J. M. BAUDOT.

PROCESS OF FREEING RAW WOOL FROM ITS YOLK AND GREASE BY ELECTRICAL MEANS.

APPLICATION FILED JUNE 8, 1906.

914,368. Patented Mar. 2, 1909.

Fig.1.

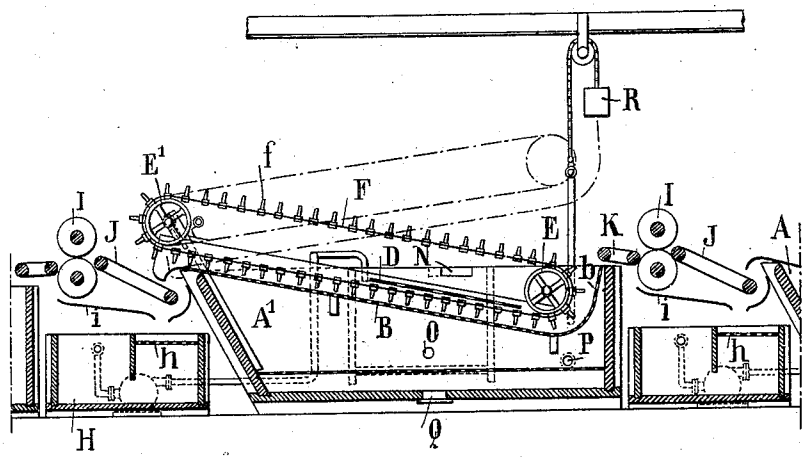


Fig.2.

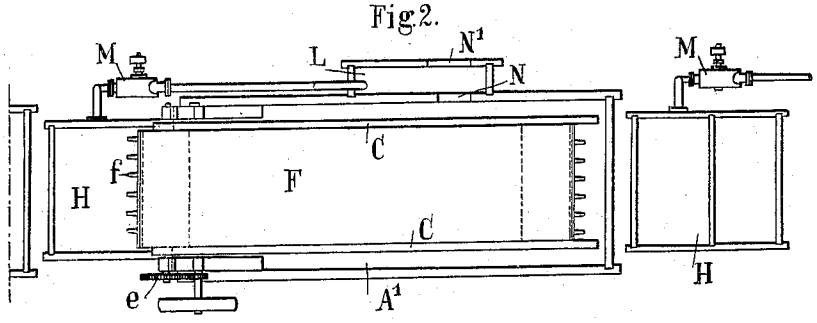
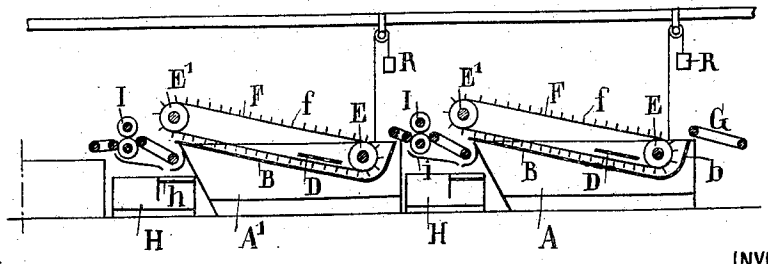


Fig.3.



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PROCESS OF FREEING RAW WOOL FROM ITS YOLK AND GREASE BY ELECTRICAL MEANS.

No. 914,368. Specification of Letters Patent. Patented March 2, 1909.

Application filed June 8, 1906. Serial No. 320,788.

To all whom it may concern:

Be it known that I, JOSEPH MARIE BAUDOT, a citizen of the Republic of France, and residing in Tourcoing, Nord, France, engineer, have invented a Process of Freeing Raw Wool from Its Yolk and Grease by Electrical Means, for which I have deposed a French patent, May 8, 1906, (not yet issued,) of which the following is a specification.

The present invention relates to a process of freeing raw wool from its yolk and grease by electrical means.

