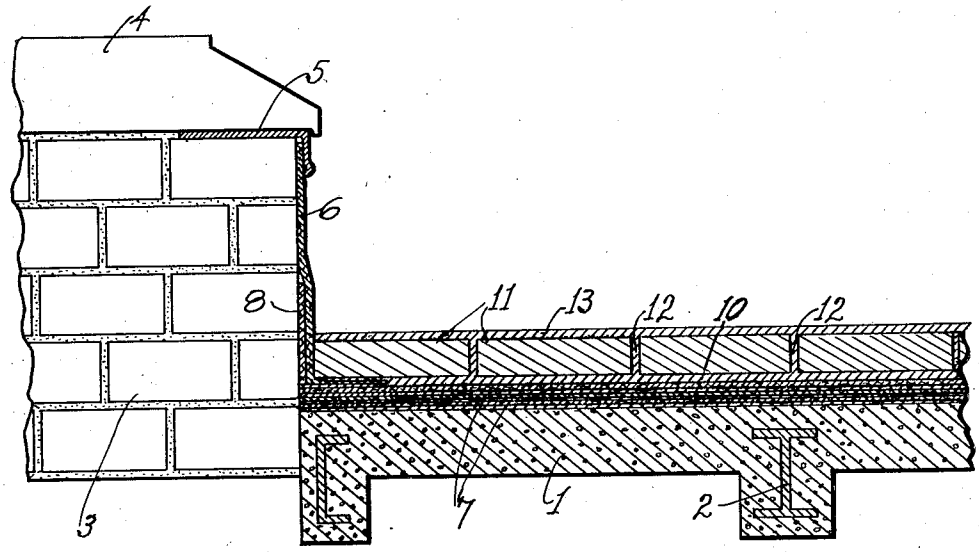
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FLAT ROOF

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FLAT ROOF

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This invention relates to a covering or protection for flat roofs, floors and the like. The covering is of such a nature that it protects the roof or floor. It possesses characteristics which enable it to resist being worn away by abrasion and also enables it to avoid becoming slippery even after it has been used for a considerable length of time. It is also resistant to alkalis and acids and does not become brittle or crack even with long use or an exposure to different atmospheric conditions.

The invention will be understood from the description in connection with the accompanying drawing which shows a vertical section partly broken away through a portion of a roof deck.

In the drawing reference character 1 indicates a flat roof deck that is illustrated as being made of concrete 1 reinforced with I-beams 2. A portion of a parapet wall 3 is shown along one edge with a coping block 4 at the top. Metal flashing 5 extends across the top of the wall 3 under the block 4 and projects outwardly a short distance along the inner side of the wall. This flashing 5 overlaps several superposed plies 6 of felt saturated with asphalt or coal tar for example, the lower edge of which is turned at right angles to lie along the roof deck.

A membrane which may be made up for example of plies 7 of tarred felt or the like extends along the upper surface of the roof deck 1 and the outer edges of same of the top plies are turned upwardly under the layers 6 as indicated at 8.

The parts thus far described are old and well known in the art, drains (not shown) being provided to carry off the water at the lowest points toward which the roof decks are made to slope gradually. With such roof decks the membrane 7 is relied upon to prevent leakage. Such membranes frequently wrinkle and leakage frequently occurs because the membrane becomes ruptured by being walked on or because of being struck by falling bodies. In order to prevent injury to membrane 7 in the prior art this membrane is frequently covered with stone surfacing or tile or the like. Therefore, in cases where it is desirable for occupants of a building to go upon the roof, the stone surfacing is disagreeable to walk upon and the tiles are in danger of being broken as they are brittle. Wooden lattice frames are sometimes used on the membrane 7 to protect the membrane but such lattice frames rot away after comparatively short periods of time.

By the present invention these objections are overcome and a roof that stays waterproof for long periods of time is provided, this roof also being adapted to be used in a manner similar to floors in a building. In carrying out the invention a layer 10 of bituminous material is applied to the topmost ply of the membrane 7 as a continuous coating thus protecting the waterproof layer and making it even more satisfactorily waterproof. As a bitumen suitable for this purpose, asphalt having a melting point from about 130° F. to 160° F. may be used.

At the top of the bitumen layer 10 blocks 11 are applied over the whole surface with their edges in proximity to each other or contacting with each other, these blocks being made of rectangular or other shapes. They are made by saturating porous fibrous blocks such as "Celotex", "Maftex", "Insulite", etc., with hot bituminous material.

