March 12, 1929. S. S. SADTLER 1,705,067

CONSTRUCTION OF ROADS FOR HEAVY TRAFFIC AND HAVING A FOUNDATION COURSE OF SAND

Filed Aug. 28, 1926

Fig. 1.

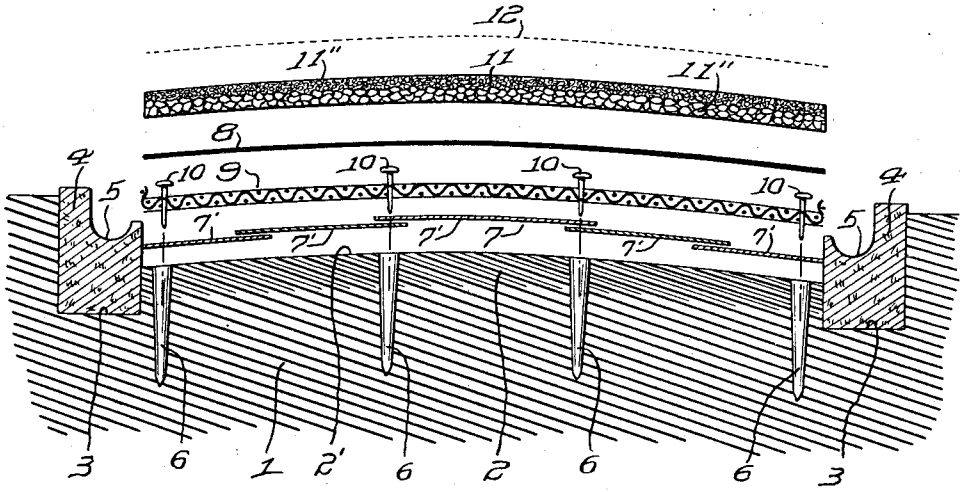
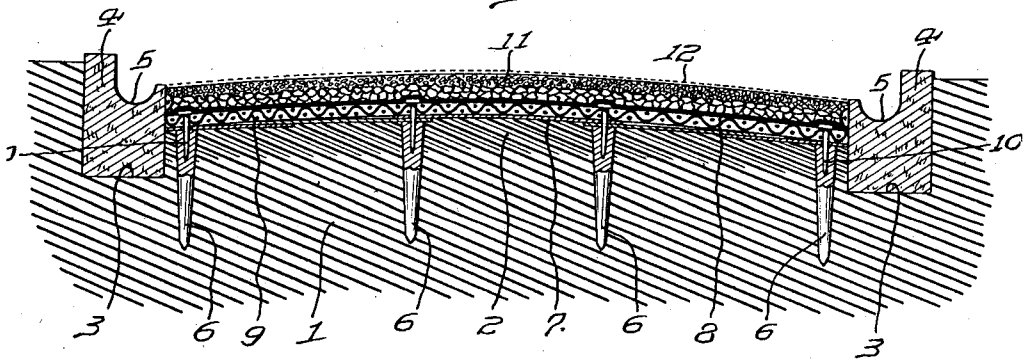


Fig. 2.



INVENTOR

Samuel S. Sadtler.

BY Alston B. Moulton

ATTORNEY

WITNESS

F. J. Hartman.

Patented Mar. 12, 1929. 1,705,067

UNITED STATES PATENT OFFICE.

SAMUEL S. SADTLER, OF SPRINGFIELD TOWNSHIP, MONTGOMERY COUNTY, PENNSYLVANIA, ASSIGNOR TO AMIESITE FOUNDATION COMPANY, A CORPORATION OF DELAWARE.

CONSTRUCTION OF ROADS FOR HEAVY TRAFFIC AND HAVING A FOUNDATION COURSE OF SAND.

Application filed August 28, 1926. Serial No. 132,136.

My invention relates to the construction of roads, particularly in sandy soils, whether composed of pure silica sand, such as found near the seashore, or a sand having a clayey or iron oxide content mixed therewith, and it is the aim and purpose of my invention to use such sands as the foundation course of the roadway.

