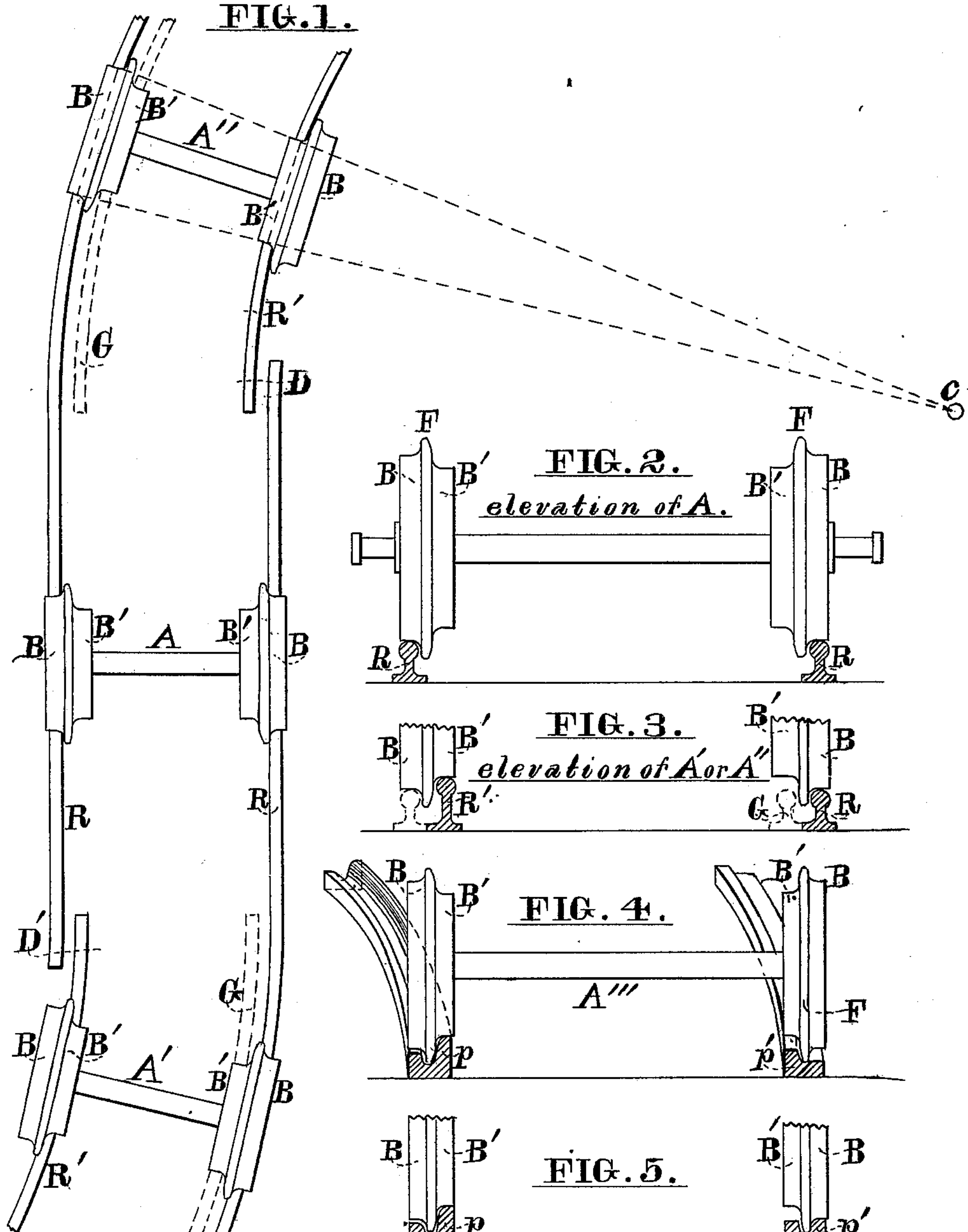
R. S. SEMPLE.

Car-Wheel.

No. 208,542. Patented Oct. 1, 1878.



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ROBERT S. SEMPLE, OF CINCINNATI, OHIO.

IMPROVEMENT IN CAR-WHEELS.

Specification forming part of Letters Patent No. **208,542**, dated October 1, 1878; application filed December 29, 1876.

To all whom it may concern:

Be it known that I, ROBERT S. SEMPLE, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Improvement in Railroad-Car Wheels and the Tracks of Railway-Curves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and the letters of reference marked thereon.

Figure 1 represents a plan view of my improvement in car-wheels and railway-tracks. Figs. 2 and 3 represent edge views of the wheels and transverse sections of the lines of rail. Figs. 4 and 5 represent edge views of the wheels, with transverse sections of modified forms of rail.

The object of my invention is to facilitate and render more safe the passage of railway-cars upon curves of the track, and to enable them to pass curves of shorter radius than is now practicable.

