June 19, 1962 D. C. GRAHAM 3,039,575

COMPOSITE GRATING

Filed Sept. 3, 1958 2 Sheets-Sheet 1

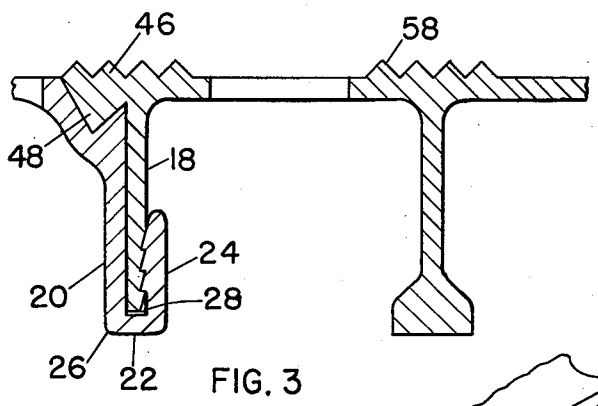
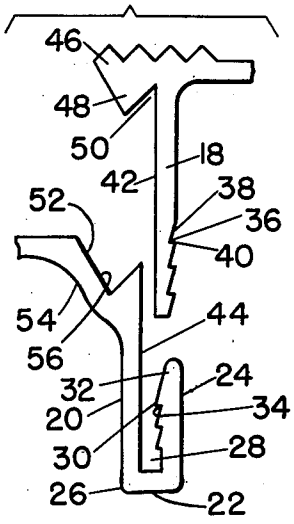


FIG. 3

FIG. 1

FIG. 4



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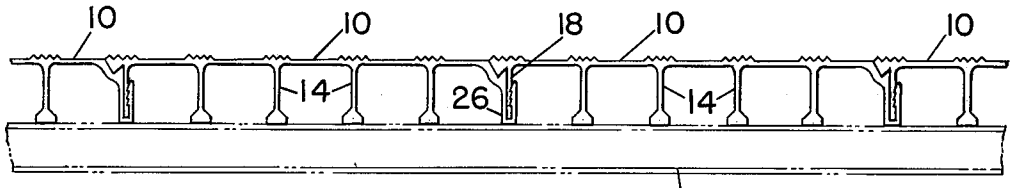


FIG. 2

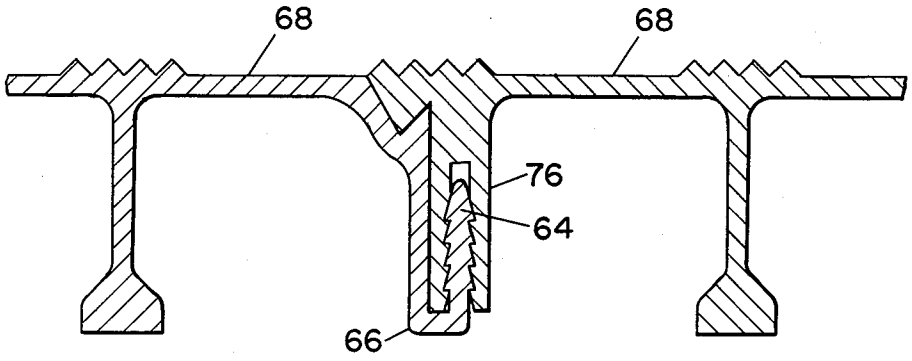


FIG. 5

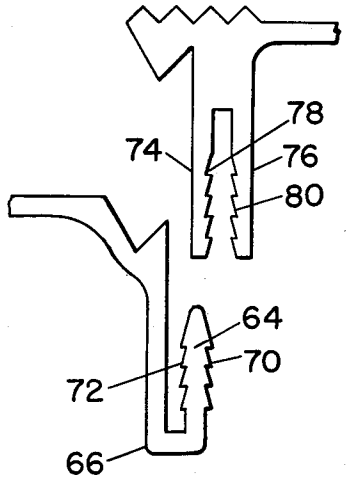


FIG. 6

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COMPOSITE GRATING

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This invention pertains to new and useful improvements in composite metal gratings for floors, cat-walks, decks, runways and the like, and more particularly to gratings, the constitutent parts of which are all formed of metal extrusions.

