

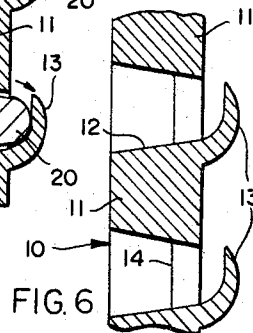
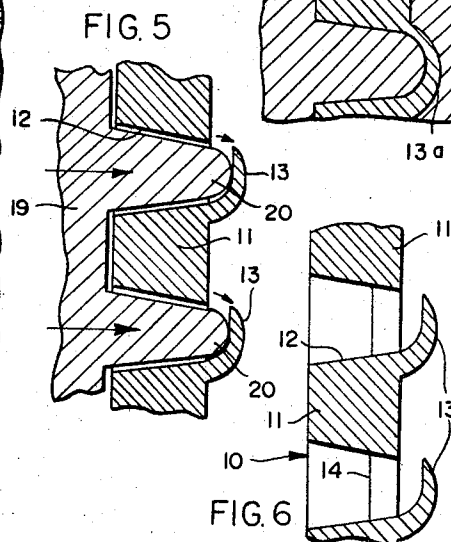
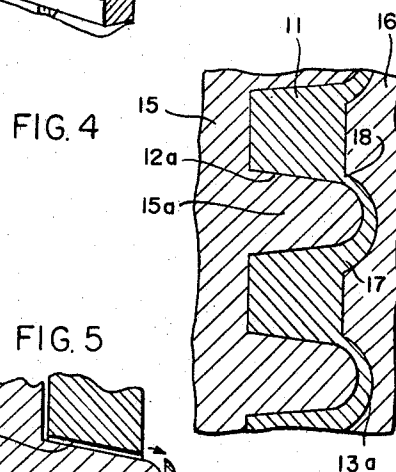
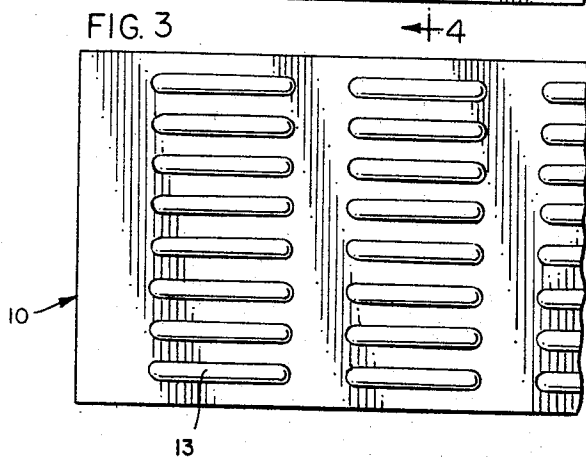
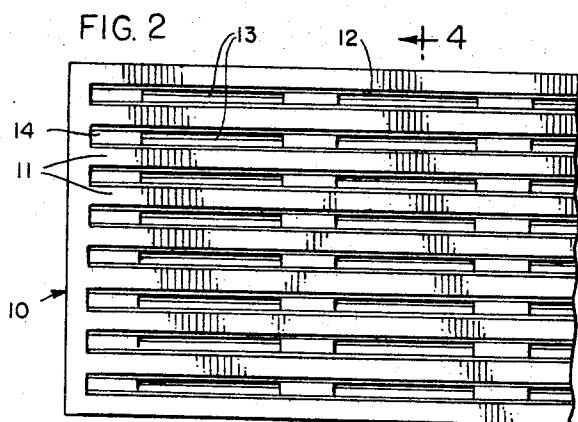
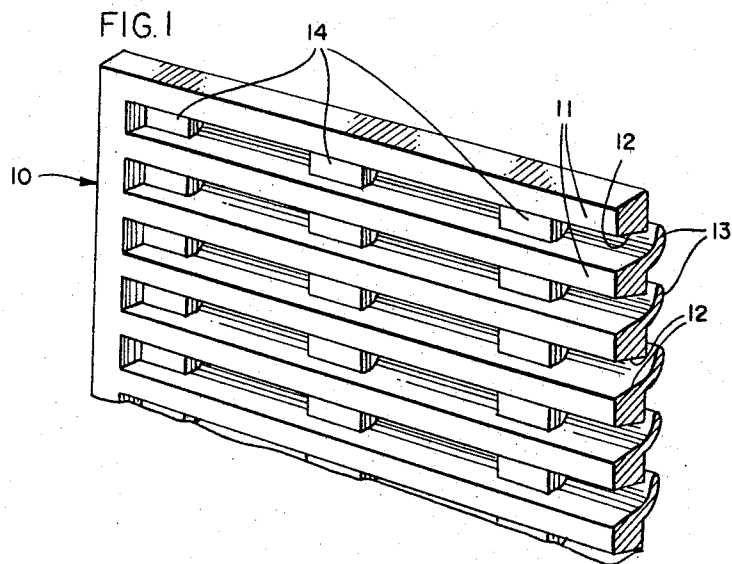
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METHOD OF MAKING A SPEAKER GRILL

