US 20050167477A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2005/0167477 A1

Collins et al. (43) Pub. Date: Aug. 4, 2005

(54) PLUG

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(21) Appl. No.: **11/045,336**

(22) Filed: **Jan. 31, 2005**

Related U.S. Application Data

(60) Provisional application No. 60/540,063, filed on Jan. 30, 2004.

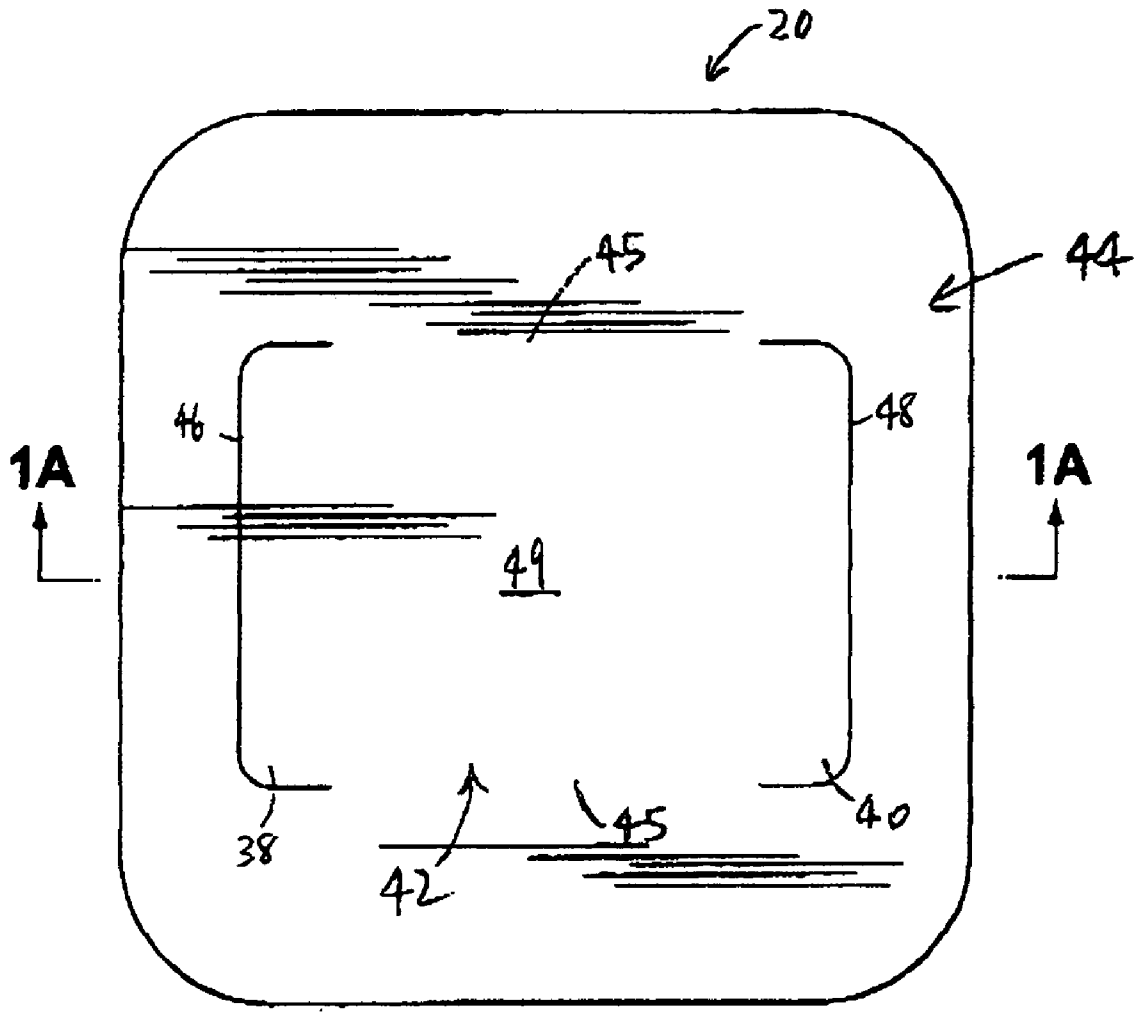
Publication Classification

(51) **Int. Cl.**[7] **B65D 5/46**

(52) **U.S. Cl.** **229/117.13**

(57) **ABSTRACT**

A plug for impeding transmission through an aperture defined by an edge in a panel. The plug is substantially elastic, and has a central portion and a peripheral portion attached to the central portion by one or more bridge portions. The central portion and the peripheral portion are separated from each other along two or more cuts. Also, the central portion includes a middle part and two or more flap parts extending from the middle part, the flap parts being defined by the cuts. The flap parts are positioned to grip the edge after the flap parts have been deformed and released in the aperture.



