

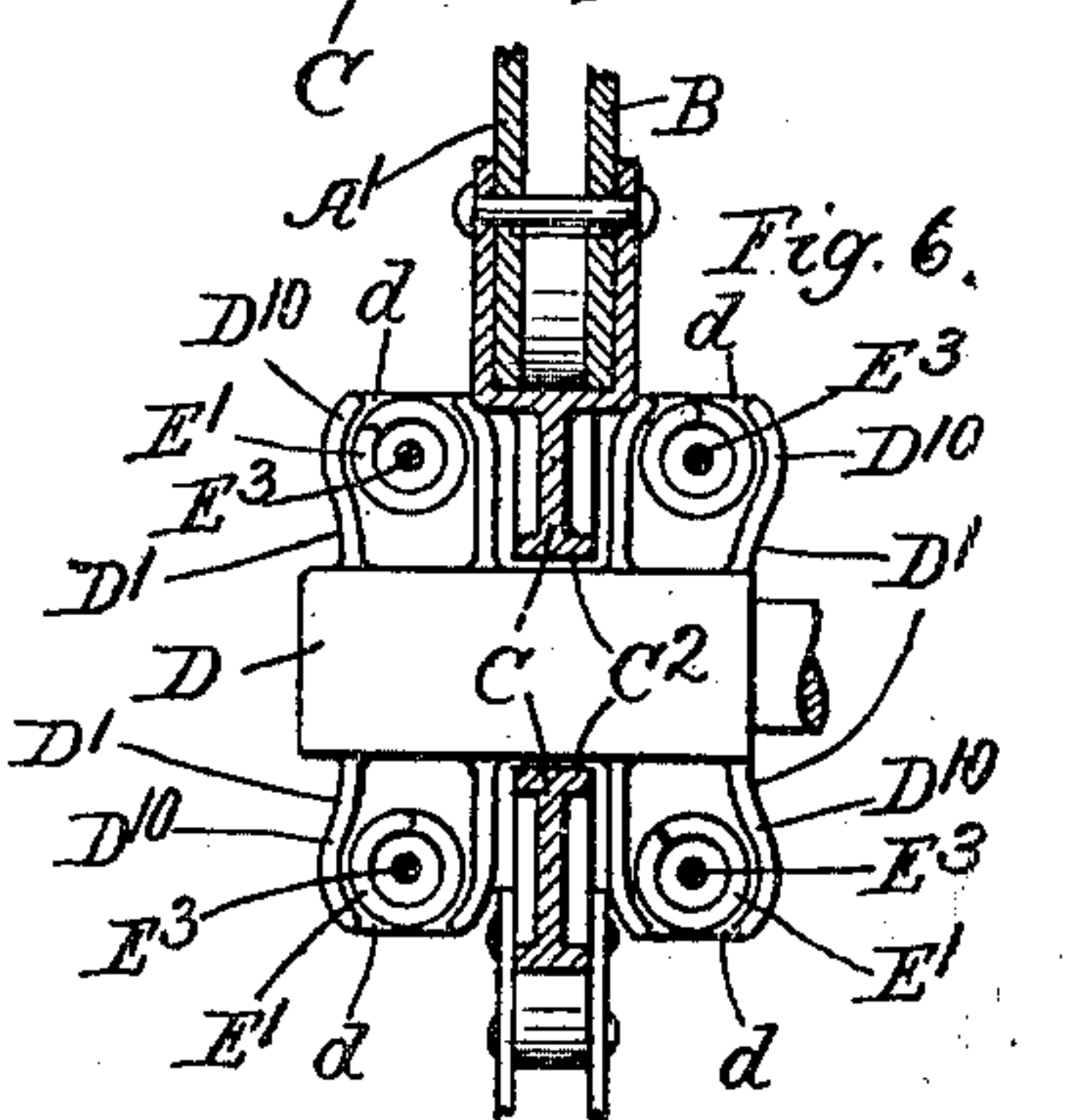
