(No Model.)

3 Sheets—Sheet 1.

M. G. HUBBARD.

CAR TRUCK.

No. 348,741. Patented Sept. 7, 1886.

Fig. 1.

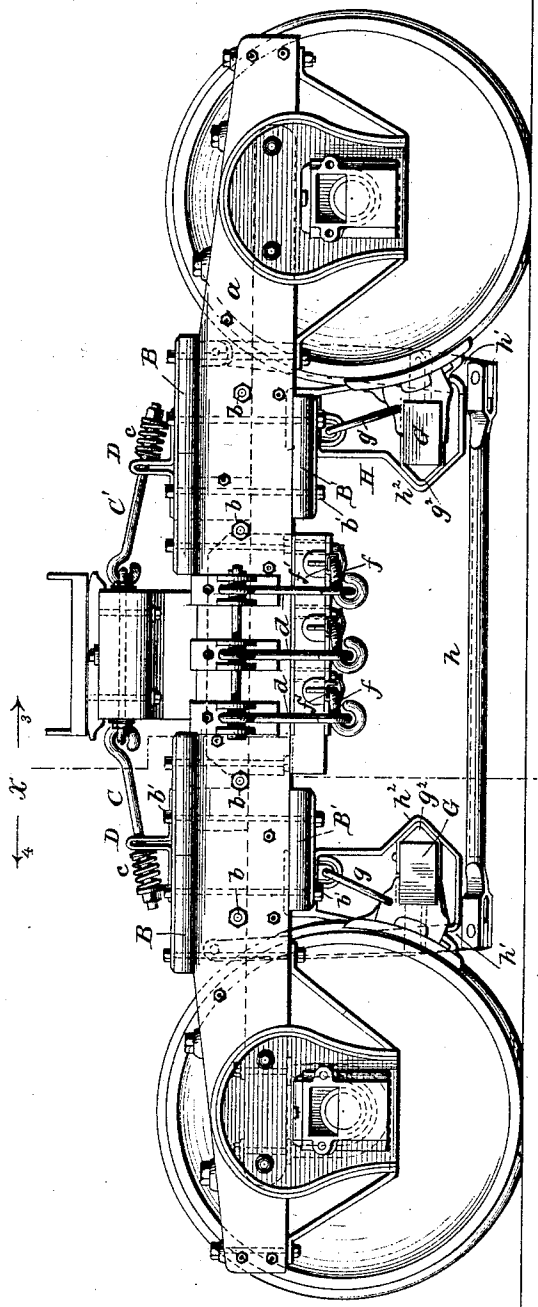


Fig. 1b

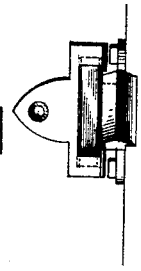


Fig. 1a

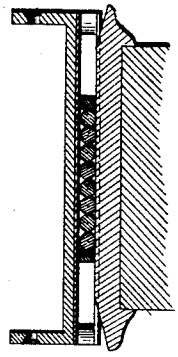
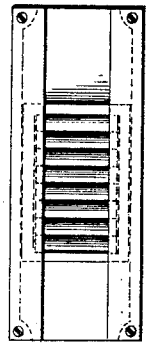


