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(54) **CUSTOMIZED INSTRUMENT EVALUATION AND ORDERING TOOL**

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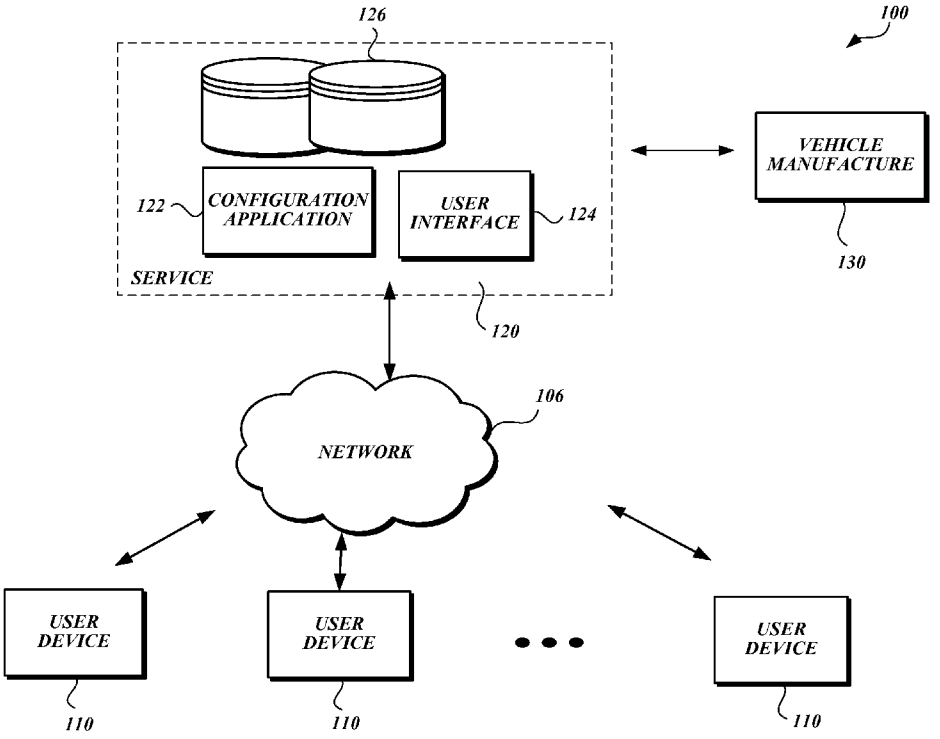
(57) **ABSTRACT**

A tool is provided to allow a user to customize the components of a vehicle instrument panel from an Internet-enabled Web site. A user can navigate to a Web site and select a vehicle for configuration. From the Web site, input may be obtained regarding the components and appearance of an instrument panel such as selecting particular types of components (e.g., display panels, gauges, etc.) and arranging where the selected components are to be located. The input generated by a user is translated into a build specification for assembling the instrument panel at the manufacturer. Accordingly, the system and method serve as an interface between the Web site that obtains user configuration data and a manufacturer's system that manages assembly of the vehicle.



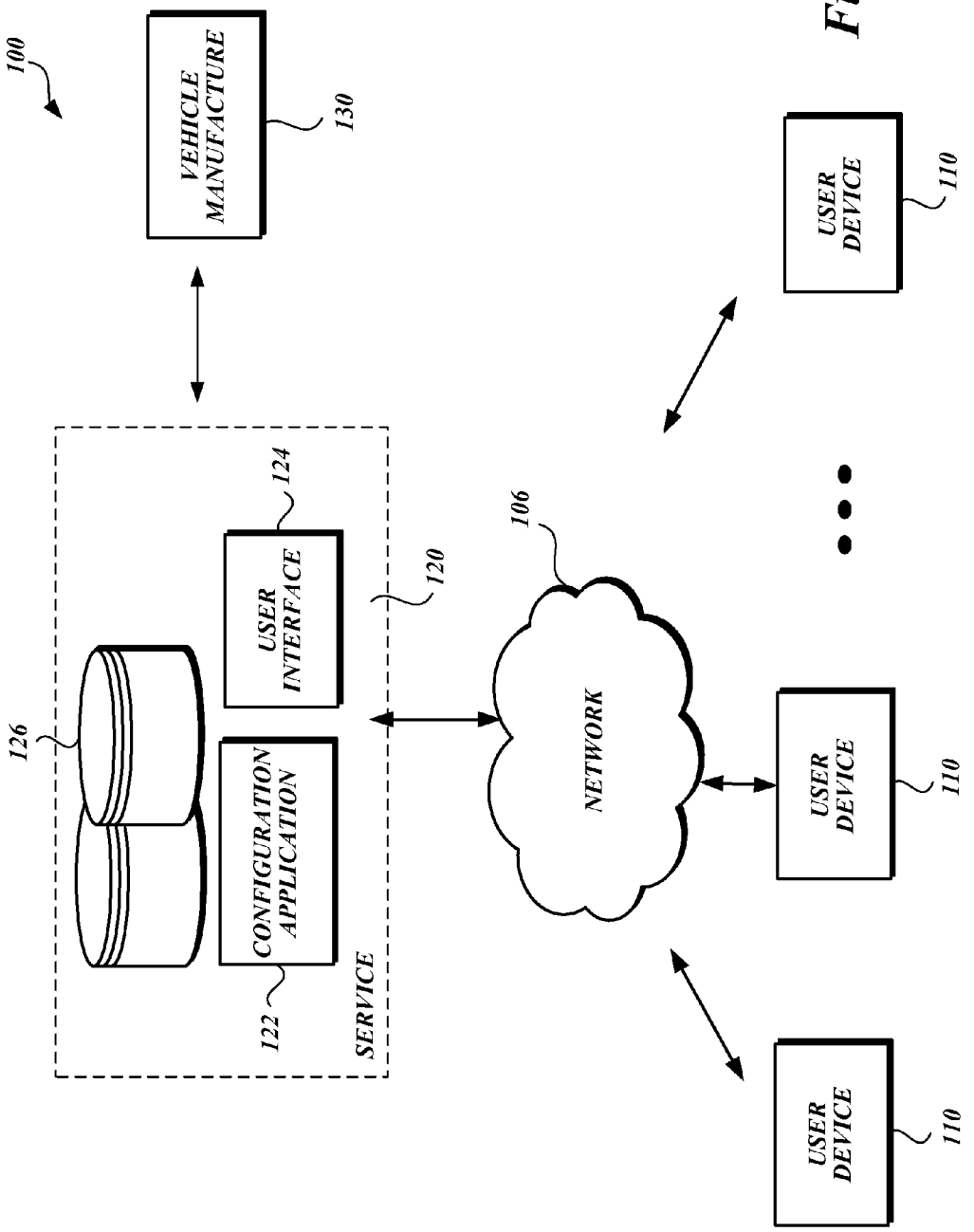

100
VEHICLE MANUFACTURE
130
USER DEVICE
110
USER INTERFACE
124
120
106
126
NETWORK
CONFIGURATION APPLICATION
122
SERVICE
USER DEVICE
110
USER DEVICE
110

Fig. 1.

