4 Sheets--Sheet 1.

J. V. MEIGS:
Locomotive.

No. 163,228. Patented May 11, 1875.

Fig: 1

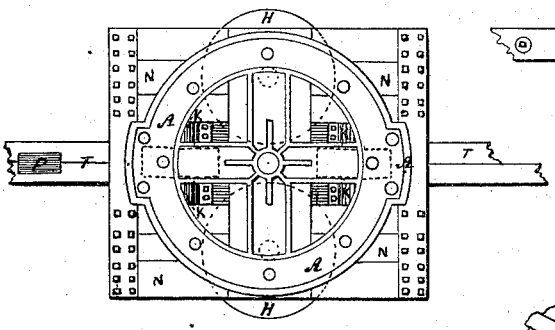


Fig: 14.

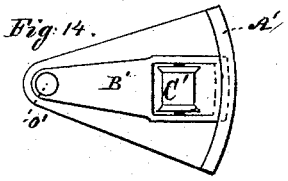


Fig: 4

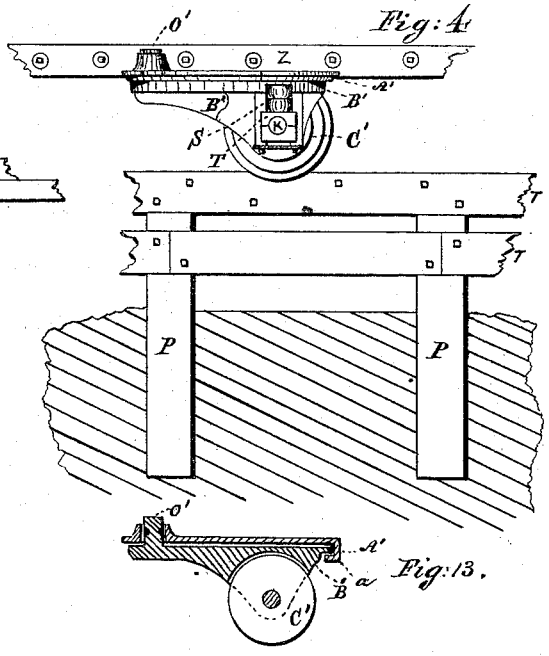


Fig: 13.

Fig: 2.

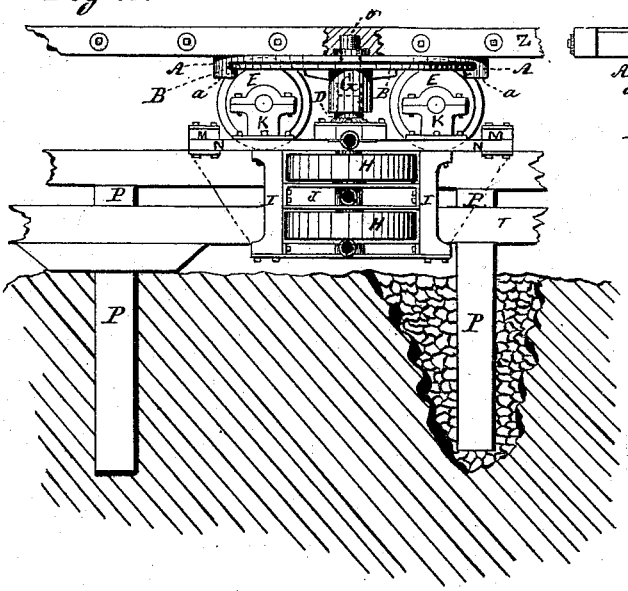
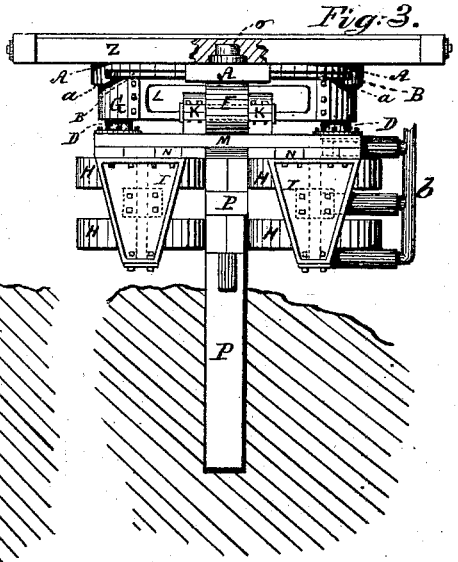


Fig: 3.