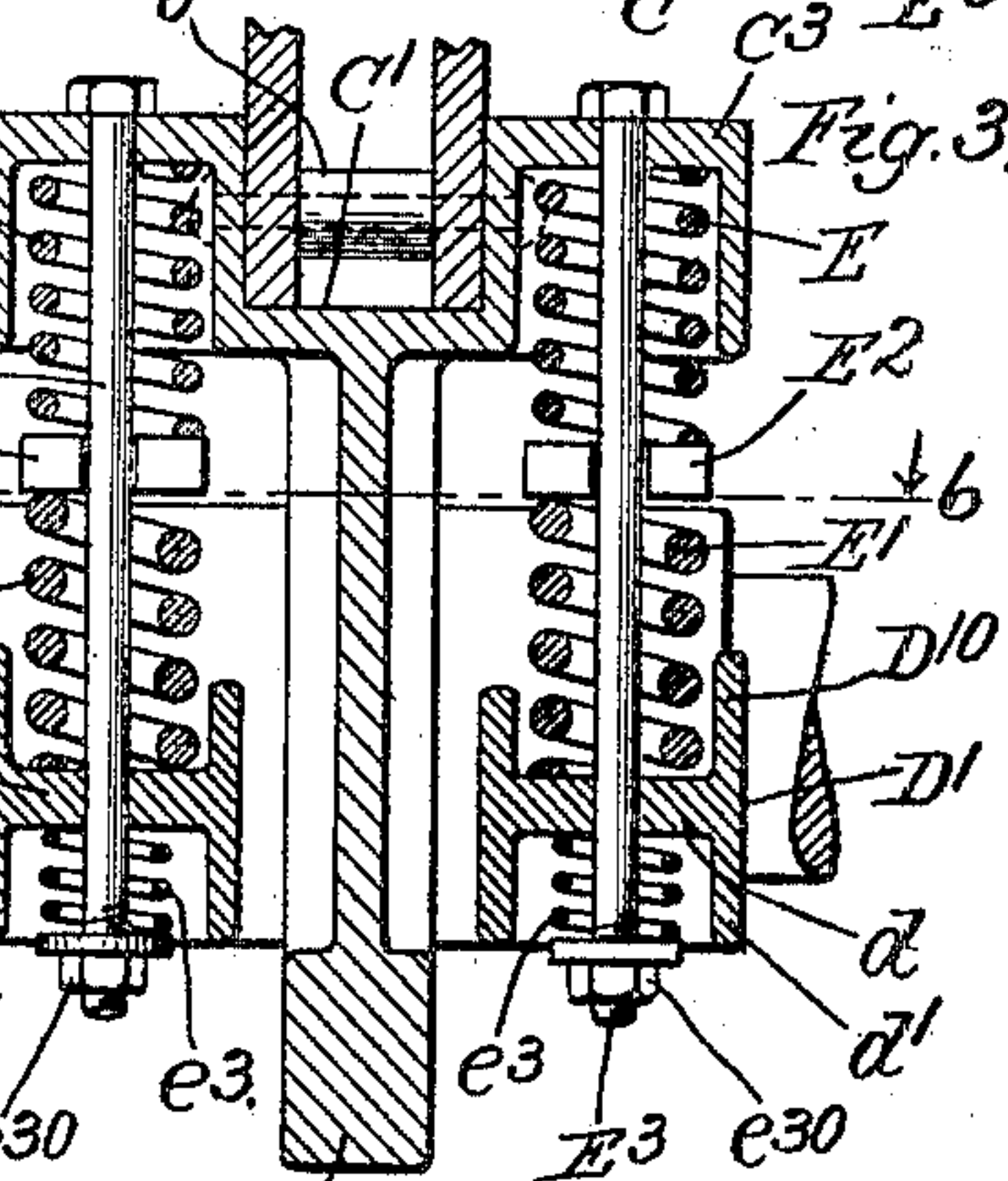
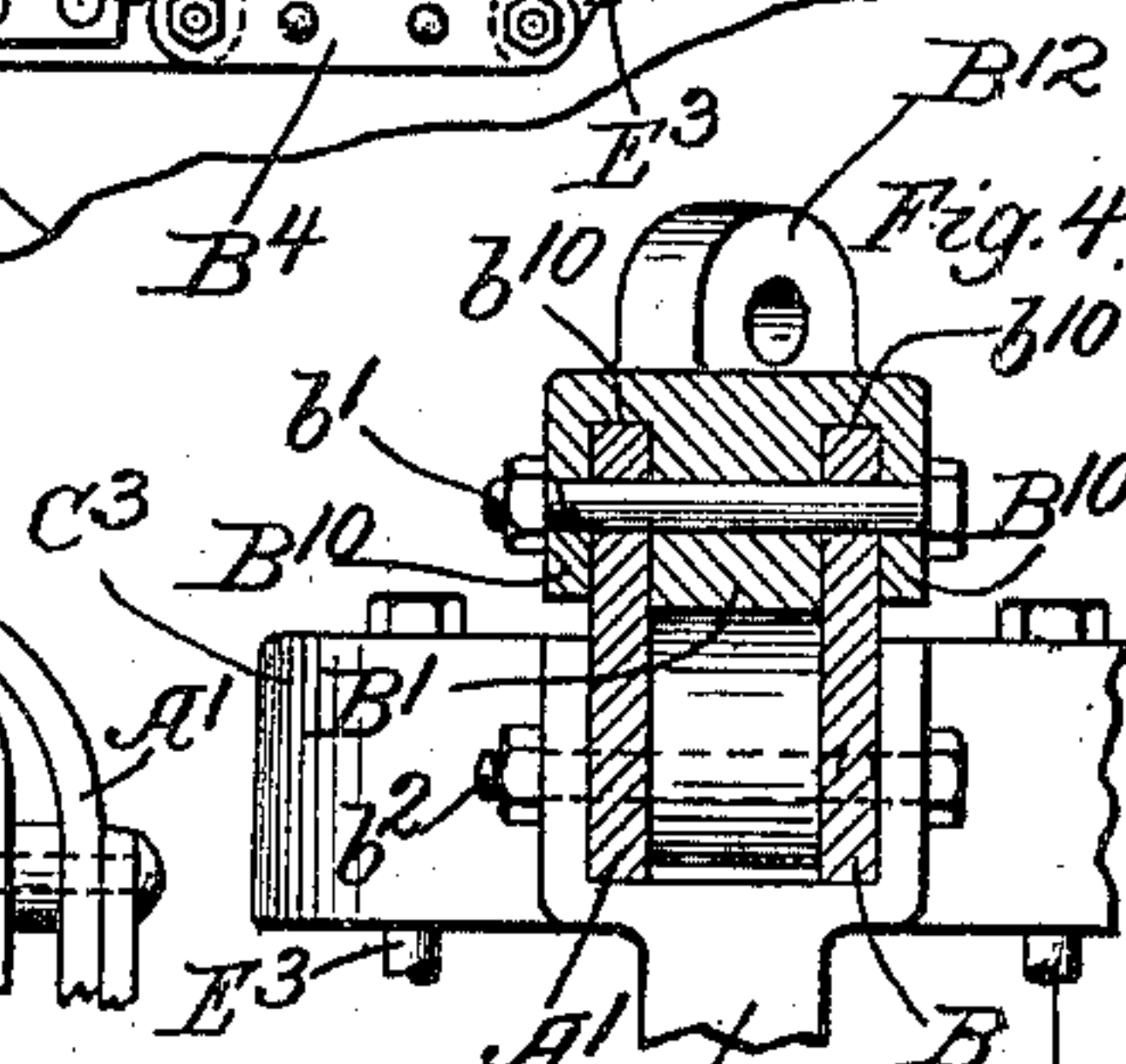
