

W. C. & F. E. WELLS.

PROCESS OF REFINING, FRACTIONATING, AND REDUCING OILS.

APPLICATION FILED DEC. 2, 1913. RENEWED JULY 8, 1918.

1,296,244.

Patented Mar. 4, 1919.

2 SHEETS—SHEET 1.

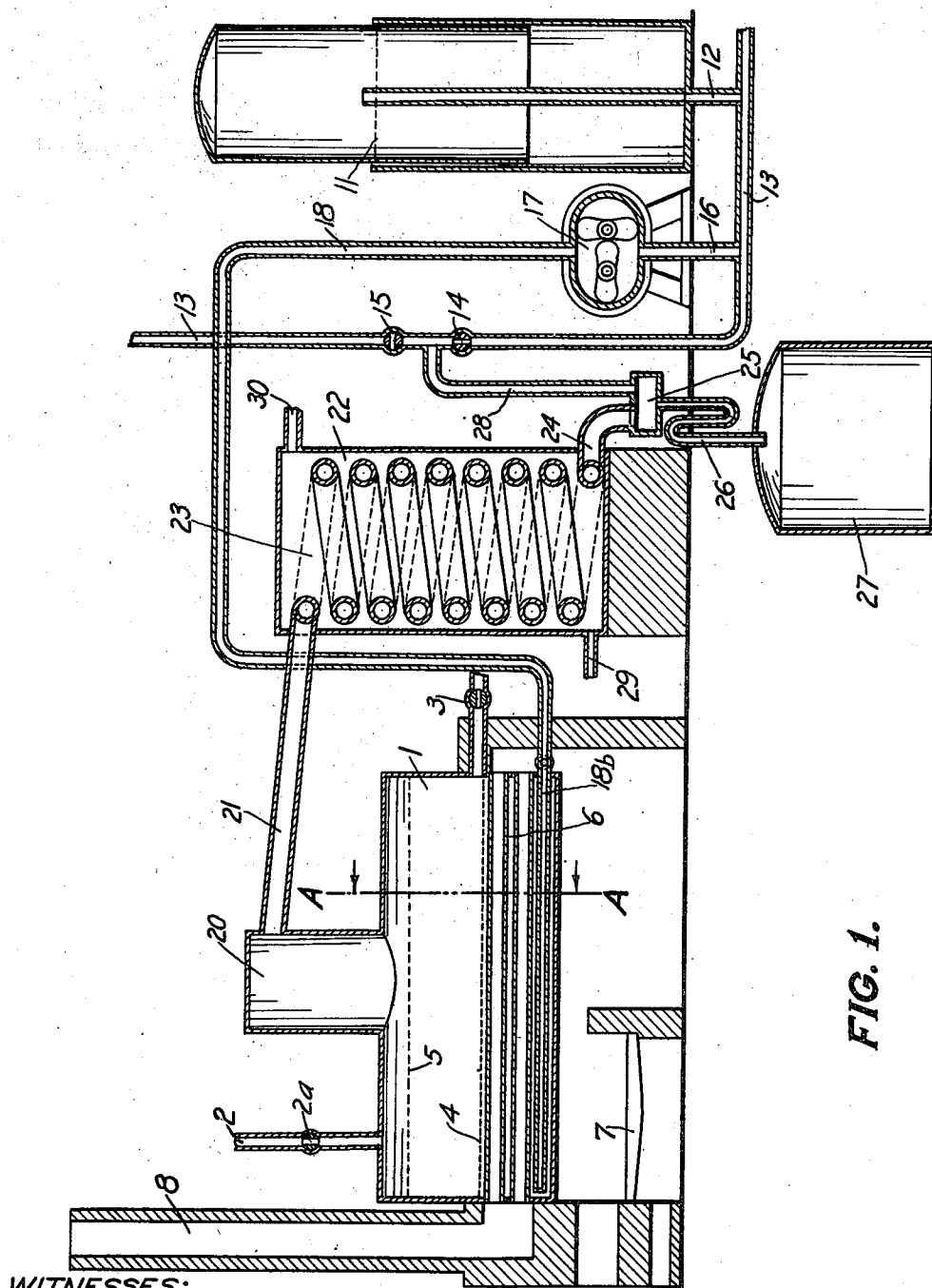


FIG. 1.

