June 11, 1946. C. B. BURNETT ET AL 2,401,906

SOUND-ABSORBING TREATMENT

Filed Aug. 27, 1942

Fig. 1.

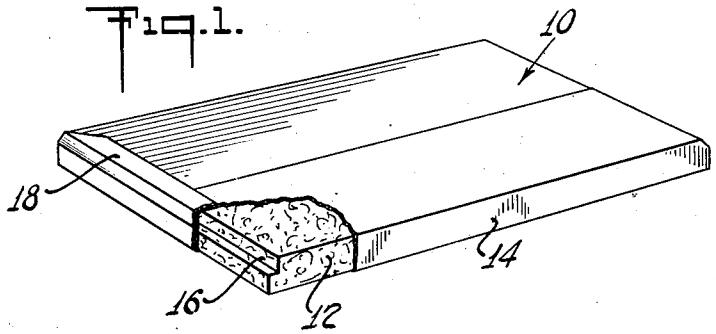


Fig. 2

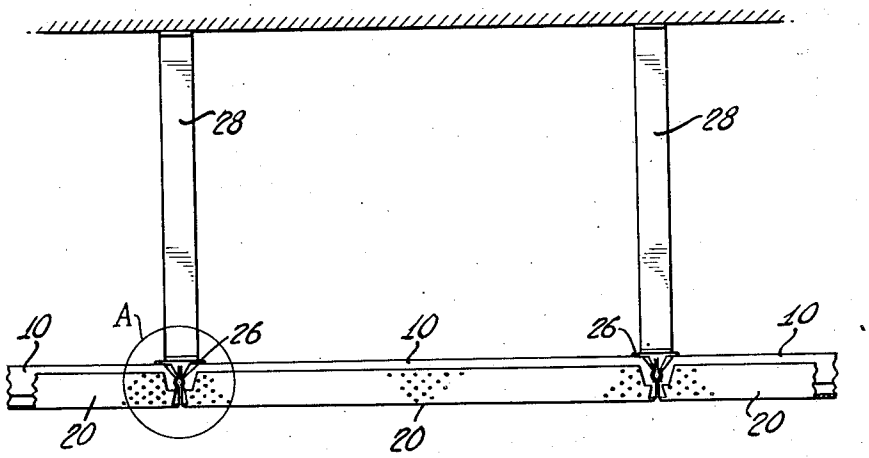
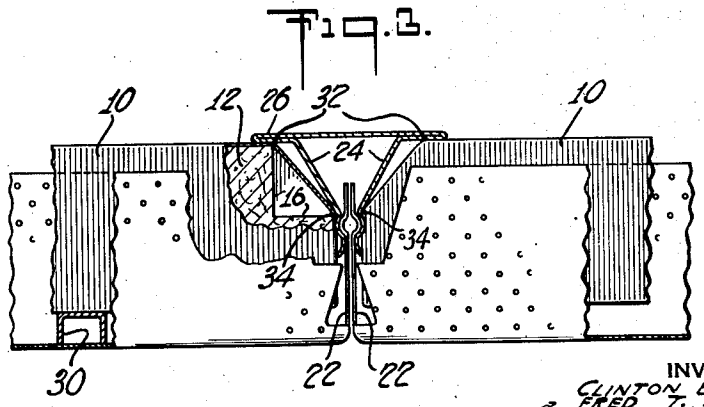


Fig. 3.



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2,401,906

SOUND-ABSORBING TREATMENT

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6 Claims. (Cl. 20—4)

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The present invention relates to acoustical constructions, and, more particularly, to improved sound-absorbing units for use in a sound-absorbing treatment of generally conventional type.

Heretofore, an acoustical treatment has been applied to walls, ceilings, and the like, the treatment including a perforated facing element supported from the ceiling or wall by parallel supporting members or T-bars, the perforated facing element carrying a sound-absorbing unit. A construction of this type which has achieved outstanding commercial success is disclosed in patent to Norris No. 1,726,500, issued August 27, 1929. As shown in the patent, the perforated facing element preferably takes the form of a plurality of metal pans, having vertical end flanges inserted between opposed flanges of the T-bars and supported thereby. The pans contain individual, fibrous, sound-absorbing units or pads.

