

No. 656,528.

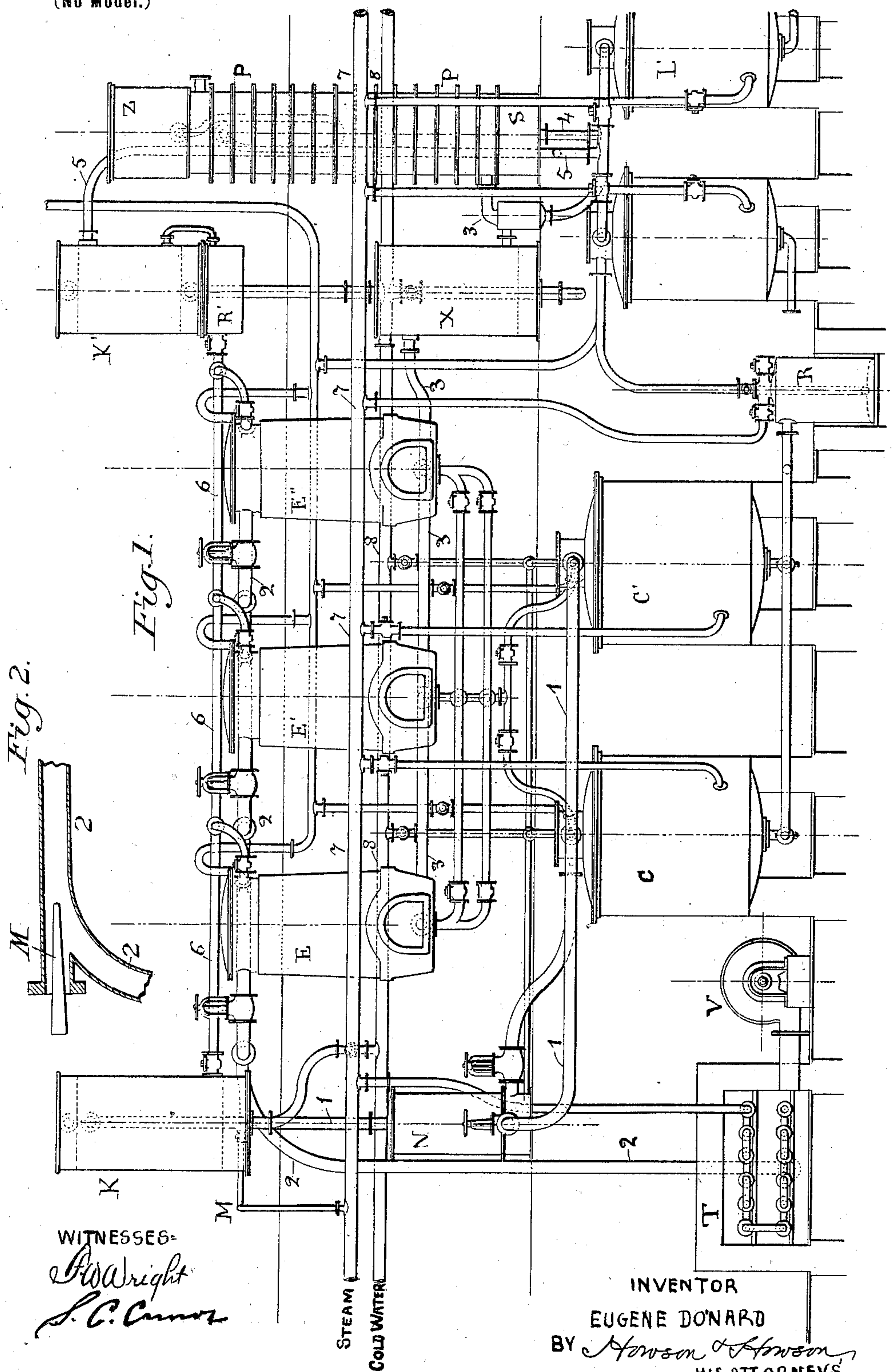
Patented Aug. 21, 1900.

E. DONARD.

PROCESS OF REMOVING SOLVENT VAPORS FROM WOOL.

(Application filed May 27, 1898.)

(No Model.)



UNITED STATES PATENT OFFICE.

EUGÈNE DONARD, OF PARIS, FRANCE.

PROCESS OF REMOVING SOLVENT VAPORS FROM WOOL.

SPECIFICATION forming part of Letters Patent No. 656,528, dated August 21, 1900.

Application filed May 27, 1898. Serial No. 681,922. (No specimens.)

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 Improvements in Extracting Grease from Wool, &c., of which the following is a specification.

This invention has reference to a process of extracting fatty or greasy substances from wool and other materials.

One of the chief difficulties heretofore experienced in degreasing wool, &c., has been to free the wool of the last traces of the solvent without injuring the fibers. The present invention overcomes the difficulty by passing through the wool when freed from the grease a current of air which has been heated to a suitable degree and which has been charged with steam as it passes to the vessel containing the wool from which the solvent is to be carried off. It can readily be calculated that air taken under ordinary atmospheric conditions and heated to, say, 70° centigrade carries about six times fewer calories than a like volume of air saturated with steam at 70° centigrade.

Figure 1 in the accompanying drawings is an elevation of apparatus, the general arrangement and details of which may, however, be varied for carrying out my invention; and Fig. 2 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 to 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. The piping 3, provided with suitable valves, connects the extractors with the condenser 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. 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.

Operation: With the described apparatus each charge of wool can be given an unlimited number of impregnations, by way of example, and it may be observed that three such im-
 5 pregnations can be given with a volume and a half of distilled solvent, as will be now described. Supposing the extractor E to be charged with wool and solvent in a first im-
 10 pregnation, 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 mix-
 15 ture 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, and passes through
 20 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
 25 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
 30 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 distilla-
 35 tion 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
 40 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
 45 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
 50 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
 55 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
 60 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
 65 upper reservoir Z to the lower reservoir S. This oil, with solvent, passes from the reser-

voir 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
 70 water and vapor of solvent rise 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
 75 the piping 6 back again into the extractors. I find in practice that the maximum temperature of the saturated mixture formed by charging hot air with steam should be for
 80 work upon fine wool about 45° centigrade and for common wool about 60° centigrade. 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.
 85 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
 90 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'' and a volume and a half of solvent is distilled from C' into E', forcing an
 95 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,
 100 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.
 105 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
 110 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 car-
 115 ried 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
 120 into the condenser K', whence it descends into the receiver R', to be again distributed to the extractors.

I do not claim in this application the apparatus which I have described and illustrated
 125 for carrying out my process, as such apparatus forms the subject of a divisional application filed by me June 14, 1900, Serial No. 20,323.

I claim as my invention—

In the degreasing of wool, &c., the herein-
 130 described process of freeing the wool from

the solvent, consisting in subjecting the wool
after degreasing to the action of a current of
hot air and moisture formed by charging hot
air with steam, the maximum temperature of
5 the said saturated mixture being about 60°
centigrade, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of
two subscribing witnesses.

EUG. DONARD.

Witnesses:

A. FAROULT,
P. PELFIENE.