

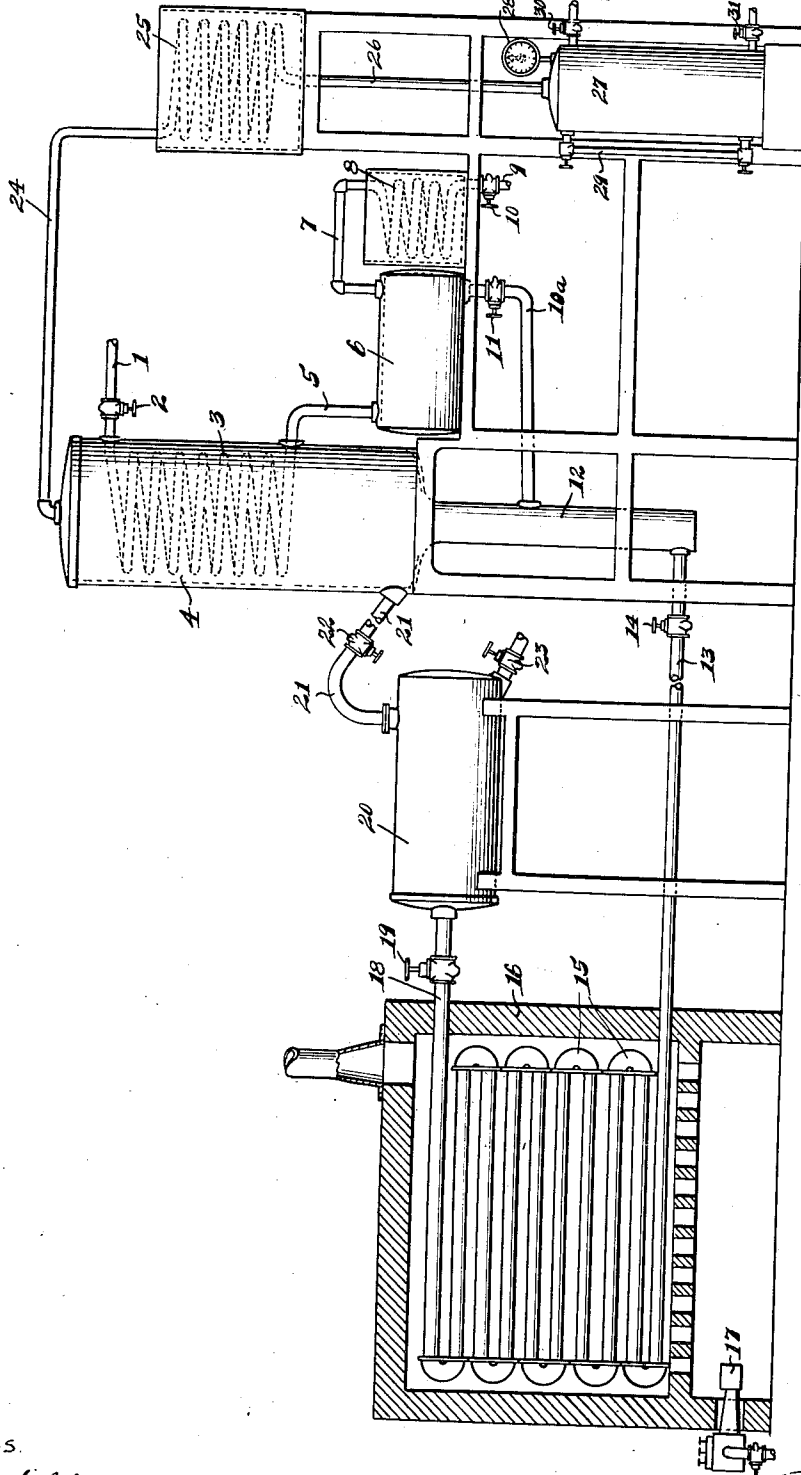
Dec. 13, 1927.

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1,652,166

PROCESS FOR CONVERTING PETROLEUM OILS

Filed Feb. 16, 1922



Witness.

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UNITED STATES PATENT OFFICE.

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PROCESS FOR CONVERTING PETROLEUM OILS.

