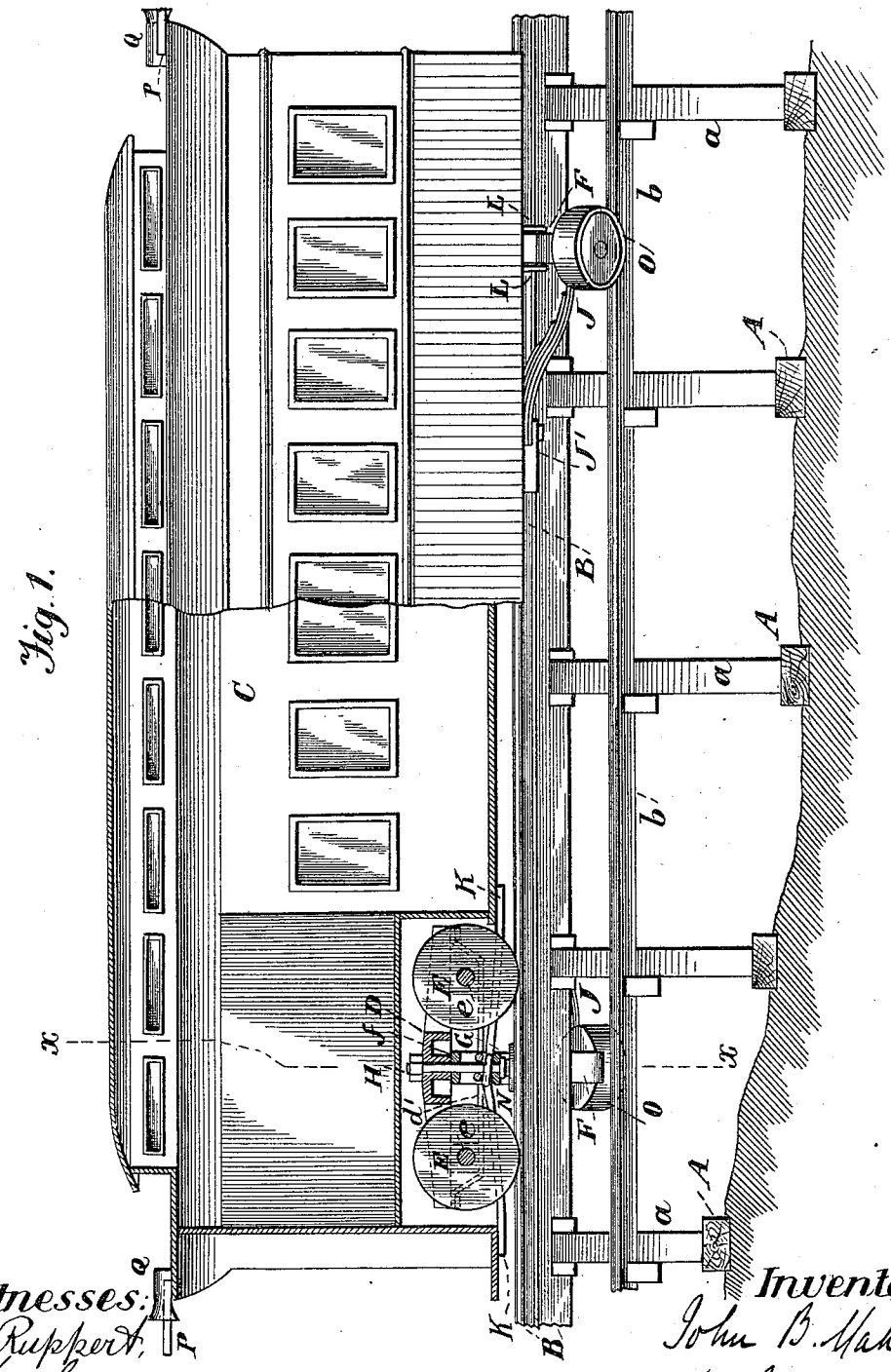
(No Model.) 2 Sheets—Sheet 1.

J. B. MAHANA.

CAR FOR SINGLE RAIL RAILWAYS.

