

[54] **GRILLE**

[75] Inventor: **Frederick Charles Helwig**, Union, N.J.

[73] Assignee: **Construction Specialties, Inc.**, Cranford, N.J.

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[58] Field of Search **98/121; 52/668**

[56] **References Cited**

UNITED STATES PATENTS

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Primary Examiner—Meyer Perlin

Assistant Examiner—Ronald C. Capossela

Attorney—Brambaugh, Graves, Donohue & Raymond

[57]

ABSTRACT

A grille comprising a plurality of substantially spaced-apart bars, each of which includes in cross-section, a web portion, a flange at one end of the web portion that has parts that project laterally, relative to the web portion, and an enlargement at the other end of the web portion that forms beads projecting out from each face of the web portion and having faces generally perpendicular to the faces of the web portion and generally facing the projecting parts of the flange. A plurality of blades extend substantially crosswise of the bars, and the blades and bars are mutually slotted and are interfitted in egg-crate fashion. Each bar receives a blade retainer that is generally U-shaped in cross-section, has resiliently deformable legs, and is provided with a bead extending inwardly from each leg that is captured by the beads on the bars. One edge of each blade engages the outwardly projecting parts of the bar flanges, and the other edges of the blades are engaged by the ends of the legs of the blade retainers.

5 Claims, 5 Drawing Figures

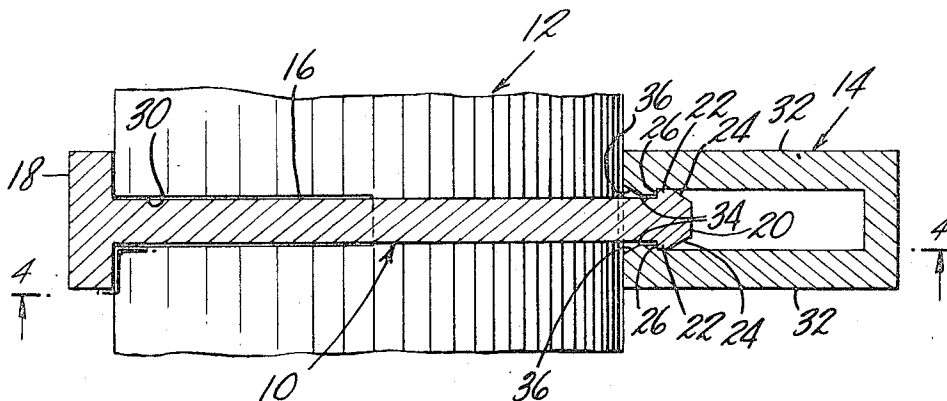


FIG. 2

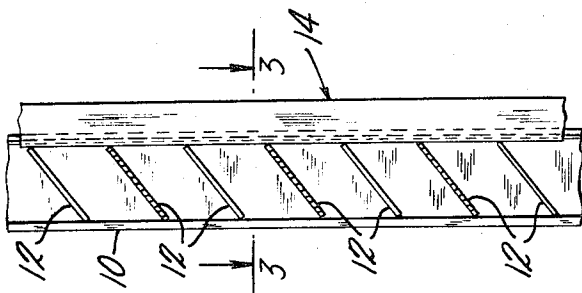


FIG. 1

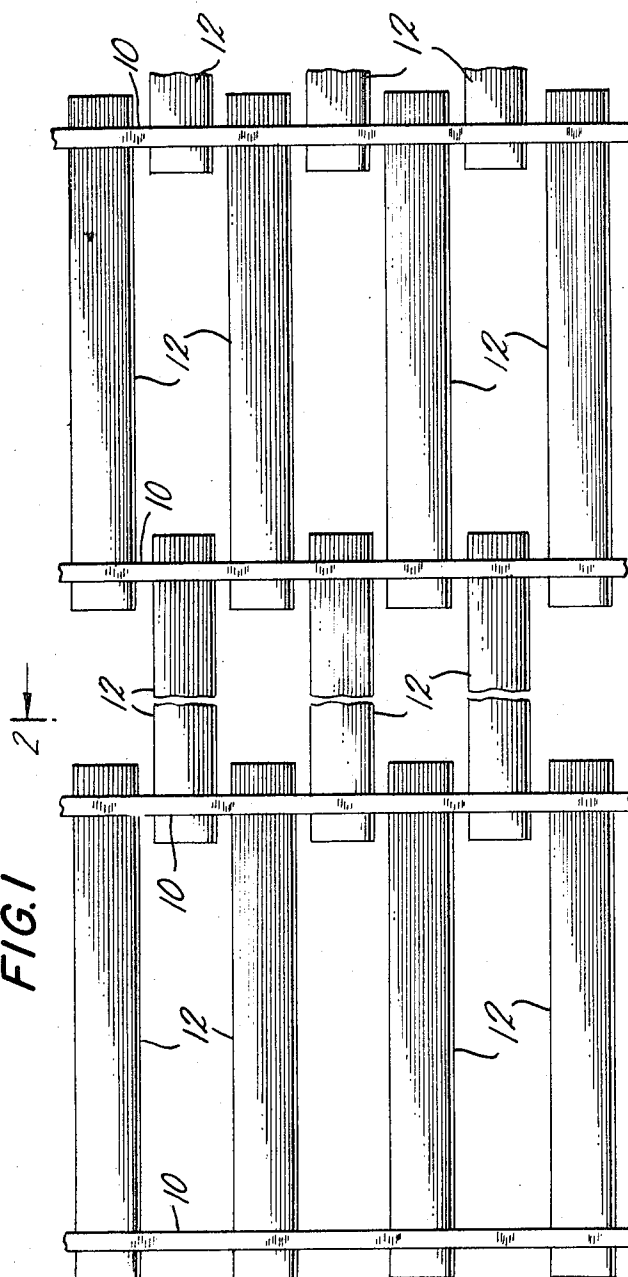
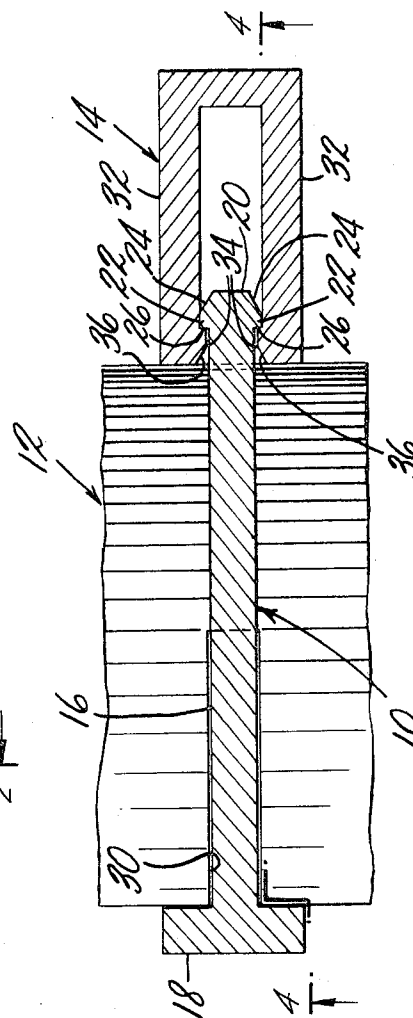


