H. P. HAMLIN.

REINFORCED CONCRETE TRESTLE.

APPLICATION FILED APR. 24, 1919.

1,341,270.

Patented May 25, 1920.

3 SHEETS—SHEET 1.

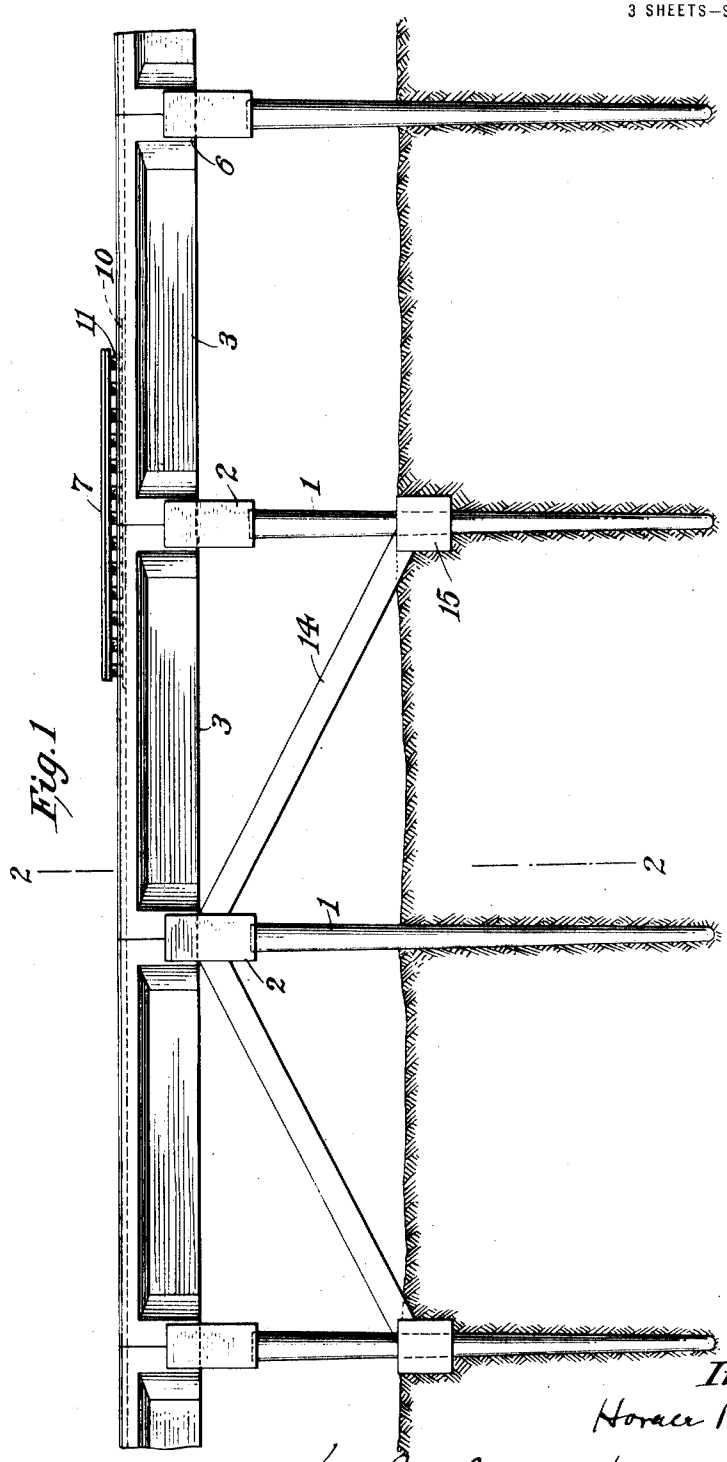


Fig. 1

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