

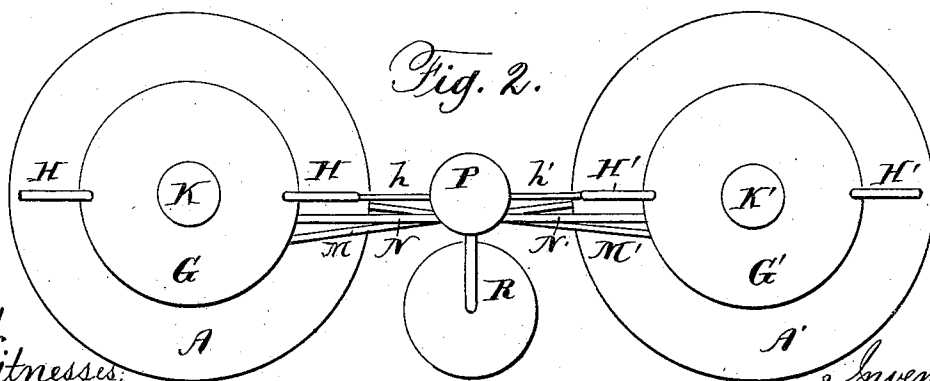
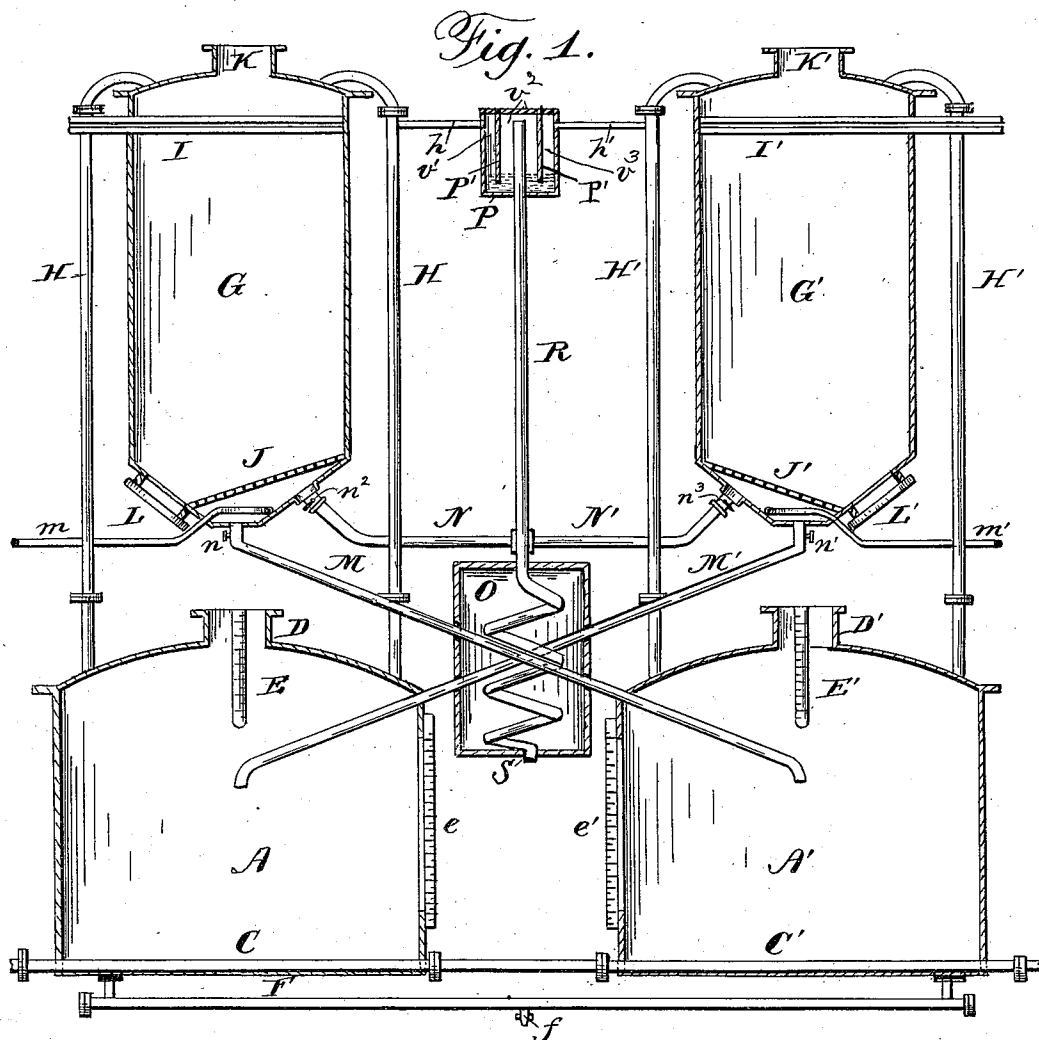
(No Model.)

