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FIRE RETARDANT COMPOSITION COMPRISING GILSONITE, MINERAL FILLER AND FATTY ACID SOAP

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This invention relates to fire retarding compositions, and more particularly to compositions that are adapted to be applied in a diluted state to wood and similar combustibles, as by dipping or spraying, whereby to make the surfaces thereof flame resistant.

The fundamental purpose of a flame retardant is to control the rate of oxidation of a combustible material, and more specifically, to slow down the rate of oxidation.

An object of the present invention is to prepare novel fire retardant compositions. Another object is to prepare fire retardant compositions that can be readily applied in the liquid state to posts and poles such as telephone and telegraph poles.

A further object is to develop such fire retardant compositions which will resist melting temperatures on the hottest desert summer days and which will also resist serious burning for exceptionally long periods of time so that at most only slight charring of the surface will result.

Still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

According to the present invention these objects are attained by blending a particular gilsonite mined in the Uintah Basin of Utah and Colorado with a roughly equal proportion by weight of a finely divided mineral filler, e.g. 300 mesh talc, to form a homogeneous mixture.

When telephone and telegraph poles and their cross arms have been coated with the composition of the present invention and then subjected to fierce oil and gasoline fires for nearly one-half hour the composition has not been burned away and charring has resulted only to depths of approximately one-half inch. Railroad ties, roofs and the like also have been treated in similar manners by brushing or spraying to provide coatings which have been thoroughly effective as fire retardants. In all instances, when the flames or burning materials applied to the surfaces were withdrawn, incipient flaming of the coatings and the objects to which the coatings were applied became immediately extinguished even in winds.

Preferably there is also added a soap of an alkaline earth metal or an organic base and a higher fatty acid or hydroxy fatty acid, e.g. octoic acid, stearic acid, oleic acid, etc., or there are added materials which will form such a soap in situ during the blending procedure. The soap possesses among other characteristics the property of acting as a protective colloid whereby a permanent, fine dispersion of the inert fire retardant mineral filler in the gilsonite is assured. The soap is ordinarily present in the order of 5 to 10% of the gilsonite, or preferably 6 to 8

pounds of soap of soap-forming materials per 100 pounds of gilsonite. Figured on the basis of equal amounts of gilsonite and mineral filler, the proportion of soap is about half this percentage.

In order to prepare the gilsonite to receive the filler, such as talc, and to distribute the filler therein, it is necessary to melt the gilsonite and to thin it somewhat with appropriate solvents. A relatively large proportion of thinner is preferred in order to yield a consistency suitable for subsequent application. For this purpose, approximately 150 pounds of thinner are preferred per hundred pounds of gilsonite to obtain good dilution and workable products. This weight of thinner amounts to around twenty gallons. The bulk of this preferred solvent (about eighteen gallons) is a hydrocarbon, e.g. a light mineral solvent having a flash point around 250° F., and may be of types known as paint thinner, mineral spirits, cleaning solvent and the like. However, a portion of the thinner is required to be somewhat heavier bodied in order to produce good solvent effect on the gilsonite, and for this reason about one gallon of each six or seven gallons is preferably of the non-drying, mineral "pale" oil type having a flash point around 250° F. or somewhat higher. Such an oil possesses light lubricating viscosity and therefore may include oils of about S.A.E. 10 grade. Thus, the preferred solvent content is about 150% by weight of the gilsonite, or about 75% by weight of the gilsonite and mineral filler combined when the gilsonite and filler are employed in approximately equal proportions by weight.

The pale oil is a distillate from the residue of petroleum which has been treated with acid and soda and washed to a light degree of color and has the above indicated S.A.E. grade.

The particular gilsonites used usually have a melting point between about 270° and 300° F. which is considerably lower than that of the usual gilsonites such as elaterite and uintahite and the like which have relatively high melting points, e.g., 400–460° F. The preferred gilsonite has the following properties.

Melting point (B. & R. gly.)	270–275° F.
Penetration at 78° F.	Less than 1.
Color of streak of powder	Brown.
Lustre	Bright.
Fracture	Conchoidal.
Specific gravity at 77° F.	1.05–1.10.
Hardness (Mohs' scale)	2.
Loss at 325° F., 7 hours	Less than 2%.
Loss at 400° F., 7 hours	Less than 4%.
Character of residue 325° F.	Original.
Character of residue 400° F.	Original.
Solubility in carbon disulfide	99%.
Solubility in carbon tetrachloride	99%.
Fixed carbon	10–15%.

