March 14, 1967 K. C. OLSON 3,308,586

VENTILATING PANELS

Filed Jan. 13, 1964

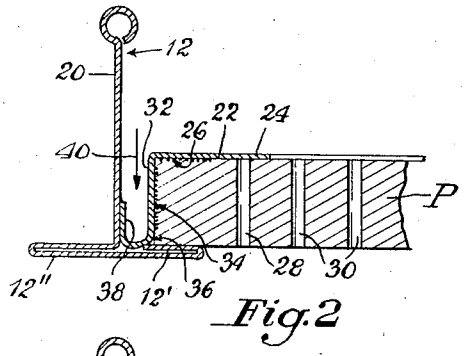


Fig. 2

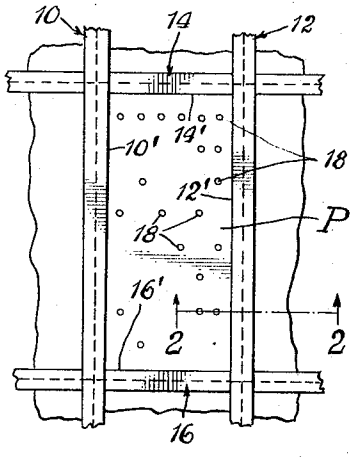


Fig. 1

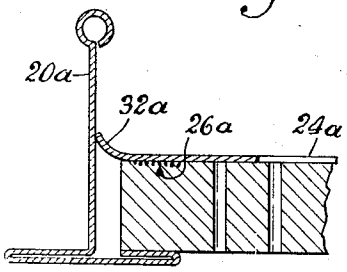


Fig. 3

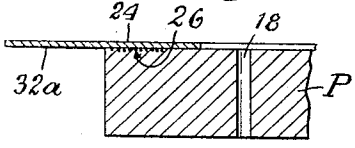


Fig. 4

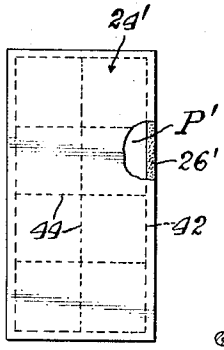


Fig. 5

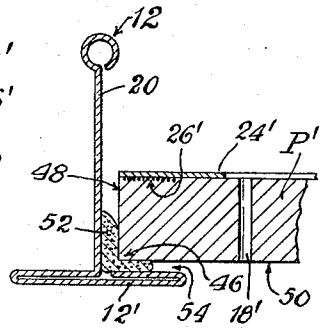


Fig. 6

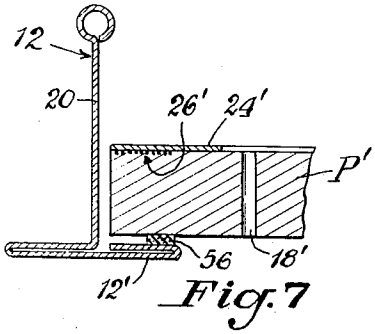


Fig. 7

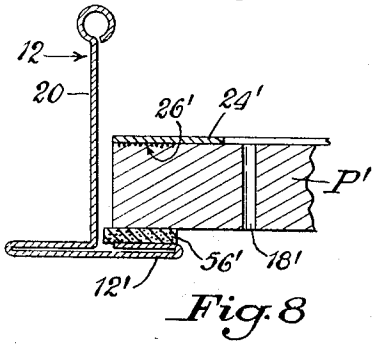


Fig. 8

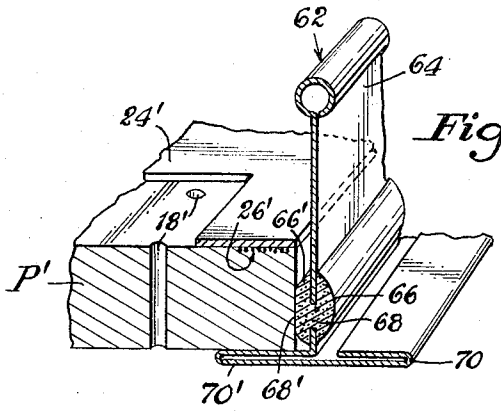


Fig. 9

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VENTILATING PANELS

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9 Claims. (Cl. 52—99)

The present invention relates to ventilating panels suitable for constructing ventilating ceilings and the like.

