No. 699,572. Patented May 6, 1902.

E. ROCCA.

APPARATUS FOR REFINING OIL.

(Application filed Dec. 10, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

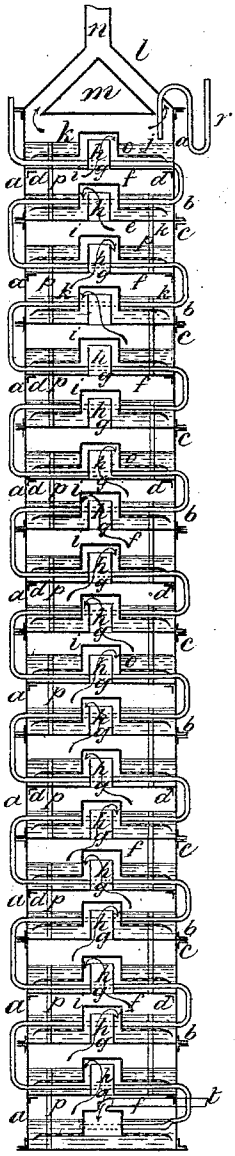
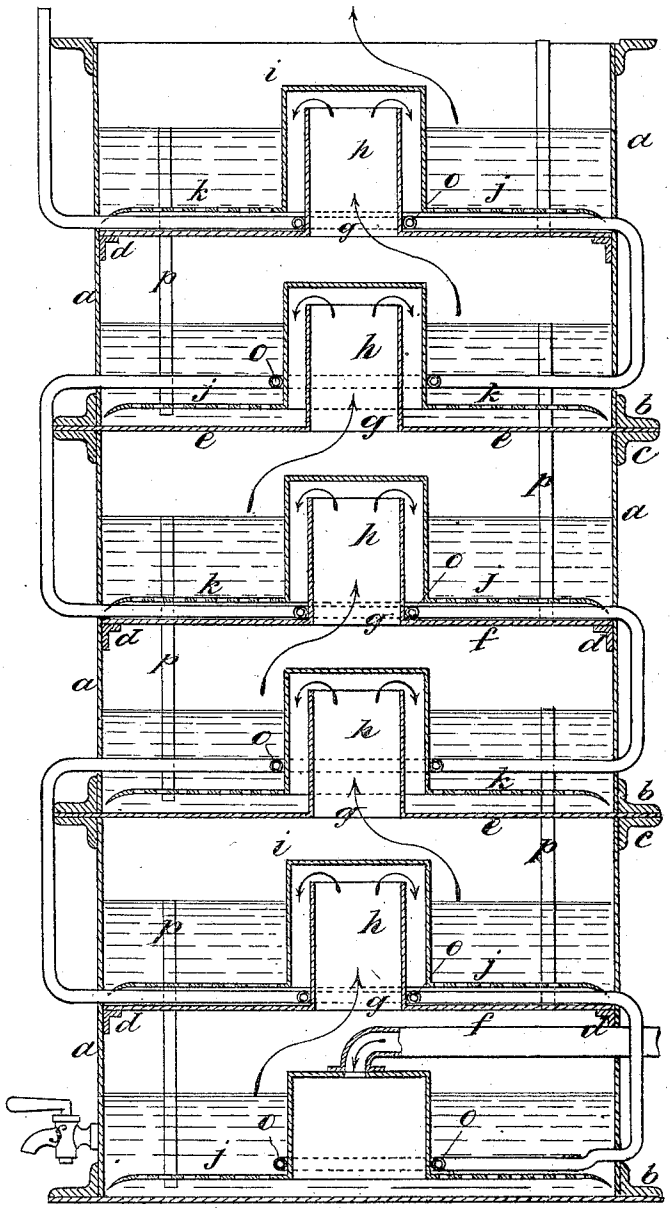


Fig. 2.



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Fig. 3.

