Aug. 22, 1933. R. KOSTER 1,923,313

ILLUMINANT BURNING WITH A MULTICOLORED FLAME

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Fig. 1.

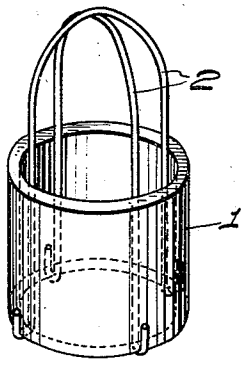
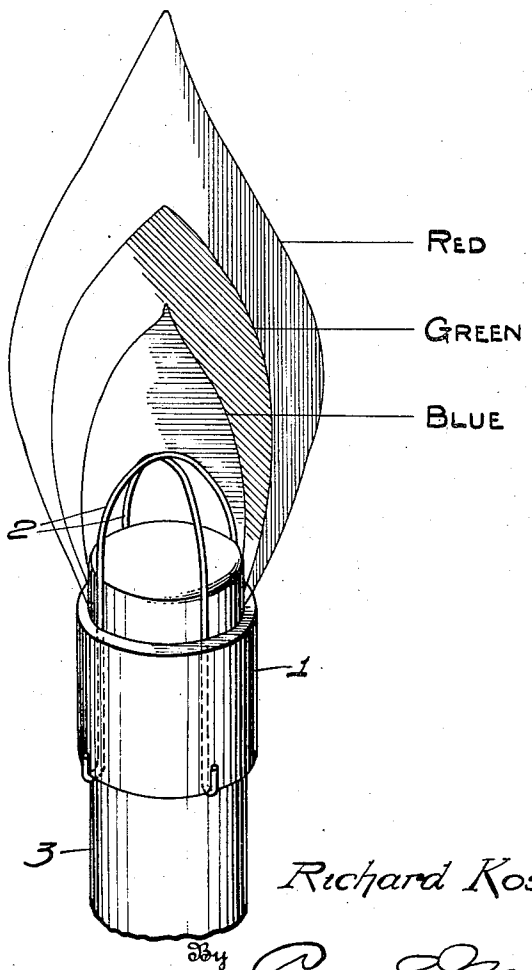


Fig. 2.



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ILLUMINANT BURNING WITH A MULTI-COLORED FLAME

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5 Claims. (Cl. 44—7)

The present invention relates to a wickless candle consisting of a smokelessly burning substance which contains ingredients of such a nature that the flame produced will have more than one color at the same time. In other words, the flame will have zones or areas of different colors, whereby a very striking and pleasing effect is produced.

Among the objects of the invention may be enumerated the following:

(1) The production of a wickless burning body, preferably elongated into the form of a candle, consisting of a material which inherently burns with a substantially smokeless flame, which flame is characterized by having a plurality of fairly well defined zones which glow with colors that differ from each other;

(2) To provide a candle as above described with a device which will prevent its combustion at any point except at the end thereof;

(3) To provide an illuminating device consisting of a solidified aldehyde or aldehyde derivative which has been admixed with flame-coloring salts or compounds whose volatility so differs as to give rise to a flame bearing more than one color at the same time;

(4) To provide means consisting of a mantle of incombustible material which surrounds a portion of the end of the candle so as to maintain the flame at the end thereof and to prevent its spreading over the entire body of the candle.

It has already been proposed in the past to produce candles either for ornamental or other purposes such, for instance, as the trimming of christmas trees, which candles will produce colored flames. It has, however, only been found possible to produce in any particular candle a flame burning with a single color, these colors being produced by well-known flame coloring reagents containing barium, strontium or similar salts. A further improvement was attempted by employing combustible substances, such as metaldehyde, in admixture with metallic powders and flame-coloring reagents, such mixtures being housed in suitable casings or similar receptacles.

For instance, in the case of wax or stearine candles in which a wick is ordinarily employed, flame-coloring salts were added or worked into the body of the candle itself, or on the other hand, were employed to impregnate the wick. Such prior art devices, however, have failed to produce practical or useful results because the wick, when thus impregnated with salts, loses its power of absorbing and conducting the combustible substances of the candle and thereby inhibit the proper burning of the candle.