FIG. 3



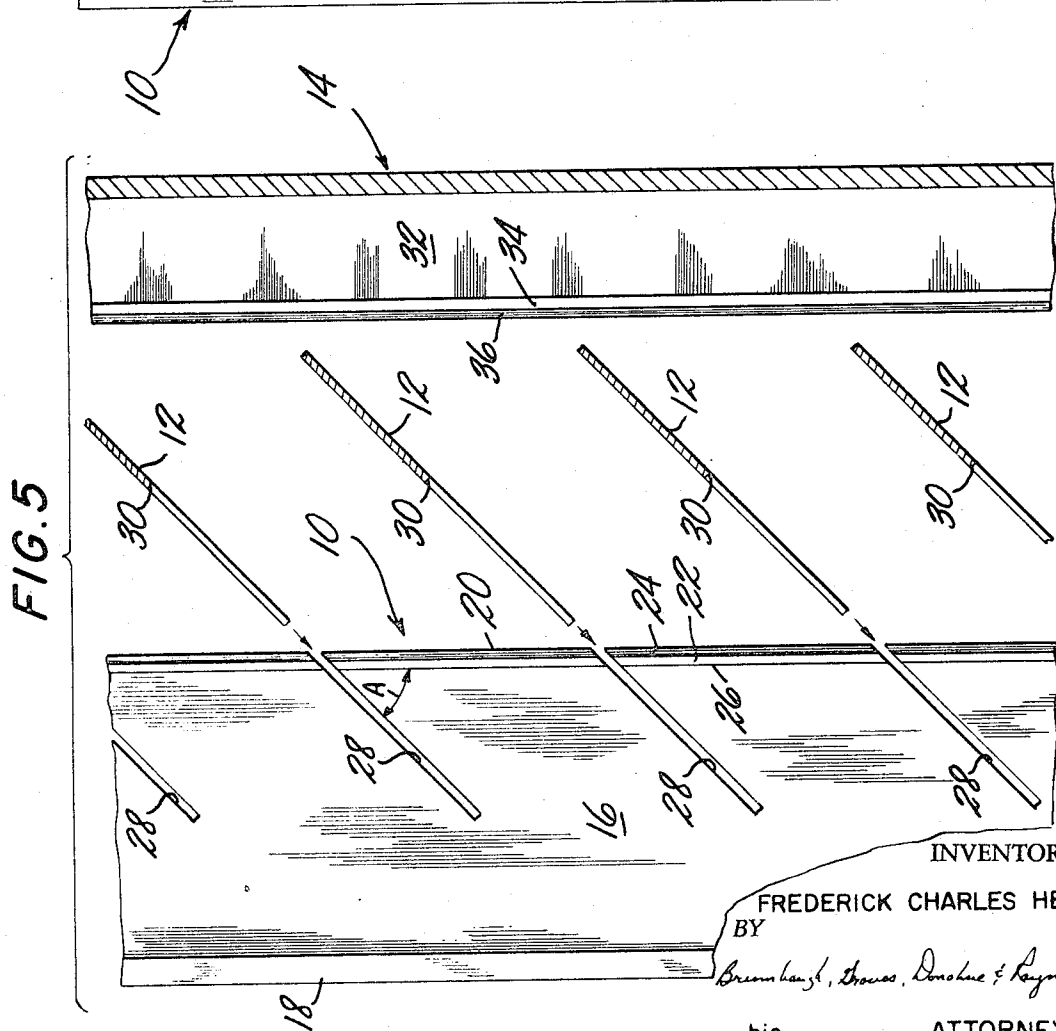
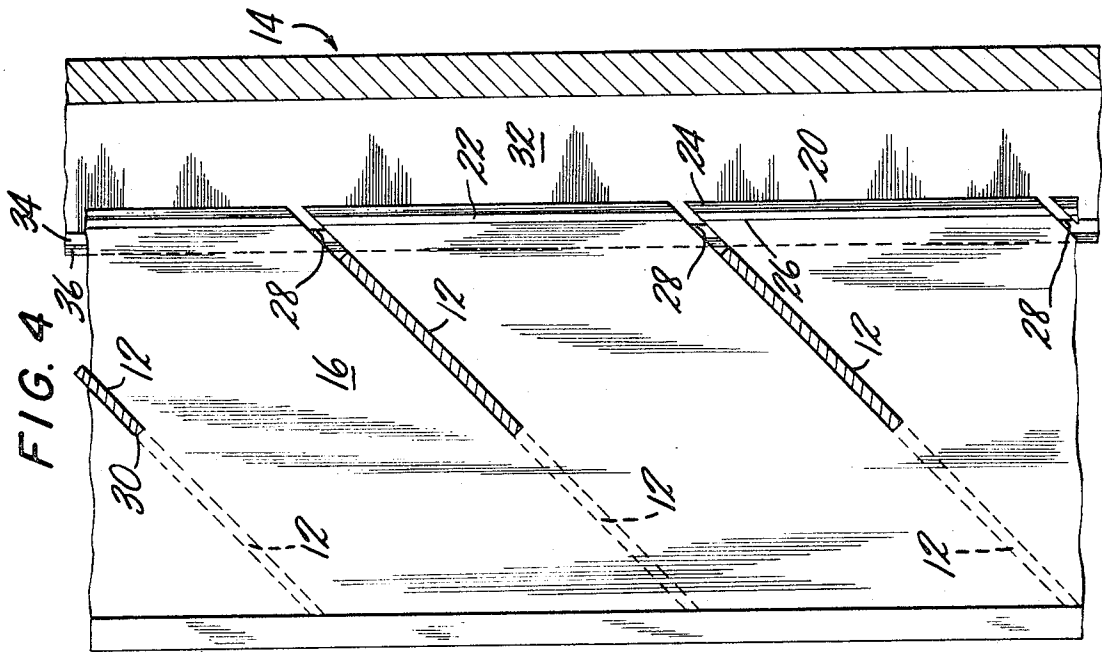
INVENTOR.
FREDERICK CHARLES HELWIG

BY

Brambaugh, Shores, Donohue & Raymond

his

ATTORNEYS



INVENTOR.

