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FIREPROOFING AND WEATHER-RESISTING PAINT.

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The present invention relates to fireproofing and weather resisting paint, designed not only to fireproof combustible substances such as wood, wood fibre, millboard, pasteboard, and strawboard, and other dense or porous or partially porous inflammable or combustible substances, but to resist the action of the elements—that is rain and sun, in their action of alternately wetting, washing and drying out and repeated wetting, washing and drying out, throughout the months and seasons of the year.

For a vehicle I may use a tung oil, or a linseed oil, either raw or boiled, or a mixture of tung oil and linseed oil, either raw or boiled, or their equivalent, adapted to oxidize into a waterproof adherent film, and with the addition of the customary turpentine and Japan dryer or their equivalents in solvent or dryer.

I grind into this oil or mixture of oils or their equivalent with the turpentine and Japan dryer or their equivalent, the several pigments necessary to secure good "hiding" power, and the chemical body or bodies adapted to prevent or delay the ignition of wood, or other combustible body over which the paint is spread.

I have found it highly desirable in the practical manufacture of such a fire and weather resisting paint to reduce the chemical substance or substances chosen to retard ignition, to the finest practicable state of subdivision. I find this exceedingly fine grinding of the fire retardant substances necessary in order that the protective film will not be punctured by minute crystal points which would in time dissolve away and leave minute pin hole openings through which water from repeated storms could enter and undermine the substance of the paint.

I am aware of the fact that many attempts have been made to produce a satisfactory rain and sun resisting and also a fire resisting paint and that expensive insoluble borates such as zinc borate and lead borate have been used together with other insoluble chemical compounds as well as with soluble chemical compounds such as ammonium phosphate, ammonium sulphate, boric acid, etc. These expensive insoluble borates as well as boric acid melt down readily to form a more or less efficient "glass" or glaze which surrounds and covers the fibres as well as the surface of the wood, thereby cutting off more or less efficiently the oxygen of the air necessary to support combustion after the kindling temperature has been attained as the result of impinging flames or other igniting influences.

Although paints fabricated from these expensive chemical substances may be what have been termed more or less efficient, they have been far from satisfactory as fire retardants.

In my fireproof paint the results in comparison have been astoundingly superior. In the fireproof paint of my present invention I find that the sparingly soluble and exceedingly cheap sodium biborate, or ordinary borax of commerce (very sparingly soluble at ordinary temperatures) grinds into the oil or compound vehicle as described together with such conventional pigments as white lead, zinc oxide, finely ground asbestine, barytes, etc., to form not only a paint of superior and exceedingly high fire resisting properties, but of exceedingly good rain and sun resisting qualities. But in practice I prefer to apply over such a priming coat or coats one or more coats of a superior weather resisting paint.

I have proven that the impalpable borax powder provided by the exceedingly fine state of subdivision, 100 mesh or finer, to which I have reduced my borax when worked into a "cream" and subsequently added to the tung oil or linseed oil vehicle with the conventional pigments, adds markedly to the difficulty of dissolving the borax out by water.

Borax when very finely ground in with a suitable oil or oils as described, not only resists washing out to a remarkable extent through the action of rain when used as a paint as above, but especially is this true when it is protected with a good weather proof paint, as above described. When a flame is impinged upon the surface of a combustible body protected by my paint containing a large percentage of borax, the latter

swells immediately and profusely causing the borax to produce a heat insulating barrier. Later, upon more intense heating, this barrier or coating gives up its water of crystallization to such an extent that it is exceedingly difficult to ignite the combustible body over which it is spread. Ultimately upon more prolonged intense heating the coating fuses down into a "glass" which impregnates the fibres of the combustible substance and gives fire resisting results infinitely superior to the expensive zinc borate or lead borate.

That is, the double action of borax in first swelling prolificly and thereby providing a heat insulating barrier on the one hand, and then in forming an oxygen isolating glaze on the other hand, produces remarkable fireproofing results. I have furthermore learned that the addition of some zinc borate or lead borate or a mixture of the two and also of some powdered glass assists in the malting down or fluxing of the borax mass after its swelling period is over and its water of crystallization is given up, although the mixture of these substances with borax is not absolutely necessary in the fabrication of a very efficient paint.

