

UNITED STATES PATENT OFFICE.

AUGUSTE BOIDIN, OF SECLIN, FRANCE, AND JEAN EFFRONT, OF BRUSSELS, BELGIUM.

TREATMENT OF TEXTILE FABRICS OR FIBERS.

No Drawing.

Application filed April 19, 1920. Serial No. 375,106.

To all whom it may concern:

Be it known that we, AUGUSTE BOIDIN, a citizen of the Republic of France, and residing at Seclin (Nord Department), in the Republic of France, and JEAN EFFRONT, subject of the King of Belgium, and residing at Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in the Treatment of Textile Fabrics or Fibers, of which the following is a specification.

This invention relates to a process for treating textile materials, such as fabrics or fibers for the purpose of removing the amylaceous dressing or sizing with which such material may be coated or impregnated.

It has been a common practice heretofore to dissolve such dressings by means of malt extracts, and large quantities of such malt extracts have been so employed.

The object of the present invention is to provide a process for the removal of amylaceous dressings or sizings from textile materials which can be carried out more rapidly than the processes heretofore employed.

The invention consists in subjecting the textile material to the action of bacterial enzymes suitable for dissolving the amylaceous dressings on said textile materials. The preparation and properties of such enzymes will be understood from the disclosures in our United States Patents Nos. 1,227,374 and 1,227,525.

In carrying out our invention in its best embodiment we employ, by preference, solutions of bacterial enzymes prepared by the aid of bacteria belonging to the species *subtilis* or *mesentericus* and cultivated on a medium high in nitrogen, as for example, soy cake. Such solutions can be prepared with advantage by employing the methods, apparatus, and media of culture described in the specification of United States Patent No. 1,227,525.

With a solution of enzymes of this kind we effect the freeing of the threads or fabrics from the dressings with which they are charged, in the following manner, which is given by way of example:—

We prepare a bath by heating a hectoliter of water to 75 to 85° C., and add thereto from 50 to 500 grams of a suitable alkali, such as potash, soda, ammonia, calcium hydroxide, alkaline salts, or alkaline earth salts, such as carbonates, polybasic phosphates or silicates of these metals, and about

a quarter of a liter of bacterial enzyme solution, the amount varying according to the activity of the enzyme. The threads or fabrics are passed into the bath and at the end of some minutes the dissolution of the dressings is obtained and the threads or fabrics are withdrawn from the bath.

Should it be found that the dissolution of the dressings is not taking place with sufficient rapidity, additional small quantities of enzymes may be added, care being taken that the medium remains alkaline, or, at least, does not become more than slightly acid.

The following method of applying the invention relates to the case of a piece of fabric which has been dressed with 20 kilogr. amylaceous matter. It will be sufficient, in order to take off that dressing, to unfold the piece of fabric in a tub or in a revolving vat containing water heated to 80° C., and made slightly alkaline, to which 100 to 500 grams enzyme liquid are added. After a few minutes the textile is removed from the bath. The solution of enzyme may be used in another operation, fresh additions of enzyme liquor being made if necessary or desirable. The textile is cleaned by shaking it or by tramping it in water until the water which flows from it is sufficiently clear.

If, instead of a small quantity of textile, there is a series of pieces of fabric to be freed from their dressings, one may operate in a continuous way. In that case the textiles are treated in tubs such as used in dyeing and comprising rollers adapted to draw the pieces of fabric through and out of the tubs. Nearly boiling and very slightly alkaline water is poured in the first tub so that the textiles have a slightly alkaline reaction when they come out of that bath and in going into the second bath; the latter bath may consist of one liter of enzyme to 4 or 5 hectoliters of hot water, the proportion varying according to the activity of the enzyme. The speed of the textile through the apparatus is regulated so that the fabric remains a few minutes in the second bath, from whence it passes to a third bath and then to a fourth bath, which are cleaning and tramping baths, so that the dressing is completely removed.

During the operation the liquid should remain alkaline and enzyme must be added whenever necessary to maintain the power of the bath to dissolve the dressing.

A great advantage of the present process is that it is rapid in action, and because the bacterial enzymes have a liquefying power considerably greater than that of malt extracts a smaller amount of material may be used. On account of the rapidity of action, the fabric is not exposed for so long a time to the treatment and therefore the fibers of the fabric are less likely to be injured than where the treatment requires a longer time. Furthermore, since the bacterial enzymes are active in an alkaline medium, as well as in a neutral or very slightly acid medium, less care is required of the operator than with processes using malt extracts, which will work well only when an acid medium is employed.

The process of the invention can be carried out very rapidly not only because the bacterial enzymes act more rapidly than malt extracts at temperatures suitable for the latter, but because the bacterial enzymes will withstand a temperature of 75° to 85° C., and even higher, while the action of malt extracts rapidly weakens as the temperature rises above 65 to 70° C. Hence by working at the temperature of 75 to 85° C., there results a very considerable increase in rapidity of action of the bacterial enzymes over that of malt extract at 65 to 70° C.

Instead of preparing the bacterial enzymes on a wort or mash of pure soy cake as is described in the specification of United States Patent 1,227,525 above referred to, we find it advantageous to add to the soy a certain quantity of another cereal, for example, 10 to 20 per cent of rye to 90 to 80 per cent of soy cake, but the best results are obtained by preparing worts containing no more than from 12 to 15 per cent of cereals.

It should be understood, further, that the invention comprises the employment of all bacterial diastases similar to those above specified, whatever may be their mode of employment. The above described method of employing enzymes is only given by way of example, as the dissolution of the dressings can be effected in a neutral medium, or even in a slightly acid medium, without departing from our invention.

What we claim is:

1. A process for freeing textile materials from the dressings with which they are charged, which consists in subjecting the textile material to the action of bacterial enzymes.

2. A process for freeing textile materials from the dressings with which they are charged, which consists in subjecting the textile material to the action of bacterial amyolytic enzymes.

3. A process for freeing textile materials from the dressings with which they are charged, which consists in subjecting said textiles for a short time to the action of a hot aqueous bath containing bacterial enzymes.

4. A process for freeing textile materials from the dressings with which they are charged, which consists in subjecting said textiles for a short time to the action of a hot non-acid aqueous bath containing bacterial amyolytic enzymes.

5. A process for freeing textile materials from the dressings with which they are charged, which consists in subjecting said textiles for a short time to the action of a hot slightly alkaline aqueous bath containing bacterial amyolytic enzymes.

6. A process for freeing textile materials from the dressings with which they are charged, which consists in immersing the textile material in an aqueous bath having a temperature of about 75° to 85° C., and containing bacterial amyolytic enzymes, then removing the textile material and subjecting it to a cleansing bath.

7. A process for freeing textile materials from the dressings with which they are charged, which consists in immersing the textile material in an aqueous bath having a temperature of about 75° to 85° C., said bath being slightly alkaline and containing bacterial amyolytic enzymes, removing the textile material when the dressing has been dissolved and then subjecting it to a cleansing bath.

8. A method of freeing textile materials from the dressings with which they are charged, which consists in subjecting the textiles to the action of bacterial amyolytic enzymes obtained from worts derived from soy.

In testimony, that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

AUGUSTE BOIDIN.
JEAN EFFRONT.

Witnesses:

CHAS. P. PRESSLY,
MAURICE ROUX.