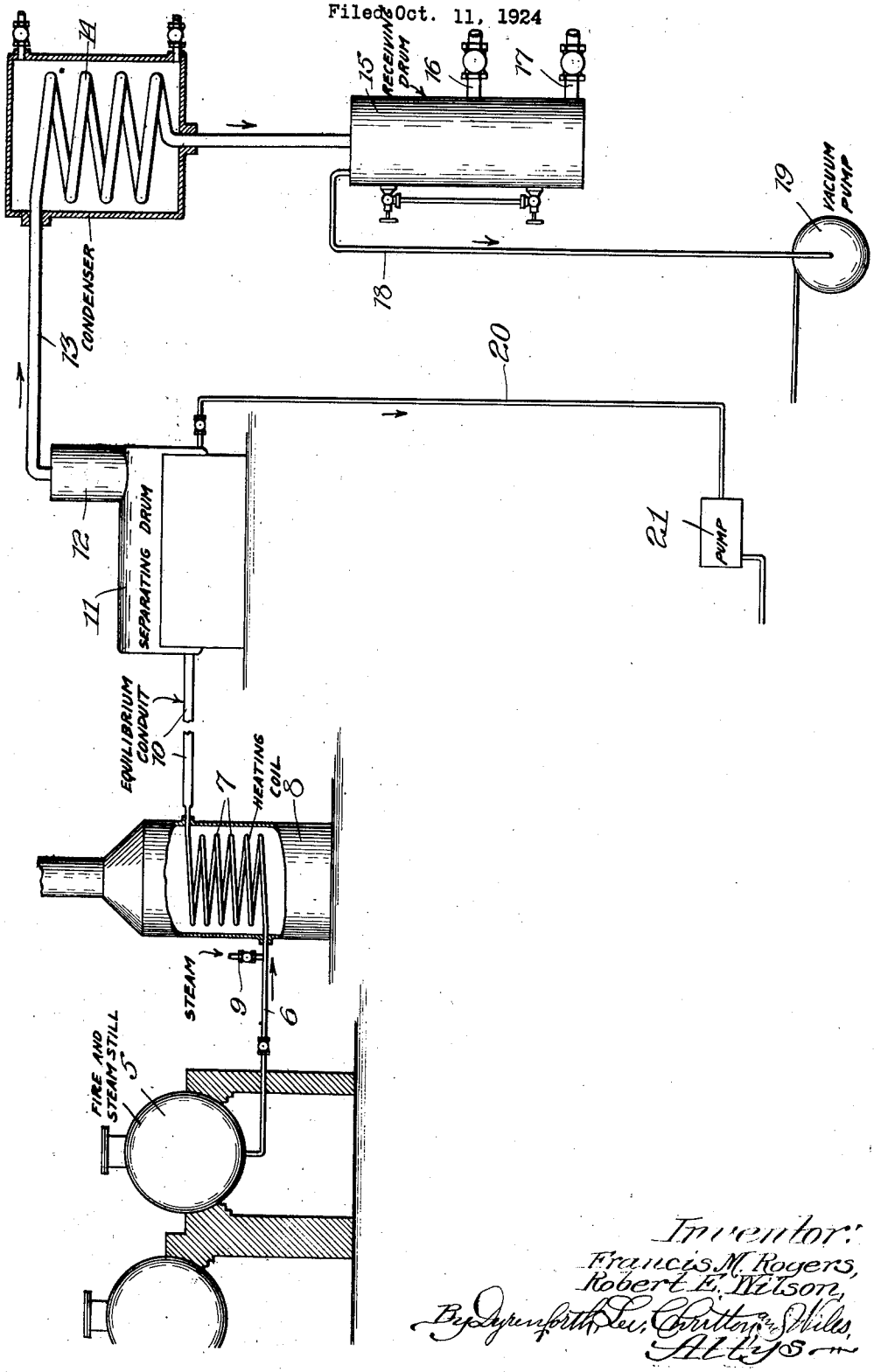
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CONTINUOUS DISTILLATION OF CRUDE PETROLEUM OILS

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CONTINUOUS DISTILLATION OF CRUDE PETROLEUM OILS.

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The present invention relates to improvements in the continuous distillation of crude petroleum oils, and will be fully understood from the following description, illustrated by the accompanying drawings, in which the figure shows diagrammatically apparatus suitable for carrying the invention into effect.

