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3,049,204

ACOUSTICAL SUSPENSION SYSTEM INCLUDING ACOUSTICAL PAN

Filed April 20, 1959

FIG. 1

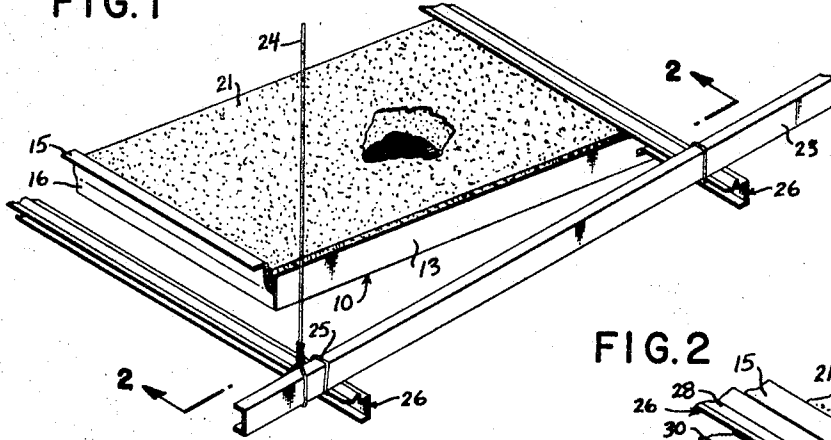


FIG. 2

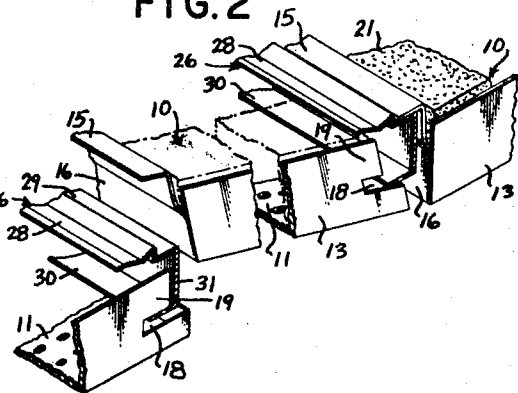


FIG. 3

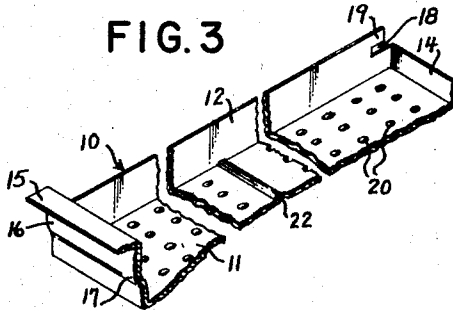


FIG. 4

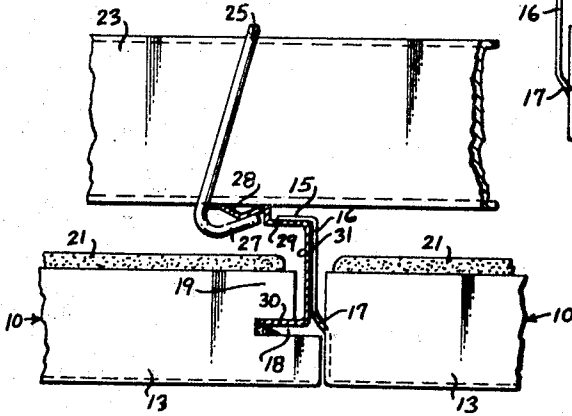
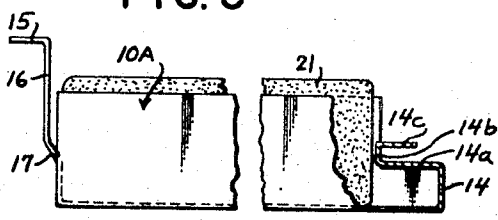


FIG. 5



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3,049,204 ACOUSTICAL SUSPENSION SYSTEM INCLUDING ACOUSTICAL PAN

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4 Claims. (Cl. 189—85)

The present invention relates to suspended ceiling systems in which the expanded ceiling is made up of multiple panels and the suspension means is completely hidden from view from below, and more particularly to the incorporation of an improved acoustical pan in the type of suspension system disclosed in my copending application, Ser. No. 601,262, filed July 31, 1956, now Patent No. 2,894,291.

As pointed out in said application, the present architectural trend is toward overhead application of utility lines in the space above a suspended ceiling with the result that access to power or telephone wires, plumbing, etc., in this space is required on occasion. Also, it is commonly desired to shift the ceiling lights to better meet the requirements of new tenants. Thus, the advantage attendant upon providing ready individual removal of the ceiling panels without damaging them is considerable.

One popular form of acoustical ceiling panel is a perforated sheet-metal pan carrying a sound-absorbing pad such as of fiberglass. Prior to my invention acoustical pans have been of the snap-in type giving poor accessibility because of the difficulty in removing them without bending the pan or tearing through its perforations. A further difficulty has been the fact that the runners used to support the prior art acoustical pans are not suitable for the support of conventional kerfed acoustical tiles and hence an interchange of pan and tile has not been possible on the same system.