The description which follows is given with reference to the accompanying drawing, in which:—

Figure 1 represents a longitudinal section through a part of the apparatus in accordance with the invention; Fig. 2 is a plan view of the same; and Fig. 3 is a diagrammatic side elevation of the apparatus as a whole.

The apparatus comprises preferably two cleansing vats A, A^1, made of wood or other non-conducting material, and provided with perforated false bottoms B carried by lateral supports C pivoted at the end of each vat and so arranged that the false bottoms B, the lower ends of which are curved upward at *b*, slant downward into the vats. The perforated bottom B constitutes the negative electrode of the apparatus, the positive electrode being formed by suitable plates D. These electrodes B and D are connected to the poles of a source of electricity of low voltage and furnishing an appropriate output.

At the opposite ends of the false bottom B, rollers E, E^1 are mounted on the supports C, the roller E^1 being driven through pinions *e*. These rollers carry an endless diaphragm cloth F of slightly porous texture provided with transverse laths on which teeth *f* are mounted. By means of the latter the wool which is fed to the vat A, in any suitable manner (as for instance by means of the traveling band G, Fig. 3) is conveyed through the vat in contact with the false bottom B. In connection with each vat is arranged a small intermediate vat H for the decantation of sand and mud. These vats are divided into two compartments, one of which is provided with a filter plate *h*. Compressor rollers I are suitably arranged above the small vats H and the wool is led from the vats to these compressor rolls by traveling aprons J arranged at the outlet from the inclined bottoms B. A second traveling apron K feeds the wool to the succeeding vat. A trough *i* is arranged below the rollers I for carrying the expressed liquid into the decantation vats H. Each of the latter is connected through a pocket L to a rotary pump M which serves to return the liquid to the vats A, A^1. Ports N, N^1 arranged at the upper part of vat A and of the pocket L permit the escape of the suintins to and the drawing off of the same from the latter while the port O establishes communication between the vat A and the pocket L at a lower level.

The vat A is provided with a cock P for drawing off the yolk waters containing the various potash salts. In the second vat A^1 this cock is replaced by a Giffard injector. A drainage valve Q permits of emptying each of the said vats A, A^1.

In order to permit of cleaning the vats A, A^1, a counter-weight device R is provided to aid in lifting the whole of the immersed portion of the system (as shown in broken lines in Fig. 1) which in the normal condition, rests upon transverse supports fixed horizontally in the vat.

The apparatus constructed as above operates in the following manner:—The two vats A, A^1 being filled with pure water, the wool in a raw state, that is to say charged and contaminated with soluble and insoluble substances (salts and various fatty bodies) and numerous impurities, is discharged at a rate appropriate to the operation of the system upon the apron G arranged at the head of the first yolk and grease removing vat A. It naturally falls into the space between the rollers E and the raised edge *b* of the perforated bottom B which is immersed in the vat A. The wool tends to float on the surface of the water, but the teeth *f*, with which the endless cloth F is provided carry the wool down to the bottom B and force it along in contact with the latter to the outlet. When the wool has reached the upper end of the perforated bottom B, it leaves the conveyer teeth and falls by gravity on to the traveling apron J which carries it to the compressor rollers I where it yields almost the whole of the yolk waters absorbed in the vat A. The wool then falls upon the apron K which discharges it at the head of a second vat A^1 which is identical with the vat A as regards its mechanical arrangement. The wool circulates in this second vat in the same manner as in the vat A, and completes its purification, giving up electrolytically in

this second vat the last traces of yolk and "suintin" which it contained, after which, on leaving the compressor rollers I, it falls into an appropriate rinsing vat. The liquid charged with yolk expressed from the wool between the compressor rollers I is discharged through the trough *i* onto the perforated filter plates *h* which retain wisps of wool fiber which may have been carried there, and is collected in the baffle compartment of the vats H and conveyed by the rotary pumps M into the pocket vats L.

