No. 699,571. Patented May 6, 1902.

E. ROCCA.

PROCESS OF REFINING OIL.

(Application filed July 13, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

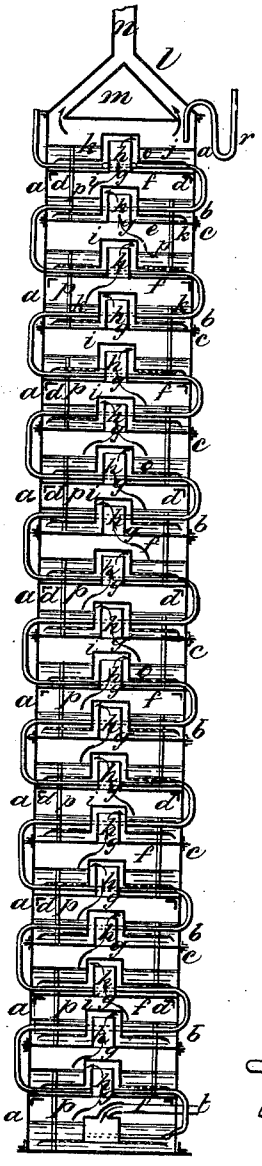
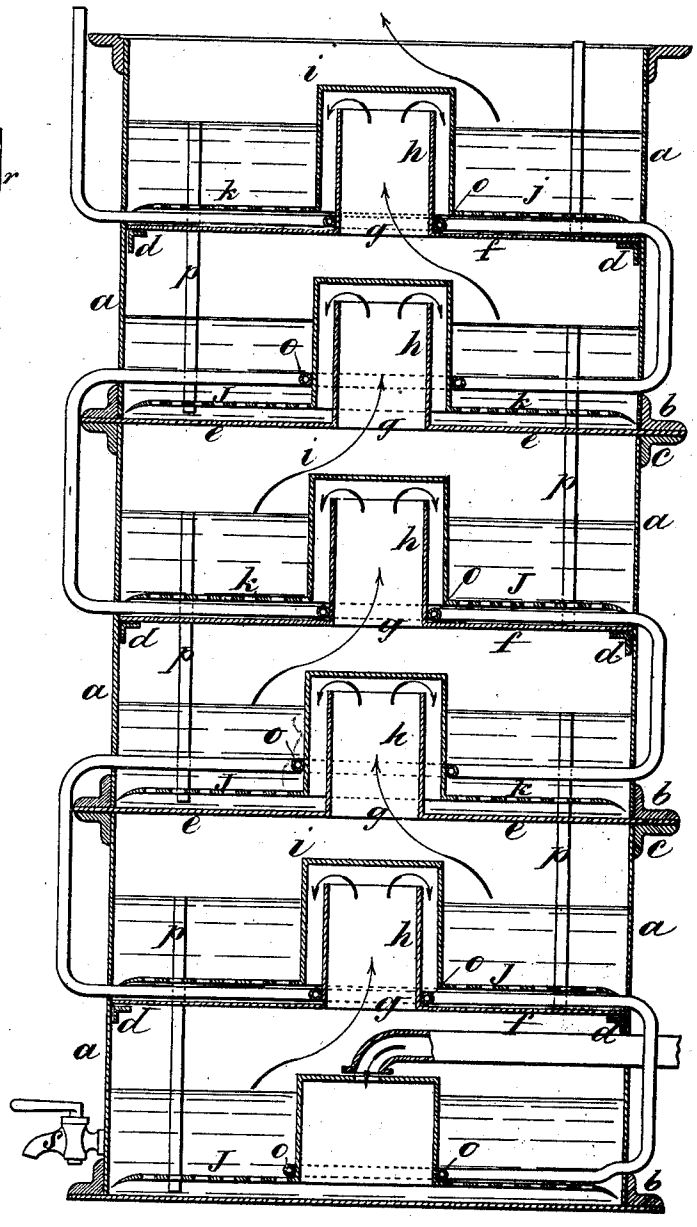


Fig. 2.



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Fig. 3.

