

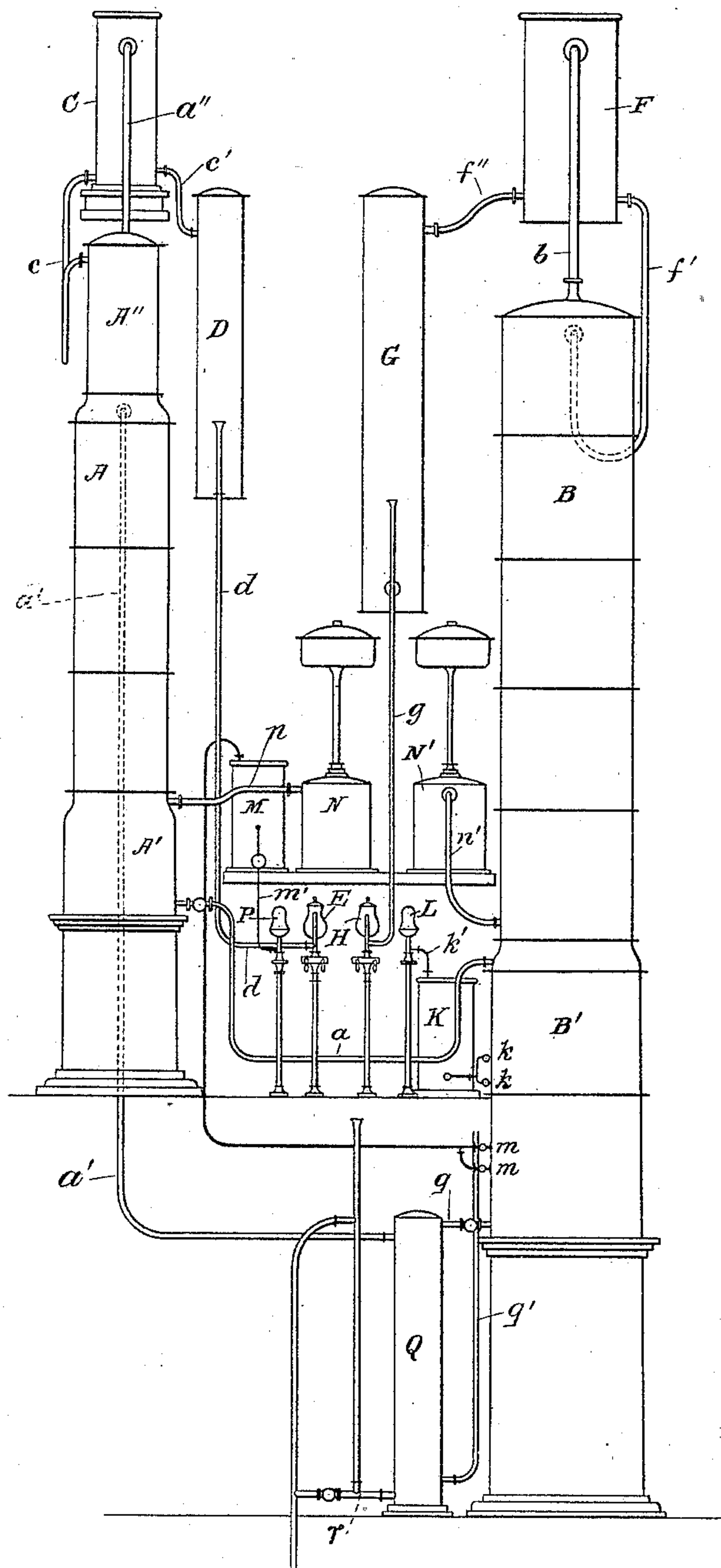
(No Model.)

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APPARATUS FOR AND PROCESS OF CONTINUOUS RECTIFICATION OF
SPIRITS, ALCOHOL, &c.

No. 436,684.

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UNITED STATES PATENT OFFICE.

EMILE AUGUSTIN BARBET, OF PARIS, FRANCE.

APPARATUS FOR AND PROCESS OF CONTINUOUS RECTIFICATION OF SPIRITS, ALCOHOL, &c.