The gratings comprise a floor providing a tread surface and longitudinally extending parallel depending flanges forming load bearer bars adapted to rest upon a floor or spaced supporting members. As a matter of manufacturing expediency and to facilitate handling, the gratings are formed of a plurality of extruded grate sections which can be of any desired practical length but, because of the necessity of confining the die to a practical size, are of limited width, a number of such sections being connected in side by side relation.

One object of the invention is to provide a novel composite grating structure of the type referred to above, formed of like grate sections of extruded metal which are readily assembled to form a unitary rigid flooring.

Another object is to provide a novel composite grating structure wherein the grate sections may be assembled into a rigid structure without the use of bolts, rivets or welding and are readily and conveniently assembled in the field without the use of special tools.

Another object is to provide a novel composite grating structure formed of like grate sections of extruded metal having novel interlocking means for securing the grate sections together to form a continuous tread surface and having integral load bearing flanges adapted to rest on a supporting structure for the grating.

A further object is to provide novel grate sections of like extruded metal form, that are simple in design and construction, inexpensive to manufacture and are adapted for side by side interengagement to form a composite grating structure. A related object is to provide grate sections of like extruded metal form having novel interengaging means facilitating assembly of a plurality of such grate sections into a composite grating structure.

Further objects and advantages of the invention will become apparent from the following description and the accompanying drawings, in which

FIGURE 1 is a fragmentary perspective view of a plurality of assembled grate sections constructed in accordance with the present invention;

FIGURE 2 is an end elevation of a plurality of assembled grate sections showing one of a series of spaced transversely extending cross beams upon which the load bearing flanges of the assembled grate sections are adapted to rest;

FIGURE 3 is an enlarged sectional view on line 3—3 of FIGURE 1 through adjacent sides of two adjoining grate sections;

FIGURE 4 is an exploded view in end elevation of adjacent portions of two adjoining grate sections;

FIGURE 5 is a sectional view through adjacent sides of two adjoining grate sections showing a modified form of construction of the interconnected ends of the grate sections; and

FIGURE 6 is an exploded view in end elevation of the

adjacent portions of the grate sections shown in FIGURE 5.

Referring to FIGURES 1 to 4, the novel grating is formed of any desired number of identical grate sections 10, connected in side by side relation, the grate sections 10 being formed of aluminum extrusions by extruding aluminum through a suitable die (not shown) to produce the shape illustrated.

The grate sections 10 are identical in construction, and it will be understood that the description of a single grate section 10 applies equally to all the grate sections, which when assembled form a composite grating.

The grate section 10 comprises a platform or floor 12 from which depend a series of integrally formed intermediate equidistantly spaced longitudinally extending parallel flanges 14 forming bearer bars. The lower edges of the flanges 14 lie in a common plane and are adapted to rest on a floor or other suitable structure, such as a series of transversely extending longitudinally spaced beams, one of which is shown in conventional lines at 16 in FIGURE 2, for supporting a plurality of interconnected grate sections 10.

The opposite sides of the grate section 10 have respectively formed therewith depending longitudinally extending flanges 18 and 20 parallel with respect to and spaced from their neighboring bearer bar flanges 14 the same distance as between the bearer bar flanges 14. A base flange 22 is formed with and extends in a lateral outward direction from the lower edge of the flange 20, and a flange 24 is formed with and extends upwardly from the outer edge of the base flange 22 in parallel spaced relation with respect to the flange 20. The flanges 20, 22 and 24 form in effect a bearer bar 26 at one side of the grate section 10 with the bottom of its flange 22 being disposed in the same common plane as the bottoms of the bearer bars 14. Considered in cross section bearer bar 26, formed by the flanges 20, 22, 24 is generally U-shaped with its outer flange 24 terminating at its upper end approximately midway between the upper and lower ends of the inner flange 20. The flanges 20, 22, 24 constituting the bearer bar 26, form an elongated groove 28 extending the length of the grate section 10 opening upwardly at one side of the grate section 10 into which, as later explained, the flange 18 of an adjoining grate section 10 is adapted to be inserted.