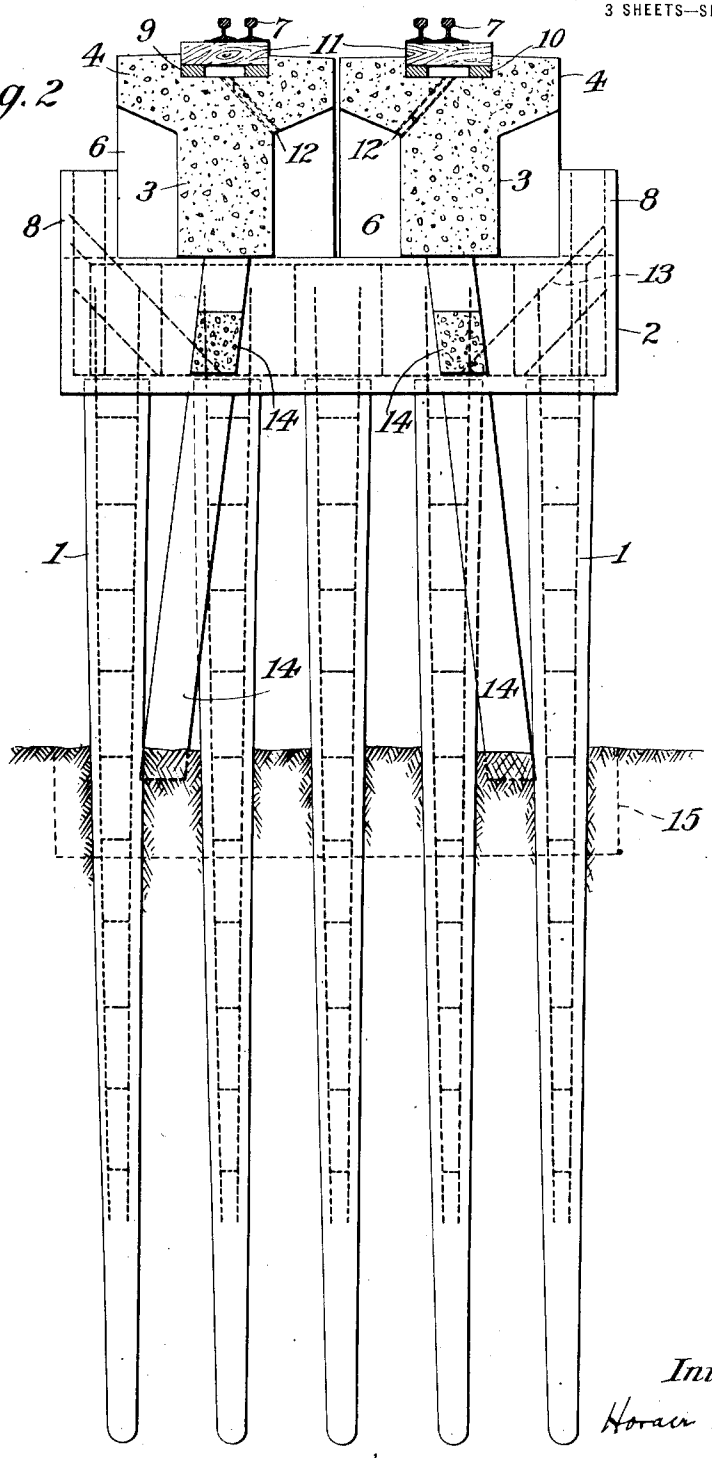
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3 SHEETS—SHEET 2.

Fig. 2



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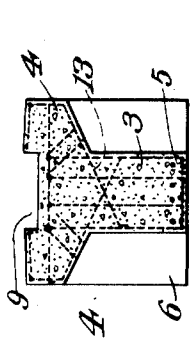