E. DONARD.

APPARATUS FOR EXTRACTING FATTY SUBSTANCES.

No. 546,509.

Patented Sept. 17, 1895.



Witnesses:
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UNITED STATES PATENT OFFICE.

EUGÈNE DONARD, OF ROUEN, FRANCE.

APPARATUS FOR EXTRACTING FATTY SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 546,509, dated September 17, 1895.

Application filed May 21, 1890. Serial No. 352,681. (No model.) Patented in France December 15, 1888, No. 194,784; in Spain April 14, 1890, No. 10,772; in Belgium April 24, 1890, No. 90,317; in Italy April 25, 1890, No. 28,779, and in England June 19, 1890, No. 9,825.

To all whom it may concern:

Be it known that I, EUGÈNE DONARD, a citizen of the French Republic, and a resident of Rouen, France, have invented a new and useful Improvement in Apparatus for Extracting Fatty Substances, (for which Letters Patent have been obtained in Great Britain, No. 9,825, dated June 19, 1890; in France, No. 194,784, dated December 15, 1888; in Belgium, No. 90,317, dated April 24, 1890; in Spain, No. 10,772, dated April 14, 1890, and in Italy, No. 28,779, dated April 25, 1890,) of which the following is a specification.

This invention consists in a novel arrangement of apparatus adapted to extract the fatty substances from any materials containing them, and to produce extracts or essences and dyes by means of the vapors arising from volatile substances.

In order to enable my invention to be better understood it is illustrated in the accompanying drawings, showing both the general arrangement and the details of the improved apparatus.

Figure 1 is a vertical section of the apparatus, and Fig. 2 a plan of the same.

The same letters of reference designate like parts in both figures.

The apparatus mainly consists of two boilers, two extractors, one safety device, and one cooling contrivance, all of which are combined with secondary parts and attachments, whereby the whole is completed.

The boilers A A' inclose a pipe C or a steam or vapor mixer. The boilers are respectively provided at the top with manhole D D' and thermometer E E', and also water-gage e e', arranged on one side. The boilers are also provided with suitable valves, and a discharge-pipe F is fixed to the bottom plates of the boilers A A' and fitted with a discharge-cock f. Both boilers A A' are respectively connected with a corresponding pair of receivers or extractors G G' by two or more pipes H H', H' H'.

The extractors G G', respectively, contain two pipes I I', I' I', one in each extractor being provided for water and the other for steam; and they also contain sheets of filtering material J J'. At the top of the respective extractors G G' there is also a manhole K K', while at its base, on the side opposite to that where

the filtering device is arranged, there is an opening or manhole covered by a cap or cover L L'. Water-pipes m m' are provided for receivers G G' to cool the extract and to condense the vapors. Pipes m m', attached to the bottoms of the receivers, connect them crosswise with the boilers A A' and are adapted to discharge the solvent and the matter extracted and displaced therewith. Pipes M M' are respectively provided with cocks n n', whereby the connection between the chamber G and the corresponding boiler A', and extractor G' and boiler A', may be cut off or restored at will. Air-pipes N N', having cocks n² n³, join the lower portions of the extractors G G' and are connected with the pipe R, which in its turn communicates with the cooling-vessel O.

The safety device consists of a closed cylinder P, divided by vertical partitions P' into three chambers v' v² v³, and a pipe R, communicating with the said chamber and the cooler O, and two pipes h h', leading from vessel P to the two chambers G G', respectively.

The whole of the apparatus may be constructed of iron, brass, bronze, cast-iron, or any other suitable material, and all parts may be tinned or silver-plated if the materials it is intended to treat in the apparatus are liable to be colored or to undergo any injurious chemical alteration through contact with the iron or brass.

