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PAVEMENT AND METHOD OF MAKING THE SAME

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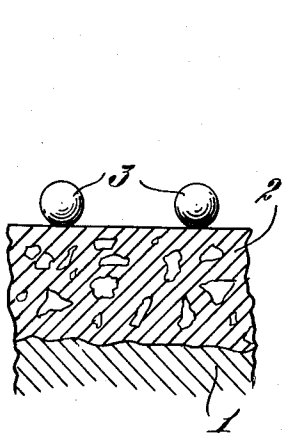

Fig. 1

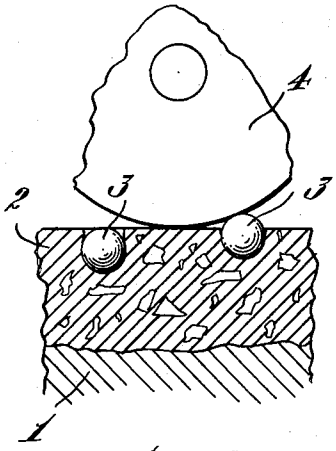

Fig. 2

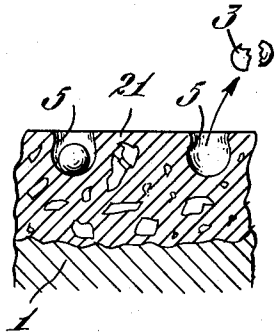

Fig. 3

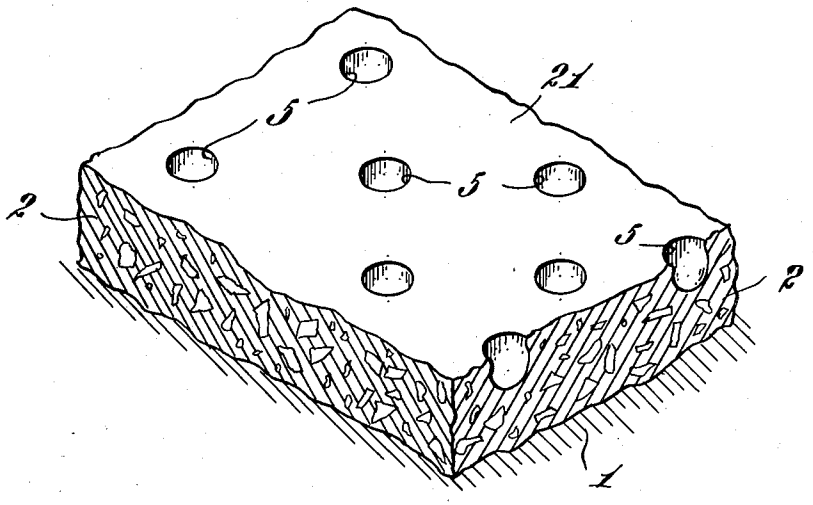

Fig. 4

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PAVEMENT AND METHOD OF MAKING THE SAME

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5 Claims. (Cl. 94—5)

This invention relates to bituminous pavements and particularly to a road surface which reduces the tendency of rubber-tired vehicles to skid at high speeds or under adverse weather conditions when the road surface becomes moist.

High grade pavements, such as bituminous or asphaltic pavements characterized by ease of laying, durability and compactness of composition tend to be smooth and somewhat slippery when wet. Therefore, bituminous pavements have frequently been laid where highest quality has been sacrificed in order to provide an open-textured surface which is more skid resistant than the optimum mixture from a structural and long-lived point of view.

Accordingly the object of the present invention is to make possible the laying of the highest quality, densest and smooth surfaced pavement with an improved anti-skid structure which is simple and economical to form.

Broadly according to the invention an anti-skid pavement is made by the method which comprises distributing small pellets of relatively rigid, disintegratable material on the surface of pliable paving material before it has been thoroughly consolidated and thereafter pressing the pellets into the pavement so as to form a plurality of pockets in the surface thereof.

While a mixture of Portland cement and aggregate remains sufficiently pliable while setting to receive the aforesaid pellets, preferably the paving mixture is composed of a bituminous or asphaltic binder and an aggregate of fine gravel or the like in a malleable state. The pellets may be large grains or chunks of a natural material such as salt crystals, but it is advantageous to produce synthetic pellets preferably spherical and comprising a filler and a binder, one or both of which is soluble or disintegrable under natural weathering or traffic conditions. Preferably the pellets and hence the pockets are spaced from each other so as to provide a supporting surface between the pellets or pockets.

Further, according to the invention, a pavement is produced which comprises a solid pavement in which the aforesaid pellets are superficially embedded in pockets opening on the surface of the layer with the pellets exposed so that they may be dislodged from the pockets after partial disintegration thereby to form a pocketed, anti-skid surface on the pavement. The aforesaid pavement may be considered completely laid when the pellets are embedded, since no further operation is needed to remove the pellets other than the natural action of weather and traffic.

For the purpose of illustration, a typical embodiment of the invention is shown in the accompanying drawing in which—

Figs. 1 to 3 are sectional elevations of a pavement showing the steps in making the same; and

Fig. 4 is an isometric view of a section of the completed pavement.