Accordingly, the present invention aims to provide an improved acoustical pan which is interchangeable with standard acoustical tile and related hangers in my suspension system of the aforesaid copending application.

More generally, a principal object of the invention is to provide an improved suspended ceiling system which includes an acoustical pan of simple and economical construction which can be quickly and easily removed for access without damage thereto.

Other more particular objects and advantages will, together with this general object, appear and be understood in the course of the following description and claims, the invention consisting in the novel construction and in the adaptation and combination of parts hereinafter described and claimed.

In the accompanying drawings:

FIG. 1 is a top perspective view, partly in vertical section, illustrating my system in operation and with one pan partially removed.

FIG. 2 is an enlarged fragmentary vertical sectional view taken generally as indicated by line 2—2 of FIG. 1.

FIG. 3 is a fragmentary longitudinal vertical sectional view of my pan.

FIG. 4 is an enlarged fragmentary vertical sectional view along one of the longitudinal side edges of the pans in the ceiling installation and with the runner in transverse vertical section.

FIG. 5 is a fragmentary longitudinal vertical sectional view of a modified pan.

Referring to the drawings it is seen that my acoustical pan is designated 10 and comprises a perforated panel 11 which has upturned longitudinal side flanges 12—13, a lower upturned back flange 14, and a hanger at the front. This hanger has a top horizontal support tab 15 joined to the panel by a standing flange 16 which has a central forward jog 17. At the level of the bottom of this jog 17 and above the back flange 14, the rear ends of the side

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flanges 12—13 are kerfed at 18 and backcut to provide rear support lips 19. The perforations 20 in the panel 11 may be arranged in any desired pattern for design effect and permit the passage of sound to a sound-absorbing pad 21 resting on the pan as is standard in the acoustical pan art. The panel surface may be subdivided by scoring 22 to simulate the juncture of two pans.

The suspension system for my acoustical pan may utilize conventional channel headers 23, commonly known as lather's channel, which are usually regularly spaced in parallel relation across the ceiling space and are suspended from the overhead structure as by hanger wires 24. Clamped to and beneath these headers by wire clips 25 are runners 26 of a general channel configuration. The clips 25 are formed of single strands of wire and are of general U-shape for straddling a header 23. At its ends each clip has foot prolongations 27 bent back at an acute angle to the plane of the clip proper. As best shown in FIG. 4, these feet 27 are adapted to grip a generally V-shaped upper step 28 formed in runner 26 and press the edges of the step up against the underside of a header 23.

Continuing to further details of the runner 26, it is seen that each is of a general channel shape having a stepped upper flange formed by upper step 28 and a flat lower step 29, a lower flange 30, and an upright web or center section 31 extending between the lower step 29 and the lower flange 30. The latter is designed to fit into the kerfs 18 at the back of the pan and engage the underedge of the lips 19 to support the back end of the pan, and the lower step 29 of the upper flange is provided to receive the hanger tab 15 for supporting the front end of the pan. For installation and removal purposes, as will hereinafter be brought out, the vertical width of the kerfs 18 into which the lower flange 30 is received is intentionally greater than the thickness (gauge) of the flange. It will be noted that the height of the front tab 15 above the level of the kerfs 18 is made to correspond to the height of the runner web 31 so that the pan will be level. Also, the steps 28—29 should have a vertical spacing exceeding the thickness of the hanger tab 15 so that the latter is free to move lengthwise along the lower step 29 and the supporting runner 26 and beneath the channel headers 23 to which the runner is clipped.

To erect the suspension system the headers 23 are first suspended as by the wire hangers 24 in parallel level relation at intervals normally from two to four pan widths. The runners 26 are then secured by the clips 25 to the headers in crosswise relation thereto and separated the length of one panel 11 from each other. With the headers and runners thus fixed in position, the next step is the actual installation of the pans 10.

To install one of my pans it is first tilted at an angle with its front hanger end uppermost so as to clear the runners, and the pan is then raised through the opening between two runners until the kerfs 18 at the back are on the same level as the bottom flanges 30 of the runners. For ease of description consider the front face of a runner as being the face of the central web 31 from which the flange 30 projects and the back face as being the other face of the web. Also, let the runner which lies proximal to the elevated front end of the tilted pan now under discussion be termed the front runner, and the runner which lies proximal to the lower back end of the pan be termed the back runner. With the tilted pan elevated as aforesaid, the applicator slips the kerfs 18 at the back onto the bottom flange 30 of the back runner as shown in FIG. 2. Then he allows the front end of the pan to drop into place, its front flange 16 sliding downwardly relative to the back face of the front runner until the hanger tab 15 comes to rest upon the lower step 29 of the front runner. In the course of this down-