WITNESSES

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J. V. MEIGS.

Locomotive.

No. 163,228. Patented May 11, 1875.

Fig. 5.

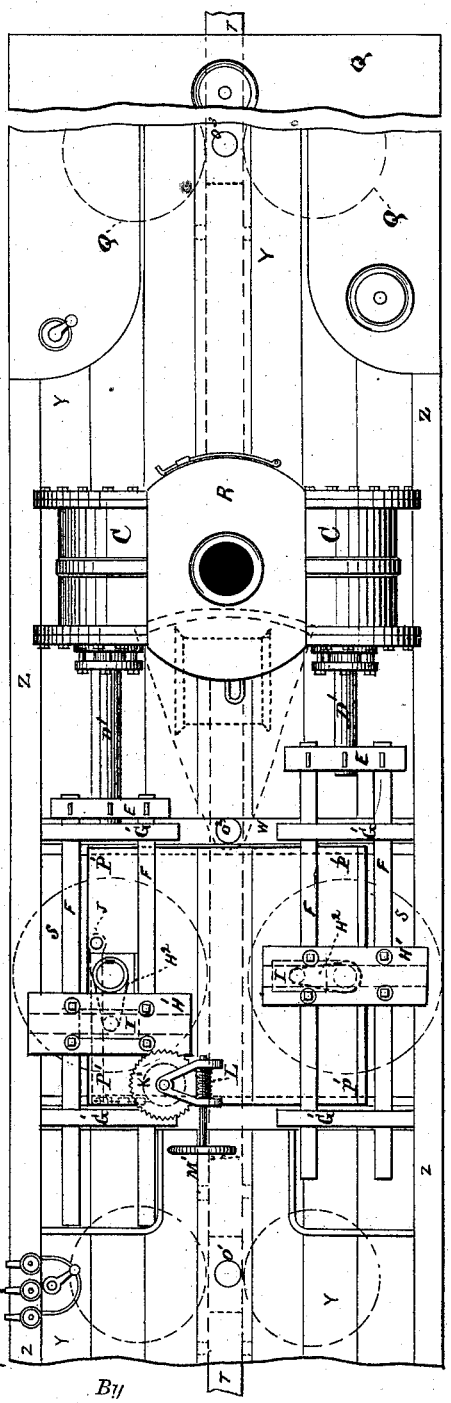
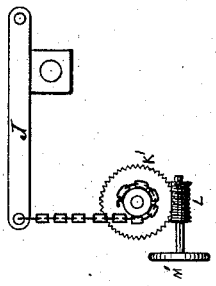


Fig. 15.



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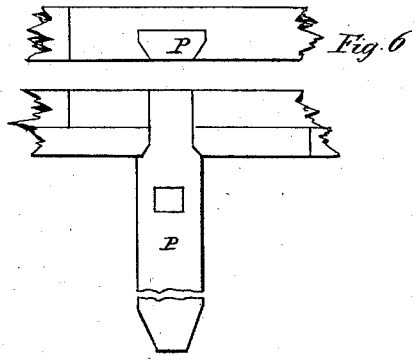


Fig. 6

Fig. 7

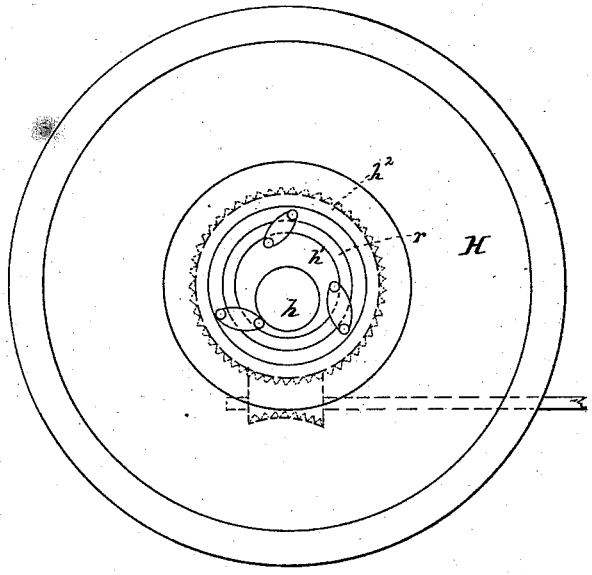
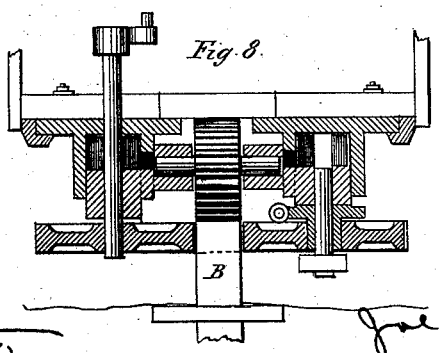


Fig. 8.



