

W. M. BURTON.
PROCESS OF PRODUCING ASPHALT.
APPLICATION FILED SEPT. 23, 1912.

1,055,707.

Patented Mar. 11, 1913.

2 SHEETS-SHEET 1.

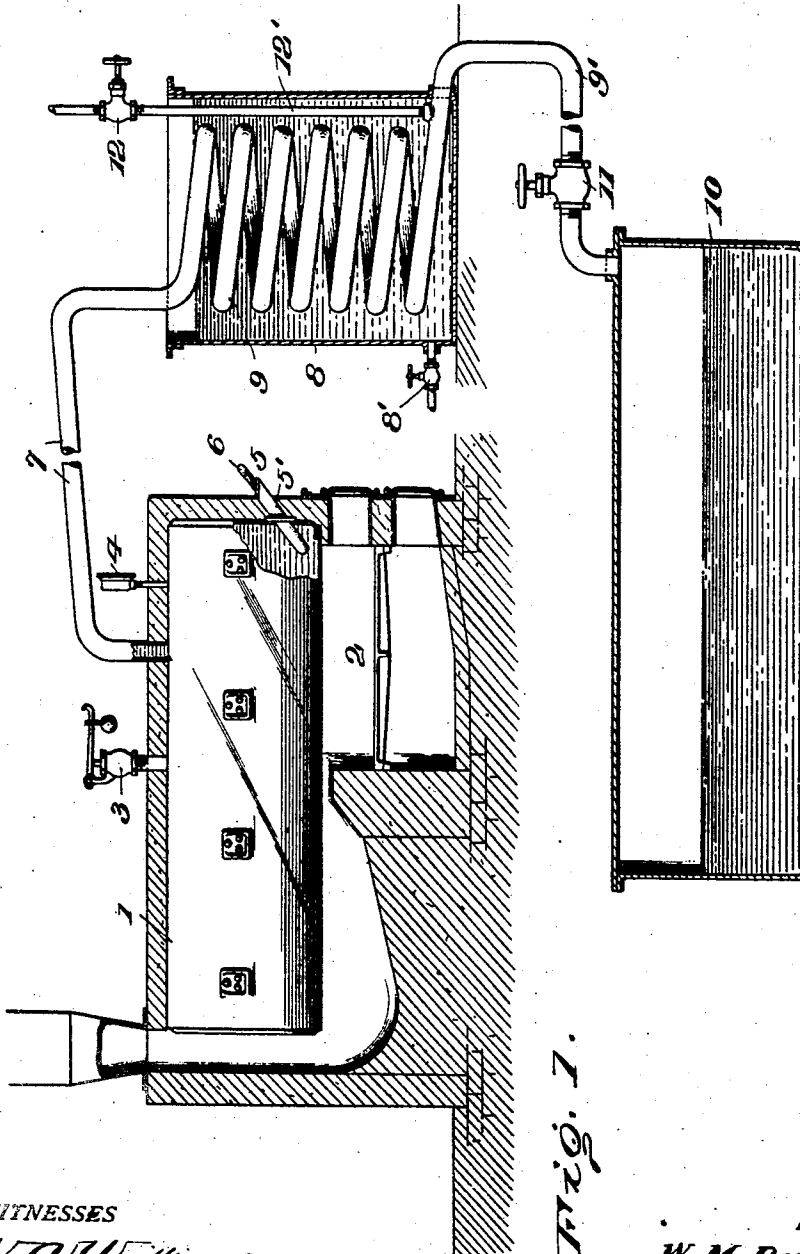


Fig. 1.

WITNESSES
W. W. Williams.
H. E. Klein.

