

H. M. PRIEST
GRATING STRUCTURE

2 Sheets-Sheet 1

FIG. 1.

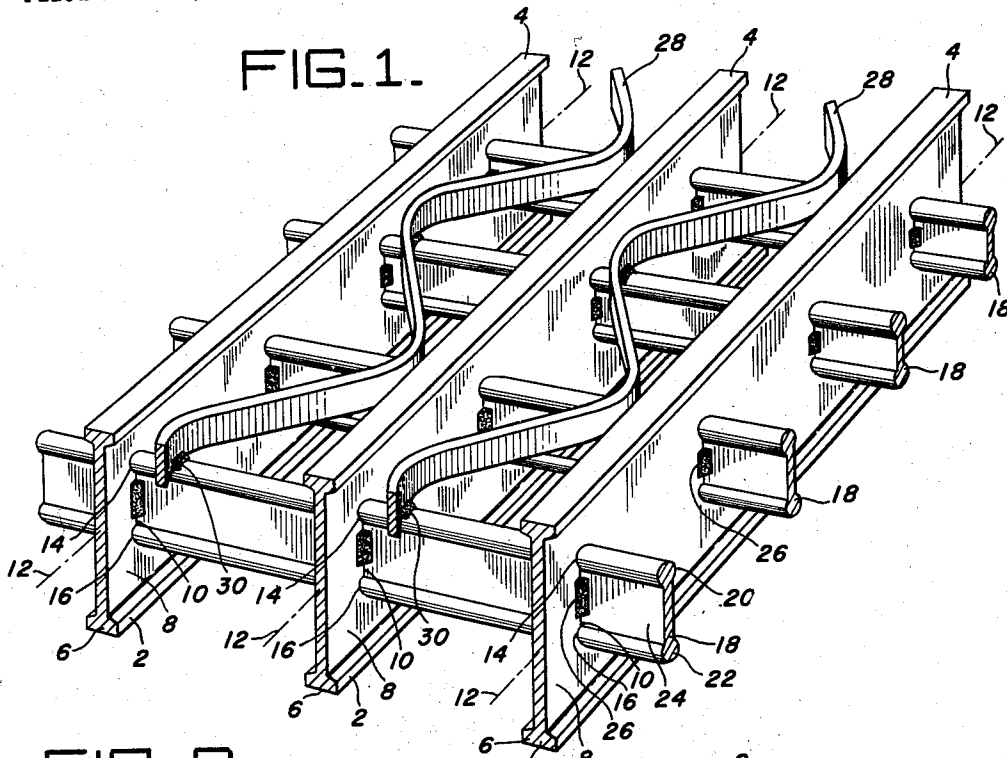


FIG. 2.

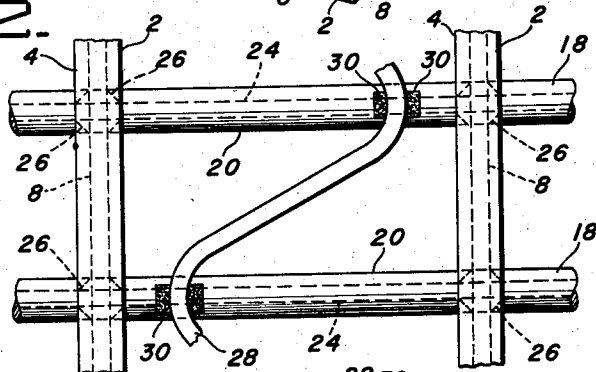
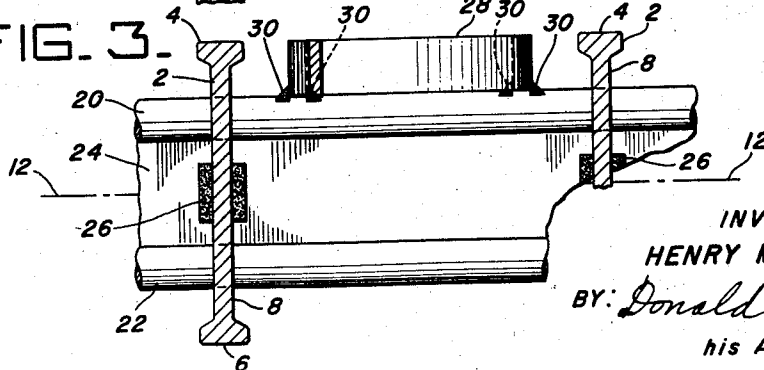


FIG. 3.



