

Nov. 8, 1938.

W. B. PIERCE

2,135,766

METHOD OF PRODUCING METAL GRILLES

Filed Feb. 7, 1935

Fig. 1.

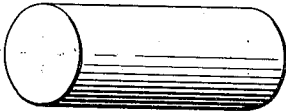


Fig. 2.

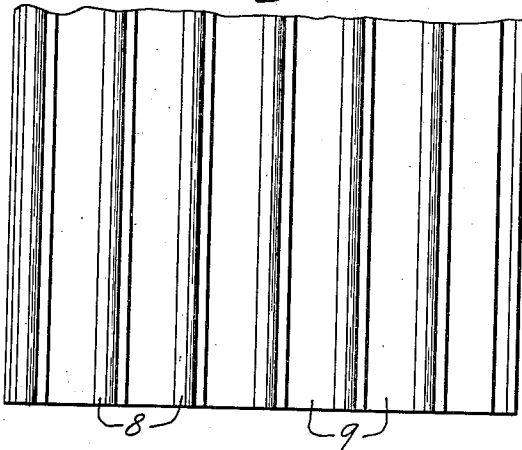


Fig. 6.

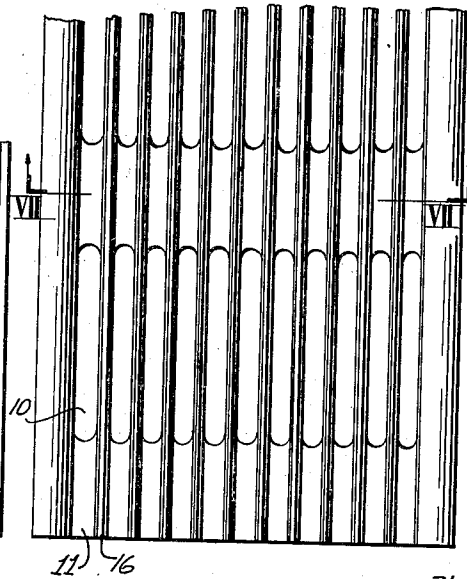


Fig. 3.



Fig. 4.

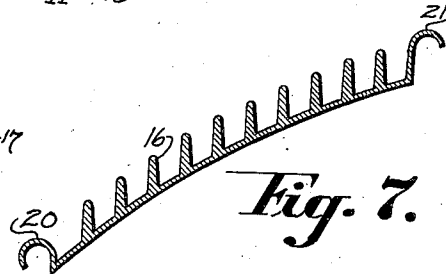
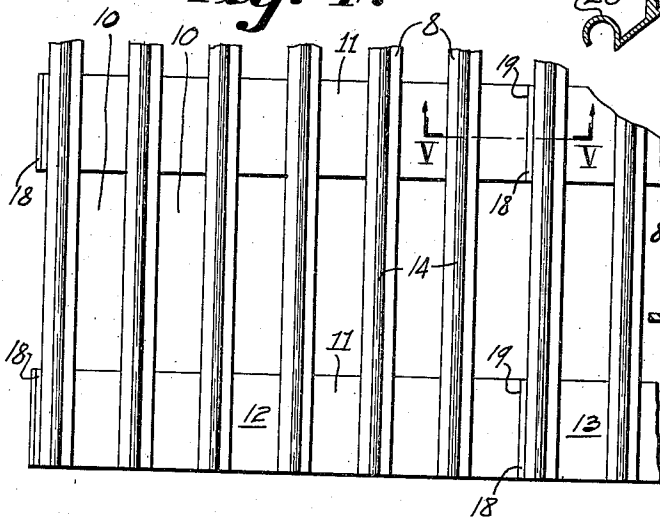
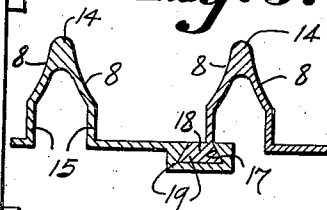


Fig. 7.

Fig. 5.



INVENTOR
WILLIAM B. PIERCE
BY *[Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE

2,135,766

METHOD OF PRODUCING METAL GRILLES

William B. Pierce, Detroit, Mich., assignor to
Aluminum Company of America, Pittsburgh,
Pa., a corporation of Pennsylvania

Application February 7, 1935, Serial No. 5,345

3 Claims. (Cl. 29-160)

This invention relates to metal working and forming and to articles produced thereby. It relates particularly to the production of an improved metal grille.

