

1,035,243.

G. SANDE.
MONORAIL CAR.
APPLICATION FILED JAN. 22, 1912.

Patented Aug. 13, 1912.
5 SHEETS—SHEET 1.

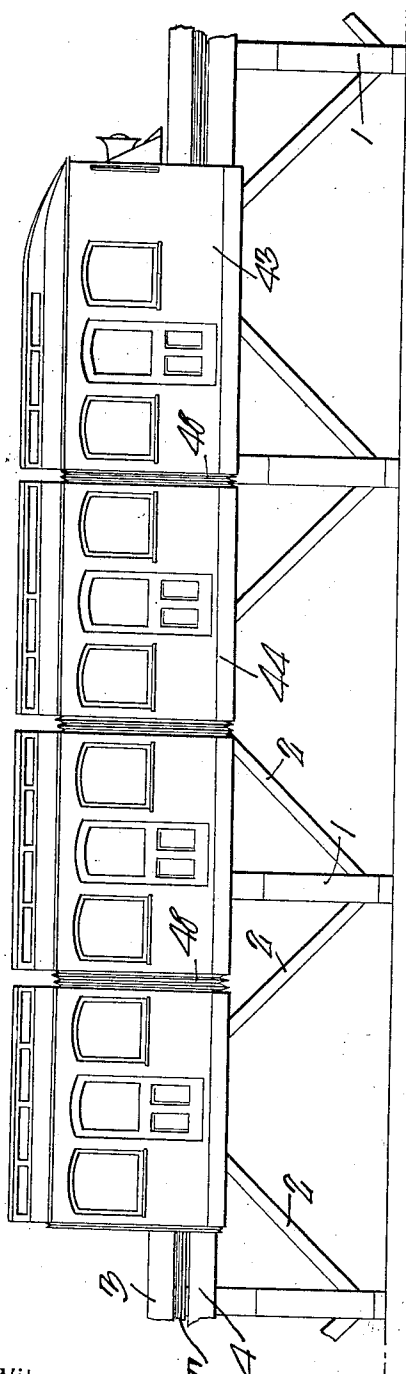


Fig. 1.

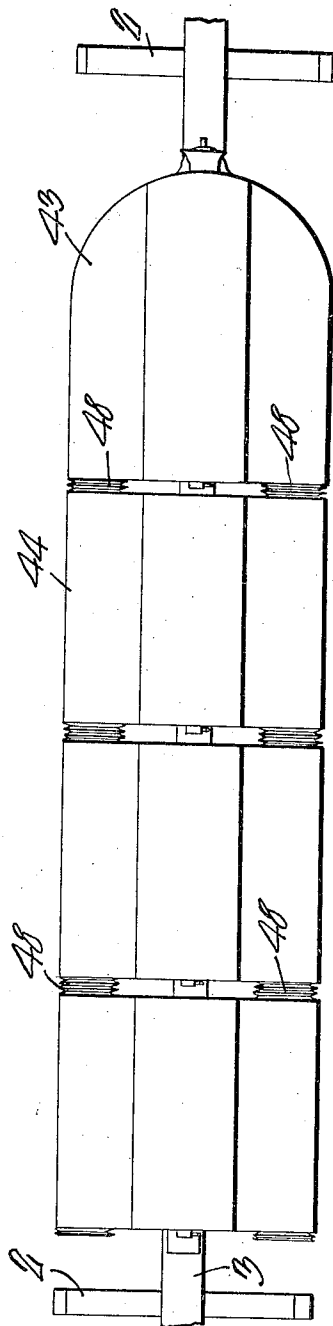


Fig. 2.