Fig. 1c



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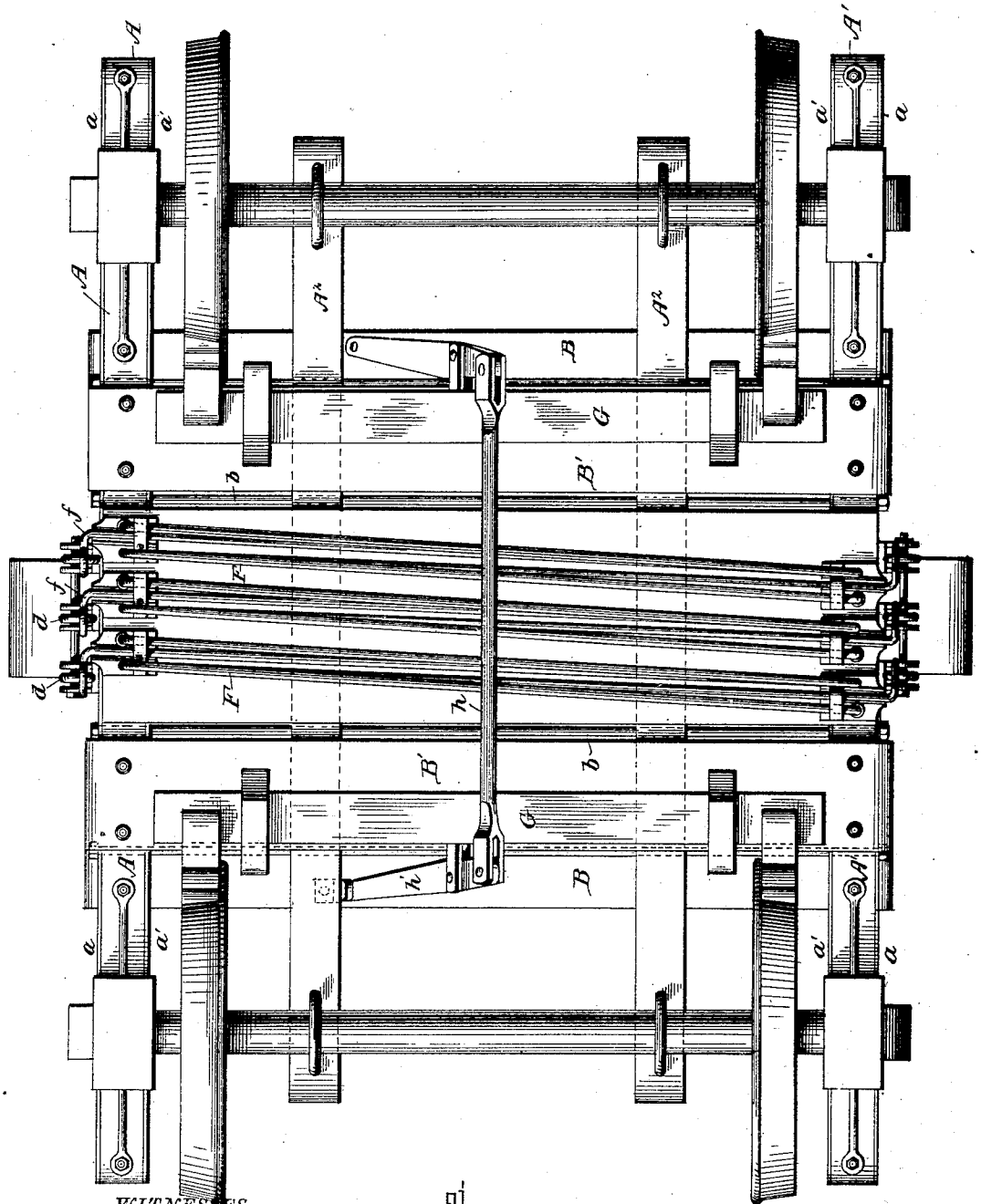


Fig. 2.

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No. 348,741 Patented Sept. 7, 1886.

Fig. 3.

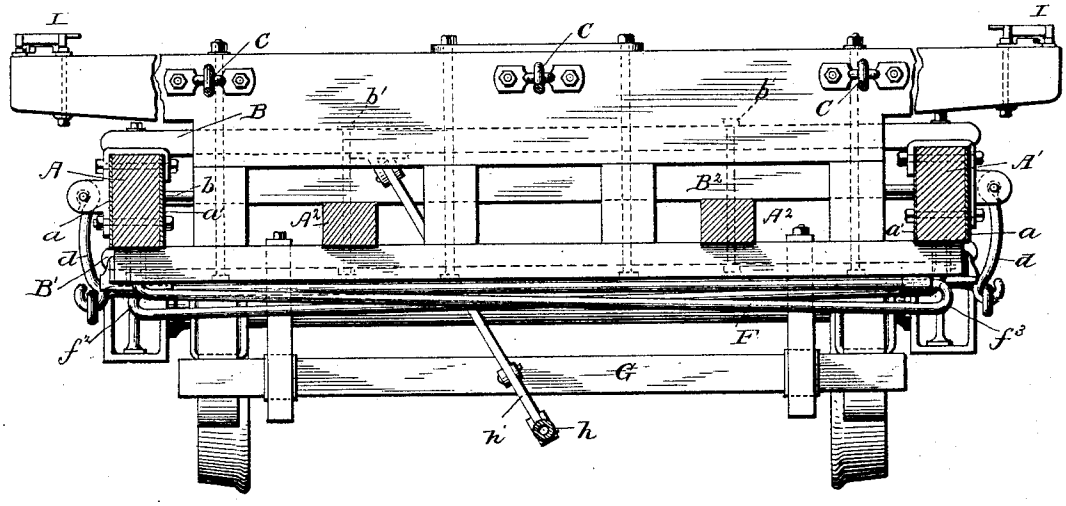
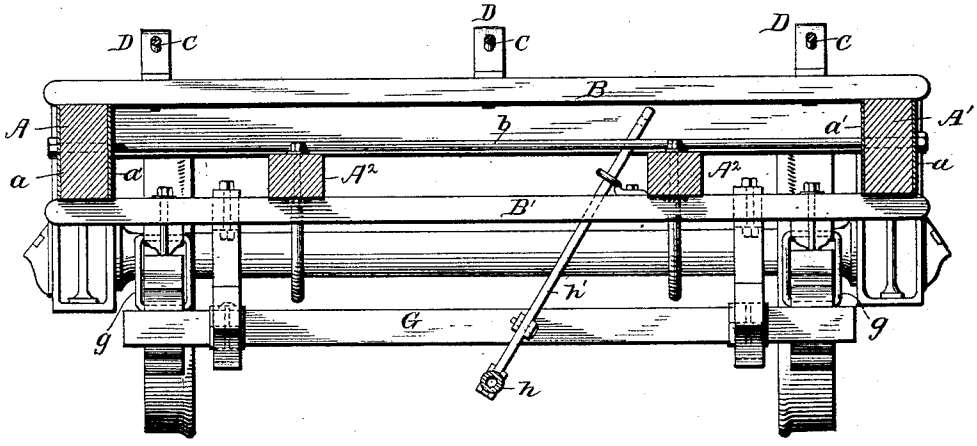


