

(No Model.)

3 Sheets—Sheet 1.

W. F. HUTCHINSON.
RAILWAY.

No. 538,784.

Patented May 7, 1895.

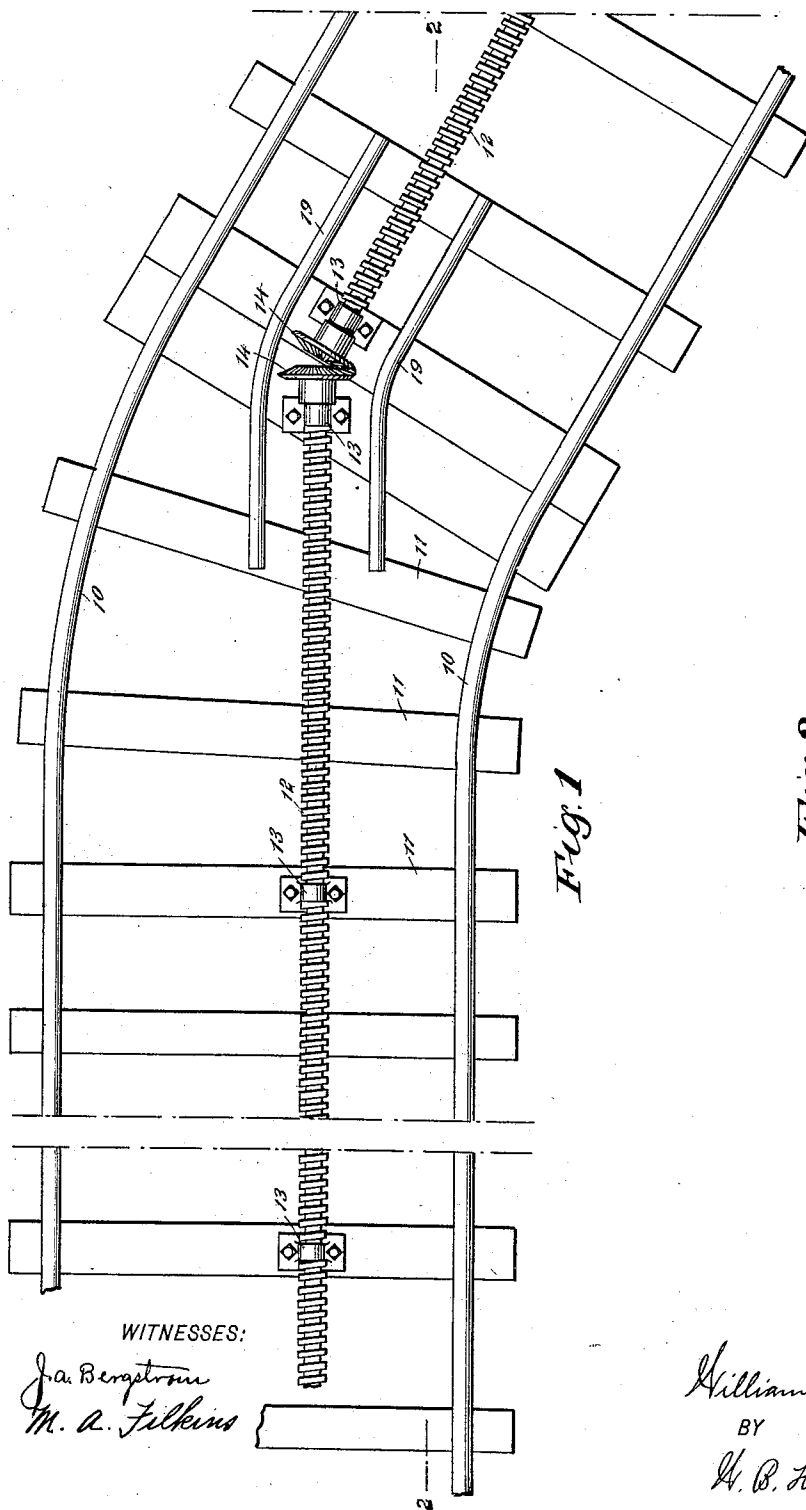


Fig. 1

WITNESSES:

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M. A. Filkins

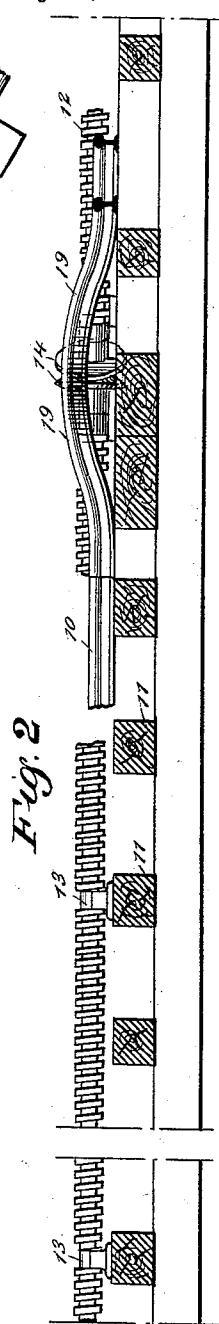


Fig. 2

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(No Model.)

W. F. HUTCHINSON.
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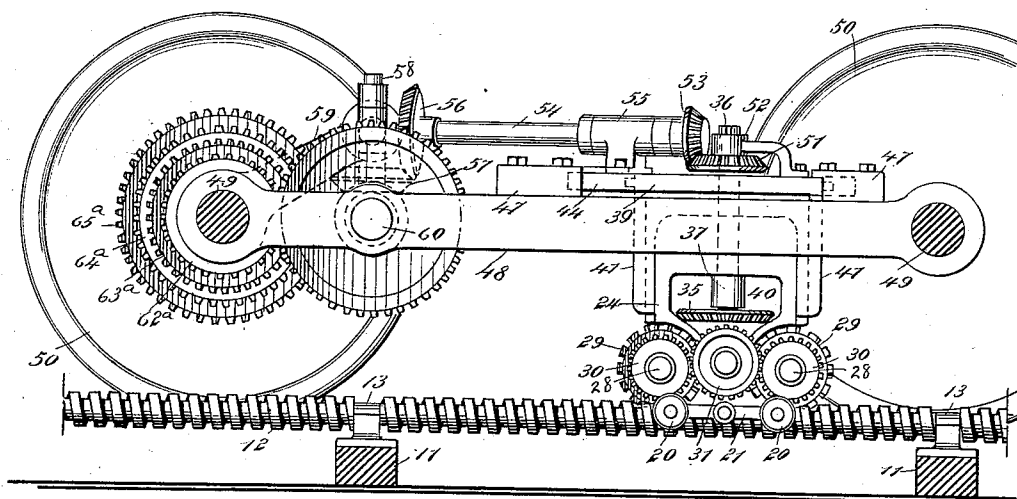


