No. 839,184. PATENTED DEC. 25, 1906.

H. B. NICHOLS & G. B. TAYLOR.

RAILWAY TRACK CONSTRUCTION.

APPLICATION FILED MAR. 2, 1906.

2 SHEETS—SHEET 1.

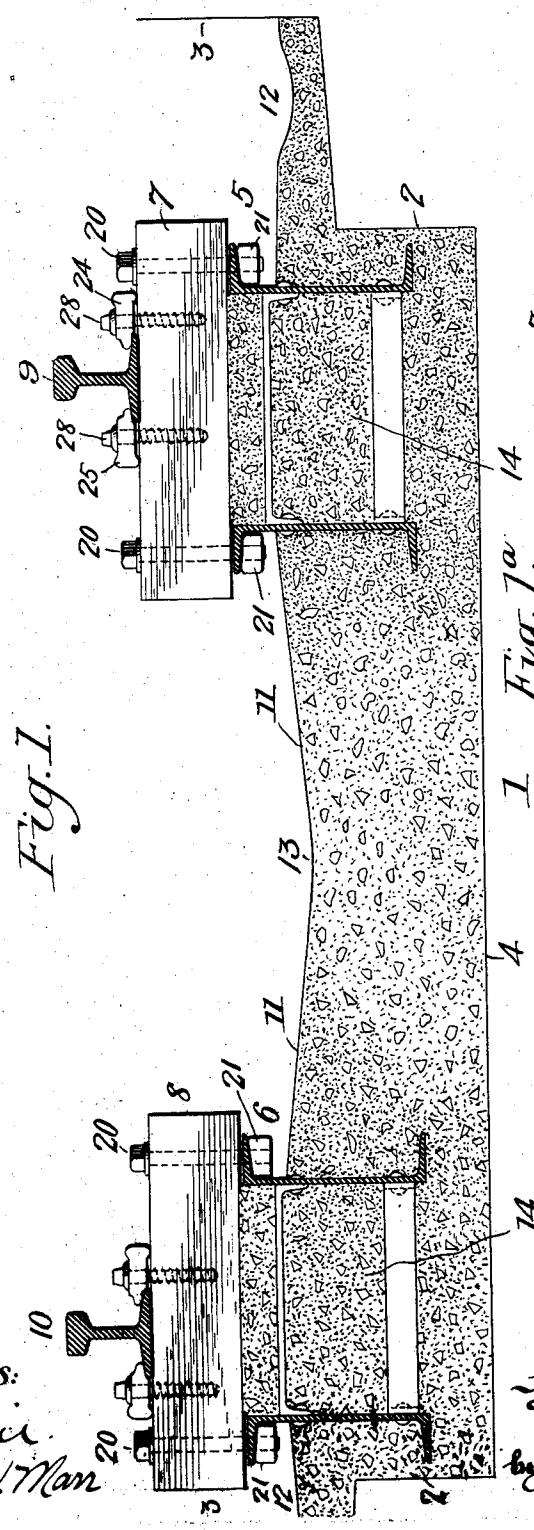


Fig. 1.

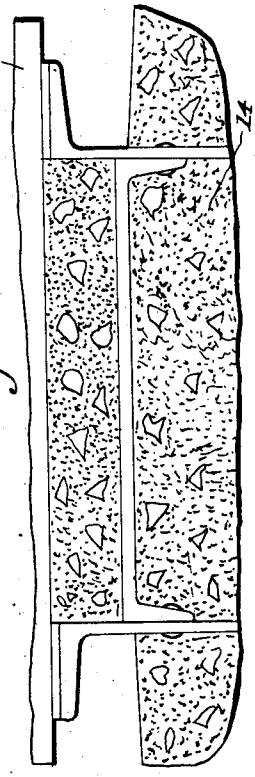


Fig. 1a.

Witnesses:
O. W. Edelin
James N. Marr

Inventors:
Henry B. Nichols
Geo. B. Taylor
by Edward B. Clement
Att.

No. 839,184. PATENTED DEC. 25, 1906.

