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DEVICE FOR GRADING COLOR VALUES

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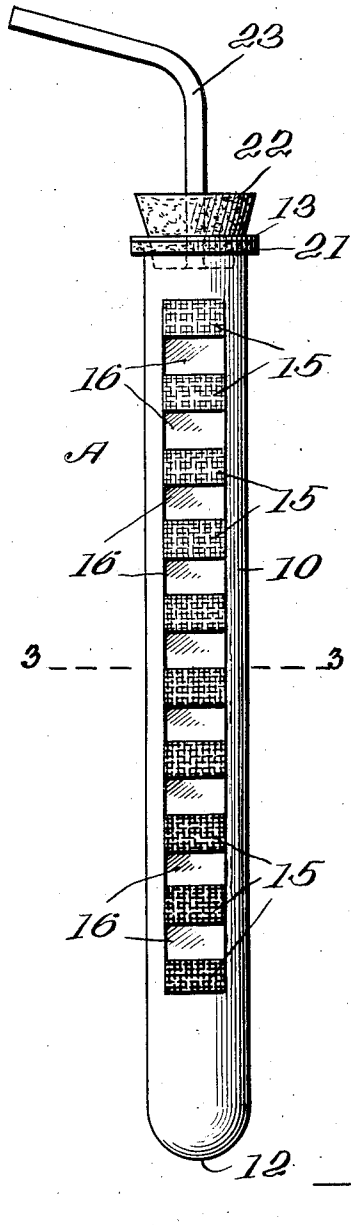


Fig. 1.

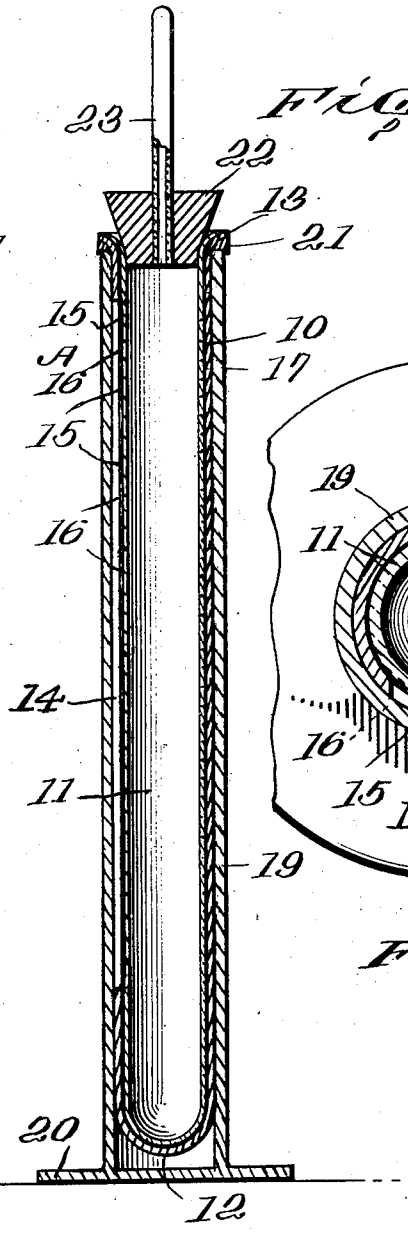


Fig. 2.

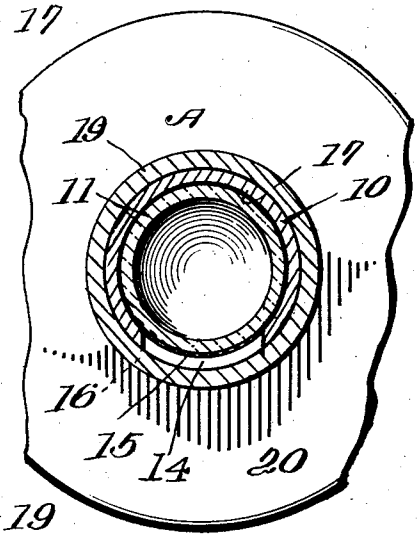


Fig. 3.

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DEVICE FOR GRADING COLOR VALUES

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10 Claims. (Cl. 88—14)

This invention is a device for determining the grades of materials on the basis of their color values.

