

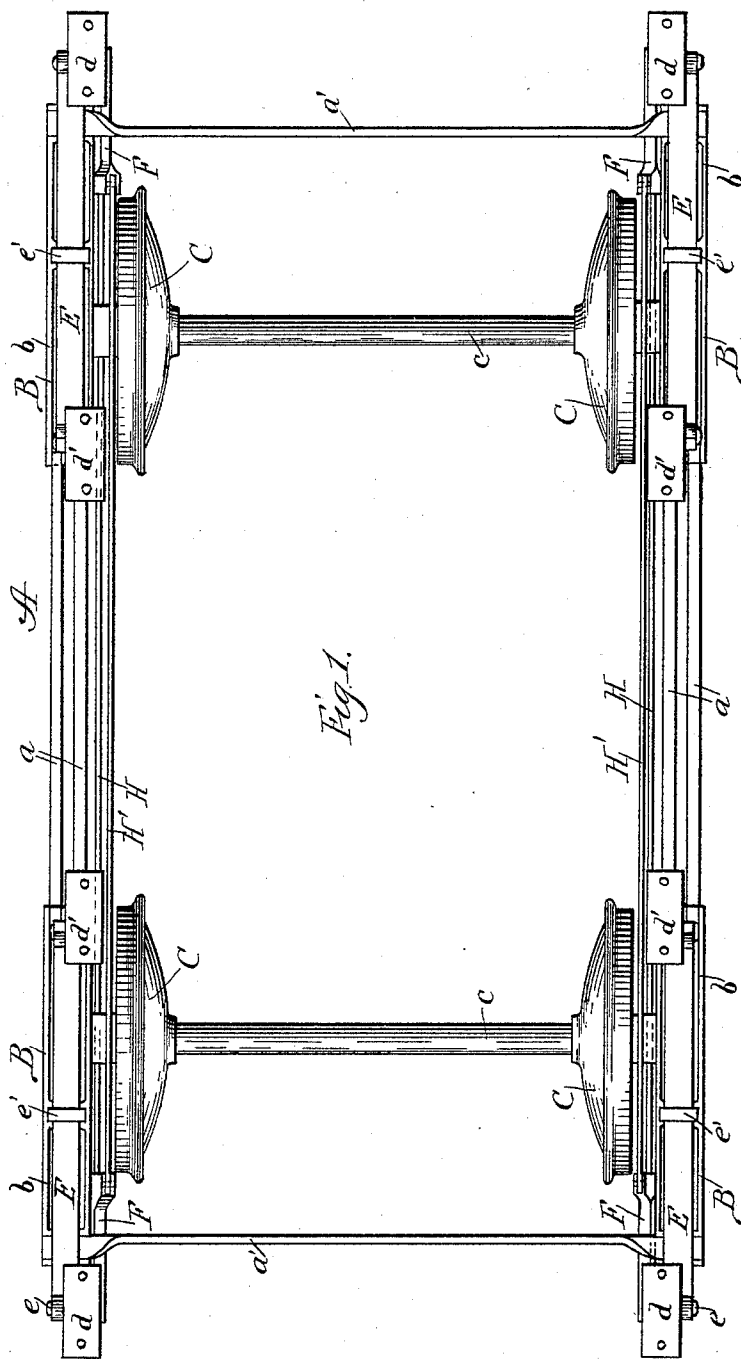
(No Model.)

3 Sheets—Sheet 1.

L. WARFIELD.
CAR TRUCK.

No. 519,824.

Patented May 15, 1894.



Witnesses:

W. C. Cordier

Jno. H. Christianson.

Inventor:

Louis Warfield.

By C. Burnett & Co.
Attys.

