No. 830,623. PATENTED SEPT. 11, 1906.

G. B. TAYLOR & C. B. VOYNOW.

RAIL.

APPLICATION FILED APR. 7, 1904.

FIG. I.

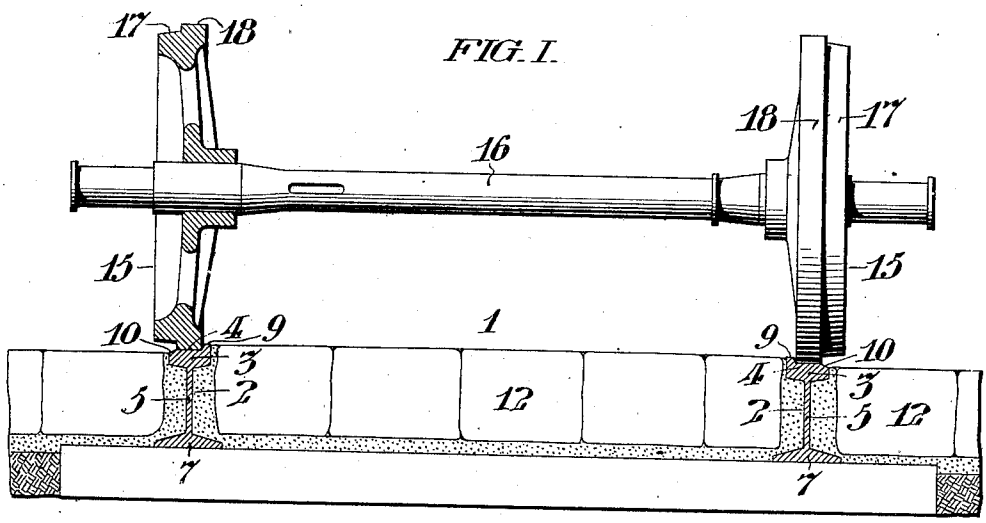


FIG. II.

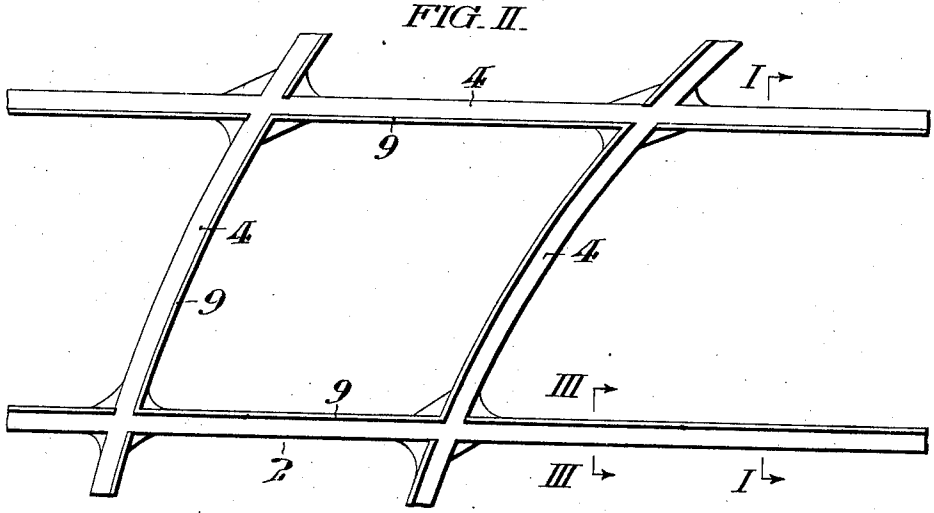
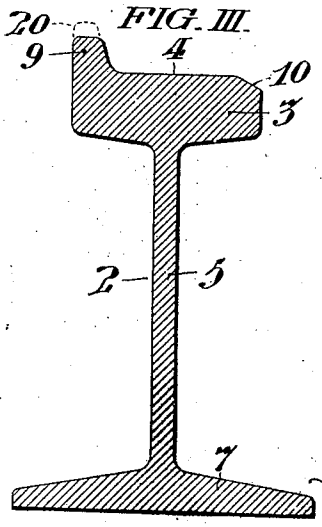


FIG. III.



