

UNITED STATES PATENT OFFICE.

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TREATMENT OF FIBROUS MATERIALS.

998,237.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, WILLIAM ALFRED DICKINSON, bedding manufacturer, residing at Grove Mills, Mitcham, in the county of Surrey, England, have invented certain new and useful Improvements in Treatment of Fibrous Materials; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in the manufacture of horse hair and other animal hair substitutes from coir and similar vegetable husks or fibers, and has for its objects the special treatment of the fiber whereby a curled and springy product is obtained that has an almost exactly similar coloring and like physical properties as hair but which can be produced commercially at a considerably lesser cost than that at which curled and manufactured hair can be sold. At the present time such substitutes are now produced in the curled state and while readily answering their purpose for bedding and similar applications they do not have a sufficient "life" if constantly used, nor is their appearance all that can be desired, the mass of curled fibers appearing even when dyed and varnished to be of a dull and lifeless color instead of lustrous and permanently resilient.

Now, according to this invention, the fiber, after being unbaled, is spread out and goes through a process of selecting or hand picking, the selected fibers being placed in a vat and allowed to boil for one hour in a solution of alkali consisting of:—80 pounds of caustic soda to 1570 gallons of water. This treatment has the effect of depriving the fiber of its resinous and gummy properties, and leaving it in a cleansed, tractable, and tougher condition, the process entirely removing the tendency of the fiber to "snap." The fiber remains in the vat for at least six hours after boiling. After removal from the alkali vat the fiber is allowed to remain on a draining board and chill. The fiber is now ready for bleaching and dyeing.

The fiber to be bleached is taken warm from the alkali vat and its superfluous moisture removed in a hydroextractor, from whence it is placed in a chlorinating vessel, and subjected while warm and moist to the action of chlorine gas, means being provided for frequently stirring the mass of fibers

until the reddish color has disappeared from the exterior when the gas is drawn off and the fibers extracted and washed in a weak solution from the alkali bath before referred to.

Only a small proportion of any batch of fibers are bleached, the remainder of the batch being ready after they have been removed from the alkali vat and cooled to be placed in the dyeing vat. About 500 lbs. of fiber can be dyed at a time in any one tank and this quantity is allowed to soak in a cold solution of:—100 lbs. copperas (sulfate of iron). 35 lbs. sumac. 30 lbs. logwood, and the contents of the tank brought gradually to the boiling point.

If the fiber is cleansed it will require to boil for two hours, if uncleansed it must be left to soak for six hours at least before boiling. The fiber so treated is now pulled up from the vat and drained.

After one treatment the same bath may be used again for another 500 lbs. of fiber if replenished with:—75 lbs. copperas, 30 lbs. sumac, 20 lbs. logwood. The fibers from the bleaching vessel and the dyed fibers are now mixed in the proportion of about one of bleached fiber to ten of dyed fiber, and in this state are wet and in clumps. These clumps require to be dried and teased out.

The drying consists in passing the fibers through a hydroextractor and then placing the fiber in a screw feeding trough, hot air being forced into the trough against the action of the screw. The fiber is now almost dry, but the action of the screw feed is insufficient to break up the clumps of fiber. This is effected by feeding the fiber on to a series of shaking trays that open the clumps and by placing steam pipes beneath the trays the fiber is completely dried and loosened when it is ready for the process of polishing. This process consists of steeping the dried and loosened fiber into a bath made up as follows:—70 lbs. of glue. 41 lbs. acetic acid. 11 lbs. 10 ozs. of nigrosin (approximately $C_{30}H_{22}N_5HSO_3$). These ingredients are mixed with 100 gallons of water in which is poured 1½ lbs. oleic acid, the whole being brought to boiling point and the bleached and the dyed fibers mixed, placed in the bath where they remain for a short while and are stirred at intervals of say once per minute. They are taken from the bath and left on a drying board so that the superfluous polish will drain away into the bath. One half ton of fiber can be

treated in this manner at a time and agitation is absolutely necessary as indicated to keep the fiber from clogging. The effect of this bath is to coat the fibers with a black adhesive coating, making more permanent the already dyed fibers, and giving a superficial black to the bleached fibers. The fibers treated are now dried in a like manner as before described for the dyeing process. They are then teased out roughly with a coarse teaser and are subsequently put through a teasing machine of a coarse character but a finer tooth than the preceding one, the final operation of this machine being that of brushing the fibers so that the product leaves the machine with an external lustrous finish. The bleached fibers during this latter process are deprived of some of their coating giving them a grayish appearance as a result of part of the varnish not adhering or being brushed off in the carding machine, and the admixture of the bleached with the dyed fibers gives the whole mass of fiber after such treatment an appearance exactly similar to horse hair whose color is approximately made up of gray and black or dark hair.

After the fibers are carded they are twisted in a rope which is afterward made up into 5 cwt. (five hundredweight) hanks and the hanks are then steeped into water and baked for some hours. This has the result of imparting a permanent curl to the fibers when they are shaken out from the dry hanks, the material being then ready for the market.

In order to render the fibers non-inflammable there may be added to the first dye bath:—Sodium borate 25 lbs. (commercial borax). Sulfate of ammonia 25 lbs. (pure crystals). This quantity is sufficient to treat the first batch of six hundredweights. A second quantity may be treated in the same bath by reinforcing the solution with:—Sodium borate 15 lbs. Sulfate of ammonia

15 lbs. And a third quantity by the addition of:—Sodium borate 10 lbs. Sulfate of ammonia 10 lbs. The bleached fiber may be in like manner made non-inflammable by dipping in a clean bath containing in solution the above ingredients.

I am aware that the recipe for the varnish is old in connection with fiber polishing and to such I do not lay any claim, but

What I do claim is:—

1. A process for making artificial hair, which consists in first treating vegetable husks or fibers with an alkaline solution to remove resinous matter and to toughen the fibers, then bleaching one portion of the fibers and dyeing the remaining portion, then mixing together and drying the bleached and the dyed fibers, then treating the mixed fibers with polishing material, and then carding and brushing the fibers to remove superfluous polishing material and to give the fibers a lustrous finish.

2. A process for making artificial hair, which consists in first treating vegetable husks or fibers with an alkaline solution to remove resinous matter and to toughen the fibers, then bleaching one portion of the fibers and dyeing the remaining portion, then mixing together and drying the bleached and the dyed fibers, then treating the mixed fibers with polishing material, then carding and brushing the fibers to remove superfluous polishing material and to give the fibers a lustrous finish, then twisting the carded fibers into ropes, then steeping the ropes in water, then drying the ropes to give the fibers a permanent set, and finally loosening up the dried and twisted fibers.

In testimony whereof I affix my signature, in presence of two witnesses.

WILLIAM ALFRED DICKINSON.

Witnesses:

H. D. JAMESON,
L. E. BOURE.