Jan. 21, 1936. C. F. BURGESS 2,028,272

SOUND ABSORBING CONSTRUCTION

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Fig. 1.

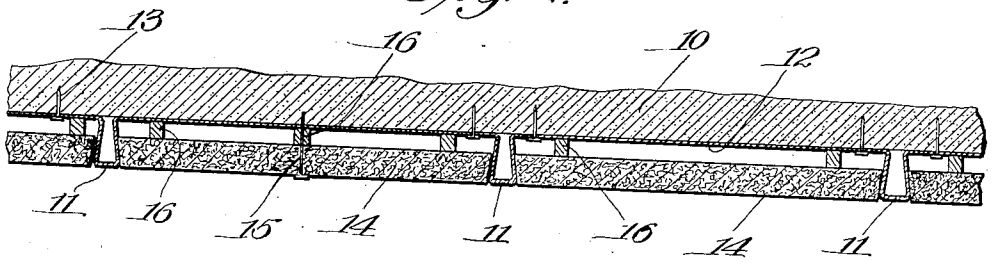



Fig. 2.

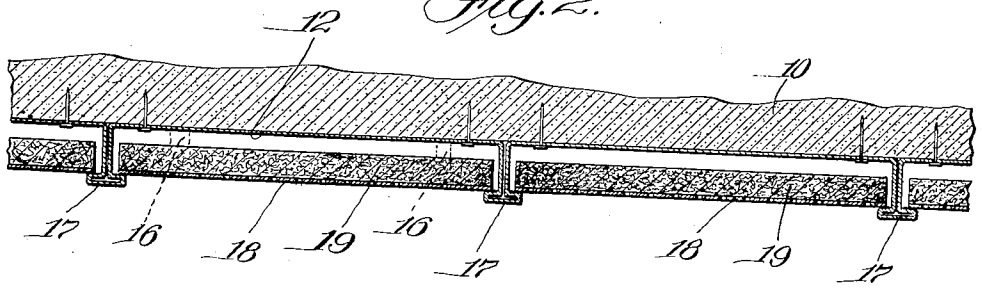
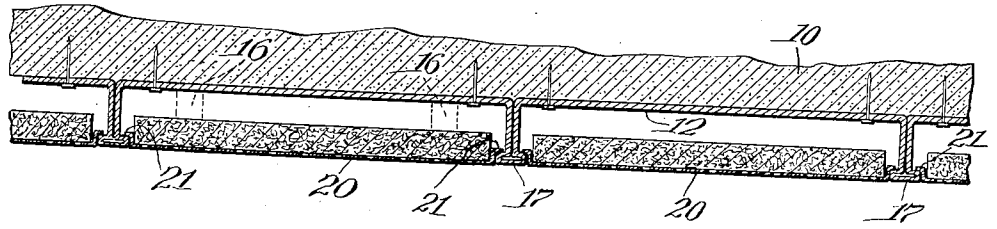



Fig. 3.



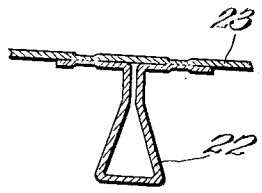




Fig. 6.

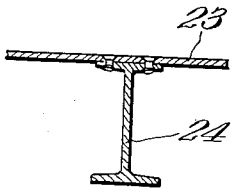



Fig. 7.

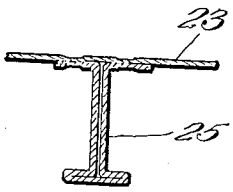



Fig. 8.

