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Tsuji

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[54] **REPLACEMENT RADIO RECEIVING APPARATUS WITH ADAPTER FRAME FOR IN DASH AUTOMOTIVE INSTALLATIONS**

[75] Inventor: **Tom T. Tsuji,** Monterey Park, Calif.

[73] Assignee: **J.I.L. Corporation of America, Inc.,** Carson, Calif.

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[52] **U.S. Cl.** ..... **312/242;** 312/7 R

[51] **Int. Cl.**[2] **H05K 5/00**

[58] **Field of Search** ..... 180/90; 248/27; 312/7 R, 312/242; 325/352

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Primary Examiner—Paul R. Gilliam
Assistant Examiner—David H. Corbin
Attorney, Agent, or Firm—Fraser and Bogucki

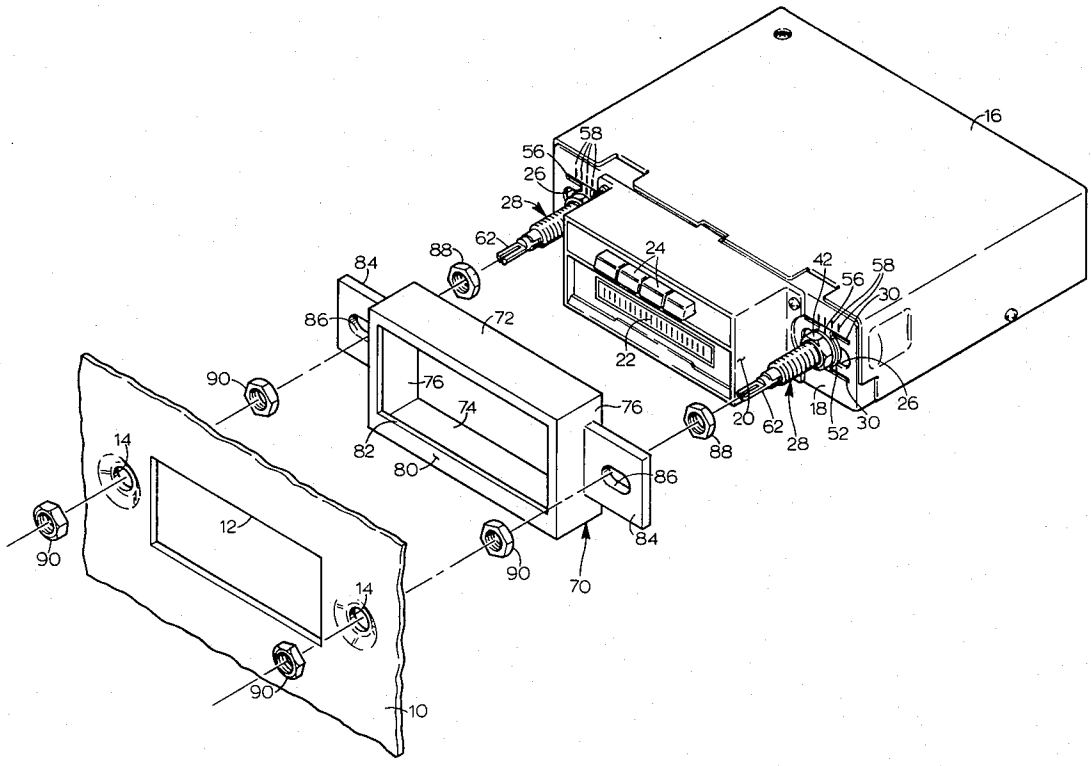
[57] **ABSTRACT**

Replacement radio receiving apparatus for "aftermarket," in-dash installation is disclosed including a faceplate from which a nosepiece and control elements project. The control elements are mounted in slots in the faceplate whereby the center-to-center distance between the control elements may be adjusted to align them with existing apertures in the instrument panel.

A generally rectangular adapter frame is further disclosed for filling the gap between the nosepiece and the edges of an existing cutout in the instrument panel for receiving the nosepiece.

Each control element has a knob shaft having a D-shaped cross-section and a longitudinal slot to accommodate various types of original equipment control element knobs.

