May 30, 1939. A. P. BALL 2,160,636

TRIM PANEL ASSEMBLY

Filed Nov. 18, 1935 4 Sheets-Sheet 1

Fig. 1

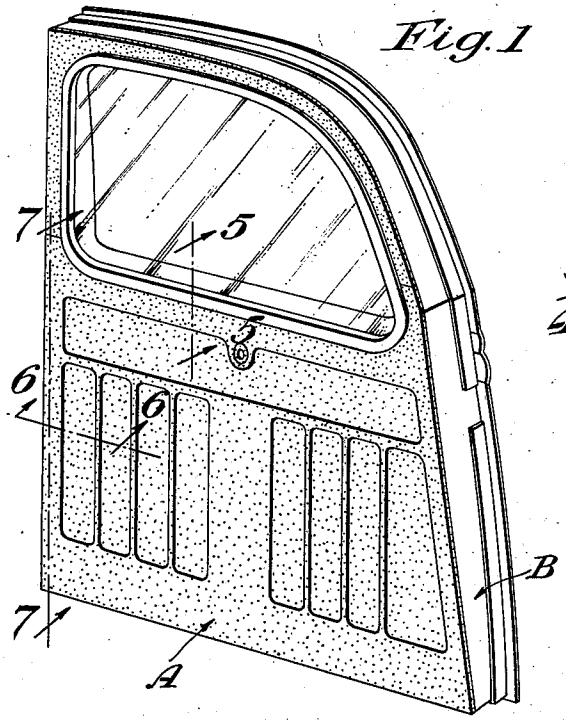


Fig. 2

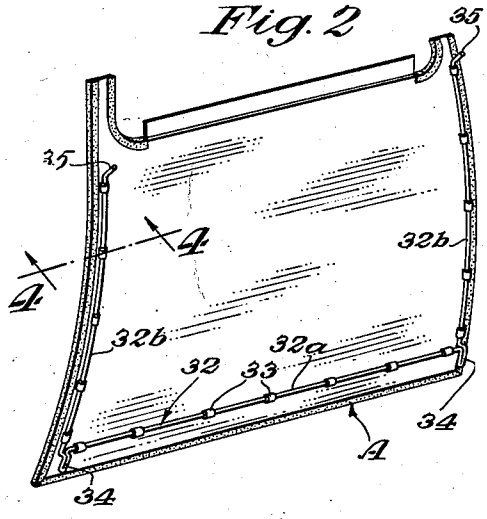


Fig. 4

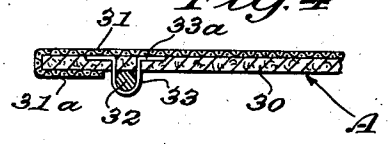


Fig. 3

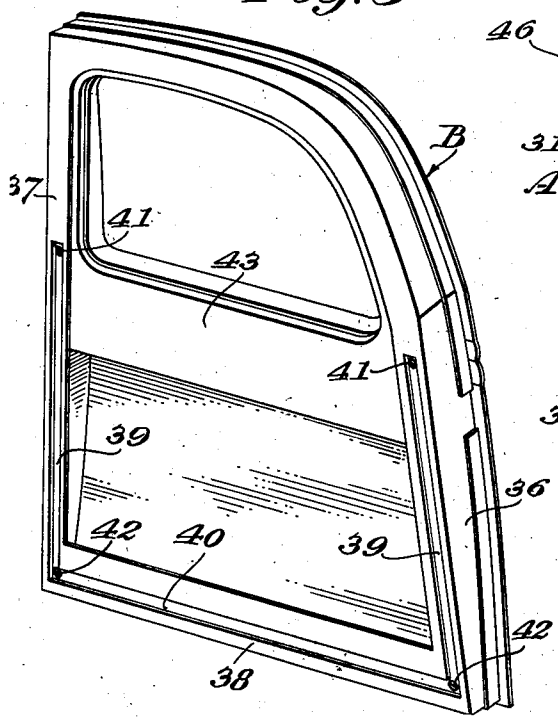


Fig. 5

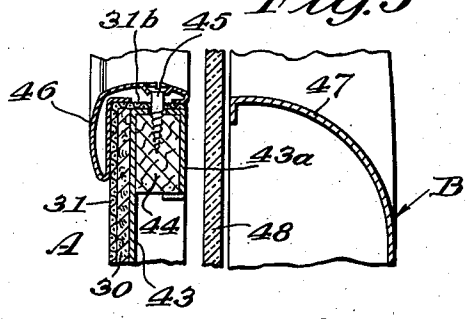
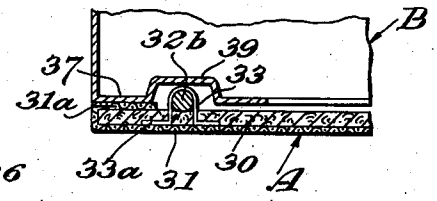


