

J. L. SIMMS & W. T. DUVALL.

Improvement in Propelling Street Cars.

No. 125,224.

Patented April 2, 1872.

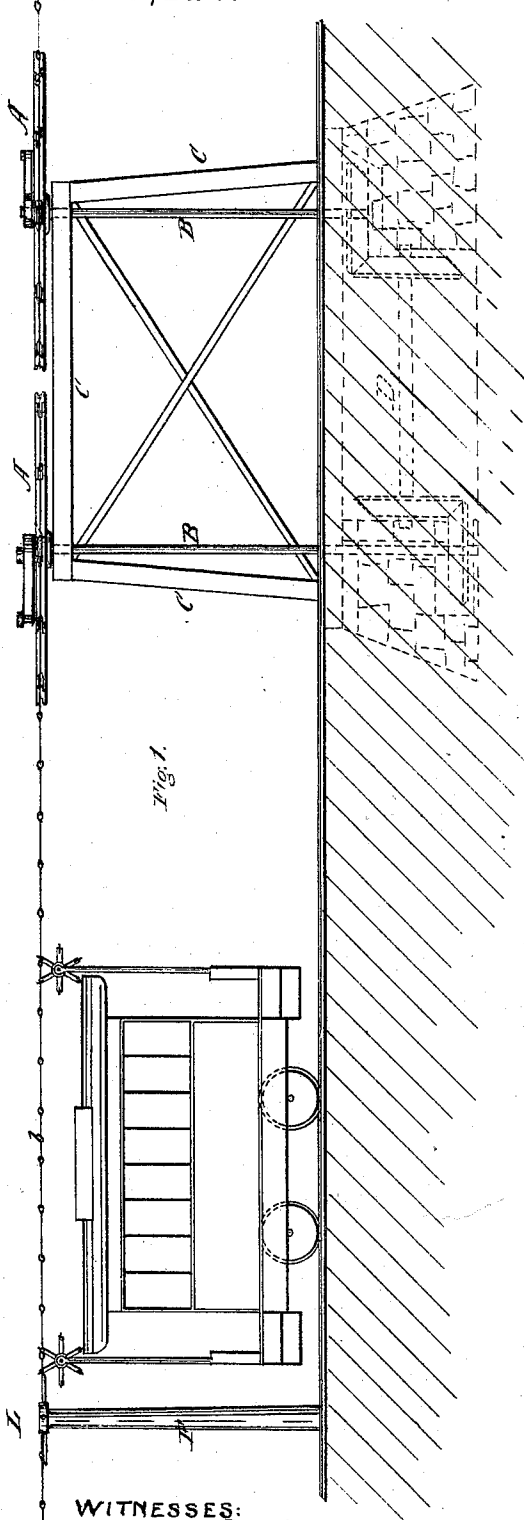


Fig. 1.

