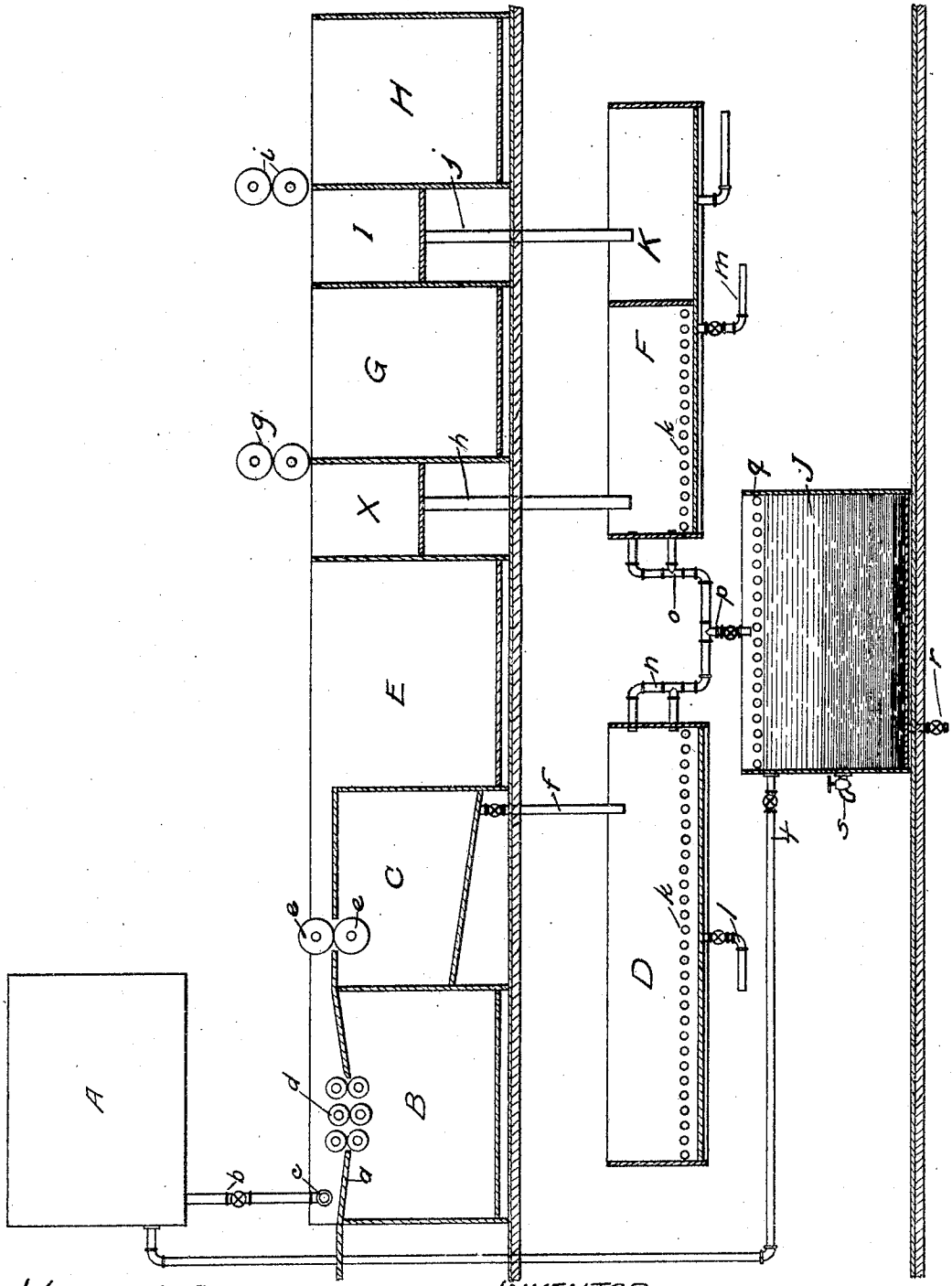
No. 796,530. PATENTED AUG. 8, 1905.

A. P. QUACKENBOS.

PROCESS OF SEPARATING EXTRACTIVE AND ADHESIVE MATTER FROM WOOL.

APPLICATION FILED AUG. 27, 1902.