Referring to the drawing, the numeral 5 indicates the end stills of a battery or series of continuous stills, such as are ordinarily employed in the continuous distillation of petroleum oils with fire and steam. From the last of the battery of continuous stills the heated residuum is discharged or pumped into the coil 7 mounted in a suitable setting 8, the coil of the usual cleanable form, and its setting being shown diagrammatically in the drawing. Steam or other inert gas may be introduced into the coil through the valve line 9, communicating with the inlet of the coil. From the coil oil passes through a line 10, preferably of greater cross-sectional area than the coil 7, and into a vaporizing chamber or drum 11. The vaporizing drum 11 may be provided with a suitable device or separator 12 for removing entrained liquid from outgoing vapors. The separator 12 communicates with the vapor pipe 13 leading to the condenser coil 14, from which condensate passes into a receiving drum 15, in which a separation of oil and water may take place. Oil may be withdrawn through the valved discharge line 16 and water may be withdrawn through the discharge line 17. From the vapor space of the receiving drum 15 a line 18 communicates with the vacuum pump 19.

Residues are removed from the vaporizing drum 11 through the valved line 20, which communicates with the intake of the hot oil or surge pump 21.

In carrying out the invention, a crude or equivalent oil, such as reduced crude oil, is reduced with fire and steam to a suitable bottom, say up to 20% and preferably 10 to 15% of the crude, in the battery of continuous stills by means of fire and steam. The temperature prevailing in the last of the stills 5 may be from 600 to 650° F. The residue passes through the pipe 6 into and through the heated coil 7, steam being added in the quantity desired to the steam inlet pipe 9. The proportion of steam employed varies with different oils and with the character of overhead distillate desired. In general, from 4 to 10 pounds of steam per gallon of distillate are employed, but this may be varied within wide limits, depending on the vacuum employed, the nature of the crude and product desired, etc. In passing through the coil 7 the oil is brought to a higher temperature, say 700 to 800° F. and preferably from 720 to 750° F. From the coil 7 the oil and steam are drawn into the enlarged pipe 10, which is preferably of considerable length, so as to permit the attainment of substantial equilibrium between vapors and liquid. The heated oil, oil vapors and steam then enter the separating drum 11, in which separation of vapors from oil residue takes place. The vapors pass out through the entrainment separator 12 and vapor line 13, the entrainment separator 12 removing entrainment particles of oil and consequently discoloration or other impairment of the distillate. The separated vapors then pass into the condenser 14, from which condensate flows to the receiver 15. In the receiver, condensed water and oil may suitably be separated.

The vapor space of the receiving drum 15 is connected with the vacuum pump 19, by which a suitable vacuum is maintained in the separating drum 11. An absolute pressure of from 1 to 3 inches of mercury or up to 4 inches may suitably be maintained in the separating drum by the vacuum pump.

The residue in the separating drum, while still in liquid state, is drawn out through the valved line 20 by the pump 21. This residue may vary from 20 to 50% on the residuum discharged from the last of the continuous stills, or from 2 to 6% on the original crude in the case of mid-continent crude. With other crudes, these proportions may vary, in part depending on their asphalt content. It has a high melting point, above 325° F., is asphaltic in character, with practically zero penetration and ductility at 77° F, and may be readily pulverized for use as a powdered fuel, crushing readily into an almost impalpable powder. Thus, a residue produced by a process herein described, from mid-continent oil, using a temperature of 720 to 750° F. at the outlet of the coil and with from 4 to 5 pounds of steam employed per gallon of distillate amounted to 3 to 4% on

the original crude and had a melting point of about 385° F.

The distillates obtained by this process are usually heavy, viscous products, but very slightly cracked, excellently adapted for the manufacture of heavy high grade lubricating oils. They may likewise be employed as a stock for cracking into gasoline, if so desired.

We claim:

1. The method of continuous distillation of crude petroleum oils which comprises reducing the oil to a very heavy bottom by subjecting the oil to the action of heat and steam, passing said very heavy bottom, accompanied by steam, through a confined passage in a heating zone at a temperature sufficient to bring the oil to a temperature of 700 to 800° F., introducing the heated oil and steam into a chamber in which separation of vapors and liquids takes place, separately removing the vapors and liquids therefrom, and maintaining within said chamber absolute pressure of less than 4 inches of mercury.

2. The method of reducing crude petroleum oils comprising subjecting a petroleum oil to distillation with fire and open steam to bring said oil to a very heavy residue amounting to not over 20% on the original crude, passing said residue, accompanied by steam, through a confined passage in a zone heated sufficiently to bring the temperature of the oil to 700 to 800° F., introducing the heated oil and accompanying steam into an enlarged chamber, wherein separation of vapors and unvaporized liquid takes place, separately removing the unvaporized liquid and the vapors, and maintaining within the vaporizing chamber an absolute pressure not over 4 inches of mercury.

3. The method of reducing crude petroleum oils comprising subjecting mid-continent petroleum oil to distillation with fire and steam to bring said oil to a pitch bottom of 10 to 15% of the original crude, passing said bottom, accompanied by steam, through a confined passage in a zone heated to bring the temperature of the oil to 720 to 750° F., introducing the heated oil and steam into a chamber in which an absolute pressure of 1 to 3 inches of mercury is maintained, and removing vapors and unvaporized residue separately therefrom.

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