Jan. 12, 1943. J. R. TENCH 2,307,869

METALLIC SUPPORTING STRUCTURE

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Fig. 1.

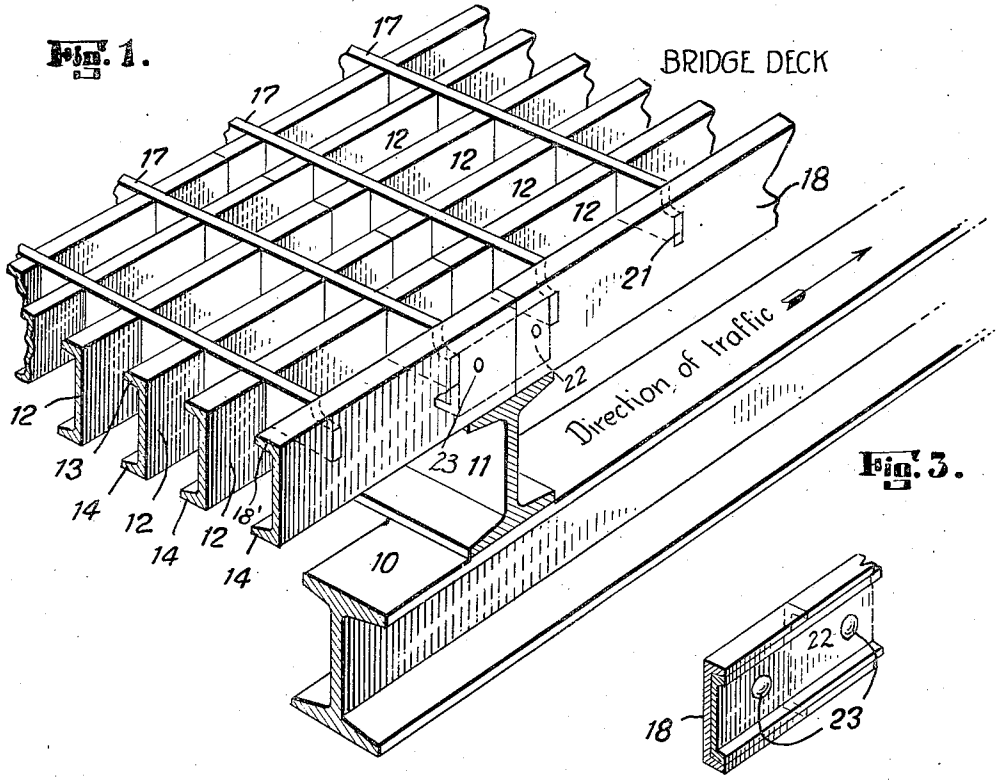


Fig. 3.

Fig. 2.

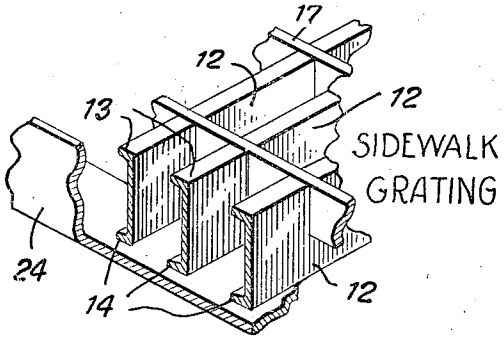
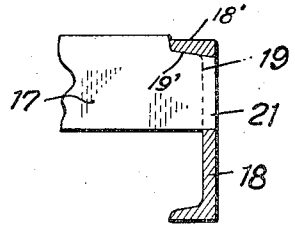


Fig. 4.



INVENTOR
John R. Tench
BY HIS ATTORNEYS
Townsend & Decker.

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Fig. 5.