While this is the preferred gilsonite, there can be employed other gilsonites having the following properties.

Color mass	Black.
Fracture	Conchoidal.
Lustre	Bright to fairly bright.
Streak	Brown.
Specific gravity at 77° F.	1.03–1.10.
Hardness on Mohs' scale	2.
Hardness, needle penetrometer at 115° F.	3–8.
Hardness, needle penetrometer at 77° F.	0–3.
Hardness, needle penetrometer at 32° F.	0.
Hardness, consistometer at 115° F.	40–60.

Hardness, consistometer at 77° F.	90–120.
Hardness, consistometer at 32° F.	Too hard for test.
Susceptibility index	100.
Ductility at 77° F. (Abraham's method)	0.
Fusing-point (K. and S. method)	230°–350° F.
Fusing-point (R. and M. method)	270°–400° F.
Volatile at 325° F., 5 hrs. (dry substance)	Less than 2%.
Volatile at 400° F., 5 hrs.	Less than 4%.
Volatile at 500° F., 5 hrs.	Less than 5%.
Fixed carbon	10–20%.
Soluble in carbon disulfide	Greater than 98%.
Non-mineral matter insoluble	0–1%.
Mineral matter	Trace–1%.
Soluble in 88° petroleum naphtha	10–60%.
Carbon	85–86%.
Hydrogen	8.5–10%.
Sulfur	0.3–0.5%.
Nitrogen	2.2–2.8%.
Oxygen	0–2%.
Solid paraffins	0–trace.
Sulfonation-residue	85–95%.
Acid value	2.3.
Saponifiable value	5.6.
Saponifiable matter	Trace.
Asphaltenes	32.6%.
Diazo reaction	No.
Anthraquinone reaction	No.

The preferred gilsonite can be obtained under the name Gilsogum. As indicated it is substantially free of mineral content (less than 1%) and is also substantially free from moisture (less than 1%). This material contains about 55% of pure, solid bitumen and about 45% of heavy oils and somewhat lighter oils which oils appear to impart the lower melting point than normal gilsonites. It has been found desirable to incorporate pale oil or similar light oils in order to further reduce the melting point of the gilsonite component to about 200 to 225° F., preferably about 210–225° F.

The oils in the Gilsogum itself are not of the petroleum type but are somewhat oxygenated and can be termed gilsonitic oils for distinction. The preferred gilsonite material of the invention is therefore roughly one-half heavy bitumen and one-half gilsonitic oils.

In preparing the gilsonite composition of this invention, the described gilsonite material is heated to somewhat above its melting point, such as to 210° F. to 225° F. if blended with pale oil or even up to the melting point or about 460° F. of other gilsonites, but without loss or removal of any of the gummy or resinous constituents which sometimes tend to separate on melting, and without loss of other constituents.

As this gilsonite melts, additional pale oil, or its equivalent, is stirred in to thin the material and reduce its viscosity. The finely divided thinner is then stirred in, the temperature of the batch being kept up so that the mass will not solidify as the filler is introduced. The mass is agitated, as with a gear driven high speed pump operating at about 200 r.p.m. or such other speed as to disperse the filler thoroughly. The batch is then flowed off and cooled to a temperature such as 200° F. so that the required amount of low-boiling thinner, such as mineral spirits or "paint thinner," may be safely introduced to lower the viscosity further and to permit a higher rate of agitation, such as 250 to 350 r.p.m., to effect absolutely thorough dispersion of the filler, or "peptization" as it is sometimes called. If the product is to be shipped ready for use, all of the indicated proportion of thinner may be added, but if it is to be shipped in a relatively solid state, thereby requiring subsequent addition of thinner by the consumer, less thinner may be used, e.g., as only that amount required for complete dispersion, this may be light mineral solvent or other thinner

of 250° F. flash point which will evaporate more or less readily.