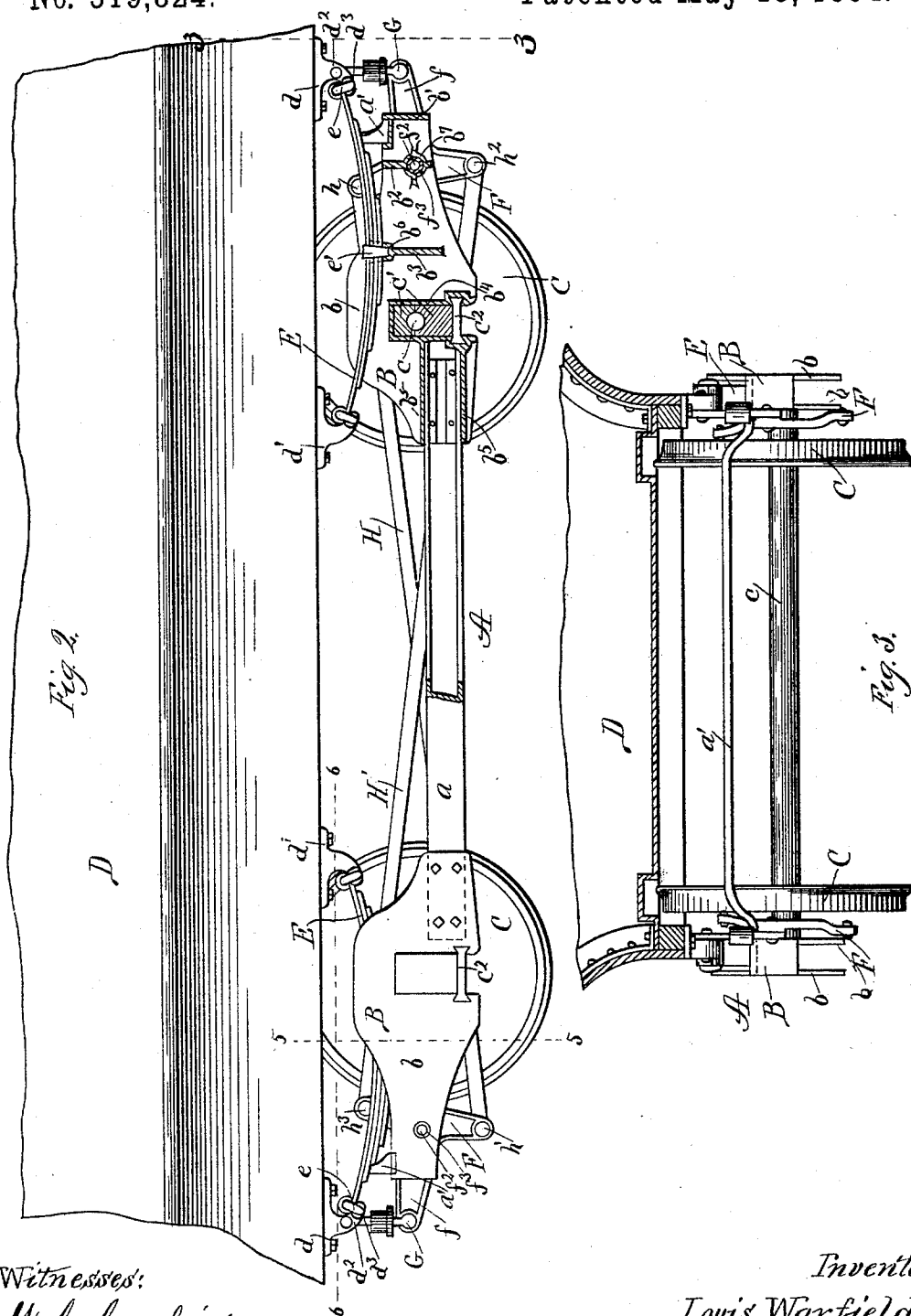
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3 Sheets—Sheet 2.

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CAR TRUCK.

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Patented May 15, 1894.



Witnesses:

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J. A. Christensen.

Inventor:

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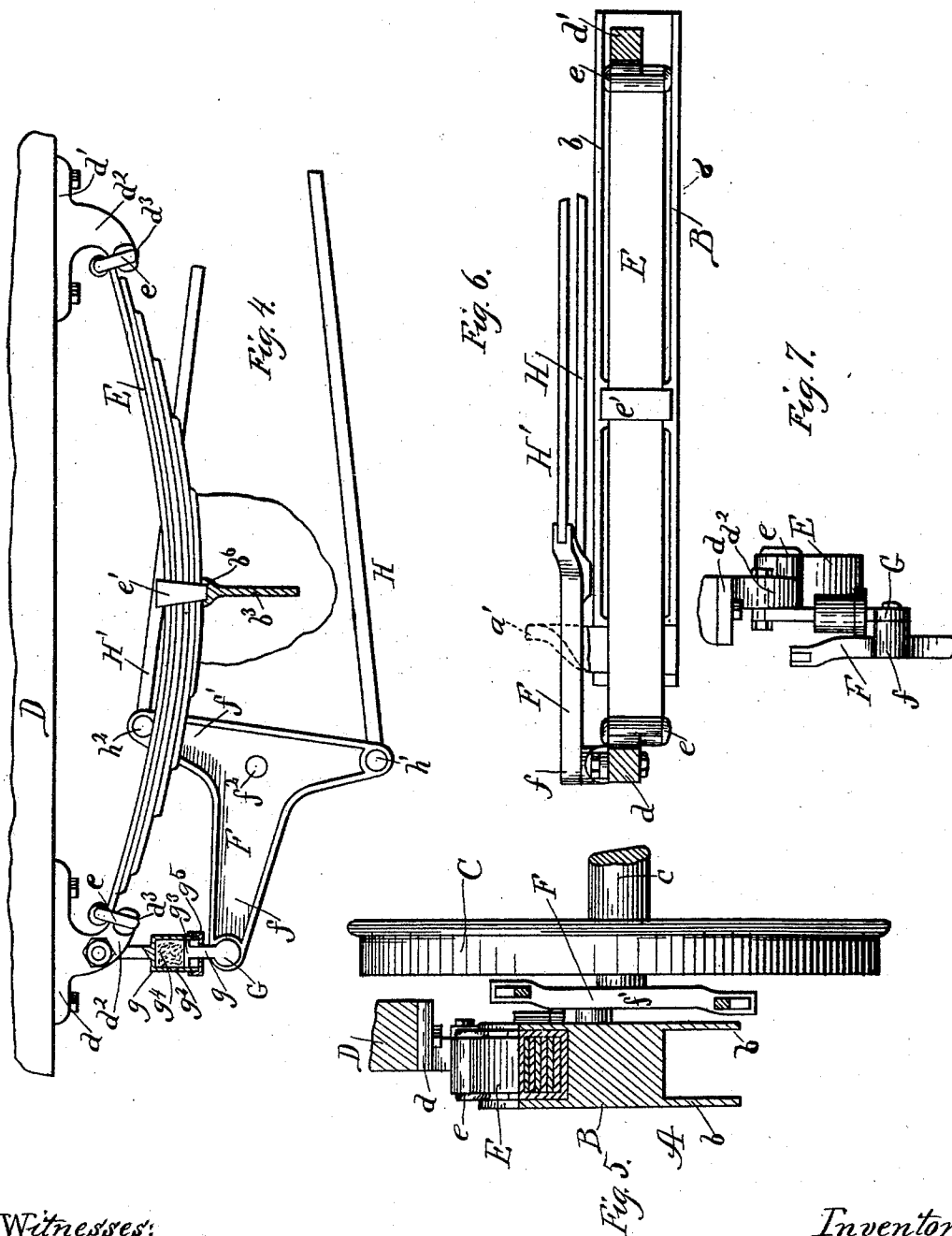
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CAR TRUCK.

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Jno. A. Christanson.

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UNITED STATES PATENT OFFICE.

LOUIS WARFIELD, OF DETROIT, MICHIGAN.

CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 519,824, dated May 15, 1894.

Application filed August 7, 1893. Serial No. 482,601. (No model.)

To all whom it may concern:

Be it known that I, LOUIS WARFIELD, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Car-Trucks, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

10 Figure 1 represents a plan view of a street car truck embodying my invention; Fig. 2, a side elevation of the same with the body applied thereto, though partly broken away, and also one of the axle boxes being in section; 15 Fig. 3, an end elevation of the same with the body in section on the line 3. 3 of Fig. 2; Fig. 4, a side elevation of a portion of the car bottom, and the equalizing supports thereof detached from the other parts; Fig. 5, a vertical section taken on the line 5. 5 of Fig. 2, 20 looking in the direction of the arrow; Fig. 6, a detail plan section taken on the line 6. 6 of Fig. 2; and Fig. 7, a detail end elevation showing the end attachment of the equalizing de- 25 vices.

In the drawings Figs. 1, 2 and 3 are upon one scale, while the remaining figures are upon another and enlarged scale.

30 My invention relates to that part of a completed car which is generally known as a "truck" and which supports the car body or platform, and also the motor in case the structure is a locomotive car.

35 The invention is especially designed for street railway cars and has for its object to connect the wheels and axles together, to furnish support which carries the springs on which the car body or platform rests, and to provide means for preventing the teetering 40 movement or vertical end vibration of the body caused by undulations in the track, especially when running at high speed.

45 I will now describe in detail the construction and operation of a car containing my invention embodied in one practical way, and will then designate in claims the particular improvements which I believe to be new and wish to secure by Letters Patent.

