Nov. 4, 1941. C. A. BAUER 2,261,578

DECORATED TRANSPARENT ARTICLE

Filed June 10, 1940

Fig. 1.

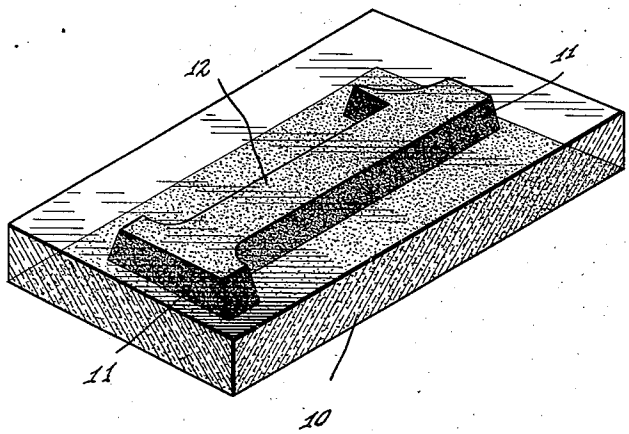
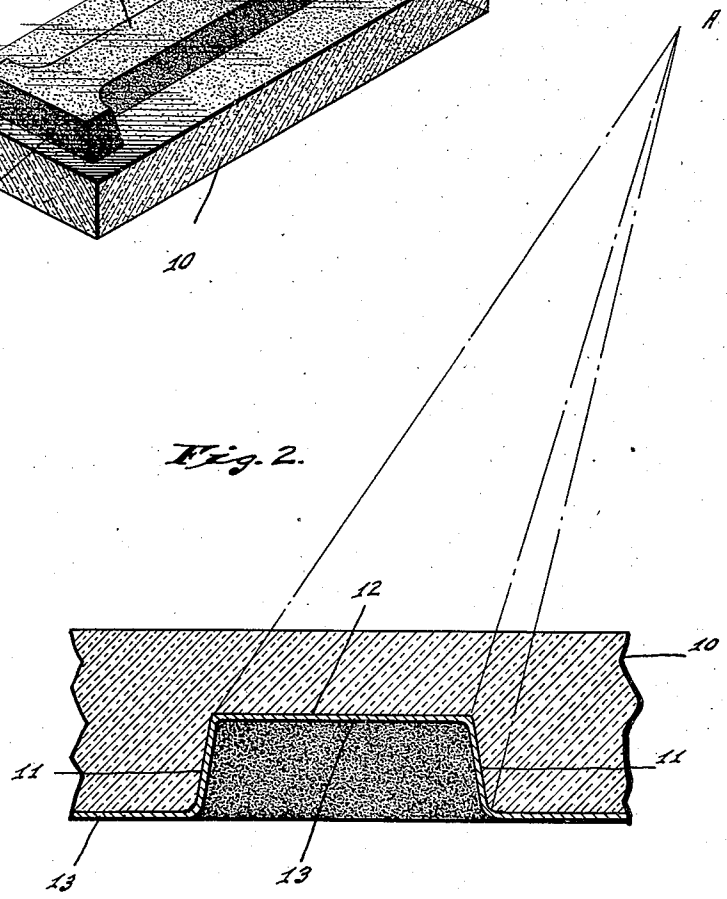


Fig. 2.



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Patented Nov. 4, 1941 2,261,578

UNITED STATES PATENT OFFICE

2,261,578

DECORATED TRANSPARENT ARTICLE

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Application June 10, 1940, Serial No. 339,729

6 Claims. (Cl. 41—22)

This invention relates to transparent articles of the type in which the rear face is recessed to form a design, the walls of the design-forming recesses (and usually the unrecessed portions of the rear face of the article also) being provided with an opaque coating of paint or similar material. In such articles, the design possesses an actual three-dimensional character which tends to make it stand out, in appearance, from its background. However, since the design is illuminated only by light which passes through the transparent body of the article, and since such light is refracted toward the normal as it enters such transparent body, the illumination of the design is necessarily relatively "flat" and not such as will produce more or less pronounced shadows tending to make the design stand out in its three-dimensional character. In many instances, especially when the coating on the recess walls is of a dark color, it is deemed necessary to coat the unrecessed portions of the rear face of the article with a coating of a contrasting color in order to make the design sufficiently distinguishable from its background; but even then, the actual three-dimensional character of the design may not be clearly apparent. Moreover, the application of paints of contrasting colors to the recess walls and background requires two operations, one of which involves the step of removing paint from certain surfaces or preventing it from reaching those surfaces; and, as a result, the finishing of the articles with paints of contrasting colors is a rather troublesome and expensive process.