An object of my invention is to make and form durable and satifactory road in or through a sandy soil by using the sand of the soil itself as the main constituent of the foundation course for the road.

A further object of my invention is to simplify and reduce the cost of building wear-resisting roads through a sandy soil by utilizing the sand as the main essential constituent of the foundation course.

A further object of my invention is to so treat a sandy soil composed mainly of silica sand, or of a sand intermixed with a clayey soil that such sandy soil may form the foundation course of a highly practical and satifactory road.

Other objects of my invention will appear in the specification and claims below.

In the drawings forming a part of this application and in which the same reference characters are employed throughout the various views to designate the same parts,

Fig. 1 is a somewhat diagrammatic view in transverse cross-section of a road embodying my invention with the course or layers employed in the construction thereof in spaced relationship and Fig. 2 is a similar cross-sectional view of the completed roadway.

It is to be understood that the drawings do not strictly indicate the relative sizes of the various parts of the road. For the sake of clearness the wire mesh fabric and the thickness of the tarred paper course is greatly exaggerated for the purpose of making the construction clear in the drawings.

In making a road through sandy soil 1, particularly if the sand be a pure silica sand, I first bring the surface of the soil to the top 2′ on the foundation level by dragging or any other suitable means, to provide the foundation 2 of sand of necessary grade and crown. The foundation 2 having thus been crowned and graded, I then preferably dig on the opposite sides of the foundation 2 suitable trenches 3 for the reception of the curbing 4. This curbing 4 is preferably of concrete, cast in the usual manner in the trench as 3 between or against wooden boards to hold the wet concrete in proper form until it has set. This curbing 4 may be provided with a gutter 5 cast integral therewith. The curbing provides a retaining wall for the sand foundation 2.

I may then drive preferably creosoted stakes 6 into the foundation course 2 to form an anchorage for one or more fabricated courses or layers, to be later described, and the tops of these stakes 6 are preferably flush with the top surface 2′ of the foundation course 2. These stakes 6 may be the stakes which were placed and used for the purpose of bringing the foundation 2 to the proper grade and crown. It is desirable, however, that there be a row or series of stakes 6 adjacent each curbing 4. In order to compact the sand of the foundation course 2 I preferably wet it with water to make the course damp to a depth of from 6 to 10 inches.

Over the surface or top 2′ of this damp compacted foundation 2 I then lay a protective course 7 of strips or sheets 7′ of tarred paper with the edges of adjacent sheets overlapped to shed water. This protective course 7 of tarred paper is operative to prevent water from above from entering the sand foundation 2 after the road is completed and I may and preferably do apply to the upper surface of the paper course 7 a course 8 thin liquid asphaltic paint, asphaltic cement or road oil which is operative, among other things, to firmly bind the upper courses of the road to the foundation course 2. Upon this paper course I also lay a course 9 of a wire mesh fabric which may be a standard galvanized chicken fencing of preferably one inch mesh. The edges of adjacent strips of this wire fabric are wired

or otherwise securely bound together. This wire fabric course 9 extends across the full width of the roadbed and preferably laps up against the side of the curbing 3. After this course 9 of wire fabric has been laid, I secure it, and the tarred paper course 7 directly beneath it, to the tops of the stakes 6 by any suitable fastening means 10 such as nails, staples or the like, stretching the wire fabric 9 especially as it is being fastened to the posts 6 at the sides of the road so that it will lay evenly and flat on and against the tarred paper course. It is preferable to apply the course 8 of liquid asphalt or similar material to the top of the course 7 of tarred paper after the layer or course 9 of the chicken wire has been stretched and secured in position in order to also coat the strands of the wire fabric 9 with asphalt to protect the same from corrosion and to make the work of securing of the wire fabric 9 to the tops of the stakes 6 easier and cleaner. In this manner the tarred paper course 8 and the wire fabric course 9 are anchored to the sand foundation course 2 by the stakes or posts 6 and the fastening 10 through the wire fabric course 9 and the paper course 7 into the ends of the posts. After the wire fabric course 9 has thus been placed in position and secured as above described, I then cover it with a course 11 of surfacing material such as amiesite and roll it with a suitable roller. The course 11 of amiesite is preferably composed of two layers, the lower layer 11′ of broken and graded stone coated with a heavy asphaltic composition and of a size larger than the mesh of this wire fabric 9, and a top or upper layer 11″ of finer stone also coated with heavy asphaltic composition. When rolled under pressure the smaller stones of the upper layer are crowded down into the spaces between the larger stones of the lower course or layer. The surface of this course 11 of amiesite or other black surfacing material is preferably given a dusting or light surfacing 12 of a sand or cement or other finely divided earthy material to provide a finish to the road and to facilitate step of compressing of the road by a heavy roller.