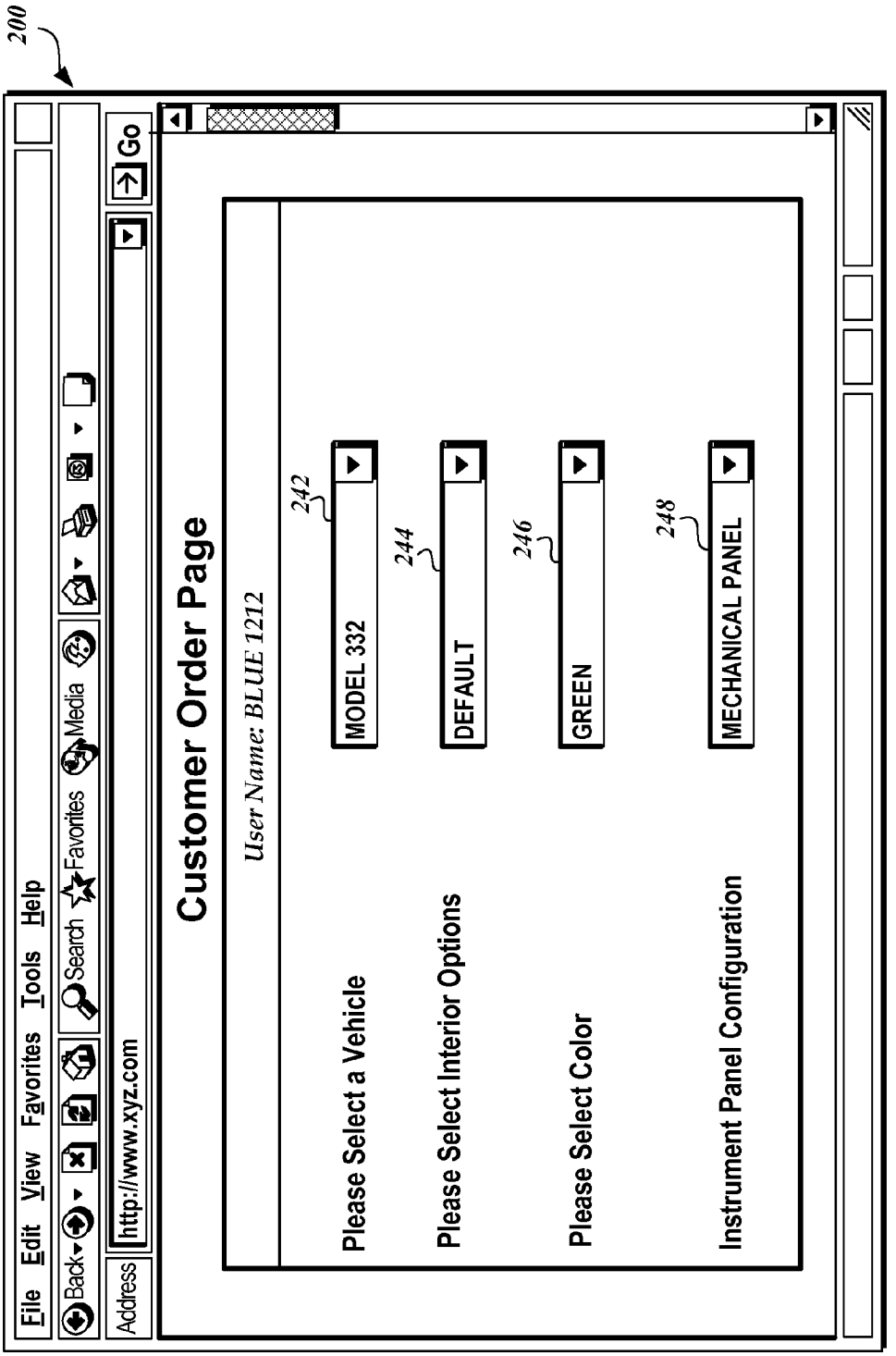

200
File Edit View Favorites Tools Help
Back
Search
Favorites
Media
Address
http://www.xyz.com
Go
Customer Order Page
User Name: BLUE 1212
242
Please Select a Vehicle
MODEL 332
244
Please Select Interior Options
DEFAULT
246
Please Select Color
GREEN
248
Instrument Panel Configuration
MECHANICAL PANEL

Fig.2A.

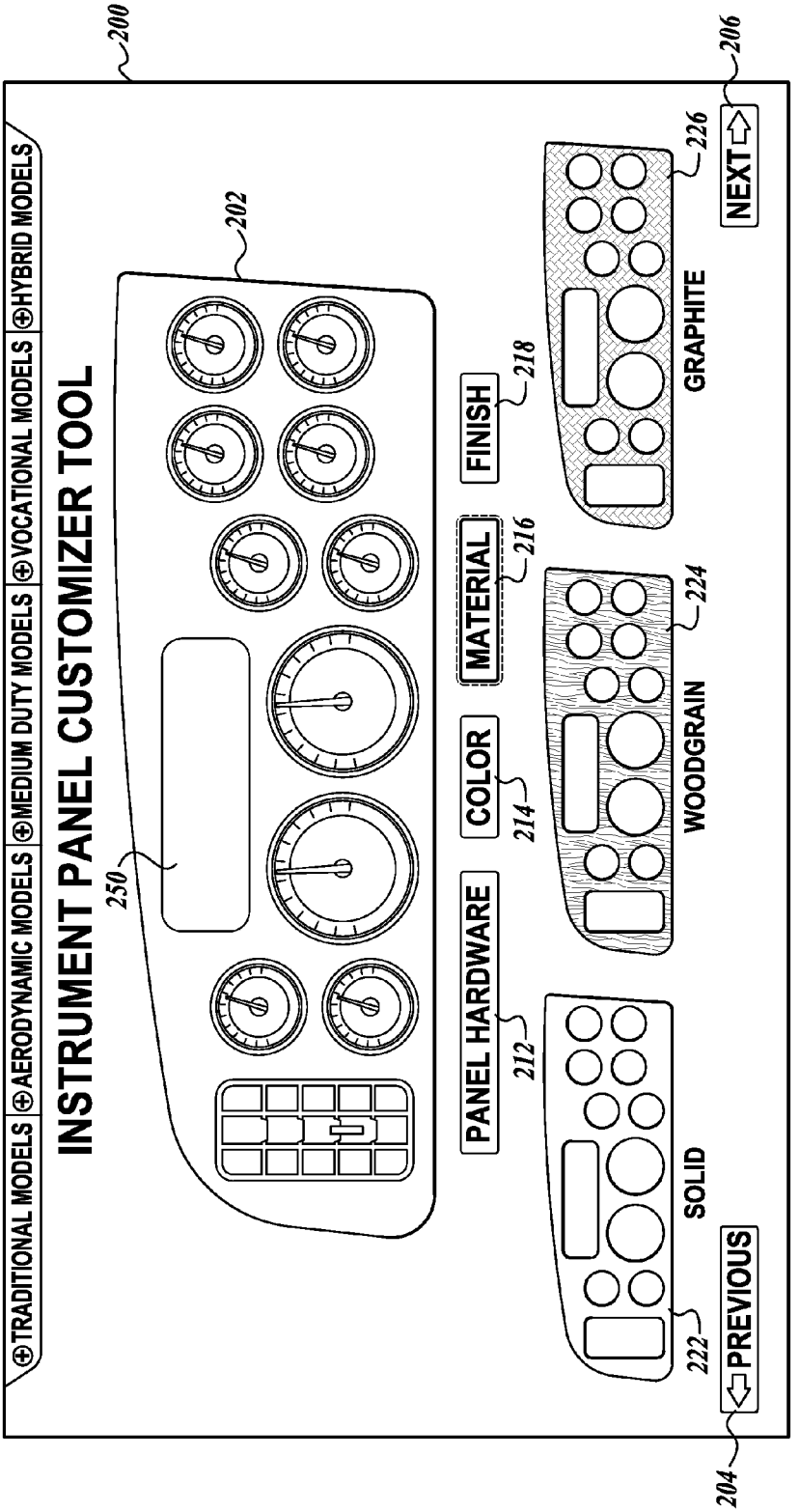

200
206
202
250
INSTRUMENT PANEL CUSTOMIZER TOOL
⊕TRADITIONAL MODELS
⊕AERODYNAMIC MODELS
⊕MEDIUM DUTY MODELS
⊕VOCATIONAL MODELS
⊕HYBRID MODELS
PANEL HARDWARE
212
COLOR
214
MATERIAL
216
FINISH
218
SOLID
222
WOODGRAIN
224
GRAPHITE
226
PREVIOUS
NEXT
204

Fig. 2B.

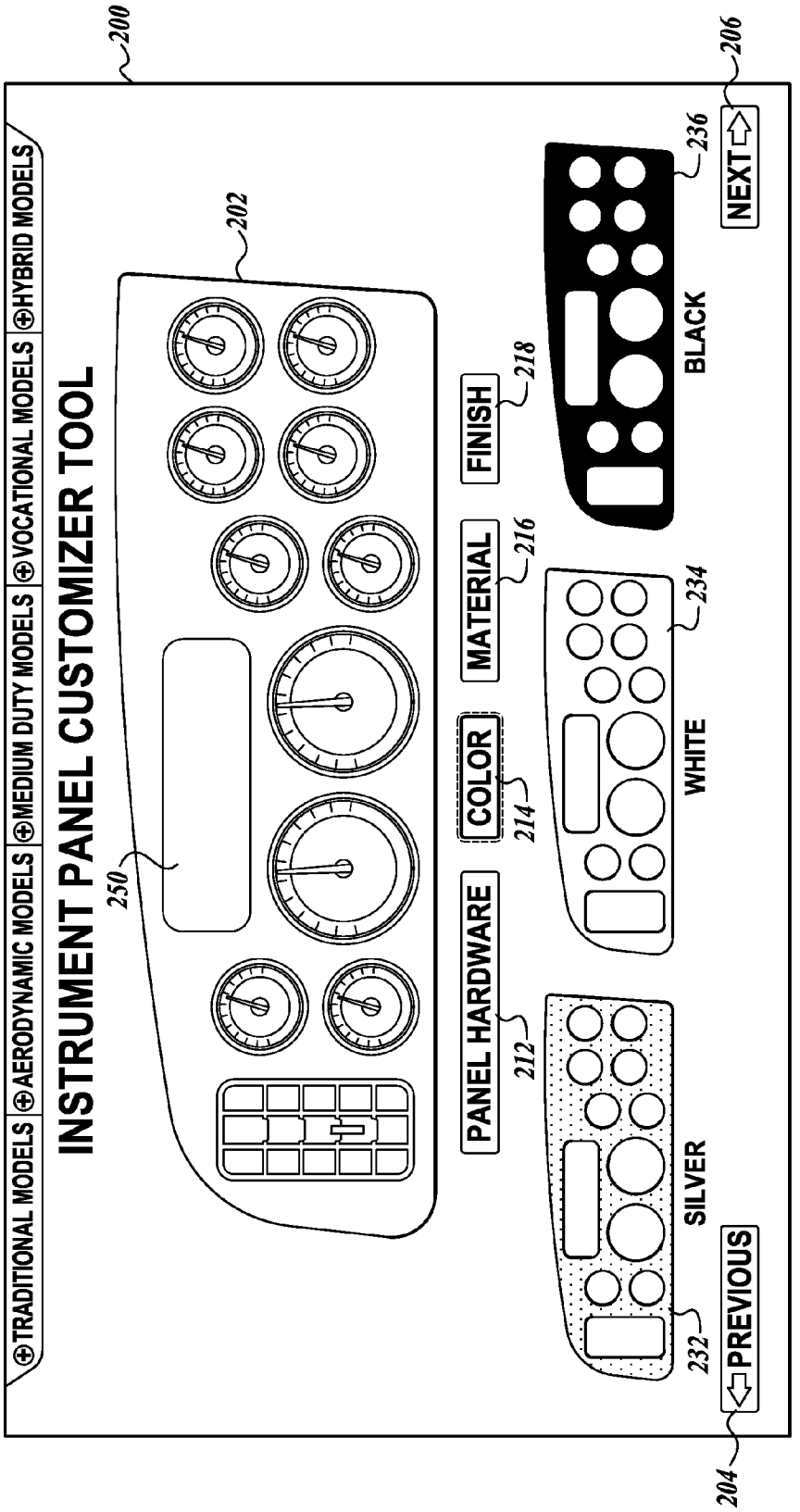

200
206
202
TRADITIONAL MODELS
AERODYNAMIC MODELS
MEDIUM DUTY MODELS
VOCATIONAL MODELS
HYBRID MODELS
INSTRUMENT PANEL CUSTOMIZER TOOL
250
PANEL HARDWARE
212
COLOR
214
MATERIAL
216
FINISH
218
SILVER
WHITE
BLACK
232
234
236
PREVIOUS
NEXT
204

Fig. 2C.