50 In the drawings A represents the truck frame of a car of any ordinary construction. This frame has side bars, *a*, and end bars, *a'*,

as usual, but they are not connected directly together. Straight bearing plates, B, are provided, the inner end of each being joined to one end of one of the side bars, *a*, as seen in 55 Fig. 2, while the outer ends thereof are connected to the respective ends of the cross bars, *a'*, and thus joined, these parts constitute together a rigid frame. These bearing plates or noses, as I call them, are of peculiar construction. They consist of two long side pieces or cheeks, *b*, separated from each other and joined by an angular web, *b'*, at the front end, a vertical web, *b²*, just back of the former, a 60 vertical web, *b³*, extending part way across the plates, and still farther back an angular or channel web, *b⁴*, near the center of the bearing, which is widened at this portion, and two horizontal webs, *b⁵*, arranged one above the other and running back from this channel 70 web to the inner end of the plate. The webs, *b'*, at the outer ends provide seats for the end bars, *a'*, and the horizontal webs, *b⁵*, at the inner ends provide socket receptacles for the side bars, as seen in Fig. 2, while the central channel web, *b⁴*, receives the axle boxes, *c'*, of the axles, *c*, on which the truck wheels, *C*, are fixed, these channel webs being constructed to provide an open space at the bot- 80 tom or lower edge of the plates to permit the said boxes to be set up in place and secured in any suitable way; as seen in Fig. 2, they are held in place by plates, *c²*, set in underneath them.

85 The car body, D, is of any ordinary construction, and is mounted upon the truck frame by means of springs, E, which, in the drawings, are shown as half elliptic springs, and are arranged in pairs at each end of the car, being connected thereto by means of 90 brackets, *d*, *d'*, attached to and depending from the bottom of the car, there being four brackets at each end of the car body, arranged one pair on each side thereof, the forward ones being marked *d*, and those in the rear 95 *d'*. These brackets have projections, *d²*, extending downward and bending inward toward each other in the separated pairs, as seen in Fig. 2, and at their extremities are provided with recesses or transverse notches, 100 *d³*, on the under side, which provide for the connection of the supporting springs, E,

thereto by means of links, *e*, at each end of said springs, which are adapted to hook into the said recesses, as seen in said Figs. 2 and 4.

From the description given above, it will be evident that the side pieces or cheeks, *b*, of the bearing plates extend up above the axle boxes and provide a free space or channel extending lengthwise between them. The supporting springs are set in these spaces between the cheek pieces and rest upon the vertical cross-webs, *b*³, the upper edges of which are provided with seat recesses, *b*⁶, adapted to receive the central bearing block or strap, *e*', of the said springs, *E*. This arrangement is shown in Figs. 2 and 4 of the drawings, and it will be seen that the springs are provided with a firm support near the truck axles and also with side protection in the upward extensions of the cheek pieces, *b*.

I will now describe a special mechanism which serves as a further connection between the car body and truck frame, and also prevents the see-saw or teetering movement so objectionable in street cars. A T-crank, *F*, is pivotally mounted in each of the bearing plates, *B*. The pivot is about at the junction of the long arm, *f*, with the T-head, *f*', of the crank, and is effected by means of a pivot pin, *f*², projecting at one side of the crank and fitting a tubular bearing, *b*⁷, provided for it in the webs, *b*², which, for strength, are cruciform, as seen in Fig. 2. This tubular bearing is made sufficiently large to accommodate a bushing, *f*³, for the pivot pin, *f*². The cranks are arranged on the inside of the bearing plates and with the long arm substantially horizontal, when, of course, the T-heads will be practically vertical, and the long arms project outward at each end of the car. The extremities of these long arms of the cranks are connected respectively by links, *G*, to the respective forward brackets, *d*. These links are composed of two parts; the upper member, *g*, is pivoted to its bracket, while the lower member, *g*', is in like manner connected to the extremity of the long arm of one of the cranks, as seen in Fig. 2. The upper member of the link is provided at its extremity with a cylinder cup, *g*², and the lower member with a piston disk, *g*³, adapted to fit the said cup; and space is provided for the reception of an elastic buffer, *g*⁴, of rubber, or a metal spring, between the cup and disk, as seen in Fig. 4, and the cup is closed by a suitable cover, *g*⁵. The T-heads of the cranks on each side of the car are connected together in pairs by rods, *H* and *H*'. These connecting rods are not arranged parallel to each other, however, but cross each other and are connected to ends of the T-heads of the cranks diagonally opposite to each other, as seen in Fig. 2, in which the rod, *H*, is shown connected by a pivot, *h* to the upper end of the T-head on the crank at the right end of the car, while at its opposite end it is connected by a pivot, *h*', to the lower end of the T-head of the crank at that end of the

car. The rod, *H*', is connected up in the opposite manner, being jointed at the right by a pivot, *h*², to the lower end of the crank head at this end of the car, and by a pivot, *h*³, to the upper end of the crank head at the opposite end or left of the car, as shown in said Fig. 2.