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J. V. MEIGS.

Locomotive.

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Fig: 10.

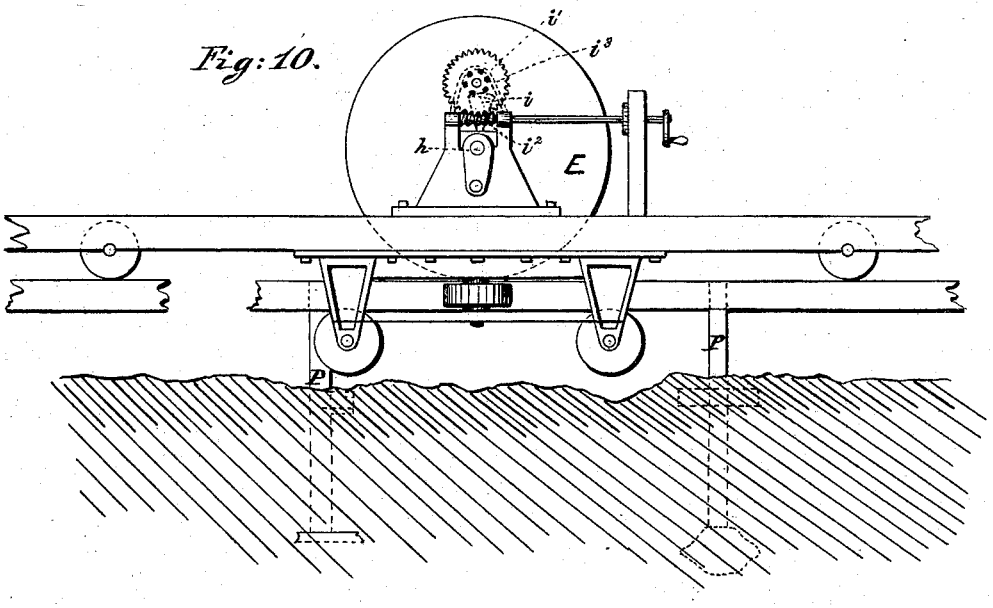


Fig: 11.

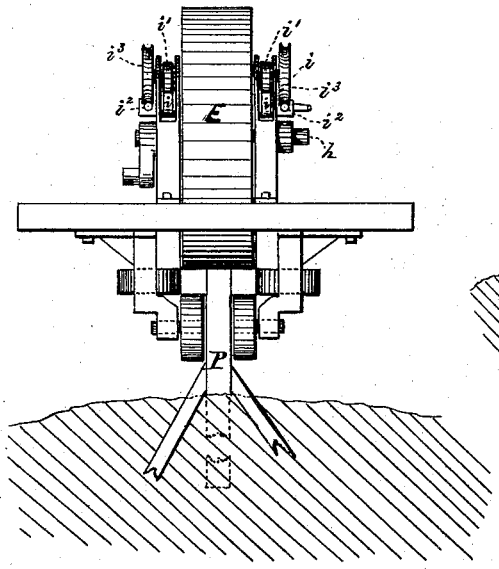


Fig: 9.

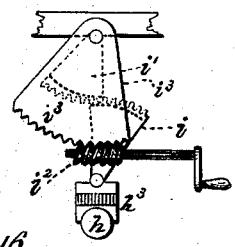


Fig: 12.

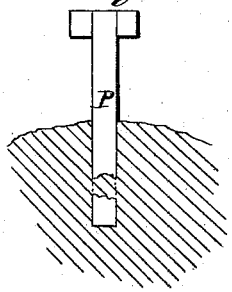
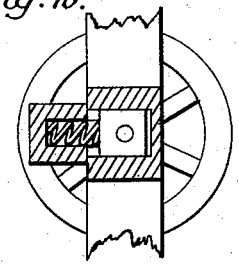


Fig. 16.



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UNITED STATES PATENT OFFICE.

JOE V. MEIGS, OF LOWELL, MASSACHUSETTS.