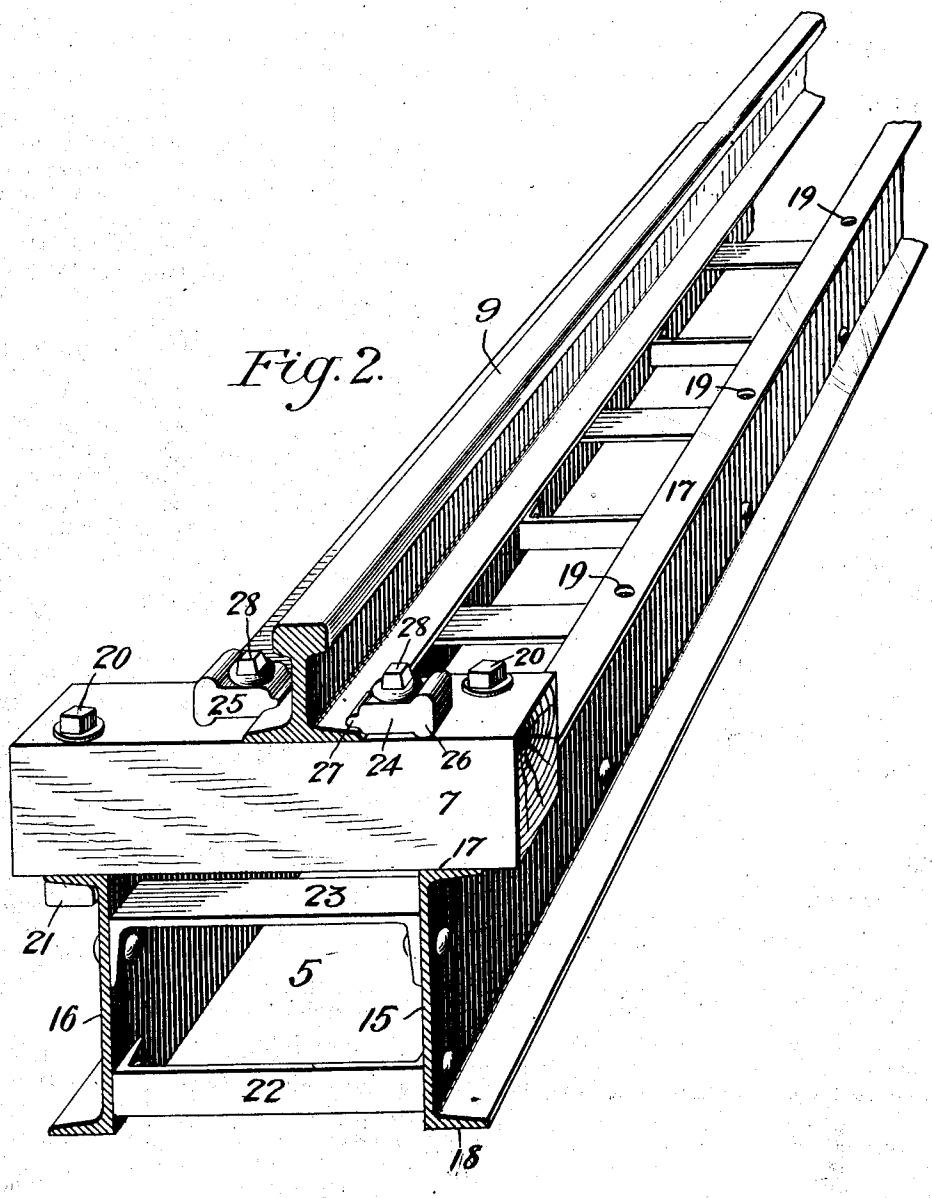
H. B. NICHOLS & G. B. TAYLOR.

RAILWAY TRACK CONSTRUCTION.

APPLICATION FILED MAR. 2, 1906.

2 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
O. W. Edelin.
James A. Marr

Inventors:
Henry B. Nichols
Geo. B. Taylor
by Edwin E. Clement
Atty.

UNITED STATES PATENT OFFICE.

HENRY B. NICHOLS AND GEORGE B. TAYLOR, OF PHILADELPHIA, PENNSYLVANIA.

RAILWAY-TRACK CONSTRUCTION.

No. 839,184. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed March 2, 1906. Serial No. 303,853.

To all whom it may concern:

Be it known that we, HENRY B. NICHOLS and GEORGE B. TAYLOR, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Improvement in Railway-Track Construction, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to railway road-beds, and has for its object the improvement thereof in the manner and particulars hereinafter set forth.