Fig. 3

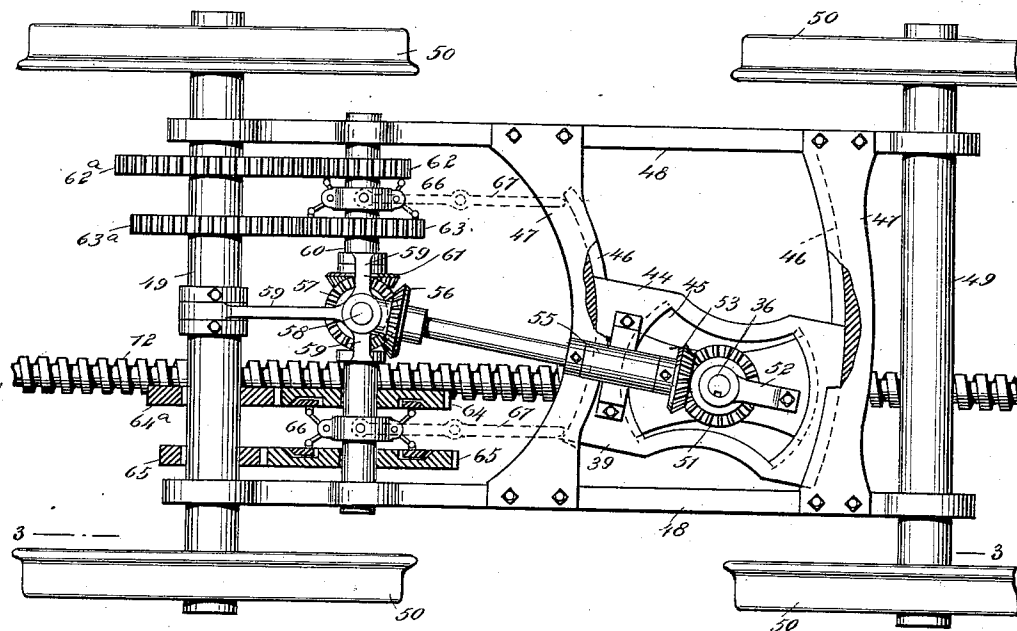


Fig. 4

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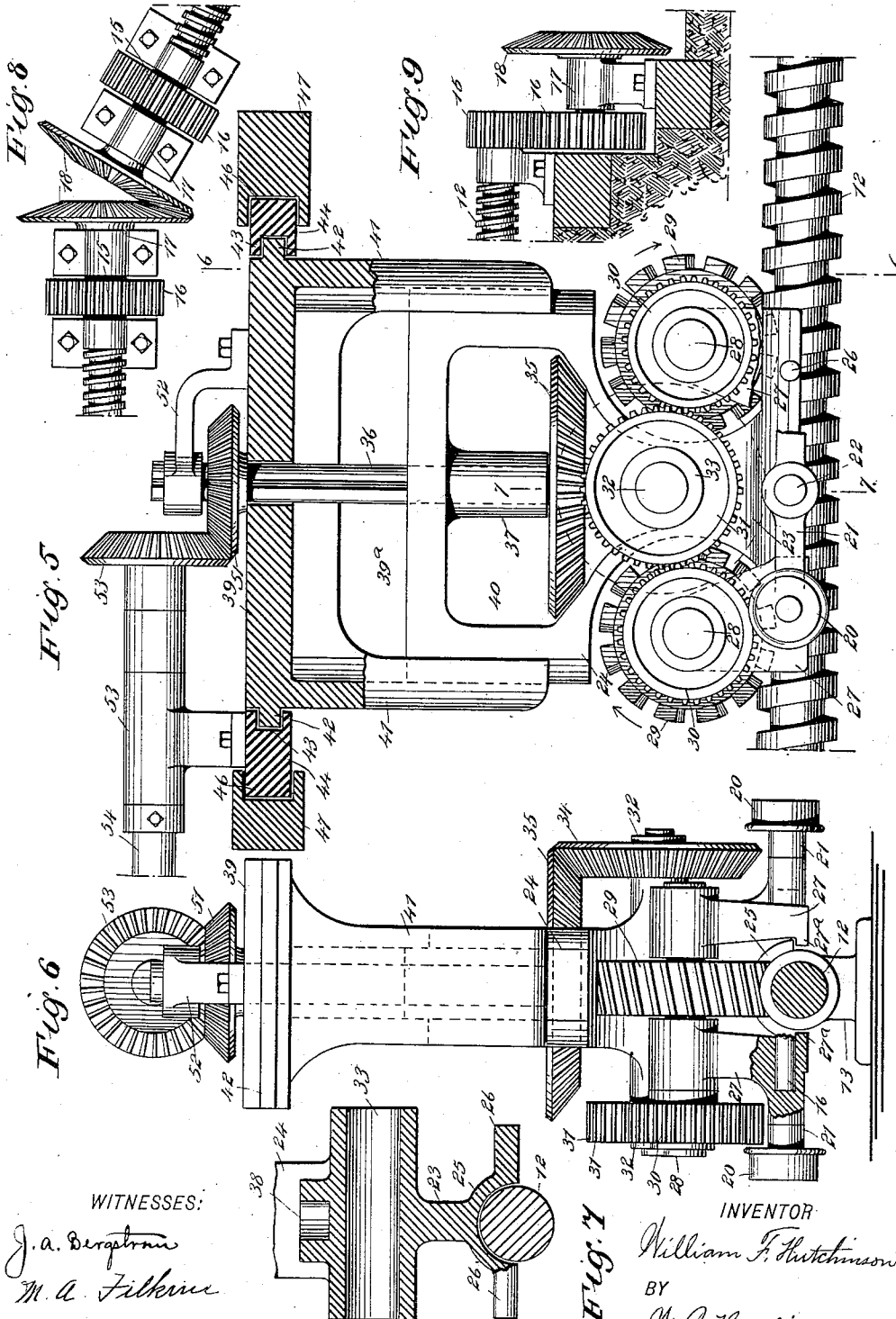
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3 Sheets—Sheet 3.