The operation is as follows: The extractors being filled with the material, and the boiler A' containing a small amount of water and boiler A water mixed with the fatty substance and the solvent left from the preceding operation, the cocks n n³ are opened and cocks n' n² closed. Steam is admitted to pipe C of boiler A and cold water to pipe I of extractor G and to pipe m and tank O. When the temperature reaches the proper point in boiler A, the solvent distills and passes through pipe H into extractor G, and by coming in contact with the cold-water pipe condenses and falls in hot drops on the material in said extractor G, descending through it and dissolving the oily or fatty substance in the material and carrying it away through filter-plate J into contact with cold-water pipe m, and thence through pipe M and cooler O into boiler A'. At a temperature of from 85° to 95° centi-

grade in pipe H it will be found that there will be but few if any traces of solvent left in boiler A, and but little or no fatty matter will be left in the material. Water is now shut off from pipe I and steam is admitted thereto, increasing the temperature in extractor G to 100° centigrade, and the steam generated from the water in boiler A passes through the material in extractor G, carrying away with it all traces of solvent remaining in the material, and passes thence through pipe M, cooler O, where the steam and solvent are condensed, and into boiler A'. Boiler A' now contains water, fatty matter, and solvent, boiler A water and oily matter, and extractor G exhausted material. The boiler A is now emptied of its water and oily substance and extractor G of its exhausted matter, after which I proceed to operate upon the matter contained in extractor G'. I would state that during the operation just described the air in boiler A', being displaced by the entering fatty substance and solvent, rises by pipes II II', is cooled by coming in contact with the pipe I', cold water having been previously admitted thereto, and then passes through the matter in extractor G', where it leaves any non-condensed solvent that may have been carried with it from boiler A'. It then passes through pipes N' R into chamber P. As boiler A' contains fatty matter mixed with the solvent, to free said solvent we reverse the before-described operation—that is to say, we admit steam to pipe C, close cocks $n n^2$, and open cocks $n' n'^2$ and admit cold water to pipes I' m'. The heat in boiler A causes the solvent to distill, the latter, passing through pipe II' into extractor G', is condensed by contact with cold-water pipe I', the hot drops falling upon and through the material in extractor G', dissolving the fatty matter and passing through pipe M' and cooler O into boiler A. At the end of this second operation boiler A will contain water, fatty material, and solvent; boiler A' water and fatty matter, and extractor G' exhausted material. The fatty matter in boiler A' can then be removed in the usual manner. It will be found that one charge of solvent suffices for a considerable number of operations. The degree of heat for the regular distillation of the solvent can be determined by thermometers E E. The operation can be made continuous by refilling an extractor with fresh material as soon as its exhausted matter has been removed. To make clear the function of the safety device, I would say that the air entering by pipes II h into chamber v' traverses the liquid therein and enters central chamber v², wherein is the end of pipe R. The air then proceeds to the cooler O by pipe R, where the solvent carried by the air condenses and comes out by end S of pipe R, said end passing through the bottom of the cooler. The condensed solvent is collected in a suitable receptacle and the air thus purified flows out into the atmosphere. The object of the liquid

in vessel P is to close communication between pipes II h and pipes II' h' when the apparatus is working, and it is easy to understand that the operation is the same when air arrives by pipes II' h' instead of by pipes II h, as above. No loss of solvent is sustained, since the material retains the vapors that may be carried away by the air, and the safety or cooling chamber never works unless the operation of the apparatus is defective. Owing to the fact that the mixture of water and oil is allowed to boil the oil is purified, all impurities it may have carried away during the displacement being separated therefrom.

The safety apparatus is adapted to admit air and vapor into and to discharge them from the boilers A A' and the receivers G G'. Any suitable solvent may be used, but preferably an essence boiling at a high temperature—say at from 85° to 95° centigrade.

When the apparatus is used for manufacturing extracts, dyes, or for scouring wool, its operation is exactly similar to that described above with regard to oil.

When the material to be treated is soluble in water, either a coil or a jacket may be provided for the passage of steam or more or less heated air to displace the solvent when it has absorbed the fatty substances extracted from the material under treatment.