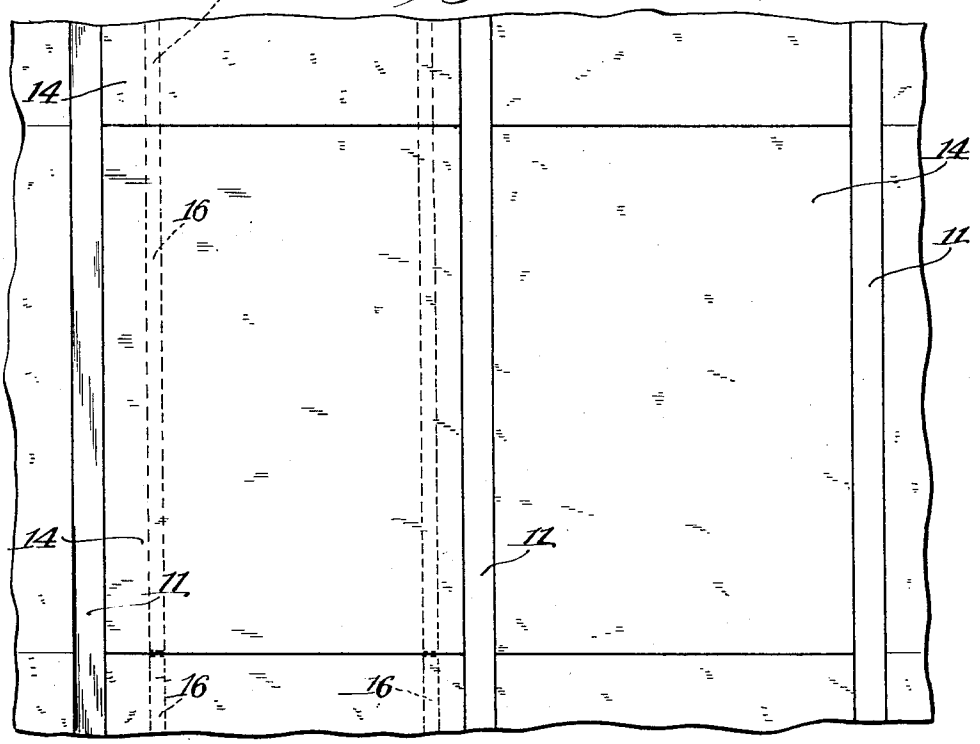
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Fig. 4.



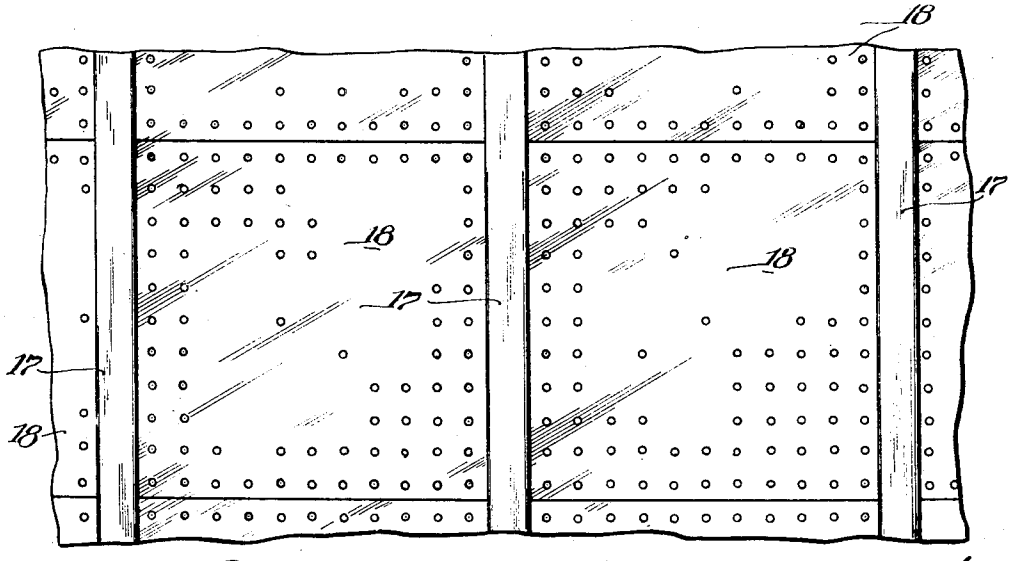




Fig. 5

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# UNITED STATES PATENT OFFICE

2,028,272

## SOUND ABSORBING CONSTRUCTION

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Application December 19, 1930, Serial No. 503,542

5 Claims. (Cl. 189—88)

This invention relates to improvements in sound absorbing constructions for walls, ceilings and the like.

