

No. 656,529.

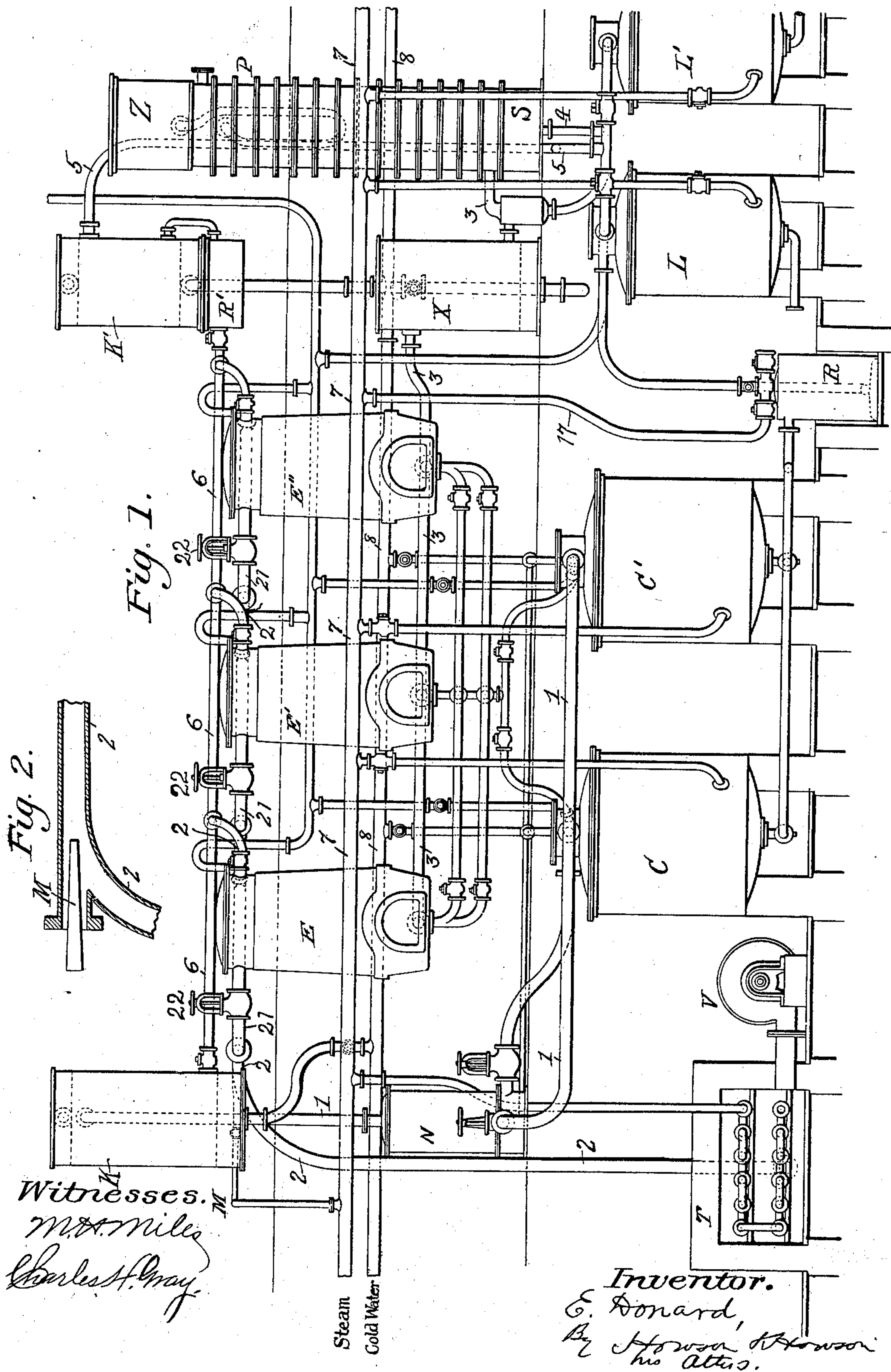
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E. DONARD.

APPARATUS FOR EXTRACTING OIL.

(Application filed June 14, 1900.)

(No Model.)



UNITED STATES PATENT OFFICE.

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APPARATUS FOR EXTRACTING OIL.

SPECIFICATION forming part of Letters Patent No. 656,529, dated August 21, 1900.

