Patented Aug. 26, 1924.

1,506,013

UNITED STATES PATENT OFFICE.

ALFRED C. LINDAUER AND GEORGE M. HUNT, OF MADISON, WISCONSIN, DEDICATED, BY MESNE ASSIGNMENTS, TO THE CITIZENS OF THE UNITED STATES OF AMERICA.

WATER-RESISTANT GLUE.

No Drawing. Application filed November 7, 1923. Serial No. 673,339.

(FILED UNDER THE ACT OF MARCH 3, 1883, 22 STAT. L., 625.)

To all whom it may concern:

Be it known that we, ALFRED C. LINDAUER and GEORGE M. HUNT, citizens of the United States of America, and employees of the Department of Agriculture, residing in Madison, Wisconsin (whose post-office address is Madison, Wisconsin), have jointly invented a Water-Resistant Glue, of which the following is a specification.

This application is made under the act of March 3, 1883, chapter 143 (22 Stat. 625), and the invention herein described and claimed may be used by the Government of the United States, its officers and employees, and by any person in the United States without the payment to us of any royalty thereon. We hereby dedicate the same to the free use of the Government and the people of the United States.

Water resistant glues are generally made of casein or blood albumin. Attempts have been made for many years to develop a practical water-resistant glue from an animal glue base but the results have never been satisfactory. Two methods for making animal glue joints water-resistant have been mentioned quite generally. One method involves treating the animal glue with formaldehyde after the glue has been applied to the surfaces to be joined. The glue is thus rendered insoluble, but the chemical reaction is so rapid that the process is not practical for factory work. The formaldehyde odors are also very objectionable and may be injurious to workmen. The other method of making animal glue water-resistant, which is often mentioned in literature, is the addition of potassium bichromate or other salts of chromic acid to the liquid animal glue. After its application to the surfaces to be joined such a glue must be exposed to the sunlight, which brings about a chemical reaction producing an insoluble compound. The impracticability of using this method for making water-resistant joints with wood is readily seen. In contrast to the above, the process which we have discovered for making animal glue waterproof is both practical and convenient.

It is a matter of common knowledge that formaldehyde reacts with proteins, albumens and gelatins to form insoluble compounds, but the reaction is too rapid for practical use in the gluing of wood. By the use of paraformaldehyde also called trioxymethylene, which liberates formaldehyde slowly, the desirable effect of formaldehyde upon these materials can be obtained at a rate of speed sufficiently slow to make a practical glue for wood working purposes. The use of paraformaldehyde in blood albumin glues is covered in U. S. Patent No. 1,459,541 dated June 19, 1923, by A. C. Lindauer. We have now discovered that paraformaldehyde also gives high water-resistance to animal glues.

In carrying out our invention we first prepare the animal glue in the regular manner. When the glue has been dissolved, the paraformaldehyde powder is added to it. The paraformaldehyde may be added in various amounts but we have obtained the best results with amounts ranging between 10 and 30 per cent of the weight of dry glue used.

The glue containing the paraformaldehyde is somewhat thicker than the ordinary animal glue but it can be applied to the wood with an ordinary brush or a mechanical glue spreader. In other words a water-resistant glue is obtained by the addition of the paraformaldehyde which is entirely practical in its application and use.

Our claims refer specifically to the use of paraformaldehyde with animal glue (which includes bone glues and hide glues) but we do not intend to limit our claims to animal glues alone. Our invention also refers to gelatine and ossein and similar products and fish glues.

The claims that we make for our invention are as follows:

1. A glue the composition of which consists essentially of animal glue, water and paraformaldehyde.

2. A glue consisting of 100 parts of animal glue, 225 parts of water and 10 to 30 parts of paraformaldehyde.

ALFRED C. LINDAUER.
GEORGE M. HUNT.