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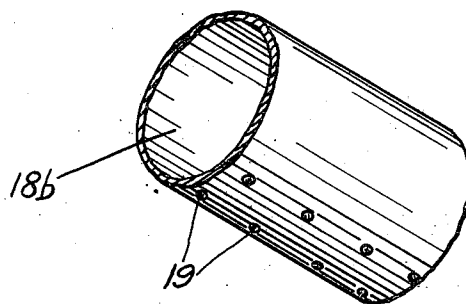


FIG. 3.

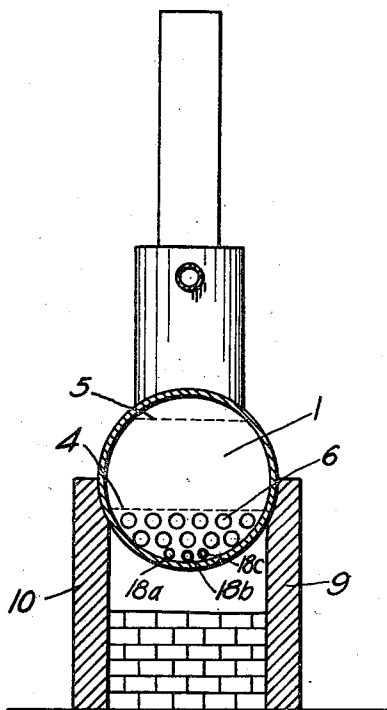


FIG. 2.

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UNITED STATES PATENT OFFICE.

WILLET C. WELLS AND FRANK E. WELLS, OF COLUMBUS, OHIO.

PROCESS OF REFINING, FRACTIONATING, AND REDUCING OILS.

1,296,244.

Specification of Letters Patent.

Patented Mar. 4, 1919.

Application filed December 2, 1913, Serial No. 804,201. Renewed July 8, 1918. Serial No. 243,947.

To all whom it may concern:

Be it known that we, WILLET C. WELLS and FRANK E. WELLS, citizens of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Processes of Refining, Fractionating, and Reducing Oils, of which the following is a specification.

10 The invention relates to a process of evaporating volatile and semi-volatile substances such as petroleum, liquid asphalts, coal tar, and the like materials, especially those that
15 of the receptacle in which they are being evaporated, and consists essentially in the use of a fluid medium bath that will not evaporate at the temperatures to be used, and is heavier than the substance to be evaporated, such as melted lead, or an alloy that
20 will be fluid at temperatures suitable for the purpose, through which heat that is imparted thereto is in turn imparted to the substance to be evaporated; and in the use
25 of a permanent gas which, passing through the heated bath conveys heat imparted thereto to the material being evaporated; the heated permanent gas, seeking to saturate
30 itself with vapors, evolves the volatile portions of the material to be acted upon in vapors at the desired low temperatures, and conveys said vapors to a condenser where it deposits its load, and repeats the performance in continuous cycle, as set forth in the
35 United States Patent No. 877,620, but is carried on in a manner different therefrom, as pointed out hereinafter.

Appropriate apparatus for performing the process is shown in the accompanying
40 drawings which are hereby made a part of this specification, in which Figure 1 is a vertical, longitudinal section through the entire apparatus; Fig. 2 is a vertical cross-section through Fig. 1 along the line A—A,
45 and Fig. 3 is a perspective of one of the tubes showing the perforations therein through which the gas is admitted into the oil vessel for use in the process.

Referring to the drawings, 1 is a retort or
50 still having intake 2 and the discharge outlet 3. In the bottom of the vessel is placed a non-evaporable fluid bath, preferably a metallic alloy of required melting point, filling the retort to about the dotted line 4, and the
55 material to be operated upon, being admitted through pipe 2 rests upon the surface of the