1 Claim, 5 Drawing Figures



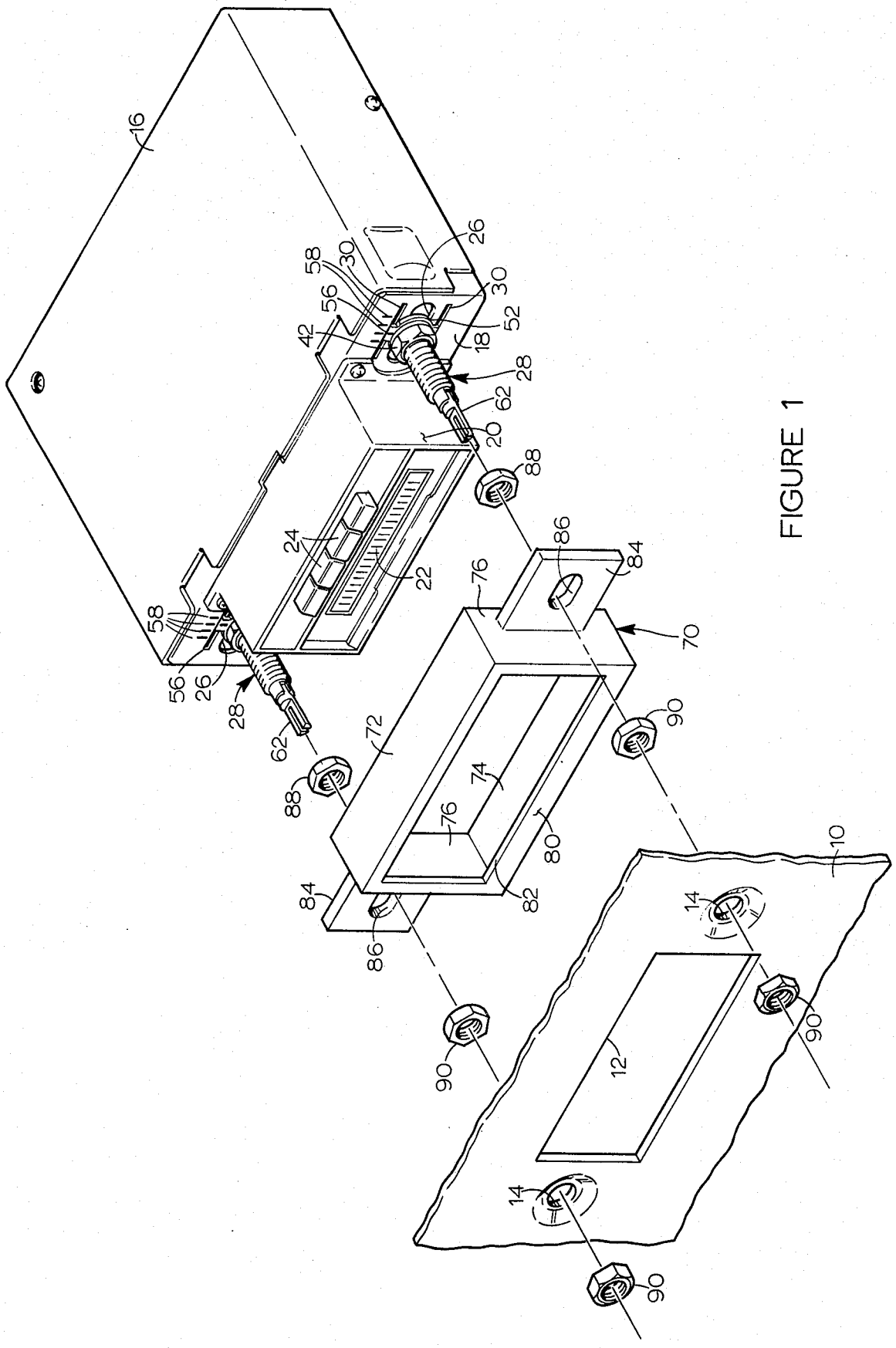

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FIGURE 1

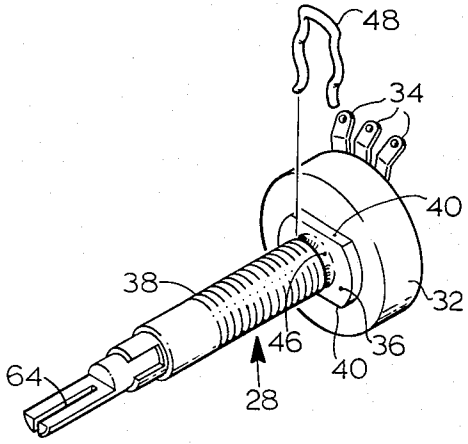

FIGURE 4

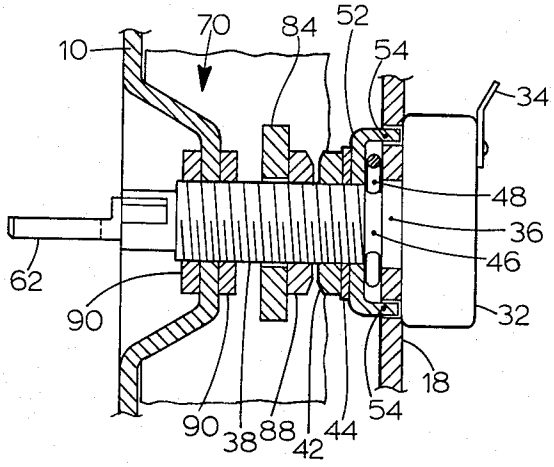

FIGURE 5

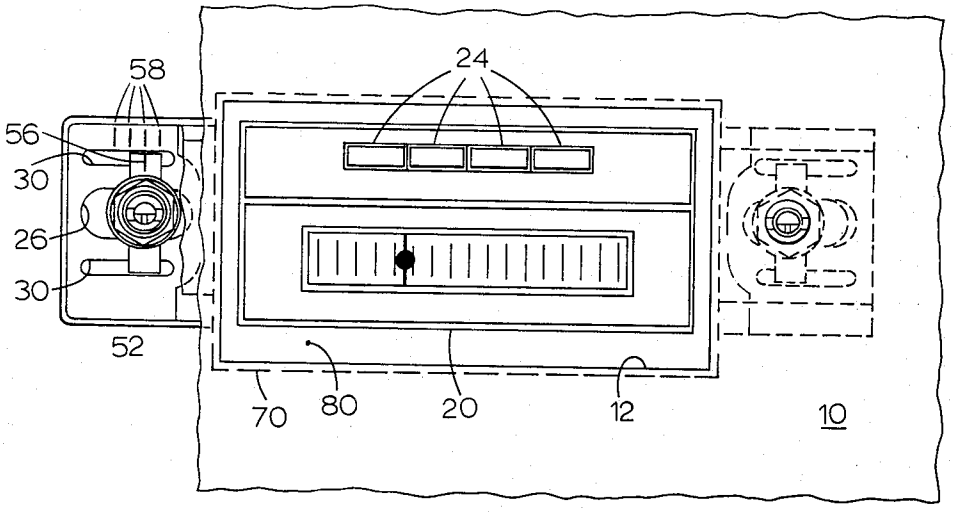

FIGURE 2

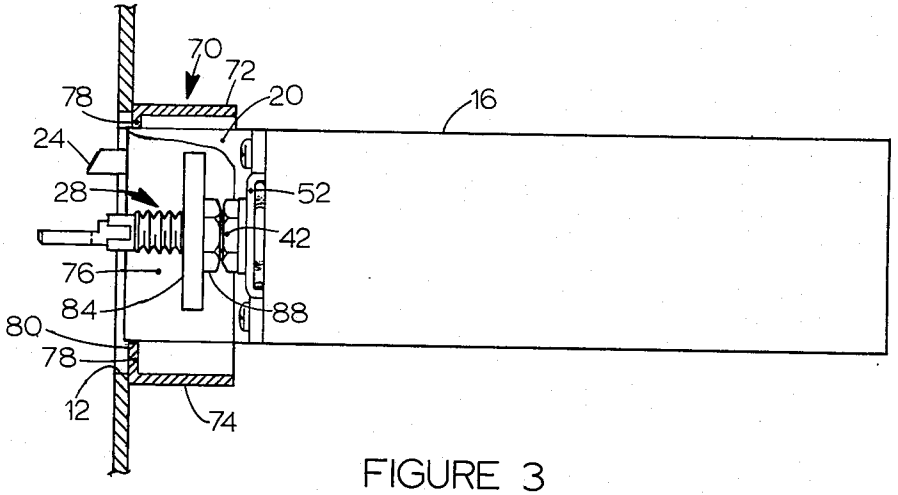

FIGURE 3

REPLACEMENT RADIO RECEIVING APPARATUS WITH ADAPTER FRAME FOR IN DASH AUTOMOTIVE INSTALLATIONS

FIELD OF THE INVENTION

The present invention relates generally to replacement radio receiving apparatus and specifically to devices for adapting such apparatus to existing tuning means cutouts and control element apertures in automobile instrument panels.

