

No. 779,795.

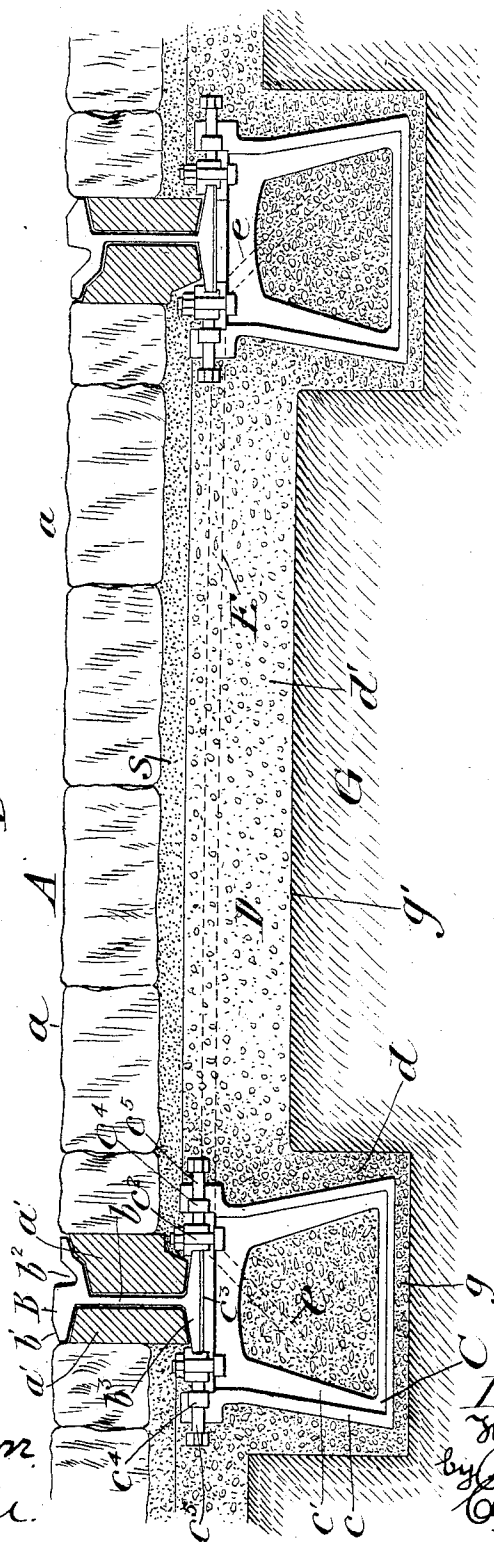
PATENTED JAN. 10, 1905.

H. B. NICHOLS.
METHOD OF CONCRETE TRACK CONSTRUCTION.

APPLICATION FILED OCT. 14, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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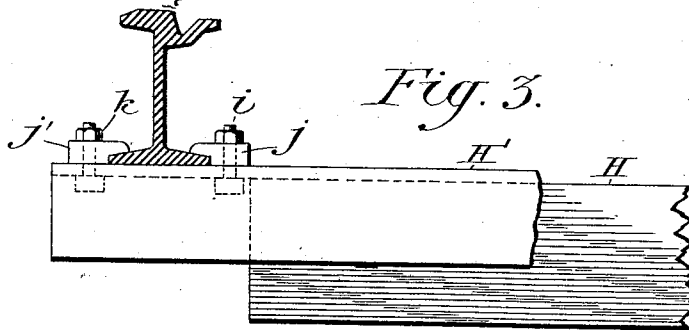
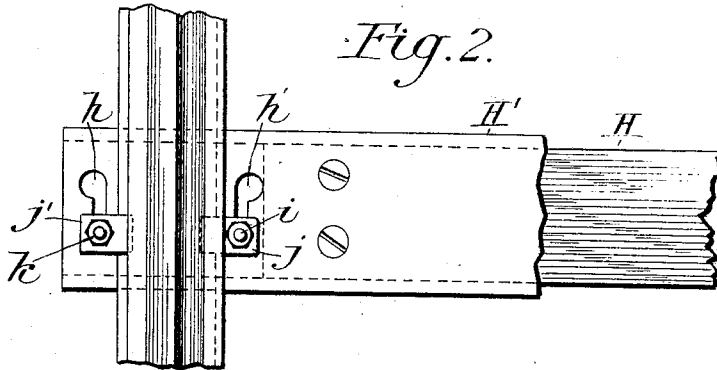
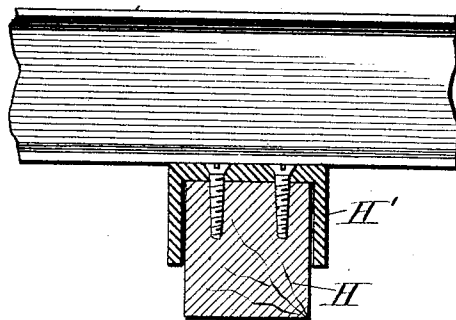


