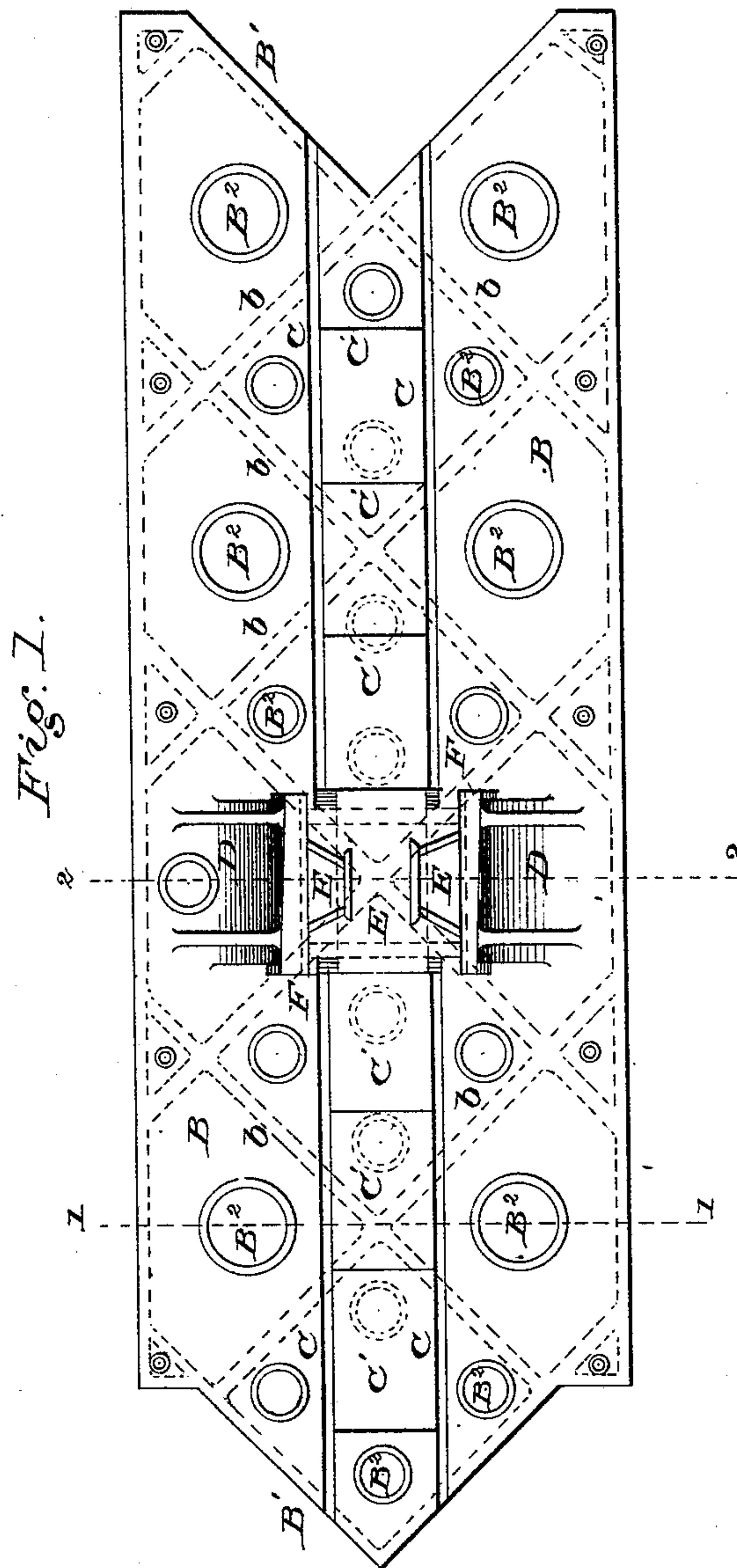


S. NICHOLLS.

. Permanent Way for Tramway.

No. 218,559.

Patented Aug. 12, 1879.



