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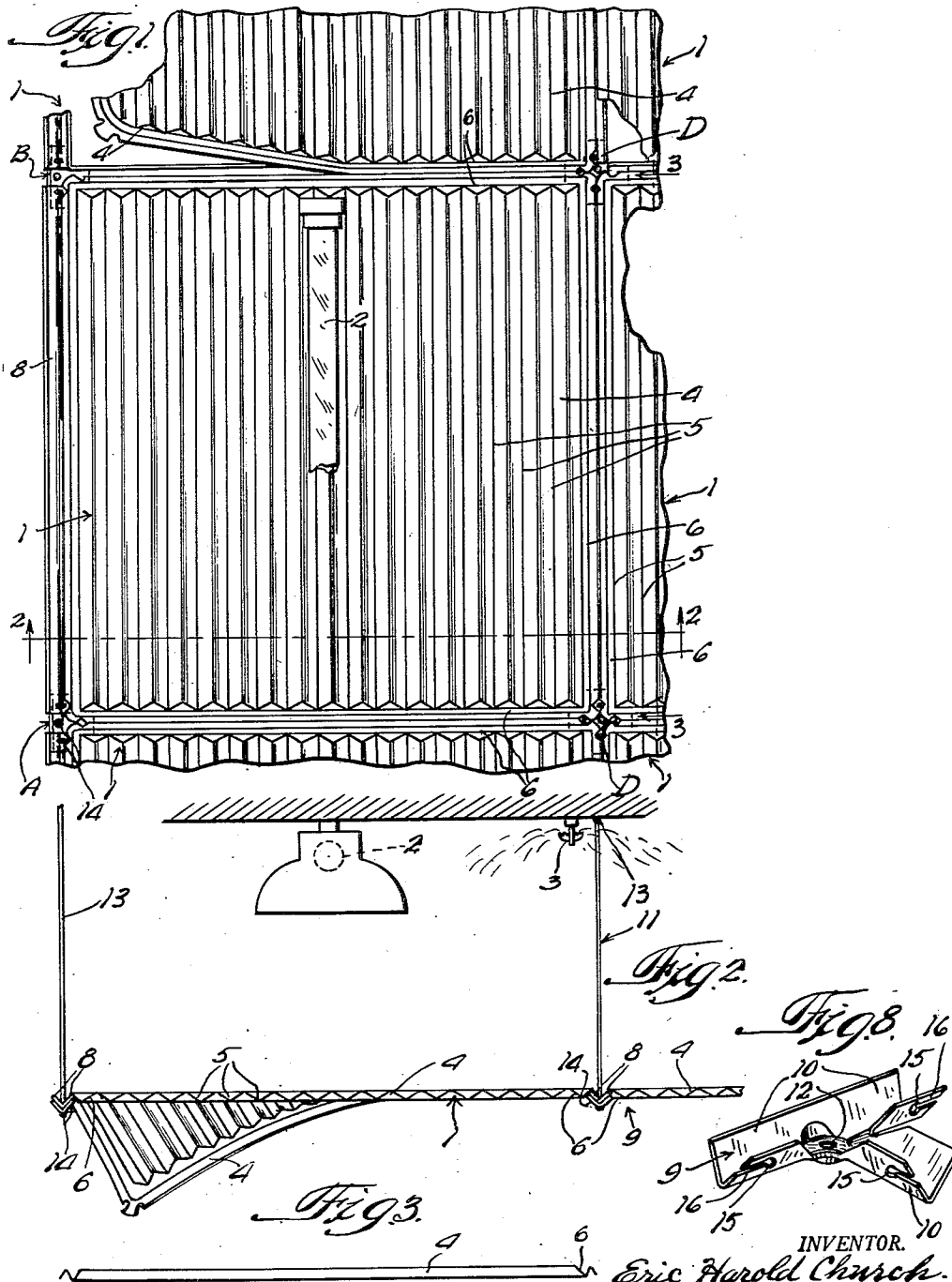
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LIGHT-TRANSMITTING PLASTIC SHEET PANELS