It consists in the novel construction of the car-wheel, which is provided with a deep central flange and an inner and outer tread of different diameters. I employ with the main rails of the track a separated rail, substituted for the inner rail of the curve, arranged upon an arc of greater radius, corresponding with the inner and diminished tread of the wheel, whereby the central flange of the wheel is made to traverse the outer edge of the rail upon which the diminished tread moves while passing around curves, thereby lessening friction and insuring safety, besides preventing torsional strain upon the axle.

My improved wheel, (shown in edge elevation and section in Fig. 2,) has two treads, B B′, of unequal diameter, separated by a central flange, F, common to both. The outer tread, B, is the ordinary running tread, and is in use upon straight portions of the track and the outer rail, R, of curves. The inner tread, B′, is of less diameter than the outer tread, B, proportioned to the radius of the curve, as indicated by the dotted radial lines, joining the extremities of their respective diameters in the pair of wheels shown at A″ and produced to the center of curvature, C. The diminished tread B′ is brought into use upon the separated inner rail, R′, of curved portions of the track.

On straight portions of the track the rails R are laid in the usual manner, and the main rail is continuous around the outer arc of the curve. Upon curves, however, the inner rail, R′, is a separated rail, laid upon an arc of greater radius than would be a continuation of the main rail, sufficiently within the ordinary alignment to accommodate the inner tread, B′, of the wheel, and is elevated sufficiently to compensate for its diminished diameter. The rails R R′ are not coterminous at the beginning and end of curves, but extend by each other a short distance, as shown at D D′, and therefore no jarring effect is produced when the bearing is transferred from one tread to the other, to facilitate which result the ends of the rails may be inclined downward.

It is obvious that the effect of elevating the supplementary rail R′ may be produced by depressing the contiguous main rail R. Where a high degree of speed is requisite, or where exact lines of curvature are impracticable, a guard-rail, G, may be laid within and parallel to the outer rail.

The operation is as follows: The pair of wheels, rigidly secured to an axle in the usual manner, designated and shown at A upon the straight track R, being moved to the right, as indicated by the arrows, upon entering a curve the inner and diminished tread, B′, of the wheel nearest the center of curvature, C, enters upon and traverses the rail R′ at and from the point D. The central flange, F, becomes operative in relation to and in connection with such inner tread, B′, in guiding the car in opposition to the tangential force upon the outer side of the rail R′, being the side of the rail nearest the center of curvature, C. The position of the wheels and their flanges in relation to the rails is shown at A″.

The wheels A being set in motion to the left, a corresponding result is attained in the opposite direction, as indicated by the relative position of parts at A′.

It will be seen, from this relation of the diameters of wheels with respect to the rails upon the inner and outer arcs of curvature, (the pair of wheels with their axle being considered as the frustum of a cone revolved upon its side,) that the tendency of motion is in a curved line about the center C.

For street-railway purposes a modification of the form of rails is desirable. The inner rail may be of the grooved form shown at *p*, now commonly in use upon curves, with the elevated portion (now used solely as a guide-rail) sufficiently high to accommodate the diminished tread B′; or a separated rail may be used, as hereinbefore described. For the outer rail two forms (shown at *p*′) may be used, so that upon curves of different radii the outer wheel may be run upon its flange upon the shorter curves, as indicated in Fig. 1.

I am aware that car-wheels have been constructed with two treads of different diameters upon the same side of the flange of the wheel; but in the use of such wheels the flanges necessarily traversed the inner edges of the rails when passing curves, and the stress of friction and centrifugal force operated wholly upon the outer wheel and larger tread in the same manner as in the use of the common wheel with the single tread; whereas in using my improved wheel and track upon curves the flanges of both wheels traverse the sides of the rails toward the center of curvature of the track, and the flange of the wheel, being deepest on that side adjoining the diminished tread, will guide and retain the car upon the track by means of the inner rail with perfect ease and safety.

Among the advantages arising from the use of my improvement are the following: First, the wheel is stronger to resist all strains upon it; second, the flange of the wheel, being in the plane of, and substantially a continuation of, the web, and being supported on both sides by the adjacent treads, is stronger to resist lateral strains than is the case with other wheels; third, the diameters of the treads being proportioned to the arcs of curvature traversed respectively, the friction is lessened and torsional strains upon the axle prevented; fourth, the resistance to tangential force upon curves being transferred to the inner wheels is not so great, because operating at a less leverage than is the case where operative upon the outer wheels, both as respects the curvature of the track and the diameter of the wheels; fifth, the guiding-flange upon curves operating as above described is deeper and stronger in relation to the tread in use, and therefore safer for the purpose than is the case with other wheels, while at the same time the flanges of the outer wheels are in the ordinary position in relation to their rail, ready to become operative to guide the car upon the outer rail in case of any accidental displacement of the inner rail or wheel; sixth, the wear of the brake-shoe may be wholly taken up upon the supplementary tread, and the unequal wear of the ordinary running tread thereby in a great measure avoided.

Having described my invention, I claim—

The centrally-flanged car-wheel cast in one piece, with two treads, one upon each side thereof, which treads are of different diameters, substantially as and for the purpose described.

In testimony of which invention I hereunto set my hand.

ROBERT S. SEMPLE.

Witnesses:

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