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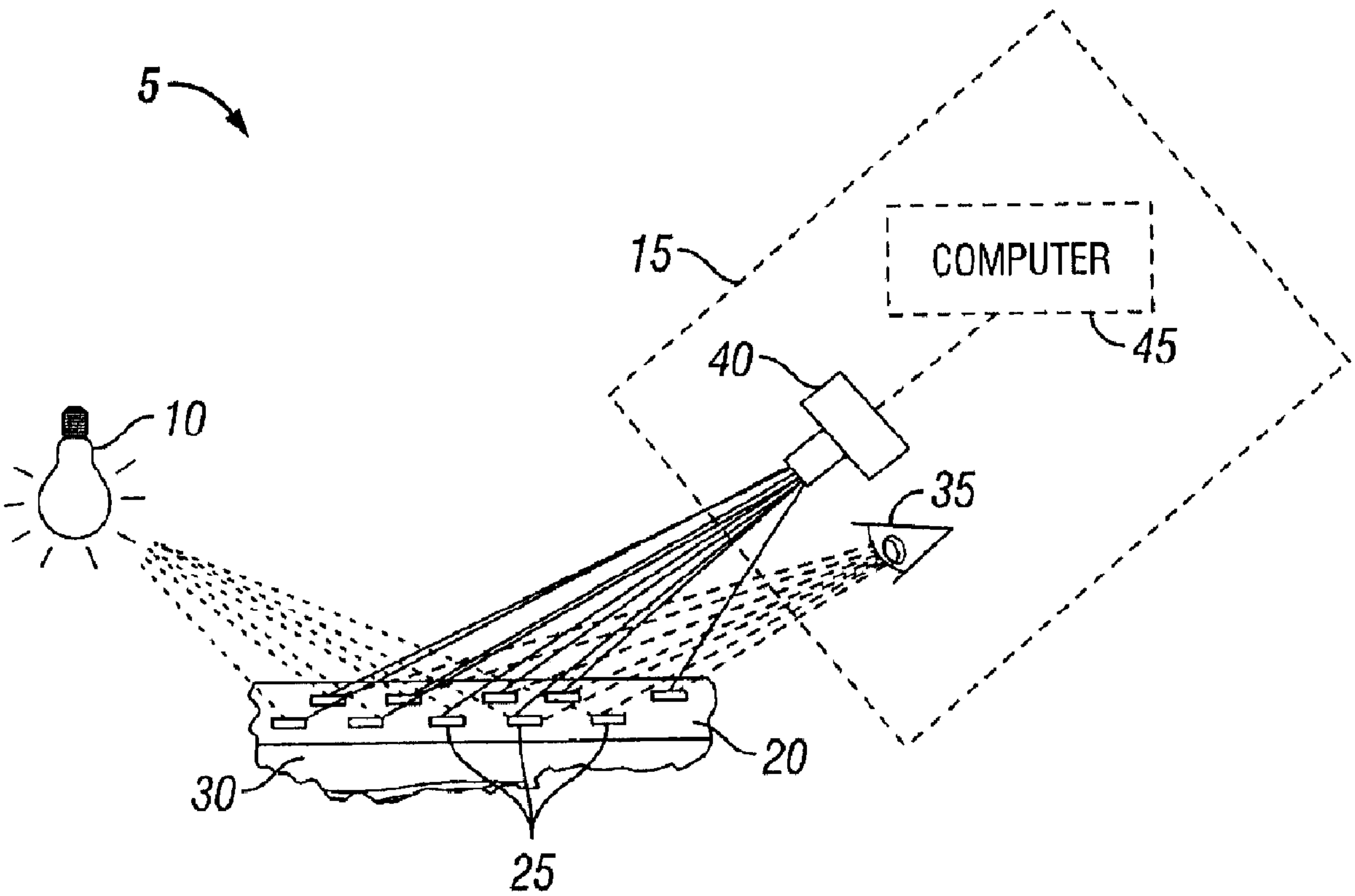
(54) **Titre : SYSTEME ET PROCEDE PERMETTANT UNE DETECTION VISUELLE AMELIOREE DES REVETEMENTS DE PROTECTION**
(54) **Title: SYSTEM AND METHOD FOR IMPROVED VISUAL DETECTION OF PROTECTIVE COATINGS**



(57) **Abrégé/Abstract:**
The present disclosure provides a system and method for providing an improved protective coating for a substrate that may be inspected using the unaided eye or other apparatus under available light. The protective coating is mixed with an additive comprising flakes or particles that, when applied to the substrate as part of the protective coating, allow the user to empirically determine if the surface has received an adequate protective coat. The determination of whether or not any defects exist may include comparing the observed appearance of the specialty pigment particles with a comparative standard.

Abstract

The present disclosure provides a system and method for providing an improved protective coating for a substrate that may be inspected using the unaided eye or other apparatus under available light. The protective coating is mixed with an additive comprising flakes or particles that, when applied to the substrate as part of the protective coating, allow the user to empirically determine if the surface has received an adequate protective coat. The determination of whether or not any defects exist may include comparing the observed appearance of the specialty pigment particles with a comparative standard.

SYSTEM AND METHOD FOR IMPROVED VISUAL DETECTION OF PROTECTIVE COATINGS

Field

The present disclosure relates generally to a system and method for applying a protective coating to a substrate. More specifically, the present disclosure relates to additives for protective coatings, and related methods for conducting inspections of components coated with a protective coating containing said additive, thereby ensuring proper coverage. The disclosure has particular utility with respect to the application of corrosion inhibiting compounds ("CIC") in the form of a coating to aircraft components.

Background

Various articles of commerce and general use a coating of some kind on surfaces thereof for a specific purpose, such as to prevent corrosion, to reduce abrasion, to reduce contamination or to perform a combination of the three. Discontinuities in a coating are frequently very minute and not readily visible. Since the quality and cost of the coating is dependent on the coating weight and uniformity it is desirable that a means for monitoring these characteristics be employed.