Filed July 9, 1953

2 Sheets-Sheet 1



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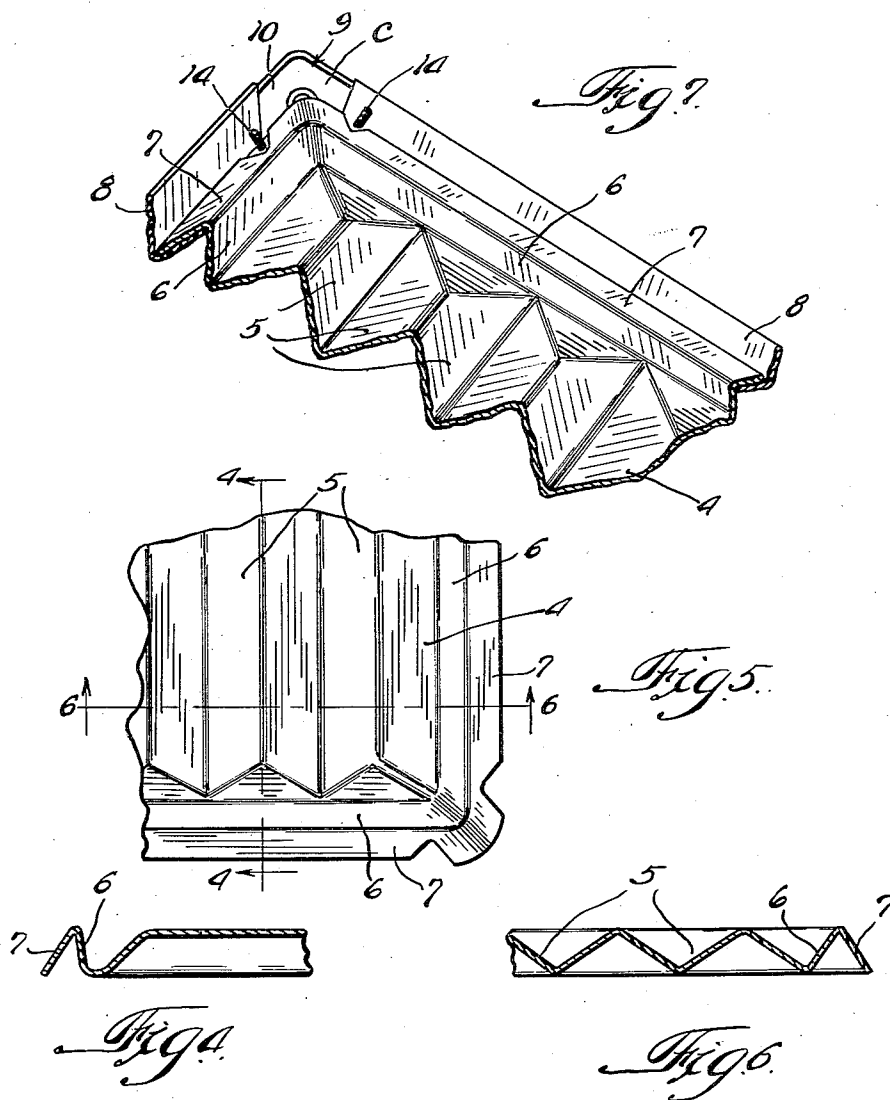
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2 Sheets-Sheet 2



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## LIGHT-TRANSMITTING PLASTIC SHEET PANELS

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13 Claims. (Cl. 169—1)

This invention relates to light-transmitting plastic sheet panels.

One of the objects of the invention is to provide a low cost thin translucent plastic panel which will transmit a sufficient proportion of light without permitting the fluorescent lamps supported thereabove to be noticeably visible.

A further object is to provide such a panel which will be relatively stiff and strong.

A further object is to provide improved means for supporting such a panel.

A further object of the invention is to provide a panel which, when used in a sprinkler system above the panel, will yield under abnormal heat and drop the panel under the weight of water from the sprinkler system above the panel.

Further objects and advantages of the invention will be apparent from the description and claims.

In the drawings, in which an embodiment of the invention is shown,

Figure 1 is a plan view of a light-transmitting plastic sheet panel construction which may extend in a generally horizontal plane underneath an overhead lighting construction;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1;

Fig. 3 is a vertical section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 5;

Fig. 5 is an enlarged plan view of the lower left-hand corner of a panel of Fig. 1;

Fig. 6 is a section on the line 6—6 of Fig. 5;

Fig. 7 is a perspective view showing a corner of the panel construction and an L-shaped channel coupling, and

Fig. 8 is a perspective view showing a T-shaped channel coupling.

Referring to the drawings in detail, the construction shown comprises a thin translucent paneled ceiling 1 which may be mounted underneath a system of fluorescent light bulbs 2 and which may be provided with an overhead sprinkler system 3 which might sometime operate, under abnormal heat, to supply a shower of water from above onto the translucent paneled ceiling 1. Each sheet or panel 4 is generally rectangular in shape and preferably has its major portion provided with parallel corrugations 5 of uniform depth extending parallel to opposite parallel side edges of the panel 4. The panel 4 is also provided with rectangular bounding corrugations 6 extending around said parallel corrugations 5 and in gravity flow communication with the parallel corrugations 5 so that all of the parallel corrugations drain into those bounding corrugations 6 extending across the ends of the parallel corrugations.

