April 28, 1942. M. T. STRAIGHT 2,281,121

LOAD BEARING ACOUSTIC BUILDING BLOCK

Filed Aug. 25, 1939

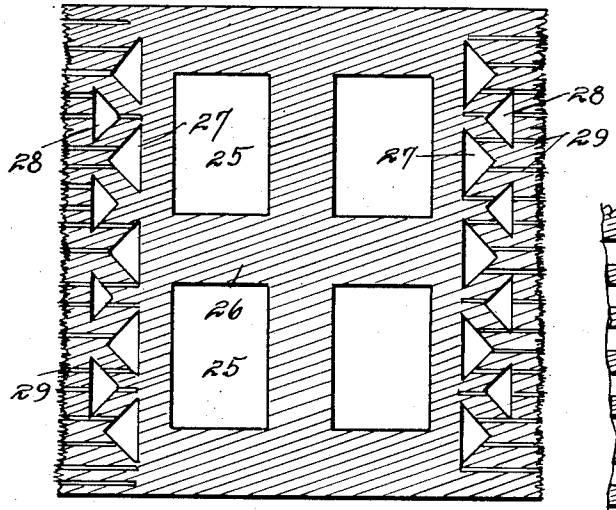


Fig. 5.

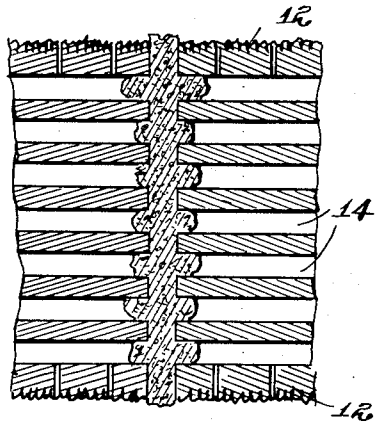


Fig. 4.

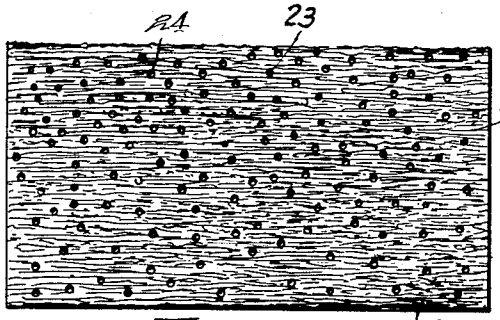


Fig. 3.

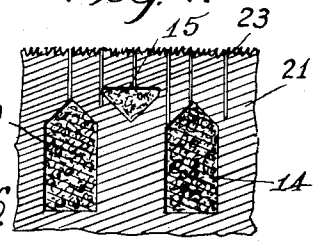


Fig. 6.

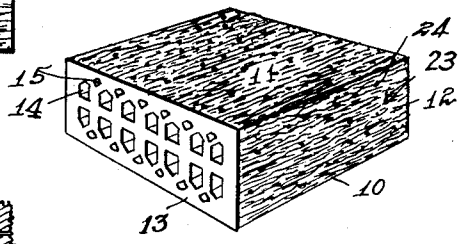


Fig. 1.

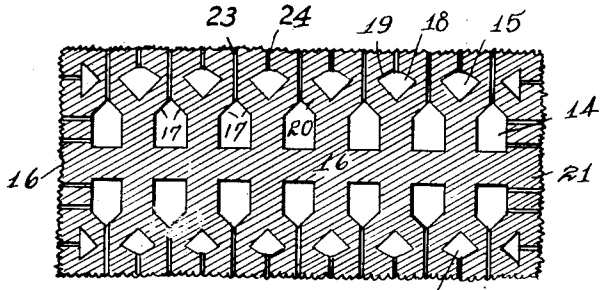


Fig. 2.

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LOAD BEARING ACOUSTIC BUILDING BLOCK

Merton T. Straight, Des Moines, Iowa

Application August 25, 1939, Serial No. 291,887

5 Claims. (Cl. 72—41)

The object of my invention is to provide an improved building block formed of plastic material having all of the properties of the vitrified building block as to strength, appearance and density, and provided with sound absorbing properties, whereby the block may be used to construct the interior of walls and partitions of auditoriums by being laid in mortar or cement in the usual manner, and when so laid will absorb and diffuse audible sound waves striking said wall or partition to prevent reflection of the same to such an extent that undesirable echoes may be eliminated within the room or building formed of said blocks without the application of independent sound absorbing material.