The inner face of the flange 24 is formed with a plurality of contiguous superimposed inwardly projecting, longitudinally extending ribs 30, which in cross section present a serrated or saw tooth profile. Each rib 30 is thus defined by an oblique side face 32 and an undercut base 34. The portion of the flange 18 which is insertable into the groove 28 of the bearer bar 26 of an adjoining grate section, is provided on its inner face with a plurality of contiguous superimposed longitudinally extending grooves 36 which in cross sectional through the flange 18 present a serrated profile. The depth and conformation of the grooves 36 are such that they snugly receive the ribs 30 of the flange 24, when the flange 18 and bearer bar 26 of adjoining grate sections are in assembled relation. The grooves 36 are defined by the oblique faces 38 and lips 40 of the flange 18.

The horizontal distance between the outer flat face 42 and the innermost edges of the lips 40 of the flange 18 is slightly greater than the horizontal distance between the outer flat face 44 of flange 20 and the innermost edges of the ribs 30 of flange 24, so that the flange 18 of one grate section 10 is not freely insertable into the

groove 28 of the bearer bar 26 of an adjoining grate section 10.

In assembling the grate sections 10, the flange 18 of one grate section is vertically inserted freely in the groove 28 of the bearer bar 26 of an adjoining grate section until the lowermost oblique face 38 defining a groove 36 engages the uppermost oblique face 32 of a rib 30, whereupon further free insertion is prevented. Now by exerting a vertically downward force upon the end of the grate section 10 carrying the flange 18, a wedging action is effected between the engaging oblique faces 32 and 38, whereupon the flange 24 by reason of the inherent resiliency of the aluminum will spring outwardly, until the lowermost lip 40 of the flange 18 clears the innermost edge of the uppermost rib 30 of the flange 24 of the bearer bar 26. The flange 24 will then spring back to its original position with the uppermost rib 30 engaging in the lowermost groove 36. Further and increased pressure will cause succeeding ribs and grooves to engage in similar manner until the flange 18 of one great section 10 is fully inserted in the groove 28 of the bearer bar 26 of an adjoining grate section 10.

The adjacent ends of two adjoining grate sections are thus securely locked and because of the overlapping engagement of the undercut base 34 of the ribs 30 with the lips 40 defining the grooves 36, removal of the flange 18 from the groove 28 is prevented, whereby upon assembly of two adjoining grate sections relative vertical displacement of one grate section with respect to the other is prevented.

The snug engagement of the flange 18 in the groove 28 with the flat faces 42 and 44 of the flanges 18 and 20 in engagement, prevents relative downward swinging movement of one grate section 10 relative to an adjoining grate section 10.

It will be apparent therefore, that a number of grate sections can be secured together in a larger composite unit and can be handled as a composite unit prior to setting it on a floor or substructure, without accidental disassembly or relative movement between the component grate sections, thus a number of sections can be pre-assembled into a unitary rigid composite unit.

Preferably, in order to provide greater rigidity of a composite grating unit during handling thereof, the floor portions 12 of the grate sections 10 are provided along their sides with interengageable means. On the flange 18 side of each grate section 10, its floor 12 projects laterally beyond the flange 18 to form an overhang 46. The outer end portion of the overhang 46 has formed on its under surface a longitudinally extending preferably V-shaped rib 48 projecting downwardly below the plane of the under surface of the floor 12 to form with the upper side portion of the flange 18 a reentrant longitudinally extending groove 50.

On the flange 20 side of each grate section 10, the floor 12 above and adjacent the flange 20 is depressed as at 52, the extruding die being formed to deform the floor 12 to provide a sloping shoulder 54 joining the upper portion of the flange 20 with the un-depressed portion of the floor 12. In the shoulder 54 of the floor 12 is formed a longitudinally extending preferably V-shaped groove 56 opening upwardly into the depression 52. The width of the overhang 46 is equal to the width of the depression 52, so that when assembling a pair of grate sections 10 the overhang 46 at one end of a grate section 10 is received in the depression 52 of the adjoining grate section, with the depending rib 48 of the overhang 46 being received in the groove 56 of the shoulder 54. Also the upper end of the flange 20 of one grate section 10, which defines one side of the V-shaped groove 56, is received in the reentrant groove 50 of the overhang 46 of an adjoining grate section 10.

