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Sun

(54) **ONE-PIECE DECORATIVE TRIM BEZEL HAVING PLURAL UNPAINTED FINISHES**

(75) Inventor: **Haoliang Michael Sun**, Rochester Hills, MI (US)

(73) Assignee: **FORD GLOBAL TECHNOLOGIES, LLC**, Dearborn, MI (US)

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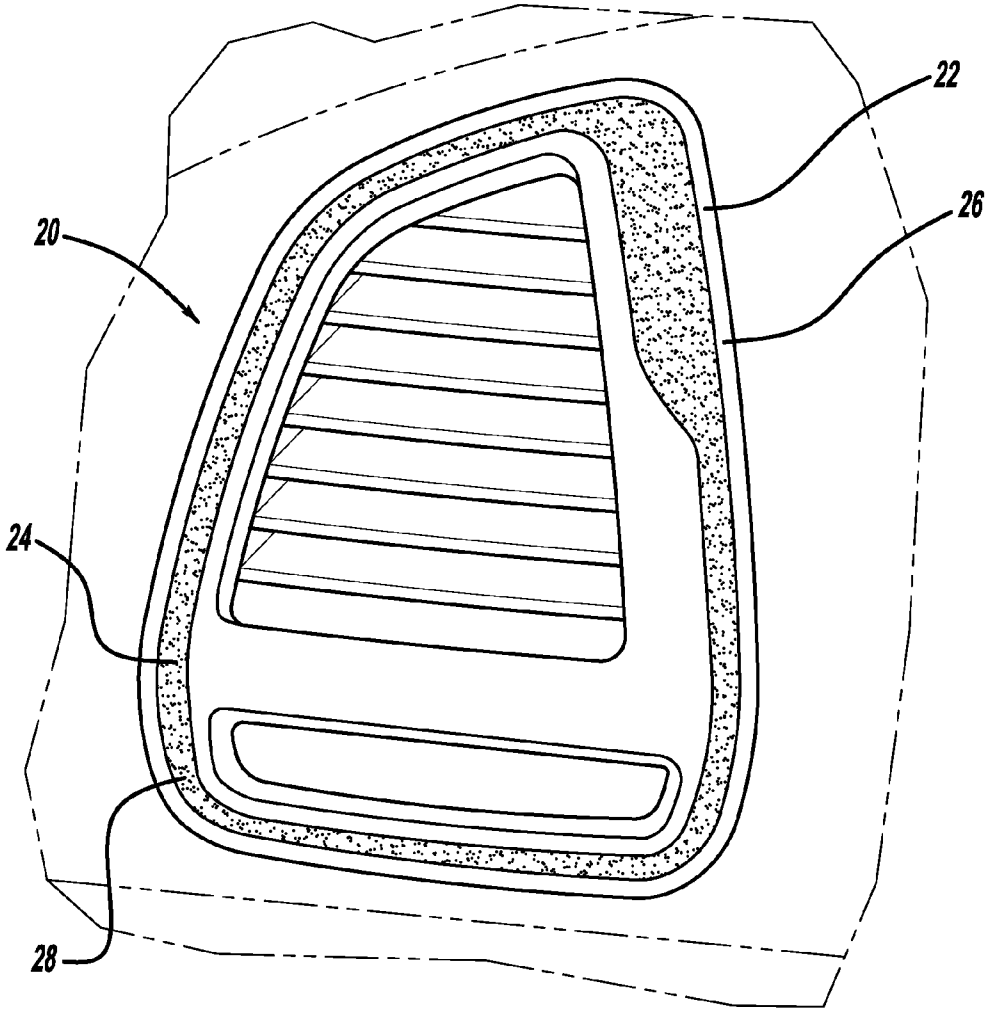
(57) **ABSTRACT**

A one-piece trim bezel formed from multiple components. In the event of two co-molded components, the first co-molded part is composed of a polymerized material having an unpainted surface that may be a high gloss smooth surface or a textured low gloss surface and the second co-molded part, formed with the first part, is composed of a plateable plastic material. The second co-molded part is co-molded with the said first co-molded part to form a single piece trim bezel. The color of the polymerized material of the first co-molded part may be selected from a variety of colors. The plateable plastic material may be plateable with chrome. A multiple-shot injection molding process is used to form the one-piece trim bezel which joins the first co-molded part and the second co-molded part in one operation. The formed part is then subjected to a plating process during which time the chrome only deposits on the surface of the plateable plastic material of the second co-molded part while the surface of the first co-molded part remains unplated.



