Aug. 30, 1938. F. LIENHARD 2,128,753

STEEL FLOOR CONSTRUCTION

Filed March 20, 1937

Fig. 1.

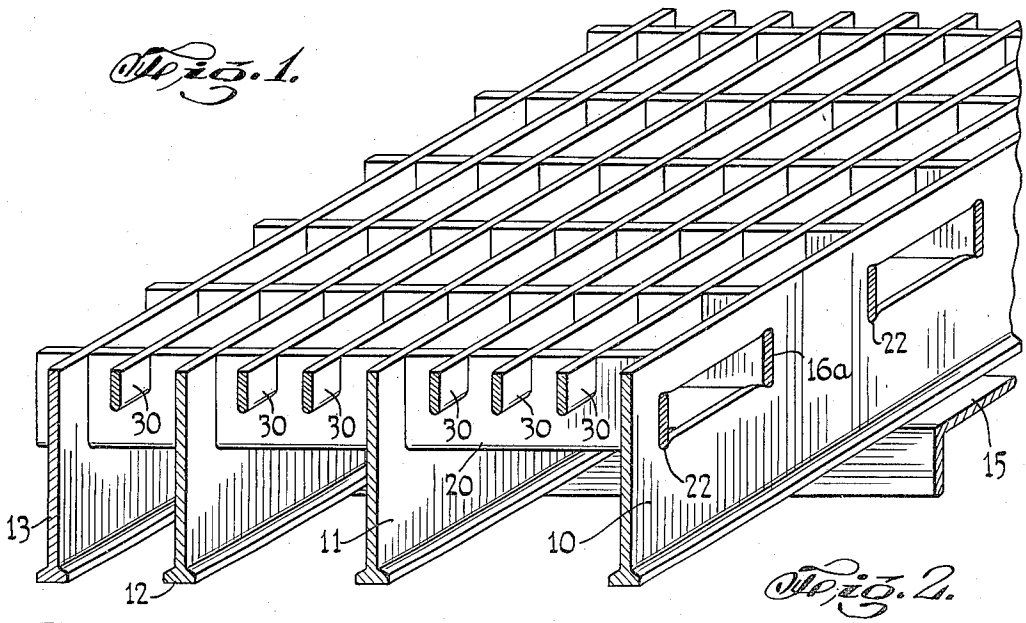


Fig. 2.

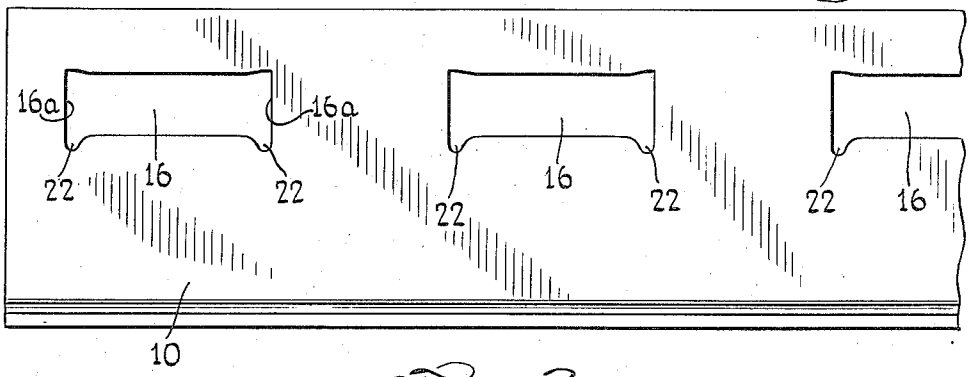


Fig. 3.

