No. 735,754. PATENTED AUG. 11, 1903.

J. H. GRAHAM.

FREIGHT CAR TRUCK.

APPLICATION FILED DEC. 20, 1902.

NO MODEL.

Fig. 1.

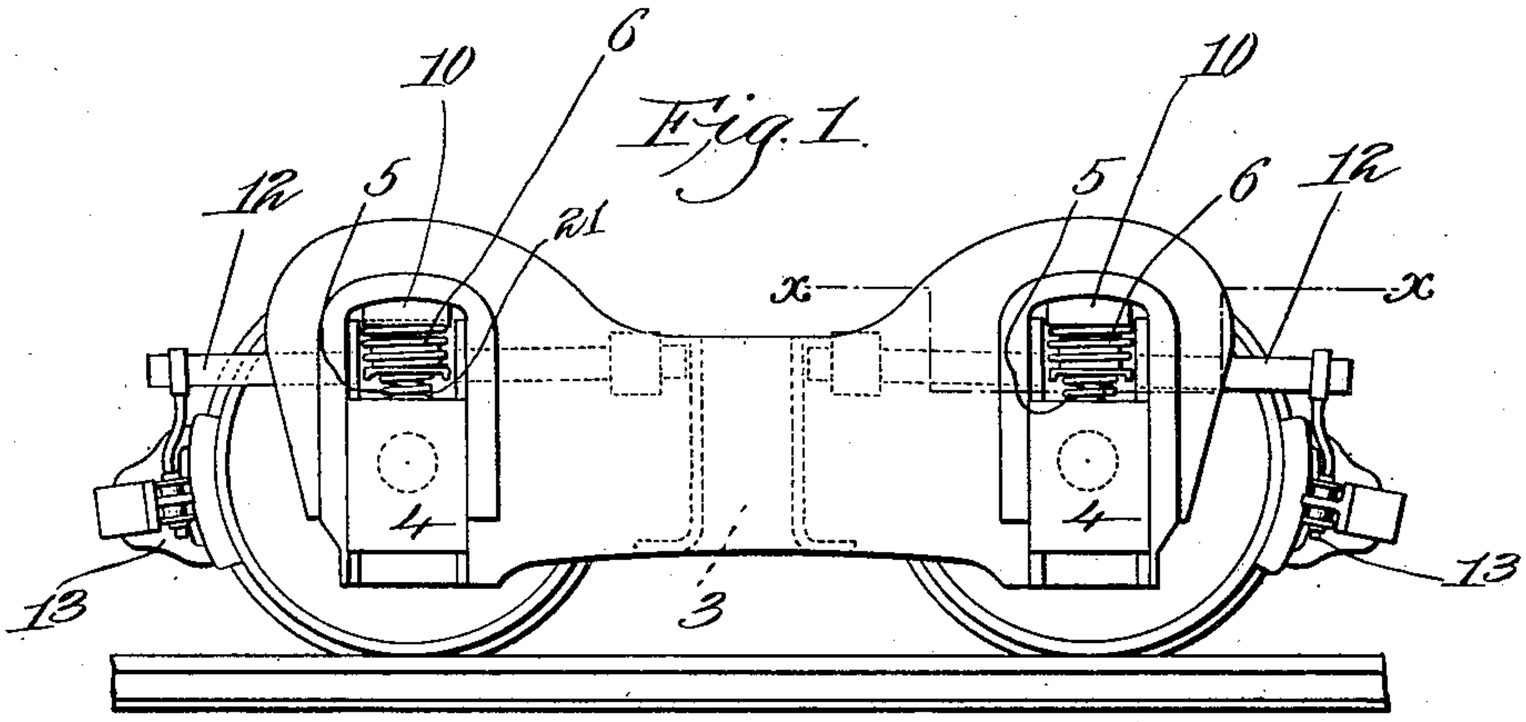



Fig. 2.

