

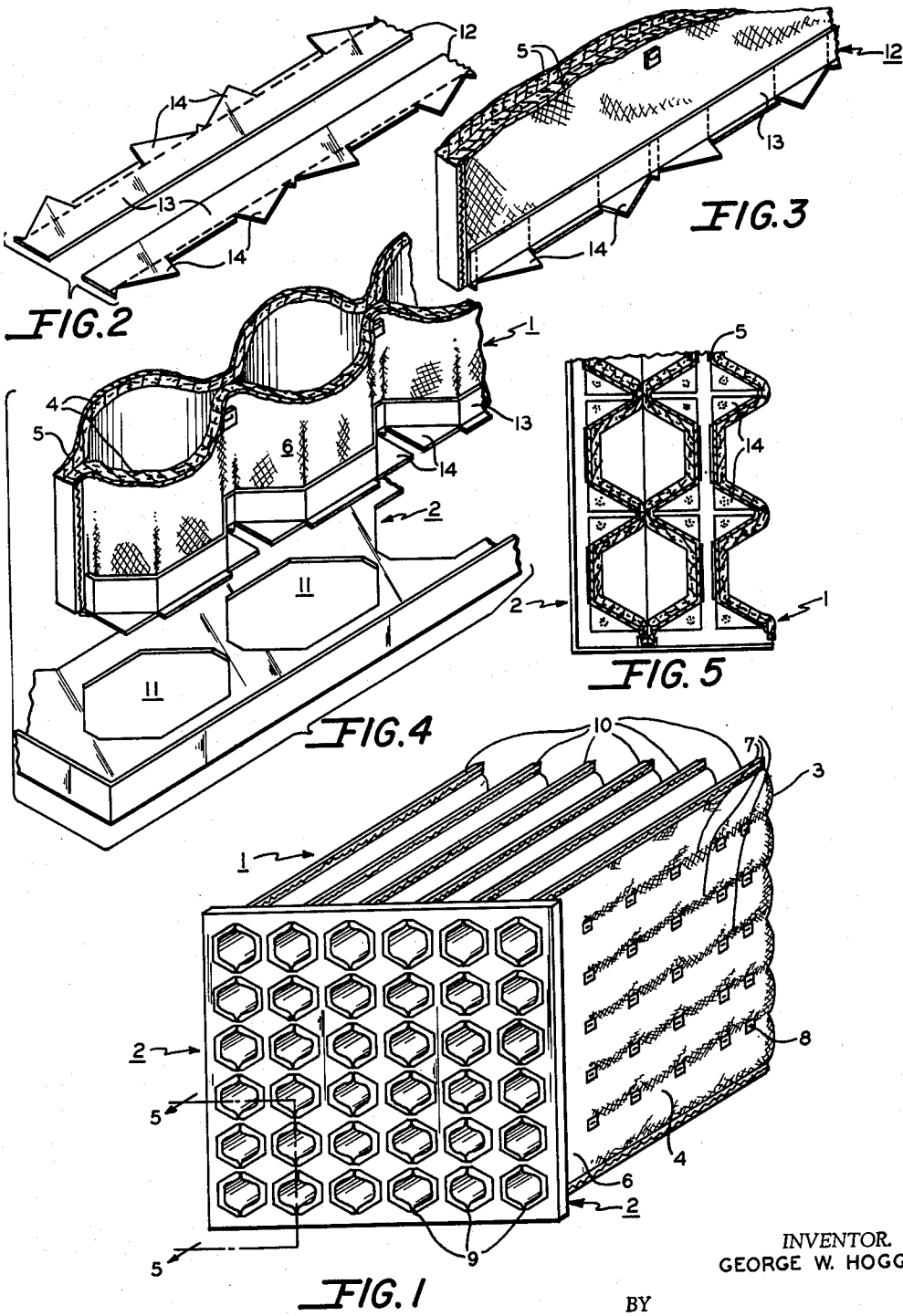
March 10, 1964

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3,124,440

POCKET-TYPE FILTER STRUCTURE

Filed April 20, 1961



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3,124,440

POCKET-TYPE FILTER STRUCTURE

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Filed Apr. 20, 1961, Ser. No. 104,357

3 Claims. (Cl. 55-484)

This invention relates to fluid filters and more particularly to improved high efficiency pocket-type filters for filtering contaminants from a dirty gas stream.