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UNITED STATES PATENT OFFICE.

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RAIL.

No. 830,623. Specification of Letters Patent. Patented Sept. 11, 1906.

Original application filed February 17, 1904, Serial No. 194,035. Divided and this application filed April 7, 1904. Serial No. 202,025.

To all whom it may concern:

Be it known that we, GEORGE B. TAYLOR and CONSTANTINE B. VOYNOW, residents of the city of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Rails, whereof the following is a specification, reference being had to the accompanying drawings.

The present application is a division of our application Serial No. 194,035, filed February 17, 1904, for Letters Patent of the United States for improvements in railway systems, and relates particularly to the improved girder-rail described and shown in said earlier application.

The purpose and effect of our improvements may be more readily explained by first briefly adverting to certain characteristics of the ordinary girder-rails as embodied in existing railway systems. In modern street-railways the rails are of the girder type, wherein the uppermost member is a tread arranged to support a car-wheel having a retaining-flange projecting below the level of said tread to laterally engage the same. The head of the rail is supported by a vertical web and horizontal base. Said web is not, however, symmetrically disposed beneath said tread, since a portion of the latter overhangs the web at one side. Below the level of the tread and on the side of the vertical web opposite to the overhanging portion of the tread is a horizontal flange of such extent and configuration as to receive and support the wheels of wagons and similar vehicles in wholly lateral relation to said vertical web. In the ordinary track structure the upwardly-projecting treads of the rails are arranged outside of the depressed flanges, and at each crossing the treads of the rails are necessarily cut away to form recesses of such extent as to permit the passage of the retaining-flanges of the wheels in both directions, and of course similar recesses must be made in the rail-treads at sidings or connecting branches between different tracks. The effect of such construction is that the car-wheels jar into and out of each of said recesses in traversing the tracks to the detriment both of the tracks and the car equipment. In the ordinary construction described the wheels of wagons and other similar vehicles run upon the depressed flanges of the rails, which are wholly lateral with relation to the vertical webs. Hence the stress of this whole traffic is unequally supported, and the normal wear of running is upon a relatively shallow part and unduly destructive.

As hereinafter described, our invention comprises a rail provided with a relatively broad and thick tread, symmetrically disposed with relation to the plane of its vertical web and to the cross-section of its base and having a lateral retaining-flange extending along one edge of the tread and projecting above the latter so far as to prevent displacement of a flangeless car-wheel, but preferably of such width as not to afford a running surface for ordinary vehicles.

Before describing our improvements in detail we would point out some of the advantages incident to their employment. For instance, there is but one tread on the rail both for cars and ordinary vehicles, and that tread is disposed in such relation to the vertical web of the rail that the load is uniformly and correctly transmitted to the web and base. Said tread member may be relatively thick vertically, so as to insure long life. The distribution of the stress at the joint-plates is to the greatest advantage. The rail is susceptible of universal use for city or suburban purposes and special work at crossings, sidings, connections, &c. Such rails at crossings present a continuous uniform plane surface for the passage of the wheels in both directions, and thus avoid the wear and tear upon the track structure, the car-wheels, motors, and other equipment incident to the jarring passage of cars over crossings formed of the ordinary rails having recesses in their tread-surfaces. Moreover, said improved rails being disposed with their retaining-flanges toward the inside of the track the arrangement is the reverse of the ordinary arrangement above described, and flangeless car-wheels may be employed with all of the economy in initial cost and cost of maintenance incident thereto. Irrespective of the general beneficial results thus afforded a conservative estimate drawn from actual experience in the city of Philadelphia indicates that the immediate financial advantages incident to the employment of our improvements would be as follows: a saving in renewals for intersections and other special work amount-

ing to two hundred thousand dollars per year, a saving of track repairs wholly independent of such special work amounting to seventy-five thousand dollars a year, the saving in the cost of repaving incident to repairs of special work and rails amounting to forty thousand dollars per year, a saving in the cost of repairing motors of seventy-five thousand dollars per year, a saving in the cost of repairing and renewing wheels amounting to ninety thousand dollars per year, and a saving in the cost of repairing car bodies and trucks amounting to forty thousand dollars per year.

