multiple associated information, paint formulas, product information, technical data and other information to achieve desired finish effects.

[00041] In one embodiment, when a user accesses the system, a welcome screen display such as the screen in FIG. 9 would appear. In this screen, the user can select an application segment, for example, Collision, Custom, Motorcycle, Historic, or Commercial.

[00042] If, for example, Collision was chosen, the user can perform an initial search using drop down boxes 48, 50 and 52 on the left side of FIG. 10. In this example, drop down boxes for year, make, and model are provided. After the search criteria is entered and submitted by clicking on button 54, or contemporaneously with the entry of the search criteria, digital color images 60 for exterior colors identified as meeting the search criteria can appear on the screen. The color images are displayed on a gray background that has been selected as described above. Clicking on one of the color chip images will bring up a screen such as that shown in FIG. 11. A return button 56 allows the user to return to a previous screen, and an exit button 58 allows the user to exit the application.

[00043] FIG. 11 is a final inspection screen 46 showing the selected color 62 and associated colors 66, such as colors for the interior of the vehicle.

[00044] The final inspection screen (FIG. 11) shows the color selected from the screen in FIG. 10, and further includes an additional drop down box 64 for associated information such as but not limited to compatibility information. If compatibility information exists for that search criteria, it will be displayed. If there is no additional information, the compatibility box may not appear or may be grayed out. If the compatibility box is selected, the system will display color chips that meet the compatibility search criteria.

[00045] From the screen of FIG. 11, the user can click on a digital color image and can be directed to another website or database of information, where the user can either obtain the paint formula of the selected color, or obtain any technical data, product information, or a location as to where the paint can be obtained.

[00046] In another embodiment, the digital color image database may be used in conjunction with a mixing software platform to allow mixing the paint components in one application. In addition, repair orders can be captured and paint selection information can be stored for future use on similar vehicles.

[00047] The online tool allows the user to select the body color and request the non-body (e.g., accent, interior, underhood, wheel, etc.) colors and information. The selected color code displayed on screen as a digital color image of the paint chip can be selected to activate a link to the Color Formulation website, as shown by the screen ~~68~~ in FIG. 12. This

allows the user to go from a selected color image to the ancillary information about related colors and to access paint formulas that can then be mixed and sold. If the user does not have security access to the Online Formulations website, a distributor locator box can appear. By entering a postal zip code, the user can initiate a search for, and display of, the nearest paint distributor or store where the user can purchase the paint product.

[00048] Utilizing several search criteria, the user may narrow the identification and selection to a small group of digital color images. Selecting a digital color image will produce additional information about that color as well as compatible color information. Digital color images can be arranged chromatically for easier selection. Final selection can link the selected color image to a color formula retrieval tool. Alternatively, final selection can link to the nearest Distributor/Supplier to purchase the paint and ancillary products. Final selection may also link to additional technical information.

[00049] Embodiments of the present invention may include one or more of the following features: displaying images of vehicle body paint colors surrounded by a gray background as discussed in US20090295823, incorporated by reference herein in its entirety; utilizing several search criteria to narrow the identification and selection to a small group of digital color images; and selecting a digital color image can produce additional information about that color and/or compatible color information. Digital color images can be arranged chromatically for easier selection, such as by sorting light to dark or by other means. The final selection can link the digital color image to a color formula retrieval tool; or alternatively the final selection can link to the nearest Distributor/Supplier to purchase the paint and ancillary products. In addition, the final selection can link to additional technical information. The correct formula can be selected using the color retrieval software; the formula can be mixed based on the formula retrieved; and the vehicle painted.

[00050] The system described above can be used to implement a method including: providing a database of digital representations of colors and metadata relating the colors to vehicle information and color usage; using one or more search criteria to identify one or more of the colors; displaying the identified colors; selecting a color of interest from the displayed colors; using the metadata, search criteria, and/or vehicle information to identify one or more additional colors related to the color of interest; and displaying the selected color and one or more additional colors.

[00051] The metadata can include at least one of: color family sorted chromatically, solid, metallic, specialty pigments, and dyes. The vehicle information can include at least one of: original equipment manufacturer, vehicle model, model year, or color code. The

Claims

1. An apparatus comprising:

a database including a plurality of digital color images and a neutral gray background value for each of the images;

a processor configured to receive search criteria and to identify one or more of the digital color images meeting the search criteria; and

a display configured to display at least one of the identified digital color images on a neutral gray background, wherein the brightness of the neutral gray background is determined by the neutral gray background value for the image being displayed, and when multiple digital color images are displayed, the neutral gray background is determined by an average of the neutral gray background values for the displayed digital color images.

