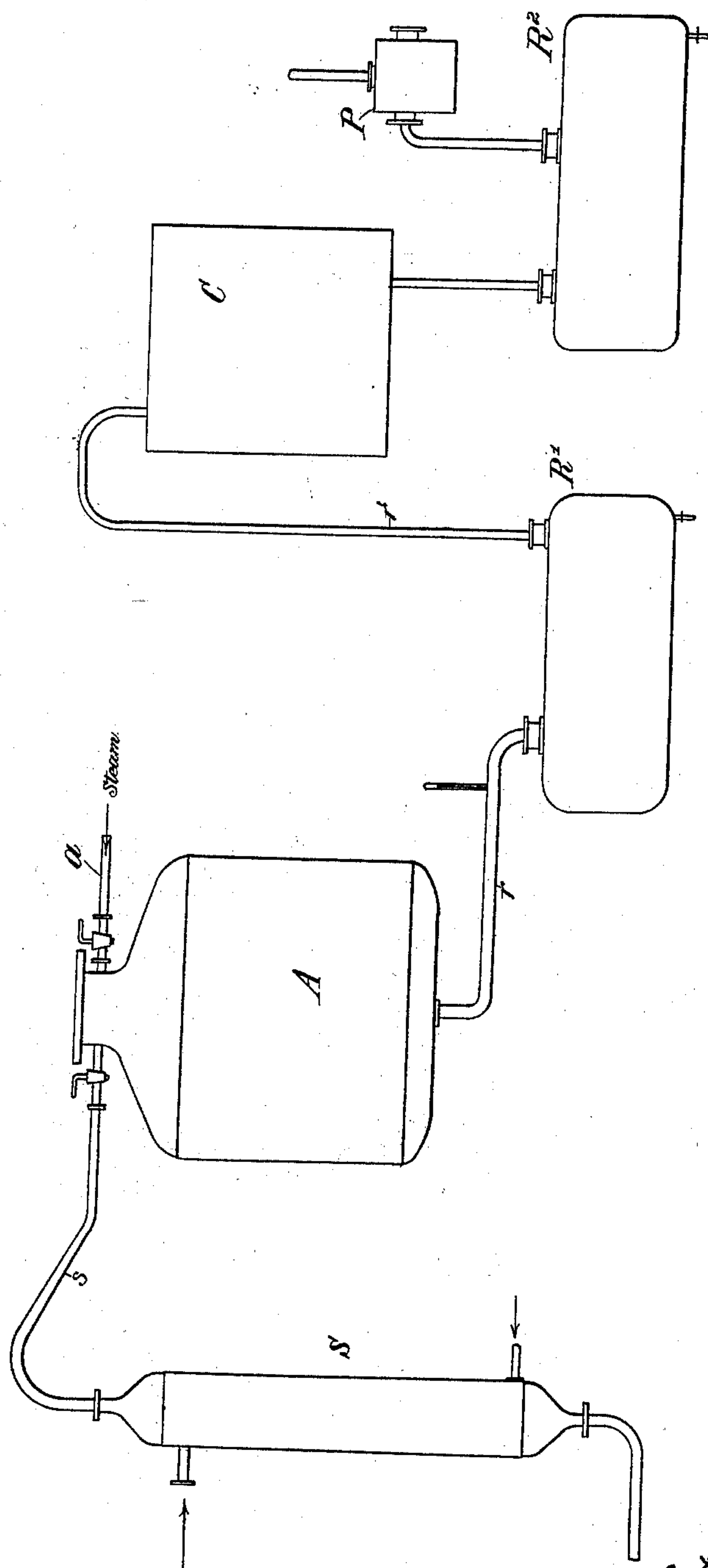


(No Model.)

E. WATEL.
PROCESS OF PURIFYING FATTY MATTERS.

No. 509,589.

Patented Nov. 28, 1893.



Attest:
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UNITED STATES PATENT OFFICE.

ETIENNE WATEL, OF PARIS, FRANCE, ASSIGNOR TO THE SOCIÉTÉ ANONYME DES PARFUMS NATURELS DE CANNES.

PROCESS OF PURIFYING FATTY MATTERS.

SPECIFICATION forming part of Letters Patent No. 509,589, dated November 28, 1893.

Application filed October 22, 1891. Serial No. 409,522. (No specimens.)

To all whom it may concern:

Be it known that I, ETIENNE WATEL, a citizen of the French Republic, residing in Paris, in said Republic, have invented certain new
5 and useful Improvements in Processes of Purifying Fatty Matters, of which the following is a full, clear, and exact description.

This invention relates to the purification of the residues or cakes from fatty substances,
10 oleaginous fruits or grains, such for example as the arachides, and coprahs.