Aircraft surfaces in particular are often coated with a corrosion inhibiting compound ("CIC"), sometimes called a corrosion prevention compound, to preserve the aircraft components and structure. A typical CIC is substantially transparent, and is only apparent to the naked eye when a thick coat is applied, which appears to give a brownish tint to the substrate. But while it is important to achieve adequate coverage of designated surfaces, it may be desirable to use a thin coating to reduce excess weight.

Many techniques have been developed to enable inspection of coated surfaces to ensure adequate coverage. Some coatings employ fluorescent agents to permit inspection of the coated surface using a UV light source. However, since fluorescence is typically a fairly weak effect, high intensity UV light sources are required for reliable detection of inconsistencies in a given circumstance. In addition, many areas requiring protective coatings are not readily accessible and providing UV light in such areas may be difficult or prohibitive. Furthermore, many coated areas requiring inspection have irregular surfaces that require the UV light to be shone from various angles before a determination can be made regarding the adequacy of the coating. The cost of special lighting further disadvantages this solution.

Some current solutions employ cameras to capture images of the coated surfaces, but these systems usually suffer from some of the same limitations as those above. The camera solutions are difficult to use in certain spaces, are often unable to be used on remote surfaces, and are costly and time-consuming. As a result, there remains a need for an improved system and method for applying and inspecting a protective coating.

Summary

The present disclosure provides a system and method wherein a protective coating is prepared with an additive comprising flakes or particles that, when applied to the substrate as part of the protective coating, allow the user to visually inspect the surface and empirically determine if the surface has received an adequate protective coat. The flakes or particles of the present disclosure tend to reflect light in a manner that allows the user to observe with the naked eye whether or not the coating is sufficient, even in circumstances where only minimal light is available.

The system of the present disclosure is not restricted to particular sources of light. Any available visible and/or ultraviolet light source can be used to illuminate the particles, producing reflected and emitted light, which may then be detected by unaided eyes. In turn, such a feature greatly simplifies the coating inspection.

A first aspect of the present disclosure provides a self-indicating protective coating that is applied to a substrate having a plurality of specialty pigment particles embedded in the coating. The specialty pigment particles are suspended within the protective coating having a substantially homogeneous distribution. By way of example, the specialty pigment particles may comprise mica, metallic flakes, glass, marble, or any combination thereof and may be described as metal effect pigments, pearl luster pigments, interference pigments, holographic effect pigments, interference pigments, pearlescent pigments, iridescent pigments, luminescent pigments, fluorescent pigments, phosphorescent pigments, or any combination thereof.

Another aspect of the present disclosure provides a method for applying a protective coating to a substrate by mixing a predetermined amount of a protective coating formulation with a predetermined amount of a specialty pigment to form a mixture. The protective coating

formulation is provided in a liquid form and the specialty pigment is provided in a particulate form. The mixture is then applied to the substrate and allowed to cure thereby forming a protective coating. A user may then observe the appearance of the specialty pigment particles embedded in the protective coating, such as the density of the specialty pigment particles or any patterns therein, to determine the presence of any inconsistencies in the coating. The user may perform the step of observing with the unaided eye or by using a digital camera device. The observing step may also include illuminating the substrate. The determination of whether or not any inconsistencies exist may include comparing the observed appearance of the specialty pigment particles with a comparative standard.

In one embodiment, there is provided a protective coating, comprising a plurality of reflective particles embedded in a substantially transparent coating matrix, wherein the reflective particles are arranged having a substantially homogeneous distribution within the coating matrix and have a ratio per unit volume of the coating that is selected according to a predetermined comparative standard, and produce an observed light contrast that varies directly with a thickness of the coating, a variation in the observed light contrast relative to the comparative standard indicating variation in the thickness.

In another embodiment, there is provided a protective coating, comprising a plurality of reflective particles, substantially homogeneously distributed within a substantially transparent coating matrix, having a ratio per unit volume of the coating that is selected according to a predetermined comparative standard, the reflective particles causing the protective coating to produce an observed light contrast that varies directly with a thickness of the coating, variation in the observed light contrast relative to the comparative standard indicating variation in the thickness.

Other systems, methods, features, and advantages of the present disclosure will be or become apparent to one with skill in the art upon examination of the following drawings and detailed description. The features, functions and advantages that have been discussed can be achieved independently in various embodiments of the present invention or may be combined in yet other embodiments further details of which can be seen with reference to the following description and drawings.

Brief Description of the Drawings

Many aspects of the present disclosure can be better understood with reference to the following drawings. The components in the drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the present invention. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.

FIG. **1** is a schematic showing a system for visual inspection of protective coatings in accordance with the present disclosure;

FIG. **2** illustrates a protective coating applied to a vehicle, according to one example of the present disclosure;

FIG. **3** is a flowchart demonstrating a method for visual inspection of protective coatings in accordance with the present disclosure; and

FIG. **4** provides one example of a protective coating with varying thicknesses applied to a substrate in accordance with the present disclosure.

Detailed Description

In the following description, reference is made to the accompanying drawings, which form a part hereof, and in which is shown, by way of illustration, various embodiments of the present disclosure. It is understood that other embodiments may be utilized and changes may be made without departing from the scope of the present disclosure. For example, the present disclosure provides a system and method for conducting inspections of protective coatings applied to a substrate. One example of particular interest that will be discussed in detail below is the application of a corrosion inhibiting compound ("CIC") in the form of a coating to the surface of various aircraft components. The scope of the present disclosure, however, is not limited to aircraft or to CIC's, as will be apparent to those in the relevant fields of study.

FIG. **1** illustrates one example of a visual inspection system **5** in accordance with the present disclosure. In the illustrated example, the system **5** comprises a light source **10** and a visual inspector **15** configured to inspect a protective coating **20** applied to a substrate **30**. The visual inspector **15** comprises an unaided eye **35** and/or a camera **40**, which in some embodiments may be coupled to an optional computer **45**. The protective coating **20** comprises a substantially homogeneous suspension of specialty pigment particles **25**.