A further object of my invention is to provide in a load-bearing building block having acoustic properties, of such size and shape that it may be laid in conjunction with transparent and ornamental blocks of standard shape and size to provide ornamental as well as acoustic effects without any additional decoration, and yet so constructed that decorative substance such as paint or the like may be readily applied if so desired.

A further object of my invention is to provide a load-bearing building block of plastic material which may be made by methods and machinery such as now in common use in the manufacture of ordinary load-bearing building blocks.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawing, in which:

Figure 1 is a perspective view of one form of my improved acoustic block;

Figure 2 is an end elevation of same;

Figure 3 is a side elevation of my improved block;

Figure 4 is an enlarged detail sectional view showing the manner in which the ends of my improved block are secured together by mortar, and the manner in which the cavities therein are sealed at their ends;

Figure 5 is an end elevation of a modified form of my improved block;

Figure 6 is an enlarged detail sectional view illustrating another modified form of my improved acoustic block.

My improved block consists of a body 10 formed of plastic material, having side members 11, edges 12 and ends 13. The body is provided with rows of longitudinal cavities 14 and 15 formed in the plastic body by suitable dies, in the ordinary manner, such as used in the construction of the ordinary plastic building block, the cavities 14 being formed in horizontal rows above and below a partition 16, the outer sides of the cavities 14 being provided with outwardly inclined faces 17. The cavities 15 are arranged in rows between the rows 14 and the corresponding faces 11 of said body, said cavities being formed in staggered relation to the cavities 14, as clearly illustrated in Figure 2 of the drawings, the inner side of the cavities 15 having inclined portions 18 diverging inwardly and substantially parallel with the inclined portions 17, the outer surfaces of the cavities 15 being preferably somewhat arched as at 19. The inclined walls 17 and 18 are spaced apart such a distance that partitions 20 are provided and so proportioned with relation to the partition 16 and the side walls that the plastic body will flow uniformly through a die of the type ordinarily used in the manufacture of plastic building blocks. The outer surfaces of the sides and edges of the body are roughened by scratching said surfaces longitudinally as the plastic column is conveyed from the die to the cut-off table to form irregular grooves 21 which are of such depth and of such distance apart that the material between the grooves will not be pulled or loosened from the main body, and yet close enough together so that a very non-uniform and roughened surface will be provided, said surface being so scratched as to prevent any symmetrical formation of grooves and ridges, thus providing a surface that is not only ornamental but also very efficient in the breaking up of sound waves to prevent said waves being reflected in a definite direction in respect to their angle of incidence. In other words, to provide a surface that will reflect the sound wave of a given angle of incidence in a large number of directions in respect to their angle of incidence in a more or less diffused manner. This roughened surface also provides means for absorbing some of the sound energy through friction and heat resulting therefrom. The roughened surface also provides a very ornamental surface that is pleasing to the sight, and usually requires no additional ornamentation. The further breaking up or absorption of the sound wave is further enhanced by passages 23 and 24 which are formed in the walls of the body, said passages having their inner ends connecting with said cavities 14 and 15, and their outer ends terminating in said roughened surface, as clearly illustrated in Figure 2, said passages 23 and 24 being arranged either symmetrically or in a non-symmetrical manner as to their distance of spacing one relative to another.

In the construction of wall formed from my improved blocks the ends of the blocks and two of their sides or edges are laid in mortar in the usual manner.

In Figure 5 I have illustrated a somewhat modi-

fied form wherein the block is built substantially square in cross section, having comparatively large longitudinally extending cavities 25 and partitions 26. Between the cavities 25 and the corresponding outer surfaces of the body I have provided two rows of cavities 27 and 28, these cavities 27 and 28 being provided with laterally extending passages 29, having their outer ends terminating in the roughened outer surface of said body.