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Fig. 1

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UNITED STATES PATENT OFFICE.

WILLIAM F. HUTCHINSON, OF NEW YORK, N. Y., ASSIGNOR TO THE INTERNATIONAL RAILWAY CONSTRUCTION COMPANY, OF NEW JERSEY.

RAILWAY.

SPECIFICATION forming part of Letters Patent No. 538,784, dated May 7, 1895.

Application filed February 18, 1895. Serial No. 538,815. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. HUTCHINSON, of the city, county, and State of New York, have invented certain new and useful Improvements in Railways, of which the following is a full, clear, and exact description.

My invention relates to improvements in railways, and particularly in the propelling mechanism for driving railway cars.

10 The object of my invention is to produce a simple, practical and powerful mechanism which may be conveniently applied to either surface, over-head or under-ground systems of railways, which employs a screw as the
15 main driver of the cars, which has a convenient gear mechanism carried by the cars to engage the screw, which has means for automatically raising a portion of the gear mechanism on the car to enable it to successfully
20 pass the couplings of the screw, which has means for placing the speed of the car under easy control, and which in general is adapted to provide a comparatively cheap and easily controlled means for propelling all kinds of
25 rolling stock.

To these ends my invention consists of certain features of construction and combination of parts, which will be hereinafter described and claimed.

30 Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a broken plan view of a railroad, showing my improvements and illustrating also a curve, which shows the means of connecting adjoining sections of the driving-screw. Fig. 2 is a longitudinal section on the line 2 2 of Fig. 1. Fig. 3 is a sectional elevation on the line 3 3 of Fig. 4, and shows the driving mechanism which is carried by the car-truck and is driven by the screw on the track. Fig. 4 is a broken sectional plan of the mechanism shown in Fig. 3. Fig. 5 is an
45 enlarged detail sectional elevation of the hanger which is suspended from the car-truck, the worm-gears connected with the hanger and engaging the driving-screw of the track, the carriage for raising the worm-gears, and the
50 swinging shaft, which forms a part of the

driving-gear of the truck. Fig. 6 is a detail cross-section on the line 6 6 of Fig. 5. Fig. 7 is a detail cross-section on the line 7 7 of Fig. 5. Fig. 8 is a plan view of a slightly-modified form of the gear-coupling connecting adjoining sections of the main driving-screw on the track, and Fig. 9 is a sectional side elevation of one part of the gear-coupling shown in Fig. 8.

The mechanism embodying my invention 60 is used in connection with the ordinary track rails 10, which as illustrated, are supported on customary sleepers, or ties, 11, and which may be arranged in any usual way, whether on the surface of the ground, or over-head, or
65 under-ground. Between the track rails, and parallel therewith, is the main driving screw 12, which is supported in suitable hangers 13, and which is turned by any suitable means, this means not being illustrated as it is ob-
70 vious that the screw may be turned in many ways.