5 Metal grille heretofore has fallen into three general classes: cast or wrought, usually of iron; assembled, usually of woven rods or strips across the face of a shell or frame; and pierced sheet metal. The use of cast iron grille is largely limited by its weight and expense. Assembled grille is usually restricted in use by the multiplicity of parts and cost. Pierced and otherwise formed sheet metal grille has found wide application owing to its inexpensive nature, light weight and 10 general adaptability. There are, however, restricting factors which also limit the use of this material. The sheet stock being of uniform thickness makes reinforcing of particular parts difficult or impossible. It is customary to make the entire unit from a single sheet, as no simple and effective method of joining the thin sheet sections has been perfected. It is, of course, impossible to form a sheet grille comprising some members of greater thickness than the sheet from 25 which it is formed, and in some cases it is difficult to simulate solidity by forming the sheet, and this has restricted the possible field of design to an appreciable extent.

The object of my invention is to overcome these 30 difficulties and to provide an improved metal grille possessing, in combination, the desirable properties and characteristics of known types of grilles and possessing other new and desirable features. A further object is to produce a grille 35 of variable metal section to allow reinforcement of certain portions. Another object is to produce grille sections provided with integral means for neatly and rigidly joining adjacent sections. Still another object is to provide a simple and 40 inexpensive method of producing my improved metal grille.

I have found that metal grille consisting essentially of longitudinal and transverse members may be efficiently produced by a combination of metal 45 working steps comprising extrusion followed by blanking. By the terms "longitudinal" and "transverse" or "lateral" used herein and in the appended claims I have reference to the direction in which the metal flows from the extrusion die, the term "longitudinal" meaning parallel with the direction of flow. I have found this process particularly adaptable to the production of metal grille because it is possible to produce with the greatest fidelity variously shaped longitudinal 50 members connected with subsequent variously

contoured transverse members. It is simple to reinforce any member, either longitudinal or transverse, for greater utility and/or beauty with an extra thickness of metal by making proper allowance in the extrusion aperture. It is usually desirable and most practical to produce this grille in sections with means formed integral with the longitudinal edges of a section for joining sections together in a neat and strong manner, as will be described hereinafter. 5 10

I will describe my invention in connection with two preferred types of grilles as shown in the drawing, in which:

Fig. 1 depicts a metal billet;

Fig. 2 shows, in plan view, the imperforate 15 product of the first step of my method;

Fig. 3 is a transverse end view of Fig. 2;

Fig. 4 is a plan view showing a finished grille following the second step of my method in interlocked relationship with a similar section; 20

Fig. 5 is an enlarged sectional view along the line V—V of Fig. 4;

Fig. 6 shows, in plan view, another form of grille; and

Fig. 7 is a sectional view along the line VII—VII 25 of Fig. 6.

Referring to the drawing, Fig. 1 shows an extrusion billet of a suitable metal but preferably aluminum or alloys thereof. By using the process of extrusion as a first step it is possible to start 30 with substantially a crude cast or formed billet, thus eliminating any initial working of the metal to sheet form.

The billet, which in this case, by way of preferred example, is aluminum, is preferably preheated and extruded in known manner from a die to produce an imperforate extruded form such as is shown in Figs. 2 and 3. The parallel longitudinal blades 8 are produced in finished form after the shape of the die aperture and project 40 above the connecting web portion 9. The extruded plate may be cut to suitable lengths if desired.

Apertures 10 in the connecting web portion 9 are now blanked out to provide air passages and 45 to form spaced transverse members 11 of predetermined design. This operation may be performed by blanking dies, or portions of the web may be removed by machining. It is obvious that other means may be used in carrying out the blanking operation. The completed grille produced in two simple steps from billet is shown in Fig. 4, sections 12 and 13. 50

The design shown in Fig. 4 is useful as grille for ventilating openings, especially large and 55

prominently placed openings, such as, for example, for supplying conditioned air to public places which demand a pleasing, decorative front which allows free passage of air. This type of grille is also eminently satisfactory for automobile fronts and/or hood openings of present design. Fig. 5 shows, in an enlarged view, a cross section of blades 8. It will be observed that in forming these blades by extrusion it is possible to reinforce with extra metal the projecting edge or bead 14, making this solid to render the blades substantially dent-proof from small accidental impacts and at the same time to form the bifurcated base portions 15, giving a light and strong construction.