Fig. 6



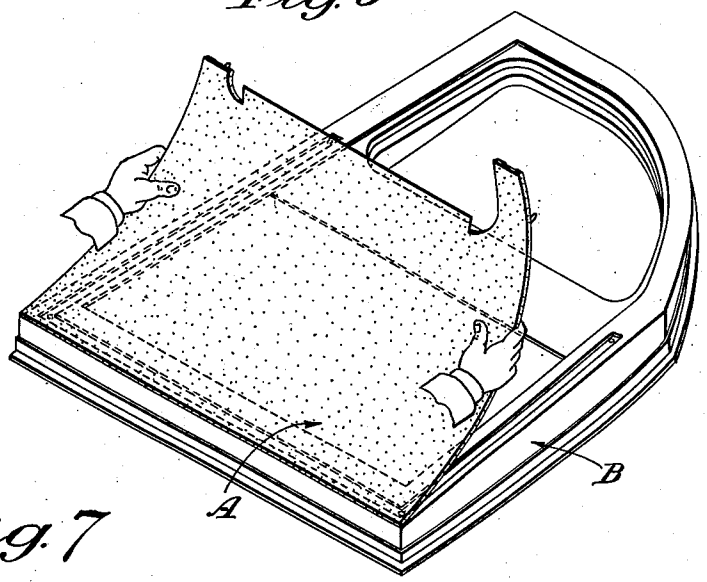
INVENTOR.
Albert P. Ball
BY
Dike, Calver & Gray
ATTORNEY.

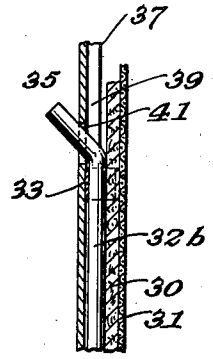
May 30, 1939. A. P. BALL 2,160,636

TRIM PANEL ASSEMBLY

Filed Nov. 18, 1935 4 Sheets-Sheet 2

Fig. 8





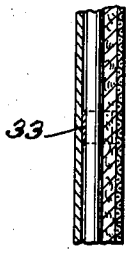
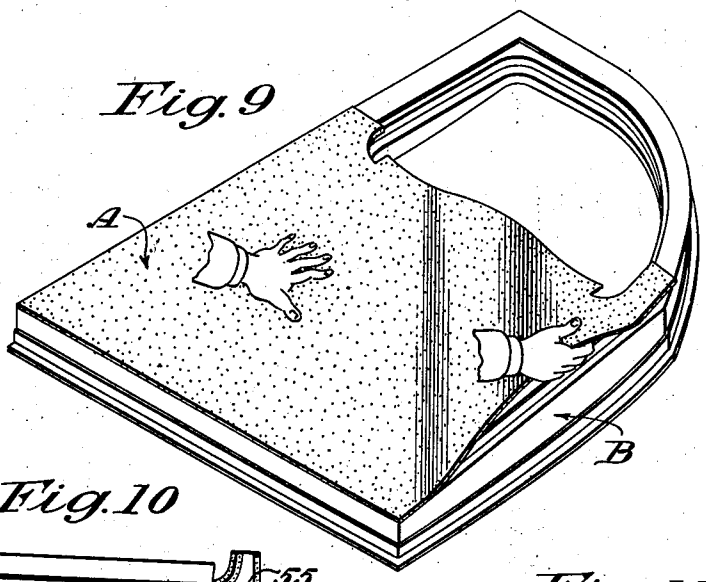


Fig. 7

Fig. 9



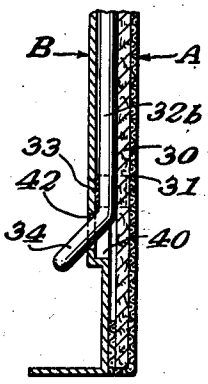


Fig. 10

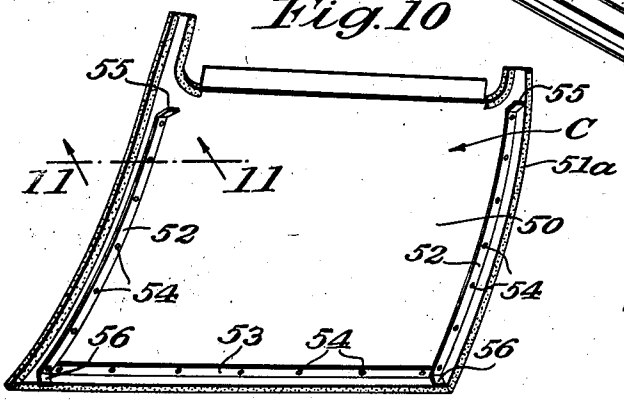
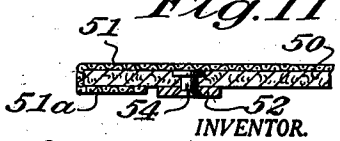