Fig. 1 shows the manner in which the screw is carried around a curve, and as it is evident that the screw cannot be bent to the curve, 75 the adjoining sections at such a point are connected by bevel-gears 14. To provide for additional strength, and to bring the tops of the gears as low as possible, the gear coupling shown in Figs. 8 and 9, is preferably employed 80 to connect adjoining sections of the screw 12, when the sections are at an angle to each other, this construction showing gears 15 on the adjacent ends of the screws, which gears are preferably of about the same diameter as 85 the screw sections, and each gear 15 meshes with a gear wheel 16 beneath it, the axle of which is journaled in a bearing 17 and carries a bevel gear wheel 18, meshing with a similar wheel of the adjacent screw section. 90

It is obvious that the mechanism carried by a car and driven by the screw could not, under normal conditions, pass the gear coupling just described, and to automatically raise the said driving gear so that it may pass the coupling, guide rails 19 are used, which are arranged on opposite sides of the gear coupling and which are bent upward in the center, as shown clearly in Fig. 5. These guide rails are adapted to engage the wheels 20 of the car- 100

riage 21, which is pivoted in the center, as shown at 22, on the reduced end 23 of the sliding section 24 of the hanger which carries the gear driven by the screw 12, and consequently when the wheels 20 strike the guide rails 19 they lift the carriage and slide 24, and the gearing carried thereby, so that the said gearing passes safely over the gear coupling and then drops into engagement with the screw. The object of having the carriage 21 pivoted in the center is to enable it to ride easily over the guide rails 19.

The reduced end 23 of the slide 24, which forms a part of the hanger, to be more specifically alluded to presently, is at the bottom, formed into a hood, or shield, 25, which fits closely over the top of the screw 12 without touching the same, however, and this hood or shield has, near the ends and on opposite sides, lugs 26, on which are pivoted the hanger arms 27, which extend upward and carry shafts 28, to each of which is secured a worm wheel 29, which engages and is driven by the screw 12. The hanger arms 27 are also pivoted to the carriage 21, and have bottom flanges 27^a, (see Fig. 6) which extend beneath the hood or shield 25, so that when the carriage 21 is raised, the flanges have a tendency to lift on the shield 25, and so steady the movement of the shield, while the flanges also serve to prevent the hanger arms from tipping forward or backward.

The shafts 28 carry gear wheels 30, which mesh with a gear wheel 31 arranged between the two gear wheels 30, as shown best in Fig. 5, and this central gear wheel 31 is secured to a shaft 32 which is hung in a bearing box 33 on the lower end of the slide 24.

The shaft 32 carries a bevel gear wheel 34 which meshes with a horizontally turning bevel gear wheel 35 on the lower end of a vertical shaft 36, which extends through a sleeve 37 on the slide 24 and is stepped at its lower end in a socket 38, while its upper end extends through the top section 39 of the hanger 39^a, which hanger is formed of the top section 39, just referred to, and the slide 24 already described. The slide 24 forming the lower section of the hanger is cut away in the center, as shown at 40, to provide for the turning of the gear wheel 35, and the said slide is movable up and down in the depending arms 41 of the top section 39, and to provide for any necessary lateral turning of the hanger, the top section 39 is provided with curved ends having ribs 42 which turn in grooves 43 of a turn-table 44, which turns or oscillates in grooves 46 of the cross bars 47, which are rigidly attached to a frame 48, which is journaled on the axles 49 of the car wheels 50.

It will be seen from the above description, that when a curve in the track is reached the carriage 21 will ride easily over the guide rails 19, thus lifting the worm wheels out of engagement with the screw 12, the slide 24 moving meanwhile upward in the arms 41 of

the top section 39 of the hanger 39^a, while in rounding the curve the car truck will not interfere with the hanger, because the said section 39 turns freely in the table 44, and the latter is also free to slide from side to side in its supporting cross bars 47, and consequently the car swings around the curve without in any way straining the gearing, and without bringing any part of the machinery into injurious contact with the gear coupling of the driving screw 12.

The upper end of the shaft 36 extends through the bevel gear wheel 51, which is held beneath the arm 52, which is secured to the top section 39 of the hanger 39^a, and the shaft 36 is geared to the gear wheel 51 so that it may slide upward through the same, but both shaft and gear wheel always turn together. The gear wheel 51 meshes with and drives a bevel gear wheel 53 on one end of a shaft 54, which is hung in a long bearing 55 on the table 44, and the opposite end of the shaft 54 carries a bevel gear wheel 56, which meshes with and drives a two faced bevel gear wheel 57, which is secured to a vertical shaft 58, which is hung on a spider 59, this being supported on one of the car axles 49 and on a counter shaft 60, which is journaled in the frame 48. The lower face of the gear wheel 58 drives a bevel gear wheel 61 which is fast on the counter-shaft 60, just referred to.