FREDERICK CHARLES HELWIG
BY

Brennhaugh, Brown, Donohue & Raymond

his

ATTORNEYS.

GRILLE

BACKGROUND OF THE INVENTION

This invention relates to grilles and, in particular, to grilles or louvers of the type that are used in connection with ventilation openings, as sunshades, building refacing, mechanical and air conditioning equipment screens and practically any other environment requiring a decorative and/or protective grille or louver structure.

Grilles or louvers of the type composed of a multiplicity of blades or vanes conventionally are assembled using clips, brackets, tabs and slots, screws, rivets or some other individual fastening element to connect each end of each blade to the sides of a peripheral frame. To assemble such grilles and louvers, a separate fastening operation is required to connect each end of each blade to a frame element. In addition to involving costly and intricate assembly techniques, which ordinarily must be hand-done, either in a plant or on site, many blade mounting arrangements are quite flimsy and can work loose over a period of time so that the blades can become dislocated or even break away from the frame.

SUMMARY OF THE INVENTION

There is provided, in accordance with the present invention, a grille or louver construction which eliminates much of the time-consuming and laborious individual securing of the blades to a frame or other form of support and which provides a highly rigid and durable construction capable of sustaining possible damage by severe weather or other potentially damaging conditions. Moreover, the grille, by reason of its construction, is amenable to a variety of attractive and purposeful designs of the blading and framing system. A grille, constructed according to the invention, is free of individual fasteners, brackets, clips or other individual, small connectors and presents a clean appearance, regardless of the position from which it is viewed, a feature that makes it particularly desirable for use in an environment in which visual attractiveness is important.

In accordance with the invention, a grille, louver or other open-type, bladed assembly (the term "grille" is used herein as a generic term covering various forms of bladed, open-work device) comprises a plurality of substantially parallel, spaced-apart bars, each of which includes, in cross-section, an elongated web portion and a flange at one end of the web portion that includes parts that extend laterally from each face of the web portion. A plurality of blades extends crosswise of the bars, the blades and bars being mutually slotted and interfitted in egg crate fashion; that is, each bar has a series of spaced-apart slots that are of a width substantially equal to the thickness of the blades and extend part-way across the width of the web, and the blades have slots of a width substantially equal to the web portion of the bars that extend part way across them widthwise. One edge of each blade engages the flanges along the edge of the bars that support it, and the other edge of each blade is engaged by a blade retainer that is substantially coextensive with and is secured to each bar.

An exemplary and preferred form of connection between the bars and the blade retainer is a snap-type

which enables the retainers to be pressed into place and to be retained by mutually engaging beads. One form of snap-type interconnection is provided by forming an enlargement along the edge of each bar that is opposite from the flange, such enlargement forming a pair of beads projecting laterally from each face of the web portion of the bar, and by the use of a blade retainer that includes a pair of interconnected, resilient members that define a slot between them and that have inwardly projecting beads that interlock with the beads on the bars. Such form of attachment between the bars and blade retainers offers the advantage of being quickly and easily assembled by simply snapping it into place, the resilient members of the blade retainer being deformed outwardly to enable the matching beads on the retainers and bars to pass each other and to permit the beads on the retainers to snap in behind the companion beads on the bars.

The bars are preferably extrusions and may be of metal, such as aluminum, or of an appropriate plastic. The retainer is also conveniently formed by extrusion, again from either a metal or a plastic. The blades can be strips of sheet material, may be flat or may have a curvature or bend in the transverse direction, in which case the slots in the web portion of the bars will be similarly formed; in the longitudinal direction they may be straight or may have angularly related portions, curves or other shapes that provide a desired design or functional effect. The grille can be constructed on various scales by appropriately dimensioning the parts. For use in association with ventilation, such as duct grilles or registers or as door louvers, for example, the bars and blades may measure, say, 1 inch across, the bars spaced several inches up to a foot or more apart, and the blades pitched at, say, 1 inch or so. On the other hand, the same form of construction can be employed to manufacture large-sized grilles having blades and bars of several inches in width with the bars spaced several feet apart and of several feet in length and with the blades pitched several inches apart. In general, however, the former scale offers the most significant advantages as far as cost saving, ease of manufacture, and so forth.

