June 2, 1931. H. C. RAYNES 1,808,571

REENFORCED WALL BOARD

Filed Nov. 1, 1926

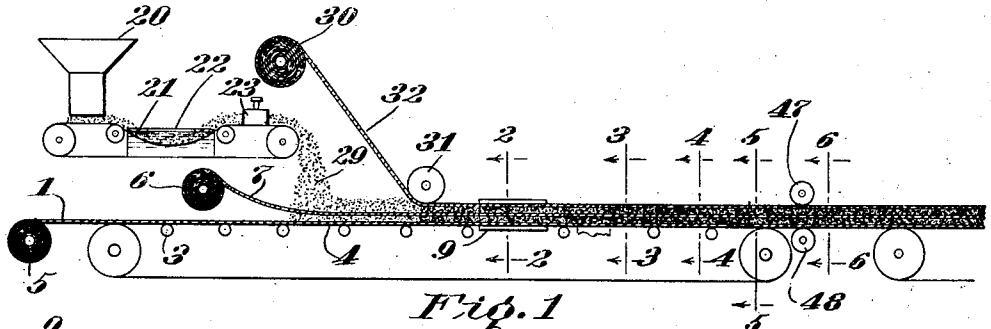


Fig. 1

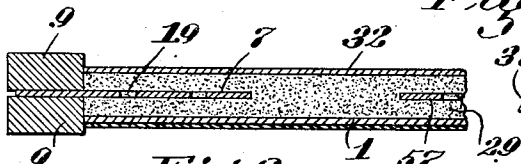


Fig. 2

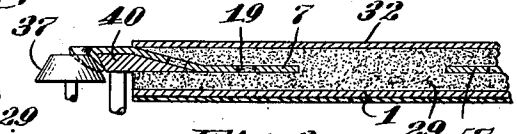


Fig. 3

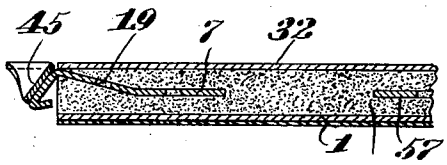


Fig. 4

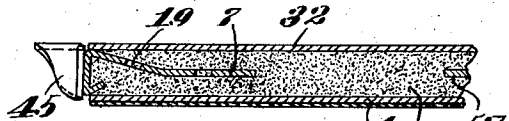


Fig. 5

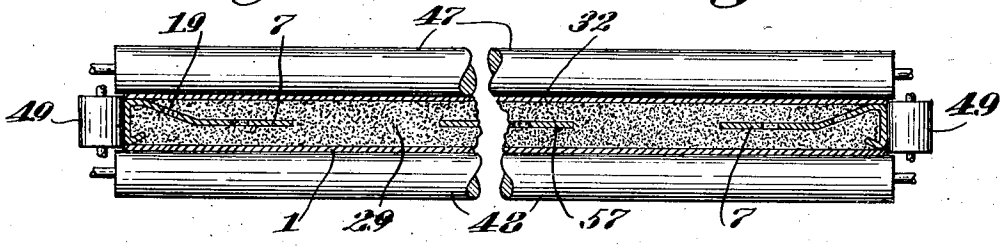


Fig. 6

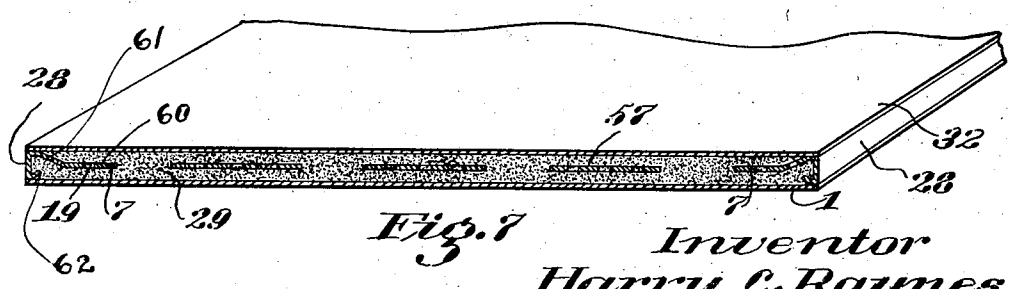


Fig. 7

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UNITED STATES PATENT OFFICE

HARRY C. RAYNES, OF PORTSMOUTH, NEW HAMPSHIRE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BEMIS INDUSTRIES, INCORPORATED, OF BOSTON, MASSACHUSETTS, A CORPORATION OF DELAWARE

REENFORCED WALL BOARD

Application filed November 1, 1926. Serial No. 145,484.

This invention relates to an improved wall board and method of making the same, said board comprising a core of hardened plastic material bound and reinforced by fibrous sheet material which may conveniently be termed paper.