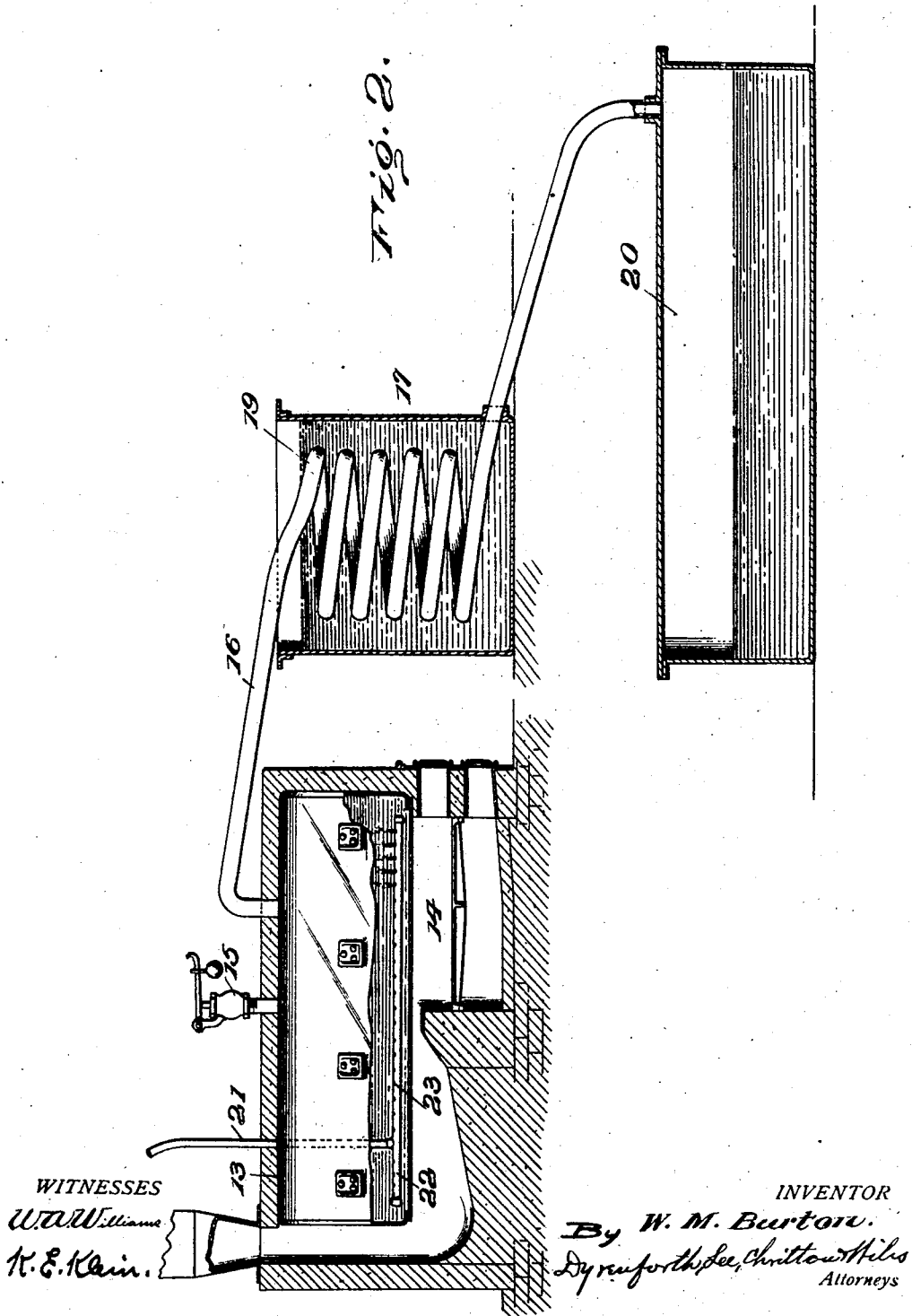
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UNITED STATES PATENT OFFICE.

WILLIAM M. BURTON, OF CHICAGO, ILLINOIS, ASSIGNOR TO STANDARD OIL COMPANY,
OF WHITING, INDIANA, A CORPORATION OF INDIANA.

PROCESS OF PRODUCING ASPHALT.

1,055,707.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed September 23, 1912. Serial No. 721,935.

To all whom it may concern:

Be it known that I, WILLIAM M. BURTON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Processes of Producing Asphalt, of which the following is a specification.

My invention relates to the process of producing asphalt by the treatment of the high boiling-point residual portions, and particularly the residue of the distillation of the paraffin group or series of petroleum after the lower boiling point distillates have been removed.

The object of my invention is to provide a process of treating the aforesaid residue of the paraffin group of petroleum by successive distillation, whereby the product remaining after such distillation is asphalt and has the same properties, both chemical and physical, as that of Trinidad, Bermuda, and other naturally occurring asphalts.

My process involves the process disclosed in my Patent, No. 1,049,667, Jan. 7, 1913, with the addition thereto that I take the liquid remaining in the still, after the process disclosed in that application is completed, and subject the same to further distillation.

A form of apparatus suitable for the practice of my invention is illustrated in the accompanying drawing, wherein the same part is designated by the same reference numeral wherever it occurs, and wherein—

Figure 1 is a broken view in vertical longitudinal section, diagrammatic in character, showing the parts in elevation of the first still and its accessories, and Fig. 2 is a similar view of the second still.