bath, which is of greater specific gravity than the said material, and the vessel 1 is filled to approximately the level indicated by the dotted line 5. A series of flues 6 is
60 arranged in the lower portion of the vessel 1 surrounded by the bath. The furnace is shown conventionally at 7, the stack at 8, and the wall supporting the retort or still at 9 and 10. By reference to Fig. 2 it will be
65 noted that the heat from the furnace 7 plays directly upon the lower part of the retort or still 1, but cannot come into contact with the walls thereof above the surface 4 of the bath. Heat is therefore applied to the bath di-
70 rectly and through the flues 6, and by means of the permanent gas which takes up the heat from the bottom of the bath and conveys it through the bath and into the material to be evaporated, thereby raising its
75 temperature to the degree desired. In the process the permanent gas used is stored in the tank 11 connecting through pipe 12 with the pipe 13 containing the valves 14 and 15. Pipe 13 also communicates through pipe 16
80 with the pump 17 which is in connection through the pipe 18 with the retort or still. Branches 18^a, 18^b, 18^c from pipe 18 are introduced into the retort or still near the bottom thereof as appears especially in Fig. 2, and
85 contain in their lower portions the perforations 19 shown especially in Fig. 3 through which the gas may issue and rise through the bath into the body of the heated material. 20 is a dome communicating with the
90 interior of the retort or still 1 from which dome the conduit 21 leads into the condenser 22 and communicates therein with the coil 23 issuing therefrom at the lower end at 24, and communicating with the box 25. Box
95 25 communicates through the trap 26 with the receiver 27 of the condensate. Box 25 also communicates through pipe 28 with pipe 13 between the valves 14 and 15. The condenser 22 is supplied with water at the
100 intake 29, and contains the water discharge 30 at its upper end.

The operation is as follows: The bath being provided in the bottom of the retort or still, the material to be evaporated is
105 then introduced through the pipe 2 and the valve 2^a is then closed. Heat is produced in the furnace 7, and the temperature of the bath is thereby raised to whatever degree may be desired, and consequently the
110 temperature of the material to be evaporated is increased as desired. The valve

14 meanwhile is closed and the valve 15 is open, and the pump 17 being started gas is drawn through pipes 12, 13, 16 and forced into pipe 18 and its branches, and out through the perforations 19 into the bath, where it is heated and rises through the bath into and through the material to be evaporated, and all air found in the retort or still and in the system of pipes is thereby expelled outwardly through the dome 20, pipe 21, coil 23, pipe 24, box 25, pipe 28, valve 15 and pipe 13 to the outer air. When complete expulsion of the air is had valve 15 is closed and valve 14 is opened, thereby establishing return communication between the retort or still and the pump.

By the action of the heat applied to the material as described, and the absorptive properties of the heated permanent gas, vapors are produced and conveyed thereby into dome 20 through conduit 21 into coil 23 in the condenser 22, and the condensate thus resulting passes through box 25 into the trap 26, and therefrom is collected into the receiver 27. The permanent gas passes out from the box 25 through the pipe 28 into the pipe 13, and through valve 14 into the pipe 16 and through the pump, and again back through the pipe 18 and its branches, and through the bath and into the material being evaporated for further service. A continuous cycle is thus provided for the permanent gas, and as the process of evaporation goes on the heat may be varied as desired through the medium of the bath. It is not essential that the permanent gas be heated solely by its contact with the bath, as it is clear that it may be raised to any desired temperature before it is supplied to the retort or still.

All residues from the desired fractions removed will rest upon the surface of the heated bath medium, and may be drawn off

through pipe 3 as desired. As nothing can attach itself to the fluid bath, and all of the residue of the material acted upon remains on top of the bath, there is therefore no burning fast to any portion of the apparatus in the entire process.

We claim:—

1. The process of evaporating petroleum residues, liquid asphalts, coal tar, and like materials, consisting in providing a heated non-evaporable fluid bath upon which said materials are superposed and are thereby heated, passing a permanent gas into and through said bath and thence through said materials, whereby the vapors evolved therefrom are conveyed to a condenser.

2. The process of evaporating petroleum residues, liquid asphalts, coal tar, and like materials, consisting in providing a heated non-evaporable fluid bath upon which said materials are superposed and are thereby heated, passing a permanent gas into and through said bath whereby said gas is heated, thence passing said gas through said materials, whereby the vapors evolved therefrom are conveyed to a condenser.

3. The process of evaporating crude petroleum to a desirable dry residue consisting in providing a heated non-evaporable fluid bath upon which said petroleum is superposed and thereby prevented from burning to the heated portion of the container, passing a permanent gas into and through said bath and thence through said petroleum, whereby said gas is saturated with the vapors of petroleum, and conveying said saturated gas to a condenser.

In testimony whereof we affix our signatures in the presence of two witnesses.

WILLET C. WELLS.
FRANK E. WELLS.

Witnesses:

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