June 5, 1945. B. A. PRINCE **2,377,648**

GRATING

Filed May 25, 1943 2 Sheets-Sheet 1

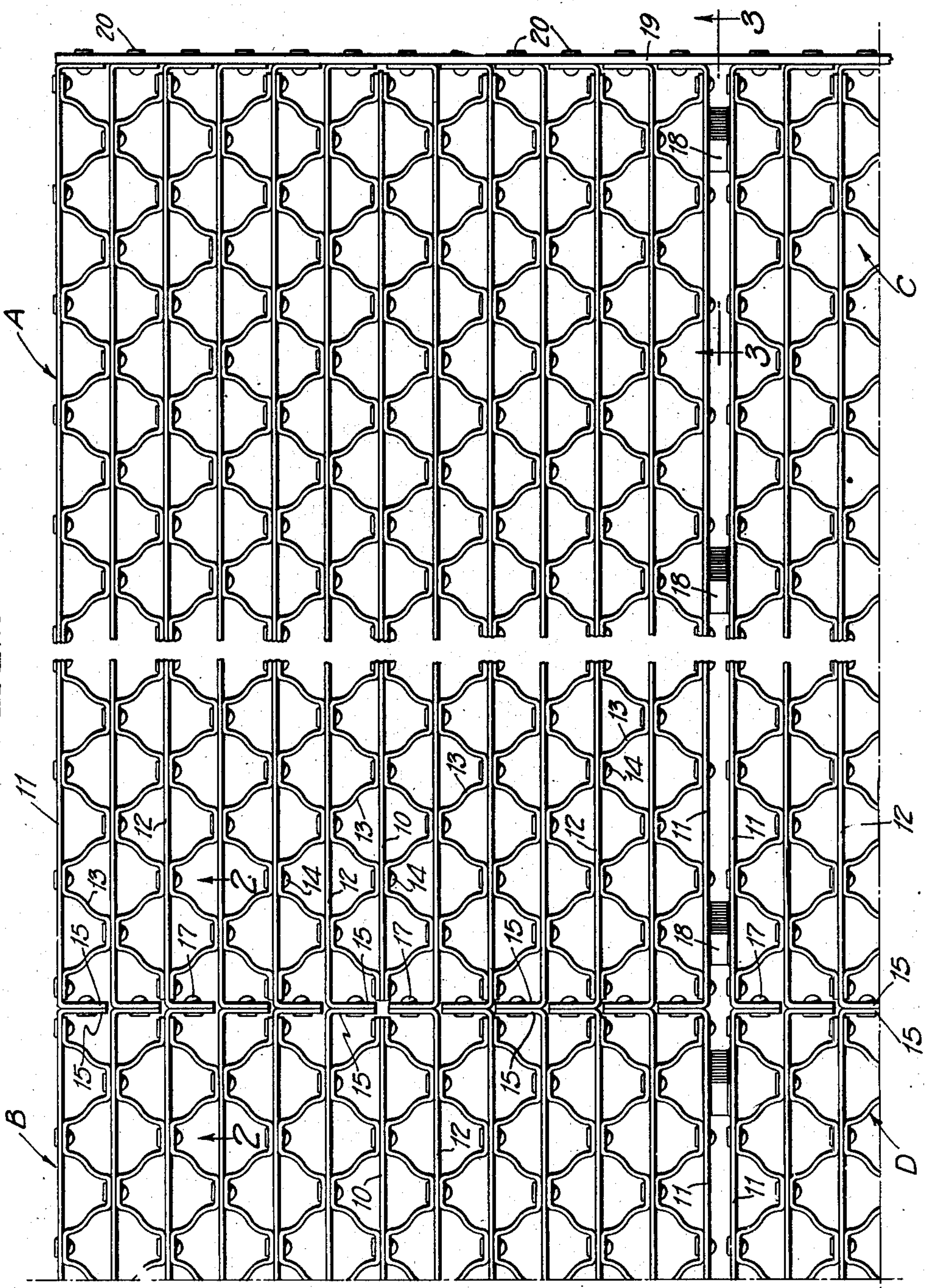

FIG. 1.

