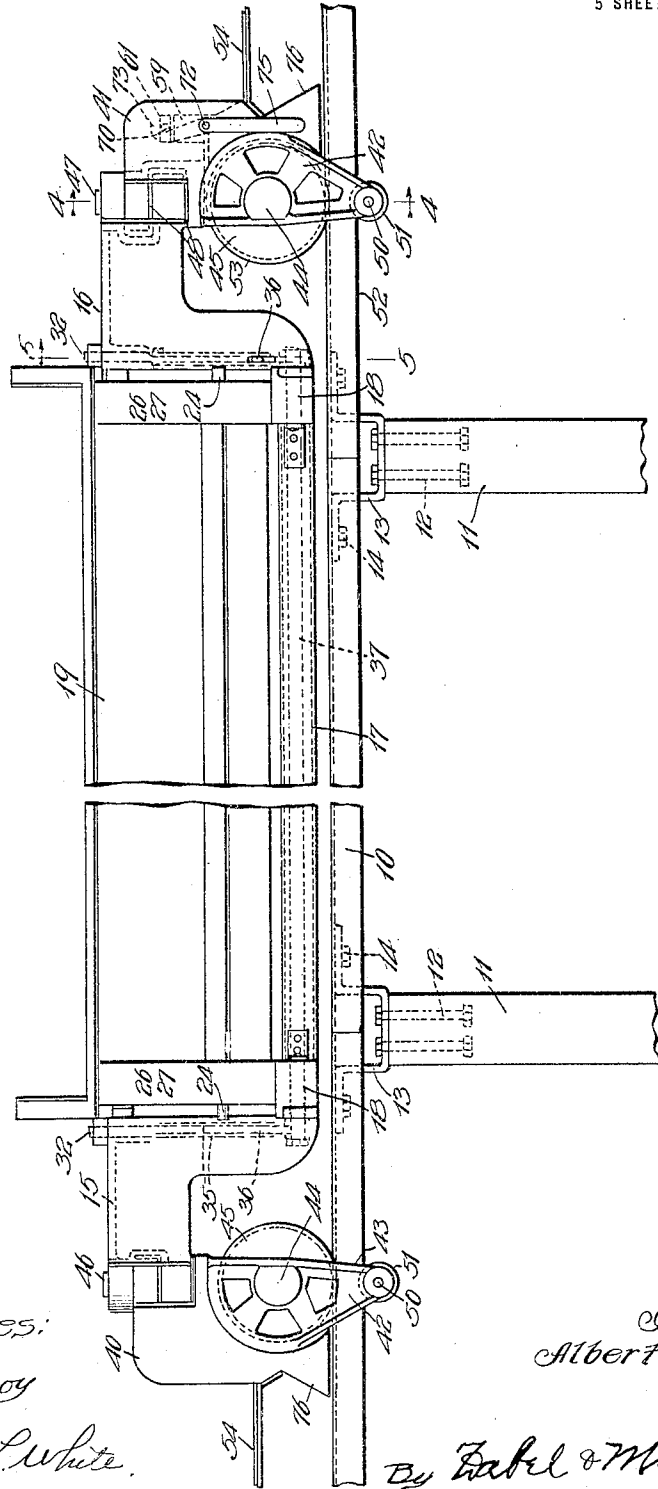


1,376,444.

Patented May 3, 1921.

5 SHEETS—SHEET 1.

Fig. 1.



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1,376,444.

