

July 3, 1934.

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1,965,265

BOARD STRUCTURE

Filed March 2, 1931

3 Sheets-Sheet 1

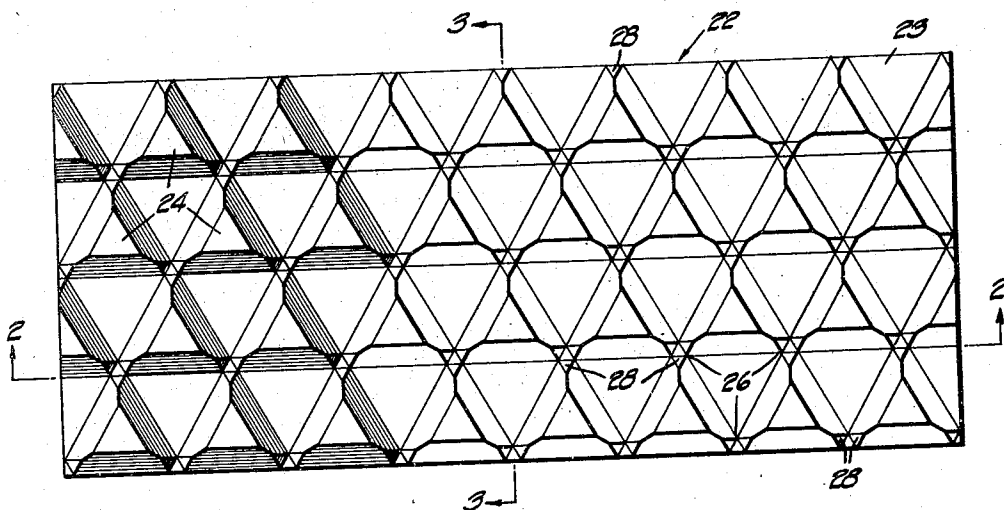


FIG. 1

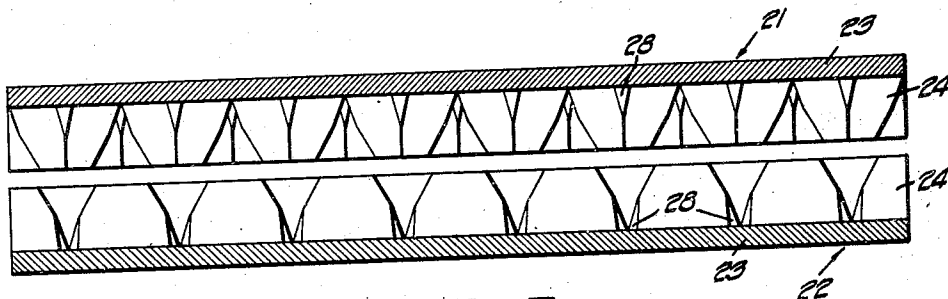


FIG. 2

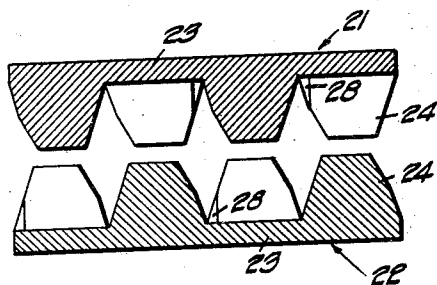


FIG. 3

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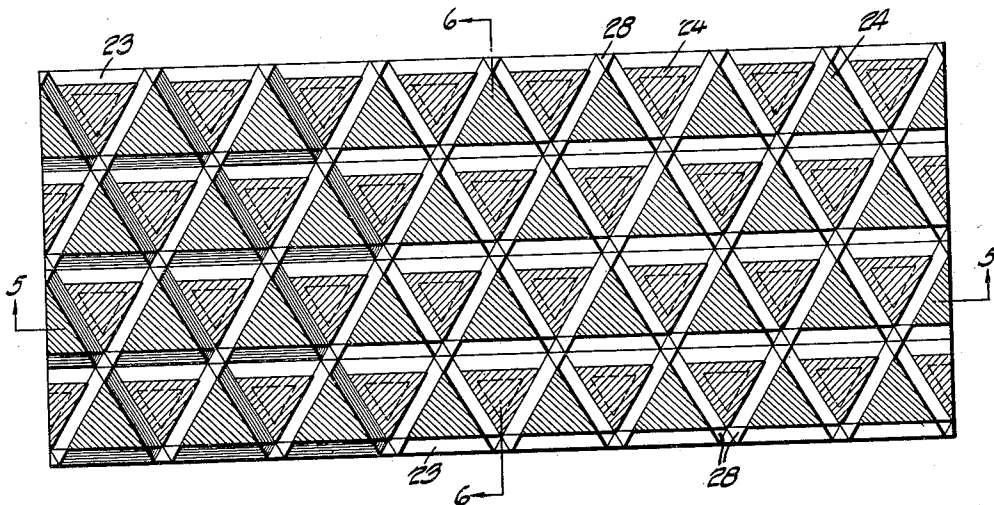


