

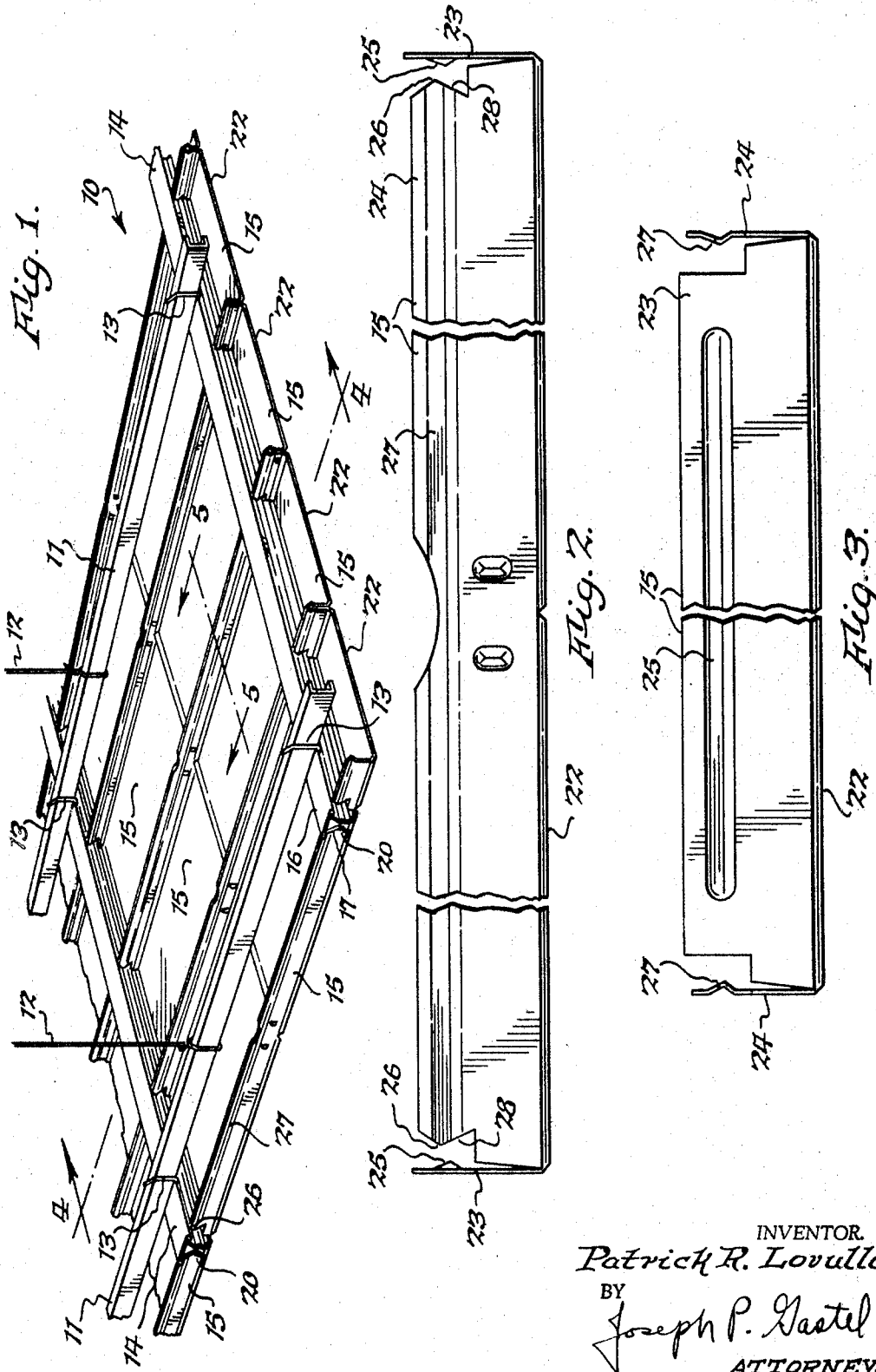
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P. R. LOVULLO  
CEILING CONSTRUCTION