A road constructed in the manner above set forth is thus provided with a surface course 11 of amiesite or similar black surfacing material, which may yield slightly under the load of traffic and in which ordinary silica sand, to which the weight of traffic is transmitted through the wire mesh fabric 9, is rigid and will not yield or move transversely under such load because of the distribution, by the wire mesh fabric, of the weight of traffic over a relatively large area of the sand foundation 2. A very durable satisfactory road may thus be constructed without using any other material for the foundation course than the sand itself.

However, in some instances I may find it desirable to treat the sand foundation chemically to render it more firm and water resisting. Instead of compacting the sand foundation 2 by sprinkling water thereon, I may sprinkle or spray the sand foundation, when graded and crowned, with a properly prepared mixture of silicate of soda, sulphuric acid and water. By way of example, the liquid, which may be thus sprayed or sprinkled over the sand foundation, may comprise substantially 10 volumes of a commercial grade of silicate of soda diluted with 90 volumes of water, and mixed with a substantially 10% aqueous solution of sulphuric acid (10 grams of sulphuric acid in a volume of 100 c. c. of the sulphuric acid solution). The amount of sulphuric acid solution which I add to the solution of sodium silicate may vary. It is preferably about 25% of the volume of the sodium silicate solution. Not enough acid should be used to convert the mass into a jelly. If the proper amount of acid is used the mixture will remain as a clear liquid for a considerable period of time and it is that type of mixture which I employ for this purpose. The mixture of sulphuric acid and sodium silicate solution should produce a solution of silicate acid which is fluid and is easily applied to the sand by any suitable spraying or sprinkling apparatus.

When this solution dries it becomes insoluble and the sand foundation 2 will be provided with a crust extending downwardly from the surface thereof.

After the sand has thus been treated with this chemical, the step may be repeated, if necessary, and when the same has become dry, I may sprinkle the surface with dry hydrated lime or Portland cement to neutralize any surface acid which would be undesirable and which would tend to rust the wire mesh.

As in the previously described modification the various courses above described are then laid on to this foundation course 2 thus prepared, but, if desired, I may in this modification omit the course 7 of tarred paper sheets, because this treatment of the sand renders it waterproof.

In other respects the road is constructed as has been above described in this specification.

When the soil through which the road is being constructed is a "bank sand" and contains an appreciable amount of clay and/or iron oxide, the sand foundation may be prepared by mixing therewith lime, hydrated or caustic and preferably hydrate, using from 2% to 3% by weight of the lime to the weight of the said foundation to be formed or made. I may thus sprinkle the sand foundation with a water containing the lime or other alkaline ingredient, or I may exca-

vate the sand to form the road bed and then mix it with the lime and then replace it on the roadbed to form the foundation 2. Enough lime should be added to the sand to bring the alkaline intensity up to about pH—11 to 12. The action of the lime is to render the clay non-plastic. After the foundation 2 has been made in either of the two manners last indicated, it may be subjected to a suitable rolling action to further compress it but this rolling should be effected before any crust forms in or on the sand.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States, is:

1. A roadway comprising a foundation course of sandy soil, retaining walls at the sides of said foundation course to prevent lateral movement of the sand of said foundation course, stakes driven into said foundation course and having their top surface flush with the top of said foundation course, sheets of tarred paper having their adjacent edges overlapped to shed water laid on the top of said foundation course, strips of reticular metal fabric laid on said tarred paper, fastening means securing said tarred paper and said metal fabric to the tops of said posts, the top surface of said sheets of paper and the metal fabric being coated with a surface of liquid asphaltic material and a surface course of stone aggregate bound together with asphaltic material supported on said reticular metal fabric.