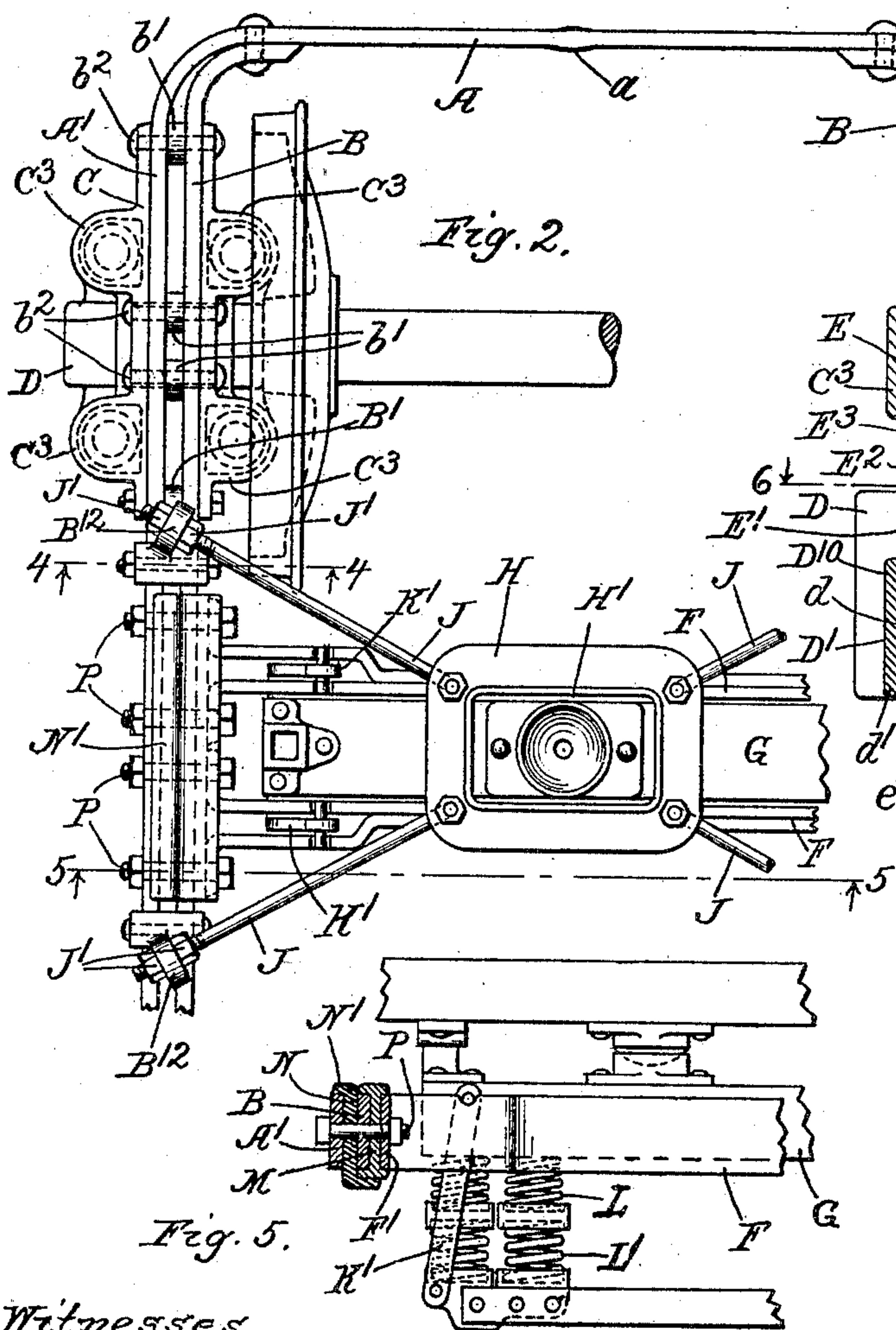