IMPROVEMENT IN LOCOMOTIVES.

Specification forming part of Letters Patent No. **163,228**, dated May 11, 1875; application filed May 16, 1873.

To all whom it may concern:

Be it known that I, JOE V. MEIGS, of Lowell, Massachusetts, have invented certain Improvements in Cars, Locomotives, and Trucks adapted for use on elevated railways, of which the following is a specification:

The first part of my invention relates to trucks adapted to run upon an elevated rail. Its objects are to secure a firm adhesion of the trucks to the tracks. To do this I construct the trucks with two or more wheels, arranged on horizontal axes, one behind the other, in the line of the rail, in bearings in the truck, to run upon the rail, and support the weight of the truck. I also mount two wheels, one above the other, on axes in frames depending from the truck on each side of the rail, to bear upon the vertical sides thereof, and resist lateral displacement. Each wheel bears upon its respective stringer-beam, thus giving a broad bearing-surface, and economizing expense of construction.

The object of the next part of my invention is to enable the wheels to conform to sinuosities in the track; to which end I attach the wheels to a turn-table capable of swinging freely on its axis, as hereinafter more fully explained.

The object of the next part of my invention is to render the cars easy riding without interfering with their capacity to follow curves in the road; to which end I interpose between the truck-frame proper and the turn-table above mentioned interlocking tubes or cylinders capable of sliding endwise, each over its fellow, and containing springs to deaden shocks, as hereinafter more fully explained.

The object of the next part of my invention is to prevent the cars from being thrown from the track by the removal or breakage of a rail, or even of a short section of the supporting-way itself. This desideratum I attain by interposing between the trucks at each end of a car a supplementary wheel or wheels to sustain the car in the center while one end may be unsupported. This roller, moreover, being mounted in a swinging frame, readily conforms to curves in the track.

The next part of my invention relates to the method of propelling the train, which I do by power applied to the lateral clamping-wheels instead of to the supporting-wheels.

My invention, under this head, further consists in a novel method of combining guide-rods reciprocated longitudinally in fixed guides, and cranks on the driving-wheels, turning in blocks sliding transversely in guides carried by the sliding guides above mentioned.

My invention further consists in the combination of a cross-head guide-frame, reciprocated longitudinally, a transversely-sliding truck, and cranks on the truck-wheels, actuated by the cross-head frame, to enable the engine to follow curves in the road without disturbing its working.

My invention further consists in a novel method of varying the pressure of the driving-wheels upon the rail, by moving their shafts laterally in their bearings.

My invention further consists in a method of rendering the balancing-wheels self-adjusting by means of springs bearing on the boxes of their shafts.

My invention further consists in a novel method of arranging the boiler, engines, and tank upon the floor of the locomotive, with the boiler and cylinders between the tank and the driving-wheels.

My inventions enable me to use very wide cars and to build very cheap single-track railroads, and dispense with the use of iron rails, though they may be used if desired. It brings the car-floor upon an elevated rail above the trucks, and straddles the trucks upon the single track so that they cannot run off. Of course, double rails can be used where one of them acts simply as a guide, or, by very peculiar construction, double tracks might be used with my system of way in between them.

In the accompanying drawings I have shown all my improvements as embodied in the best way now known to me. Obviously, some of these improvements may be used without the others, and their details of construction may be varied within certain limits without departing from the spirit of my invention.

Figure 1 shows a plan view of the truck

and of a portion of the track; Fig. 2, a side elevation, and Fig. 3, an end elevation thereof. Fig. 4 shows a side elevation of the safety-truck. Fig. 5 shows a plan view of the locomotive. Fig. 6 shows the details of construction of a modified form of track. Fig. 7 shows a plan view of an eccentric-ring and operating-gearing for regulating the pressure of the side wheels upon the rail. Fig. 8 shows an end elevation, partly in section, through a modified form of truck, in which a single set of side wheels only is shown, one being represented as a driving-wheel and the other as having the clamping arrangement shown in Fig. 7 adapted thereto. Fig. 9 shows another method of clamping the wheels upon the track by means of a worm-wheel and geared cams. Fig. 10 shows a side elevation of a T-rail track, with clamping-wheels running on its under side, and with the clamping-apparatus shown in Fig. 9 applied thereto. Fig. 11 shows an end view of the same. Fig. 12 is an end view of the rail. Fig. 13 shows a transverse section; and Fig. 14, a plan of Fig. 4. Fig. 15 represents a mode of clamping the driving-wheels of Fig. 5; Fig. 16, a view in detail, partly in section, showing the spring for rendering one of the balancing-wheels self-adjustable, to keep it always against the side of the rail.