In these installations wherein a plenum chamber above a ceiling delivers air through the ceiling to the space below, it is known to provide ventilating openings in the ceiling and suitable means to adjust the degree of opening in each panel for the particular chamber to be ventilated. When the ceiling is formed of a plurality of individual rectangular panels suitably supported on hangers so that the passage of air past the edges of the panels is prevented, the panels are constructed to permit opening the passage through each panel to a desired degree within limits.

It is an object of the present invention to provide a panel having a multiplicity of small openings through the body portion thereof and means on the back of the panel closing at least some and preferably all of said openings which means is easily rendered ineffective or subject to removal at one or more fractional areas of the panel to open passage through openings previously covered.

It is another object of the invention to provide space-closing sealing means against the passage of air past the periphery of a panel, and if desired to provide such sealing means carried by the panel.

The invention is carried out by covering the holes at the back of a ventilating panel with a severable or ruptural air-impervious layer, so that any desired number of holes at the back, from less to all of them, may be opened by removal of the air-impervious layer over each hole to be opened for passage of air.

In particular, the invention may be carried out by covering the entire back of the panel with air-impervious sheet material, so related to the panel that desired portions of it may be easily removed while the remaining portions remain in hole-closing relation to the panel when in use with a plenum chamber. This may be accomplished by securing a sealing sheet of material to the panel so as to be fixedly located over at least a portion of the back of the panel and preferably covering the entire back. This may be done in one way by adhesive only at locations within a peripheral band at the edges of the back. When the sheet is provided with weakened structural lines, such as a score-line or a tear-line of perforations one or more fractional areas of the sheet may be easily and neatly removed. However, such lines are not necessary in view of the ease with which a covering sheet may be punctured or cut with a razor blade.

Sheet material such as paper, metal foil and plastic films are suitable, not only for removal of whole sections thereof, but for puncturing over selected holes, if desired.

To provide a ceiling of such panels they should be mounted so that air does not leak past the edges of the panels. Because of the need to operate individually on each panel for a particular installation, the panels are intended for use by dropping them into a recess of a grid providing a rectangular supporting ledge from which they may be easily lifted, and preferably by providing suitable edge-sealing means.

The accompanying drawings illustrate a suitable mounting grid for the panels and also a suitable panel construction.

FIG. 1 represents a portion of the exposed face of a ceiling showing a ventilating panel and the related grid members which support it.

FIG. 2 is an inverted enlarged fragmentary cross section on line 2—2 of FIG. 1 showing one form of sealing means.

FIG. 3 is a modified form of FIG. 2.

FIG. 4 is an edge view of a panel showing a projecting edge of a covering layer.

FIG. 5 is a view of the back of a panel illustrating one way of providing tear-lines.

FIGS. 6, 7, 8 and 9 are views of separate embodiments showing sealing gaskets apart from the panel.

In FIG. 1 the numerals **10** and **12** designate the exposed faces of two parallel inverted T-runners and the numerals **14** and **16** designate two crossing members. The dotted lines represent the locations of the vertical webs from which extend opposite horizontal flanges forming a rectangular ledge on which to lay a panel P. Panel P is shown as having ventilating openings **18**, of which only a few are shown, these being illustrative only of function and not of structure. The prime numbers **10'**, **12'**, **14'** and **16'** represent the four flanges which support panel P.

In FIG. 2 the runner **12** has vertical web **20**, suitably suspended by means not shown. It has a conventional form as a T of sheet metal deformed to provide horizontal flanges **12'** and **12''**.

Panel P as shown may or may not be of sound-absorbing quality, but has openings through it for ventilating. Originally, at least a portion of the back **22** of the panel and preferably the entire back is covered with an air-impervious sheet **24**, adequately secured to the panel, preferably only at locations within a peripheral band around the four edges as illustrated by adhesive **26**, representing either spots of adhesive or a continuous band of adhesive.

The covering sheet **24** functions to block passage of air through those holes such as **28** which it covers. Sheet **24** is preferably unsecured to the back **22**, except in the area of the peripheral band, so that portions of it may be removed, as by tearing or cutting out, to uncover holes such as **30** for a predetermined degree of opening through the panel.