Fig. 4.



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UNITED STATES PATENT OFFICE.

MOSES G. HUBBARD, OF NORRISTOWN, PENNSYLVANIA.

CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 348,741, dated September 7, 1886.

Application filed March 31, 1886. Serial No. 197,242. (No model.)

To all whom it may concern:

Be it known that I, MOSES G. HUBBARD, of Norristown, county of Montgomery, 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.

In the accompanying drawings, Figure 1 represents a side elevation of my improved car-truck, and Figs. 1^a, 1^b, and 1^c detail views of the outer bolster-bearing. Fig. 2 is a bottom view of the same. Fig. 3 is a transverse section on the line *x x*, Fig. 1, looking in the direction indicated by the arrow 3; and Fig. 4, a section the same as Fig. 3, but looking in the direction indicated by the arrow 4.

My invention relates to certain improvements upon the passenger-car truck patented by me September 22, 1885; and it consists, first, in double plating the wooden side sills or "wheel-pieces," A A′, with a plate of thin iron or steel riveted or bolted to each side, to stiffen and strengthen it in every direction and form a better support for the "pedestals" by which the journal-boxes are attached and to all of the transverse bolts. It is desirable to keep these plates *a a′* whole without mortises through either of them, in order to preserve their entire strength. By attaching the cross-sills B B′ on the upper and under sides of the wheel-pieces, as more fully described in my said patents, I am enabled to preserve both of the side plates whole, and thus secure the entire strength of both plates.

My invention further relates to the construction and improvement of the draft-links C C′, described in the said patents, and consists in making them elastic to keep them taut, and to make the attachment of the bolster flexible and elastic in every direction, and to aid in controlling the lateral swinging motion of the car. One convenient way of making these links elastic is to pass one end through a heavy coil-spring, *c*, outside of the draft-link knee-iron D, as shown in Fig. 1. When the draft-links are elastic, they all help to check and control the lateral movement of the bolster E and car by the angle which they assume when the bolster is moved laterally. This is necessary, because in this truck there is none of the friction caused by the draft of ordinary trucks, to check the lateral freedom of the bolster, and I find that much outward inclination of the links *d d d*, upon which the bolster and springs are suspended for this purpose, causes a great and dangerous lateral strain upon the spring crank-arms *f*, located on the outer side of the trucks in passing rapidly around curves, and if the said links are inclined inward then the same excess of strain would be thrown on the crank-arms located on the inner side of the trucks, while if these pendent links were exactly vertical the lateral strain would be equal on all of the crank-arms on both sides of the truck. It is therefore safer and better to use less inclination of the links to check the lateral swaying and employ some other means to accomplish this object. I find that one good and convenient way is to employ the stiff springs on the draft-links, as above described. The shorter the draft-links are the better for this purpose, because their angle would increase more rapidly, and when they are thus arranged to act in combination with the pendent links *d*, to check the lateral movements, the best aggregate result is attained.