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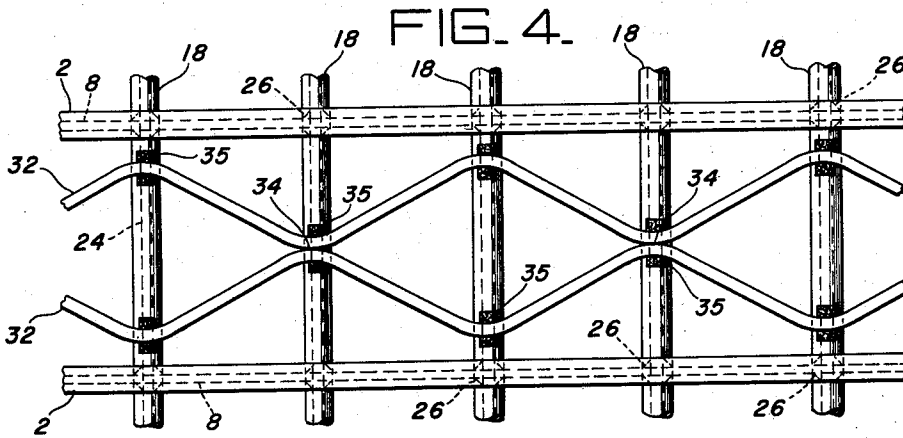
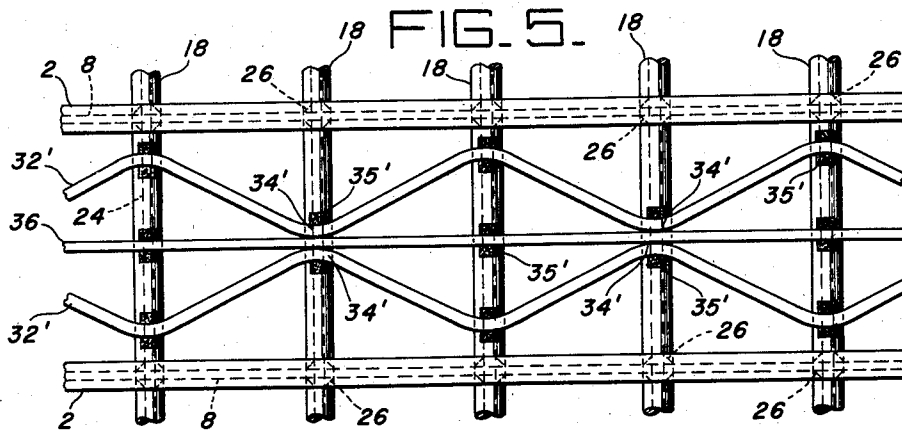
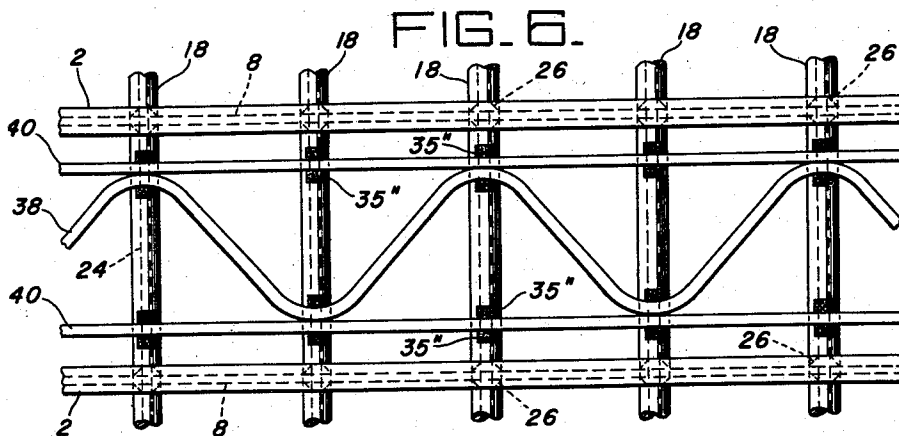
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H. M. PRIEST
GRATING STRUCTURE

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2 Sheets-Sheet 2



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2,846,931

GRATING STRUCTURE

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Application November 12, 1953, Serial No. 391,518

2 Claims. (Cl. 94—30)

This invention relates to a grating structure and more particularly to an open floor metallic grating used on bridges and the like. Such grating structures are well known and are of many types. In most instances the grating consists of longitudinal beams connected by cross bars. In some instances additional bars are used in the construction. The connections between the longitudinal beams and cross bars are generally such that part of one or both members must be cut out and in most instances the cut out portion provides a point of very high stress. The most common way of connecting the members is by welding and the welds are generally provided at points of relatively high stress so that there is danger of failure thereof.

It is an object of my invention to provide a relatively inexpensive grating structure in which stress concentrations are minimized at the welds and at the connections between the parts of the grating.

This and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a perspective view of one form of my improved grating structure;

Figure 2 is a partial plan view of the grating of Figure 1;

Figure 3 is a sectional elevation taken between two of the longitudinal beams of Figure 2;

Figure 4 is a plan view of a second form of my invention;

Figure 5 is a view, similar to Figure 4, showing another embodiment of my invention; and

Figure 6 is a view, similar to Figure 4, showing still another embodiment of my invention.