In order to assist complete dispersion and to assure retention of such state of complete dispersion during periods of shipping and storage, it is desirable to incorporate into the mix a protective colloid as above mentioned, which may be around 5% to 10% by weight of the gilsonite. A very desirable material for this purpose has been found to be morpholine oleate. This has been prepared by reacting oleic acid and morpholine in approximately stoichiometric proportions at suitable temperatures, but preferably with a slight excess of the acid, and adding the resultant soap to the materials undergoing admixture at any appropriate stage. A suitable and preferred stage is following addition and distribution of the pale oil. However, it can be added with the pale oil, or with some of the thinner, or even after introduction of all the filler. Another suitable soap is one of the ethanolamine amine oleates, such as monoethanolamine oleate or triethanolamine oleate; or similar organic base soaps of oleic acid or any of the other unsaturated saponifiable fatty acids preferably, such as ricinoleic acid or linoleic acid, can be used. Soaps of the saponifiable saturated fatty acids such as stearic acid or myristic acid for example are acceptable for some uses, but less desirable. Again, any of the alkaline earth metal soaps of any of these higher fatty acids may be used, such as the calcium or barium soaps, e.g. calcium oleate and barium stearate, all of which are oil-soluble, as are the organic base soaps of such acids, such as above indicated.

Since the temperatures of mixing of the filler with the gilsonite are in the order of 185° F. to 225° F. or higher and are appropriate for the formation of the indicated soaps, and since some free acid appears desirable for full dispersive effectiveness of the chosen soap, the soap-making constituents may be added prior to mixing the filler and gilsonite so that the saponifying reaction takes place in situ during dispersion of the filler. Thus, I have added about four and one-half pounds of oleic acid and three pounds of monoethanolamine to a batch containing one hundred pounds of the gilsonite while it is being heat treated; and similarly I have added about four pounds of oleic acid and two pounds of morpholine. Lime and oleic acid have been similarly introduced to obtain calcium oleate formation in situ.

A formaldehyde-urea resin may be similarly incorporated, to the extent of about ¼% to ½% to serve as a plasticizer for the gilsonite. For example, I have added reactive proportions of urea and formaldehyde to the heated mix undergoing treatment. Alternatively preformed dimethylolurea or urea-formaldehyde can be employed as well as melamine-formaldehyde.

A preferred filler has been indicated as fine talc of about 300 mesh or even finer. Other fine inert mineral fillers also impart fireproofing and flame retardant properties, such as fine clays, asbestos diatomaceous earth, ground silicious material, e.g. sand, ground asbestos if desired for a particular purpose, and the like, or mixtures of these.

The indicated gilsonite, for best results, should not contain other bitumens such as asphalt, or even other gilsonites, and if any amount of such is added it acts to reduce the quality of the product correspondingly due to a tendency to blister under flame or high heat especially in the case of asphalt. However, up to 50% of other gilsonite or up to 50% asphaltum can be used for some purposes if only mild fire resistance is required, but such uses are not recommended. It is possible to use entirely the other high melting gilsonites instead of the preferred low-melting gilsonite described herein cases where only very low fire-retarding properties are required. Even then, such procedures are not desirable as compared with the preferred gilsonitic material of this invention.

If higher fire retardancy is needed, there may be added

to the formulation one-half ounce per gallon of antimony oxide; and if insect or fungus retardants are required a small amount of sodium fluoride or copper 8-quinolinolate, approximating one pound per 100 gallons, may be introduced.

While the proportions above given are preferred and are critical within limits such as given in the following table, there are nevertheless small ranges of permissible variations as furnished below on the basis of one hundred pounds of the preferred low-melting gilsonite described herein:

	Preferred Composition, pounds	Range
Gilsonite	100	100 pounds.
Filler (talc)	100	50 to 125 pounds.
Oil-soluble soap	6 to 8	4 to 10 pounds.
Urea-formaldehyde resin	½	⅛ to 1 pound.
Pale Oil (250° F.)	20	15 to 25 pounds.
Low-boiling thinner (e.g. paint thinner).	130	25 to 200 pounds e.g. (quite variable according to desired shipping consistency).
Copper 8-quinolinolate, Antimony oxide.		