The principal object of the invention is to provide a sound absorbing construction which is simple, inexpensive, easily installed and permits the use of a variety of sound absorbing materials.

Various types of sound absorbing equipment have been used heretofore. It is the practice, in some cases, to nail or glue sound absorbing material such as felt, balsam wool and the like, to the wall or ceiling. In the case of another and widely used type of installation, it is customary to employ joists, furring strips, clips or T-bars which are fastened to the wall or ceiling in parallel relation, after which sound absorbing units of predetermined size are interlocked with or otherwise secured to the parallel supporting members to complete the installation. Such installations require skilled workmen and the exercise of considerable care to insure that the furring strips or other supporting members are, in fact, fastened to the walls or ceiling in exact parallel relation and in substantially the same plane, otherwise the units subsequently applied will not fit.

It is a contributory object of my invention to provide a series of parallel supporting members secured to or forming part of a common support or backing, and arranged in exact parallel relation, and in substantially the same plane where a resulting flat surface is desired, thus providing a structure which may be applied to a wall or ceiling as a unit of fairly large size. In other words, the structure may be made in a factory, by machinery, under conditions which insure exact parallelism of a series of members which are mounted on a base, whereby the rapidity and success of the assembling operation in the building where the installation is to be used, are not dependent on the varying skill of the individual workmen.

Other objects and advantages will become apparent from the following description which is to be taken in conjunction with the accompanying drawings wherein:

Fig. 1 is a sectional view of one embodiment of my invention;

Fig. 2 is a sectional view of another embodiment of the invention;

Fig. 3 is a sectional view of a further embodiment of said invention;

Fig. 4 is a bottom view of the form shown in Fig. 1;

Fig. 5 is a bottom view of the form shown in Fig. 2; and

Figs. 6, 7 and 8 are end elevations of several modifications of one of the parts, shown on a larger scale.

In Fig. 1, 10 represents the wall or ceiling to which a sound absorbing treatment is to be applied. In the construction shown, parallel outwardly flaring ribs 11 are rolled into a stiff metal sheet 12. In this manner the ridges or ribs are an integral part of the sheet and are held in spaced relation thereby. The ribs illustrated in Fig. 1 are preferably of the so-called keystone shape, which is peculiarly advantageous for my purpose. Said ribs are laterally spaced a distance approximately equal to the length or width of the sound absorbing slabs or tiles it is desired to use or which construction requirements may dictate. The metal sheet, having a plurality of such ribs, may be fastened to the ceiling or wall 10 by any suitable means, such as nails 13. Screws or bolts may be used, depending upon the nature of the wall or ceiling. The ribs are arranged to project away from the wall or ceiling.

After a section of ribbed sheet metal 12 has been mounted and while the ribs 11 are free, slabs of sound absorbing material 14, if very stiff, are slid longitudinally into place and wedged therein between an adjacent pair of ribs. Additional fastening means 15 may be used if desired if the material is of a character which permits such use. If the slabs are of the proper size their exposed surfaces will coincide with the bottom or under surfaces of the ribs 11 and a substantially plane surface will be presented to the eye. The sound-absorbing slabs may be of stiffened felt, wood fiber insulating boards, ceramic tile, asbestos or mineral wool composition boards, or any other suitable material.

It is possible also to use sound-absorbing material faced with perforated metal sheets as described and claimed in Norris Patent No. 1,726,500 issued August 27, 1929.

It is possible also to position screening, stiff perforated sheet material of veneer, vulcanized rubber, vulcanized fiber, condensation products and the like, between the ribs 11 in such manner that the facing membrane will be held in proper position. The loose, highly efficient sound absorbing material is placed upon this facing membrane or otherwise supported behind the same. In Fig. 1, spacing strips 16 or blocks are shown which are forced between

the wall and the sound absorbing material after the latter is in place to maintain the relative position of the parts.