Referring more particularly to Figures 1 to 3 of the drawings, the reference numeral 2 indicates the longitudinal beams of the grating structure. As shown, the beam consists of a top flange 4, a bottom flange 6 and a vertical web 8 connecting the flanges. It will be understood that the construction of the longitudinal beam 2 may vary in various details from that shown, but in each instance there will be a vertical web 8. The beams 2 are adapted to be supported on any desired structure such as the girders of a bridge. The beams 2 are spaced apart in parallel relationship. Each of the beams has a plurality of dumbbell shaped openings 10 therethrough arranged substantially symmetrical around the horizontal neutral axis 12—12 of the beam with the bulbous portions 14 and 16 of the openings being arranged in vertical alignment. The openings in each beam are aligned with the corresponding openings in the other beams and a dumbbell shaped cross bar 18 is passed through each set of the aligned openings. Each of the cross bars 18 has an upper bulbous portion 20 and a lower bulbous portion 22 connected by a vertical web 24. Vertical welds 26 along the webs 8 and 24 connect the cross bars 18 to the beams 2. While a weld is shown at each corner of each intersection the number of welds may be

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varied as desired. It will be seen that the welds are provided substantially on the neutral axis of the beams 2 and cross bars 18 so that they are at the points of minimum stress. The dumbbell shape of the bars 18 places metal at the top and bottom of the bars to act as flanges and at the same time the round shape of the holes in the longitudinal beams minimizes stress concentration. The dumbbell shape of the cross bars may be modified in some instances, such as by forming a top flat portion on the top bulbous portion, but in all cases the cross bars will have a vertical web and a bulbous top flange. An intermediate serpentine bar 28 is provided between each pair of longitudinal beams and rests on and is fastened to the tops of the cross bars by means of welds 30. It will be seen that the connection between the cross bars and serpentine bars is such that there are no sharp cut out corners and the weld is at the point of minimum stress. The top of the bars 28 is shown as substantially flush with the top of the longitudinal beams 2 so as to provide a wearing or bearing surface for traffic passing thereover, but the top of the bars 28 could be slightly above or below the top of the beams 2 without detracting from the advantages of the invention. While the bars 28 are shown as connected only to the cross bars 18 they may extend to the adjacent longitudinal beams and be fastened thereto if desired.

In Figures 4, 5 and 6 the construction and arrangement of the longitudinal beams 2 and the cross bars 18 are the same as in the first embodiment of my invention, but the arrangement of the intermediate bars varies. In Figure 4 two opposed similar serpentine bars 32 are used instead of a single serpentine bar, the arrangement being such that the apexes of the bars are opposite each other. The bars 32 may be welded together at their apexes 34 after which they are placed in position on the assembled longitudinal and cross bars and welded to the cross bars 18 by welds 35. The arrangement of the intermediate bars 32' in Figure 5 is the same as in Figure 4 except that a straight bar 36 is provided between the bars 32'. The bars 32' may be welded to the bar 36 at their apexes 34' and then placed in final position in the floor grating after the longitudinal beams and cross bars have been assembled. Welds 35' connect the bars 32' and 36 to the cross bars 18. In Figure 6 a single serpentine bar 38 is arranged between two longitudinal bars 40 to which they are welded in any suitable manner. The bars 38 and 40 may be separately assembled and placed in final position after the longitudinal beams and dumbbell shaped cross bars have been assembled. Welds 35'' connect the bars 38 and 40 to the cross bars 18.

While several embodiments of my invention have been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. A grating structure comprising a plurality of spaced apart parallel longitudinal beams each having a vertical web, each of said beams having a plurality of openings therethrough, each of said openings including a bulbous top portion and a vertical web receiving portion arranged around the horizontal neutral axis of the beam, the openings in each beam being aligned with the corresponding openings in the other beams, a cross bar having substantially the same shape as said openings passing through each set of aligned openings, each of said cross bars having a bulbous top portion and a vertical web, welds at the intersections of the beams and cross bars connecting the beams and the bars, said welds extending vertically along the webs of said beams and cross bars, and a serpentine bar between each pair of longitudinal beams resting on and fastened to the tops of said cross bars

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with the top thereof approximately in the plane of the top of the longitudinal beams.

2. A grating structure comprising a plurality of spaced apart parallel longitudinal beams each having a vertical web, each of said beams having a plurality of dumbbell shaped openings therethrough arranged substantially symmetrical around the horizontal neutral axis of the beam with the bulbous portions of the openings in vertical alignment, the openings in each beam being aligned with the corresponding openings in the other beams, a dumbbell shaped cross bar having substantially the same shape as said openings passing through each set of aligned openings, welds at the intersections of the beams and cross bars connecting the beams and the bars, said welds extending vertically along the webs of said beams and cross bars, and a serpentine bar between each pair of longitudinal beams resting on and fastened to the

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tops of said cross bars with the top thereof approximately in the plane of the top of the longitudinal beams.

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