Fig. 11



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TRIM PANEL ASSEMBLY

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Fig. 12

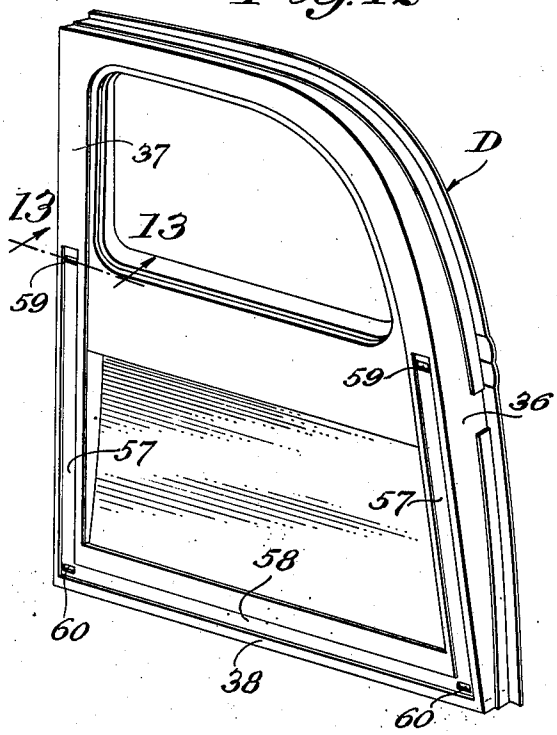


Fig. 13

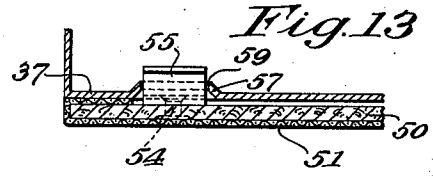


Fig. 15

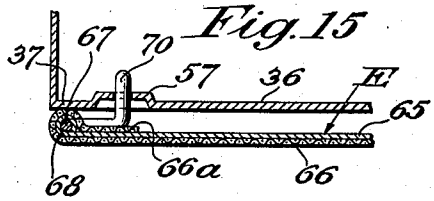


Fig. 14

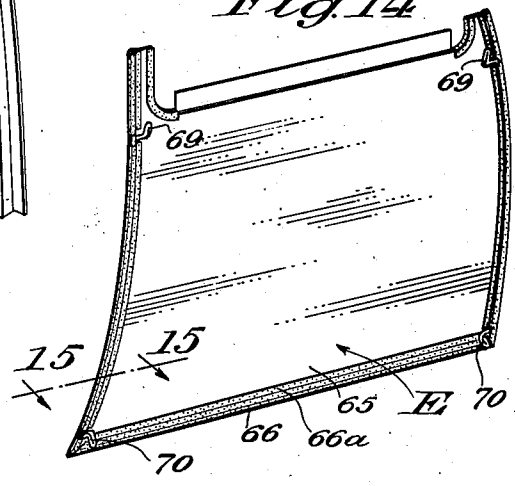


Fig. 16

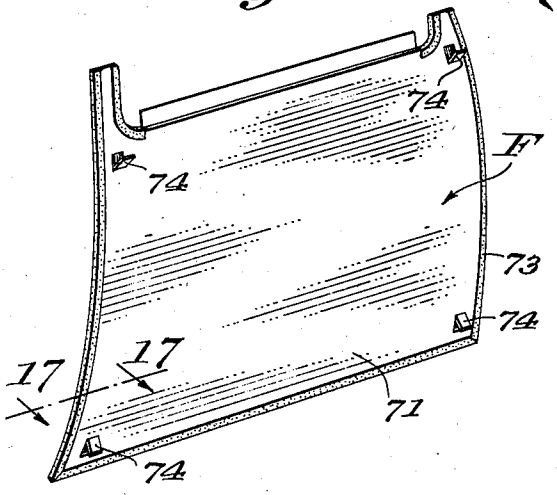
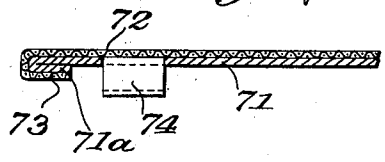


Fig. 17



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May 30, 1939. A. P. BALL 2,160,636

TRIM PANEL ASSEMBLY

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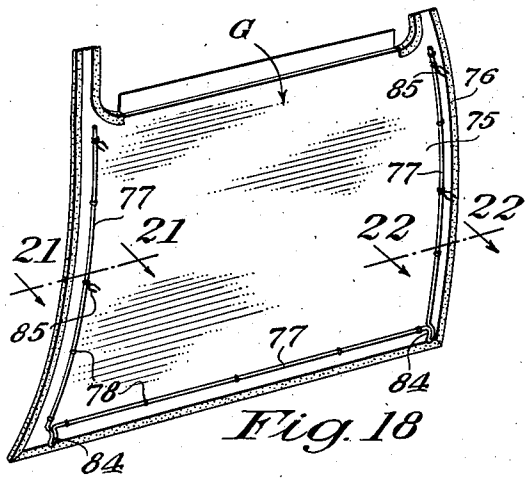


