

UNITED STATES PATENT OFFICE.

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ROAD AND METHOD OF BUILDING SAME.

No. 915,062.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, AMZI L. BARBER, a citizen of the United States, residing in the city of Washington, District of Columbia, have invented certain new and useful Improvements in Roads and the Method of Building the Same, of which the following is a specification.

This invention relates to an improvement in roads and the method of building the same and is particularly adapted to the construction of country roads as distinguished from roads in cities, towns and villages.

There are two points to be specifically considered in the construction of a road, the foundation or pavement proper and its covering. The foundation should be stable and is usually constructed of stone or gravel of various kinds and sizes, laid and rolled in various ways. Such foundation is of rigid and unyielding material which, if fractured or ruptured in any way, will rapidly disintegrate or ravel. To protect the material of the foundation or pavement proper from fracture and consequent disintegration, it is customary to top dress the road with sand, gravel or screenings of various kinds generally in connection with a binding material to hold the particles together as far as possible. These top dressings are unstable, are blown away by the wind in the form of dust and are carried away by the rains, thus again exposing the foundation or pavement proper to wear and injury. The best wearing top dressing, on account of its hard and finely divided character, is sand but the problem has been how to keep it in place on the road. This problem has become acute since the advent of the automobile with its great speed and consequent destructive power on the road surface, the protective covering of the road being rapidly removed in the form of dust. The tires of automobiles exercise a sucking effect on the binding material of this protective covering, distribute it as dust over the surrounding country, disintegrate the road and ultimately destroy it. Many attempts have been made to preserve the roads from this kind of injury, but such attempts up to the present have resulted only in expedients of a temporary or evanescent character, requiring constant care and watchfulness and frequent repetition of the remedy.

In building long country roads, such as

trunk and post roads connecting the various cities, it is practically impossible, except at enormous and prohibitive expense, to maintain the surface of the same in proper condition, as roads have heretofore been built. The surface of the road must be constantly renewed or continuously treated with some substance adapted to prevent the fine particles of the surface from being removed in the form of dust or otherwise.

The attempts heretofore made to prevent the removal of the protective covering of the road may be grouped under four headings and a short consideration of each will show its temporary or otherwise objectionable character.

First, moistening the road with water or other liquid. The liquid quickly evaporates leaving the road surface as before.

Second, treating the surface of the road with an oil emulsion. This also evaporates and has a bad odor.

Third, treating the surface of the road with crude petroleum or some of its derivatives. This has a bad odor and is destructive of plants, paint on vehicles and the clothing of persons using the road, both when freshly applied to the road and when after a rain it is thrown up in the mud.

Fourth, treating the surface of the road with coal tar, its derivatives, and preparations containing it. This has a somewhat similar effect to crude petroleum.

The foregoing resumé of the art has been given to emphasize the fact that attempts at improvement heretofore have been directed entirely toward the preservation of the loose surface covering of the road and not toward the production of the ideal road which should be permanent and indestructible and neither require nor produce a loose surface layer.

It might be interesting to note that the condition of the country roads in the United States is one of the most important factors in the agricultural development of the country. It is notorious that our country roads are bad and that the expense of hauling over them is very great in comparison with the expense of hauling over the country roads of Europe. Statistics show that in Europe the average cost of hauling a ton a mile over the country roads is ten cents, while in the United States the average cost of hauling a ton a mile is twenty-five cents. Statistics further show that the average haul in the United States is

about ten miles. It, therefore, appears that by reason of our poor roads the average cost of hauling a ton over the average distance is a dollar and a half per ton greater in the United States than in Europe, and that this great difference is because of the character of the roads. When we consider the hundreds of thousands of miles of roads in the United States and the millions of tons hauled over them per annum, the problem assumes such proportions that it is difficult for the mind to grasp it. The saving to agricultural interests, if good roads were universal, would be nothing short of marvelous. The problem is to make these roads good at as small an expense, compared with a permanent structure, as is possible.

This invention is designed to overcome the objections stated and to provide a road suitable for the country districts which will be easy of construction, not excessive in cost, cheap in maintenance, practically waterproof and hence permanent and practically indestructible in character.

The invention meets the requirements of horses as well as automobiles, is applicable to existing roads formed of macadam or hard crushed rock as well as to newly constructed roads and provides a surface which is smooth and waterproof. Slipping and skidding are provided against and any damage done to the surface may be readily repaired.