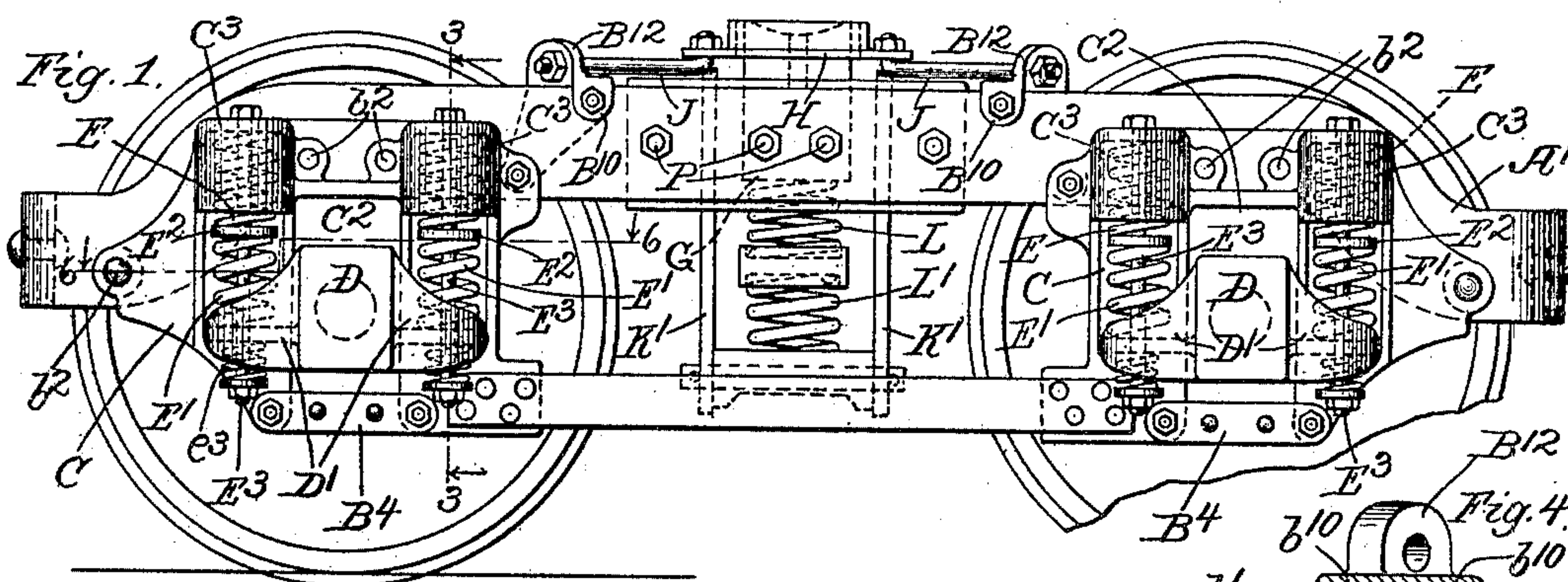
No. 682,348.