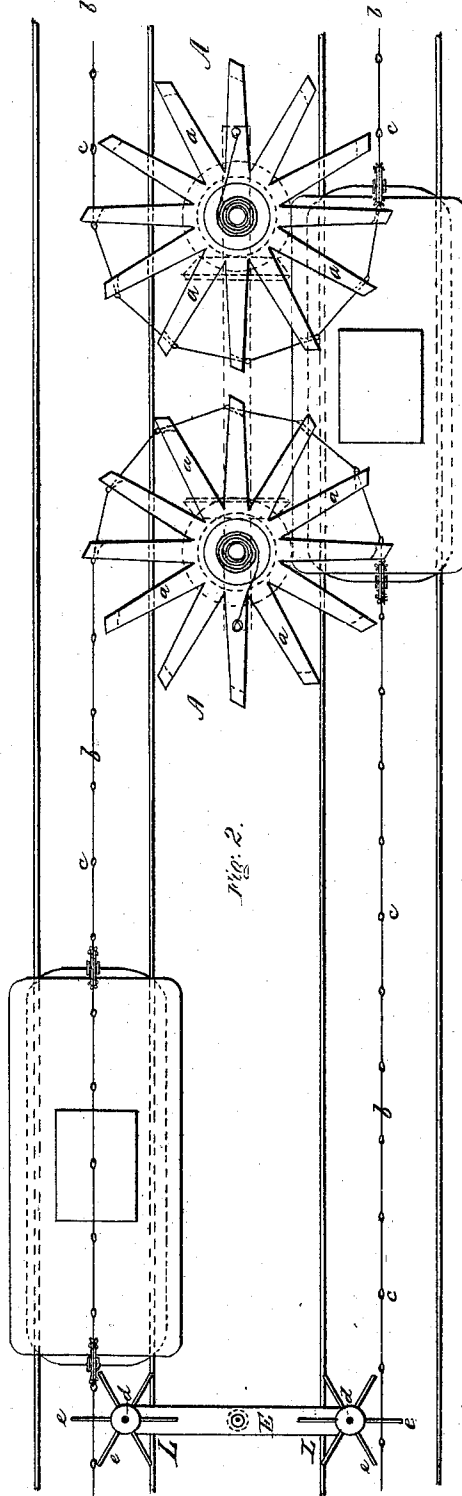


Fig. 2.

WITNESSES:

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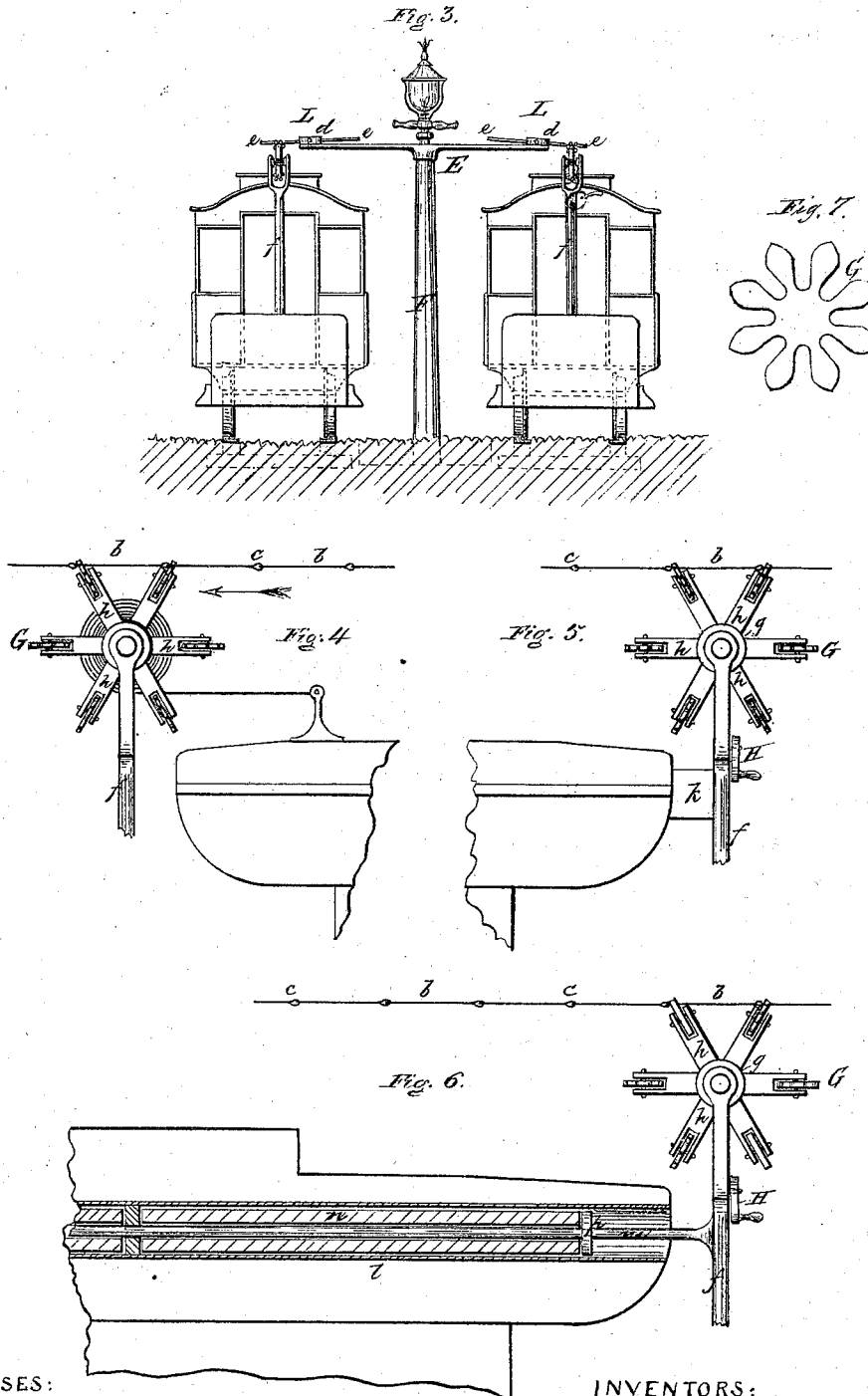
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UNITED STATES PATENT OFFICE.