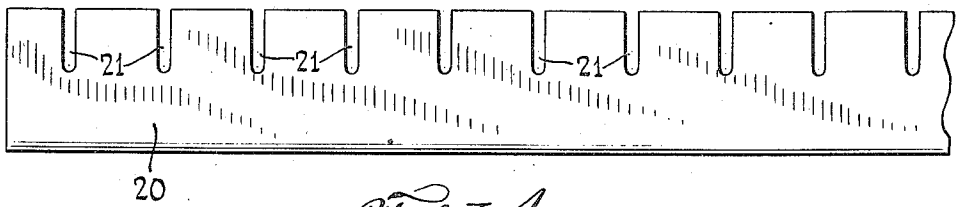
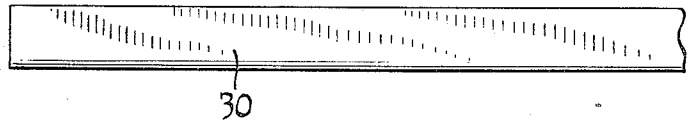


Fig. 4.



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STEEL FLOOR CONSTRUCTION

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9 Claims. (Cl. 189—82)

This invention relates generally to steel floor constructions. More particularly, it relates to the type of assembled steel floor constructions known as open gratings and adapted to be used as flooring for bridges and the like.

One of the objects of my invention is to provide a steel floor construction of the character described, which shall comprise relatively few and simple parts, which shall be easy to assemble, and in which the said parts are so standardized that large quantities may be manufactured at a minimum cost, and stocked to be subsequently assembled and used for any size or type of steel flooring desired, depending upon the actual conditions.

Another object of my invention is to provide a steel floor construction of the character described, comprising a plurality of assembled steel bars forming a grating having a plurality of equal rectangular surface openings in which said steel bars are all of the same uniform thickness to afford an even riding surface for vehicular traffic.

Still another object of my invention is to provide a steel floor construction of the character described in which the open rectangular spaces of the surface thereof may be varied in size without varying the construction of the individual steel bars and without weakening the entire assembly.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawing, in which is shown one of the various possible embodiments of this invention,

Fig. 1 is a perspective view of an assembled steel floor construction embodying my invention;

Fig. 2 is an enlarged side elevational view of one of the series of main steel bar members illustrated in Fig. 1;

Fig. 3 is an enlarged side elevational view of the second series of steel bar members illustrated in Fig. 1; and

Fig. 4 is an enlarged side elevational view of the third series of steel bar members illustrated in Fig. 1.

Referring now in detail to the drawing, there is disclosed in Fig. 1 an assembled metal open grating adapted for use as flooring for bridges and the like and constructed in accordance with my invention. The assembled grating comprises a series of parallel main bars 10, 11, 12 and 13, disposed in predetermined spaced relationship to each other and which may be aided in load distribution by a distributor bar 15 of any desired strength, depending upon the particular needs of the proposed construction. Each of the main bars 10 to 13 are provided with a plurality of substantially rectangular shaped openings 16 with the longer sides of the rectangles disposed parallel to the longitudinal axis of the said main bars. The openings 16 are spaced from each other a uniform predetermined distance depending upon the ultimate size of the rectangles desired in the top surface of the grating. The openings 16 are designed to permit the insertion therein and the proper positioning of two cross bars 20, each of which is provided at the upper end thereof with a plurality of uniformly spaced notches 21 of uniform width and depth, for reasons which will soon become apparent.

It is noted that the openings 16 are provided with notches 22 at opposite corners of the bottom wall thereof. These notches are designed to facilitate the insertion and proper upright positioning of the members 20 in the openings 16. The openings 16 are made of sufficient size so that the members 20 may be inserted therethrough in a flatwise direction and then turned upwardly so that one of the notches 21 will straddle the portion of the bar 10 above the openings 16 and thus permit the member 20 to be positioned in the notch 22 and stand in a vertical direction contacting the end walls 16a of the openings 16. When the cross bars 20 are thus inserted in the openings 16, the top edges thereof will be flush with the top edges of the main bars 10 to 13. The openings 16 are designed to accommodate two of the members 20 at opposite ends thereof so that the distance between the openings 16 will be large enough to prevent weakening of the main bars. If the openings 16 were of such size as to permit the insertion and accommodation of only one of the members 20 therein, it is clear that in the event an open grate construction was desired in which the rectangular openings at the top thereof were of very small size, there would be insufficient metal between the openings 16 to give sufficient strength to the assembled structure.