Fig. 18

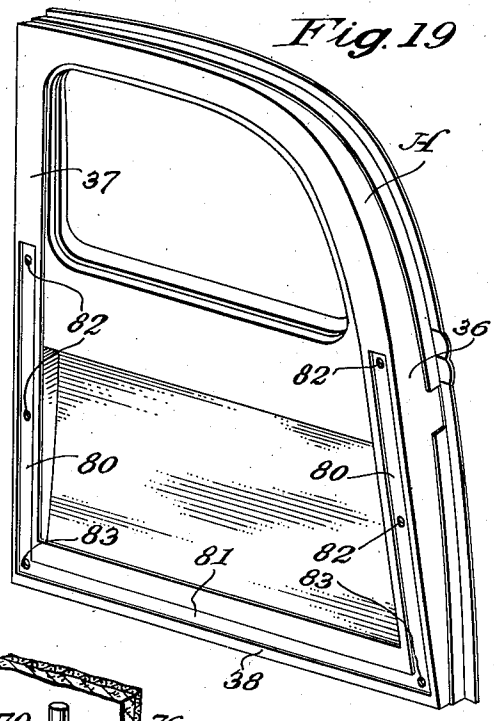


Fig. 19

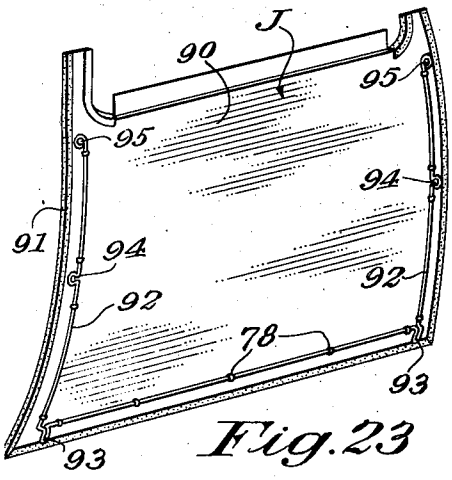


Fig. 23

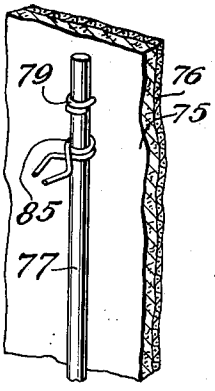


Fig. 20

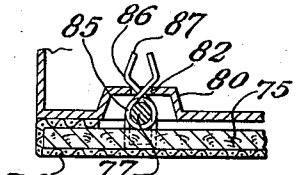


Fig. 21

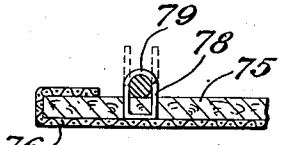


Fig. 22

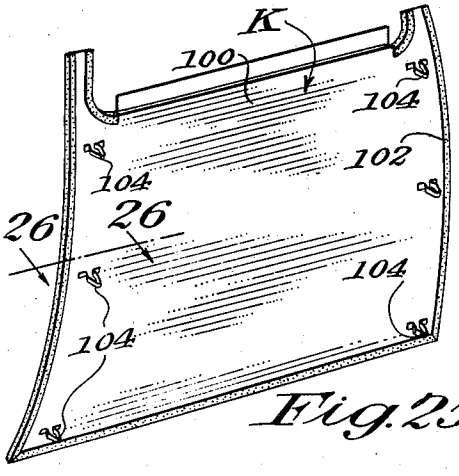


Fig. 25

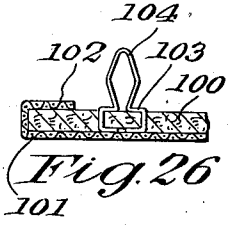


Fig. 26

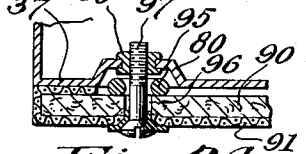


Fig. 24

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Patented May 30, 1939 2,160,636

UNITED STATES PATENT OFFICE

2,160,636

TRIM PANEL ASSEMBLY

Albert P. Ball, Detroit, Mich., assignor to Briggs Manufacturing Company, Detroit, Mich., a corporation of Michigan

Application November 18, 1935, Serial No. 50,331

9 Claims. (Cl. 45—138)

This invention relates to trim panels or trim panel assemblies particularly adapted for use in the interior trim finish of automobile or other vehicle bodies, an object of the invention being to provide a new and improved interior trim panel, or trim panel assembly, and an improved method of forming, constructing and applying the trim portions of the body.

In conventional practice the interior body trim, including portions of the trimming for the doors, comprises panels usually composed of non-metallic backing sheets covered with the trim fabric, these panels being usually attached to the doors or other framing supports of the body by means of separate concealed snap fasteners. These fasteners are usually in the form of bent wire devices which must be anchored by hand in apertures in retainer plates or sockets located at the back of the trim panel and which, when the panel is mounted on the body, fasten into apertures in the latter. This mode of constructing and attaching the trim panels to the body framing has many disadvantages. Because of the large numbers of these fastener devices required for each body and the time, labor and expense necessary for their manufacture and installation, the use thereof in practice amounts to a substantial item of expense in the manufacture of automobile bodies.

An important object of the present invention is to eliminate these disadvantages, simplify and improve the construction of the trim panels, reduce the cost thereof, and provide improved and better means and method for fastening the trim panels to the doors and other frame portions of the body whereby substantial manufacturing economies are obtained while at the same time providing a more satisfactory, simple and efficient construction.

A further object of the invention is to provide a trim panel which may be composed of a relatively stiff backing sheet, either of non-metallic or metallic material, adapted to be covered with fabric or other trim material, and which panel is bent or otherwise preformed so as to be maintained normally in bowed condition, fastening means being provided whereby upon attaching or fastening the panel to the body support, the panel will be reversely bent and maintained under tension when mounted on the support.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a perspective view looking toward the inside of a vehicle door carrying a trim panel constructed pursuant to the present invention.