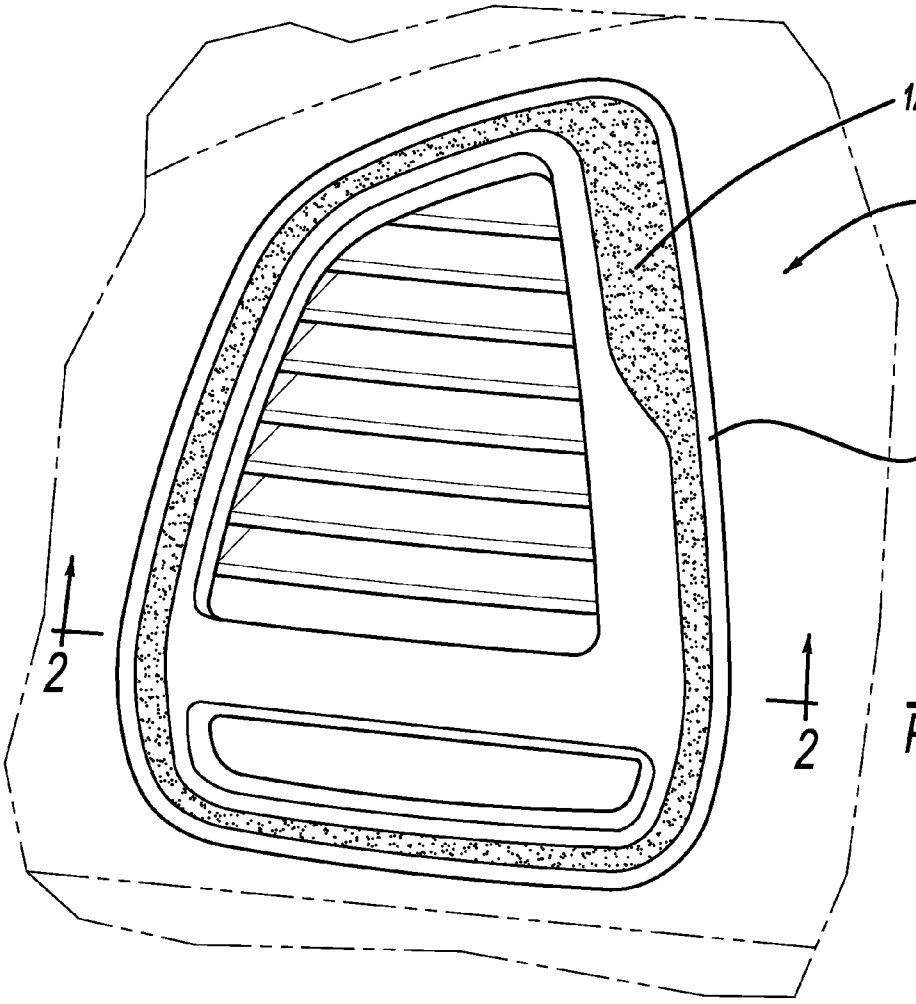


FIG - 1
Prior Art

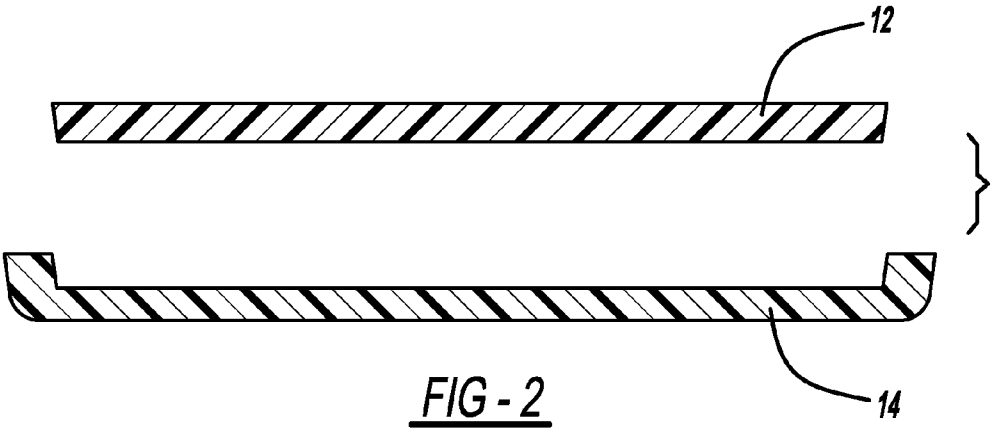


FIG - 2

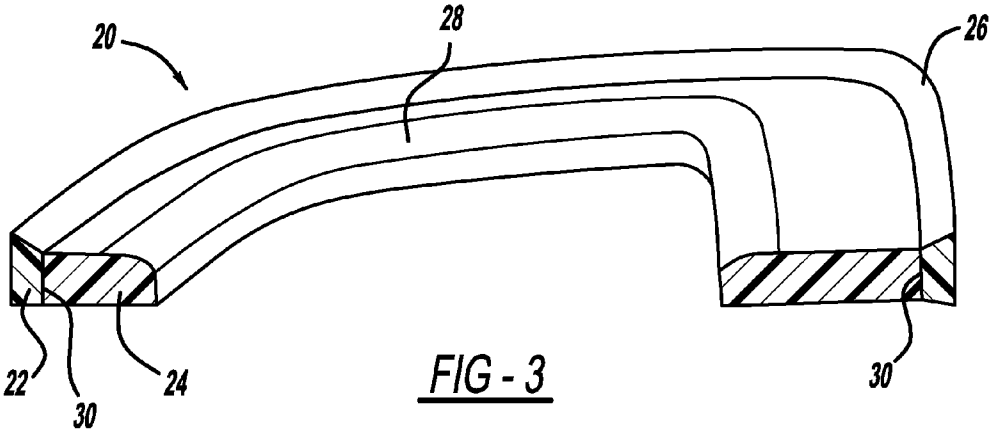


FIG - 3

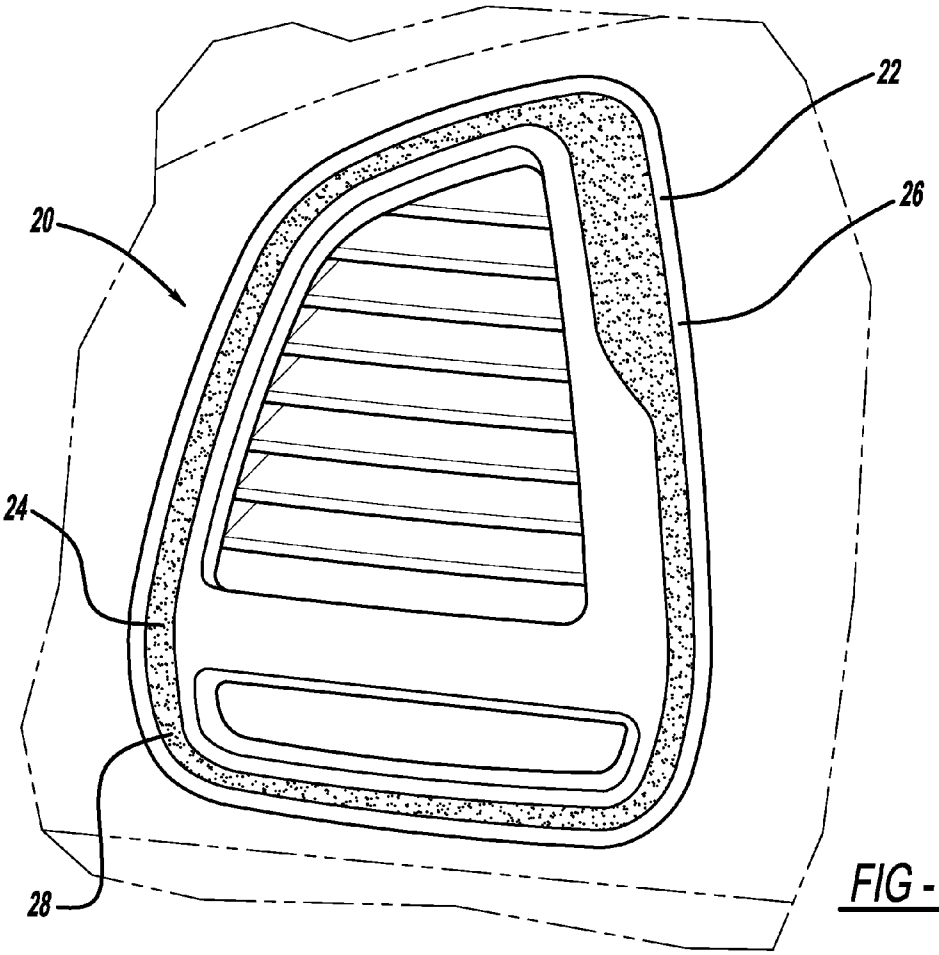


FIG - 4

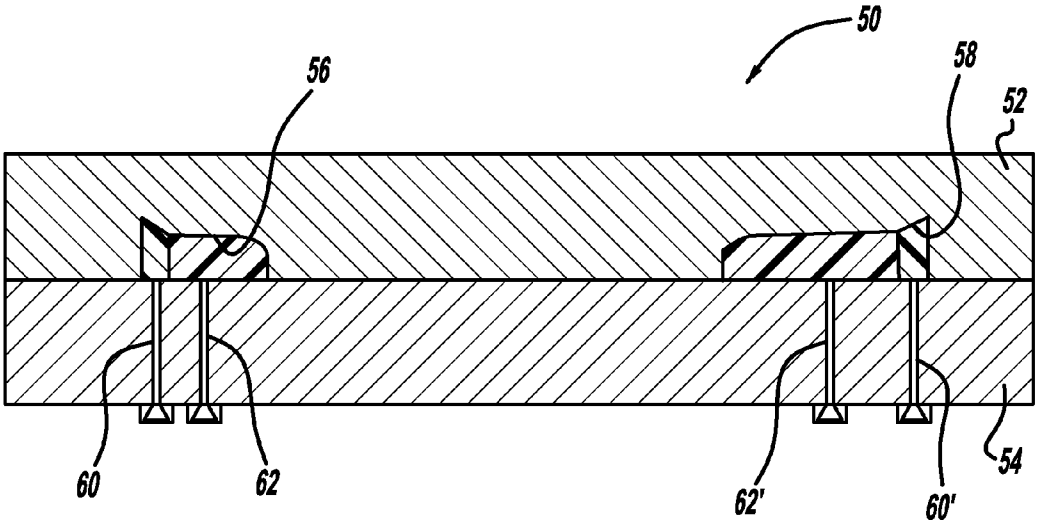


FIG - 5

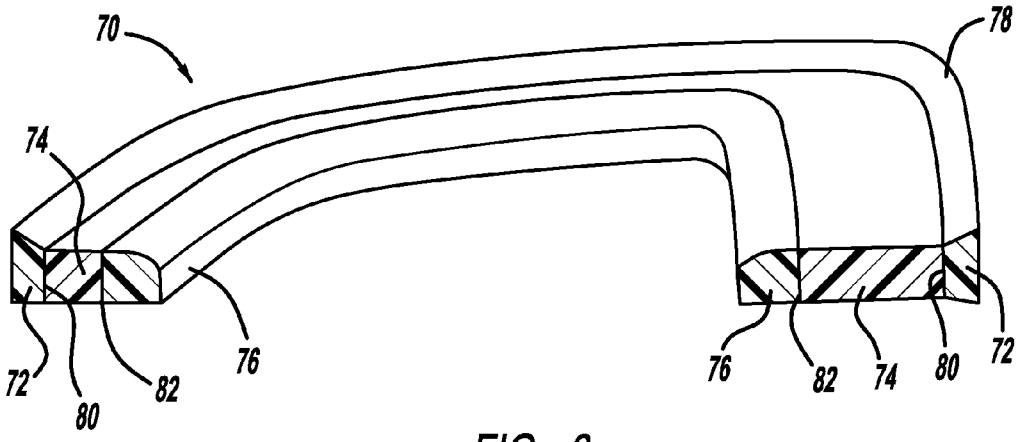


FIG - 6

ONE-PIECE DECORATIVE TRIM BEZEL HAVING PLURAL UNPAINTED FINISHES

TECHNICAL FIELD

[0001] The present invention relates generally to trim bezels for vehicles. More particularly, the present invention relates to unpainted one-piece trim bezels for vehicles comprising a chrome-plated finish and an un-painted and un-plated finish.

BACKGROUND OF THE INVENTION

[0002] It is known to include trim bezels in the interiors of vehicles of all types. Decorative trim bezels are often desired by the styling designer to compliment a particular surface, to highlight a feature or to differentiate vehicle series. Trim bezel designs with multiple surface finishes have become