In marketing many products, more particularly opaque liquids, pastes and solids such as milk, catsup, tomato juice, tomato pulp, mustard, sugar, flour, and so forth, a premium is often put on color. For instance, with respect to milk, those breeders whose cattle produce a deep yellow-colored milk are very often able to demand a larger price for their product than can breeders whose cattle produce milk of a lighter shade. In view of the foregoing, one of the objects of the invention is to provide a simple and inexpensive device for readily and accurately determining color shades of selected products of the character above mentioned, by bringing the sample close to standardized color indicia. A further object is to insure maximum accuracy of color matching and grading by eliminating the miniscus effect of curved transparent surfaces. A further object is to provide a device in which the color grading indicia is arranged in a manner to eliminate what is known as "end effect", and also to arrange such indicia in such a manner that the observations may be made, by means of reflected light and thereby avoid the errors which are incident to observations made by transmitted light.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—

Figure 1 is a front elevation illustrating a tubular container constructed in accordance with the invention. Figure 2 is a vertical sectional view illustrating the gauge member enclosed within a supporting and protecting casing. Figure 3 is a transverse sectional view on the line 3—3, Figure 2.

Referring to the drawing, A designates a color gauging device formed of an opaque tubular body 10, having a lining 11, preferably of glass. The body 10 may be of any desired contour but is shown as conforming to the shape of a standard type glass test-tube, namely having a rounded closed lower end 12 and an upper flaring open end 13. Said body is provided with a longitudinally extended slot 14, back of which is the portion of the transparent glass lining 11, along which is arranged a plurality of relatively spaced transverse panels or color grading members 15. Said last mentioned members are spaced apart, so as to expose between them a plurality of transparent windows 16. The body 10 may be made of any suitable material, but it is preferable to construct it of thin-sheet metal enclosing an ordinary glass test-tube, which constitutes the lining. The color indicating panels are arranged to delineate progressive shade variations of a predetermined color. For the purposes of illustration, the device is illustrated as adapted to grade milk, and therefore the panels 15 are indicated in progressively varying shades of yellow, the deepest shade being at one end and the lightest shade at the other end. In the drawing ten of such variations are indicated, the panels being opaque in character and secured to the exterior of lining 11. It is obvious, however, that the number of panels 15 may be varied, and any other basic color may be substituted for that shown. To secure the most nearly perfect results, the areas of the color panels 15 and the windows 16 should be approximately the same, so that the regular sequence or scale of color shades is equally spaced along the member 10, thereby exposing areas of the material to be tested of the same size as the color panels and in juxtaposition to the respective color panels. In this way, all undesirable visual effects caused by unequal areas is eliminated, and a greater accuracy in color matching is possible.

In order to protect the lining 11 from breakage, and the soiling of the color standards by undue exposure to light and overflow of the material being tested, the glass test-tube is inserted into and secured within the metal member 10. The lining 11 is secured to the inner surface of the container 10 in suitable manner, such as by cementing, indicated at 17.

It is preferred to provide the device with a suitable support for holding it while not in use, and also while the container is being filled with the material to be tested. For this purpose, a cylindrical holder 19 is provided, the same being open at its top and provided with a supporting base 20 at its bottom, the diameter of the body being sufficient to allow the gauging device A to be readily inserted and removed.

Encircling the member 10 adjacent the open end thereof is a gasket 21. The upper end of the gauge member is also provided with a snugly fitting, removable stopper 22 through which extends a glass tube 23, the lower end of which terminates flush with the lower end of the stopper 22, the upper portion of the tube 23 being curved and extended laterally, so as to project beyond the edge of the device.

In practice, the gauge A, consisting of the member 10 and its lining 11 is normally supported within the holder 19, the gasket 21 resting upon the top edge of the holder. To make a

color determination, the stopper 22 and its tube 23 are removed, and the gauge member is filled with the material to be tested. After filling, the stopper 22 is placed in position, so as to force part of the sample out of tube 23. The stopper thereby seals the upper end of the gauge and holds the contents more or less solidly against internal movement. The tube 23 also permits the passing off of any air bubbles which may have been produced by the filling of the gauge and which might interfere with the accuracy of the color matching. The bent portion of the tube 23 is long enough to prevent any excess or overflow of the sample from coming in contact with the color indicia. To avoid any contamination of the device, it is preferable to dry the exposed parts by means of a suitable cloth or other means, and to then remove the gauge A from the holder 19. The gauge should be viewed from directly above and held in a horizontal position away from the body and at approximately right angles with respect to the eye of the observer. By following this procedure, the inspector can immediately obtain a very close approximate grading, by simply noting the color panel 15 which carries the color most nearly matching that of the sample showing through the windows 16. The sample is then graded by giving to it the number of the panel which it most nearly matches.

