

[54] **ARTIFICIAL FIREPLACE LOGS WHICH
BURN WITH COLORED FLAME**

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[56] **References Cited**

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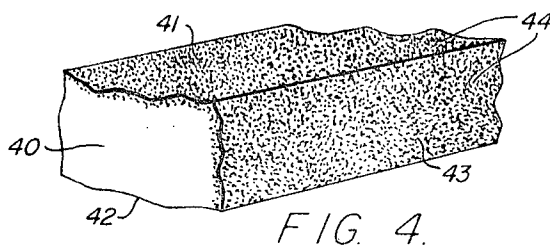
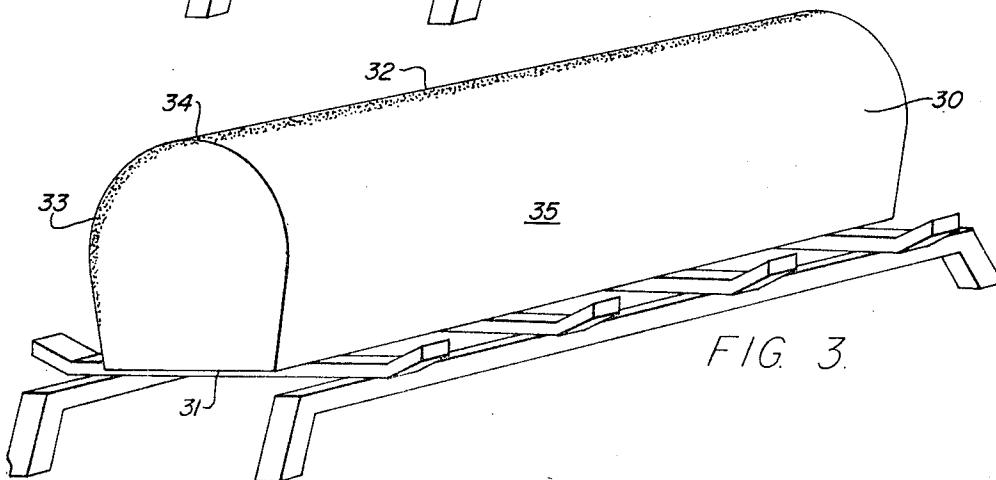
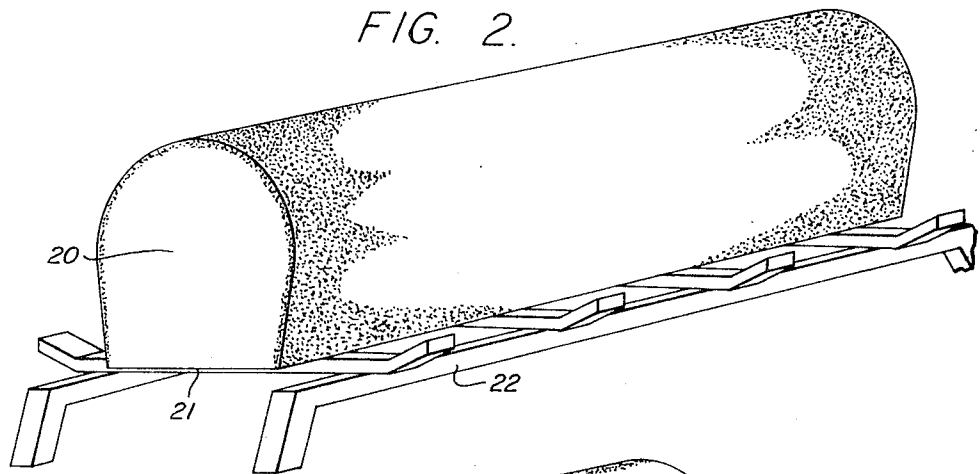
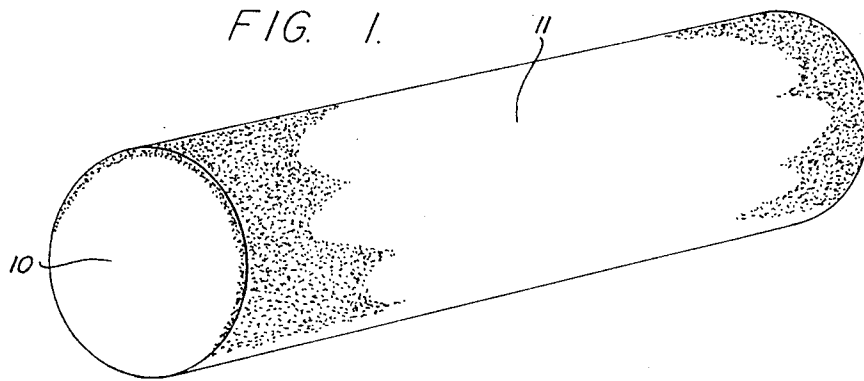
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ABSTRACT

