

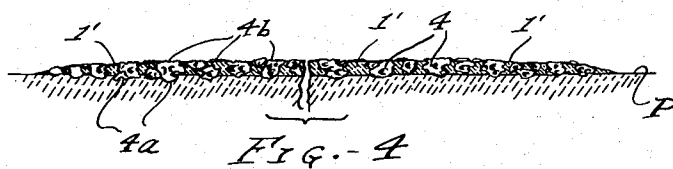
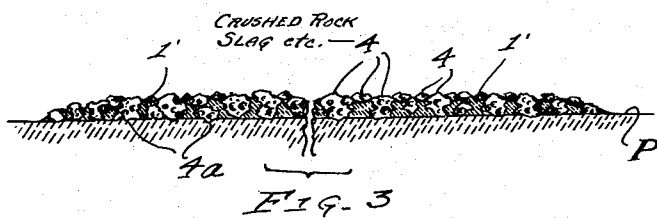
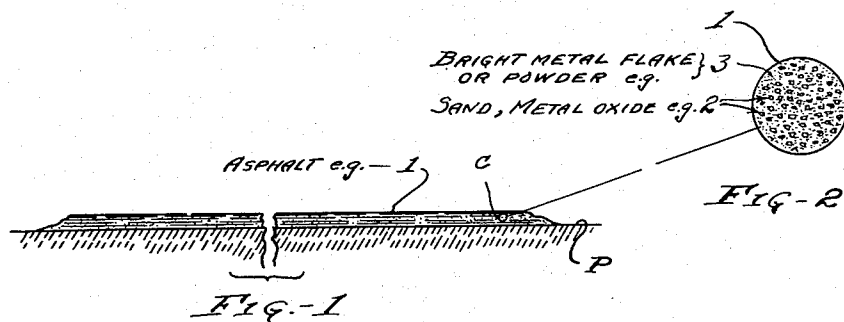
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PAVEMENT MARKING

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PAVEMENT MARKING

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10 Claims. (Cl. 94—1.5)

Pavement marking has heretofore customarily been provided by painted lines or by metallic inserts. Paint has the serious defects that it is apt to be tracked off before thoroughly dry, and after it is dried is not only easily discolored but wears off quickly, and maintenance costs from frequent replacement are excessive. Inserts of metal, etc., are objectionably costly, and are prone to work loose under traffic; generally also they are of poor visibility when viewed from an angle, and if raised above the surface give an undesirable washboard effect when driven over. A system of marking which is easily applied, and of reasonable cost while being more akin to paving material in durability, is accordingly a fundamental desideratum in the art and of considerable practical importance.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In the accompanying drawing, Fig. 1 is a diagrammatic sectional view showing the first step in one exemplary method of applying the pavement marker to the pavement in accordance herewith; Fig. 2 is a microscopically enlarged view showing the appearance of a small section of the material applied in Fig. 1 as indicated by the small circle C on Fig. 1; Fig. 3 is a diagrammatic sectional view similar to Fig. 1 showing the second step of the method (application of crushed rock e. g.), and Fig. 4 is a similar diagrammatic sectional view showing the appearance of the completed marker after considerable use.

In accordance with the invention, a binder 1 (Figs. 1 and 2), preferably of bituminous character, as asphalt, natural or artificial, pitch, etc., is admixed with bodying material 2 (the larger granules Fig. 2) and light-color material 3 (the small dots Fig. 2), and the resultant mass is applied on the surface of the pavement P in marker-line form as desired.

As bodying material 2, where employing an asphalt binder for instance, I may incorporate sand or light colored metal oxides and equivalent metallic salts; white lead powder e. g., or generally both. In case of adding sand e. g. this, I believe, acts to retain the light color material both by thickening the binder material after