ward movement of the front end of the pan, it will be apparent that the pan will have performed a swinging action with the fulcrum of the pivot being the lower back corners of the lips 19. This fulcrum gradually moves rearwardly along the upper face of the lower flange 30 of the back runner as the pan pivots to a level position. The significance of having the vertical width of the kerfs 18 greater than the thickness of the bottom runner flange 30 which is received therein will now be apparent, the greater width permitting the pan to partake of such pivotal action. The pan should then be adjusted horizontally so that the back face of the rear flange 14 of the pan will occupy a projected position rearwardly slightly beyond the back face of the back runners corresponding in distance to the horizontal extent of the jog 17 in the front flange 16. It will be noted that this horizontal extent is less than the backcut of the lips 19 by an amount sufficient to provide enough gap between such lips and the front face of the related back runner to permit the pan to be tilted at its front end should it be later desired to remove the pan by reversing the application procedure.

Referring to FIG. 1 it can be seen that any pan which is to lie in part beneath a header 23 must be first placed in position alongside of the header and then be slid sideways with its front hanger tab 15 along the lower step 29 of the front runner and with the lips 19 of its back end along the bottom flange 30 of the back runner to bring the pan beneath the header 23.

Thus it is seen that if access is required to the space above one of the pans 10, the pan can be readily removed by pushing up the front end of the pan to elevate the tab 15 free of its runner 26 and then shifting the pan forwardly while in its tilted position so as to free the back lips 19 from the bottom flange 30 of the other supporting runner. If the pan to be removed lies partially beneath one of the headers 23 it is necessary to first remove one of the pans against which its longitudinal side edges abut, shift the pan sidewise from beneath the header, and then remove it as just described.

The vertical distance from the bottom edge of the back support lips 19 to the ceiling surface of the panel portion 11 of the pan is preferably made in correspondence with the distance from the underside of the upper lip to the ceiling surface of standard kerfed acoustical tile so that such tile will be interchangeable with my acoustical pans by the use of the hanger means disclosed in my aforesaid copending application.

It will be noted that the jog 17 in the front hanger of the pan is designed to place the upper portion of the flange 16 against the back face of the related runner while permitting the rear end of the next forward pan to override such face. This facilitates pan removal and at the same time aids in the attainment of proper gauging of the runners and snug end abutment of the pans.

In FIG. 5 I have shown a modified pan 10A in which the back lips 19 have been eliminated and functionally replaced by an extension 14a-c of the back flange 14. This extension bends forwardly by portion 14a, then upwardly at 14b for a relatively short distance and finally bends rearwardly by a terminal lip 14c. Thus there is formed a back kerf 18a corresponding to the kerf 18. In all other respects the pans 10-10A are identical, and hence the same identifying numerals have been applied to corresponding parts. The installation and removal steps of the modified pan 10A are the same as those afore-

described with the transverse lip 14c taking over the function of the lips 19.

Acoustical pans are normally stamped from sheet metal, but it is not my intention to limit the pans of the present invention to such material since the pans can also self-evidently be formed from suitable plastics.

The advantages of the invention, it is thought, will have been clearly understood from the foregoing detailed description of the illustrated preferred embodiments. Minor changes will suggest themselves and may be resorted to without departing from the spirit of the invention, wherefor it is my intention that no limitations be implied and that the hereto annexed claims be given a scope fully commensurate with the broadest interpretation to which the employed language admits.

What I claim is:

1. In a ceiling suspension system, a pan having a panel with an upstanding front hanger flange, a pair of upstanding longitudinal side flanges, and an upstanding back flange, said hanger flange having a forwardly projecting hanger tab, and said side flanges having respective forwardly extending kerfs in the rear end thereof at a level above the top of said back flange thereby providing lips above said kerfs, said hanger tab being located above the level of the upper extremity of said lips, and said lips terminating at their rear ends forwardly of the rear end of said panel.

2. The structure of claim 1 in which said panel has multiple holes therethrough, and an acoustical pad covering said panel and surrounded by said front, side and back flanges.

3. In a ceiling suspension system, a pair of front and back parallel spaced runners each having a bottom support flange and a top flange spaced thereabove and stepped to provide a lower step and an upper step, and a pan having a panel with an upstanding front hanger flange, a pair of upstanding longitudinal side flanges, and an upstanding back flange, said hanger flange having a forwardly projecting hanger tab resting on said lower step of the front runner, said side flanges having respective forwardly extending kerfs in the rear end thereof at a level above the top of said back flange thereby providing lips above said kerfs, said lips terminating at their rear ends forwardly of the rear end of said panel and resting on said bottom support flange of the back runner with the underlying rear end portion of the panel covering the back runner from below, all of said pan being located beneath the level of said upper step, and of said kerfs being greater than the vertical thickness of said bottom support flanges whereby said pan can be tilted for removal from said runners.

4. The structure of claim 3 in which said panel has multiple holes therethrough, and an acoustical pad covering said panel and located at the rear beneath said top flange of the back runner.

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