The advantages of the invention will be readily understood by those skilled in the art to which it belongs. For instance, it will be readily understood that by arranging the color indicating panels in a series along the gauge body with transparent windows between them, and by progressively grading the shades of the standard color, the undesirable visual effects caused by unequal areas is overcome, and a very accurate determination of color grades is possible. By using a gauge which is opaque except as to the small transparent areas for visualizing the sample, all possibility of any light being transmitted through the material while being tested is eliminated, and the more nearly correct color reflected from the surface of the sample is available for comparison and grading. In this way, all of the objection of possible error in color comparison, due to transmitted light is eliminated and at the same time the distortion or miniscus effect incident to the curvature of a transparent tube are avoided. A further advantage is that the color standard panels are placed on the outside of a thin walled tube, thereby making it possible for the sample and color standard panels to be illuminated under similar conditions. In other words, the intensity of light striking a sample and a standard shade panel is for all practical purposes the same, the slight normal error due to loss of light transmitted through the glass being taken care of in the depth of shading of the respective color standard panels. A very important advantage is the linear arrangement of the color standard panels, whereby the elimination of which is termed the "end effect" is accomplished. For instance, in a series of color shades differing from each other by a constant visual step, the step between either of the extremes and its nearest adjacent shade will usually appear different from the steps between any of the colors flanked by another shade in the series. However, if another shade is added to either end of the series, the original end will disappear in line with the rest of the series while the new end will again appear out of place. This is known as the "end effect" and is entirely eliminated in the present device.

Having thus explained the nature of the invention and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what is claimed is:—

1. A color grading device comprising an opaque tubular container provided with transversely disposed longitudinally spaced windows through which the sample within the container may be viewed, and a plurality of opaque longitudinally spaced, progressively graded color standard indicia occupying the spaces between and separating said windows in such manner that spaced-apart portions of the sample will be exposed adjacent to a plurality of said indicia.

2. A color grading device comprising a sample-receiving tubular container provided with a plurality of longitudinally spaced transparent windows, and means providing a plurality of longitudinally spaced color standard indicia of graded shades interposed between the respective windows and located adjacent thereto, said indicia and said windows being so constructed and arranged that one or more spaced apart visible portions of a sample placed within the container will be exposed through said windows in close proximity to adjacent indicia.

3. A color grading device comprising a tubular container of transparent material, an opaque covering for said container provided with transversely disposed longitudinally spaced windows through which the sample within the container may be viewed, and a plurality of opaque longitudinally spaced, progressively graded color standard indicia occupying the spaces between and separating said windows in such manner that spaced-apart portions of the sample will be exposed adjacent to a plurality of said indicia.

4. A color grading device comprising a tubular container of transparent material, an opaque covering for said container having a longitudinally disposed portion exposing a coextensive portion of the transparent container through which the sample within the container may be viewed, and a plurality of longitudinally spaced color standard indicia of progressively graded shades positioned transversely across said transparent portion in such manner as to divide said transparent portion into longitudinally spaced windows.

5. A color grading device of the character described comprising an opaque tubular body having a longitudinally disposed slot, a transparent lining located within said body and having a portion registering with said slot and coextensive in area therewith, and a plurality of color standard panels arranged transversely of said transparent portion and denoting progressive shade variations of a predetermined color, said panels being relatively spaced so as to provide transparent windows adjacent the respective panels.

6. A color grading device of the character described comprising an opaque tubular body having a longitudinally disposed slot, a glass lining located within said body and cemented thereto, said lining having a transparent portion registering with said slot and coextensive in area therewith, a plurality of opaque panels on the outer surface of said container and arranged transversely of said transparent portion, said panels denoting progressive shade variations of a predetermined color and being relatively spaced so as to pro-

vide transparent windows adjacent the respective panels.

7. A color grading device of the character described comprising an opaque tubular gauge provided with a longitudinal slot, a vitreous lining located therein and having a transparent portion positioned to register with said slot and coextensive therewith, a plurality of color standard panels arranged transversely of said transparent portion and in spaced relation with respect to each other, so as to provide transparent windows adjacent each panel, said panels denoting progressive shade variations of a predetermined color, and a holder for said gauge member, said holder having a supporting base.

8. A color grading device comprising an opaque tubular container having a longitudinal transparent portion through which the sample within the container may be viewed, and a plurality of longitudinally spaced color standard indicia of progressively graded shades positioned transversely across said transparent portion in such manner as to divide said transparent portion into longitudinally spaced windows, and a closure for said container provided with means for venting the interior thereof.

9. A color grading device comprising a tubular container open at one end and closed at its other end, said container being provided with transversely disposed longitudinally spaced windows through which the sample within the container may be viewed, and a plurality of opaque longitudinally spaced, progressively graded color standard indicia occupying the spaces between and separating said windows in such manner that spaced-apart portions of the sample will be exposed adjacent to a plurality of said indicia.

10. A color grading device of the character described comprising an opaque tubular body having a longitudinally disposed transparent portion, a plurality of color standard panels arranged transversely across said transparent portion and relatively spaced so as to provide transparent windows adjacent the respective panels, said panels delineating progressive shade variations of a predetermined color, a gasket encircling said body adjacent the upper end thereof, and a holder for said body, the upper edge of which is engaged by said gasket.

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