It has heretofore been proposed, especially in systems designed by the present applicants, to employ a monolithic rail-support with holding means for the rails, such that the weight of the latter and of the rolling load thereon will be taken directly by the monolith without the interposition of metal or other separated supports of fastening devices. Specifically stated, such construction involves the use of concrete laid in a solid and unbroken mass throughout the length of the rails with yokes or spikes or anchors of some sort embedded in the concrete and holding the rails down thereon. In certain places and under certain conditions it has been found desirable, not to say necessary, to add certain special features in order to gain all the advantages due to the monolithic support. Thus in subway or tunnel or other construction where there is no street traffic or general crossing traffic to be provided for some form of T-rail is usually employed, and it is found desirable to have this rail supported on ties of some sort. The problem then to be met is this: The weight of the rail must be communicated direct to the concrete, the ties must be supported so as to permit free ventilation and drainage, and the securing means must all be readily detachable and of such a nature as to permit of readjustment and regaging of the rails with ease and quickness when desired.

Our present solution of this problem and the means by which we attain the ends stated are shown in the accompanying drawings.

We employ what we may call "box-girders," composed of iron channels of standard size and shape, which are extended longitudinally of the rails and embedded as well as filled with the concrete, the upper edge of each girder throughout its length uprising above the main body of the concrete, so as to leave the flanges clear for the manipulation of bolts or other securing means. Instead of using cross-ties we employ a series of short separated ties for each rail, bolted at opposite ends to the two flanges of the box-girder and carrying the rail upon their upper surfaces. These ties do not rest upon the girder in any case, but are supported upon the body of concrete therein, whose upper surface protrudes above the level of the flange-faces by a small fraction of an inch. The rails are held down to these ties by means of lag-screws passing through lever-clamps of different lengths, the clamps on one side of the rail being shorter than those on the other by about one-fourth of an inch from centers, so that as the rail wears it may be readjusted to gage by merely changing the clamps.

In order to avoid weakening the ties and to secure a firm holding for both rail and girder, the lag-screws are set in staggered relation and the securing-bolts in reversed staggered relation, so that diagonals drawn through the screws and bolts will intersect.

The side channels on our box-girders are made solid, but they are cross-connected by a system of skeleton braces or ribs, which act as different distance-pieces and maintain the shape of the girder under stress, while at the same time permitting the body of the concrete within and without each girder to be substantially continuous.

Referring to the accompanying drawings, illustrating our invention, Figure 1 shows a cross-section through a railway road-bed involving our invention. Fig. 1ª is a fragmentary detail view of the box-girder, the rail-support, and the false gages. Fig. 2 shows one girder or rail-support, one tie, and a rail thereon removed from the concrete.

Referring to Fig. 1, the numeral 1 designates a foundation, such as the bed of the roadway in a channel or on a concrete bridge or viaduct. The material of this foundation is of no moment. It may indeed be simple earth, or broken stone, or what not. A trench 2 is formed in this foundation having a lateral extension 3 on each side and a level bottom 4. Along the opposite sides of the trench are laid the girders 5 and 6, supporting ties 7 and 8, and upon them the rails 9 and

10. The trench is filled with a body 11 of composition, such as concrete, in which the girders are embedded to within a short distance of their upper flanges. On the outside of each girder the concrete is sloped away somewhat and channeled out, as shown at 12, to form a gutter. Between the two girders another depression or gutter 13 is formed, both of these being for purposes of drainage. Inside each girder is a body of the composition, (marked 14,) which on account of the discontinuous character of the cross-webs is substantially continuous with the main body 11.

In constructing this road-bed and laying the rails we first excavate the trench, if the same has to be done. The girders are then placed into position, being laid upon a preliminary layer of concrete or temporarily blocked up, if desired. Concrete is then filled in and about them until they are solidly bent and anchored in the unyielding mass. The filling within the girders is continued clear up to the top and a little above, being gaged so as to allow for shrinkage. One way of doing this is to lay temporary distance-strips along the tops of the flanges and leveling off the concrete to the surface of these strips. Afterward when the strips are removed the concrete is found to project upon the flanges by just the thickness of the strips. The ties 7 and 8 are then placed in position and bolted down, the rails secured upon them, and after some adjustment the job is finished.