The shaft 60 is provided with a series of graduated gear wheels 62, 63, 64, and 65, which are loose on the shaft and connected therewith by means of clutches 66, which are operated by levers 67, shown by dotted lines in Fig. 4, but these clutches and levers are not shown in detail because they form no part of my invention and any well-known form of clutch may be used to connect the said gear wheel rigidly with the shaft. The gear wheels aforesaid drive gear wheels 62^a, 63^a, 64^a and 65^a, on one of the car axles 49, and, it will be seen that by throwing the gear wheel 62 into gear it will drive the gear wheel 62^a, and thus move the car at a comparatively slow speed, because the gear wheel 62 is relatively small and the gear wheel 62^a relatively large, but, by throwing the gear wheel 63 into gear the speed will be somewhat increased, and, the speed may be still more accelerated by throwing the gear wheel 64 or 65 into gear.

I have shown a set of four gear wheels to graduate the speed, but it will of course be understood that any desired number from one up may be used without affecting the principle of the invention.

The operation of the system is as follows: The screw 12 is kept in constant motion, and by engaging the worm wheels 29 turns them, and these turn the gear wheels 30 which transmit the motion to the gear wheel 31 and shaft 32, which transmits its power, by means of the gear wheels 34 and 35, to the vertical shaft 36, and this, through the medium of the gear wheels 51 and 53 drives the shaft 54, and the latter, through the gear wheels 56

and 58 drive the counter-shaft 60, but the motion will not be transmitted to the car axle, and so to the car, until one of the gear wheels 62, 63, 64, or 65 is thrown into gear, after which the motion is transmitted to the car axle, as specified above. The table 44 swings on a center struck from the shaft 58, so that the gear wheel 56 will always be in engagement without regard to the position of the table 44, and so the mechanism is adapted to work without regard to the relative height of the two rails 10 of the track. When rounding a curve the worm wheels 30 will ride over the coupling which connects the adjoining screw sections, and the motion of the car will be kept up by other sets of mechanism, similar to that described, which are in engagement with the screw at points in front of or behind the coupling.

I do not limit my invention to the arrangement of parts set forth and described, although these are particularly adapted to propelling the car from a screw, but I claim broadly any screw driven mechanism for driving a car, in combination with means for automatically throwing the driven mechanism out of gear; and also claim broadly any means which provides for free oscillation of the car without disturbing its gear connection with the driving screw.

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

1. An improved railway system, comprising suitable track rails, a driving screw parallel with the rails, a car, gear mechanism carried by the car to engage the screw, and means for automatically throwing the gear mechanism out of gear at the couplings of the screw, substantially as described.

2. In a railway system, the combination, with the revoluble driving screw, of worm wheels carried by a car and engaging the screw, an operative connection between the worm wheels and the car wheels, and a device for automatically removing the worm wheels from the screw at points opposite the screw couplings, substantially as described.

3. In a railway system, the combination, with the driving screw of a car, a vertically movable hanger on the car, worm wheels carried by the hanger and engaging the screw, and guides on the track near the screw couplings to lift the hanger, substantially as described.

4. In a railway system, the combination, with the driving screw and the car, of a vertically movable hanger on the car, a gear mechanism carried by the hanger and driven by the screw, an operative connection between the said gear mechanism and the car wheels, and means for raising the gear mechanism from the screw, substantially as described.

5. In a railway system, the combination, with the driving screw and the car, of a horizontally turning and vertically movable hanger on the car, the gear mechanism car-

ried by the hanger and adapted to engage the screw, and an operative driving connection between the said gear mechanism and the wheels of the car, substantially as described.

6. In a railway system, the combination, with the driving screw and the car, of the vertically movable hanger on the car, the carriage pivoted on the hanger, the worm wheels journaled on the carriage, an operative driving connection between the worm wheels and the car wheels, and guides near the screw to engage and raise the carriage, substantially as described.