Example 1

100 pounds of a mixture of the preferred gilsonite (Gilsogum) blended with sufficient pale oil (250° F. flash point), to reduce the melting point of the Gilsogum from 270–275° F. to 210–225° F. is heated to its melting point (about 220° F.) and there is added 4.5 pounds of oleic acid and 3 pounds of monoethanolamine. The mass is agitated with the awl of a gear driven pump operating at about 200 r.p.m. and 100 pounds of 300 mesh talc is thoroughly dispersed into the mass. This mixture proved effective as a fire retardant composition.

Example 2

Example 1 was repeated but the final mixture was allowed to cool to 200° F. and 130 pounds of mineral spirits were added with agitation at a rate of 300 r.p.m. Addition of the mineral spirits lowered the viscosity and improved the workability of the mixture.

Example 3

To the final mixture of Example 2 there was added 0.5 pound of urea formaldehyde to obtain a satisfactory fire-retardant composition.

Example 4

20 pounds of pale oil (250° F. flash point) were added to the composition of Example 3.

Example 5

To 100 gallons of the composition of Example 4 there were added 50 ounces of antimony oxide in order to increase the fire retardancy.

Example 6

To the composition of Example 5 were added 1 pound of sodium fluoride as an insect retardant. In another example the sodium fluoride was replaced by 1 pound of copper 8-quinolate.

The essential ingredients are the low melting gilsonite, the mineral filler and the oil-soluble soap. While the proportions of soap normally will be within the range indicated, since less soap reduces the effectiveness of dispersion and more soap appears to have little additional value, still it is possible to vary this component outside the precise range set forth. Similarly, the resin will normally be within the range stated although it likewise can be varied.

The other additives can be employed for their known functions but can also be omitted if desired.

Other oil-soluble wetting agents or surface agents can be added, if desired.

As to the proportion of the preferred form of gilsonite with respect to the talc or other mentioned filler, when combined in approximately the proportions stated the composition sets up in use as a slightly yielding body acting somewhat like a cushion, which is a very desirable characteristic especially for the coating of telephone poles, bridge timbers and the like. If the proportion of fire-retardant mineral filler is greatly expanded such condition tends to be lost and the binding qualities of the gilsonite material are to a large extent lost. Reduction of the mineral filler appreciably below the lower limit indicated adversely affects the fire-resistant properties of the composition.

The above composition may also be employed for treating burlap, roofing felt and lumber and lumber products and when higher fire retardant is required, to penetrate them and make them more fire retardant, by emulsifying in it about 5 to 30% and preferably around 10% to 25% of the fireproofing solution now to be described. Approximately 1500 pounds of ammonium sulfate (such as the commercial grade) about 250 pounds of ammonium phosphate (such as good grade A), approximately 250 pounds of boric acid crystals (granular), and around 50 to 60 pounds of borax are dissolved in about 250 gallons of soft water, preferably with heat at a temperature preferably around 150° F. To the above water solution is added a solution of about ten to twelve pounds of ammonium aluminum sulfate (alum) in two gallons of aqua ammonia (14% ammonium hydroxide solution). There is also added to the above water solution a solution about ten to twelve pounds of copper sodium alginate in about six gallons of 14% aqua ammonia. Preferably, the water solution also receives around 14 ounces to a pint of benzaldehyde.

The resultant mixture of the above described solutions is then cooled somewhat, preferably to about 100° F. It should have a pH of 7.2 to 7.5, and if necessary soda ash is added to attain such pH. To such mixture of solutions, there is then added, preferably at 100° F. or up to 150° F. a copper naphthenate and urea-formaldehyde solution which is produced as follows: 30 pounds of urea are dissolved in about 8 to 8½ gallons of 37% formaldehyde solution (in water); and two gallons of 65% copper naphthenate (8% metal) in a petroleum vehicle (e.g., "benzine") are combined with the urea-formaldehyde solution. Or, ten gallons of commercial prepared urea-formaldehyde soluton may be used instead, making the urea-formaldehyde solution as described.

The final fire-proofing solution just described may be used as such to treat burlap, roofing felt and the like, in which case it is preferably diluted with about two parts of soft water (per one part of solution), which brings it to a specific gravity of about 1.200 at 60° F. Penetration may be improved by adding a conventional small amount such as 1% of any good wetting agent for such a purpose, such as that available on the market as "Victawet," e.g. Victawet 35B, which is an anionic wetting agent having the formula $Na_5R_5(P_3O_{10})_2$ wherein R is 2 ethylhexyl, or Victawet 58B, wherein R in the above formula is capryl. Other wetting agents such as sodium lauryl sulfate, aerosol OT, sodium dodecylbenzene sulfonate, etc., can also be employed.