It is to be observed that country roads may be classified as narrow, medium or wide according as they are designed to accommodate light, medium or heavy traffic respectively, and that in any case the middle or crown of the road receives the greater part of the wear, the vehicles, except when passing others, naturally traveling in the middle of the road. In fact so general is this, that, in order to distribute the wear, signs are frequently posted along the roadside urging drivers to travel on the side of the road, a request which few heed. On the other hand at the moment of passing, the vehicles may be off the center and at that moment fast moving vehicles, such as automobiles, generally slacken their speed so that at that moment the wear on the surface of the road off the middle is less, and at any rate, such wear is of short duration in point of time, the vehicle immediately swinging back into the middle of the road again. Generally only the wheels on the one side would be off the middle. Even if such custom of following a certain track in the road should not be followed as a rule, it could easily be established by making that part of the road on which you wish the travel to go, the best part of the road. Hence it follows that if for example, the middle of the road; that is, a width at least sufficient to accommodate an ordinary four-wheeled vehicle, for example, from six to nine feet, were so constructed as to be

practically indestructible in character, the life of the whole road would be lengthened and its quality improved. In a road where traffic is heavy, it might be advisable to broaden the indestructible strip so as to accommodate two lines of vehicles.

I accomplish the object of the invention by the means hereinafter more specifically described, the features thereof being more particularly pointed out in the claims.

The road bed or foundation is constructed in any solid and substantial manner, such as is practiced, for example, in constructing a macadam or Telford foundation, or in constructing a foundation of hydraulic concrete. This road bed should preferably be carried to a point somewhat below the line of the finished grade, for example, to within two inches of that line. At either side of the middle for example, the road may then be finished with fragmentary or granular material such as gravel, screenings, etc., in the usual manner, while the center portion is filled to grade with a suitable smooth, practically indestructible and waterproof material of preferably homogeneous character such as hydraulic concrete or any suitable bituminous concrete whether made from coal tar, residual pitch or otherwise, the preferred material, bituminous concrete, being of a yielding, elastic or resilient, plastic and malleable nature, as well as forming a smooth and waterproof surface. Such material should then be rolled or otherwise packed firmly into place in preferably continuous strips of the width desired and will present a smooth and unbroken surface. It is immaterial which part of the road be constructed first, although I prefer to construct the road by first finishing the fragmentary or granular portion and then crowding the indestructible strip into place. In some cases it might be preferable to construct the foundation under the indestructible strip of hydraulic concrete to form a more stable structure.

Such a road as I have described would, it is obvious, have the characteristics of durability, ease of construction and of maintenance. It would render the country roads equal to the best in the city at very much less cost and would do away in a large measure with the dust nuisance. If a wheel or a calk on a horse shoe should cut into the indestructible strip, it could be readily repaired, and if asphaltic or other bituminous concrete were used the plastic and malleable character of the same would permit the cut to be filled up by the pressure of the passing vehicles, etc. In wet weather the vehicles could be driven so that the wheels on one side or the horses would be off the indestructible strip and hence no slipping or skidding would result.

Horses can be driven on the granular or

macadam part of the roadway as now, if desired. Automobiles can run with one side on the asphalt and one side on the macadam, and so avoid any tendency to skid, if the asphalt is wet with rain. When automobiles meet they usually slow down, but in any case would run upon the macadam only on one side and but for a few feet. When the road is clear it would be ideal for automobiles, smooth as a billiard table, with no ruts or lumps to look out for. When on the asphalt, the automobiles will cause neither dust nor wear. Finally, and if no other advantage were to be gained, the farmers can haul on the asphalt more than double the load than they can on macadam. This consideration alone is of great weight as bearing on the utility of the invention.