7. In a railway system, the combination, with the driving screw and the car, of a horizontally turning and vertically movable hanger on the car, a sliding table supporting the said hanger, a gear mechanism carried by the hanger and engaging the screw, and an operative driving connection between the said gear mechanism and the wheels of the car, substantially as described.

8. In a railway system, the combination, with the driving screw and the car, of the vertically movable hanger on the car, the guides on the track near the couplings of the screw, the carriage pivoted on the hanger and provided with wheels to engage the guides, the gear mechanism carried by the hanger and carriage, and an operative driving connection between the said gear mechanism and the wheels of the car, substantially as described.

9. In a railway system, the combination, with the driving screw and the car, of the horizontally turning and vertically movable hanger on the car, the gear mechanism carried by the hanger and driven by the screw, a vertical shaft on the hanger connected with the said gear mechanism, a gear wheel keyed to the vertical shaft, and an operative driving connection between the gear wheel and the wheels of the car, substantially as described.

10. In a railway system, the combination, with the driving screw and the car, of a differential gear connection between the driving screw and the wheels of the car, and means for automatically throwing the mechanism out of gear at points near the screw couplings, substantially as described.

11. In a railway system, the combination, with the driving screw and the car, of the hanger on the car comprising a horizontally turning top section, a bottom section slidable vertically in the top section, a gear mechanism carried by the bottom section and engaging the screw, and means for raising the bottom section of the hanger and throwing the mechanism out of gear, substantially as described.

12. In a railway system, the combination, with the driving screw, of the vertically movable hanger on the car, the shield or hood at the lower end of the hanger extending over the top of the screw, the carriage pivoted on the lower end of the hanger, the gear mechanism carried by the carriage and hanger and engaging the screw, an operative driving con-

nection between the gear mechanism and the wheels of the car, and guides near the screw couplings to engage and lift the carriage, substantially as described.

5 13. In a railway system, the combination, with the driving screw and the car, of the vertically movable hanger on the car, the shaft journaled in the hanger and operatively connected with the wheels of the car, the carriage
10 pivoted on the lower end of the hanger, worm wheels mounted on the carriage and engaging the screw, a gear connection between the worm wheels and the shaft in the hanger, and guides near the screw to engage and raise the
15 carriage, substantially as described.

14. In a railway system, the combination, with the driving screw and the car, of the vertically movable hanger on the car, the shafts journaled near the lower end of the hanger
20 and operatively connected with the car wheels to turn them, the carriage pivoted at the foot of the hanger, the hanger arms pivoted on the carriage and hanger, the worm wheels journaled in the hanger arms and engaging the
25 screw, and a gear connection between the worm wheels and the shaft in the hanger, substantially as described.

15. In a railway system, the combination, with the screw and the car, of the laterally
30 sliding table on the car, the hanger suspended from the table, the gear mechanism carried by the hanger and engaging the screw, and a driving connection between the said gear mechanism and the wheels of the car, sub-
35 stantially as described.

16. In a railway system, the combination,

with the driving screw and the car, of the laterally sliding table on the car, the hanger carried by the table, a gear mechanism supported by the hanger and engaging the screw, and a
40 shaft carried by the table and having one end geared to the gear mechanism of the hanger, and the other end geared to an axle of the car, substantially as described.

17. In a railway system, the combination, 45 with the driving screw and the car, of the laterally sliding table on the car, the gear mechanism supported from the table and engaging the screw, and a shaft carried by the table and driven at one end by the gear mechanism
50 of the hanger and connecting at the other end by a differential gear mechanism with the axle of the car, substantially as described.

18. In a railway system, the combination, with the car and the driving screw, of a counter-shaft on the car, an operative driving connection between the screw and the counter-
55 shaft, and a differential gear connection between the counter-shaft and one of the car axles, substantially as described. 60

19. In a railway system, the combination, with the driving screw and the car, of the counter-shaft on the car, a gear mechanism connecting the screw with the counter-shaft, and a clutch-controlled system of graduated gears
65 connecting the counter-shaft with one of the car axles, substantially as described.

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Witnesses:

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