It will also be noted that if the clearance between the sound absorbing material and the metal sheet 12 is sufficient, and if the inclined sides of the keystone ribs have the proper slope, the slabs of sound absorbing material may be lifted into place by holding the same in inclined position with reference to the ceiling or to the wall, and inserting first one side and then the other, to permit said slab, which is of greater width than the distance between the keystone ribs, to be introduced between said ribs adjacent the sheet metal backing 12, and then moved away from said backing to the position shown in Fig. 1, where it may be wedged in place by the spacers 16. This is convenient in locations where there is no room available to slide the slab in place longitudinally, particularly where the slab represents the last one of a series of aligned slabs and completely fills the remaining space available.

The construction shown in Fig. 2 is especially adapted for use with material that is faced with perforated sheet metal. The ribs, instead of being keystone-shaped are preferably in the form of inverted T's 17. The plain perforated metal plates 18 are placed upon the ledges formed by the end portions or heads of the inverted T's and the sound absorbing material 19 is placed upon the plates 18.

Said metal plates, it will be seen, are wider than the distance between the enlargements or heads of adjacent parallel ribs, but not as wide as the distance between the webs of said T shaped ribs. Thus, under proper conditions, said perforated plates may be positioned by introducing them between said ribs in diagonal position as previously described and thereafter lowering them to final position as shown in Fig. 2, assuming that the installation is for a ceiling. If the space beyond the ends of said ribs is unobstructed, said perforated metal plates may be slid into place in the manner described in connection with Fig. 1, and under these conditions said perforated plates may be made sufficiently wide to prevent of their removal except by an operation the reverse of that which effected their installation. In other words, said perforated plates may be wider than the distance between the vertical web of one rib and the adjacent inner surface of the enlargement or head on the next rib parallel thereto. The sound absorbing material is preferably slipped into place after the perforated plate has been positioned, although with sufficient clearance behind it, said plate with the sound absorbing material on it may be inserted as a unit. If the sound absorbing pad and the perforated metal facing are constructed as a unit, as for example where the two are caused to adhere to each other, they would necessarily be installed as a unit.

The necessity for bending the edge portions of the plates to form pan-like shapes, as described in Patent 1,726,500, is obviated. The perforated sheet material may be used in the form of strips, the lengths of which are only limited by the length of supporting sheet material 12, the ease of handling and the accuracy with which the sheets of the latter material are lined up. The use of the larger sheets 18 has the advantages of lower cost and increased regularity of wall or ceiling surface.

Fig. 3 shows a modification of the construction shown in Fig. 2. In Fig. 3 the strips of perforated sheet material 20 are shown in channeled form, being provided with angular flanges 21 which fit over the end portions of T-shaped ribs 17. This latter construction possesses the advantage that it presents a plane surface to the eye while that shown in Fig. 2 presents a ribbed surface. The construction of Fig. 3, however, has the disadvantage that the edges of the sheets must be flanged upwardly and outwardly.

The sound absorbing material and supporting perforated sheet material may in this case also be installed in any one of the several ways previously described.

Although in the three forms illustrated the ribs are formed as an integral part of the metal backing, they may of course be formed separately if desired, and secured in any one of a number of different ways. Fig. 6 shows an arrangement in which the keystone shaped rib 22 is separately formed and riveted, spot welded or otherwise secured to the sheet metal backing 23. In Fig. 7 the rib 24 has a section of a small I-beam and is riveted, spot welded or otherwise secured to the sheet metal backing 23, and in Fig. 8 the rib 25 also has the general cross section of an I-beam but is formed of sheet material, preferably metal, and similarly secured to the sheet metal backing 23.

The exposed outer ends of the ribs in all of the foregoing structures present a smooth unbroken surface except where the end of one unit joins another unit and shows a dividing line. Under some conditions where appearances are a less important consideration, the exposed ends of said ribs may be detachably secured to the webs as by screwing on or otherwise securing a strip of metal to the web, thus facilitating the installation or removal of the sound absorbing material.