In some embodiments, the protective coating **20** comprises a formulation in a liquid form, selected from any of a number of compounds or solvents that provides the desired characteristics for a particular application. For example, the protective coating **20** may comprise one or more of a monomer or polymer composition, a petroleum-based compound, an amine, a hydrazine, or other useful compound, organic or inorganic. In some specific embodiments, the protective coating **20** comprises a petroleum-based CIC. The protective coating **20** may be derived from a formulation that has the desired viscosity and thermoplastic properties to allow the protective coating **20** to be applied simply, such as by using a sprayer, and resulting in a desired thickness.

The substrate **30** may comprise any suitable material or surface desired to be coated. For example, in some cases, the substrate **30** comprises a surface of a vehicle **50**, such as an aircraft, as shown in FIG. **2**. Although an aircraft is shown as an example, those of ordinary skill in the art will appreciate that the protective coating **20** may be applied to a wide variety of other vehicles **50**, such as, for example, automobiles, watercraft, trains, etc., or other desired surfaces. In the particular example illustrated in FIG. **2**, the protective coating **20** comprises a CIC applied to surfaces of the vehicle **50** that are prone to corrosion, such as the lower lobe of the fuselage **55** and the landing gear **60**. Depending on the application, the CIC may be reapplied periodically, such as every few years. In some embodiments, the CIC is applied as a layer having a thickness within the range of approximately **10-50** microns when dried.

Referring again to FIG. **1**, the specialty pigment particles **25** may comprise any suitable particles that improve the visibility of the protective coating **20**. In some embodiments, for example, the specialty pigment particles **25** may be chosen from reflective pigment particles, light emitting pigment particles, black pigment particles, or the like. Reflective pigments can be classified as effect pigments, metal effect pigments, pearl luster pigments, and interference pigments. Examples of reflective pigments include glitter-type pigments and can be selected from variety of materials such as metallic, holographic, interference, pearlescent, and iridescent pigments, glass, marble, and mica particles. In some specific embodiments, the specialty pigment particles**25** may comprise interference mica, iron oxide flakes, aluminum flakes, and the like, which in some cases may be coated with specific pigments prior to their introduction into the protective coating **20**.

The specialty pigment particles **25** preferably exhibit some combination of reflectivity, diffractive, or absorbance characteristics to provide a high contrast with the light reflected by the protective coating **20** and the substrate **30**. In some embodiments, for example, distinctive light contrast can be achieved with light absorbent effect pigments such as black glitter pigments. The specialty pigment particles **25** may also exhibit fluorescence when subjected to certain types of light, such as ultraviolet light. Light emitting pigments may be, for example, luminescent pigments, fluorescent pigments, and phosphorescent pigments.

The light source **10** may comprise any suitable source of visible and/or ultraviolet light, such as day light or direct sunlight, incandescent light, fluorescent light, LED light, or other types of lights. In operation, the light source **10** illuminates the protective coating **20**, which reflects light for observation by a suitable visual inspector **15**, such as the unaided eye **35** and/or the camera **40** and optional computer **45** shown in FIG. **1**.

In some embodiments, the camera **40** and optional computer **45** comprise a self-contained, portable apparatus combined in a single housing that captures one or more digital images of the protective coating **20** under inspection. The apparatus can then detect discontinuities in the protective coating **20** and determine its uniformity and thickness based on the observed patterns of reflected light, as compared with a plurality of pre-stored images saved as comparative standards. In other examples, the camera **40** and optional computer **45** comprise separate devices that communicate with each other via a suitable link, such as a physical connector or a wireless communication link.

FIG. **3** is a flowchart demonstrating one example of a method **100** for visual inspection of protective coatings **20** in accordance with the present disclosure. In the illustrated embodiment, the method **100** comprises a first step **101**, in which the amounts and types of specialty pigment particles **25** to be added per unit volume to the protective coating **20** are determined prior to the formation of a mixture. This may be done, for example, by selecting a desired pigment ratio, adding a corresponding amount of specialty pigment particles **25** to a precursor of the protective coating **20**, and mixing the resultant mixture until the distribution of specialty pigment particles **25** therein becomes substantially homogeneous. In some embodiments, the specialty pigment particles **25** are selected to be large enough to be noticed by the unaided eye **35** during inspection, but not larger than warranted for the application. In some cases, for example, the specialty pigment particles **25** are at least smaller than the desired thickness of the protective coating **20**.

In some embodiments, the specialty pigment particles **25** are mixed in predetermined amounts and selected combinations to achieve the desired results of the visual detection of the protective coating **20**. The combinations of specialty pigment particles **25** can be made to improve the visual detection of the coating uniformity, proper thickness, insufficient thickness, over-coating (excess thickness), and discontinuities such as pinholes, voids, holidays, and absence of the protective coating **20**.

For example, the ratio of specialty pigment particles **25** within a certain volume of the mixture may be chosen to result in a desired distribution when the protective coating **20** is applied to a substrate **30** at a particular thickness. In some specific embodiments, for example, sufficient specialty pigment particles **25** are added to produce an expected distribution of about **10-30** specialty pigment particles **25** per square inch when the protective coating **20** is applied to a substrate **30** at a desired thickness, such as about **10-50** microns. If properly mixed and applied, any deviation from this distribution at a given location would be an indication that there is a likelihood of an inconsistency at that location. Other ranges and methods are also feasible. For example, a lower range of about **5-10** specialty pigment particles per square inch, a narrower range of about **10-20** specialty pigment particles per square inch, or an upper range of greater than about **30** specialty pigment particles per square inch may be used, depending on the application and the inspection methods that are available.

Methods for preparing a homogeneous mixture are well-known in the art. The mixture is substantially homogeneous when a portion of the volume of the mixture has a substantially similar ratio of specialty pigment particles **25** by volume as that of the entire volume of the mixture. For example, where a mixture has been prepared with a ratio of about **16** ounces of specialty pigments per gallon, and where the specialty pigments are known to have approximately **1,000** individual specialty pigment particles **25** per ounce, one could predict the approximate number of pigments within a particular volume (such as a tablespoon) using the following formula: P (pigment particles) = R (expected ratio of pigment particles per unit volume) x V (volume). In the example outlined above, one tablespoon would be expected to contain about **62.5** pigment particles **25**. An acceptable range (such as within **10%** of the expected number of pigment particles **25**) may be determined according to the criticality of a particular application.