Patented Sept. 10, 1901.

A. A. AMBLER.
CAR TRUCK.

(Application filed Nov. 24, 1900.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

ARTHUR A. AMBLER, OF CHICAGO, ILLINOIS.

CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 682,348, dated September 10, 1901.

Application filed November 24, 1900. Serial No. 37,609. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR A. AMBLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Trucks, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

10 This invention relates to car-trucks especially designed for suburban or elevated service. The features which constitute its novelty are mainly designed to contribute to rigidity of the frame while keeping it light and
15 to adapt it to cause the car to ride easily and with the minimum oscillation or vertical vibration, whether empty or lightly or heavily loaded, and are specifically pointed out in the claims.

20 In the drawings, Figure 1 is a side elevation of my improved car-truck, many features of details not strictly pertaining to the subject-matter of the claims being omitted. Fig. 2 is a detail plan of the same truck, broken away
25 so as to avoid showing more than one of the features, which are the same in the four quarters of the truck. Fig. 3 is a section at the line 3 3 on Fig. 1 upon an enlarged scale. Fig. 4 is a detail section at the line 4 4 on Fig. 2.
30 Fig. 5 is a detail section at the line 5 5 on Fig. 2. Fig. 6 is a horizontal section at the line 6 6 on Figs. 1 and 3.

My improved truck comprises a wheel-encompassing frame, consisting of an integral
35 wheel-encompassing bar A, suitably bent and forged to extend upon the four sides of the frame, the ends being brought together and welded at *a*, midway in one of the end bars. The side bars of this wheel-encompassing
40 frame are rendered suitably rigid by the addition of supplemental side plates B B, paralleling the side plates A' A' of the integral continuous frame-bar A, said supplemental side plates B B being suitably spaced from
45 the side plates A' A' by spacing-washers *b' b'* on the bolts *b² b²*, which secure said plates A' and B together, and said supplemental side plates B B are at the ends bent around the corners of the frame and abut facewise upon
50 the inner surface of the end bars of the continuous frame-bar A.

C C C, &c., are wheel-pedestals, rigid with

the wheel-encompassing frame. These wheel-pedestals are longitudinally apertured at the upper part at C' and in said aperture receive 55 the compound side bar of the wheel-encompassing frame, both the plates of said side bar being entered in one and the same upwardly-open aperture C' of the pedestal. The pedestal is transversely apertured at the 60 lower part at C² to admit the axle journal-box D, and the two branches or fork-arms of the pedestal bounding the downwardly-open aperture or gap which receives the journal-
65 box are tied together below the latter after it is inserted by means of the removable tie-bar B⁴.