Fig. 2 is a perspective view looking at the inner face of the trim panel shown in Fig. 1.

Fig. 3 is a perspective view, similar to Fig. 1, with the trim panel removed.

Fig. 4 is detail section taken through lines 4—4 of Fig. 2 in the direction of the arrows.

Fig. 5 is a detail section taken through lines 5—5 of Fig. 1 in the direction of the arrows.

Fig. 6 is a detail section taken through lines 6—6 of Fig. 1 in the direction of the arrows.

Fig. 7 is a detail section taken through lines 7—7 of Fig. 1 in the direction of the arrows.

Figs. 8 and 9 are perspective views of the door illustrating a mode of assembly of the trim panel shown in Fig. 2.

Fig. 10 is a perspective view of a trim panel, taken from the rear thereof and illustrating another embodiment.

Fig. 11 is a detail section taken through lines 11—11 of Fig. 10 in the direction of the arrows.

Fig. 12 is a perspective view illustrating a vehicle door of somewhat modified form for the attachment thereto of a trim panel.

Fig. 13 is a detail section taken through lines 13—13 of Fig. 12 with the trim panel assembled thereon.

Fig. 14 is a perspective view of a trim panel, looking at the rear side thereof and illustrating a further embodiment.

Fig. 15 is a detail section taken through lines 15—15 of Fig. 14 with the panel assembled on the body or door frame.

Fig. 16 is a perspective view of a trim panel, illustrating a further embodiment.

Fig. 17 is a detail section taken through lines 17—17 of Fig. 16.

Fig. 18 is a perspective view of a trim panel, looking at the rear side thereof and illustrating a further embodiment.

Fig. 19 is a perspective view of an automobile door, looking at the rear side thereof, constructed for the attachment thereto of the panel illustrated in Fig. 18.

Fig. 20 is a detail perspective view, in section, illustrating the manner of supporting the fasteners on the panel of Fig. 18.

Figs. 21 and 22 are detail sections taken respectively through lines 21—21 and 22—22 of Fig. 18.

Fig. 23 is a perspective view of the trim panel,

looking at the rear side thereof and illustrating a further embodiment.

Fig. 24 is a detail section illustrating the manner of attachment of the panel of Fig. 23 to the door or other body frame member.

Fig. 25 is a perspective view of a trim panel, looking at the rear side thereof and illustrating a further embodiment.

Fig. 26 is a detail section taken through lines 26—26 of Fig. 25.

Before explaining in detail the present invention, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

Referring to Figs. 1 to 9 inclusive, there is herein illustrated, by way of example, a fabric covered trim panel A adapted to be releasably attached to the inner side of an automobile door B. In this instance the panel comprises a relatively stiff non-metallic backing sheet **30** of suitable material, such as fibre-board, the outer face of this sheet being covered with a suitable fabric or other trim material **31** folded around the edges of the backing or foundation sheet at **31***a* and cemented thereto. Mounted upon the rear face of the backing sheet, preferably along or adjacent the upright side edges and the lower edge thereof, is a tensioning device comprising metallic strip **32** which, in the present example, is in the form of a single length of relatively heavy gauge spring wire bent to provide a three-sided frame comprising portions **32***b* extending along the opposite upright side edges of the backing sheet and a portion **32***a* extending along the lower edge of the sheet. As illustrated in Fig. 4, the member **32** may be securely attached or anchored at suitable intervals to the backing sheet **30** by means of staples **33**, each comprising a portion looped over the wire **32** and having its ends penetrating into the backing sheet and clinched over at **33***a*, the clinched ends being covered by the fabric **31**.

The side extensions **32***b* and the base **32***a* of the tensioning device are first permanently bent into outwardly bowed or curvilinear shape so that upon attaching the wire to the backing sheet by means of the clips **33**, the panel as a whole will be bent into bowed or curved shape and in addition the lower edge therof will be outwardly bowed, thus conforming to the preformed shape of the wire portions **32***a* and **32***b*. Thus, by means of the wire formed frame **32**, the trim panel A will normally be maintained in bowed condition preparatory to attachment to the door frame. The upper terminal ends of the portions **32***b* are bent outwardly from the rear face of the backing sheet to provide fastener elements, lugs or projections **35**. At the lower corners of the wire frame **32** adjacent portions of the wire are clinched together and bent outwardly and downwardly to provide fastener members **34** offset outwardly from the face of the backing sheet.

The panel A may be releasably attached to the rear face of a door B which may be constructed in the manner shown in Figs. 3 and 6. The door comprises front and rear pressed metal pillars **36** and **37** respectively and a lower pressed metal cross-frame member **38**. The inner flanged sides of the pillars **36** and **37** may be pressed or stamped to provide vertically extending grooves or channels **39** and the inner flange of the cross-member **38** may be provided with a connecting transverse groove or channel **40**. Apertures or holes **41** are pierced through the bottoms of the channels **39** at the upepr ends thereof and similar apertures or holes **42** are pierced at the lower ends thereof. As illustrated in Fig. 7, the fastener lugs **35** and **34** preferably slant upwardly and downwardly, respectively, in diverging relation. The lugs **34** also preferably slant outward slightly in diverging relation. The vertical distance between the apertures **41** and **42** and the horizontal distance between the apertures **42** are less than the distance between the corresponding ends of the projecting lugs **34** and **35**. Consequently, by simply flattening out the panel A upon the inner face of the door B, the lugs **34** and **35** will not enter the apertures **41** and **42** due to the greater distance between the ends of the lugs.

