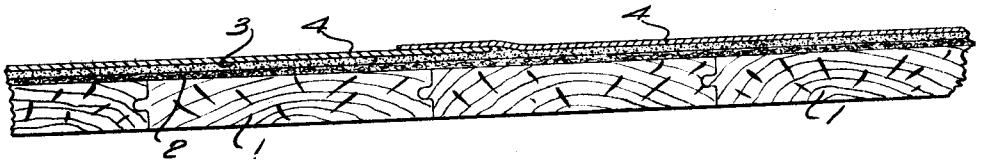
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H. R. WARDELL

ROOF

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# UNITED STATES PATENT OFFICE.

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## ROOF.

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My invention relates to roofs in general but is particularly designed to produce a structure which shall not only be waterproof, but shall also be impervious to fumes, vapors or gases which might disintegrate the waterproofing elements of the roof structure if allowed free access to them. While my invention has so far proven itself successful for the above mentioned purpose when applied to oil tanks, it is obviously capable of wider applications by changing the materials employed to produce the desired resistance to fumes or vapors other than those given off by bodies of liquid hydrocarbon.

The best form of construction at present known to me embodying one example of my invention is illustrated in the accompanying sheet of drawing which shows a cross section of a roof deck with my invention applied thereto, parts being broken away.

In the drawing, 1 represents a portion of the roof deck of a large tank for storing liquid hydrocarbon, such as crude oil, employed by pipe line and oil refining companies, which is made of boards, and 2 is a layer of any suitable flexible fabric, more or less absorbent, such as paper, superimposed on the boards 1. Over this paper is spread a film of silicate of soda 3, which may partly impregnate the paper beneath it, but mainly persists, after hardening, as a continuous film or layer superposed thereon. On top of the foundation so prepared is placed any desired commercial form of roofing 4, now on the market, having an asphaltum binder, either prepared roofing composed of asbestos felt, woolfelt, or the like, impregnated with asphaltum, or built-up roofing of like character.

When a roof structure of this type is applied to an oil tank the hydrocarbon vapors generated by the liquid contents of the tank are of considerable volume, especially during hot weather, and the same escape between the adjacent edges of the boards 1 and tend to attack the hydrocarbon content of any superimposed roofing if the same is not protected. This modifies the physical condition of the binder of the roofing 4 and eventually disintegrates the fabric, destroying its water proof qualities. As the roof structure ages, the boards 1, 1, dry out and contract, opening wider cracks and aggravating the trouble. The continuous gas proof film 3 of silicate of soda or equivalent material employed in my invention prevents any such access of the fumes, vapors or gases to the superimposed waterproof material 4, and prevents its disintegration from the causes indicated. The fabric 2 being continuous, supports and maintains the continuous film of silicate of soda 3 and prevents its cracking, as it would otherwise do if applied directly to boards 1, 1, of the roof deck.

Moreover, the fabric 2, being absorbent or bibulous, and only partly impregnated by the vapor-proof cementitious material associated with it, is capable of receiving, distributing in its body, retaining, and dispersing by evaporation, water-vapors which condense in or upon it. Water-vapor is not infrequently found in the gaseous or vaporous contents of an oil tank, and this, if permitted to exert localized action—as at seams or joints in the roof—is liable to have a disintegrating effect on a cementitious material which, though proof against oil-vapors and the like, is subject to deterioration by water. Thus, the absorbent layer 2, by arresting and distributing in its body any water-vapor that may intrude therein, protects the cementitious vapor-proof film and preserves it intact to perform its function of protecting the outer asphaltic weather proof covering from the vapors which would disintegrate that covering. Reciprocally, the asphaltic covering protects the vapor-proof film against attack by water coming from outside the tank.

Another advantage of the invention results from the fire proof character of the silicate of soda film 3 which would resist the further progress of any hot cinders from an adjacent conflagration which might melt holes in the superposed waterproof fabric 4.

It is evident that the particular method of carrying out the principle of the above described invention may be modified to suit varying conditions, thus if the waterproof element of the roof structure needs to be protected from acid fumes generated beneath it, a film of some other material more resistant to such acid fumes might be substituted for the silicate of soda film above mentioned.

The partial impregnation of the paper or other continuous fabric 2 by the silicate of soda 3, tends to increase the degree of protection as any cracks which might occur in the pure silicate of soda film from age or excessive dryness would be less likely to ex-


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tend into the saturated or impregnated zone of the paper, and the paper so impregnated would remain resistant to fumes after the solid silicate of soda film had cracked, and would also be slow burning. The paper supports the superposed film of fume resisting material and protects it from any disrupting effect of the expansion or contraction of the boards or other supporting element beneath it.

In the appended claims I shall use the word "fumes" as generically including also vapors and all gaseous products.

While but one layer or film of the fume-proof material, and one layer of supporting fabric, are shown in the drawing, it is to be understood, of course, that under severe conditions more than one each of these might be required.

Having described my invention, I claim:

1. In a roof adapted for use over fume-generating materials, the combination, with the roof-deck, of an upper layer of waterproof, bituminous, surfacing material susceptible to disintegration by one type of vapors normally present beneath the roof-deck, a layer proof against said type of fumes but susceptible to disintegration by water, said layer comprising a continuous sheet of absorbent fabric and a continuous film of fume-proof material associated with said fabric.

2. In a roof adapted for use over fume-generating materials, the combination, with the roof-deck, of an upper layer of waterproof bituminous surfacing material susceptible to disintegration by one type of vapors normally present beneath the roof deck, and a vapor-proof layer beneath said outer layer, comprising a continuous sheet of absorbent fabric and a continuous film of silicate of soda associated with said fabric.

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