In some examples, the specialty pigment particles **25** are suspended in the mixture with a substantially homogeneous distribution therein, so that when the protective coating **20** is applied to the substrate **30** and dried, the visible distribution of specialty pigment particles **25** embedded in the protective coating **20** corresponds to the thickness of the protective coating **20**.

FIG. **4** provides an example of a protective coating **20** with varying thicknesses applied to a substrate **30** in accordance with the present disclosure. As shown in FIG. **4**, the observed contrast of the protective coating **20** varies directly with the thickness of the protective coating **20**, as it increases along the direction of the x axis (from left to right). Thus, as the protective coating **20** becomes thicker, a corresponding increase in the density of the observed specialty pigment particles **25** occurs. Additionally, the contrast between the light reflected by the protective coating **20** and by the specialty pigment particles **25** falls within a much narrower range where the protective coating **20** is applied with the intended thickness. In the example shown in FIG. **4**, for example, the thickness of the protective coating **20** is intended to fall within the range of t_1 to t_2, in which the observed light contrast falls within the range of c_1 to c_2. When overcoating occurs (e.g., when the thickness of the protective coating **20** falls within the range of t_2 to t_3), however, the protective coating **20** becomes increasingly opaque, and the observed light contrast falls within the range of c_2 to c_3. In some embodiments, t_1 is a thickness of about **10** microns, t_2 is a thickness of about **50** microns, and t_3 is a thickness of about **300** microns. In those embodiments, c_1 is a light contrast of about **10%**, c_2 is a light contrast of about **50%**, and c_3 is a light contrast of about **70%**. In other embodiments, t_1-t_3 and c_1-c_3 may have different values, suited for a variety of desired applications.

Referring again to FIG. **3**, if a test surface has a protective coating **20** of proper thickness and the specialty pigment particles **25** enable the inspection of the surface by the unaided eye, the user may determine that the initially chosen ratio is appropriate and the test surface may be used as a comparative standard for later inspections. Some examples may involve an iterative process. Once the desired ratio is known, the method **100** proceeds to a next step **102**, in which comparative standards for the protective coating **20** with the specialty pigment particles **25** are prepared under controlled conditions to establish the plurality of the patterns of the light reflected and emitted by the pigment particles.

After determining the desired ratio of specialty pigment particles **25** per unit volume of the protective coating **20**, and after preparing a comparative sample (if desired), in a next step **103**, the mixture of the protective coating **20** with the specialty pigment particles **25** is prepared in quantities appropriate for the desired application. In a next step **104**, the protective coating **20** is then applied to the substrate **30** and allowed to cure. The protective coating **20** may be applied through automated or manual processes, and may be performed using sprayers, brushes, or the like.

In a next step **105**, the inspection area of the cured protective coating **20** is illuminated with a suitable light source **10**. In some embodiments, the light source **10** may emit ultraviolet light, which may further enhance the ability to inspect the protective coating **20**. The contrast between the light reflected by the specialty pigment particles **25** forms patterns that may be recognized by the visual inspector **15**.

In a next step **106**, the illuminated area of the protective coating **20** may be viewed with the visual inspector **15** to determine the patterns of the light reflected and emitted by the specialty pigment particles **25**. In a step **107**, the observed patterns of the light reflected and emitted by the specialty pigment particles **25** are then compared with the patterns of the comparative standards prepared separately under control conditions (see step **102**).

In a final step **108**, images of the protective coating **20** under inspection are compared with the comparative standards, and the uniformity, thickness, and discontinuities of the inspection area are determined. For example, the comparative standard may specify that the protective coating **20** should contain a certain number of specialty pigment particles **25** within a given area, such as each square inch. Trouble spots on a protective coating **20** under inspection may be visible to the unaided eye **35**. Also, the camera **40** and optional computer **45** may identify locations that contain more or less than the expected number of specialty pigment particles **25**. Other variations may be used that will allow the user to make a determination of whether or not the protective coating **20** under inspection meets a particular set of criteria.

It should be emphasized that the above-described embodiments of the present device and process are merely possible examples of implementations and merely set forth for a clear understanding of the principles of the disclosure. While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention as construed in accordance with the accompanying claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A protective coating, comprising a plurality of reflective particles embedded in a substantially transparent coating matrix, wherein the reflective particles are arranged having a substantially homogeneous distribution within the coating matrix and have a ratio per unit volume of the coating that is selected according to a predetermined comparative standard, and produce an observed light contrast that varies directly with a thickness of the coating, a variation in the observed light contrast relative to the comparative standard indicating variation in the thickness.

2. The protective coating of claim **1**, wherein the protective coating is applied to a substrate.

3. The protective coating of claim **2**, wherein the substrate comprises a metallic surface.

4. The protective coating of claim **2**, wherein the substrate comprises a composite surface.

5. The protective coating of claim **2**, **3**, or **4**, wherein the substrate comprises the surface of an aircraft component.

6. The protective coating of any one of claims **1** to **5**, wherein the protective coating comprises a corrosion inhibiting compound.

7. The protective coating of any one of claims **1** to **6**, wherein the protective coating comprises an organic compound.

8. The protective coating of any one of claims **1** to **7**, wherein the reflective particles comprise mica.

9. The protective coating of any one of claims **1** to **8**, wherein the reflective particles comprise metallic flakes.

10. The protective coating of any one of claims **1** to **9**, wherein the reflective particles comprise glass.

11. The protective coating of any one of claims **1** to **10**, wherein the reflective particles comprise marble.

12. The protective coating of any one of claims **1** to **11**, wherein the reflective particles comprise metal effect pigments.