In Fig. 5 one method of securing the upper free edge **31***b* of the trim fabric to the door frame is illustrated, by way of example. In this figure the garnish molding **46** is applied to the panel **43** and held in place by a screw or screws **45** which are threaded into a wood filler block or strip **44**, the strip being located between the panel **43** and the flange **43***a* thereof. The window glass is shown at **48**, a portion thereof being located in the window well between the panel **43** and the door reveal **47**.

The trim panel A may be readily and quickly assembled on the door frame in the manner illustrated in Figs. 8 and 9. Preferably the panel is first reversely bent and flattened along its lower edge to cause the projecting lugs **34** to enter to their full depth the apertures **42**, as indicated in Fig. 8. Thereupon to insert the lugs **35** in the openings **41**, the panel is reversely bent transversely so as to foreshorten it sufficiently, as illustrated in Fig. 9, to cause the terminal ends of the lugs **35** to enter the apertures **41** whereupon the panel is pressed down flat against the face of the door causing the projections **35** to enter to their full depth the apertures **41**, the depth of the channels **39** and **40** which receive the wire **32** being sufficient to cause the panel to lie flat against the face of the door frame. The operation of reversely bending the curved panel and attaching it so as to lie flat on the face of the door results in placing the wire portions **32** under tension, and the tendency of these wire portions to bow or spring outwardly, when fastened to the door in straightened condition, results in locking the lugs **34** and **35** against the edges of the apertures and also results in holding, and in fact clamping, the edges of the panel intermediate the lugs tightly and snugly against the face of the door.

Referring to Figs. 10 to 13 inclusive, there is provided in this instance a trim panel assembly embodying a trim panel C of somewhat modified construction. The panel C comprises a relatively stiff non-metallic backing sheet **50** of suitable material, such as fibre-board, the outer face of this sheet being covered with a suitable fabric or other trim material **51** folded around the edges of the backing or foundation sheet at **51***a* and cemented thereto. Mounted upon the rear face of the backing sheet, preferably along or adjacent the upright side edges thereof, are flat strips **52** of suitable material, preferably spring steel, and mounted along the lower edge thereof is a similar metallic strip **53**. The metal strips **52** and **53** may be attached to the backing sheet

50 as by means of staples or rivets 54 which penetrate the material of the backing sheet and are are clinched or headed over, being concealed at the front face of the sheet by the fabric material. The metal strips 52 and 53 are preformed, preferably before attachment to the backing sheet, to have a permanent bowed or arcuate formation, so that when assembled on the backing sheet 50, the latter will be bent or bowed in two directions to have a corresponding curvature, similar in all respects to the trim panel A. The terminal ends of the bowed metal strips 52 are, in this instance, bent outwardly from the rear face of the panel to provide upper and lower lugs or fastener elements 55 and 56, respectively, it being noted that these lugs project outwardly in divergent relation similar to the lugs 34 and 35.

The panel C may be releasably attached to the rear face of a door D which may be constructed in the manner illustrated in Figs. 12 and 13. The front and rear pillars 36 and 37, and the bottom cross-member of the door frame, are pressed or stamped to provide, respectively, vertical grooves or channels 57 and a horizontal connecting groove 58. Adjacent the upper and lower ends of the channels 57 are holes or apertures 59 and 60, respectively, which are punched or pierced in the metal at the base of the channels and being shaped to receive the fastener lugs 55 and 56. The trim panel C may be attached to the door D in the same manner as hereinbefore described in connection with the assembly of trim panel A on the door B, it being understood that the panel C, when being assembled, is reversely bent and flattened sufficiently so as to place the spring strips 52 and 53 under tension effective to hold and clamp the side and lower edges of the panel intermediate the lugs 55 and 56 tightly and snugly against the face of the door with the lugs 55 and 56 locked within the apertures 59 and 60 in the same manner as hereinbefore described.