The pedestal C has at the upper part four downwardly-facing spring housings or seats C³ C³ C³ C³, one upon each side of the longitudinal aperture which receives the com- 70 pound side bars of the frame and one upon each side of the transverse aperture provided to receive the axle journal-box. The journal-box D is provided with four lugs D' D' D' D', 75 having corresponding seats *d*, facing upwardly to receive the lower ends of such springs, which are guarded and retained by the vertical flanges D¹⁰ D¹⁰. Each of the springs located in the four positions thus pro- 80 vided is composed of two parts or elements. An upper element E is adapted to yield under moderate pressure—such, for example, as might be exerted by the empty car—and is adapted to cushion the car suitably when it is 85 thus carried empty or with a light load. The lower element E' is a heavier spring, adapted to yield very slightly only under the pressure which compresses the spring E to its limit, or nearly so, and adapted, therefore, to carry 90 the weight of the loaded car with proper cushioning effect. Intermediate the two elements E and E' of each complete spring there is interposed a division-plate E² to prevent the springs becoming interlocked and to transmit 95 the pressure of the one to the other. A center and check bolt E³ is extended through the spring, being inserted through a suitable aperture at the center of the housing above, through a like aperture in the division-plate 100 E², and through a like aperture in the center of the seat *d*. Below said seat the bolt protrudes and is provided with a light check-spring *e³*, retained by a nut *e³⁰*, guarded by

the lateral flange d' , and adapted to take up the slack and prevent the bolt from rattling or being jolted upward when the springs E and E' are alternately compressed and extended under the oscillation of the car.

The most effective method of rendering a four-sided frame horizontally rigid is to extend from opposite sides diagonal ties or braces, intersecting at the center. Precisely this cannot be done in the case of a car-truck frame, because at the center must be located the bolster-pivot. The construction of my truck in this respect may be understood from Fig. 2, F F being cross-bars which connect the opposite compound side bars of the wheel-encompassing frame, the truck-bolster G being carried on the bar K, which is suspended by links K' K', &c., from the bars F F, suitable springs being interposed between the carrying-bar K and the bolster G and the latter having at the middle point of its length the bolster-pivot seat g , in which the pivot g' , projecting downward from the car-body bolster G', is seated. The springs on which the bolster G rests are constructed on principles similar to that already described in respect to the springs E and E', being made to consist of two parts L and L', separated by a plate L², the lower spring L' being heavier and adapted to carry the weight of a loaded car, while the upper spring L is lighter and adapted to properly cushion the empty or lightly-loaded car. In order to make the wheel-encompassing frame rigid horizontally, notwithstanding the impossibility of extending diagonal braces through the center, I provide a plate H, apertured to accommodate the bolster-pivot seat, the aperture H' being elongated transversely with respect to the truck in order to accommodate the transverse oscillation of the car, which gives longitudinal oscillation to the truck-bolster, permitted and provided for by the suspending links K' K'. From the corners of the plate H, I extend four strain-rods or tie-bars J J J J to the opposite side bar of the wheel-encompassing frame, said strain-rods or tie-bars diverging to said side bars and toward the end bars of the frame, the diagonally opposite of these strain-rods or tie-bars being in line through the axis of the bolster-pivot. These strain-rods or tie-bars being pivotally attached to the plate H and fastened to the side bars of the frame operate with the precise effect of diagonal tie-bars intersecting at the center to prevent distortion of the frame in a horizontal plane. A convenient and effective means of fastening the strain-rods or tie-bars to the side bars of the frame is to utilize a spacing-block B', which is bound between the plates of the compound side bar in the longitudinal upper aperture of the pedestal, such spacing-block being extended above the plate and across their upper edges and being provided with downwardly-extending lugs B¹⁰ B¹⁰, which embrace the plates between them, forming

intervening shoulders b^{10} b^{10} , which lodge upon the upper edges of the plate, a bolt b' being inserted through the lugs B¹⁰ B¹⁰ and through the intervening plates in addition to the bolt b^2 , which secures the spacing-block and at the same time binds the plates which constitute the compound side bars in position in the longitudinal aperture of the pedestal. The clip, consisting of said extended spacing-block, is thus very rigidly secured to the side bar and also to the pedestal and is provided with an upstanding lug B¹² to receive the threaded ends of the strain-rods J, nuts J' J' on the threaded portion of the strain-rods at opposite sides of the lugs B¹² serving to adjust and secure the strain-rods, taking up any slack in the construction, and, if desirable, putting the rods and the frame under tension for the purpose of greater rigidity.

