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GAS FILTER BAG STRUCTURE

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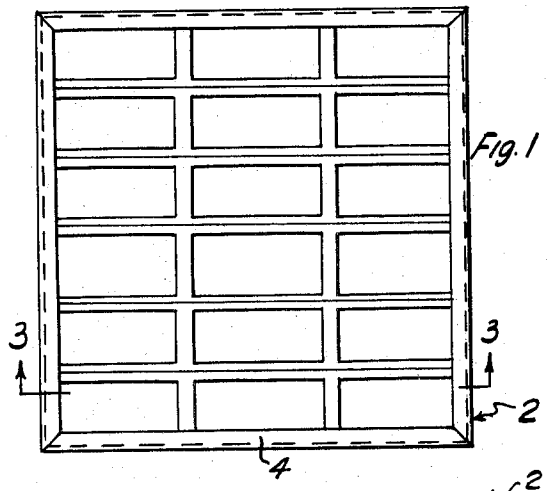


Fig. 1

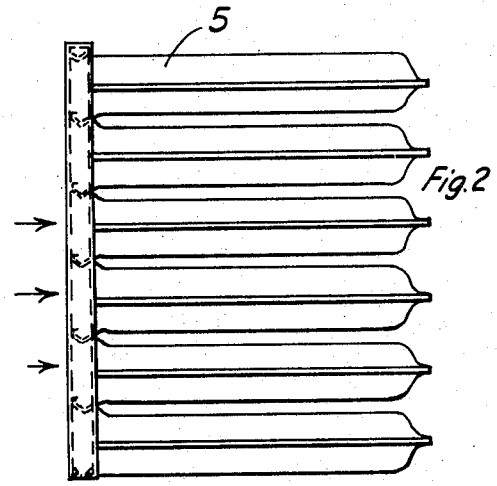


Fig. 2

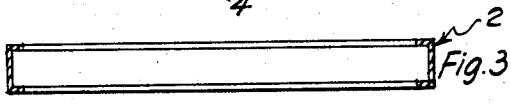


Fig. 3



Fig. 4

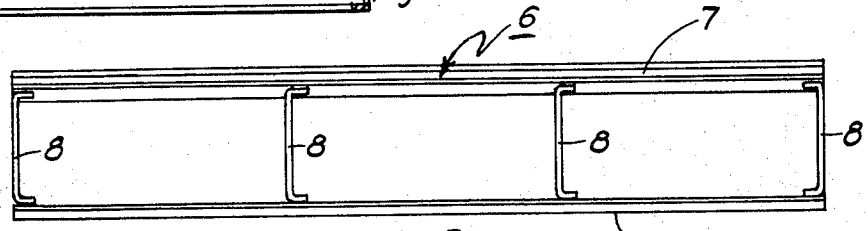


Fig. 5

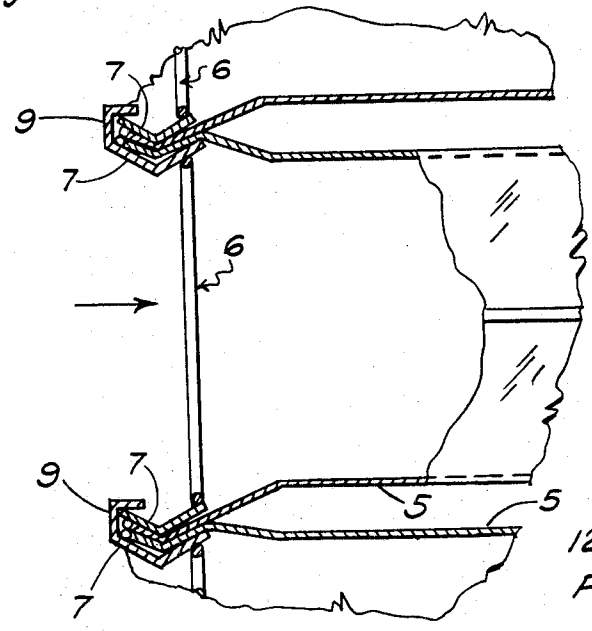


Fig. 6

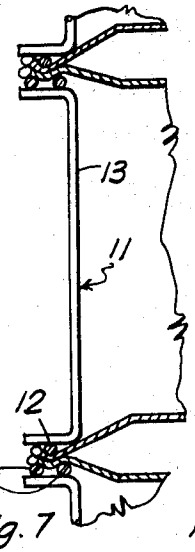


Fig. 7

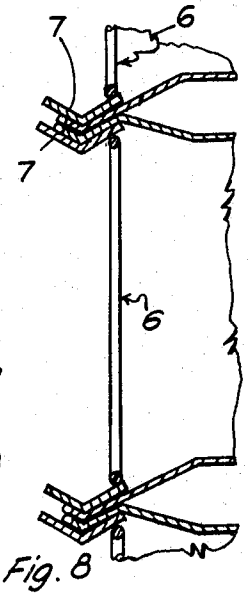


Fig. 8

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GAS FILTER BAG STRUCTURE

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ABSTRACT OF THE DISCLOSURE

An improved gas filter bag structure comprising: a plurality of side-by-side filter bags each having their mouth portion held in an open position by a rigid mouth-shaping member, the opposite extremities of the mouth portions of the filter bags being inserted in a channel-shaped flow-through border frame sized to hold the mouth portions of the filter bags in fast side-by-side relation to grip such mouth portions therebetween.