Original application filed May 27, 1898, Serial No. 681,922. Divided and this application filed June 14, 1900. Serial No. 20,323. (No model.)

To all whom it may concern:

Be it known that I, EUGÈNE DONARD, a citizen of the French Republic, residing at Paris, France, have invented an Improved Apparatus for Extracting Grease and Oil from Wool, &c., of which the following is a specification.

This invention has reference to an improved apparatus for use in extracting fatty or greasy substances from wool and other materials or for extracting oil from grain.

In the accompanying drawings, Figure 1 is an elevation of my improved apparatus, the general arrangement and details of which may, however, be varied; and Fig. is a sectional detail of the steam-injector.

E, E', and E'' are three extractors in which the wool or other such material is subjected to the different operations of the process.

C and C' are two heaters or boilers which are alike and are each provided at the bottom with a steam-coil. They are intended to receive the mixture of essence or solvent and grease coming from the extractors, and they serve to distil off the solvent.

K is a condenser for the vapors of the solvent coming from the boilers C and C'.

N is a suitable dephlegmator to retain the water entrained by the solvent vapors.

V is a fan or blower to force a current of air across the heater T and into the extractors E E', &c. M is a steam-injector to charge this current of hot air with steam.

P is a recovery-column to recover the solvent carried over by the hot air which is passed through the wool. This column is surmounted by a reservoir Z, containing pure oil, and at the bottom of the column is a reservoir S, which collects the oil charged with solvent descending through the column.

X is a condenser for the water and solvent entrained by the air coming from the extractors.

L and L' are two boilers like the boilers C C'. The first, L, serves to distil the solvent contained in the oil coming from the column P, while the second boiler L' serves to purify the greasy matters extracted from the wool.

R is a monte-jus to charge these matters into the boiler L' after each operation.

K' is a condenser for the vapors of water and solvent arising from the boilers L and L'.

R' is a reservoir or Florentine vessel to separate the water and solvent coming over from the distillations in the boilers L L'.

The boilers C and C' are connected to the extractors E E' E'' through the dephlegmator N by piping 1, from which dephlegmator the vaporized solvent freed of entrained water passes to the condenser K and then into the extractors in a liquid state. The piping 7, connected to any suitable source of steam-supply and provided with suitable valves, distributes the steam to all parts of the apparatus where it is used, while the piping 8 supplies cold water from a suitable source where it is needed. The piping 2 conveys hot air from the heater T, to which the air is supplied by a suitable blower V, to the wool in the extractors E E' E'', such air being charged with steam by suitable connection of the pipe 2 with the steam-pipe, in the present instance by an injector device M, supplied by a branch pipe connected to the pipe 7. From the piping 2 branch pipes 21 connect with the upper parts of the several extractors E E' E'', and each branch has its cock 22 to enable the extractors to be operated independently. The piping 3, provided with suitable valves, connects the extractors with the condensers X, and the piping 4 connects the reservoir S at the bottom of the recovery-column P with the boiler L, while the piping 5 connects said boiler with the condenser K', the latter of which is connected to the extractors E E' E'' by piping 6. A pipe 17 supplies steam-pressure from the pipe 7 to the monte-jus R. All the pipes are provided with suitable valves and cocks, as shown in the drawings. The condensers K, K', and X may be of any suitable construction.

By way of example I will now describe how the apparatus may be employed in the degreasing of wool; but it should be understood that the process herein described forms the subject of my application, Serial No. 681,922, filed May 27, 1898, of which the present application is a division, and it should be further understood that my improved apparatus may be used in other ways.

With the described apparatus each charge of wool can be given an unlimited number of impregnations. By way of example it may