Application filed February 16, 1922. Serial No. 536,841.

This invention relates to improvements in a process and apparatus for converting petroleum oil and refers more particularly to a process in which prior to the converting operation the oil is relieved of any water or moisture that may be contained in the oil either in complete or emulsified stage.

The single figure is a diagrammatic side elevational view of the apparatus.

Referring to the drawing, the oil to be treated is introduced from any convenient source through the line 1 controlled by a valve 2 and is circulated through the coil pipe 3 mounted in the dephlegmating or refluxing column 4. In its circulation through this coil the oil serves to reflux the vapors which rise through the dephlegmating column and in addition the raw oil is preheated prior to its introduction to the heating stage. The raw oil after being circulated in the dephlegmating column through the coil 3, passes down through the line 5 to a retort or still 6. The oil after passing through the coil in the refluxing column is at a higher temperature than the boiling point of water and on being collected in the still or retort 6, permits a vaporization and distillation of the moisture or water which is contained in the oil. This water vapor rises from the oil body and passes out through the line 7 to and through a condensing coil 8 and may be drawn off in liquid form through the line 9 controlled by a valve 10. The dry oil on the other hand, is withdrawn from the bottom of the still or retort 6 through the line 10^a regulated by a throttle valve 11 and is introduced to the lower leg 12 of the dephlegmator. From this lower extension or leg 12 a line 13 controlled by a valve 14 serves to direct the oil to the heating coils 15 mounted in a furnace 16 which is preferably heated by means of gas burners 17. The oil after being raised to a conversion temperature in the heating coils 15 passes through the transfer line 18 in which is interposed a valve 19 into the expansion or vaporizing chamber 20 where the major part of the conversion and vaporization takes place. The vapors evolved in this expansion chamber pass off through the vapor line 21 controlled by a valve 22 to the dephlegmating or refluxing column 4. The liquid or unvaporized oil on the other hand

may be drawn off through the valve 23. As explained, the vapors rising through the dephlegmator are refluxed by the cool preheating coil which is positioned therein. It will be further noted that the raw oil does not come in intimate contact with the vapors but the heat interchange is effected by radiation through the coil pipe, thus the preheating coil becomes a distilling coil for the water or moisture which is contained in the oil.

The vapors which are dephlegmated in the refluxing column 4 by the dephlegmating coil 3 pass over through a line 24 to a water condenser 25. The liquid distillate flows down through line 26 to a receiving tank 27 which is equipped with a pressure gauge 28, liquid level gauge 29, pressure relief valve 30 and a liquid draw-off valve 31.

By preheating the oil in this manner difficulty which would be experienced with the formation of water vapor or steam in the oil during the conversion reaction, and during the heating in the coils 15 is obviated.

I claim as my invention:

1. A process for simultaneously dehydrating and cracking petroleum oil, consisting in passing the oil in a confined stream through a dephlegmating zone where said oil is subjected to a temperature above the boiling point of water and wherein it acts as a dephlegmating medium for the vapors passing through said dephlegmating zone, in then introducing this preheated oil to an enlarged zone wherein the water vapors are relieved from the oil, in discharging such vapors, in continuously taking off dry oil from said enlarged zone and passing it in a restricted stream through a heating zone wherein it is raised to a cracking temperature, in thence passing such heated oil to an enlarged reaction zone, in passing the evolved vapors from said zone to said dephlegmating zone, and in discharging the uncondensed vapors from said dephlegmating zone for condensation and collection.

2. A continuous process for simultaneously dehydrating and cracking petroleum oil, consisting in initially passing water-bearing oil in a confined stream through a dephlegmating zone wherein the heat of the vapors raises the temperature of the water-bearing oil to a point sufficiently high to

cause vaporization of the water content of such oil, in delivering the heated water-bearing oil into an enlarged zone wherein such water vapors are released, in continuously passing the dry oil from said enlarged zone in a restricted stream through a heating zone wherein it is subjected to a cracking temperature, in delivering such heated oil to a reaction zone from which no unvaporized oil is permitted to return to the heating zone, and in conveying vapors from said reaction zone to said dephlegmating zone. 10

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