106. COMPOSITIONS,
COATING OR PLASTIC.

18

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CHARLES RIDGELY ALLISON, OF PEEKSKILL, NEW YORK.

FIRE-RESISTING COMPOSITION.

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To all whom it may concern:

Be it known that I, CHARLES RIDGELY ALLISON, residing in Peekskill, New York, a United States citizen, have invented the following described Improvements in Fire-Resisting Compositions.

This invention is a new waterproofing and fire resisting composition adapted for impregnation into the material to be protected and to form a paint coat thereon. It involves the combination of a vehicle, which of itself may be readily inflammable, a component of material or materials non-inflammable or neutral in respect to flammability for giving body to the composition or to give it color, and an active fire resisting component which imparts fire resisting qualities to the entire composition and to whatever inflammable material it may be applied. The fireproofing effect is strong and permanent being unimpaired by contact with water or long exposure to the weather. The waterproofing effect is equivalent to that afforded by oil paints, stains or varnishes and besides providing these results, the new composition allows the use of larger percentages of oily vehicle, such as pitches, linseed oil, etc., thereby promoting the general durability of the coating or stain and facilitating its practical application to the woodwork or fabrics. The invention resides in the composition before being applied as well as after application to the surface of the inflammable body to be protected in which condition it is composed only of the solid residuum of the ingredients employed, more or less impregnating the said surface and also covering the same.

The vehicle may be any of those commonly used as vehicles in the manufacture of paint, such as linseed oil, soya bean oil, fish oil or tung oil, or pitch or any oil derived from pitch, petroleum, or pine tar, or an oil derived from stearine pitch or the equivalent thereof, or the combination of any two or more of such vehicles, the function of which is to bind together the particles of solid matter in the mixtures and fill up the pores of the protected surface and form a continuous film. This substantially non-volatile vehicle is generally used in conjunction with a drier such as manganese dioxide or litharge or their equivalents, and also with a thinner of greater or less thinning power such as turpentine, naphtha, kerosene, benzine, resin oil or the like, or a combination of any two or more of them.

The neutral body-giving and pigmentation component when used also consists of materials commonly used in paints such as zinc oxide, white lead, ochre, china clay, ground asbestos, magnesia, ground silicates and the like or combinations of them, which materials may or may not in themselves provide any substantial fireproofing effect when combined with an oily vehicle.

The amount of this component used in the composition is subject to variation depending on circumstances and the character of the work in hand and may be omitted in some cases. The fire resisting agent is oxychloride of zinc in any of its usual chemical forms and as I have discovered, is efficacious either as the commercially pure chemical or in the form of zinc-skimmings in either case introduced with water as below described. Zinc skimmings is the dross and surface refuse removed from baths of molten zinc used for galvanizing and is a well known commodity which I have determined may be used in various ways within this invention for imparting the fireproofing effect. I prefer to use it as follows.

I first thoroughly steam a quantity of it to make it pasty and finely grind it in water, and after grinding I let it remain in a shallow vessel for a period of say about 30 days stirring it in the meantime and adding more water to make up for evaporation, the resulting product being a paste about equivalent in consistency to white-coat plaster as mixed for use and containing a predominating proportion of oxychloride of zinc together with some iron, zinc oxide and earthy matter. Such paste is mixed with a paste previously made of the body-giving and pigmentation component and the vehicle. The mixture may then be finely ground in a burstone mill, after which more of the vehicle and a solution of chloride of ammonium in water are added together with an appropriate thinner and drier to give the desired working consistency. The chloride of ammonium is introduced in solution with water of a strength of from 10 to 60% by weight, and its addition to the mixture is

preferred because it is not only itself a fire resisting agent but its presence in the mixture has a marked effect in augmenting the fire resisting action of the zinc skimmings or the oxychloride of zinc. And it also involves a further introduction of water into mixture with the oxychloride, a considerable proportion being desirable. Grinding of all of ingredients to an impalpable condition, so far as possible, is also most desirable.

The manner of combining the foregoing ingredients and the relative amounts used may be varied to produce the novel effects stated. The preferred formula for a composition adapted to be painted with a brush on wood, is as follows:

Linseed oil—by weight, 29 per cent; white lead or zinc oxide, or equal parts of both, 23 per cent; ground zinc skimmings in water as above, or ground oxychloride of zinc, 23 per cent; chloride of ammonium 25% solution in water, 15 per cent; thinner —turpentine, etc., 10 per cent.

