

UNITED STATES PATENT OFFICE

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BITUMEN ROAD COMPOSITION AND METHOD OF FORMING THE SAME

No Drawing.

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This invention relates to road construction, and more particularly to the type of roads employing a bitumen-coated aggregate of stone.

gives very good results without the use of asphalt in the solvent.

As a concrete example of my liquefier composition, I may prepare a mixture of one litre of kerosene, one litre of a coal tar solvent of moderate volatility, such as drip oil, and one-half litre of crude oleic acid or red oil. I then take two kilograms of asphalt or so-called "flux oil" of high penetration, say 100-140 and after melting it add thereto two and one-half litres of the foregoing mixture of kerosene, drip oil and oleic acid. When the mixture is completed, the final liquefier is a bituminous liquefier which remains quite fluid at normal temperatures and is of a dark brown or blackish color.

In treating the limestone with this liquefier, I add it to the stone in proportions of about two gallons of the liquefier, more or less, depending upon the character of the stone, to about 1900 pounds of graded stone. If the limestone is moderately hard, less liquefier is required to coat it. In some exceptional cases, slightly more than two gallons of the liquefier may be required. When the liquefier is added, the stone preferably is at a temperature of between 65° to 90° F.

After the stone is fully wetted with this liquefier melted asphalt is added. For a top course, I prefer to use about 90 to 95 pounds of asphalt in addition to that in the liquefier to 1900 pounds of stone, and for a bottom course or layer 65 to 85 pounds of asphalt may be used, depending somewhat upon the size of the aggregate. This asphalt or bituminous mixture is added preferably at a temperature of approximately 220° F., and is fully incorporated with the stone that has previously been treated and wetted by the liquefier. Following the addition of and incorporation of the asphalt, hydrated lime is added in amount of approximately 6 to 10 pounds, and after its thorough admixture, the batch is ready for use.

In addition to the beneficial effect of the pretreatment of the aggregate, as described, in facilitating the proper coating of the stone, I consider the presence in the final mixture of the calcium oleate or other alka-

5 Considerable difficulty has been experienced in coating certain kinds of limestone, particularly soft limestone such as of the Niagara formation occurring in the Great Lakes district of North America, so that the bitumen coating will adhere strongly to the stone. Using the ordinary materials and methods, it has been found that the adherence of the bitumen to the stone is unsatisfactory and comparatively easily displaced, particularly in cool and damp weather.

15 The principal object of this invention is to provide novel means for obtaining a durable bond between the above-mentioned class of stone and the bitumen binder with which the stone is mixed in forming the road composition.

20 I have discovered that by first preparing the surfaces of the stone by treating the latter with a specially prepared bitumen solvent or liquefier including oleic acid or other oil-soluble fatty acid capable of combining with hydrated lime to form a soap practically insoluble in water and soluble in or easily wetted by oils and asphalt, and by thereafter adding the bitumen and a predetermined quantity of lime to react with the aforesaid fatty acid, the asphalt coating is made to adhere to the surface of the stone strongly and firmly and the tendency of the bitumen coating to be displaced is practically eliminated.

35 Although various liquefier materials may be used in preparing the stone surfaces for reception of the asphalt, I prefer to employ a mixture of relatively soft asphalt, having for example a penetration of from 100-140, with kerosene or similar light oil, preferably also including a coal tar solvent of moderate volatility, such as drip oil. I have found, however, that the use of a fatty acid, such as oleic, in a diluent such as kerosene, naphtha, or a compound solvent containing both of these substances or other organic liquids in which bitumens are more or less soluble,

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line earth salt of a fatty acid to have a substantial water-proofing effect.

I claim:

1. The method of forming bitumen road compositions, which comprises taking a stone aggregate, coating the aggregate with a bituminous liquefier containing an oil soluble fatty acid capable of combining with hydrated lime to form a soap which is water-insoluble, and thereafter adding a normally solid bitumen binder in a heated liquid state and lime.

2. The method of forming road compositions, which consists in taking a stone aggregate, treating said aggregate with a bituminous liquefier containing soft asphalt of relatively high penetration and an oil-soluble fatty acid capable of combining with hydrated lime to form a water-insoluble soap, and thereafter incorporating a normally solid bitumen binder in heated liquid condition and lime.

3. The method of forming a road composition, which consists in taking a stone aggregate, treating the surfaces of the stone with a bituminous liquefier containing soft asphalt of relatively high penetration, kerosene and an oil-soluble fatty acid capable of combining with hydrated lime to form a water-insoluble soap, the fatty acid content being more than ten per cent of the bituminous liquefier and thereafter incorporating a normally solid bitumen binder in heated liquid state and lime.

4. The method of forming a road composition, which consists in taking a stone aggregate, treating the surfaces of the stone with kerosene and an oil-soluble fatty acid capable of combining with hydrated lime to form a water-insoluble soap the quantity of fatty acid being substantially one-half that of the kerosene, and thereafter incorporating a normally solid bitumen binder in heated liquid state and lime.

5. The method of forming a road composition, which consists in taking a stone aggregate, treating the surfaces of said stone with a bituminous liquefier containing a soft asphalt of high penetration, kerosene, drip oil and an oil-soluble organic acid capable of combining with hydrated lime to form a soap which is insoluble in water, and thereafter incorporating a normally solid bitumen binder in heated liquid condition and lime.

6. The method of forming a road composition, which consists in taking a stone aggregate, treating the surfaces of said stone with a bituminous liquefier containing more than ten per cent of oleic acid, and thereafter incorporating a bitumen binder and lime.

7. The method of forming a road composition, which consists in taking a stone aggregate, treating the surfaces of said stone with a bituminous liquefier containing a fatty

acid, and a slowly volatile solvent of bitumen, and thereafter incorporating a bitumen binder and lime.

8. As a new composition of matter for use in the preparation of bituminous road compositions, a bitumen liquefier, a substantial portion of which is slowly volatile and oleic acid.

9. As a new composition of matter for use in the preparation of bitumen road compositions, a bituminous liquefier a substantial portion of which is slowly volatile containing upwards of ten per cent of a fatty acid.

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