No. 461,763. Patented Oct. 20, 1891.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

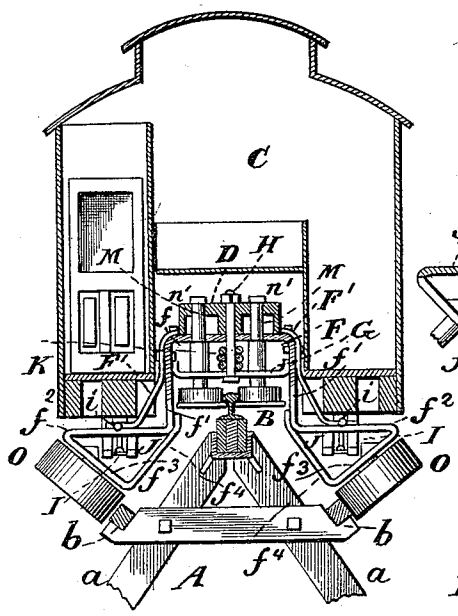


Fig. 4.

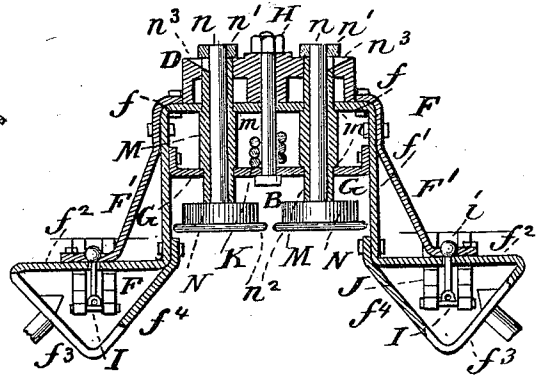


Fig. 5.

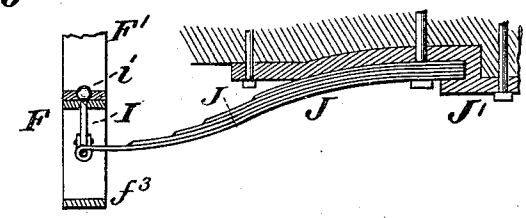


Fig. 6.

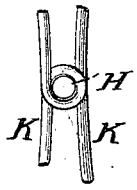


Fig. 3.

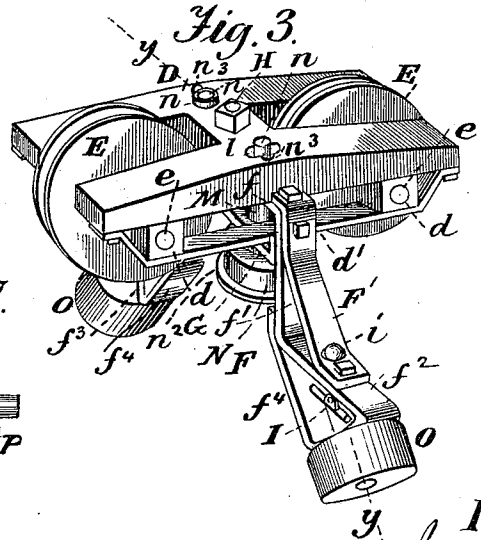
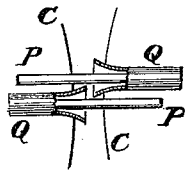


Fig. 7.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN B. MAHANA, OF FREEWATER, OREGON.

CAR FOR SINGLE-RAIL RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 461,763, dated October 20, 1891.

Application filed January 24, 1891. Serial No. 378,964. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. MAHANA, of Freewater, in the county of Umatilla and State of Oregon, have invented certain new and useful Improvements in Cars for Single-Rail Railways, of which the following is a specification, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of my invention is to improve the running-gear of cars for single-rail railways and its connection to the car, whereby the strain on the running-gear caused by the lateral thrust of the car when entering and running on a curve will be greatly reduced, and whereby also the oscillation and jolting usually experienced when the car is running will be greatly diminished, if not entirely overcome.

A further object is to increase the safety of the train when running at a high speed.

To these ends my invention consists in the several details of construction and arrangement of the several parts, as will be hereinafter fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation, partly in section, of my improved car on a track. Fig. 2 is a vertical transverse section taken on the line $x\,x$ of Fig. 1. Fig. 3 is a perspective view of the running-gear detached from the car. Fig. 4 is a vertical transverse section taken on the line $y\,y$ of Fig. 3. Figs. 5, 6, and 7 are detached details.

Similar letters of reference indicate similar parts in the respective figures.

The track for which my improved cars are adapted may be briefly described, although it forms no part of my present invention. A series of trestles A A, of unequal height when necessary to adapt the track to the uneven nature of the ground, are used, each trestle having two posts $a\,a$ inclined toward each other at their upper ends. A rail B is supported by the upper ends of these trestles, and on each side of the trestles a stringer b is placed. These stringers are gaged a common distance apart and set a uniform distance below the rail for the entire length of the track.