The pavement is laid on a base 1 such as an old road surface or a layer of coarse crushed rock or gravel or

Portland cement concrete or the like. On the base 1 a layer 2 of paving mixture is spread in the usual manner. This paving mixture composed of mineral aggregate and binder may be mixed after deposition on the road but preferably the mixture is produced in an asphalt mixing plant. The layer 2 is rolled to smooth and compact it. Rolling continues until the layer is dense due to compaction and hard due to cooling down to normal temperature in the case of hot mixed bituminous pavement or hard due to evaporation of constituents in the case of cold mixed bituminous pavements. This compaction and rolling period extends over several hours.

According to the present invention, before the layer 2 is fully compacted and solidified relatively hard pellets are distributed at an average spacing of two inches, more or less, over the layer preferably by mechanical spreaders which distribute the pellets in a predetermined geometric pattern or by broadcasting which achieves a fairly uniform distribution of the pellets over the layer. If the asphalt layer is not somewhat compacted during spreading it may be given a preliminary rolling while the layer 2 is still pliable and partially but not fully compacted. The pellets are pressed by a roller 4 into the surface of the layer 2 so that they are superficially embedded in the layer in pockets formed by the pellets, which pockets open on the smooth surface of the layer 2. Thereafter the layer 2 is fully compacted. The layer is then exposed to weathering and traffic conditions which disintegrate the pellets by dissolution and crumbling, by slow reduction in size or by fracturing, until the pellets are dislodged from the pockets by vehicle tires or other ordinary conditions on the road. Thereafter the pavement appears as in Fig. 4 wherein the compacted layer 2 has a plurality of pockets 5 distributed over its surface 21. A pavement so provided with uniformly distributed pockets of one-quarter to one inch in diameter has been shown to have surprising anti-skid properties possibly due to the creation of suction by a rubber tire passing over the pockets or to a mechanical interlocking of the tire in the pocket or a combination of both.

The surface 21 may be the highest grade smooth surface. One example of high grade pavement is asphaltic plant mix prepared as follows:

Liquid asphalt and heated aggregate of sand, gravel or the like are intimately mixed together until the liquid asphalt has coated each particle of mineral aggregate so as to produce a black colored mixture which is granular in texture and at a temperature of about 300°. While hot this mixture is malleable and of a consistency which will crawl. The mixture is transported hot from the mixing plant to the road under construction and spread in a layer of one to three inches. Such a mixture is preferable because the uniform mixing of asphalt and aggregate produces a layer which is easy to smooth and which is uniformly strong throughout and which retains its resiliency and strength for many years and is virtually impervious to weathering as by penetration of water followed by freezing.

Although various natural pellets such as water soluble salt crystals or pellets made of such soluble material as calcium chloride may be used, artificial, fabricated pellets in controlled sizes of approximately one-quarter inch to one inch are preferred. One artificial pellet found to be particularly suitable comprises the solid ash waste or residue of materials used in the manufacture of acetylene or similar gas. This calcium ash, composed largely of calcium hydroxide, is mixed with a resin cement such as casein in proportion of 1 part of cement to four parts of ash by volume, and molded in spherical form. A pellet so formed is hard relative to the pliable pavement layer. The pellets are disintegrable under the action of weathering on the road including the solvent

action of rain, freezing, the heat of the sun and the impact of traffic on the road.

After the relatively short period in which the pellets are disintegrated and removed, the pockets will retain their anti-skid function for substantially the normal life of the pavement. As previously explained the anti-skid structure does not interfere with the selection of the pavement mixture, and any type of mixture, including types which normally might be slippery may be used.

It should be understood that the foregoing description is for the purpose of illustration only and that the invention includes all modifications and equivalents within the scope of the disclosure. For example a cold asphaltic mixture of aggregate and binder may be used instead of hot asphaltic.

We claim:

1. The method of making a pavement which comprises spreading a top layer of a plastic mixture of aggregate and binder, distributing in spaced relation small pellets of relatively rigid, readily weather-disintegrable material on said layer while said layer is still plastic, and pressing the pellets into said layer so as to form a plurality of pockets therein with the pellets exposed, whereby to leave said pockets when said pellets are disintegrated, thereby to form a pocketed, anti-skid surface on said layer.

2. The method of making a pavement which comprises spreading a top layer of a plastic mixture of aggregate and bituminous binder, partially compacting the layer, distributing in spaced relation small pellets of relatively rigid, readily traffic- and weather-disintegrable material on said layer, and pressing the pellets into said layer so as to form a plurality of pockets therein with the pellets exposed, whereby to leave said pockets when said pellets are disintegrated, thereby to form a pocketed, anti-skid surface on said layer.

3. A pavement comprising a solid layer of a mixture of aggregate and binder, and a plurality of spaced pellets readily disintegrable by weather or traffic and superficially embedded in said layer to form unconnected pockets opening at the surface of said layer.

4. A pavement comprising a solid layer of a mixture of aggregate and binder, and a plurality of spaced pellets superficially embedded in said layer to form unconnected pockets opening at the surface of said layer, said pellets comprising generally spherical bodies of calcium ash bonded with a resinous cement.

5. A pavement comprising a solid layer of a mixture of aggregate and binder, and a plurality of spaced pellets readily disintegrable by weather or traffic and superficially embedded in said layer to form unconnected pockets opening at the surface of said layer, said pellets being spaced in a predetermined pattern over said layer, whereby to leave a pattern of said pockets when said pellets are disintegrated.

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