R. GRANT.

Car Wheel.

No. 294. Patented July 22, 1837.

Fig. 1.

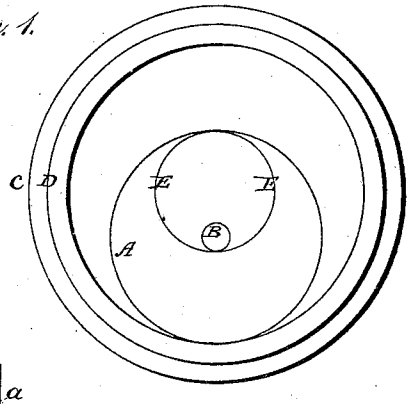


Fig. 2.

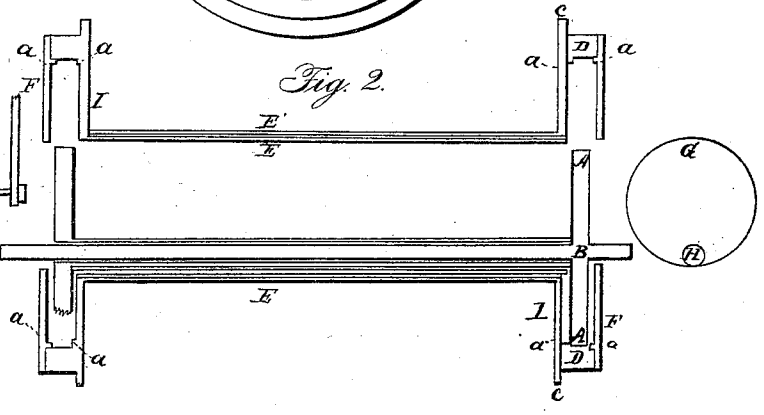
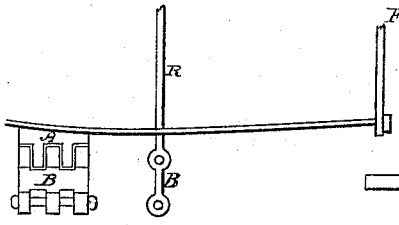


Fig. 4.



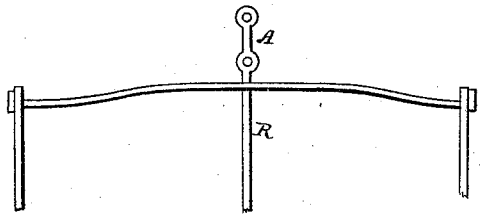


Fig. 3.

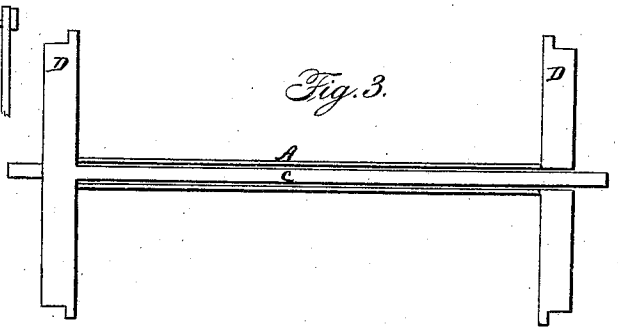


Fig. 5.

UNITED STATES PATENT OFFICE.

ROBERT GRANT, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN MODES OF CONSTRUCTING AND CONNECTING TOGETHER THE CARS OR CARRIAGES USED ON RAIL AND OTHER ROADS.

Specification forming part of Letters Patent No. **294**, dated July 22, 1837.

To all whom it may concern:

Be it known that I, ROBERT GRANT, of the city of Philadelphia, in the State of Pennsylnia, have made certain Improvements in the Mode of Constructing and Connecting Together the Cars or Carriages Used upon Railroads, and which improvements are in part applicable to such carriages as are used upon common roads; and I do hereby declare that the following is a full and exact description thereof.

My first improvement consists in a mode of constructing the wheels and axles of cars or carriages and their appendages, by which the draft is applied to a wheel which rolls within a rim upon a larger wheel near to its periphery, the tread of which larger wheel bears upon the rail or road.

I am aware that this principle has been already applied or has been proposed to be applied to the wheels of cars and carriages, but by an arrangement differing essentially from that which I have adopted.