My new system of constructing and operating railways comprehends the use of a single track or rail, of wood, preferably, supported upon posts of a height varying according to the undulations of the surface, or the use to which it is to be applied. Rails of iron may be used. A single square rail may be employed, as in Fig. 8, or a T-rail, as in Figs. 10, 11, and 12. I prefer, however, the construction shown in Figs. 1 to 5, both inclusive, in which two rails, rectangular in cross-section, are arranged one above the other, with an interval between, or in contact, as this method of construction affords a wide bearing-surface for the side wheels. The posts P may be piles driven into the ground, or they may be secured and braced in any of the various ways, well known to engineers, according to the nature of the earth, several such modes being illustrated in various figures of the drawings. The switching is done by pivoting one end of a short section of the track so that its other end may be swung from one track to another. The rails may be composed of compound beams, if preferred, instead of solid timbers. On the under side of the car-body Z, and near each end thereof, a circular bed-plate, A, having internally projecting flanges *a*, is secured. A turn-table, B, is provided with lugs, corresponding to the flanges *a*, above mentioned, so that the bed-plate and turn-table may be interlocked by inserting the lugs in the intervals between the flanges, and turning the table until the lugs rest on the flanges, when the table will be supported vertically, and yet, at the same time, be free to turn horizontally. A central collar on the bed-plate fits on a stud or king-bolt, *o*, on the turn-table B, to afford firm support, and prevent breakage of the flanges. This turn-table is connected with the truck-frame M N by means of tubes G, attached to the table, sliding over posts D on the truck-frame. Springs are inclosed in these tubes to prevent shocks. Chains may also be used to connect the turn-table or car and truck, and prevent them from becoming separated.

Wheels E are mounted centrally in the truck-frames—one behind the other—in boxes K. These wheels run upon the rail, and support the main portion of the weight of the car. They are, by preference, made with plane broad treads without flanges, thus enabling them to move freely laterally without strain. Figs. 10 and 11 show one such wheel to each truck.

The adhesion of the car to the rails is secured by means of clamping or balancing wheels. In Figs. 2 and 3 these wheels H are shown as mounted in pairs—one above the other—on vertical axes, secured underneath the truck-frames M N, one wheel of each set bearing against the side of its respective rail. Any tendency of the cars to upset is thus effectually counterbalanced by the pressure of the wheel upon the rail. The clamping pressure of these wheels upon the rails is regulated by devices hereinafter described. These wheels may also constitute the driving-wheels, as hereinafter explained. The swinging of the truck will enable the wheels to follow curves of very short radiuses; but it is obvious that even with rigid trucks, curves of very short radiuses could be followed without binding, by wheels bearing upon the side of the track, as do those shown at H in Figs. 2 and 3, when provided with springs, as shown in Fig. 16, bearing on the boxes of their shafts, or by other means, as hereinafter explained. Fenders I, which may be part of the truck-frame which supports the axes of the wheels H, or may be made separate, protect the wheels H from injury.

Fig. 8 shows a single balancing-wheel bearing on each side of the top rail. In Figs. 10 and 11 the clamping is shown as effected by wheels on horizontal axes bearing on the under side of the rail.

I propose to regulate the pressure of the clamping-wheels upon the rails in various ways. In Fig. 7 the clamping-wheel H is shown as turning on a shaft, *h*, supported in an eccentric ring, h^1, connected by links, with a gear, h^2, actuated by a worm-wheel to move the shaft closer to or farther from the track. A rubber ring may be interposed between the eccentric and gear ring to secure elasticity.

Figs. 9, 10, and 11 show the shaft *h* as movable up and down in its bearings, its movable

box h^3 carrying a geared sector-cam, i, gearing into a similar one, i^1, on the truck-frame. A worm-wheel, i^2, actuates a sector fixed on the same shaft as the sector-cam i^3, so that the pressure may be regulated by adjusting the relation of the cams, as is well understood.