JOSEPH L. SIMMS AND WILLIAM T. DUVALL, OF GEORGETOWN, D. C.

IMPROVEMENT IN PROPELLING STREET-CARS.

Specification forming part of Letters Patent No. 125,224, dated April 2, 1872.

To all whom it may concern:

Be it known that we, JOSEPH L. SIMMS and WILLIAM T. DUVALL, both of the city of Georgetown, in the county of Washington and District of Columbia, have invented a new and Improved Method of Propelling Cars on Street-Railways, and for other similar purposes; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, through letters of reference marked thereon forming part of this specification, and in which—

On Sheet 1, Figure 1 represents a side elevation of a rail-track and car with our improved traction apparatus applied, and a section of the sub-surface and operating gear. Fig. 2 is a plan or top view of the same as arranged for a double-track road.

On Sheet 2, Fig. 3 is an end elevation of two cars, roadway, and chain-carrying device. Figs. 4, 5, and 6 show three modifications of apparatus for connecting the car with the traction-chain. Fig. 7 is a detached view of the grappling device for connecting the car with the chain and freeing it when desired.

The invention is designed to dispense with the use of animal power for car-traction in a manner to materially reduce the running expenses of a road; and it consists in an arrangement of posts or pillars at suitable distances apart between the two tracks, with steam or other suitable power applied at intervals to operate horizontal armed wheels carrying endless chains centrally over each track—these chain driving-wheels, being all geared together in pairs to connect the several sections of endless chain in a manner that the weight of a car in descending a grade on any portion of the route is made available to aid the ascent of another on any other portion, thus virtually reducing the road to a level as far as the practical working is concerned; also, in a novel device or combination of devices for automatically connecting the car with the traveling-chain, and self-detaching at turning curves or passing the driving-wheels.

Referring to the drawing, A represents the horizontal radially-armed driving-wheels of the apparatus attached to the vertical shafts B, which latter are supported in hollow columns or suitable frame-work C, and provided with gearing

at their lower extremities beneath the roadway, to gear with the horizontal shaft D, which may be operated by any suitable motor beneath the roadway, or by suitable gearing from the side of the road, said gearing being so arranged as to rotate both shafts B in the same direction. The power applied to the shaft D operates two sections of endless chain; the shaft B of their opposite ends, being similarly geared to the adjacent ones of the next sections, each way, do not necessarily require a driving power, unless such sections are very long. The number and power of the several motors on a given length of roadway must be determined by the number of cars to be in motion at the same time. The arms *a* of the wheels A are forked at their ends to carry the chain *b* by holding onto the connecting-eyes *c* of its links, which latter are of a length corresponding with the cord from the extremity of one arm *a* to that of another, by which arm the said chain is operated. The diametrical extremity of the arms of the wheels A is equal to the distance from center to center of the double track, so that the chain is immediately over the center of the car traveling thereon. Intermediately of these driving-wheels A at suitable distances apart, we provide a carrying arrangement, consisting of a cross-head, E, supported on a pillar, F, between the two tracks, and carrying at each end a wheel, L, consisting of a hub, *d*, with radial arms *e*. The axis of this hub is so inclined that in its rotation, by the action of the eyes *c* of the chain traveling over it, the advancing arm shall be in position below the level of the carrying one, and thus pick up and support the chain on a level, or nearly so. In this manner a series of endless traction-chains may be used of such lengths as not to be materially affected by expansion and contraction, with perfect facility for turning curves, and with but a small consumption of motive power applied through the driving-shaft D to each two sections of the traction apparatus; and in localities where inclines or grades occur the descending cars will generally balance the ascending ones, the several sections being all geared together, as represented in Fig. 1, by the shaft D, and it gears throughout the entire route, thus reducing the motive traction very greatly.

