ARTIFICIAL LOGS FOR FIREPLACES

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ARTIFICIAL LOGS FOR FIREPLACES
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ABSTRACT OF THE DISCLOSURE

A light-weight hollow structure simulating a log for a fireplace, comprising an inner hollow self-supporting structure formed of aluminum silicate fibers held in shape by an inorganic refractory colloidal binder of silica gel wherein the proportion of aluminum silicate fibers predominates and an outer thin layer of clay covering at least the visible side of the hollow structure. The clay covering being a lightweight fire brick grog mixed with a clay binder and pigment is shaped to simulate a log.

This invention relates to an artificial log and more particularly to an artificial log as used in a fireplace in the presence of a burning gas.

This product employs refractory fibers molded into a desirable shape and reinforced by a fire clay preferably forming the visible surface of the artificial log. The refractory fibers are reinforced by organic and inorganic binders varied in proportions determined by temperature and strength requirements.

It is the principal object of the invention to provide an artificial fireplace log of remarkably reduced weight as compared to a conventional artificial fireplace log.

A further object of the invention is the provision of an artificial fireplace log which may be fabricated as a single unit having the desirable appearance of the conventional fireplace log formed of clay and the like and capable of being used in a fireplace in the presence of a gas flame in exactly the same manner as the conventional clay fireplace heretofore known in the art.

A still further object of the invention is the provision of an artificial log for a gas fireplace wherein the materials used in the formation of the log are light weight, capable of durable thin wall construction and more importantly able to withstand the temperatures experienced in the presence of gas flames and the like without deterioration.

The artificial logs for gas fireplace heretofore known in the art have been formed of fire clay and shaped so as to resemble natural logs or split sections of natural logs and colored with suitable fire resistant pigments so that they very closely resemble such natural logs. Such artificial logs as heretofore known in the art required relatively thick wall areas formed of relatively heavy fire clay or the like and therefore weighed a considerable amount, which adversely affected the area in which such artificial fireplace logs could be economically shipped.

The present invention discloses an artificial log for a gas fireplace which resembles a natural log, or a conventional fire clay artificial log, and has the unique advantage of being extremely light in weight and therefore capable of being shipped relatively long distances at an economical freight rate, thus very greatly increasing the distribution area and the potential consumer demand with respect to the new article of manufacture.

The artificial log for gas fireplaces disclosed herein makes it possible to reduce the wall thickness of the conventional artificial log as heretofore formed of fire clay and the like from 2½” or 3” as heretofore customary to approximately ⅛”, and the weight from approximately 25 pounds or more to approximately 2 pounds or less; thus, resulting in economies of manufacturing and shipping costs.

The artificial log for gas fireplaces as disclosed herein will despite its thin wall, light weight construction withstand continuous use temperatures as high as 2300° F. and will maintain its shape and appearance throughout temperature changes and resists spalling, cracking and other types of thermal shock.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

FIGURE 1 is a perspective view of an artificial log for gas fireplace formed in accordance with the invention.

FIGURE 2 is a vertical section on line 2—2 of FIGURE 1 and in enlarged detail.

It will be understood from the following description that the artificial log for a gas fireplace disclosed herein is a typical embodiment as the flexibility of the manufacturing process facilitates production of an artificial log of practically any required size and shape.

The preferred materials employed in manufacturing the artificial log for a gas fireplace are aluminum silicate fibers, a colloidal silica primary binder and a suitable organic secondary binder. A typical specification for the aluminum silicate fibers would be as follows:

<table>
<thead>
<tr>
<th>Color</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber length</td>
<td>Short to 1½ inches</td>
</tr>
<tr>
<td>Fiber diameter</td>
<td>Submicron to 10 microns, a mean of 2½ microns</td>
</tr>
</tbody>
</table>

Bulk density as shipped — 4 lbs. per cubic foot.
Recommended packing density — 6 lbs. per cubic foot or higher.
Use temperature — Above 2300° F.
Melting point — Above 3200° F.

The approximate chemical analysis of this material in percentage by weight is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al₂O₃</td>
<td>51.2</td>
</tr>
<tr>
<td>SiO₂</td>
<td>47.4</td>
</tr>
<tr>
<td>B₂O₃</td>
<td>0.7</td>
</tr>
<tr>
<td>Na₂O</td>
<td>0.7</td>
</tr>
</tbody>
</table>

These fibers are placed in a tank containing water and a colloidal silica which has the following properties:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent colloidal silica</td>
<td>30.0</td>
</tr>
<tr>
<td>Ratio, wt., SiO₂/Na₂O</td>
<td>95</td>
</tr>
<tr>
<td>Chloride as NaCl, percent</td>
<td>0.04</td>
</tr>
<tr>
<td>Sulfate as Na₂SO₄, percent</td>
<td>0.05</td>
</tr>
<tr>
<td>Viscosity at 25° C., ccs.</td>
<td>3.6</td>
</tr>
<tr>
<td>pH at 25° C.</td>
<td>9.8</td>
</tr>
<tr>
<td>Surface area B.E.T. method m²/g, silica</td>
<td>210</td>
</tr>
<tr>
<td>Approximately particle diameter, μ</td>
<td>15</td>
</tr>
</tbody>
</table>

Stability — Stable, except toward freezing which causes irreversible precipitation. Freezing point 32° F.