Witnesses:

Wm Stark
Wm E. Stummeck

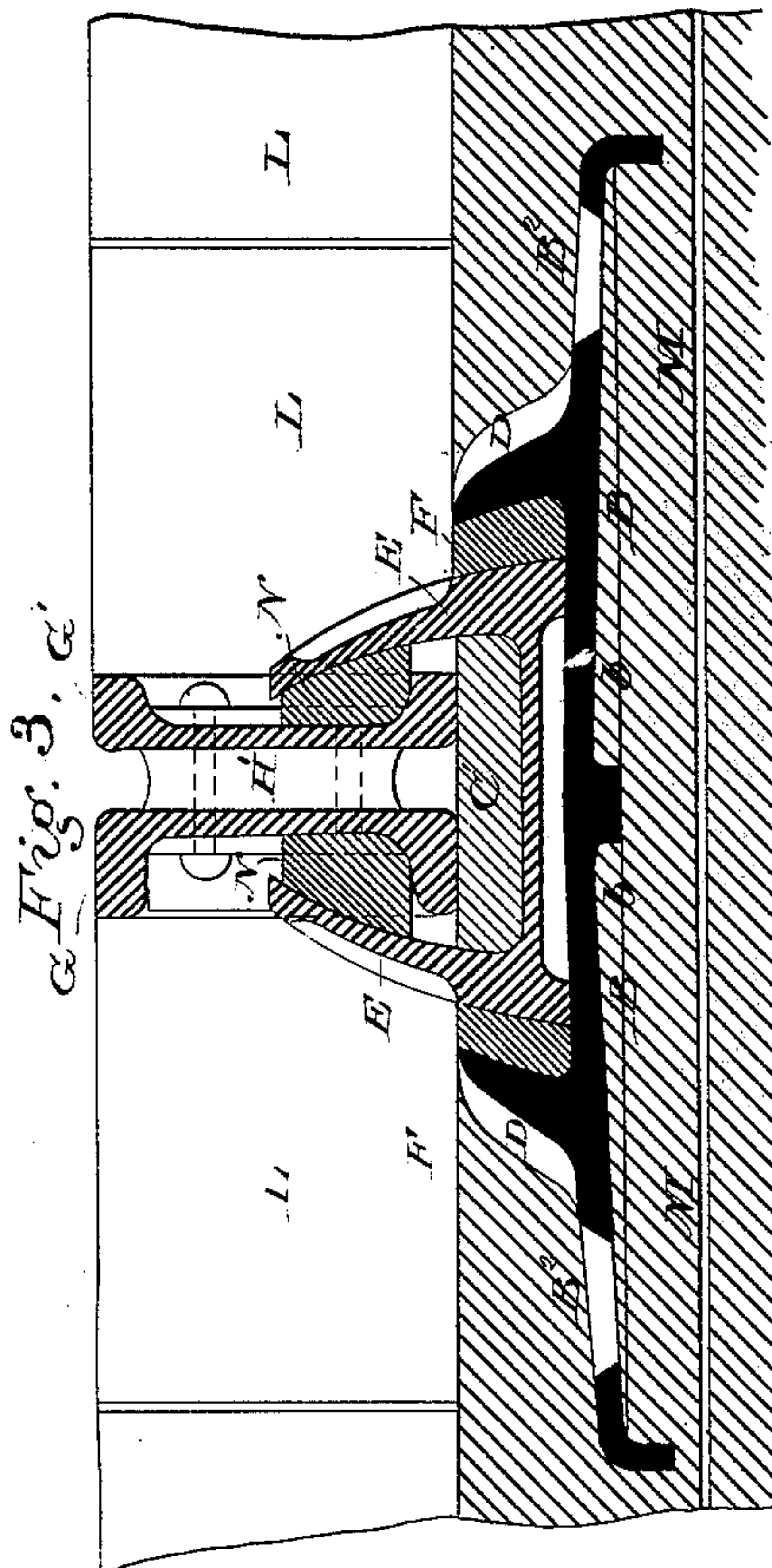
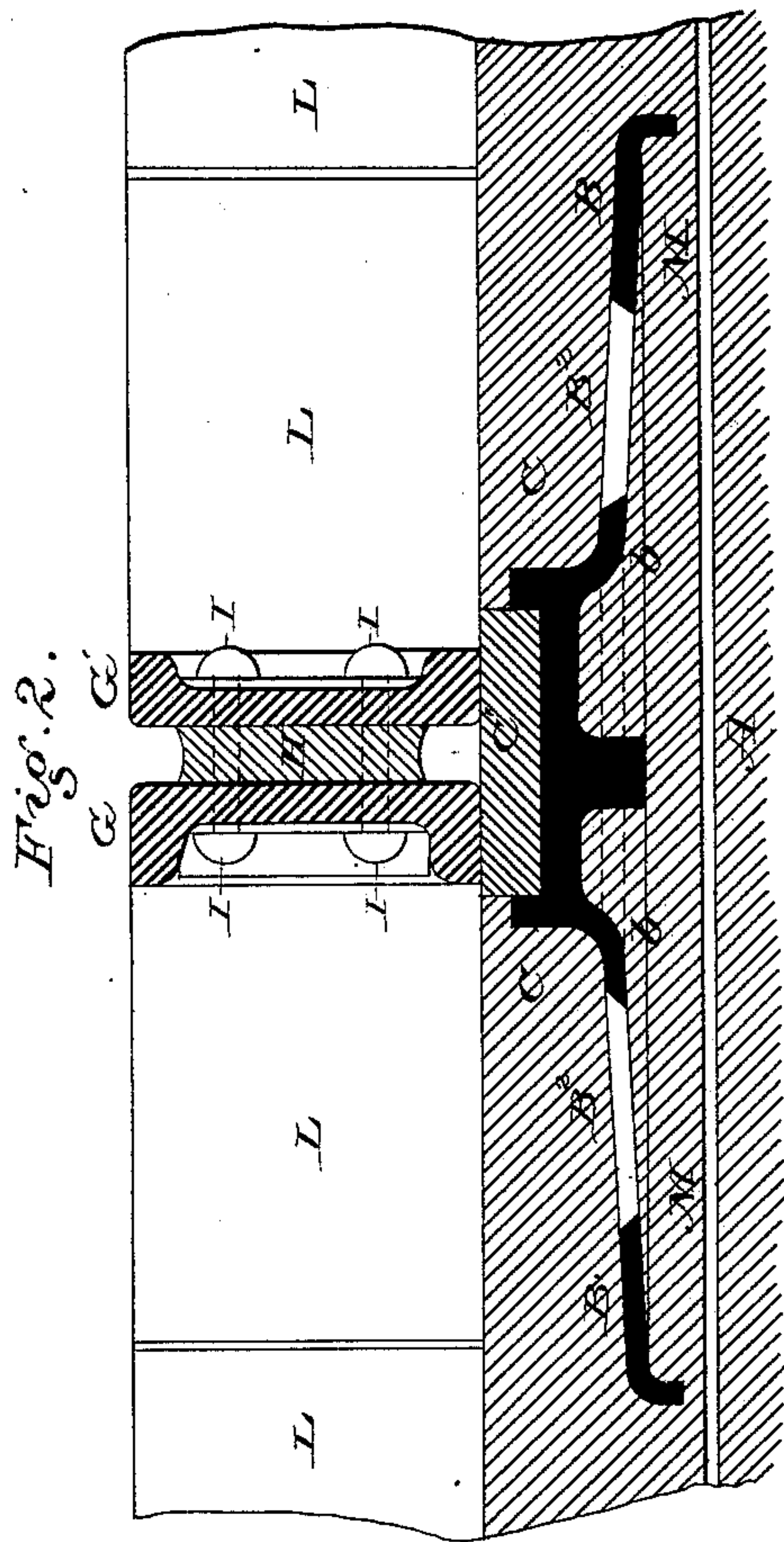
Inventor

