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METHOD OF FIREPROOFING REDWOOD BARK FIBERS

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This invention relates to a new and improved process for fireproofing tree bark fibers, and particularly to process of fireproofing redwood bark fibers.

Such bark and bark fibers have, until recently, had little or no commercial value, but they are now finding increased application in industry. It has been found, for example, that they form excellent insulators for heat and cold and also against the transmission of sound. These fibers have been used in loose form and also have been formed into sheets or pre-formed masses and have been used in building construction. However, when these fibers are used for such purposes, it is desirable, and frequently necessary, that they be fireproofed so as to reduce the probability of flame propagation in case the building catches fire. The specifications of many communities require that the insulation material used in the walls conform to certain tests of non-flammability.

For this reason, it has become common practice to treat the bark fibers with certain salts such as ammonium sulfate, diammonium or other phosphates, urea, and the like, or combinations of these salts, and this treatment has been found to reduce the flammability of the fibers to a marked extent so that they readily pass the tests required by fire underwriters and other agencies. The use of such salts is not new with us.

The bark is customarily shredded, dried, processed to remove dust and fines, and the solution of the fireproofing salts is sprayed on the fibers. After this treatment, the fibers must be dried again to remove the water which is sprayed on the fibers with the salts. This extra operation of removing water from the product is costly. In addition, it is substantially impossible to reach all parts of the fiber mass with a solution which is simply sprayed thereon and, hence, the distribution of the fireproofing salts is not uniform throughout the fibers in the mass.

It is an object of this invention to develop a process for the treatment of bark fibers with fireproofing salts that will be more simple and less costly than those heretofore used.

It is a further object of our invention to develop a process for treating tree bark fibers with fireproofing salts that will give a uniform distribution of the salts throughout the fiber mass so that ever fiber in the mass and every part of every fiber will be equally treated and hence all the fibers in the mass will be uniformly resistant to the flame propagation.

Other objects and advantages of our invention will appear from the following specification.

The moisture content of tree bark entering the bark processing plant varies within rather wide limits due to the exposure of the bark to the weather, processing for removal from the tree trunk or log, and other causes. The end products, however, must be held to a low moisture content and within comparatively narrow limits. Thus it is a common practice to dry the bark after it has passed through the shredder.

We have discovered that normally this bark is about fifty percent moisture by weight and that this is sufficient to dissolve fireproofing salt crystals in concentrations essential to fireproofing the finished bark fibers. We therefore introduce these dry salts into the bark stream as it enters the plant and before any operation has been performed on it and thus produce a water solution of these

salts in concentrated form throughout the wet bark mass. The bark so treated, passing through the shredder, the drier, and other processing operations, is tumbled and mixed so that this solution penetrates uniformly to practically every individual fiber in the mass.

The bark and the salts may be introduced into a hammer mill at a predetermined rate. We utilized only enough of the salts to produce the desired fireproofing effect. We have found that any of the aforementioned salts, and any combination of them, will be satisfactory. The weight of the wet bark stream is determined and the dry fireproofing salts are added at such a rate as to give the final bark fiber product a concentration required for maximum fire resistance but with no wasteful excess. This is readily accomplished by feeding the dry fireproofing crystals into the wet bark stream by means of a regulated feeder such as a syntron. For example, we have used approximately one hundred pounds of these salts to a ton of bark, the water content of the bark it being recalled being approximately fifty percent by weight.

In order to facilitate the flow of the dry fireproofing salt crystals, a thin stream of water may be played on the crystal stream after it leaves the syntron or other feeder, but this is merely a detail of possible convenience and does not affect the invention nor is it a part of the same.

Nitrogen determinations on samples removed from different parts of a day's production of fireproof treated bark fiber by our process have shown variations of only a few tenths of a percent, as compared with variations of whole percentages in samples from unit lots of fibers treated for fireproofing in accordance with methods in common practice. Thus the uniformity that would be expected from our process is confirmed. This is important not only in meeting trade and specification requirements, but also, and more important, in giving the fire protection in use that is and should be expected.

It will be apparent that we have eliminated one drying operation, that is the first drying operation, in the conventional process. Moreover, since the salts are introduced to the fibers before the drying operation, it is apparent that the drier may be operated at a higher temperature than in the conventional process in as much as the fibers which are being dried are fireproofed and the danger of flame propagation is reduced. We are able to eliminate one drying step, we are able to operate our drier at a higher temperature, and we are able to produce a better product in a short period of time.

We claim:

1. A process for fireproofing tree bark, comprising the steps of adding dry crystalline fireproofing salts to a wet bark mass, prior to any other processing thereof, reducing the wet bark mass to coarse shreds and drying the coarse shreds.

2. A process as in claim 1 wherein the dry crystalline fireproofing salts are added during the reduction step.

3. A process as in claim 1 wherein the dry fireproofing salts are added before the reduction step.

4. A process for fireproofing redwood bark, comprising the steps of adding dry crystalline fireproofing salts to a wet bark mass, prior to any other processing of the bark, permitting the moisture in the wet bark mass to dissolve the fireproofing salts to produce a concentrated solution of the salts in intimate contact with the wet bark mass, reducing the bark mass to coarse shreds, permitting the concentrated fireproof solution sufficient time to penetrate the innermost fibers of the individual shreds and then drying the coarse shreds.

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