Witnesses

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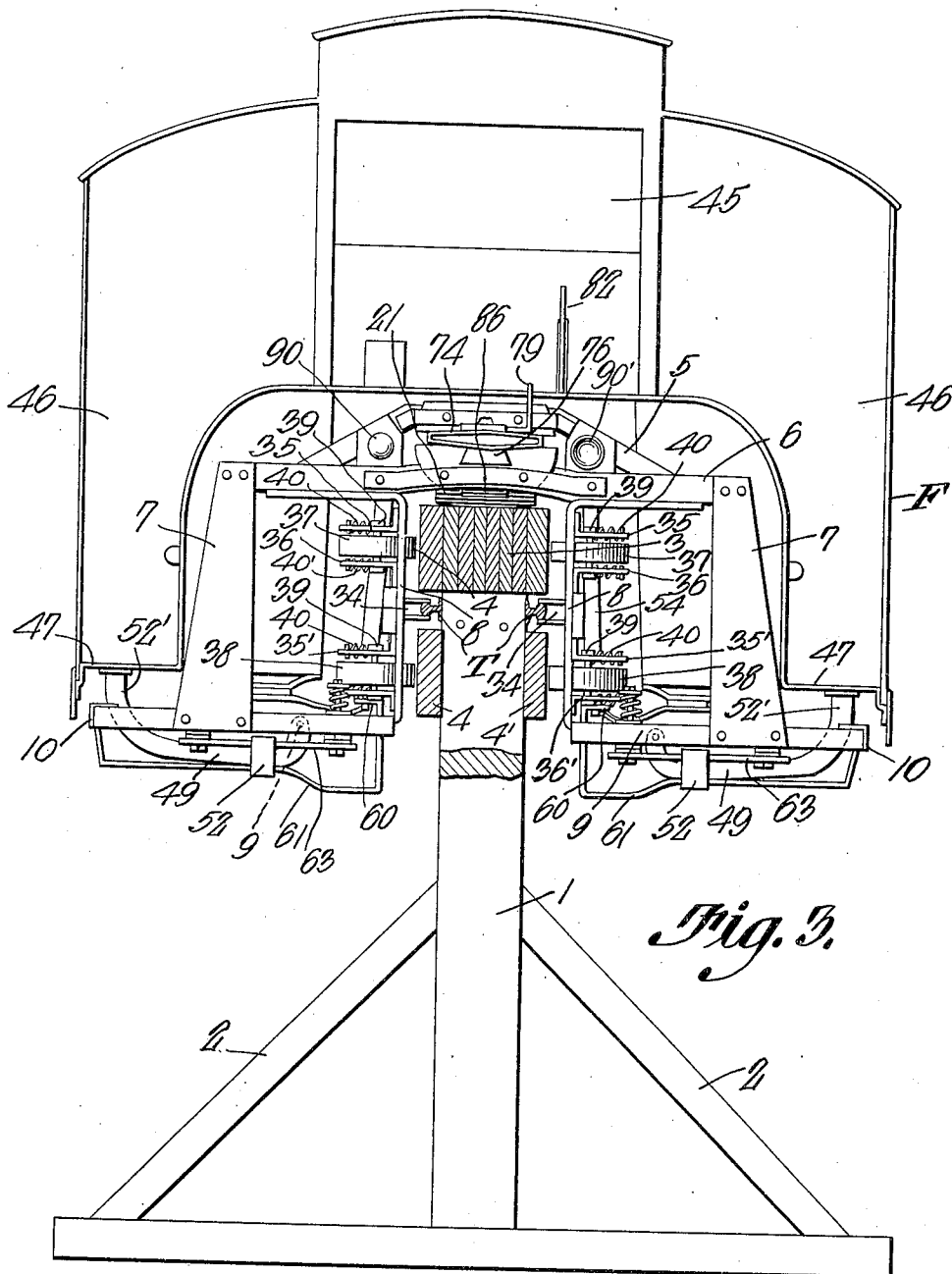


Fig. 3.

