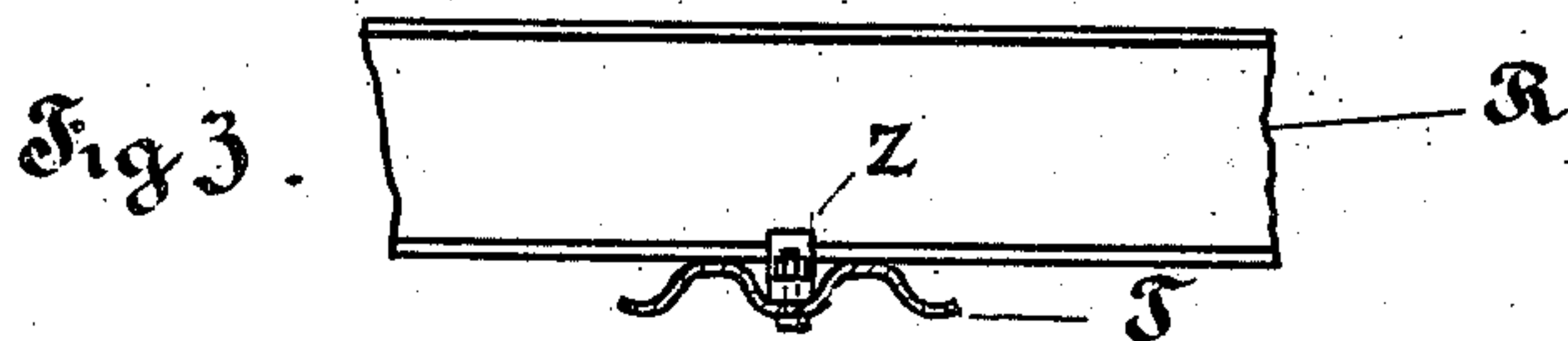
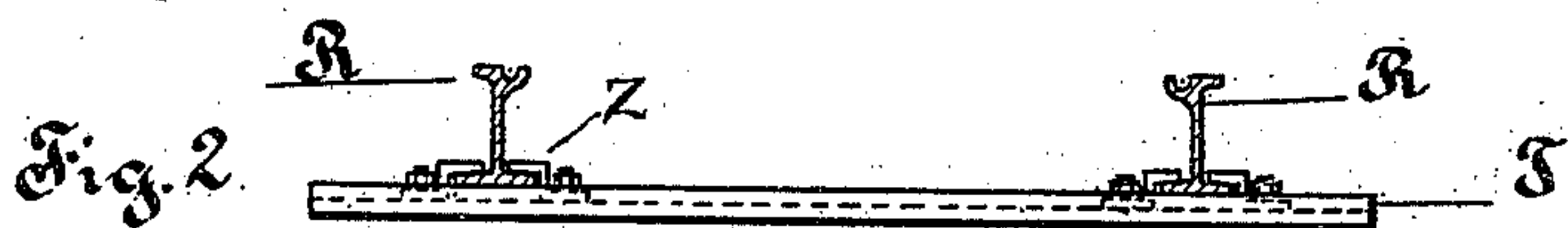
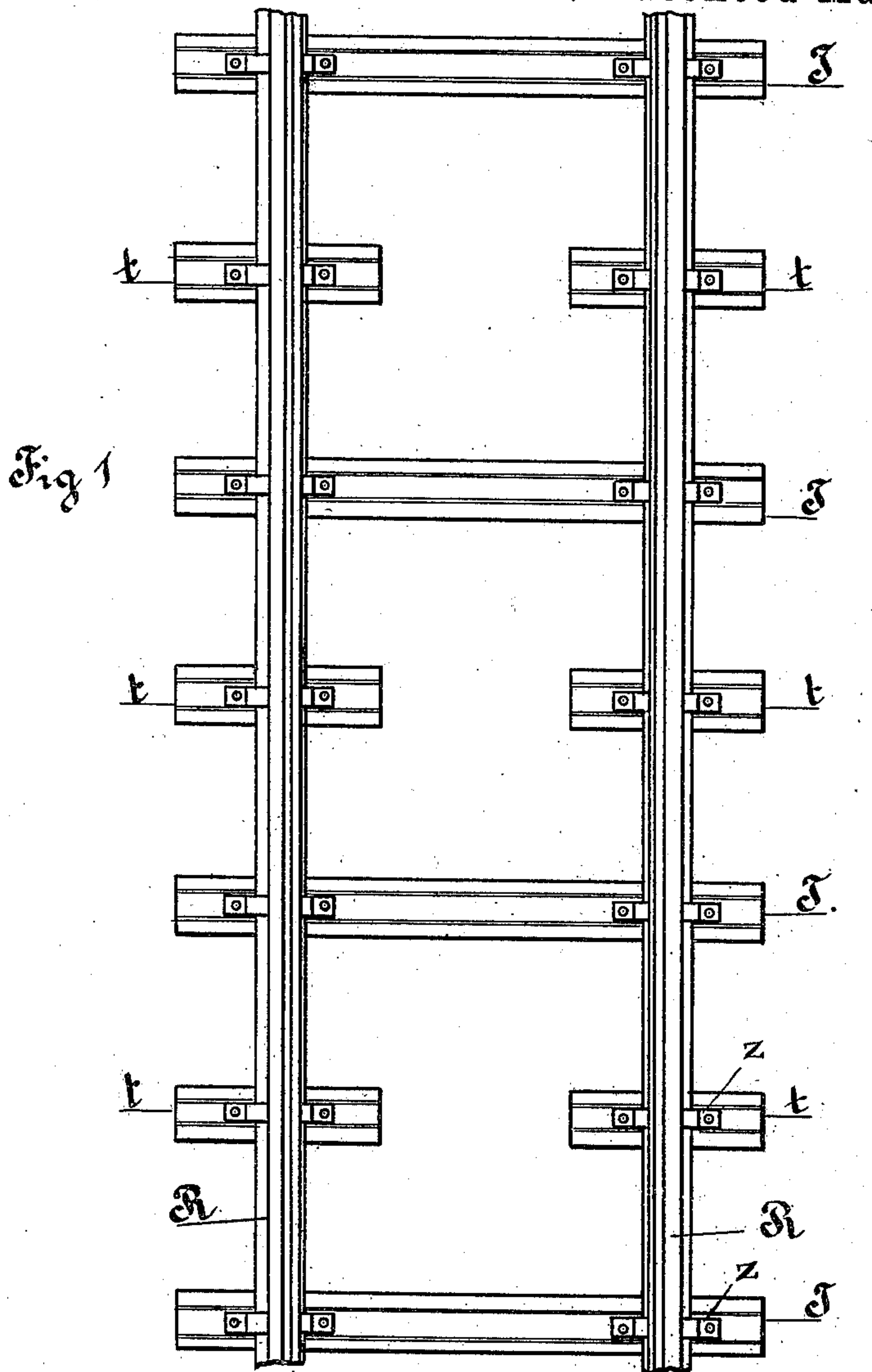