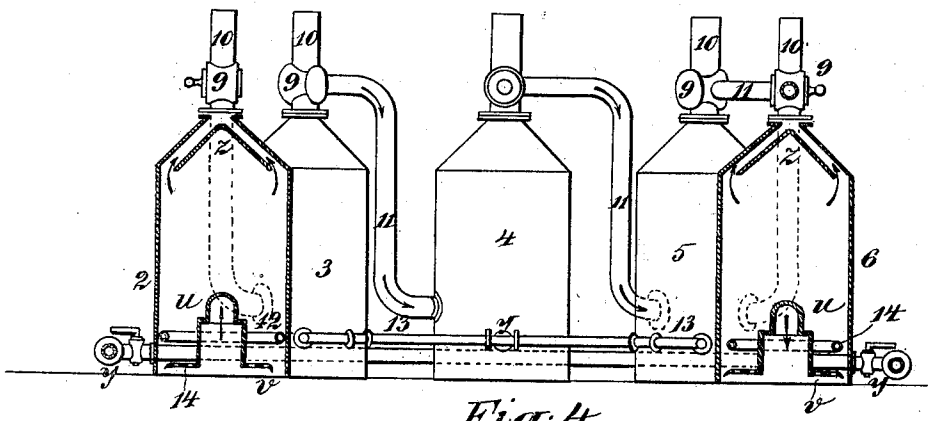
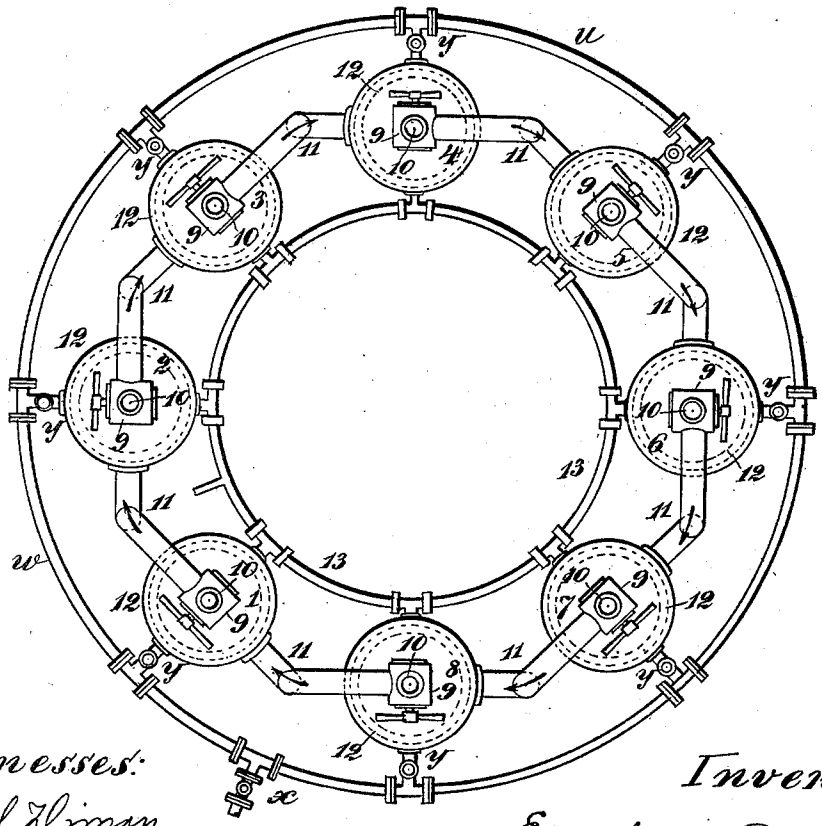


Fig. 4.



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UNITED STATES PATENT OFFICE.

EMILIEN ROCCA, OF MARSEILLES, FRANCE.

PROCESS OF REFINING OIL.

SPECIFICATION forming part of Letters Patent No. 699,571, dated May 6, 1902.

Application filed July 13, 1900. Serial No. 23,481. (No specimens.)

To all whom it may concern:

Be it known that I, EMILIEN ROCCA, a citizen of the Republic of France, residing in Marseilles, Bouches-du-Rhône, France, have invented new and useful Improvements in Methods of Refining Oil, which are fully set forth in the following specification.

This invention relates to a method of refining oils by which a great economy of steam is effected and a product is obtained the taste and odor of which are nearly perfect. It is based on the principle of systematic purification already in use in other industries, such as the distillation of spirit and the manufacture of sugar, dyewood extracts, and the like; and it consists in applying this principle to the treatment with steam of fats and oils, notably cocoanut-oil, by causing the oil and steam to travel in opposite directions to each other through a series of receivers or compartments, so that the steam becomes more highly charged with the impurities in proportion as it meets more impure oil. Heat is applied at proper points to prevent undue condensation of the steam and to maintain the latter at a suitable temperature.

The apparatus in which this method is applied may have either of two forms, accordingly as the compartments are superposed, as in a column-still, or juxtaposed, as in a diffusion-battery. In order that my method may be the better understood, I will describe successively these two forms with reference to the accompanying drawings.

Figure 1 is a vertical section of the whole apparatus of the one form, Fig. 2 being a vertical section of the lower part, drawn to an enlarged scale.