In accordance with the present invention, and as a result of numerous trials and practical experiments, it has been discovered that it is possible to produce a substance which burns simultaneously with the flame having a plurality of colors which are fairly sharply defined. In producing such a body a combustible material is employed; this consisting of either solid alcohol or polymerized product thereof, or that of a keton or similar carbon compound; these combustible substances being combined with materials such as stearin, cellulose acetate, and such salts or compounds as will be productive of the desired multi-colored flames. Such a substance, when properly mixed in accordance with the disclosure hereinbelow, will burn with a flame which has fairly well defined zones, each of which zones radiates light of a different wave length. That is to say, a flame may be simultaneously blue, red and green; yellow, blue and red, etc.; each color being individually perceptible. This stratification of the different colors in the flame is caused by the variations in the specific gravity of the gases produced by the flame coloring substances which are present in the candle.

A combustible substance so admixed, however, when ignited, will burn over its entire surface so that in order to produce a cylindrical object, such as a candle, it was found necessary to provide means to prevent the combustion from spreading over the parts of the candle which it was not desired should be in active combustion. In other words, a device had to be found to limit or localize the burning process to a specific portion of the surface of the substance, as otherwise the entire body would break into flame.

How this is accomplished is illustrated on the drawing accompanying the present specification, in which Figure 1 is a perspective view of a mantle or flame limiting device and Figure 2 is a perspective drawing of a portion of the candle carrying the said device of Figure 1, also showing the various zones of different color that occur in the flame.

This flame limiting device consists of a broad ring 1 made either of asbestos, glass, clay or other incombustible and preferably non-heat-conducting substances; the internal diameter of said ring being just sufficiently larger than that of the candle so that the ring may slide along the longitudinal axis of the candle as the same slowly burns away. In order to prevent the ring from falling down the length of the candle prematurely, it is provided with a plurality of metallic or non-

metallic handles, preferably in the form of wires 2 in the form shown in Figure 1, so that the flame limiting device will set astride of the end of the candle 3 in the manner shown in Figure 2.

When using the candle the flame-limiting device is placed over one end thereof and this end is then ignited by means of a match or other small flame, whereupon it will burn at the end only, the spread of the flame being prevented by the ring 1. It will be noted that the materials employed hereinbelow are not fusible but burn directly to a gas so that there is no melting and dripping as there is in the case of stearine, paraffine or wax candles. As the material of the candle is consumed by the flame the ring slowly slides down along the candle until the same has been substantially entirely consumed, when the ring also acts as a snuffer.

As the preferred embodiment of the present invention, there will now be given a number of examples of chemical mixtures from which to form it, these mixtures differing in accordance with the color of the flame that is desired.

Ex. No. 1—A flame burning with yellow and blue light

	Parts
Sodium chloride	0.1
Metaldehyde, and/or hexamethylentetramine	100.0

Ex. No. 2.—A flame burning with green and violet light

	Parts
Cupric chloride	0.2
Potassium chloride	0.75
Metaldehyde, and/or hexamethylentetramin	100.0

Ex. No. 3.—A flame burning with red, orange and blue light

	Parts
Lithium carbonate	0.25
Metaldehyde, and/or hexamethylentetramin	100.0

Ex. No. 4.—A flame burning with red, green and blue light

	Parts
Cupric carbonate	0.5
Lithium chloride	0.1
Metaldehyde, and/or hexamethylentetramin	100.0

As already stated, these mixtures are merely exemplary and may, of course, be varied within the skill of a chemist who is familiar with the flame colors of various chemical reagents. In the above examples, metaldehyde and hexamethylentetramin are equivalents; that is to say, either one or the other may be used, or an admixture thereof. Hexamethylentetramin is sometimes sold on the market under the name of urotropine and is a combination of formaldehyde and ammonia. The metaldehyde is a solid condensation product of formaldehyde and is obtainable in solid or powdered form. It is also within the contemplation of the invention to add various aromatic substances to the candle so that the same may give off agreeable odors, as in the manner of incense.

The forming of the candles into their particular shape may be accomplished by any suitable means, preferably by the expedient of pressing the powder with the admixed substances in suitable molds.

What it is desired to protect by Letters Patent is the following:—

1. An illuminant consisting of a body of volatile substantially infusible combustible organic material containing a plurality of flame-coloring constituents in small amounts, characterized by burning with a flame having areas emitting light of different wave-lengths simultaneously.

2. An illuminant comprising a cylindrical body of a volatile solid infusible organic combustible material in admixture with salts capable of emitting different wave-lengths of light when heated, there being more than one of said substances present, whereby the candle will simultaneously exhibit a flame of more than one color.

3. An illuminant consisting of a body of a polymerized aldehyde in admixture with small amounts of at least two different flame-coloring substances.

4. An illuminant consisting of a body of metaldehyde in admixture with at least two different flame-coloring substances.

5. An illuminant consisting of a body of hexamethylenetetramine in admixture with small small amounts of at least two different flame-coloring substances.

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