

(No Model.)

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PROCESS OF SCOURING AND WASHING WOOL AND OTHER MATERIALS
AND APPARATUS FOR THE PURPOSE.

Patented Dec. 16, 1884.

Fig. 1.

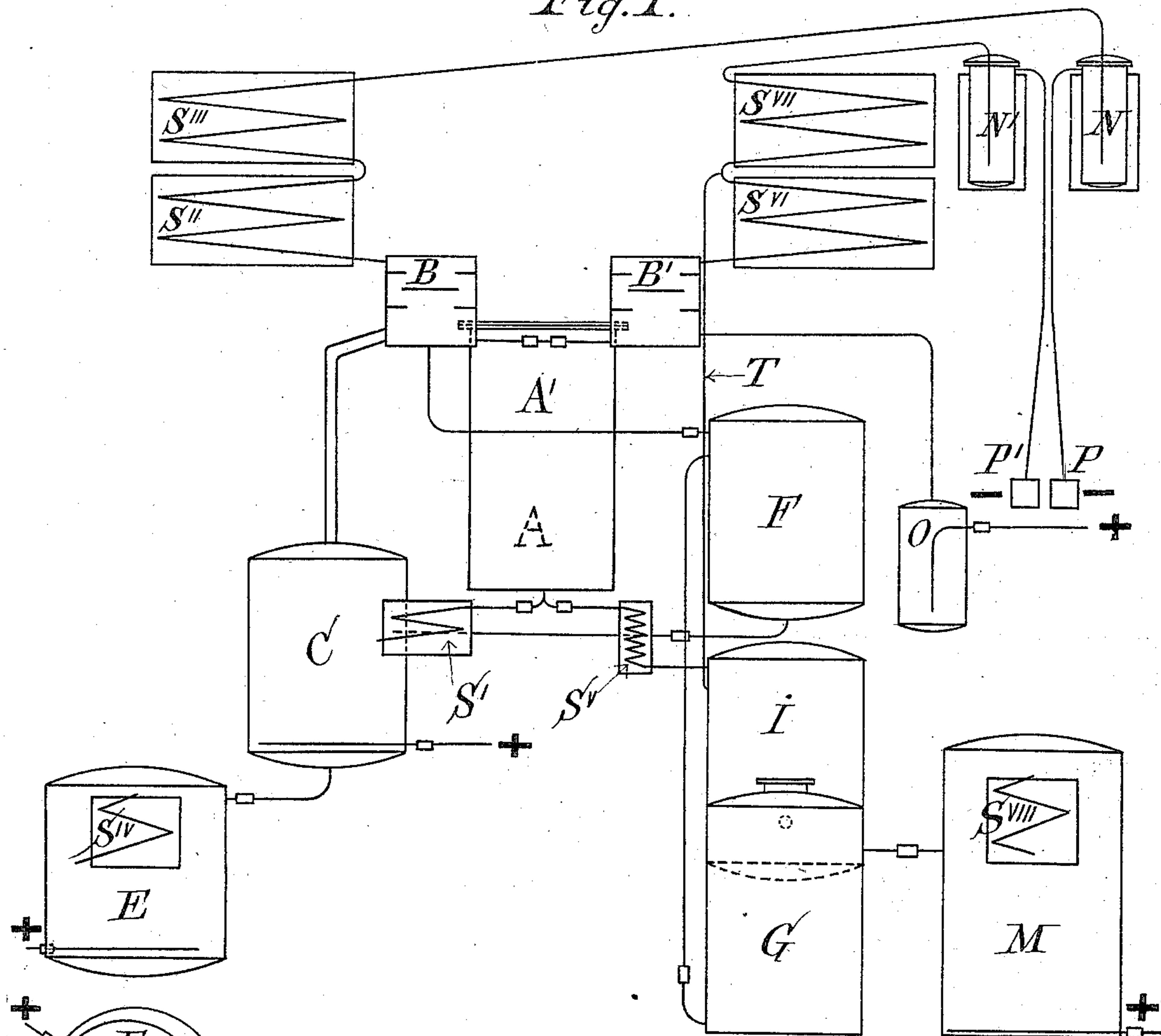
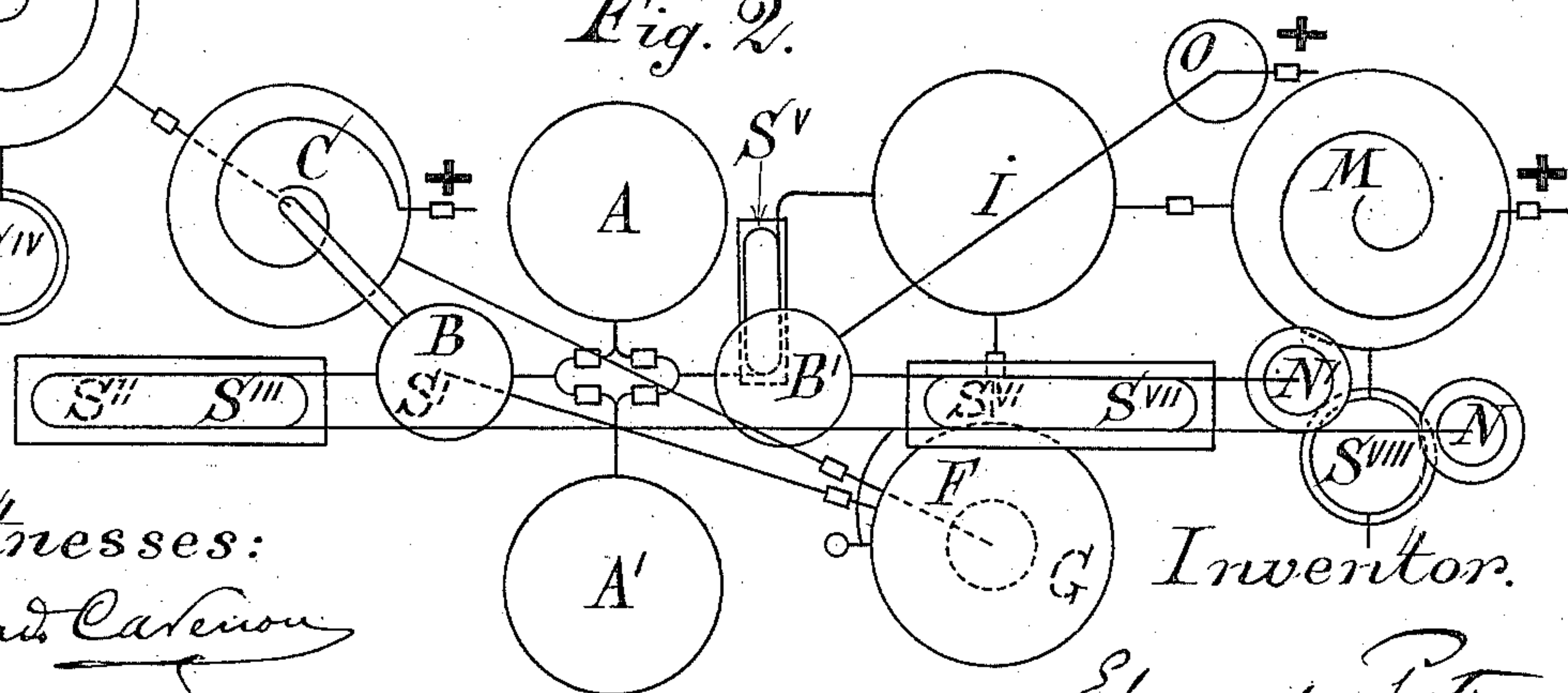