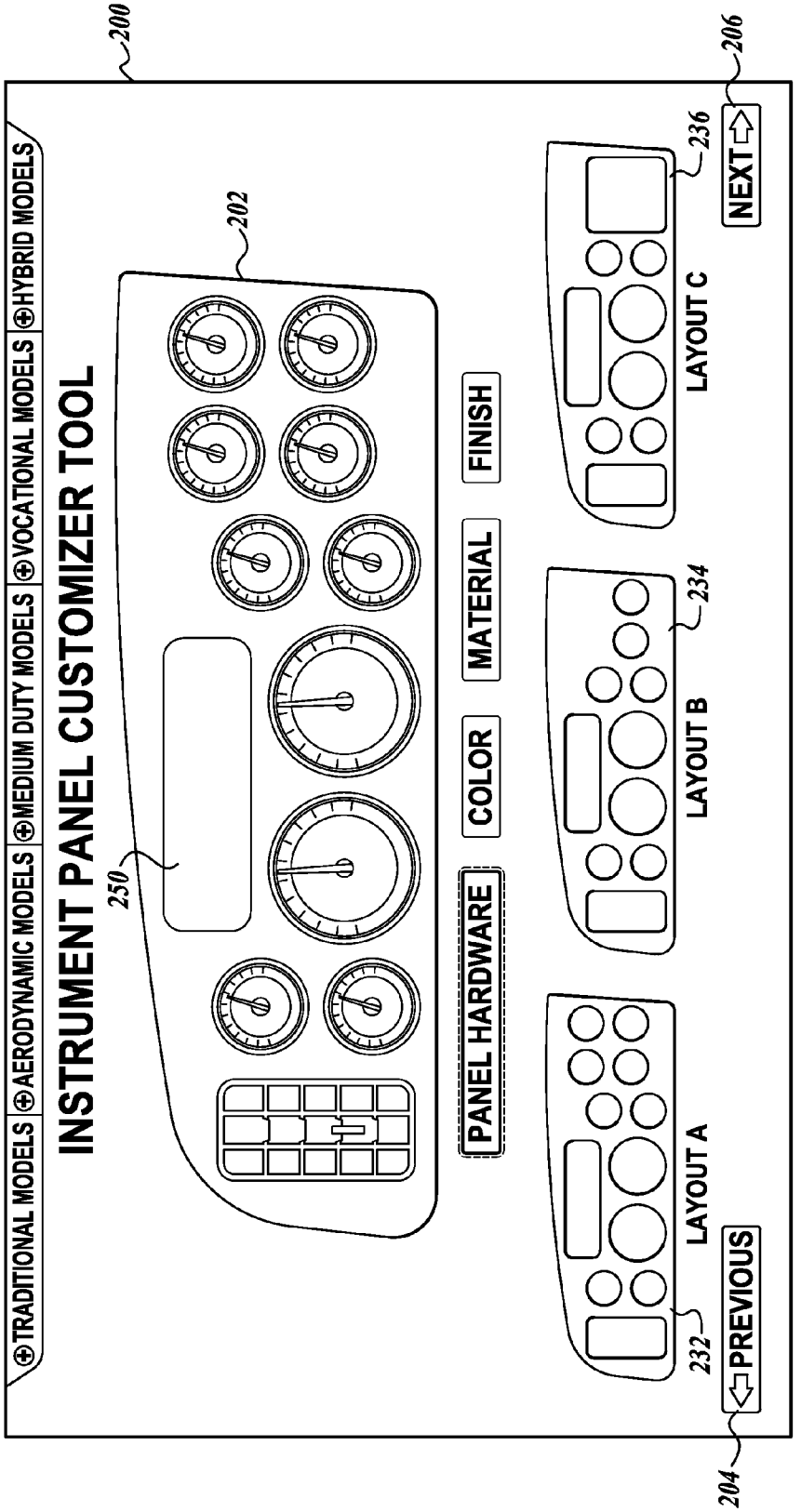

200
206
TRADITIONAL MODELS
AERODYNAMIC MODELS
MEDIUM DUTY MODELS
VOCATIONAL MODELS
HYBRID MODELS
INSTRUMENT PANEL CUSTOMIZER TOOL
202
250
PANEL HARDWARE
COLOR
MATERIAL
FINISH
LAYOUT A
LAYOUT B
LAYOUT C
232
234
236
PREVIOUS
NEXT
204

Fig. 2D.

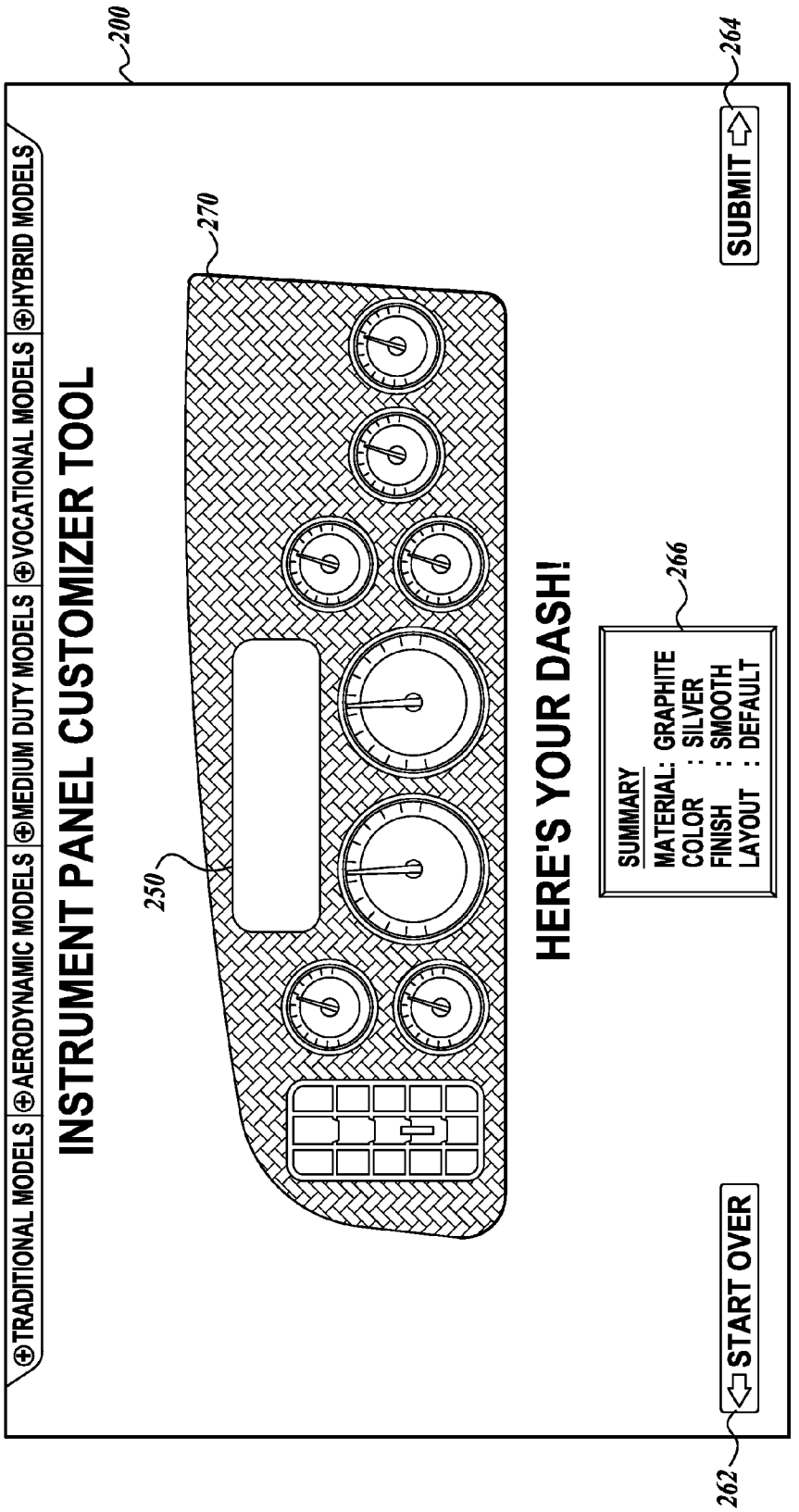

200
264
270
250
266
262
⊕TRADITIONAL MODELS
⊕AERODYNAMIC MODELS
⊕MEDIUM DUTY MODELS
⊕VOCATIONAL MODELS
⊕HYBRID MODELS
INSTRUMENT PANEL CUSTOMIZER TOOL
SUBMIT
HERE'S YOUR DASH!
SUMMARY
MATERIAL: GRAPHITE
COLOR : SILVER
FINISH : SMOOTH
LAYOUT : DEFAULT
START OVER

Fig. 2E.

