No. 696,837. Patented Apr. 1, 1902.

T. J. McTIGHE.

RAILWAY TRACK SPECIAL.

(Application filed Nov. 4, 1901.)

(No Model.)

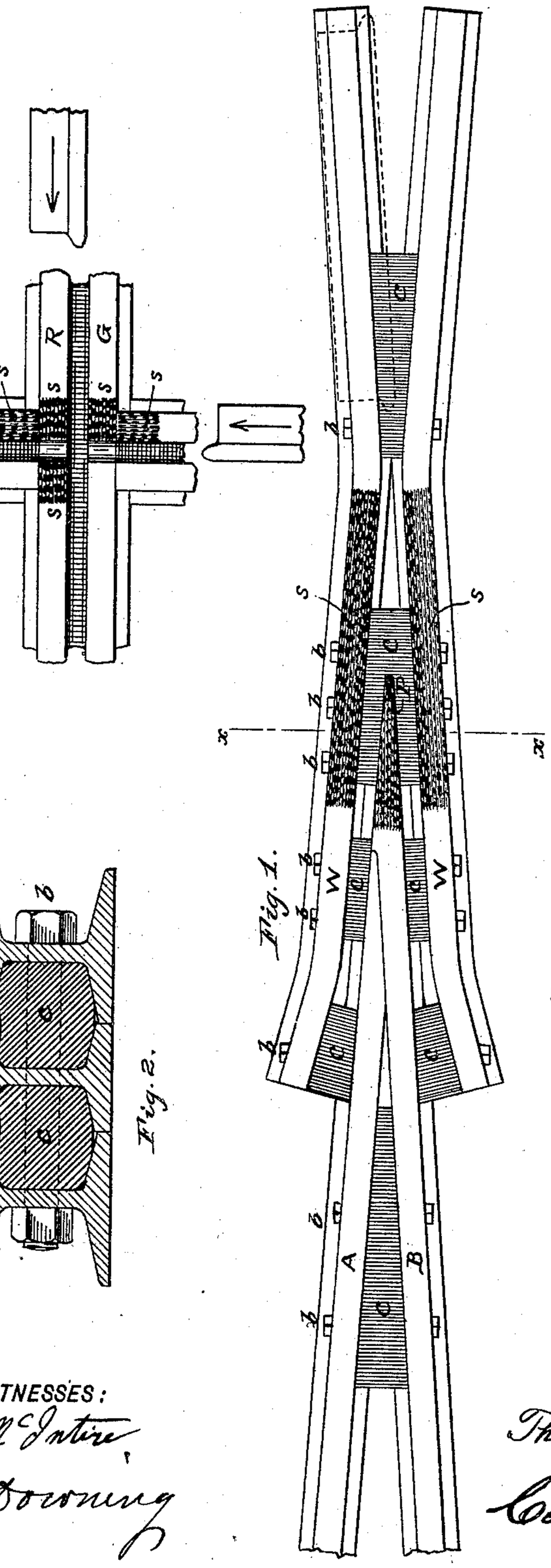

Fig. 3.

Fig. 2.

Fig. 1.

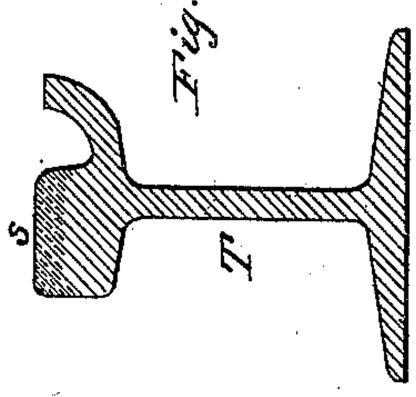

Fig. 5.