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WITNESS:
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GRATING

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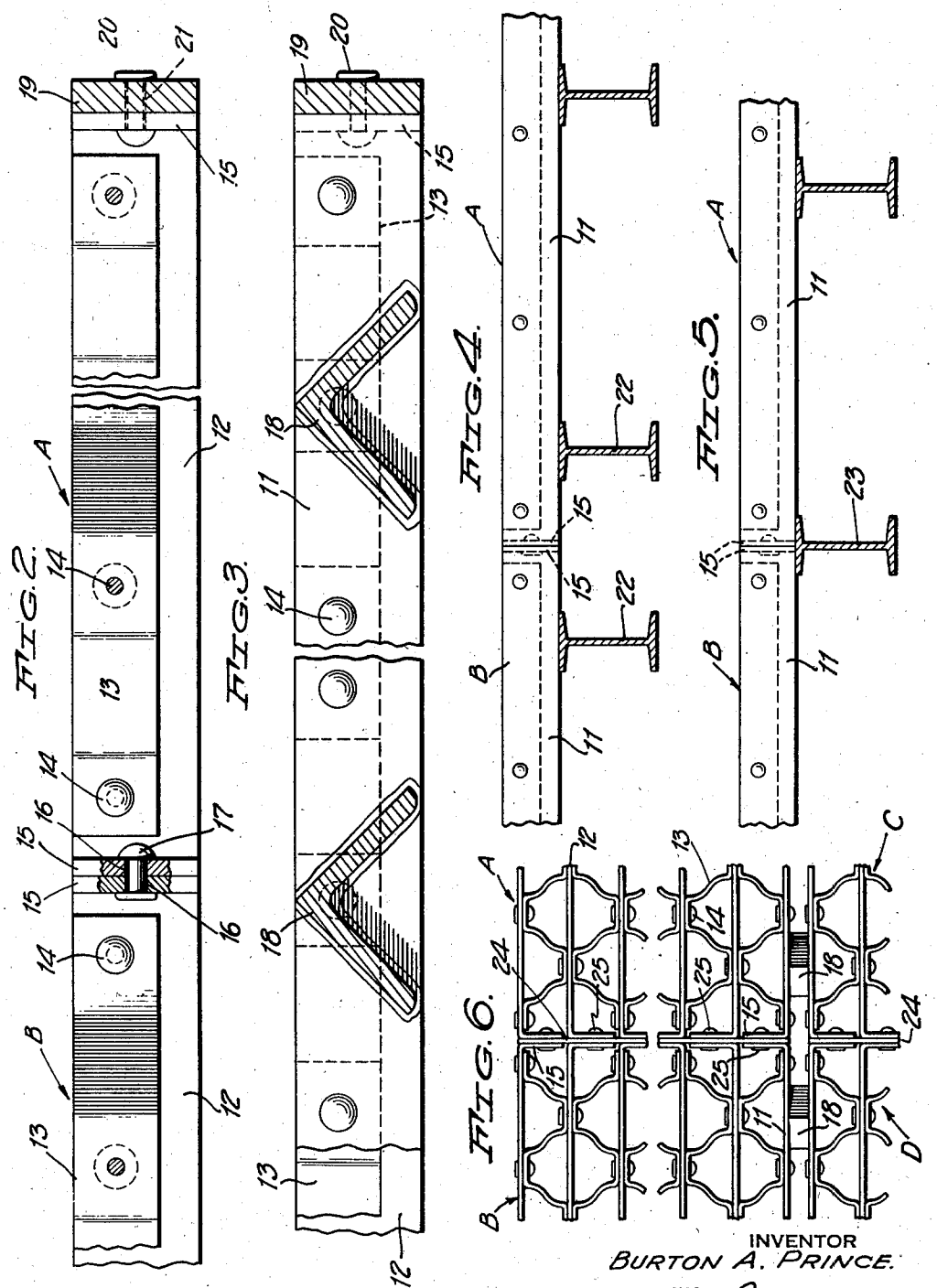

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UNITED STATES PATENT OFFICE

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GRATING

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5 Claims. (Cl. 94—30)

This invention relates to improvements in continuous grating structures for use in the formation of bridge decks, flooring, roadways, and other grating surfaces over which foot or motor traffic is adapted to travel.

One of the important features of the invention resides in a novel means of splicing the abutting ends of adjacent grating panels which enables the placing of the panels in their relative positions upon a bridge or other roadway to extend from curb to curb for subsequent field riveting. Heretofore splicing by the field riveting of grating panels upon bridges, necessitated the laying of the two lines of side panels at least three feet from adjacent curbs to provide sufficient clearance for the handles of the squeezing tools used in field riveting and which handles extend transversely of the panels when in use, otherwise bolts and nuts would be required for the splicing of the two lines of side panels, which has proven unsatisfactory due to the time required in applying the bolts and nuts, and the danger of them becoming loose. Therefore, a further feature of this invention is to provide a butt-splice for adjacent panels in which the handles of the rivet squeezing tools operate in a direction parallel with the curbs, thus eliminating the tedious practice required for the separate placing of the next-to-curb grating panels.

Another feature of the invention is the provision of a grating panel and butt-splice therefor which is strong, which may be installed for use in the field in less time than others with which I am familiar, and which effects a saving in rivets, time, and labor.

