This invention relates to building constructions, and has reference more particularly to building constructions in which units of acoustical materials are provided for ceilings and walls of a room for correcting the acoustics in the room and reducing the amount of reverberation of sound.

It has been found in the application of acoustical materials to the ceilings and walls of buildings, said materials consisting of perforated metal membranes backed by a fibrous sound absorbing material, that considerable time and expense are necessary in erecting the construction. It has been found desirable to have acoustical units consisting of perforated metal backed by sound absorbing fibrous pads, which can be assembled at the factory and quickly snapped into place at the job with a minimum of erection cost.

An object of this invention, therefore, is to provide a construction in which units of perforated membranes with sound absorbing backing pads of fibrous material are assembled at the factory and are shipped to the job in assembled condition to be easily and quickly snapped into place between suitable supporting runners with a minimum of labor and trouble in erection; also to improve building constructions in other respects hereinafter specified and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which

Fig. 1 is a perspective view of the preferred form of my invention, showing an acoustical unit.

Fig. 2 is a sectional elevation through the building construction, including the acoustical unit shown in Fig. 1.

Fig. 3 is a large scale, sectional elevation through a portion of the construction shown in Fig. 2.

Fig. 4 is a perspective view of a modified form of the perforated membrane with supporting structures for holding the sound absorbing pad.

Fig. 5 is a sectional elevation through the modified form of building construction shown in Fig. 4.

Fig. 6 is a perspective sectional elevation showing the form of construction shown in Figs. 4 and 5, and

Fig. 7 is a sectional elevation through a further modified form of acoustical unit.

In constructing my improved acoustical unit, I employ a perforated metallic membrane 10 which may be square or rectangular in outline, and is provided with a large number of small openings 11, which may be triangular in shape and cover the entire face of the membrane to permit the passage of sound waves through the holes. Other shaped holes may be used than triangular, such as slots, round holes, or other desired designs.

The edges of the membrane are formed into inwardly extending, beveled sections 12 which terminate in inwardly extending flanges 13 extending at right angles to the membrane 10. In order to support an absorbing pad 14 of mineral wool, hair felt, or other acoustical absorbing material, metal strap bars 15 are formed with transversely extending ears or flanges 16 at each end, which are arranged to engage in loops 17 struck out from the metal of the membrane flanges 13. Each of the ears 16 has a struck-out locking lug 18 formed on the extreme end thereof for the purpose of entering into locking engagement with the inner edge of the loop 11. Prongs 19 are struck outwardly at right angles from the body of the strap 15, said prongs being arranged to extend into the acoustical pad 14 and prevents transverse movement of said pad. U shaped wires 20 have inwardly extending legs 21 which terminate in outwardly extending pivot sections 22 for engaging in pressed out annular recesses 23 formed in opposite pairs of flanges 13. The wires 20 are snapped into the recesses 23 by depressing the legs 21, and said wires press lightly against the top of the acoustical pad 14 so as to hold said pad in position on the straps 15.

In order to attach the acoustical unit formed by the membrane 10 and pad 14, to a building surface, as to a ceiling 24, a plurality of U shaped runners 25 are preferably rolled of sheet metal and are provided with flanges 26 which may be attached to the ceiling surface 24, as by nails 27. The runners 25 are also provided with outer flanges 28 which are spaced apart from the building surface 24. Attaching flanges 29 are struck out from each end of the straps 15 and extend inwardly at an acute angle thereto, terminating in inwardly extending angular flanges 30, which extend at an acute angle to the membrane 10. As seen in Fig. 3, as the unit is moved upwardly between flanges 28 of adjoining runners 25, the flanges 30 are first pressed inwardly by the edges of the flanges 28 and then snap outwardly again to lock on top of said flanges 28. As an alternate method of erection, (Fig. 2) the unit may be moved slightly to the left with the flange 30 resting on top of the flange 28 and then right-hand end of the unit may be moved upwardly and then the entire unit translated to the right until both of the opposed flanges 30 rest upon the top of the corresponding runner flanges 28.

In the modified form of the construction shown in Figs. 4, 5 and 6, a perforated metal membrane 32 has beveled edge flange 33 terminating in
flanges 34 which extend at right angles to the membrane 32. On two opposite sides of the membrane, integral flanges 35 are connected to the flanges 34 and extend inwardly parallel to the membrane 32. The flanges 35 are bent outwardly to form flanges 36, each of which has a pair of outstanding lugs or flanges 37 for the purpose of being bent at right angles during assembly of the units to form flanges 38 which engage the inner surface of an acoustical pad 39.

A plurality of openings 40 is formed in each of the flanges 36, and straps 41 are formed at each end with outwardly extending legs 42 which are secured to the flanges 36 adjacent the openings 40, as by spot welding or rivets 43. The legs 42 have an inclined catch section 44 extending outwardly through each of the openings 40, and having an inwardly extending flange 45 for engaging on top of flanges 46 formed on H shaped runners 47, the latter being secured to the ceiling surface 48.

The form of construction shown in Fig. 7 resembles the construction shown in Figs. 4, 5 and 6, except that less height is required for an acoustical unit than for those previously described. This reduction in overall height is accomplished by forming a reverse bend 49 in strap 50 adjacent the snap openings 51 in membrane flanges 52. The reverse bend 49 is secured, as by spot welding 53, to the flange 52 so that the strap 50 lies fairly close to the membrane 32, and in spaced, parallel relation, thereto.

I would state in conclusion that while the illustrated examples constitute practical embodiments of my invention, I do not wish to limit myself precisely to these details, since manifestly, the same may be considerably varied without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In an acoustical building construction, a plurality of runners attached to a building surface in spaced, parallel relation, a plurality of perforated membranes removably secured to said runners, straps extending across a membrane, an absorbing pad supported by said straps, and metallic means for attaching a pad to the straps of a membrane to form an acoustical unit.

2. In an acoustical building construction, a plurality of perforated, metal membranes having transversely extending, edge flanges, struck out loops in said flanges, straps extending across said flanges and having transversely extending ears engaging behind said loops, a sound absorbing pad supported on said pads, prongs struck out from said straps and engaging said pad, means for securing said pad to said straps to form an acoustical unit, runners, and flanges formed on said straps and engaging said runners so as to attach said unit to said runners.

3. In an acoustical building construction, a building surface, a plurality of runners secured to said surface in spaced, parallel relation, said runners having outstanding flanges, perforated metal membranes arranged in a plane adjacent said runner flanges, straps extending across outstanding flanges formed on a membrane, outstanding resilient latch flanges formed on each strap and arranged to secure said membranes to said runner flanges, and a sound absorbing pad secured to said straps.

4. In an acoustical building unit, a perforated metal membrane having outstanding peripheral flanges, offset outstanding flanges formed on said peripheral flanges, said offset flanges being provided with openings, straps extending across said membrane and attached to said offset flanges, latch flanges formed on said straps and extending into said openings so as to latch said membrane to building structures, and a sound absorbing pad supported by said straps.

5. In an acoustical building unit, a perforated metal membrane having outstanding edge flanges, straps extending across and secured to said edge flanges and having latch flanges for attaching said membrane to a building structure, a sound absorbing pad supported on said straps, and transversely extending flanges formed on said edge flanges and confining said pad on said straps to form an assembled acoustical unit.

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