

F. W. HOLMES & E. C. BLASDELL.
 APPARATUS FOR REFINING PETROLEUM.
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1,055,747.

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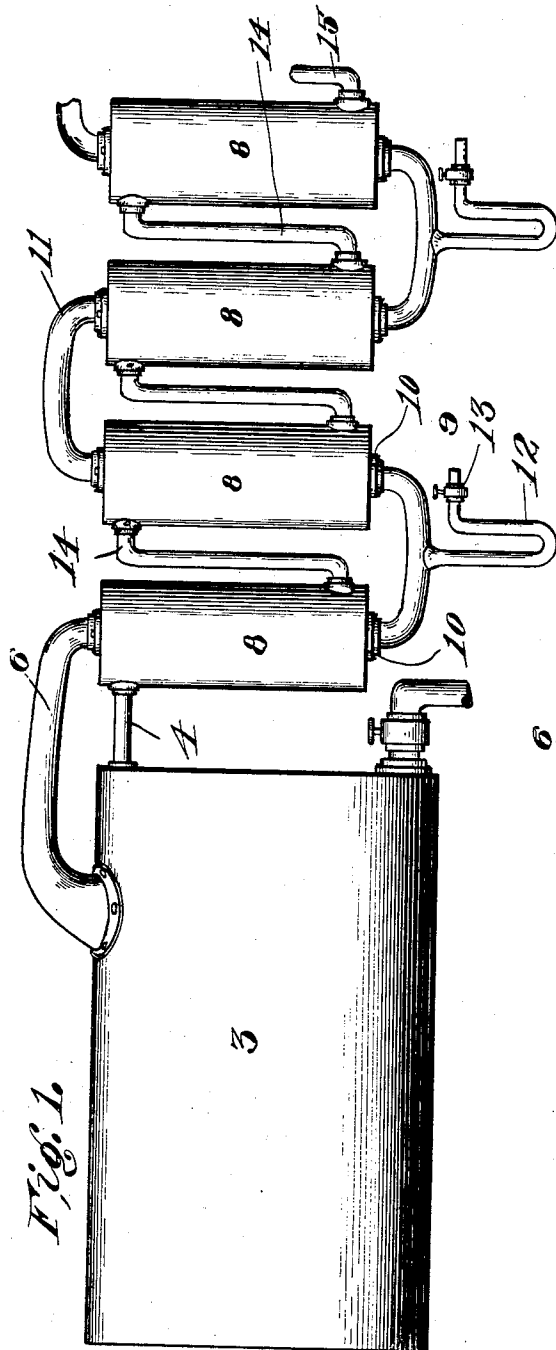


Fig. 1.