3,461,630

Filed Dec. 7, 1964

2 Sheets-Sheet 1



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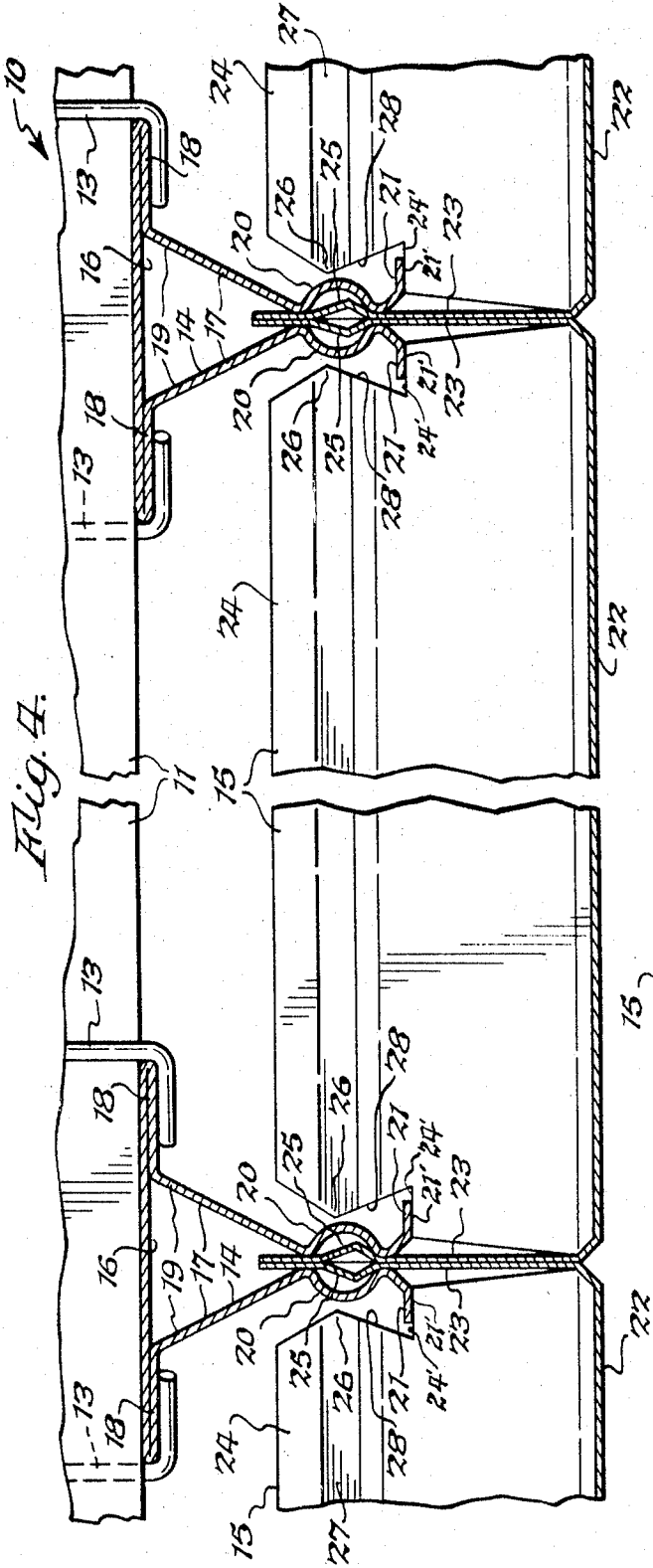


Fig. 4.

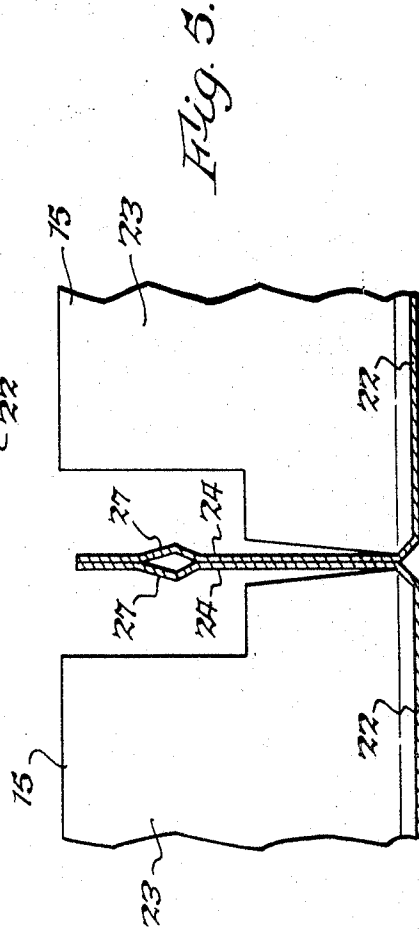


Fig. 5.