FIG. 4

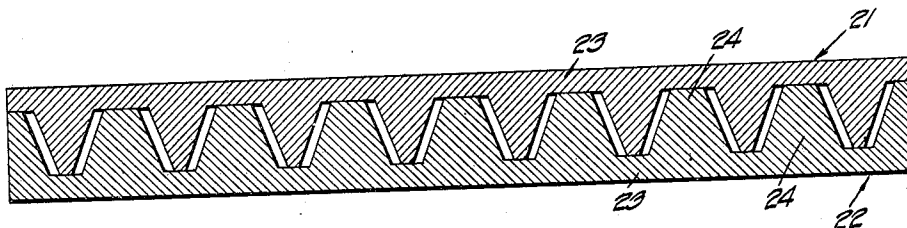


FIG. 5

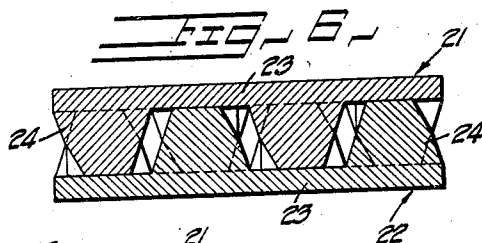


FIG. 6

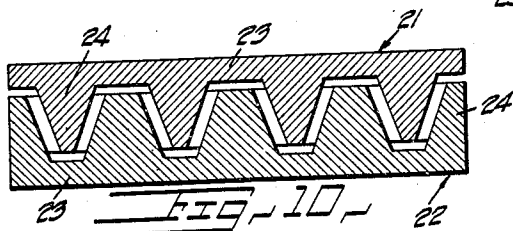


FIG. 10

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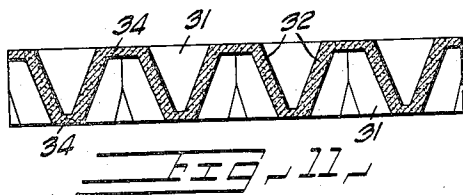
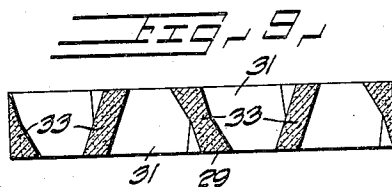
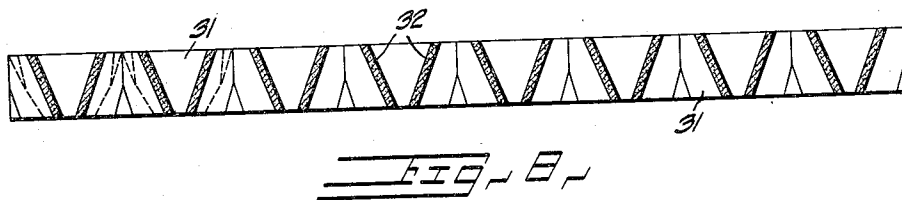
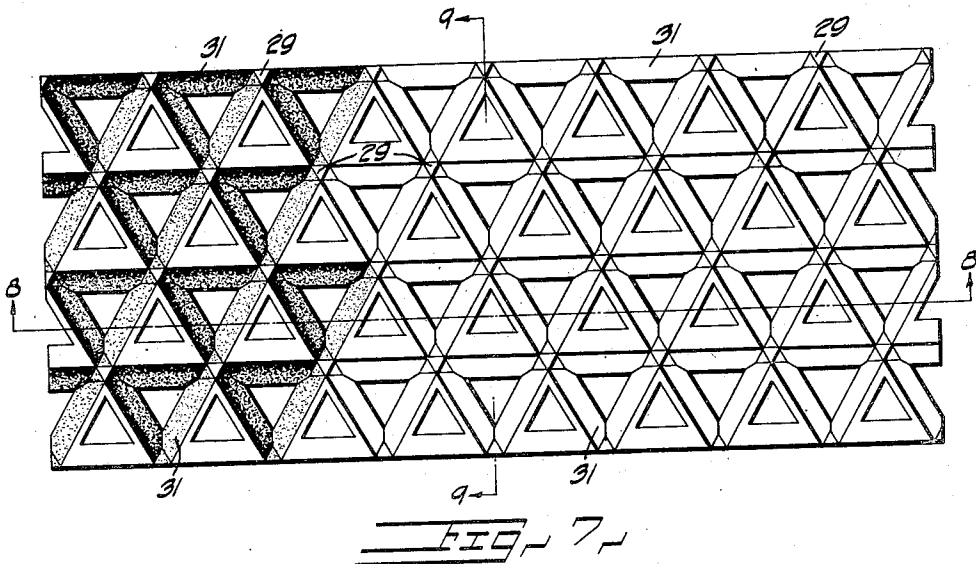
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BOARD STRUCTURE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,965,265