In describing my present invention I shall refer to one truck only and the manner of connecting one end of the car thereto, it being understood that the other end of the car is attached in a similar manner to a similar truck.

C represents the car, and D the truck proper.

E E are centrally-grooved vertical wheels, the axles e of which are journaled in suitable boxes d on the truck. These wheels E E are arranged one before the other in the truck and run on the rail B, thereby supporting the entire weight of the car so long as it is in a perpendicular position. The truck D is made of suitable metal and braces d' connect the boxes d on each side of the truck to give it additional strength and rigidity.

F indicates a saddle-frame made, preferably, of wrought-iron or steel. It consists of one continuous bar of iron or steel, bent, as shown, to have the horizontal part f, the two vertical portions f', the two horizontal parts f^2 at right angles to the portions f', the inclined bends $f^3\,f^3$ at acute angles to the parts $f^2\,f^2$, and the bends $f^4\,f^4$ at right angles to the inclined bends $f^3\,f^3$. The inclined bends $f^4\,f^4$ are bolted to the vertical portions $f'\,f'$, as shown. The portions f^2, f^3, and f^4 form lateral extensions of the saddle-frame on each side of the truck D.

F' F' are diagonal ties connecting the horizontal parts $f^2\,f^2$ to the horizontal part f. A strut or brace G extends across between the vertical portions $f'\,f'$ to prevent their being forced inwardly toward each other. The saddle-frame F is suspended from the truck D by means of a large king-bolt H, which extends from the top of the truck down through the truck, the horizontal piece f, and the strut G, the bolt being secured in position by suitable keys and nuts.

Depending from each of the horizontal portions f^2 of the saddle-frame is a T-iron hanger I, the stem of which is connected to the part f^2 by a ball-and-socket joint, as shown at i, thus forming a universal joint.

J J represent plate-springs, the thick end of each spring being held in a suitable iron box J', securely bolted to the heavy timbers on the bottom of the car and the other end of each spring attached to the head of the T-iron, a spring being on each side of the stem. Two springs therefore connect the car with

each of the T-iron hangers I and consequently four springs unite one end of the car with its truck. I do not, however, limit myself to this number of springs, as in some cases it may be preferable to use a greater or lesser number. The entire weight of the car is therefore carried on the springs J, and as the T-irons, to which the springs are suspended, have a universal-joint connection to the saddle-frame it is evident that the truck and saddle-frame may have limited lateral and vertical motion without affecting the car. This will therefore almost entirely obviate the sudden shocks and jars to the car-body caused by the unevenness or curvature of the track. It will be seen that, while the entire weight of the car comes on the horizontal portions f^2 of the saddle-frame, the ties F′ and strut G render the saddle-frame F so rigid that the strain caused by the weight of the car is largely distributed over the entire saddle-frame.

K K are rods looped around the king-bolt H, their ends being securely fastened to the bottom of the car-frame in any suitable manner.

L L are plates arranged in pairs and secured to the bottom of the car-frame in any appropriate way. These plates extend downward and each pair embraces one of the horizontal portions f^2 of the saddle-frame. These plates, in connection with the rods K K, effectually prevent any forward or backward movement of the car independently of the truck, while allowing free vertical or lateral play.

M M are sleeves passing through the strut G, the part f of the saddle-frame, and the truck D. They fit tightly in the strut G and part f, but the openings l in the truck through which they pass are enlarged for the purpose of allowing the sleeves a certain amount of play in the truck, and thereby permitting the frame F to have a slight pivotal movement on the king-bolt. The sleeves have shoulders m m, which abut against the under surface of the part f of the saddle-frame and the upper surface of the strut G and prevent the strut G from bending upward, as it would otherwise have a tendency to do on account of the weight of the car.

N N are horizontal wheels, each having a shaft n, which passes entirely through one of the sleeves M and is held therein by a cap n', securely fastened on the end of the shaft. Each wheel N is provided with a flange n^2, adapted to extend under the tread of the rail B. These wheels are arranged on each truck midway between the vertical wheels E E, so as to be on opposite sides of the rail, each being about one-fourth of an inch away from the rail when the car is in a perpendicular position. When, however, the car sways in either direction, one of the horizontal wheels N will come in contact with the tread of the rail and serve to relieve the strain on the bearings of the vertical supporting-wheels C. The wheels N also serve to prevent the truck jumping the track. An opening n^3 is cut in the upper end of each sleeve M for the purpose of introducing a lubricant to the shaft n.

