

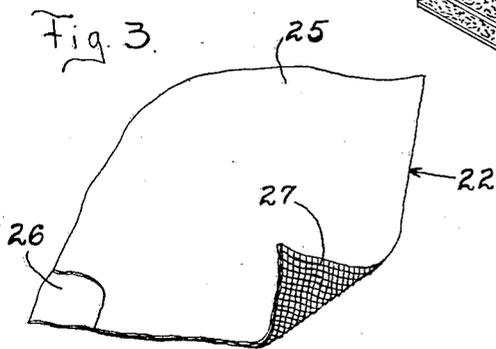
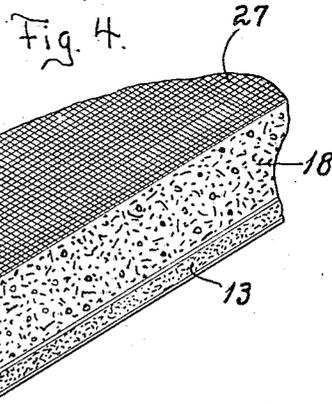
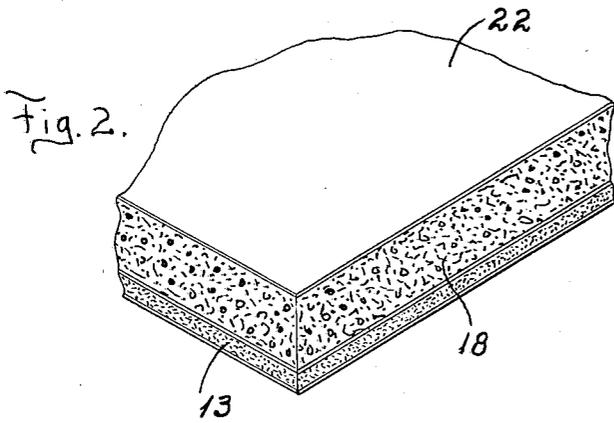
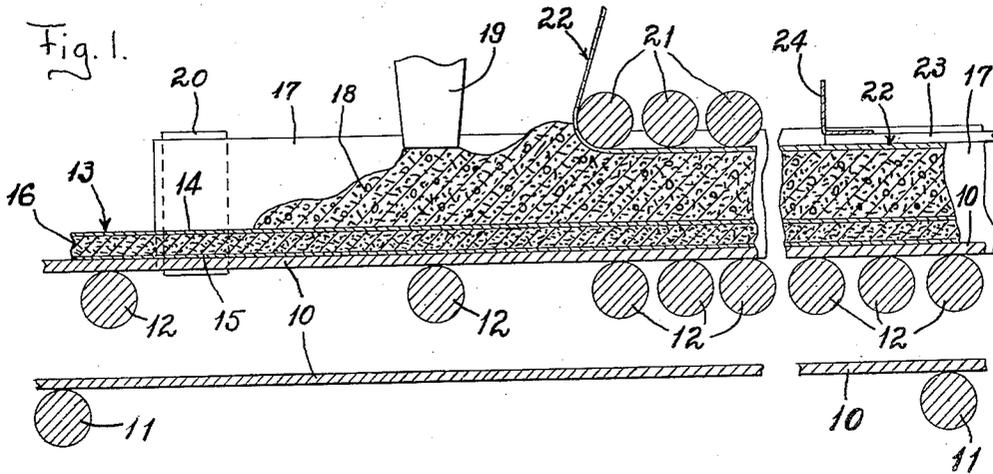
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L. E. ARMSTRONG

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INSULATING BOARD

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UNITED STATES PATENT OFFICE

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INSULATING BOARD

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My invention relates to improvements in insulating board and the method of producing the same. It is one of the objects of my invention to provide an improved construction and arrangement of board of this type whereby a maximum of strength may be procured with a minimum of weight.

Any proposal to produce board of very light weight has been discouraged heretofore by the well understood difficulty of obtaining adhesion between the top liner of paper or other suitable material and the body of the board. As is fully appreciated by those skilled in the art, when gypsum or other suitable cementitious material is aerated or otherwise expanded so as to be rendered light and porous, its adhesiveness is very greatly reduced and the difficulty of obtaining the required strength of adhesion between the liners and the body material is correspondingly increased, due to the proportionately small amount of solid material in a given body of the porous material. It is one of the objects of my invention to provide an arrangement by which the desired adhesion may be attained even when the weight of the body material is very greatly reduced from the normal.