Concerning the porous fibrous blocks above referred to, and in connection with which "Celotex", "Maftex", "Insulite", etc. are cited as examples, it is to be noted, that various fiber boards sold under such trade-marks are representative of that type of material ordinarily referred to and available as fiber insulating boards. These fiber insulating boards are made from a relatively coarse cellulose containing fiber stock, the fiber of which may be derived from cotton, sugar cane bagasse, licorice root, corn stalks and other cellulose containing fiber growth. The relatively coarse fibers are suspended in a large proportion of water and the boards are formed therefrom by processes generally resembling those employed in producing paper products, that is, by a process comprising essentially the filtering out of such fibers from such fluid stock, such filtering accomplished by deposit of the fibers on a screen through which the suspending fluid passes leaving the fibers on the screen as a filtered out mass. It is characteristic of the filtering process utilized in producing these fiber insulated boards, that the fibers are laid down on the screen essentially as a plurality of superimposed layers each of which is substantially coextensive with the filtering area, but each of which is additionally, to a substantially degree, interlaced with each adjacent layer of the composite sheet deposited. It will be seen that in accordance with the foregoing description that materials having the general characteristics of fiber insulating board are not a heterogeneous felted mass, but that instead, such materials are composed of a plurality of fibrous layers with each layer knit or felted into each adjacent layer, which structure is quite different from that of a truly felted substance. A very satisfactory bitumen for the purpose of saturating

the described fibrous blocks is an asphalt which will soften at about 90° F. to 170° F. sufficiently to penetrate the porous blocks. The volatile content of this saturate should be less than about two percent in ten hours of heating at 200° F. and an amount ranging from about 1.8 to 2.5 times the weight of the fibres has been found to be satisfactory for this purpose. The thickness of the blocks may vary considerably. Thicknesses about two or three times that of the membrane 7 that is to say, of a thickness of from ¼" to ½", have been found to serve the purpose very satisfactorily or much thicker blocks may be used, and blocks 20" by 30" have been found to be convenient and desirable for this purpose although other sizes may be used.

It is to be understood that the fiber blocks described are, as generally available, of relatively low density, that is to say, of a density of around 0.26 or within the range of densities of between the densities of from 0.24 to 0.28. Such fiber blocks are of a quite porous or open structure having a high degree of internal porosity due to the great number of interconnected and intersecting channels or pores and voids therein formed in the fibrous structure, between the individual fibers thereof and at points of intersection and bridging within the fibrous structure.

Saturation of the fibrous blocks as hereinbefore described, to the extent stated, is by no means a complete saturation of the fibrous blocks, that is to say, roughly stated such fibrous blocks so saturated carry only about one half of the amount of the saturant which they can be made to absorb so that they are by no means completely saturated. The fibrous blocks when saturated to the extent indicated constitute a two phase system wherein the fibers comprise a primary outer continuous phase in the form of an interconnecting continuous open and porous matrix carrying within but not filling the such porous and open matrix, a secondary inner phase in the form of a skeletonal cushioning filler of the bituminous saturant.

The saturated fibrous blocks due to the interior structure thereof as above detailed are not hard and unyielding, since, as described, there still remain within the body thereof numerous open pores or channels and voids only partly filled with the saturant and it therefore results that upon the application of a compressive force upon a surface of such saturated blocks that there is a give or resiliency in the block due to the fact that the fibrous block is not completely saturated whereby upon the application of such compressive force upon a surface the material gives and compacts or condenses as distinguished from flowing laterally which would occur were it not possible for the material to condense upon itself.

The blocks 11 are preferably applied while the bitumen or asphalt layer 10 is still hot so that when the blocks are pressed in place some of the bitumen will be squeezed between the joints as indicated at 12 or hot or soft bitumen may be poured into these joints after the blocks have been applied.

After the blocks 11 have been applied as described, the tops or exposed surfaces of these blocks may be painted or covered with coats 13 of butuminous material or colored asphaltic paints and a final coat of aluminum paint if desired.

The blocks 11 not only protect the waterproof membrane of the roof deck but they also provide a safe and pleasant surface for flat roofs or floors that can be walked on without wearing away rapidly or becoming slippery. Also, the blocks 11 do not become chipped when they are struck and do not crack when high pressure is applied to them but on the contrary blows and pressure serve to make the same more compact or dense.