In accordance with the present invention an economic, efficient and easy to assemble structural arrangement is obtained for pocket gas filters of a type similar to that disclosed in assignee's co-pending application Serial No. 104,200, filed April 17, 1961. Further, with the structural arrangement for pocket-type filters as disclosed herein, it is possible to provide broad variations in pocket contour without restrictions due to filter material thickness. Moreover, the structural arrangement of the present invention insures firm and uniform application of pocket-formed filter media to a support frame, permitting ready adjustment to possible changes in size between media and support frame and avoiding some of the expensive stamping and casting procedures heretofore required in the art.

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

More particularly, the present invention provides in a pocket-type filter structure wherein a pleat of flexible filtering material is divided into at least two pocket members having an open-end mouth immediately adjacent supporting portions of the pleat with the pleat being fastened through the supporting portions to a frame having a gas inlet passage co-operable with the open-end mouth of the pleat, a pliant skirt means fastened to the supporting portions of the pleat and bent to displace the supporting portions to form the open-end mouth of the pocket members into individual openings for each pocket member, the pliant skirt means including apron portions fastened to the frame so that individual openings of the pleat are aligned with the gas inlet passage of the frame.

It is to be understood that various modifications can be made in the arrangement, form and construction of the apparatus disclosed herein without departing from the scope or spirit of the present invention.

Referring to the drawing:

FIGURE 1 is an overall oblique view of a pocket-type filter arrangement of the present invention, including an apertured frame member arranged to support separate pocket-formed pleats formed from webs of flexible filtering material;

FIGURE 2 is an enlarged oblique view of a portion of a pliant skirt strip pair which can be fastened to the supporting portions of a pleat, bent and subsequently fastened to an apertured support frame as in FIGURE 1;

FIGURE 3 is an oblique view of the skirt strip portions of FIGURE 2, disclosing one of the strips fastened to a pleat supporting portion with the apron portions of the strip bent at right angles to the fastening portion of the strip;

FIGURE 4 is an exploded oblique view of a pocket member portion and apertured frame portion prior to assembly, disclosing a skirt strip portion after it has been bent to displace the supporting portion of the pleat to which it has been fastened;

FIGURE 5 is a cross-sectional plan view of the downstream side of a support frame with pocket members assembled thereto.

Referring to FIGURE 1 of the drawings, a plurality of spaced pocket-formed pleats 10 are disclosed as connected to and supported by apertured frame 2. Pleats

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10 advantageously can be similar to the pocket-formed pleats of assignee's aforementioned co-pending application Serial No. 104,200 and, as such, can be made from any one of a number of suitable gas filtering materials which are relatively non-stretchable and porous. Advantageously, a woven fabric or a fibrous glass type material having fibers of substantially one micron in size can be used. To provide tensile strength to pleats 10 and to insure that the pleats are properly supported when positioned in the fluid stream to be filtered, each pleat 10 can be faced with a scrim-type material 5, this material being stronger in nature than the pleat and of maximum porosity. As in applicant's aforementioned co-pending application, each pleat is formed from a web of flexible filtering material that is provided with a mid-point fold line 3 which divides each web into a pair of pleat forming sections 4 having terminal supporting portions 6 remote from fold line 3. The pleat forming sections are folded to face each other and form the pleat 10. Spaced seams 7 are then extended across the pleat transverse fold line 3 to join the facing sections of the pleat and form a plurality of pocket members having an open-end mouth immediately adjacent the supporting portions 6 of the pleat. Seams 7 can be stitched or, if desired and like the seams in the aforementioned application, can be comprised of a plurality of spaced staples 8 with reinforcing member coupled therewith to minimize tearing. Since construction of the pleats 10 with the rows of side-by-side pockets is fully disclosed in assignee's aforementioned co-pending application, further details thereof are not set forth herein.

As can be seen in the drawings and in accordance with the invention, to support pleats 10 in a fluid stream to be treated, apertured frame 2 is disclosed. This apertured frame includes spaced parallel rows 9 of gas inlet passages in the form of spaced apertures 11. Although apertures 11 are disclosed as hexagonal in shape, it is to be understood that other shapes can be used if so desired.

