July 14, 1970 L. E. BOWEN 3,520,115

COLLAPSIBLE HOOD ASSEMBLY

Filed June 24, 1968 3 Sheets-Sheet 1

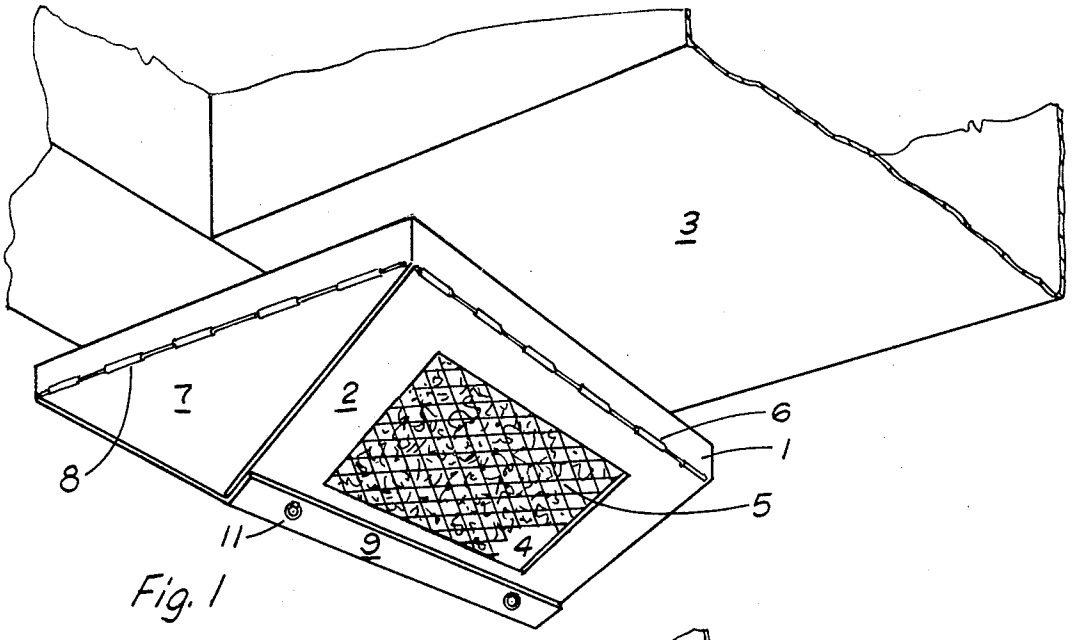


Fig. 1

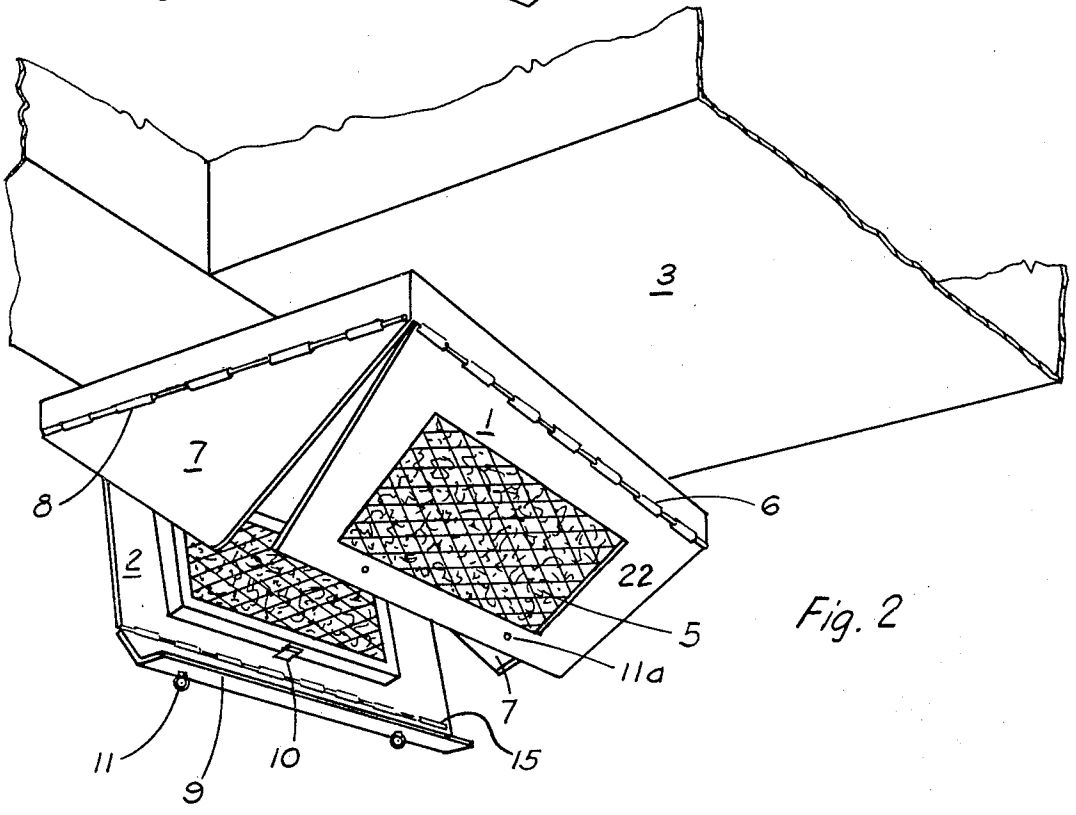


Fig. 2

INVENTOR.
LONNIE E BOWEN
BY
Edward M. Stenton

July 14, 1970 L. E. BOWEN 3,520,115

COLLAPSIBLE HOOD ASSEMBLY

Filed June 24, 1968 3 Sheets-Sheet 2

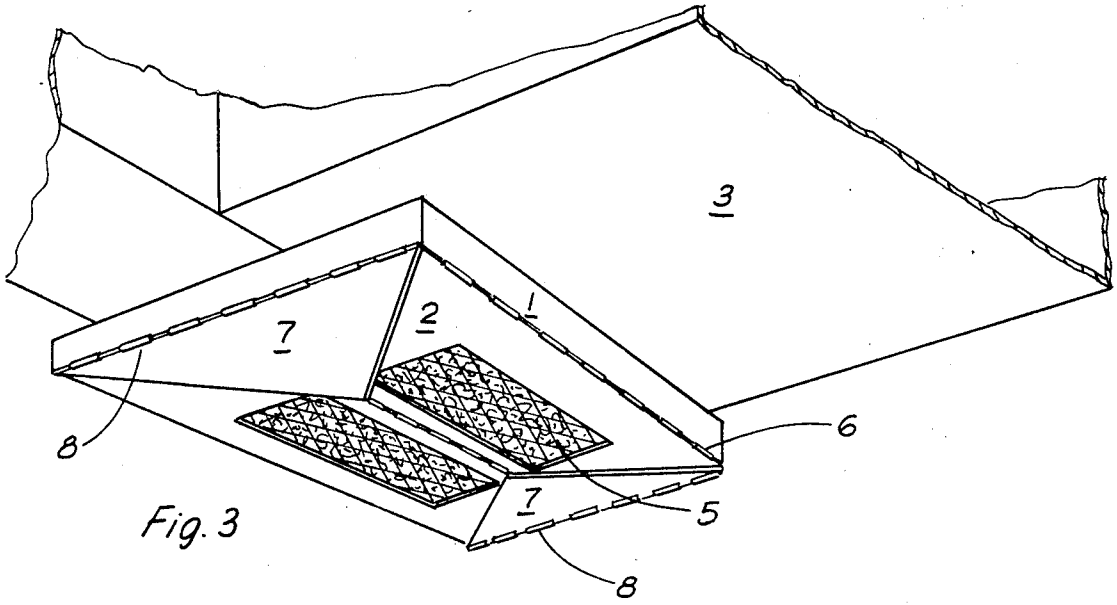


Fig. 3

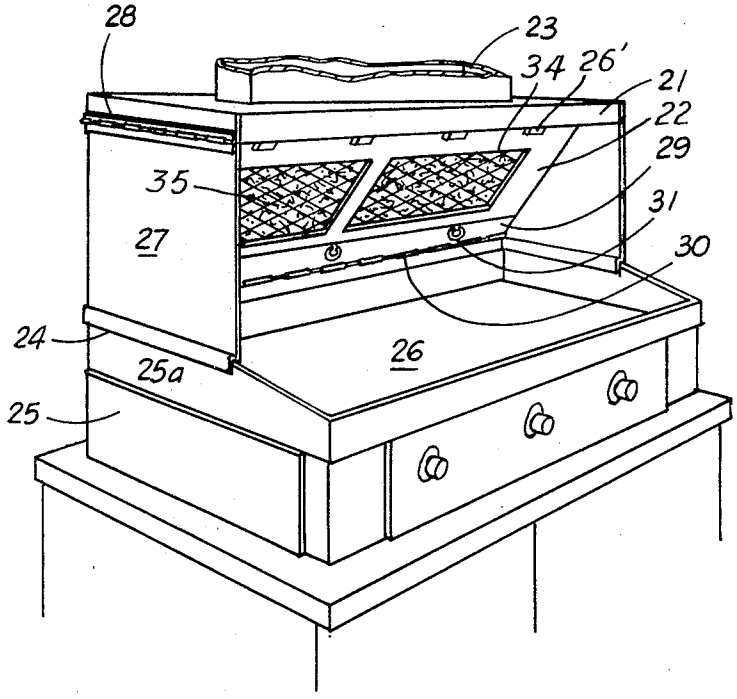


Fig. 4

INVENTOR.
LONNIE E. BOWEN
BY Edward M. Steutermann

July 14, 1970 L. E. BOWEN 3,520,115

COLLAPSIBLE HOOD ASSEMBLY

Filed June 24, 1968 3 Sheets-Sheet 3

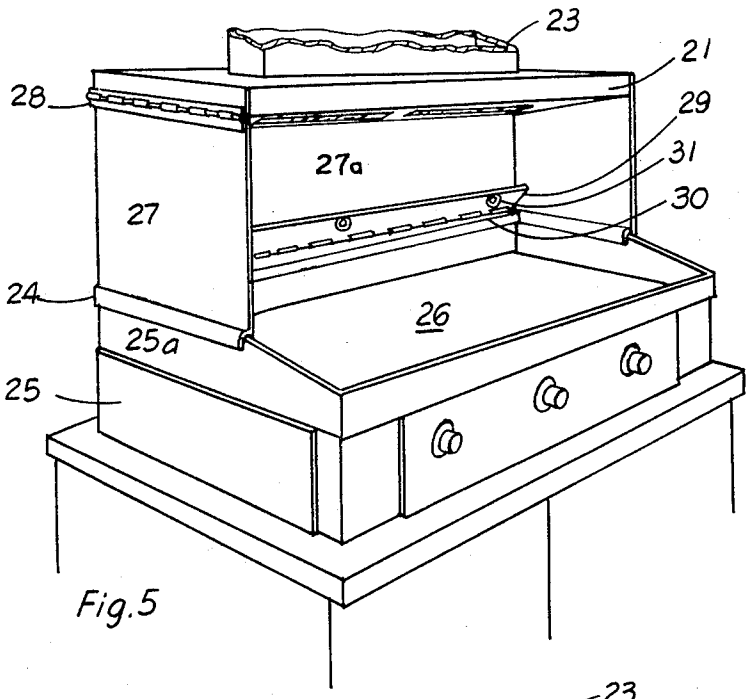


Fig.5

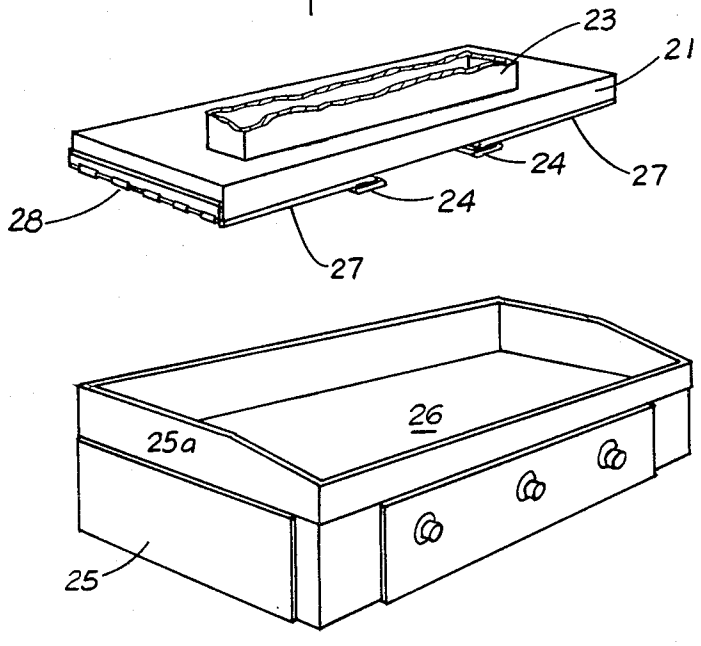


Fig. 6

INVENTOR.
LONNIE E. BOWEN
BY Edward M. Steinmann

United States Patent Office

3,520,115
Patented July 14, 1970

3,520,115

COLLAPSIBLE HOOD ASSEMBLY

Lonnie E. Bowen, Bridgeton, Mo., assignor to American Air Filter Company Inc., Louisville, Ky., a corporation of Delaware

Filed June 24, 1968, Ser. No. 739,466
Int. Cl. B01d 46/42
U.S. Cl. 55—422 3 Claims

ABSTRACT OF THE DISCLOSURE

A hood assembly including a frame member with apertured panel means hingedly connected to the frame to be extended outwardly from the frame to receive a stream of air through the apertures and to be folded into