increasingly popular in vehicle design studios. For example, it is common in vehicle interiors to find a single trim bezel comprising two or more connected parts with one of the parts having a high gloss surface (such as a high gloss piano black surface) or low-gloss textured surface adjacent to a thin, chrome-plated ring surrounding the periphery.

[0003] An example of such a known two-piece trim bezel is illustrated in FIG. **1** which illustrates a trim bezel, generally illustrated as **10**, which includes a first part **12** having a high gloss finish or a textured low gloss finish and a second part **14** having a chrome-plated finish. The first part **12** is produced conventionally by injection molding with its black high gloss finish ordinarily being the result of a base color coat and a layer of clear coat. The first part **12** and the second part **14** are thus separate parts, as illustrated in FIG. **2**, which are then snap-fitted or heat staked together to form a single component for installation into the interior of the vehicle.

[0004] While providing a satisfactory trim bezel, the known two-piece approach suffers from several drawbacks. One of them is the high cost resulting from multiple pieces and the necessary labor to attach the two parts together. Another problem is inherent with two closely positioned pieces which inherently has the high risk of squeaking or rattling when the vehicle is in motion, particularly over time as the vehicle age advances. An additional problem of known two-piece assemblies is the potential for a poor surface appearance caused by any of several painting defects, including orange peel, sag, paint spits, and the like. Still a further problem inherent in known manufacturing processes of two-piece bezels is the negative environmental impact generated by VOC of painting as is well known.

[0005] As an alternative to the two-piece approach, it is known to injection mold a single piece followed by masking of the area to be plated. The masked part is then painted with a coating-resistant paint applied to the area not requiring chrome plating. The piece is then electroplated with the chrome plate adhering to the non-painted areas. Once electrocoated, the part is then cleaned, masked and painted again, this time with a high gloss finish coat, such as common piano black. While having certain desirable aspects, this approach requires a long supply chain and suffers from labor-intensive steps including repeated masking and painting processes and the difficult-to-avoid result of having a rough-cut line between the chrome finish and the high gloss finish due to limitations of the chrome coating-resistant paint.

[0006] Accordingly, for both known methods discussed above in which the two-piece component or the single-piece component is masked, painted, plated and painted again, both inconsistent and poor quality and high labor and production costs are known problems.