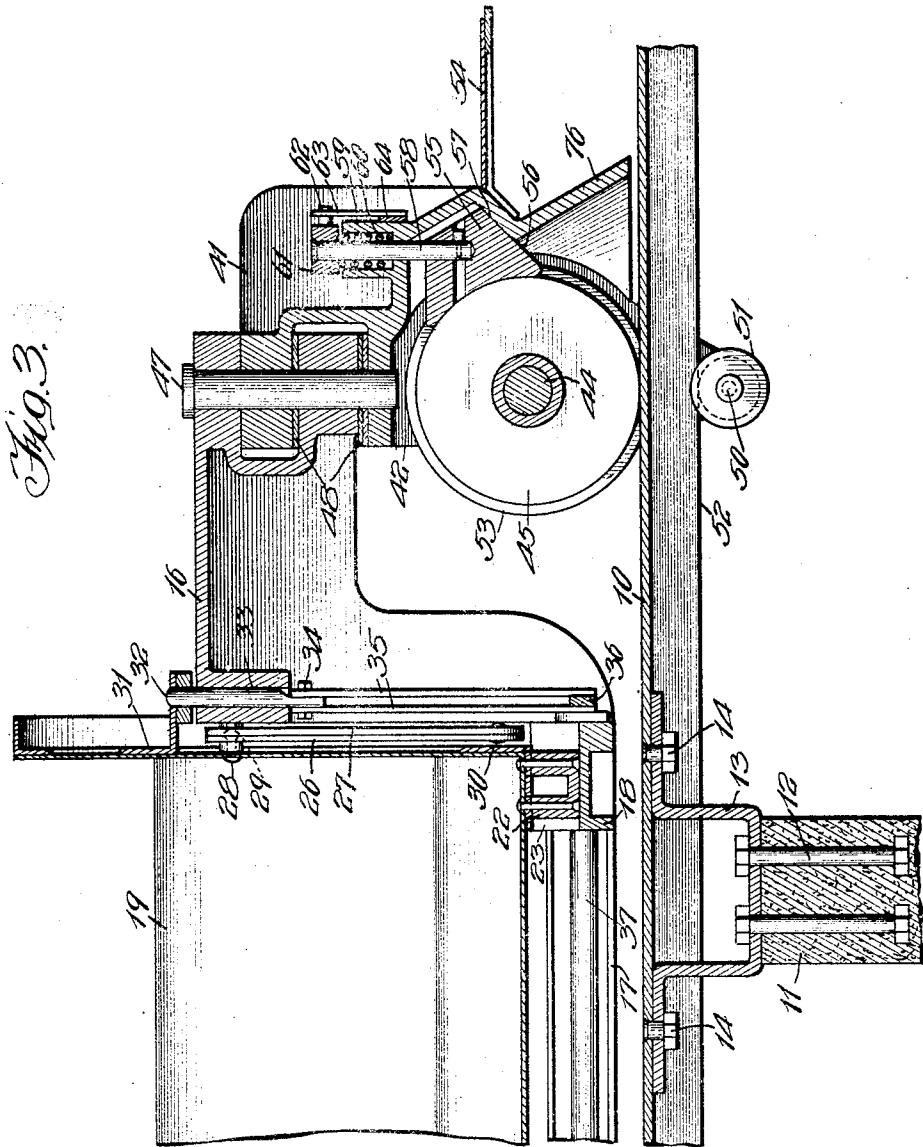
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A. P. LEE.
MONORAIL RAILWAY.
APPLICATION FILED JULY 2, 1919.

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5 SHEETS—SHEET 3.



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 5 SHEETS—SHEET 4.

Fig. 4.