Referring to FIGURES 2-5 inclusive, the novel structural arrangement for fastening pocket-formed pleats 10 to apertured frame 2 is disclosed. This arrangement includes pairs of opposed skirt strips 12 of pliant material, the strips of each pair being mirror images of each other with each of strips 12 including a fastening portion 13 and apron portions 14 (FIGURE 2). It is to be understood that strips 12 can be formed from any one of a number of well known pliant materials and, advantageously, can be stamped from thin gauge aluminum sheet. In this connection, it is to be noted that in stamping skirt strips 12, apron portions 14 of the pairs of strips are made of suitable shape to conform with the peripheral contour of apertures 11 in frame 2 after strips 12 have been bent and are ready to be assembled to frame 2 (as described hereinafter). Once strips 12 of a pair have been stamped out, the fastening portions 13 of the strips can be coated with a suitable adhesive, such as a neoprene cement, and the strips can then be brought into facing engagement with the outside walls of supporting portions 6 of a pocket-formed pleat 10. At this point, apron portions 14 of the strips can be turned at right angles to the fastening portions 13 of the strips. It is to be understood that, if desired, the turning of apron portions 14 also can be accomplished prior to actual fastening of the strips to the supporting portion of a pleat. It further is to be understood that apron portions of one strip of a pair extends at right angles from the fastening portion of such strip in a direction opposite to the direction in which the apron portions of the other strip of the pair extends. Once a pliant pair of strips has been appropriately assembled to supporting portions 6 of a pleat 10, the strips of the pair can be manually bent in an opposing manner to conform

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with the apertures of the frame with which they are to be assembled. In this connection, it is to be noted that the bending of strips 12 causes fastening portions 13 of the strips to displace the supporting portions of the pleat 10 in successively opposed crests and valleys to form individual openings substantially aligned with the pocket members of the pleat.

Referring to FIGURE 4 of the drawings, when this has been accomplished, pleat 10 is assembled to the apertured frame with the individual openings of the pleat, which openings are substantially in alignment with the pocket members of the pleat, also in alignment with the spaced apertures 11 of an apertured row 9 in frame 8. It is to be understood that any suitable means for fastening apron portions 14 of strips 12 to the downstream side of frame 8 can be used; for example, the bonding of the apron portions to the frame can be accomplished by stapling, spot welding, by use of an adhesive or by riveting. It also is to be understood that, if desired, the apron portions of the strips can include tab members which can be adopted to engage in slots provided around the periphery of the apertures of frame 8 (not shown), the tab members subsequently being folded over to thus provide a quick connect and disconnect arrangement for the pleat and frame. Finally, it is to be noted that the simple and efficient pliant skirt strip construction with the subsequent forming of apertures in the supported pleat, not only provides an efficient and novel arrangement for assembling flexible filtering pocket-type material to a support frame, but, in addition, the pliant skirt strips serve as strengthening ribs to give torsional and dimensional stability to the frame with which they are associated.

The invention claimed is:

1. A pocket type fluid filter comprising:

- (a) spaced pleats of flexible filtering material with each pleat divided into at least two pocket members having an open-end mouth immediately adjacent opposite supporting portions of said pleat;
- (b) frame means including a plurality of spaced parallel rows of spaced apertures;
- (c) a plurality of pairs of separate contiguous skirt strips of pliant material;
- (d) each of said skirt strip pairs being fastened to said opposite supporting portions of a pleat and bent

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one with respect to the other in mirror image form to displace said supporting portions in continuously running successively opposed crests and valleys to form apertures substantially in alignment with said pocket members of said pleat and in conformation in shape to the apertures of said frame; and,

(e) apron means to fasten said skirt strip pairs to said frame to extend along the periphery of the aperture rows in said frame so that the apertures formed by each of said skirt strip pairs in a pleat are substantially aligned with the spaced apertures of an aperture row of said frame.

2. A pocket type fluid filter comprising:

(a) a pleat of flexible filtering material divided into at least two pocket members having an open-end mouth immediately adjacent opposite supporting portions of said pleat;

(b) frame means including a row of spaced apertures;

(c) continuous skirt strip means of pliant material;

(d) said skirt strip means being fastened to said opposite supporting portions of said pleat and bent along said opposite supporting portions in mirror image form so as to displace said supporting portions in continuous running successively opposed crests and valleys to form apertures substantially in alignment with said pocket members of said pleat and in conformation in shape to the apertures of said frame; and,

(e) apron means to fasten said skirt strip means to said frame to extend along the periphery of the aperture rows in said frame so that the apertures formed in said pleat by said skirt strip means are substantially aligned with the apertures of said frame.

3. The apparatus of claim 2, said apron means comprising tab members integral with said strip means and extending substantially at right angles away from said apertures formed by said strip means to face said frame means for assembly thereto.

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