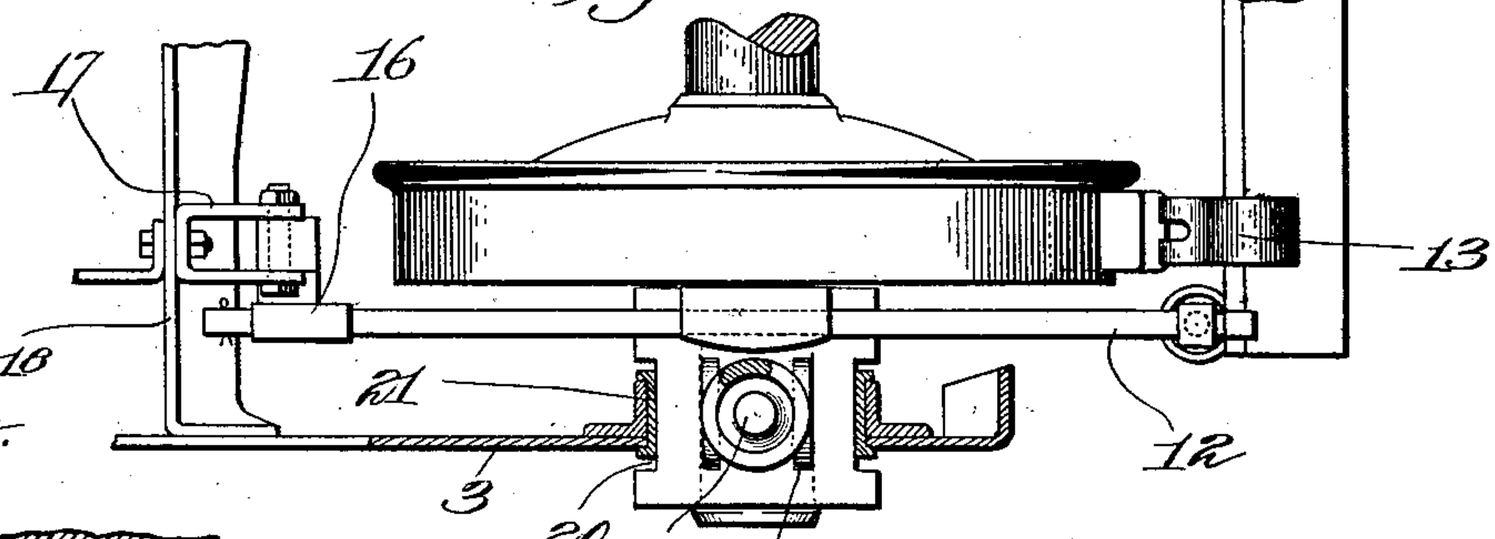



Fig. 4.

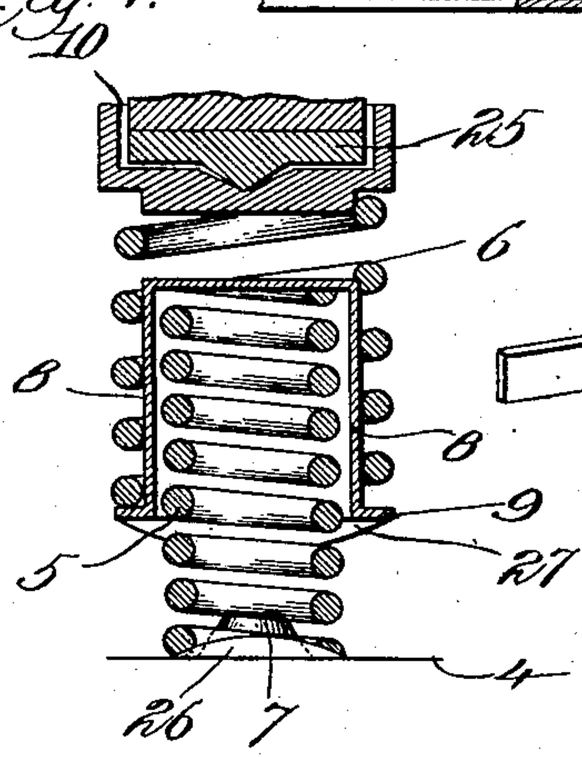
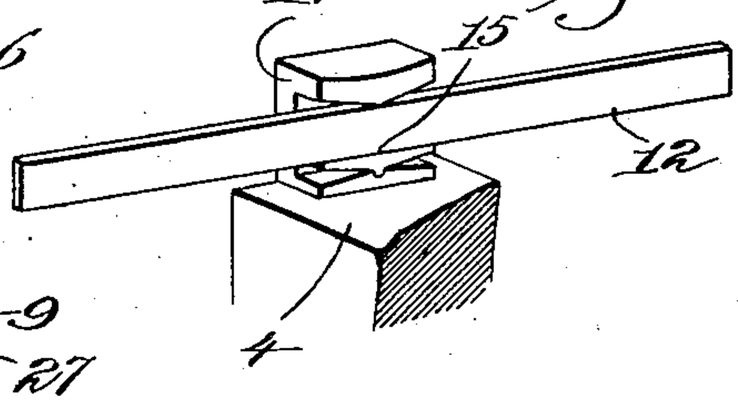