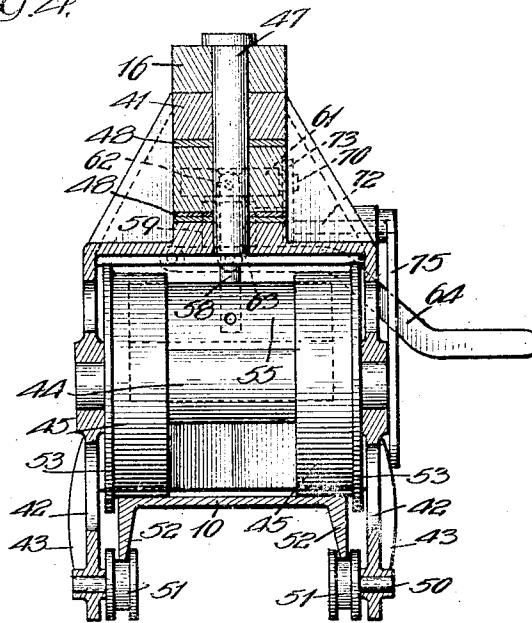
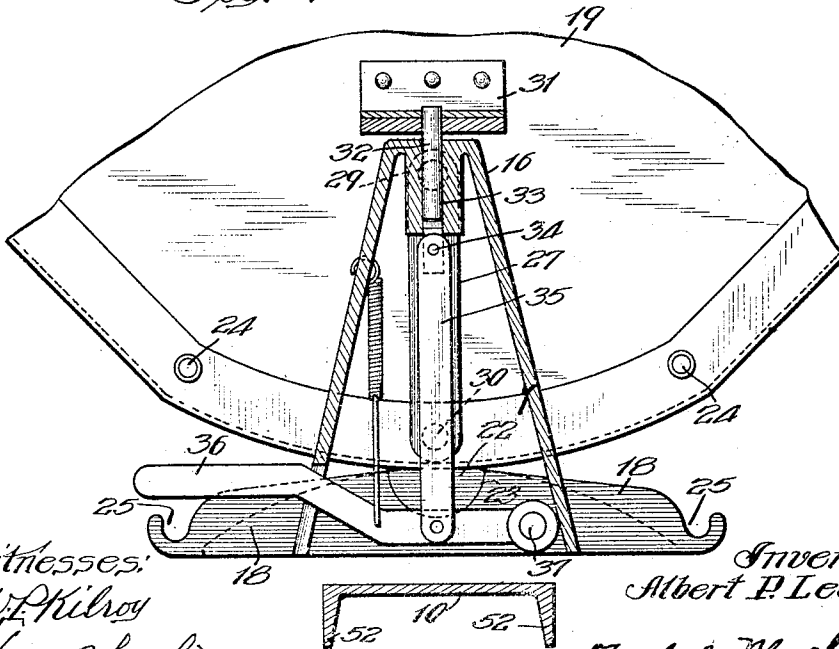


Fig. 5.



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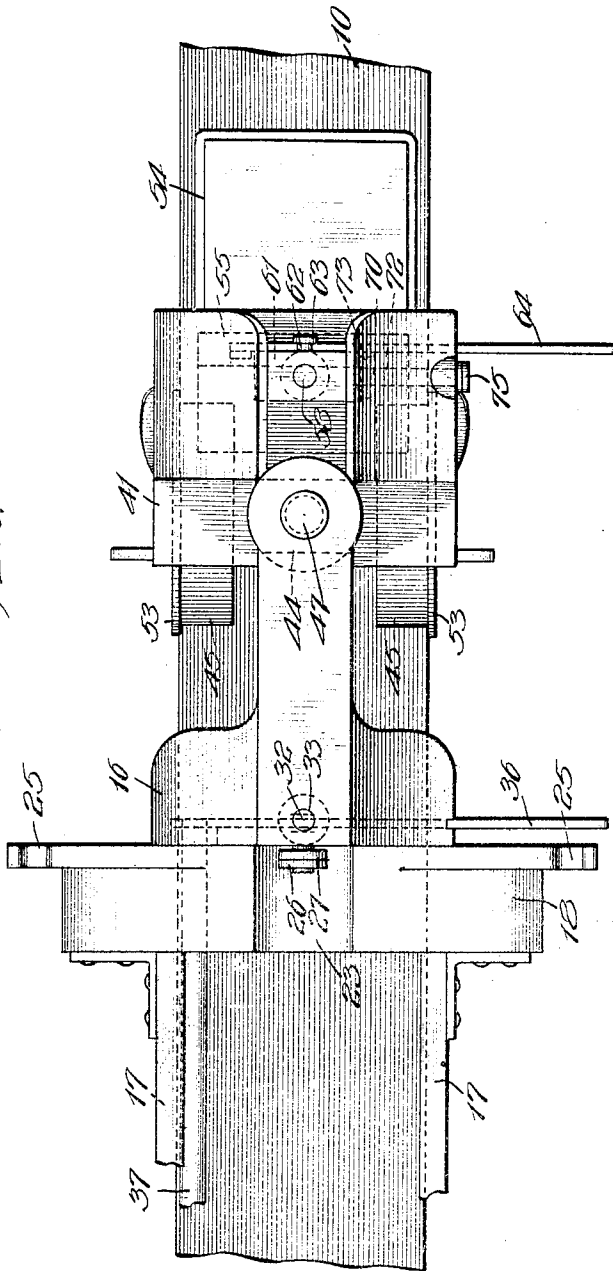
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Patented May 3, 1921.
 5 SHEETS—SHEET 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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MONORAIL RAILWAY.