2. A roadway comprising a foundation course composed of sandy soil, a course of fibrous material coated with liquid asphaltic material lying on the top of said sand foundation, strips of open mesh metal fabric lying on said fibrous material and coated with said liquid asphaltic material, and a surface course of stone aggregate bound together with asphaltic material supported on said metal fabric, the stone aggregate in said surface course and adjacent said metal fabric being of a size larger than the size of the mesh in said metal fabric.

3. A roadway comprising a foundation course composed of sandy soil, lime and water and having a series of stakes therein extending along the roadway near the side edges thereof, a fibrous course comprising sheets of tarred paper laid on the surface of said foundation course with their adjacent edges overlapping to shed water, strips of open mesh wire fabric lying on said fabric course and coated with liquid asphaltic material, the adjacent edges of said wire mesh fabric being secured together and means to secure said wire fabric and said fibrous course to the top ends of said stakes and a surface course on said metal fabric comprising stone aggregate bound together with asphaltic material.

4. A roadway comprising a foundation course of compacted sandy soil, retaining walls at the sides of said foundation course and extending above said course, stakes driven into said foundation course and having their top ends substantially at the level of the top surface of said foundation course, sheets of tarred paper lying on said foundation course and having their adjacent edges overlapped to shed water, and having an upper coating of liquid asphaltic material, a layer of metal fabric comprising strips having their adjacent edges bound together, stretched over said course of coated tarred paper and having their sides turned upwardly to lie flat against said retaining wall, said metal fabric being coated with liquid asphaltic material and said paper course, said metal course being secured to the tops of said stakes, and a surface course of stone aggregate coated with and bound together with asphaltic material lying on said metal fabric and composed of two layers, the stones of the lower layer being larger than the mesh in said wire fabric and the stones in the lower layer being of smaller size.

5. A roadway comprising a foundation course of compacted sandy soil, sheets of tarred paper lying on said foundation course, having their edges overlapped to shed water and having an upper coat of liquid asphaltic material, a layer of metal fabric comprising strips lying flat on said course of tarred paper, said metal fabric being coated with liquid asphaltic material, and a surface course of stone aggregate coated with and bound together with asphaltic material on said coated metal fabric.

6. A roadway comprising a foundation course of compacted sandy soil, stakes driven into said course and having their top ends substantially at the top of said foundation course, sheets of tarred paper lying on said foundation course and having their adjacent edges overlapped to shed water and having an upper coating of liquid asphaltic material, a layer of metal fabric lying on said paper course and coated with liquid asphaltic material, said paper course and said metal course being rigidly secured to the tops of said stakes and a wearing course of stone aggregate coated with and bound together with asphaltic material laid on said metal asphaltum coated fabric.

7. A roadway comprising a foundation course of compacted sandy soil, retaining walls at the sides of said course, sheets of tarred paper lying on said foundation course, having their adjacent edges overlapped to shed water and having an upper coating of liquid asphaltic material, a layer of metal netting comprising strips having their adjacent edges bound together, stretched over said tarred paper course and having

their ends turned to lie flat against said retaining walls, said metal fabric being coated with liquid asphaltic material, and a surface course of stone aggregate coated with and bound together with asphaltic material laid on said coated metal fabric and comprising two layers, the lower of which contains stones of larger size than the mesh of said fabric, and the upper layer being composed of smaller stones.

In witness whereof, I have hereunto set my hand this 26th day of August, 1926.

SAMUEL S. SADTLER.