Another embodiment of my invention is shown in Figs. 6 and 7. This form is particularly adapted to decorative grille requiring a projected curved surface such as is desired in some types of automobile fronts. The blades 16 are slimmer than blades 8 with a bifurcated base portion shown in Fig. 4 and are made solid. The apertures may be of any other appropriate design, if desired. The curved end pieces 20 and 21 may be included as a means of holding the grille in position, or as a purely decorative part.

It is customary, owing to the greater expense of extruding sections of relatively great width, to produce relatively narrow longitudinal grille sections with means extruded integral with the section along the longitudinal edges for joining adjacent sections in assembled panels. Various forms of undercut locking portions of joining means are susceptible to formation during the extrusion step. In Figs. 2 and 3 the undercut groove 17 and the corresponding tongue 18 are an example of a means of effecting the dovetail joint which is substantially invisible when viewed from one side. Such a joint between adjacent sections 12 and 13 is illustrated at 19 of Figs. 4 and 5. It is not necessary that the locking means be shaped to lock as fitted together, but such means may consist of formed recesses which are locked by a subsequent rolling or pressing of the assembled joint. In this manner an extruded section may form a part of assemblies consisting of extruded and otherwise formed sections. It will be understood that many types of joining or locking means are possible in the extruded form, and while it is possible to build up a sectional grille of practically any size, it is, if desired, practical in many cases to produce the grille as a unit.

In the two preferred forms of grille which have been described and shown in the drawing the connecting web 9 between the longitudinal blades 8 or 13 is positioned at the base of the blades. This construction is usual in cases where the grille will ordinarily be viewed from one side only. However, the web may be placed in any position, and in case it is desired to produce a grille with a reversible pattern, that is, one which presents the same appearance from either side, the web may be formed in the center of the blade. In this case the blade projects from the plate in either direction. The blades may project upward a substantial distance from the web, or may pro-

ject scarcely any distance at all. It is, of course, possible to perforate the longitudinal members as well as the web portion. It will be clear that by proper design the transverse members 11 formed by aperturing the web need not necessarily be at right angles to the blades but may be at any angle in accordance with the desired design. Furthermore, it is practical to produce grille with blades arranged in a fan shape and not parallel. This may be accomplished by forming the grille after the blanking operation by crimping or otherwise shortening the effective length of the transverse connecting members by degrees, starting with the full desired shortening across the section at some desired point and shortening any intervening transverse members in progressive lesser amounts until the required form is attained. This graduated shortening of the connecting members draws the grille blades out of parallel relationship. The resulting shape produced by the progressive change in effective length of the transverse connecting members may be described as fan shape, although it may be formed in other shapes also by means of varying the length of the transverse connecting members.

By the method of my invention, comprising chiefly a combination of steps of extruding and blanking, it is possible to produce metal grille of improved design and improved appearance. It has been found that the extruded grille possesses the appearance of great depth and hiding power, valuable qualities in grille, and if obtainable in sheet metal grille are obtained only at great expense in the forming operation and in forming equipment. Moreover, by virtue of my method a more effective use of metal is possible in that only the necessary parts need be reinforced, and in this manner a grille possessing greater utility per unit weight is produced.

I claim:

1. A method of producing a fan-shaped metal grille, comprising the steps of extruding a longitudinal form consisting of projecting parallel blades connected by integral web portions and blanking out in said web spaced transverse connecting members and thereafter shaping to shorten some of said transverse members in progressive degree to produce a fan-shaped grille section.

2. A method of producing metal grille having a base portion and integral blades of varying wall thickness, said method comprising extruding metal from a die in the form of bifurcated parallel blades of varying wall thickness connected by a web, and simultaneously forming securing means on at least one edge of the metal.

3. A method of producing metal grille having a base portion and integral blades of varying wall thickness, said method comprising extruding metal from a die in the form of bifurcated parallel blades of varying wall thickness connected by a web, simultaneously forming securing means on at least one edge of the metal, and thereafter blanking out portions of the web.

WILLIAM B. PIERCE.