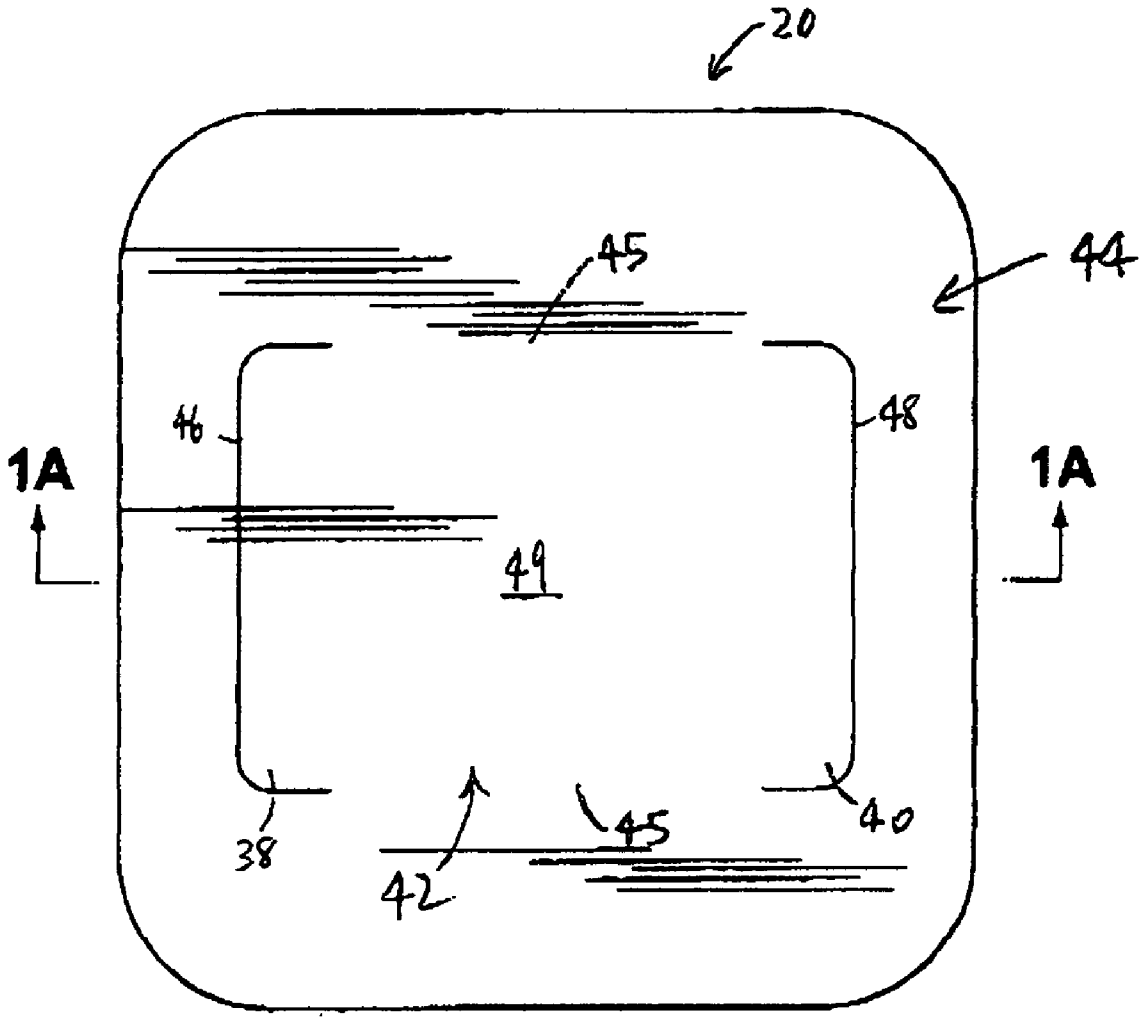


FIG. 1

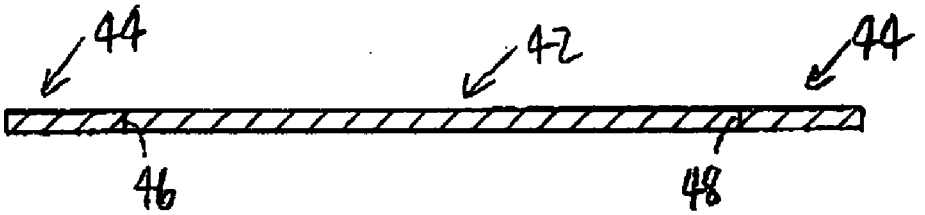


FIG. 1A

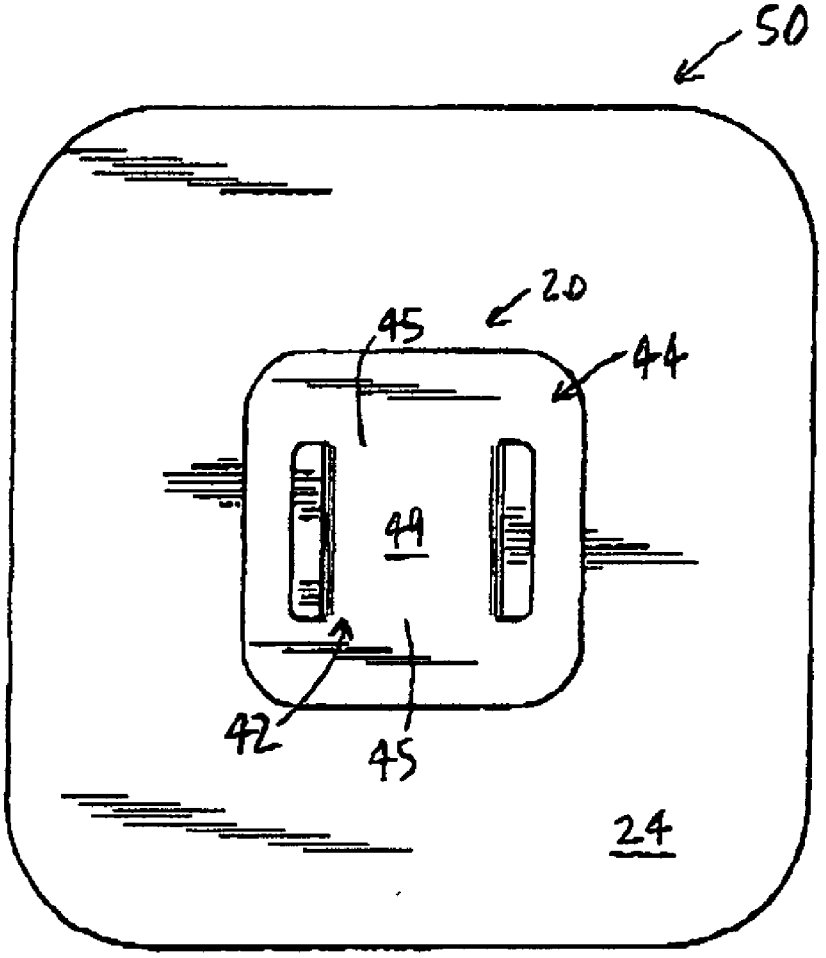


FIG. 2

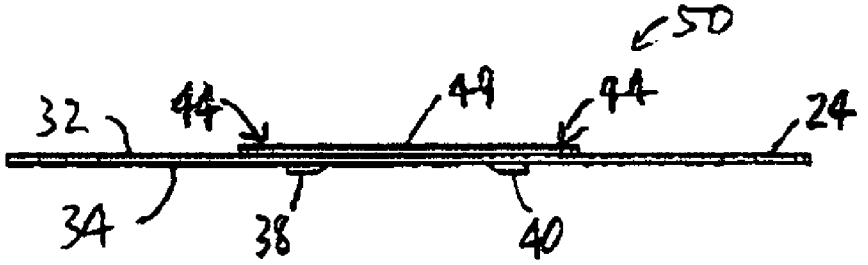


FIG. 3

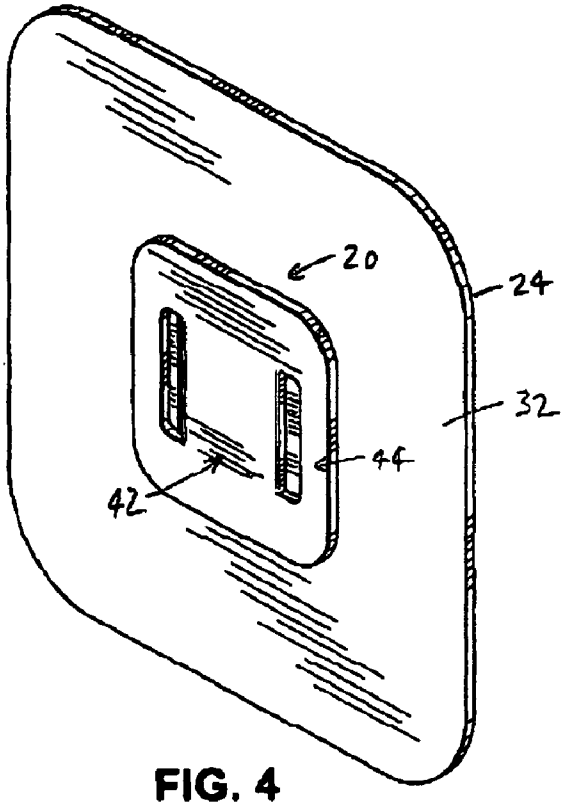


FIG. 4

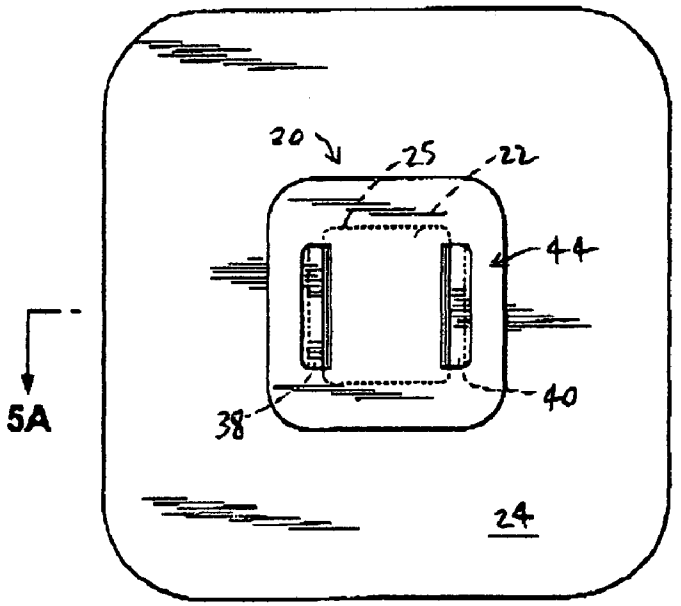


FIG. 5

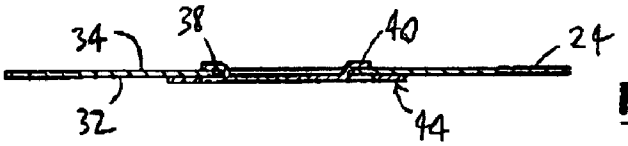


FIG. 5A

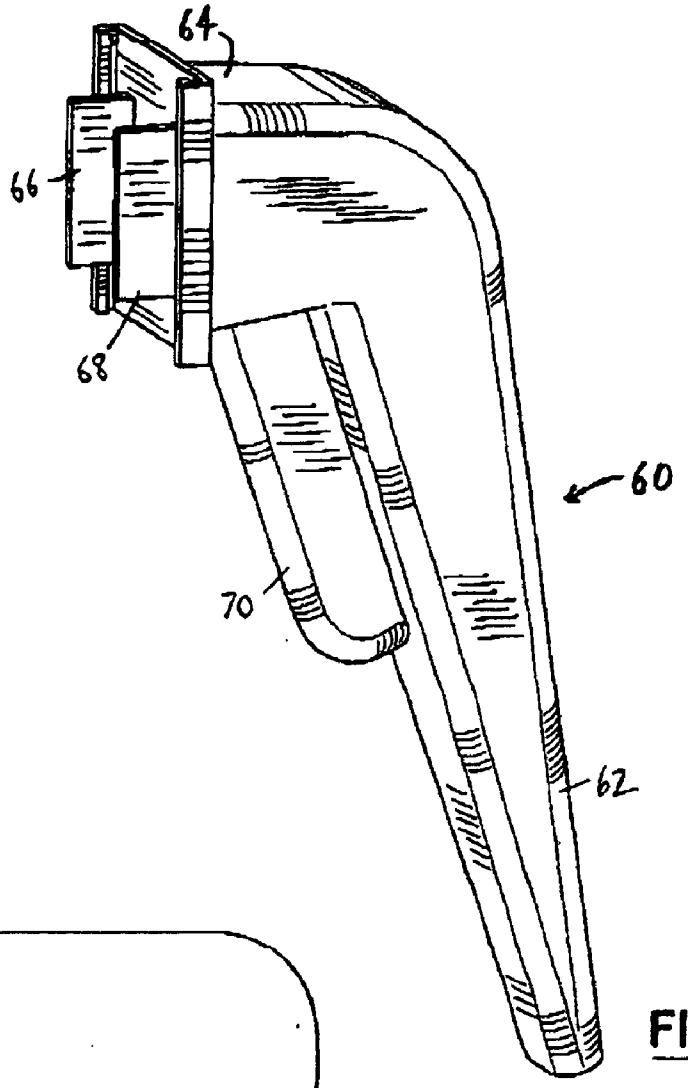


FIG. 7

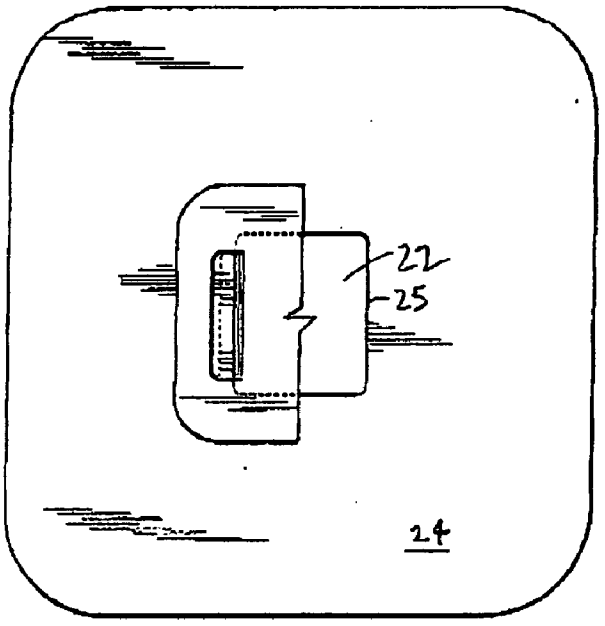


FIG. 6

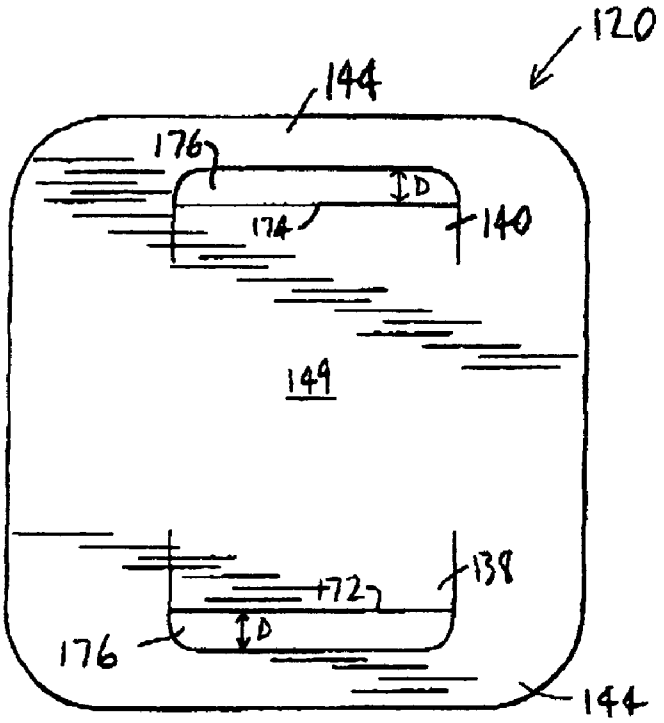

120
144
176
D
174
140
149
138
172
D
176
144

FIG. 8

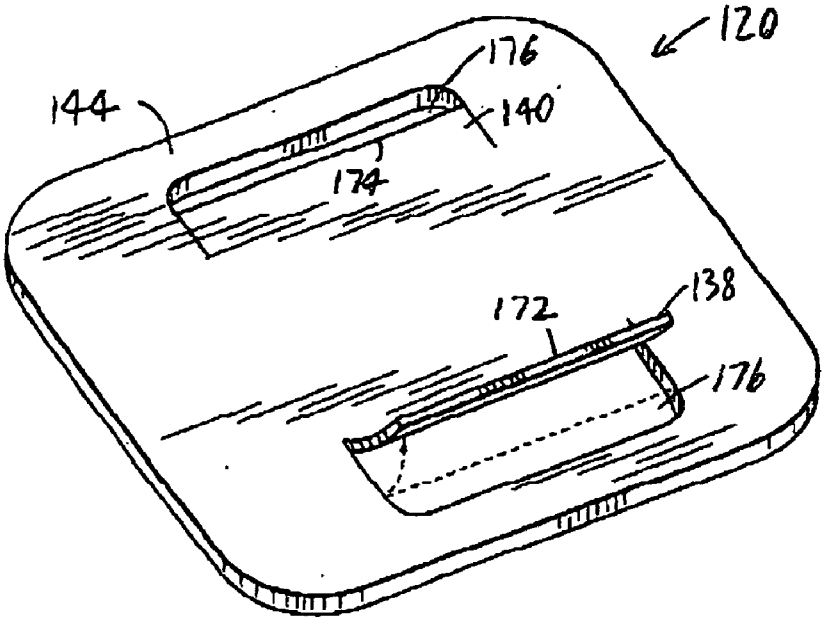

120
176
144
140
174
172
138
176

FIG. 9

PLUG

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 60/540,063, filed Jan. 30, 2004.

FIELD OF THE INVENTION

[0002] This invention is related to a plug for impeding transmission of sound and material through an aperture.

BACKGROUND OF THE INVENTION

[0003] Panels, such as a panel inside an automobile door, are included in a structure to strengthen its or for other purposes, such as enclosing an open volume. Such