June 12, 1962 J. L. JEZL 3,038,392

PAVEMENT CONSTRUCTION

Filed Sept. 10, 1958

Fig. 1

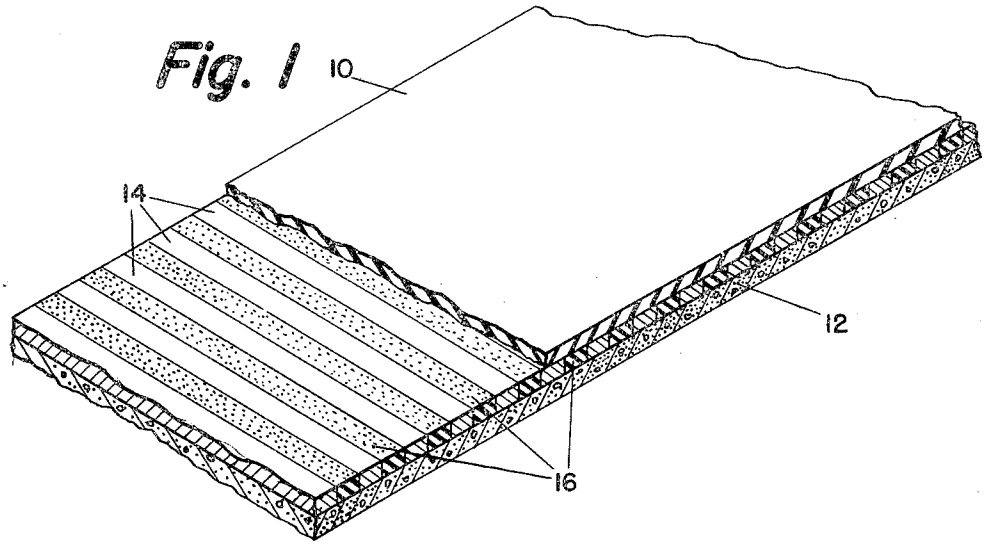


Fig. 2

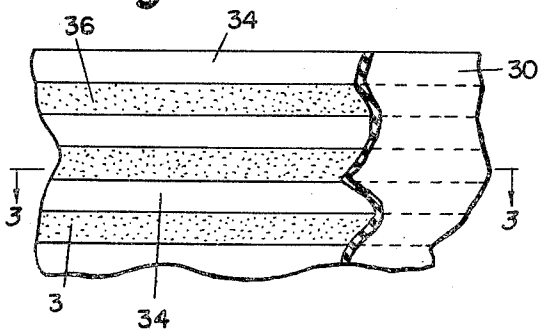


Fig. 3

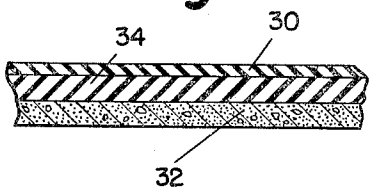
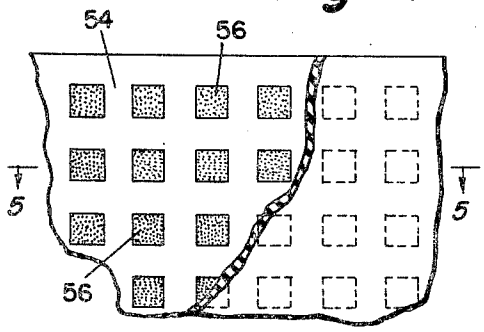


Fig. 4



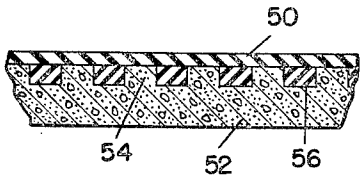


Fig. 5

INVENTOR.
JAMES L. JEZL

BY

ATTORNEY

United States Patent Office

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PAVEMENT CONSTRUCTION

James L. Jezl, Swarthmore, Pa., assignor to Sun Oil Company, Philadelphia, Pa., a corporation of New Jersey

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This invention relates to pavement construction for roads and more particularly to a construction which facilitates the removal of ice from pavement surfaces.

The formation of sheets of ice on road surfaces constitutes an obvious hazard to motor traffic. Various expedients have been employed in order to reduce the hazard, involving the application of materials to the surface of the sheet of ice in order to reduce the danger of skidding, or to promote melting of the ice. However, these measures are often employed too late to be effective, and in any event they require that a considerable effort be expended each time that weather conditions result in the formation of sheets of ice.