In the accompanying drawings, Figure 1 shows the face of one of my combined wheels, the outer plate, to be presently described, being removed. The red line A is the periphery of my inner wheel, and B its axle. C is the flange of the outer wheel, which on common roads will be omitted. D is the projecting rim, upon the inner surface of which the wheel A rolls, its outer forming the tread of the wheel. E E is a tube firmly attached to the wheel, and extending to its fellow wheel on the opposite side of the carriage.

Fig. 2 is a section through a pair of such wheels and the tubes by which they are connected together, the same letters of reference being used to designate the same parts, as in Fig. 1. Each wheel is furnished with a tube, E E, the tube of one wheel passing within and revolving free in that of the other, which allows an independent motion of each wheel when the curvature of a road requires it.

F F are face-plates which are attached to the rims D D and inclose the wheels A A. These plates have openings in their centers of a diameter equal to that of the tube E, to allow of the free motion of the axle B. These openings I usually cover with a circular plate, G, fitting loosely against a rabbet and revolving freely. It has a perforation, H, near its periphery to allow the axle B to pass through. To prevent the friction of the inner wheels against them, the inner sides of the face-plates F F are made concave, as are the inner surfaces of the plates I I of the outer wheel; or the same end may be accomplished by means of fillets in the angles of the outer wheel, as shown at *a a*. Wheels thus constructed and furnished with the plates G will be defended against the introduction of dust and dirt of all kinds, while the axis B will roll round freely within the tubes E E. The diameter of these tubes will be determined by the size of the wheel A A, and may probably vary from four inches to a foot, according to the purpose to which they are to be applied. They may be confined together in various ways, and should be made to touch each other by projecting rims or bands, and not along their whole extent. By this arrangement of the combined wheels there will not only be a diminution of friction, but the outer wheels will pass more readily over obstructions, and the shock produced by them, both in the ascent and descent of the wheel, will be much less felt. The power of traction is applied to the outer ends of the axle B. To the interior wheels, A A, I also give an independent motion, so that one may revolve without carrying the other with it, and this I effect by the application of the principle of one axle revolving around the other in a manner analogous to that of the two tubes above described. I, however, in this case make the axle of one wheel a solid cylinder of iron, attaching the wheel firmly thereto, and this cylinder is surrounded by a tubular axis, to which the other wheel is attached, the tube extending from one wheel to the other, and confined upon the inner axle by a pin working in a groove, or in any other convenient way. I sometimes, instead of my combined wheels, intend to use car-wheels of the ordinary construction, and to employ therewith the solid and tubular axes, as above described. This modification is represented in section in Fig. 3, where A is the tubular axis, to which the wheel B is affixed, and C the solid axis, to which the wheel D is fastened.

I connect the cars to the locomotive and to each other by means of a double hinge-joint, the pin of which is vertical, so as to allow of any required degree of lateral motion in the

cars as they follow each other, while it admits of but little vertical play. This connection is shown in Fig. 4, where A B is the double hinge-joint. There may be more joints, if desired; but the double joint is deemed sufficient for the object in view—namely, to allow the wheels of a two-wheeled car, in following that which precedes it, to adapt themselves independently to the curvature of a road, which cannot take place when the single connecting-joint heretofore employed is used. As these double joints have considerable depth from top to bottom and are made sufficiently strong, should one wheel break, these connecting-links will sustain the car with sufficient power to prevent any serious danger from the accident.

To give greater support, also, in case of the breaking of an axle I employ a middle rail, R, Fig. 5, in the frame of the carriage, the lower side of which is nearly in contact with the axle, and this rail may have a box or bearing on its under side, embracing but not touching the axle, but which will come into contact with it should the axle break at any part. This, with the aid of the connecting-links of the contiguous cars will most commonly support the load and prevent upsetting.

What I claim as my invention in the before-described machinery is—

1. The manner of connecting the larger wheels of my combined wheel by means of revolving tubes, which constitute their axes and allow the axle of the interior wheels to pass through and revolve within them in the manner described.

2. The inclosing of the interior wheels by means of a face-plate, and the combining therewith a central circular plate admitting the axles of the interior wheels to pass through them, as set forth.

3. The manner described of combining the solid and the tubular axles either of the interior wheels or of the ordinary wheels of rail-road-cars.

4. The double or a greater number of vertical hinge-joints for connecting trains of cars together, in the way and for the purpose herein shown.

5. The so placing and fixing the middle rail of the frame of a car as that it shall aid in supporting it in case of the breaking of an axle, substantially as herein fully set forth.

ROBERT GRANT.

Witnesses:
THOS. P. JONES,
W. THOMPSON.