An artificial fireplace log containing pyrogenic coloring matter which produces colored flames upon ignition of the log continuously until the log is consumed. The log is composed of combustible materials, preferably sawdust and wax, and contains pyrogenic coloring matter distributed throughout the log mix. Additional pyrogenic coloring matter is adhered to the surface of the log, preferably along two adjacent longitudinal sides corresponding to the top and front of the log as it is positioned in a fireplace. The preferred pyrogenic coloring matter comprises chlorinated vinyl polymers or copolymers either alone or in mixture with other metallic salts known to provide flame coloration upon burning. These flame colorants can be used in any form and with virtually any combustible materials in fireplaces. The process of the invention includes the steps of preparing an artificial log mix containing pyrogenic coloring matter, molding an artificial log with the mix, and adhering pyrogenic coloring matter, preferably in the form of dry, finely divided particles, along the surface of the log.

6 Claims, 4 Drawing Figures



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ARTIFICIAL FIREPLACE LOGS WHICH BURN WITH COLORED FLAME

BACKGROUND OF THE INVENTION

1. Field

This invention relates to artificial fireplace logs having pyrogenic coloring matter which produces colored flames upon being burned. The invention also relates to the use of chlorinated vinyl resins as flame colorants in fireplace fires.

2. State of the Art

Although many attempts have been made to produce a commercially acceptable artificial fireplace log which would exhibit colored flames upon ignition of the log and continuously until the log is consumed, prior to the making of this invention no such logs were available on the market. It has been common practice to sprinkle flammable metallic salts on burning logs to produce locally colored flames for short periods of time, but this practice does not produce sustained coloration of the flames from the time the log is ignited until final expiration of the flame.

OBJECTIVES

It was a purpose in making this invention to produce an artificial log which would burn with various colored flames continuously from ignition of the log to final consumption thereof. An additional purpose in making the invention was to provide a new flame colorant for producing colored flames in fireplaces with virtually any combustible material.

SUMMARY OF THE INVENTION

The process of the invention is practiced by formulating an artificial log mix containing combustible materials. The customary mix in use today and the one preferred for use with this invention is a mix consisting essentially of sawdust and wax. Preferably dry, discrete particles of pyrogenic coloring matter for imparting coloration to the flames are admixed with the log mix to distribute them throughout the mix. The log mix containing the pyrogenic coloring matter is molded into a log, and an additional quantity of discrete particles of pyrogenic coloring matter is adhered to the surface of the log by dusting or other suitable means, such as spraying, dipping or the like.

The resulting log, when burned, will produce colored flames virtually upon ignition of the log and will provide such colored flames continuously throughout the burning of the log. In a preferred construction, one longitudinal side of the log has a flat surface which is used for solidly seating the log upon a grate or other log-holding means in a fireplace, so that the log does not move or roll as it burns. This also permits the log to be placed in a fireplace with the top and front side of the log facing the front of the fireplace. It is preferred that the particles of pyrogenic coloring matter be adhered to the surface of the log longitudinally of the log along two adjacent sides, corresponding to the top and front side of the log as it would be positioned in a fireplace. This arrangement provides for efficient utilization of the pyrogenic coloring matter, since the flames located at the bottom and rear side of the log cannot be seen from the front of the fireplace.

As an additional feature of the invention, it has been found that chlorinated vinyl polymers and copolymers provide a bright, colorful green flame when used as flame colorants in fireplace fires. Such resins decompose at relatively low temperatures, enabling them to be used in any form with virtually any combustible material which can be burned in a fireplace, including natural wood. The preferred polymer for use as a flame colorant in the invention is polyvinyl chloride (PVC) because of its low cost and ready availability.

THE DRAWING

The accompanying drawing illustrates several embodiments of the artificial log of the invention:

FIG. 1 illustrates a log having a cylindrical configuration and shows the superficially adhering particles of pyrogenic coloring matter;

FIG. 2 is a view of a log of the invention having a longitudinal, flat side corresponding to the bottom of the log;

FIG. 3 shows a log of the invention having particles of pyrogenic coloring matter adhering only to the top and front side of the log; and

FIG. 4 illustrates another embodiment of the invention in which the artificial log is in the form of a briquette.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

As shown in FIG. 1, a log 10 of the invention is customarily cylindrical in form and is composed primarily of combustible materials. Preferably dry, discrete particles of pyrogenic coloring matter 11 are distributed over the surface of the log and adhered thereto.