The principal object of the instant invention is the provision of an improved unit for sound-absorbing treatments of the type referred to above.

Another object of the invention is the provision of a unit having a higher sound-absorbing efficiency than those heretofore proposed.

In the present commercial treatments, the units include a pad formed of a suitable felted material, such as felted mineral wool, and an enclosing wrapper, which, in addition to other functions, serves to prevent breathing through the pad; that is, the passage of air through the pad upon variations in pressure above and below the acoustical treatment. Due, however, to the character of the felted material, the units cannot ordinarily be made to such accurate dimensions as to fit the metal pans closely enough to insure that there will be no movement of air between the units and pan walls, particularly at the ends. Accordingly, a further object of the invention is the provision of a unit or pad susceptible to accurate dimensioning to secure a close fit within the pan when the same is supported by the T-bars.

A still further object of the invention is the provision of a pad having an improved end construction to insure an air seal between the ends of the units and the T-bars.

Another object of the invention is the provision of a unit including a cover member or wrapper which may be readily assembled.

Our invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description thereof which is to follow and to the accompanying drawing, in which:

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Fig. 1 is a perspective view, with portions broken away for purposes of illustration, of an acoustical unit in accordance with the invention;

Fig. 2 is a sectional view taken through a portion of a room ceiling, illustrating the application of the units as a component of an acoustical treatment; and

Fig. 3 is a detail view on an enlarged scale of the portion indicated at A in Fig. 2.

Referring now to the drawing, and particularly to Fig. 1, an acoustical unit 10 in accordance with the invention comprises a felted pad 12 enclosed in a wrapper 14. Pad 12 is, in accordance with the preferred embodiment, composed of interfelted mineral wool fibres having a suitable binder dispersed throughout the felt. Suitably, the pad is formed by a process as shown in reissue patent to Powell No. 22,090, dated May 5, 1942, wherein a layer of felted fibres carrying an intermingled, preferably heat-setting binder, such as a drying oil, is compressed to the desired density and the binder set by the application of heat, whereby a very resilient felt results. For the purposes of the present invention, the felt is compressed and the binder set while the felt is under compression to obtain a final product of a density of the order of 8 to 16 pounds per cubic foot. The resultant pad is resilient and shape retentive, and, due to its relative rigidity, may be dimensioned within reasonably accurate limits.

Pad 12 is provided with a stepped end edge 16 (see Fig. 1), the step being located approximately midway of its thickness. Wrapper 14 comprises a bag formed to accurate dimensions and having a cross section, when fully opened, slightly smaller than the normal cross sectional area of the pad, whereby when the bag and pad are assembled, the latter is maintained under slight compression.

The pad 12 may be assembled with the wrapper or bag 14 in any suitable manner. For example, the bag may be held with its mouth distended, the pad slightly compressed between two surfaces and slid into the open mouth of the bag, the bag expanding throughout its length as the pad enters. The bag may then be sealed by cementing a suitable closure flap, as indicated at 18, over the open bag end. Due to the compression of the felt and its property of resiliency, the bag is expanded and the ends are pulled across the stepped ends of the felt, as illustrated.

Unit 10 is preferably employed in acoustical treatment of the generally conventional type described in patent to Norris No. 1,726,500, previously referred to. A treatment of this type (see Figs. 2 and 3) includes perforated pans 20 having

end flanges 22 received between the converging arms 24 of T-bars 26. T-bars 26 are, in turn, supported from the ceiling or base wall by any suitable means, such as straps 28. A unit 10 is placed in each pan 20 and supported therein on members 30, the members serving to space the unit from the forward face of the pan. The stepped end edges of the pads cause the wrapper to contact the T-bars as shown, particularly, in Fig. 3 at 32 and 34 to form lines or planes of contact, whereby a positive air seal is provided to prevent breathing between the ends of the units and the T-bars. Due to the relatively accurate dimensioning of the pads, permitted by the character of the felted material of which they are composed, the side edges of the units lie closely adjacent the side flanges of the pans, and breathing at these points is, hence, likewise prohibited.