As a whole the apparatus has the form of a column containing a series of superposed compartments, each surmounted by a cap provided with a large perforated collar, which causes the steam to bubble through the oil. A central tube brings under this collar the steam which is passing from one chamber into the next. Thus the steam travels from chamber to chamber, passing through the oil in each, the depth of the oil being maintained suitably constant—say at twenty-five centimeters. The column consists of a series of short cylinders *a*, each of which carries at both ends a flange *b c*, whereby it may be bolted to those next above and below it. Each cylinder also carries an angle-iron *d* on its inside surface at the middle of its height. Of the plates which separate the column into compartments those marked *e* are gripped at their edges between the flanges of two contiguous cylinders, while those marked *f* are supported on the inside angle-irons *d*. Each of the plates *e* and *f* has a central opening *g*, surmounted by a tube *h*, which is covered by a cap *i*, carrying at its lower edge a large collar *j*, supported some centimeters above the plate. The tube *h* and the cap *i* are coaxial, and there is a space between them for the circulation of the steam, as will be explained subsequently. The collars *j* are perforated with a number of holes *k*. The upper part *l* of the top compartment is coned and is partly blocked by an internal cone *m*, a passage to the chimney *n* being left between the cones. Through each compartment passes a steam-coil *o* for heating the matter to be treated. The pipes *p* make communication between two contiguous compartments, the upper end of each pipe being at the surface of the oil in the upper compartment, while the lower end opens near the plate which forms the bottom of the lower compartment. The oil enters by the bent pipe *r* at the top of the apparatus and fills the top compartment up to the level of the top of the pipe *p*, down which it then flows into the next lower compartment. This it fills to the same level, and then flows down the second pipe *p* into the next lower compartment, and so on until it reaches the bottom compartment. This latter is provided with the cock *s* and the steam-pipe *t*, opening into the cap *i*. The steam entering the bottom compartment escapes through the holes *k* in the cap-collar *j* and bubbles up through the oil in this compartment. It then passes through the tube *h* of the plate *e* or *f* immediately above, down the space between the tube *h* and its cap *i*, and underneath the plate *j* of the next compartment, this course being repeated from compartment to compartment up the column. The steam thus meets in each compartment oil more impure than that which it has just traversed, and the crude oil flowing in at the top meets steam already laden with impurities; but in proportion as the oil

becomes purified it meets purer steam, until in the bottom compartment it is finally treated with fresh steam and passes away in a pure condition.

The second form of apparatus is shown in sectional elevation in Fig. 3 and in plan in Fig. 4. It comprises a number of oil-receivers 1 2 3 8, arranged in a circle on a horizontal plan. Each receiver has a cap *u*, provided with a perforated collar *v* to cause the steam to bubble through the oil. A circular pipe *w* receives steam through a cock *x* and conveys it through cocks *y* into each oil-receiver. A conical baffle-plate *z* and a valve 9 are placed at the top of each receiver, the valve being so constructed that the steam may be made to pass either into the pipe 10, which constitutes a chimney, or into a pipe 11, which conducts it into the cap *u* of the succeeding receiver. The coils 12 communicate with the pipe 13 and convey steam for heating the oil. The operation is as follows: The receivers being charged to a convenient depth, the cock *y* of receiver 1, for example, is opened, all the other cocks *y* being closed. The valve 9 of the last receiver 8 is then turned to communicate with the chimney 10, those of the other receivers being turned so that the steam must pass into the respective pipes 11. The steam passes by the pipe 14 into the cap *u* of receiver 1, bubbles through the oil, and passes by pipe 11 into receiver 2, where it goes through the same course until it arrives at receiver 8, from which it passes into the chimney. The systematic refining is thus effected as in the first-described apparatus. When the operation is finished in the receiver 1, this is cut out by its cock *y*, emptied, and charged again with crude oil. Its valve 9 is turned so as to communicate with the chimney, and the cock *y* of receiver 2 is opened. This latter then becomes the first of the battery, and the valve 9 of 8 being turned into its other position 1 becomes the last. The cycle continues as before.

I do not claim the above-described apparatus in this application, nor is this invention limited to its use. I have embodied and claimed the apparatus in another pending application, Serial No. 85,355, filed December 10, 1901.

Having thus described the nature of this invention and the best means I know of carrying the same into practical effect, I claim—

1. The herein-described method of refining oil, which consists in causing a current of oil and a current of steam to move in opposite directions and causing the current of steam in fine jets to pass upwardly through the current of oil at a plurality of points, and in maintaining the steam against condensation throughout its travel, substantially as set forth.

2. The herein-described method of refining oil, which consists in causing the oil to flow in one direction, but step by step from one collecting-point to another successively, simultaneously causing a current of steam to flow in the opposite direction from one of said oil-collecting points to another successively, the steam passing in a finely-divided condition through the oil at said collecting-points, and applying heat at said collecting-points to prevent undue condensation, substantially as set forth.

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

EMILIEN ROCCA.

Witnesses:
JULES ARMENGAUD, Jeune,
J. ALLISON BOWEN.