The car is rigged with any suitable form of brake mechanism, but as this constitutes no part of my present invention, I have not shown the braking devices in the drawings. Any desirable mechanism for this purpose may be used.

The action of the mechanism to prevent the teetering movement of the car will be readily perceived from the description above and the construction shown in the drawings. Obviously if an attempt is made to depress or tip down one end of the car body the connection of the opposite end of the body therewith through the cranks and cross-connecting rods will operate to depress the other end of the body also, and vice versa. The tendency to a see-saw movement of the body as the wheels pass over undulations in the track is, therefore, counteracted at once, and so this disagreeable movement, so common in street cars of ordinary construction is practically obviated. At the same time, it is obvious that this mechanism does not interfere with the functions of the supporting springs. If, instead of an end depression, the entire body be depressed, the supporting springs elongate naturally, and the cranks with their connecting rods adjust themselves accordingly, without more resistance than the simple friction of their journaled supports. As already suggested, the bearing plates provide not only for the seating, but also to some extent the protection of the supporting springs. It will be noticed further that these plates also provide for strong supporting connections with the side bars and end bars of the frame, and also a suitable bearing for the pivots of the crank, which, of course, receive at times a severe strain, and so require a strong support. The buffers in the link connections between the cranks and the car body serve to take up, to some extent, sudden shocks which may occur in the practical operation of cars. The special bearing plates are not indispensable, but the frame may be formed in other ways.

I am aware that attempts have been made to prevent the teetering movement of cars with varying success, but, so far as I know, none have resulted in anything more than a modification of the teetering motion without absolute prevention. In my system I secure a positive action simultaneously at both ends of the car and in the same direction, so that if the mechanism is in operative condition no teetering movement whatever is possible; I believe I am the first to secure such an action and result.

In details of construction there may be changes without departing from the charac-

teristic features of my improvement, and, therefore, I do not wish to be understood as restricting the invention to particular details in all respects as herein set forth and shown.

5 Having thus described my invention, what I believe to be new, and desire to secure by Letters Patent, is—

1. In a railway car, a truck, in combination with a car body mounted thereon by supporting springs, two long rods extending from end to end of the car and crossing each other diagonally between the truck-wheels, and means for connecting the opposite ends of both rods directly to the respective ends of the car body, whereby a vertical movement of one end of the car body will produce a movement in the said direction of the opposite end thereof, substantially as described.

2. In a railway car, a rigid truck frame, in combination with a car body, D, mounted thereon by springs, the T-cranks, F, pivotally mounted in the truck frame, connecting rods, H—H', pivoted respectively to diagonally opposite ends of the crank heads on each side of the car, and connections between the long arms of the cranks and the car body, substantially as described.

3. In a railway car, a rigid truck-frame, in combination with the T-cranks, F, pivotally mounted therein, the crossed connecting rods, H—H', uniting said cranks on the same side of the car, a body, D, mounted on the truck

frame by supporting springs, and yielding links, G, connecting the long arms of the T-cranks to the body, substantially as described. 35

4. In a railway car, the bearing plates, B, consisting of side pieces or cheeks, *b*, suitably connected together and provided with a vertical web, *b*³, in combination with the body, D, and supporting springs, E, arranged between the cheeks of the bearing plate and seated on the upper edge of the web, *b*³, substantially as described. 40

5. In a railway car, the bearing plates, B, consisting of side pieces or cheeks, *b*, united by suitable cross-webs, in combination with the side and end bars of the truck frame rigidly connected to said bearing plates, the T-cranks, F, pivotally mounted in the bearing plates, the crossed connecting rods, H—H', uniting the crank heads at points diagonally opposite, the body, D, supporting springs, E, seated between the cheeks of the bearing plates on a web between the two, and the two-part links, G, connecting the long arms of the cranks to the body and composed of the two members, *g*—*g'*, with an elastic buffer arranged between them, substantially as described. 55

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Witnesses:

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H. M. FIELD.