be observed that three such impregnations can be given with a volume and a half of distilled solvent, as will be now described. Suppose the extractor E to be charged with wool and solvent in a first impregnation and supposing the extractor E' to be freshly charged with greasy wool, while the vessel E'' is by a suitable manipulation of cocks cut out of the process, except that a current of warm moist air is passed through it. The boiler C contains water and a mixture of solvent from a preceding operation. The vessel C' contains only cold water. Steam is admitted to the coil in the boiler C from the pipe 7, the solvent is vaporized therein, and its vapor rises in the pipe 1, passes through the dephlegmator N, which retains the entrained water. The vaporized solvent enters the condenser K, whence it passes in a liquid state into the extractor E, which has previously been put in communication at the bottom through the pipe 3 with the extractor E'. Then the solvent entering the extractor E forces what is already in there into the extractor E'. The distillation from the boiler C into the extractor E is thus continued until the extractor E' is full. One-half the solvent charged with greasy matters is then let out from the extractor E' into the vessel C', cutting off for the moment communication with the extractor E, but continuing the distillation into the latter from boiler C. When the level of the solvent in E' descends to about mid-height, the emptying is stopped by closing the communication to boiler C'. Connection between E and E' is reopened and distillation into E from C continued until the extractor E' is again filled with solvent. At this point distillation in the boiler C is stopped and the rinsing solvent is allowed to flow from the extractor E into the vessel C'. The vessel E is cut off from the circulation of solvent, and the wool in the vessel E is subjected to the action of a current of hot air charged with steam. For this purpose the upper part of the extractor is put into communication through the piping 2 with the blower V and air-heater T, and the valve of the steam-injector M is opened. The air heated to a suitable temperature and charged with steam, so that the temperature of the mixture may be below 100° centigrade or the boiling-point of water, traverses the wool from top to bottom and carries off in vaporized form the solvent remaining in the wool. It goes out through the piping 3 and into the condenser X, where it leaves the greatest part of the solvent and water, and then it traverses the recovery-column P from the bottom upward. There the last traces of solvent are given up to the oil, which descends from plate to plate from the upper reservoir Z to the lower reservoir S. This oil, with solvent, passes from the reservoir S through the pipe 4 to the boiler L. There it comes into contact with boiling water, whose vapors carry off with them all the solvent in the oil. The mixtures of vapor of wa-

ter and vapor of solvent rises through the pipe 5 into the condenser K'. The products of condensation fall into the reservoir or Florentine receiver R', whence the solvent separated from the water is distributed through the piping 6 back again into the extractors. When the wool is entirely freed from solvent, the current of air is stopped, the extractor E is emptied of its degreased wool, and it is filled anew with wool to be degreased. During the passage of the hot moist air through the wool in the extractor E the extractor E'' has been charged with wool to be treated, and a new series of impregnations is now carried on in the extractors E' and E'' in the way already described with reference to E and E'—that is to say, the extractor E'' being full of solvent communication is opened between E' and E'', a volume and a half of solvent is distilled from the C' into E', forcing an equal quantity of solvent from the latter into E'', thus making in all three impregnations in E' and one and a half in E''. It will thus be seen that by distilling a volume and a half of solvent three impregnations are effected, since the same quantity passes successively through two charges of wool. It will be readily understood that by suitable modification four impregnations may be obtained by distilling two volumes of solvent, and so on. The extractor E' having had its last impregnation its solvent is discharged into the boiler C, which meantime has been emptied of water and greasy matters and supplied with a fresh quantity of cold water. The monte-jus R is used to force the discharged matters from the boiler C into the boiler L'. The extractor E' is then opened to the current of hot air, as already described with reference to the boiler E, and a new series of impregnations is carried on between E'' and E, distilling from C into E'', and so on continuously. The matters extracted from the wool are purified in the boiler L'. The solvent contained therein is vaporized and passes through the pipe 5 into the condenser K', whence it descends into the receiver R' to be again distributed to the extractors.

I claim as my invention—

1. The herein-described apparatus for degreasing wool, &c., comprising boilers C C', extractors E E', means for supplying hot air charged with steam to the extractors, a condenser X connected to the lower part of each extractor, and a recovery-column P, in combination with a boiler L connected with the said condenser and recovery-column, a condenser K' for the vapors from the said boiler, a receiver to separate the solvent from the water and piping 6 to return the solvent to the extractors.

2. The herein-described apparatus for degreasing wool, &c., comprising two boilers C and C', and three extractors E E' E'' and valved piping connecting the boilers and extractors, in combination with piping 1, leading from the boilers, a dephlegmator N and

condenser K and piping connecting the latter with the upper parts of the extractors, substantially as described.

3. The herein-described apparatus for de-greasing wool, &c., comprising boilers and extractors, in combination with an additional boiler L', a monte-jus R connected to the bottom of the first-named boilers and to the upper part of the boiler L' with a condenser K'

and means for returning the recovered solvent to the extractors, substantially as described.

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

EUGÈNE DONARD.

Witnesses:

EDWARD P. MACLEAN,
GEORGE E. LIGHT.