

W. D. VALENTINE.
MONORAILWAY SYSTEM.

APPLICATION FILED JAN. 20, 1908. RENEWED SEPT. 18, 1909.

1,102,615.

Patented July 7, 1914.

2 SHEETS—SHEET 1.

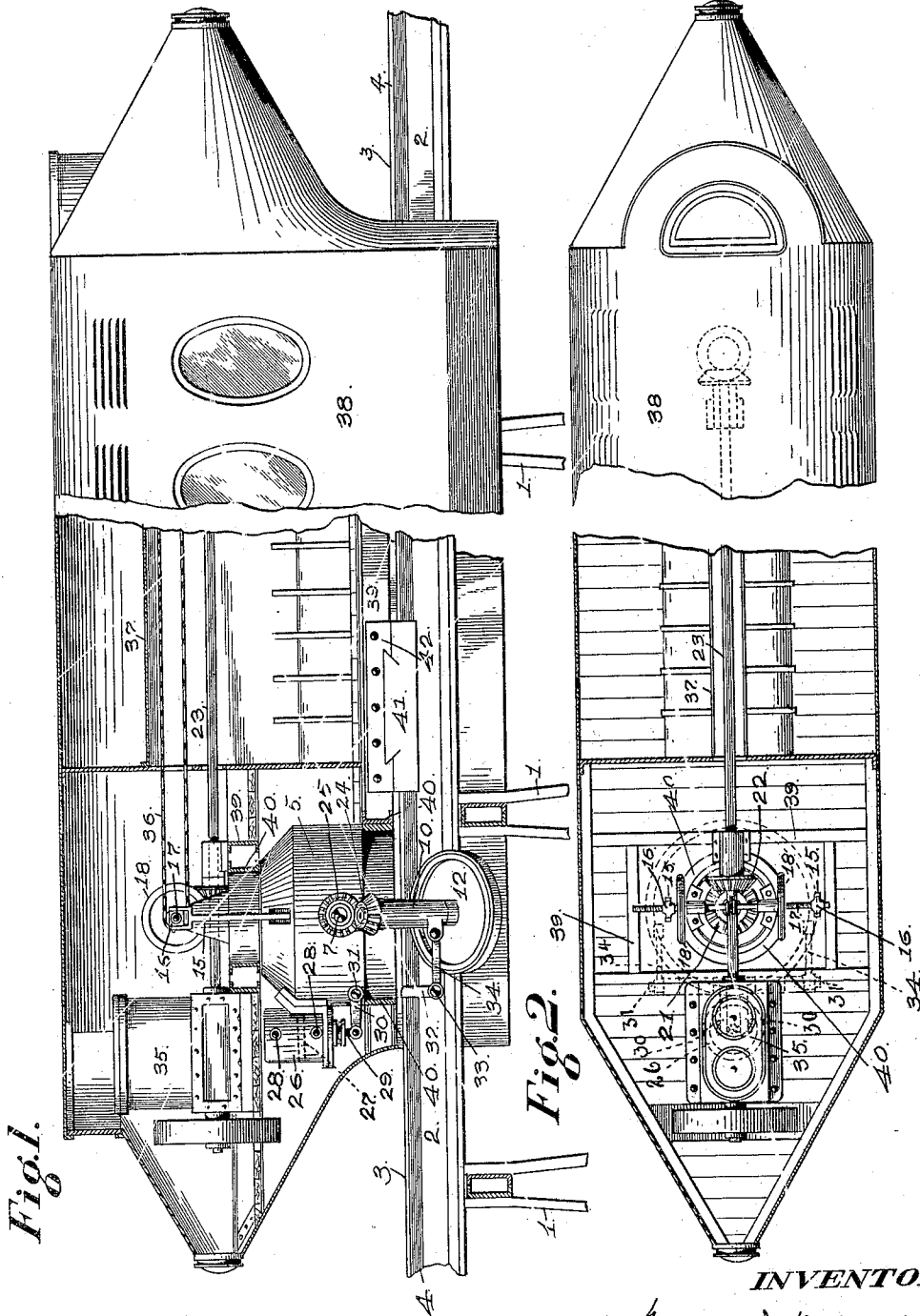


Fig. 1.