Each sheet panel 4 has its surrounding outer edge 7 extending outwardly and downwardly for engagement with the metal bounding supports 8 of V-shaped cross section, the upwardly extending side edges of which engage underneath the surrounding outer edges 7 of the panels.

The complete rectangular panel 4 is supported on its four sides by four V-shaped channels 8, respectively, and embraced by a number of similar rectangular panel portions 4. These panels may be of any suitable size and thickness. A size commonly used is three feet square. A thickness of .015 inch has been found satisfactory. They may be made of any suitable material such as translucent plastic; for example, translucent white Vinylite which is odorless, nontoxic, and will not distort or shrink due to water absorption. It is highly resistant to most common chemicals and does not support combustion. Its light transmission factor may be approximately 43 percent, and its reflection factor 55 percent. It may be cut with ordinary scissors and has a permanent mat finish. The corrugations may be any suitable depth; for example,  $\frac{5}{8}$  inch. The material may be de-staticized at time of manufacture so that dust will not tend to cling to the surface. The central panel 4 is shown as supported on all four sides by four V-shaped metal supporting channels 8 in which the downwardly and outwardly extending flanges 7 of the panel 4 are fitted. Three of the adjacent edges of the other panel 9 shown are fitted into V-shaped channels 8 embracing the central panel.

As previously indicated, one of the features of the invention is the provision of a panel so that if it is installed along with an automatic release overhead sprinkler system 3 and the sprinkler system is activated before the panel drops down from the channel 8, the weight of the water falling and collecting in the corrugations 5 in the panel will, as the water collects, cause the panel to yield and drop down from the channels 8 to discharge the water from the panel to assist in extinguishing the fire underneath. As the water falls down onto the panel construction from the sprinkler system 3 it will fall into the trough-like corrugations 5 and fill up these corrugations, maintaining a uniform height therein because of the intercommunication of the parallel corrugations 5 through the surrounding communicating corrugations 6.

The V-shaped channel 8 in which the down-turned edges 7 of the panels are seated are supported by channel couplings 9 at the junctures of the channels. Two T-shaped couplings are shown at A and B, an L-shaped coupling at C, and two cross-shaped couplings at D.

A T-shaped channel coupling 9 is shown in perspective in Fig. 8. A part of an L-shaped channel coupling 9 is shown in perspective in Fig. 7.

Referring first to Fig. 8, this channel coupling 9 may be made of sheet metal, shaped to provide three channel-like arms 10, one for each of the V-shaped channels 8 which are seated in the coupling arms. The channel coupling may be supported from a suspension rod 11 (Fig. 2) extending upwardly through an opening 12 adjacent the junction of the coupling arms 10 and secured at its upper end at 13 as shown in Fig. 2. The ends of the V-shaped channels 8 when seated in the arms 10 of the channeled couplings 9 are secured in position by means of screws 14 extending through openings 15 in the coupling arms 10, respectively, and threaded into the V-shaped supporting channels. In order to provide for the easy assembly and disassembly of the channels and couplings, slots 16 are provided leading from the ends of the coupling channels to the openings 15 for the connecting screws 14.

Fig. 7 shows an assembly of a corner portion of the panel 4 with the downwardly and outwardly extending flanges 7 seated in the V-shaped channels 8 which, in turn, are seated in V-shaped arms 10 of the L-shaped channel coupling 9. This Fig. 7 also shows the connecting screws 14 which extend through holes in the arms of the channel coupling member 9 and are threaded into the inside wing of the V-shaped channel 8.

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The parallel corrugations 5 and the bounding corrugations 6 in combination provide a comparatively rigid construction of panel of generally uniform resistance to collapse. Other arrangements of corrugations which provide the necessary rigidity and flow communication with the bounding corrugations may also be employed. The downwardly and outwardly extending bounding flanges 7 seated in the four surrounding channels 8 extend the connection between panel and channels to completely surround the panel, so that under excessive heat it will release at a generally definite temperature whereby its operation will be consistent.

Laboratories have completed a testing program on the translucent ceiling panels. The tested panels were three feet square, corrugated and formed from .015" thick vinyl plastic sheets. The individual panels are supported along all four edges by a metal suspension system.