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METHOD OF MAKING A SPEAKER GRILL
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ABSTRACT OF THE DISCLOSURE

Method of forming a cast speaker grill of unitary construction in which integral ribs are spaced behind the grill openings and extend along planes substantially parallel with the plane of the grill. The grill is first cast with integral webs closing off the openings thereof and merging with the partition portions along predetermined lines of structural weakness. Thereafter, the webs are urged rearwardly to cause fracture along said lines of weakness and to provide shielded openings in the grill.

Background of the invention

In the construction of radio and television receiver sets, it has become a common practice to utilize the decorative face panel or mask as a structural element to support internal components of the set. For such a dual purpose, the face panel must be rigid and strong as well as decorative. In general, plastics have not been considered satisfactory for the purpose because of inadequate strength and, if metal framing must be added to reinforce the plastic panel, then assembly and material costs are increased. Furthermore, there is the added disadvantage that the connections between assembled plastic and metal parts might become loose in use, producing possible vibrations during sound transmission as well as more serious hazards should any of the internal components of the set become exposed.

For these reasons, metal is generally considered to be a superior fabricating material for receiver face panels, both in terms of structure and function. In general, such metal face panels are cast rather than stamped, since stamping techniques are severely limited in the extent to which such panels may be provided with design detail.

Even casting such face panels is not free of shortcomings, however. The principal problem relates to the formation of the speaker grill area of such a panel. Mere openings in the panel for the emission of sound are considered aesthetically undesirable, not only because the speaker itself may be partially visible through such openings, but also because they attract a viewer's attention to the speaker area. In some cases, this is simply accepted as a disadvantage which must be tolerated, while in other instances manufacturers have attempted to reduce the problem by attaching to the panel some screening overlay in the area of the speaker openings. While such overlays may be desirable from the standpoint of appearance, their application requires an additional manufacturing step. Also, should an overlay work loose, vibrations might occur which would interfere with proper sound projection.

To overcome the need for providing additional covering elements for the openings of cast speaker grills, efforts have been made to cast such grills so that the openings are less noticeable and the speakers are not visible through such openings. One technique has been to cast a face panel with grill openings and with ribs projecting rearwardly behind such openings, and then, in a later manufacturing step, bend the ribs inwardly to partially block such openings. In general, such grill constructions are unacceptable because the material from which the face panels are cast is too brittle to permit bending the ribs

to the extent necessary to block visibility of the speaker and to protect the speaker should a child or some other person insert a pointed object through one of the openings. At best, such ribs can be bent only about 30 degrees before fracturing; not enough to adequately block the openings and protect the speaker. Also, it has been found that unless such ribs can be bent approximately 90 degrees, light tends to reflect off the bent ribs and increases rather than decreases the contrast between the openings and the remaining portions of the grill.

Summary of invention

It is therefore a principal object of the present invention to provide a method of making a cast face panel and speaker grill, which overcomes all of the aforementioned defects and disadvantages of prior constructions and methods. Specifically, it is an object to provide a unitary face plate and grill in which integral ribs are spaced directly behind the grill openings and extend along a plane or planes parallel with the face plate, thereby protecting the speaker from objects which might otherwise be inserted through such openings, and producing a face plate of aesthetically pleasing effect. In this connection, it is a specific object to provide a cast face panel and grill for television and radio receivers which has grill openings of ample size for the proper emission of sound but which has integral ribs disposed behind such openings, the ribs tending to conceal the presence of such openings and thereby contributing significantly to the overall appearance of the panel.