In Figure 6 I have illustrated another modified form of block in which the cavities 14 and 15 are filled with a quantity of particles of material 30, such as sawdust or expanded mica flakes, to form a sound absorbing filter, and retained within the cavities and bound together by a suitable binder such as Portland cement or water-proofing glue, the filter being placed within the cavities of the block after the block has been hardened by drying, or by burning and vitrification, and firmly retained therein by the said binder so that the block may be handled and transported from one point to another. This filter provides means whereby under certain conditions the sound-absorbing qualities may be increased, or, under other conditions, part of the cavities 14 and 15 may be filled with the filter and others left empty, thus providing means whereby the resonant peak of the sound reflected waves of the block may be greatly broadened.

Thus, it will be seen I have provided a load-bearing building block which is constructed of a hard refractory material and capable of being laid in the partition walls of a building or in the exterior walls, and to carry a superimposed load, and at the same time have provided a block having ornamental exposed surfaces and one in which a large percentage of the sound wave striking the roughened surface of the block will be reflected and diffused in various directions so that at no time will a given sound wave have its entire energy focused at any particular point in the building. A large percentage of the energy is also absorbed by friction in the walls of the longitudinal cavities. I have also provided an improved acoustic block which may be manufactured by the ordinary machinery used in the manufacture of plastic wall blocks, with the addition of mechanism for perforating the sides of the walls, the blocks thus formed being burned in the usual manner.

It will further be seen that I have provided a building block having two of its surfaces roughened, and opposite said roughened surfaces, longitudinal cavities with a partition between said cavities formed integrally as a part of the body, and passages extending between the roughened surfaces and the corresponding cavities so that each side of the block is provided with an acoustic construction, one of which is independent of the other as provided in the central partition, so that sound waves entering the passages of one surface will not be transmitted through the passages of the other surface, thus providing a block which is formed integrally therewith with each of its opposite sides so constructed as to have acoustic properties without having to attach to the surface of the wall additional sound-absorbing devices such as are now in quite common practice.

I claim as my invention:

1. An improved load-bearing building block formed of plastic material having two of its side faces roughened to form an irregular and uneven surface, a cavity extending longitudinally through said block opposite each of said roughened surfaces, and a partition impervious to the passage of sound vibrations between said cavities formed integrally with said body, said roughened surfaces being provided with inwardly projecting passages having their inner ends connected with said cavities.

2. An improved refractory load-bearing building block, comprising a hollow body having a central and longitudinally extending partition impervious to the passage of sound vibrations and its outer surface opposite said partition being provided with very irregular and non-uniformly arranged grooves to form surfaces capable of reflecting portions of sound waves striking said surfaces at various angles relative to their angle of incident, and a plurality of comparatively narrow and laterally formed passages connecting said outer surface and the corresponding cavities on opposite sides of said partition, whereby the building block may be laid in a partition wall, in single tiers to provide sound-deadening surfaces and at the same time, to prevent sound waves from passing through said block from one surface to the other.

3. An improved load-bearing building block formed of plastic material, comprising a body having a plurality of longitudinal rows of cavities on opposite sides of a central partition forming an integral portion of said body, the cavities of one row of cavities being larger and staggered in relation to those of another row of cavities, the side faces of said body opposite the rows of said cavities being roughened and provided with a plurality of comparatively narrow and laterally formed passages connecting the roughened outer surface and the outer walls of said cavities, said cavities being taggered so that all of said laterally formed passages will have their inner ends terminating in one or the other of said cavities, for the purpose of forming resonant chambers of different sizes whereby the resonant peak of the block may be broadened.

4. An improved load bearing building block formed of plastic material, comprising a body having spaced longitudinal cavities to form a unitary partition impervious to the passage of sound vibrations between them, the sides of said block opposite said cavities having a sound-diffusing and absorbing surface, including passages connecting said cavities and said surfaces, said partitions serving to prevent passage of sound waves from one sound-absorptive surface to the other when the blocks are laid in a partition wall and in a single tier.

5. An improved load-bearing building block formed of plastic material, comprising a body having a plurality of longitudinal rows of cavities, the cavities of one row of cavities being larger and staggered in relation to those of another row of cavities, the side faces of said body opposite the rows of said cavities being roughened and provided with a plurality of comparatively narrow and laterally formed passages connecting the roughened outer surface and the outer walls of said cavities, said cavities being staggered so that all of said laterally formed passages will have their inner ends terminating in one or the other of said cavities, for the purpose of forming resonant chambers of different sizes whereby the resonant peak of the block may be broadened.

MERTON T. STRAIGHT.