BOARD STRUCTURE

John H. Spohn, Jr., San Francisco, Calif.

Application March 2, 1931, Serial No. 519,366

6 Claims. (Cl. 154—55)

This invention relates particularly to a light but strong and resilient board structure which is adapted to be made from such a fibrous material as a kraft pulp, or other suitable fiber. The board structure is particularly adapted for employment wherever a light composite board having great strength, resilience, and those other properties desirable in such a structural element are prerequisites.

My invention is also concerned with the provision of suitable molds or forms for the manufacture of the board structure.

It is in general the broad object of the present invention to provide a board structure, and suitable means for its manufacture, to the end that a board, having great strength, resilience, and economy of production, may be formed.

In general, my invention contemplates a board structure in which adjacent and alternate areas of the board are depressed so that a honeycomb like structure is produced. It has previously been suggested that certain areas of fibrous boards be depressed, but such structures have not been particularly noted for strength, resilience, or economy of production.

In the present invention, I have made use of various geometrical forms in such a wise that a marked improvement in strength, resilience and economy of production is attained. While various geometrical forms may be utilized, I have found that the employment of regular, truncated tetrahedrons is particularly advantageous and I, therefore, prefer that these be utilized and arranged in such a manner that a hexagonal configuration is secured in the composite board structure finally produced. By employing the truncated tetrahedrons to form the hexagonal figures, the minimum of material is required to produce the board structure, while the material is disposed to greatest advantage in forming the board.

It is of course possible to use other geometrical elements such as octagons and to form other configurations than that of the hexagon within the board structure, but these are not so economical, nor do they have as desirable a disposition of material.

The invention possesses numerous and other advantageous features and objects, some of which, with the foregoing, will appear at length in the following, wherein I have outlined and depicted the preferred form and manner of forming the composite board structure of my invention, and the molds for producing the same.

In the drawings, attached hereto and made a

part hereof, I have depicted a preferred form of the invention, as previously stated, but it is to be understood that the invention is to be accorded a range of equivalents consistent with the state of the prior art and the scope of the claims.

In the drawings, to which reference has been made above, Figure 1 is a plan view of one face of the mold.

Figure 2 is a section taken along the line 2—2 of Figure 1, the view illustrating the cooperative relationship and the relationship between the various parts of the die shown in Figure 1 and a cooperating die.

Figure 3 is a section taken along the line 3—3 of Figure 1, illustrating in transverse section the cooperative relationship between the aforementioned dies.

Figure 4 is a cross section taken through adjacent dies illustrating the relationship between them.

Figure 5 is a section taken along the line 5—5 of Figure 4, illustrating a possible manner of spacing the dies and the cooperative relationship between the dies.

Figure 6 is a view taken along the line 6—6 of Figure 4.

Figure 7 is a plan view of a board structure manufactured and produced in accordance with my invention.

Figure 8 is a section taken along the line 8—8 of Figure 7 illustrating the relative position of the walls of the structure and the interstices.

Figure 9 is a section taken upon the line 9—9 of Figure 7.

Figure 10 is a view, similar in certain respects to Figure 5, and showing another relationship between the dies by which another type of structure, particularly shown in section in Figure 11, can be manufactured.

Figure 11 is a section through a board formed by an arrangement of dies, such as that shown in Figure 10.

In its preferred form, the composite board of my invention comprises a light but strong and resilient sheet of fibrous material in which regularly spaced and regularly provided depressions are struck out from the board, are formed in the board, or are depressed in the fibrous material.