It is another object of my invention to provide an arrangement whereby a coarse open-mesh fabric may be utilized to advantage as the top facing means for the board or as an element thereof for insuring the desired bonding, and for the accomplishment of this purpose it is one of my objects to provide an improved arrangement whereby the board may be produced by a continuous process upon a machine of the plaster board type without any danger of the top leveling and pressure rollers of the machine coming into contact with the sticky body material of the board penetrating the openings through the fabric.

It is another object of my invention to improve board of this type and the method of producing the same in sundry details hereinafter pointed out. The preferred means by which I have accomplished my several objects is illustrated in the drawing and is hereinafter specifically described. That

which I believe to be new and desire to cover by Letters Patent is set forth in the claims.

In the drawing,—

Fig. 1 is a diagrammatic view of a portion of a machine with a partially formed board in position thereon, being a central vertical section through said machine portion;

Fig. 2 is a perspective view of a fragmentary portion of my improved board;

Fig. 3 is a perspective view of a fragmentary portion of the top liner as applied to the board; and

Fig. 4 is a view similar to Fig. 2, but with a portion of the top liner stripped off.

Referring now to the several figures of the drawing, in which corresponding parts are indicated by the same reference characters, 10 indicates the main conveyor of a board machine of approved type, such conveyor being in the form of an endless belt which is supported and driven in any approved manner. In Fig. 1, the lower ply of the belt is supported between its ends by rollers 11, and the upper ply of the belt is supported by rollers 12 arranged at suitable intervals therealong for taking care of the downward pressure applied thereto as hereinafter set forth.

In Fig. 1 of the drawing, the left-hand portion of the complete machine is broken away, such portion being of the usual construction for the production of a plaster board base member 13 of any approved type. The plaster board base 13 comprises a top facing or liner 14 and a bottom facing or liner 15, such liners being formed of paper or other suitable fibrous material. Between the liners 14 and 15 is provided a layer 16 forming the body of the board, such body in the arrangement shown being formed principally of gypsum as is well understood in the wall board art. In the machine as shown in Fig. 1, the board 13 which is still wet and plastic is moving with the top ply 10 of the conveyor toward the right, the portion of the machine shown in Fig. 1 being immediately ahead (at the right) of the means for forming such board 13. Inasmuch as the part of the machine for forming the base 13 may be

of any approved type it is believed to be unnecessary to illustrate it any more fully.

In the construction shown, an endless belt 17 is provided at each side of the conveyor 10 for holding in position on the conveyor 10 the mass of body material 18 delivered to the conveyor through a chute or spout 19 from any suitable source. The endless belts 17 are supported by means of pulleys or rollers 20, only one of which is shown in the drawing.

As the top ply of the conveyor 10 moves continuously toward the right in Fig. 1, the desired supply of body material 18 is delivered in position thereon, such body material being leveled by means of rollers 21 applying pressure to the body material through a top liner 22 of the type hereinafter described. After passing underneath the series of rollers 21, the board is brought into operative position beneath an ironing device 23 of any approved type which is movably supported in position so as to apply downward pressure upon the top face of the liner 22. In the arrangement shown, the ironing device 23 is connected to an anchor bar 24 of any approved form and arrangement.

The formation of the top liner 22 is best shown in Fig. 3. The arrangement there shown comprises a sheet of paper 25 covered on one face with a layer of water-proofing means 26, with a sheet of coarse open-mesh fabric 27 such as burlap bonded to the face of the paper through the medium of the layer of water-proofing means. In the arrangement shown in Fig. 1, the coarse fabric is on the face of the liner adjacent to the body material 18, so that the body material is forced through the openings of the fabric, serving to imbed the fabric in the top surface portion of the body and causing a strong mechanical bonding between the body material and the liner. The body material forced through the openings of the fabric is, of course, brought into contact with the sheet of water-proofed paper so as to be bonded by adhesion more or less strongly thereto.

In Fig. 2, I have shown a piece of my improved board comprising the base or panel member 13, the layer of body material 18 hardened in position on the top face of the base or panel 13, and the top liner 22 bonded both mechanically and by adhesion on the top surface of the body material 18.

In the preferred form of product as made by me, the layer of body material 18 is of considerably greater thickness than that of the body material forming a part of the base 13, such body material 18 being of very materially lighter form. For the body material 18, I prefer to employ a product such as "Insulex" prepared substantially in accordance with the teachings of Ashenhurst Reissue Patent No. 15,952 of November 25, 1924, by the use of which a comparatively very light cellular material is produced having a

very great number of minute closed air cells of substantially uniform size and largely closed off completely from each other. I have had very good results in the preparation of my improved board by the use of body material 18 formed of the following ingredients,—100 pounds of calcined gypsum, 1¼ ounces of commercial retarder, 3 pounds of a suitable carbonate, such as calcium carbonate, and 6 pounds of aluminum sulphate containing water of crystallization, all of such ingredients being finely ground and thoroughly mixed in a dry state. In using such mixture, sufficient water is added for producing a liquid mass adapted to flow readily. Such water introduced into the dry mixture combines with the different ingredients for causing the production of a mass of cells filled with air or other gas which is entrapped when the material sets and hardens. With the ingredients as named above, I have been able to provide body material having a weight of substantially 24 pounds per cubic foot, which has proved admirable for my purposes.