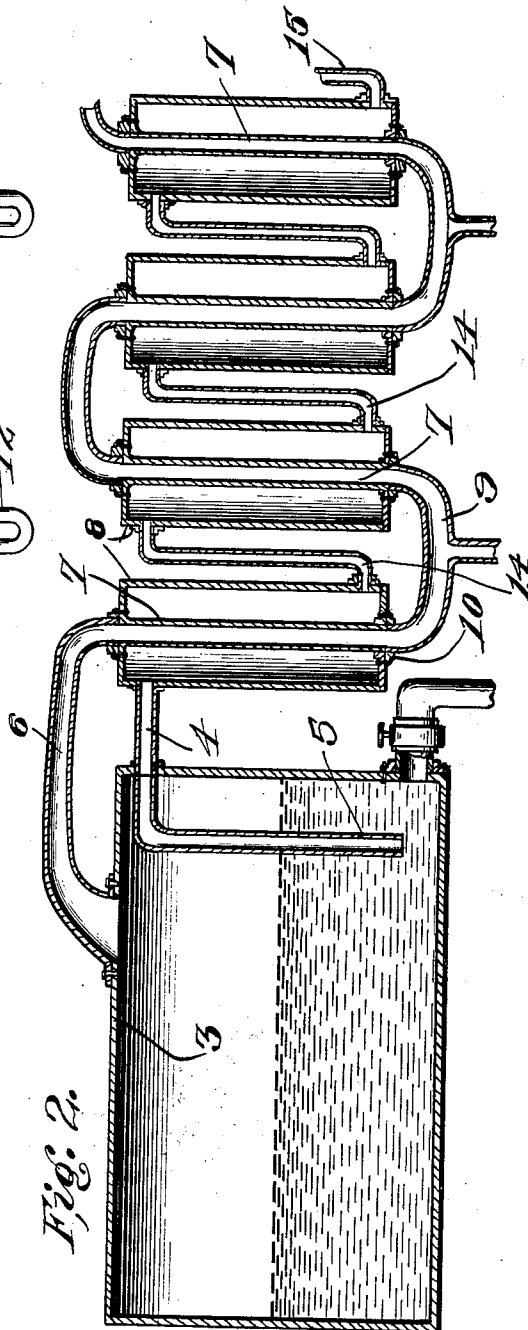


Fig. 2.

Witnesses
Rohe Meyer.
A. C. Barkley.

Inventors
F. W. Holmes.
E. C. Blasdel.

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Thurks & Sullivan

Attorney

UNITED STATES PATENT OFFICE.

FRANK W. HOLMES AND ELMER C. BLASDELL, OF PITTSBURGH, PENNSYLVANIA.

APPARATUS FOR REFINING PETROLEUM.

1,055,747.

Specification of Letters Patent.

Patented Mar. 11, 1913.

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To all whom it may concern:

Be it known that we, FRANK W. HOLMES and ELMER C. BLASDELL, citizens of the United States of America, and residents of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Refining Petroleum, of which the following is a specification.

This invention relates to the refining of petroleum, and particularly to means for heating crude petroleum and in circulating the vapor therefrom in a circuitous route or channel, whereby the vapor condenses, it being well known that the heavier products precipitate when the temperature is slightly lowered, whereas the lighter products are produced by the condensations at relatively lower temperatures.

Hence it is the object of this invention to provide a series of traps wherein the products of petroleum may be collected according to the specific gravity thereof, novel means being provided for utilizing the heat radiating from the vapor in its process of condensation and heating the crude petroleum as it is being delivered to the still, thus utilizing the heat from the vapor or gases generated in the still for raising the temperature of the petroleum delivered thereto. The petroleum therefore acts as a condensing medium, while deriving heat from the medium being condensed.

The arrangement indicated will obviously result in an economical use of the heat, and require a minimum amount of fuel to perform the functions necessary in the process of distilling petroleum. It is not the purpose of the inventors to be limited with respect to proportions, or the exact arrangement of parts, or the number of condensers, but for the purpose of illustrating the invention and one method of carrying the same into practice, reference will be had to the accompanying drawing forming part of this specification, wherein like characters denote like parts of the several views, and in which,

Figure 1 is a view in elevation of a still with condensers connected thereto, and Fig. 2 is a vertical sectional view thereof.

In these drawings, 3 denotes the still which may be of any appropriate configuration or size, having a supply pipe 4 extending into the still through, or near the top, the said supply pipe having a depending ex-

tension 5 terminating near the bottom of the still where the crude petroleum is delivered to said still. The still is further provided with a goose-neck or off-take pipe 6 preferably communicating with the interior of the still through the top thereof, said goose-neck being connected to a condenser pipe 7. The apparatus further consists in a series of jackets 8 of any appropriate number, each of which contains a longitudinally disposed condenser pipe 7, the condenser pipes of the successive jackets being in communication to produce a continuous flow of vapor therethrough. To that end the first and second condenser pipes from the still are connected by appropriate fittings 9, secured to the condenser pipe by an appropriate coupling, such as 10, whereas the condenser pipes in the second and third jackets are connected by appropriate fittings 11, secured to the said condenser pipes by a coupling similar to the coupling 10. Furthermore, the condenser pipes contained in the third and fourth jackets are coupled together at their ends similar to the connection between the condenser pipes in the first and second jackets. In this manner the couplings can be continued according to the number of jackets employed.

Each of the pipes 9 is provided with a trap 12, preferably of the goose-neck type, each of which terminates in a cock 13, for the purpose of drawing off the products of condensation.

The supply pipe 4 is tapped or otherwise connected to one of the jackets 8, and the several jackets are furthermore connected successively, one to the other, by means of a pipe 14, whereas the jacket remote from the still has a supply pipe 15 which leads to, or is in communication with the source of petroleum supply, so that the petroleum passing therethrough may flow through the series of jackets before being delivered to the still through the supply pipe 4.