As is best shown in Figures 1 to 6 inclusive, the board is preferably manufactured by employment of two complementary dies 21 and 22. Each of these dies includes a base 23 upon which a plurality of regularly spaced projections 24 are formed so that the projections upon opposite

bases fit together in a complementary fashion, as is shown in Figures 5 and 6, to leave free spaces between which the material is disposed to form the desired structure.

5 The projections are preferably truncated tetrahedrons arranged upon the bases so that adjacent corners 26 of each tetrahedron are adjacent to the corners of other tetrahedrons on the base so that, in effect, a plurality of rows of tetrahedrons are provided. The dies, when placed one on top of the other, have the projecting tetrahedrons slip into the space bounded by the angular sides of the several tetrahedrons so that a plurality of connected but relatively small spaces exist into which the fibrous material, of which the composite board is to be formed, is depressed, or is allowed to flow.

In practice, the composite board structure can be either formed by placing a sheet of fibrous material, in a suitable condition for working, between the dies and then depressing the dies into the material so that the depressions are struck out, in one sense, from the material, or else the material, in such a suitable condition as that of a pulp can be flowed between the dies while the dies are advanced and approach relative to each other. Thus the dies can be provided upon a conveyor mechanism extending down into a tank of the pulp so that the dies, in effect, lift out the pulp and, as they advance away from the container, press out the water in the pulp while forming the composite structure.

In the preferred form of the invention, each of the adjacent corners 26 of the tetrahedrons are flattened off, as at 28 so that solid columns 29 of the material extend from one face of the board to the other. This provides a suitable stiffening for the board and suitable foundation post or column upon which the adjacent sides forming the hollow tetrahedrons depressed into the board are supported and are carried.

When finally produced, the board includes a plurality of regularly positioned truncated tetrahedral spaces 31 which are alternately omitted from opposite sides of the board. These spaces are defined by walls 32, as appear in Figure 8, and other walls 33, as appear in Figure 9, of a greater extent than walls 32.

When the dies are spaced apart, the tetrahedral spaces 31 are faced over at the smaller end thereof, as appears at 34 in Figure 11. This provides a possibly heavier structure of greater strength.

Under some circumstances it is desirable to provide continuous faces over both sides of the board or only one side. This can be readily achieved by securing a paper sheet, or a sheet of the desired covering over the face or faces of the board.

60 I claim:

1. A board structure of predetermined thickness comprising a plurality of intersecting walls arranged in three groups; the first group of

walls being regularly spaced, parallel to one another and extending longitudinally of said structure, the second group being regularly spaced parallel to one another and extending transversely of said structure at an oblique angle to the line of direction of said first group of walls, and the third group of walls being regularly spaced, parallel to one another and extending transversely of said structure at an oblique angle to the line of direction of said first group of walls but in a different direction than the direction of said second group of walls, all of said walls being substantially of the same cross sectional dimension and thickness.

2. A board structure of predetermined thickness comprising a plurality of intersecting walls arranged in three groups; the first group of walls being regularly spaced, parallel to one another and extending longitudinally of said structure, the second group being regularly spaced, parallel to one another and extending transversely of said structure at an oblique angle to the line of direction of said first group of walls, and the third group of walls being regularly spaced, parallel to one another and extending transversely of said structure at an oblique angle to the line of direction of said first group of walls but in a different direction than the direction of said second group of walls, all of said walls being substantially of the same cross sectional dimension and thickness and being of greater cross sectional dimension at the points of intersection with other walls than the cross sectional dimensions between said points of intersection.

3. A board structure of the character defined in claim 1 and in which all of the walls of said first group are similarly inclined, all of the walls of the second group are similarly inclined, and all of the walls of the third group are similarly inclined but in a different direction from the vertical than the walls of the second group.

4. A board structure of the character defined in claim 2 and in which all of the walls of the first group are similarly inclined, all of the walls of the second group are similarly inclined, and all of the walls of the third group are similarly inclined but in a different direction from the vertical than the walls of the second group.

5. An article of manufacture comprising a compound truss board structure, said structure including a network of intersecting rectilinear walls all inclined from the vertical, and substantially vertically disposed columns supporting said walls at the intersections.

6. An article of manufacture comprising a compound truss board structure, said structure including a plurality of intersecting rectilinear walls all of which are inclined at different directions from the vertical, and substantially vertically-disposed columns supporting said walls at the intersections.

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