the same is rendered fluent, thereby reducing the tendency of the light color material to float or precipitate as the case may be, and by attracting the particles of light color material to itself, holding the same against floating or precipitating. A convenient and cheap oxide is lead oxide, litharge being usually preferred to the higher oxide, by reason of its lighter color effect. The litharge has, I believe, an affinity for the preferred contrasting color material (aluminum flake or powder) and also has sufficient weight to remain in suspension in the binder during fluidity of the latter, whereby the coloring material remains uniformly distributed throughout the subsequently solidified marking medium. The litharge also toughens the marking medium in order to better resist wear, and improves the color contrast with the pavement. The amount of oxide may vary somewhat depending upon the particular bituminous base, and in the case of such higher lead oxide may be employed in the amount of about 5-25 per cent, and for litharge preferably 10-20 per cent. The sand or the like is advisably a light-color sand, such for instance as a white silica sand, and some sharpness of grain is advantageous. The sand may be in amounts of 10-25 per cent, generally 10-15 per cent. Crushed rock of light color may be used, and such aggregate is desirable in addition to the sand in most instances.

For the light-color component 3 I prefer aluminum powder or flake, although in some cases I may employ other light reflecting material such as titanium oxide, magnesium oxide, zinc oxide, lithopone, etc., or mixtures. If a yellowish color is desired, ochre, chromium oxide, and the like may be substituted in whole or in part. The aluminum powder may be in amounts of 10-40 per cent, preferably 20-25 per cent, and the titanium oxide or other pigment may be in amounts of 10-25 per cent.

The bituminous binder is rendered fluent by melting or by means of a solvent-thinner such as a naphtha or the like, and the other materials are mixed in, final consistency being such as to be capable of being spread in lines without difficulty, on the same general plan of application as practiced in the case of a rather thick paint application. For instance, where thinning the bituminous base by a hydrocarbon solvent, a petroleum naphtha or gasoline may be used in the amount of 40-75 per cent.

After laying out the desired marker-lines along the pavement, for instance applying the

marker material by means of a line-marker-hopper device, as customarily employed heretofore with paint, it is advantageous to immediately sprinkle on a cover of crushed rock 4 or the like, this immediately settling upon the yet tacky surface and serving for an immediate protection thereof to prevent spalling of the line and prevent tracking while the mass attains its set, particles permanently adhering being also an additional element in the wear-action. Such crushed mineral for this application may be any convenient light-colored rock, as limestone or slag, etc., in granules of sufficient size to extend above the strip of bituminous material while embedded therein to the full depth of the strip, and having sufficient crushing strength to withstand normal passage of traffic thereover. The size of the particles may advantageously range from $\frac{3}{4}$ inch mesh down, say $\frac{1}{4}$ – $\frac{3}{4}$ inch, and preferably about $\frac{3}{8}$ inch mesh. If the particles furthermore, are of irregular grade within such range, (see Fig. 3) a more advantageous bedding in may be had. The surface may be finally rolled or packed.

As an example: A petroleum asphalt of melting point 180° F. and penetration 20 at 77° F. is thinned with 50 per cent of petroleum naphtha having a B. P. range of 110 – 440° F., about 10 per cent of litharge is stirred in, and then about 20 per cent of aluminum powder flake, about 10 per cent of silica sand, and about 5 per cent of light-colored crushed rock. The mass is of a consistency which is then applied in marker-line form by drawing a hopper-applicator along over the pavement in the desired form, whether traffic-lane lines, turn-directions, "Stop" signs, or whatnot. A cover of crushed slag of $\frac{1}{8}$ – $\frac{1}{2}$ inch mesh range is then desirably spread on the surface, and is rolled, and traffic may be resumed, since lines so formed set quickly (solidified asphalt etc. indicated at 1' Figs. 3 and 4), without danger of smearing or displacement, and such slight raise as is involved, is practically imperceptible in its effect on tire-traffic. From the standpoint of visibility however, the lines stand out in contrast to the pavement-ground, and with wear, the light-reflecting ingredient tends to even increase the effectiveness.