As shown in Fig. 1 of the drawing, the suction intake of the pumps M is situated at the upper part of the vats H and their discharge takes place in proximity to ports N formed at the upper parts of the vats A, A^1 through which the "suintins" pass off. It will thus be seen that the wool circulates in more or less thick layers and between the endless diaphragm cloth F and the perforated false bottom or inclined bottom B and that it is gently drawn by the series of feed bars *f* up to the apron J arranged in advance of the presser rollers I. During this movement through the vat the wool floats lightly in the liquid of the bath, finding itself in contact, on the one hand, with the perforated false bottom B which serves as a negative electrode, and on the other hand, with the endless diaphragm cloth F which separates it from the series of plates D (positive electrode) which lie in the liquid in the upper part of the vat.

The endless diaphragm F placed between the electrodes is a poor conductor by reason of its closely woven texture, and by reason of the fact that it is always somewhat impregnated with the greases from the wool. Consequently (1) it forms a resistance to the passage of the electric current between the upper electrode and the lower electrode, the current being, so to speak, spread out and distributed uniformly over the layer of wool which moves under the said diaphragm cloth, (2) it offers a certain resistance to the filtration of the chemical anodics and cathodics produced by the wool. As the layer of raw wool is in close contact with the diaphragm cloth from the time of its introduction in the electrolytic vat until it is discharged therefrom, and as it travels in constant contact with the negative electrode (perforated false bottom) all the electrolytic phenomena occur in the body of the layer of raw wool and in direct contact with the diaphragm cloth. These phenomena are the decomposition and separation of the alkaline from the neutral electrolytes, viz. different potassium and sodium salts, etc.; of the suint from the greasy bodies or fatty acids of the suint, (suintin, cholesterin, lanolin, etc.); and then the new combinations between the saponifiable fatty acids (of the suintin type) and the non-saponifiable fatty acids, (cholesterin, lanolin, etc.), and the different salts, (potassium, sodium, etc.) It should be noted in this connection that while the wool is in weak contact with the anode (plates D) by reason of the intervening diaphragm cloth F, it is in direct sliding contact with the cathode (false bottom B).

Without entering into a very long theoretical explanation it is necessary to pass on to the principal electro-mechanical and electro-chemical effects produced by this electrolytic treatment and the construction adopted.

Electro-mechanical effects.—As the electric current which is established between the anode and the cathode follows its best conductor, which in practice is found to be the different salts of potassium and of sodium and of suint obtained from the wool under treatment and the solutions which are formed thereby, none of the salts can escape its action during the travel of the wool through the bath. But as the salts of suint are in a state of combination with the greasy bodies and the fatty acids of the raw wool, naturally there is produced a disintegration of the said bodies and fatty acids.

Electro-chemical effects.—The greater these electro-mechanical effects of division and disintegration, the more modifications in the nature and action of the numerous fatty acids and greasy bodies are produced, as indicated by the appearance in the body of the wool itself of an emulsion of a soapy nature composed of the original saponifiable bodies, (suintin), non-saponifiable bodies, (cholesterin, etc.), these last undergoing an electro-chemical transformation described later.

Another characteristic on which the system is based is this. The electrolytic freeing of raw wool from its suint under the theoretical and practical conditions in which it is applied in the present system render immediately saponifiable those greasy portions of the suint which are theoretically recognized as being non-saponifiable-cholesterin, lanolin, etc.—and which may be electrolytically emulsified concurrently with the suint which is a naturally saponifiable body. It is thus easy to understand that the present method of removing the fatty matters of the wool renders unnecessary the degreasing operation hitherto employed after the desuinting process and thus presents a decided advance not only in the speed of the cleansing operation but in the economy with which it is carried out.