1,376,444.

Specification of Letters Patent.

Patented May 3, 1921.

Application filed July 2, 1919. Serial No. 308,100.

To all whom it may concern:

Be it known that I, ALBERT P. LEE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Monorail Railways, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

An object of my invention is to provide a mono-rail railway of the character described which can be easily and cheaply constructed, operated efficiently, readily and quickly installed, and which can be moved to other locations in shorter time and with less expense than the small gage or other railways now in use.

Another object is to provide a mono-rail railway of the character described which will take up little space and will make sharp turns so that the same may be mounted upon or over the tops of walls or fences or on brackets projecting from any other supports, or may be mounted close to the walls of buildings and yet make the sharp curves around the corners of the buildings.

Another object is to provide a mono-rail railway of the character described having a dumping hopper which can be moved in either direction from its central position to dump its load on either side of the rail.

Another object is to provide a car for a mono-rail system which has a pivoted truck at each end, which trucks are positively held to the rail so as to prevent accidental jumping off the rail.

Another object is to provide a car with means thereon to control its movements and the movements of the hopper, as well as a platform for the operator of the car.

Another object is to provide means whereby the car may be dumped without imposing excessive strains on the supporting rail.

Another object is to provide controlling means for the car which are within easy reach of an operator, either on the platform or on the ground.

Other objects of the invention will be apparent from the following detailed description of the device disclosed in the drawings accompanying this specification. In this specification and in the drawings I have disclosed one form which my invention may take, which form is the best known to me at

the present time. However, it is to be understood that by this specification and the accompanying drawings I do not intend to limit myself to the specific construction disclosed, as modifications of the specific structure may be required in the manufacture thereof, or may occur to those skilled in this art. The real nature and scope of the invention disclosed is to be determined from the claims appended to this specification.

In the drawings the same reference numerals have been used to designate the same parts where shown in the different views.

Figure 1 is a side elevation of my improved mono-rail car mounted on its supporting rail;

Fig. 2 is an end view of the structure, showing the supporting bracket used at the dumping position;

Fig. 3 is a sectional view through one end of the device, taken along the center line of the track;

Fig. 4 is a vertical section taken through the truck on the line 4—4 of Fig. 1;

Fig. 5 is a vertical sectional view on line 5—5 of Fig. 1, showing the locking means for the hopper;

Fig. 6 is a plan view of the structure shown in Fig. 3, with the hopper removed.

The device disclosed may be termed a rail-way car, inasmuch as the structure is very similar to the structure of an ordinary railway car. The term car will therefore be used to designate as a whole the movable portion of my invention. This car is supported and travels on a rail 10 which is suitably supported on posts 11 which are preferably made of concrete but may be made of any other suitable material. These posts have embedded in their tops suitable bolts 12 which form means for securing to the posts U-shaped plates 13, clearly shown in Fig. 1 of the drawings. These plates are in turn rigidly secured by means of bolts or rivets 14 to the rail 10. The joints in the rail 10 may be located directly above the posts 11 so that by removing the bolts 14 the sections of the rail may be moved to any other location. With this construction of the rail a track is formed which can be readily and easily installed, which takes up but little space and requires less labor for installation than the usual railway tracks which are used at the present time. My car proper comprises suitable cast iron end members 15 and 16, which