It is obvious that the indestructible strip may be of such width as desired, but at least wide enough to accommodate ordinary four wheeled vehicles, and may be at one side as well as in the center of the road, the essence of the invention residing in providing a permanent protective covering for a portion of the road surface which, in case of asphaltic or other bituminous concrete, is of a yielding, elastic or resilient character in contradistinction to the rigid character of the material of the ordinary road. The terms "asphaltic concrete" and "bituminous concrete" are intended to include asphaltic and bituminous cements whether mixed with broken stone, gravel, sand, pulverized limestone or other substance or not, as well as coal tar and residual pitch mixed with such materials. It is further obvious that by practicing the invention set forth the time of use of the road by the usual traffic is greatly expedited, as for example, a road finished in the evening can be thrown open to full traffic the following morning, thus avoiding the usual delays as at present caused by the old methods of road building wherein the macadam must be left for several days to dry out and set. The invention also tends to equalize the wearing down of the road surface. While the macadam or granular strip would wear down more rapidly than the asphalt under equal conditions, the greater amount of traffic would be over the asphalt, thus lessening the wear on the macadam and increasing the wear on the asphalt proportionally.

What I claim and desire to secure by Letters Patent is:

1. A road comprising a suitable foundation, a lengthwise strip of fragmentary, granular material and another lengthwise strip of smooth, substantially indestructible material at least wide enough to accommodate an ordinary four-wheeled vehicle.

2. A road comprising a suitable foundation, a lengthwise strip of fragmentary, granular material at each side of the road and a

strip of smooth, substantially indestructible material intermediate the side strips and at least wide enough to accommodate an ordinary four-wheeled vehicle.

3. A road comprising a suitable foundation, a lengthwise strip of fragmentary, granular material and another lengthwise strip of yielding material at least wide enough to accommodate an ordinary four-wheeled vehicle.

4. A road comprising a suitable foundation, a lengthwise strip of fragmentary, granular material at each side of the road and a strip of yielding material intermediate the side strips and at least wide enough to accommodate an ordinary four-wheeled vehicle.

5. A road comprising a suitable foundation, a lengthwise strip of fragmentary, granular material at each side of the road and a strip of yielding, resilient material intermediate the side strips and at least wide enough to accommodate an ordinary four-wheeled vehicle.

6. A road comprising a suitable foundation, a lengthwise strip of macadam at each side of the road and a bituminous concrete strip intermediate the macadam strips and at least wide enough to accommodate an ordinary four-wheeled vehicle.

7. A road comprising a rigid foundation, a protecting covering for one portion of said road consisting of fragmentary granular material and for another portion of said road consisting of a yielding, resilient, semi-elastic material, each of said coverings extending lengthwise the road and at least wide enough to accommodate an ordinary four-wheeled vehicle.

8. A method of road construction consisting in preparing a suitable foundation, covering one part of the same with fragmentary, granular material and another part with smooth, substantially indestructible material, said coverings being arranged in parallel strips lengthwise the road and at least wide enough to accommodate an ordinary four-wheeled vehicle.

9. A method of road construction consisting in preparing a suitable foundation, covering a lengthwise strip at each side of the road with fragmentary, granular material and inserting a strip of smooth, substantially indestructible material intermediate said side strips, said intermediate strip being at least wide enough to accommodate an ordinary four-wheeled vehicle.

10. A method of road construction consisting in preparing a suitable foundation, finishing a portion of the surface with fragmentary, granular material and inserting a strip of yielding material in said surface lengthwise the road and at least wide enough to accommodate an ordinary four-wheeled vehicle.

11. A method of road construction consisting in preparing a suitable foundation,

finishing the surface at the sides of the road with fragmentary, granular material and inserting a strip of yielding material lengthwise the road intermediate the granular strips and at least wide enough to accommodate an ordinary four-wheeled vehicle.

12. A method of road construction consisting in preparing a suitable foundation, finishing the surface at the sides of the road with fragmentary, granular material and inserting a strip of yielding, resilient, semi-elastic material lengthwise the road intermediate the granular strips and at least wide enough to accommodate an ordinary four-wheeled vehicle.

13. A method of road construction consisting in preparing a suitable foundation, macadamizing the surface of the road at the side edges and inserting a bituminous con-

crete strip between said macadamized strips and lengthwise the road and at least wide enough to accommodate an ordinary four-wheeled vehicle.

14. A method of road construction consisting in preparing a rigid foundation, protecting one portion of the surface with a fragmentary, granular covering and another portion with a yielding covering, said protecting coverings extending lengthwise the road but at least wide enough to accommodate an ordinary four-wheeled vehicle.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

AMZI L. BARBER.

Witnesses:

K. G. LEARD,

M. M. RIEMANN.