June 28, 1966 A. R. CRIPE 3,257,764

BRIDGE CONSTRUCTION WITH GIRDER HAVING TRIANGULAR INTERMEDIATE AND RECTANGULAR END CROSS-SECTIONAL CONFIGURATIONS

Filed Sept. 27, 1962

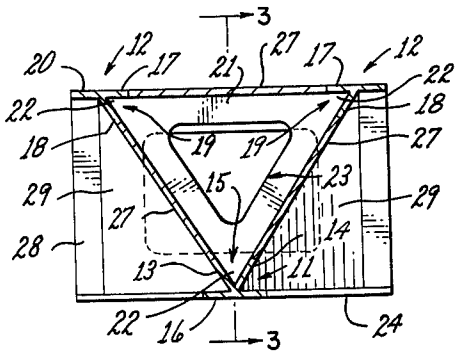


FIG.2

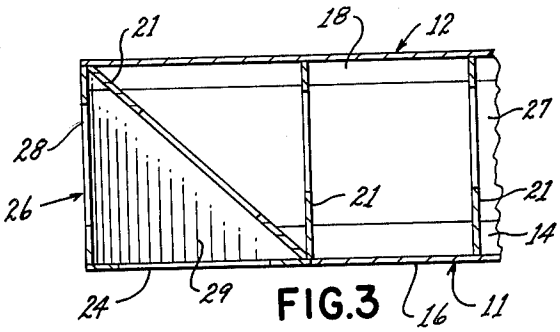


FIG.3

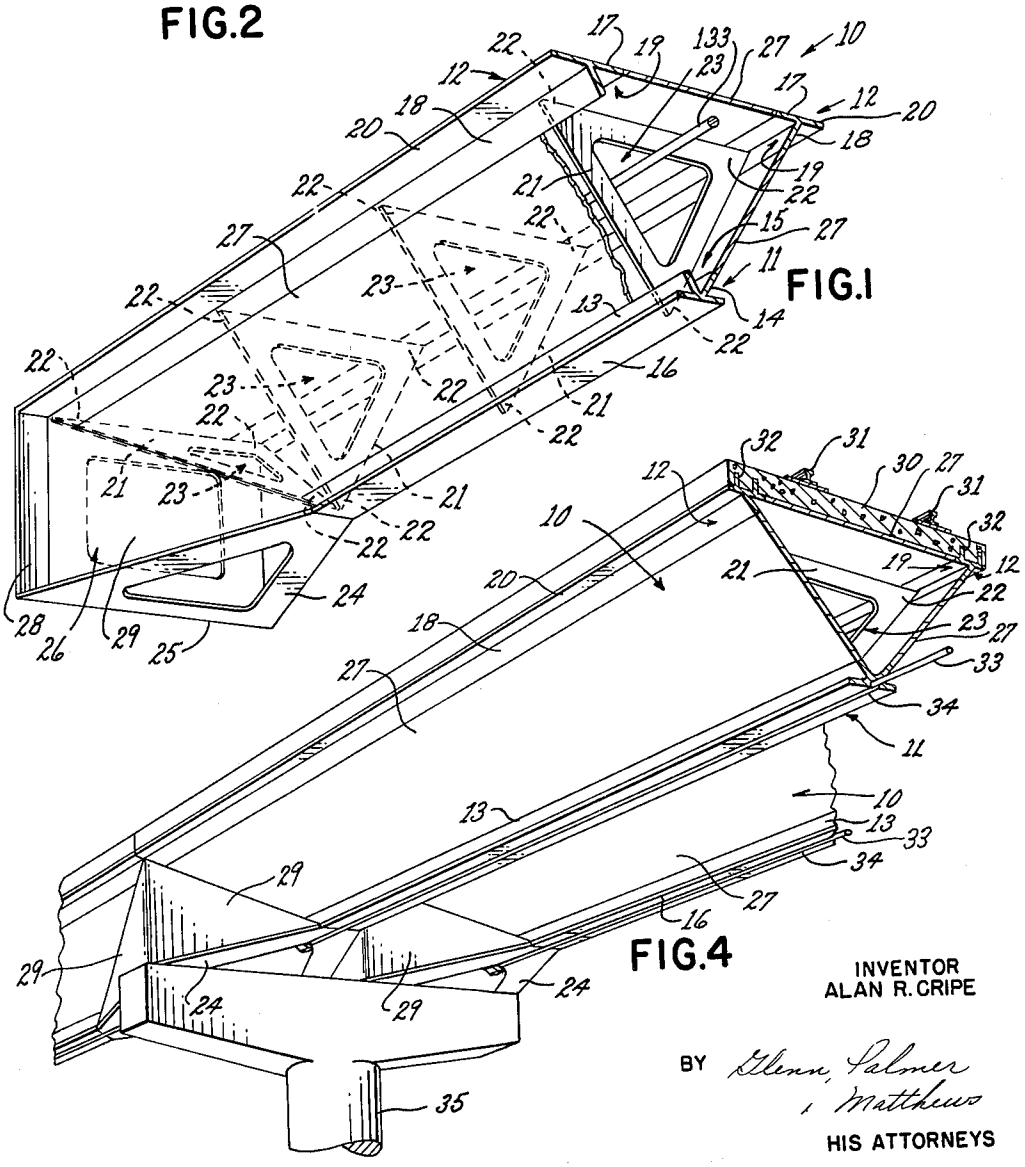


FIG.1

FIG.4

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United States Patent Office 3,257,764 Patented June 28, 1966



3,257,764

# BRIDGE CONSTRUCTION WITH GIRDER HAVING TRIANGULAR INTERMEDIATE AND RECTANGULAR END CROSS-SECTIONAL CONFIGURATIONS

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Filed Sept. 27, 1962, Ser. No. 226,559
15 Claims. (Cl. 52—252)

This invention relates to an improved supporting construction, such as a bridge construction or the like, as well as to improved parts for such a supporting construction or the like.

One embodiment of this invention includes a frame structure formed of any suitable material, such as steel, aluminum, structural plastic materials or the like, providing the structural strength for the bridge construction and adapted to span the space between vertically extending piers or the like. The frame structure is adapted to carry a slab of material, such as concrete or the like, on the top thereof to provide a road bed or the like, the slab of material being secured to the frame structure in a manner hereinafter described.

The frame structure of this invention is so constructed and arranged that the various parts thereof can be simply and inexpensively manufactured and assembled together while still providing the optimum structural strength for the bridge construction.