Example 7

A final fire-proofing composition was made by emulsifying the composition of Example 4 with high speed agitation with 20% by weight of a fire-proofing solution made as follows:

1500 pounds of ammonium sulfate, 250 pounds of ammonium phosphate, 250 pounds of granular boric acid crystals, and 55 pounds of borax were dissolved in 250 gallons of water at 150° F. To this solution were added 11 pounds of ammonium aluminum sulfate in two

gallons of 14% aqueous ammonia. There were then added 11 pounds of copper sodium alginate in six gallons of 14% aqueous ammonia and 15 ounces of benzaldehyde.

The resultant mixture was cooled to 100° F. and had a pH of 7.3. This mixture was heated to 125° F. and there was added a dispersion made by dissolving 30 pounds of urea in 8.25 gallons of 37% aqueous formaldehyde and then adding two gallons of 65% copper naphthenate (8% metal) in benzine. The final fire-proofing composition can then be sprayed on roofing felt to fireproof the same.

Example 8

To improve the penetration of the roofing felt to the final composition of Example 7, there was added 1% of Victawet 35B.

Example 9

The fire-proofing solution of Example 7 was diluted with two parts of water per part of solution to bring the specific gravity to about 1.200 at 60% and 1% of Victawet 35B was added. This diluted fire-proofing solution was then sprayed on the roofing felt and allowed to dry. Then the roofing felt was sprayed with the final fire-proofing composition of Example 7. Alternatively, the final composition can be applied by dipping or brushing.

The fire-proofing solution of Example 7 is also usable in the indicated proportions for dispersion in conventional gilsonites, to which gilsonites, however, sufficient light oils or other thinners, have been added to make workable mixtures or dispersions.

A particularly preferred type of composition for controlling fires is shown in Example 10.

Example 10

In a tank heat 250 gallons of water to 150° F. Then add with stirring 1440 pounds of ammonium sulfate, 240 pounds of ammonium phosphate, 254 pounds of granular boric acid, 55 pounds borax, 12 pounds of copper sodium alginate previously dissolved in 6 gallons of 14% aqueous ammonia and 14 ounces of benzaldehyde. The pH of the composition is about 7.35 and the specific gravity is about 1.29. Then 30 pounds of urea is dissolved in 8.5 gallons of 37% aqueous formaldehyde and the solution added to the above composition to form Formulation A. The pH remained at 7.35. The pH should be between 7.20 and 7.50 at this point. If the pH is below 7, it should be adjusted to the proper value with soda ash.

It is well known that a blanket thrown around burning cloth will slow down the chemical reaction rate to the point of snuffing the fire out. The present invention utilizes the blanket principle and in fact provides a more efficient blanket in that the composition is prepared in such a manner that due to cross linking of chemical bonds it does not break apart during heating and since it is applied so as to penetrate the fibres of the combustible material before a fire occurs, the chemical reaction rate does not increase to the point where it will continue burning after the open flame is removed.

Casein glue when added to the chemical formulations of the instant invention has been found to bring about this chemical cross linking forming a fine interwoven structure upon drying if finely divided metallic copper is added during the compounding. The copper acts as a catalyst during the drying process after the formulation is applied to combustible material. The chemical blanket thus formed as a network pattern of cross linked or interlocking chemical bonds is not broken up by heating, even by a blow torch, but in effect, gently slides down leaving a layer of protective material tightly locked into the combustible areas.