[0007] As in so many areas of vehicle technology, there is room for improvement in the manufacture of vehicle decorative trim bezels. Such improvements ideally include labor cost and component cost reductions with an associated improvement in trim bezel quality.

SUMMARY OF THE INVENTION

[0008] The disclosed invention provides a one-piece trim bezel formed from two or more co-molded components. Where two co-molded components are involved, the first co-molded part is composed of a polymerized material having an unpainted high gloss surface or a textured low gloss surface and the second co-molded part, formed with the first part, is composed of a plateable plastic material. The plateable plastic material can be selected from the group consisting of ABS, PC/ABS or any polymerizable that can be plated. The second co-molded part is composed of any polymerizable material that will not take a deposition of chrome plating. This component may be, for example, a polycarbonate (PC) or a PC blend in which the majority of the component is PC. Regardless of the material, in the two co-molded component construct the second co-molded part is co-molded with the said first co-molded part to form a single piece trim bezel. The color of the polymerized material of the first co-molded part may be selected from a variety of colors, such as piano black. The plateable plastic material may be plateable with chrome with different finishes such as bright or satin.

[0009] A multi-shot injection molding process is used to form the one-piece trim bezel. The multi-shot injection molding process of the disclosed invention may include two shots wherein a first co-molded part is joined with a second co-molded part in one operation. The multi-shot injection molding process of the disclosed invention may also employ more than two shots, for example, where one shot is for a first component (such as a plateable chrome ring), one shot is for a second component (such as a high gloss piano black element), and another shot is for a third component (such as a textured low gloss finish element).

[0010] Regardless of the number of shots, a two-piece mold having a highly polished surface for the second co-molded part is used. The mold heats the bezel cavity to between 80° C. and 180° C. prior to material injection followed by a rapid cool down. For example, and in the case of a two-shot process, the formed part is then subjected to a plating process during which time only the chrome is deposited on the surface of the plateable plastic material of the second co-molded part while the high-gloss surface or textured low gloss surface of the first co-molded part remains unplated. Alternative methods of heating the tool cavity may include, but are not limited to, electrical heat, steam, pressurized hot water, hot oil, and the like.

[0011] Other advantages and features of the invention will become apparent when viewed in light of the detailed description of the preferred embodiment when taken in conjunction with the attached drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] For a more complete understanding of this invention, reference should now be made to the embodiments illus-

trated in greater detail in the accompanying drawings and described below by way of examples of the invention wherein:

[0013] FIG. **1** illustrates a front view of an example of a two-piece trim bezel according to the prior art;

[0014] FIG. **2** illustrates a sectional view of the two-piece trim bezel of the prior art shown in FIG. **1**;

[0015] FIG. **3** illustrates a partially perspective, sectional view of a one-piece trim bezel according to one embodiment of the disclosed invention;

[0016] FIG. **4** is a front view of a one-piece trim bezel according to the disclosed invention;

[0017] FIG. **5** is a sectional view of a preferred set of molds used in the production of the one-piece trim bezel of the disclosed invention; and

[0018] FIG. **6** illustrates a partially perspective, sectional view of a one-piece trim bezel according to another embodiment of the disclosed invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] In the following figures, the same reference numerals will be used to refer to the same components. In the following description, various operating parameters and components are described for different constructed embodiments. These specific parameters and components are included as examples and are not meant to be limiting.

[0020] With reference to FIGS. **3** and **4**, an exemplary one-piece trim bezel of the disclosed invention is shown and is generally illustrated as **20**. It is to be understood that the shape and overall design of the one-piece trim bezel **20** is only presented for illustrative purposes and is not intended as being limiting as any of a number of designs and configurations can be produced using two co-molded components according to the disclosed invention.

