To all whom it may concern:

Be it known that I, WILLIAM B. BRADY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Processes of Making Bituminous Concrete Pavements, of which the following is a specification.

This invention relates to an improved process of laying bituminous concrete pavements, the process applying specifically to the laying of a pavement having a foundation course formed wholly or in part of hydraulic cement, and a wearing surface formed of bituminous concrete, anchored to the foundation course.

Among the salient objects of the invention are to provide a method of laying pavement of the character referred to which will insure rapid, economical and certain results, i.e., will insure the making of uniformly good quality pavement; to provide a process which may be carried out chiefly by the use of machine tools instead of requiring much hand labor; and to provide a process which enables the pavement to be readily made, which is characterized by extreme density, imperviousness, and a reliable anchoring of the wearing surface as to all portions thereof to the foundation or sub-course.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims.

The invention will be readily understood from the following description, reference being had to the accompanying drawing, in which—

Figure 1 is a view in perspective with parts in cross section, of a portion of a pavement, embodying the invention; Fig. 2 a transverse sectional view showing the several layers of the pavement, although it will be understood that in practice each course is completed before the next is commenced.

In constructing a preferred embodiment of my invention, the roadway to be improved is first graded to provide a uniform or substantially uniform surface, say, for ordinary roads, about eight inches below the finished grade line. Upon the sub-grade thus prepared there is evenly laid or spread a foundation course of ordinary hydraulic cement concrete which is preferably made of a depth about five and one-half inches and is called the foundation course. This foundation course is designated in the drawing, and its constituents may be varied to suit local conditions; the object being to provide a comparatively inexpensive rigid concrete foundation. Obviously this may ordinarily be most economically obtained by the use of mineral aggregate graded from relatively large down to comparatively fine particles, the grading being in accordance with well-known practice for securing density of aggregate, or, in other words, elimination of voids, and therefore the use of a minimum amount of cement proper. Over this foundation course of concrete, preferably before the same has set, there is evenly laid or spread what is termed a slush coat about one-half inch in depth, and composed of fine or comparatively fine hydraulic concrete. A suitable formula for this slush coat is one part Portland cement (by measure), three parts clean sharp sand (by measure), thoroughly mixed into mortar by the addition of sufficient water and a thorough mixing; the mortar thus made being applied immediately upon the foundation course while the same is still wet, so that good union is secured between the slush coat and the foundation course.

As soon as the slush coat has been evenly spread out over the foundation course, and before it has set or hardened, there is scattered and distributed evenly over the whole a coating of broken stone, as 3, preferably sharp hard limestone, trap rock, or other suitable stone, ranging from 3 inches to 2 90 inches in diameter, and consisting preferably in the main of stone about one inch in diameter. A sufficient quantity of loose stone of this character is to be applied to just nicely cover the slush coat, and the loose course thus applied is immediately tamped lightly so as to embed all stones into the surface of the slush coat, i.e., force the
stones down until practically every individual stone is inset into the slush coat and so that in the main these stones are brought into bearing with the foundation course.

This method of construction produces an anchoring surface to which the bituminous concrete is subsequently anchored. That is to say, the loose stones, larger in diameter than the thickness of the slush coat, are forced into the latter as to their lower portions and project freely above the slush coat, forming projections, angles and recesses with which the lower part of the wearing surface combines and anchors.

After the anchor surface has been applied and the slush coat allowed to set and dry out, the bituminous concrete wearing surface is applied. A preferred way of forming and applying the wearing surface is as follows: Over the anchor concrete surface is poured and spread a suitable asphaltic or bituminous binder, in quantities sufficient to fill all voids in the surface of the anchor concrete and to fully submerge the anchor projections. This bituminous binder is, of course, preferably applied hot. Thereafter there is evenly spread a layer of clean crushed limestone screenings, or granite screenings, washed torpedo sand, or other suitable mineral top dressing material, to a depth of about one inch in thickness, after which this top dressing is thoroughly rolled and bonded into the bitumen. Thereafter all loose screenings or top dressing material which has not been forced into and become bonded into the bitumen is swept off and a so-called squeezee coat of hot liquid asphalt or other suitable bitumen is applied in quantities of about two hundred pounds to one hundred square yards of pavement. Thereafter the loose screenings which have been swept off, and if necessary additional loose screenings of the same character, are again spread over the surface of the pavement to a depth of one-fourth inch, and these screenings or top dressing material again rolled into and bonded with the bitumen, thereby producing the finishing or surfacing coat.

While the above described manner of preparing the bituminous concrete wearing surface is deemed the preferred way, it is nevertheless obvious that the bituminous concrete might be separately compounded of suitably graded mineral and bitumen before being spread, after being thoroughly mixed, and while hot, spread and rolled in a manner entirely familiar to those skilled in the art. In either event it will be obvious that the bituminous concrete completely fills the interstices and depressions of the rough anchor surface and becomes perfectly bonded to the latter. By reason of the rigidly held anchor projections rising from the concrete foundation into the bituminous concrete wearing surface, it will be obvious that the latter is prevented from being laterally displaced or flowing, even under very heavy traffic or in extremely warm weather. Nevertheless the wearing surface is entirely water-proof, and because of the stability afforded by the anchor foundation, the consistence of the bituminous binder may be safely kept comparatively soft, i.e., slightly softer than would be safe to use in a wearing surface composed wholly of bituminous concrete and not combined or incorporated with an anchor supporting surface. The advantage of employing bituminous binder which is not too hard is, of course, well understood, and resides chiefly in the freedom from liability to crumble and crack, especially in cold weather or after a long period of time.

While the foregoing description sets forth the exact method which in practice I have found to be preferred, yet it will be understood that the method may be somewhat modified without departing from the invention. The appended claims, therefore, are not to be construed specifically, except in so far as they are made specific in terms.

I claim as my invention:

1. The herein described method of laying pavement which consists in first laying a relatively heavy sub-course of hydraulic cement and suitably finishing the surface thereof to leave the same uniform and smooth, or approximately so, then applying and uniformly spreading a relatively thin course of fine hydraulic cement, then, while said latter course is still plastic, distributing uniformly over the same an anchor course of mineral aggregate composed of pieces of stone of greater diameter than the thickness of said course of plastic cement, and pressing the coarse aggregate down into bearing with the foundation course, thereby embedding it in said plastic course, allowing the thus-formed anchor course to set and harden, and finally applying a wearing surface course of bituminous concrete over the anchor course and suitably rolling and finishing the same.

2. The herein described method of laying pavement which consists in first preparing the bed, next laying thereon, a relatively heavy sub-course of coarse mineral aggregate mixed with hydraulic cement and suitably rolling, compacting and finishing the surface thereof so as to leave the same uniformly and approximately smooth, then applying and uniformly spreading a thin coat of fine hydraulic semi-liquid cement, then, while said latter coat is still plastic, distributing over the same in anchor course of mineral aggregate largely composed of pieces of stone of greater diameter than the thickness of said course of plastic cement,
and rolling or otherwise pressing the same into the plastic cement and into bearing with the sub-course, allowing the thus-formed anchor course of coarse aggregate and plastic cement to set and harden, and finally applying a wearing surface of bituminous concrete of such thickness as to completely submerge the anchor projections of the anchor course and suitably rolling and finishing said wearing course.

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Witnesses:

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