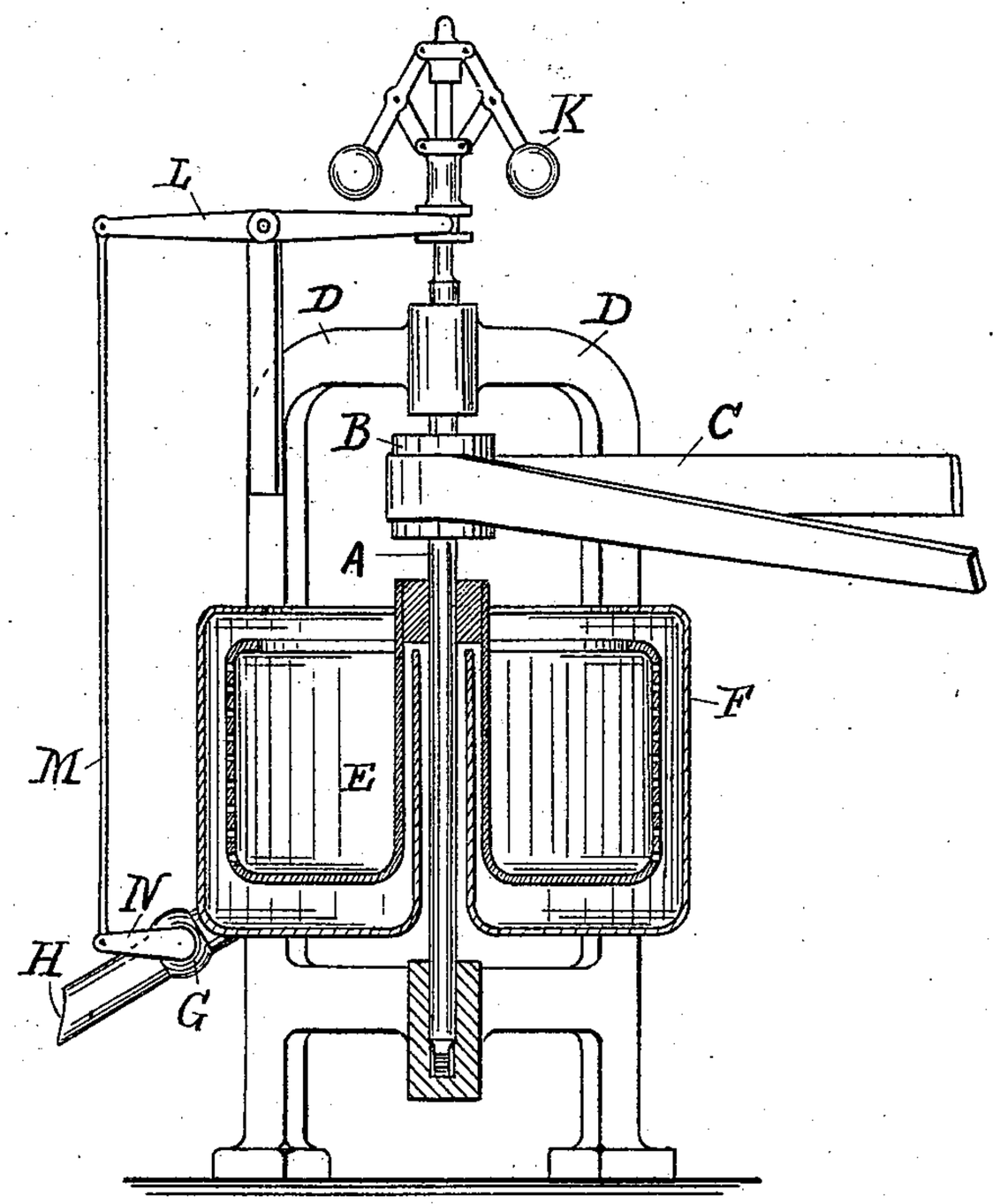
(No Model.)

J. H. WINGFIELD.

PROCESS OF CLEANING WOOL

No. 549,042. Patented Oct. 29, 1895.



Witnesses.
Samuel W. Baesh.
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by

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UNITED STATES PATENT OFFICE.