In order to insure prolonged resistance to the elements such as rain, sun, snow, drying out, wetting again, freezing, thawing, drying out again, etc., etc., I prefer to apply one or more coats of the fire resisting paint as above described and to give to this paint a protective coat of ordinary paint containing the conventional vehiles such as tung oil and linseed oil and the conventional pigments such as white lead, basic sulphate of lead, and zinc oxide ground in the vehicle oils with turpentine and suitable dryer. I also prefer to cover in some cases the fire retardant paint with a protecting paint consisting of an oil or oils such as tung oil or linseed or their equivalent and conventional pigments such as white lead and zinc oxide but in adding a certain percentage of varnish.

With this combination covering the surface to be protected, I secure efficient results, the under coat or coats containing the borax or sodium biborate sparingly soluble in water at ordinary weather temperatures, and the outer coat or coats consisting of a good and suitable water shedding paint.

Having described my invention and the principle thereof, I am giving here a typical formula with proportions which may be more or less varied for preparing one gallon of my borax paint:

5 pounds borax.
1 pound white lead.
1 pound zine oxide.
5 ounces asbestine.
3 ounces barytes.
1 ounce lead borate.
1 ounce zinc borate.
3 pints linseed oil (boiled).
1 pint treated tung oil.
¼ pint Japan dryer.
¾ pint varnish.

Although I have found in practice that a gallon of paint made upon the above proportions gives most efficient results, it is understood of course, that these proportions may be somewhat varied without departing from the spirit of my invention and without unduly impairing the efficiency of the product.

Having described my invention, I claim:

1. The herein described fire proofing and weather resisting paint composition, the same comprising borax, white lead, zinc oxide, asbestine, barytes, lead borate, zinc borate, and an oxidizing oil in substantially the proportions specified.

2. The herein described composition of matter including oxide of zinc, basic lead carbonate, borax, asbestine, barytes and borates of lead and zinc, all substantially in the proportions specified and mixed with a liquid vehicle containing linseed oil.

3. A fire resisting paint including in its composition, a plurality of pigments mixed in a vehicle including oil, said pigments including borax reduced to an impalpable powder and in quantity in excess of 40 per cent by weight of the total pigment content so as to form when applied in the form of a coating on surfaces of wooden articles an oxygen isolating glaze under exposure to heat.

4. A fire resisting paint including in its composition, a plurality of pigments mixed in a vehicle including oil, said pigments including borax reduced to an impalpable powder and in quantity sufficient to form when applied in the form of a coating on surfaces of wooden articles an oxygen isolating glaze under exposure to heat, said paint including also a flux-promoting agent so as to aid in the formation of the oxygen isolating glaze.

5. A fire resisting paint including in its composition, a plurality of pigments mixed in a vehicle including oil, said pigments including borax reduced to an impalpable powder and in quantity sufficient to form when applied in the form of a coating on surfaces of wooden articles, an oxygen isolating glaze under exposure to heat, said paint including also a borate as a flux-promoting agent for the borax.

6. A fire resisting paint including in its composition a plurality of pigments mixed in a vehicle including oil, said pigments including more than 50 per cent by weight of borax reduced to an impalpable powder.

7. A fire resisting paint including in its composition a plurality of pigments mixed in a vehicle including oil, said pigments including more than 50 per cent by weight of

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borax reduced to an impalpable powder, and less than 5 per cent by weight of a borate.

8. A fire resisting paint including in its composition a plurality of pigments mixed in a vehicle including oil, said pigments including more than 50 per cent by weight of borax reduced to an impalpable powder, and in excess of 10 per cent each by weight of basic lead carbonate and zinc oxide.

Signed at New York city, in the county of New York and State of New York this 30th day of June, A. D. 1922.

NEVIL MONROE HOPKINS.