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METHOD OF TREATING ROAD SURFACES

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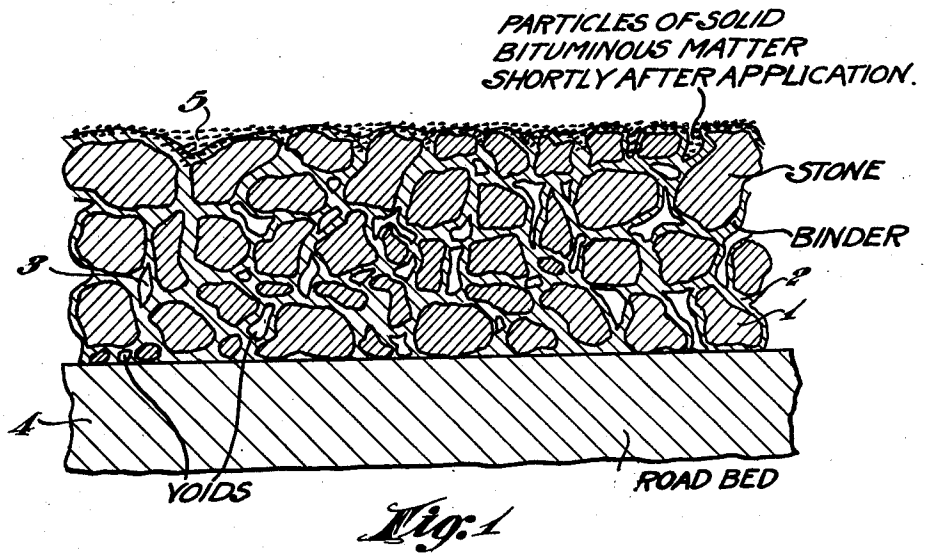



Fig. 1

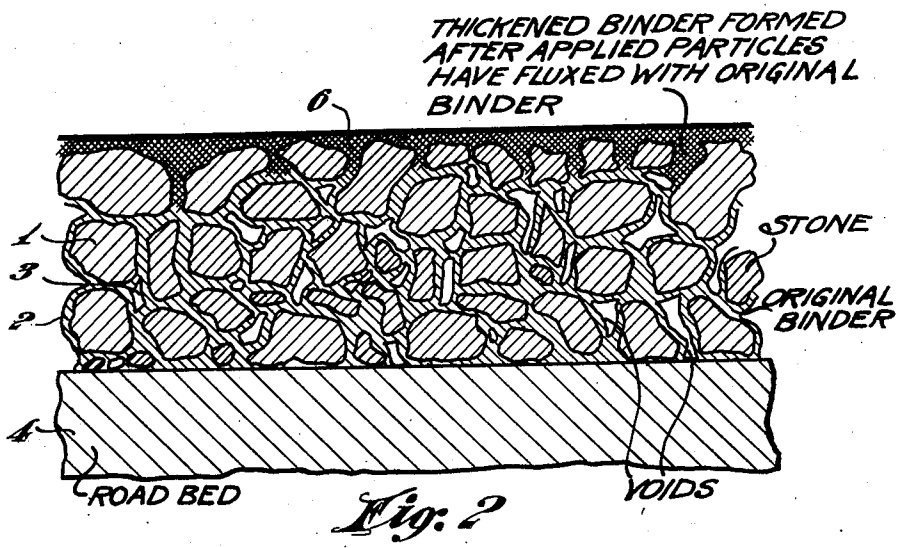



Fig. 2

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## METHOD OF TREATING ROAD SURFACES

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7 Claims. (Cl. 94—23)

This invention relates to a method of treating road surfaces, particularly of the types which are laid cold and are known as bituminous macadam or bituminous concrete roads.

An object of the present invention is to provide a method whereby an improved road surface may be secured and it may be rendered impervious to air and moisture.

A further object is to provide a method whereby a previously laid bituminous macadam or bituminous concrete road may be treated to improve the bituminous binder in the road mixture.

It is customary to construct roads with a premixed material composed of the desired grade of mineral aggregate and a bituminous binder. Ordinarily the binder would have a float test at 32° C. of 100 to 300 seconds (A. S. T. M. method D139–27). The premixed material is placed upon the road and rolled to produce a relatively smooth surface. To render the surface less pervious to air and moisture, it has been the practice to apply thereto a sealing coat of hot tar or asphalt after the premixed material has "set up."

The present process comprises spreading on the surface of a road prepared from material containing mineral aggregate and a bituminous binder, particles of a bituminous substance which is adapted to coalesce with the binder. The mixture of mineral aggregate, such as crushed stone, and bituminous binder, such as tar or asphalt, are put in place in the usual manner and then rolled. A powdered or granular bituminous material is then preferably immediately distributed over the surface of the road. The powdered bituminous material may be mixed with a filler, if desired.