JOHN H. WINGFIELD, OF MONTCLAIR, NEW JERSEY.

PROCESS OF CLEANING WOOL.

SPECIFICATION forming part of Letters Patent No. 549,042, dated October 29, 1895.

Original application filed December 20, 1890, Serial No. 375,379. Divided and this application filed April 27, 1892. Renewed September 23, 1895. Serial No. 563,440. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN H. WINGFIELD, a citizen of the United States of America, residing at Montclair, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Processes of Cleaning Wool, of which the following is a specification.

My full process consists, essentially, in subjecting wool in the grease to the action of warm heavy petroleum-oil to remove the suint, and then removing the solution by throwing off a part of it by centrifugal action and washing off or scouring off the residue by water or other suitable agent; and I claim, also, the discovery that the solution of the soluble constituents of suint in the heavy petroleum solvent can be washed or scoured out of wool by water and suitable aqueous solutions.

This application is a division of my original application filed December 20, 1890, Serial No. 375,379.

In another application filed by me on July 24, 1895, Serial No. 557,028, I have shown and claimed a process which I deem to have advantages in some cases over the process described herein, for whereas in the present application I look to the removal of the solution from the wool as effectually as may be convenient before the scouring, in my other said application I leave a portion of the solution thereon, I having discovered since the filing of the application of which this is a continuation that the part so left forms an excellent detergent with the scouring liquid to remove the dirt, &c.

With the object of reducing to the minimum the necessary handling of the wool I conduct a process as follows: The wool in the grease is placed in the basket of a hydro-extractor, the construction of which will be seen in the accompanying drawing, in which the figure represents the hydro-extractor of the form recommended, partly in section and partly in elevation.

A is the shaft, B a pulley, and C a belt.

D D are standards which support the shaft above and below.

E is the basket and is rigidly attached to the shaft.

F is an outer stationary casing, which is a closed box capable of holding the liquids used in treating the wool.

G is a valve which normally closes an outlet H, leading from the outer casing F. This valve is opened when the shaft is revolved by means of a speed-governor X, which is connected with it through a pivoted lever L, rod M, and valve-arm N. The basket can be revolved on a vertical or longitudinal axis, as preferred. The basket containing the wool in the grease is then filled with some petroleum-oil at a temperature of about 120° Fahrenheit; but if the oil is heated to a higher temperature the wool need not be steeped therein so long as when the oil is cooler. I recommend uncracked petroleum-oil of specific gravity ranging from 30° to 32° Baumé. Neutral or uncracked petroleum-oils are preferred to paraffine or cracked petroleum-oils, since the latter are apt to stain the wool, particularly the first time they are used. The quantity of oil used should be from one-half to one gallon for each pound of wool, the point being to subject the entire mass of wool to the action of the solvent. After the wool has been steeped in the solvent for from ten to fifteen or twenty minutes, the basket of the hydro-extractor is revolved at the rate of about twelve hundred revolutions per minute for some time, when by far the larger part of the fluid is thrown off. The residue of the solution which remains on the wool can be removed in several ways, the method depending partly upon how completely the wool is to be cleaned of the solution and on considerations of convenience and cheapness. One way is to subject the wool to the action of a light petroleum solvent ranging from 65° to 86° Baumé, sufficient solution being used to completely subject the wool to the action of the solvent. After the wool has been steeped in the light petroleum for a sufficient time to dissolve the solution of heavy oil and suint on the wool the hydro-basket is again revolved and the wool dried as completely as

feasible. The residue of the light petroleum can then be removed by warm-water, which will carry it off either mechanically or by vaporizing it according to the temperature and pressure. This can be done by turning a jet of water, preferably warm, on the wool while the basket is revolving. Instead of plain water an alkaline solution can be used, and after the suggested removal of the light petroleum-oil the wool will usually be subjected to the ordinary process of scouring. When I carry on this process, the water is used at a temperature somewhat below 90° Fahrenheit. The low temperature is also more favorable to maintaining the integrity of the fiber. This method with the light petroleum-oil is stated as a feasible and practicable method of removing heavy oils; but in practice I prefer to wash out the residue of the suint in heavy oil by the method I shall proceed to describe.