(No Model.)

R. E. DANIELS.  
RAILWAY CONSTRUCTION.

No. 555,934.

Patented Mar. 10, 1896.



WITNESSES:  
Geo. Richter  
David A. Murch

Fig 4.



INVENTOR,  
Robert E. Daniels.  
BY  
L. Dorrdownorth  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

ROBERT E. DANIELS, OF YOUNGSTOWN, OHIO.

## RAILWAY CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 555,934, dated March 10, 1896.

Application filed April 4, 1895. Serial No. 544,517. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT E. DANIELS, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Railway Systems of Construction; and I do hereby declare the following to be a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

The object of my invention is an improved economic system in the construction and maintenance of railways for general application in all railroads, but more particularly designed for street-railways that have a road-bed of concrete or similar material, whereby the cost of ties is reduced a very large per cent., while the value and usefulness of the road-bed equipment are not diminished for use and is repaired with greater facility and less expense than in other systems. It is also more especially adapted for the use of the tie known as "the Daniels steel corrugated tie" as now manufactured, although advantageous whatever tie may be chosen. I accomplish this object by the means hereinafter described and illustrated in the drawings, in which—

Figure 1 is a plan view of a section of railway-track constructed in accordance with my economic system. Fig. 2 is a cross-section view of the same as seen at the neighboring end of Fig. 1. Fig. 3 is a side view of a section of the rail R, showing an end of the tie T attached thereto; and Fig. 4 is a cross-section view of the tie T, the sleepers or rail-supports *t* being similar on their transverse lines.