Fig. 2.

WITNESSES.

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2 SHEETS—SHEET 2.

Fig. 3.

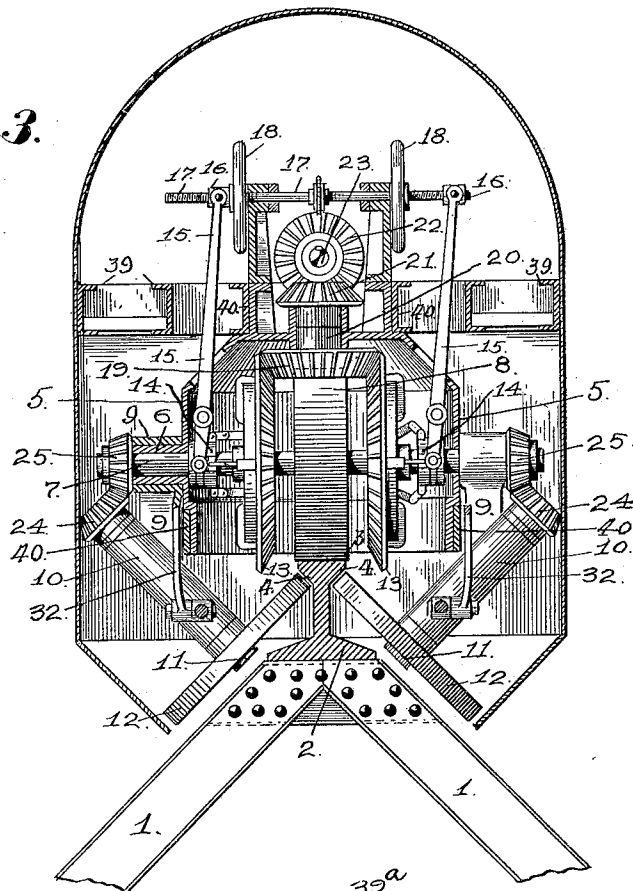
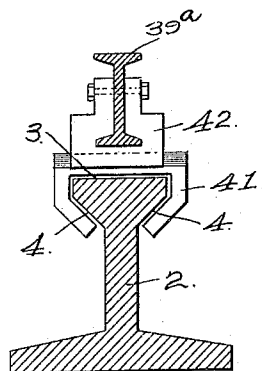


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MONORAILWAY SYSTEM.

1,102,615.

Specification of Letters Patent.

Patented July 7, 1914.

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To all whom it may concern:

Be it known that I, WALTER D. VALENTINE, a citizen of the United States, residing at Altadena, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Monorailway Systems, of which the following is a specification.

My invention relates particularly to improvements in the means for supporting cars upon the rail in monorailway systems.

The object of my invention is to provide means whereby cars may be supported from the rail in such a manner as to absolutely insure equilibrium and safety at all times. I accomplish this end by providing a rail with a rail-head having a plurality of opposed treads and grouping the wheels of each of the car trucks around the rail-head upon these treads.

In carrying out my invention I have found it best to provide the rail with superior and inferior treads, the upper tread forming the main supporting surface for the car and the inferior tread or treads being designed to receive one or more locking wheels for maintaining the equilibrium of the car and preventing its derailment. All of the wheels of which I make use, however, are designed to be used as traction wheels for propelling the car, but I have so arranged the wheels received by the inferior treads that they are normally maintained out of contact with the rail so as to be used only for restoring the equilibrium of the car and have provided means whereby they may be thrown into contact with the rail when desired, to assist in propelling the car and also to exert a positive gripping action upon the rail.