Thus in handling a composite grating, should one grate section 10 be held or supported while the remaining grate sections of the composite grating are unsupported, the interengaging ribs 48 and grooves 56, relieve part of the pressure exerted against the flange 20 of the supported grate section by the unsupported overhanging weight of the unsupported grate sections, thereby minimizing any tendency of the flange 20 of the supported grate section to bend, whereby a rigid composite grating is provided.

The tread surface of the grate section floor 12 is preferably formed with a plurality of groups of upstanding inverted V-shaped longitudinally extending ribs 58 overlying the bearer bar flanges 14 and the flange 18, leaving a plane flat tread surface 60 between each group of ribs 58. After extrusion of the grate sections 10, openings 62 of any desired size and shape are stamped out of the tread surfaces 60 to provide for passage of light and air, and water drainage therethrough.

It is apparent that the grating described above can be readily and conveniently assembled in the field without any special tools. The grating may also be cut to fit around obstructions without any parts thereof becoming loose or disassembled.

In FIGURES 5 and 6 is shown a modified form of the invention, wherein the outer flange 64 of the bearer bar 66 at one side of a grate section 68, corresponding to the flange 24 of bearer bar 26 of the first described form of the invention, is provided on its outer face with a series of longitudinally extending ribs 70 which are the same as the ribs 72 on the inner face of the flange 64, the ribs 72 being the same as ribs 30 of the first form of the invention, previously described.

Also, in this modified form of the invention, the opposite side of the grate section 68 is provided with a pair of depending longitudinally extending spaced flanges 74 and 76 in place of the single flange 18 of the first form of the invention. The flange 74 is provided with longitudinally extending grooves 78 the same in all respects as the grooves 36 of the first form of the invention. The flange 76 is provided on its surface facing the flange 74 with a series of longitudinally extending grooves 80 similar to the grooves 78. The grate sections 68 are assembled in the same manner as the grate sections 10 of the first form of the invention, and when assembled as shown in FIGURE 5, the ribs 72 and 70 of the flange 64 are snugly received in the grooves 78 and 80, respectively, of the flanges 74 and 76. The additional flange 76 and the engagement of its grooves 80 with the ribs 70 provides for additional rigidity of the assembled grate sections.

Having thus described the invention, what I claim is:

1. A grating including a plurality of adjoining interlocked elongated longitudinally extending grate sections of extruded metal, each grate section being formed as an integral unit having a floor providing an upper tread surface, said floor along one longitudinal side thereof being depressed below the level of said tread surface, a longitudinally extending flange U-shaped in cross section having an arm thereof depending from the outer edge of the depressed portion of said floor and having the other arm thereof disposed in laterally outward spaced relation with respect to the outer edge of said depressed floor portion to form a longitudinally extending channel opening upwardly beyond the said outer edge of said depressed floor portion, and a longitudinally extending connecting flange depending from and offset inwardly of the opposite longitudinal side of said floor to form an overhanging floor portion, said overhanging floor portion being received in the depressed floor portion of an adjoining grate section and said connecting flange being received in the channel of the U-shaped flange of said adjoining grate section, said adjoining grate sections being relatively movable in a direction normal to the planes of the floors thereof for vertical insertion of said connecting flange in said U-shaped flange, a pair of meeting faces of the interfitted connecting flange and the U-shaped flange having complementary interengageable longitudinally extending

ribs and grooves formed therewith, a wall of said U-shaped flange being capable of flexing to permit vertical insertion of said connecting flange in the channel of said U-shaped flange to interlocked position for rigidly connecting said adjoining grate sections against relative movement with respect to each other.

2. A grating structure as defined in claim 1, wherein said overhanging and depressed floor portions of adjoining grate sections have on their respective nether and top surfaces complementary interengaging longitudinally extending ribs and grooves cooperating with said interengageable flanges to minimize downward deflection of an unsupported grate section from an adjoining supported grate section.

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