Referring to Figs. 14 and 15, there is illustrated in this instance a somewhat modified form of trim panel assembly. In this embodiment there is provided a trim panel E including a metallic backing sheet 65 blanked out of suitable gauge metal, such as sheet steel. The outer face of this sheet is covered with a suitable fabric or other trim material 66. The upright side edges and the lower longitudinal edge of the metal backing sheet 65 are coiled over onto the rear face of the sheet to provide rolled edges 68, reinforcing wires 67 being embodied within the coils. The fabric material 66 is folded over the rolled edges 68 onto the rear face of the sheet at 66*a* and cemented thereto. The wire strips or members 67, incorporated in the coiled edges of the sheet, are of relatively heavy gauge and are preformed to provide spring bow members along the opposite upright edges and the lower edge of the panel, and the backing sheet 65 is pressed so as to have a corresponding preformed surface curvature. Thus, the metal backing sheet 65 is initially bowed outwardly in two directions and the spring wire members 67, along the opposite side edges and lower edge thereof, are similarly bowed outwardly. The upper ends of these wire members are extended inwardly through cut-out portions in the coils 68 and bent rearwardly to provide projecting lugs or fastener elements 69. In like manner, the lower ends of the wire members are projected inwardly through cut-outs in the coiled edges 68 of the backing sheet and then bent outwardly to provide fastener lugs 70. The trim panel E, thus formed, is assembled on the inner face of a door constructed in all respects similarly to the door D, with the exception that apertures or holes of a shape corresponding to the shape of the lugs 69 and 70 are pierced in the upper and lower ends of the grooves or channels 57 in lieu of the openings 59 and 60. The panel E is mounted on and releasably attached to the frame of the door D in the same manner as that hereinbefore described in respect to previous embodiments. In this instance it will be noted that, upon flattening the panel E to apply it to the door, both the backing sheet 65 and the spring wire strips or members 67, along the side edges thereof, will be placed under tension so as to clamp the rolled edges of the panel firmly against the face of the door frame.

Referring to the embodiment illustrated in Figs. 16 and 17, in this instance the trim panel F comprises a metallic backing sheet 71 of suitable material, such as pressed sheet steel. The upright side edges and the lower longitudinal edge of the panel are folded over upon the back face of the sheet at 71*a*. The front face of the backing sheet 71 is covered with a suitable fabric or other trim material 72 which is folded around the edges of the backing or foundation sheet at 73 and cemented thereto. As in the previous embodiments, the metal panel 71 is pressed and preformed to have an arcuate shape, being permanently bowed before attachment to the body frame. Fastener lugs or projections 74 are struck out rearwardly from the metal of the backing sheet, preferably adjacent the four corners thereof, as illustrated in Fig. 16. The lugs of each upper and lower pair are reversely inclined and extend in divergent relation similar to the lugs 55 and 56 or the lugs 34 and 35. The trim panel F may be attached to the door D, illustrated in Fig. 12, in the same manner as that hereinbefore described by bending the panel to effect insertion of the lugs 74 into the apertures 59 and 60. By thus reversely bending or flattening out the panel F upon assembling the same, it will be seen that the panel, due to the preformed bowed formation thereof, will be held under constant tension causing the edges of the panel to hug tightly the flat faces of the door frame.

Referring to the embodiment illustrated in Figs. 18 and 22 inclusive, it will be seen that in this instance the trim panel G comprises a non-metallic backing sheet 75 of suitable material, such as fibre-board, the outer face of which is covered by a sheet of trim fabric 76 which is folded around the edges of the backing sheet and cemented thereto. Mounted upon the rear face of the backing sheet is a tensioning means comprising, in this instance, a single length of heavy gauge wire 77 bent into a three sided frame which is attached to the backing sheet 75, see Fig. 22, at suitable intervals by means of staples 78. These staples may be driven through the sheet from the front face thereof and the ends 79 looped or clinched around the wire 77. The sides of the wire frame 77 are bowed in the same manner as the wire frame 32, hereinbefore described, thereby imparting to the backing sheet 75 an initial curved or bowed formation. The fastener lugs are, in this instance, omitted at the upper terminal ends of the wire members, the lower ends, however, being provided with projecting fastener lugs 84 constructed in the same manner as the lugs 34. The bowed trim panel G, as in the case of the trim panels of previous

embodiments, may be releasably attached to a suitable framing portion of the body and, in the present instance, is designed for attachment to a vehicle door H shown in Fig. 19. As in the previous embodiments, the front and rear pillars 36 and 37 of the door and the lower cross-frame member 38 are stamped or pressed at the inner faces thereof to provide connected channels or grooves 80 and 81. The metal at the base of these channels is pierced to provide a suitable number of holes or apertures 82 and 83. In attaching the panel G to the door frame, the wire framing 77 will lie within the channels 80 and 81 which provide sufficient clearance to permit the trim panel to lie flat against the door frame. The lugs 84 will interlock in the lower apertures 83. In this instance, however, the panel is additionally attached to the door frame by means of spring wire fastener elements 85, see Fig. 21. Each fastener element or device comprises a base looped around the wire 77 with the projecting ends of the fastener reversely bent to provide wedge-shaped shoulders 86 and closely spaced terminal ends 87. The fastener devices 85 are slidable along the wire members 77 intermediate the points of attachment 78 thereof. Hence, the apertures 82, cooperating therewith, do not need to be accurately located on the door frame since, in attaching the panel, the devices 85 may be readily adjustable on the wire 77 to register with the apertures 82. The free ends 87 of the fasteners are forced through the apertures 82, compressing the same together, and the parts are locked by means of the shoulders 86 engaging the edges of the apertures, as shown in Fig. 21. It will be understood that the trim panel G is assembled and held in reversely bent or flattened condition and under tension on the door H in the same manner as hereinbefore described in connection with previous embodiments.

