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G. D. SIMS

APPARATUS FOR TREATING OILS

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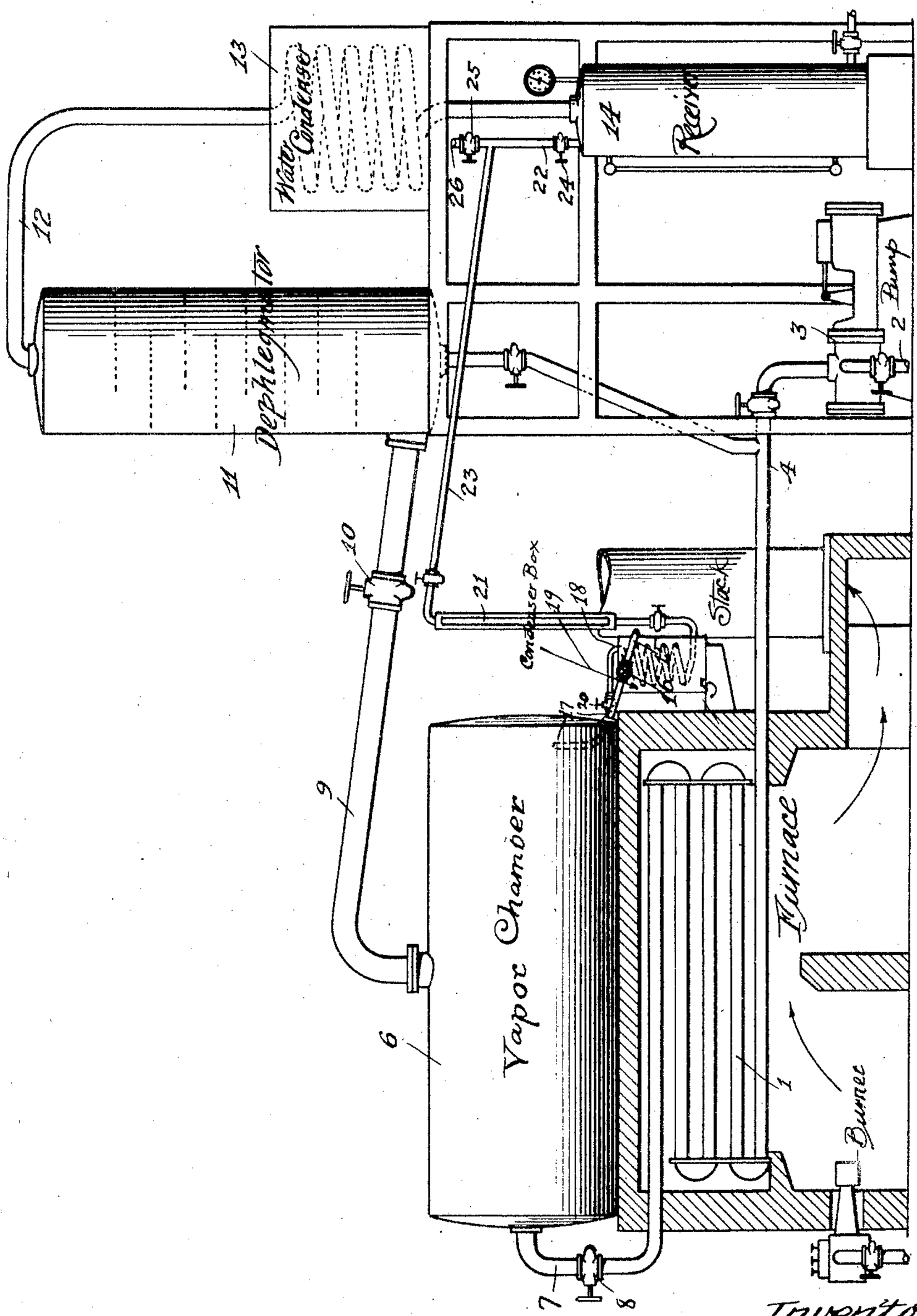

Witness,
S. D. Mann

Inventor,
George D. Sims.
By Frank L. Belknap. Atty.

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GEORGE D. SIMS, OF INDEPENDENCE, KANSAS, ASSIGNOR TO UNIVERSAL OIL PRODUCTS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF SOUTH DAKOTA.

APPARATUS FOR TREATING OILS.

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This invention relates to improvements in apparatus for treating oils and refers more particularly to a means for designating the amount of liquid contained in the vaporizing chamber while the reaction is taking place.

There is found to be a definite relation between the amount and character of the reaction in the vaporizing chamber to the level of the liquid maintained therein. For this reason, it is of importance that this level be maintained at a certain height and the only accurate means for ascertaining this height is a gauge in which the level may be kept at all times during the operation of the process. Difficulties have attended attempts at attaching a device of this sort to the vapor chamber as the high pressure and rapid circulation of the vapors permitted no definite level to be maintained in the gauge. It has been found that by cooling the liquid introduced to the gauge and taking the pressure from any portion of the system, the level may be very definitely registered at all times.

