UNITED STATES PATENT OFFICE.

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FIBER BOARD.

1,406,410. Specification of Letters Patent. Patented Feb. 14, 1922.

No Drawing. Application filed October 24, 1917. Serial No. 198,219.

To all whom it may concern:

Be it known that I, JAMES C. PEABODY, a citizen of the United States, residing at Boston, county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Fiber Board, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has for its object a new and improved composition which is adapted for a number of uses in the arts in which fiber board as heretofore produced is capable of being employed, as well as for a variety of uses for which leather is used but for which fiber has been incapable of use. A material which is a substitute for hard fiber is also included within my invention. My invention also includes the novel process of making the hereindescribed material. In the past, so far as known to me, fiber board having high tensile strength has been stiff or rigid, the composition of the fiber board being such that the quality of stiffness is a necessary adjunct to tensile strength. In the past, therefore, fiber board has not been adapted for uses in which the quality of flexibility or pliability is essential, as is the case for example in boots and shoes where a flexible and pliable material which will readily yield with the shoe is necessary. The fiber board made in accordance with my herein described invention has all the characteristics of leather, being soft and yet tough and pliable, and in addition is not disintegrated by water which renders it particularly useful in the manufacture of boots and shoes.

The material is furthermore adapted to be moulded to any desired shape, and when so moulded, although flexible and pliable, it will retain the general shape given to it. Also it is possessed of great tensile strength even when wet which renders it capable of being stretched without breaking or tearing, and it may be handled and worked while flat without pulling or rubbing up into rolls which has been one of the great objections to fiber board in the past.

While this material is capable of being softened by vapor or water during the process of manufacture so that it may be moulded or shaped as desired, it is not injured by moisture when the herein described process is completed. While I have referred to my material as particularly adapted for use in the manufacture of boots and shoes, it will be understood that I do not limit myself to that use alone, but claim it broadly for any use to which it may be put.

My invention will be fully understood from the following description and the novel features thereof will be pointed out and clearly defined in the claims at the close of this specification.

In the manufacture of material embodying my invention, I take a batch of fiber of any ordinary nature, such as a mixture of chiefly old twine, rope, flax, wood pulp, leather board scrap (except that containing animal fiber) or the like and make up a furnish of fiber by placing it in the usual beater together with a quantity of water in proportions preferably of one part of fiber to twenty parts of water. The fiber is manipulated in the beater as is usual in the manufacture of paper or fiber board. The process heretofore described is substantially that employed in paper making and it will be understood that other ingredients of variations in material may be employed as is well known to paper makers. I then add a quantity of cellulose in a liquid state. The amount may be varied according to the character of the finished product to be produced. Any of the well known celluloses may be used such as those made from cotton or wood pulp, produced either by the acid or alkali processes. The amount of cellulose used varies anywhere from three to fifteen per cent of the weight of the fiber used and depends upon the character of the finished product and somewhat upon the character of the materials used. I find that I can regulate the pliability of the finished product by adding a greater or less amount of cellulose. Where a stiff product is desired as for example for use as a hard fiber, the amount of cellulose employed is greater than where a more flexible and pliable product is desired. The cellulose is then thoroughly manipulated with the furnish of fiber until the fiber becomes thoroughly saturated and impregnated by it. When treated in this manner, the cellulose forms a binding material for the fiber and gives the product a body and strength which can be obtained in no other way so far as known to me. The material produced by the process so far described may be moistened or otherwise

tempered and worked to any desired shape and when dry is relatively rigid and retains the shape given to it.

Dry sheets of my novel material produced as described above, are then treated in the following manner in order that they may be rendered flexible and yielding and at the same time retain their tensile strength and water resisting qualities to adapt them among other things to be used in the manufacture of boots and shoes or other articles heretofore made of leather or the like. I prepare a solution of deliquescent salts such as calcium chloride, salt, or calcium chloride and salt, and soak the dry sheets of fiber in the solution until thoroughly saturated with it. The fiber sheets are then removed from the solution and dried out completely. I have found that the complete saturation of the fiber board composition by the deliquescent salt solution described above does not detract from the tensile strength, toughness or water resistant quality of the material, but renders it hygroscopic so that it becomes flexible and pliable and has all of the physical characteristics of leather in this regard.

What I claim is:

1. The hereindescribed material composed of fiber impregnated with regenerated cellulose, the whole being rendered hygroscopic by the presence of a deliquescent salt.

2. The hereindescribed material composed of fiber and a regenerated cellulose which was once liquid, said material containing a deliquescent salt to render it hygroscopic.

3. The improved process of making the hereindescribed material which consists in thoroughly mixing a batch of fiber with water and thereafter adding liquid cellulose to the said batch of fiber while suspended in water, manipulating the whole until the cellulose is uniformly distributed, then extracting the water, then treating the material with a solution of a deliquescent salt and allowing the material to dry.

In testimony whereof I affix my signature.

JAMES C. PEABODY.