Witnesses

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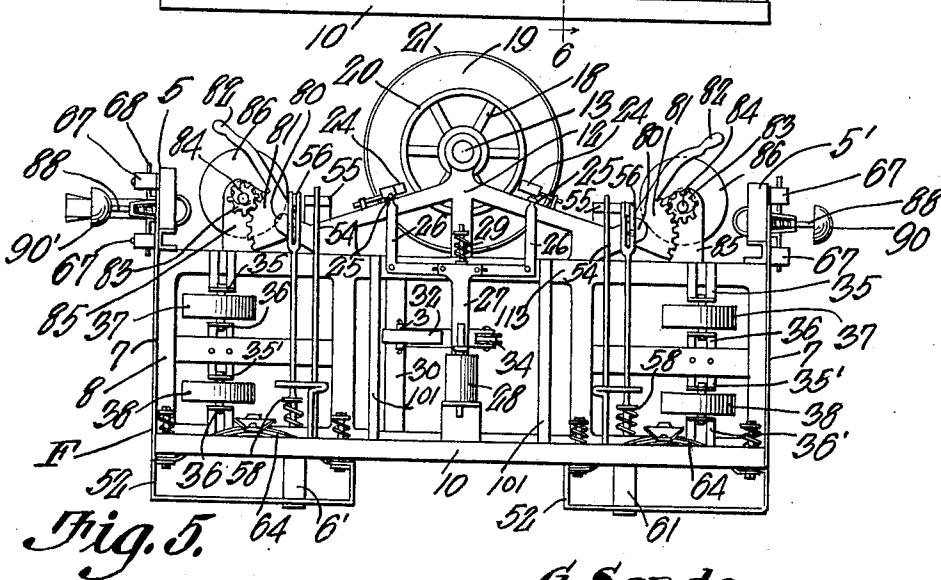
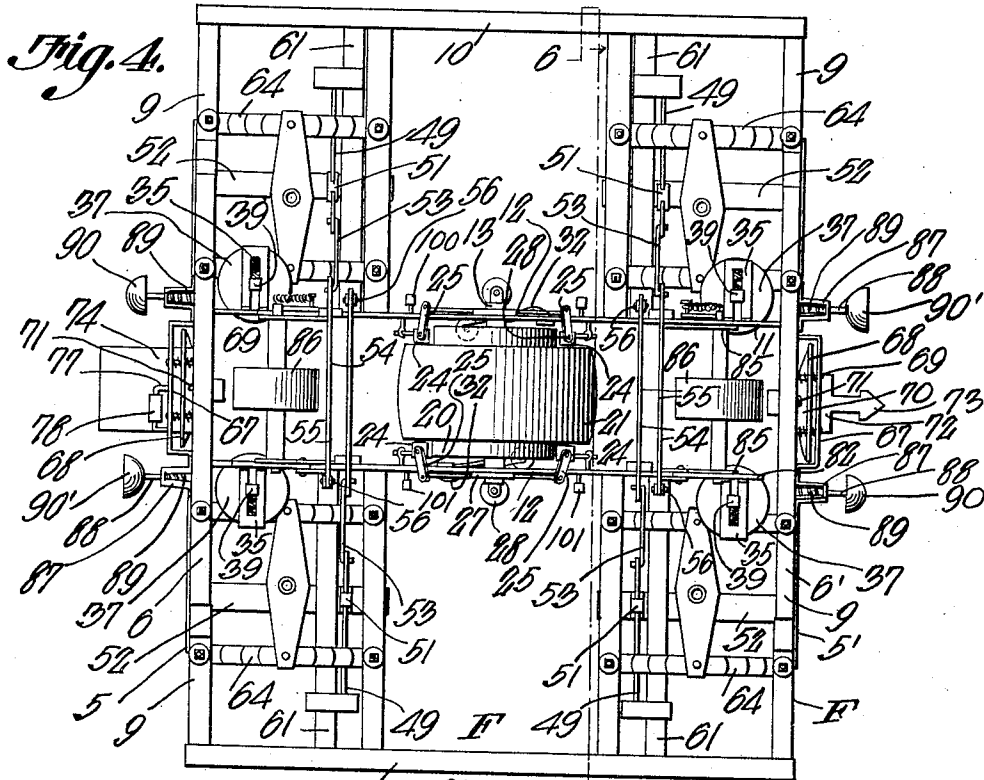
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5 SHEETS-SHEET 3.



Witnesses

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5 SHEETS—SHEET 4.

Fig. 6.

