Jan. 28, 1936. C. P. DISNEY 2,028,741

BRIDGE CONSTRUCTION

Filed Nov. 25, 1932

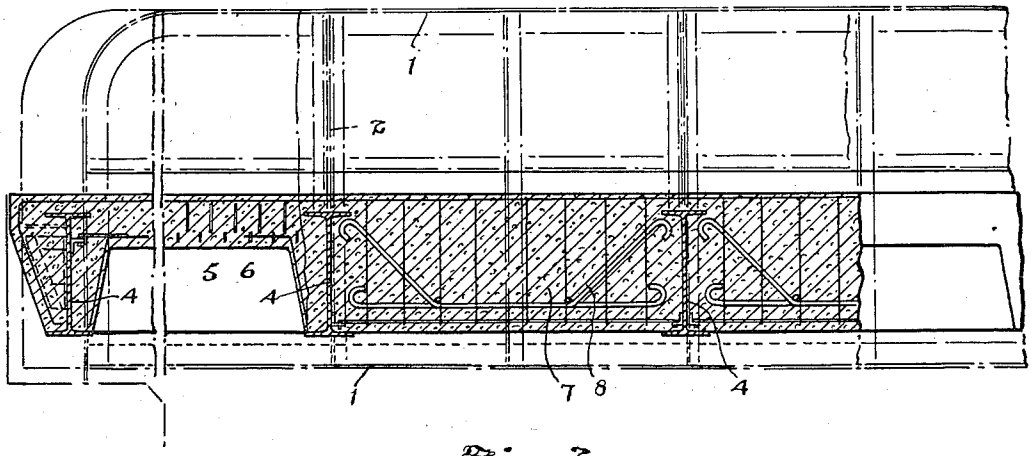


Fig. 2.

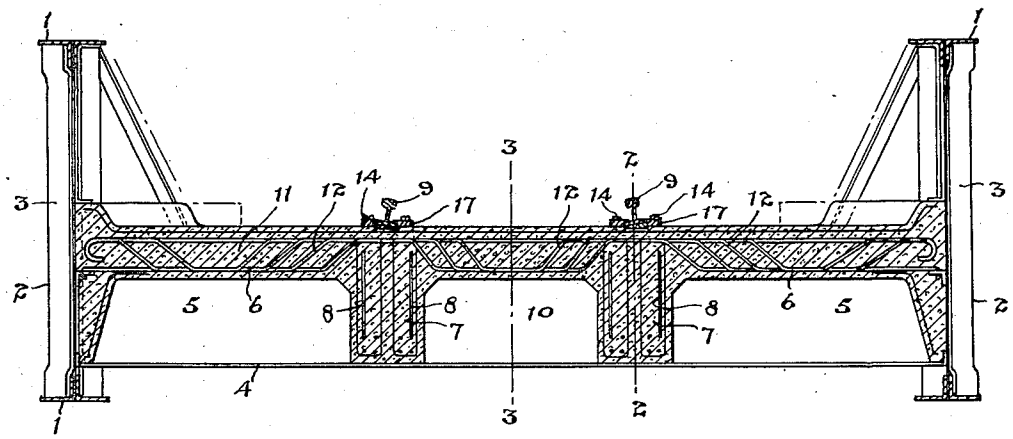


Fig. 1.

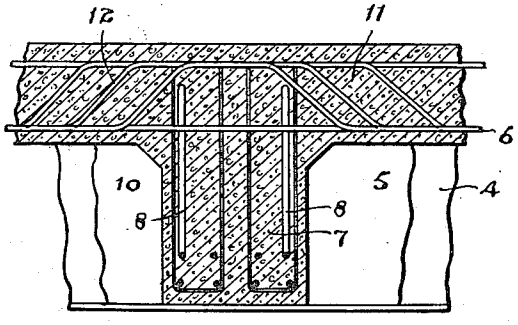


Fig. 3.

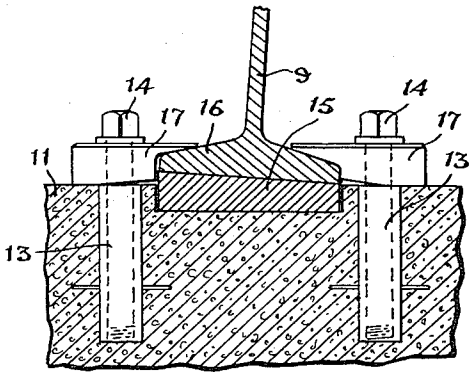


Fig. 4.

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BRIDGE CONSTRUCTION

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1 Claim. (Cl. 72—8)

The principal objects of the invention are, to devise a bridge construction which will very materially reduce the cost, thereby enabling the carrying out of grade separations which have otherwise been prohibitive.