In FIG. 2, the preferred log 20 of the invention has a flat surface 21 which acts as the bottom of the log when it is placed on a grate 22 in a fireplace. The log is thereby prevented from rolling out of position as when placed on a grate or when partially burned.

As illustrated in FIG. 3, a log 30 having a flat bottom 31 serves the additionally important function of providing a reference point for positioning the log in a fireplace when only the top 32 and front sides 33 of the log 30 have adherent particles of pyrogenic coloring matter 34. The resulting colored flames (not shown) along the top 32 and front sides 33 of the log 30, when burned, are seen from the front of the fireplace (not shown). The rear side 35 of the log 30 does not have particles of pyrogenic coloring matter adhered to its surface. If it is desired to wrap such a log in paper or other combustible material for purposes of marketing, directions as to placement of the log in the fireplace to achieve maximum exposure of the colored flames can be printed clearly on the wrapping material which is left on the log and serves as an aid to igniting the log.

Although the traditional log-shaped artificial log having a flat surface along one longitudinal side is preferred from both a practical and an aesthetic standpoint, it is also within the contemplation of the invention that such artificial logs may take other shapes and forms. For example, as illustrated in FIG. 4, the log may take the form of a briquette 40 having a flat top 41, a flat bottom 42, and a flat front side 43. In this embodiment, the particles of pyrogenic coloring matter 44 can be adhered to the top 41 and front 43 of the briquette 40.

The log of the invention is not restricted to producing a single colored flame. Several differently colored flames can be produced either intermingled with one another, or in separate bands or strips along the log. For example, the surface of the log can be divided into three or four bands around the circumference of the log. Each band contains coloring matter producing a different colored flame, resulting in a very pleasing and striking effect.

Although in many instances it may be preferred to utilize the same flame colorant within the log mix as is used to adhere superficially to the surface of the log, this need not be so. As an example, it is possible to use one type of flame colorant admixed with the log mix, and a second type as the superficially adhering coloring matter. It is also possible to combine different flame colorants which produce differently colored flames and use the combination to effect new flame colors by admixing the combination with the log mix and/or using it as the superficially adhering coloring matter.

The screen particle size of the flame colorant particles is preferably 20 mesh or below for convenience in handling and mixing. However, larger size particles can be used if necessary or desirable.

It is of significance that polyvinyl chloride, a polymer of vinyl chloride, has flame coloring characteristics which make it ideal for use as a flame colorant in artificial logs of the invention. Most of the known flame coloring agents, e.g., the copper, barium, potassium, lithium, calcium, and strontium salts, have decomposition or ionization temperatures which are considerably in excess of the combustion temperatures of

the combustible materials found in artificial logs presently available. For example, the decomposition temperatures of copper sulfate, barium nitrate, and strontium carbonate are 400° C., 900° C., and 1,100° C., respectively, while the wax contained in most common artificial logs has a flash point below about 600° F. The advantage of the chlorinated vinyl polymers is readily apparent when the ionization temperatures of the common metallic salts are compared with the decomposition temperatures of chlorinated vinyl polymers. Polyvinyl chloride, as an example, decomposes at 200° to 350° F. As the wax vaporizes in the interior of the log, it carries the decomposing vinyl resins with it to the surface of the log where the resins ignite and color the flame.

The use of the chlorinated vinyl resins as pyrogenic coloring matter both within the mix of the artificial log and on the surface thereof results in a colored flame being produced almost immediately upon igniting the log. The presence of the chlorinated vinyl polymers on the surface of the log imparts color to the flames as the surface colorants decompose and ignite. As the log begins to burn and the temperature in the interior of the log rises, the wax contained within the log vaporizes and carries the decomposing, interior flame colorants with it to the surface of the log, where they are consumed by the flames, thereby providing additional coloration to the flames. The combination of the adhered coloring matter on the surface of the log and the distributed coloring matter within the log serve to provide a continuous coloration of the flames throughout the burning of the entire log. As the surface coloring matter is consumed, the coloring matter within the log replenishes the surface coloring matter available for coloring the flames.

A further advantage in the use of the chlorinated vinyl resins as coloring agents is the elimination of the masking effect by other ions present in the coloring agents. For example, in the use of common salt, sodium chloride, the potential coloring effect of the chloride ion is masked by the much stronger sodium ion which imparts a yellow color to the flame. This masking effect is not found in the chlorinated vinyl polymers since the vinyl polymers alone produce no flame coloration.