panels are usually made of sheet metal or any other suitable material, and typically include one ox more apertures. The apertures may be included in the panel to provide access, to enable pass-through, for reducing the panel's weight, or for other reasons. Typically, apertures in a panel in an automobile door vary from approximately one inch or less in diameter up to eight to ten inches in diameter, or greater.

[0004] Sound Is transmittable through the apertures, however, and depending on the structure and its use, the transmission of sound through an aperture in a panel may be undesirable. For example, "road noise" may be transmitted through the apertures in the panel inside an automobile door, to a passenger compartment adjacent to the door. In addition, the transmission of material through the apes is undesirable. For example, dust may move through the apertures from the exterior of the automobile, ultimately moving into the passenger compartment. Also, air flow through the apertures is undesirable, as this may lead to undesirable cooling or warming of the passenger compartment. (For the purposes hereof, "transmission of sound and material" shall be understood to include air flow through the aperture.)

[0005] Different approaches to reducing the transmission of road noise and material through panel apertures are known. For example, mastic patches are typically made of plastic or any suitable material, and formed to be slightly larger than the aperture to be covered. Mastic or any other suitable adhesive is placed on one side of the mastic patch. The adhesive side of the mastic patch is placed over the aperture in question, and is held in place by the adhesive. One disadvantage with mastic patches is that, if the patch is not properly aligned on the aperture, the patch may only partially cover the aperture, thereby significantly reducing its effectiveness. Also, it is sometimes necessary to remove a patch (i.e., to permit maintenance or repair), and mastic patches can be difficult to remove. Yet another disadvantage is that a mastic patch typically cannot be reused after it is removed.