The solution of the constituents of suint in the heavy petroleum-oil has the property of making an excellent emulsion with warm or cold water, and especially with warm or cold alkaline aqueous solution. The detergent and soluble and miscible properties of the heavy oil solutions are better than those of the oil alone.

My discovery renders possible thorough cleansing of the wool without distillation of the solvent. I first rinse the wool in warm water of a temperature somewhat below 90° Fahrenheit. The rinsing may be assisted by a centrifugal action; but this is not necessary, nor do I in practice use it. If there is a good deal of dirt present it may be necessary to use an aqueous alkaline solution instead of plain water. This rinsing with water or an aqueous solution renders the wool clean enough for manufacturing purposes generally, since the oils which I use, and particularly the solution of the constituents of suint in the heavy petroleum-oils, are excellent wool-oils. By "wool-oil" is meant a lubricant applied to wool to be carded or spun or otherwise manufactured. If, however, it is for any reason necessary that the wool be white at this stage it should be subjected to the process of scouring. The temperature is preferably not raised above 100° Fahrenheit in any of the steps of washing or scouring which I have here indicated.

The term "heavy petroleum-oil" used in the claims is intended to mean one which can be heated sufficiently to dissolve the suint with safety in open vessels, and not higher than the kerosene-oils of 51° Baumé. I believe that generally the best results will be obtained by using the uncracked petroleum-oil of 30° to 32° Baumé, as recommended. The oils ranging between these degrees are much more easily removed than the heavier oils or than the kerosene-oils ranging, say, from 47° to 51° Baumé, and the American petroleums are preferable to the Russian petroleums, because the former are free from the aromatic group of hydrocarbons, which impart a disagreeable odor to the wool.

All specific gravities herein specified are assumed to be determined at a temperature of about 60° Fahrenheit. The table of specific gravities and degrees Baumé in *Cairn's Quantitative Chemical Analysis* (Henry Holt & Co., New York, 1890) is followed.

In the present application I do not broadly claim the process of removing suint from wool by dissolving the former in the petroleum-oil specified and removing the solution, nor do I specifically claim the process of removing the residue of such solution from the wool by means of the herein-described light hydrocarbon process, nor do I claim any products resulting from the solution of the suint in the heavy petroleum-oil specified, as I have claimed such processes and products in another application filed by me on the 1st day of February, 1895, and serially numbered 536,996.

Without limiting myself to the mechanism shown, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The process of cleaning wool, which contains suint, consisting in dissolving the suint in a heavy petroleum oil solvent not lighter than 51° Baumé, separating the bulk of the solution from the wool and washing off the residue of the solution, substantially as described.

2. The process of cleaning wool which contains suint, consisting in dissolving the suint in a heavy petroleum oil solvent not lighter than 51° Baumé, separating the bulk of the solution from the wool, and washing off the residue of the solution with water, substantially as described.

3. The process of cleaning wool which contains suint, consisting in dissolving the suint in a heavy petroleum oil solvent not lighter than 51° Baumé, separating the bulk of the solution from the wool, and washing off the residue of the solution with water containing an alkali in solution, substantially as described.

4. The process of cleaning wool, which contains suint, consisting in dissolving the suint in a heavy petroleum oil solvent not lighter than 51° Baumé and removing the solution from the wool by centrifugal action and washing, substantially as described.

5. The process of cleaning wool which contains suint, consisting in dissolving the suint in a heavy petroleum oil solvent not lighter than 51° Baumé, and removing the solution from the wool by centrifugal action and washing with water, substantially as described.

6. The process of cleaning wool which contains suint, consisting in dissolving the suint

in a heavy petroleum oil solvent not lighter than 51° Baumé, and removing the solution from the wool by centrifugal action and washing with water containing an alkali in solution, substantially as described.

7. The process of cleaning wool which contains suint, consisting in dissolving the suint in a heavy petroleum oil not lighter than 51° Baumé, separating the bulk of the solution from the wool, washing off the residue of the solution and then scouring the wool, substantially as described.

Subscribed by me in the city of New York this 26th day of April, 1892.

JOHN H. WINGFIELD.

In presence of—

THOMAS EWING, Jr.,

SAMUEL W. BALCH.