are rigidly secured together by side members 17. These members 15, 16 and 17 constitute the frame proper of my car. Cast integral with the end members 15 and 16 are suitable rails 18 which are clearly shown in Fig. 2 of the drawings. These rails form tracks for the rolling hopper 19 which is constructed and operates in a manner similar to that shown in my Patent No. 1,253,059, of January 8, 1918. The hopper 19 is shown as having flaring side walls 20 and a rounded bottom portion 21 which coöperates directly with the rail as is shown in the patent. Secured centrally to the rounded portion 21 is a projecting lug member 22 which fits into a corresponding recess 23 in the rail 18. It is to be understood that the rails 18 at each end of the frame are constructed in a similar manner. The lugs 22 and recesses 23 prevent the hopper from sliding laterally on the rails 18. The hopper is further provided with suitable pins 24 which are adapted when the hopper reaches the limit of its dumping movement in either direction to enter depressions 25 in the ends of the rails 18. In the further movement of the hopper toward its dumping position the hopper pivots about the pin 24 as a center. In order to limit the dumping movement of the hopper in either direction link members 26 and 27 are provided. One end of the link 26 is pivotally connected to the hopper at 28, as shown in Fig. 2, and one end of the link 27 is pivoted to the member 16, as is also shown in Fig. 2. The other ends of the links 26 and 27 are pivotally connected together at 30. When the hopper is in its dumping position these links are extended in a straight line, as is shown in Fig. 2. When the hopper is in its normal or central position the links depend vertically from the pivots 28 and 29, as is shown in Fig. 3. When the hopper is in its central position the pivots 28 and 29 are in horizontal alinement, as is shown in the drawings. Secured to the end of the hopper 19 is an L-shaped plate 31 provided with a suitable opening adapted to be engaged by a locking bolt 32. This bolt moves vertically in a guideway 33 in the frame member 16 and has connected its lower end by means of the bolt 34 suitable links 35. The lower ends of these links are pivotally secured to a handle member 36 secured to shaft 37 and extending laterally to one side of the car, as is shown in Fig. 2. When it is desired to dump the hopper in either direction the operator moves the handle 36 downwardly and this causes downward movement of the bolt 32 out of engagement with the plate 31. A similar plate 31 is secured to the opposite end of the hopper and this plate is engaged by a second locking bolt 32. This bolt is connected by links 35 to one end of an arm 38 rigidly secured to the other end of the shaft 37 which extends longitudinally of the car frame. With this construction when the operator moves the handle 36 downwardly the two bolts 32 at the opposite ends of the hopper 19 are simultaneously moved out of engagement with the plates 31. The hopper is then free to move in either direction and due to the downward inclination of the rails 18, can be readily started toward its dumping position. The car frame described above is suitably mounted upon and carried by truck members 40 and 41. These truck members are suitably made of cast metal and have downwardly extended portions 42 at each side. These portions 42 are reinforced by means of ribs 43 clearly shown in the drawings. The truck members support suitable axles 44 upon which are mounted the truck wheels 45. The axles 44 rotate in suitable bearings in the truck members. The truck members 40 and 41 are secured pivotally to the car frame by means of pivots 46 and 47. Bearing plates or washers 48 are inserted between the cast elements, as is clear from Fig. 3. The downwardly extending portions 42 are provided with stub shafts 50, upon which are mounted suitable grooved guiding rollers 51, shown in Fig. 4. These guide rollers engage the downwardly extending flanges 52 of the rail 10 which rail is formed of an ordinary channel member, as is clear from the drawings. The wheels 45 are provided with flanges 53 which depend at the sides of the rail 10 and these flanges together with the rollers 51 prevent accidental displacement of the trucks. Each truck member is provided with a platform 54, upon which the operator in charge of the car may stand. Suitable brake mechanism is provided on the truck 41, shown at the right in Fig. 1. This brake mechanism comprises the brake-shoe 55, shown in Fig. 3. This brake-shoe has an inclined bottom surface 56 which coöperates with an inclined surface 57 of the truck member 41. A vertically extending rod 58 is suitably connected to the brake-shoe 55 and passes through an opening in the top of the casing which incloses the brake-shoe. Surrounding the rod 58 is a vertical wall 59 having an interior diameter larger than the diameter of the rod 58. Surrounding the rod is a spring 60 which normally tends to hold the brake-shoe away from the wheel 45. The upper end of the spring bears against a block 61 secured to the upper end of the rod 58. This block has a forwardly extending pin 62 which is secured to one end of the link 63. This link depends downwardly and is secured at its other end to a handle member 64 pivoted to the truck frame at 65. This handle member extends toward the same side of the car as the handle member 36. When an operator is standing on the ground at the side of the car and desires to