2. The apparatus of claim 1, wherein the neutral gray background values comprise integers, and when the average includes a fraction, the neutral gray background value corresponding to the integer without the fraction is used in the display.

3. An apparatus comprising:

a database including a plurality of digital color images and a neutral gray background value for each of the images;

a processor configured to receive search criteria and to identify one or more of the digital color images meeting the search criteria; and

a display configured to display at least one of the identified digital color images on a neutral gray background, wherein the brightness of the neutral gray background is determined by the neutral gray background value for the image being displayed, and wherein the database further includes a hue number for each of the images, and the hue of the neutral gray background is determined by the hue number for the image being displayed.

4. An apparatus comprising:

a database including a plurality of digital color images and a neutral gray background value for each of the images;

a processor configured to receive search criteria and to identify one or more of the digital color images meeting the search criteria; and

a display configured to display at least one of the identified digital color images on a neutral gray background, wherein the brightness of the neutral gray background is determined by the neutral gray background value for the image being displayed, and wherein the database further includes a chroma value for each of the images, and the chroma of the neutral gray background is determined by the chroma value for the image being displayed.

5. The apparatus of claim 1, wherein the neutral gray background surrounds the displayed digital color image.

6. The apparatus of claim 1, wherein the database further includes metadata relating to vehicle information and color usage; and the processor is configured to receive the search criteria transmitted from a user over a network and to use the metadata to identify one or more additional colors related to the identified digital color images.

7. The apparatus of claim 6, wherein the database includes a plurality of collections of the digital color images and metadata, and wherein the collections comprise at least one of:

an image collection, a colors by module collection, a colors by usage collection, and a model/usage compatibility collection.

8. The apparatus of claim 6, wherein the metadata comprises at least one of:

color family, solid, metallic, specialty pigments, or dyes.

9. The apparatus of claim 6, wherein the additional colors comprises at least one of:

accent, interior, underhood, or wheel colors.

10. The apparatus of claim 1, wherein the search criteria comprises at least one of:

vehicle manufacturer, vehicle model, model year, an original equipment color code, a brand code, a color family, a finish effect, color usage information, or an application segment.

11. The apparatus of claim 1, wherein the processor implements a color visualization tool, in which a selected color can be visualized on a three dimensional representation of a manufactured article including at least one of:

a vehicle, a vehicle part, a fender, a gas tank, a spoiler, a cladding, a truck cap, a geometric test panel or a speed shape.

12. A computer implemented method comprising:

providing a database including a plurality of digital color images and a neutral gray background value for each of the images;

using one or more search criteria to identify one or more of the digital color images; and

displaying at least one of the identified digital color images on a neutral gray background, wherein the brightness of the neutral gray background is determined by the neutral gray background value for the image being displayed, wherein when multiple digital color images are displayed, the neutral gray background is determined by an average of the neutral gray background values for the displayed digital color images.

13. The method of claim 12, wherein the neutral gray background values comprise integers, and when the average includes a fraction, the neutral gray background value corresponding to the integer without the fraction is used in the display.

14. A computer implemented method comprising:

providing a database including a plurality of digital color images and a neutral gray background value for each of the images;

using one or more search criteria to identify one or more of the digital color images; and

displaying at least one of the identified digital color images on a neutral gray background, wherein the brightness of the neutral gray background is determined by the

neutral gray background value for the image being displayed, and wherein the database further includes a hue number for each of the images, and the hue of the neutral gray background is determined by the hue number for the image being displayed.

15. A computer implemented method comprising:

providing a database including a plurality of digital color images and a neutral gray background value for each of the images;

using one or more search criteria to identify one or more of the digital color images; and

displaying at least one of the identified digital color images on a neutral gray background, wherein the brightness of the neutral gray background is determined by the neutral gray background value for the image being displayed, and wherein the database further includes a chroma value for each of the images, and the chroma of the neutral gray background is determined by the chroma value for the image being displayed.

16. The method of claim 12, wherein the neutral gray background surrounds the displayed digital color image.

17. The method of claim 12, wherein the database further includes metadata relating to vehicle information and color usage; and a processor is configured to receive the search criteria transmitted from a user over a network and to use the metadata to identify one or more additional colors related to the identified digital color images.