[0006] Another approach in the prior art is to provide plugs formed to fit in the aperture, and which are held in place by a series of retention tabs which cooperate with the edges of the aperture. This type of plug is more likely to be installed properly than the mastic patch. Also, such plugs can be designed for relatively easy removal and reuse. However, these plugs require expensive tooling to manufacture, and the cost of each plug is relatively high.

[0007] There is therefore a need for an improved plug for impeding transmission of sound and material through an aperture in a panel.

SUMMARY OF THE INVENTION

[0008] In one of its aspects, the invention provides a plug for impeding transmission of sound and material through an aperture in a panel. The aperture is defined by one or more edges. The plug has a central portion comprising a substantially elastic material and a peripheral portion attached to the central portion by one or more bridge portions comprising a substantially elastic material. The central portion and the peripheral portion are separated from each other along two or more cuts. The central portion includes a middle part and two or more flap parts extending from the middle part, and the flap parts are defined by the cuts. The flap parts are positioned to grip the edge (or edges) after the flap parts have been deformed and released in the aperture, so that the middle part is located in the aperture by the flap parts.

[0009] In another aspect, each of the flap parts includes an outer segment located distal to the middle part The outer segments are spaced apart from the peripheral portion by a preselected distance respectively to facilitate deformation of the flap parts.

[0010] In yet another aspect, the flap parts are disposed substantially opposite to each other so that, upon the flap parts having been deformed and released in The aperture to engage the edge respectively, the flap parts hold the middle part substantially over the aperture.

[0011] In another of its aspects, the peripheral portion is adapted to engage a first side of the panel. Also, the flap parts are positioned for engaging a second side of the panel (the second side being positioned opposite to the first side) at the edge of the aperture respectively. The panel is received between the peripheral portion and the flap parts upon releasing the deformed flap parts in the aperture, thereby causing the panel to be gripped between We peripheral portion and the flap parts. The middle part is positioned over the aperture by the flap par.

[0012] In yet another of its aspects, the flap parts are biased to a rest position in which the flap parts are substantially coplanar with the middle part and the peripheral portion. The flap parts are positioned for engagement with the edge (or edges) of the aperture so that, upon deformation of the flap parts and release of the flap parts in the aperture, the flap parts urge the peripheral portion against the first side of the panel.

[0013] In another aspect, the invention includes a panel assembly having a panel with an aperture defined by one or more edges. The panel has a first side and an opposed second side. The panel assembly also includes a plug having a central portion and a peripheral portion. The central portion includes two or more flap parts and a middle part connecting the flap parts, which are made of a substantially elastic material. The peripheral portion substantially surrounds the central portion, and the peripheral portion and the central portion are connected to each other. Also, the flap parts are spaced apart a predetermined distance for engaging the aperture's edge. The plug is mountable on the panel upon deformation of the flap parts, insertion of the flap parts through the aperture, and release of the deformed flap parts. Each of the flap parts is sufficiently elastic that, acting through the middle part, each of the flap parts urges the peripheral portion against the first side of the panel when the flap parts are engaged with the second side, thereby maintaining the middle part over the aperture.

[0014] In yet another of its aspects, the invention includes a method of forming a plug for impeding transmission through an aperture in a panel. The method includes the steps of, first, selecting a substantially planar blank of a substantially elastic material. The blank has predetermined dimensions so that the blank is sufficiently large to cover the aperture and a predetermined area of the panel substantially surrounding the aperture. Second, two or more cuts are to be formed in the blank according to a predetermined pattern to define the flap pans. The flap pans and a middle part therebetween form a central portion of the plug. Also formed is a peripheral portion substantially surrounding the central portion and connected to the central portion at the middle part.

[0015] In another aspect, the invention includes a method of forming a plug for impeding transmission through an aperture in a panel. The method comprises the steps of, first, selecting a substantially planar blank of a substantially elastic material. The blank should preferably be sufficiently large to cover the aperture and a predetermined area of the panel substantially surrounding the aperture. Next, two or more cuts are formed in the blank to define two or more flap parts. The flap parts are included in a central portion and extend from a middle part of the central portion. Also formed is a removal portion of the blank extending from an outer segment of each flap part. Each outer segment is positioned distal to the middle part. Finally, the removal portion is removed so that each outer segment of the flap parts is spaced apart from the peripheral portion by a predetermined distance, to facilitate deformation of the flap parts.

[0016] In yet another of its aspects, the invention provides a plug for impeding transmission through an aperture in a panel. The aperture is defined by one or more edges. The plug has a central portion comprising a substantially elastic material and a peripheral portion attached to the central portion by one or more bridge portions also comprising a substantially elastic material. The central portion and the peripheral portion are separated from each other along one or more cuts. In addition, the central portion includes a middle part and one or more flap parts extending from the middle part. The flap part is defined by the cut. The flap part is positioned to grip the edge at the flap part is deformed and released in the aperture, so that the middle part is positioned in the aperture by the flap part.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The invention will be better understood with reference to the drawings, in which:

[0018] **FIG. 1** is an elevation view of a preferred embodiment of the plug of the invention;

[0019] **FIG. 1A** is a cross-section of the plug of **FIG. 1**, taken along line **1A-1A** in **FIG. 1**;

[0020] **FIG. 2** is a view of a first side of a panel with the plug of **FIG. 1** mounted on the panel to form a panel assembly;

[0021] **FIG. 3** is a side view of the panel assembly of **FIG. 2**;

[0022] **FIG. 4** is an isometric view of the panel assembly of **FIG. 2**;

[0023] **FIG. 5** is a view of the panel assembly of **FIG. 2** showing the outline of an aperture in dashed lines;

[0024] **FIG. 5A** is a cross-section of the assembly of **FIG. 5**, taken along line **5A-5A** in **FIG. 5**;

[0025] **FIG. 6** is a view of the panel assembly of **FIG. 2** with the plug partially cut away, showing the position of the aperture in the panel;

[0026] **FIG. 7** is an isometric view of a preferred embodiment of a plug insertion tool of the invention;

[0027] **FIG. 8** is an elevation view of an alternative embodiment of the plug; and