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## CEILING CONSTRUCTION

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8 Claims

### ABSTRACT OF THE DISCLOSURE

A ceiling pan construction including a face with both end flanges and side flanges extending perpendicularly therefrom, embossments in said end flanges for releasably engaging mating portions in legs of associated T bars, and apices on the ends of said side flanges lying substantially abreast of and facing said embossments for engaging said legs of said T bars in the event said T bars move out of engaging relationship with said embossments.

The present invention relates to an improved ceiling pan and ceiling construction incorporating such pans.

The use of ceiling pans and T bars to provide a ceiling construction is well known. Ceiling pans have a face portion and a pair of upstanding end flange portions and a pair of upstanding side flange portions. The end flange portions have embossments therein which are received in detent holding relationship in bulb portions of spaced legs of adjacent structural members commonly called T bars. However, in the event of a fire in ceiling constructions of the foregoing type, the T bars may become distorted so that the legs thereof move out of engagement with the flanges of the pans to release the detent holding engagement and permit the pans to drop. This action in the past precluded the obtaining of a fire rating on such ceiling constructions, the fire rating, insofar as pertinent here, being the ability for the construction to bar the passage of heat for predetermined periods of time. It is with a construction which overcomes the foregoing shortcoming of ceiling pans and ceilings incorporating such pans that the present invention is concerned.

It is accordingly one object of the present invention to provide an improved ceiling construction including an improved ceiling pan which is capable of being held in its normal installed position regardless of the warping to which either it or its supporting T bars are subjected.

Another object of the present invention is to provide an improved ceiling construction which is capable of providing an approved fire rating which was not attainable by similar ceiling constructions heretofore commonly used.

Still another object of the present invention is to provide an improved ceiling construction incorporating improved ceiling pans which can be installed or removed, as desired, to provide accessibility to the space above the ceiling, notwithstanding that the pans cannot be released from their installed position when subjected to heat resulting from fire.

A further object of the present invention is to provide an improved ceiling pan and ceiling construction which not only is capable of achieving the foregoing objects but is also extremely economical. Other objects and attendant advantages of the present invention will readily be perceived hereafter.

The improved ceiling pan of the present invention includes a face portion having opposite sides and opposite ends. A pair of end flange portions extend substantially perpendicularly from the opposite ends of the face portion. Embossments are provided in the end flange por-

tions. A pair of side flange portions extend substantially perpendicularly from opposite sides of the face portions. Each of the side flange portions is cut away at its ends which are adjacent to the end flange portions, and each end of each side flange portion terminates in the form of an apex which extends toward the embossment of an adjacent end flange portion. During installation the embossments in the end flange portions are moved into detent holding engagement with the bulbs of the legs of adjacent T bars so that a leg of each T bar lies between the embossment of the end flange and the apex adjacent thereto. During normal conditions, the embossment of each end flange and the bulb of a leg of the T bar are in detent holding relationship to hold the ceiling pan in position. However, in the event of a fire which causes the leg of the T bar to buckle out of detent holding engagement with the end flange of the ceiling pan, an outwardly extending foot on the outwardly moving T bar leg will engage underneath the apex of the side flange to thereby provide a supplemental latching engagement. Thus, the improved ceiling pan of the present invention is capable of being mounted in such a manner that it cannot be released when subjected to heat, thereby providing the underlying basis for an approved fire rating for a ceiling incorporating such constructions. However, the ceiling pans are removable without permanent distortion by applying a physical force to remove them from their installed position, thereby permitting the space above the ceiling to be readily accessible. The present invention will be more fully understood when the following portions of the specification are read in conjunction with the accompanying drawings wherein:

FIGURE 1 is a fragmentary perspective view of a ceiling construction having spaced T bars and ceiling pans mounted thereon;

FIGURE 2 is a side elevational view of the improved ceiling pan of the present invention;

FIGURE 3 is an end elevational view of the improved ceiling pan of the present invention;

FIGURE 4 is a view taken substantially along line 4—4 of FIGURE 1; and

FIGURE 5 is a view taken substantially along line 5—5 of FIGURE 1.

In FIGURE 1 an improved ceiling construction 10 is shown which includes the improved ceiling pans 15 of the present invention. The ceiling construction 10 includes a plurality of spaced channels 11 which are supported by wires 12 tied to beams (not shown). Clips 13 attach spaced parallel T bars 14 to channels 11. It is T bars 14 which support the improved ceiling pans 15.