[0021] The one-piece trim bezel **20** of the disclosed invention is formed from two or more co-molded components including at least a plateable portion **22** and a non-plated portion **24**. The plateable portion **22** may be formed from any one of several plateable polymerizable materials including without limitation ABS or PC/ABS plastic. More generally, the plateable portion **22** can be any polymerizable material which can be plated. The non-plated portion **24** may be formed from any of several polymerizable materials capable of achieving a high gloss finish or textured low gloss finish upon molding, such as a polycarbonate (PC) or a PC blend in which the PC is the majority component. The color of the colored portion **24** may be any color as required to match the color scheme of the vehicle interior, such as the popular bezel trim color of piano black.

[0022] The plateable portion **22** is plated with a plated finish **26** which is preferably a chrome plated finish. The colored portion **24** includes an in-mold gloss finish **28**.

[0023] The plateable portion **22** and the colored portion **24** are co-molded. The co-molding process, described below, results in a portion joint **30** which is not discernable when the one-piece trim bezel **20** is viewed by a vehicle occupant.

[0024] The one-piece trim bezel **20** of the disclosed invention is formed by a two-shot injection molding process using a bezel mold **50** as shown in FIG. **5**. With reference thereto, the bezel mold **50** includes a first half **52** and a second half **54**. The first half **52** and the second half **54** are illustrated in FIG. **5** in their injection position in which the halves are positioned together.

[0025] The first half **52** of the bezel mold **50** includes a mold cavity **56** defined therein. The mold cavity **56** includes a polished surface or textured surface **58** against which the plateable portion **22** is injected.

[0026] For injection of the plateable portion **22** one or more injection ports **60**, **60'** are formed in the second half **54** of the bezel mold **50**. For injection of the colored portion **24** one or more injection ports **62**, **62'** are formed in the second half **54** of the bezel mold **50**.

[0027] In operation, the bezel mold **50** heats the mold cavity **56** to between 80° C. and 180° C. prior to injection. Once a temperature within this range has been achieved, the injection of the polymerized materials forming the plateable portion **22** and the colored portion **24** takes place in a single operation with these materials being injected into the mold cavity **56** by the injection ports **60**, **60'** and **62**, **62'** respectively.

[0028] After the polymerized materials forming the plateable portion **22** and the colored portion **24** have been injected into the mold cavity **56**, the bezel mold **50** is subjected to a rapid cool down. The formed one-piece trim bezel (not shown) is then removed and is subjected to a plating process during which time chrome adheres only to the surface of the plateable portion **22** to form the plated finish **26** (shown in FIG. **3**) while the high gloss finish of the colored portion **24** remains unplated.

[0029] Alternative methods of heating up the tool cavity may include, but are not limited to, electrical heat, steam, pressurized hot water, hot oil, and the like.

[0030] The description above relates to a two-component bezel and a method of making the two-component bezel. In addition, a multi-component bezel may be made from a multi-shot process. By way of example, a three-component bezel, generally illustrated as **70**, is illustrated in FIG. **6**. The bezel **70** includes a plateable portion **72**, a first non-plated portion **74**, and a second non-plated portion **76**. The arrangement and number of components shown in FIG. **6** are intended as being suggestive and are not intended as being limiting. The plateable portion **72** may be formed from any one of several plateable polymerizable materials including without limitation ABS or PC/ABS plastic. More generally, the plateable portion **72** can be any polymerizable material which can be plated. The non-plated portions **74** and **76** may be formed from any of several polymerizable materials capable of achieving a high gloss finish or textured low gloss finish upon molding, such as a polycarbonate (PC) or a PC blend in which the PC is the majority component. The color of the non-plated portions **74** and **76** may be any color as required to match the color scheme of the vehicle interior.

[0031] The plateable portion **72** is plated with a plated finish **78** which is preferably a chrome plated finish. The non-plated portions **74** and **76** may have any of several finishes, such as a gloss finish (e.g., gloss piano black) and a textured low gloss finish.

[0032] The plateable portion **72** and the unplated portions **74** and **76** are co-molded. The co-molding process results in a first joint **80** between the plateable portion **72** and the first unplated portion **74** and a joint **82** between the first unplated portion **74** and the second unplated portion **76**. The joints **80** and **82** are not discernable when the one-piece trim bezel **70** is viewed by a vehicle occupant.