Fig. 4

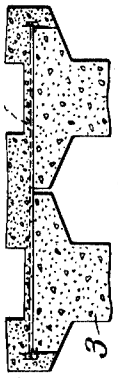


Fig. 7

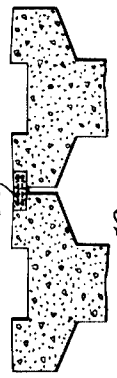


Fig. 8



Fig. 9

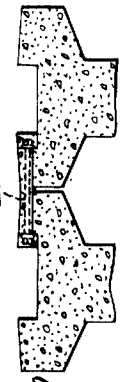


Fig. 10

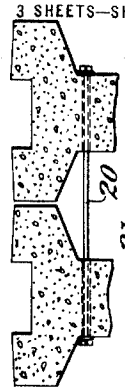


Fig. 11

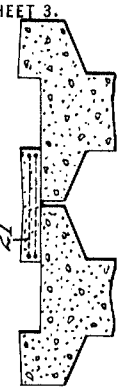


Fig. 12

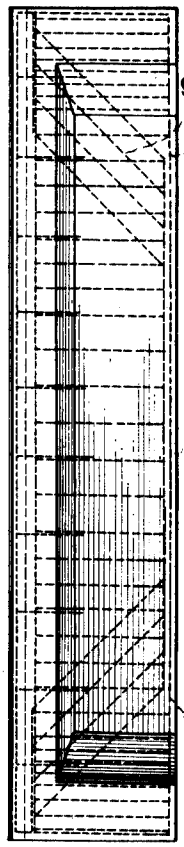


Fig. 3

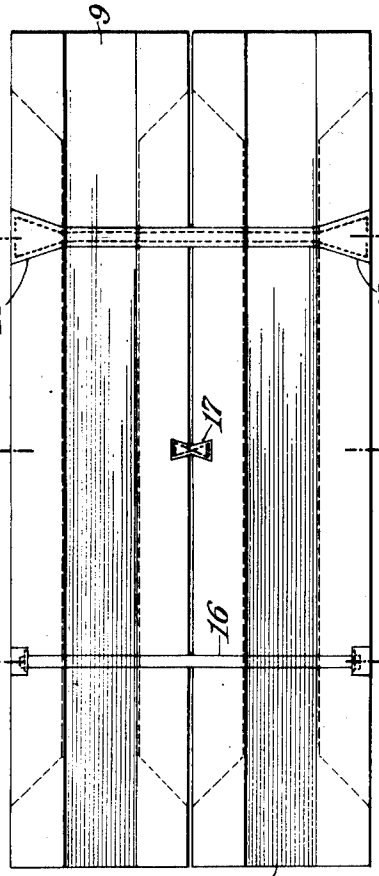


Fig. 5

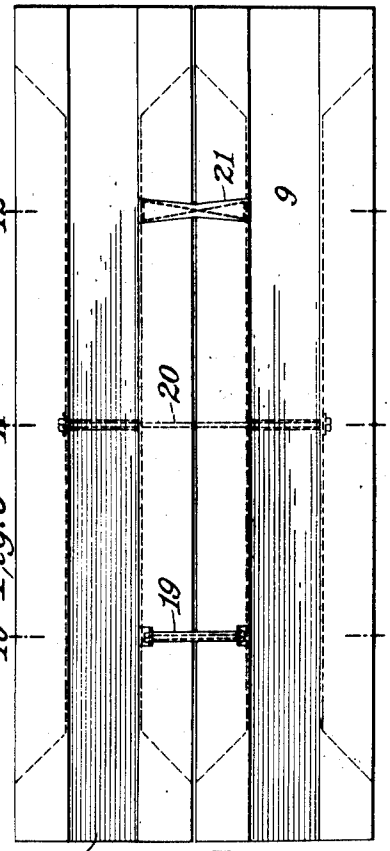


Fig. 6

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UNITED STATES PATENT OFFICE.

HORACE P. HAMLIN, OF MONTCLAIR, NEW JERSEY, ASSIGNOR TO RAYMOND CONCRETE PILE COMPANY, A CORPORATION OF NEW JERSEY.

REINFORCED-CONCRETE TRESTLE.

1,341,270. Specification of Letters Patent. Patented May 25, 1920.

Application filed April 24, 1919. Serial No. 292,272.

To all whom it may concern:

Be it known that I, HORACE P. HAMLIN, residing at Montclair, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Reinforced-Concrete Trestles, of which the following is a full, clear, and exact description.

The invention for which I now ask protection by Letters Patent, is an improvement in reinforced concrete trestles, primarily designed for and hereinafter to be described as adapted to support railroad tracks over marshes, depressions or bodies of water. The objects which I have had in view are to simplify the construction and reduce the cost of such structures, while securing greater strength, rigidity and durability.

The nature of the improvements which I have designed and embodied in the new structure renders unnecessary for its understanding any general statement, and I therefore refer to the accompanying drawings for such explanation of the invention as may be necessary.

Figure 1. is a view in side elevation of a section of my improved trestle.

Fig. 2 is a vertical cross section of the same in line 2—2 of Fig. 1.

Fig. 3 is an enlarged side view of an improved girder used in the construction, showing diagrammatically the reinforcements incorporated therewith.

Fig. 4 is a sectional view of the same part.

Figs. 5 and 6 are plan views; and Figs. 7 to 12 inclusive are sectional views illustrating various means for locking or securing together two parallel girders.

The reference numerals indicate corresponding parts of the structure.

In this art it is of primary importance to provide bents capable of sustaining the concentrated wheel loads of the heaviest motive power that passes over the road, and the aggregation of principal weights in the prime movers, which constitute the heaviest loads the road is called upon to sustain, usually lies within spaces of fifteen to twenty feet and practically never exceeds twenty-five feet. It is therefore economical to secure bents of sufficient strength to carry the entire maximum load. For this purpose, I employ at such distances apart as other considerations of good engineering practice may dictate, rows of concrete piles 1, 1 capped by cross girders 2 of the specific nature hereinafter set forth. These cross girders afford supports for longitudinal girders, and heretofore, in reinforced concrete structures of this nature, it has been customary to use pre-cast slabs of rectangular cross section for this purpose, which, in order to afford sufficient compression strength to carry the beam action, were made quite massive and required a relatively large amount of material.