After the main bars 10 to 13 have been suitably spaced from each other in accordance with the needs of the particular construction, and

two transverse or cross bars 20 are inserted through each of the openings 16 and rotated to proper vertical position, the remaining notches 21 in the bars 20 may be filled by a third series of bars 30 of a depth equal to the depth of the notches 21 and disposed parallel to the main bars 10 to 13 to form an assembled open grating having a plurality of rectangular openings at the top surface thereof. After the members have been assembled as above described, the entire construction may be welded together to maintain the different parts in position.

By arranging the notches 21 in the cross bars 20 equidistant from each other and making them all of the same size, it is possible to adjustably space the main bars 10 to 13 from each other, in order to fit any particular constructional needs. Thus, for example, as shown in Fig. 1, the main bar 11 is spaced from the main bar 10 so that there are three intermediate notches 21, in the cross bars 20 which receive therein the bars 30. If desired, the main bar 12 may be spaced from the main bar 11 to accommodate only two bars 30 therebetween; whereas, the main bar 13 may be spaced from the main bar 12 to accommodate only one bar 30 therebetween. Also, by the above described construction, it is seen that a main bar, such as 10, may be placed near the edge of any desired open grating and maintain the full strength of the grating right up to the edge because it can be placed sufficiently near to the adjacent main bar 11. In other words, the assembled grating constructed in accordance with my invention achieves a uniform strength throughout its width.

It is noted that the three types of bars, 10, 20 and 30 may be made of uniform width to provide a uniform riding surface for vehicular traffic.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A grating of the character described formed of a plurality of series of bars extending in intersecting relation, the bars of one series being provided with a plurality of uniformly spaced and equal sized openings, two bars of a second of said series of bars being inserted through each of said openings, the bars of said second series being wider than the height of said openings and provided with a plurality of uniformly spaced equal notches extending downwardly from the upper edges thereof to permit the upright positioning of said second series of bars in said openings, and at least one bar of a third series of bars disposed parallel to and between each pair of adjacently disposed bars of said first named series of bars.

2. A grating of the character described formed of a plurality of series of bars extending in intersecting relation, the bars of one series being provided with a plurality of uniformly spaced and equal sized openings, two bars of a second of said series of bars being inserted through each of said openings, the bars of said second series being wider than the height of said openings and provided with a plurality of uniformly spaced equal notches extending downwardly from the upper edges thereof to permit the upright positioning of said second series of bars in said openings, said openings being provided with notches at opposite corners of the bottom wall thereof to facilitate the upright positioning and the maintenance in such position of said last named bars, and at least one bar of a third series of bars disposed parallel to and between each pair of adjacently disposed bars of said first named series of bars.

3. A grating of the character described formed of a plurality of series of bars extending in intersecting relation, the bars of one series being provided with a plurality of uniformly spaced and equal sized openings, a bar of a second of said series of bars being inserted through each of said openings, the bars of said second series being provided with a plurality of uniformly spaced equal notches extending downwardly from the upper edges thereof, and a third series of bars disposed parallel to the bars of said first series and received in said notches, whereby to form a grating having a plurality of uniform rectangular shaped open spaces of a size equal in one direction to the distance between two adjacent bars of the second series of bars and less than the distance in the other direction between two adjacent bars of the first series of bars.