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PROCESS OF SEPARATING EXTRACTIVE AND ADHESIVE MATTERS FROM WOOL.

No. 796,530. Specification of Letters Patent. Patented Aug. 8, 1905.

Application filed August 27, 1902. Serial No. 121,218.

To all whom it may concern:

Be it known that I, ALFRED P. QUACKENBOS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Processes of Separating the Extractive and Adhesive Matters from Wool, of which the following is a specification.

My invention relates to the extraction of the soluble and extractive adhesions to wool and other animal or vegetable fibers and the subsequent recovery of the elements in solution; and its objects are to degrease the fiber and recover the by-products in a safe, cheap, and expeditious manner.

Existing processes for the removal of fat or grease from wool and similar fibers may be classed under two general heads—first, those which consist in scouring the wool with soaps, alkalies, and great quantities of water; second, those involving the subjection of the wool to the action of solvents, which are subsequently recovered from the wool by a distillation process. Wool subjected to both of these processes still retains upon the exterior of its fiber a smooth film of wax. The film is serious in that it prevents the adhesion of dye applied in subsequent stages of cloth manufacture. The second enumerated process is wasteful and costly. Both methods are laborious.

My invention avoids the enumerated disadvantages without injury to the wool. I have discovered that by the employment of hydrocarbons—such as naphtha, refined petroleum, or a similar solvent—with a detersive, such as soap, applied singly or in combination, the grease may be emulsified and expressed from the wool or similar substance, after which the solvent and grease may be recovered from the emulsion by natural or artificial refrigeration.

My process is herein described in connection with the accompanying drawing, wherein the figure is a diagrammatic view, partly in section, of an apparatus which may be used in performing the process.

In the drawing, A is a tank containing the solution intended for application to the material treated, which in this instance is wool. The solvent may be naphtha, refined petroleum, or a similar ingredient, either alone or combined. Projecting downwardly from the tank A is a pipe *b* with a perforated arm *c*, through which is discharged the solvent upon the wool to be treated, resting upon a horizontal rack *a*, crossing the tank B. Mounted in this tank transversely of the rack *a* are a train of rolls *d* in pairs, by means of which the solvent is thoroughly incorporated into the wool after being sprinkled thereon. The incorporation is assisted by providing the rolls *d* with corrugated surfaces. After the treatment described the wool passes to an adjacent tank C, where it is fed to squeeze-rolls *e*, mounted therein for expression from the material of the excess of solvent when an excess of solvent is present. A pipe *f* in the bottom of tank C conveys the expressed liquid to a storage-tank D below.

Adjacent the tank C is the soap-tank E, which contains water and a solution of neutral soap varying in amount from one to ten per cent. of soap, according to the amount of grease in the wool. In this tank the solvent-impregnated wool is submerged after its removal from the squeeze-rolls. During this bath in the tank E both the soap and the hydrocarbon act upon the fatty constituents in the wool-fat, loosening the hold of the latter upon the fiber, thereby permitting the same to be easily removed by pressure.

Adjoining the soap-tank is a catch-basin X, above which is mounted a second pair of squeeze-rolls *g*, which presses the remaining grease in the form of a white magma from the wool. This drops into the catch-basin, whence it passes through pipe *h*, leading therefrom downwardly into a second tank F preparatory to subsequent separation. The wool passes from the squeeze-rolls *g* into an adjacent rinsing-tank G, containing water in which is soap and alkali, which cleanses the residual grease, solvent, or other foreign material from the fiber. The rinsing operation is repeated by passing the wool through another set of squeeze-rolls *i* into a second rinsing-tank H and the expressed liquid containing the dirt remaining in the wool after the first rinsing falls into a second catch-basin I and thence through the pipe J into the filtering-tank K. After rinsing the wool is thoroughly degreased and is ready for the drier and subsequent customary manipulations.