One of the chief obstacles which has hitherto opposed the greater extension of processes of extraction by volatile solvents, such
15 as petroleum, in the manufacture of oils and fats arises from the fact that it is difficult, and in certain cases almost impossible, by the well known methods to free the exhausted material from the solvent which it retains
20 after the oil has been withdrawn, without destroying its qualities as manure or alimentary cake, or without losing too great a quantity of the solvent. On the one hand the use of hot air or other gas, even if it has the advantage of not changing the nature of the residue,
25 causes a certain amount of loss of the solvent which largely augments the cost price of the said solvent; on the other hand it has been found that the employment of steam under conditions heretofore practiced is applicable only to a limited number of cases. If, for example, amylaceous materials are treated, the water condensed causes the whole mass to form a paste, which promptly arrests
35 all ulterior action, so that there is at the same time a change in the material treated and an increased loss of solvent. Moreover, even in cases where the operation itself may be considered successful, the cake requires to be
40 dried, which further increases the cost of manufacture.

The improved method herein described has for its object to obviate the inconveniences above referred to, and to enable dry cakes to
45 be obtained from all oleaginous fruits and grains, without the odor of the solvent and possessing all their useful qualities. It is also based upon the results obtained by the method in respect to which Letters Patent
50 numbered 398,119 were granted August 23,

1892, to the assignee of Jules Massignon, entitled "Purification of fatty substances," use being made of the aforesaid method in the case of more or less pulverulent solid substances. Accordingly for freeing the ex-
55 hausted material (residue or cake) from the solvent which it retains, steam is employed with or without a vacuum, but under conditions which prevent all condensation in the material treated. The steam carries away to
60 the condenser the last traces of the solvent after the manner of a gas, but of a gas which can be condensed at the same time as the vapor of the solvent with which it is mixed, to such an extent that the whole is collected in
65 the liquid state without any loss. The condensation of the steam in the midst of the material under treatment is avoided by subjecting this material to a temperature above the boiling point of the water for the pressure at which the treatment is effected. In
70 the method described in the above mentioned patent this result is attained by heating the fatty substances in the liquid state by means of a double bottom wherein steam circulates;
75 in the present instance on account of the more or less pulverulent state of the material, this method would be impracticable and unsuccessful. This difficulty is overcome by communicating beforehand to the material a
80 sufficient excess of heat through the medium of a current of steam, superheated at a suitable temperature, the mode of operation being as follows:—When the material has been
85 exhausted, and while it is still in the extractor, vapor from the superheated solvent is introduced at the top of the extractor, the liquid solvent retained in the material is displaced little by little, and even distilled, the temperature in the extractor gradually rising
90 to the boiling point of the solvent. Instead of now stopping the introduction of the vapor from the solvent, as heretofore practiced by those who also employ vapor from the superheated solvent, the introduction of this vapor
95 is continued until the entire mass in the extractor has obtained the desired temperature. At this moment a current of dry steam is introduced through the top of the extractor, and,
100 owing to the excess of heat previously com-

communicated to the material, the steam does not condense but being lighter than the vapor from the solvent it displaces the latter. The cake is then freed from all odor of the solvent and contains only a very small amount of moisture.

It is expedient to superheat the steam before its introduction into the extractor so as to overcome the cooling and to maintain the material under treatment more easily at the proper temperature, which should as before said be above the boiling point of the water for the pressure at which the operation takes place. The degree to which this steam can thus be superheated depends on the temperature from which the material under treatment is susceptible of change under existing conditions. If the material operated upon is susceptible of change at about 100° centigrade, it is advisable to produce a partial vacuum in the apparatus prior to the introduction of steam so that the boiling point of the water at this pressure shall be lower by some degrees than the temperature at which the mass is susceptible of change.

The accompanying drawing represents by diagram an arrangement of apparatus suitable for carrying on the improved process, in which—

A represents the extractor containing the exhausted material from which the solvent retained is to be freed, and S is a superheater for the solvent, communicating with the top of extractor A by a pipe s. The lower portion of the extractor communicates by a pipe r with a reservoir R', in which the liquid solvent driven out by the pressure is collected.

a is a pipe for the introduction of steam

into the upper portion of the extractor, the mixed steam and vaporous solvent passing from the lower portion of the latter into the upper portion of reservoir R' and from thence by a pipe r' to the condenser C, being finally deposited in a liquid state in reservoir R².

Connected with the upper portion of reservoir R² is a vacuum pump P which is used in certain instances heretofore referred to.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, what I claim as new is—

In the process of extracting essential oils &c. from oleaginous fruits and grains by means of volatile solvents, the improvement consisting in heating the pulverulent residues remaining in the extractor by introducing superheated solvent vapor until the remaining traces of solvent liquid are volatilized, and until the temperature of the entire mass is raised to a point at which steam cannot condense under the conditions of pressure in the extractor, and below that at which the matter undergoes alteration, and then passing through the mass currents of dry steam to remove the solvent vapor, the temperature and pressure of the mass being maintained during the entire operation at such degrees respectively that the steam cannot condense, substantially as described.

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

ETIENNE WATEL.

Witnesses:

ROBT. N. HOOPER,
JOSEPH COWINS.