Fig. 2.



Witnesses:

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PROCESS OF SCOURING AND WASHING WOOL AND OTHER MATERIALS, AND APPARATUS FOR THE
PURPOSE.

SPECIFICATION forming part of Letters Patent No. 309,312, dated December 16, 1884.

Application filed May 15, 1884. (No model.) Patented in France November 21, 1883, No. 158,694; in Belgium January 8, 1884, No. 63,793; in England January 8, 1884, No. 973; in Germany January 9, 1884, No. 28,588; in Luxemburg January 10, 1884, No. 345, and in Italy June 30, 1884, No. 16,957.

To all whom it may concern:

Be it known that I, EDOUARD PATRY, a citizen of Switzerland, residing at Paris, in the French Republic, have invented a certain new and useful Process of Scouring and Washing Wool and Other Materials, and Apparatus for the Purpose; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to the scouring and washing of certain materials, especially raw or worked wools, for the removal therefrom of oily and fatty bodies, and also substances that can be dissolved in water. I employ a solvent for said fatty bodies that is capable of ready separation from water—for example, one of the various light oils of coal or petroleum distilling under 120° to 140° centigrade; and I also employ water as a solvent for other foreign substances soluble therein, these actions being constantly aided by a vacuum. I do not employ sulphuret of carbon, as the same is liable to injure the wool, &c. The constant aid of a vacuum, as I have been able to ascertain from numerous experiments, and which might be, moreover, the explanation of the excellent result obtained, is an essential and necessary factor of this new process.

