

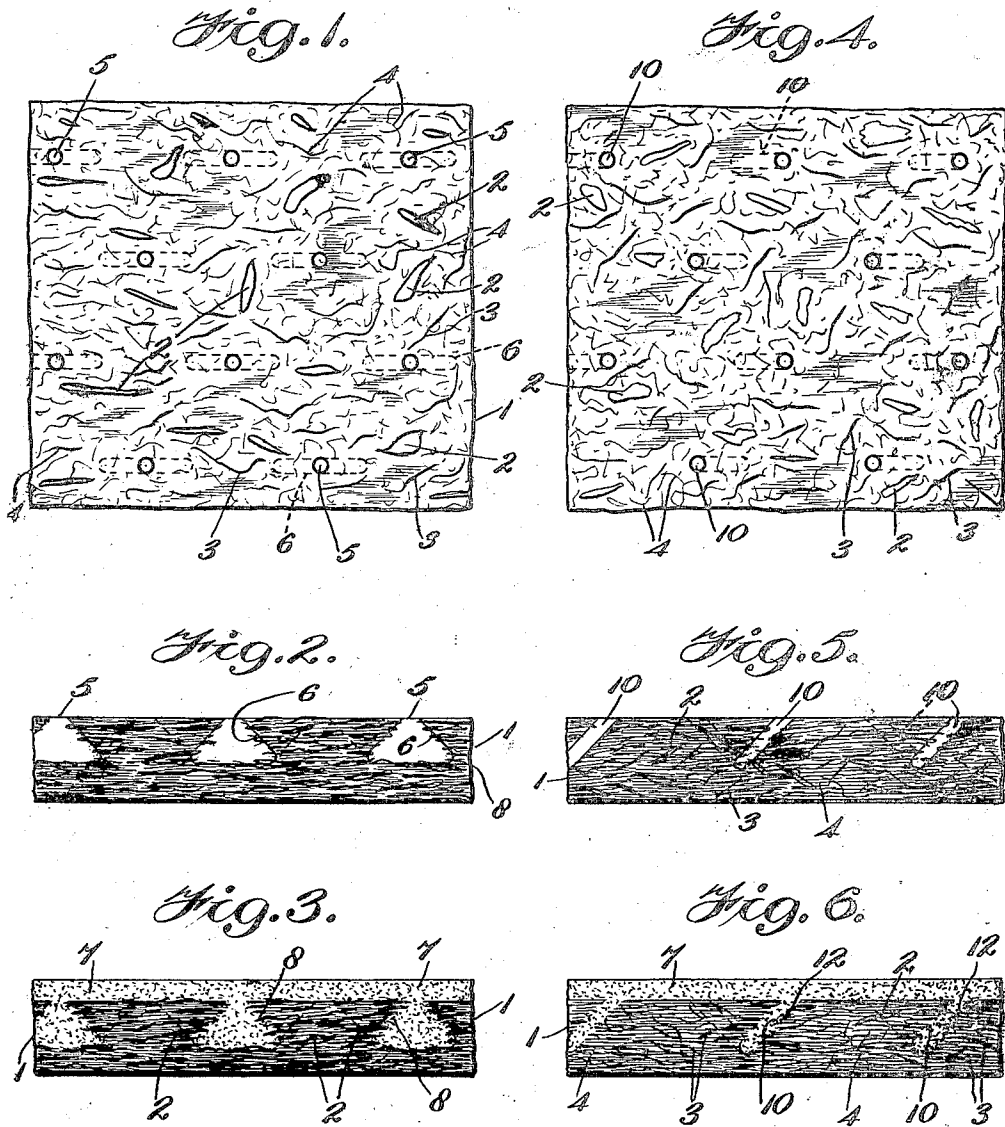
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J. K. SHAW

WOOD FIBER BOARD

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WOOD-FIBER BOARD.

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To all whom it may concern:

Be it known that I, JOHN K. SHAW, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Wood-Fiber Boards; 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 pertains to a board or panel of the class commonly known as plaster-boards, because designed to serve as a base upon which to carry a layer or coating of plaster, cement, or stucco, suitable for interior or for exterior walls of buildings, and for other structural uses.

The board or base is formed mainly of disintegrated vegetable fiber, largely the tailings or screenings of wood-pulp paper stock, too coarse for the manufacture of paper, and heretofore commonly treated as refuse or waste material. In practice it is preferred to use the product known and sold under the registered trade name or trade mark "Insulite." This product is primarily designed as a thermo-insulating material, and its properties and the mode of its manufacture are set out in Letters Patent of the United States granted and issued to Carl Muench, September 14, 1915, and numbered 1,153,512. It is therein described as extremely light, tough, flexible, of great tensile strength, and containing countless air cells, hence constituting an ideal non-conductor, well adapted for structural purposes. Owing to its porosity, its felted formation, and fibrous texture, plaster applied to its surface adheres tenaciously thereto, entering more or less into the same to a slight depth.