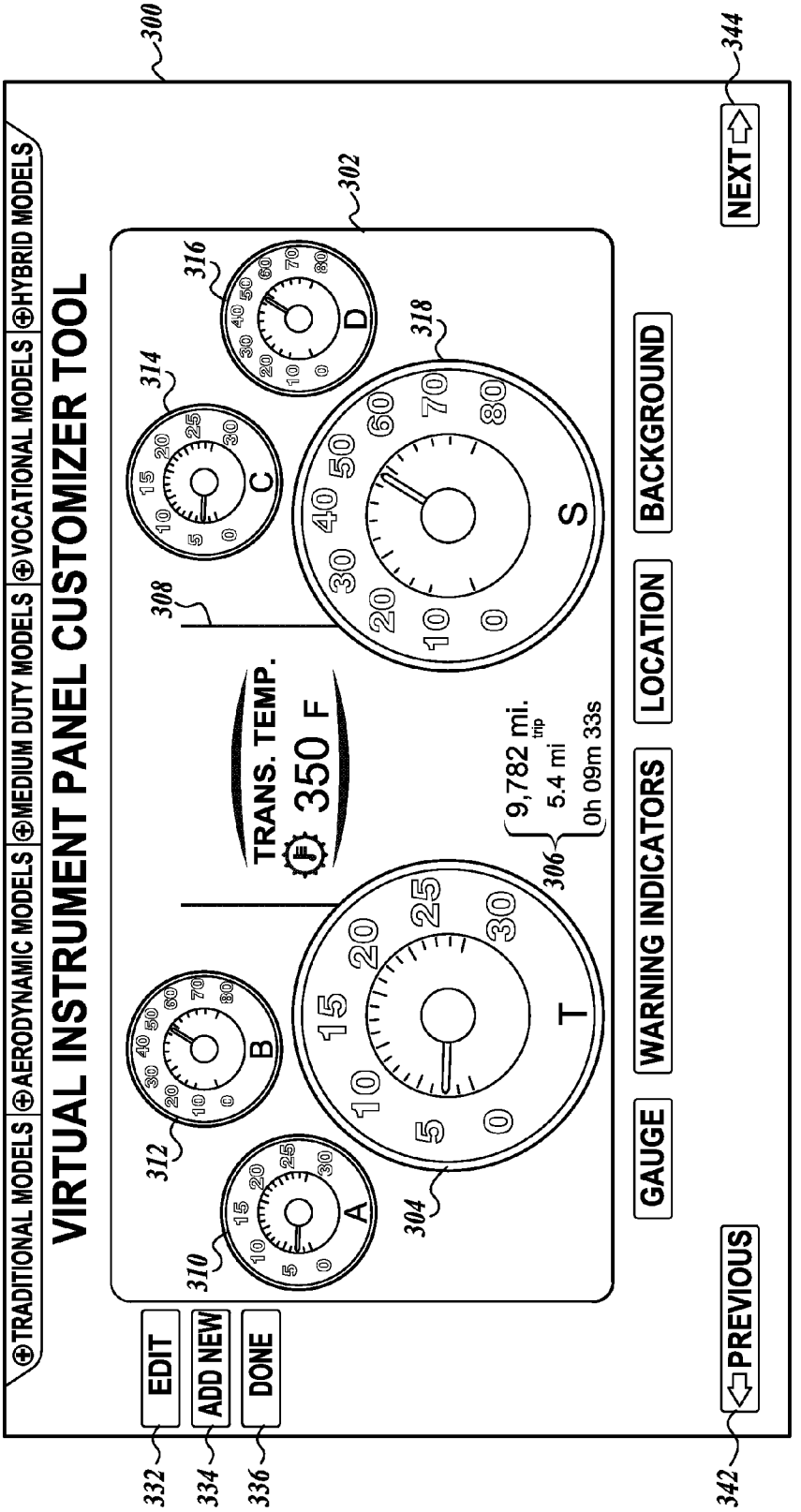

300
344
TRADITIONAL MODELS
AERODYNAMIC MODELS
MEDIUM DUTY MODELS
VOCATIONAL MODELS
HYBRID MODELS
VIRTUAL INSTRUMENT PANEL CUSTOMIZER TOOL
302
316
314
318
308
TRANS. TEMP.
350 F
9,782 mi.
5.4 mi
0h 09m 33s
306
312
310
304
EDIT
ADD NEW
DONE
GAUGE
WARNING INDICATORS
LOCATION
BACKGROUND
PREVIOUS
NEXT
332
334
336
342

Fig.3A.

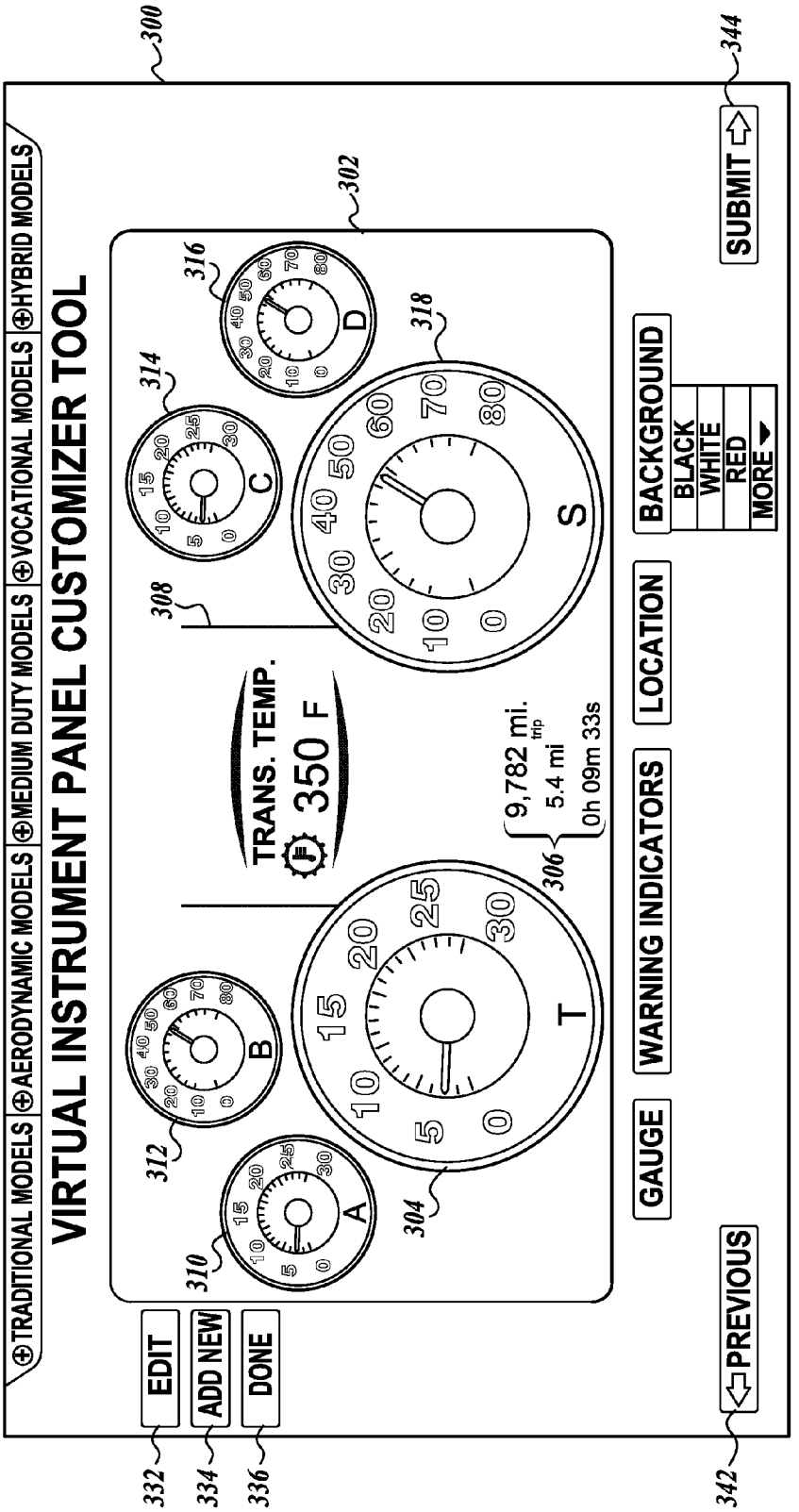

300
344
TRADITIONAL MODELS
AERODYNAMIC MODELS
MEDIUM DUTY MODELS
VOCATIONAL MODELS
HYBRID MODELS
VIRTUAL INSTRUMENT PANEL CUSTOMIZER TOOL
302
316
314
318
308
TRANS. TEMP.
350 F
9,782 mi.
5.4 mi
0h 09m 33s
306
312
310
304
A
B
C
D
S
T
BACKGROUND
BLACK
WHITE
RED
MORE
GAUGE
WARNING INDICATORS
LOCATION
SUBMIT
EDIT
ADD NEW
DONE
PREVIOUS
332
334
336
342

Fig.3B.