As can be seen from FIGURE 4, each of the T bars 14 includes an upper planar portion 16 having a pair of legs 17 extending downwardly therefrom with the upper portions 18 of legs 17 lying in pressed relationship against the undersurface of top planar portion 16 and the intermediate portion 19 of legs 17 converging toward each other until they reach bulbs 20 which extend substantially throughout the length of T bars 14. The lower portions of bulbs 20 in turn merge into feet 21.

The improved ceiling pan of the present invention includes a face portion 22 having end flanges 23 bent upwardly from opposite ends thereof and extending substantially perpendicularly thereto. Side flanges 24 are bent upwardly from the opposite sides of face portion 22 and extend substantially perpendicularly thereto.

From FIGURE 4 it can be seen that in order to install the improved ceiling pans 15 of the present invention between two facing legs 17 of adjacent T bars 14 it is merely necessary to slide the opposite end flanges of ceiling pan 15 between said pair of legs 17 of adjacent

T bars until such time as the embossments 25 in end flanges 23 move into detent holding engagement with bulbs 20 of legs 17. This will cause ceiling pan 15 to be held in its normal position. As can be seen from FIGURE 4, an adjacent ceiling pan 15 is slipped up into the space between an adjacent pair of T bars in the same manner until such time as the entire ceiling is covered.

Under normal conditions each ceiling pan 15 will hold very well in its installed position, and, if desired, each may be removed for any desired purpose by merely pulling it downwardly in a direction substantially perpendicularly to its face portion to thereby release the detent holding engagement provided between the opposite end flanges of each ceiling pan and the facing legs of adjacent T bars. This procedure is used to permit access to the space above the ceiling. The same pan can thereafter be reinstalled because it is in no way damaged during removal.

However, in the event that the ceiling on which pans 15 are located is subjected to intense heat or fire, the legs 17 of T bars 14 will tend to warp, and they may warp out of detent locking engagement with the end flanges 23. In the past such warping caused the pans 15 to be released from the ceiling and they dropped, thereby permitting excessive heats to pass beyond the ceiling. More specifically, assuming that both of the facing legs 17 of the adjacent T bars 14 in FIGURE 4 were subjected to excessive heat and tended to move toward each other, they would have, with past constructions, moved sufficiently so as to cause bulbs 20 thereof to move out of engagement with embossments 25 in flanges 23 of pan 15 and pan 15 would have dropped.

The construction of the present invention overcomes the above-described separation which previously occurred. As can be seen from FIGURES 2 and 4, side flanges 24 are cut away at their ends and terminate in apices or protuberances 26 which are directed generally toward embossments 25 in the end flanges (see FIGURE 2). Furthermore, an embossment 27 extends throughout the length of side flanges 24 for rigidizing apices 26 at opposite ends of the side flanges, as well as rigidizing the remainder of said side flanges.

Whenever the ceiling, including ceiling pans 15, is subjected to flame or excessive heats, as noted above, and when adjacent legs 17 of adjacent T bars 14 tend to warp and thus terminate the detent holding engagement between embossments 25 of end flanges 23 and bulbs 20 of T bar legs 17, feet 21 will move into engagement with sloped ends 28 underlying apices 26 to provide a secondary latching engagement between said feet 21 and side flanges 24. Therefore it can be seen that when the first detent connections between embossments 25 and bulbs 20 are terminated, latching engagement between sloped ends 28 of side flanges 24 and feet 21 will be initiated to thereby surely and positively prevent the ceiling pans from falling from their installed position. It will be appreciated, however, that while feet 21 are shown as having an extensive lateral projection, any amount of lateral projection which is capable of engaging end 28 underneath an apex 26 is within the contemplation of the present invention.

However, notwithstanding that the ceiling pans 15 will not be unintentionally dislodged from the T bars as a result of fire or any other cause, such pans may be removed by pulling them downwardly in a direction perpendicular to their face portions to thereby release the detent holding connection between embossments on the end flanges and the bulbs in facing legs of adjacent T bars. This removal is desirable when access is required to the space above the ceiling. During such removal the pans 15 and T bars 14 are in no way injured or destroyed so that they may be reinstalled as required. It is also to be noted that T bars 14 are resilient so that legs 17 are biased toward each other.

It is also to be noted that the undersurfaces 21' of feet 21 engage edges 24' of side flanges 24 to thereby limit the upward movement of pans 15 during installation. The dis-

tance between bulbs 20 and surfaces 21' and the distance between embossments 25 and edges 24' are such so that a tight fit of the pans on the legs 17 is obtained. It will also be appreciated that the clearance distances between feet 21 and ends 28 are such as to permit the above discussed intentional removal of pans 15, but if legs 17 are distorted more than they would be during such intentional removal, as would be the case when they are subjected to excessive heat, the feet 21 will engage ends 28 to provide the above described latching engagement.