Among the light oils above mentioned I employ, by preference, toluene, which is a hydrocarbon distilling between 108° and 112° centigrade, and which gives no waste in the distillations to which it is successively submitted.

My improved process permits of obtaining separately, first, a perfectly scoured and washed material; second, the fatty bodies, and, third, the matters soluble in water. Furthermore, the scouring and washing in water of the material to be treated being operated in a medium rarefied at will, I can maintain during the working a sufficiently low temperature in order not to injure in anywise the material under treatment. According to the case, I can use water and a solvent for the fatty bodies either in a liquid state or in the state of vapor, or in both conditions; and in any

case I obtain at the termination of the operation the complete removal of the solvents impregnating the material, and recover them almost without loss for a fresh operation.

In order that the nature and the general working of my process may be understood, I proceed to describe, with reference to the accompanying drawings, a special arrangement of double-acting apparatus in which, let it be supposed, greasy wool is to be treated in order to extract therefrom all the fatty bodies and alkaline salts.

From the following a single-acting apparatus may be readily understood without any special description of same.

Figure 1 is an elevation, and Fig. 2 a view in plan. On the diagrams of these two figures the pipes are indicated in full lines, and the cocks are represented by simple rectangles, (□). The steam-inlets are represented by the signs +, and the connections with the valves by the signs —.

In the operations the degree of the vacuum which has given good results for wool corresponds to an interior effective pressure of from ten to twenty centimeters of mercury. The more complete the vacuum the lower the temperature will be, and, inversely, in certain instances, or for certain materials, it may be advantageous to work with a less depression and consequently at a higher temperature. The wool is placed in a closed air-tight vessel, A, which is in communication with a vacuum apparatus, P, through a baffling-vessel, B, worms S^{II} S^{III}, and a safety-box, N. The air-tight vessel A is also in double communication with the vessel C, which contains the solvent for the fatty bodies, on the one hand by the baffling-vessel B and on the other by the worm S^I and a plunger-tube. The vessel C is heated by a closed coiled pipe. The solvent in a state of vapor rises into the baffling-vessel B, is partly condensed in the worms S^{II} S^{III}, falls back into the baffling-vessel B, then into the air-tight vessel A, becomes charged with the fatty bodies which impregnate the wool, and re-enters the vessel C, where it is evaporated afresh, leaving there-

in the fatty bodies, and so on. The worms S^{II} S^{III} perform the office of valves with regard to the solvent. Nevertheless, to avoid all loss the safety-box N is interposed between these worms and the vacuum apparatus. If, for any reason whatever—such as too high exterior pressure, too hot a water of condensation, &c.—loss of the solvent is still to be feared, the gases might be freed under a stratum of oil, or other suitable liquid, before introducing them into the vacuum apparatus. The baffling-vessel B is also destined to reheat, by the vapor of the rising solvent, the liquid solvent which may have become too cool in the worms S^{II} S^{III} . When the wool has been quite scoured, the communications from A with B and S^I are closed, and the communications with the baffling-vessel B' and the worm S^{IV} are opened, and the functions which the parts B, S^{II} , S^{III} , N, P, and S^I perform for the solvent for the fatty bodies are then repeated in the same way for the water by B', S^{VI} , S^{VII} , N', P', and S^V . The vacuum is created to the desired degree and steam is introduced at O, where, mixing with the water therein, it takes up the temperature corresponding to the said degree of the vacuum maintained in the apparatus. The partly-condensed steam passes into the air-tight vessel A with the water of condensation, finishes being condensed therein, displaces the solvent for the fatty bodies which has remained in the wool, dissolves out the soluble salts, and, cooled entirely by the worm S^V , enters the vessel I. This washing by steam may be completed, or in part replaced, by the use of a certain quantity of water introduced into the baffling-vessel B', passing into the air-tight vessel A, onto the wool, and collected in the vessel I, or into a supplementary vessel for the purpose.

It is advantageous to put the vessel I into communication with the vacuum, or otherwise than through the wool, and it is this purpose which the tube T fulfills.