apply the brake, he moves the handle 64 downwardly. This causes downward movement of the brake-shoe 55 and the cooperating cam surfaces 56 and 57 cause the shoe 55 to move laterally against the wheel. As soon as the handle is released the spring 60 moves the brake-shoe out of contact with the wheel. If the operator is standing on the platform 54 he may place his foot on top of the block 61 and press the same downwardly against the action of the spring 60. This will cause the brake shoe to move against the wheel as in the operation just described. It is at times desirable to apply the brake to the wheels and leave the same in its braking position. To provide for this I have shown a pin 70 extending from one end of the block 61. Pivotaly secured on a short shaft 72 carried by the truck frame 41 is a hook member 73 which is adapted to engage the pin 70 when the block 61 is depressed and hold the block against the action of the spring 60. The brake will therefore remain applied to the wheels. In order to release this hook member 73 I have secured to the shaft 72 a depending handle member 75, shown in Figs. 1 and 2. This handle member is within easy reach of the operator either on the platform 54 or on the ground adjacent the track. The usual cow-catchers 76 are provided at each end of the machine. The guide rollers 51 prevent the trucks from leaving the rail 10, but in order to provide additional support and to relieve the rail of excessive strains when the hopper is dumped, I have provided the bracket member shown in Fig. 2. This bracket member comprises an angle bar 80 embedded in or secured to the post 11, as is shown in this figure. This angle bar extends upwardly at one side of the rail 10. A similar angle bar 80 is secured to an adjoining post 11. Secured to the upper ends of the two angle members 80 is a rail member 81, preferably shaped as shown in Fig. 2. This member is bolted to the upper ends of the angle bars 80 by means of bolts 82, so that the same may be disassembled when it is desired to move the track to another location. The rail 81 lies within the outer ends of the rail members 18 and forms supports for the ends of the rails when the hopper is being dumped as is clear from Fig. 2. The rail 81 is spaced from the rail 10 so that the depending portions 42 of the truck members may pass between them.

It is to be understood, of course, that this extra supporting rail 81 is only provided at suitable stations along the rail which stations may be called dumping stations. They are not necessary along portions of the rail where the hopper is not to be dumped.

From the above description the construction and operation of my device will be apparent. Modifications of the detail shown

may become necessary in the manufacture of the device, but the essential characteristics of the device are herein shown.

Having thus described my invention, what I claim as new is:

1. A monorail railway of the character described comprising a rail, a car having a load carrying body mounted upon said rail, means engaging the lower side of the rail to prevent the car from tipping off the rail, and means whereby the load in said body may be dumped on either side of the rail.

2. A monorail railway of the character described comprising a rail, means to support said rail above the ground, a car with a rolling body mounted upon said rail and means engaging the lower side of the rail to prevent the car from tipping off the rail.

3. A monorail railway of the character described comprising a channel shaped rail, a car having a frame, truck frames pivotaly connected to said frame, supporting wheels mounted in said truck frames and adapted to run on said rail and means engaging the lower edges of the channel shaped rail to prevent the car from tipping off the rail.

4. A monorail railway of the character described comprising a rail, a car having a frame, truck frames pivotaly connected to the frame, supporting wheels mounted in said truck frames, and guide rollers mounted in said truck frames and adapted to engage the lower side of the rail to prevent the car from tipping off the rail.