SPECIFICATION forming part of Letters Patent No. 436,684, dated September 16, 1890.

Application filed March 20, 1890. Serial No. 344,628. (No model.) Patented in France February 11, 1881, No. 141,039; in Germany June 11, 1881, No. 17,421, and in Austria-Hungary October 13, 1881, No. 18,028.

To all whom it may concern:

Be it known that I, EMILE AUGUSTIN BARBET, a citizen of France, and a resident of Paris, in the Republic of France, have invented a new and useful Improvement in Apparatus for and Process of Continuous Rectification of Spirits, Alcohols, &c., (for which I have obtained patents in France, No. 141,039, dated February 11, 1881; Germany, No. 17,421, dated June 11, 1881, and Austria-Hungary, No. 18,028, dated October 13, 1881,) which improvement is fully set forth in the following specification.

This invention relates more particularly to the rectification of crude alcohols of the distillery, although it has reference also to other volatile products.

Heretofore the rectification of alcohols has been discontinuous—that is to say, the still is charged with the crude spirits, and as distillation proceeds a number of products are successively obtained, which are collected separately. The first products distilled are bad and placed aside. Next comes over those of medium grade, (or “light middlings,” as they may be called,) then the fine alcohol, afterward on further fractioning other products of medium grade, (“heavy middlings,” they may be called,) and, lastly, the amylic oils. The apparatus is then cleansed for receiving a new charge.

By means of the present invention the operation is or may be rendered continuous, and extra-fine alcohol of ninety to ninety-four per cent. may be obtained from the start without any middlings of any kind to be repassed through the rectifier, and that, too, with great economy of steam. Moreover, the waste or loss of rectification is reduced at least one per cent. There is also no need of large rectifying stills or boilers, and consequently it is possible to construct powerful apparatus easy to transport and occupying but little space when set up.

In accordance with said present invention the products more volatile than the alcohol (which products are constituents of the first runnings of the ordinary rectification) are separated from the balance of the crude spirits, and the spirits thus purified are subjected to a further treatment, which constitutes the

rectification, properly speaking. In this latter treatment the alcoholic vapors are purified and distill over in concentrated form, while the water and the amylic oils are drawn off at the base of the apparatus.

The accompanying drawing, which forms part of this specification, is a view in elevation of an apparatus for carrying out the new or improved process, the apparatus itself forming also part of the invention.

The spirits are introduced through the pipe a' into the upper part of a primary purifying or distilling column A, provided with plates, shelves, disks, diaphragms, or divisions of any ordinary or suitable construction, and having at the bottom a vessel or chamber A', provided with a steam-heating coil, or with means for introducing free steam into the said vessel or chamber.

At N is a regulator of ordinary construction for governing the admission of the steam. It is connected with the chamber A' by the pipe n , which conveys the pressure to the interior of the regulator, as well understood.

In the column A the more volatile portion of the crude spirits is vaporized progressively in a continuous manner by contact with the rising vapors, and, being more or less concentrated, it passes thence up through the small rectifying-column A'', (wherein a still further concentration is effected,) and by way of the pipe a'' into the partial condenser or dephlegmator C, where the light products are further deprived of their water and alcohol. The liquid of condensation returns to the rectifying column A'' by the pipe c , and the light products pass by pipe c' into the condenser or cooler D, which delivers them through the pipe d to the proof-bottle E. The operation of distilling off the light products is thus continuously performed.