I have found in practice that the top liner 22 of the type above described has a comparatively very strong bonding with the body material 18, such bonding being largely of a mechanical nature by reason of the fabric being imbedded directly in the top surface portion of the layer 18. I have found, moreover, that the body material 18 has a satisfactory bonding relationship to the base 13, it being well understood in the art that it is much easier to obtain bonding between the body material of a board and a supporting base in the form of a liner or panel than to obtain satisfactory bonding in connection with the top liner.

I have found in practice that my improved board is comparatively very light as compared with an ordinary wall board of similar thickness. Furthermore, the strengthening effect of the imbedded fabric in combination with the other elements of the product is such as to produce comparatively very great strength as compared with its weight, and particularly so when the base is in the form of a plaster board or other stiff panel as shown in my drawing.

My improved board as shown in Fig. 2 is adapted to be used at any point where insulation is required, either surface of the board being applied next to the studding or other support. In some cases, the smooth wall board portion 13 would normally be faced outwardly for being finished in the ordinary manner in connection with wall board. In other cases, where a rough finish is desired, or where it is desired that a layer of plaster be applied, the base 13 may be positioned next to the supporting means, the paper 25 and the layer of water-proofing 26 being preferably stripped off as shown in Fig. 4 of my drawing. When so installed the board pos-

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sesses considerable capacity to absorb sound waves.

When the board is to be used under conditions where the absorption of sound is of considerable importance, the top surface of the board, after the removal of the water-proofed paper, may be perforated in any suitable manner for providing openings in the outer walls of the cells whereby the reflection of the sound waves may be kept to a minimum.

While I prefer to employ in my board substantially the form as shown in my drawing and as above described, it is to be understood that my invention is not limited thereto except so far as the claims may be so limited by the prior art.

I claim:—

1. A product of the type described, comprising in combination a stiff base, a layer of cellular, cementitious material bonded to said base, and a facing of fabric imbedded in said layer at its top surface.

2. A product of the type described, comprising in combination a stiff base, a layer of cellular, cementitious material bonded to said base, a facing of open-mesh fabric imbedded in said layer at its top surface, and a sheet of fibrous material bonded to said fabric and to the cellular material through the openings of said fabric.

3. A product of the type described, comprising in combination a stiff base, a layer of cellular, cementitious material bonded to said base, a facing of fabric imbedded in said layer at its top surface, and a layer of water-proofed fibrous material on the outer surface of said fabric.

4. A product of the type described, comprising in combination a stiff base, a layer of cellular, cementitious material bonded to said base, and a facing sheet formed of paper and burlap bonded together by a cement and in turn bonded mechanically to said layer at its top surface by reason of the burlap being imbedded in said layer.

5. A product of the type described, comprising in combination a base member of plaster board having a top facing of fibrous material, a layer of cellular material comprising gypsum as its principal ingredient and of much lighter form and greater thickness compared with the plaster board base and bonded to the outer surface of said top facing, and a facing of open-mesh fabric imbedded in said layer at its top surface.

6. A product of the type described, comprising in combination a base member of plaster board having a top facing of fibrous material, a layer of cellular material comprising gypsum as its principal ingredient and of much lighter form and greater thickness compared with the plaster board base and bonded to the outer surface of said top facing, and a facing sheet formed of fibrous

material such as paper and coarse fabric such as burlap bonded together and in turn bonded to said layer at its top surface.

7. A product of the type described, comprising in combination a base member of plaster board having a top facing of fibrous material, a layer of cellular material comprising gypsum as its principal ingredient and of comparatively much lighter form and greater thickness than the plaster board base and bonded to the outer surface of said top facing, and a facing sheet formed of paper and burlap bonded together by the use of a cement and in turn bonded mechanically to said layer at its top surface by reason of the burlap being imbedded in said layer.

8. A light-weight, board-like product having sound absorption properties of high value, comprising a base member, a layer of cellular material comprising gypsum as its principal ingredient and of comparatively much lighter form and greater thickness than the base member and bonded to the base member, and an open-mesh fabric imbedded in the top face of said cellular material, the fabric face of said cellular material having a multiplicity of perforations extending therinto thereby establishing communication into and through many of the cells for the reception of sound waves.

LOUIS E. ARMSTRONG.

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