Referring to the embodiment illustrated in Figs. 23 and 24, in this instance the trim panel J comprises a non-metallic backing sheet 90 of suitable material, such as fibre-board, the outer face of which is covered by a fabric sheet 91 folded around the edges of the backing sheet and cemented thereto, the construction being similar to that previously described. Mounted on the rear face of the backing sheet is a metal tension member 92, herein comprising a length of wire, constructed in the form of a three-sided frame substantially the same as the member 32 previously described. The side portions thereof are bowed in the same manner and the lower corners are provided with lugs 93 similar to the lugs 34. The member 92 is attached to the backing sheet 90 by rivets or staples in the same manner as previously described. In this instance, however, the upright sides of the wire frame 92 are provided intermediate their ends with loops or eyes 94 formed from the metal of the wire, and the upper terminal ends are also bent to provide eyes 95. The trim panel is pierced to provide holes 96 through which extend fastener devices in the form of screws 97. These screws extend through the panel from the outer face thereof and are adapted to be threaded or screwed into clinch nuts 98 secured within holes or apertures pierced through the bottom of the channels 80 in the door frame H. The screws 97 pass through the eyes 94 and 95. Thus, in assembling the trim panel J on the door frame H, the lugs 93 are first inserted into the apertures 83 in the manner illustrated in Fig. 8. The panel, being held in bowed condition by the metallic spring strips 92, may then be flattened against the face of the door frame, thereby placing the panel under tension, and secured to the door frame by means of the screw devices 97 passing through the trim panel and the eyes 94 and 95 and threaded to the clinched nuts 98 on the door frame.

Referring to the embodiment illustrated in Figs. 25 and 26, there is herein illustrated a trim panel K comprising a relatively stiff non-metallic backing sheet 100 of suitable material, such as fibre-board. The front face of this backing or foundation sheet is covered by fabric or trim material 101 folded around the edges thereof at 102 and cemented to the backing sheet. For attaching the panel, for example, to the door frame H of Fig. 19, there is provided at suitable intervals on the rear face of the panel a series of fastener elements or devices 103. Each of these devices may be in the form of a wire member having its free ends penetrating the backing sheet and clinched thereto as illustrated in Fig. 26, the projecting end of the fastener 104 being wedge-shaped so that, when forced through the apertures 82 and 83, it will be compressed sufficiently causing the shoulders of the fastener to spring outwardly behind the apertures and interlock the parts together. In this embodiment the backing sheet 100 is pressed or stamped to have a preformed surface curvature, the panel thereby presenting a bowed condition similar to that of the panels of the previous embodiments. The trim panel K is assembled on the door frame in the same manner as previously described by reversely bending and flattening the same so as to attach the fastener elements 104 in the apertures 82 and 83. The backing sheet 100 is thus held in flattened condition under its own tension causing it to hug the inner face of the door frame.

I claim:

1. A trim panel and a supporting frame therefor, the panel comprising a backing sheet and metal strips along side edges thereof permanently bowed to hold the panel normally in bowed condition, the frame having clearance grooves to receive said strips, and cooperating means on the frame and panel for attaching and holding the panel on the frame in flattened condition.

2. A trim panel comprising a fabric covered backing sheet, concealed spring wire members attached to the back face of the sheet and formed with eyes, and devices penetrating said sheet and passing through said eyes for fastening the panel to a support, said members being formed to maintain the panel under spring pressure against the face of the support.

3. A trim panel comprising a relatively stiff backing sheet and metallic spring means mounted on said sheet and initially formed to hold the sheet in bowed condition and adapted to be stressed by bending when the panel is bent down upon a supporting surface to conform thereto.

4. A trim panel according to claim 3 in which the metallic means extends along at least two edges of the sheet one transverse to the other and is effective normally to hold said edges under stress in bowed condition.

5. A trim panel and a supporting frame therefor, the panel comprising a relatively stiff flexible backing sheet and metal strips along side edges thereof permanently bowed to hold said edges bowed outwardly from said frame, and means cooperating with said strips for drawing down said

edges tightly against the frame and attaching the same thereto.

6. A trim panel for attachment to a supporting surface of a vehicle body comprising a relatively stiff flexible backing sheet having a set bowed condition with edges of the sheet bowed outwardly from said surface before attachment thereto, and means for attaching opposite ends of the sheet to the surface by bending said edges down tightly against said surface.

7. A trim panel for attachment to a supporting surface of a vehicle body comprising a relatively stiff flexible backing sheet having a set bowed condition with side and bottom edges of the sheet bowed outwardly from said surface before attachment thereto, and means for attaching opposite ends of the sheet to the surface at at least four points by bending said edges down tightly against said surface.

8. A trim panel comprising a relatively stiff backing sheet, metallic spring means mounted on said sheet along at least two edges of the sheet one transverse to the other, said spring means being initially formed to normally hold said edges under stress in bowed condition, and devices cooperating with said metallic means and adapted to cooperate with a support for the sheet when said edges are bent down upon the support to hold said metallic means stressed and said edges tightly against the surface of the support.

9. A trim panel comprising a relatively stiff backing sheet, metallic spring means mounted on said sheet along at least two edges of the sheet one transverse to the other, said spring means being initially formed to normally hold said edges under stress in bowed condition, and devices carried by said metallic means and adapted to cooperate with a support for the sheet when said edges are bent down upon the support to hold said metallic means stressed and said edges tightly against the surface of the support.

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