18. The method of claim 16, wherein the database includes a plurality of collections of the digital color images, and wherein the collections comprise at least one of:

an image collection, a colors by module collection, a colors by usage collection, and a model/usage compatibility collection.

19. The method of claim 17, wherein the metadata comprises at least one of:

color family, solid, metallic, specialty pigments, or dyes.

20. The method of claim 17, wherein the additional colors comprise at least one of:

accent, interior, underhood, or wheel colors.

21. The method of claim 12, wherein the search criteria comprises at least one of:

vehicle manufacturer, vehicle model, model year, an original equipment color code, a brand code, a color family, a finish effect, color usage information, or an application segment.

22. The method of claim 21, wherein the finish effect comprises at least one of:

solid, metallic, specialty pigment, or dyes.

23. The method of claim 21, wherein the application segment comprises:

collision, custom, motorcycle, historic, fleet, commercial, or other industries.

24. The method of claim 12, further comprising:

selecting a color of interest from the displayed colors;

using metadata, the search criteria, and/or vehicle information to identify one or more additional colors related to the color of interest; and

displaying the selected color and one or more additional colors.

25. The method of claim 24, further comprising:

displaying a paint formula for the color of interest and/or additional colors.

26. The method of claim 12, further comprising:

enabling a link to a color formula retrieval tool.

27. The method of claim 12, further comprising:

enabling access to a location where paint and/or ancillary products may be purchased.

28. The method of claim 24, further comprising:

displaying additional information including at least:

a paint label location, a vehicle identification number (VIN), a model assembly plant, a technical data sheet, a material safety data sheet (MSDS), ready to spray information (RTS), volatile organic compound (VOC) information, and product usage about the selected color of interest.

29. The method of claim 24, further comprising:

using a color visualization tool, in which the selected color of interest can be visualized on a three dimensional representation of a manufactured article including at least one of:

a vehicle, a vehicle part, a fender, a gas tank, a spoiler, a cladding, a truck cap, a geometric test panel or a speed shape.

30. The method of claim 24, further comprising:

mixing paint in the selected color of interest.

31. The method of claim 24, wherein the selected color of interest is entered on a repair order.

32. The method of claim 12, further comprising:

displaying a link to a color formula retrieval tool.

33. The method of claim 12, further comprising:

displaying a link to a distributor or supplier where paint and/or ancillary products may be purchased.

WE CLAIM:

1. An apparatus comprising:

a database including a plurality of digital color images and a neutral gray background value for each of the images;

a processor configured to receive search criteria and to identify one or more of the digital color images meeting the search criteria; and

a display configured to display at least one of the identified digital color images on a neutral gray background, wherein the brightness of the neutral gray background is determined by the neutral gray background value for the image being displayed.

2. The apparatus of claim 1, wherein when multiple digital color images are displayed, the neutral gray background is determined by an average of the neutral gray background values for the displayed digital color images.

3. The apparatus of claim 2, wherein the neutral gray background values comprise integers, and when the average includes a fraction, the neutral gray background value corresponding to the integer without the fraction is used in the display.

4. The apparatus of claim 1, wherein the database further includes a hue number for each of the images, and the hue of the neutral gray background is determined by the hue number for the image being displayed.

5. The apparatus of claim 1, wherein the database further includes a chroma value for each of the images, and the chroma of the neutral gray background is determined by the chroma value for the image being displayed.

6. The apparatus of claim 1, wherein the neutral gray background surrounds the displayed digital color image.

7. The apparatus of claim 1, wherein the database further includes metadata relating to vehicle information and color usage; and the processor is configured to receive the search criteria transmitted from a user over a network and to use the metadata to identify one or more additional colors related to the identified digital color images.

8. The apparatus of claim 7, wherein the database includes a plurality of collections of the digital color images and metadata, and wherein the collections comprise at least one of:

an image collection, a colors by module collection, a colors by usage collection, and a model/usage compatibility collection.

9. The apparatus of claim 7, wherein the metadata comprises at least one of:

color family, solid, metallic, specialty pigments, or dyes.

10. The apparatus of claim 7, wherein the additional colors comprises at least one of:

accent, interior, underhood, or wheel colors.

11. The apparatus of claim 1, wherein the search criteria comprises at least one of:

vehicle manufacturer, vehicle model, model year, an original equipment color code, a brand code, a color family, a finish effect, color usage information, or an application segment.

