Nov. 4, 1930.

J. BERG

1,780,739

INSULATING BLOCK

Filed April 12, 1930

Fig:1

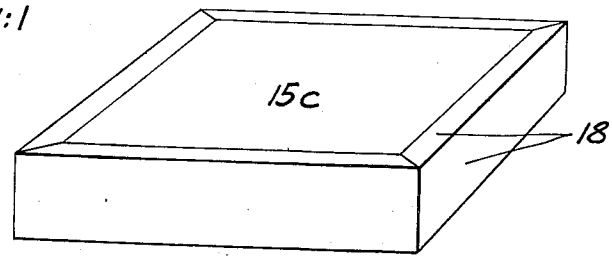


Fig:2

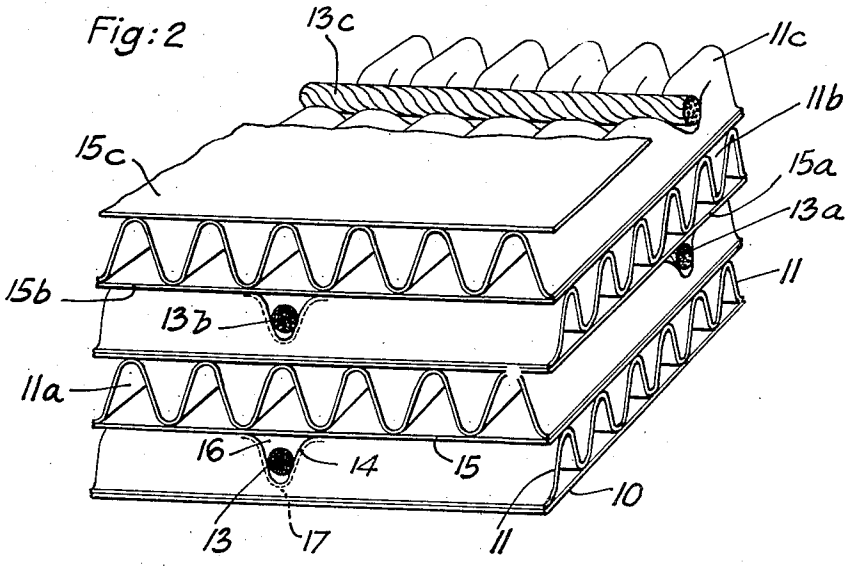
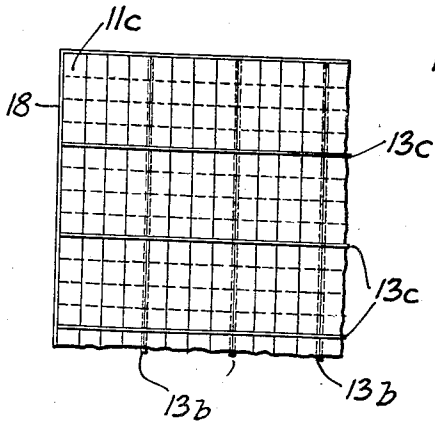


Fig:3



Joseph Berg
INVENTOR.

BY Walter E. Wollheim
ATTORNEY.

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UNITED STATES PATENT OFFICE

JOSEPH BERG, OF LONG ISLAND CITY, NEW YORK

INSULATING BLOCK

Application filed April 12, 1930. Serial No. 443,753.

This invention relates to an insulating block to be used for walls of refrigerating units, buildings where temperature preserving qualities are paramount, or other similar purposes, and to the method of producing the same.

It is one of the objects of the invention to provide a block which has a cellular structure in which a partial vacuum is maintained. Another object is to so dispose the cells in the block that in case of puncture, only a limited number of cells will be subjected to atmospheric pressure, while the remaining cells comprising the major portion of the block will still be under a partial vacuum, thus maintaining its desired insulating characteristics. A further object is to make the block so that it can readily be made up in sizes to meet specifications or to enable the same to be manufactured in standard sizes for stock. A still further object is to provide means for producing the block in a simple and efficient manner which does not require expensive mechanisms nor specially skilled workmen. Other more specific objects will be brought out in the following specification.

In the drawings, in which a preferred form of the invention is illustrated,

Fig. 1 is a perspective view of a block made according to my teachings in a form ready to be marketed;

Fig. 2 is a perspective fragmentary end portion of the cellular structure of the block, the binding at its sides being omitted for sake of clearness; and

Fig. 3 is a fragmentary plan view of a corner portion of the block with the top sheet and binding removed.

Like characters of reference denote similar parts throughout the several views and the following specification.

In order to fabricate the block, I take a flat sheet of cardboard 10 or the like and place upon it a sheet 11 of corrugated cardboard. The corrugations are about ¼″ high. In order to fasten the corrugated cardboard 11 to the flat sheet 10 I paint both with silicate of soda or the like which acts as a binder. I then take a number of strands of twisted vegetable cord 13 and place them upon the top of the corrugations of sheet 11 at right angles to the corrugations, about 2″ apart from each other, and press them downwardly. Thus the corrugations are divided into cells, each about 2″ long. The silicate of soda closes up effectively the spaces between the top of the corrugations which are depressed by cords 13 as shown at 14 and the top of the sheet 10. A flat sheet 15 of cardboard is then placed upon the corrugated sheet 11 and fastened thereto by a liberal application of silicate of soda. It will be noticed now that the space between sheets 10 and 15 is divided into cells about 2″ long, formed by, respectively, the spaces between the lower surface of corrugated sheet 11 and the top of sheet 10, and by the top of the corrugated sheet 11 and the bottom of sheet 15.