According to the present invention, road paving surfaces are so constructed that sheets of ice which form thereupon are removed in a superior manner by the normal passage of motor vehicles over the road. Thereby, the delay between the formation and the removal of ice is minimized, and the application of materials to the surface of the ice in order to reduce the danger of skidding or to promote melting is made unnecessary.

The invention will be further described with reference to the attached drawing, wherein FIGURE 1 is a sectional view of pavement construction according to one embodiment of the invention, FIGURES 2 and 3 are sectional elevational and sectional plan views respectively of another embodiment of the invention, and FIGURES 4 and 5 are sectional elevational and sectional plan views respectively of still another embodiment of the invention.

Referring to FIGURE 1, a road bed **12** of conventional construction is provided. Supported by the road bed are a plurality of strips of material having different degrees of compressibility. The strips **14** are composed of relatively noncompressible materials, and the strips **16** are composed of relatively compressible materials. These strips, which fit closely together, constitute an alternating relatively compressible underlayer and relatively noncompressible underlayer for the pavement surface **10**, which is supported by the underlayer.

The top surface **10** is composed of a compressible or flexible solid material suitable for road paving, e.g. asphalt, rubber, or mixtures of asphalt and rubber, etc. This surface may be preformed, or it may be formed in place by application in fluid state to the underlayer.

The compressible underlayer provided by the strips **16** is also composed of a solid material suitable for road paving, e.g. asphalt, rubber or mixtures thereof, etc. This compressible underlayer may be composed of the same material as the top surface, though it is preferably composed of a material which is more compressible than the top surface.

The relatively noncompressible underlayer provided by the strips **14** can be composed of materials belonging to the same class as those materials of which the compressible underlayer and the top surface are composed, but differing therefrom in being composed of materials within that class which are less compressible than the materials of which the compressible underlayer is composed. Alternatively, metal rods, wooden boards or concrete strips or other rigid solid materials can be employed, with spaces therebetween for the introduction of the relatively compressible underlayer provided by the strips **16**. The relatively noncompressible underlayer is preferably less compressible than the top surface **10**, though this is not an

essential feature. The essential features are that the top surface is compressible to at least some extent, and that the underlayer be composed of alternating strips of material of different compressibility.

The operation of the paving construction in removing sheets of ice is as follows. When a sheet of ice has formed on the top surface of the layer **10**, and an automobile subsequently passes over the pavement, the pressure exerted by the weight of the automobile, transmitted through the tires, results in greater deformation of the compressible layer **10** in those portions of the pavement directly above the strips **16** as compared with the extent of deformation above the strips **14**. This results in the application of unequal stress to different parts of the ice layer, and these stresses result in cracking of the ice. Upon fragmentation of the ice as a result of such cracking, the removal of the ice fragments as a result of further passage of vehicles over the road surface is made possible.

It is essential according to the invention that the underlayer be composed of materials having different degrees of compressibility in different portions of the underlayer. If a compressible top surface were supported by an underlayer of substantially uniform compressibility, some application of stress to a sheet of ice would be provided by the deformation of the top layer at the outer edges of the tires, but this would usually not be sufficient to provide the necessary fragmentation of the ice. By providing a plurality of locations at which unequal stress is applied beneath each tire of a vehicle passing over the paving, superior results are obtained compared to those which can be obtained with a uniformly compressible underlayer.

Preferably, the strips **14** and **16** have width within the approximate range from one-half inch to two inches. If the width is greater, the number of places at which unequal stress is applied is disadvantageously reduced, whereas if the width is less, it is difficult to obtain sufficient deformation of the upper surface as a result of the unequal stresses.

Referring to FIGURES 2 and 3, a similar arrangement to that shown in FIGURE 1 is provided, except that the strips of the underlayer are aligned substantially parallel to the direction of travel of vehicles over the road, rather than perpendicular to that direction as in FIGURE 1. The strips may be aligned in any other desired direction relative to the direction of travel. The numerals **30**, **32**, **34** and **36** correspond to the numerals **10**, **12**, **14** and **16** of FIGURE 1.

Referring to FIGURES 4 and 5, a similar construction to that illustrated in FIGURE 1 is provided, with the exception that the relatively noncompressible part of the underlayer constitutes a continuous medium in which the relatively compressible portions of the underlayer are located as discrete portions arranged in rows both parallel and perpendicular to the direction of travel of vehicles over the road.