12. The apparatus of claim 1, wherein the processor implements a color visualization tool, in which the selected color can be visualized on a three dimensional representation of a manufactured article including at least one of:

a vehicle, a vehicle part, a fender, a gas tank, a spoiler, a cladding, a truck cap, a geometric test panel or a speed shape.

13. A computer implemented method comprising:

providing a database including a plurality of digital color images and a neutral gray background value for each of the images;

using one or more search criteria to identify one or more of the digital color images; and

displaying at least one of the identified digital color images on a neutral gray background, wherein the brightness of the neutral gray background is determined by the neutral gray background value for the image being displayed.

14. The method of claim 12, wherein when multiple digital color images are displayed, the neutral gray background is determined by an average of the neutral gray background values for the displayed digital color images.

15. The method of claim 13, wherein the neutral gray background values comprise integers, and when the average includes a fraction, the neutral gray background value corresponding to the integer without the fraction is used in the display.

16. The method of claim 12, wherein the database further includes a hue number for each of the images, and the hue of the neutral gray background is determined by the hue number for the image being displayed.

17. The method of claim 12, wherein the database further includes a chroma value for each of the images, and the chroma of the neutral gray background is determined by the chroma value for the image being displayed.

18. The method of claim 12, wherein the neutral gray background surrounds the displayed digital color image.

19. The method of claim 12, wherein the database further includes metadata relating to vehicle information and color usage; and the processor is configured to receive the search criteria transmitted from a user over a network and to use the metadata to identify one or more additional colors related to the identified digital color images.

20. The method of claim 18, wherein the database includes a plurality of collections of the digital color images and metadata, and wherein the collections comprise at least one of:

an image collection, a colors by module collection, a colors by usage collection, and a model/usage compatibility collection.

21. The method of claim 18, wherein the metadata comprises at least one of:

color family, solid, metallic, specialty pigments, or dyes.

22. The method of claim 18, wherein the additional colors comprises at least one of:

accent, interior, underhood, or wheel colors.

23. The method of claim 12, wherein the search criteria comprises at least one of:

vehicle manufacturer, vehicle model, model year, an original equipment color code, a brand code, a color family, a finish effect, color usage information, or an application segment.

24. The method of claim 22, wherein the finish effect comprises at least one of:

solid or metallic, specialty pigment such as pearlescent and dyes.

25. The method of claim 22, wherein the application segment comprises:

collision, custom, motorcycle, historic, fleet, commercial, or other industries.

26. The method of claim 12, further comprising:

selecting a color of interest from the displayed colors;

using the metadata, search criteria, and/or vehicle information to identify one or more additional colors related to the color of interest; and

displaying the selected color and one or more additional colors.

27. The method of claim 12, further comprising:

displaying a paint formula for the color of interest and/or additional colors.

28. The method of claim 12, further comprising:

enabling a link to a color formula retrieval tool.

29. The method of claim 12, further comprising:

enabling access to a location where paint and/or ancillary products may be purchased.

30. The method of claim 12, further comprising:

displaying additional information including at least:

a paint label location, a vehicle identification number (VIN), a model assembly plant, a technical data sheet, a material safety data sheet (MSDS), ready to spray information (RTS), volatile organic compound (VOC) information, and product usage about the selected color.

~~31. The method of claim 12, further comprising:~~

using a color visualization tool, in which the selected color can be visualized on a three dimensional representation of a manufactured article including at least one of:

a vehicle, a vehicle part, a fender, a gas tank, a spoiler, a cladding, a truck cap, a geometric test panel or a speed shape.

32. The method of claim 12, further comprising:

mixing paint in the selected color.

33. The method of claim 12, wherein the selected color is entered on a repair order.

34. The method of claim 12, further comprising:

displaying a link to a color formula retrieval tool.

35. The method of claim 12, further comprising:

displaying a link to a distributor or supplier where paint and/or ancillary products may be purchased.

36. A computer implemented method comprising:

providing a database of digital images of colors and metadata relating the images to vehicle information and color usage;

using one or more search criteria to identify one or more of the digital image colors;

displaying the digital images of the identified colors;

selecting a color of interest from the displayed colors;

using the metadata to identify additional information related to the color of interest;

displaying the digital image of the color of interest and the additional information; and

using the displayed digital image of the color of interest and the additional information to make a final color selection.