Silas Nicholls.

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Witnesses:

Wm Stark
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Inventor:

Silas Nicholls

UNITED STATES PATENT OFFICE.

SILAS NICHOLLS, OF ST. CLEMENT DANES, COUNTY OF MIDDLESEX,
ENGLAND.

IMPROVEMENT IN PERMANENT WAYS FOR TRAMWAYS.

Specification forming part of Letters Patent No. **218,559**, dated August 12, 1879; application filed
January 29, 1879.

To all whom it may concern:

Be it known that I, SILAS NICHOLLS, of St. Clement Danes, in the county of Middlesex, England, have invented a new and useful Improvement in Permanent Ways for Tramways; and I do hereby declare that the following is a full, clear, and exact description of the same.

The object of my invention is to construct a tramway capable of resisting for a lengthened period the damaging effects of rain, frost, and snow, and in which the tram-rails and the paving of the road on either side of them are kept firm and (so far as the durability of the road materials will admit) of uniform surface-level.

The invention has, further, for its object to enable the rails (when the road-paving is fairly worn below their level) to be lowered until they are again flush with the surface of the road without taking up the whole of the paving between the rails, whereby the paving may be retained a much longer time in use. When the road is completely worn it can be taken up and relaid during night, or at any other convenient time, without much skilled labor, delay, or stoppage of traffic.

In order that my invention may be more readily understood, I have illustrated it in the accompanying drawings, in which—

Figure 1 is a plan of a portion of the continuous bed-plate, with one of the chairs and the wood packing to receive the rail, the latter, however, being removed. Fig. 2 is a cross-section of the rail and the bed-plate, taken on line 1 1; and Fig. 3 is a similar section taken on line 2 2, Fig. 1, Figs. 2 and 3 being, however, drawn to a scale twice the size of that of Fig. 1.