The silica is insoluble once the colloidal solution has dried. It also has the property of gel formation whereby small silica particles link together to form a strong aggregate structure.
In forming the artificial log for a gas fireplace, the initial shape is formed of the aluminum silicate fibers and binders, as above noted, in a uniform and homogeneous structure wherein the fibers are dispersed uniformly in the solution as set forth. A foraminous mold having an exterior surface conforming with the interior configuration of the artificial log is submerged in the solution which is drawn by vacuum through the mold causing the fibers to be deposited upon the mold surface. The wall thickness of the artificial log is determined by the amount of time that the mold is left submerged in the solution. The mold is then withdrawn from the solution and by means of vacuum the artificial log is removed from the mold and dried, whereupon it becomes a self-supporting unit.

The artificial log at this stage has satisfactory properties for its intended use, but may not have desirable appearance characteristics, and it may not be susceptible to hand shaping and decorating, as is customary in the artificial log art.

By referring now to FIGURE 2 of the drawings, it will be seen that the artificial log is disclosed at this stage of production as a hollow shape, generally indicated by the numeral 10 and defining an elongate cavity 11 therein, which occurs between the bottom portion 12 thereof and the upper curving section 13 and the respective ends, one of which appears in FIGURE 2 and indicated by the numeral 14. A light-weight fire brick greg mixed with a clay and clay is then applied to the outermost surface of the artificial log shape. As seen in FIGURE 2 of the drawings, the layer of clay is indicated by the numeral 15. The layer may comprise a coating of from ¼" to ½" thick and in addition to contributing to the properties of the artificial log, it provides a surface which may be mechanically or manually shaped and decorated so that it very closely resembles a natural log, as may be seen by referring to FIGURE 1 of the drawings.

In the formation of artificial logs for gas fireplaces, it is customary to shape the visible surface by hand so as to impart realistic appearing characteristics, such as splits in the bark, details of the bark and the details at the ends of the logs which resemble sawed or split sections. In addition to the formation of the artificial logs for gas fireplaces from aluminum silicate fibers and the colloidal silica binder, it is also possible to utilize fibers of mineral wool, asbestos and other fibers, as will occur to those skilled in the art, together with other binders both organic and inorganic.

In a preferred embodiment, the aluminum silicate fibers are present as approximately 90% of the initially formed shape as illustrated in the drawings and indicated by the numeral 13. The artificial log after having been manually finished as to shape and appearance is then colored with suitable colors of suitable pigment so that the portions of the log that resemble bark have natural coloration; those portions which resemble the cut or split wood beneath the bark are colored appropriately; and the completed artificial log is then dried thoroughly, which completes its fabrication, and the same is ready for installation in a fireplace where gas flames can be directed under, on and around it as desired and where it will maintain its shape and appearance indefinitely.

It will occur to those skilled in the art that an artificial log for a gas fireplace has many of the characteristics of a clay radiant in that the material of the log becomes heated by the gas flames to a temperature where the heat is radiated and the artificial log disclosed herein is particularly suitable for such function as it is capable of being subjected to operating temperatures up to 2300° F.

It has high resistance to thermal shock, such as cracking and spalling, and it therefore contributes to combustion efficiency of the gas flames directed thereagainst when the same has been heated, all of which is highly desirable in an artificial log for a gas fireplace.

Artificial logs for gas fireplaces manufactured with the foregoing materials and method are light in weight, adaptable to size and shape, they are stable, thin walled, easy to install or replace and offer the incidental economic advantages while providing an improved product.

It will thus be seen that an artificial log for gas fireplaces has been disclosed, which meets the several objects of the invention and having thus described my invention what I claim is:

1. An artificial log comprising an inner supporting structure of aluminum silicate fibers, in predominate proportion, held in a stable self-supporting structural shape by an inorganic refractory colloidal binder of silica gel which makes up the balance of the mixture, said structure comprising a base portion and a convexly curved upwardly extending portion, the outer surface of said upwardly extending portion carrying a relatively thin layer of clay, said clay being a light-weight fire brick greg mixed with a clay binder and pigment and shaped to simulate an artificial log.

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