In order to prepare 100 gallons of flame retardant covering (Formulation B), 20 ounces of Victawet 35B and 20 ounces of lecithin are dissolved in 10 ounces of perchlorethylene and added with stirring to 38 gallons of water in a tank kept at 150° F. Separately, there are dissolved 141 ounces of urea in 141 ounces of 14% aqueous formaldehyde and this mixture is added to the tank with stirring. Then 141 ounces of oleic acid is blended with 141 ounces of monoethanolamine, the temperature reduced to 100° F. and 800 ounces of Formulation A is added and the blended mixture is added to the tank with stirring. Next, 100 ounces of fine copper powder (300 mesh) is stirred into the tank and then one pound of sodium fluoride and 20 ounces of Antifoam B (Dow-Corning), an oil-in-water emulsion, the active ingredient of which is believed to be a polymeric methyl siloxane. Next, 800 ounces of antimony trioxide is stirred into the tanks. There is separately blended 200 pounds of the previously described preferred Utah gilsonite having a melting point of 270–275° F. with 360 ounces of high flash point naphtha (alternatively mineral spirits can be used as the thinner) and this blend added slowly to the tank with stirring. Next, 50 pounds of #1 vermiculite and 200 pounds of talc powder (#400 Fibrine, manufactured by Sierra Talc and Clay Co.) are thoroughly mixed and added to the tank. Finally, 100 ounces of casein glue is stirred into the tank and the temperature raised to 200° F. to form the final flame retardant covering (Formulation B).

Formulation B weighs 8.5 pounds per gallon and is a thicky, sticky, black mass. It can be painted on combustibles, e.g., wood telephone poles, by hand or by high pressure gun using the spray method.

Formulation A contains fire retardants and insect pesticides dispersed and adapted to be bonded to the combustible with the aid of copper sodium alginate in similar manner to my Patent No. 2,001,194. The perchloroethylene serves as a fire retardant and also aids as a disperser. The urea-formaldehyde acts as a plasticizer and fire retardant. It aids in forming a reaction rate reducing blanket. The sodium fluoride serves as a fire retardant and insect pesticide. The finely divided copper (usually 300 mesh) serves as an active catalyst in forming a cross linked chemical bonding in the final blanket. Casein normally acts as an emulsifying agent. Upon catalytic drying, however, with the aid of the copper cross linking occurs. The lecithin implements the action of the casein. The oleic acid and monoethanolamine form a good dispersing agent in situ and the Anti-Foam B is used merely to cut down foaming. The antimony trioxide acts as a flame retardant and insect pesticide.

The gilsonite is a difficult inflammable binder and glue and acts as a mechanical protectant of the material to be treated. It forms a hard, tough finished surface after drying and setting with the casein and copper. Generally for each 100 pounds of gilsonite there are 3 to 3.5 pounds of casein and 3 to 3.5 pounds of copper. The lecithin can be omitted or can be present in an amount of 0.6 to 0.7 pound. The dispersing or wetting agent and the mineral filler are used in the amounts previously set forth, namely 50 to 125 pounds of filler and 4 to 10 pounds of wetting agent per 100 pounds of gilsonite.

The vermiculite and Fibrine talc increase the flame retardant characteristics, act as fillers and heat repellants and insulators and are inert with respect to the other chemicals present. The water acts as a temporary vehicle while blending and dispersing the ingredients. It makes the final blend less firm and easier to use. It readily evaporates off after application to the combustible material and leaves a hard, tough set finish.

Example 11

The conventional pesticides, etc., can be omitted if desired as is shown by the following composition. To 38 gallons of water are added 20 ounces of Victawet 35B, 20 ounces of lecithin dissolved in 10 ounces of perchloroethylene, 100 ounces of finely divided copper, a blend

of 200 pounds of the above described preferred gilsonite melting at 270–300° F. and 360 ounces of mineral spirits, 50 pounds of #1 vermiculite and 200 pounds of talc (mistron T–076) and finally 100 ounces of casein glue.

Unless otherwise stated, all parts and percentages are by weight.

The preparation of a composition having improved fire-retardant properties as compared with that in Example 10 is illustrated in the following example.

Example 12

To prepare 100 gallons of flame-retardant, 22 ounces of Victawet-B and 22 ounces of lecithin are dissolved in 11 ounces of perchloroethylene and added with stirring to 38 gallons of water in a tank kept at 150° F. There are then added 155.1 ounces of urea and 155.1 ounces of formaldehyde with stirring. Then 155.1 ounces of oleic acid is blended with 155.1 ounces of monoethanolamine. The temperature is reduced to 100° F. and 880 ounces of Formulation A (of Example 10) are added and the blended mixture is added to the tank with stirring. Next, there is added 110 ounces of copper naphthenate and 110 ounces of powdered copper. This is followed by 17.6 ounces of sodium fluoride and 22 ounces of Antifoam B. There is then added 880 ounces of antimony trioxide.

