

UNITED STATES PATENT OFFICE.

JULES LASSAILLY, OF ISSY-LES-MOULINEAUX, FRANCE.

PROCESS FOR MAKING ROADS, PAVEMENTS, &c.

987,726.

Specification of Letters Patent.

Patented Mar. 28, 1911.

No Drawing.

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To all whom it may concern:

Be it known that I, JULES LASSAILLY, engineer, citizen of the Republic of France, residing at 40 Route des Moulinaux, Issy-les-Moulinaux, in the Department of Seine, in the Republic of France, have invented certain new and useful Improvements in Processes for Making Roads, Pavements, &c., (for which I have obtained a patent in Belgium, No. 205,811, dated February 11, 1908, and an additional patent in Belgium, No. 211,480, dated October 23, 1908;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved practical method of constructing roads, and according to this invention it is possible to build roads which can resist the rough usage to which they are subjected when motor cars pass on them. It is known in fact that the sand at present utilized for binding together the materials, is torn out from the road by the suction produced by the passage of rubber-tired wheels, and the disaggregation thus started is continued by the action of other vehicles. It has, therefore, been found necessary to look for some materials with greater binding property than sand, and it has been suggested to use tar either when making the road, or as a superficial or surface cover for the road, but the processes in question did not give the expected effects as regards economy and durability.

It would be possible to obtain a "monolithic" road by pouring into the interstices between the stones bituminous cement such as that used in making side-walks. But in that case, the expenses would be very high, and it would be practically impossible to use such a product, because it would be first necessary to heat it and then to pour it by means of buckets, in which case it would become solidified almost instantaneously. Consequently, the rolling, which is an essential operation for giving to the road the necessary compression in order to insure its solidity, could not be carried out. The present invention, starting from this idea, utilizes the bituminous cement in question, constituted by a thorough mixture of 80 parts by weight of calcareous-clayey sand, and 20 parts of soft coal-tar pitch as aggregating or binding material, then it becomes possible

to make a road by a cold process, that is to say, by means of the processes usually employed.

As it is practically impossible to mix soft cold coal tar pitch with sand, sand is mixed with common dry coal tar pitch, finely pulverized, the said pitch is then turned into soft pitch by adding to the mixture the necessary quantity of coal-tar oil—about 12% by weight of the quantity of pitch—either before or after the mixture is spread upon the road. The rolling is then carried on until the mixture or binding material can no longer be absorbed by the road metal.

Experience has proved that with sufficiently dry sand, the mixture can be easily made, perfectly applied, and that the road with bituminous cement can be obtained at a very moderate price. The proportions of materials can of course vary in accordance with the nature of the constituent materials of the road and in accordance with the traffic on the same. The proportions hereinafter specified are not absolutely essential, they being merely given by way of example and being based on the assumption that the necessary binding material represents about one-fifth of the volume of the stone used:

Stone	1	cubic meter
Sand	0.170	cubic meter
Dry-coal-tar pitch	53	kilograms
Coal tar oil	7	kilograms

The stone must be as hard as possible and broken up in a uniform manner. When the sand is too dry, a little carbonate of lime, limestone, marl, etc., is used to correct it.

The previous mixing of the elements which the binding cement consists of must be carefully done on the spot before the spreading operations take place. Coal-tar oil, which has the advantage of best dissolving the pitch and of being cheaper than other oils, could of course be replaced by some of the latter oils. Thus, for instance, petroleum oils, shale oil, etc., or a mixture of tar and oil, or even pure tar, or any other dissolving materials could be used. Coal pitch could also be replaced by petroleum pitch, shale pitch, wood pitch, resin pitch, etc., which, however, have the disadvantage of being more expensive.

The water generally used in rolling must be done away with in metaling in accordance with the present invention as it would impregnate the agglomerating mixture and

prevent coal-tar oil, which in its natural state is completely insoluble, from penetrating into it, and forming the soft pitch which it is desired to obtain. Consequently it is necessary to select for making the road hot weather, or at least fine weather, in order that the thorough and quick agglomeration of the materials used should be facilitated by the action of the sun. The disadvantages met with in bad weather could however be obviated by making the coal-tar oil, intended for the regeneration of the pitch, soluble in water, and by carrying out the work, as is generally done, by the wet process. To that end, a small proportion of resin, turpentine, pitch, colophony or the like is dissolved in the said oil, either cold or hot, and the solution is treated with any lye, soda potash or ammonia, so as to form a liquid soap with coal-tar oil soluble in any proportion with water. In that case it is sufficient to add to the water used such a quantity of soluble coal-tar oil, that the mixture of insoluble heavy oil and resin is from nine to ten kilograms per cubic meter of stone used, as the resin can replace its weight of coal-tar pitch. Then the mixture will have the following composition:

Stone	1	cubic meter
Sand, preferably clayey-calcareous	0.170	cubic meter
Dry coal pitch	50	kilograms
Water	0.5	cubic meter
Soluble coal-tar oil	10	kilograms

It is obvious that this formula may vary according to circumstances and especially the quantity of water used, which may greatly vary according to the toughness of ground. It is not necessary to use soluble oil in the water used for the preliminary softening of the ground before spreading the stone. The said oil is added only to the water used for the sprinkling of the binding mixture. Moreover it is necessary to stir the mixture of soluble coal tar oil and water in each sprinkling vat in order to obtain a homogenous solution and uniform impregnation of the mixture of dry coal tar pitch and sand.

By this process it is possible to make a road in any weather. After the evaporation of the water the desired road made with bi-

uminous cement similar to reinforced asphalt is obtained. The road could be, moreover, built of different materials to a more or less great depth on ordinary support or on concrete support, and protected against wear by the application of superficial or surface tarring in the usual manner.

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

1. The method of making roads, paths, side-walks, etc., which consists in mixing calcareous-clayey sand 80% and dry coal-tar pitch 20%, then spreading the mixture upon a base, then adding a solvent and turning said mixture into a soft pitch and a bituminous cement.

2. The method of making roads, paths, side walks, etc., consisting in using as binding material a mixture of sand and pulverized dry pitch, in spreading the said mixture upon the road metal previously spread on the ground, in rolling the said mixture and sprinkling it with water to which is added the necessary quantity of coal tar oil, to turn dry coal tar pitch into soft coal tar pitch, and obtain the bituminous cement.

3. The method of making roads, paths, side walks, etc., by using as a binding material for the road metal, in the proportion of 1 fifth of the total volume of the latter, a mixture consisting by weight of 4 parts of sand and 1 part of pulverized dry pitch, in spreading the said mixture upon the road metal, in rolling it, then sprinkling the road, with oil in the proportion of about 7 kgs. per cubic meter of spread road metal.

4. The method of making roads, paths, side walks, etc., by using as a binding material of the road metal, in the proportion of 1 fifth of the volume of the latter, a mixture consisting by weight of 4 parts of sand and 1 part of pulverized dry pitch; by spreading the said mixture upon the road metal; by rolling the road and watering it during the rolling process with water to which about 10 kgs.,—per cubic meter of road metal—, of oil, made soluble, are added.

In testimony whereof I affix my signature.

JULES LASSAILLY.

In the presence of—

THEODORE REDIG,
CHARLES BLANDEL.