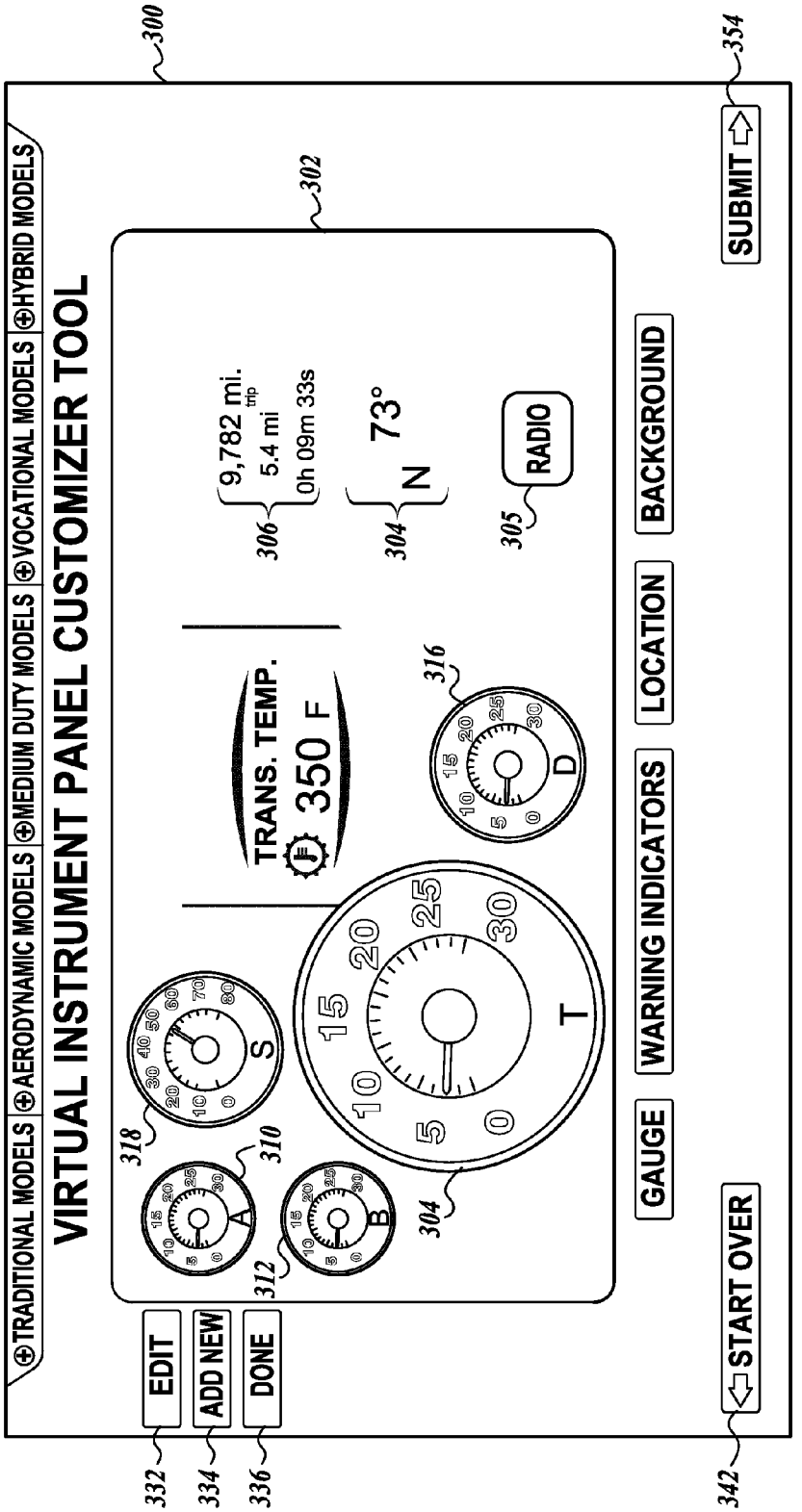

300
TRADITIONAL MODELS
AERODYNAMIC MODELS
MEDIUM DUTY MODELS
VOCATIONAL MODELS
HYBRID MODELS
VIRTUAL INSTRUMENT PANEL CUSTOMIZER TOOL
302
TRANS. TEMP.
350 F
9,782 mi.
5.4 mi
0h 09m 33s
306
73°
N
304
RADIO
305
316
318
310
312
304
EDIT
ADD NEW
DONE
332
334
336
GAUGE
WARNING INDICATORS
LOCATION
BACKGROUND
START OVER
342
SUBMIT
354

Fig.3C.

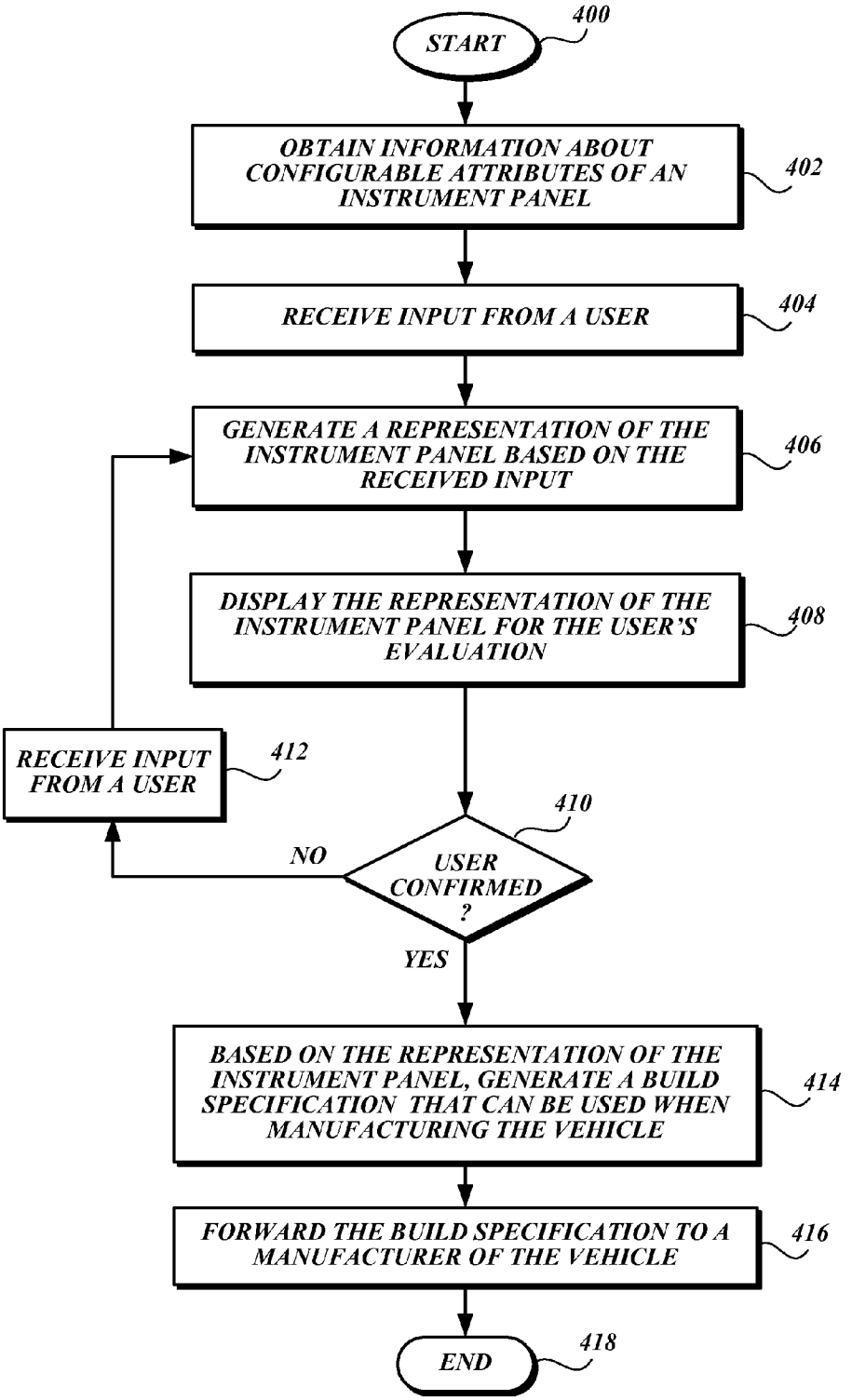

400
START
OBTAIN INFORMATION ABOUT CONFIGURABLE ATTRIBUTES OF AN INSTRUMENT PANEL
402
RECEIVE INPUT FROM A USER
404
GENERATE A REPRESENTATION OF THE INSTRUMENT PANEL BASED ON THE RECEIVED INPUT
406
DISPLAY THE REPRESENTATION OF THE INSTRUMENT PANEL FOR THE USER'S EVALUATION
408
RECEIVE INPUT FROM A USER
412
410
NO
USER CONFIRMED ?
YES
BASED ON THE REPRESENTATION OF THE INSTRUMENT PANEL, GENERATE A BUILD SPECIFICATION THAT CAN BE USED WHEN MANUFACTURING THE VEHICLE
414
FORWARD THE BUILD SPECIFICATION TO A MANUFACTURER OF THE VEHICLE
416
END
418

Fig.4.

CUSTOMIZED INSTRUMENT EVALUATION AND ORDERING TOOL

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is a divisional of U.S. patent application Ser. No. 12/711,054, filed Feb. 23, 2010, the disclosure of which is incorporated by reference herein in its entirety.