Marginal portions of the sheet at the panel back serve to permit the sheet to extend beyond the panel at the four edges, a portion of such extension being designated by numeral **32** which may, if desired, be secured by adhesive **34** to the edge-face **36**, although this is not necessary, and further designated by the free terminal portion **38**. As the panel P is placed on its support the free portion **32–38** is automatically positioned as shown and is held there by air pressure, indicated by arrow **40** in the plenum chamber. When the portion **32** is not adhesively secured as shown, the sheet **24** must be sufficiently flexible to yield to the air pressure for location as shown. When the portion **32** is adhesively secured to the edge-faces as shown at **34**, the adhesive **26** at the back may be omitted.

FIG. 3 is a modified form of FIG. 2 in which a sheet **24ª** secured at **26ª** has extending portions **32ª** too narrow to seal against the flanges, but sufficiently wide when flexed to lie against a suitably wide vertical web, such as **20ª**. Sheet material **24ª** must be sufficiently stiff to resist the air pressure and bridge the gap as shown.

FIG. 4 represents panel P with openings **18** and covering sheet **24** as it is present before installing, the extending portion **32ª** not being secured to the side of the panel.

When sealing means apart from the panel is provided, the covering sheet **24'** may have its edges coincident with the edges of the panel P' having openings **18'** as shown in FIG. 6.

In FIG. 5 the peripheral band shown by the dotted line **42** represents the preferred area within which to locate adhesive **26'**. Although the sheet **24'** may be cut as mentioned, it may be desired to provide perforate tear-lines

such as 44 so that portions may be removed, as shown in FIGS. 2 and 3.

To provide the peripheral sealing for panels such as shown in FIG. 5, a gasket may be placed between the panel and the grid. In FIGS. 6, 7 and 8, such seal is shown in part at least on the horizontal flange.

In FIG. 6 the panel P' with openings 18' and covering sheet 24' has a corner 46 formed by edge-face 48 and ceiling face 50 resting in a fillet 52 of yielding sealing material, such as a soft rubber, closed-cell foam with or without a skin, a skin-covered open-cell foam, or skinless open-cell foam which yields to the weight of the panel sufficiently to provide a dam against the flow of air through it. The fillet 52 is placed in the corner formed by the web 20 and the flange 12'. Preferably, the fillet is secured to one or both of the corner walls of the runner 12, either by added adhesive or by being foamed in situ, as may be done with polyurethane and vinyl foams.

It is noted that in FIG. 6 there is a space 54 between the edge of the flange 12' and the ceiling face 50. To avoid forming such a space, a gasket strip may be placed at the edge of the flange 12' as shown in FIGS. 7 and 8.

FIG. 7 shows panel P' and the runner 12 of FIG. 1 with a sealing gasket 56 secured to flange 12'. FIG. 8 is a modified form of FIG. 7 in which the sealing gasket 56' covers the flange 12'. The gaskets 56 and 56' may be of material above mentioned for the fillet 52.

Certain panels have a rough face or fissures, such that there is a chance that the ceiling faces may not tightly seal on gaskets such as shown in FIGS. 6, 7 and 8. For such panels, and for all panels, a preferred seal is shown in FIG. 9.

In FIG. 9 a grid member 62 has its vertical web 64, on its panel-facing side provided with a strip of elastomer foam 66 secured to the web. This may be a strip of open-cell foam with an exterior skin or a strip of closed-cell foam with or without skin. It also may be a strip of open-cell skinless foam which can yield to pressure to close passage through it, but its thickness must be properly adjusted to the width of space in which it is compressed. Such a preformed strip of polyurethane or vinyl or other foamed material may be adhesively secured to the web 64. The strip 66 with a skin may be provided by forming the foam in situ, as by depositing on the web a mixture of the ingredients of a self-foaming composition, such as those which produce polyurethane and vinyl foams. When both sides of the web are so used to foam in situ, the web may, if desired, have a series of holes 68 through it to provide foam filler as integral connections between gasket strips 66 and 66'. These strips are located close to the horizontal flanges 70 and 70', in position to face the square edge face of a panel, such as P' having openings 18' and covering sheet 24' secured by adhesive 26', and with its edges coincident with the edges of the panel.

It is preferred that the strips 66 be convex in cross-section as shown so as not to provide an obstruction to entry of the panel. The dimensions of the assembly are such that when the panel is in place, it flattens the convex face to assure a tight seal, as shown by the contact area 68' on strip 66'. When the strips 66 are foamed in situ by conventional procedures the preferred skin-surface is normally provided, but it is to be understood that a skin face is not essential to a perfect seal as described above.