Fig. 3.

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No. 735,754. Patented August 11, 1903.

# UNITED STATES PATENT OFFICE.

JOHN HECTOR GRAHAM, OF BOSTON, MASSACHUSETTS.

## FREIGHT-CAR TRUCK.

SPECIFICATION forming part of Letters Patent No. 735,754, dated August 11, 1903.

Application filed December 20, 1902. Serial No. 135,955. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN HECTOR GRAHAM, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Freight-Car Trucks, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

This invention has for its object to provide a novel form of truck which is especially designed for freight-cars.

As freight-car trucks are now commonly constructed the truck-frame is provided with ways in which are received the axle-boxes, and interposed between the axle-boxes and truck-frame are coiled springs which are intended to yieldingly support the load. The brakes are usually hung from the ends of the truck-frame, with the result that when they are applied with any degree of force a very severe strain is brought directly upon the springs. In the present type of truck, therefore, the springs must not only have sufficient strength to support a loaded car yieldingly, but must also be strong enough to resist the strain to which they are subjected during the application of the brakes. A spring which is sufficiently strong to stand up under the severest strain to which it is subjected while in use in a freight-car truck will not yield at all when it is only subjected to the lighter strains—as, for instance, when it is supporting merely an empty car-body. The result is that while the spring mechanism of the common type of freight-car truck will support yieldingly a loaded car it will not yield at all when merely supporting an empty car, and hence in the latter case it forms a practically rigid or unyielding support for the car-body. When an empty freight-car is in motion, therefore, all of the vibrations of the car-wheels are transmitted directly to the car-body, which of course is racked more or less by such vibrations and the constant jolting to which it is subjected. Moreover, all the vibrations which the body receives are transmitted to the trucks, so that the latter are subjected to not only the shocks and blows occasioned by the rapid movement of the car over the rails, but also to the shocks caused by the jolting of the empty car-body. These double shocks or blows are instrumental in causing what is known as "shelling" of car-wheels, by which is meant the scaling or shelling off of the tread-surface of the wheel, a fault which soon renders the wheels unfit for use. To obviate these difficulties, I have employed a compound spring for supporting yieldingly the truck-frame and have combined with the spring a special form of brake-suspension by means of which the severe strain incident to the application of the brakes is transmitted directly to the car-axles instead of to the truck-frame. The form of compound spring I use comprises two superposed springs of different tension, the spring of lesser tension being constructed to support yieldingly the empty car and the spring of greater tension operating to support yieldingly the loaded car.

In the drawings, Figure 1 is a side elevation of my improved truck-frame. Fig. 2 is an enlarged section on the line $x\,x$, Fig. 1. Fig. 3 is a detail of my special brake suspension, and Fig. 4 is a detail of the compound spring.