Inasmuch as the grille is composed of only three components, each of which is readily manufactured on a mass-production basis, it can be constructed at relatively low cost. Moreover, the form of construction is readily adapted to obtaining, with relatively little difficulty and expense, a wide variety of configurations and dimensions. In this regard, the bars can be easily cut from long extrusions to a desired length, suitable slots formed at a desired pitch in the bar, and companion slots formed at a desired spacing in the blades, all of these operations being rather conveniently variable to enable custom work to be performed at relatively modest cost. An important advantage of the grille is the ease of assembly; the blades are readily fitted to the bars by simply sliding them into place, and assembly of the grille is complete upon securing the blade retainers to the bars. A snap-in type of connection between the retainers and bars is particularly quick and easy to accomplish.

DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference may be made to the following description of an exemplary embodiment, taken in conjunction with the Figures of the accompanying drawings in which:

FIG. 1 is a front elevational view of a representative segment of a grille constructed according to the invention, portions of a center section of blades being broken away to reduce the size of the figure;

FIG. 2 is an end view in cross-section taken generally along a plane represented by the lines 2—2 of FIG. 1 and in the direction of the arrows;

FIG. 3 is a top view in section of a portion of the grille, the section being taken generally along a plane represented by the lines 3—3 and in the direction of the arrows and the view being on a larger scale than are FIGS. 1 and 2;

FIG. 4 is a fragmentary side view in section taken generally along a broken plane represented by the lines 4—4 of FIG. 3 and in the direction of the arrows; and

FIG. 5 is an exploded side view of a portion of the grille of FIGS. 1-4 and illustrating the manner in which the grille is assembled, the view being substantially identical to FIG. 4 except that it shows the parts separated.

DESCRIPTION OF AN EXEMPLARY EMBODIMENT

FIG. 1 of the drawings illustrates three sections or bays and a portion of a fourth bay of a grille and it will be readily apparent to those skilled in the art that additional repeats of the individual sections may be made to produce a grille of any desired length. Similarly, FIG. 1 illustrates only a portion of a grill, with respect to the vertical dimension.

The grille is composed of a multiplicity of each of three basic parts, bars 10, blades 12 and blade retainers 14. As may best be seen in FIG. 3, the bar part is an elongated member of substantially uniform cross-section and is T-shaped in cross-section, having a web portion 16, a flange 18 extending along one edge of the web portion 16 and an enlargement 20 extending along the opposite edge of the web portion. The enlargement is shaped to form a pair of beads 22 that project a small distance out from each face of the web portion 16. The flange 18 includes parts that extend outwardly from each face of the web portion 16; in the embodiment, the flange 18 is rectangular in cross-section and is substantially perpendicular to the web 16.

As described in greater detail below, the enlargement 20 along the edge of the web portion 16 of the bar 10 is one component of a snap-type connection by which the blade retainer 14 is secured to the bar 10. To this end, the enlargement 20 has a pair of angularly related faces 24 that face outwardly and rearwardly, relative to the web portion 16. The enlargement 20 further includes a shoulder or face 26 constituting the inner edge of each bead 22 and disposed substantially perpendicular to either face of the web 16.

As may best be observed in FIGS. 4 and 5 of the drawings, a series of spaced-apart parallel slots 28 extend part way across the bar in a forwardly and downwardly inclined direction from the enlargement edge of the bar. The slots have a width substantially

equal to the thickness of the blades 12 and form an angle "A" (FIG. 5) with the vertical axis of the bar, the angle corresponding to the desired slope of the blades.

In the illustrated embodiment, the blades 12 are elongated, flat, thin strips of metal or plastic and are of a length such that they extend slightly beyond adjacent pairs of bars 10. Each blade is supported by two adjacent bars, and the blades of alternate sections or bays of the grille are staggered relative to the blades of the remaining sections. This, however, is purely a matter of design, and the blades can readily be constructed to a length such that they extend across and are supported by several bars 10. In the illustrated embodiment each bay or section has blades that occupy only alternate possible positions, and again, the construction can be varied so that every appropriate blade position receives a blade. Thus, the embodiment is exemplary in that it depicts a grille design embodying a staggered pattern of blades of relatively short length and consequently illustrates the versatility of design that may be provided employing the grille construction according to the invention.