Additional advantages in the use of chlorinated vinyl resins are the elimination of rapid flaming, spitting or melting associated with the use of some metallic salts. These undesirable characteristics are found in several known flame colorants, for example, potassium nitrate and strontium nitrate.

Polyvinyl chloride is preferred as a flame colorant because of its relatively low cost and ready availability in various forms. However, other chlorinated vinyl resins are equally well suited to imparting coloration to flames in fireplaces. The term "chlorinated vinyl resins" or "chlorinated vinyl polymers" as used herein include both the polymers formed by polymerizing monomeric vinyl chloride and also the vinyl copolymers formed by polymerizing vinyl chloride with other nonmasking compounds, such as acetate.

While it is preferred to employ the flame colorants, and particularly the chlorinated vinyl polymers, in their finely divided, dry particulate or powder form, the colorants can also be employed in other physical forms, for example, as a liquid, or as scrap pieces from milling operations using solid polyvinyl chloride. In fact, it is not necessary that the chlorinated vinyl resins be in a pure form. They can contain nonmasking plasticizers or other nonmasking compounds.

Due to their relatively low temperatures of decomposition, the chlorinated vinyl resins can be used in a variety of ways in accordance with the invention. For example, polyvinyl chloride can be utilized solely within an artificial log; it can be used in a powdered or dusted form solely along the surface of the log; or it can be simply sprinkled along a natural log in a

fireplace to produce instantaneous colored flames.

Polyvinyl chloride or other polyvinyl chlorinated resins in combination with metallic salts known to impart coloration to flames provides what appears to be a synergistic effect in imparting coloration to flames. The synergistic effect has been most significant when polyvinyl chloride has been mixed with copper sulfate and used in accordance with the invention. Although either the polyvinyl chloride or the copper sulfate alone will provide a colored flame effect when used as set forth in the process of the invention, an even brighter, more striking, turquoise coloration effect is achieved when the two are combined in a formulation which is adhered to the surface of the artificial log. When such a formulation is adhered to the surface of the log, it is sufficient to use the chlorinated vinyl polymer alone in the log mix, thereby achieving an economic advantage. It has been found advantageous to facilitate the distribution of the particulate chlorinated vinyl resins and/or metallic coloration salts by incorporating extenders, such as ammonium chloride, in the colorants to more easily control the concentration of the colorants within the log mix and on the surface of the log.

As described above, the preferred composition for an artificial log mix comprises sawdust and wax. The formulation can contain other binders and additives which contribute to the stability of the log if desired. However, other combustible materials and binders can also be used in the process of the invention. For example, wood chips, powdered coal, peat moss, and petroleum coke, can be utilized as combustible materials. A preferred apparatus for making the logs of the invention is described in my copending application entitled "Apparatus for Making Artificial Fireplace Logs Having Colored Flames."

The following example of a typical artificial log mix and flame colorant dusting formulation is provided for purposes of illustration. Those skilled in the art will be aware of other formulations which are within the scope of the invention.

EXAMPLE

In a 450 lb. batch of log mix containing sawdust and wax which produced 78 logs, the following ratios of supplementary ingredients were employed:

A. A 12 lb. mixture of additives was prepared comprising:

2.4 lb. polyvinylchloride

4.2 lb. copper sulfate

4.2 lb. ammonium chloride

0.2 lb. talc

2.0 lb. wood flour

8 lb. of the mixture was added to the log mix and

4 lb. used for dusting the surface of the logs.

B. 4 lb. of polyvinyl chloride were added to the log mix, and

4 lb. of the mixture described in (A) were used for dusting.

C. 2 lb. of polyvinyl chloride were added to the log mix, and 4 lb. of the mixture described in (A) above were used for dusting.

I claim:

1. An artificial log comprising a mixture of combustible materials and a chlorinated vinyl resin to produce colored flames when burned.

2. A log mixture as set forth in claim 1, wherein the chlorinated vinyl resin is polyvinyl chloride.

3. A log mixture as set forth in claim 1, including at least one metallic salt capable of coloring the flame when burned.

4. A log mixture as set forth in claim 1, including at least one plasticizer.

5. A log mixture as set forth in claim 1, wherein the chlorinated vinyl resin is distributed throughout the mixture.

6. A log mixture as set forth in claim 1, wherein the chlorinated vinyl resin is adhered to the surface of the log.

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