I have shown one embodiment of my invention in the accompanying drawings in which:

Figure 1, is a side elevation, partly in section, of a car and supporting rail built in accordance with my invention; Fig. 2, is a plan view partly in section of the car shown in Fig. 1; Fig. 3, is a vertical cross section of the parts shown in Fig. 1; and Fig. 4, is an enlarged detail of the rail showing the safety grip.

In the drawings 1 is a bed or superstructure of any suitable character elevated or otherwise for supporting a monorail 2. The rail 2 which may be either integral or com-

pound is constructed with a web and foot of any suitable shape, but is provided with a head having oppositely disposed treads. In the modification which I have shown in the drawings the rail-head is provided with a superior tread 3 and two downwardly converging inferior treads 4.

The car 38 which is supported by the rail 2 is provided with a plurality of trucks, each of which comprises a hollow cylindrical body frame 5 having outwardly projecting bearings 6 for receiving a main axle 7. The cylindrical body frame 5 is pivoted in a bearing 40, located in a channel iron framework 39 carried by the car. Upon the axle 7 is supported a main wheel 8 which rests upon and has contact with the superior tread 3 of the rail 2. The exterior surface of the side bearings 6 are turned smooth to receive the treads of pivoted brackets 9, the lower ends of which carry inclined bearings 10 for receiving axles 11 of wheels 12 which are adapted to run upon the inferior treads 4. The axles 11 carry at their upper ends bevel gears 24 which mesh with bevel gears 25 carried upon the ends of the shaft 7. By this means the wheel 8 and the wheels 12 are all driven simultaneously from the same source of power.

The wheels 12 carried in the brackets 9 are supported in such a manner as to be normally maintained very close to but out of contact with the treads 4, so that they are brought into contact therewith only in case the car sways or when they are positively moved into such contact. The wheels 12 are positively moved into contact with the rail whenever it is desired to increase the tractive effect upon the car or when it is desired to tightly grip the rail for any desired purpose and in order to effect this movement I provide a power operated mechanism. This comprises a compressed air cylinder 26 having a piston 27 and suitable compressed air connections 28 above and below the piston to permit it to be moved in either direction as desired. A piston rod 29 attached to the piston 27 is connected to a pair of levers 30 which are rigidly secured to a rock shaft 31, to each end of which is secured a lever 32 connected by means of a link 34 to one of the axle-bearings 10.

All of the wheels, both upper and lower, are positively driven by a suitable motor mechanism. The shaft 7 is driven from any

suitable source of power. In the construction shown in the accompanying drawings, however, there is at each side of the wheel 8 a bevel gear 13 loosely carried by the shaft 7, to each of which there is connected a clutch member 14 slidably mounted upon the shaft 7 for moving the gears 13 into and out of engagement with the shaft. The gears 13 are designed to rotate the shaft 7 to propel the car either forwardly or backwardly, according as one or the other is thrown into engagement with the shaft. In order to effect this engagement, each clutch member 14 has connected thereto a lever 15 which is pivotally supported by and passes through the cylindrical body frame 5. A nut 16 is pivoted to the top of each of the levers 15, and each of the nuts is carried upon one end of a screw-threaded shaft 17 having hand operating wheels 18. A chain 36 passing over a sprocket wheel carried by the shaft 17 leads to the corresponding mechanism upon the other truck carried by the car, so as to cause the motive power to be disconnected or the tractive effect to be reversed in both trucks simultaneously. A bevel gear 19 carried by a shaft 20 meshes with the bevel gears 13 and the shaft 20 is provided at its upper end with another bevel gear 21 which meshes with a similar gear 22 carried by a horizontal motor shaft 23. The shaft 23 may be driven by any suitable motor 35 and may extend to all the trucks of the car so as to drive all of the wheels attached thereto in unison. In order to remove the shaft 23 and the chain 36 from view I provide a housing 37 for them, situated upon the interior of the car. A safety grip 41 attached to I beam 39^a of the car 38 by means of a head 42 extends around each side of the rail tread, but out of contact therewith, to prevent any possibility of derailment.