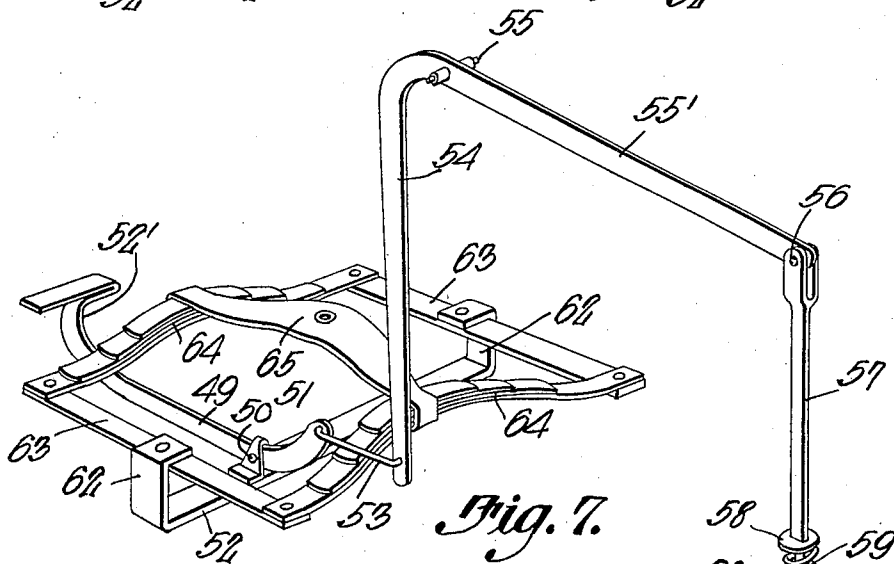
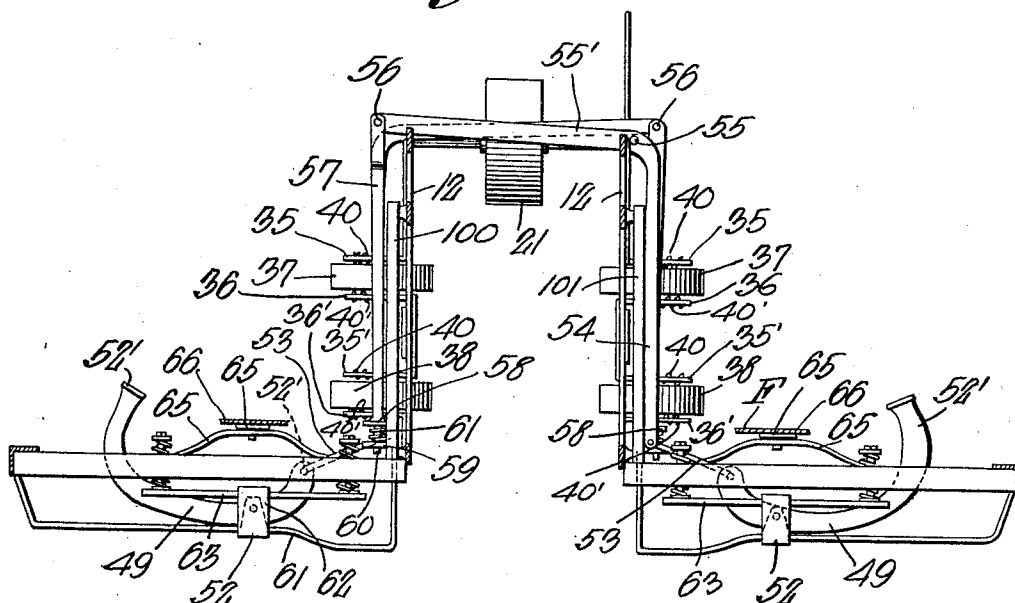


Fig. 7.