To avoid this I mold the longitudinal girders in the form shown in Fig. 2. That is to say, I use a deep narrow girder 3 with a flaring cantaliver top 4, which provides a larger mass and area of concrete in the top where resistance to compression stresses is needed and a minimum amount of material at the bottom, where little if any more concrete is required than will embed the tension steel reinforcements 5, shown in Fig. 4. These members 3 are flattened and broadened where they rest in contact with the girders capping the rows of piles, as shown at 6 in Figs. 1 and 2, but otherwise they are formed in such manner as to require the minimum amount of material consistent with strength, notwithstanding they are or may be made deeper than the usual rectangular girders thereby making it possible to use a minimum amount of steel.

The following is the method in detail which I follow in building the trestle thus generally described. Having driven the rows of piles I embed their tops in masses of concrete 2, Fig. 2, and upon the tops of these masses which constitute the cross girder, I lay the abutting ends of the longitudinal girders 3. Preferably the tops and the widened ends of the latter, which rest upon the girders 2, together form a bed of sufficient width for a track 7. After these girders are laid, by the application of suitable molds, upwardly extending flanges 8 are cast along the ends of the girders 2 to form locking means to hold the girders 3 in place and secure them to their supports 2. It will be understood, of course, that these flanges 8 may be cast integrally with the girders 2, if so desired.

The upper and closely abutting tops 4 of the longitudinal girders form the flat even surface of the road bed. In each top

there is a longitudinal groove 9 in which on suitable stops or rests 10 are laid the creosoted beams 11, to which the rails are nailed. It is desirable that drainage passages 12 be provided from the grooves 9 as shown in Fig. 2.

It is essential that all concrete portions of the structure should be properly and effectually reinforced, and for purposes of illustration of the nature of the reinforcements which, under the circumstances, would be required, dotted or broken lines 13 are applied to Figs. 2 and 3 to show the location, direction and general nature of such reinforcements. This illustration gives to those skilled in the art all the information necessary on this point.

It may be and generally is necessary to provide longitudinal bracing for such a structure as this, and wherever this is required I employ reinforced concrete beams 14, the upper sides of which are embedded in the girders 2, when the latter are formed, and the lower ends of which are sunk or embedded in masses of concrete 15, deposited at the proper points.

It is furthermore necessary that the parallel girders 3 be securely held together and locked against any possible tendency against spreading. This may be done in many ways, examples of which are shown in Figs. 5 to 12 inclusive. For example a rod 16 may be used to span the two girders, and then covered with a top molded in place, or it may be run through holes or grooves in the girders below the bottom of the grooves 9.

Again reinforced blocks 17 with widened ends may be cast or inserted in correspondingly shaped recesses in the abutting edges as shown in Fig. 8. Or extended reinforced concrete tie rods 18 may be laid or cast in suitable recesses extending entirely across the upper part of the girders as shown in Fig. 9, and the latter then butt up.

Another way would be to lay short bolts 19 in grooves in the upper surface and fill in the grooves with grout. Still another way would be to use the bolts 20 passing through holes in the narrow lower portion 3 as shown in Fig. 11, or to lay or cast reinforced concrete slabs 21 in grooves extending only from the edge of one groove 9 to the edge of the groove in the adjacent girder, as shown in Fig. 12. Many other means might be used as is well understood.

It is manifest that the longer the span can be made from bent to bent, provided any one support is of sufficient strength to carry the maximum load of the prime movers, the greater the economy of construction. Hence any reduction in the weight of the girders connecting the bents, which permits of an increase of span without sacrifice of strength, makes to this end.

One feature of construction which has heretofore made this type of reinforced concrete trestle so expensive, is the tendency of engineers to place a ballast fill and cross ties on the top of the girders, thereby materially increasing the dead weight to be carried. By my plan of construction, however, the necessity for this is entirely obviated.

In practice I have found that the plan of construction herein described results in an economy of construction of from seventeen to twenty-five per cent. over anything that has heretofore been produced or practically used to my knowledge.

What I claim as my invention is:

1. In a reinforced concrete trestle the combination with piles and concrete caps thereon, of longitudinal girders having deep narrow body portions broadened and thickened at the points where they meet and extend over upon said transverse concrete caps, and flaring cantaliver tops which when fitted together form the flat surface of a roadway, and means for directly tying together the thus-formed girders.

2. The combination of elements named in claim 1 when the directly-tied-together flaring cantaliver tops form a flat surface of a width to accommodate a railway track and have longitudinal parallel grooves in their upper faces to receive the beams or timbers upon which the track rails are secured.

In testimony whereof I hereunto affix my signature.

HORACE P. HAMLIN.