the frame in collapsed relation. Side panel means are hingedly connected to the frame to be folded to the frame in closed position and opened to extend outwardly from the frame in contact with the sides of the first panel means and seal panel means are provided to support the first panel means at an angle relative to the frame in gas receiving position and to prevent flow of air around the first panel means. Gas permeable liquid de-entrainment pads can be provided to cover the apertures to remove liquid droplets entrained in the gas stream.

BACKGROUND OF THE INVENTION

It is frequently desirable to provide hood means to remove entrained liquid droplets from an air stream emitted from a selected work area, for example from a cooking surface where the air stream carries entrained grease and/or water from a paint spray area where the air stream carries entrained solvent droplets. Such means are generally connected to evacuation ducts to carry the air stream to a selected emission site. In many such applications it is desirable to separate the entrained liquid droplets before the air stream enters the duct because the liquid is flammable and fires can result in inaccessible portions of the cooperative duct work or the liquid may be greasy and result in buildup of dirt and particulate matter to restrict passage through the duct system.

In some previous hood assemblies the de-entrainment pads have been disposed at an angle relative to the horizontal so the liquid separated on the pad is collected at a low point in the pad to keep most of the pad clear of excess liquid so the pressure drop experienced by the gas stream flowing through the pad is not excessive.

SUMMARY OF THE INVENTION

The present invention recognizes that in many applications, for example portable kitchens which are periodically moved from location to location, space is at a premium and it is desirable to provide a collapsible hood assembly to receive an air stream carrying entrained liquid droplets.

Accordingly, the present invention provides an economical, straightforward, hood assembly which can be collapsed to a compact package to increase available space when the hood is not in use and can be easily opened to receive an air stream. Furthermore, the hood assembly can, advantageously, include means for removal of liquid droplets carried by the gas stream.

It has likewise been recognized that the hood arrangement provided by the present invention can be easily opened for cleaning and replacement of the de-entrainment pads can be accomplished with a minimum of effort.

Various other features of the present invention will become obvious to those skilled in the art upon reading the disclosure set forth hereinafter.

More particularly, the present invention provides an air receiving hood assembly having peripheral frame means; first apertured panel means hingedly joined along an edge of the frame means to extend outwardly from the frame means to receive an air stream and to be folded into the frame means in collapsed relation; side panel means hingedly connected to the edge of the peripheral frame means to be folded to the frame means and be opened outwardly away from the frame means to contact the first panel means to restrict flow of gas around the first panel means; seal panel means to be releasably connected to the first panel means to support the first panel means is gas receiving relation at an acute angle relative to the frame means and restrict flow of gas around the first panel means.

Gas permeable liquid separating de-entrainment pads can be provided to cover the apertures of the first panel means.

It is to be understood that examples of the present invention given hereinafter are not by way of limitation and that various changes can be made in the arrangement, form, or configuration of the illustrative examples without departing from the scope or spirit of the present invention.