Witnesses

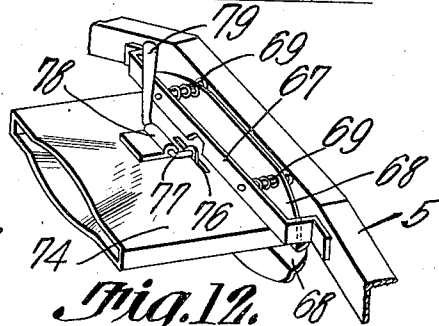
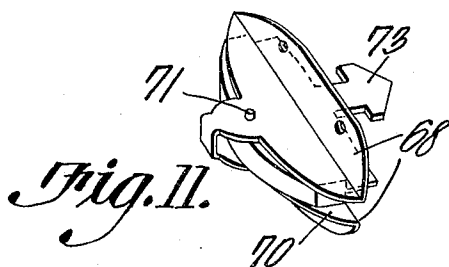
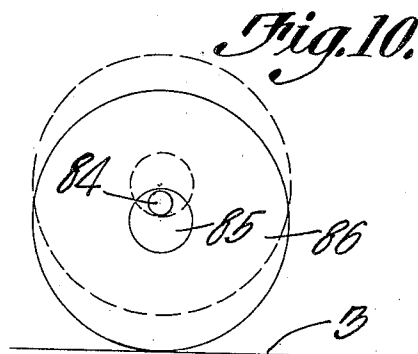
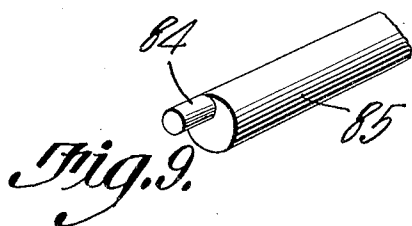
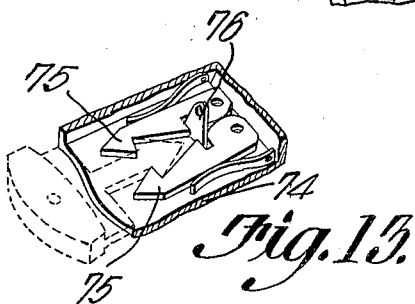
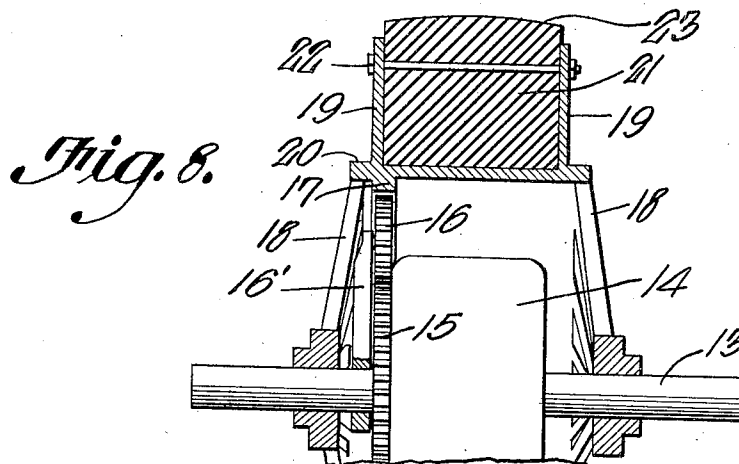
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

GUS SANDE, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-THIRD TO JOHN L. LARIMER AND ONE-THIRD TO HARRY HOBEY, OF SEATTLE, WASHINGTON.

MONORAIL CAR.

1,035,243.

Specification of Letters Patent.

Patented Aug. 13, 1912.

Application filed January 22, 1912. Serial No. 672,563.

To all whom it may concern:

Be it known that I, GUS SANDE, a subject of the King of Sweden, residing at Seattle, in the county of King and State of Washington, have invented a new and useful Monorail Car, of which the following is a specification.

The present invention relates to improvements in monorail cars, the primary object of the present invention being the provision of a monorail car, composed of a plurality of sections detachably connected together, each of said sections being provided with its individual propulsion motor, with means for controlling all of said motors from the forward end or section, the body portion of each section being removably attached to its respective frame, whereby the frames for the forward, intermediate and rear sections of the car or train are identical, and carry the respective adjacent mechanisms for maintaining the equilibrium of the car bodies with relation to the train and maintaining the proper relative position of the frame to the monorail both upon straight-away and curves.

A further object of the present invention, is the provision of a monorail car, the frame of which is so constructed as to sit astride a monorail, a single internal motor-propelled tractor wheel being disposed to rest upon the upper portion of the monorail and carry the frame, there being laterally disposed spring rollers carried by the frame to abut the respective sides of the monorail to cushion the frame and car during the propulsion thereof upon the rail due to any irregularities or curves.