One feature of this invention is to provide a bridge structure which has an attractive appearance and a narrow bottom flange. In cases of conventional bridge construction for elevated railway application, the unsightliness of the structure is often cited and the many parts of the structure permit dirt to accumulate and birds to roost. By the design of this invention having a completely closed section, these factors can be eliminated and the design provides an extremely graceful appearance.

In order to stabilize such a triangular cross section at the piers, the lower flange is split into two separate flanges, and these splay apart to form a substantially rectangular cross section at the pier. This not only serves as an excellent torsional stiffener for the structure, but provides additional shear strength near the piers where it is most required.

Accordingly, it is an object of this invention to provide an improved supporting construction having one or more of the novel features of this invention set forth above or hereinafter shown or described.

Another object of this invention is to provide improved parts for such a supporting construction or the like.

Other objects, uses and advantages of this invention are apparent from a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a fragmentary perspective view of one embodiment of the supporting construction of this invention.

FIGURE 2 is an end cross-sectional view of the supporting construction illustrated in FIGURE 1.

FIGURE 3 is a fragmentary, cross-sectional view taken on line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary, perspective view illustrating another embodiment of this invention.

While the various features of this invention are hereinafter illustrated and described as being particularly adaptable for forming a bridge construction or the like, it is to be understood that the various features of this invention can be utilized singly or in any combination thereof to provide other constructions as desired.