The column to the left in the drawing, including the primary column A and the secondary column A'', in which the crude spirits receive the initial continuous distillation, may, for the sake of distinction, be termed the “distilling column.” The columns B B', in which the partially-purified spirits are subjected to further purification after treatment in the distilling-column, constitute the rectifier, it being in this part of the apparatus

that the "rectification," properly so called, is carried on. The rectifier consists of a primary distilling or rectifying column B' and a secondary distilling or rectifying column B, and with these are combined the dephlegmator or partial condenser F. The column B may be provided with plates, shelves, disks, diaphragms, or divisions of any ordinary or suitable construction. As shown, partly-purified crude spirits pass through the pipe *a* into the upper part of the column B', wherein the alcoholic portion is driven off, and whence it rises into the rectifying-column to be further concentrated and purified by the repeated partial condensations. From the rectifying-column the alcoholic vapors pass by the pipe *b* into the partial condenser or dephlegmator F, from which the condensed liquid is returned by the pipe *f'* to the column B, while the alcohol goes by way of the pipe *f''* into the condenser or cooler G, and thence by pipe *g* to the proof-bottle H. At *k k* the distilling-column B' is provided with pipes and cocks for drawing off the amylic oils in a liquid state into the cooler K, whence they pass by the pipe *k'* to the proof-bottle L. At *m m* are pipes and cocks for drawing off the vapor in order to ascertain the degree of exhaustion of the spent liquor, the pipes communicating with the condenser or cooler M, and this latter by the pipe *m'* with the proof-bottle P.

The column B' is provided with a steam-coil or means for introducing free steam, and at N' is shown a regulator for governing the steam-supply. It is connected with the columns B B' by the pipe *n'*, through which the pressure is conveyed to the interior of the regulator, as well understood. The heat of the exhausted liquid or spent wash from the column B' is utilized to raise the temperature of the crude spirits supplied to the first or purifying-column A. The hot spent wash passes from the base of column B' by the pipe *q* into the recuperator or heat-exchanger Q, in which it is cooled by the crude spirits introduced through the pipe *q'*, passing through the recuperator Q in the opposite direction to the spent wash, and thence delivered by the pipe *a'* to the column A, as already described. The pipe *r* is the outlet for the spent liquor from vessel Q.

The preliminary purification of the crude spirits, as described, may be employed preparatory to the ordinary rectifying operation, with the effect of improving considerably the phlegms or crude spirits and securing by the subsequent rectification alcohols much more pure.

As shown, the crude spirits deprived of their light impurities are delivered directly into the rectifying apparatus; but while this is specially understood in the invention the latter extends also to the treatment even if the partly-purified spirits are stored for a longer or shorter time before they are introduced into the rectifier for the alcohol.

The invention also covers the application of the new process and apparatus, or any new improvement embodied therein, to the treatment of other volatile products, petroleums, benzols, wood-spirit, &c., as well as to ordinary alcohol or vinous spirits.

I claim herein as my invention or discovery—

1. The process herein described for rectifying crude alcohols, consisting in first separating the more volatile impurities by continuous distillation, partial condensation, and return of the liquids of condensation for further distillation, and, second, subjecting the partially-purified spirits to rectification for elimination of the alcoholic portion from the heavier impurities, substantially as described.

2. The combination, with a distilling column and rectifier, of a pipe-conduit or conveying means between the lower part of said distilling-column and the said rectifier, substantially as described.

3. The combination of a distilling-column comprising a primary column and a secondary column having its lower part in communication with the upper part of said primary column, a rectifier for the liquid from said distilling-column, and a pipe-conduit or conveying means between the said rectifier and the lower part of said distilling-column, substantially as described.

4. The combination of a distilling-column comprising a primary column and a secondary column having its lower part in communication with the upper part of said primary column, a dephlegmator or condenser having its vapor-inlet and liquid-outlet connected with said secondary column, a rectifier for the liquid from said distilling-column, and a pipe-conduit or conveying means between said rectifier and the lower part of said distilling-column, substantially as described.

5. The combination, with a still such as the distilling-column described and a rectifier composed of distilling and rectifying columns, in communication with each other, of a pipe-conduit or conveying means between the said rectifier and the outlet for the liquid from said still, substantially as described.

6. The combination, with a still such as the distilling-column described, of a rectifier composed of distilling and rectifying columns communicating with each other, a pipe-conduit or conveying means between said rectifier and the outlet for the liquid from said first-mentioned still, and draw-off or outlets at different points on the distilling portion of said rectifier below where the liquid from the still is supplied, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EMILE AUGUSTIN BARBET.

Witnesses:

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GEORGE R. OSTHEIMER.