April 9, 1968 M. R. LANNERT 3,377,144

SPEAKER GRILL

Original Filed April 8, 1965

FIG. 1

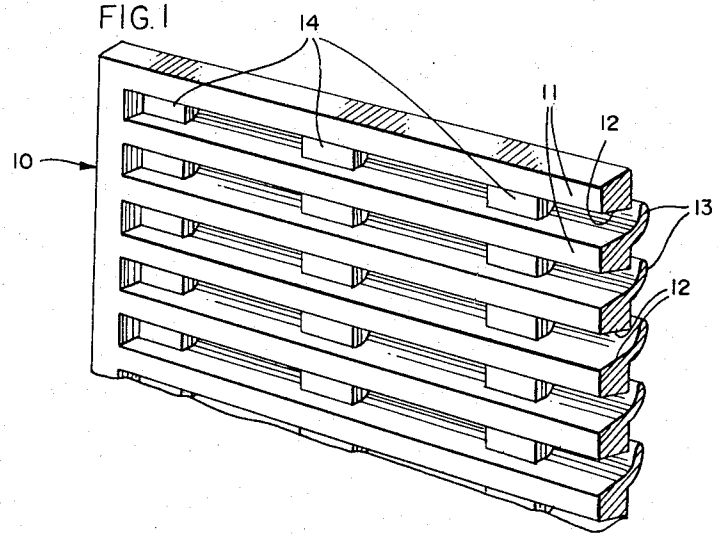


FIG. 2

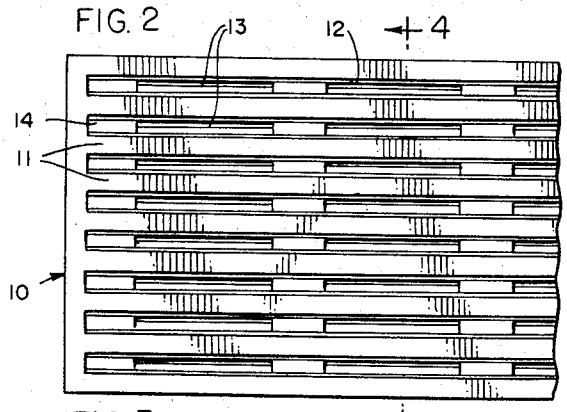


FIG. 3

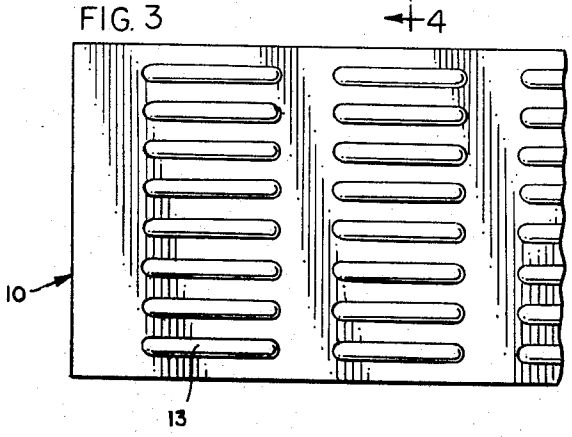


FIG. 4

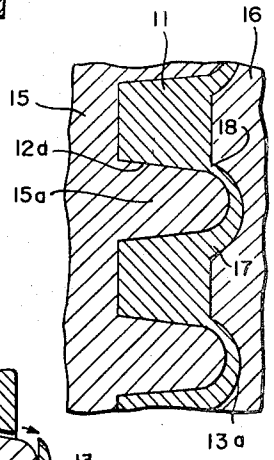
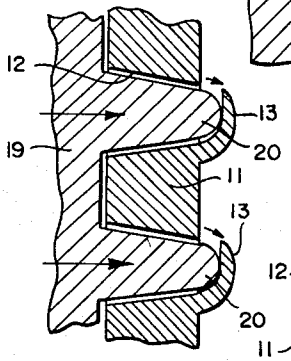


FIG. 5



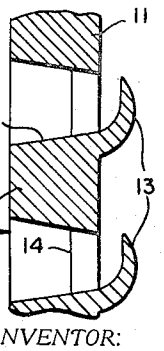


FIG. 6

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SPEAKER GRILL

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Original application Apr. 8, 1965, Ser. No. 446,641, now Patent No. 3,328,869, dated July 4, 1967. Divided and this application Mar. 20, 1967, Ser. No. 624,421
6 Claims. (Cl. 29—183)

ABSTRACT OF THE DISCLOSURE

A cast speaker grill having a plurality of horizontally elongated openings, each of the openings being partially closed at its rear by an integral horizontally elongated rib. Each of the ribs is generally arcuate in transverse cross section and has a free longitudinal edge portion generally parallel with the remainder of the grill and spaced rearwardly behind the rear surface of that grill. The ribs merge with partitions of the grill and extend rearwardly and upwardly behind the grill openings.

This application is a division of copending application Ser. No. 446,641, filed Apr. 8, 1965, now Patent No. 3,328,869.

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 loosen, 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 the invention

It is therefore a principal object of the present invention to provide a cast face panel and speaker grill which overcomes all of the aforementioned defects and disadvantages of prior constructions. 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.

The 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 positions 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 enlarged 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 horizonally 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 **15***a* which form recesses **12***a* 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 **15***a*, and hence recesses **17**, extend rearwardly a distance greater than the horizontal depth of partitions **11**. Also, webs **13***a*, later to become ribs **13**, bridge adjacent partitions **11**, being merged integraly with each pair of adjacent partitions.

The arcuate webs **13***a* 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 **12***a*. Continued movement of the tool with respect to the braced plate brings the ends of the projections **20** into contact with webs **13***a*, 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 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. A cast speaker grill comprising an integral metal plate having a plurality of elongated partitions spaced apart to define elongated openings between adjacent pairs thereof, each of said openings being partially closed by an elongated rib integral with one partition of each pair of adjacent partitions, said ribs each having free edge portions generally parallel with said plate and spaced rearwardly behind said partitions.

2. The structure of claim **1** in which each of said ribs is generally arcuate in transverse cross section.

3. The structure of claim **1** in which each of said ribs merges along its lower portion with one of said partitions and extends rearwardly and upwardly therebehind.

4. A cast speaker grill comprising an integral metal plate having front and rear surfaces and having a plurality of horizontally elongated partitions arranged in vertically spaced series to define a plurality of horizontally elongated openings therebetween, said openings extending through said plate and being partially closed at

their rear ends by a plurality of horizontally elongated ribs formed integrally with said partitions, said ribs each having a free longitudinal edge portion generally parallel with said plate and spaced rearwardly behind the rear surfaces of said partitions.

5. The structure of claim 4 in which each of said ribs is generally arcuate in transverse cross section.

6. The structure of claim 4 in which each of said ribs merges along its lower portion with one of said partitions and extends rearwardly and upwardly therebehind.

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