The storage-tanks D and F are provided

with heating pipes or coils, whereby their contents, consisting of the water received with the expressed matter, are raised in temperature before removal. The magma, water, and other matter expressed by the rolls *g* fall into the tank F, wherein the raised temperature of the water is a purifying medium for the solvent, soap, and wool-grease. The dirt is precipitated to the bottom of the tanks D and F, whence it may be drawn off through the waste-pipes *l* and *m*, respectively, and pass to the sewer. The cleaned grease and solvent are floated off through the pipes *n* and *o*, which converge in pipe *p* and pass therethrough into the refrigerating-tank J, where a low temperature is sustained by the cold pipes *q* in the roof thereof. The refrigeration of the liquids from the tanks D and F results in separating the mixture into its original elements, thus: the water when present rests upon the floor, the naphtha, petroleum, or other solvent in a liquid condition forms the top stratum, while the wool grease or fat forms the intermediate layer. The low temperature often solidifies the two lower strata. As a temperature of 20° to 40° Fahrenheit is sufficiently low for refrigeration, it is evident that artificial refrigerating means may often be omitted, providing the requisite temperature is attained by natural means. The actual solidification of the two lower strata is not necessary to effect the ends sought in my process, but it facilitates the removal of the upper liquid solvent stratum through the pipe *t*. The refrigerated solvent is of course in a non-volatile form and as a liquid is forced by any mechanical means, such as a pump, through the pipe *t* to the solvent-tank A. The pipes *s* and *r* at successively lower points in the refrigerating-tank allow egress of the grease and water, respectively. If the grease and water strata are solidified, they may either be removed from the tank in solid form from above or subjected to a sufficiently-high temperature to allow them to melt and then be withdrawn through their pipes *s* and *r*, as above described.

In prior patents refined petroleum has been mentioned as an available solvent; but in actual practice it has never been used, for the obvious reason that it cannot be distilled from the wool-grease. By my method of refrigeration this solvent as well as others heretofore unavailable may be utilized.

It should be noted that when such hydrocarbons as refined petroleum or shale oil are used as solvents they may be heated to 100° or 120° Fahrenheit before incorporation into the wool, thereby increasing their disintegrating properties—a valuable auxiliary when heavy greasy wool is treated.

In the original experiments with this process it was found that the heating of naphtha would of course produce volatilization, and owing to its high specific gravity the magma produced by naphtha separates from the water naturally without any heating and is drawn off from the tank F into the tank J in the same way. Hence when naphtha is used the heating step is omitted, but when light petroleums are used the heating step is convenient.

I do not limit myself to the apparatus described in carrying out my process.

What I claim is—

1. A process of treating wool which consists in impregnating the wool with the solvent, removing the surplus solvent from the wool, then subjecting the wool with the remaining solvent to a bath in an emulsifying agent, expressing the resulting magma from the wool, then causing a heating of the combined elements and finally a cooling thereof.

2. A process for treating wool which consists in first impregnating the wool with a solvent, next removing surplus solvent from the wool, then immersing the wool in a bath of water and neutral soap, expressing the resulting magma from the wool, raising the temperature of the magma, and separating the constituents of the magma by refrigeration.

3. A process for treating wool which consists in first impregnating the wool with a solvent, next removing surplus solvent from the wool, then immersing the wool in a bath of water and neutral soap, expressing the resulting magma from the wool, then heating the magma in mixture with water, and finally recovering the grease by refrigeration.

4. A process for treating wool which consists in first impregnating the wool with a solvent, next eliminating surplus solvent from the wool, then subjecting the wool to the action of a bath of water and neutral soap, then expressing the resulting magma from the wool, next subjecting both the surplus solvent and the magma to heat in the presence of water, then combining the solvent and magma thus heated, and finally recovering the grease by refrigeration.

5. A process for treating wool which consists in successively subjecting the wool to the action of a solvent and to a bath of water and neutral soap to produce a magma, removing the magma from the wool, and finally recovering the grease by refrigeration after an intermediate heating thereof.

6. A process for treating wool which consists in first subjecting the wool to the action of a solvent and then to the action of an emulsifying agent producing a magma, and finally recovering the grease by refrigeration after an intermediate heating thereof.

7. A process for treating wool which consists in successively subjecting the wool to the

action of a solvent and a solution of soap, expressing the liquids from the wool thus treated, then raising the temperature of the expressed liquids, and finally subjecting the resultant liquid mixture to a refrigerating temperature to stratify the elements.

8. The process of separating a mixture of solvent and wool-grease consisting in first raising the temperature of the mixture and subsequently refrigerating the same.

In testimony whereof I have affixed my signature in presence of two witnesses.

ALFRED P. QUACKENBOS.

Witnesses:

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