1 designates the first still for the treatment of liquid, and it surmounts a fire chamber 2 and is shown to be equipped with a safety valve 3, to relieve excessive pressure in the still, a pressure gage 4 and a temperature gage 5, one construction of which is that illustrated, of a tube 5' inclining inwardly into the holder through its head, and closed at its inner end for containing mercury or by preference, oil, and adapted to have withdrawably inserted into it through its outer, open end a suitable thermometer 6 for immersion into the contents of the tube under subjection to the heat in the holder. A conduit 7 leads from the top

of the holder and inclines upwardly therefrom, to induce the return-flow into it of unvaporized portions of the liquid, to a condenser 8, the tank of which is shown to be provided with a lower draw-off cock 8'. The condenser-coil 9 discharges at its lower end through a pipe-extension 9' thereof, of any desired length, into a receiver 10 for the products of condensation. In this pipe, and thus beyond the discharge-end of the coil, is contained a shut-off valve 11, and it is desirable to equip the coil with a relief-valve 12, shown on the upper end of a pipe 12' rising from near the lower end of the coil through the top of the condenser-tank, for relieving the pressure of the gas which is liable to accumulate in the coil and obstruct the action of the apparatus.

13 designates a second still into which the residue remaining in the first still is charged. This still is shown as surmounting a fire-chamber 14, and is shown as equipped with a safety-valve 15 to relieve excessive pressure in the still. A conduit 16 leads from the top of the still to a condenser 17 and inclines downwardly from the still to prevent the return flow into the still of any unvaporized liquid. The condenser 19 discharges by its lower end into a tank 20, adapted to receive the condensed distillates from the still 13. It will be noted that as the connection between the still 13 and the tank 20 is an open one, no excess pressure will be generated in the still 13. In order to prevent the cracking of the residue in the still 13 I introduce an inert vapor, such as steam, carbon dioxide, or the like, by means of a pipe 21 entering the still, to the lower end of which is connected a pipe 22 extending longitudinally inside the still adjacent to its bottom, and provided with openings 23 for the escape steam or other inert gases the length of the still.

In carrying out my process I charge into the still 1 the liquid residue of the paraffin group of petroleum which has a boiling-point of upward of 500°, the charge preferably being of such an amount as to fill the still about half full, and heat is applied thereto and the pressure held in the still at about 4 to about 5 atmospheres. This will cause the liquid to vaporize and to give off its distillates at about 650° to 800° F. and the distillates are preferably condensed under pressure as fully described in my ap-

plication above referred to. This distilling process is continued until the bottom of the still is red hot, which heating of the bottom is caused by the precipitation of coke therein. The liquid residue is then drawn off from the first still and charged into the second still 13. This liquid residue or tar is limpid about the consistency of thin syrup, and has a greater specific gravity than water. After the second still 13 is charged, heat is applied thereto from the furnace 14, and steam or other inert vapor is supplied through the pipe 21, in order to prevent further cracking. The distilling operation is carried on in the ordinary way, using fire under the still and inert vapor in the still, until from 60 to 70 per cent. of the charge has been taken off as a distillate; then the residue remaining in the still 13 is withdrawn and permitted to cool. This residue is asphalt, and has the same chemical and physical characteristics as the natural asphalt.

I have shown the distillates as passing through the condenser 17 and into the tank 20. It will be noted that this has an open connection between the still 13 and the tank 20, so that no excess pressure is generated in the still, and the distilling operation is carried on at substantially atmospheric pressure.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The process of producing asphalt which consists in distilling at a temperature of from about 650° to about 850° F. the liquid portions of the paraffin series of petroleum-distillates having a boiling-point of

upward of 500° F. maintaining by the volatile constituents of said liquid a pressure on the liquid of from about 4 to about 5 atmospheres until the liquid has been reduced to an amount equal to 40 to 50% of its original volume, drawing off said liquid residue and subjecting the same to a temperature of from 500 to 700° F. under substantially atmospheric pressure until the major portion of said liquid residue has been distilled off, and then permitting the residue to cool.

2. The process of producing asphalt which consists in distilling at a temperature of from about 650° to 850° F. the liquid portions of the paraffin series of petroleum-distillates having a boiling-point of upward of 500° F. maintaining by the volatile constituents of said liquid a pressure on the liquid of from about 4 to about 5 atmospheres until the liquid has been reduced to an amount equal to 40 to 50% of its original volume, drawing off said liquid residue and subjecting the same to a temperature of from 500 to 700° F. under substantially atmospheric pressure, introducing an inert vapor into the liquid during said heating, continuing said heating and continuing the introduction of inert vapor until the major portion of said liquid residue has been distilled off, and then permitting the residue to cool.

In testimony whereof I affix my signature in presence of two witnesses:

WILLIAM M. BURTON.

Witnesses:

FRANCIS M. PHELPS,
GEO. S. LIVINGSTON.