Each blade 12 has a slot 30 formed approximately half-way across its width-wise, substantially perpendicular to its longitudinal axis and located near each end. The distance between the slots 30 in each blade is equal to the desired pitch of the bars 10. The slots 28 in the bars and the slots 30 in the blades enable the blades to be interfitted with the bars in egg crate fashion by simply sliding the blades edgewise into the slots 28 of the bars with the blade slots 30 aligned with the webs of the bars, as represented by the arrows in FIG. 5 and with the result shown in FIG. 4. The dimensions of the slots 28 and 30 are such as to locate the downward and forward edge of each blade in engagement with the inside faces of the outwardly projecting parts of the flanges 18 of the bars 10.

Referring particularly to FIG. 3, the blade retainer part 14 of the grille is composed, in cross-section, of a pair of spaced-apart interconnected legs 32, the particular section of the embodiment being of generally U-shape and rectangular overall. The free edge of each leg 32 of the retainer 14 has an internal bead 34 that extends inwardly and presents a rearwardly facing shoulder or face that matches the shoulder 26 of the enlargement 20 of the bar part 10. The free end of each leg 32 also has an angularly related face 36 that matches the camming faces 24 at the edge of the bar 10. The companion beads 34 and 22 of the retainer 14 and the bar 10 secure the retainer 14 on the bar 10. The transverse dimension of each blade 12 is such that the upper and rearward edge is located, upon assembly of the blades onto the bars, to be engaged by the free ends of each leg 32 of the retainer.

It is apparent from the drawings and the foregoing description that each retainer 14 is assembled onto a bar 10 by lining it up with the enlargement edge of the bar and pressing it toward the bar, thereby to engage the companion angularly disposed camming surfaces 36 on each leg of the retainer 14 with the matching faces 24 of the bar 10. The angular orientation, relative to the major axes of the bar and retainer, of the faces wedges the leg 32 of the retainer 14 outwardly so that the beads 34 on the retainer leg 32 can pass the beads 22 on the enlargement 20 of the bar 10. The beads 34

on the legs 32 of the retainer 14 then will snap in behind the beads 22, thus securing the retainer 14 on the bar 10, the inherent resiliency of the retainer legs causing the beads 34 to snap into and stay in position as soon as the shoulders clear the shoulders 26 on the enlargement 20.

I claim:

1. A grille comprising a plurality of elongated spaced-apart parallel bars of substantially uniform cross-section, each bar having in cross-section a web portion, a flange portion at one edge of the web portion, the flange portion including parts that project laterally in opposite directions from the web portion, and an enlargement forming a pair of laterally projecting beads at the opposite edge of the web portion; a plurality of elongated blade retainers, one of which is received on the enlarged portion of each bar and each of which has in cross-section a pair of interconnected spaced-apart resilient legs, each leg having an enlarged portion forming a bead that projects toward the bead of the other leg, the beads of the enlargement on the bars and the bead on the legs of the blade retainers being positioned and shaped relative to each other to interengage and hold the retainers on the bars, and the legs being of a length and having a resiliency such that the retainers are receivable on the bars by pushing them laterally toward each other to snap the retainers in place on the bars; and a plurality of spaced-apart blades extending crosswise of the bars, the blades and bars being mutually slotted and interfitted in egg-crate fashion, opposite edge portions of each blade being engaged by the lateral projecting parts of at least two bars and by the ends of the legs of the retainers associated

with such bars thereby to capture and retain the blades on the bars, and the enlarged portions of corresponding bars and retainers being in engagement with each other to retain the retainers on the bars.

2. A grille according to claim 1 wherein the bars are generally T-shaped in cross-section, the flange being a portion substantially perpendicular to the web portion.

3. A grille according to claim 1 wherein the blade retainers are generally U-shaped in cross-section, the leg portions of the U being resiliently deflectable to enable the beads thereon to pass the beads on the enlargement of each bar and to be captured between the blade edges and the beads of the enlargement of each bar.

4. A grille according to claim 3 wherein the enlargement of each bar includes, in cross section, angularly related end faces, and wherein the bead on each leg of each blade retainer includes a face generally parallel to a corresponding face on the bar enlargement, such faces of the bar enlargement and the retainer legs being engageable upon assembly of a retainer on a blade and being adapted to cam the legs outwardly and enable the beads on the retainer to pass by the beads of the bars.

5. A grille according to claim 4 wherein the beads on each bar include faces disposed substantially perpendicular to the faces of the web portion and facing inwardly toward the web portion and wherein the beads on the retainer legs include faces substantially parallel to and engageable with the said faces on the corresponding bar face to secure the retainer on the corresponding bar.

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