A still further object of the present invention is the provision of a monorail car frame adapted to sit astride and be propelled upon a monorail, in combination with a car body, or more properly speaking a section of a car body, disposed to rest upon the frame and equilibrium or equalizing devices, so that should the section be loaded too heavily upon one side, or more heavily upon one side than the other, such over-weight will be compensated for without producing a detrimental effect upon the frame astride the monorail.

A still further object of the invention is the novel construction of section coupling means and eccentrically disposed leveling

devices, one upon each side of the centrally disposed tractor wheel, to provide for the leveling of the couplers of the respective abutting sections, when the sections are stationary and are being coupled to form a train or car.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of description hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings—Figure 1 is a side elevation of a car or train made up of four sections mounted on a monorail structure constructed according to and embodying the present invention. Fig. 2 is a top plan view thereof. Fig. 3 is a cross section through the monorail showing the open end of one of the respective sections of the car. Fig. 4 is a top plan view of the car body carrying frame of each section. Fig. 5 is a side elevation thereof. Fig. 6 is a section taken on line 6—6 of Fig. 4 showing particularly the equilibrium or equalizing device, the same being in the normal position it would assume with the car body removed. Fig. 7 is a detail perspective view of one of the springs and its equalizing device. Fig. 8 is a cross section through one side of the tractor wheel, showing its connection with the self-contained or internal motor. Figs. 9 and 10 are detail views of the coupler leveling devices. Figs. 11, 12 and 13 are detail views of the car couplers.

In describing the present invention, the same will be taken up under specific headings, so that the full description thereof may be more readily understood.

Monorail structure.—The monorail structure as clearly shown in Figs. 1, 2 and 3, consists primarily of the vertical supports or posts 1 and the braces 2 which form with the tractor wheel engaging monorail 3 a cantaliver structure, there being secured to the respective sides of the post 1 in spaced relation to the monorail 3 the lateral roller engaging plates 4, the electrical current conducting rails T being connected to the post 1 in the space between the monorail 3 and the

plates 4. With a structure of this character, the said monorail 3 being made of a plurality of sections of wood, the bearing surface may be readily repaired, although it is to be understood that the same may be made of plates of metal properly secured together and mounted upon the upper ends of the respective posts 1. The outer faces of the opposite sides of the monorail 3 are so positioned as to be in substantially parallel lines with the outer faces of the plates 4, so as to provide means to receive peculiarly mounted wheels which are carried by the car frame F, and which will be described later on.

Car frame and motor.—The car frame F consists of the upper end plates 5 and 5' and the oppositely disposed plates 6 and 6', to the outer ends of which are connected and descend downwardly the plates 7, which coact with side plates 8 of the frame to properly support the lateral wing frames 9 having the longitudinal strips or plates 10. By this means the plates 6, 6' and 8 provide a longitudinal space or recess throughout the length of each sectional frame to sit astride of the monorail and side plates 4.

Centrally of and upon the upper edge of the respective side plates 8 are the superstructures 12 which provide a proper support for the motor axle 13, which as shown in Fig. 9, has keyed thereupon the internal motor 14, which receives its power from the trolley rails T through any form of controlling means, and rotates the gear 15, which through the small intermediate gear 16 carried upon the arm 16' transmits motion through the internal gear 17 to the two spiders 18 which are mounted for rotation upon the shaft 13 upon each side of the motor 14. These spiders 18 carry the two flanges or plates 19 and have the outwardly disposed ends 20 which form braking surfaces for the tractor wheel, while clamped between the respective flanges 19 is the concentric tread 21 by means of the bolt 22, the outer surface of the tread being convexed as at 23. By this means the car is permitted a slight rocking movement in rounding curves, and the same amount of frictional contact upon the tread at all times is provided.