My invention further relates to means for strengthening the said truck transversely; and it consists in the employment of two or more butting-sills, B^2, extending across between the wheel-pieces to receive the pressure of the ordinary cross-tie rods, *b*, and remove this pressure from the vertical bolts which attach the upper and lower cross-sills of the frame, and I pass strong bolts *b′* down through the upper cross-sills, B, the butting-sills B^2, the safety-sills A^2, and the lower cross-sills, B′, to firmly hold them all together and secure the greatest possible strength of truck.

When the springs F are located near the center of the truck, it is necessary to make the wheel-pieces A A′ unusually stiff vertically, and as this central location is desirable for the best action of the springs, and the wheel-pieces must be strengthened to permit such a location of the springs, the double-plated wheel-pieces become essential elements of my improved truck.

By locating the springs near the center of the truck I can locate the brakes between the

wheels and attach them to the frame entirely independent of the springs, and thereby avoid all of the jar of ordinary trucks caused by the action of the brakes, and also avoid the great increase of weight or draft-pressure on the axle-journals when the brakes are applied, and thus relieve the journals from much strain and wear; but one of the most important advantages of this location of the brakes consists in the form of self-adjusting brake, which it renders practicable and convenient.

It is very important that the brakes should be made self-adjusting to the increased weight on the leading wheels when they are applied, because the leading wheels are capable of yielding much greater brake resistance than the tracting-wheels, on account of the increased weight upon them caused by the point of draft of the truck being so much higher than the axles; and both pairs of brakes should be made to adjust themselves to this very important result, because the car is intended to move in either direction. The most simple possible device for this purpose is to locate the brakes between the wheels and incline the brake-hangers $g\,g'$ from the brakes and toward the bolster, attaching the upper ends of these hangers to the truck-frame, to permit the bolster or springs to act independently of them. In this position the hangers which sustain the brakes acting upon the leading wheels will act as inclined braces, and tend to increase the pressure of the brakes upon the leading wheels in proportion to their inclination, which can be made to correspond very nearly with the increased weight upon the leading wheels. By this arrangement and attachment of the brakes and springs a simple self-adjusting brake is formed and its action independently of the springs is fully secured. This arrangement also adds materially to the durability of the journals and journal-boxes by supporting and carrying the increase of weight or draft-pressure upon the brakes instead of the journals.

When the brakes are located between the wheels, the brake-beams G must be pressed apart to apply the brakes, which tend to crush or bend the "brake-connection." I therefore find it much better to use a tube, h, in making the brake-connection, and weld suitable jaws to its ends for attachment to the brake-levers h', thus making a very stiff and light brake-connection.

To keep the brakes in position while not in use, I form the angle h^2 in each of the brake-bar safety-loops H, and corresponding angle-iron, g^2, are attached to the brake-bars in proper position to fit into the angle h^2, formed in the brake-bar safety-loops, and I arrange a spring to force the brake beams or bars back to press the angle-irons g^2 into the angles h^2 with considerable force. The ordinary brake-bar spring may be used for this purpose; but the form of brake-bar spring more fully described in my Letters Patent dated February 24, 1885, is probably the best. This arrangement of the angle-irons and springs keeps the brakes from rattling, and thereby avoids the objectionable wear and noise.

Experience in the use of my circumferential springs as applied in my said patent shows an inclination to wear the elongated journal-bearings, which makes it necessary to line the said bearings with thin steel plates to give the spring a dense and durable material to roll on, and I make this bearing flat for greater convenience in applying these steel lining-plates, as shown at f' in Fig. 1.

I have found it difficult to attach my recurved springs F to the center of the truck on account of the space which they require longitudinally of the truck. To overcome this objection, I now construct my said springs with the vertical recurvature, as shown at f^2 f^3 in Fig. 3, which saves nearly half of the space which they occupy when the recurvature is horizontal. I also find in applying the springs to these trucks that certain other peculiarities are desirable, which would not be necessary in other vehicles. The great speed requires not only the soft elastic action of the long recurved spring, but also the finest possible vibratory action of the crank-arm, which I attain by the free pendent links, and to attain this result in the greatest possible degree I so proportion the spring as to carry the load at about a horizontal position of the crank-arm f, as that is most favorable for the finest vibratory action, and as the further action of the spring is seldom required, and any considerable movement is objectionable, I interpose an auxiliary stop or limit to the downward movement, which in the truck may be conveniently provided by so proportioning the space between the extended bolster and the top of the wheel-pieces as to thereby limit the downward movement, as desired.