In order to secure the desired thickness of sheet or slab, successive layers of the pulp screenings, with water, are in practice superposed and felted together, lightly pressed, and finally dried, cut into suitable lengths or sizes, and these are used in lieu of lathing, expanded metal, and like foundations for plaster, cement, stucco, and other surface coatings. Owing to this laminate structure, it has been feared by some builders and architects that in use, particularly for outside walls exposed to the elements, the outer layer or layers might, under the

weight of the cement or stucco coating, separate and fall away from the inner layers, and in fact many doubted the adequate adhesion of plaster to such a surface, even for indoor use. These fears have proven to be without substantial basis, though in certain unusual situations such a separation might occur.

The primary object of this invention hence is to bond or tie together the layers or a considerable percentage of the laminae of the board or base, and in doing so to anchor the plastic to such board or base by lugs, keys or studs of plaster, integral with the surface coating, and extending into cavities, holes, or recesses formed in the face and extending well toward the back of the board or base. These lugs, keys or studs are formed in the act of applying the coating to the surface of the board, pressure being applied to the more or less fluid plaster, cement, stucco, or like material, and thereby forcing it to flow into and fill the cavities, recesses, or holes. Owing to the porosity of the board or base, the air is enabled to escape from the cavities as the plaster enters and fills them, and, due to the fibrous and porous character of the walls of the cavities the plaster effectively attaches itself thereto. The plaster, cement, or stucco also adheres to the face of the board or base for like reasons.

To further ensure the bonding together of the laminae and preclude any withdrawal of the lugs, keys, or studs from their seats in the board or base, the cavities, recesses or holes are undercut, or have their walls inclined relatively to the face of the board, and in different directions. They may be of uniform cross section but pointed in divergent directions, or made of frusto-pyramidal form, increasing in cross section toward their inner ends or toward the rear wall of the board or base.

The employment of lugs, keys or studs of relatively small cross section rather than long or continuous ribs or bars of dovetail section, is desirable because such lugs afford adequate bonding or holding capacity, yet do not greatly or materially impair the insulation value of the board, their aggregate area being small in proportion to the area of the board; and finally, the lugs, keys or studs do not materially weaken the board or base. The cavities will be made

with a mouth or open end of sufficient size to permit the ready entrance of the plaster, cement, stucco, or like surfacing material, but preferably not larger than will insure such entrance. As the board is primarily used because of its heat-insulating properties, the importance of this feature is manifest.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:

Figure 1 is a plan view of a block or slab of "Insulite" material showing its larger fibers somewhat exaggerated;

Figure 2, is a sectional view of the material shown in Figure 1;

Figure 3 is a view of the block or slab shown in Figure 2 with a plastic material applied thereto;

Figure 4 is a view of a block or slab similar to that shown in Figure 1 but having a different kind of cavity or depression therein;

Figure 5 is a sectional view of the block or slab shown in Figure 4; and

Figure 6 is a view of the block or slab shown in Figure 5 with a plastic material applied thereto.

In order that the precise invention may be the more clearly understood, it is said: The board, or "Insulite" material from which the block, panel, or board 1, is preferably made, is partly composed of quite large fibrous pieces, or slivers 2, occasionally as much as $1/8$ of an inch wide and $1/2$ inch to one inch long. Mixed with these slivers 2 is a second class of string like fibers 3 which are say $1/32$ to $1/64$ of an inch in diameter and 1 inch or 2 inches long. Mixed with the fibers 2 and 3 is a third class of hair like fibers 4 whose diameters are say, from $1/100$ to $1/200$ of an inch and which are sometimes 1 or 2 inches long, although they vary greatly in length: And mixed with fibers 2, 3 and 4 is a fourth class of fibers such as those used in the making of paper of coarser and of finer grades, for which the paper-pulp screenings used in "Insulite" would be unsuited. These various fibers are compressed and felted together, when owing to the very great differences in their coarseness, the resulting board, tile, block or panel is found to be so porous that it resembles cork in its lightness and heat insulating properties. In fact, the specific gravity of "Insulite" is often well below three tenths, although it varies with the raw material and manner of making. In all cases, however, it is so porous that plaster, cement and other like plastics, may enter its interstices to a greater or less extent and thus bond with the same. On the other hand, as the "Insulite" material is made in a manner very similar to paper board by flow-

ing one layer of pulp upon another, its body portion exhibits a layer formation, and therefore plastics adhering to the surface of said material might if strongly pulled upon flake off one or more layers of "Insulite", and thus effect a complete separation of the plastic layer from the "Insulite."

To guard against such contingency, and to anchor or tie the plaster, cement or stucco to the board or base, I have provided the body portion of the "Insulite" material 1, with numerous holes 5, and as said holes extend below the surface they widen out as indicated at 6, to form an undercut or under pressed out surface as shown.