Silicate of soda fills up the crevices around the cords 13 and between the top and bottom of the corrugations and the sheets 10 and 15, as indicated at 16 and 17.

In a similar way, corrugated sheet 11^a is fastened upon sheet 15 taking care, however, to place it in such a position that the corrugations are disposed at right angles to those of sheet 11, as clearly shown in the drawings. These corrugations are similarly divided into cells by strands of cord 13^a. By placing a flat sheet 15^a upon the corrugated sheet 11^a, a second set of longitudinal cells is completed, each set at right angles to each other. For purposes of illustration, I have shown 4 sets of cells, made by corrugated sheets 11^b and 11^c, flat sheets 15^b and 15^c, and strands of cords 13^b and 13^c, in addition to the sheets and strands of cords above mentioned.

The strands of cord where used, instead of being pressed into the corrugations of one sheet at a time, may be placed in position and by pressing all the sheets together after they were assembled as described, will divide the corrugated sheets into cells at one time. Instead of strands of cords, it is feasible also to use flat strips of cardboard or other material for the same purpose and in the same manner as mentioned before.

While I have described one method of making these cellular blocks, I wish by no means

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to restrict myself to this specific method. I have also found it to be practical and somewhat cheaper to omit the strands of cords and to simply indent the corrugations by any blunt instrument, where otherwise the strands are placed. This also effectively divides the corrugated sheets into longitudinal cells at the underside of the corrugations only.

After having completed the cellular block by any one of the methods described, I bind three sides of the block with strips 18 of water proof material glued onto its edges and overlapping about ¾". I then place the block into an oven having a temperature of about 250 to 300 degrees Fahrenheit, until thoroughly heated and remove it and seal the fourth side. Next I apply to the block a coat of water proofing by dipping it into or spraying it with pyroxylin lacquer, stearic acid or the like. Then the block is allowed to cool. The hot air in the cellular structure now gradually reduces in volume, i. e. contracts by the cooling, and thus produces within each cell a partial vacuum.

The advantages of blocks made according to the methods described are manifold. Blocks can be manufactured in standard sizes and thus marketed, or made up in large sheets to certain specifications. By reason of their construction, that is the cellular layers superimposed upon and at right angles to each other, the blocks are strengthened all out of proportion to their lightness. The cellular construction of the blocks with the partial vacuum in each cell is an excellent insulating medium. Thus lightness is combined with strength and heat insulation qualities making these blocks especially adapted for use with electric refrigerating units, building wall inserts, or the like. They are also soundproof to a certain degree because of which their use and application commands a very wide field. In case of punctures of the blocks, it is apparent that the insulating qualities are not impaired to any degree because air will be admitted into those cells only of which the walls have been ruptured.

Moreover, while I have described the layer of one set of longitudinal cells disposed at right angles to the set immediately above or below it, this need not necessarily be interpreted as being limited to right angles, but any angular relation of side walls will serve the purpose equally as well because this has the effect of strengthening the cellular structure. Instead of cardboard, any other suitable material, such as fiber for instance, may of course be employed.

It is obvious that various other changes of form, proportion, minor details and combination of parts and method of producing the same may be resorted to without departing or sacrificing any of the advantages of the invention, as defined in the appended claims.

What I claim as new, is:

1. The method of making insulating blocks consisting of providing a plurality of cells, partly sealing them, placing them in a heated oven, removing them while hot and completely sealing them water and air tight, and then permitting them to cool in order to cause a partial vacuum to be formed in the said cells.

2. The method of making insulating blocks comprising the steps of associating a sheet of corrugated fabric with a pair of sheets of flat fabric, one on each side thereof to form a block, dividing the channels in said corrugated sheet into cells, partly sealing the side edges of the block, subjecting the block to heat, completing the sealing of said side edges and then permitting the block to cool to cause a partial vacuum to be formed in the said cells.

3. The method of making insulating blocks comprising the steps of superposing a plurality of corrugated sheets interposing flat sheets between adjacent corrugated sheets, placing strips of substantial thickness between said corrugated sheets and said flat sheets, said strips being disposed transversely to said corrugations, pressing said strips into said corrugations to divide the channels formed by said corrugations into cells, and sealing the side edges of the block.

4. A cellular insulating block comprising a plurality of corrugated sheets, each sheet having a series of transverse corrugations on one face thereof, flat sheets interposed between said corrugated sheets, relatively thick cords disposed in said transverse corrugations, thereby providing a plurality of relatively short cells, and sealing strips for the side edges of said block.

In testimony whereof I have hereunto set my hand.

JOSEPH BERG.