

UNITED STATES PATENT OFFICE.

JOHN F. LOVEJOY, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO ABRAHAM STEIN,
OF NEW YORK, N. Y.

METHOD OF PRODUCING COAL-TAR PITCH.

No. 875,196.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN F. LOVEJOY, a citizen of the United States, and a resident of New York, county of New York, and State of New York, have invented a new and useful Improvement in Methods of Producing Coal-Tar Pitch, of which the following is a specification.

The aim of my invention is to produce from coal-tar the pitch adapted more especially for use in the manufacture of coal briquets. The desirable pitch for this purpose should have a melting point higher than that of the ordinary pitch of commerce, and should be free from the fine particles of carbon, known as free carbon, and from other foreign matters which are usually contained in the original tar.

Heretofore, in the distillation of tar, the presence of water has been considered highly objectionable and it has been the general practice, before distillation, to remove from the tar the water and the ammoniacal fluids, commonly present in small percentages, as far as practicable. I have discovered the fact that, contrary to the general belief, the presence of water in the tar during distillation is highly advantageous, provided it is used in substantial quantity.

In carrying out my process I subject the tar to distillation in the presence of water and subject to agitation, preferably passing steam upward through the mass after it has acquired a temperature of 220 degrees Fahrenheit, or thereabout.

In practice, I introduce into a still or retort of any suitable construction from five to ten parts by weight of water, and then introduce one hundred parts of crude tar, which is preferably heated before its introduction, in order to facilitate the operation. The mass is gradually heated to 212 degrees Fahrenheit to distil or vaporize the water, care being taken to see that there is no violent boiling or foaming action. During this action, the mass may be advantageously agitated mechanically, and this agitation may be continued until a much higher temperature is attained. When the water has been partially vaporized and the temperature begins to rise appreciably above the boiling point of water, the heat is increased and the temperature of the mass slowly or gradually raised to from 575 to 680 degrees Fahrenheit, according to the predetermined melting point of the pitch. When the temperature reaches

220 degrees Fahrenheit, or thereabout, steam should be introduced at the bottom and its flow continued until the distillation is complete, that is, until the predetermined melting point of the pitch has been reached.

It is found that water may be mechanically incorporated in or intermingled with the tar, and that during the distilling operation, the resulting steam or vapor rising through the mass of tar, aids in causing a continuous agitation and circulation of the same, and has a peculiarly efficient action in washing out, setting free and carrying away the particles of free carbon and other impurities. It also has the effect of thoroughly washing from the tar the ammoniacal liquor and of setting free and carrying away to a substantial extent the light oils, even while the temperature of the mass remains at or near 212 degrees Fahrenheit. The agitation of the tar, with which the water is intermingled or mechanically combined, results in the steam or vapor coming in contact with and acting upon every portion of the tar, with the cleansing effect, and also in the vaporization and release of the various lighter oils so that they may escape successively at their respective vaporizing temperatures as the distillation progresses. The water will not be completely volatilized until the temperature of the mass has reached from 300 to 340 degrees Fahrenheit. The distillation should, however, be carried on slowly in order to permit the oils to escape successively. The distillation is concluded at a temperature of from 575 to 680 degrees Fahrenheit.

The pitch resulting from my method of distillation will commonly have a melting point of from 155 to 165 degrees Fahrenheit. Under ordinary conditions, the complete distillation is accomplished in about thirty-six hours, more or less, and the temperature standing near 212 degrees at the first twenty-four hours or thereabout.

I believe myself to be the first to intentionally add water to tar prior to or during the process of distillation, and it is to be understood that my invention relates to the employment of water alone to the exclusion of chemicals which have, in some instances been employed.

The apparatus for practicing my invention may be of any suitable construction, stills adapted for the purpose being well known in the art.

It is to be understood that I add water in a quantity which forms a substantial portion of the entire charge,—a quantity which will produce a very great volume of steam.

5 I am aware that it has been proposed to distil coal tar in the presence of sulfate of iron, water being used in a limited quantity to dissolve the sulfate, but in practice it has been discovered that although the iron is
10 beneficial in certain ways, it is seriously objectionable because of its precipitation in the still beneath the tar, resulting in serious injury to the still and in irregular and uncertain distillation.

15 Having described my invention, what I claim and desire to secure by Letters Patent is:

1. The method of producing pitch, consisting in distilling coal tar in the presence of
20 an abnormal percentage of water.

2. The method of producing pitch, consisting in combining coal-tar and water in substantially the proportions specified and distilling the same, at the same time sub-
25 jecting the mass to agitation.

3. The method of producing pitch, consisting in commingling coal-tar with a substantial percentage of water to the exclusion of other substances, and subjecting the mass
30 to distillation until the resulting pitch has a melting point of 155 degrees Fahrenheit, more or less.

4. The method of producing pitch, consisting in distilling coal-tar in the presence of an abnormal amount of water, and passing
35 steam through the mass during distillation.

5. The method of producing pitch, consisting in distilling coal-tar in the presence of an abnormal amount of water, mechanically agitating the mass during distillation to in-
40 sure distribution of the water through the mass and at the same time passing steam upward through the mass.

6. The method of producing pitch, consisting in commingling coal-tar and water, subjecting the mass to a temperature of about 212 degrees Fahrenheit for twenty-
45 four hours, more or less, and thereafter gradually raising the temperature to from 575 to 680 degrees Fahrenheit.
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7. The method of producing pitch, consisting in distilling coal-tar and water in the proportions of one hundred parts of tar, more or less, and from five to ten parts of
55 water, and subjecting the mass during distillation to mechanical agitation.

In testimony whereof I hereunto set my hand this 26th day of February, 1906, in the presence of two attesting witnesses.

JOHN F. LOVEJOY.

Witnesses:

P. T. DODGE,
E. J. LAMB.