I claim:

1. A substantially flat deck having a continuous waterproofing covering thereon, a resilient wear-resistant protective covering overlaying said continuous water-proofing covering and comprising a plurality of units of felted fiberboard, the units of felted fiberboard having within the interstitial structure thereof and extending throughout a secondary continuous skeletonal structure of bituminous material, the bituminous material partially but not completely filling the interstitial voids of the felted fiberboard, the such units having edges in proximity each with the other and comprising a continuous protective layer overlaying the continuous water-proofing covering, the said protective covering constituting a wear-resistant and resilient layer overlaying the water-proofing covering.

2. A wear-resisting and resilient surfacing construction comprising a base having adhered thereon a continuous covering comprising a plurality of units of felted fiberboard, the felted fiberboard having interior interstices therein, interiorly and throughout the body thereof a secondary structure comprising a continuous skeletonal structure of bituminous material partially but not completely filling the interior interstices of the felted fiberboard, the units of the assemblage in substantially edge to edge contact, the joints between adjacent units sealed with a bituminous filler and the surface of the assemblage having thereon a continuous coating of a facing material having a bituminous base.

3. A substantially flat decking having a continuous water-proofing covering thereon, a protective covering overlaying said continuous water-proofing covering and comprising a plurality of individual units of felted fiberboard, each carrying a bituminous saturant to the extent of approximately 1.8 to 2.5 times the weight of the felted fiberboard, such saturant penetrating throughout the felted fiberboard but not in sufficient quantity for the complete saturation thereof, the bituminous saturant having a melting point of between 90 and 170° F. the units containing the bituminous saturant applied to the surface of the water-proofing covering in substantially edge to edge contact adhered thereto with a bituminous adhesive and providing over such continuous water-proofing a surface conforming resilient and flexible continuous and wear-resistant protective covering.

4. A substantially flat deck having a continuous water-proofing coating thereon, a resilient protective covering overlaying said coating and comprising a plurality of units of felted fiberboard having within the skeletonal structure thereof a secondary skeletonal structure of bituminous material, the said second skeletonal structure of bituminous material extending throughout the interior structure of the felted fiberboard in a quantity insufficient to completely fill the internal voids thereof, the upper surfaces of the units in the same plane and thereby affording a planar surface for said overlaying protective covering, the units applied slightly spaced one from another, the spaces between adjacent edges filled with a mastic and the entire surface of the said

construction having applied thereover a continuous surfacing coating having a bituminous base.

5. A continuous resilient and wear-resisting surfacing covering comprising a plurality of selectively processed units of material, the processed units of a thickness between ¼" and ½" and comprising as the base thereof felted fiber insulation board having a porous internal structure, a secondary structure extending substantially uniformly throughout the porous internal structure of the fiberboard to partially but not completely fill the porous internal structure, the secondary structure comprising a bituminous substance substantially uniformly distributed throughout the porous internal structure of the fiberboard to the extent of between 1.8 to 2.5 times the weight of the fiber, the secondary structure having the physical properties with respect to resilience and softening substantially those of asphalt having a melting point of between 90 and 170° F., the such units adhered to the supporting surface applied adjacent one to another but slightly spaced and with the faces thereof in substantially planar relation, the spaces between adjacent units filled with a bituminous filler whereby said processed units so applied and having the internal porosity incompletely filled with the secondary internal structure extending throughout forms a continuous resilient protective covering without tendency to delaminate.

6. A substantially flat deck having a resilient wear-resisting protective covering overlaying said deck and comprising a plurality of units of felted fiber board, the units of felted fiber board having within the interstitial structure thereof and extending throughout a secondary continuous skeletonal structure of bituminous material, the bituminous material partly but not completely filling the interstitial voids of the felted fiber board, the such units having edges in proximity each with the other and comprising a continuous protective layer overlaying the deck, the said protective covering constituting a wear-resistant and resilient layer overlaying the said deck.

7. A substantially flat deck, a resilient protective covering overlaying the deck and comprising a plurality of units of felted fiber board having within the skeletonal structure thereof a secondary skeletonal structure of bituminous material, the said second skeletonal structure of bituminous material extending throughout the interior structure of the felted fiber board in a quantity insufficient to completely fill the internal voids thereof, the upper surfaces of the units in the same plane and thereby affording a planar surface for said overlaying protective covering.

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