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY B. NICHOLS, OF PHILADELPHIA, PENNSYLVANIA.

METHOD OF CONCRETE TRACK CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 779,795, dated January 10, 1905.

Original application filed July 27, 1904, Serial No. 218,395. Divided and this application filed October 14, 1904. Serial No. 228,483.

To all whom it may concern:

Be it known that I, HENRY B. NICHOLS, a citizen of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Concrete Track Construction, of which the following is a specification.

My invention relates to methods of constructing railway road-beds and track structures.

It relates particularly to such structures as have the supporting means for the rails and the road-surfaces associated with or carried by masses of composition material—such as, concrete, artificial stone, cement, and the like—as set forth in my pending application, filed July 27, 1904, Serial No. 218,395, of which the present application is a division.

My invention has for its object the production of a structure of the class mentioned in which the rails are removably carried upon and supported by a mass or masses of composition, to which they are anchored by means which hold them down, but which provide for adjustment, the change of rails, and the easy repair of the supporting structure or the surface.

It also has for its object the development of a method of building the supporting structure and laying the rails which combines simplicity with certainty, which insures the compactness and homogeneity of the mass of composition employed, and that it shall present a sufficient resistance to tensile as well as to compression strains, as well as that it shall permit either old or new rails at first laying or any subsequent time to be accurately and readily adjusted.

I attain my objects in the following manner: I form my supporting structure, preferably, as a monolith or continuous unbroken mass of concrete or artificial stone. I may in some cases employ segregated masses of concrete supporting the rails at intervals after the manner of ties; but the principal embodiment of my invention is in a monolithic structure. This comprises two longitudinal masses extending along the sides of the track, each beneath one line of rails, these being

connected by a horizontal web of the same material, which serves the double purpose of connecting the side bodies and of making a solid foundation for the road-surface between the rails. Suitable reinforcing-rods are embedded in this horizontal body at intervals with their ends extending down and embedded in the masses of the side bodies. In each side body I provide at intervals metallic anchors or yokes, also embedded in the mass, and upon these I secure means for holding down and for adjusting the rails. An important feature of the invention resides in such adjustment of the parts as permits the rails to rest upon the concrete without bearing upon the yokes, although held down by the latter. I thus secure a solidity and uniformity of support, together with a certainty of anchorage, that has hitherto been and is now unattainable by any other means. In order to secure the independence of the support and the anchorages, I make use of certain temporary devices in laying the track, to which I shall refer in the description of my method.