[0028] **FIG. 9** is an isometric view of the plug of **FIG. 8**, with one flap part lifted.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0029] Reference is first made to **FIGS. 1, 1A, 2-5, 5A**, and **6** to describe a preferred embodiment of a plug indicated generally by the numeral **20** in accordance with the invention. As can be seen in **FIGS. 2-5, 5A**, and **6**, the plug **20** is for covering an aperture **22** in a panel **24** to impede the transmission of sound and material through the aperture **22**. The aperture **22** is defined by one or more edges **25** (**FIGS. 5 and 6**). The plug **20** preferably has two or more flap parts **38, 40** included in a substantially elastic central portion **42** and a substantially elastic peripheral portion **44**. In the preferred embodiment, the peripheral portion **44** is attached to the central portion **42** by bridge portions **45**, and the peripheral portion **44** and the central portion **42** are also separated from each other along cuts **46, 48**. As can be seen in **FIG. 1**, the cuts **46, 48** define the flap parts **38, 40**. Also, the central portion **42** preferably includes a middle part **49** from which the flap parts **38, 40** extend. The flap parts **38, 40** are positioned to grip the edge **25** after the flap parts **38, 40** have been deformed and released in the aperture **22**, so that the middle part **49** is located in the aperture by the flap parts **38, 40**, as will be described.

[0030] As can be seen in **FIGS. 5, 5A**, and **6**, the aperture **22** can be defined by one or more edges **25**. It will be understood that the aperture **22** shown in the drawings is exemplary, and the aperture **22** can have any shape. Preferably, the flap parts **38, 40** are disposed substantially opposite to each other so that, upon the flap parts **38, 40** having been deformed and released in the aperture **22** to engage the edge **25** respectively, the two flap parts hold the middle part **49** substantially over the aperture **22**. As can be seen in **FIGS. 5, 5A**, and **6**, once in position, the middle part **49** impedes transmission (i.e., of sound and material, including air flow) through the aperture **22**.

[0031] As can be seen in **FIGS. 2-5** and **5A**, the panel **24** has a fog side **32** and an opposed second side **34**. The flap parts **38, 40** are positioned for engaging the second side **34** of the panel **24** at, and/or proximal to, the edge **25**. The edge **25** is at least partially located on the second side **34**. In the preferred embodiment, the peripheral portion **44**, which substantially surrounds the central portion **42**, is adapted to engage the first side **32** of the panel **34**. Also, the flap parts **38, 40** are positioned for engaging the second side **34** at the edge **25** respectively. As shown in **FIG. 5A**, once the flap parts **38, 40** are deformed and released in the aperture **22**,

due to elastic memory of the flap parts **39**, **40**, the flap parts **38**, **40** engage the second side **34**, and the panel **24** is received and gripped between the peripheral portion **44** and the flap parts **38**, **40**.

[**0032**] As can be seen in **FIG. 1A**, the flap parts **38**. **40** are biased to a rest position **(FIG. 1A)** in which the flap parts **38**, **40** are substantially coplanar with the middle part **49** and the peripheral portion **44**. Upon deformation of the flap parts **38**, **40** and release in the aperture **22** of the flap parts **38**, **40**, the flap parts **38**, **40** urge the peripheral portion **44** against the first side **32** of the panel **24**, and the middle part **49** is held substantially over the aperture **22**.

[**0033**] A panel assembly **50 (FIGS. 2-5)** consists of the panel **24** with the plug **20** mounted thereon

[**0034**] Preferably, the plug **20** is made of any suitable elastic material—i.e., any material that is able to return to its original shape after experiencing strain and removal of deforming stress (sometimes referred to as elasticity memory), such as any flexible or semi-flexible plastic material with as least some acoustic barrier capability, i.e., some ability to impede the transmission of sound therethrough. Any thermoplastics or other plastics (recycled or otherwise) with these characteristics (including "hard" plastics), or rubber or rubber-based materials with these characteristics, would be suitable materials. In the preferred embodiment, the plug **20** is cut out of a sheet of elastic material. The cuts in the material can be made using dies or by any other suitable means. The substantially elastic material preferably has a thickness of between approximately 0.020 inch and 0.120 inch. It will be appreciated by those skilled in the art that the plug **20** can be formed to cover apertures in a variety of shapes, and that the cuts can be made in any suitable pattern.

[**0035**] Although forming the plug **20** out of an integral sheet of elastic material is the most economic way to create the plug **20**, other methods of creating the plug **20** will be apparent to those skilled in the art. For example, if desired, the peripheral portion **44** could be made of a material which is not the same as the material comprising the central portion **42**. The peripheral portion **44** is not necessarily made of a substantially elastic material, although it is preferred. The flap parts **38**, **40** and the bridge portions **45** should be made of a substantially elastic material, however.

[**0036**] It will be understood that, although the preferred embodiment of the plug **20** includes two or more flap parts **38**, **40**, a plug **20** including only one flap past could be used, depending on the shape of the aperture **22** and the shape of the flap part.

[**0037**] In use, the plug **20** can be mounted on the panel **24** in different ways. For example, the flap parts **38**, **40** could be squeezed by a thumb and an index finger respectively. The flap parts **38**, **40** are then positioned inside the aperture **22**, and subsequently released. The elastic memory of the plug **20** causer the flap par **38**, **40** to engage the second side **34** of the panel **24** near the edge **25** of the aperture **22**. Also, the elastic memory of the plug **20** causes the peripheral portion **44** to engage the first side **32** of the panel **24**.

[**0038**] Alternatively, the outer edges of the plug **20** near the flap parts **38**, **40** could be pulled outwardly, and the flap parts **38**, **40** then slid into the aperture **22**, to engage the second side **34** of the panel **24**.

[**0039**] Another approach would be to position the plug **20** so that the central portion **42** is over the aperture **22**, and then push on the central portion **42**. This pushes the flap parts **38**, **40** into the aperture **22**, where they engage the second side **34** due to elasticity memory of the plug **20**.

[**0040**] It is preferred that the plug **20** is mounted in the aperture **22** manually. However, such mounting can also be effected using a plug insertion tool **60**, shown in **FIG. 7**. The tool **60** includes a handle **62** and a distal or end portion **64** in which two prongs **66**, **68** arc positioned. In general, the tool **60** is adapted to mount the plug **20** on the panel **24**, in any and all of the ways described above.