13. The protective coating of any one of claims **1** to **12**, wherein the reflective particles comprise holographic effect pigments.

14. The protective coating of any one of claims **1** to **13**, wherein the reflective particles comprise interference pigments.

15. The protective coating of any one of claims **1** to **14**, wherein the reflective particles comprise pearlescent pigments.

16. The protective coating of any one of claims **1** to **15**, wherein the reflective particles comprise iridescent pigments.

17. The protective coating of any one of claims **1** to **16**, wherein the reflective particles comprise luminescent pigments.

18. The protective coating of any one of claims **1** to **17**, wherein the reflective particles comprise fluorescent pigments.

19. The protective coating of any one of claims **1** to **18**, wherein the reflective particles comprise phosphorescent pigments.

20. The protective coating of any one of claims **1** to **19**, wherein the protective coating is a thin film protective coating.

21. A protective coating, comprising a plurality of reflective particles, substantially homogeneously distributed within a substantially transparent coating matrix, having a ratio per unit volume of the coating that is selected according to a predetermined comparative standard, the reflective particles causing the protective coating to produce an observed light contrast that varies directly with a thickness of the coating, variation in the observed light contrast relative to the comparative standard indicating variation in the thickness.

22. The protective coating of claim **21**, wherein the protective coating is applied to a substrate.

23. The protective coating of claim **22**, wherein the substrate comprises a metallic surface.

24. The protective coating of claim **22**, wherein the substrate comprises a composite surface.

25. The protective coating of claim **22**, **23**, or **24**, wherein the substrate comprises the surface of an aircraft component.

26. The protective coating of any one of claims **21** to **25**, wherein the protective coating comprises a corrosion inhibiting compound.

27. The protective coating of any one of claims **21** to **26**, wherein the protective coating comprises an organic compound.

28. The protective coating of any one of claims **21** to **27**, wherein the reflective particles comprise reflective pigment particles.

29. The protective coating of any one of claims **21** to **28**, wherein the reflective particles comprise light emitting particles.

30. The protective coating of any one of claims **21** to **29**, wherein the reflective particles comprise black pigment particles.

31. The protective coating of any one of claims **21** to **30**, wherein the reflective particles comprise mica.

32. The protective coating of any one of claims **21** to **31**, wherein the reflective particles comprise metallic flakes.

33. The protective coating of any one of claims **21** to **32**, wherein the reflective particles comprise glass.

34. The protective coating of any one of claims **21** to **33**, wherein the reflective particles comprise marble.

35. The protective coating of any one of claims **21** to **34**, wherein the reflective particles comprise metal effect pigments.

36. The protective coating of any one of claims **21** to **35**, wherein the reflective particles comprise holographic effect pigments.

37. The protective coating of any one of claims **21** to **36**, wherein the reflective particles comprise interference pigments.

38. The protective coating of any one of claims **21** to **37**, wherein the reflective particles comprise pearlescent pigments.

39. The protective coating of any one of claims **21** to **38**, wherein the reflective particles comprise iridescent pigments.

40. The protective coating of any one of claims **21** to **39**, wherein the reflective particles comprise luminescent pigments.

41. The protective coating of any one of claims **21** to **40**, wherein the reflective particles comprise fluorescent pigments.

42. The protective coating of any one of claims **21** to **41**, wherein the reflective particles comprise phosphorescent pigments.

43. The protective coating of any one of claims **21** to **42**, wherein the protective coating is a thin film protective coating.