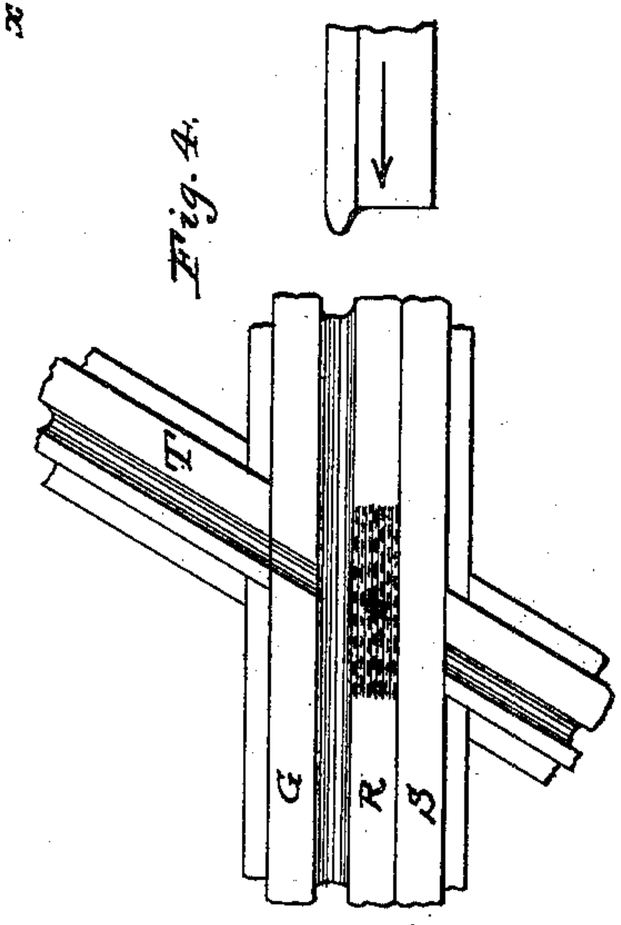

Fig. 4.

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THOMAS J. McTIGHE, OF NEW YORK, N. Y.

RAILWAY-TRACK SPECIAL.

SPECIFICATION forming part of Letters Patent No. 696,837, dated April 1, 1902.

Application filed November 4, 1901. Serial No. 81,075. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. McTIGHE, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Railway-Track Specials, of which the following is a specification.

This invention relates to certain improvements in railway frogs, crossings, switches, and other structures used in railway-tracks, and which are generally known in the trade under the term "track-specials," a term which is adopted by me as descriptive of any of the numerous forms of track structures to which my invention is applicable. Many of such track-specials are built up or constructed of the ordinary forms of rolled-steel rails, and when practicable, as is usually the case, the track-special is built up of the standard form and weight of rail used in the tracks at the location the special is to be used in. These track-specials are generally subjected to more severe conditions of service than the standard track; and the primary object of my invention is to construct them in a manner which will increase their durability.

Briefly, my invention consists in a frog, switch, crossing, or other type of track-special, wherein one or more of the wearing parts is made of mild or low-carbon steel, which is locally supercarbonized or impregnated with hardening material and hardened; further, in a structural railway-rail of mild or low-carbon steel having one or more of its wearing-surfaces locally supercarbonized or impregnated with hardening material and capable of hardening by heat and quenching; further, in the track-specials constructed according to my invention, all substantially as hereinafter more fully described, and set forth in the claims.

In the accompanying drawings, which form part of this specification, Figure 1 is a plan view of the ordinary type of stiff frog made of T-rail and embodying my invention. Fig. 2 is a transverse section of the same on line *x x* on an enlarged scale. Fig. 3 is a plan view of one of the four corners of a plain right-angle or "window-frame" crossing embodying my invention. Fig. 4 is a plan view of one of the four corners of a diagonal "jump-crossing," illustrating another application of my invention; and Fig. 5 is a section showing the application of my invention to a piece of "girder-rail" used in a track-special in a street-track.

In the frog shown at Fig. 1 the general construction is that of a standard T-rail stiff frog, in which A B are the point-rails, machined and fitted together to form the point P. W W are the wing-rails, bent at the required points, as usual. All these parts are of T-rail rolled from mild or low-carbon steel ingots. The fillers *c* are applied in any of the customary ways, and the structure in this instance is held firmly together by the transverse bolts *b b*.

In applying my invention I take the wing-rails W W and the point P, either before or after the fitting is done, and subject them, singly or together, to treatment in a suitable furnace, confining the treatment to such portions as are afterward to be subjected to the most severe conditions of service in the track—in the present instance represented approximately by the shaded or line-tinted surfaces *s s s* on the point and wing rails. At the right of Fig. 1 a car-wheel is shown in dotted lines to indicate the path of wear at the intersection and show why these shaded portions should be stronger and harder than the other parts. I have found that either before or after machining and fitting the parts these local wearing-surfaces of an ordinary mild-steel frog can be supercarbonized to any desired percentage and depth, according to temperature and time of submission to the carbonizing material in contact with such local surfaces, being variable at will between very wide limits. For example, in the case of a point or wing rail of mild steel containing normally, say, one-fourth of one per cent. of carbon I can project into the wearing surface or surfaces enough carbon to raise the local percentage to two and one-half per cent. or more, thus bringing that portion of the structure into a condition which is capable of being hardened to any desired extent, the same as the highest grades of crucible-steel and in the same manner—namely, by heating and quenching. A frog thus supercarbonized at