The test results indicate that these plastic ceiling panels may be installed under the main ceiling below the lighting fixtures 2 and the sprinkler system 3 and have no adverse effect on the operation of the sprinklers or the distribution of water from them. Heat from the exposure fire in the test area created sufficient thermo drafts to dislodge the individual panels 4 as shown in Figs. 1 and 2 and cause them to fall to the floor before temperatures were reached high enough to operate the automatic sprinklers located above the suspended ceiling. The various panels in dropping to the floor came down in such a pattern as not to shield a fire under the bench, counter, table, or similar object from the sprinkler water. When individual panels dropped on the exposure fire, the vinyl plastic decomposed with no apparent spread of flame over the surface of the plastic material.

The material of the panels was such that it did not become distorted under heat and drop out of the supporting framework until a temperature considerably above 125° F. was reached. Relation of release of the panels under heat to the temperature at which the sprinklers begin operating is such that the sprinklers started to operate about two minutes after the ceiling panels had dropped.

Further modifications will be apparent to those skilled in the art and it is desired, therefore, that the invention be limited only by the scope of the appended claims.

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

1. A leak-proof light-transmitting thermoplastic sheet panel, to be supported in horizontal position underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uniform depth and length extending parallel to opposite parallel side edges of the panel, and gravity flow liquid conduit means providing water flow between all of said corrugations.

2. A leak-proof light-transmitting thermoplastic sheet panel, to be supported in horizontal position underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uniform depth and length extending parallel to opposite parallel side edges of the panel.

3. A leak-proof light-transmitting thermoplastic sheet panel to be supported in horizontal position underneath a sprinkler system, said sheet panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uniform depth and length extending parallel to opposite parallel side edges of the panel, and parallel corrugations extending across opposite ends of said first parallel corrugations and in gravity flow communication therewith throughout their extent.

4. A leak-proof light-transmitting thermoplastic sheet panel to be supported in horizontal position underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uni-

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form depth and length extending parallel to opposite parallel side edges of the panel, and parallel corrugations extending across opposite ends of said first parallel corrugations.

5. A leak-proof light-transmitting thermoplastic sheet panel to be supported in horizontal position underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uniform depth and length extending parallel to opposite parallel side edges of the panel, and a rectangular corrugation extending around said parallel corrugations and in gravity flow communication with them throughout their extent.

6. A leak-proof light-transmitting thermoplastic sheet panel to be supported in horizontal position, underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uniform depth and length extending parallel to opposite parallel side edges of the panel, and a rectangular corrugation extending around said parallel corrugations.

7. A leak-proof light-transmitting thermoplastic sheet panel to be supported in horizontal position underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uniform depth and length extending parallel to opposite parallel side edges of the panel, said sheet panel having a surrounding flange having its outer edge extending outwardly and downwardly for engagement with upwardly facing supporting flanges.

8. A plurality of light-transmitting thermoplastic sheet panels to be supported underneath a sprinkler system and lighting system in horizontal position with their edges adjacent each other, each panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uniform depth and length extending parallel to opposite parallel side edges of the louver, adjacent edges extending toward each other and downwardly, and a channel support extending underneath said adjacent edges for receiving and supporting said edges.

9. A plurality of light-transmitting plastic sheet panels to be supported underneath a sprinkler system and lighting system in horizontal position with their edges adjacent each other, each panel being generally rectangular and having its major portion provided with parallel corrugations of substantially uniform depth and length extending parallel to opposite parallel side edges of the louver, adjacent edges extending toward each other and downwardly, and a channel support extending underneath said adjacent edges for receiving and supporting said edges, said plastic panels being of thin thermoplastic material fusible at a temperature substantially below the temperature at which the sprinkler system becomes effective to sprinkle below the system.

10. A light-transmitting thermoplastic sheet panel, to be supported in horizontal position underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having corrugations of substantially uniform depth extending substantially between opposite side portions thereof, each of said corrugations extending substantially parallel to a pair of opposite parallel side edges of the panel.

11. A light-transmitting thermoplastic panel, to be supported in horizontal position underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having a plurality of corrugations, each of said corrugations being substantially parallel to a pair of opposite side edges of the panel, and gravity flow liquid conduit means providing water flow between all of said corrugations.

12. A plurality of adjacent light-transmitting thermoplastic sheet panels to be supported underneath a sprinkler system and lighting system in substantially horizontal posi-

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tion, each panel being generally rectangular and having corrugations of substantially uniform depth, each of said corrugations being substantially parallel to a pair of opposite side edges of the panel, adjacent edges of the panels extending toward each other and downwardly, and a support extending underneath said adjacent edges for supporting said edges.

13. A light-transmitting thermoplastic sheet panel to be supported in horizontal position underneath a sprinkler system and lighting system, said sheet panel being generally rectangular and having a plurality of substantially straight corrugations of substantially uniform depth ex-

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tending substantially between opposite side portions of said panel, and gravity flow liquid conduit means providing water flow between said corrugations.

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