Having thus described the traction appara-

tus, we will proceed to the grappling attachments of the cars, which are necessarily of a peculiar construction, to enable them to pass from section to section, and to be stopped and started at pleasure. These are mainly represented on Sheet 2 of the drawing, in which *f* represents a standard forked at its upper end, or it may be divided throughout its entire length, one of which is attached at each end to the platform or other suitable portion of the car, and at the upper end of this forked standard is pivoted a hub, *g*, in which are a series of arms, *h*, of such length and number that the cord from the point of each to the next shall correspond with the length of the links *b* in the traction-chain. Near the ends of each of these arms *h* is pivoted a grappling-wheel, *G*, (represented on an enlarged scale in Fig. 7,) the radial fingers of which engage with the eyes *c* of the links of the traction-chain, and by which, when the brake *H*, Fig. 6, (which may be of any suitable character,) is applied to the hub *g* of this grappling device to prevent it from revolving in the forked standard *f*, the car is drawn by said chain. The grappling-wheels *G*, being pivoted on axes parallel to the travel of the car, will, in passing from one section to another, be turned aside as the chain curves away from the line of the track in passing around the driving-wheels *A*, and thus be freed from its hold, while the similar device at the rear end of the car, having hold of the chain, will continue to carry it forward until the front one engages with the adjacent section of chain, which enters one of its forks at the inner side and gradually turns it upwardly and outwardly until the chain rests in line over the axis of said grappling-wheel, by which time that at the rear end of the car will in turn and in like manner be freed from the traction section, passed, and taken up by the chain of the next section.

In stopping the car the brakes *H* on the hubs *g* are released, which may be done simultaneously at each end of the car by a rod extending from end to end, and forming the axis of two eccentrics, or by any other well-known mechanical device which would accomplish the object. This allows the grappling-arms to revolve on their axes in the forked standards *f*, and frees the car from traction by the chain; this done, the ordinary brakes may be applied

to the wheels of the car to check its impetus. For starting again it is only necessary to release the brakes from the car-wheels and apply the brakes *A* to the grappling apparatus. In order to prevent the shock on the car in starting, the brake on the grappling apparatus should be applied gradually; but if this should prove insufficient, various devices may be used for that purpose, such as a coiled spring applied to the axis of the chain driving-wheel *A*, as represented in Figs. 1 and 2, or to the hub of the grappling-wheel, as in Fig. 4; or a rubber block, as shown at *k*, between the forked standard *f* and end of the upper portion of the car, as in Fig. 5; or a cylinder, *l*, may be placed in the roof of the car, with tubular or other elastic cushion, *n*, to be compressed by a piston or pistons *p* on the rod *m*, which connects the forked standards *f*, as seen in Fig. 6. It will be obvious that the same system of sectional endless traction-chains may be applied under the ground surface for single-track roads by arranging the driving-wheels *A* on horizontal axes for operation, in combination with similar grappling devices slightly modified to suit such arrangement.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The endless-chain traction-power, when divided up in sections of the route, and two or more of said sections geared together, substantially as and for the purpose specified.

2. In combination with such traction-power, we claim the grappling apparatus substantially as herein described, whereby the vehicle is made to automatically detach and attach itself in passing from one section to another of said traction-chain.

3. The combination of the carrying-wheels *L* with the driving-wheels *A* and chain, substantially as and for the purpose described.

4. The arrangement of an endless traction-chain or rope in connected sections on a double-track road, so that the descending load on a down grade is made available to aid the ascent of another load on the up grade of the same, or another section.

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Witnesses:

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