Disposed adjacent to the respective braking surfaces or rims 20 are the brake shoes 24, each one of which has connected thereto a link 25, said links 25 being connected in pairs upon each side of the tractor wheel by means of the two parallel arms 26 carried by the T-frame 27 whose lower end is operatively connected to the air brake cylinder 28, the spring 29 normally holding the said frame 27 downwardly and consequently the brakes 24 out of engagement with the brake shoe or surface 20. Thus it will be seen when it is desired to actuate

the brake, air is admitted to both of the cylinders 28, which operation throws all of the brake shoes 24 into contact with the braking rims 20 and brings the tractor to a halt.

In order that the electrical energy may be transmitted to the internal motor 14, hingedly connected to the vertical plates 30 carried by the respective frames 8 by means of the hinge joints 31, are the spring plates 32 which are forked as at 33 and carry the trolley wheels 34, which are normally tensioned to engage the respective rails T and thus provide the proper rolling collecting means for the current passing through the trolleys. Carried by each frame 8 at its respective ends are two pairs of lugs 35—36, and 35'—36', in which are journaled the respective lateral strain cushioning rollers 37 and 38, there being eight to each frame. The journals of each one of these wheels is mounted in a sliding boxing 39 carried by the respective lugs, the spring 40 being so disposed as to normally hold the respective wheels 37 and 38 toward and in engagement with the outer faces of the monorail 3 and the plates 4. By this means the frame is cushioned when passing over any irregularities when rounding a curve so that too sudden jar upon the respective sections and the occupants is avoided.

Car body.—It is desired to produce removable sections, so that any frame will be a power unit and will receive a section or compartment, which may be either a baggage section, express section, a freight section, or a passenger section, while the forward section will always be so shaped as to give to the motor man the full view of the road and to be properly shielded from the elements. As viewed in Figs. 1 and 2, the forward section 43, constructed with the rounded forward end, is properly coupled to the other sections 44, each section being provided with the central portion which is disposed to fit over and incase the tractor wheel and the respective coupling elevating wheels 86. This arrangement provides the two aisle-ways 46, the lower forward portions 47 of which constitute a rest for positioning the car body upon the frame, the co-acting guides 100 and 101 carried by the respective frame and car body being provided to permit the car body to be slid vertically downward upon or upwardly off of the frame. Connected between the respective sections and in line with the aisle-ways thereof are the two bellows vestibules 48.

Equilibrium device.—To take care of occasions when one side of the respective car bodies may be loaded more heavily than the other side, and provide a means whereby the weight will be equalized and not affect the frame or its positioning upon the monorail, the curved levers 49 are pivoted at 50

to the lugs 51 carried by the plate 52 and properly supported by the respective lateral wings of the car frame. The free end 52' of the lever 49 is provided with a plate to engage the under side of the body of the car as clearly shown in Fig. 3, such action
 5 tending to lift the other end 52' and consequently pull upon the link 53 which pulls downwardly upon the long bell crank lever 54 fulcrumed at 55 at the top of one of the
 10 frames 8 and having its terminal 55' extending across the center of the car frame with its free end pivoted at 56 to the upper end of the vertical link or rod 57. This rod 57 is
 15 provided with a disk 58 upon its end, while its stem 59 is slidably mounted in an eyed lug 60, with a spring 61 surrounding the stem interposed between the disk 58 and the lug 60 so as to normally exert an upward
 20 tension when the levers 49 are in the position as shown in Fig. 6. There are four of these mechanisms to each car frame, and therefore four bearing plates 52 for the levers 49 are provided upon the car bodies.
 25 These levers 49 are fulcrumed in the carrying frame as shown in Fig. 7 while the outer upstanding ends 62 of the plate 52 carry the connecting rods or plates 63, two in number, which are in turn connected to the
 30 respective ends of the two leaf springs 64, said leaf springs 64 being connected together by means of the connecting plate 65, which carries the bearing plate 66 to engage the under side of the car body when in frame
 35 covering position, thus providing a spring cushion for the car body upon the frame. By this means, the spring carrying frames to which the lower ends of the rods 57 are attached, are pulled from below to have
 40 their springs 64 compressed, such compression being therefore at the opposite side of the car to the operation of its lever 49.