BACKGROUND OF THE INVENTION

The present invention relates to an improved filter apparatus for gas separation, and more particularly, to an improved support structure for holding the mouth portions of filter bags in side-by-side relation.

A number of filter bag arrangements are known in the art of gas filtration wherein the mouth portions of the bags are retained in a flow-through border frame. These past arrangements have included complex, time-consuming and expensive structures to fasten the mouth portions to the support frame and have required considerable effort in assembly and maintenance, further requiring various sealant materials along a multitude of places to avoid possible leak passages between the frame and the mouth portions of the bags.

SUMMARY OF THE INVENTION

The present invention, recognizing that past support arrangements have presented problems in construction, mounting, sealing, wear, clamping and leakage, as well as problems in assembly and removal, provides a filter bag support structure arrangement which is straightforward and economical in construction and maintenance, allowing quick installation and removal with a minimum of leakage and a maximum of access for installation, repair and removal. In addition, the present invention provides an arrangement which permits accurate relative alignment of the several filter bags in a support structure and avoiding the application of expensive sealant materials along the edges of the bags.

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

More particularly, the present invention provides an improved filter bag structure comprising: at least two open-mouth filter bags, each having a flow-through rigid mouth-shaping member disposed in the open-mouth portion of the bag; and a flow-through peripheral border frame means of channel-shaped cross section to receive opposed ends of each of the mouth-shaping members and the mouth portions associated therewith to support the filter bags, the border frame means being sized relative the breadth of the mouth-shaping members so that the mouth-shaping members are held in fast, side-by-side relation to firmly grasp the mouth portions of the filter bags therebetween.

It is to be understood that various changes 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 which discloses one advantageous embodiment of the present invention and several modifications thereto:

FIG. 1 is a plan view of an improved filter bag structure of the present invention;

FIG. 2 is a side view of the filter bag structure of FIG. 1;

FIG. 3 is a cross-sectional view of the border frame only taken in a plane through line 3–3 of FIG. 1;

FIG. 4 is an enlarged side view of one advantageous embodiment of a mouth-shaping member for one of the filter bags;

FIG. 5 is a plan view of the mouth-shaping member of FIG. 4;

FIG. 6 is an enlarged side view of the mouth-shaping member of FIG. 5 disclosing details of the mouth-shaping member in its relationship with an immediately adjacent mouth-shaping member;

FIG.7 is an enlarged side view silimar to FIG. 6, disclosing a modified mouth-shaping member arrangement; and

FIG. 8 is an enlarged side view similar to FIGS. 6 and 7 disclosing still another modified mouth-shaping arrangement.

Referring to the drawings, the novel filter structure is disclosed as including a flow-through peripheral border frame **2** which can be of rectangular configuration and which, as can be seen in FIG. 3 of the drawing, is of U- or channel-shaped cross section. Advantageously, frame **2** can be made from any one of a number of suitably rigid materials such as a light gauge aluminum. At least one side of frame **2**, as designated by reference numeral **4**, can be moved aside during bag assembly operations to provide an over-all frame of U-shaped configuration for insertion of opposed ends of filter bags **5** in opposed channels of frame **2** so that the bags are in side-by-side relation, all in a manner described hereinafter. Referring to FIGS. 2 and 4 to 6 of the drawings, each of filter bags **5** can be provided with a rigid mouth-shaping member **6** which can be made of a suitably rigid material such as aluminum. Mouth-shaping member **6** can be sized so that it can be readily disposed in an open-mouth portion of a filter bag **5** in snug relationship therewith. Once a mouth-shaping member is properly disposed in a filter bag, opposed ends of the mouth of the bag can then be inserted in opposed U-shaped channels of opposed sides of border frame **2**, the side **4** of frame **2** being set aside to permit insertion of the bag mouths. Thus, the bags can be supported in side-by-side relation in border frame member **2**. In this connection, it is to be noted that border frame member **2** is so sized relative the breadth of mouth-shaping members **6** that the mouth-shaping members are held in fast side-by-side relation when side **4** is replaced so as to firmly grip the mouth portions of filter bags **5** therebetween. It is to be understood that filter bags **5** can be made from any one of a number of suitable filter media such as a random lay fiber glass material with a selected amount of organic binder. It further is to be understood that other types of filter media can be utilized, and that the filter media need not be shaped in the manner disclosed, but can assume any one of several shapes well known in the art.

