

UNITED STATES PATENT OFFICE.

CLIFFORD RICHARDSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

PROCESS OF DEHYDRATING CRUDE ASPHALT.

SPECIFICATION forming part of Letters Patent No. 551,294, dated December 10, 1895.

Application filed December 19, 1893. Serial No. 494,120. (No specimens.)

To all whom it may concern:

Be it known that I, CLIFFORD RICHARDSON, of the city of Washington, District of Columbia, have invented a certain new and useful Process of Dehydrating Crude Asphalt, of which the following is a specification, reference being had to the accompanying drawing.

The object of my invention is to produce an improved process of dehydrating crude lake asphalt and rendering it suitable for commercial purposes—as, for example, in the manufacture of street-pavements—without the use of heat.

Natural asphalt of the general class known as “lake” asphalt is a natural emulsion and contains a large percentage of water. The percentage of water varies considerably in different specimens, but averages about twenty-eight per cent.

In order to render the asphalt suitable for such commercial purposes as the manufacture of street-pavements or the like, it is necessary to dispel the water and to reduce the material to a homogeneous state. Such dehydration has been heretofore accomplished by the means of heat, and various methods of applying heat for the purpose have been employed. The most obvious method of heating the material—as, for example, by means of flame-heat applied directly to the exterior of a vat or pan containing the material—is, owing to the character of asphalt, objectionable for different reasons. Among them an important one is that the non-conductivity of asphalt makes it difficult for the heat to permeate from the surface of direct application through a mass of any considerable magnitude. Therefore, it has been found impracticable to dehydrate asphalt by the direct application of flame-heat without danger of scorching and thereby impairing or totally destroying the valuable properties of the asphalt so treated, or at least that portion thereof lying next to the sides of the receptacle to which the flame is applied.

To overcome the objections against the use of flame-heat, or otherwise produced excessive temperatures, resort has been made to the use of steam or hot air, either injected into the mass of material to be treated, or conveyed throughout the mass in pipes or coils, either stationary or movable. Such methods of treatment, while they overcome in large measure the objections against the use of flame-heat or other high temperatures, are

nevertheless exceedingly expensive and, moreover, they also tend to drive off some of the more volatile constituents that enter into the composition of crude asphalt.

By my invention I am able to produce thorough dehydration, entirely without the aid of heat, and without the aid of that expensive machinery which it is necessary to employ for the purpose of dehydration in accordance with the most approved methods of dehydration by distillation or the use of heat.

My process consists in thoroughly grinding or pulverizing the crude asphalt and exposing it, in the ground or pulverized condition, to the atmosphere, or subjecting it in the ground or pulverized condition to an artificial drying process. The crude asphalt, on account of its peculiar nature, being, as it is, an emulsion, will not, generally speaking, by the first grinding and exposure to the atmosphere be reduced immediately to a powder, and my process contemplates repeated acts of grinding and exposure, each one successively tending to reduce the crude material to a powder and the final grinding and exposure being the step which reduces it, by complete dehydration, to the required state of the commercial product.

The artificial means of drying which I prefer to employ, either as the last step of the final treatment of the material, or as the drying step in each successive treatment, is that of subjecting it to exposure over acid in a vacuum.

The following is the result of one experiment made by exposing a quantity of previously-pulverized asphalt on a damp day. The percentage of loss of water within certain limits of time is laid down.

Loss.	Time of exposure.	
	Hours.	Minutes.
2.2 per cent.....		5
3.5 per cent.....		10
6.5 per cent.....		20
9.5 per cent.....		30
16.5 per cent.....	1	
20.0 per cent.....	2	
21.0 per cent.....	3	

After grinding the mass again finer:

22.50 per cent.....	4	
30.00 per cent.....	21	

The mass was afterward subjected to a drying process in vacuo over acid, when an additional .6 per cent. of water was obtained.

It will be observed that an entire loss of thirty per cent. (which is two per cent. above the average proportion of water in the emulsion) was driven off in twenty-one hours. After the expiration of three hours, the mass was ground finer than it had been in the first place, but it may be ground to the requisite fineness in the first instance and thus avoid the additional handling. Generally, in practice, however, I prefer to subject the material alternately to successive steps of grinding and drying in order to produce the best results.

What I claim is—

1. The process of dehydrating crude asphalt, which consists in successively and alternately grinding or pulverizing the same and drying it in order to reduce it from its

natural state of emulsion to a dry powder, substantially as set forth.

2. The process of dehydrating crude asphalt, which consists in grinding or pulverizing the same and submitting it to the action of the atmosphere, substantially as and in the manner specified.

3. The process of dehydrating crude asphalt, which consists in grinding or pulverizing the same, thereafter submitting it to the action of the atmosphere and finally subjecting it to a drying process over acid in a vacuum, substantially as and in the manner specified.

In testimony of all which I have hereunto subscribed my name.

CLIFFORD RICHARDSON.

Witnesses:

JOSEPH L. ATKINS,
GEO. L. CLARK.