BACKGROUND

[0002] With the increased popularity of the Internet, network-based product ordering services, e.g., Web sites that enable people to place an order or make purchases online, have become increasingly accepted and popular. In that regard, some Web sites allow a user to select a desired configuration for a product from a predetermined set of configurations before purchasing the product. For example, a user can purchase, over the Internet, a customized car by selecting a specific model, color, or interior/exterior options. Typically, a vehicle manufacturer does not allow a customer to change most of the attributes of an instrument panel in the vehicle.

[0003] An instrument panel provides a variety of functions within a vehicle. Gauges mounted within the panel are the primary interface between the vehicle operator and the vehicle. Typically in a vehicle, a factory installed instrument panel is designed to present a particular arrangement, e.g., a cluster of gauge-type instruments or digitized (virtual) instruments in a pre-set design. Thus, when a user wants to have a customized instrument panel, the user may have to hire a third party company that specializes in replacing the factory installed instrument panel with the customized one. However, replacing an existing instrument panel of a vehicle with the customized instrument panel can be costly and a waste of time and resources. Further, such customization, including hiring a third party company, has inherent limits and risks as well, such as the likelihood of incorrect gauge calibration. Typically, virtual type instruments, such as LCD virtual gauge instruments, are hard to replace with gauge-type instruments or vice versa. Moreover, there is no tool that allows the user to visually review or evaluate the customized instrument panel before the customized instrument panel is manufactured and installed on the vehicle.

SUMMARY

[0004] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[0005] A system and method are provided to allow a user to customize the components of a vehicle instrument panel from an Internet-enabled Web site. A user may navigate to a Web site and select a vehicle for configuration. From the Web site, input may be obtained regarding the components and appearance of an instrument panel. For example, a user may generate input to select particular types of components (e.g., display panels, gauges, etc.) and arrange where the selected components are to be located. Moreover, a user is allowed to specify a type of instrument panel, such as mechanical, virtual, or mixed instrument panel. In one aspect, the input generated by a user is translated into a build specification for assembling the instrument panel at the manufacturer. In another aspect, the system and method display a visual representation of the instrument panel based on the received user input. The user can add, delete or modify the instrument panel after reviewing and evaluating the displayed visual representation of the instrument panel.

[0006] In accordance with an aspect of an embodiment, a system is provided for facilitating a configuration service of an instrument panel. The system comprises a memory component for storing information about vehicles and information about an instrument panel of each vehicle and a computing device that is communicatively connected with the memory component. The computing device is operative to obtain information about configurable attributes of an instrument panel for a vehicle, wherein a user of a remote computing device selects the vehicle for customizing thereof and receives input from the user regarding a desired configuration of the instrument panel that includes at least one hardware instrument and at least one virtual instrument, wherein the input from the user is directed to the configurable attributes. The computing device is further operative to generate a visual representation of the instrument panel based on the received input, to render the generated visual representation of the instrument panel on the remote computing device, to generate a build specification that is designed to be used by a manufacturer for assembling an instrument panel that corresponds to the generated visual representation and to provide the build specification to a manufacturer system. In one aspect, the rendered visual representation of the instrument panel includes depictions of the hardware and virtual instruments.

[0007] In accordance with another aspect of an embodiment, a method implemented in computer-executable instructions is provided for configuring an instrument panel based on received user input. The method comprises receiving input from a user regarding desired configurations of an instrument panel of a vehicle, generating a visual representation of the instrument panel based on the received input, causing the generated visual representation of the instrument panel to be rendered on the remote computing device and receiving from the user a review regarding the visual representation of the instrument panel. If the review is satisfactory, a build order is generated that is designed to be used for assembling the instrument panel that corresponds to the generated visual representation. The build order identifies instruments that will be displayed on the instrument panel and specifies characteristics and locations of the identified instruments. The build order is provided to a manufacturer system that includes an assembly application configured to assemble the instrument panel in accordance with the build order.

[0008] In accordance with yet another aspect of an embodiment, a system is provided for facilitating a configuration service between a user and a manufacturer of a vehicle over a communication network. The system comprises a memory component for storing information about vehicles and information about an instrument panel of each vehicle, a user interface component configured to obtain input from a user and render a graphical display in a Web page and a configuration component. The configuration component is operable to generate a visual representation of an instrument panel based on the obtained input, wherein the obtained input is the desired configuration of the instrument panel, to cause the user interface component to render the generated visual representation of the instrument panel on the remote computing device, wherein the user interface component is further configured to receive from the user a review regarding the visual

representation of the instrument panel and to determine whether the user's review is satisfactory. If the user's review is satisfactory, the configuration component generates a build order that is designed to be used for assembling the instrument panel that corresponds to the generated visual representation and provide the build order to a manufacturer system. The build order identifies instruments that will be displayed on the instrument panel and specifies characteristics and locations of the identified instruments.

DESCRIPTION OF THE DRAWINGS

[0009] The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

[0010] FIG. **1** is a pictorial depiction of an exemplary system architecture that illustrates components suitable for implementing aspects of the disclosed subject matter;

[0011] FIGS. **2**A-**2**E and **3**A-**3**C are exemplary graphic user interfaces where a user can customize and evaluate the configuration of an instrument panel in accordance with additional embodiments of the disclosed subject matter; and

[0012] FIG. **4** is a flow diagram of a method for customizing and evaluating configuration of the instrument panel in accordance with additional embodiments of the disclosed subject matter.

DETAILED DESCRIPTION

[0013] The detailed description set forth below in connection with the appended drawings where like numerals reference like elements is intended as a description of various embodiments of the disclosed subject matter and is not intended to represent the only embodiments. Each embodiment described in this disclosure is provided merely as an example or illustration and should not be construed as preferred or advantageous over other embodiments. The illustrative examples provided herein are not intended to be exhaustive or to limit the disclosure to the precise forms disclosed. Similarly, any steps described herein may be interchangeable with other steps, or combinations of steps, in order to achieve the same or substantially similar result.

[0014] Prior to discussing the details of the systems and methods for proving a tool to allow a user to customize and visually evaluate an instrument panel of a vehicle prior to purchase the vehicle, it should be understood that several sections of the following description are presented largely in terms of logic and operations that may be performed by conventional components. These components, which may be grouped in a single location or distributed over a wide area, generally include processors, memory, storage devices, display panels, input devices, etc. In circumstances where the components are distributed, the components are accessible to each other via communication links. The following description provides examples of the systems and methods that facilitate various services for a user to customize the configuration of an instrument panel of a vehicle and visually evaluate the user's customized configuration over the communication networks.

[0015] FIG. **1** and the following discussion is intended to provide a brief, general description of an exemplary system environment **100** for implementing aspects of the disclosed subject matter. The system environment **100** of FIG. **1** includes a service system **120** and one or more remote devices for users, such as user devices **110**, by which a user (not shown) can interact with the service system **120**. The user devices **110** communicate with the service system **120** via a communication network **106**, such as the

[0016] Internet. The user devices **110** are typically computing devices including a variety of configurations or forms such as, but not limited to, laptop or tablet computers, personal computers, personal digital assistants (PDAs), hybrid PDA/mobile phones, mobile phones, workstations, personal media players, and the like.

[0017] In FIG. **1**, the service system **120** may comprise one or multiple servers or discrete components to provide configuration and purchasing services to the users. In one embodiment, a service system **120** includes one or more memory component **126**, a configuration component **122**, and a user interface component **124**, etc. The memory component **126** may include databases for storing information relevant to the configuration and purchasing services provided by the service system **120**. For example, the database stores information such as the user profile, vehicle catalogs, customizable attributes of each vehicle, a manufacturer of a vehicle, customizable attributes of an instrument panel, etc. It is noted that the term "vehicle", as used herein, generally refers to any type of vehicle, including a truck, an automobile, boat, Recreational Vehicle ("RV"), vessel, etc., that can be used to implement aspects of the present disclosure.

[0018] As will be well appreciated by one of ordinary skill in the art, the memory component **126** depicted in FIG. **1** is one example of computer-readable media suited to storing data and program modules for implementing aspects of described embodiments. As used herein, the term "computer-readable media" includes volatile and non-volatile and removable and non-removable memory, implemented in any method or technology capable of storing information, such as computer-readable instructions, data structures, program modules, or other data. By way of example, computer-readable media include, but are not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium that can be used to store the desired information for access by the processor of the service system.

[0019] The user interface component **124** may be configured to display a graphic user interface (GUI) on the remote user device **110** to interact with a user of the remote user device **110**. In an illustrative embodiment, the user interface component **124** represents the front-end of a stand-alone application, such as a Web browser. Alternatively, the user interface component **124** can be integrated with one or more software applications. As will be described in more detail below, the configuration component **122** is configured to process user input received through the user interface component **124** and to generate a representation of an instrument panel for a vehicle, a build specification for the instrument panel, and the like.

[0020] In the illustrative embodiment depicted in FIG. **1**, the system environment **100** includes one or more vehicle manufacturers that are responsible for manufacturing and providing a vehicle based on a user order and/or a build specification from the service system **120**. As will be described in detail below, the service system **120** may be configured to generate a file having data that describes a build

specification based on user input. The data file created may be transmitted to the vehicle manufacturer and automatically loaded into a vehicle build queue for configuring the vehicle in accordance with the build specification.

[0021] One of ordinary skill in the art will appreciate that the service system **120**, a vehicle manufacturer **130**, and a remote device **110** for a user will include many more components than those depicted in FIG. **1**. However, it is not necessary that all of these generally conventional components be shown or described.