As has been stated, the vapor which arises from the still, follows the condenser pipes through the jackets. The oil which is being delivered to the still passes into the jacket remote from the still, at approximately the atmospheric temperature, but the temperature of said oil is immediately affected by the heat radiating from the condenser pipes, and hence the said petroleum is heated in its passage through the several jackets, until when it reaches the still, the

temperature thereof is approximately the temperature of the oil in the still, so that only a slight heating is required before it vaporizes and is in condition to be subjected to the condensing action of the coils or pipes leading through several jackets. At the same time, a great benefit is derived from the condensing action of the cool petroleum in its passage through the jackets; furthermore the petroleum protects the metallic parts of the apparatus from deterioration due to the oxidation which results when water is employed as the condensing medium.

It will be observed that the condenser pipes are larger in those jackets near the still and are reduced in diameter as the necessity for their capacity is decreased.

It will be observed that in our apparatus all of the vapors from the oil in the still pass out through the short take-off pipe at the top which extends laterally and discharges into the upper end of the condenser pipe 7 which extends down to the fitting 9 where the heavier portion is drawn off after being condensed in the condenser pipe. The vapors pass through the various condenser pipes in series and the passage way for those vapors is symmetrical in form, gradually tapering so that there will be a uniform movement of the vapors, and there are no sharp angles or expanded chambers to cause unequal condensation or unequal movement of the various parts of the vapor. This produces a uniformity and certainty in operation which is very desirable and enables us to get with certainty and accuracy the proper condensation and separation of the oils of various grades with a single continuous operation. The arrangement by which the incoming oil surrounds and takes up heat from the condenser pipes successively finally discharging into the still gives a progressive and uniform action to the condensation and at the same time gradually heats up the incoming oil.

We claim—

1. In an apparatus for refining petroleum, a still, a series of jackets separated from one another and from the still, a supply pipe for crude petroleum extending into the bottom of the outer jacket, pipes connecting the tops to the bottoms of the jackets whereby the crude petroleum is delivered to the bottoms of the jackets and rises therein due to the heat and pressure and overflows into the bottom of the next succeeding jacket leading to the still, and a connection between the jacket nearest the still and the said still for conducting the crude petroleum to the still, a condenser pipe in each jacket, means for connecting the condenser pipe in the jacket nearest the still with the interior of said

still, means for connecting the upper ends of the condenser pipes in series and traps connecting the lower ends of the condenser pipes in series, the connections for the condenser pipes being gradually reduced in size from the still to the one remote therefrom whereby the distillates are drawn from said traps according to their specific gravity.

2. In an apparatus for refining petroleum the combination with a still of a short take-off pipe at the top leading laterally for conveying the vapors generated in the still, a plurality of substantially vertical condenser pipes, fittings in the form of short pipes connecting said condenser pipes in series alternately at the top and bottom, the first of said condenser pipes nearest the still being connected at its top to said take-off, the said take-off pipe, condenser pipes and connecting fittings forming a continuous symmetrical passage way for the vapors whereby there will be a free and uniform passage from the still through the various condensers, means in each lower fitting for drawing off the condensed vapors produced in the condenser pipe leading down to that fitting, and means for cooling the condenser pipes.

3. In an apparatus for refining petroleum the combination with a still, of a short take-off pipe at the top leading laterally for conveying the vapors generated in the still, a plurality of substantially vertical condenser pipes, fittings in the form of short pipes connecting said condenser pipes in series alternately at the top and bottom, the first of said condenser pipes nearest the still being connected at its top to said take-off, the said take-off pipe, condenser pipes and connecting fittings forming a continuous symmetrical gradually tapering passage way for the vapors whereby there will be a free and uniform passage from the still through the various condensers, means in each lower fitting for drawing off the condensed vapors produced in the condenser pipe leading down to that fitting, a series of separate jackets surrounding said condenser pipes, and means for passing the incoming petroleum through said jackets successively to said still to progressively cool said vapors in the condensers and to progressively heat the incoming petroleum.

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

FRANK W. HOLMES.
ELMER C. BLASDELL.

Witnesses:

BESSIE M. BARKLEY,
JOHN E. WINNE.