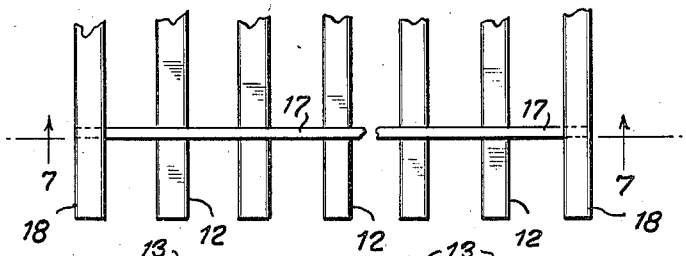


Fig. 6.

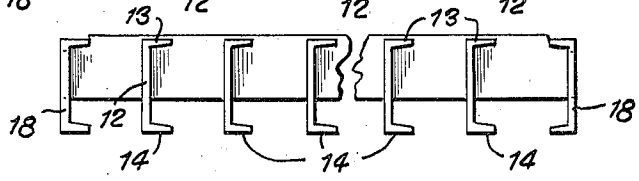


Fig. 7.

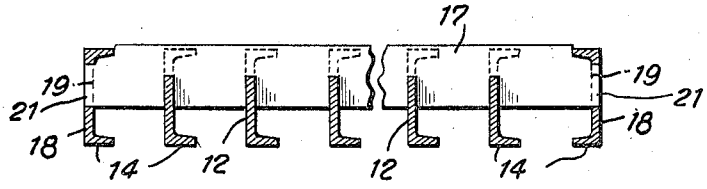


Fig. 8.

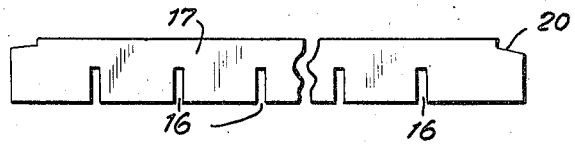
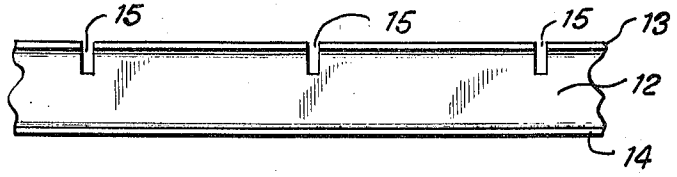


Fig. 9.



INVENTOR
John R. Tench
BY HIS ATTORNEYS,
Townsend & Decker

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UNITED STATES PATENT OFFICE

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METALLIC SUPPORTING STRUCTURE

John R. Tench, Tarrytown, N. Y., assignor to Structural Patents Corporation, New York, N. Y., a corporation of New Jersey

Application March 23, 1940, Serial No. 325,532

3 Claims. (Cl. 189—82)

The present invention has for its principal object the production of a metallic structure adapted for use as a bridge decking, grating, such, for instance, as a sidewalk grating or other analogous structures adapted to resist force applied under compression and to sustain heavy loads, the structure being such as will permit it to be manufactured with expedition and facility and with a minimum of expense.

A further object of the invention is the production of a structure of the character above described which, preferably, shall be made up of standard parts easily procurable thereby making unnecessary the special manufacture of parts with its attendant expense and the delays incident to the procuring of such parts.

A further object of the invention is the production of a metallic structure having the above characteristics which shall be of great strength and particularly resistant to buckling while at the same time retaining its stability.

To the above ends the invention consists in the improved metallic structure hereinafter more particularly described and then specified in the claims.

Referring in detail to the accompanying drawings showing a practical embodiment of the invention:

Fig. 1 is a fragmentary perspective view of the structure of the invention when employed as a bridge decking.

Fig. 2 is a similar view showing the invention employed as a sidewalk grating.

Fig. 3 is a perspective view showing the manner of connecting or joining sections of the structure together.

Fig. 4 is a side elevation of one of the ends of the crossing members showing its interconnection with one of the outermost bearing members of the structure.

Fig. 5 is a plan view of a portion of the structure.

Fig. 6 is an end elevation of Figure 5.

Fig. 7 is a horizontal section on the line 7—7 of Figure 5.

Fig. 8 is a front elevation of one of the crossing members, and

Fig. 9 is a front elevation of one of the bearing members.

