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# UNITED STATES PATENT OFFICE.

FRITZ LUX, OF MANNHEIM, GERMANY, ASSIGNOR TO THE FIRM LUFTFAHRZEUGBAU  
SCHÜTTE-LANZ, OF MANNHEIM-RHEINAU, GERMANY.

PROCESS OF PRODUCING A COLD GLUE FROM BLOOD.

No Drawing. Application filed July 3, 1920, Serial No. 394,011. Renewed May 14, 1923.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, FRITZ LUX, a subject of Germany, residing at Mannheim, Germany, have invented certain new and useful Improvements in Processes of Producing a Cold Glue from Blood (for which I have filed applications in Italy, April 22, 1919; France, May 22nd, 1919, and obtained the following patents: Spain, 69763, July 2, 1919; Argentina, 16,599, October 30, 1920; Germany, 307,687, July 1st, 1918), of which the following is a specification.

It is known to employ blood albumen for gluing of wood. To this end the blood is whipped and stirred and then evaporated. The blood albumen obtained in this way is stirred up with water and used as glue. Under this process, however, the fibrin which possesses great adhesive properties is separated out.

According to the present process the blood as it is obtained from animals is converted with lime binding substances such as oxalic acid, sodium citrate or the like and the fibrin which would otherwise separate out remains in solution. This blood is then evaporated for example in a vacuum at a temperature which does not produce coagulation. The dry residue then obtained can be again dissolved in water especially when the latter is rendered alkaline. This solution which in a small quantity of water is very viscous can be used without further addition for gluing wood for example, and forms a glue having great adhesiveness. If wood thus glued is then heated to a temperature above 70° C. both the albumen and the fibrin coagulate and the coating of glue then becomes insoluble in water. Coagulation always takes place for example in gluing crossed wooden plates as these are hot pressed. If to the solution obtained from the blood treated with oxalic acid etc. and evaporated is added a soluble calcium salt coagulation of the fibrin takes place. The time within which coagulation occurs is dependent on the solubility of the calcium salt. In order that coagulation shall not take place too quickly or in other words that the glue shall remain usable for a longer time

calcium salts or their compounds difficultly or slowly soluble as for example calcium chloride fructose and the like are employed. In gluing with fibrin-containing blood solutions coagulation of the fibrin also takes place due to the calcium salts contained in the wood.

The particularly good adhesive properties of this glue consists in this that the comparatively brittle albumen is impregnated with tough fibrin just as occurs in clotted blood with wounds.

What I claim is:—

1. In a process of producing a cold glue from blood, the step of treating the freshly taken blood to be dried with a calcium binding substance so as to prevent the fibrin from separating out.
2. In a process of producing a cold glue from blood, the step of treating the freshly taken blood to be dried with oxalic acid so as to prevent the fibrin from separating out.
3. A process of producing a cold glue from blood, consisting in treating the freshly taken blood with a calcium binding substance and treating further the blood albumen so obtained, which contains the fibrin, with a soluble calcium salt so as to produce after gluing a glue insoluble in water.
4. A process of producing a cold glue from blood, consisting in treating the freshly taken blood with a calcium binding substance, evaporating this blood at a temperature which does not produce coagulation and treating the solution so obtained with a soluble calcium salt.
5. A process of producing a cold glue from blood, consisting in treating the freshly taken blood with oxalic acid, evaporating the so prepared blood in a vacuum at a temperature which does not produce a coagulation, and dissolving in water the dry residue thus obtained.

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

FRITZ LUX.

Witnesses:  
HEINRICH HEMPEL,  
MAX VOGEL.