and construction of the torsion-springs and the construction and arrangement of their supports.

In my present improvements the bolster C
15 is mounted upon spiral torsion-springs D, arranged in one or more rows in line transversely across the truck, as shown in Fig. II, which shows a bolster and spring-platform, B', in front elevation and the springs arranged in
20 line upon the spring-platform, which is bolted permanently to the double-plated wheel-pieces A. Fig. III shows the same parts suspended by the diagonally-inclined pendent links, the lower ends of which I incline considerably in
25 and slightly from each truck-wheel toward the center of the truck, so that it is inclined to some extent diagonally across the truck.

Fig. IV is a side elevation of my improved truck. The bolster C C' is held in position
30 longitudinally of the truck by my said patent draft-links c, and is constructed with abutting shoulders c', extending down between the wheel-pieces to limit its lateral movement and the lateral strain upon the vertical springs.

35 The construction and arrangement of the springs favor the location of the brakes e between the wheels, because it enables me to very considerably diminish the width of the spring-platform, and thereby bring the cross-
40 sills of the truck-frame nearer together, and thus allow ample room for the brakes between the cross-sills and wheels within the limits of a truck or ordinary base.

When constructed as described, my truck
45 unites the greatest degree of strength, lightness, flexibility, economy, and convenience, with the longest, and therefore the most delicate, torsion-spring that can be conveniently constructed, and, operating entirely free from
50 friction and wear, they act more freely and respond more readily to the rapid vibrations of the car-wheels than any other form of spring.

Notwithstanding the entire freedom of the bolster to vibrate in all directions when supported on these springs, and only held in position
55 circumferentially of the king-bolt by the elastic draft-links, my said anti-friction outer bolster-bearings will not cause the bolster to swing out of position, because they act upon
60 the bolster with almost perfect freedom from friction, also imparting to the truck unusual freedom to curve and follow a crooked track, without liability to jump the track or cause abrasion of the rails and flanges of the wheels,
65 as more fully described in my patents above referred to.

It will be observed that with the above-de-

scribed springs located in the vertical position shown in Figs. III and IV and constructed in the form and proportions described, their
70 free ends will have about as much lateral elasticity as vertical, and this peculiarity adapts them specially to co-operate with the draft-links and the other elements described in imparting to the car-wheels and to the car just
75 the movement required for easy riding, and as they occupy less space longitudinally of the truck than any other form of springs they favor the location of the brakes between the wheels in my flexible truck, within a conven-
80 ient base, especially when combined with my above-described double-plated wheel-pieces, which permit a longer truck than could otherwise be made with safety.

When I use the pendent links in combina-
85 tion with the vertical springs for imparting lateral freedom, I locate the abutting sills, described in my aforesaid patents, within a few inches of the bolster, to aid the cross-sills in supporting the pendent links, and thus attain
90 great vertical strength at the points of their attachment, and when these pendent links are inclined inward at their lower ends their action, when one of the truck-wheels is suddenly
95 raised by an obstacle, is peculiarly adapted to co-operate with the horizontally-elastic springs, because, as the truck-frame at that point rises, the link, when thus inclined, lengthens by the lateral movement of its up-
100 per end, and thereby and through the lateral elasticity of the springs materially modifies and diminishes both the lateral and vertical action upon the bolster, so that the ultimate result is so distributed by the combined action
105 as to become imperceptible on the car.

To connect the bolster and spring-platform and hold the springs in position, I attach the upper ends of a check-loop to the bolster and extend it around under the spring-platform, which also serves to check the upward move-
110 ment of the bolster. This check-loop is shown in Figs. II and III. The vertical springs are thus securely held in position without impairing or diminishing their free lateral and ver-
115 tical action, and these two motions of these springs, when combined with the greatly-increased rocking freedom of the bolster, (and therefore of the truck,) which results from their arrangement in line transversely across the truck, and with the inwardly-inclined
120 pendent links, accomplish an aggregate result of ease and quiet riding never before attained by any other construction and arrangement with which I am acquainted.

Having now described my invention, I claim
125 as new—

1. The car-truck bolster pivoted at its center to the car and mounted on the vertical spiral torsional springs, in combination with the draft-links of the car-wheels, whereby the car-
130 wheels can vibrate both vertically and laterally without frictional resistance from the draft, substantially as described.

2. The combination of the elastic draft-links,

a car-truck bolster pivoted at its center to the car and mounted on the vertical spiral torsion-springs, with the truck-wheels, whereby the truck-wheels can vibrate in all directions from the rail without frictional resistance from the draft, substantially as and for the purposes set forth.

3. The spiral torsion-springs constructed as described, and located one pair each side of each safety-sill and all in line transversely across the truck-frame, substantially as described and shown.

4. The abutting sills located near the bolster and adapted to act also as supporting-sills, in combination with the pendent links for supporting the bolster, substantially as and for the purposes set forth.

5. The combination of the springs, constructed and located substantially as described, with the flexible truck-frame having double-plated wheel-pieces, whereby the truck may be more safely made with convenient base to admit of the wide thin cross sills between the bolster and springs, substantially as described.

6. The flexible truck-frame constructed, substantially as described, with double-plated wheel-pieces, and the springs constructed and located therein, as set forth and shown, in combination with the brakes located between the wheels, substantially as and for the purposes described.

7. The combination of the bolster, the vertical springs, the spring-platform, and the ver-

tical check-loop, constructed and arranged substantially as and for the purposes described.

8. The combination of the extended bolster and the vertical spiral torsion-springs with the anti-friction outer bolster-bearings to diminish the circular or twisting strain upon the vertical springs, substantially as set forth.

9. In a car-truck, the combination of the lower spring support or platform rigidly attached to the truck-frame, the spiral torsion-springs mounted thereon, and the truck-bolster mounted, as described, in such manner that the lateral motion thereof shall be controlled by the springs, whereby both the vertical and lateral movements of the car or its wheels are controlled and cushioned by the same springs, for the purposes substantially as described.

10. The combination of a lower spring support or platform rigidly attached to the truck-frame, the vertical spiral torsion-springs mounted thereon, the truck-bolster mounted on the springs, and the elastic draft-links, whereby the attachment of the car to the wheels is made elastic in every direction, for the purposes substantially as set forth.

In testimony whereof I have hereunto set my hand this 1st day of July, A. D. 1887.

MOSES G. HUBBARD.

Witnesses:

LISLE STOKES,
GEO. J. WATT.