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X2021D
SEARCH ROOM
Anti F (6) Bate

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COATING COMPOSITIONS AND COATED STRUCTURES

Clarence E. Wilkinson, Port Neches, Tex., assignor to Texaco Inc., a corporation of Delaware

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This invention is concerned with a novel asphaltic composition and method for protecting and preserving wooden structures such as utility poles, railroad ties, bridge timbers, and marine pier piles against the ravages of moisture, weather and particularly, fire. In addition, the invention covers the production of the novel composition and also wooden structures coated therewith.

It is well known that wooden structures are especially prone to severe damage and destruction by fire and to disintegration by moisture and weathering. A specific example of such structures are wooden utility poles located in the vast swampland area of the States bordering the Gulf of Mexico. These poles are often subjected to swamp grass fires, violent changes in weather and tidal action. The cost of replacement and repair is substantial and it is, therefore, essential that they be preserved by a low cost yet effective means.

I have discovered a superior asphaltic coating composition which, in addition to having outstanding fire resistant properties (upon curing), has the following desirable attributes:

(1) Low cost.
(2) Ready penetration of wood fibre.
(3) Strong adherence to wood surfaces even at moderately high temperatures.
(4) Moisture and weather resistance.
(5) Resistant to blistering and cracking.
(6) A consistency which allows application by painting or spraying at moderate atmospheric temperatures without substantial sagging of the resultant coating.

The composition of the invention includes a suitable asphalt base cut back with a volatilizable diluent such as a light hydrocarbon distillate. Specific examples of such a diluent are kerosene and naphtha. The composition also includes a combination of inorganic fillers consisting essentially of fine asbestos fibres, fine mica, fine vermiculite and a fine alkali metal tetraborate. Since vermiculite has the property of substantial expansion when heated, vermiculite which has been previously expanded by exposure to high temperatures is preferably used in my novel composition. The use of expanded vermiculite prevents the possibility of change in particle size of the vermiculite component when my novel coating material is subjected to extreme heat such as by exposure to fire. I include within the definition of the tetraborate ingredient the hydrous as well as the anhydrous forms thereof. Specific examples of the borates contemplated herein are sodium tetraborate, sodium tetraborate decahydrate and potassium tetraborate.

The novel filler combination imparts unexpectedly superior fire resistant properties to the asphalt cutback compared to other inorganic filler combinations. Demonstration of this fact is found in subsequent examples.

The novel composition is applied by trowel, brush or preferably sprayed on the wooden structure with a spray gun. A good thick coating is desirably applied such as ⅛ to ¼ inch in thickness. The coatings are self-curing in that in several weeks' time under atmospheric conditions the volatilizable diluent component will evaporate off. The wooden structures may be coated with a novel composition before or after being fixed in a permanent position. In addition, the wooden structures may be entirely coated or just those portions for which protection is desired. For example, in the case of utility poles in their permanent position, it is generally preferable to coat the pole from a point two to three feet below the earth surface to a point 8 to 10 feet above said surface. Such a coated area will normally extend above the optimum height of grass fire flames and below the penetration depth of the earth surface water.

The asphalt component of the protective composition consists of a good coating asphalt such as an asphalt prepared from a paraffinic-asphaltic crude petroleum residuum by steam, vacuum distillation and/or air blowing. Examples of suitable asphalts are ones having a softening point of about 100–180° F. ball and ring, a penetration at 77° F. under a 100 gram load of about 30 to 70 and a solubility in carbon tetrachloride of at least 99.5%.

The asphalt is heated to fluidity and mixed, preferably by stirring, with a volatilizable diluent to form the asphalt cutback. The proportion of the asphalt cutback in the total composition is preferably about 60 to 70%. The amount of asphalt and volatilizable diluent comprising the cutback will vary depending upon the consistency of the cutback desired. Preferably the proportions of asphalt and volatilizable diluent are adjusted to form an asphalt cutback having a viscosity of about 75 to 150 seconds, Saybolt Furol at 122° F. (75 to 150 SF/122° F.). Ordinarily the proportions of asphalt and diluent in the novel composition of this invention approximate 35 to 55% asphalt and 15 to 30% diluent.

The cutback is heated and mixed, preferably by stirring, with the fine inorganic filler combination consisting essentially of asbestos, mica, vermiculite and an alkali metal tetraborate. The total inorganic filler content should ordinarily be within the range of about 30 to 40% of the total composition. The individual components of the inorganic filler should generally be within the range of about 5 to 15% asbestos fibre, about 5 to 10% mica, about 5 to 15% vermiculite and about 2 to 8% of the borate. By the term "fine" I mean materials which will substantially all pass a No. 12 mesh U.S. standard screen.

As heretofore disclosed my novel composition, when applied to a wooden structure and allowed to naturally cure for several weeks' time, will lose its volatilizable diluent component through evaporation. Therefore, my preferred coating composition consisting essentially of about 30 to 55% asphalt, about 15 to 30% volatilizable diluent, about 5 to 15% asbestos fibre, about 5 to 10% mica, about 5 to 15% vermiculite, and about 2 to 8% alkali metal tetraborate and wherein the asphalt and diluent comprise about 60 to 70% of the composition, is converted upon curing to a composition consisting essentially of about 43 to 65% asphalt, about 6 to 21% asbestos fibre, about 6 to 14% mica, about 6 to 21% vermiculite and about 2 to 11% alkali metal tetraborate.

All of the compositions in the subsequent examples were prepared by sifting the particular pre-blended inorganic filler combinations into the asphalt cutback (asphalt+naphthenic distillate) heated to a temperature between 100 and 120° F. while stirring at 70 r.p.m. in a 2½ gallon motor driven dough mixer. After all the filler had been added to the cutback, stirring was continued for a period of 10 minutes. In the preparation of the composition described in subsequent Example IV, the aluminum pigment was dispersed in the cutback before the inorganic fillers were added.

Although the individual inorganic filler components in