A further feature of the invention resides in a grating and splice therefor which when assembled for use provides the desired continuity of the continuous grating surface which is essential for the safe passage of the tires of motor vehicles thereover.

A still further feature of the invention is to provide a grating and splice therefor which permits of expansion and contraction of the metal grating panels without buckling or distortion.

Other novel features of the invention will become apparent as the following specification is read in conjunction with the accompanying drawings, in which:

Figure 1 is a top plan view of several grating panels constructed and connected in accordance with my invention, portions of the panels being shown broken away.

Figure 2 is an enlarged detail vertical longitudinal sectional view on the line 2—2 of Figure 1 with parts broken away in section.

Figure 3 is an enlarged vertical longitudinal sectional view on the line 3—3 of Figure 1.

Figure 4 is a vertical sectional elevational view illustrating the method of supporting the panels with the splice joint disposed intermediate adjacent sills.

Figure 5 is a view similar to Figure 4 illustrating the method of supporting the splice joint directly upon a sill.

Figure 6 is a fragmentary top plan view of a modified form of butt-splice between adjacent panels.

Referring to the drawings by reference characters, the letters A, B, C, and D (Figure 1), represent four like grating panel units which are constructed and spliced together to provide a continuous grating surface in accordance with the invention now to be specifically described.

Each grating panel unit is rectangular in configuration, and includes a central straight floating bar 10, outer straight side bars 11—11, and groups of straight intermediate bars 12 respectively disposed between the central bar 10 and the respective side bars 11—11. The straight bars 10, 11—11, and 12 are disposed in spaced parallel relation by intermediate crimped strips 13 which are secured to adjacent bars at all points of contact therewith by rivets 14, although other fastening means may be resorted to if desired. The bars and crimped strips are constructed of bendable metal such as iron. The straight bars are of a greater depth than the crimped strips 13 as illustrated in Figures 2 and 3, but the top edges of the bars and strips are on the same plane, and the bars and strips coact to form an even mesh surface for traffic bearing purposes.

The opposed ends of the straight bars 11—11 and 12 are provided with angular end extensions 15, preferably extending inwardly at right angle to the bars. The end extensions all extend in the direction toward the floating bar 10 and are of lengths just short of the width of the space between adjacent bars so that they are free of each other. By making the angular end extensions 15 of a length to extend to close proximity to the adjacent straight bar, the same substantially close the mesh at that point and act as an approximate equivalent of a separate bar. The straight bars are of the same length so that the end extensions 15 are in transverse alinement at the ends of the panel. Each end extension 15 has a hole 16 therein for the passage of a fastening element presently to be described.

The construction of the grating panel unit so far described is fabricated in the factory and is shipped and delivered to a job as a separate unit for subsequent assembly in the field with other like units in a manner now to be described.

The grating panel units are placed upon a bridge, road, or other structure or surface which is to receive the continuous grating, in their relative positions of longitudinal and transverse rows; the straight bars being disposed parallel to the direction of traffic intended to pass over the continuous grating. In Figure 1, the panel A constitutes one of the side rows of panels and also one of the end panels of a continuous grating surface. Panel B is the next panel of the outer side row and is placed end to end with the inner end of the panel A, with the respective adjacent angular end extensions 15 in alined abutting engagement. The rivet operator inserts blank rivets 17 through the alined holes 16 and by the use of a rivet squeezing tool proceeds to deform the rivets and complete the formation thereof. When all the rivets 17 have been squeezed home, a rigid butt end splice is effected. In field riveting the butt end splice between adjacent panels, the squeezing tool handles operate in a direction parallel to the straight bars and curbs, which eliminates the usual practice of the separate placing of the next-to-the-curb panels. Thus the squeezing tool handles operate longitudinally of the grating surface instead of the former practice of transversely thereof. It will be noted in Figure 1, that the adjacent ends of the floating bars 10—10 between panels A and B are in spaced relation, and that the ends of the connected adjacent angular end extensions 15 are spaced from and free of the next adjacent set of connected end extensions. The aforesaid features permit of the relative expansion and contraction of the metal from which the panels are constructed without danger of breaking or distortion of the panels at their spliced ends. The ends of the crimped strips 13 terminate at the ends of the straight bars in a manner so as not to break up the continuity of the grating meshes at the spiced butt ends of the connected grating panels.

The next longitudinal row of grating panels includes the panel units C and D which are placed adjacent the inner longitudinal sides of the panel units A and B respectively and which have their ends in transverse alinement with the respective ends thereof. One of the side bars 11 of each panel has metal spacer members 18 welded thereto at the factory, there being one adjacent each end of the panel and others at suitably spaced intermediate points therealong. The spacer members are shown in Figure 2 as short lengths of inverted angle bars, and as previously stated they are shop welded to one of the panels, but during assembly of the panels on a job, the spacer members are field welded to the next adjacent panel. In Figure 1 the members 18 are shop welded to panels A and B, and field welded to panels C and D. The spacer members 18 also act to reinforce the adjacent sides of the panels along the length thereof.