These ingredients are compounded in the following order. The pigments, white lead and/or zinc oxide are mixed with a little of the linseed oil to form a paste and, if necessary, ground together as customary in paint manufacture. The paste of ground zinc skimmings is introduced and mixed with the pigment and vehicle and then the remaining vehicle and chloride of ammonium solution are added with more or less thinner as desired and some drier. The mixed skimmings and pigment may be ground together though this is not necessary if the separate grindings have been thorough. When the ground oxychloride of zinc is used in place of the skimmings, it may conveniently be produced by mixing 1 part of zinc-chloride of the so-called "technical grade," with two parts of water and gradually stirring one part of commercial zinc oxide into the mixture, which results in a pasty mass of oxychloride of zinc ready for mixture with the pigment for further treatment the same as above described for the skimmings, the materials being always reduced by grinding to an impalpable or smooth consistency as above explained. The particular sequence of steps above described is found superior to any other. (The resulting composition contains about 17% oxychloride of zinc, depending upon the amount of thinner added, and as the paint coat dries, this percentage becomes still higher as the result of evaporation of the water and volatile part of the vehicle. It also contains chloride of ammonium.) Notwithstanding the presence of the linseed oil the combustibility of wood or fabric painted or treated with this composition is so reduced that it will not burn, that is to say, will not support or propagate flame, when subjected to flame temperatures, nor will it support combustion in the form of a glowing ember or coal. Instead of using linseed oil substantially the same effect may be obtained by using any of the other vehicles herein referred to, or by using any other desired body-giving material or inert mixture.

The said formula is modified when used for impregnating fabrics and staining shingles by diminishing the body-giving and pigmenting component to the point necessary for the desired appearance and increasing the quantity and fluidity of the liquid vehicle, following the methods and procedure commonly employed in the manufacture of paints and stains.

In both cases, the resulting impregnating liquid, a paint, varnish or stain, comprises a large percentage of oxychloride of zinc with some chloride of ammonium, which, by its association with the oxychloride, is rendered water-insoluble, and hence permanent under weather conditions. In its liquid form ready for application the liquid comprises upward of 5% oxychloride of zinc, and 10% is preferred. The liquid also contains a relatively large proportion of liquid vehicle, including volatile liquids,—water and thinner, which do not remain after the composition has been applied and dried so that a considerable quantity of oxychloride of zinc with the chloride of ammonium remains in and upon the wood or fabric producing with the other ingredients the permanent fireproofing and weather-proofing effect above referred to. In the dry form the oxychloride of zinc must be in excess of 8%. The oxychloride of zinc as such, in the composition, affords practically no pigmenting effect and where color effects are desired, corresponding ingredients must be added as above indicated. The ground zinc skimmings has the advantage of affording some pigmenting effect—a light gray—but even this ordinarily requires to be supplemented by special pigments when stronger color effects are required.

The combination is cheaply produced and applied, and in distinction from all prior formulæ for fire resisting compositions that I am aware of, is indefinitely permanent in its fireproofing function regardless of situation and circumstances, being aided thereto not only by the oily vehicle but by the fact that the principal fireproofing agent, to wit, the oxychloride, is itself non-soluble in water, and, by the fact that its process of manufacture and admixture with water causes it to penetrate the material to which the composition is applied, whether by brush, or by dipping. I believe myself to be the first to have discovered the fire resisting influence of the materials above indicated, and the first to have indicated the form and the means whereby they can be

106. COMPOSITIONS,
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18

Draftsman

most cheaply and practically compounded for the purposes stated and I therefore desire to claim my composition broadly and without limitation to details except as below specifically set forth in the claims.

I claim:

1. A weather-proofing and fire-resisting composition adapted for impregnating the material to be protected comprising oxychloride of zinc, water, chloride of ammonium, a body-giving component and an oily vehicle.

2. As a composition of matter, a weather-proofing and fire-resisting composition comprising upward of five per cent of oxychloride of zinc, upward of 25% of relatively non-volatile oily vehicle including a volatile thinner, the remainder being body and color-giving material.

3. A fire-resisting waterproofing composition comprising finely ground zinc-skimmings, water, a body-giving component and an oily vehicle.

4. A water-proofing, fire-resisting composition comprising zinc-skimmings ground in water and mixed with a suitable oily vehicle.

5. A water-proofing and fire-resisting composition comprising ground zinc-skimmings, chloride of ammonium, and a liquid vehicle including water.

6. A water-proofing and fire-resisting composition comprising oxychloride of zinc in water, chloride of ammonium, and an oily vehicle.

7. The method of making a fire-resisting weather-proofing composition which consists in mixing a paste of the pigmentation and body-giving components of the composition with a portion of the vehicle of the composition, making a thick liquid of a non-soluble fire-resisting agent ground in water, mixing said liquid with the said paste and thereafter adding the remainder of the vehicle and thinning the mixture to working consistency.

8. The method of making a fire-resisting water-proofing composition which consists in mixing a paste of finely ground zinc-skimmings in water, allowing the same to age for a number of days, and combining it with a vehicle.

9. The combination with an inflammable body of a fire-protecting composition impregnated into the surface thereof and comprising oxychloride of zinc in excess of 8%.

10. A fire-protecting composition adapted for impregnation into and the covering of the surface of the protected body comprising when applied oxychloride of zinc in excess of 8%, and the solid residuum of an oily liquid vehicle.

In testimony whereof, I have signed this specification.

CHARLES RIDGELY ALLISON.