In building the structure I have thus indicated I proceed as follows: I first excavate a broad continuous trench of only sufficient depth to accommodate temporary ties, upon which the rails are laid and roughly brought to gage and line. These ties may be supported by tamping the earth up under their middle portions or otherwise, leaving the ends free. They support the rails and yokes during construction and insure the bases of rails and tops of yokes being in the same horizontal plane with respect to each other in the finished work. Side trenches are then excavated (or they may be cut in the beginning) of proper depth to accommodate the concrete side bodies or stringer portions of the monolith. The yokes or anchors are then secured to and hung from the rails in these side trenches, shims or distance-pieces being interposed between the rails and yokes to maintain a proper distance relation. The concrete filling is then applied, the side trenches thereby being filled so as to embed all but the upper surface of the anchors or yokes in a solid mass, and the concrete is tamped solidly beneath the bases of the rails between the yokes.

The temporary ties are removed, the cross-trench filled, covering in reinforcing-rods lying across the homogeneous mass thus produced, with their ends bent down into the side
 5 bodies. Upon the concrete attaining a sufficient degree of hardness the shims are removed, leaving the rails a short distance above the upper surfaces of the yokes. Each yoke is provided with side adjustment-screws and
 10 lock-nuts and with vertical holding bolts or screws which take over the base-flange of the rail. By means of these side adjustment-screws the rails are now finally brought to accurate line and gage, and by means of the
 15 vertically-holding-down bolts the rails are drawn firmly down to the concrete stringer, thereby compensating for the shrinkage of the concrete in hardening. A layer of sand being placed over the concrete, the paving
 20 materials are then laid so as to fill up between and on each side of the rails. Properly-shaped blocks are preferably employed to fill in between the flanges of the rails themselves. I sometimes place additional concrete
 25 across the width of the excavation to a depth sufficient to embed the side adjustment-screws and nuts of holding-down bolts, in which case this additional concrete serves as a locking means for these screws and nuts to prevent
 30 their loosening and which additional concrete may readily be chipped away for access to the screws and nuts.

A great many points of novelty and of merit will be evident in this structure and in
 35 the method of laying it. As the monolithic bed has a long life, longer than the rails, the latter may be renewed or replaced by rails of a different pattern, if desired, and perfect adjustment secured thereafter. This has never
 40 been possible heretofore to my knowledge.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a cross-section of a road-bed constructed as I have indicated. Figs. 2, 3,
 45 and 4 are plan, side, and end views, respectively, of one of the temporary ties employed during construction of the same.

Referring to the drawings, A is the road-surface, paved with blocks *a* or in any other
 50 suitable manner, this surface paving resting on a layer of sand *s*. The rails B rest upon the solid body of concrete D, which extends across the horizontal surface *g'* of the earth G and into the side trenches *g*, cut longitudinally beneath the rails. This mass of concrete extends along the track continuously and at intervals has embedded in it the reinforcing-rods E, having their ends *e* bent down
 55 into the side trenches in order to gain a firm anchorage in the side bodies. At intervals in each side body a yoke C is embedded, consisting, preferably, of an open frame with flanged sides *c* and provided at its upper end with opposite lugs *c'*, within which work the
 60 adjusting-screws *c''*, these confining between

them the holding-blocks and vertical screws or bolts *c''*, the foot *b'* of the rail B being embraced between these holding-blocks and the rails being therefore adjustable to exact gage by manipulating the screws *c''*. 70

In setting the rails the horizontal trench is first excavated and surfaced, as at *g'*. Temporary cross-ties H H' are then supported transversely in this trench, the rails laid thereon and roughly brought to gage. I prefer for this purpose to use the form of cross-tie shown in Figs. 2, 3, and 4, which consists of a wooden body portion H, surmounted by the channel member H', suitably secured thereto and of a length greater than that of
 80 the body portion H. The overhanging ends thus produced facilitate the attachment and detachment of the rails, while the body portion H is adapted to the operation of surfacing the rails by tamping up under the tie. At
 85 each end of the tie the overhanging channel portion is perforated by the slotted holes *h* *h'*, through the enlarged portion of which the head of the bolt *i* freely slips to be engaged by the slotted portion of the hole for the purpose of clamping the rail and tie by means of the clips *j* *j'* and nuts *k* *k'*. Having secured the rails to the temporary ties, the side
 90 trenches *g* are dug, the yokes or anchors C hung upon the rails, and the concrete filled in. In this part of the process shims or distance-pieces *c''* are interposed between the rail-foot *b'* and the head of each yoke. In finishing these are removed, as well as the temporary
 95 ties, leaving the rails, as shown, raised from the yokes and adjustably held down thereby upon the concrete. 100