5. A monorail railway of the character described comprising a single rail, a car running on top of the rail and having a dumping hopper adapted to be supported by and run on said rail, and means whereby said hopper may be rolled to discharge its load on either side of the rail.

6. A monorail railway of the character described comprising a single rail, a car having a supporting roller engaging the upper surface of the rail and a grooved guide roller engaging the under surface of the rail, runways on the car and a hopper adapted to roll on said runways from charge receiving to discharge position.

7. A monorail railway of the character described comprising a single rail having a flat surface and a downwardly extending flange, a car having a supporting roller engaging the upper surface of the rail and a grooved guide roller engaging the under surface of the flange, and a load-carrying hopper movable on said car from charge holding to discharge position.

8. A monorail railway of the character described comprising a channel-shaped rail and a car adapted to run on said rail with a downwardly projecting flange, said car comprising a frame, trucks pivotaly connected to said frame, depending portions on said

trucks and grooved guide rollers carried by said depending portions and adapted to engage the under side of the flange of said rail.

9. A monorail railway of the character described comprising a single rail and a car adapted to travel on said rail, said car comprising a frame, a hopper adapted to roll on said frame to a dumping position, and means on said car to prevent the car from tipping off the rail when the hopper rolls to dumping position.

10. A monorail railway of the character described comprising a single rail and a car adapted to travel on said rail, said car comprising a depending frame, inclined rails on said frame, a hopper adapted to roll on said rails to a dumping position, and means on said car to prevent the car from tipping off the rail when the hopper rolls to dumping position.

11. A monorail railway of the character described comprising a single rail and a car adapted to travel on said rail, said car comprising a depending frame, downwardly inclined rails on said frame, a hopper adapted to roll on said rails to a dumping position, and means on said car to prevent the car from tipping off the rail when the hopper rolls to dumping position.

12. A monorail railway of the character described comprising a single supporting rail and a car adapted to travel on said rail, said car comprising a depending frame traveling close to the upper surface of the rail, trucks pivotally secured to the ends of said frame, rails on said frame, a hopper adapted to roll on said rails to a dumping position, and means on said car to prevent the car from tipping off the rail when the hopper rolls to dumping position.

13. A monorail railway of the character described comprising a single supporting rail and a car adapted to travel on said rail, said car comprising a depending frame traveling close to the upper surface of the rail, rails on said frame, a recess in each rail, a hopper adapted to roll on said rails to a dumping position, lugs on the hopper adapted to fit into said recesses, and means on said car to prevent the car from tipping off the rail when the hopper rolls to dumping position.

14. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a frame, a hopper adapted to roll on said frame to either side of its dumping position, and a bracket adapted to support said frame when the hopper rolls to its dumping position.

15. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a frame, a hopper adapted to roll on said frame to either side of its dumping position,

means to lock said hopper in its central position, and a bracket adapted to support said frame when the hopper rolls to its dumping position.

16. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a frame, a hopper adapted to roll on said frame to either side of its dumping position, means to lock said hopper in its central position, means to release said locking means, and a bracket adapted to support said frame when the hopper rolls to its dumping position.

17. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a frame, a hopper adapted to roll on said frame to either side of its dumping position, means at each end of the hopper to lock the hopper in its central position, and a bracket adapted to support said frame when the hopper rolls to its dumping position.

18. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a frame, a hopper adapted to roll on said frame to either side of its dumping position, means at each end of the hopper to lock the hopper in its central position, means for simultaneously releasing both of said locking means, and a bracket adapted to support said frame when the hopper rolls to its dumping position.

19. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a frame, a hopper rolling on said frame, trucks pivotally secured to the ends of the frame, means carried by the trucks to prevent the car from tipping off the rail, and brake mechanism carried by one of said trucks to prevent movement of the car during rolling of the hopper.

20. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a frame, a hopper adapted to roll on said frame, trucks pivotally secured to the ends of the frame, means carried by the trucks to prevent the car from tipping off the rail, brake mechanism carried by one of said trucks, and means to operate the brake mechanism to lock the car against movement during the rolling of the hopper.

21. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a drop frame traveling close to the upper surface of the rail, trucks pivotally secured to the ends of the frame, a hopper adapted to roll on said frame, means carried by the trucks to prevent the car from tipping off the rail, brake mechanism carried by one of

said trucks, means to operate the brake mechanism to lock the car during rolling of the hopper and means to lock the brake mechanism in applied position.

22. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a drop frame traveling close to the upper surface of the rail, trucks pivotally secured to the ends of the frame, a hopper adapted to roll on said frame, means carried by the trucks to prevent the car from tipping off the rail, brake mechanism carried by one of said trucks, means to operate the brake mechanism to lock the car during rolling of the hopper, means to lock the brake mechanism in applied position and means to release said brake locking means.

23. A monorail railway of the character described comprising a rail, a drop frame car adapted to travel on said rail, and a truck at each end of the car for supporting the frame close to the rail, each truck comprising a frame member, an axle supported on said frame member, supporting wheels on said axle, portions on said frame member depending below the axle and guide rollers carried by said depending portions, said wheels and rollers engaging opposite surfaces of the rail to prevent tipping of the truck relatively to the rail.

24. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, said car comprising a frame, trucks pivoted to the ends of the frame, an operator's platform on each truck and guide rollers on said trucks adapted to engage said rail to prevent the car from tipping off the rail.

25. A monorail railway of the character described comprising a rail, a car adapted to travel on said rail, supports for said rail, brackets on said supports, and a rail carried by said brackets adjacent the first rail and adapted to prevent the car from tipping off said first rail.

26. A monorail railway of the character described comprising a rail, and a car adapted to travel on the first rail, said car comprising a frame, a hopper adapted to roll on the frame to dumping position, and a second rail adjacent the first rail adapted to support the frame when the hopper rolls to dumping position.

27. A monorail railway of the character described comprising a single rail having a flat upper surface and a downwardly extending flange, a car having pairs of flanged supporting wheels engaging the upper surface of the rail, the flanges on said wheels engaging the opposite side edges of said rail, a grooved guide roller engaging the under

surface of said flange, and a load carrying hopper movable on said car from charge holding to discharge position.

28. A monorail railway of the character described comprising a rail, a drop frame car adapted to travel on said rail, and a truck at each end of the car for supporting the frame close to the rail, each truck comprising a frame member, an axle supported on each frame member, a pair of supporting wheels on each axle, portions on each frame member depending below said axle and guide rollers carried by said depending portions, said wheels engaging the top and opposite sides of said rail and said rollers engaging lower edge portions of said rail, thereby preventing tipping of said truck relatively to the rail.

29. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, truck frames secured to the ends of said car provided with wheels, and brake mechanism carried by one of said truck frames, said brake mechanism comprising a shoe provided with an inclined face and said truck frame having an integral inclined wall portion providing an inclined face coöperating with said brake shoe to force said shoe against said wheels on downward movement thereof.

30. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, truck frames secured to the ends of said car provided with wheels, and brake mechanism carried by one of said truck frames, said brake mechanism comprising a shoe provided with an inclined face and said truck frame having an integral inclined wall portion providing an inclined face coöperating with said brake shoe to force said shoe against said wheels on downward movement thereof, and spring means for normally holding said shoe spaced from said wheels.

31. A monorail railway of the character described comprising a rail and a car adapted to travel on said rail, truck frames secured to the ends of said car provided with wheels, and brake mechanism carried by one of said truck frames, said brake mechanism comprising a shoe provided with an inclined face, and said truck frame having an integral inclined wall portion providing an inclined face coöperating with said brake shoe to force said shoe against said wheels on downward movement thereof, means for moving said shoe downward, and spring means for normally holding said shoe spaced from said wheels.

In witness whereof I hereunto subscribe my name this 28th day of June, A. D. 1919.
ALBERT P. LEE.