The car 38 can be propelled either forwardly or rearwardly or it can be entirely disconnected from the motive power by operating the hand wheels 18 in the proper direction. While in motion the car is prevented from being derailed by the proximity of the wheels 12 to the inferior treads 4 which are immediately brought into contact therewith in case the car assumes a swaying or swinging motion. By this means any tendency of the car to travel in any other than a vertical position above the center of the rail is immediately corrected. When the wheels 12 are brought into contact with the rail-head for this purpose the car will not be retarded in any way as the wheels 12 are also positively driven and at the same peripheral speed as the wheel 8.

Should it be desired to more tightly grip the rail either to prevent the slipping of the driving wheels upon the rail or to minimize the lateral motion of the car, the wheels 12

can be moved closer to or into actual contact with the treads 4 by admitting compressed air to the cylinder 26 to move the piston 27 in the proper direction. Any possibility of derailment is absolutely avoided at all times by the presence of the safety grip 4.

While I have described my invention in detail I wish it to be understood that many changes may be made therein without departing from the spirit and fundamental principles thereof.

I claim:—

1. In a monorailway system, the combination with a rail, the head of which has a tread surface on top and inwardly and laterally inclined tread surfaces beneath, of a car truck provided with supporting and driving wheels arranged to engage said surfaces, and means to move the wheels engaging said inclined surfaces toward and away from the same.

2. In a monorailway system, the combination with a rail, the head of which has a single tread surface on top and a pair of opposite downwardly converging tread surfaces beneath, of a truck having wheels grouped about said head and adapted to have traction contact with its treads, and a motor driving means for all of said wheels.

3. In a monorailway system, the combination with a rail, the head of which has a tread surface on top and inwardly and laterally inclined tread surfaces beneath, of a car truck provided with a supporting and driving wheel engaging said top tread surface and with lateral wheels adapted to engage said inclined surfaces but normally out of engagement therewith, and means to move said lateral wheels into and out of engagement with said surfaces.

4. In a monorailway system, the combination with a rail having a head with treads upon upper and under surfaces of the rail, of a truck having wheels grouped about said head and adapted to have traction contact with its treads, said truck having side bearings for the axle of the superior tread wheel, brackets pivotally mounted on the exterior of the said side bearings, said brackets having bearings for the axles of the inferior tread wheels, means for moving said brackets on their pivotal centers to throw the inferior tread wheels into and out of traction contact with the inferior treads, a motor and connections therefrom to drive the axle of the superior tread wheel, consisting of the opposing gears loose on the axle, the clutches for said gears, the levers for operating the clutches and the screw-shaft and nuts for operating said levers, the motor shaft with its gear, and the gear hub between said motor-shaft-gear and the axle gear, and gears between the ends of said axle and the axles of the inferior tread wheels to drive said wheels.

5. In a monorailway system, the combination with a rail having a head with plural treads, of a truck having a hollow body-casting mounted to swivel in suitable exterior guides, said casting having mounted within it the main supporting axle and wheel and the driving connections therefor, and having pivotally supported from its sides the lower axles and their wheels and driving connections therefor, and means for throwing the lower wheels into and out of traction contact with their corresponding rail-head-treads.

6. In a railway system, the combination of a rail, a truck having wheels designed to engage said rail, and means for pneumatically drawing upward one or more of said wheels.

7. In a railway, the combination with a rail having a substantially horizontal upper tread surface and inwardly and downwardly inclined lateral tread surfaces, of a car truck provided with wheels arranged to run on said tread surfaces, the axes of said wheels being located in the same plane, means to drive all of said wheels and means to move said lateral wheels toward and away from said inclined tread surfaces.

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

WALTER D. VALENTINE.

Witnesses:

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D. B. RICHARDS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."