It is the broad object of my invention to enhance the appearance of designs formed in plastic articles as above described, to make the three-dimensional character of the design more readily apparent, and to render the details of the design more readily distinguishable. In the particular form illustrated and described herein, a more specific object of my invention is to produce a readily distinguishable design which will stand out from its background, and to do so with a coating of a single color, which may even be a dark color, applied to both the rear face of the article and to the walls of the design-forming recesses.

In carrying out my invention, I prefer to shape each design-forming recess in section so that it will have surfaces or surface-portions whose respective angles to any customary line of vision will differ widely; and, most desirably, so that the recess walls will present some surfaces or surface portions which lie approximately perpendicular to usual lines of vision and other surfaces or surface portions which lie approximately parallel to usual lines of vision. I then apply to the recess walls a coating of a character distinguished from the coating produced by ordinary pigment paints in that the degree to which it disperses light incident upon it is relatively small. Since the design will necessarily be illuminated by light passing through the transparent body of the article, those surfaces of the design which are disposed most effectively to reflect light toward the eye of the observer will appear much brighter than those which concentrate the reflected light more or less in a beam directed away from the observer. As a result, the three-dimensional character of the design is made more evident and the design effectively stands out from its background, even when that background is formed by a coating of the same color as that applied to the walls of the design-forming recesses.

The accompanying drawing illustrates my invention: Fig. 1 is an isometric view of a section of a transparent article in which the design consists of the numeral 1, and Fig. 2 is a fragmental transverse section through the article illustrated in Fig. 1.

Although not limited thereto, my invention is especially useful and valuable in connection with designs consisting of or comprising letters, numerals, graduations, or other indicia on instrument-dials, escutcheon plates, name plates, etc.; for the application of the invention makes the design readily distinguishable without the necessity of employing two colors to obtain contrast. The possibility of eliminating two-color coatings is obviously of particular advantage when the recessed design is relatively small, as it usually is when consisting of letters, figures, or graduations.

The article illustrated in the drawing consists of a portion of a sheet 10 of transparent material, conveniently of molded plastic material such, for example, as cellulose acetate. The design, here illustrated by way of example as consisting of the numeral 1, is formed by recessing the rear face of the article in the desired pattern. As previously indicated, I prefer to form the recess with walls or wall-portions whose respective angles to any normal line of vision will differ widely. Thus, in the particular article illustrated, the side walls 11 of the recess will be approximately parallel and the bottom wall 12 approximately perpendicular to any normal line of vision. As shown in Fig. 2, both side walls 11 and the bottom wall 12 are approximately plane and meet each other at a relatively well defined edge; but this is not essential. For example, the recess-

walls might appear curved in cross-section with the curved portions merging smoothly into each other, or the recess-walls might consist of a single smoothly curved surface. However, in securing the most pronounced beneficial results in the practice of my invention it is advisable that the wall or walls of the recess include portions which, in cross-section, are at markedly different angles to any usual line of vision.

With the recess desirably formed as just set forth, the walls thereof are coated with a coating 13 of opaque material which may, as illustrated in Fig. 2, extend over the unrecessed portions of the rear face of the article 10. As previously indicated, this coating is of a character such that the interface between it and the recess-wall will possess materially less light-dispersing power than does ordinary ground-pigment paint. I have obtained the most satisfactory results with coating material comprising a metallic pigment suspended in a volatile vehicle which includes a dye of the desired color, and which also includes or consists of a volatile solvent for the material of which the article 10 is formed, as set forth in my co-pending application Serial No. 265,746, filed April 3, 1939. The metallic pigment which I prefer to employ is formed by the disintegration of metal foil, with the result that the individual pigment-particles are in the form of relatively flat flakes, in contradistinction to the generally spheroidal form which characterizes conventional ground pigments such, for example, as white lead. I have found that a coating material of the preferred form can be applied in such a manner that, when it dries, the flakes of metallic pigment adjacent the interface will be more or less oriented in positions generally parallel to that interface; and, as a result, light reflected from the interface is dispersed to an extent materially less than it would be if the coating comprised a ground pigment or unoriented plane particles.