The process also permits of the recovery of certain valuable by-products. During the process a double electrolytic decomposition of the soap formed takes place. The salts become distributed throughout the entire bath, while the fats (suintins) are momentarily divided into two parts, one, the least abundant, rises in a semi-fatty state to the surface of the bath, and the other is carried

with the yolk waters with which the wool is saturated to the compressor rollers I. These remove the greater part of the yolk waters and the "suintin". The waters charged with yolk salts and fatty substances, descend through the trough *i* into the small baffle vat H passing through the filter plate *h*. Here they are freed of the earthy substances and sand and are taken up at the surface on the opposite side of the baffle partition and returned to the compartment L. The "suintins" immediately rise to the surface and may readily be withdrawn through the outer port N^1 at the same time as the fats which have entered the compartment L through the port N opening into the vat A.

The yolk waters charged with the various potash salts of the wool being of greater density, naturally return to the vat A through the lower door O, thereby enriching the bath, the density of which increases as fresh quantities of wool are freed from their yolk. The "suintins" extracted from the vats A A^1 only need to be freed from their excess of moisture by evaporization in order to become utilizable and marketable. The yolk waters which fill the vats A and A^1 are drawn off through the bottom port P when they have reached a density of say about 10° or 12° B. These may then be treated by any known industrial means for extracting their potash salts. The result of such a method of freeing raw wool from its yolk and grease is that no chemical product is required, such as potash salts, soda or soap. In the first place the vats A, A^1 contain nothing but water. As soon as the first charges of raw wool have been introduced, the water in the vat A very speedily attains the density of 2° B., which is sufficient for regularly establishing the electrolytic system, the progress of which becomes increasingly accentuated in proportion as the density of the bath increases. As the second vat A^1 originally filled with pure water gradually becomes charged, but to a much smaller extent, owing to the arrival and the passage of the wools from which the saline waters have been completely expressed by the first rollers I, waters at 4° or 6° are always available for recharging the vat A by means of a Giffard injector when the yolk waters at 10° and 12° B. are drawn off therefrom. The second vat A^1 then receives pure water in order to compensate for the small quantities of yolk water that it has supplied to the first vat A. The operation of the apparatus proceeds in this manner without further modification, but it should be noted that it is quite possible to accelerate the starting of the process if a small reserve of yolk water is available; it should further be noted that this electrolytic method of removing yolk and grease only necessitates a comparatively low temperature, say from 25° to 30° C.

I claim as my invention:

1. The process of treating raw wool which consists in bringing the same into a suitable bath and there subjecting it to the electrolytical action of a current of comparatively low voltage to eliminate its suint, grease and yolk, substantially as described.

2. The process of treating raw wool which consists in bringing the same into a water bath and there subjecting it to the electrolytical action of an electric current of low voltage to eliminate its suint, grease and yolk, substantially as described.

3. The process of treating raw wool which consists in bringing it into a suitable bath, and passing it through the same in contact with the cathode whereby said wool is subjected to electrolytical action to eliminate its suint, grease, and yolk, substantially as described.

4. The process of treating raw wool which consists in bringing the same into a suitable bath and passing it between an anode and a cathode immersed therein, and dispersing the electrical current flowing from the anode to the cathode by means of a substantially non-conducting diaphragm interposed between said wool and the anode so that said current passes through all parts of the wool, substantially as described.

5. The process of treating raw wool which consists in bringing it into a suitable bath, there subjecting it to electrolytical action to free it of its grease, suint and yolk, removing it from the bath and extracting the adherent waters therefrom, and recovering the suintins from said extracted water, substantially as described.

6. The process of treating raw wool which consists in bringing the same into a suitable bath and then subjecting it to electrolytical action to free the natural salts of the wool and thereby increase the density of the bath, substantially as and for the purpose described.

7. The process of treating raw wool which consists in bringing the same into a suitable bath and there subjecting it to the electrolytical action of a current of comparatively low voltage so that the temperature of said bath is maintained comparatively low, whereby said wool is freed of its suint, grease and yolk, substantially as described.

8. In the process of treating raw wool to free the same of its suint, grease and yolk, the subjection of the same to electrolytical action in a bath containing the natural salts of the wool, substantially as described.

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

JOSEPH MARIE BAUDOT.

Witnesses:

ALFRED C. HARRISON,

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