[0022] FIGS. **2**A-**2**E and **3**A-**3**C illustrate exemplary graphic user interfaces (GUIs) where a user can customize configuration of an instrument panel in accordance with additional embodiments of the disclosed subject matter. In the exemplary embodiment depicted in FIG. **2**A, the service system **120** (i.e., the user interface component **124** in FIG. **1**) displays a GUI **200** on a screen of the user device **110**, in which the user is prompted to choose a particular vehicle for customizing the configuration of an instrument panel. In that regard, the GUI **200** may provide several visual indicators representing menus, such as vehicle menu **242**, interior option menu **244**, color menu **246**, and instrument panel configuration menu **248**, each providing available choices about a particular attribute of the vehicle.

[0023] As will be appreciated, a particular vehicle may include predetermined components that are customizable by a user when ordering the vehicle over the network. In this regard, the manufacturer of the vehicle may provide the service system **120** with a vehicle catalog, including information necessary to facilitate configuration and/or ordering services. The service system **120** processes the information obtained from the manufacturer in order that the information can be easily used for configuration services. In this regard, the provided and processed information may be stored in the database of the service system **120**.

[0024] In this embodiment, as the user identifies a particular vehicle of interest for a customization service, the service system **120** further prompts the user to select other attributes of the vehicle. By way of example, assume that the user has selected a particular vehicle, such as "MODEL 332" for the vehicle of their interest, as shown in FIG. **2**A. In response to the user's input, the service system **120** obtains the customizable attributes of the vehicle of interest, including, but not limited to, color, interior/exterior, and instrument panel options available for the "MODEL 332" vehicle.

[0025] As will be described in further detail below, the service system **120** allows the user to start a configuration service for an instrument panel of the vehicle. As discussed above, there are several types of instrument panels that can be available for the vehicle, such as a mechanical instrument panel with hardware components, a virtual instrument panel with visual image elements representing gauges or warning indicators, or a mixed instrument panel with some hardware components and some visual image elements.

[0026] As each type of instrument panel includes different components and attributes to be customized, the GUI prompts the user to select a desired type of instrument panel to start a configuration service for an instrument panel. As shown in FIG. **2**A, in this example, the user selects "Model 332" from the vehicle menu **242**, "Default" from the interior option menu **244**, "Green" from the color menu **246**, and "Mechanical Panel" from the instrument panel configuration menu **248**.

[0027] FIGS. **2**B-**2**E illustrate GUIs **200** where a user can customize the configuration of a mechanical instrument panel. A default instrument panel **202** is initially depicted to assist a user to customize various components of the instrument panel. The GUI **200** provides "PREVIOUS" button **204** and "NEXT" button **206** so that the user can go back to the previous screen of the GUI **200** or move to the next screen of the GUI **200**. In the exemplary embodiments depicted in FIGS. **2**B-**2**E, a user can customize several attributes of the default instrument panel **202**, including, but not limited to, "Panel Hardware" **212**, "Color" **214**, "Material" **216**, "Finish" **218**, and the like.

[0028] As shown in FIG. **2**B, the GUI **200** may present to the user a set of predetermined materials, such as "SOLID" **222**, "WOODGRAIN" **224**, and "GRAPHITE" **226**, available for the instrument panel cover. Likewise, the GUI **200** may present to the user a set of predetermined colors, such as "SILVER" **232**, "WHITE" **234**, and "BLACK" **236**, available for the instrument panel cover, as depicted in FIG. **2**C. In some embodiments, the user can select a desired layout of the instrument panel. As shown in FIG. **2**D, a set of predetermined layouts, such as "LAYOUT A" **252**, "LAYOUT B" **254**, and "LAYOUT C" **256** of instrument panels may be presented in the GUI **200** for configuration of the instrument panel.

[0029] Although it is not shown, the user can add or remove a particular hardware component into/from the displayed instrument panel **202**. Further, the user can change the appearance of the hardware component face or accessories. In that regard, the user can customize some characteristics of the hardware components, such as a gauge face, gauge mounting cup, desired gauges, etc., that are to be installed on the selected layout.

[0030] In one aspect, after the user finishes customizing the configuration of the instrument panel, the user has an option to review and evaluate before manufacturing of the instrument panel. In that regard, an image of the instrument panel may be simulated in accordance with the user's configuration, which may be presented to the user. In response to presentation of the simulated instrument panel, the user can examine and review the final product look of the configuration. The user can then decide whether or not to proceed with manufacturing the instrument panel based on the configuration.

[0031] FIG. **2**E includes an exemplary GUI **260** depicting the simulated image **270** of the final-product-to-be of the instrument panel, based on the user's configuration. In the exemplary GUI **260**, the simulated image **270** is rendered based on the desired configuration of the instrument panel including the "graphite material," "silver color," "smooth finish," and "default layout" attribute values. In some embodiments, a brief summary **266** of the user's configurations may be also provided. The user reviews the simulated image to see and feel if the configuration would result in what the user wants. After the review and evaluation of the simulated image **270**, if it is not satisfactory, the user can restart the configuration service with the service system **120** by pressing the "START OVER" button **262**. Alternatively, the user can choose to change some attributes of the instrument panel represented in the simulated image. In that regard, the service system **120** may instantaneously store the user's inputs regarding the configuration so that the user can stop their configuration service anytime and resume the configuration service later without the need to provide previously entered user inputs again.

[0032] If the review and evaluation of the simulated image is satisfactory, the user may finalize and submit the configu-

ration by indicating to place an order for the vehicle with the simulated instrument panel installed. Upon receipt of a user's indication to finalize, the service system **120** may create a build specification for the instrument panel based on the submitted configuration and forward the build specification to the manufacturer of the vehicle. The selected attributes of the vehicle, such as model number, color, horse power, etc., are also forwarded to the manufacturer. In the exemplary screen depicted in FIG. **2**E, the user can press the "SUBMIT" button **264** to finalize the configuration.

[0033] In some instances, a user may choose to have a virtual instrument panel installed in a vehicle. As will be well understood, the virtual instrument panel consists of virtual image elements representing gauges, warning indicators, etc., that convey information about specific vehicle conditions. In one aspect, when the virtual or mixed instrument panel is selected, the visual characteristics and attributes (e.g., size, location, color, etc.) of the virtual image elements may be configured through a configuration service provided by the service system **120**. Similar to the configuration services for the mechanical instrument panel, the user is allowed to select particular types of visual image elements and arrange where each of the selected virtual image elements will be located.

[0034] FIGS. **3**A-**3**C illustrate GUIs **300** where a user can customize the configuration of a virtual instrument panel in accordance with additional embodiments of the disclosed subject matter. A default instrument panel **302** is initially depicted to assist a user to customize various components of the instrument panel. Generally, the default virtual instrument panel **302** has been predefined by a manufacturer and such default virtual instrument panel information is provided from a manufacturer and then properly stored in the database. Within the GUI **300**, the user can add, delete, and modify visual image elements to/from the default virtual instrument panel **302** to achieve their desired configuration. In that regard, the GUI **300** may include several menu options, for example, "EDIT" menu option **332**, "ADD NEW" menu option **334**, "DONE" menu option **336**.

[0035] In the exemplary embodiment depicted in FIG. **3**A, the default virtual instrument panel **302** may include the visual image elements **304**, **306**, **308**, **310**, **312**, **314**, **316**, **318** that represent a variety of gauges that are customizable, including, but not limited to, a speedometer, tachometer, headlight indicator, oil pressure gauge, fuel gauge, temperature gauge, voltmeter, turn signal indicator, cruise control indicator, fuel economy indicator, and a navigation indicator, among others. The default instrument panel **302** may include the visual image elements in a default size and location with a default background color. FIG. **3**B depicts the GUI **300** where the user can change the background color of the default instrument panel **302**.

[0036] In addition or alternatively, the service system **120** allows a user to change the characteristics/attributes of a visual image element that represents a particular gauge. If a user selects to change the appearance of a particular visual image element, for example wanting to have an enlarged tachometer, the user can interact with the GUI to enlarge the visual image element **312** representing a tachometer. In this regard, the user can click the image elements **312** representing the tachometer using a pointing device such as a mouse and then change the size of it by dragging the selected image to a desired size. In addition or alternatively, the user can manually enter the desired attribute values. By way of example only, a user presses the "EDIT" menu option **332** provided in the GUI **300** in FIGS. **3**A-**3**C, and the GUI **300** may display several names of virtual image elements that are currently included in the default panel. The user selects a name of a particular virtual image element, and the GUI **300** then may prompt the user to input the desired attributes for the selected gauge display. The user can manually provide to the service system **120** information regarding the width, length, color, or the like.

[0037] Upon any changes made by the user, the representation of the updated virtual image element may be shown on the virtual panel so that the user can review and evaluate the changes in the virtual image element. FIG. **3**C shows the appearance and location of the visual image element **318** and the locations of various visual image elements (e.g., **306**, **310**, **312**, **316**) have been changed from the default virtual panel **302** depicted in FIG. **3**B. Further, a user removed visual image element **314** and added new visual image elements (e.g., element **324** (showing "N" and "73°"), element **305** (showing "Radio")) in the space where virtual element **318** was previously placed.

[0038] Similar to the mechanical panel, the service system **120** may instantaneously store the user's inputs regarding the configurations so that the user can stop their configuration service at any time and resume the configuration service later without having to provide previously entered user inputs again.