Another object lies in a method of making a speaker grill having the aforementioned advantages, such method involving the casting of the grills from materials which permit only limited bending of the protective ribs.

Drawings

FIGURE 1 is a fragmentary perspective view of a face panel for a television receiver and illustrating in particular the speaker grill area of that panel.

FIGURE 2 is a front elevational view of the grill area as shown in FIGURE 1.

FIGURE 3 is a rear elevational view of the grill portion of the face panel.

FIGURE 4 is an enlarged vertical sectional view taken along line 4—4 of FIGURE 2.

FIGURE 5 is an enlarged sectional view similar to FIGURE 4 but showing the step of bending the web portions of the grill rearwardly.

FIGURE 6 is an enlarged cross sectional view showing the grill after it has been completely formed.

Description

One aspect of the present invention lies in the recognition that a cast speaker grill with protected or shielded openings may be formed by first casting the grill with its openings completely closed by integral web portions, and then fracturing and bending the web portions into position in which openings are provided for the emission of sound, but in which the webs or ribs tend to block the passage of light or small objects through such openings. A further aspect of the invention lies in the discovery that such bending or flexure of the webs may be achieved with the alloys commonly used in the casting of face panels for television and radio sets without breaking the webs completely free from the body of the grill.

FIGURE 1 is a fragmentary perspective view showing a corner portion of a completed face panel or grill 10. It is to be understood that the grill portion illustrated in the drawings would normally constitute only one part of an integrally-cast face panel. Other portions of the face panel (not shown) would normally have a different appearance and design and would be provided with an en-

larged opening for the television tube or radio dial. Since the present invention is concerned only with the speaker grill section of such a panel, only that section is shown in the drawings.

As is well known in the art, the casting material is preferably a zinc alloy, primarily because such alloys may be cast at a lower temperature (approximately 800 degrees F.) than other materials such as brass or aluminum alloys. The high casting temperatures for other alloys tends to cause early fatigue stress of the dies, with the resulting heat checking and cracking of such dies. It is to be understood, however, that the invention is not limited to the use of zinc alloys and that other suitable materials having similar properties might also be used.

Grill 10 consists essentially of a cast metal plate having a plurality of elongated and closely spaced partitions 11. In the illustration given, such partitions extend horizontally and the plate is oriented in its position of intended use (i.e., in a vertical plane), although it is believed apparent that for some installations the speaker grill plate might be oriented horizontally, or if vertically, then the partitions might also extend vertically. In fact, during the casting process to be described hereinafter, it is preferable that the dies be positioned so that the plate to be formed extends along a vertical plane with the partitions 11 also extending vertically, thereby insuring the flow of metal into all spaces between the dies.

The straight, horizontally elongated partitions 11 are tapered in a forward direction to facilitate casting, and between the sloping surfaces of adjacent partitions are horizontally elongated openings 12. The openings pass completely through the plate; however, arcuate ribs 13 project rearwardly and upwardly from the rear surface of the plate behind each opening and therefore prevent the passage of light or objects through the plate openings in a horizontal and rearward direction. Ribs 13 are formed integrally with the plate and constitute upward and rearward extensions of the lower partition 11 of the spaced pair of such partitions defining each elongated opening.

Where the size of the speaker grill requires reinforcement for the partitions 11, integral spacer elements 14 may be provided. In such a case, the length of each elongated rib 13, and of the opening 12 which it shields, are limited to the distance between the spacer elements of the series. In the illustration given, three rows of spacer elements 14 are shown, each of the spacer elements being set back from the front face of the plate (or the front surfaces of the partitions) but having its rear surface flush with the rear of the plate, exclusive of ribs 13 (FIGURES 3 and 6).

Referring to FIGURE 6, it will be seen that each of the generally arcuate ribs 13 has its free end portion extending along a plane substantially parallel with the grill plate 10 and spaced rearwardly behind the partitions 11 of that plate. When the plate is disposed vertically as shown, objects positioned behind the plate cannot be viewed from the front side of the plate when the line of vision is substantially horizontal or angled downwardly from the horizontal. Not only do the ribs block visibility of objects or components disposed behind the plate, but they also prevent access to such objects by devices or materials which might be thrust rearwardly through openings 12. Thus, if a child should urge a rod or slender instrument rearwardly through openings 12, a speaker disposed behind the grill would be protected by the upwardly-extending ribs. The ribs would also tend to protect the speaker against dirt and other foreign particles, and even liquids, which might impinge on the front surface of the grill and otherwise pass rearwardly through the openings.