According to the invention I employ channels as the bearing bars or members for the structure. These channel members are spaced from each other and are set on end and comprise webs or bodies having laterally extended upper and lower legs connected to or integral with the upper and lower ends respectively of the webs. These legs are of substantial width, the lower ones acting as supports for the structure and adding to its strength and stability, while the upper ones support crossing members which, in the preferred form of the invention, may be ordinary metal plates or bars of standard size and construction. The channel members as will be apparent from an inspection of the drawings may be conventionally rolled channels of standard construction which are easily procurable.

Crossing members other than plates or bars may be employed if so desired. For instance, at times, I may employ as the crossing members twisted rods or bars the employment of which I have found desirable in some cases in that they provide an anti-skid or anti-slip tread. I have also made provision for locking the interconnected bearing bars and crossing bars together by novel and simple means and have also provided novel means for joining sections of the structure together, it being obvious that it would not be practicable or feasible to form a complete structure having sufficient length to permit it to be used commercially.

In the accompanying drawings showing a practical embodiment of the invention:

Reference numeral 10 indicates longitudinal stringers forming, for instance, the conventional stringers employed in a bridge construction while 11 indicates the cross stringers which support a bridge decking and in this case the bridge decking of the invention. Said cross stringers are located at spaced intervals on said longitudinal stringers to connect them together. They are fastened to said longitudinal stringers in any desirable manner as by bolting, riveting or welding, etc. The webs or bodies of the channels forming the bearing members are indicated at 12 and these webs are provided at their ends with upper and lower laterally extending legs 13 and 14 respectively which may be and preferably are integral with the webs. Said channels are set on end in spaced relation to each other and are supported by the heads of the cross stringers 11 to which some or all of the lower legs 14 of the bearing members may be fastened in any desirable manner. It will be noted that the upper sides of the lower legs 14 are inclined downwardly from the vertical so that they resist any tendency to retain snow, rain, dust, dirt or any other foreign matter thereon.

The upper legs 13 of the channels are slotted as at 15 (see Fig. 9) and these slots extend downwardly within the webs 12 and are received by slots 16 (see Fig. 8) in transverse crossing mem-

bers or bars 17 which crossing members may be plates of standard size and constructions as is mentioned hereinbefore. These slots permit the bearing members and crossing members to be conveniently interlocked together as will be obvious. The members may be held from disengagement one with the other in transit by a tight frictional engagement.

The slots described are of such depth as will permit the upper ends of the crossing members 17 to lie in a horizontal plane slightly above the plane of the upper ends of the bearing bars or members as shown. This, manifestly, provides a convenient anti-skid or anti-slip construction which is desirable.

The outermost of the bearing bars or members of the structure, which I have indicated generally at 18, (see Fig. 4) are positioned so that their legs 18' will extend inwardly of the structure although the others of said bearing bars may extend generally in the same direction. Said outermost members are provided with slots 19 in alignment with the crossing members 17. The ends of the crossing members 17 are cut away at an angle, as at 19', to form receiving recesses and to provide tongues 21 to engage and snugly interfit within the slots 19 in the outer bearing members to which they may be welded or riveted. The recesses 19' so formed by the said cut away portions are adapted to receive the inwardly extending legs 13' at the upper ends of the outermost bearing bars or members 18 and conform to the inclination or other configuration of the undersides of said legs which fit snugly therein. By this construction the legs 18' are arranged to overlie and protect the tongues and brace them against downward pressures or any stresses or strains tending to cause relative upward and downward movements of the crossing and bearing members. The recesses 19' also provide for the reception of the legs 18' so that such legs may lie in the same horizontal plane as the legs 13 of the inner bearing members and allow the upper edges of the body portions of the crossing members to project above the horizontal plane of the legs 13, 18' to provide anti-skid surfaces. Furthermore, and as is obvious, by means of this construction, it is unnecessary in many cases to secure, weld or otherwise fasten the lower legs 14 of the intermediate bearing bars to the cross stringers 11 or to other supports, the fastening thereto, or to some of them, of the lower legs of the outermost channels 18 only being necessary. When said outermost channels are so fastened, it is manifest that it is not possible to disengage the intermediate channels from said cross stringers or other supports or to disengage the transverse bars 17 from the slots 15 in said intermediate channels. This eliminates a number of fastening devices or welds which otherwise might be found necessary.