Inasmuch as the entire weight of the car is transmitted to the truck through the bars F F, which support the bolster, it is essential that the attachment of said bars F F to the side bars of the wheel-encompassing frame should be made in such a manner as to endure the strain caused by this weight. It will be manifest that if this attachment is made merely by bolts the shearing stress upon these bolts will be very great, and such mode of attachment will not be adequate or secure. The construction which I provide at this point is best seen by examination of Fig. 5, which is a section through the compound side bar immediately adjacent the junction therewith of one of the bars F. The bar F is bent at its foot to form a flange F', and between this flange and the inner plate of the compound side bar is interposed I-blocks M, the flanges of which upon one side embrace the upper and lower edges of the inner plate B of the compound side bar, while the flanges of the opposite edge embrace the foot-flange F' of the bar F. Between the two bars A' and B, forming the compound side bar, at this point there is interposed a spacing-block N, which is V-shaped in cross-section, having its outer flange N' turned outward and embracing the upper edge of the outer plate A', while the lower flange is turned inward and embraces the lower end or flange of the I-block M. A bolt P, inserted through the foot-flange F', I-block M, both plates A' and B of the compound side bar, and intervening space-blocks N, binds all these parts together. It will be seen that the weight of the load transmitted by the bar F, which would otherwise operate with a shearing stress upon the bolt P, is taken by the flange of the I-block on which the foot-flange F' of the cross-bar F rests and is by the I-block transmitted to the upper outer flange of the latter and thence to the plate B, by which the stress is transmitted to the inner flange of the I-block and thence to the lower flange of the spacing-block N, and thereby to the upper flange of said block and thence to the outer plate A' of the compound bar, there-

by distributing the weight to both the plates A' and B and relieving the bolt of substantially all shearing stress.

I claim—

5 1. In a car-truck, a rigid wheel-encompassing frame, a bolster, having the pivot-seat for the car-body, a plate having an aperture for the pivot-seat, and four diagonal strain-rods or tie-bars, located in line two and two, through
10 the axis of the bolster-pivots, and connected to the apertured center plate and to the side bars of the frame.

2. In a car-truck, a rigid wheel-encompassing frame; a transversely-oscillating bolster-plate having pivot-seats for the car-body; a
15 plate having an oblong aperture to accommodate the oscillation of the pivot of the bolster; and four diagonal strain-rods or tie-bars, located in line two and two through the axis of
20 the bolster-pivot, and connected to the apertured center plate and to the side bars of the frame.

3. In a car-truck, a rigid wheel-encompassing frame; a bolster having the pivot-seat for
25 the car-body; a plate having an aperture to accommodate such pivot-seat; and four diagonal strain-rods located in line two and two through the axis of the bolster-pivot, and connected at their opposite ends respectively to
30 such apertured center plate and to the wheel-pedestal.

4. In a car-truck, a frame encompassing the wheels having compound side bars composing
35 two parallel vertically-edgewise plates rigidly spaced and secured together, and pedestal-irons longitudinally apertured from the top downward to receive the compound side bars, both plates of such compound bars being received in one and the same upwardly-open
40 aperture in the pedestal.

5. In a car-truck, the frame encompassing the wheels, having compound side bars composed each of two parallel vertically-edgewise plates rigidly spaced and secured to-
45 gether; pedestal-irons longitudinally apertured from the top downward to receive the compound side bars and transversely apertured from the lower side upward to receive the axle journal-boxes, both plates of such
50 compound bars being received in one and the same aperture in the pedestal.

6. In a car-truck, the frame encompassing the wheels having compound side bars composed each of two parallel vertically-edgewise plates rigidly spaced and secured to-
55 gether; pedestal-irons longitudinally apertured from the top downward to receive the compound side bars and transversely apertured from the lower side upward to admit
60 the axle journal-boxes, and detachable tie-bars connecting the lower branches of such pedestal-irons across the gap through which the axle journal-boxes are admitted.

7. In a car-truck, an integral endless vertically-edgewise frame-bar encompassing the
65 wheels, combined with supplemental plates bound to the sides respectively of such wheel-

encompassing frame-bar, and spaced therefrom, and extended around the corners and lapped and secured facewise rigidly on the
70 end portions of the encompassing frame-bar.