the surfaces *s s s* has greatly-increased durability. The depth of the treatment may be as great as the head or form of the rail will permit—say up to three-quarters of an inch, if desired—depending upon the form and depth of the rail-head.

In Fig. 2 I show one of the wing-rails treated also on one edge *e*. This is in some cases desirable where the passage of trains happens to give a side thrust or grinding effect of the flanges of the wheels laterally against the wing-rails.

In carrying out the treatment I prefer to allow the frog or rail to cool slowly after removal from the furnace and then reheat the treated portions and quench in water or other suitable bath. The hardness and temper of the parts *s s s* can thus be regulated within close limits. Reheating to a low red and moderately rapid quenching produces a very hard exterior, which gradually blends inwardly through the highly-carburized area to the mild steel. Reheating to a bright red and very rapid quenching gives a maximum hardness practically throughout the entire area of supercarbonization.

Fig. 3 shows the same invention applied to the ordinary railway-crossing, the figure, however, showing only one of the four intersections required where one track crosses another. R is the rail of one track; R′, that of the other. G G′ are the respective guard-rails. Portions of the wheels are shown to indicate the path of heaviest service and the desirability of capacity to resist wear. In this figure again, *s s s* mark the portions locally supercarbonized and hardened.

Fig. 4 shows the same invention applied to a diagonal crossing of the jump type, often used where a street-railway track crosses the track of a steam-railroad, the latter being shown as composed of T-rail and the former of "grooved-girder" rail. R is the main rail of the steam-railroad; G, its usual guard-rail, which is notched for the passage of the wheel-flanges of the street-railway; S, an extra T-rail fitted outside the main rail R to prevent worn wheels of the steam-road from injuring the abutting rail ends of the street-railway, whose girder-rail is shown at T. Both the main and extra rails R and S are uncut, so that the wheels of the street-railway have to jump or ride over them in crossing. To prevent the usual cutting action by the wheel-flanges due to this jumping, I supercarbonize locally or otherwise harden the rail R, (and rail S, if found desirable,) as shown at *s*. The street-railway girder-rail T may also be likewise treated, as indicated at *s* in the enlarged section, Fig. 5.

Obviously the invention is applicable to all forms of track-specials, such as frogs, whether "stiff" or "spring" rail, crossings, curve-crosses, switches, mates, and all such structures as are composed partly or wholly of steel rails capable of having additional carbon absorbed or projected into their wearing-surfaces.

While in the foregoing I have exemplified the invention as embodied in a carbonizing treatment applied to the wearing-surfaces, I do not limit myself to a surface hardened by the addition of carbon alone. I consider as within the scope of this invention the use of any material—such, for instance, as manganese, nickel, or other metal or substance capable of being projected or absorbed or alloyed into the rail directly, so as to harden it locally and increase its resistance to wear.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a railway-track special, a rail of mild steel having one or more of its local wearing-surfaces integrally modified into a hard steel or steel alloy capable of being hardened.

2. In a railway-track special a rail of low-carbon steel substantially incapable of hardening, having one or more of its local wearing-surfaces integrally modified into high-carbon steel capable of hardening and tempering.

3. A railway-track special composed partly or wholly of rolled railway-rails of low-carbon steel having one or more of their local wearing-surfaces integrally modified into high or hard steel.

4. A railway-track special composed partly or wholly of rolled railway-rails of low-carbon steel having one or more of their wearing-surfaces integrally supercarbonized.

5. A railway-frog having its point formed by two converging railway-rails of low-carbon steel, the tops of either or both said rails being locally modified into hard steel at and near the point.

6. A railway-frog having its wings formed of low-carbon-steel railway-rails which are integrally modified into hard steel locally adjacent to the intersection-point of the frog.

Signed at New York, in the county of New York and State of New York, this 2d day of November, A. D. 1901.

THOMAS J. McTIGHE.

Witnesses:
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