Therefore, this invention is not to be limited to only the



embodiment illustrated in the drawings because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGURE 1, an improved supporting construction of this invention is generally indicated by the reference numeral 10 and comprises a first substantially V-shaped elongated member 11 and a pair of like, substantially V-shaped members 12, the V-shaped members 11 and 12 forming the corners of the supporting construction 10.

As illustrated in FIGURES 1 and 2, the flanged V-shaped member 11 is defined by a pair of legs 13 and 14 integrally joined at angles relative to each other and providing an outwardly facing V-shaped channel 15 therebetween. A flat flange 16 is medially joined to the legs 13 and 14 at the juncture thereof to provide rigidity to the V-shaped member 11.

Each V-shaped member 12 is defined by a pair of legs 17 and 18 integrally joined at angles relative to each other and providing an outwardly directed substantially V-shaped channel 19 therebetween. An outwardly directed flange 20 is integrally joined to the legs 17 and 18 of each V-shaped member 12 at the juncture thereof and is disposed in the same plane as the leg 17 to add rigidity to the V-shaped member 12.

While the V-shaped chord members 11 and 12 can be formed in any suitable manner and of any suitable material, the embodiments thereof illustrated in the drawings are formed by extruding metallic material, such as aluminum-containing metallic material or the like, by conventional extruding apparatus, whereby the particular configurations of the V-shaped chord members 11 and 12 can be simply and inexpensively formed.

In order to form the supporting construction 10, the V-shaped chord members 11 and 12 are secured together in spaced relation by a plurality of substantially triangular, metallic gussets or baffles 21 respectively having the apexes 22 thereof received in the channels 15 and 19 of the V-shaped chord members 11 and 12 and secured thereto by welding or the like, the diaphragms 21 being suitably spaced along the lengths of the V-shaped members 11 and 12 and being relieved at 23 to reduce the weight thereof without appreciably reducing the strength thereof and to provide interior access for electrical wires, cables, telephone lines, etc., 133 which can be protected from damage.

The V-shaped members 12 for each supporting construction 10 can be substantially longer than the V-shaped chord member 11 in the manner illustrated in FIGURE 1 whereby another triangular plate or gusset 24 is adapted to be secured to the opposed ends of the bottom flange 16 of the V-shaped chord member 11 and be disposed in the same plane as the flange 16 thereof whereby the ends 25 of the plates 24 terminate in the same plane as the ends of the V-shaped members 12 to provide an end diaphragm structure 26 for the supporting construction 10 in a manner hereinafter described.

The spaces between the adjacent legs of the adjacent V-shaped members 11 and 12 are filled by plate-like metallic members 27 secured to the adjacent legs 17, 17; 18, 13; and 18, 14 of the V-shaped members 11 and 12 while being disposed in the same plane therewith to provide a web girder and substantially triangular supporting construction throughout the major portion of the length thereof.

To complete each end structure 26 of the supporting construction 10, a diaphram is angularly disposed and respectively joined to the adjacent ends of the V-shaped chord members 11 and 12. An end plate member 28 is secured to the terminal ends of the V-shaped members 12 and the edge 25 of the end plate 24 while side members 29 are joined to the side plates 27, and plate member

28 and plate 24 to completely enclose the end structure 26.

If desired, the end plate members 28 can have openings passing therethrough in much the same manner as the diaphragms 21 and as illustrated in the drawings.

Therefore, it can be seen that supporting construction 10 can be formed in a relatively simple and relatively rapid manner to provide a supporting beam or the like adapted to have the end flanges 24 thereof rest on a suitably vertically supported pier or the like whereby the top of the supporting construction 10 provides a flat roadbed or the like.

For example, a slab of material 30, FIGURE 4, can be disposed on the top of the supporting construction 10 to provide a roadbed for railroad tracks 31 or the like, the slab of material 30 comprising concrete or the like and being secured to the supporting construction 10 in any suitable manner.