From the foregoing it is to be understood that the invention may be practiced in other ways than those herein illustrated, and that modifications are contemplated as falling within the scope of the invention as expressed in the appended claims.

In my cofiled application Serial No. 337,287, the sealing means between the panel and the grid is described and claimed.

I claim:

1. In a ventilating ceiling having a ventilating panel with ventilating openings through its body portion for the passage of air through the ventilating panel, and having a supporting grid including horizontal flanges providing a circuitous ledge removably supporting the ventilating panel, a layer of air-impervious material over at least a portion of the back of the ventilating panel, said layer covering at least some of the ventilating openings of the body portion and said layer being secured to the panel at regions other than the portion of the back having said covered ventilating openings, said layer having means at a selected portion within the periphery of the panel and in close proximity to at least one ventilating opening in the panel for readily severing and removing a portion of the layer over said ventilating opening.

2. A ventilating ceiling according to claim 1 in which the said layer extends freely as flexible sheet material beyond the periphery of the panel and in space-closing contact with the grid.

3. A ventilating ceiling according to claim 1 in which the said layer extends freely as flexible sheet material beyond the periphery of the panel, and in which said extensions overlie the edge-faces of the panels and extend therefrom and overlie an adjacent portion of the grid in space-closing contact.

4. A ventilating panel for a ventilating ceiling comprising a body portion having ventilating openings therethrough for the passage of air and an air-impervious layer over at least a portion of the back of the panel secured to said panel at the marginal edges of the panel and unsecured over the area of the panel containing ventilating holes covered thereby, said layer covering at least some of the openings and said layer having means at a selected portion within the periphery of the panel and in close proximity to at least one ventilating opening in the panel for readily severing and removing a portion of the layer over said ventilating opening.

5. A ventilating panel according to claim 4 in which said layer extends freely away from the panel periphery as a flexible sheet.

6. A ventilating panel for a ventilating ceiling comprising a body portion having ventilated openings therethrough and an air-impervious layer over at least a portion of the back of the panel secured to said panel only at the margins of the panel and unsecured over an area of the panel containing at least one ventilating opening, said layer covering at least some of the openings, and some of the openings being free of cover by said layer, said layer having means at a selected portion within the periphery of the panel and in close proximity to said ventilating opening in the panel for readily severing and removing a portion of the layer over said ventilating opening.

7. A ventilating panel having a plurality of ventilating openings therethrough for the passage of air, and an air-impervious layer of sheet material over at least a portion of said openings at the back of the panel, said layer being secured to said panel at marginal edges of the panel and being unsecured to the panel at the area containing the covered openings, said layer having tear lines at selected portions thereof covering ventilating openings to facilitate removal of selected portions of the layer to uncover selected openings for the passage of air therethrough.

8. In a ventilating ceiling having a ventilating panel with ventilating openings through its body portion for the passage of air through the ventilating panel, and having a supporting grid including horizontal flanges providing a circuitous ledge removably supporting the ventilating panel, a sheet of air-impervious material over at least a portion of the back of the ventilating panel, said sheet covering at least some of the ventilating openings of the body portion and having a removable area covering at least one ventilating opening in the body portion of the ventilating panel, said sheet having weakened tear-lines therein for removing said portion which covers said opening.

9. A ventilating panel for a ventilating ceiling comprising a body portion having ventilating openings therethrough for the passage of air, and an air-impervious

sheet over at least a portion of the back of the panel secured to said panel at marginal edges of the panel and unsecured over the area of the panel containing ventilating openings covered thereby, said sheet covering at least some of the openings, and said sheet having at least one removable area covering at least one ventilating opening in the body portion of the ventilating panel, said sheet having weakened tear-lines therein for removing said portion which covers said opening.

References Cited by the Examiner

UNITED STATES PATENTS

2,669,116	2/1954	Erickson	52—99
2,781,557	2/1957	Ericson	53—303 X
2,990,027	6/1961	Sabine	181—33.1
2,993,240	7/1961	Ericson	52—484 X
2,996,138	8/1961	Schwartz et al.	98—400 X
3,058,411	10/1962	Hanson et al.	98—40
3,111,188	11/1963	Rees et al.	52—484 X
3,159,092	12/1964	Ericson	98—40

FOREIGN PATENTS

1,281,949	12/1961	France.

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