While wall boards of this general character are well known in the art, commonly being made of gypsum plaster with sheets of heavy paper disposed upon either side and folded over the edge of the plaster slab to hold the material in place and to reinforce it for nailing, shipping and the like, the present invention provides means for producing a board of this general character in a continuous elongate strip which may be cut to convenient lengths to provide wall boards of the desired size.

Furthermore, the invention discloses means whereby the edges of the board may be supplied with improved binding and reinforcing elements which are independent of the fibrous coating or covering sheet upon either face thereof and are adapted to be stronger and permit subjection of the finished board to rougher usage than is possible with the types of edges now known to the art. Furthermore, the aforesaid process is adapted to permit incorporation of intermediate reinforcing strips into the central portion of the plastic core thus rendering the wall boards still more enduring and able to withstand rough usage. This process is adapted to be used with a wide variety of materials; for instance, the plastic core of the wall board may be composed of cementitious or frangible material, such as calcined or uncalcined gypsum with or without a suitable fibrous aggregate, or an accelerator or decelerator to aid or retard setting or hardening or which has been treated with various chemcials to enhance the fire or moisture resistance of the material.

The fibrous covering sheets may be of various forms of material ordinarily classified as paper and may be in the form of chipboard, cardboard, mixtures of various kinds of wood or vegetable fibers with asbestos or the like. Similarly the marginal protecting and reinforcing strips may be of these materials but preferably are composed of a heavy paper which includes a large percentage of rope fibers in order to provide singularly tough and strong fibrous reinforcements.

More specificaly the present invention relates to means whereby a core of gypsum or similar material may be located between upper and lower sheets of fibrous material to provide protective surfaces for the faces of the finished wall board, and to means whereby a protective and reinforcing marginal strip may be introduced into each edge of the gypsum core between these fibrous sheets, having a perforated portion extending inwardly into the plastic slab for some distance and being folded over upon the edge of the slab with its opposite margin inturned and embedded in the frangible material so that neither edge is exposed.

The above and further advantageous features attributable to the invention will be apparent to those skilled in the art upon reading the subjoined description and claims in conjunction with the accompanying drawings wherein

Fig. 1 is a diagrammatic view partly in section and partly in elevation of one form of apparatus for making the improved type of wall board;

Figs. 2 to 6 inclusive are sections on lines 2—2, 3—3, 4—4, 5—5, and 6—6 respectively of Fig. 1; and

Fig. 7 is a perspective view of a portion of the completed wall board.

Referring more particularly to Fig. 1, it is to be understood that an under sheet of fibrous material 1 is derived from any suitable source, as from the paper roll 5. In certain cases it may be desirable to make this fibrous material concomitantly with the formation of the board itself in the manner disclosed more specifically in my copending application No. 145,485, filed on even date herewith Patent Number 1,774,813, Sept. 2, 1930; but in such a case for the purposes of the present invention the fibrous material will have been formed into a substantially cohesive sheet by the time it is joined with the gypsum core. The sheet 1 passes over a series of table rolls 3 and may be supported upon a continuous moving wire or felt 4 of the type commonly used in paper making

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machinery. Above table rolls 3 may be located a pair of rolls 6, one of which is above each margin of the sheet 1. Each of these rolls holds a strip of fibrous material which is adapted to comprise the marginal reinforcement of the finished wall board and which preferably consists of heavy, tough rope paper. This paper 7 is directed from the rolls 6 to a position parallel to but spaced above the sheet 1, it being guided to and held in such a position by the fixed metal guide pieces 9 at either side of sheet 1, Fig. 2.

Each paper strip 7 has its inner margin perforated to provide numerous openings 19 to permit passage of the plastic therethrough and an interlocking engagement with the same. The gypsum or similar plastic 29 with or without aggregate, etc., may be fed to the machine from a hopper 20, falling upon a moving belt 21, passing through a liquid vat 22 and under a suitable slice 23 and then falling upon the moving sheet 1. The cementitious or plastic material being in a semi-fluid or viscous state is adapted to pass through the openings 19 in strips 7 and to flow under the same so that the inner portions of these strips are embedded in the edges of the plastic material.

The upper covering sheet 32 of fibrous material may be introduced into the machine from any suitable source, such as the paper roll 30 or, if desired, the fibrous material may be manufactured concomitantly with the board itself as disclosed more particularly in my copending application No. 145,485. The press roll 31 is adapted to press the upper sheet 32 into engagement with the plastic 29. Thus it is evident that the plastic is located between two sheets of fibrous material 1 and 32 respectively, with a perforated margin of each strip 7 embedded therein and its opposite outstanding edge disposed between the fixed metal guide members 9. Upon either side of the sheet the lower of these guide members terminates in an upwardly extended portion 40 which is adapted to twist the outstanding edge of the marginal sheet to a position adjoining the covering sheet 32 as disclosed in Fig. 3 and which has an outer downwardly and inwardly inclined surface which is in juxtaposed relation to a guide spindle 37 of frusto-conical form, whereby the outer marginal portion of the reinforcing strip is folded or sharply inturned in the manner disclosed in Fig. 3. The guide 45 is adapted to engage the upper surface of strip 7 as it leaves member 40 and to fold it downward in the manner disclosed in Fig. 4; this guide having a gradually twisted or curved surface to effect the infolding of the strip and eventually to locate it in the position disclosed in Fig. 5; these operations obviously taking place continuously as different portions of the paper and the reinforcing strip pass through successive parts of the machine. The fibrous covering sheets and reinforcing strips, are thus located in the manner disclosed in Fig. 5, it being understood that for purposes of convenience only one marginal reinforcing strip has been shown, although preferably similar strips are undergoing similar operations upon either side of the wall board.