This apparatus is mainly designed for manufacturing purposes. In addition to the advantages that will appear from the preceding description, it obviates any loss of volatile liquid, as well as any accidents injurious to health, and removes any danger of fire.

I claim—

1. In an apparatus of the class described, the combination with a boiler A, an extractor G therefor, pipes leading from the boiler and into the upper end of the extractor, a second boiler A', an extractor G' therefor, pipes leading from the latter boiler and into the upper end of the extractor G', a pipe leading from the lower end of extractor G and into the boiler A', a pipe leading from the lower end of extractor G' and into the boiler A, a condensing device arranged in each of the extractors at the upper end thereof, a cooler through which pass the pipes connecting the extractor G with boiler A', and extractor G' with boiler A, and means for supplying heat to said boilers, as and for the purpose specified.

2. In an apparatus of the class described, the combination with a boiler A, an extractor G therefor, pipes leading from the boiler and into the upper end of the extractor, a second boiler A', an extractor G' therefor, pipes leading from the latter boiler and into the upper end of the extractor G', a pipe leading from the lower end of extractor G and into the boiler A', a pipe leading from the lower end of extractor G' and into the boiler A, a safety device consisting of a vessel containing a liquid, and pipes connecting the said vessel with the extractors, a condensing device arranged in each of the latter at the upper end

thereof, a cooler through which pass the pipes connecting the extractor G with boiler A', and extractor G' with boiler A, and means for supplying heat to said boilers, as and for the purpose specified.

3. In an apparatus of the class described, the combination with a boiler A, an extractor G therefor, pipes leading from the boiler and into the upper end of the extractor, a second boiler A', an extractor G' therefor, pipes leading from the latter boiler and into the upper end of the extractor G', a pipe leading from the lower end of extractor G and into the boiler A', a pipe leading from the lower end of extractor G' and into the boiler A, water and steam pipes located in the upper portion of each of said extractors, a water pipe located in the lower portion of the same, a cooler through which pass the pipes connecting the extractor G with boiler A' and extractor G' with boiler A, and means for supplying heat to the boilers, as and for the purpose specified.

4. In an apparatus of the class described, the combination with a boiler A, an extractor G therefor, pipes leading from the boiler and into the upper end of the extractor, a second boiler A', an extractor G' therefor, pipes leading from the latter boiler and into the upper end of extractor G', a pipe leading from the lower end of extractor G and into the boiler A', a pipe leading from the lower end of extractor G' and into the boiler A, water and steam pipes located in the upper portion of each of said extractors, a water pipe located in the lower portion of the same, a cooler through which pass the pipes connecting the extractor G with boiler A', and extractor G' with boiler A, means for supplying heat to the boilers, and a safety device consisting of a vessel containing a liquid and pipes connecting said vessel with the extractors, as and for the purpose specified.

5. In an apparatus of the class described, the combination with the boiler A, an extrac-

tor G therefor, a pipe leading from the boiler and into the upper end of the extractor, of a second boiler A', an extractor G' therefor, a pipe leading from the boiler A' and into the upper end of extractor G', a pipe leading from the lower end of extractor G and into the boiler A', a pipe leading from the lower end of extractor G' and into boiler A, water and steam pipes arranged in the upper portion of each of the extractors, and filter plates located in the lower portion of the same, a cooler through which pass the pipes connecting the extractor G with boiler A', and extractor G' with boiler A, and means for supplying heat to the boilers.

6. In an apparatus of the class described, the combination with the boiler A, an extractor G therefor, a pipe leading from the boiler and into the upper end of the extractor, with a second boiler A', an extractor G' therefor, a pipe leading from the boiler A' and into the upper end of extractor G', a pipe leading from the lower end of extractor G and into boiler A', a pipe leading from the lower end of extractor G' and into boiler A, water and steam pipes arranged in the upper portion of each of the extractors, filter plates located in the lower portions of the same, a cooler through which pass the pipes connecting the extractor G with boiler A', and extractor G' with boiler A, means for supplying heat to the boilers, and a safety device consisting of a vessel containing a liquid, and pipes connecting the said vessel with the extractors, and with the cooler, as and for the purpose specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 19th day of March, 1890.

EUGÈNE DONARD.

Witnesses:

C. M. LAFONTAINE,
G. EARTAMDINE.