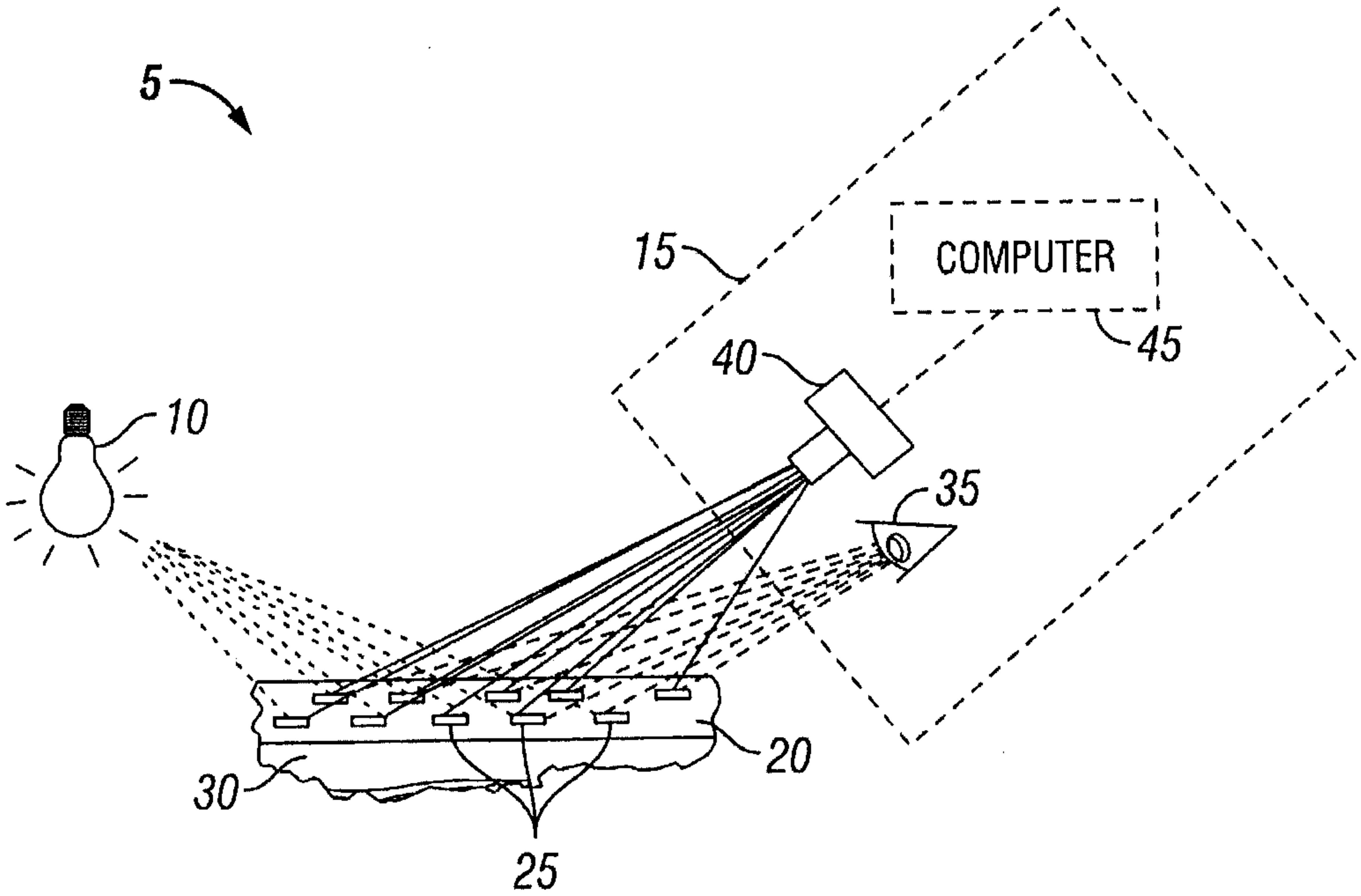


FIG. 1

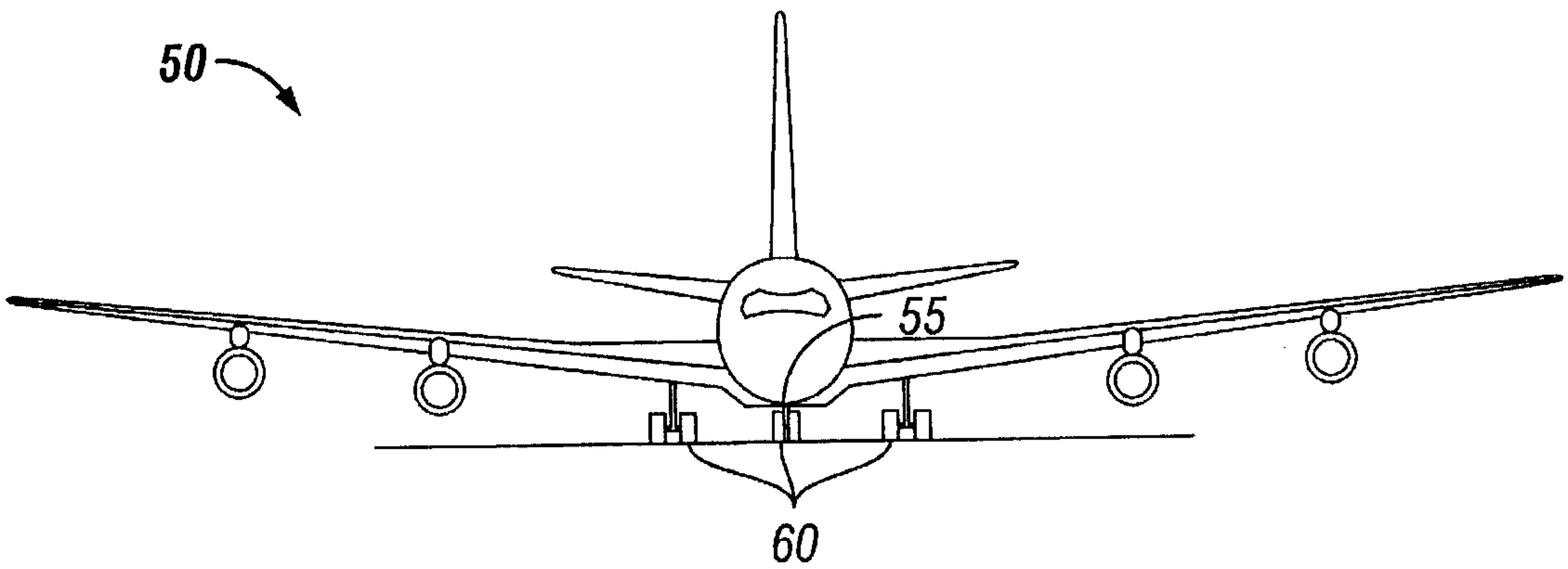


FIG. 2

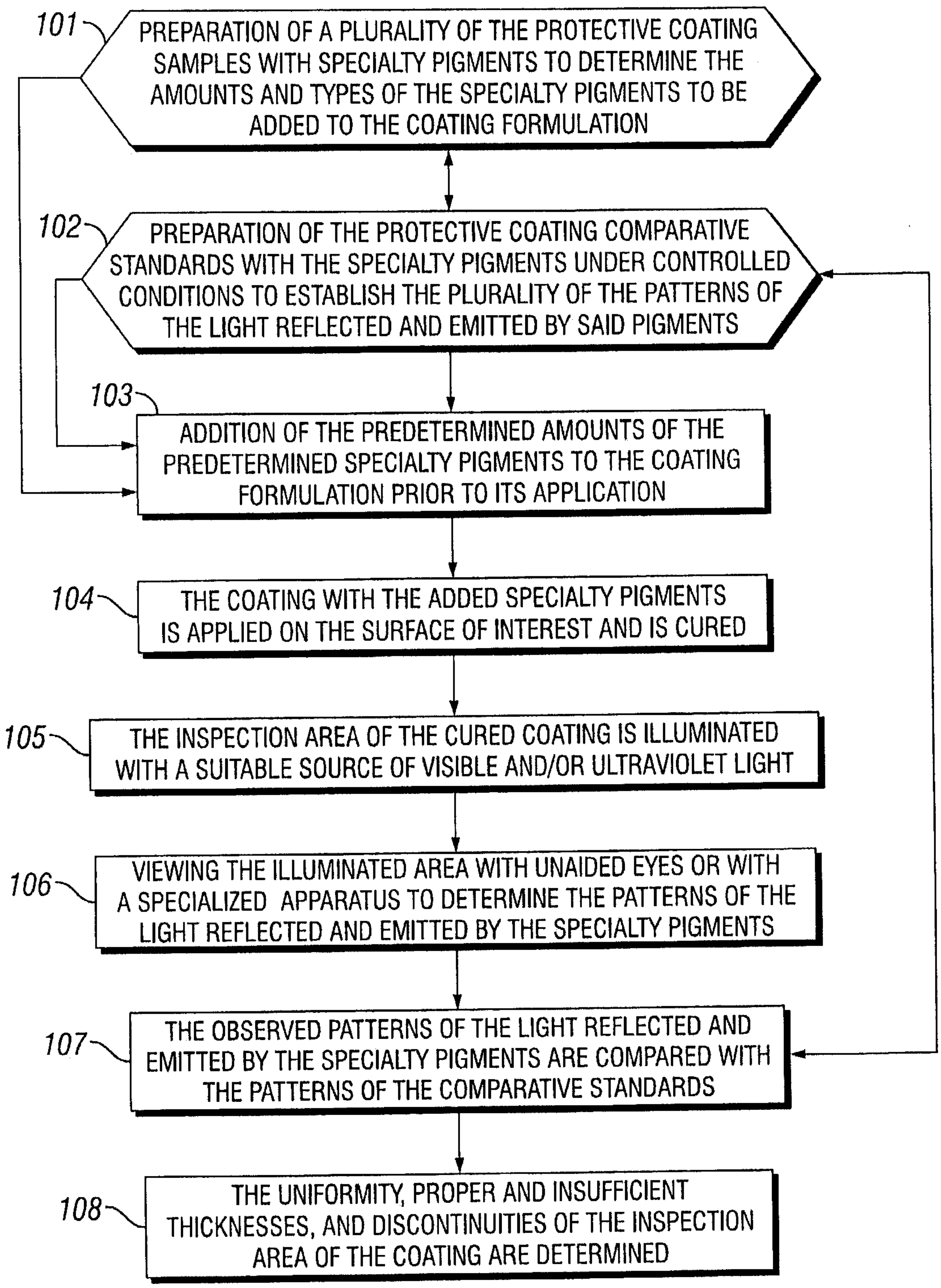

101
PREPARATION OF A PLURALITY OF THE PROTECTIVE COATING SAMPLES WITH SPECIALTY PIGMENTS TO DETERMINE THE AMOUNTS AND TYPES OF THE SPECIALTY PIGMENTS TO BE ADDED TO THE COATING FORMULATION
102
PREPARATION OF THE PROTECTIVE COATING COMPARATIVE STANDARDS WITH THE SPECIALTY PIGMENTS UNDER CONTROLLED CONDITIONS TO ESTABLISH THE PLURALITY OF THE PATTERNS OF THE LIGHT REFLECTED AND EMITTED BY SAID PIGMENTS
103
ADDITION OF THE PREDETERMINED AMOUNTS OF THE PREDETERMINED SPECIALTY PIGMENTS TO THE COATING FORMULATION PRIOR TO ITS APPLICATION
104
THE COATING WITH THE ADDED SPECIALTY PIGMENTS IS APPLIED ON THE SURFACE OF INTEREST AND IS CURED
105
THE INSPECTION AREA OF THE CURED COATING IS ILLUMINATED WITH A SUITABLE SOURCE OF VISIBLE AND/OR ULTRAVIOLET LIGHT
106
VIEWING THE ILLUMINATED AREA WITH UNAIDED EYES OR WITH A SPECIALIZED APPARATUS TO DETERMINE THE PATTERNS OF THE LIGHT REFLECTED AND EMITTED BY THE SPECIALTY PIGMENTS
107
THE OBSERVED PATTERNS OF THE LIGHT REFLECTED AND EMITTED BY THE SPECIALTY PIGMENTS ARE COMPARED WITH THE PATTERNS OF THE COMPARATIVE STANDARDS
108
THE UNIFORMITY, PROPER AND INSUFFICIENT THICKNESSES, AND DISCONTINUITIES OF THE INSPECTION AREA OF THE COATING ARE DETERMINED