In addition to the advantages referred to above, a unit in accordance with the instant invention is more resistant to deformation or distortion during handling and transportation than those heretofore provided due to the character of the felt of which it is composed and to the closely confining wrapper. Also, the pads have a higher sound-absorbing efficiency than pads heretofore employed.

Having thus described our invention, in rather full detail, it will be understood that these details need not be strictly adhered to, but that various changes and modifications will suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What we claim is:

1. A sound-absorbing unit for mounting in a pan supported by spaced T-bars, said unit comprising a preformed, resilient, self-sustaining, fibrous pad having opposed faces, said pad having marginal portions cut back from one face thereof to define corners at said one face and at a point intermediate said opposed faces, said pad being maintained under slight compression by a flexible wrapper whereby distortion forces applied against said unit are yieldingly resisted and said wrapper is distended by the resiliency of the pad and drawn across said corners to define lines of contact with said T-bars.

2. A sound-absorbing unit for mounting in a pan supported by spaced T-bars, said unit comprising a self-sustaining, mineral wool pad having a binder in minor proportions distributed throughout the pad, said pad including opposed faces and having marginal portions cut back from one of said faces to define corners at the said one face and at a point intermediate the opposed faces, said pad being maintained under slight compression by a flexible wrapper whereby distortion forces applied against said unit are yieldingly resisted and the wrapper is distended by the resiliency of the pad and drawn across said corners to define lines of contact with the T-bars.

3. A sound-absorbing unit for mounting in a pan supported by spaced T-bars, said unit comprising a preformed pad composed of inter-felted mineral wool fibers and containing a thermo-set binder in minor proportion distributed substantially uniformly throughout the pad, said binder maintaining said fibers in inter-felted relationship to impart resilient, distortion-resistant characteristics to said pad, said pad having marginal end portions cut back from one face thereof to define stepped end edges, and a flexible bag-type wrapper enclosing said pad and maintaining the same under compression, said wrapper being distended by the resiliency of said pad and drawn across said stepped end edges to define lines of contact with said T-bars.

4. A sound-absorbing unit for mounting in a pan supported by spaced T-bars, said unit comprising a resilient pad of felted mineral wool fibers and an interspersed binder, said pad having a density of the order of 8–10 lbs. per cu. ft. and having marginal portions cut back from the rear face thereof to define stepped end edges, and a flexible bag-type wrapper enclosing said pad and maintaining the same under compression, said wrapper being distended by the resiliency of said pad and drawn across said stepped end edges to define lines of contact with said T-bars.

5. A sound-absorbing treatment comprising a series of parallel T-bars, pans having forward faces forming the visual surface of said treatment, said pans being supported by said T-bars, and sound-absorbing units in said pans with their ends adapted to contact said T-bars, each of said units comprising a resilient, preformed, felted pad having an end marginal portion thereof at the face remote from the forward face of the pan cut back to form a stepped end edge, and an enclosing flexible wrapper maintained in distended shape by said pad and forced into contact with said T-bar at said stepped end edge.

6. A sound-absorbing treatment comprising a series of parallel T-bars having downwardly converging locking flanges, pans having forward faces forming the visual surface of said treatment and including end walls received between said locking flanges, and sound-absorbing units in said pans with their ends adapted to contact said T-bars, each of said units comprising a resilient pad of felted mineral wool fibers and an interspersed binder, said pad having marginal end portions cut back from the rear face thereof to define stepped end edges, and a flexible bag-type wrapper enclosing the pad and maintaining the same under compression, said wrapper being maintained in distended shape and forced into contact with said T-bars at said stepped end edges by said pad.

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