We are of course aware of the enormous variety of rail-sections which have been suggested or attempted, and we recognize an apparent simple aspect of the contemplated change when viewed from what may be termed a "popular" standpoint as distinguished from that of the engineer trained in the art to which the invention directly relates. We have therefore presented at some length the considerations which we believe will be recognized by engineers skilled in the art as affording evidence of a radical departure, the apparent simplicity of which by no means represents the novelty of the conception or the practical consequences of its embodiment.

Our invention comprehends the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings, Figure I is a transverse sectional view taken on the line I I in Fig. II, showing a pair of our improved rails embodied in a track structure of the character herein contemplated and in coöperative relation with a pair of improved double-tread wheels. Fig. II is a plan view of special work embodying our improved rail of the cross-sectional configuration shown in Fig. III. Fig. III is a transverse sectional view of one of our improved rails, taken on the line III III in Fig. II.

In said drawings, 1 is a section of road-bed of the improved type provided with rails 2, whose heads 3 have wheel-treads 4 centrally disposed with respect to their vertical webs 5, which support said heads in connection with the base-flange 7, which are centrally related to said web 5. The wheel-retaining flanges 9 project above the level of said wheel-treads 4 along the inner longitudinal edges thereof.

As shown in Fig. III, the outer longitudinal edge 10 of the rail-head 3 is beveled; but this is only desirable to insure that the paving-blocks 12, which are rammed to the lower level of said edge 10, shall not project above the tread 4.

Referring to Fig. I, the car-wheels 15, which are coupled by the axle 16, comprise treads 17, which are adapted for operative engagement with ordinary rails (of the character above described) and treads 18, which are adapted for operative engagement with the wheel-treads 4 of the new rails 2, as shown in said figure. As indicated in Fig. I, said wheel-treads 17 and 18 are conveniently formed of different diameters, and the wheels are so disposed upon the axles that their larger diameters are adjacent to each other and supported by the rail-treads 4, upon which they are retained by the flanges 9.

In Fig. II, which shows special work arranged for the intersection of straight tracks and curved tracks, both pairs of tracks comprise our improved rails of the cross-sectional configuration shown in Fig. III, and the treads 4 thereof extend in one continuous common plane, so that the wheels may pass freely across said intersection in either direction and upon either pair of tracks without jolting.

Although the form of our improved rails shown in Fig. II is adapted for special work, as above described, where such work comprises tracks which have sharp curves we prefer to increase the height of the wheel-retaining flanges 9, as indicated by the dotted lines 20 in Fig. III, so as to withstand the extraordinary impact incident to the traverse of vehicle-wheels around such curves.

We do not desire to limit ourselves to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of our invention.

We claim—

1. A straight rail of the girder type, of greater height than width, comprising a vertical web, extending more than one-half of the height of the rail; base-flanges projecting symmetrically upon opposite sides of said web; a head symmetrically disposed upon opposite sides of said vertical web and provided with a wheel-tread, extending in a plane parallel with the bottom plane of said base-flange; and, a wheel-retaining flange on said head, projecting above said tread along one longitudinal edge thereof, substantially as set forth.

2. A straight rail of the girder type, of greater height than width, comprising a vertical web, extending more than one-half of the height of the rail; base-flanges projecting symmetrically upon opposite sides of said web; a head symmetrically disposed upon opposite sides of said vertical web and provided with a wheel-tread; and, a wheel-retaining flange on said head, projecting above said tread along one longitudinal edge thereof, substantially as set forth.

3. A straight rail of the girder type, of greater height than width, comprising a vertical web extending more than one-half of the height of the rail; base-flanges projecting equidistantly upon opposite sides of said web; a head projecting equidistantly upon

opposite sides of said web and provided with a wheel-tread extending in a plane parallel with the bottom plane of said base-flanges; a wheel-retaining flange on said head projecting above said tread along one longitudinal edge thereof; and, the edge of said head opposite to said wheel-retaining flange being beveled, substantially as set forth.

In testimony whereof we have hereunto signed our names, at Philadelphia, Pennsylvania, this 6th day of April, 1904.

GEORGE B. TAYLOR.
CONSTANTINE B. VOYNOW.

Witnesses:
HENRY B. NICHOLS,
BENJ. STOTT.