FIG. 3

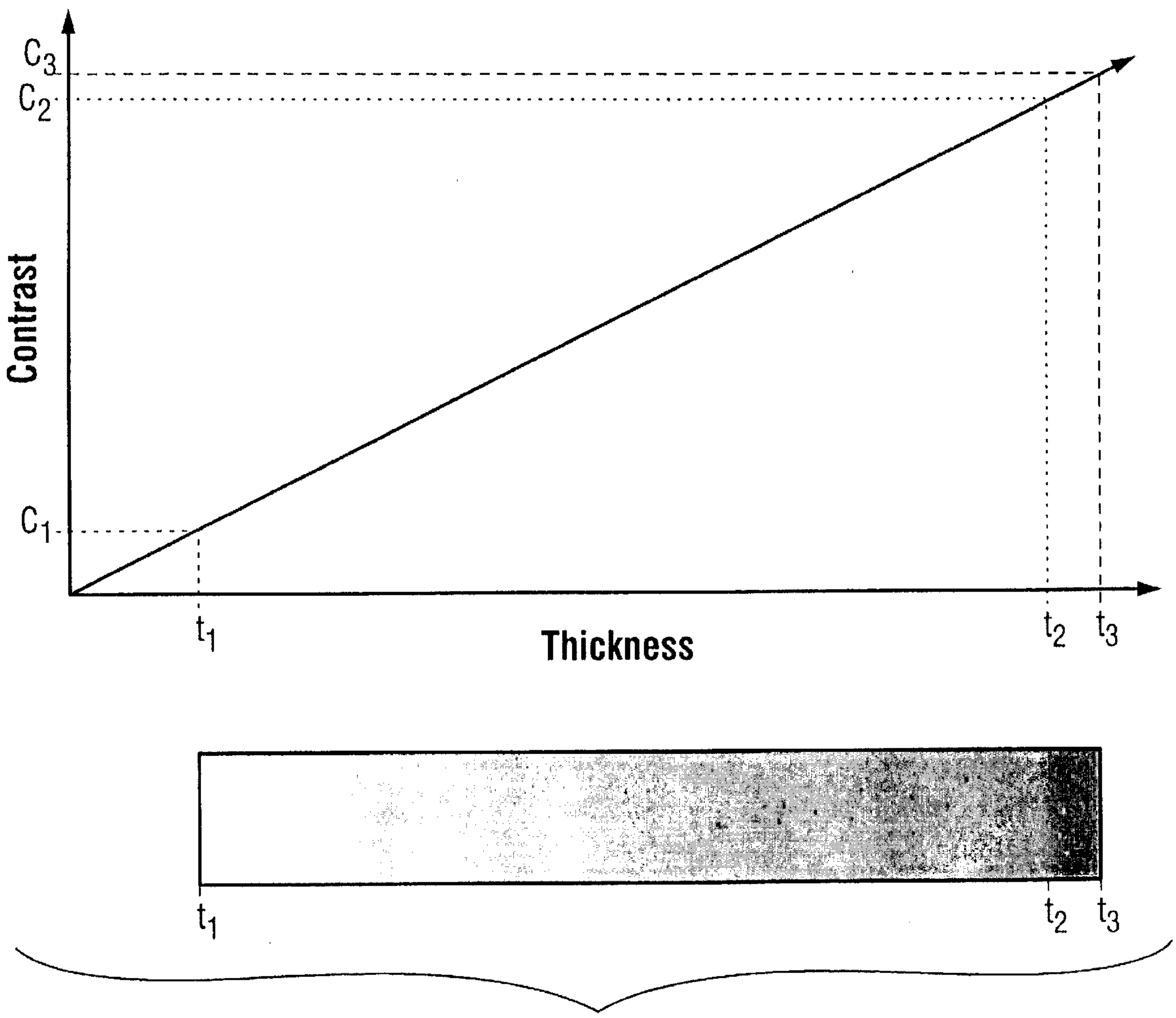
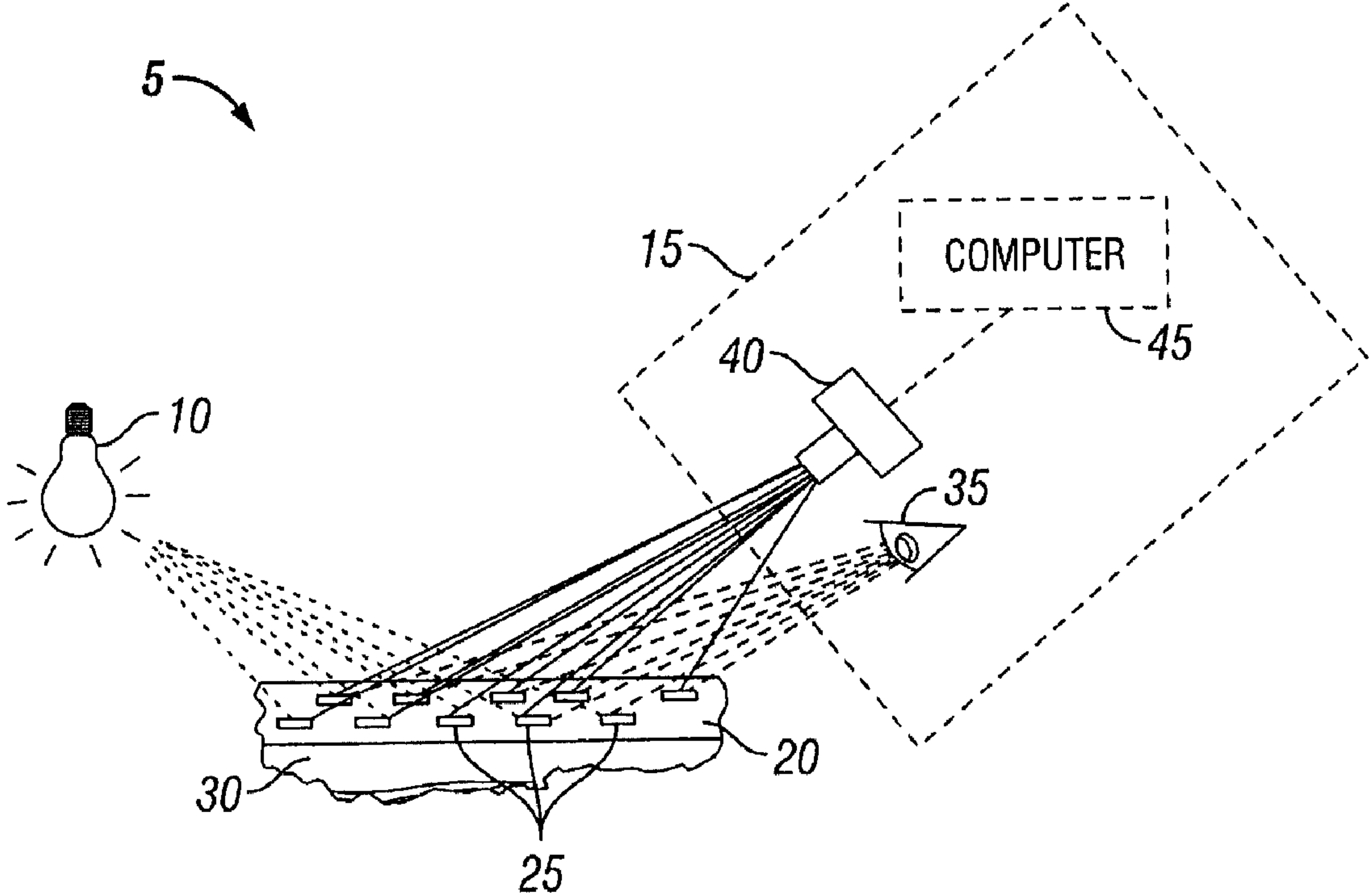


FIG. 4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