In the drawings a type of rail in common use is shown at B with a head *b'* and a high web *b* and a groove *b''*, having an inclined face. The concave sides of the rail-figure are filled out by means of the special blocks *a'*, which, it will be observed, do not take or transmit any strains and which clear the adjusting and holding screws or bolts. Any other form of
 110 rail or any new rail of the same form can be substituted for the rail shown without in any material degree disturbing or injuring the main body of the concrete bed. Moreover, the road-surface may be repaired as desired
 115 and the sand replaced from time to time without injury to the concrete.

It is to be understood that I do not limit myself to the non-essential steps herein described, as I am fully aware the same may be varied indefinitely without altering or departing from the scope of my general scheme. The distinguishing features of my invention are, first, the support of the rails with their yokes on them in a temporary manner (although the supports may be parts of the permanent structure) and building the permanent support, such as concrete or other suitable body, under or around the rails and yokes and building the latter into the body or mass, 130

so the rail is then held firmly down; second, having the rail supported in such a way that after the concrete or equivalent construction is complete the rail is supported thereon and the yokes serve merely to hold it down.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The method of laying railway-track which consists: first in forming a preliminary trench and laying temporary supports therein; second in supporting rails upon said temporary supports, and hanging the permanent securing devices upon the rails; third in building up beneath the rails a supporting mass and embedding the securing devices therein; fourth in removing the temporary supports, completely filling the trench and finally adjusting the rails, all substantially as described.

2. The method of railway-track construction which comprises the following steps: first supporting the rails upon a temporary structure; second hanging the permanent securing devices upon the rails with interposed distance-pieces; third building up beneath the rails a permanent support and embedding the permanent securing devices therein; fourth removing the temporary supporting structure and removing the distance-pieces, so as to leave the rails supported upon the permanent structure and held down by the permanent devices, all substantially as described.

3. The method of alining and surfacing railway-tracks comprising the following operations: first supporting the rails in rough alinement upon temporary ties and bringing same to an accurate surface by tamping beneath the ties; second building up beneath the rails a permanent support and embedding therein permanent securing devices having adjustable rail-securing members; third removing the temporary ties and bringing the rails to an accurate alinement by means of the adjustable rail-securing members of the permanent securing devices; all substantially as described.

4. The method of laying railway-track which consists in: first forming a trench and laying supports in proximity thereto; second placing rails on said supports and securing devices, separate from the supports, on the rails; third building beneath the rails a supporting mass and building the securing devices therein; fourth removing the weight of the rail from the original support to the supporting mass, filling, and adjusting the rails; all substantially as described.

5. The method of laying railway-track which consists in: first arranging supporting means to carry rails during construction approximately at their final level; second supporting the rails with their final securing devices upon them, said securing devices being separate means from the supporting means; third building up beneath the rails and the supporting means and building the securing devices in the structure so created; substantially as described.

6. The method of laying railway-track which consists in: first temporarily supporting the rails with their final securing devices carried by them, said securing devices being separate from the temporary supporting means; second building full supporting means under or about the rails and securing devices so that the latter then hold the rail in position; substantially as described.

7. The method of laying railway-track which consists in: first supporting the rails temporarily by means other than their permanent securing devices or yokes and with the latter hung upon them, and then building under or about them so that the rail will rest on the supporting structure so built and the yokes will be embedded or secured firmly therein, substantially as described.

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

HENRY B. NICHOLS.

Witnesses:

GEO. B. TAYLOR,
HERBERT G. CAMPTON.