I have shown my invention as applied to a pressed-steel car-truck of the box-girder type, and 3 designates one of the usual box-girders, having suitable ways for receiving the usual axle-boxes 4. My special spring is supported, as usual, upon each axle-box 4 and in turn supports the truck-frame. In order to secure the results aimed at, I employ the compound spring shown in detail in Fig. 4, which consists of the spring 5 of lesser tension, on which is supported a spring 6 of greater tension. Both of the springs are coiled springs, and the spring 5 preferably will rest over a positioning-boss 7 on the axle-box and will be partially received in a cup-shaped separator 8, on the flange 9 of which the spring of greater tension rests. The upper end of the spring 6 engages a cap-piece 10, on which rests the truck-frame. The springs 5 have the proper tension or strength to support yieldingly an empty car-body, and hence when the car is empty the springs 5 are constantly breathing in response to thrusts of the car-wheels, and are thus absorbing all such thrusts or shocks. When, however, the car is loaded, each of the springs 5 will be compressed until the flanges 9 of the various separators 8 meet the axle-boxes 4, when further compression of the

springs as a whole will take place in the springs 6, which will then come into play to support yieldingly the loaded car. In order to relieve the springs entirely from the strain incident to the application of the brakes, I employ a special form of brake suspension, by means of which the lifting and depressing strains caused by the friction between the brake-shoes and car-wheels are taken entirely by the car-axles. For this purpose the brake-heads 13 are suspended from the outer end of brake-supporting members 12, which are fulcrumed upon the axle-box and which are pivotally connected at their inner ends to the truck-frame. As herein shown, each axle-box is provided with the grooved bracket 14, in which the corresponding brake-supporting member is received, said member resting upon a rocker 15. The inner ends of the brake-supporting members are shown as carried by brackets 16, which are fulcrumed to the clips 17, carried by the usual transoms 18. This particular form of brake suspension has been made the subject of another application, Serial No. 105,922, filed May 5, 1902, and for a further description thereof reference is made to said application. From the foregoing it will be apparent that whenever the brakes are applied the severe lifting and depressing strains caused by the friction between the brake-shoes and the wheels are transmitted directly to the axle-boxes and that any strain to which the truck-frame is subjected is transmitted thereto at substantially its central point and will therefore not appreciably affect the springs. Since with this form of brake suspension the springs are not affected by the operation of applying the brakes, it is possible to construct them much lighter than would be possible if the brakes were hung from the ends of the truck-frame. In fact, it is only necessary to construct them heavy enough to properly support the loaded car.

I have discovered that the form of compound spring herein illustrated has special advantages when combined with the above-described form of brake suspension, for since the springs are relieved entirely of any strain incident to the application of the brakes it is possible to construct the compotent parts of each spring with special reference to the performance of a single function—that is, the spring 5 has merely to absorb the shocks due to the vibration of the wheels and poise the car-body when the latter is empty, and the spring 6 has merely to perform the same functions when the car is loaded.

In addition to the above features I have herein shown the axle-boxes as capable of having a limited movement transversely to the truck-frame, for which purpose the grooves 20, in which the ways 21 of the truck-frame are received, are wider than the said ways, as best seen in Fig. 2. This permits the truck-frame to move laterally to a limited extent and renders the passage of the car around a curve much smoother than if the frame had no lateral movement. In order that this lateral movement may not affect the operation of the compound springs, I will preferably provide a rocking engagement between the ends of the spring and the truck-frame and axle-boxes, respectively. For this purpose a rocker 25, which may either be integral with the truck-frame or separate therefrom, is interposed between the cap 10 and truck-frame, as seen in Fig. 4, and the spring 5 rests upon a rounded bearing-surface 26. The flange 9 is also provided with the rocking bearing-surface 27, by means of which a rocking engagement between the separator 8 and the axle is provided when the spring 5 is fully compressed.

Various changes may be made in the structure herein illustrated without departing from the spirit of my invention.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a freight-car truck, a compound spring supported on each axle, and a truck-frame supported on said springs, the latter each comprising springs of different tension superposed one on the other, combined with a brake-supporting member fulcrumed on the car-axle and a brake supported thereby.

2. In a freight-car truck, compound spring supported on each axle, and a truck-frame supported on said springs, the latter each comprising springs of different tension superposed one on the other, combined with a brake, and means for supporting the latter on the car-axle.

3. In a freight-car truck, a compound spring supported on each axle, and a truck-frame supported on said springs, the latter each comprising springs of different tension superposed one on the other, combining with means for supporting the brake on the car-axle, and means whereby the truck-frame may have a limited lateral movement with reference to the car-axles.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN HECTOR GRAHAM.

Witnesses:
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