(No Model.)

E. G. BROWN, O. N. CAMMANN & O. WILLCOX.

PROCESS OF OBTAINING SWEET RESIDUAL PETROLEUM PRODUCTS.

No. 510,672. Patented Dec. 12, 1893.

Fig. 2.

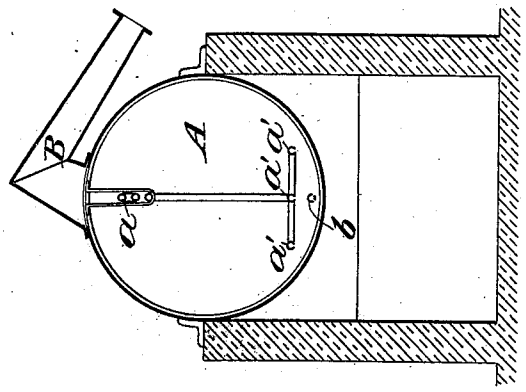
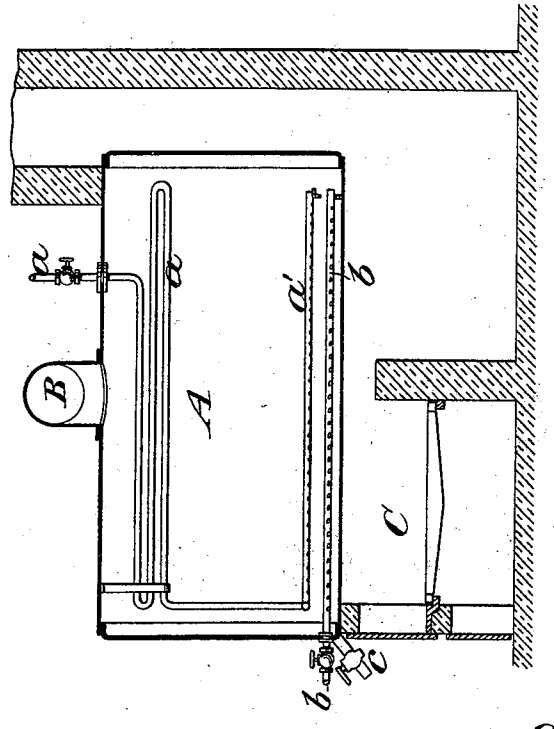


Fig. 1.



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PROCESS OF OBTAINING SWEET RESIDUAL PETROLEUM PRODUCTS.

SPECIFICATION forming part of Letters Patent No. 510,672, dated December 12, 1893.

Application filed February 10, 1893. Serial No. 461,753. (No specimens.)

To all whom it may concern:

Be it known that we, EDWARD G. BROWN, of the city of Brooklyn, in the county of Kings, OSWALD N. CAMMANN, of New Brighton, in the county of Richmond, and OLIVER WILLCOX, of the said city of Brooklyn, State of New York, have invented a new and useful Improvement in Processes of Obtaining Sweet Residual Petroleum Products, of which the following is a specification.

The product to which our invention relates is the heavy residuum resulting from the process of distilling petroleum. In order that this product may be suitable for many purposes in the arts it requires to be as free as possible from the taste and odor of petroleum.

A very important object of our invention is to obtain such product in a sweeter condition, that is to say, more free from odor and taste than has heretofore been found possible in the still and also to render the said product free from the opalescent appearance, or as it is commonly termed "bloom," common to such products when obtained by any known process of distillation.

An important feature of our invention is moreover its economy, in that the refining or sweetening is the continuation of the original process by which the refined product is obtained directly from the petroleum, our whole process beginning with distilling off the lighter components of the crude petroleum and ending with the sweetening being performed in the still by a continuous operation.

We will proceed to explain our invention fully with reference to the accompanying drawings of an apparatus in which it may be performed and afterward point out its novelty in a claim.

Figures 1 and 2 of the drawings represent vertical sections of the apparatus at right angles to each other.

A is a still such as is commonly used in the distillation of petroleum, provided with the usual goose-neck B connected with a condenser (not shown) and heated by a fire in a furnace C. For the purpose of our invention this still is fitted with a pipe *a* for the introduction of steam from any suitable boiler and with a pipe *b* for the introduction of air from any suitable compression apparatus. The steam pipe *a* is represented as furnished with a stop valve a^2 and entering the still at the top, having two or three turns back and forth horizontally in the inside of the still for the purpose of drying the steam and running down nearly to the bottom of the still where it is represented as divided into several horizontal branches a' a' which are perforated along their bottoms to distribute the steam in numerous jets into the contents of the lower part of the still. The pipe *b* is represented as furnished with a stop valve b^2 entering and running along the still near the bottom thereof and as having perforations through which the air is distributed near the bottom of the still.

The process is performed in this apparatus in the following manner: The still is charged with petroleum and a fire is started under it and continued until the condensed distillate reaches a density of about 60 to 65° Baumé. Up to this time the valves a^2 and b^2 remain closed but now the valve a^2 is opened to admit through the pipes a' a' and into the residuum in the still a small quantity of simple or saturated steam, at a pressure of about fifty pounds to the square inch, care being taken to so govern the volume of steam admitted in all stages of the process as not to prime the still. The distillation then goes on until the gravity of the condensed distillate reaches about 54° Baumé when the volume of steam admitted is increased and as the process of distillation progresses more and more steam is admitted, the pressure in the boiler being kept constant throughout the whole operation. As the admission of steam is increased the fire under the still is gradually lessened or allowed to die out, and the process is carried on by the use of steam alone until the density of the residuum reaches say from about 35° to about 27° Baumé which is shown by tests with a hydrometer. The steam is then shut off by the valve a^2 and the valve b^2 is opened to admit air through the pipe *b*. This admission of air through the heated residuum is continued for about two hours or more, or until the residuum is sweet. The object of the admission of air is mainly

to destroy the bloom but also to complete the sweetening of the residual product which is commenced by the steam. It may be necessary to start up the fire under the still and increase the admission of steam, at least for a time, in order to maintain the residuum at a sufficiently high degree of heat to enable the admitted air to oxidize or sweeten the residuum.

Another advantage of this process besides obtaining a sweeter product is the economy of fuel resulting from the utilization for refining, of the heat remaining in the residuum after the first distillation at the high temperature.

Another advantage is that the formation of carbon in the bottom of the still is prevented or greatly reduced and a further advantage is that a larger quantity of distillate is obtained owing to the saving of what is driven off after the primary stage of distillation.

We do not claim it to be new to use steam in a still or to use air in the process of distillation, but what we have discovered is the fact heretofore unknown that by carefully combining the action of dry heat, simple or saturated steam and air applied as herein described, new results are produced.

What we claim as our invention, and desire to secure by Letters Patent, is—

The within described continuous process of obtaining a refined and sweetened residual product of petroleum consisting in first subjecting petroleum to distillation by the agency of heat externally applied, next while still so heated causing the passage through it of saturated steam and finally while still heated causing the passage through it of air, substantially as herein set forth.

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