United States Patent

[11] 3,615,804

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[54] **BITUMINOUS PAVING MIX**
2 Claims, No Drawings

[52] **U.S. Cl.** **106/281,** 94/20, 94/23, 106/282
[51] **Int. Cl.** **C08h 13/00,** C08h 17/10, C08h 17/16
[50] **Field of Search** 106/273–284; 94/20, 23; 260/28, 28.5, 745

[56] **References Cited**

UNITED STATES PATENTS

2,841,060	7/1959	Coppage	106/277 X
2,884,841	5/1959	Dickinson	106/281 X
3,206,174	9/1965	Young	106/281 UX
3,287,146	11/1966	Rogers et al.	106/281
3,457,090	7/1969	Sor et al.	106/281

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ABSTRACT: A street-covering mix comprising crushed gravel, sand, bituminous binding agents, and a filler with a plurality of components; the proportions of gravel, sand and bituminous binders comprise the greater amount, as used in fluid asphalt and asphalt beton, the proportion of filler being decreased; at least one component of the filler being selected to increase the structural viscosity of the mastic formed from the filler and bituminous binding agent.

BITUMINOUS PAVING MIX

BACKGROUND OF THE INVENTION

Description of the Prior Art

For the purpose of paving, the prior art normally uses asphalt-concrete or poured asphalt. These two street-covering methods differ in their compositions principally by the amount of the mastic used, the mastic being a mixture of the filler and bitumen. For the relatively inexpensive method of producing asphalt beton paving by spreading and rolling, approximately half as much mastic will be used as in the production of a molten fluid asphalt, which is twice as expensive. Because of its high constituency of mastic, fluid asphalt has a higher tensile strength and cohesiveness, is nevertheless less stable and resistant to flow, and therefore not as rigid. By the definition "-filler" material is meant a material which has a granular size of less than 0.09 mm.

SUMMARY OF THE INVENTION

The present invention has as its object the production of a street covering or paving of a great strength, which on one hand is as tough and has as much impact strength as fluid asphalt, and on the other hand is as hard and inexpensive to produce as asphalt beton.

In an attempt to achieve this object, one could employ only half as much mastic in the production of fluid asphalt, so that the fragmented gravel and sandy grains of the mineral foundation touch each other directly, as is the case with asphalt concrete. This kind of procedure, however, cannot be permitted since this method would involve a decrease in the proportion of bituminous binding agents, which would lead to a higher rate of the mortar-type corrosion and would lead to the washing out of the sand. For the reduction of the amount of mastic by retention of a sufficient proportion of bitumen, the filler amount is being decreased according to the invention and the resultant undesired fluidity of the mastic is being compensated for by the use of a filler with a plurality of components, of which at least one has the property of increasing the structural viscosity of the mastic, i.e. such viscosity, which is identified in consideration of the fact that the mastic is not of Newtonian fluid.

It has been established that the tensile strength of the street covering obtained is that much greater the better the mastic fills the existing hollow spaces between the mineral framework of gravel and/or sand, and the smaller the remaining space is. With the filler of the present invention, one can increase the filling of the pores and even approach the value of nil of the hollow spaces whereby the properties of fluid asphalt are approximated, although the mass remains grainy as in asphalt-concrete. Thus, a street covering is obtained that combines the viscosity of fluid asphalt with the hardness of asphalt beton.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood from the following specification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The inventors discovered that when the ratios of crushed gravel, sand and bituminous-type binders, conventionally employed in the production of molten asphalt and of asphalt beton are maintained, a decrease of the conventionally employed amount of filler, a substitution of at least one component of the filler with a clay, treated with a wetting agent and finally the inclusion in the filler as a component, an organic compound with chain-forming molecules of the caoutchouc or synthetic polymer types, each step or means independently or in the combinations stated will improve the desirable properties of the coverings.

By such means particularly the structural viscosity of the mastic is increased. The ratio of filler to the covering is defined as between 6 to 20 percent, advantageously 10 to 15 percent and preferably about 12 percent.

The wetting agent is to be selected among organic wetting agents for the treatment of the clay admix.

As a component which aids the structural viscosity of the mastic preferably a fibrous structure is to be employed, preferably of the mineral fiber types.

The inventors discovered that a proportion of from 6 to 20 percent filler, particularly between 10 to 15 percent and preferably 12 percent, is desirable.

To increase the structural viscosity of the mastic, a preferable illustrative example of the foregoing invention employs in the filler components of organic clays treated with wetting agents.

It has also been proven favorable to employ a component selected among fibrous structures such being particularly suitable because the matting of the individual fibers brings about an especially good stiffening of the mastic. In particular, mineral fibrous materials such as asbestos, glass fiber and basalt wool have shown to be suitable.

Generally, in accordance with the invention, the following mixture for street covering employing mineral fibrous materials is preferably used.

about 2.5%	Mineral fibrous material
about 5.0%	Limestone or slate powder
about 3.9%	Fine sand (0.09 mm. to 0.2 mm.)
about 0.023%	Wetting agents
about 7.5%	Bitumen
about 46.0%	Crushed gravel—size about 2 to 8 mm.
about 35.0%	Sand—size about 0.09 mm. to 2 mm.

In accordance with the invention, for the production of an especially elastic covering, as for example, the surface of tennis courts, preferably a filler component for increasing the structural viscosity of the mastic is selected from organic compounds with chain-form molecules; for example, caoutchouc or synthetic polymers.

The following mixture employing caoutchouc was discovered to be particularly suitable for a street covering:

about 0.4%	caoutchouc particles
about 7.1%	limestone or slate powder
about 3.9%	fine sand (0.09 mm. to 0.2 mm.)
about 0.023%	wetting agents
about 7.5%	Bitumen
about 46.0%	crushed gravel—size about 2 to 8 mm.
about 35.0%	sand—size about 0.09 mm. to 2 mm.

Various modifications are contemplated and may be obviously resorted to by those skilled in the art without departing from the spirit and scope of the invention, as hereinafter defined by the appended claims, as only preferred embodiments thereof have been disclosed.

We claim:

1. A street covering mix comprising crushed gravel, sand, bituminous binding agents and a filler with a plurality of components, the proportion of the filler being below 20 percent by weight of the total mix; at least one component of the filler being selected to increase the structural viscosity of the mastic formed from the filler and bituminous binding agent, aid mix comprising:

about 2.5%	mineral fiber material
about 5.0%	limestone or slate powder
about 3.9%	fine sand 0.09 mm. to 0.2 mm.
about 0.023%	wetting agents
about 7.5%	Bitumen
about 46.0%	crushed gravel—size about 2 to 8 mm.
about 35.0%	sand—size about 0.09 mm. to 2 mm.

2. A street covering such as for a tennis court comprising

about 0.4%	caoutchouc particles
about 7.1%	limestone or slate powder
about 3.9%	fine sand 0.09 mm. to 0.2 mm.
about 0.023%	wetting agents
about 7.5%	Bitumen
about 46.0%	crushed gravel—size about 2 to 8 mm.
about 35.0%	sand—size about 0.09 mm. to 2 mm.

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,615,804 Dated October 26, 1971

Inventor(s) Hans Peter Defregger, et. al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the cover sheet [73] "Walter de Couet Strabenbau and Tiefbau" should read -- Walter de Couet Strassenbau and Tiefbau -- .

Signed and sealed this 19th day of December 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

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