Car coupler and coupler leveling devices.—In order that the respective frames
 45 may be properly connected together there is attached to the respective plates 5 and 5', the yokes 67 which provide a receptacle for the two plates 68, which are cushionedly supported to the respective plates 5 and 5'
 50 by means of the pin and spring cushioning devices 69. Connected to the respective plates 67 are the lugs 70 which have pivoted therein pins 71 carrying the plates 72 and the arrow head male coupling 73. A coact-
 55 ing coupling member is similarly supported and constitutes the female coupling member 74, which is provided with the spring cushioned normally closed male member engaging jaws 75, to which are connected the ver-
 60 tically movable wedge 76, which through the medium of the lever 77 and sleeve 78 may be manually controlled by means of the handle 79 to spread the jaws and release the male coupling member 73 therefrom.

65 By reason of the fact that the respective

frames are hung centrally by the tractor wheels, the ends have a tendency to swing, and therefore would ordinarily prevent the proper alining of the coupling members during the coupling operation, so as to avoid
 70 this and level the respective ends so that the coupling may be accomplished, there is fulcrumed in each projecting end 80 of the frame 12, the toothed segment 81 provided with an operating handle 82, readily acces-
 75 sible, as clearly shown in Fig. 3. Each of the segments 81 is in mesh at all times with the gear 83 which is mounted upon the reduced ends 84 which are journaled in the bearings 85 carried by the respective plates
 80 or frames 8. These reduced ends carry the eccentrically disposed intermediate portion 85, upon which is keyed the respective leveling rollers 86, which when in coupling position assume the position as shown in Fig.
 85 10, while after the car has been coupled and the same is ready to proceed, the segment 81 is operated to move the respective leveling wheels or rollers 86 to the dotted position Fig. 10 and thus throw the weight entirely
 90 upon the tractor wheel.

In order to assist in the coupling operation and at the same time provide a spring buffer between the respective sections, the yokes or frames 87 are connected to the re-
 95 spective plates 5 and 5' of the car frames and have slidably mounted therein the stems 88 which are spring cushioned by means of the springs 89 and carry upon their outer ends the male and female buffer members
 100 90 and 90', respectively.

From the foregoing description taken in connection with the drawings, it is evident that a monorail car constructed according
 105 to and embodying the present invention provides each section with a power unit, whereby the same may be controlled separately, or when connected in series with other sections may be controlled by the forward section, the car bodies of each section being so
 110 constructed and removable as to permit the introduction of any form or shape of car body upon its frame, so that the said frames may be made entirely separate and the re-
 115 spective body sections placed upon at the shops as desired. It is also evident that with the equalizing devices herein set forth, that the car bodies regardless of the unequal amount of weight carried by one side will
 120 not detrimentally affect the operation of the car and that with a tractor wheel constructed as described, the operation of the car will be under control at all times.

What is claimed is—

1. A monorail car, having a frame pro-
 125 vided with a longitudinal cavity to fit upon and astride a monorail, a centrally disposed motor tractor wheel carried by said frame, a car body vertically slidable upon said frame, and spring cushioned equilibrium de-
 130

vices carried by the frame and disposed in operable relation to engage both sides of the car body.

2. A monorail car, having a frame provided with a longitudinal monorail receptacle, a car body vertically slidable upon the frame, coacting means carried by the car body and frame to prevent longitudinal sliding movement of the body with relation to the frame, and a plurality of spring cushioned equilibrium devices connected to the frame and disposed to engage both sides of the car body to equalize the weight of the car body with relation to the frame.

3. A monorail car, having a frame provided with a longitudinal monorail receptacle, a car body vertically slidable upon the frame, coacting means carried by the car body and frame to prevent longitudinal sliding

movement of the body with relation to the frame, a plurality of bell crank levers pivoted to the frame, a spring cushioned rod engaging the upper free terminal of each lever and normally holding the lower terminal thereof toward the central portion of the frame, and car body engaging levers one to each bell crank lever operably connected to the lower terminal of each lever to distribute the weight within the car body upon the frame without affecting the positioning thereof with relation to the monorail.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GUS SANDE.

Witnesses:

SELINA WILLSON,
I. E. SIMPSON.

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