The grill is formed by the method steps illustrated in FIGURES 4 and 5 of the drawings. As a first step, the grill is cast as an integral unit between a pair of opposing dies 15 and 16. Die 15 is provided with projections 15a

which form recesses 12a in the grill, such recesses being subsequently extended (FIGURE 5) to provide the completed grill openings 12. In the casting stage of FIGURE 4, it will be noted that projections 15a, and hence recesses 17, extend rearwardly a distance greater than the horizontal depth of partitions 11. Also, webs 13a, later to become ribs 13, bridge adjacent partitions 11, being merged integrally with each pair of adjacent partitions.

The arcuate webs 13a are not of uniform thickness throughout their entire vertical (or transverse) extent. It will be seen that each web has a thickened base portion 17 merging with the partition therebelow and an upper portion 18 of substantially reduced thickness merging with the partition thereabove. The portion of reduced thickness 18 defines a line of structural weakness between each web and the partition thereabove, and it is this line of weakness which becomes a line of fracture during the subsequent bending step illustrated in FIGURE 5.

In the web fracturing and bending step, a suitable tool 19 having projections 20 is urged against the face of the plate with the projections passing rearwardly into recesses 12a. Continued movement of the tool with respect to the braced plate brings the ends of the projections 20 into contact with webs 13a, causing the upper portions of the webs to break away from the partitions 11 along the predetermined fracture lines. Rearward movement of the tool is continued until the newly-formed ribs 13 have flexed along substantially their entire transverse extent to bring the free upper end portions of the ribs into a plane or planes substantially parallel with the plate and spaced rearwardly behind the rear surfaces of partitions 11. Since the amount of bending necessary to achieve such a relationship, as illustrated in FIGURE 6, is not substantial, and since the bending of the ribs is distributed over at least a major portion of their vertical extent, it has been found that such bending may be readily achieved without producing unintentional fracturing of the ribs and without danger of breaking the ribs completely free from the plate. This is true despite the generally brittle character of the metals commonly used for casting.

While in the foregoing I have disclosed the structure and method of the present invention in considerable detail for purposes of illustration, it will be understood by those skilled in the art that many of these details may be varied without departing from the spirit and scope of the invention.

I claim:

1. In a method of forming a one-piece speaker grill, the steps comprising casting an integral metal plate having a plurality of recesses separated by elongated and substantially parallel partitions, each recess extending rearwardly into the plate from the front surface thereof and having a rearward extent at least as great as the rearward extent of the partitions bordering the same, each recess being closed at its rear end by a web integral with the bordering partitions and merging with one of such partitions along a predetermined line of weakness capable of fracturing upon the application of rearward force exerted upon said web, and thereafter forcing said web rearwardly to cause fracture along said line of weakness and to bend the web rearwardly to provide an opening through said plate.

2. The method of claim 1 in which the bending of each web is distributed throughout a major proportion of the transverse dimension thereof as measured between adjacent partitions.

3. The method of claim 1 in which each web is forced rearwardly following fracture until the free end portion thereof extends along a plane substantially parallel with said plate.

4. In a method of forming a one-piece speaker grill, the steps comprising casting a one-piece metal plate having a plurality of recesses separated by a plurality of elongated and substantially parallel partitions, each recess extending rearwardly into the plate from the front surface thereof and having a rearward extent at least as great

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as the rearward extent of the elongated partitions bordering the same, each recess being closed at its rear end by a web integral with a pair of bordering partitions and merging with one partition of the pair along a zone of reduced thickness and structural weakness, and thereafter simultaneously forcing all of the webs rearwardly to cause fracture of each web along its line of structural weakness, and continuing with the application of rearward force against all of said webs to simultaneously bend the same rearwardly and to provide a plurality of openings extending through said plate.

5. The method of claim 4 in which the application of rearward force against said webs is continued until the free edge portions of said webs extend along a plane parallel with said plate.

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6. The method of claim 4 in which the casting of said plate forms said webs in an arcuate shape extending rearwardly behind and between said partitions.

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