When an extended bolster is used, or to favor the elastic draft-links, I find it desirable to employ an anti-friction outer bolster-bearing, because the outer bearing when located so far away from the center of the truck increases its purchase on the truck and requires more force to turn or curve the truck, and also injures the action of the elastic draft attachment. The outer bolster-bearings frequently sustain a large proportion of the great weight of the car and receive such rough usage as to require great strength and durability in their construction. To combine these qualities with the greatest possible freedom and ease of movement, I construct the outer bolster-bearing as follows: I employ a series of steel rollers, (shown at $i\,i$ in Fig. 1[a],) which I confine in the moving frame I', to keep them in position, and I confine this moving frame in the stationary frame or case I, for attaching it to the truck or body-bolster, and I line the wearing-surface of this case with a thin plate of steel, i', to give the rollers a smooth and durable surface to roll on, and I cover the shoe or track J with a steel plate, j, for the same reason. The rollers are cheaply made by cutting them off from a steel rod of suitable size.

The moving frame I′ renders it unnecessary that the rollers should have journals turned on their ends or other means to keep them in proper position. This outer bolster-bearing almost entirely removes the great friction caused by the swaying of the car, and permits the truck to turn or curve with the greatest possible ease and freedom, and it permits the elastic draft-links to control the bolster and keep it in proper position in a circular direction around the king-bolt. The moving frame, in which the rollers are confined, slides on the shoe or track, and serves to keep the surface clean and free from dust, &c., and thereby promotes the durabilty of the working parts.

Having now described my invention, I claim as new—

1. In a car-truck, the longitudinal sills or wheel-pieces plated on both sides, in combination with cross-sills attached to the upper and under sides thereof, whereby the mortising or mutilation of the plates is avoided, substantially as and for the purpose described.

2. In a car-truck, the bolster suspended on pendent links, in combination with the horizontal draft-links and coil-springs, by which the bolster is controlled in its movements both longitudinally and transversely of the truck, for the purpose substantially as specified.

3. The wheel-pieces and interposed butting-sills, in combination with the upper and lower cross-sills and the cross-tie rods, substantially as and for the purpose described.

4. The combination, in a car-truck, of the double-plated wheel-pieces, the cross-sills attached to the upper and under sides thereof, and the truck-springs located at or near the center of the truck longitudinally, substantially as and for the purpose described.

5. In a car-truck, the brakes, in combination with the angle-irons, or their equivalent, and their springs, constructed and arranged substantially as and for the purpose described.

6. The long tubular rod connecting the two brake-beams, in combination with the brakes located between the wheels, substantially as specified.

7. The circumferential springs provided with the vertical recurvature to diminish the space which they require in the truck, substantially as described.

8. The combination of the long recurved circumferential springs, the short crank-arms, and the pendent links with a fixed stop or limit to the downward movement, for the purpose substantially as specified.

9. In a car-truck, the combination, with the bolster, of an anti-friction outer bolster-bearing having a series of cylindrical rollers arranged and operating substantially as and for the purpose set forth.

10. In a car-truck, the anti-friction outer bolster-bearing composed of a series of rollers, in combination with a sliding frame, which moves with and guides said rollers, substantially as specified.

11. In a car-truck, the anti-friction outer bolster-bearing composed of a series of rollers and a moving frame for keeping them together, in combination with the stationary frame or case, in which they roll and for attaching them to the truck or body bolster, substantially as described and shown.

12. The combination of an anti-friction outer bolster-bearing with the extended bolster, substantially as set forth.

13. The combination of an anti-friction outer bolster-bearing with the elastic draft attachment, substantially as described.

14. The combination of the elastic draft attachment with the extended bolster and anti-friction outer bolster-bearing, substantially as and for the purpose specified.

15. In a car-truck, an outer bolster-bearing constructed and arranged substantially as described, in combination with a raised shoe or track for it to roll on, as set forth.

16. In a car-truck, an anti-friction outer bolster-bearing having a series of rollers confined in a moving frame, which slides upon the raised shoe or track to keep it clean, substantially as described.

17. In a car-truck, the combination of the upper cross-sills, the butting-sills, the safety-sills, and the lower cross-sills, all bolted together substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 14th day of January, A. D. 1886.

MOSES G. HUBBARD.

Witnesses:
A. M. SMITH,
ROBINSON WHITE.