Owing to the very coarse nature of the fibers 2 and 3 above mentioned the surfaces 6, are more or less ragged, and afford numerous interstices into which the plastic material 7 may enter as indicated at 8. The result is said plastic material 7 not only obtains a firm hold on the "Insulite" 1 but it permeates and binds together so to speak the layer like structure of said "Insulite", thus making a firm and permanent board.

In the somewhat modified form of the invention shown in Figures 4 and 6, the material is the same as in the preceding figures, but the holes 10 are of a different shape and are slanted in different directions as indicated by the full and dotted lines in Figures 4 and 5. The bonding action of the plastic material 7, however, is the same as in the preceding figures, in that said material penetrates between the fibers to a greater or less extent as indicated at 12, and thus firmly binds the layer like structure together.

It will thus be observed that I am enabled, by following the procedure outlined, to produce a panel, block, slab, tile, etc., consisting of "Insulite" material with a plastic material firmly anchored thereto, and that these articles are capable of general use. It will also be clear that the block, slab or panel 1 of "Insulite" shown in Figures 1 and 4 is capable of use alone in forming the interior surfaces of walls and buildings or in other relations where it is desired to apply plaster like materials to a substance simulating the physical properties of cork.

It is further observed that I am enabled, by following the procedure outlined, to produce a panel, block, board, etc., which is composed of disintegrated vegetable fiber pulp, and which is formed with depressions adapted to positively interlock with a plaster applied thereto. Further, the fiber pulp being so porous it is adapted to stretch and compress so readily that it will not offer sufficient resistance to crack the plaster when the latter expands.

Accordingly it is obvious that those skilled in the art may vary the details of construction as well as the relations of the parts

without departing from the spirit of the invention. Therefore, I do not wish to be limited to the above disclosure, except as may be required by the claims.

5 What I claim is:—

1. As a new article of manufacture a porous body of paper board material, containing coarse, fine and intermediate sized fibers disposed in layers, said body having a
10 specific gravity of less than four tenths, and provided with a plurality of holes having ragged surfaces adapted to receive and anchor a plastic substance, substantially as described.

15 2. As a new article of manufacture a porous body of paper board material, containing sliver like and string like fibers mixed with other finer fibers disposed in layers, said body having high heat insulating properties and a specific gravity less
20 than four tenths; and having adhering thereto and penetrating the pores thereof a layer of a plastic substance, substantially as described.

25 3. As a new article of manufacture a porous body of paper board material, containing sliver like and string like fibers mixed with other finer fibers disposed in layers, said body having high heat insulating properties and a specific gravity less
30 than four tenths; said body also provided with holes having ragged edges extending in an inclined direction under its surface and having adhering thereto and penetrating the
35 pores thereof a layer of a plastic substance, substantially as described.

4. A lath board composed of disintegrated fiber formed into a porous expansible and compressible heat insulating body having on
40 one of its surfaces depressions adapted to positively interlock with the plaster.

5. A lath board composed of disintegrated vegetable fiber pulp and formed with depressions to positively interlock with plaster
45 applied thereto, the fiber pulp being adapted to stretch and compress under a force less than that which will crack said plaster.

6. A porous, compressible and resilient heat-insulating wall-board formed mainly
50 of disintegrated vegetable fiber, and having numerous relatively small recesses extending from its plaster-receiving face inward well

toward its rear surface, the walls of said recesses being oblique to the plaster-receiving surface.

7. A porous, compressible and resilient heat-insulating wall-board formed mainly of disintegrated vegetable fiber, and having numerous relatively small recesses extending
60 from its plaster-receiving face inward well toward its rear surface, the walls of said recesses being oblique to the plaster-receiving surface; and a layer of plastic material covering the outer face of the board and entering the recesses, substantially as described.

8. A porous, compressible and resilient heat-insulating wall-board of disintegrated vegetable fiber, having a series of recesses extending from its plaster-receiving face inward, the walls of said recesses being oblique
70 and at divergent angles to the plaster-receiving surface.

9. A porous, compressible and resilient heat-insulating wall-board of disintegrated
75 vegetable fiber, having a series of recesses extending from its plaster-receiving face inward, the walls of said recesses being oblique and at divergent angles to the plaster-receiving surface; and a layer of plastic material covering the outer face of the board and entering the recesses, substantially as described.

10. A wall-board formed of disintegrated vegetable fiber, and having its plaster-receiving face provided with recesses extending
85 inward toward the rear face of the board, their walls being oblique to said face; whereby said board is adapted to receive a layer of plastic material which, flowing into
90 such recesses and forming lugs or keys, will be firmly anchored to the board.

11. A wall-board formed of disintegrated vegetable fiber, and having its plaster-receiving face provided with recesses extending
95 inward toward the rear face of the board, their walls being oblique to said face; and a coating of plastic material applied and adhering to the surface of said board, and anchored thereto by lugs or keys of plaster
100 integral with the surface coating.

In testimony whereof I affix my signature.

JOHN K. SHAW.