The same letters of reference indicate the same parts in all the figures.

In carrying out my invention I construct the permanent way of the tram-road as follows: I first make a good firm foundation of concrete, A, upon which I lay continuous cast-iron bed-plates B, in length of five feet by about twelve to twenty-two inches wide and about half an inch thick, said plates being of the arched form in cross-section, so as to be concave on the under side, as clearly shown in Figs. 2 and 3, and having downwardly-projecting side

flanges and diagonal ribs *b*, cast on the under side, to strengthen the plates B and to bed into and obtain a firm gripe of the concrete.

The butt-ends B¹ of these bed-plates B are "bird's-mouth" jointed together, as shown, the end of one plate being formed with a salient angle, which fits in a corresponding re-entering angle in the end of the next plate, so as to make a continuous bearing-surface.

B² are holes in the plates B, through which holes, when the plates are laid on a bed of concrete, as above mentioned, they are grouted in with lime and sand, or other binding materials, to bed them firmly and solidly on the concrete, the said holes also serving to connect the concrete below the plates B with the concrete above said plates, so as to give a portion of the paving a direct bearing on the whole body of concrete, which renders the whole road solid and firm.

Upon the upper surfaces of the plates B are cast two longitudinal ribs, C C, to receive between them a packing, C', of one or two layers of cross-grained wood, upon which the rails rest.

At suitable distances apart—say at the middle of each plate B—there is a pair of clips or brackets, D, cast upon the plate B to receive the rail-chair, the ribs C being interrupted, and the surface of the bed-plate B sunk at this point to receive the base of the chair. The chairs (of which E is one) resemble ordinary railway-chairs, and are secured in their clips by wedge-shaped oak keys F at either side, the clips D being slightly askew to correspond to the inclined surfaces of the keys F, so that the other sides of the keys next the chair shall be always parallel to the rail. By driving the one or other key in more or less, the chair E may be readily moved in or out, as may be required, to adjust it to the gage of the line.

The rail is divided longitudinally to form the groove for the wheel-flanges to run in, and it is double-headed, so as to be reversible when worn. The rail is composed of two parts, G G', of channeled or U-shaped iron or steel, with cast-iron packing-blocks H H' between them to separate the two parts and admit the flanges of the wheels between them. The two

parts G G' of the rail are riveted together by rivets I passing through holes in the parts G G' and in the packing-blocks H. The ends of the two parts G G' do not come opposite one another; but the one projects about eighteen inches beyond the other, so that the two parts of the rail break joint, and the joints in each are "fished" by extra long packing-pieces introduced at these points. The two parts G G' of the rail are riveted together beforehand, and in laying the line the overlapping ends are united *in situ* by bolts and nuts.

The rails are fixed in the chairs, in the ordinary way, by keys N, driven in at either side. Pieces of hoop-iron, M, may be embedded in the concrete to tie the road together, if required.

L are the paving-blocks of the road at each side of the rail. There is a layer of concrete between the plates B and the blocks L for the latter to bed upon to prevent noise and damage to the plates B, the object being to give the rails and the adjacent paving an equally solid bearing on plates B. When the paving L has worn down below the level of the rails, and it is desired to lower the latter, the packing C' is removed and replaced by a thinner packing of the same kind.

The bed-plates B, when to be laid on hilly ground, may be cast with transverse ribs on the upper surface to keep the paving-blocks in position.

I am aware that a rail has been made of two sections, spaced apart by spacing-blocks placed at intervals therein, and bolted together, said

sections being so constructed as to overlap and break joint.

What I claim as my invention is—

1. The flanged continuous bed-plates B, arched in cross-section, having diagonal ribs, *b*, and provided with grouting-holes B², in combination with two layers of concrete, one above and the other below the plate, as shown and described.

2. The combination of the plates B, having ribs C and clips D, the wooden packing C', the chains E, and the keys F, as and for the purpose specified.

3. In the construction of a tramway, the cast-iron bed-plates, constructed of arched form in cross-section, with diagonal ribs and side flanges on the under side, and with holes for grouting in and for connecting the concrete above and below the plates, substantially as herein shown and described, said plates being jointed together at the ends in such a way as to form a continuous bearing-surface, and being of considerably greater width than the rails, so as to project beneath the paving at either side, in order to afford a firm bearing both for the rails and the adjacent paving, as specified.

The above specification of my invention signed by me this 11th day of December, 1878.

SILAS NICHOLLS.

Witnesses:

WM. CLARK,

Chancery Lane, London.

WM. G. E. SWINNOCH.