Patented Apr. 24, 1923. 1,452,555

UNITED STATES PATENT OFFICE.

FREDERICK J. GLEASON, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO MAX BROWN, OF BOSTON, MASSACHUSETTS.

METHOD OF MAKING BRAKE LININGS AND THE LIKE.

No Drawing. Application filed February 17, 1921. Serial No. 445,876.

To all whom it may concern:

Be it known that I, FREDERICK J. GLEASON, a citizen of the United States, and resident of Cambridge, county of Middlesex, Commonwealth of Massachusetts, have invented an Improvement in Method of Making Brake Linings and the like, of which the following description is a specification.

This invention relates to the manufacture of friction brake linings such as employed for lining the brakes of automobiles and other uses. It has hitherto been customary to employ for this purpose woven asbestos fiber on account of its heat resisting, non-carbonizing properties, but the use of this substance is objectionable not only on account of its relatively high cost, but because of its inherent lack of strength which requires that it be reinforced with a metallic wire mesh and even then the asbestos has a tendency to disintegrate. It has hitherto been considered impracticable to use cotton fiber for this purpose for the reason that no practical way has been known for preventing the carbonization and disintegration of the cotton under action of a relatively low heat, i. e., 212° F. I have discovered that by suitable treatment, woven cotton fiber may be impregnated and prepared so that it is capable of withstanding a very much higher degree of heat without carbonization or injury, and when treated in accordance with my improved method, a brake lining of cotton fiber may be produced adapted for all ordinary brake lining uses. An essential feature of my invention consists in treating the cotton brake lining which may have been previously impregnated with suitable filler and friction substance, in a manner so that all the volatile elements are distilled off in an atmosphere of a character to prevent the carbonization of the cotton and at a temperature approximating the maximum that the brake lining will be called upon to withstand in use. I preferably provide this non-carbonizing atmosphere by subjecting the material to live steam at a relatively high pressure and for a substantial interval. In carrying out my invention the cotton may be carded and spun in the usual way and may be woven into a fabric, preferably with interposed reinforcing wires or wire netting. In making up a three-ply lining of cotton I would preferably employ a two-ply wire reinforce. In uniting the layers of material together, they are combined loosely so that the impregnated substance may be taken up thereby readily and to the fullest extent. After the brake lining is thus made up, it is run through a bath composed substantially of a solution of ten per cent (10%) boiled linseed oil, fifteen per cent (15%) turpentine and seventy-five (75%) per cent petroleum naphtha in which is dissolved asphaltum, preferably the asphaltic product known as "gilsonite" in the proportion of two pounds of gilsonite to the gallon. After the brake lining is impregnated in this solution, it is hung in a drying chamber, and the more volatile elements of the solution are evaporated at a relatively low temperature, i. e., 212° F. which is the carbonization point of cotton. After this the brake lining is placed in a steam vulcanizer and is subjected to the action of live steam at a pressure of from 80 to 100 pounds per inch, for from 4 to 5 hours. Since this live steam under the pressure named is at a relatively high temperature, i. e. about 500° F. it results that all the substances of the lining that would be volatile at this temperature will be distilled off and the lining will be impregnated with a baking japan filling throughout. The lining is now ready for use except for drying out of the moisture which may be accomplished in an ordinary open-heat oven. The gilsonite asphaltum substance to which I have made reference is a natural product from certain mines in the Uintah Mountains in the State of Utah, which has been affected by nature to such an extent as to remove the more volatile oils. This substance in its natural form has a co-efficient of friction well adapted to brake linings.

I do not claim to be the first to use this product in connection with a brake lining, but I believe that I am the first to use this product in baking japan and wherein the volatile solvent is removed in the presence of live steam to prevent the carbonization of the cotton or other vegetable fiber of the fabric. While I refer herein to cotton as the material of the fabric, this is to be understood in a broader sense as illustrative of any suitable vegetable or other fiber subject to disintegration at higher temperatures. Also while I have found the formula

as stated for the baking japan to be a suitable and practicable one, I do not desire to be limited precisely thereto since other, generally equivalent ingredients may be substituted to some extent, as will be understood by those skilled in the art, and to produce a baking japan adapted for the treatment described. In these as well as other particulars therefore, the present description is to be understood as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description, to indicate the scope of the invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The herein described method which consists in impregnating a cotton fabric with a baking japan solution, and subjecting the impregnated fabric to live steam under substantial pressure for a substantial interval.

2. The herein described method which consists in impregnating a fabric of vegetable fiber with a baking japan solution and subjecting the impregnated fabric to the action of live steam under pressure at a temperature substantially in excess of 212° F. for a substantial interval.

3. The herein described method which consists in impregnating a fabric of vegetable fiber with a baking japan solution, drying the fabric at a relatively low temperature, and then subjecting the fabric to the action of live steam under substantial pressure and at a temperature materially in excess of 212° F. for a substantial interval.

4. The herein described method which consists in impregnating a fabric of vegetable fiber with a baking japan solution composed of a minor proportion of boiled linseed oil and a major proportion of gilsonite asphaltum and both dissolved is volatile solvent, and subjecting the impregnated fabric to live steam at a substantial pressure and a temperature materially in excess of 212° F. for a substantial interval.

5. The herein described method which consists in impregnating a cottom fabric with a baking japan solution and subjecting the impregnated fabric to live steam at a pressure of 80 pounds or more for 4 hours or more.

6. The herein described method which consists in impregnating a multi-ply cotton fabric with a baking japan composed of approximately ten per cent boiled linseed oil, fifteen per cent turpentine, and seventy-five per cent petroleum naphtha in which is dissolved gilsonite asphaltum of a weight of about two pounds to the gallon, and subjecting the impregnated fabric to the action of live steam under substantial pressure at a temperature materially in excess of 212° F. for a substantial period.

In testimony whereof, I have signed my name to this specification.

FREDERICK J. GLEASON.