In particular, tie bolts and the like can be secured to the flanges 20 or legs 17, or both, of the V-shaped members 12 and project upwardly thereof to be embedded in slab of material 30 cast thereon to firmly hold the slab of material 30 in place and insure structural participation of the slab of material 30.

Alternately, upwardly directed projection means 32, FIGURE 4, can be integrally extruded with the V-shaped members 12 to provide concrete tying means throughout the entire lengths of the V-shaped members 12.

When the slab of material 30 is cast on top of each supporting construction 10, the supporting construction 10 can be pre-tensioned by a cable 33, FIGURE 4, inserted in the lower V-shaped member 11 of each supporting construction 10. The member 11 can be provided with an outwardly directed, cable-receiving channel 34, FIGURE 4, to receive the pre-tensioning cable 33 during the casting of the slab of material 30 on the top of same, the cable 33 having a terminal fitting and tensioning nut as illustrated in FIGURE 4.

Such concrete and metallic supporting constructions 10 can be utilized in the manner illustrated in FIGURE 4 by having the end flanges 24 thereof supported on and secured to vertically extending piers 35 to span the spaces therebetween to provide one or more roadbeds of a desired bridge construction or the like.

Therefore, it can be seen that this invention provides improved supporting constructions for forming bridge constructions or the like wherein the supporting construction comprises a combination of concrete and metal or other materials uniquely formed to provide a supporting construction which is relatively light in weight but is relatively strong and long lasting.

Further, this invention provides improved parts for such a supporting construction or the like.

While the form of the invention now preferred has been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. A bridge comprising a pair of spaced vertically disposed piers and a supporting construction disposed on and spanning said piers, said supporting construction comprising three V-shaped elongated members forming the intermediate cross-sectional corners of said construction, and a plurality of plate-like members extending between and secured to said V-shaped members, said supporting construction having an inverted substantially triangular intermediate cross-sectional configuration and having opposed ends provided with substantially rectangular cross-sectional configurations respectively resting on said piers, the inverted apex of said triangular configuration being interconnected to the lower corners of said rectangular end configurations by triangularly shaped plate means.

2. A bridge as set forth in claim 1 wherein a plurality of diaphragms are disposed between said V-shaped members.

3. A bridge comprising a pair of spaced vertically disposed piers and a supporting construction disposed on and spanning said piers, said supporting construction comprising three V-shaped elongated members forming the intermediate cross-sectional corners of said construction and each being defined by a pair of legs joined at angles relative to each other, and a plurality of plate-like members extending between and secured to said V-shaped members, each plate-like member being disposed in the same plane as the adjacent legs of the adjacent V-shaped members, said supporting construction having an inverted substantially triangular intermediate cross-sectional configuration and having opposed ends provided with substantially rectangular cross-sectional configurations respectively resting on said piers, the inverted apex of said triangular configuration being interconnected to the lower corners of said rectangular end configurations by triangularly shaped plate means.

4. A bridge comprising a pair of spaced vertically disposed piers and a supporting construction disposed on and spanning said piers, said supporting construction comprising three V-shaped elongated members forming the intermediate cross-sectional corners of said construction, a plurality of plate-like members extending between and secured to said V-shaped members, and a slab of material carried on top of two of said V-shaped members, said supporting construction having an inverted substantially triangular intermediate cross-sectional ocnfiguration and having opposed ends provided with substantially rectangular cross-sectional configurations respectively resting on said piers, the inverted apex of said triangular configuration being interconnected to the lower corners of said rectangular end configurations by triangularly shaped plate means.

5. A bridge as set forth in claim 4 wherein means are carried by said two V-shaped members and are embedded in said slab of material to hold said slab of material in place.

6. A bridge as set forth in claim 4 wherein said two V-shaped members have outwardly directed projections along the length thereof which are embedded in said slab of material to hold said slab of material in place.