There is separately blended 220 pounds of the preferred Utah gilsonite having a melting point of 270 to 275° F. and 24.75 pounds of naphtha and this blend is added slowly to the tank with stirring. This is followed by 55 pounds of #1 vermiculite and 220 pounds of talc powder (#400 Fibrine). Finally 110 ounces of casein glue is stirred into the tank to give a homogeneous mixture.

I claim:

1. A fire retardant composition including body-forming material comprising a gilsonite having a melting point between about 270 degrees F. and about 200 degrees F. containing a substantial proportion of heavy gilsonitic oils and a substantial proportion of mineral-free bitumen and about 50 to 125 parts of a finely divided inert fire retardant mineral filler per 100 parts of gilsonite distributed throughout the body-forming material in a state of uniform, fine dispersion; said composition also containing a very minor proportion of a fatty acid soap to maintain said state of fine dispersion.

2. A composition as in claim 1 wherein said soap is an amine soap.

3. A composition according to claim 1, wherein the soap is selected from the group consisting of morpholine and ethanolamine soaps of unsaturated fatty acids.

4. A composition as in claim 1 and a voltatile thinner facilitating preparation and application of said composition.

5. A composition as in claim 1 wherein said gilsonite and the inert filler are present in approximately equal proportions.

6. A composition as in claim 1 wherein the gilsonite melts in the neighborhood of 275 degrees F. and has a constitution of about one-half solid bitumen and about one-half gilsonitic oils, added oily materials being present in the composition to reduce viscosity for thorough dispersion of the filler.

7. A composition as in claim 1 including less than one percent of urea formaldehyde for the gilsonite.

8. The composition of claim 1 wherein a part of the gilsonite up to 50% is replaced by a member of the group consisting of gilsonite melting above about 400 degrees F. and asphaltum.

9. A fire retardant composition according to claim 1, including between about 15% to 25% of a light oil thinner based on the gilsonite.

10. A fire retardant composition as in claim 1 wherein said soap is an ethanolamine soap of a saponifiable unsaturated fatty acid.

11. A composition as in claim 1 wherein said soap is an alkaline earth metal soap.

12. A fire retardant composition including the composition of claim 1 and about 10% to 25% based thereon of a fire-proofing composition dispersed therein and containing: ammonium sulfate about 150 parts, about 25 parts each of ammonium phosphate and boric acid, about five parts borax, all dissolved in about 200 parts of water; about one part of alum, about one part of copper sodium alginate; about five parts of urea formaldehyde; and copper naphthenate amounting to about one part.

13. A fire retardant composition according to claim 1 including a minor amount of finely divided metallic copper and casein.

14. A composition according to claim 13 including lecithin.

15. A composition according to claim 13 including a wetting agent.

16. A fire-proofing composition containing essentially: about 75% to 90% of a mixture of a gilsonite having a melting point between about 270° F. and about 300° F. and light oil, said mixture having a melting point between about 200 degrees F. and about 225 degrees F. and being substantially free from mineral constituents, said gilsonite and light oil being admixed with about 50% of inert mineral filler based on said gilsonite; and about 10% to 25% of a fire-proofing dispersion containing essentially about 150 parts of ammonium sulfate, about 25 parts each of ammonium phosphate and boric acid, all dissolved in about 200 parts of water; about one part of alum; about one part of copper sodium alginate; about five parts of the reaction product of urea and formaldehyde; and about one part copper naphthenate, all the latter named parts being also dispersed in said water.

17. A composition as in claim 16 containing a minor proportion of one part of benzaldehyde.

18. A fire retardant composition consisting essentially of 100 parts of a gilsonite having a melting point between about 270 degrees F. and about 300 degrees F. containing a substantial proportion of heavy gilsonitic oils and a substantial proportion of mineral-free bitumen, 50 to 125 parts of inert fire retardant mineral filler, 4 to 10 parts of a fatty acid soap, ⅛ to 1 part of urea formaldehyde resin, 15 to 25 parts of non-drying mineral oil having a flash point not materially below 250 degrees F., and 25 to 200 parts of low boiling mineral thinner having a flash point around 280 degrees F.

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