While not shown in the drawings, it is to be noted that a wire grid may be placed within the flanges of pans 15 and mineral wool filler thereafter placed on the wire grid. The combination of the wire grid and mineral wool filler serve the dual function of providing sound absorption and retarding the passage of flame and intense heat.

While a preferred embodiment of the present invention has been disclosed, it will be appreciated that it is not limited thereto but may be otherwise embodied within the scope of the following claims.

I claim:

1. A ceiling pan comprising a face portion having opposite sides and opposite ends, end flanges extending substantially perpendicularly from said opposite ends of said face portion, embossment means extending from each of said end flange portions for retaining said ceiling pan in mounted position, and normally inactive latching means constituting an integral portion of said ceiling pan and located laterally of and substantially abreast of said embossment means extending from said end flange portions and spaced therefrom for providing a supplemental holding action for holding said ceiling pan in the same position it occupied when it was retained in mounted position by said embossment means only in the event said embossment means are rendered ineffectual for retaining said ceiling pan in mounted position.

2. A ceiling pan comprising a face portion having opposite ends, first means extending from said opposite ends for normally holding said ceiling pan in mounted position, and normally inactive second means spaced from said first means for providing a supplemental holding action for maintaining said ceiling pan in the same mounted position in which it was held by said first means only in the event said first means no longer normally hold said ceiling pan in mounted position and thus are rendered ineffectual.

3. A ceiling construction comprising a plurality of spaced substantially parallel T bars each having a pair of legs, a plurality of ceiling pans each having face portions, opposite end portions on each of said face portions, end flanges extending upwardly from said end portions, embossments in each of said end portions, said end flanges of each of said ceiling pans straddling a pair of facing legs of adjacent T bars, configurations in said legs of said T bars for receiving said embossments in detent holding relationship, protuberance means extending from each of said ceiling pans located adjacent and abreast of each of said facing legs of said T bars for engaging said legs and effecting a supplementary holding engagement therewith in the event that said configurations of said facing legs of said adjacent T bars move relatively toward each other and out of detent holding engagement with said embossments, and a clearance between said protuberance means and said legs for permitting said pans to be mounted and demounted relative to said legs without interference from said protuberance means.

4. A ceiling construction as set forth in claim 3 wherein said face portion includes opposite side portions, side flange portions extending substantially perpendicularly from said opposite side portions, and wherein said protuberance means for providing said supplementary holding engagement comprise apices at the ends of said side flange portions, said apices lying abreast of and extending toward said adjacent legs.

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5. A ceiling construction as set forth in claim 4 wherein feet are provided on said legs underlying said configurations, said feet being pointed at the ends of said side flange portions for moving into engagement with said ends of said side flange portions in underlying relationship to said apices when said legs move relatively toward each other and out of said detent holding engagement.

6. A ceiling pan comprising a face portion, end flange means extending substantially perpendicularly from said face portion, said end flange means having an outer edge remote from said face portion, embossment means on said end flange means lying between said face portion and said outer edge, side flange means extending substantially perpendicularly from said face portion, said side flange means being cut away at the ends thereof proximate said end flange means with said side flange means terminating in apex means extending toward said embossment means of said end flange means, said apex means lying laterally of and substantially abreast of said embossment means.

7. A ceiling pan comprising a face portion, an end flange extending from said face portion, said end flange having an outer edge remote from said face portion, embossment means in said end flange lying between said face portion and said outer edge, a side flange extending from said face portion, said side flange being cut away at the end thereof proximate said end flange with said side flange terminating in an apex extending toward said embossment of said end flange, said apex lying laterally of and substantially abreast of said embossment means.

8. A ceiling pan comprising a face portion having opposite sides and opposite ends, end flanges extending sub-

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stantially perpendicularly from said opposite ends of said face portion, first latching means forming a part of said end flange portions for providing a normally active first latching engagement with legs of associated spaced supporting bars for retaining said ceiling pan in mounted position on said supporting bars under normal conditions, and normally inactive second latching means forming an integral part of said ceiling pan and located adjacent to and laterally abreast of said legs when said ceiling pan is mounted thereon for providing a second latching engagement with said legs in the event that said legs move laterally out of said first latching engagement, and a clearance between said first and second latching means for permitting said ceiling pan to be mounted relative to said legs.

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