The material as thus produced is then compacted between horizontal rolls 47 and 48 and vertical rolls 49 which engage the edges of the material, whereby firm engagement of the fibrous sheets with the plastic core is provided while a further dehydration of the gypsum core takes place. Having been further compacted to a suitable degree by passing between the desired number of rolls, the material passes upon any suitable conveyor or table rolls and is transversely sawed and conveyed to a drying room or kiln where final setting of the plastic or cementitious material takes place in order to provide the completed wall board.

If desired, intermediate reinforcing strips 57 may be introduced into the gypsum core at the same time the marginal strips 7 are introduced into the plastic material, these strips being unwound from rolls which are located in alignment with and between roll 6. Such reinforcing strips may be of various materials but preferably may be the type of paper which is advantageously used for the edge reinforcements and they are likewise perforated to ensure firm interlocking of the plastic and to permit passage of the plastic therethrough.

The resulting wall board (Fig. 7) has a frangible core of hardened cementitious or plastic material e. g. which may have the usual covering sheets, a plurality of intermediate reinforcing strips 57 of rope paper and marginal reinforcing strips 7 both edges of which are embedded in the cementitious material, one embedded portion being perforated more firmly to interlock with the same, while an intermediate portion of this strip comprising an edge covering 28 for the cementitious core 29. Referring to Fig. 7, the edge portion 60 of the marginal reinforcing strip is embedded in the slab substantially midway between and parallel to the cover sheets, and spaced from the faces of the slab by layers of the slab material. The adjacent portion 61 of the strip is inclined outwardly to lie near a cover sheet (32). The adjacent portion 28 of the strip covers the slab edge, while the edge portion 62 of the strip opposite to the first edge portion 60, is inclined inwardly in relation to the face of the slab and embedded therein.

It is obvious that wall board manufactured in the manner disclosed is provided with a marginal reinforcing sheet which may provide the frangible core with considerable additional tensile or bending strength at a

region of normally high stress, namely, a vertical edge of the board and that it may be reinforced in order to provide much more satisfactory nailing qualities than usually are possessed by material of this character. The interlocking engagement of the inwardly projecting marginal reinforcing strip which is permitted by its perforations and its location intermediate the surface of the plastic material permits an unusually strong bond between the marginal reinforcement and the plastic material and permits the full benefit of the tensile strength and toughness of the fibrous material for reinforcing the frangible core.

I claim:

1. Wall board comprising a frangible slab, cover sheets of fibrous material thereon, and a reinforcing strip comprising a fibrous sheet with an edge embedded in the marginal portion of the frangible slab and lying parallel to the cover sheets, a portion of said strip being inclined outwardly to lie near a cover sheet at the edge of the slab.

2. Wall board comprising a frangible slab, cover sheets of fibrous material thereon, and a marginal reinforcing sheet having an edge portion embedded in the slab substantially intermediate the faces thereof, a portion covering the slab edge and a portion inclined in relation to the aforesaid portions and connecting the same, the edge of the reinforcing sheet opposite the first edge also being inclined inwardly in relation to the face of the slab.

3. Wall board comprising a frangible slab, cover sheets of fibrous material thereon, and a reinforcing strip comprising a fibrous sheet having one of its edges embedded in the marginal portion of the frangible slab parallel to the cover sheets, an adjacent portion of said strip being inclined outwardly to lie near a cover sheet at the edge of the slab, another portion of said reinforcing strip covering the slab edge, and an edge portion of the strip opposite the first edge being embedded in the slab.

4. Wall board comprising a frangible slab, cover sheets of fibrous material thereon, and a reinforcing strip comprising a fibrous sheet having one of its edges embedded in the marginal portion of the frangible slab parallel to the cover sheets, an adjacent portion of said strip being inclined outwardly to lie near a cover sheet at the edge of the slab, another portion of said reinforcing strip covering the slab edge, and an edge portion of the strip opposite the first edge being inclined inwardly in relation to the face of the slab and embedded therein.

Signed by me at Portsmouth, New Hampshire, this twenty-eighth day of October, 1926.

HARRY C. RAYNES.