[0033] The foregoing discussion discloses and describes exemplary embodiments of the present invention. One skilled in the art will readily recognize from such discussion, and

from the accompanying drawings and claims that various changes, modifications and variations can be made therein without departing from the true spirit and fair scope of the invention as defined by the following claims.

What is claimed is:

1. A single piece trim bezel formed from multiple co-molded components comprising:
- a first co-molded part composed of an unplateable polymerized material having an unpainted surface;
- a second co-molded part formed with said first part, said second co-molded part being composed of an unplateable polymerized material, said second co-molded part being co-molded with said first co-molded part to form a single piece trim bezel.

2. The single piece trim bezel of claim **1** further including a third co-molded part composed of a polymerized material.

3. The single piece trim bezel of claim **1** wherein said unpainted surface has a finished selected from the group consisting of high gloss and textured low gloss.

4. The single piece trim bezel of claim **1** wherein said unplateable polymerized material is piano black.

5. The single piece trim bezel of claim **1** wherein said co-molded parts are molded by two-shot injection molding.

6. The single piece trim bezel of claim **2** wherein said co-molded parts are molded by three-shot injection molding.

7. A single piece trim bezel formed from multiple co-molded components comprising:
- a first co-molded part composed of a polymerized material having an unpainted high gloss surface;
- a second co-molded part composed of a plateable polymerized material; and
- a third co-molded part formed from a polymerized material having an unpainted textured low gloss surface, said co-molded parts being co-molded to form a single piece trim bezel.

8. The single piece trim bezel of claim **7** wherein said second co-molded part is composed of a plateable polymerized material selected from the group consisting of ABS or PC/ABS.

9. The single piece trim bezel of claim **7** wherein said unpainted polymerized material is selected from the group consisting of unplateable PC or an unplateable PC blend.

10. The single piece trim bezel of claim **7** wherein said unpainted polymerized material is a color selected from a variety of colors.

11. The single piece trim bezel of claim **10** wherein said polymerized material of said first co-molded part is piano black.

12. The single piece trim bezel of claim **11** wherein said injection molding is three-shot injection molding.

13. A method for forming a single piece trim bezel including the steps of:
- forming a bezel mold having a first half and a second half, said bezel mold having a first injection port for a first polymerizable material and a second injection port for a second polymerizable material;
- positioning said first half and said second half of said bezel mold next to one another;
- injecting said first polymerizable material into said first injection port, said first polymerizable material being an unplateable material;
- injecting said second polymerizable material into said second injection port, said second polymerizable material being plateable;
- removing said single piece trim bezel from said bezel mold; and
- subjecting said single piece trim bezel to a plating process whereupon plating material adheres only to said second polymerizable material.

14. The method for forming a single piece trim bezel of claim **13** wherein said injection of said first polymerizable material and said second polymerizable material is a two-shot injection process.

15. The method for forming a single piece trim bezel of claim **13** further including the step of forming a third injection port in said bezel mold and injecting a third polmerizable material into said bezel mold, said third polymerizable material being an unplateable material.

16. The method for forming a single piece trim bezel of claim **15** wherein said injection of said first polymerizable material, said second polymerizable material, and said third polymerizable material is a three-shot injection process.

17. The method for forming a single piece trim bezel of claim **13** wherein said bezel tool cavity is heated to between 80° C. and 180° C. prior to material injection and thereafter said bezel mold is subjected to a cool down after injection of said first and second polymerizable materials.

18. The method for forming a single piece trim bezel of claim **13** wherein said bezel includes an outer surface and wherein said first half of said mold includes a cavity defining said bezel surface.

19. The method for forming a single piece trim bezel of claim **18** wherein said cavity includes a first surface against which said first polymerizable material is injected and a second surface against which said second polymerizable material is injected, said second surface being a polished surface.

20. The method for forming a single piece trim bezel of claim **13** wherein said first polymerizable material forms an unpainted high gloss surface in said bezel mold.

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