7. A bridge comprising a pair of spaced vertically disposed piers and a supporting construction disposed on and spanning said piers, said supporting construction comprising three V-shaped elongated members forming the intermediate cross-sectional corners of said construction and each being defined by a pair of legs joined at angles relative to each other, two of said members each having an outwardly directed flange disposed in the same plane as one of the legs thereof, the remaining member having a flange medially joined to the legs thereof at the juncture of said legs, and a plurality of plate-like members extending between and secured to said V-shaped members, said supporting construction having an inverted substantially triangular intermediate cross-sectional configuration and having opposed ends provided with substantially rectangular cross-sectional configurations respectively resting on said piers, the inverted apex of said triangular configuration being interconnected to the lower corners of said rectangular end configurations by triangularly shaped plate means .

8. A bridge comprising a pair of spaced vertically disposed piers and a supporting construction disposed on and spanning said piers, said supporting construction comprising three V-shaped elongated members forming the intermediate cross-sectional corners of said construction and each being defined by a pair of legs joined at angles relative to each other, two of said members each having an outwardly directed flange disposed in the same plane as one of the legs thereof, and a plurality of plate-like members extending between and secured to said V-shaped members, said supporting construction having

an inverted substantially triangular intermediate cross-sectional configuration and having opposed ends provided with substantially rectangular cross-sectional configurations respectively resting on said piers, the inverted apex of said triangular configuration being interconnected to the lower corners of said rectangular end configurations by triangularly shaped plate means.

9. A bridge comprising a pair of spaced vertically disposed piers and a supporting construction disposed on and spanning said piers, said supporting construction comprising three V-shaped elongated members forming the intermediate cross-sectional corners of said construction and each being defined by a pair of first and second legs joined at angles relative to each other, two of said members each having an outwardly directed flange disposed in the same plane as said first leg thereof, a plurality of plate-like members extending between and secured to said V-shaped members, and a slab of material disposed on top of said flanges and said first legs of said two V-shaped members, said supporting construction having an inverted substantially triangular intermediate cross-sectional configuration and having opposed ends provided with substantially rectangular cross-sectional configurations respectively resting on said piers, the inverted apex of said triangular configuration being interconnected to the lower corners of said rectangular end configurations by triangularly shaped plate means.

10. A bridge as set forth in claim 9 wherein means are carried by said two V-shaped members and are embedded in said slab of material to hold the same in place.

11. A bridge as set forth in claim 9 wherein said two V-shaped members carry projections throughout the length thereof which are embedded in said slab of material to hold the same in place.

12. A bridge comprising a pair of spaced vertically disposed piers and a supporting construction disposed on and spanning said piers, said supporting construction comprising three V-shaped elongated members forming the intermediate cross-sectional corners of said construction and each being defined by a pair of legs joined at angles relative to each other, one of said members having a flange medially joined to the legs thereof at the juncture of said legs, and a plurality of plate-like members extending between and secured to said V-shaped members, said supporting construction having an inverted substantially triangular intermediate cross-sectional configuration and having opposed ends provided with substantially rectangular cross-sectional configurations respectively resting on said piers, the inverted apex of said triangular configuration being interconnected to the lower corners of said rectangular end configurations by triangularly shaped plate means.

13. A bridge as set forth in claim 12 wherein said flange has an outwardly facing channel throughout the length thereof.



14. A bridge comprising a pair of spaced vertically disposed piers and a supporting construction disposed on and spanning said piers, said supporting construction comprising three V-shaped elongated members forming the intermediate cross-sectional corners of said construction, a plurality of plate-like members extending between and secured to said V-shaped members, and a pair of end members secured to the opposed ends of said V-shaped members to define opposed ends of said supporting construction, said pair of vertically disposed piers carrying said construction at said end members thereof, said supporting construction having an inverted substantially triangular intermediate cross-sectional configuration and having said opposed ends provided with substantially rectangular cross-sectional configurations respectively resting on said piers, the inverted apex of said triangular configurations being interconnected to the lower corners of said rectangular end configurations by triangularly shaped plate means.

15. A bridge as set forth in claim 14 wherein a slab of material is carried on top of two of said V-shaped members.


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