Grating panel units A and C are shown as the end units of a continuous grating surface, therefore the free ends thereof are reinforced and rigidly held together by a metal end bar 19 which flatly abuts the transversely alined end extensions 15 of the panel units A and C and bridges the joint between the adjacent confronting sides of these units. Rivets 20 pass through the holes 16 in the end extensions and through alined holes 21 provided in the end bar 19. The thickness of the end bar 19 is greater than that of the straight bars for reinforcing purposes at the free ends of a continuous grating surface.

In Figure 4 of the drawings, I have illustrated two spliced grating panel units A and B as being supported upon the sills 22 of an elevated structure such as a bridge. The splice joint is disposed between the two relatively closely spaced sills 22. In Figure 5, however, the butt splice between the two connected panels A and B rests directly upon a sill 23 which provides a direct support for the splice.

In Figure 6 of the drawings, I have shown a slight modification of the butt splice, wherein a straight transverse bar 24 is interposed between adjacent angular end extensions 15 and secured thereto by rivets 25. The bar 24 acts as a stiffener for the spliced ends of the panels. In practice, the bar 24 would be shipped loose and assembled between panels in the field.

While I have shown and described what I consider to be the preferred embodiment of my invention, I wish it to be understood that such changes in construction and design as come within the scope of the appended claims may be resorted to if desired without departing from the spirit of the invention as set forth in the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A grating unit comprising a plurality of parallel straight bars, a plurality of intermediate crimped strips secured to adjacent straight bars at all points of contact therewith, and free angular end extensions provided on all of the straight bars except an intermediate straight bar, said angular end extensions facing in a direction toward the said intermediate straight bar, the free ends of those end extensions adjacent the ends of the intermediate straight bar being in close spaced proximity thereto.

2. A grating unit comprising straight side bars, a straight intermediate bar, groups of straight bars intermediate the intermediate bar and the respective side bars, all of said bars being parallel, intermediate crimped strips between adjacent straight bars and secured thereto at all points of contact therewith and forming meshes, and angular end extensions provided on the ends of the side bars and groups of bars, each angular extension being of a length to extend in close proximity to the adjacent straight bar in order to substantially close the mesh at that point and act as an approximate equivalent of a separate bar, and respectively extending in a direction toward the intermediate straight bar.

3. A continuous grating structure including a pair of grating panels arranged in end to end relation, each of the grating panels comprising a series of straight parallel bars, mesh forming means for securing the straight bars in fixed spaced apart relation, adjacent ends of the straight bars of the grating panels being provided with confronting abutting angular end extensions each angular end extension being of a length to extend in close proximity to the adjacent straight bar in order to substantially close the mesh at that point and act as an approximate equivalent of a separate bar, and fastening means fixedly securing the respective confronting end extensions together.

4. A continuous grating structure including a

grating panel comprising an intermediate straight bar, groups of straight bars disposed at opposite sides of the intermediate straight bar and disposed parallel thereto, crimped strips disposed intermediate all the straight bars and fixed thereto at all points of contact therewith and cooperating therewith to form meshes, angular end extensions provided on the opposed ends of the groups of straight bars and extending in a direction toward the intermediate straight bar, each end extension being of a length to extend to close proximity to an adjacent straight bar to substantially close the mesh at that point and to act as an approximate equivalent of a separate bar, a companion grating panel similar to the aforesaid grating panel having its angular end extensions at one of the ends of its groups of straight bars in confronting abutting relation to the angular end extensions at the adjacent end of the first grating panel, fastening means securing the confronting angular end extensions together, an end bar fitting against the angular end extensions at the other end of the first grating panel and being of a length at least substantially equal to the width of said grating panel, and fastening means securing the end bar to the respective abutting angular end extensions.

5. A continuous grating structure including a rectangular grating panel and a companion grating panel, each comprising a series of straight parallel bars extending lengthwise of the panel, intermediate crimped strips secured to adjacent bars at all points of contact therewith and forming a mesh structure, angular end extensions provided at one of the ends of straight bars disposed at right angles thereto, each end extension being of a length to extend to close proximity to the adjacent straight bar in order to substantially close the mesh at that point, the grating panel and companion grating panel being arranged in side by side relation with their angular end extensions in transverse alinement, an end coupling bar fitting against the angular end extensions of the grating panel and companion panel and bridging the joint therebetween, and fastening means securing said end coupling bar to the respective angular end extensions.

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