The completed metallic structure for use as a bridge decking or sidewalk grating is preferably made of a plurality of sections or units of the character described. These units may be conveniently connected together by placing them end to end and then joining adjacent ends of the units by means of connecting channels 22 of a size and configuration permitting them to interfit snugly with the outermost channels 18 of the units. (See Fig. 3.) The channels 22 are then connected to the adjacent outermost channels 18 by means of bolts or rivets 23 passing through the webs of the channels 18 and 22.

In Fig. 2 I have shown the invention as applied to a sidewalk grating. The metallic structure per se is similar to that previously described but the supports therefor consist of angle bars 24 and horizontal flanges of which support the bearing bars and some or all of the lower legs 14 of which are connected to said horizontal flanges in any desirable manner.

The metallic structure hereinbefore described has such strength and stability and the bearing members thereof are so resistant to buckling, it will be found that a much less number of bearing bars are necessary than are necessary in analogous structures of which I have knowledge thereby decreasing the weight of the structure and also decreasing the expense of necessary material. It will also be found that in the case of bridge deckings a less number of cross stringers 11 will be necessary when the present invention is employed than have been found necessary in previous bridge constructions to thus appreciably decrease the expense of such constructions.

The invention claimed is:

1. A metallic structure comprising spaced inner bearing members set on end and having laterally extending legs at their upper ends arranged in the same horizontal plane with the upper portion of each of said inner bearing members including its leg being provided with a slot therein, a plurality of spaced crossing members provided with slots extending within the slots in the inner bearing members to detachably connect the bearing members and crossing members together, said crossing members having their upper edges extending above the plane of said legs and being provided with tongues at their ends disposed below the plane of their upper edges, and outer bearing members provided with slots in the bodies thereof receiving said tongues at the ends of the crossing members to retain them in inter-engagement with the bearing members and having inwardly extending lateral legs arranged in the same plane as the legs of the inner bearing members and overhanging said tongues.

2. A metallic grating structure comprising spaced inner and outer bearing members disposed in parallel relation and set on end, each inner bearing member being provided at its upper end with a laterally extending leg and having a vertical slot opening at its upper end through said leg, and each outer member being provided with a laterally extending leg directed inwardly therefrom toward the adjacent inner leg and having a keeper slot formed therein below said leg, the legs of all of said members being arranged in the same horizontal plane, and spaced parallel crossing members seated in said slots in the inner bearing members and having their upper edges cut away at their ends to provide tongues engaging the slots in the outer bearing members and recesses above said tongues receiving the inwardly directed legs of the outer bearing members whereby the tongues are overlapped by said legs of the outer bearing members, the arrangement of the slots, tongues and recesses being such as to support the crossing members with the upper edges of their body portions projecting above the horizontal plane of the legs of said inner and outer bearing members to form anti-skid projections.

3. A metallic grating structure comprising spaced inner and outer bearing members disposed in parallel relation and set on end, each inner bearing member being provided at its upper end with a laterally extending leg integral therewith and having a vertical slot opening at its upper

end through said leg, and each outer member being provided with a laterally extending leg integral therewith and directed inwardly therefrom toward the adjacent inner leg and having a keeper slot formed in the body thereof below its leg, the legs of all of said members being arranged in the same horizontal plane, and spaced parallel crossing members seated in said slots in the inner bearing members and having their upper edges cut away at their ends to provide tongues engaging within and interfitting with the keeper slots in the outer bearing members and recesses above said tongues receiving the inwardly directed legs of the outer bearing members whereby said tongues are overlapped by said legs of said outer bearing members, the arrangement of the slots, tongues and recesses being such as to support the crossing members and lock them to said outer bearing members and prevent their disengagement from said inner bearing members.

JOHN R. TENCH.