As can be seen in FIGS. 2 and 4 to 6 of the drawing, each of mouth-shaping members **6** comprises a pair of spaced parallel side bars **7** connected together by sets of spaced transverse cross bars **8**. It is to be noted that side bars **7** of each mouth-shaping member **6** is of corresponding V-shaped cross section with the legs of the V of both side bar cross sections extending in a similar direction whereby adjacent side bars **7** of adjacent mouth-shaping members **6** nestingly grip the mouth portions of

filter bags **5** therebetween when they are inserted in border frame member **2**, attention being directed particularly to FIG. 6 of the drawing. As also will be noted in FIG. 6 of the drawing, each of the pairs of spaced parallel side bars **7** has one correspondingly positioned bar of the pair provided with a longitudinally extending hooked or right angle edge member **9** which extends therefrom in hooked overlap relation with the top edge of the other bar of the pair of bars **7** of an immediately adjacent mouth-shaping member **6** to grip the adjacent mouth-shaping members in fast relation and to cover the top portions of the mouth of the filter bag **5** nesting therebetween. As can be seen in FIG. 8, in another embodiment of the invention, the hook-shaped member can be omitted if so desired.

Referring to FIG. 7 of the drawings, mouth-shaping members **11** are disclosed comprised of spaced parallel cylindrical side rods **12** connected together by sets of spaced transverse cross bars **13** in a manner similarly described for the embodiment of FIG. 5. Each mouth-shaping member **11** of FIG. 7 has a single side rod **12** on one side and a pair of selectively spaced parallel rods **12** on the other side whereby the single rod of one side of a mouth-shaping member **11** nests with a pair of selectively spaced parallel rods of an adjacent side of an adjacent mouth-shaping member to grip the mouth portions of the filter bags therebetween.

In the arrangements abovedescribed, it can readily be seen that it only is necessary to quickly insert a rigid mouth-shaping member in a filter bag and slip the opposed ends of the mouth-shaping members and the surrounding mouth portions of the filter bag in the opposed channel sections of opposite sides of a border frame **2**. Once the selected number of filter bags **5** are placed in side-by-side relation in frame **2**, the open-ended side **4** of frame member **2** can be closed to hold the filter bag mouth portions in fast relationship. Thus, the over-all filter bag structure can be assembled in a quick and efficient manner with a minimum of steps, with a minimum of materials, and without edge sealant materials.

The invention claimed is:

1. An improved filter bag structure comprising: at least two open-mouthed filter bags, each having a flow-through rigid mouth-shaping member disposed in the open mouth portion of said bag; and a flow-through peripheral border frame means of channel-shaped cross section to receive opposed ends of each said mouth-shaping members and the mouth portions associated therewith to support said filter bags, said border frame means being so sized relative the breadth of said mouth-shaping members that said mouth-shaping members are held in fast side-by-side relation to firmly grip the mouth portions of said filter bags therebetween, said mouth-shaping members each comprising a pair of spaced parallel side bars connected together by sets of spaced transverse, cross bars, said side bars having a corresponding V-shaped cross section with the legs of the V of both side bar cross sections extending in a similar direction whereby adjacent side bars of adjacent mouth-shaping members nestingly grip the mouth portions of said filter bags therebetween.

2. The apparatus of claim **1** each of said pair of spaced parallel side bars of each mouth-shaping member having one correspondingly positioned bar thereof with a longitudinally extending hooked top edge member extending therefrom in hooked overlap relation with the top edge of the other bar of an immediately adjacent mouth-shaping member to hold said adjacent mouth-shaping member in fast relation and to cover the top portions of said filter bags nesting therebetween.

3. The apparatus of claim **1**, said border frame means and said mouth-shaping members being of rectangular configuration with one side of said border frame being removable to permit insertion of said filter bag mouth portions with their rectangular mouth-shaping members disposed therein.

4. An improved filter bag structure comprising: at least two open-mouthed filter bags each having a flow-through rigid mouth-shaping member disposed in the open mouth portion of said bag; and a flow-through peripheral border frame means of channel-shaped cross section to receive opposed ends of each of said mouth-shaping members and the mouth portions associated therewith to support said filter bags, said border frame means being so sized relative the breadth of said mouth shaping members that said mouth-shaping members are held in fast side-by-side relation to firmly grip the mouth portions of said filter bags therebetween, said mouth shaping members each comprising spaced parallel cylindrical side rods connected together by sets of spaced transverse cross bars, said mouth-shaping members each having a single side rod on one side and a pair of spaced parallel rods on the other side whereby the single rod of one mouth-shaping member nests with said pair of parallel rods of an adjacent mouth-shaping member to grip the mouth portions of said filter bags therebetween.

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