BACKGROUND OF THE INVENTION

Original equipment automobile radio receiving apparatus typically comprises an AM push button receiver and replacement thereof with a better quality system providing higher fidelity and a greater variety of programming including, for example, FM, FM stereo and magnetic tape playback, is often desired. It is important, of course, from the standpoint of consumer acceptance that such replacement radio receiving apparatus be adaptable to a great variety of instrument panel configurations and that the visible portions of such apparatus blend in with a wide range of interior designs to present an appearance that is pleasing and resembles as closely as possible the original equipment installation. It has been found that the latter requirement is best met when the area around the tuning dial and push buttons appears as a substantially continuous surface, that is, when the front face of the enclosure or "nosepiece" surrounding the tuning dial and push buttons is in approximately the same plane as the instrument panel. Several problems arise however, in meeting the foregoing requirements. For example, the nosepiece of a given replacement radio receiver apparatus may be significantly smaller than the instrument panel cutout in which case a gap remains around the nosepiece.

SUMMARY OF THE INVENTION

In accordance with one aspect of the present invention, an adapter frame is provided for filling the gap defined by the instrument panel cutout and the nosepiece. More specifically, the adapter frame has a front surface with an outer margin at least as large, and preferably slightly larger, than the instrument panel cutout. The frame also has an inwardly directed flange defining an inner opening closely conforming to the size and shape of the exterior surface of the nosepiece. The frame also has laterally projecting lugs with openings for receiving the control elements.

Other particular aspects of the invention pertain to structural features of the control elements for preventing rotation and longitudinal movement thereof during installation and adjustment of the distance between control elements. Moreover, the control element knob shafts are adapted in accordance with the invention to receive either of the two most commonly employed knob types.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the invention may be had by reference to the detailed description below taken in conjunction with the accompanying drawings, in which:

FIG. 1 is an exploded, perspective view of a replacement radio apparatus incorporating features of the present invention;

FIG. 2 is a front elevation view of a replacement radio receiving apparatus in accordance with the invention as installed in an automobile instrument panel;

FIG. 3 is a side elevation view, partly in section, of the replacement radio receiving apparatus of FIG. 2 and in which certain elements, including the instrument panel, have been omitted for clarity;

FIG. 4 is a perspective view of a control element for use in connection with the present invention; and

FIG. 5 is a side elevation view, partly in section, of a portion of the radio receiving apparatus of FIGS. 1–3 showing details of the control element mounting.

DETAILED DESCRIPTION OF THE INVENTION

By way of definition, the terms "front" and "forward" will be used to describe elements or portions of elements closest to the passenger compartment and the terms "rear" and "rearward" will be used to describe elements or portions of elements positioned away from said compartment. Further, the term "longitudinal" will be used to refer to a direction extending generally normal to the instrument panel and would apply, by way of illustration, to the direction of movement of the station selector push buttons.

Moreover, although the apparatus of the invention will be designated in this description primarily as a "radio receiving" apparatus it will be evident that the invention described and claimed herein is not limited to any particular form of automtoive sound apparatus but may include any one or a combination of AM, FM, FM stereo and/or tape playback capabilities, the latter being provided by either cassettes or 8-track tape cartridges.

Turning now to the drawings, the replacement radio receiving apparatus of the invention is designed for mounting in an instrument panel **10** having a tuning means cutout **12** and a control element aperture **14** adjacent each side of the cutout **12.** Typically the portion of the automobile instrument panel carrying the radio receiving apparatus has a flat, vertically disposed front surface. The instrument panels of many vehicles have wells or recesses about the control element apertures **14** as best seen in FIG. **1.**

The radio receiving apparatus includes an exterior case **16** housing a chassis carrying appropriate electronic components and having a front face defined by a faceplate **18.** Attached to the faceplate **18** is a tuning means enclosure or nosepiece **20** incorporating a tuning dial **22** and from which push button station selectors **24** project. In accordance with one practical example, the nosepiece **20** has an overall width of **105** mm (to accommodate standard tape cartridges **102** mm in width) and thus, in a typical installation, will fit through the existing instrument panel cutout **12** with a substantial amount of clearance.