It will be seen that by applying lithic granular material such as above described to the marker-line coating, drying of the coating is accelerated both by reason of the fact that the dry granules readily absorb a portion of the volatile component of the coating and further, in the case of crushed slag or other rough or cellular granules, the marker-line coating material becomes exposed to the air (principally the air trapped in the cavities and pockets on the lithic material by the coating material). The lithic granules being of such size as to come to rest on the pavement surface underlying the coating while protruding from the upper surface of the coating are laterally supported and interlocked with the coating whereby the granules will not become displaced by the resumption of traffic over the finished marker-line even while still soft. In the event the pavement surface is impressionable (as in the case of asphalt or macadam) the lithic granules applied on top of the marker-line composition and embedded therein as described also interlock to some extent with the underlying pavement body as shown at 4a Figs. 3 and 4 and are further prevented from displacement by traffic over the line. Further the crushed slag or other light colored lithic material used for

the applied granular coating enhances the contrast between the marker-line and the pavement surface. The protruding portions of the applied granules finally wear down as shown at 4b Fig. 4 or become so nearly fully embedded that the upper surfaces of the granules are nearly in the plane of the intermediate binder-color etc. composition, but, as a matter of practice, the binder-color etc. composition, being more yielding, is always below the plane of the top surfaces of the granules, assuming, of course, that the granules are relatively hard. The result of this is that the marker-line remains rough affording a non-skid surface, and reflects light from almost any angle in contrast with the pavement even though the pavement surface including the marker-line is wet. Thus, during wet weather and at night, when the glare of approaching vehicles obliterates to a large extent the actual color contrast between the marker-line and pavement surface the line is still visible to aid in the direction of traffic due to the difference in reflecting qualities of the relatively rough surface of the marker-line and the relatively smooth pavement surface.

It will thus be seen that a marker-system may be had which offers the advantages of being so similar in composition, to the pavement surface, as to wear substantially like the pavement itself, and the light-reflecting component continues to function in exposure, irrespective of surface-wear. Furthermore, there is little interruption in traffic, since the material may be driven over soon after being completed, and withal, the procedure in applying is simple and advantageous from cost-standpoint.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. The method of marking pavement, which comprises rendering a bituminous binder fluent, admixing litharge and powdered aluminum and granular mineral matter, and applying the resultant fluent mixture to the pavement surface to be marked.

2. The method of marking pavement, which comprises rendering a bituminous binder fluent, admixing bodying material and light-color metal flake or powder, applying the resultant fluent mixture to the pavement surface to be marked, and applying granular mineral material to the marking medium.

3. The method of marking pavement, which comprises rendering a bituminous binder fluent, admixing a metal oxide and light-color material, applying the resultant fluent mixture to the pavement surface to be marked, and then applying granular mineral material to the marking medium, the granules being of greater dimensions vertically than the thickness of the applied fluent mixture.

4. The method of marking pavement, which comprises rendering a bituminous binder fluent, admixing lead oxide and sand and powdered aluminum, applying the resultant fluent mixture to the pavement surface to be marked, and then applying crushed rock material to the marking medium.

5. A pavement line-marker composition, comprising a bituminous binder, lead oxide, and powdered aluminum.

6. A pavement line-marker composition, comprising a bituminous binder, lead oxide, sand, and powdered aluminum.

5 7. A pavement line-marker composition, comprising a bituminous binder, a metal oxide, sand, powdered aluminum, and a surface application of granular mineral material.

10 8. A pavement line-marker composition, comprising a bituminous binder, lead oxide, sand, powdered aluminum, and a surface application of granular mineral material.

15 9. A pavement line or symbol marker comprising a strip of bituminous binder material containing bodying material and light color material distributed therethrough to its full depth in sufficient quantity so that the strip clearly contrasts with the pavement surface to be marked throughout the life of the strip, said strip adhering to the pavement surface to be marked, and granular mineral material embedded in the strip and maintained in place thereby in contact with the underlying pavement surface the granules being of

sufficient size to extend above the strip, said granular material having sufficient crushing strength to sustain traffic over the marker and prevent contact of said traffic with the bituminous material for a substantial period of time.

5 10. A pavement marker comprising an adhesive bituminous web of substantial thickness adhering to the pavement surface, the bituminous material containing a sufficient quantity of light color material mixed therewith so that the web for its full depth is light enough in color to contrast with an asphalt or like pavement surface, and lithic granules of color contrasting with such pavement surface embedded in the web to the full depth thereof so as to be supported directly by the underlying pavement surface and of sufficient size and number to extend above the web material in closely spaced relation over the entire surface of the web, the granules having sufficient crushing strength to support traffic and prevent tracking of the web material. 10 15 20

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