[0039] If the currently displayed virtual panel is satisfactory, the user can finalize and submit the configuration to the service system **120**. In the GUI of FIG. **3**C, the user can press the "SUBMIT" button **354** to finalize the configuration. Upon receipt of the user's request to finalize, the service system **120** may create a build specification for the instrument panel based on the configuration and forward the build specification to the manufacturer of the vehicle. The selected attributes of the vehicle, such as model number, color, horse power, etc., are also forwarded to the manufacturer.

[0040] In some instances, a user wants to have a mixed type instrument panel that includes at least one hardware component and at least one visual image element. By way of example only, with reference back to FIG. **2**A, the mechanical instrument panel can includes a visual display window **250** where some virtual image elements can be displayed along with the hardware components. As with customizing the virtual instrument panel, a user can select each virtual image element to be displayed in the visual display window **250** and customize the visual display window **250** through the configuration service discussed above in connection with FIGS. **3**A-**3**C.

[0041] In one embodiment, the service system **120** may provide a GUI displaying a default visual display window that has been predetermined for the selected vehicle, to assist a user in customizing the virtual portion of the instrument panel. As will be appreciated, the GUI is provided so that the service system **120** can interact with the user when receiving user inputs regarding configurations. Likewise, the mechanical portion of the panel can be customized in a manner similar to that discussed in connection with FIGS. **2**A-**2**E. In this way, the instrument panel may include a combination of hardware components and virtual instrument components that are customizable, including, but not limited to, a speedometer, tachometer, headlight indicator, oil pressure gauge, fuel gauge, temperature gauge, voltmeter, turn signal indicator, cruise control indicator, fuel economy indicator, and a navigation indicator, among others.

[0042] In one aspect, the service system **120** may store the user's inputs regarding the configurations so that the user can stop their configuration service anytime and resume the configuration service later without providing previously entered user inputs again. After the user finishes customizing the configuration of the mixed-type instrument panel, the user has an option to review and evaluate the instrument panel prior to manufacturing of the instrument panel. In that regard, the service system **120** simulates an image of the instrument panel including a mechanical portion and a virtual portion in accordance with the user's configuration, which may be presented to the user.

[0043] In response to the presentation of the simulated instrument panel, the user can examine and evaluate the final product look of the configuration. The user can then decide whether or not to move forward with manufacturing the panel based on the configuration.

[0044] It is noted that the screen displays and examples described in FIGS. **2**A-**2**E and **3**A-**3**C are discussed only for exemplary purposes. As one of ordinary skill in the art would appreciate, depending on a particular vehicle and manufacturer, there are various different attributes and values available for customizing configuration of the instrument panel. Thus, the discussed and described screen displays and examples should not be considered as limiting the scope of the disclosed subject matter.

[0045] Now with reference to FIG. **4**, a flow diagram will be described that depicts one exemplary embodiment of a routine **400** for allowing customized configurations of an instrument panel in accordance with the disclosed subject matter.

[0046] In one embodiment, the routine **400** may be implemented by the configuration module **120** in connection with the user interface module **130** in the service system **120** (FIG. **1**). For the sake of discussion, it is assumed that a user has selected a desired vehicle and identified a mixed type instrument panel to be installed in the vehicle. Subsequently, the service system obtains information about the mixed instrument panel that is necessary to facilitate the configuration service.

[0047] As illustrated in FIG. **4**, the routine **400** begins at block **402** where the routine obtains, from a database, information about configurable attributes of an instrument panel for the selected vehicle. In one embodiment, a default instrument panel may be displayed on a remote device of the user. In this regard, a GUI similar to the GUI depicted in FIGS. **2**A-**2**E and **3**A-**3**C may be presented to the user to assist the user to customize the configuration of the instrument panel.

[0048] At block **404**, the routine **400** receives the user input identifying desirable attributes of virtual image elements to be displayed and hardware components to be included in the instrument panel. As described above, a user can initially be presented with a default instrument panel. The user can add, delete, or change a visual image element and/or hardware component included in the default instrument panel to customize the configuration. In some embodiments, a user can start from scratch, i.e., an empty instrument panel. The user can identify desired virtual image elements and hardware components, their appearance, and placement on the empty instrument panel.

[0049] At block **406**, based on the user input, logic implementing the routine **400** generates a representation of the instrument panel that is used to present the simulated image of the instrument panel to the user. For example, the representation of the instrument panel that includes at least one hardware instrument and at least one virtual instrument (visual image element) is generated. At block **408**, the generated representation of the instrument panel, i.e., the simulated image of the instrument panel, is displayed for the user's review and evaluation. In this regard, the service system **120** (i.e., the user interface module **130**) renders the simulated image of the instrument panel in accordance with the user's customized configuration.

[0050] At a decision block **410**, it is determined whether the user has confirmed the configuration after reviewing and evaluating the simulated image. If it is determined that the user does not confirm the configuration because the configuration is not satisfactory, the routine **400** proceeds to block **412** where the user is allowed to modify the configuration or start a new configuration service for the instrument panel. The routine **400** returns to block **406** and repeats the above mentioned steps. If it is determined that the user confirms the configuration, the routine proceeds to block **414** where it causes the service system **120** to generate a build specification (build order) that can be used to assemble the instrument panel in the vehicle at the manufacturer. At block **416** the build specification of the panel is forwarded to a manufacturer of the vehicle.

[0051] By way of example, the service system **120** may be configured to generate a file having data that describes the build specification based on user input. The data file created may be transmitted to the vehicle manufacturer and automatically loaded into a vehicle build queue for configuring the vehicle in accordance with the build specification. The data file may be in a suitable file format to be automatically loaded into a vehicle build queue for configuring the vehicle and/or the panel in accordance with the customized configurations. In one embodiment, the vehicle manufacturer's system may include an assembly application component for assembling a customized instrument panel based on the loaded data file. In one embodiment, the service system **120** may forward a generated build specification about a vehicle to the manufacturer. In one aspect, the service system **120** may serve as an interface between the Web site that obtains user configuration data and a vehicle manufacturer's system that manages assembly of the vehicle. After forwarding the build specification at **416**, the routine **400** completes at block **418**.

[0052] It should be well understood that the routine **400** described above with reference to FIG. **4** does not show all of the functions performed when a user customizes configuration of an instrument panel. Instead, the routine **400** describes exemplary embodiments of the disclosed subject matter, such as the process of configuration of a mixed type instrument panel. It is noted that similar steps can be implemented to configure a mechanical or a virtual instrument panel. Those skilled in the art and others will recognize that some functions may be performed in a different order, omitted/added, or otherwise varied without departing from the scope of the claimed subject matter.

[0053] While illustrative embodiments have been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention.

1. A method implemented in computer-executable instructions for configuring an instrument panel based on received user input, the method comprising:

receiving input from a user regarding desired configurations of an instrument panel of a vehicle;

generating a visual representation of the instrument panel based on the received input;

causing the generated visual representation of the instrument panel to be rendered on the remote computing device;

receiving from the user a review regarding the visual representation of the instrument panel; and

if the review is satisfactory:

generating a build order that is designed to be used for assembling the instrument panel that corresponds to the generated visual representation, wherein the build order identifies instruments that will be displayed on the instrument panel and specifies characteristics and locations of the identified instruments; and

providing the build order to a manufacturer system that includes an assembly application configured to assemble the instrument panel in accordance with the build order.

2. The method of claim **1** further comprising:

if the review is not satisfactory:

receiving, from the user, input to change the configuration of the instrument panel;

updating the visual representation of the instrument panel based on the input to change the configuration of the instrument panel; and

causing the updating visual representation of the instrument panel to be rendered on the remote computing device.

3. The method of claim **1**, wherein the build order identifies the instruments, including the at least one hardware instrument to assemble into the instrument panel, and the at least one virtual instrument to be displayed on the instrument panel.

4. The method of claim **3** wherein the build order specifies characteristics and placements of the identified instruments.

5. The method of claim **1**, wherein the assembly application is operable to correlate the build order with the instrument panel to be installed in the vehicle.

6. The method of claim **1**, further comprising:

obtaining information about configurable attributes of the instrument panel for the vehicle; and

presenting the obtained information about available configurations of an instrument to the user to assist the user in customizing the configuration.

7. A system for facilitating a configuration service between a user and a manufacturer of a vehicle over a communication network, the system comprising:

a memory component for storing information about vehicles and information about an instrument panel of each vehicle;

a user interface component configured to obtain input from a user and render a graphical display in a Web page; and

a configuration component operable to:

generate a visual representation of an instrument panel based on the obtained input, wherein the obtained input is the desired configuration of the instrument panel;

cause the user interface component to render the generated visual representation of the instrument panel on the remote computing device, wherein the user interface component is further configured to receive from the user a review regarding the visual representation of the instrument panel; and

determine whether the user's review is satisfactory:

if the user's review is satisfactory:

generate a build order that is designed to be used for assembling the instrument panel that corresponds to the generated visual representation, wherein the build order identifies instruments that will be displayed on the instrument panel and specifies characteristics and locations of the identified instruments; and

provide the build order to a manufacturer system, the build order including an assembly application that is configured to assemble the instrument panel in accordance with the build order.

8. The system of claim **7**, wherein if the user's review is not satisfactory, the configuration component is operative to:

receive, from the user, input to change the configuration of the instrument panel;

update the visual representation of the instrument panel based on the input to change the configuration of the instrument panel; and

cause the updated visual representation of the instrument panel to be rendered on the remote computing device.

9. The system of claim **7**, wherein the instrument panel includes at least one hardware instrument and at least one virtual instrument.

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