Similar letters refer to similar parts in each view.

It will be seen by inspection of the drawings that my economic railway system consists in the use of the long or bridge ties T for rail-support and to retain them rigidly in parallel, having intermediately the short sleeper or rail-supports *t* for rail support only, the economic result being in the less tie material employed and the less labor required in laying and maintenance thereafter.

It is well known that in railway construction, especially in street-railways and such

railroads as have concrete or similar material for road-bed, the number of ties required in any given distance to securely hold the rails in parallel positions is much less than the number necessary for rail-support

The object of my investigation and experiments has been to discover the relative proportions of ties and of sleepers or rail-supports required for these two purposes. In these investigations and experiments I have considered chiefly the Daniels corrugated steel tie mentioned, the cross-section form of which is shown at Fig. 4. I have found that while variations may be made with good results, such variations being based upon the size of the rail and cars used and the expectations of traffic, for street-railways having seventy-two-pound rails and the usual electric cars doing the usual passenger business of cities two short sleepers or rail-supports (one under each parallel rail) intermediate between two long or bridge ties, as shown in the drawings, such ties separated between centers, give the best results. Any suitable means of fastening the rail to the ties may be employed, but I prefer a Z clip or clamp *z* having an outwardly-projecting horizontal portion bolted to the tie and an upward-curved portion that overlaps the lower flange of the rail, such clamp presenting the advantage of placing the bolt-hole in the tie at a distance from the pressure-point of the rail.

For the reason that proportional variations may be made in the use of the bridge and short ties I do not limit myself to any proportions, but include the use of short sleepers or rail-supports intermediate between long or bridge ties, each being of corrugated steel sleepers or tie-supports of the construction about to be described in a railway system, as being within the scope and spirit of my invention.

The Daniels corrugated steel tie that I use in my economic railway-construction system is corrugated throughout its length in parallel lines, being intermediately flat, such corrugations forming in the arches or lower faces curves less than a half-circle, the material being so distributed as to present a greater bulk of material on the upward portion of the corrugations, which have upwardly flat surfaces for rail-seats, the upper



inner face-lines of the corrugations retaining their curved form so as to yield a desirable degree of elasticity, thus differing from the tie for which Letters Patent No. 482,997 were 5 granted to me, dated September 20, 1892, in the matter of increased bulk in the portion mentioned and in an upper flat surface of the corrugations.

I am aware that patents are disclosed, one 10 showing a rail-brace holding the rails in parallel position, such rails being supported by stone slabs, some in form approximating a cross-tie and some supporting only one rail, and one also showing a shoe-plate having place 15 intermediately between ordinary wood cross-ties bolted in pairs oppositely to the web of the rail with downward-diverging wings to enter the material of the road-bed; but I am not aware that a system of railway construction 20 employing bridge-ties with intermediate short sleepers or rail-supports of the form and material above described was ever known until my invention thereof.

What I claim is—

25 1. A railroad-tie, comprising a corrugated metallic plate, said corrugations forming el-

liptic arches with flattened facets or rail-seats, two of said facets being in a plane, combined with a Z-clip bolted to said tie within the depending arch and engaging the rail-flange. 30

2. In a railroad, a corrugated metallic transverse sleeper for the rail thereof, comprising a double flattened arch supporting said rail and a depending flattened arch integral therewith, combined with a Z-clip bolted to the 35 said depending arch and engaging the base-flange of said rail, substantially as described.

3. In a railroad, a metallic tie-plate, comprising integral arches or corrugations with flattened facets of increased thickness, a Z- 40 plate bolted to the depending facet and engaging the base-flange of the rail, in combination with an intermediately-disposed transverse sleeper-plate of a similar corrugated form and provided with similar mechanism for 45 engaging the rail, substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

ROBERT E. DANIELS.

Witnesses:

ETTA BROWN,  
MYRON WOOD.