The nature and relation of the mechanical parts we employ appear best in Fig. 2, which is a perspective view. The box-girder 5 is shown formed of the standard channel shapes 15 and 16, having top and bottom flanges 17 and 18, respectively. The top flange 17 is perforated at intervals, as shown at 19, to receive the bolts 20 of the ties 7. The holes through which each tie receives these bolts are both bored at the same time by using a suitable jig or a boring-machine with double spindles, and this operation is done quite accurately, as well as the punching or drilling of the holes 19. Each bolt 20 receives a nut 21 below the top flange 17, and these nuts conform to the shape of the flange, being also squared, so they cannot turn.

The side channels of the girder 5 are connected by the cross members 22 and 23, the former being turned vertically and the latter horizontally as regards their flat sides. These are provided with end knees and are riveted to the channel-irons. By the use of standard sizes and shapes in these irons we are enabled to produce our structure at reduced cost and in better shape than if the materials had to be specially rolled. The vertical arrangement of the members 22 assists in preventing any longitudinal motion by offering broad faces to the concrete.

The rail 9 is laid upon the ties and secured by means of clips 24 and 25. Each of these is shaped with a wide heel 26, a reduced toe 27, and a perforation to receive the lag-screw 28. Each clip thus constitutes a lever, with the fulcrum at 26, the power applied at 28, and the weight brought to bear by the toe 27 upon the foot-flange of the rail 9. The clips 24 are purposely made about one-quarter of an inch longer than the clips 25, measuring from the center of the bolt-hole to the toe 27. The purpose of this is to be able to correct the gage when the gage-line has worn away. It can be brought back by merely exchanging clips, placing those on one side or the other, and vice versa, whereby the position of the rail will be slightly shifted. If desired, this operation can be repeated by reversing the rail itself.

Our construction thus described is particularly suitable for use on straight lines, although we have employed it upon curves. The principal difficulty experienced therein, however, is that of properly adjusting the ties so as to keep them radially disposed.

In our claims we shall designate the box-girders as "sleepers," since they perform some of the functions of sleepers. It is to be understood, however, that this is a term of definition and not of limitation.

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

1. In railway-track construction, a monolithic body, a hollow longitudinal support or sleeper embedded therein, and a rail supported on the monolithic body above the sleeper, substantially as described.

2. In railway-track construction, a monolithic body, a pair of hollow girders or molds partly embedded in said body, auxiliary longitudinal bodies of composition, uprising within said girders, and rails supported upon said auxiliary bodies, substantially as described.

3. In railway-track construction, a continuous body of composition, hollow girders embedded within said body, a filling homogeneous and integral with the main body and extending to the top of each girder, together with rails supported thereon, substantially as described.

4. In railway-track construction, a rail-support comprising a mold, a mass of composition filling and partly embedding said mold, and a rail-support upon said composition, substantially as described.

5. A railway-track construction and trench, a concrete filling for said trench, a pair of girders partly embedded in said concrete filling, a concrete filling for the girders, together with rails supported thereon, substantially as described.

6. In railway-track construction a rail-support comprising a pair of channel-irons

cross-bonded to form a girder, a concrete filling for said girder, means for supporting a rail upon said concrete filling, and holding means for the rail attached to the channel-irons, substantially as described.

7. In railway-track construction, a rail-support comprising a pair of channel-irons, cross-bonded, a concrete filling therefor, and short ties resting upon said concrete but secured to the channels, substantially as described.

8. In railway-track construction hollow girders formed of side irons, connected by cross-bonds, a concrete foundation partly embedding the same, a complete concrete filling for the same integral with the foundation, and cross-ties supported upon said concrete filling and secured to the side irons, and a rail secured upon the cross-ties, whereby all downward stresses are transmitted from the rail directly to the concrete foundation, while the side irons serve as secure anchors for the rail without receiving any weight, substantially as described.

9. In railway-track construction, means for securing rails comprising single-ended clips of unequal lengths, secured to the rail-support and engaging the rail on opposite sides, whereby the gaging may be adjusted by interchanging the clips, substantially as described.

10. The method of railway-track construction which consists in the following steps: (1) excavating a trench; (2) setting hollow supports or molds in said trench; (3) adjusting false gages on the molds; (4) filling said trench and the molds with composition in a plastic state to the top of the false gages; (5) removing the false gages and adjusting the rails when the composition has set; all substantially as described.

In testimony whereof we have affixed our signatures in presence of two witnesses.

HENRY B. NICHOLS.
GEORGE B. TAYLOR.

Witnesses:
C. B. VOYNOW,
W. F. KUNKEL.