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

Describing briefly the apparatus, and disclosing therewith a process carried on in the apparatus shown, the raw oil to be treated is introduced to the heating tubes 1 through the line 2, pump 3 and charging pipe 4. After being raised to a cracking temperature in the heating tubes which are mounted in the furnace 5, the heated oil is passed to the vapor chamber 6 through the transfer line 7 in which is interposed a valve 8. The heated oil is permitted to react in the vapor chamber, the vaporized portion passing off through the vapor line 9 controlled by a throttle valve 10 and rising through the dephlegmator 11 where it is subjected to a refluxing action. The uncondensed vapors pass off from the top of the dephlegmator through the line 12 to the water condenser 13 and is collected as distillate in the receiver 14. The unvaporized portion in the vapor zone may be drawn off intermittently or continuously through the residuum line 15 controlled by a valve 16 and may be directed to storage or to further treating processes. For registering the liquid level in the vapor chamber, a pipe 17 is tapped into the vapor chamber near its bottom; this line communicates with a condenser coil 18 mounted in the condenser box 19, the oil flow being regulated by a valve 20. A strong glass tube or reinforced cylindrical transparent tube 21 is connected to the condenser coil and communicates with the pressure relief pipe 22 in the top of the receiver by means of a connecting line 23. Valve 24 regulates the amount of uncondensed gases which are permitted to return to the line 23 and a valve 25 permits the exhausting of the vapor pressure from the system through the relief pipe 26, by means of which the vapor pressure on the system may be accurately regulated. The function of the return pressure pipe 23 is as follows: It equalizes the pressure on the liquid level gauge and supplies thereto a somewhat cooler vapor than that being generated in the vapor chamber. To connect the vapor chamber directly with the top of the liquid level gauge would be to invite difficulty as these vapors are in violent agitation and are of a much more active character than the uncondensable gases maintained over the distillate body in the receiver. There may be some difference in the vapor pressure on the receiver and on the vapor chamber and this in turn may affect somewhat the liquid level in the gauge. When this condition is once ascertained, it may be easily compensated for. By drawing off the liquid from the vapor chamber and introducing it to a condenser coil, the liquid is cooled to a much lower temperature and does not impose upon the elements of the liquid level gauge the extremes of temperature that would be prohibitive were they subjected directly on the gauge. As explained, the liquid level maintained in the vapor chamber is of importance in the regulation of the character of the vapors and distillate which pass over into the condensing apparatus and consequently, the functioning of an operative liquid level gauge supplies important operating data to the control and operation of the process.

The drawoff line 17 for directing the liquid oil from the vaporizing chamber to the gauge through the water condenser is extended into the chamber as a short standpipe so that the line will not become excessively burdened or clogged with carbon and prevent an accurate liquid level reading on the gauge.

I claim as my invention:

1. In an apparatus for treating oils, the combination with a reaction chamber adapted to receive oil heated to a conversion

temperature and in which chamber said oil is maintained under a superatmospheric pressure, of a vapor outlet from the chamber, a condenser through which the discharged vapors are passed, a receiver in which the cooled condensate and uncondensed gases collect, means for indicating the level of the oil in said chamber comprising a gauge, a liquid oil discharge line from said chamber to said gauge, means interposed in said discharge line for cooling the oil before it is admitted to the gauge, and means for introducing uncondensed gases from said receiver to maintain the oil in the gauge under the pressure maintained on the oil undergoing treatment in the apparatus.

2. In an apparatus for treating oils, the combination with a reaction chamber adapted to receive oil heated to a conversion temperature and in which chamber the oil is maintained under superatmospheric pressure, of a vapor outlet from said chamber, a condenser through which the discharged vapors are passed, a receiver in which the condensate and cooled uncondensed gases collect, means for indicating the level of the oil in said chamber comprising a gauge, said gauge being connected at one end with said chamber and at the opposite end with said receiver, liquid oil being passed to the gauge from the chamber and cooled uncondensed gases being supplied to the gauge from said receiver whereby the oil in the gauge is subjected to substantially the same pressure as the oil undergoing treatment in the apparatus.

3. In an apparatus for treating oil under superatmospheric pressure at high temperatures, the combination with an enlarged chamber in which a body of oil is adapted to be maintained under a superatmospheric pressure, of means for indicating the level of the oil in said chamber, comprising a gauge, a liquid oil discharge line from said chamber communicating with said gauge, means interposed in said line for cooling the oil before it is admitted to the gauge, a vapor outlet from said chamber, condensing means connected with said vapor outlet for condensing the condensable constituents from the vapors passing through said vapor outlet, and means for admitting uncondensed gases, which have passed through said condensing means, to said gauge, to maintain the oil in the gauge under the same pressure as the pressure maintained on the oil in said enlarged chamber.

GEORGE D. SIMS.