Referring now to the figures which show one example of apparatus in accordance with the present invention:

FIG. 1 is a view of an arrangement in accordance with the present invention which provides two apertured liquid de-entrainment panels;

FIG. 2 is an illustration of the apparatus of FIG. 1 showing the panel members in separated relations;

FIG. 3 is an illustration of the apparatus of FIG. 1 showing the hood assembly in folded, compact configuration;

FIG. 4 is a view of an arrangement in accordance with the present invention which provides one apertured panel with gas permeable de-entrainment pads covering the aperture;

FIG. 5 is an illustration of the apparatus of FIG. 4 showing the de-entrainment panel means folded into the frame member; and,

FIG. 6 is an illustration of the apparatus of FIGS. 4 and 5 showing the hood assembly in folded compact configuration.

FIGS. 1–3 illustrate the relationship of the panel members of one example of an apparatus in accordance with the present invention having two apertured panels **2** connected to a peripheral frame **1**.

The hood assembly shown in FIGS. 1–3 is normally disposed to draw gas into the duct system from a selected area and frame member **1** can be adapted to be received in communicative relation by a duct assembly **3** so gases are drawn through aperture **4** of panel members **2** to be conducted to a selected remote location.

As shown in the example of the figures, the panels are connected to frame **1** by means of hinges **6** which provide

means for panels 2 to be pivoted from a position extending outwardly from frame 1, as shown in FIG. 2, to a generally horizontal, folded position within frame 1 as shown in FIG. 3. It will be noted that panels 2 can be cooperatively sized so that both panels can be folded into frame 1 in generally planar configuration.

Gas permeable liquid de-entrainment pads 5 can be provided to cover apertures 4 for removal of liquid droplets carried by the air stream flowing through apertures 4. The composition of the liquid may vary for different applications, for example when the hood assembly is disposed near a stove where food is prepared the liquid may include water and grease whereas in industrial applications various liquid solvents may be separated from the air stream. The de-entrainment media pads 5 are, advantageously, gas permeable and, for example, can be wire mesh, glass fiber, or other suitable materials depending on the application. The pads can be supported by frame means adapted to be received by retaining means, for example cooperative locks 10 provided by panels 2.

In accordance with another feature of the present invention, side panels 7 are connected to frame 1 by means of hinges 8 and can be extended outwardly from frame 1 in contact with panels 2 to provide a sealing means for the sides of panels 2 as shown in FIG. 1 to prevent flow of gas around panels 2. Seal edges, not shown can be provided on the inner surfaces of the panels 7 to facilitate restriction of air flow. Hinges 8 permit panels 7 to be folded outwardly from frame 1 as shown in FIGS. 1 and 2 to be folded to a position against frame 1 when the hood assembly is collapsed, as shown in FIG. 3.

Sealing panel 9 is provided to be fastened to both panels 2 to dispose the panels in open relation as shown in FIG. 1. In the example of the figures panel 9 is V-shaped to dispose panels at a selected angle relative to frame 1 and it will be noted that the relative position of the panels is determined by the length and configuration of panel 9. Furthermore, panel 9 prevents flow of air between the panels 2 so all gas is admitted to the hood assembly through apertures 4.

In the example of the figures, sealing panel 9 is connected to one of the panels 2 by means of hinges 15 and fastener means, for example screws 11, can be provided on sealing panel 9 to engage cooperative topped holes 11*a* of the opposite panel 2. When the hood assembly is collapsed as shown in FIG. 3 panel 9 is folded to a position on top of the panel 2 and is received by frame 1.

The hood is folded as illustrated sequentially by FIGS. 1–3 when the screws 11 are disengaged from topped holes 11*a* of panel 2. To collapse the hood, panel 9 is folded inwardly to a position on top of panel 2, to which it is hinged, and panels 2 are then folded into frame 1 where lock means, not shown, can be provided to retain the panels within the frame. When panels 2 have been folded into frame 1, side panels 7 are then folded to frame 1 to be locked in position (by means not shown) as shown in FIG. 3 and the collapsed assembly then occupies only a fraction of the space required when the hood is fully assembled.

It will be noted that in the example of the present invention shown in the figures de-entrainment pads 5 are easily replaced by releasing sealing panel 9 to separate panels 2 and provide access to the de-entrainment panels which can then be easily removed and replaced with clean pads.

FIGS. 4–6 illustrate an example of a hood assembly in accordance with the present invention having one de-entrainment panel 22.