A further and very important object is to minimize the depth of the overhead structure while maintaining the maximum of strength and efficiency, and a still further object is to provide a structure which will enable the production of bridges of an attractive design.

The principal features of the invention consist in the novel features of a transverse monolith structure of a bridge whereby longitudinally reinforced concrete beam sections are united in a unitary structure with the transverse steel beam sections and are arranged to support the load to which the longitudinal dimensions of the structure is submitted in service.

In the drawing, Figure 1 is a cross section through a bridge structure in accordance with this invention.

Figure 2 is a longitudinal sectional view of a bridge shown in Figure 1, being shown partly in section on the line 2—2 of Figure 1 with the end section being shown on the line 3—3 of Figure 1.

Figure 3 is an enlarged cross sectional view through one of the longitudinal beams at the intersection of one of the cross beams and off centre thereof.

Figure 4 is an enlarged sectional detail illustrating the manner of supporting the rails of a railroad upon the deck of the bridge.

In carrying this structure into effect the longitudinal side beams 1 are formed with a suitable metallic web 2 flanged at the top and bottom and carrying a concrete facing 3.

Secured to the metal webs 2 at regular intervals throughout their length are the metal cross beams 4, here shown of I-beam structure. Arranged on either side of the cores of the cross beams is a concrete beam structure 5, which is suitably reinforced with trussed tie rods 6.

Intermediate of the length of the cross beams 4 are arranged a plurality of longitudinal beam structures 7 which are of concrete cast in monolith structure with the concrete of the cross beams and are reinforced with the trussed tie rods 8 which interlock with the trussed tie rods of the cross beam structures.

The longitudinal beams are aligned from end to end of the bridge structure and are united with the cross beam structures and these longitudinal beams are arranged in a position to carry the longitudinal load which is carried by the bridge, either in the form of railway trains or guided vehicular traffic.

The construction of bridge herein described is particularly adaptable to railroad use and with the longitudinal beam arrangement extending over the cross beams the rails 9 are placed centrally over the beams 7 so that the load of a train passing over the bridge is distributed centrally over the longitudinal beams, which carry such load from end to end of the bridge between the reinforced monolith transverse beams 4.

A suitable monolithic deck slab 10 is supported between the longitudinal beams 7 and cross beams 4, being suitably reinforced to interlock with the reinforcements of the cross beams 4.

The surfaces of the several deck slabs and the top surfaces of the longitudinal beams 7 and cross beams 4 are covered with a concrete surfacing 11 which is reinforced with a suitable expanded metal or mesh reinforcement 12.

In a bridge construction where rails are to be used, rows of short vertical metal pipes 13 are bedded and these are threaded to receive the rail fastening bolts 14. Wood blocks 15 are imbedded in the concrete between the rows of pipe 13 and these project slightly above the concrete surface and are adapted to support the rail flange 16. Flanged blocks 17 are secured by the bolts 14 to hold the rail in place.

With a bridge constructed in the manner described no upper ballast or ties are used, the rails being fastened directly to the concrete deck. This reduces the depth of the deck structure to the minimum and where used in subway structures in municipalities it requires the street surface being lowered a minimum depth avoiding to a great extent interference with sewers and water and gas conduits.

Another and very important feature in this construction of bridge is the very material reduction of the dead weight of the floor system through the elimination of ballast and ties which add no structural strength to the deck system, other than to distribute the live load and still more important economy in cost and dead load is the elimination of the usual longitudinal steel stringers filled in between with concrete which also requires expensive waterproofing.

What I claim as my invention is:—

A railway bridge structure comprising a pair of longitudinal steel side girders having deep web portions, transverse steel beams rigidly secured to the webs of said girders with the underside adjacent the bottom of said girders, a pair of longitudinal reinforced concrete beams ex-

tending between said transverse steel beams in a common horizontal plane therewith with the reinforcing members thereof terminating closely adjacent the steel cross beams, said transverse steel beams having a casing of concrete forming an anchorage for the said ends of the reinforcing members of the longitudinal concrete beams, and a concrete deck slab integrally bonded with the concrete of the longitudinal beams and with the concrete casing of said transverse steel beams, said deck slab being mainly confined in a plane below the upper level of said longitudinal concrete beams and transverse steel beam, whereby the overall depth of the bridge structure between said side girders is reduced, said deck slab being flared laterally to meet the deep web of said main side girders in supporting contact therewith, said longitudinal concrete beams being massive and spaced a predetermined distance to form a solid bearing for standard-gauge load-carrying rails placed thereover.

CHARLES P. DISNEY.