8. In a car-truck, in combination with the wheel-encompassing frame, pedestal-irons having the frame-bars extending longitudinally through them at the upper part and
75 the axle journal-boxes extending transversely through them at the lower part, and having at the upper part downwardly-open spring housings or seats, one upon each side of the longitudinal frame-bars, and one upon each
80 side of the axle journal-box; such axle journal-box having corresponding seats for the lower ends of the springs, and four springs interposed between said downwardly-open
85 seats or housings and the upwardly-facing seats of the journal-box.

9. In a car-truck, in combination with the wheel-encompassing frame, a cross-bar at the middle part of the length for supporting the
90 bolster, the side bars of the frame being composed of two vertically-edgewise plates and an I-block, having its flanges at one side embracing the upper and lower edges of the inner plate of such side bar, the cross-bar having its end formed with a seat between
95 the upper and lower flanges of the I-block on the inner side, and a spacing-block between the two plates of the side bar, Z-shaped in cross-section, having its upper flange turned
100 outward and engaging above the upper edge of the outer plate, and its lower flange turned inward and engaging below the flange of the I-block; and a bolt taking through the foot of the cross-bar and the I-block, both plates of the side bar and the spacing-block between
105 the same.

10. In a car-truck, in combination with the wheel-encompassing frame having compound side bars composed of edgewise-vertical plates rigidly spaced and secured together, the ap-
110 pertured center plate and the strain-rods or tie-bars extending therefrom to the side bars of the frame; spacing-blocks, of the compound side bars, being extended and provided with shoulders bearing upon the upper edge of the
115 plates, and with a lug to receive the strain-rods or tie-bars to constitute the means of connecting the same to the frame.

11. In combination with the centrally-apertured plate and the strain-rods or tie-bars
120 therefrom to the side bars of the frame, the spacing-block, extended above the upper edges of the plates forming the side bar, and provided with downwardly-extending lugs clasping said side bars between them, and an
125 upwardly-extending lug to receive the strain-rods or tie-bars.

12. In a car-truck, in combination with a wheel-encompassing frame, a bolster supported therein, having a pivot-seat for the
130 car-body, a central plate apertured to accommodate the pivot-seat; strain-rods pivotally connected to and extending from such center plate to the side bars of the frame, and the

lugs, rigid with such side bars, apertured to receive the rods, the rods being threaded and provided with nuts, whereby they may be adjusted to take up slack in the construction, 5 and render the frame tensely rigid horizontally.

13. In a car-truck, an integral, vertically-edgewise frame-bar encompassing the wheels, the ends or transverse portions of such frame-bar being drooped below the level of the sides or longitudinal portions, and supplemental plates bound to said sides respectively, and spaced therefrom and extending along the drooping portion to the lower level occupied 10 by the end portion, and bound rigidly facewise to said end portion.

14. In a car-truck, an integral, endless, vertically-edgewise frame-bar encompassing the wheels, the ends or transverse portions of 20 such integral frame-bar being drooped below the level of the sides or longitudinal portions; supplemental plates bound to said sides respectively and spaced therefrom, and extending along the drooping portions to the 25 lower level occupied by the ends and bound rigidly facewise to said ends; pedestals having the sides or longitudinal portions of frame-bars secured to them at the top and rigid lon-

gitudinal bars connecting at the bottom the pedestals at each side, the ends or transverse 30 portions of the integral frame-bars being intermediate in level between the longitudinal portions of the same and said lower longitudinal bars.

15. In a car-truck, an integral, endless, vertically-edgewise frame-bar encompassing the 35 wheels, the ends or transverse portions of such integral frame-bar being drooped below the level of the sides or longitudinal portions; pedestals having the sides or longitudinal 40 portions of such frame-bars secured to them at the top, and rigid longitudinal bars meshing at the bottoms of the pedestals at each side, the ends or transverse portions of the integral frame-bars being intermediate in 45 level between the longitudinal portions of said integral bar and said lower longitudinal bars.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at 50 Chicago, Illinois, this 17th day of November, A. D. 1900.

ARTHUR A. AMBLER.

In presence of—

CHAS. S. BURTON,

ADNA H. BOWEN, Jr.