[**0041**] For example, in the preferred embodiment, the prongs **66**, **68** are transversely movable (relative to the handle **62**), and such transverse movement is controlled via a trigger **70** on the tool **60**. A user (not shown) places the plug **20** on the tool **60** by inserting the prongs **66**, **68** into the cuts **46**, **48**. When the trigger **70** is pressed, the prongs **66**, **68** move towards each other, thereby squeezing the flap parts **38**, **40** and the middle part **49**. This causes the flap parts **38**, **40** to bend, or deform, and the user inserts the end **64** into the aperture **22**, so that the deformed flap parts **38**, **40** are adjacent to the second side **34** of the panel **24**. However, at the same time, the peripheral portion **44** remains adjacent to the first side **32** of the panel **24**. With the end **64** in the aperture **22**, the user releases the trigger **70**, causing the prongs **66**, **68** to move apart, thereby permitting the flap parts **38**, **40** to engage the second side **34** at, or in the vicinity of, the edge **25** of the a **22**.

[**0042**] Preferably, the tool **60** also is adapted to extend the prongs **66**, **68** outwardly from the end portion **64** upon activation, preferably via the trigger **70** or similar activation means. The tool **60** is preferably also adapted to retract the extended prongs **66**, **68** (not shown), also upon appropriate activation by the user. With the plug **20** on the tool **60** (i.e., the prongs **66**, **68** inserted into the cuts **46**, **48**), the forward movement, or extension, of the prongs **66**, **68** is initiated, so that the flap parts **38**, **40** are inserted into the aperture **22** when the prongs **66**, **68** move forwardly.

[**0043**] Preferably, when the extended prongs **66**, **68** are positioned in the aperture **22**, the extended prongs **66**, **68** are moved apart (upon appropriate activation by the user) so that the flap parts **38**, **40** will engage the second side **34** of the panel **24**. The prongs **66**, **68** are subsequently retracted out of the aperture **22** (i.e., into the end portion **64**), leaving the plug **20** mounted on the panel **24**.

[**0044**] Au additional embodiment of the invention is shown in **FIGS. 8 and 9**. In **FIGS. 8 and 9**, elements are numbered so as to correspond to like elements shown in **FIGS. 1, 1A, 2-5, 5A** and **6**.

[**0045**] As shown in **FIG. 8**, in an alternative embodiment **120** of the plug, each of the flap parts **138**, **140** includes an outer segment **172**, **174** positioned distal to the middle part **149**. The outer segments **172**, **174** are spaced apart respectively from the peripheral portion **144** by a preselected distance (designated as "D" in **FIG. 8**) across a gap **176** to facilitate deformation of the flap parts **138**, **140**. Deformation of the flap part **138** is shown in **FIG. 9**. The gap **176** between the outer segments **172**, **174** and the peripheral portion **144** is beneficial because, where the plug **120** is to be mounted manually, a user (not shown) can more easily

grasp the flap parts **138**, **140** by first inserting the user's index finger and thumb (not shown) into the gaps **176**. The plug **120** could also be mounted using the too) **60**.

[**0046**] It will be appreciated by those skilled in the art that the invention can take many forms, and that such forms are within the scope of the invention as claimed. Therefore, the spirit and scope of the appended claims should not be limited to the description of the preferred version contained herein.

We claim:

1. A plug for impeding transmission through an aperture in a panel, the aperture being defined by at least one edge, the plug having:

a central portion comprising a substantially elastic material;

a peripheral portion attached to the central portion by at least one bridge portion comprising a substantially elastic material, the central portion and the peripheral portion being separated from each other along at least two cuts;

the central portion including a middle part and at least two flap parts extending from said middle part, said at least two cuts defining said at least two flap parts; and

said at least two flap parts being positioned to grip said at least one edge after said at least two flap parts have been deformed and released in the

whereby the middle part is located in the aperture by said at least two flap parts.

2. A plug according to claim 1 in which each of said at least two flap parts includes an outer segment distal to the middle part, the outer segments being spaced apart from the peripheral portion by a preselected distance respectively, to facilitate deformation of said at least two flap parts.

3. A plug for impeding transmission through an aperture in a panel, the aperture being defined by at least one edge, the plug having:

a central portion comprising a substantially elastic material;

a peripheral portion attached to the central portion by at least one bridge portion, the bridge portion comprising a substantially elastic material, the central portion and the peripheral portion being separated from each other along at least two cuts;

the central portion including a middle part and at least two flap parts extending from said middle part, said at least two cuts defining said at least two flap parts; and

said at least two flap parts being disposed substantially opposite to each other such that, upon said at least two flap parts having been deformed and released in the aperture to engage said at least one edge respectively, said at least two flap parts hold the middle part substantially over the aperture,

whereby the middle part impedes transmission through the aperture.

4. A plug according to claim 3 in which each of said at least two flap parts includes an outer segment distal to the middle pat, the outer segments being spaced apart from the peripheral portion by a preselected distance respectively, to facilitate deformation of said at least two flap parts.

5. A plug for impeding transmission through an aperture in a panel, the aperture being defined by at least one edge, the panel having a first side and an opposed second side, the plug having;

at least two substantially elastic flap parts;

a central portion including said at least two flap parts, said at least two flap parts being connected to each other by a middle part of the central portion;

a peripheral portion substantially surrounding the central portion and connected to the central portion by a bridge portion;

the peripheral portion being adapted to engage the first side of the panel; and

said at least two flap parts being positioned for engaging the second side of the panel at said at least one edge respectively, said at least two flap parts being deformable such that the panel is received between the peripheral portion and said at least two flap parts upon releasing said at least two deformed flap parts in the aperture, thereby causing the panel to be gripped between the peripheral portion and said at least two flap parts,

whereby the middle part is positioned over the aperture by said at least two flap parts.

6. A plug according to claim 5 in which each of said at least two flap parts includes an outer segment distal to the middle pay the outer segments being spaced apart from the peripheral portion by a preselected distance respectively, to facilitate deformation of said at least two flap parts.

7. A plug for impeding transmission through an aperture in a panel, the aperture being defined by at least two substantially opposed edges, the panel having a first side and a second side, the plug having:

at least two substantially elastic flap parts;

a central portion including a middle part and said at least tvo flap parts, said at least two flap parts attached to the middle part;

a peripheral portion substantially surrounding the central portion, and connected to the central portion;

each of said at least two flap parts being biased to a rest position in which said at least two flap parts are substantially coplanar with the middle part and the peripheral portion; and

said at least two flap parts being positioned for engagement with said at least two edges such that, upon deformation of said at least two flap parts and release of aid at least two flap parts in the, said at least two flap parts urge the peripheral portion against the first side of the panel,

whereby the middle part is held substantially over the aperture to impede transmission through the aperture.