In FIGURES 4 and 5, the relatively noncompressible portions **54** of the underlayer are represented as being formed integrally with the roar bed **12**. This is in some cases a desirable alternative to the formation, as illustrated in FIGURE 1, of relatively noncompressible portions which are not integral with the road bed.

Numerals **50**, **52**, **54** and **56** correspond to the numerals **10**, **12**, **14** and **16** in FIGURE 1. Alternatively, the continuous medium **54** may be composed of the relatively compressible material, and the portions **56** of the relatively noncompressible material.

It will be apparent to a person skilled in the art that various other constructions within the scope of the invention can be provided. It will also be apparent that various means can be provided to construct an under-

layer having the essential characteristics according to the invention. Thus for example, strips of relatively noncompressible material can be laid on the road bed, with the proper spacing therebetween, and a relatively compressible material can be applied in the fluid state between the strips of relatively noncompressible material. Alternatively, the strips of relatively noncompressible material can also be formed in situ by erecting on the road bed suitable metal forms into which the relatively noncompressible material can be introduced as a fluid material and allowed to set, with subsequent removal of the forms and introduction of the relatively compressible material as fluid into the spaces between the strips of the relatively noncompressible material.

In one embodiment of the invention, the respective portions of the underlayer are composed of different materials which have approximately the same hardness and the same compressibility at temperatures of 70–80° F. for example, but which have substantially different hardness and different compressibility at reduced temperatures near the freezing point of water. The portions of the underlayer can be composed of asphalt or rubber or mixtures of the two. It is known in the art that such materials may have different hardness-temperature characteristics depending upon their source and method of preparation, and in this embodiment of the invention two such materials are employed in the preparation of the underlayer, both having approximately the same hardness at the higher temperatures, but one of the materials hardening more rapidly upon cooling, so that at the freezing point of water it has greater hardness and lesser compressibility than the other material. By using materials which have, however, approximately the same hardness and compressibility at 70–80° F. for example, it is possible to avoid unequal deformation of the upper surface when such unequal deformation is not needed for breaking ice layers on that upper surface.

In the constructions described above, it is noted that the strips of compressible and noncompressible material in the underlayer may be integral with the upper surface **10** or even with the road bed **12**. Thus, for example, after placing the noncompressible strips **14** on the road bed, the compressible strips of the underlayer and the upper surface can be supplied in one operation by applying a relatively compressible material in fluid state to fill the spaces between the noncompressible strips and also to cover the noncompressible strips with the upper surface **10**. Alternatively, the relatively compressible strips **16** can be placed first, and a relatively, but not completely, noncompressible material added to provide the strips **14** and the upper surface **10**. The noncompressible strips **14** can be made integral with the road bed **12** by constructing ridges in the shape indicated, composed of the same material as the road bed, the relatively noncompressible material and the upper surface being subsequently added.

In either of the constructions indicated above, the relatively compressible material in the underlayer can be a fluid rather than a solid material, and can be provided in one embodiment by leaving an air space between the relatively noncompressible portions **14**.

Any suitable design and arrangement of compressible and relatively noncompressible portions of the underlayer in the construction according to the invention can be employed, neither the arrangement of the portions in parallel or perpendicular relationship with respect to the direction of travel, nor the arrangement thereof in straight lines being essential according to the invention. The essential features are that alternately compressible and relatively noncompressible portions be provided, and the specific pattern of the arrangement of the portions can be varied as desired.

The invention claimed is:

1. Pavement construction comprising: a rigid base; spaced strips of resilient material supported on said base; strips of rigid material also supported on said base and alternating with said strips of resilient material; and a resilient surface layer supported on said strips; said strips of resilient material being more resilient than said surface layer; whereby the application of a load to said pavement causes said surface layer to flex over said strips of rigid material and form depressions in said strips of resilient material, whereby a layer of ice upon said pavement is fractured.

2. Pavement construction comprising: a rigid base having projecting ribs on its upper surface; resilient elements in the spaces between said ribs; and a resilient surface layer supported on said ribs and said resilient elements; said resilient elements being more resilient than said surface layer; whereby the application of a load to said pavement causes said surface layer to flex over said ribs and form depressions in said resilient elements, whereby a layer of ice upon said pavement is fractured.

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