Any of the well known bituminous materials which may be readily ground into a powder or into granular form may be used, as, for example, pitches from coal tars or oil tars, Trinidad, Bermudez, Cuban or petroleum asphalts and even bituminous substances, such as those mentioned, containing dispersions of coal. In other words, any bituminous material which is hard enough to be ground to produce particles of from 8 to 20 mesh down to an impalpable powder may be used. Materials are used having a cube-in-air melting point of 115–160° C. when tested in the apparatus described in Fischer Scientific Co.'s (Pittsburgh, Pa.) Catalogue under the number 1-665 and in J. Ind. Eng. Chem. 10 817, (1918).

The best results are obtained by the use of a bituminous material having a low temperature susceptibility in the range of temperatures encountered in nature and which when spread on the road surface, will coalesce with the binder and thereby increase the viscosity and melting point thereof.

Examples of filler which may be used with the powdered bituminous material are rock dusts, stone screenings, hydrated lime, sand, celite and lampblack. These fillers may be mixed with the bituminous powders in any desired proportions, as, for instance, equal parts of each.

The amount of powdered bituminous materials distributed on the surface of a road depends upon the texture thereof and the more porous the surface, the greater the quantity required to seal it. Ordinarily 2 to 6 pounds of powdered bituminous material per square yard of road surface may be used. The particles may be brushed into the surface or after they have been uniformly distributed they may be rolled.

In the accompanying drawing, Figures 1 and 2 are sectional views of a pavement shown in two different stages.

In both figures a layer of a mixture of aggregate 1 and binder 2 with voids 3 is shown on a road bed 4.

In Fig. 1, particles of pitch 5 are shown distributed over the surface of the layer in such a manner that at least the pits and crevices formed by the spaces between the pieces of stone are filled. Of course the pitch may be applied to form a layer of any desired depth.

By treating a road surface in the manner described above, the hard pulverized bituminous material, upon coming in contact with a soft binder 2 already present in the road surface mixture, fluxes with the soft binder as shown at 6 and increases the hardness thereof. In the drawing, the distances between the stones are somewhat exaggerated to more clearly indicate the change which takes place.

Besides obtaining a moisture and air impervious layer, the road surface is made tougher and more resistant to deformation. A quicker "set up" of the road surface is brought about than by the natural agencies of evaporation, oxidation and polymerization.

I claim as my invention:

1. A method of preparing a road surface which comprises forming a surface layer containing bituminous binder material of relatively low stability and then spreading on the said surface layer solid particles consisting of solid material substantially entirely bituminous, adapted to coalesce substantially entirely with, and to increase the stability of, said surface layer in its upper

portion by mixing with the said binder material in said portion of said layer.

2. A method of preparing a road surface which comprises spreading on a road bed a road material comprising bituminous material of relatively low stability to form a layer and then spreading on the surface of the said layer solid particles consisting of solid material substantially entirely bituminous, of relatively high viscosity and adapted to coalesce with the bituminous material of said layer by mixing therewith in the upper portion of the said layer to thereby materially increase its stability in such upper portion.

3. A method of preparing a road surface which comprises providing a layer of road material consisting at least in part of relatively soft binder which material is of relatively low stability, and spreading on the said layer of road material comminuted pitch of relatively high viscosity and melting point and which is adapted to coalesce and mix with said binder in the upper part of the said layer to thereby produce a combined bituminous mixture the viscosity and the melting point of which are materially higher than those of said binder, the said mixture forming a seal for said road surface.

4. A method of treating a surface of a road constructed of materials including a layer of mineral aggregate and a bituminous binder, which method comprises distributing on the surface of the said layer solid particles consisting of solid material substantially entirely bituminous and having a melting point of 115° C. to 160° C., and subjecting the said layer to pressure and a distributing action to bring about coalescence of the said solid particles with the said binder in the upper stratum of the said layer and to thereby form a seal for the surface of said layer.

5. A method of preparing a road surface which comprises mixing aggregate and a bituminous binder of relatively low viscosity, spreading the mixture, and subsequently distributing on the surface of the spread mixture finely divided hard bitumen and finely divided filler.

6. A method of preparing a road surface which comprises mixing aggregate and a bituminous binder of relatively low viscosity, spreading the mixture, and subsequently distributing on the surface of the spread mixture finely divided hard bitumen and finely divided filler in substantially equal parts by weight per square yard of road surface.

7. A method of preparing a road surface, which comprises mixing aggregate and a bituminous binder of relatively low viscosity, spreading the mixture, and subsequently distributing on the surface of the spread mixture hard bitumen particles.

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