To prevent accidents from broken rails, I mount one or more bearing-wheels, C′, Figs. 4, 17, and 18, in a frame, B′, turning on a king-bolt, o', in front, and supported in rear by a guide-flange, A′, constructed like the plate A, hereinbefore described, and curved in the arc of a circle, of which the king-bolt o' forms the center. The truck is thus securely held vertically, but free to swing laterally to follow curves. This wheel being between the trucks serves as a support, so that in case a short section of the track were removed this wheel, and the truck at one end of the car, would support it, while the other truck passed over the gap. The trucks would then support the car, as usual, until the supporting-wheel passed the gap, when it and the forward truck, already over, would sustain the rear end of the car, and allow the hind trucks to ride safely over the gap. The advantages of such an arrangement are obvious. Suitable springs may be interposed between the frame B′ and car-body to deaden shocks.

Upon the floor Y, Fig. 5, of the frame Z I mount tanks, Q, of proper form. The boiler R is located between the cylinders C, the piston-rods D′ of which actuate slides F reciprocating longitudinally in guides G′ on the frame. These slides carry cross-heads H^1, slotted transversely to receive sliding blocks I, in which the wrists of the cranks H^2 of the driving-wheels turn. The entire sliding frame P′ in which these driving-wheels are mounted slides freely laterally in guides to accommodate itself to curves in the track without interfering with the working of the driving mechanism, this non-interference being due to the peculiar combination above described of the reciprocating cross-heads, sliding blocks, and driving-cranks.

The wheels in Fig. 5 are shown as clamped upon the track by means of a lever, J, under the frame, (shown in dotted lines, Fig. 5, and in detail in Fig. 19,) attached to the boxes which carry one set of wheels, and acted upon by a chain wound upon a drum moved by a gear, K′, and worm-wheel L, the latter being moved by a hand-wheel, M′, actuated by the driver.

All of the clamping mechanism above described is mounted upon the laterally-sliding frame P′ above mentioned.

The throttle-valves, gage-cocks, reversing-levers, &c., may be located in any position suiting the convenience of the constructor.

The driving and clamping or balancing wheels may be pressed upon the track by the direct pressure of steam, air, water, or other fluid, (admitted through pipes b, Fig. 3,) upon their movable boxes in a way which would readily suggest itself to a skillful constructor.

The track may be elevated only the height above the ground to admit of the passage of the trucks over it, or it may be elevated above the sidewalks so as to permit it to be used in cities for passenger traffic, and at the crossing of roads, &c., to permit them to go under it.

The system of side adhesion which I use admits of my cars being driven up any incline from vertical to horizontal, and this fact will enable me to construct single-arch bridges of any span desirable, the only condition of safety being that they be held vertical by suitable guys, or bridges may be constructed of cross-trussses without further timber, thus reducing cost and weight very much. My system also admits of telegraph-lines being run between the posts, so as to show ahead coming trains and misplacement of switches or broken track. No dust will be experienced, and an elasticity of track will be secured that will protect passenger and car from wear and tear.

I claim as my invention—

1. The combination of a swivel-truck, bearing-wheels mounted thereon to run on a rail, and adjustable clamping or balancing wheels mounted on the truck, and bearing upon the vertical sides of the rail, as set forth.

2. The combination of two rails, one above the other, a truck, bearing-wheels mounted thereon, one behind the other, and adjustable clamping or balancing wheels, one above the other, and bearing on opposite vertical sides of the rails, as set forth.

3. The combination of a truck-frame, a turn-table, bearing-wheels adapted to run on top of the rail, and clamping or balancing wheels to run on the side of the rail, as set forth.

4. The combination of the turn-table, the truck-frame, the posts, the overlapping sliding tubes, and the springs inclosed therein, as set forth.

5. A supplementary supporting wheel or truck interposed between and combined with the end trucks, whereby one end of the car may be supported, while the other may be projected across a gap in the track, substantially as and for the purpose set forth.

6. The method of propelling cars by driving from the clamping-wheels instead of from the bearing-wheels, substantially as set forth.

7. The combination of longitudinally-reciprocating transversely-slotted cross-heads, and blocks sliding in said slots, and carrying the wrists of the driving-cranks, as set forth.

8. The method of mounting the driving-wheels in a frame adapted to slide laterally, to accommodate itself to curves in the track, substantially as and for the purpose set forth.

9. The method of varying the pressure of the driving or of the balancing or clamping wheels upon the track by shafts laterally adjustable in the truck-frame, as set forth.

10. The method of constructing a locomotive with the cylinders and boiler between the tank and driving-wheels, all combined as set forth.

In testimony whereof I have hereunto subscribed my name.

JOE V. MEIGS.

Witnesses:
LAURIN MARTIN,
WM. B. RICHARDSON.