Since light illuminating the coating 13 must pass through the transparent material constituting the article 10, wall surfaces, such as the wall 12, which are generally perpendicular to any usual line of vision will tend to reflect toward the front face of the article light which is incident upon them; while surfaces, such as the side walls 11, which form the edge portions of the design and which are generally parallel to the line of vision will tend to reflect light incident upon them toward the rear face of the article. As a result, to an observer located at the point A, for example, the former wall surfaces will appear materially brighter and lighter than the latter. Because of the contrast in shade between surfaces or surface portions disposed at materially different angles to the line of vision, the design formed by the coated recess walls stands out very effectively in its three-dimensional character and is clearly distinguishable even from a background of the same color. Recess surfaces which are curved in cross-section are very effectively highlighted.

In situations where the outer or free surface of a metallic-pigment coating is to be viewed, it is recognized that the vehicle in which the metallic pigment is suspended should desirably be of a character promoting uniform dispersion of the pigment particles; for, if the vehicle contains any ingredient or possesses a pH value which tends to cause aggregation of the pigment particles, the resultant surface possesses relatively high light-dispersing properties. I find the same to be true of the metallic-pigment coatings used in the practice of my invention where it is the inner or bond surface of the coating which is visible. When, as is preferable, the coating material employs a vehicle containing or consisting of a volatile solvent for the material of which the article is formed, I find it desirable to apply the coating in as dry a form as possible. In spraying, which is usually the most satisfactory method of applying the coating, I therefore prefer to hold the spray nozzle at a distance from the work such that some evaporation of the solvent occurs before the spray strikes the articles to which it is being applied. This procedure is desirable for the reason that if the coating material as applied contains too much solvent for the material of which the article is formed, it may roughen the surfaces thereof and accordingly increase the light-dispersing qualities of the interface.

I claim as my invention:

1. A transparent article having substantially plane parallel front and rear faces, said article being provided in its rear face with a recess forming a design, the recess walls having portions near the edges of the design which are approximately perpendicular to the front and rear faces of the article and intermediate portions which are approximately parallel to such front and rear faces, the walls of the design-forming recess being provided with an opaque coating which is visible through the article and which comprises flakes of metallic pigment oriented generally parallel to the adjacent portion of the recess-wall.

2. A transparent article having substantially plane parallel front and rear faces, said article being provided in its rear face with a recess forming a design, the recess walls having portions near the edges of the design which are approximately perpendicular to the front and rear faces of the article and intermediate portions which are approximately parallel to such front and rear faces, the walls of the design-forming recess being provided with an opaque coating which is visible through the article, and the front face of which possesses light-dispersing properties of the order of those possessed by a coating comprising flakes of metallic pigment oriented in generally parallel relationship.

3. A transparent article having front and rear faces and provided in its rear face with a recess forming a design, the recess walls having portions near the edges of the design which are approximately parallel to a normal to the front face of the article and intermediate portions approximately perpendicular to such normal, the walls of the design-forming recess being provided with an opaque coating which is visible through the article and which comprises flakes of metallic pigment oriented generally parallel to the adjacent portion of the recess-wall.

4. A transparent article having front and rear faces and provided in its rear face with a recess forming a design, the recess walls having portions near the edges of the design which are approximately parallel to a normal to the front face of the article and intermediate portions approximately perpendicular to such normal, the walls of the design-forming recess being provided with an opaque coating which is visible through the article and the front face of which possesses light-dispersing properties of the order of those possessed by a coating comprising flakes of metallic pigment oriented in generally parallel relationship.

5. A transparent article having front and rear

faces and provided in its rear face with a recess forming a design, the recess walls having portions making materially different angles with a normal to the front face of the article, the walls of the design-forming recess being provided with an opaque coating which is visible through the article and which comprises flakes of metallic pigment oriented generally parallel to the adjacent portion of the recess-wall.

6. A transparent article having front and rear faces and provided in its rear face with a recess forming a design, the recess walls having portions making materially different angles with a normal to the front face of the article, the walls of the design-forming recess being provided with an opaque coating which is visible through the article and the front face of which possesses light-dispersing properties of the order of those possessed by a coating comprising flakes of metallic pigment oriented in generally parallel relationship.

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