The faceplate **18** has a horizontal slot **26** along each side of the nosepiece **20** through which a control element **28** extends. Above and below each slot **26** is a horizontal guide slit **30** having a length approximately equal to that of the slot **26.** The control element **28** may comprise any one of a number of well known devices for controlling functions such as volume, station selection, tone, balance and power. The control elements illustrated herein each comprise a dual function potentiometer means including a housing **32,** terminals **34** projecting from the rear face of the housing, a boss **36** on the front face of the housing **32** and an outer, threaded sleeve **38** extending from the boss **36.** The

boss **36** has horizontal flats **40** for engaging the upper and lower edges of the slot **26.** Each control element **28** is secured to the faceplate **18** by a nut **42** engaging a washer **44.**

The control element sleeve **38** has a circumferential groove **46** immediately adjacent the boss for receiving a retainer clip **48.** The clip **48** engages the faceplate **18** and along with the front face of the potentiometer housing **32** prevents longitudinal movement of the control element **28.** During installation of the radio receiving apparatus, while the control elements **28** are slidably positioned along the horizontal slots **26** to align them with the apertures **14,** the flats **40** on the boss **36** prevent rotation of the control elements and thereby maintain the terminals **34** in a predetermined orientation, for example, facing upwardly. The retainer clips **48** prevent the control elements from being pushed inside the chassis, thereby eliminating any possibility of damage to or shorting of the terminals **34.**

As best shown in FIG. **5,** disposed between the retainer clip **48** and the control element washer **44** is a guide washer **52** for providing an adequate surface area for engagement by the washer **44** and for assisting in the placement of the control element **28** along the length of the slot **26.** In the latter connection, the guide washer **52** has upper and lower, rearwardly projecting tabs **54** extending into the guide slits **30.** An indicator mark **56,** impressed along the upper edge of the guide washer **52** is alignable with any of a series of corresponding marks **58** on the faceplate **18** to set the center-to-center spacing between the control elements **28.** The distance between corresponding faceplate marks **58** on opposite sides of the nosepiece **20** are equivalent to the center-to-center control element aperture spacings utilized in various major automobile makes.

In order to enhance the appearance of the replacement installation, the control element knobs from the discarded original equipment radio may be used. To accommodate the two major types of knobs on original equipment units, each control element has a bifurcated knob shaft **62** with an axially extending slot **64** and a D-shaped cross-section. Original equipment knobs, both of the kind having D-shaped shaft apertures and of the kind having a central, recessed clip for frictionally engaging the sides of the shaft slot **64,** may therefore be re-used.

In accordance with another aspect of the invention, an adapter frame **70** is provided for filling the gap between the exterior surface of the nosepiece **20** and the edges of the cutout **12.** The frame **70,** which may be a molded plastic part, has a generally rectangular configuration defined by side walls **76** and upper and lower walls **72** and **74,** respectively. The exterior surface of the frame is shaped and dimensioned so as to be slightly larger than the instrument panel cutout **12.** An inwardly directed front flange **78** bordering the frame defines a front surface **80** for bridging the space about the nosepiece **20** and also defines an inner opening **82** dimensioned for a close fit with the exterior surface of the nosepiece **20.** Lugs **84** having horizontally oriented slots **86** spaced and dimensioned for alignment with the slots **26** in the faceplate **18,** project from the side walls **76.** The lugs **84** are positioned sufficiently rearward of the front surface **80** so as to provide ample clearance for the instrument panel recesses about the control element apertures **14.** A control element nut **88** behind each lug **84** positions the frame **70** longitudinally so that, in a typical installation, the front face of the nosepiece **20** projects slightly (for example, about **1** mm) from the surface **80** of the frame **70,** as best shown in FIG. **3.**

Upon installation of the replacement apparatus in the instrument panel **10,** the longitudinal position of the apparatus relative to the instrument panel is determined by the control element nuts **90** on opposite sides of the instrument panel. Typically, the apparatus is positioned so that the outer margin of the front surface **80** of the frame **70** just engages the inside surface of the instrument panel about the cutout **12,** as best shown in FIGS. **2** and **3.**

What is claimed is:

1. For use with a replacement radio receiving apparatus adapted to be mounted in an automobile instrument panel having a generally rectangular nosepiece cutout and control element apertures in recessed portions of the instrument panel bilaterally adjacent the cutout, the receiving apparatus having a faceplate and a nosepiece and control elements bilaterally adjacent the nosepiece projecting from the faceplate: a generally rectangular adapter frame for filling a gap defined by the nosepiece and the instrument panel cutout, the adapter frame including top, bottom and side walls having front extremities, a flange directed inwardly from the front extremities of the walls and defining an inner, rectangular opening adapted to receive the nosepiece in a close fit, the flange defining a front surface having an outer rectangular margin dimensioned to engage the portion of the instrument panel around the cutout, the frame further including a lug projecting laterally from each side wall, each lug having a horizontally oriented slot for receiving one of the control elements and permitting lateral adjustment thereof, each lug being attached to the side wall rearward of the front surface of the frame to provide clearance for the recessed portion of the instrument panel.

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