4. A grating of the character described formed of a plurality of series of bars extending in intersecting relation, the bars of one series being provided with a plurality of uniformly spaced and equal sized openings, two bars of a second of said series of bars being inserted through each of said openings, the bars of said second series being wider than the height of said openings and provided with a plurality of uniformly spaced equal notches extending downwardly from the upper edges thereof to permit the upright positioning of said second series of bars in said openings, said openings being rectangular in shape and disposed with their longer sides parallel to the longitudinal axis of the bars of said first series, said notches of said second series bars being so constructed and arranged whereby at least one notch of each bar of said second series of bars will be disposed between each pair of bars of the said first series of bars, and bars of a third series of bars parallel to the bars of said first series of bars and received in the notches of said second series of bars.

5. A grating of the character described formed of a plurality of series of bars extending in intersecting relation, the bars of one series being provided with a plurality of uniformly spaced and equal sized openings, two bars of a second of said series of bars being inserted through each of said openings, the bars of said second series being wider than the height of said openings and provided with a plurality of uniformly spaced equal notches extending downwardly from the upper edges thereof to permit the upright positioning of said second series of bars in said openings, said notches being vertically disposed and at right angles to the longitudinal axis of said second series bars, and at least one bar of a third series of bars parallel to the bars of said first series and received in the corresponding notches of the said bars of said second series.

6. A grating of the character described formed of a plurality of series of bars extending in intersecting relation, the bars of one series being provided with a plurality of uniformly spaced and equal sized openings, two bars of a second of said series of bars being inserted through each of said

openings, the bars of said second series being wider than the height of said openings and provided with a plurality of uniformly spaced equal notches extending downwardly from the upper edges thereof to permit the upright positioning of said second series of bars in said openings, said openings being rectangular in shape and disposed with their longer sides parallel to the longitudinal axis of the bars of said first series, and adapted to form a grating assembly in which the upper surface thereof constitutes a plurality of open spaces rectangular in shape and of uniform size, said notches of said second series bars being so constructed and arranged whereby at least one notch of each bar of said second series of bars will be disposed between each pair of bars of the said first series of bars.

7. A grating of the character described formed of a plurality of series of bars extending in intersecting relation, the bars of one series being provided with a plurality of uniformly spaced and equal sized openings, at least one bar of a second of said series of bars being inserted through each of said openings, the bars of said second series being wider than the height of said openings and provided with a plurality of uniformly spaced equal notches extending downwardly from the upper edges thereof to permit the upright positioning of said second series of bars in said openings, and bars of a third series received in the notches of the said second series bars disposed between said first series bars, whereby to form a grating having a plurality of uniform rectangular shaped open spaces of a size equal in one direction to the distance between two adjacent bars of the second series of bars and less than the distance in the other direction between two adjacent bars of the first series of bars.

8. A metal grating assembly adapted to be used as a flooring without filling material for bridges and the like, comprising a plurality of main bars provided with openings spaced from each other and from the upper and lower longitudinal edges of said main bars, a plurality of cross bars and a plurality of auxiliary bars, said auxiliary bars being parallel to said main bars, said cross bars being adapted to pass transversely through said openings in said main bars and said auxiliary bars being adapted to be received in aligned notches in the upper edges of said cross bars, to form a grating in which the upper longitudinal edges of said main bars, cross bars, and auxiliary bars are in the same plane and in which the upper surface thereof constitutes a plurality of open spaces rectangular in shape and of uniform size, said size being equal in one direction to the distance between two adjacent cross bars and in the other direction less than the distance between two main bars.

9. A metal grating assembly adapted to be used as flooring for bridges and the like formed of a plurality of series of bars extending in intersecting relation, certain of the bars of said first series of bars being unequally spaced from each other, all of the bars of said first series being provided with a plurality of uniformly spaced and equal sized rectangular openings, two bars of a second series of bars being inserted through each of said openings, said second series bars being wider than the height of said openings and provided with a plurality of uniformly spaced notches extending downwardly from the upper edges thereof to permit upright positioning of said second series of bars in said openings, and a third series of bars parallel to said first series of bars and received in the notches of said second series of bars whereby to form a grating assembly in which the upper surface thereof constitutes a plurality of open spaces of uniform shape and size irrespective of the spacing between the bars of said first series of bars.

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