A frame 21 is provided having an outlet 23 to be connected to cooperative gas receiving duct means (not shown). In the example of the figures, frame 21 of the hood assembly is disposed above the cooking surface 26 of a grill 25 by means of side panels 27 and a back panel 27*a*, connected to frame 21 by means of hinges 28. As shown, each panel 27–27*a* includes cooperative recessed

ridge means 24 to engage a side 25*a* of grill 25 adjacent surface 26.

Apertured panel 22 is connected to frame 21 by means of hinges 26' along the upper edge of the panel and extends substantially the length of frame 21 between extended side panels 27 and back panel 27*a* to define a gas receiving chamber. Side panels 27 are adapted to abut the edges of panel 22 to prevent gas flow around panel 22.

Panel 22 is, advantageously, disposed at an angle relative to frame 21 by means of a sealing panel 29 connected to back panel 27*a* as shown in FIGS. 4 and 5 by hinges 30 and to panel 22 by fasteners 31 which are received by cooperative lock receiving means (not shown) in panel 22.

Panel 22 includes apertures 34 to admit air flow to the hood assembly and liquid de-entrainment pads 35 are provided to cover the apertures for removal of liquid droplets carried by the air stream. Pads 35 can, for example, be of glass fiber, wire mesh, or other suitable gas permeable construction depending on the application.

As shown in FIGS. 4–5, the hood can be folded by releasing locks 31 so sealing panels 29 can be folded to frame 27*a* and panel 22 can be folded into frame 21. Back panel 27*a* and side panels 27 are then folded to frame 21 to form a compact lightweight hood assembly and to provide an open area over grill 25.

It will be noted that the de-entrainment pads can be easily removed for cleaning or replacement by releasing locks 31 so panel 21 is released from panel 27*a* to provide access to de-entrainment pads 25.

The invention claimed is:

1. A hood assembly having a multiplicity of folding panel members capable of defining a gas receiving plenum when in extended position comprising: a rectilinear flow-through support frame having first and second pairs of opposed sides; first and second pairs of opposed panel members coextensive respectively with said first and second pair of opposed sides, each panel member of each pair being hingedly connected along one edge thereof to an adjacent side of said support frame whereby said second pair of panel members can be extended outwardly from said support frame at an angle to the face of said support frame and said first pair of panel members can be extended outwardly from said support frame between said second pair of opposed panel members with the side edges thereof engaging against the opposed faces of said second pair of panel members to define a gas receiving plenum therewith; at least one of said panels of said first pair being at an acute angle to the face of said support frame when in extended position; seal panel means coextensive with and hingedly connected along an extended edge of one of said first pair of panel members to connectingly engage with the adjacent extended edge of the other of said first panel members to support said panel members in preselected gas receiving position with at least one of said panel members being at said acute angle to the face of sadi support frame; aperture means in at least one of said first panel members, the remainder of said panel members being gas impervious; and a de-entrainment pad means covering said aperture means.

2. The apparatus of claim 1, both of said panel members of said first pair being at acute angles to the face of said support frame when in extended position.

3. The apparatus of claim 1, one of said first pair of panels being at an acute angle to the face of said support frame and having said aperture disposed therein, said aperture being covered by said de-entrainment pad; the other of said panels of said first pair being substantially normal to the face of said support frame when in extended position, and being of gas impervious material.

References Cited

UNITED STATES PATENTS

462,127	10/1891	Hanson	55—422
1,015,430	1/1912	Farmer	312—258

(Other references on following page)

5			6
2,621,755	12/1952	Gray.	
2,627,854	2/1953	Sava ---------- 312—258	
2,825,500	3/1958	McLean.	
2,974,663	3/1961	Humbert.	
3,082,680	3/1963	Nevin et al.	
3,120,076	2/1964	Zuch ---------- 312—258	
3,372,632	3/1968	Stalker.	
3,378,934	4/1968	Erickson ---------- 55—482	
3,412,530	11/1968	Cardiff ---------- 55—419	
404,194	5/1889	Holm ---------- 98—115	
2,258,344	10/1941	Walker ---------- 119—19	

OTHER REFERENCES

Grease Fillers—Research Products Corporation of Madison, Wis., pp. 1–4, dated Sept. 24, 1965.

FRANK W. LUTTER, Primary Examiner

B. NOZICK, Assistant Examiner

U.S. Cl. X.R.

55—493, 504, 511; 98—115; 312—258