O O are inclined wheels, the shafts of which are journaled in the inclined portions f^3 of the saddle-frame. These wheels are adapted to come in contact with the stringers b when the car leaves a perpendicular position, and thereby prevent the car from losing its balance. When the car is perpendicular, the wheels O are about one inch away from the stringers b. It will be seen, therefore, that so long as the car maintains a perpendicular position only the vertical wheels C C will be in contact with the rail, and there will be no unnecessary friction to retard the movement of the car. As it is practically impossible for the wheels C to jump the track as long as the wheels N retain their proper position, it will be apparent that a very high rate of speed can be safely attained.

To further prevent the oscillation of the cars, I provide each car at both ends with a pin P and a socket Q, lying side by side and firmly secured to the roof of the car. They are so arranged that the pin on each car will enter the socket on the car against which it abuts. The mouth of the socket Q is funnel-shaped, as shown, for the purpose of guiding the pin into the socket.

It is well-known that the tendency in car-building at the present time is to increase the weight of the car for the purpose of rendering it less liable to jump the track and also to give it increased steadiness when in motion. This theory has its advantages, as also its disadvantages. Among the latter it may be mentioned that from thirty-five to forty tons of car are used to carry less than four tons of freight, as in the case of the Pullman cars so generally in use; also in case of collision the momentum of a heavy train tends greatly to increase the damage and loss of life and property.

My idea in constructing cars in accordance with my invention is to greatly reduce their weight, and it is thought that a car not exceeding eight tons in weight can be built that will give to passengers all the comforts and ease in riding to be found in the present Pullman car. It is obvious that a very heavy car cannot be suspended from the trucks in the manner I propose, but a light car can be so suspended with perfect security, and as any ordinary jar on the truck will be readily taken up by the springs the car will move with almost perfect steadiness. It has also been shown that trucks constructed in accordance with my invention cannot possibly leave the track under any ordinary circumstances. Therefore all the conditions of ease and safety found in a heavy car can be found equally in my light car.

Having described my invention I claim—

1. In cars for single-rail railways, a truck, and two vertical wheels journaled one before the other in said truck and adapted to run on

the single rail, combined with a saddle-frame suspended from the truck over the rail and between the two wheels, said frame having a slight pivotal movement relative to the truck, a car-body, and plate-springs whose thick ends are rigidly secured to the car-body and their other ends attached to the saddle-frame by a universal-joint connection, substantially as specified.

2. In cars for single-rail railways, a truck adapted to run on the rail, and a saddle-frame suspended from said frame over the rail, combined with a car-body, and plate-springs, each having one of its ends rigidly secured to the car-body and the other attached to the saddle-frame by a universal-joint connection, substantially as specified.

3. In cars for single-rail railways, a truck having two vertical wheels, one before the other, to run on the rail, combined with a saddle-frame pivotally suspended from the truck between said wheels, two horizontal wheels journaled in said frame and adapted to embrace the tread of the rail between the two vertical wheels, and two inclined wheels also having bearings in said saddle-frame and arranged at equal distances on either side of and below the vertical wheels, substantially as and for the purpose specified.

4. In cars for single-rail railways, the combination, with a truck, of a saddle-frame pivotally suspended thereto and having lateral extensions on either side of the truck, a hanger pivotally suspended from each of said extensions, a car-body, and plate-springs, the thick ends of said springs being secured to the car-body and their other ends to the suspended hangers, substantially as and for the purpose specified.

5. In cars for single-rail railways, the combination, with a truck, a saddle-frame, and a king-bolt connecting said truck and saddle-frame, of a car-body and rods looped around the king-bolt and having their ends firmly secured to the car-body, substantially as specified.

6. In cars for single-rail railways, the combination, with a truck, a saddle-frame having lateral extensions, and a king-bolt uniting said truck and saddle-frame, of a car-body, plates secured to said car-body and extending down to embrace the lateral extensions of the saddle-frame, and rods looped around the king-bolt and having their ends firmly secured to the car-body, substantially as and for the purpose specified.

7. In cars for single-rail railways, a truck, a saddle-frame pivotally suspended therefrom, and hangers pivotally suspended in said saddle-frame, combined with a car-body, springs connecting the bottom of the car-body with the said hangers, and pins and sockets at the top of the car-body, substantially as and for the purpose specified.

8. A saddle-frame for single-rail railway-cars, consisting of a continuous bar bent, as described, to form a horizontal top portion, two vertical sides and two lateral extensions, combined with a strut between the two vertical sides, and diagonal ties connecting the lateral extensions with the top portion, substantially as set forth.

In testimony whereof I hereto set my hand and seal.

JOHN B. MAHANA. [L. S.]

Witnesses:
EDWIN CRUSE,
E. T. WHITE.