No. 769,087. Patented August 30, 1904.

UNITED STATES PATENT OFFICE.

THOMAS HEYWOOD IBOTSON, OF EAST GREENWICH, AND ROBERT MELDRUM, OF BLACKHEATH, ENGLAND.

PROCESS OF MANUFACTURING OR PRODUCING ASBESTOS MILLBOARDS, SLATES, PLATES, OR TILES.

SPECIFICATION forming part of Letters Patent No. 769,087, dated August 30, 1904.

Application filed April 10, 1903. Serial No. 152,062. (No specimens.)

To all whom it may concern:

Be it known that we, THOMAS HEYWOOD IBOTSON, a resident of Greigs Wharf, Blackwall Lane, East Greenwich, and ROBERT MELDRUM, a resident of Glynwood, Foyle road, Blackheath, Kent, England, subjects of the King of Great Britain and Ireland, have invented certain new and useful Improvements in or Relating to Processes for the Manufacture or Production of Asbestos Millboards, Slates, Plates or Tiles, of which the following is a specification.

Our invention relates to the production of asbestos millboards, plates, artificial slates, and tiles and the like which will be practically fire and waterproof and at the same time of homogeneous texture, with a certain amount of flexibility.

In carrying our invention into effect we adopt a method essentially differing from any heretofore employed to produce a similar substance. Primarily we deposit upon a suitable fabric a mixture of magnesium oxid and asbestos fiber with magnesium-chlorid solution in the manner hereinafter described. The material so produced may be of any predetermined thickness and degree of flexibility to meet the requirements incidental to its application and is at all times homogeneous and is incombustible and impervious to water or deterioration by humidity. This material or substance may be used for various purposes—such, for instance, as roofing, exterior or interior linings, partitions, ceilings, outhouses, and other buildings and for various purposes for which slate, sheet metal, and wood are now used, the thickness, color, flexibility, and pattern being suitably varied in the process of making.

The asbestos fiber used in the process may be of the kinds generally known commercially as "Cape," "Italian," "Russian," or "Canadian," having a length of from two inches to about one-eighth of an inch. This is placed in a beating-engine or any equivalent apparatus. The liquid added is an aqueous solution of magnesium chlorid $MgCl_2$, having a specific gravity of from 1.25° to 1.15° in the proportion of from two hundred and fifty gallons to five hundred gallons per one hundred pounds of fiber, and the mass is then pulped finely, preferably without using a drum or other wash-discharge during the operation. When the pulping aforesaid has been thoroughly performed, we add a proportion of not less than fifty pounds and not more than one hundred and fifty pounds per one hundred pounds of asbestos fiber of calcined magnesium oxid MgO in a finely-powdered state and continue the mixing for another half-hour. The amorphous infusible magnesium oxid may be obtained by heating the carbonate, nitrate, or acetate of magnesium to calcination. Any suitable coloring medium may be added at this stage. The pulp or "slip" is then deposited upon a filter-bed of any textile fabric or metallic gauze of suitable texture to a depth varying with the thickness of slate or other article required. Beneath the filter-bed a partial vacuum is obtained by means of a steam ejector, pump, or rotary exhauster, the surplus liquid being transferred to a suitable receptacle for further use, treatment, or recovery of constituents, leaving the pulp in a comparatively dry state upon the filter-bed aforesaid. Then the fabric, with the adherent layer of soft material, is removed to a hydraulic, mechanical, or manual press and subjected to a pressure of from two hundred to three hundred pounds per square inch, and upon removal from the press the adherent material is detached from the fabric and the yet soft substance laid upon slats or shelves for air-drying. During the operation of pressing, any design or pattern may be printed or impressed upon the surface. When dried to hardness, the plates, slabs, or the like thus formed are washed in hot or cold water to remove any soluble salts and then immersed in a twenty-per-cent. solution of sodium silicate or potassium silicate for a period which need not exceed twenty-four hours. We have found even half an hour's immersion to give satisfactory results. They are then removed and again subjected to an air drying process.

As a modification of the process according to our invention we may substitute pure water for the solution of magnesium chlorid herein-

before referred to and pulp the asbestos fiber therein with the admixture of magnesium oxid in the same proportion as in the previously-described process, and the substance, material, or fabric after pressing and detachment from the adherent filtering material is rapidly dried in a hot-air oven and then immersed for about fifteen minutes in a bath of magnesium-chlorid solution of from 1.25° to 1.15° specific gravity and air-dried, as before. When sufficiently hard and dry, the plates or slabs are washed with hot or cold water to dissolve out soluble salts and then treated with a twenty-per-cent. solution of sodium or potassium silicate in the manner hereinbefore described and when dried are ready for use.

We are aware that sodium and potassium silicate solutions have been used heretofore in connection with fabrics or substances having a base of asbestos fiber for the purpose of producing a deposit of colloidal silicic acid or silica within the fibers, such deposit binding or cementing the fibers together; but we do not claim such use.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. A process of making a pulp-board product consisting in pulping asbestos fiber with magnesium oxid and subsequently treating the pulp to an alkaline-silicate solution.

2. A process of making a pulp-board product consisting in pulping asbestos fiber with magnesium oxid in a solution of magnesium chlorid, and subsequently treating the pulp to an alkaline-silicate solution.

3. A process of making a pulp-board product consisting in pulping asbestos fiber with magnesium oxid, subjecting the pulp to filtering and drying steps, and finally treating the same to an alkaline-silicate solution.

4. A process of making a pulp-board product consisting in pulping asbestos fiber with magnesium oxid in a solution of magnesium chlorid, depositing the pulp on a filter-bed, pressing the pulp upon the filter-bed, detaching the pulp from the filter-bed and subjecting the same to a drying operation, and finally treating the same to an alkaline-silicate solution.

In testimony whereof we have affixed our signatures in presence of two witnesses.

THOMAS HEYWOOD IBOTSON.
ROBERT MELDRUM.

Witnesses:
WM. O. BROWN,
S. M. KOWSELL.