8. A plug according to claim 7 in which each of said at least two flap parts includes an outer segment distal to the middle part, the outer segments being spaced apart from the peripheral portion by a preselected distance respectively, to facilitate deformation of said at least two flap parts.

9. A panel assembly including:

a panel with an aperture defined by at least one edge, the panel having a first side and an opposed second side;

a plug having:

a central portion including at least two flap parts, the central portion having a middle part connecting said at least two flap parts, said at least two flap parts comprising a substantially elastic material;

a peripheral portion substantially surrounding the central portion, the peripheral portion and the central portion being connected to each other;

said at least two flap parts being spaced apart a predetermined distance for engaging said at least two edges;

the plug being mountable on the panel upon deformation of said at least two flap parts, insertion of said at least two flap parts through the aperture, and release of said at least two deformed flap parts; and

each of said at least two flap parts being sufficiently elastic that, acting through the middle part, said at least two flap parts urge the peripheral portion against the first side of the panel, thereby maintaining the middle part over the aperture,

whereby the middle part substantially impedes the transmission through the aperture.

10. A panel assembly according to claim 9 in which each of said at least two flap parts includes an outer segment distal to the middle part, the outer segments being spaced apart from the peripheral portion by a preselected distance respectively, to facilitate deformation of said at least two flap parts.

11. A plug for impeding transmission through an aperture, the aperture being defined by at least one edge, the plug having:

a substantially elastic central portion with a middle part and at least two flap parts extending from the middle part;

a peripheral portion connected to the middle part and substantially surrounding the central portion;

said at least two flap parts being positioned for engagement with said at least one edge at substantially opposed sides of the aperture, such that the panel is receivable between said at least two flap parts and the peripheral portion; and

said at least two flap parts being deformable and, upon deformation thereof and release of said at least two flap parts in the aperture, said at least two flap parts engage the panel and cause the peripheral portion to engage the panel,

whereby the middle part impedes transmission through the aperture.

12. A plug according to claim 11 in which each of said at least two flap parts includes an outer segment distal to the middle par; the outer segments being spaced apart from the peripheral portion by a preselected distance respectively, to facilitate deformation of said at least two flap parts.

13. A method of forming a plug for impeding transmission through an aperture in a panel, the method comprising the steps of:

(a) selecting a substantially planar blank of a substantially elastic material, the blank having predetermined dimensions such that the blank is sufficiently large to cover the aperture; and

(b) forming at least two cuts in the blank according to a predetermined pattern to define at least two flap parts, said at least two flap pans and a middle part therebetween forming a central portion of the plug, and a peripheral portion substantially surrounding the central portion and connected to the central portion at the middle part.

14. A method of forming a plug for impeding transmission through an aperture in a panel, the method comprising the steps of.

(a) selecting a substantially planar blank of a substantially elastic material, the blank being sufficiently large to cover the aperture and a predetermined area of the panel substantially surrounding the aperture;

(b) forming at least two cuts in the blank to define:

at least two flap pars, said at least two flap parts being included in a central portion and extending from a middle part of the central portion;

a removal portion extending from an outer segment of each flap part, each outer segment being positioned distal to the middle part, and the peripheral portion; and

(c) removing the removal portion such that each outer segment of said at least two flap parts is spaced apart from the peripheral portion, to facilitate deformation of said at least two flap parts.

15. A method of mounting a substantially elastic plug on a panel, the plug being adapted to impede transmission through an aperture in the panel, the aperture being defined by at least one edge, the method comprising the steps of:

(a) squeezing at least two flap pans of the plug to deform said at least two flap parts, said at least two flap parts extending from a middle part of a central portion of the plug:

(b) inserting said at least two flap parts into the aperture; and

(c) releasing said at least two flap parts in the aperture, said at least two flap parts engaging said at least one edge to hold the middle part over the aperture.

16. A method of mounting a substantially elastic plug on a panel, the plug being adapted to impede transmission through an aperture in the panel, the aperture being defined by at least one edge, the method comprising the steps of:

(a) providing the plug, the plug having:

a central portion comprising a substantially elastic material;

a peripheral portion comprising a substantially elastic material attached to the central portion by at least one bridge portion, the central portion and the peripheral portion being separated from each other along at least two cuts;

the central portion including a middle part and at least two flap parts extending from said middle part, said

at least two cuts defining said at least two flap parts in accordance with a predetermined pattern; and

said at least two flap parts being positioned to grip said at least one edge after said at least two flap parts have been deformed and released in the aperture;

(b) providing a tool having:

a handle;

at least two prongs mounted on a distal end of the handle, said at least two prongs being adapted to deform said at least two flaps;

(c) engaging said at least two prongs wit said at least two flap parts to deform said at least two flap parts;

(d) inserting the distal end of the tool into the aperture, with said at least two flap parts deformed by said at least two prongs;

(e) releasing said at least two flap parts from said at least two prongs, to permit said at least two flap parts to engage said at least one edge to hold the middle part over the aperture; and

(f) removing the distal end of the tool from the aperture.

17. A tool for mounting a substantially elastic plug having at least two flap parts spaced apart from each other, the tool having:

a handle;

at least two prongs mounted on a distal end of the handle, said at least two prongs being adapted to move between a closed position, in which said at least two flap parts are engaged by said at least two prongs respectively to deform said at least two flap parts, and an open position, in which said at least two prongs are disengaged from said at least two flap parts; and

means for controlling movement of said at least two prongs.

18. A plug for impeding transmission through an aperture; in a panel, the aperture being defined by at least one edge, the plug having:

a central portion comprising a substantially elastic material;

a peripheral portion attached to the central portion by at least one bridge portion comprising a substantially elastic material, the central portion and the peripheral portion being separated from each other along at least one cut;

the central portion including a middle part and at least one flap part extending from said middle part, said at least one cut defining said at least one flap part; and

said at least one flap part being positioned to gyp said at least one edge after said at least one flap part has been deformed and released in the aperture,

whereby the middle part is located in the aperture by said at least one flap part.

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