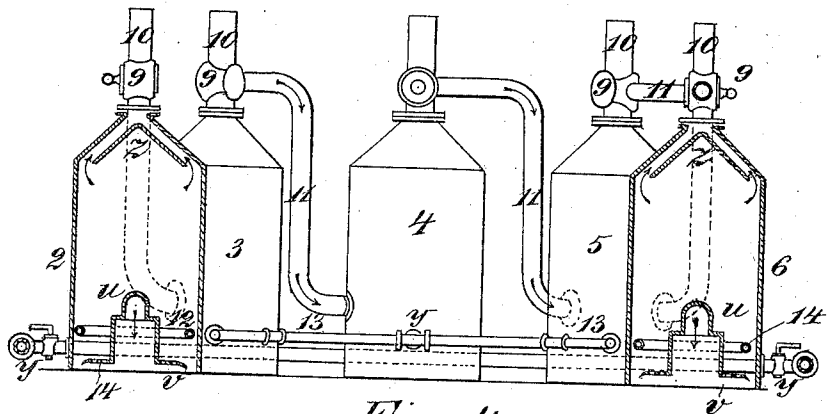
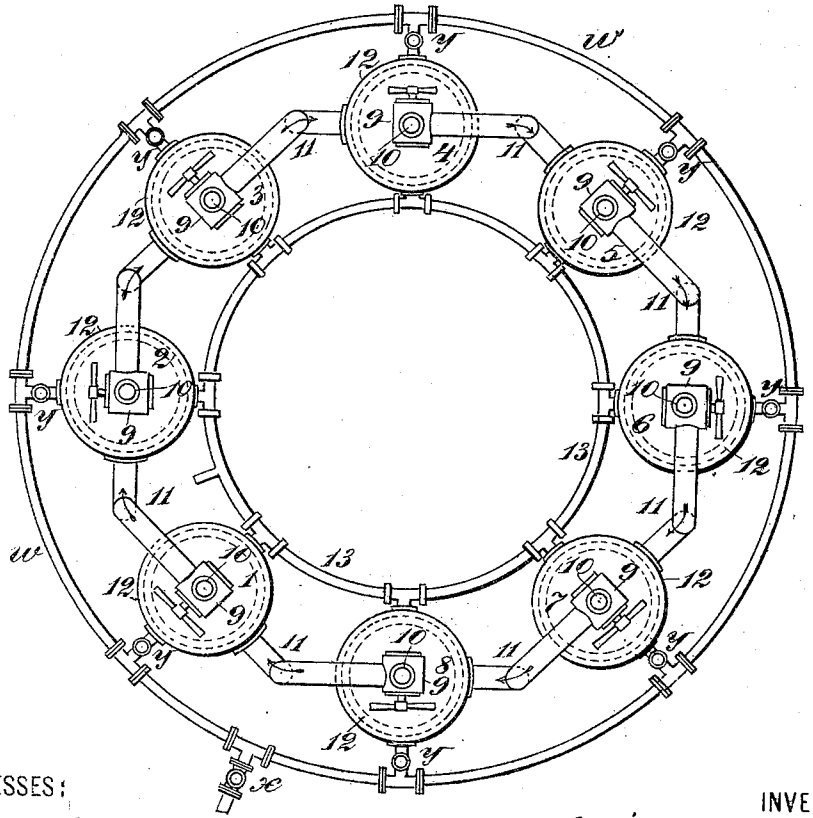


Fig. 4.



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UNITED STATES PATENT OFFICE.

EMILIEN ROCCA, OF MARSEILLES, FRANCE.

APPARATUS FOR REFINING OIL.

SPECIFICATION forming part of Letters Patent No. 699,572, dated May 6, 1902.

Original application filed July 13, 1900, Serial No. 23,481. Divided and this application filed December 10, 1901. Serial No. 85,355. (No model.)

To all whom it may concern:

Be it known that I, EMILIEN ROCCA, a citizen of the French Republic, residing at Marseilles, Bouches-du-Rhône, France, have invented certain new and useful Improvements in Apparatus for Refining Oil, of which the following is a specification.

This invention, which forms a division of my application, Serial No. 23,481, filed July 13, 1900, relates to that class of oil-refining apparatus wherein steam is used in the treatment of the oil or fat, notably cocoanut-oil, and wherein the oil and steam travel in opposite directions through the series of receivers or compartments of the apparatus in such a manner that the steam becomes the more highly charged with impurities in proportion as it meets the more impure oil.

The apparatus may have either of two forms, according to the arrangement of the compartments—viz., whether they are superposed, as in a column-still, or juxtaposed, as in a diffusion-battery. The two arrangements are illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical section of the entire apparatus with the oil-receiving compartments superposed. Fig. 2 is a sectional view of the lower part of the apparatus on a much larger scale. Fig. 3 is a sectional elevation, and Fig. 4 is a plan, of the apparatus, showing the oil-receiving compartments juxtaposed.

Referring primarily to Figs. 1 and 2, 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 brim or flange, which causes the steam to bubble through the oil. A central tube brings under this flange 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 is provided at its respective ends with external flanges *b* and *c*, whereby it may be bolted to those next above and below it. Each cylinder also has an angle-iron *d* on its inner 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*, having at its lower edge a broad base-flange *j*, supported some centimeters above the bottom plate. The tube *h* and the cap *i* are coaxial and there is an annular space between them for the circulation of the steam, as will be explained. The flanges *j* have numerous perforations or holes *k*. The upper part *l* of the topmost compartment is coned and is partly filled 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. These pipes may be either below or above the flanges *j*. In Figs. 1 and 2 they are shown disposed in both ways. 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 thereof 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 perforations *k* in the flange *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 flange *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 impuri-

ties; 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.

In the juxtaposed arrangement of the compartments seen in Fig. 3 the compartments or oil-receivers are designated for convenience by numerals 1 2 3 to 8, and these are arranged in a circle when seen in plan, as in Fig. 4. Each receiver has a cap *u*, provided with a perforated flange *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.

Having thus described my invention, I claim—

1. An apparatus for refining oil with the aid of steam, the same comprising a series of connected oil-receivers having an inlet for admitting oil to the receiver at one end of the series and an inlet for admitting steam to the receiver at the other end of the series, each receiver having a perforated plate near its bottom and above the steam-inlet to the receiver whereby the steam is broken up into jets, and having also in it a closed steam-coil for maintaining the temperature of the matter treated, substantially as set forth.

2. An apparatus for refining oil with the aid of steam, the same comprising a series of connected oil-receivers having an inlet for oil and an outlet for steam at one end of the series and an inlet for steam and an outlet for oil at the other end of the series, the inlet for steam being at the bottom of each receiver, and each receiver having a perforated plate above the steam-inlet and a steam-coil below said plate, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name, this 25th day of October, 1901, in the presence of two subscribing witnesses.

EMILIEN ROCCA.

Witnesses:
FRANCOIS DA ROCCA,
ROBERT M. FAST.