To more rapidly cleanse the wool from the solvent of the fatty bodies a suitably-regulated quantity of water, besides the steam, may be caused to enter the baffling-vessel B'. In this case the worm S^{VI} is dispensed with, and the communication with the vacuum only takes place through B', A, S^V , I, T, S^{VII} , and N'. S^{VII} then performs the office of valve for the vapors, which, although having passed S^V , might have escaped condensation. When the wool has lost by the first operation all its fatty bodies, by the second the excess solvent, and the bodies soluble in water, the air-tight vessel A is placed in communication with the atmosphere. It is then opened, and the wool taken out. In the double-acting arrangement herein described the air-tight vessel A effects the scouring, while a second and similar air-tight vessel, A', effects the washing, and vice versa. When the vessel C contains sufficient fatty body, communication with the vessel A is closed, and communication be-

tween C B F established, and the heating is effected in the vessel C. The solvent distills, is condensed in worms S^{II} S^{III} , and falls back into F, whence it is caused to pass into vessel C after having run off the fatty bodies from C into E. In this vessel these fatty bodies are, by means of a steam-stirrer, deprived of the solvent which they may still have retained. This portion of the solvent having passed out through the worm S^{IV} , the fatty bodies are discharged ready for use industrially.

The liquids which are in the vessel, I, form two strata. The lower stratum, which is water slightly charged with the solvent for the fatty bodies, and which has dissolved out the alkaline salts, is decanted in vessel M, from which a steam-stirrer drives out the solvent through the worm S^{VIII} . The water in question is then carried into the evaporators and potash-ovens. The upper stratum, formed by the solvent for the fatty bodies, is likewise decanted, and is carried into the vessel G, which vessel serves for the first charge of the solvent for the fatty bodies, and receives likewise the portions of the solvent which have been collected in the worms S^{IV} S^{VIII} . The action of the vacuum causes the solvent to pass from G into F, from F into C. The solvent re-enters by its own weight.

By the means described I obtain wool perfectly scoured and washed without its fibers being injured, perfectly separated fatty bodies, and liquors only containing salts soluble in water and in excellent condition of concentration, the whole without loss of solvent. The result also of the foregoing is, by reason of the apparatus adopted, that I obtain a circulation of the solvents so that the same quantity of these solvents serves a great number of times in the same operation, and this permits of the use of a small quantity of solvents, consequently diminishing loss, and finally rendering the use of relatively high-priced solvents practical.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The process herein described of scouring and washing wool or similar material and removing oily bodies and other foreign substances therefrom, consisting in first subjecting such material in a suitable vessel from which the air has been exhausted to the action of a hydrocarbon liquid, such as toluene, for dissolving the oily and fatty bodies, then drawing off the hydrocarbon liquid, and then subjecting in the same vessel such material and the remaining hydrocarbon-liquid solvent held by it in suspension to the action of water or steam, or both, to wash out of such material the remaining hydrocarbon liquid and foreign substances, and then drawing off the liquid, as and for the purposes set forth.

2. In an apparatus for scouring and washing wool or similar material, the combination of the closed vessel A, for containing the wool,

the baffling-vessel B, the vessel C, for hydro-
carbon solvent liquid, the worms S^I, S^{II}, and
S^{III}, the safety-box N, and the vacuum appa-
ratus P and their connecting pipes and coils
5 with the baffling-vessel B', the water and steam
vessel O, the worm S^V, the vessel I, the worms
S^{VI} and S^{VII}, the safety-box N', and the vacuum
apparatus P' and their connecting pipes and
coils, as and for the purposes set forth.
10 3. In an apparatus for scouring and wash-
ing wool or similar material, the combination
of the vessel C, the baffling-vessel B, the con-
densing-worms S^{II} and S^{III}, the vessels F E,
and worm S^{IV} and their connecting pipes and
15 coils for distilling the hydrocarbon-liquid solv-
ent and separating it from the fatty and oily
matters removed from the wool or similar ma-
terial, and reclaiming both, as and for the
purposes set forth.

4. In an apparatus for scouring and wash- 20
ing wool or similar material, the combination
of the vessel A, for containing the wool, the
vessel I, for receiving the washing-liquid from
A, the vessel M, for decanting said liquid, the
worm S^{VIII}, for condensing the hydrocarbon 25
vapors driven off from the vessel M, the ves-
sels G, F, and C, for receiving the hydrocarbon-
liquid solvent, and the pipes and cocks con-
necting the various vessels, whereby the said
liquid is returned to the vessel C, as and for 30
the purposes set forth.

In witness whereof I have hereunto signed
my name in the presence of two subscribing
witnesses.

EDOUARD PATRY.

Witnesses:

• EDOUARD CAVENON,
ERNEST LAMBERT.