When my improved construction is applied to vertical walls it is necessary to employ means for maintaining the exposed surface in the desired plane. This may be done by causing the sound absorbing material to fit snugly against the wall surface in order that the engaging portions of the sound absorber or the metal facing press against the cooperating portions of the supporting ribs, or spacing strips or blocks may be used as in Fig. 1, for example. It will be understood also that suitable spacing strips or blocks may be used in connection with the structure of Figs. 2 and 3. It will also be understood that slabs of sound absorbing material such as shown in Fig. 1 may be supported by ribs of the type shown in the other figures, for example. In other words, the structural features shown in connection with any one or more of the various figures need not necessarily be used in connection with the remaining structural features disclosed therein, but may be combined with parts of the structures shown in other figures or in various other relations which suggest themselves in view of the disclosure made herein.

The edge portions of sound absorbing pads or slabs such as shown in Fig. 1, may be glued to the ribs if desired, particularly where the pads or slabs are mounted in vertical or inclined position. In Fig. 4 showing a bottom view of the assembly of Fig. 1, said pads or slabs are shown as rectangular in shape, and arranged with their ends in alignment. They may of course be square or of less length and width and may have a staggered arrangement if desired. The metal

faced sound absorbing material in Fig. 5 is shown as squares by way of illustration but may be otherwise shaped. In fact, said perforated metal need not necessarily be flat but may be curved along the arc of a circle where the treatment is applied to an arched roof or ceiling or may be otherwise shaped to conform to the decorative design of the surroundings.

In general, various changes may be made in the structures shown herein without departing from the spirit of the invention as expressed in the appended claims.

I claim:

1. The combination with the wall or ceiling of a room, of a sound absorbing construction comprising a stiff metallic plate having openings therein, fastening means passing through said openings to secure said plate to said wall or ceiling and to permit removal thereof, spaced, parallel, laterally extended ribs on said plate, projecting into the room bounded by said construction, and slabs of preformed sound absorbing units mounted between said ribs with a clearance between said slabs and said plate, and held against outward movement by the extended portions of said ribs, but not confined against inward movement thereby.

2. As a new article of manufacture, a sound absorbing construction comprising a sheet metal backing preformed with accurately spaced ribs thereon and means for fastening the same to a ceiling, said ribs having lateral enlargements forming supports, perforated sheet material of uniform width resting horizontally on said supports and sound absorbing material resting on said perforated sheet material, the latter being narrower than the distance between a rib and the adjacent edge of the lateral enlargement on the next adjacent rib, whereby said perforated sheet material and said sound absorbing material may be inserted diagonally between said ribs in installing the same.

3. A sound absorbing construction comprising a series of members provided with a backing for holding said members in parallel relation and forming therewith a readily installable supporting unit for sound absorbing material, preformed units of sound absorbing material spaced from said backing, disposed between adjacent parallel members and confined thereby against movement outwardly but not inwardly, and spacing members insertable between said sound absorbing units and said backing to obstruct inward movement.

4. A sound absorbing construction for surfaces such as walls and ceilings comprising a stiff metallic plate having means for attaching it to said surface, and having spaced, parallel, keystone shaped ribs, said ribs being adapted to project into the room bounded by said construction, and slabs of preformed sound absorbing units mounted between said ribs, having bevelled edges to fit the same and held in place by the flaring portions thereof at a distance from said plate, whereby said slabs may be moved toward said plate to disengage them from said ribs.

5. As a new article of manufacture, a sound absorbing construction comprising a preformed supporting member with a series of parallel securing members thereon, said securing members having lateral enlargements forming supports, sound absorbing units resting in horizontal position on said supports, said units being narrower than the distance between a securing member and the adjacent edge of the next adjacent lateral enlargement, whereby said units may be inserted diagonally between said securing members in installing the same.

CHARLES F. BURGESS.