

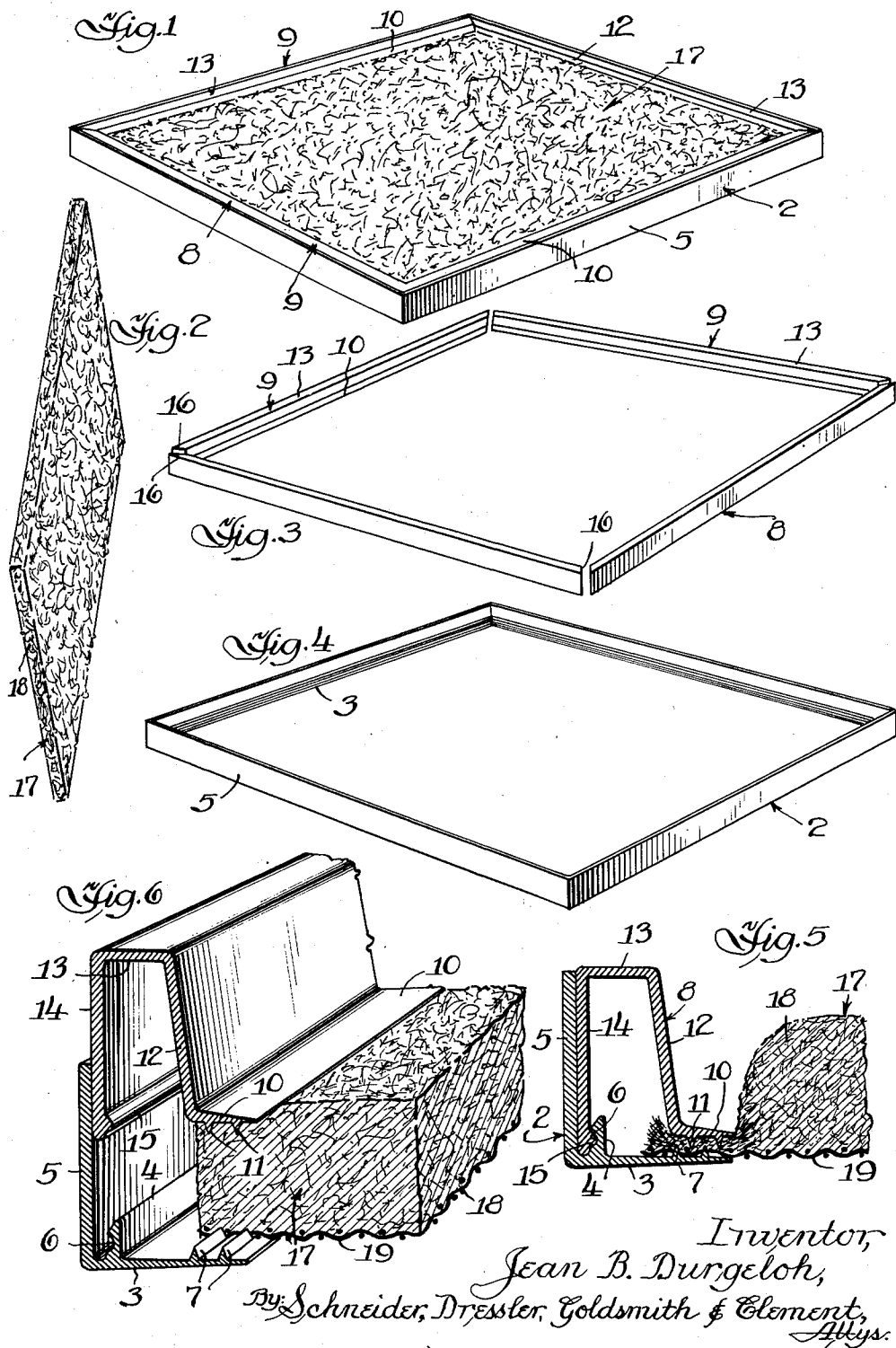
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FILTER

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1

3,076,303
FILTER

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This invention relates to a filter for filtering air or other gas, and is particularly concerned with a frame for holding a filter media to facilitate the handling and use of the filter.

Air filters of the type with which the present invention is concerned are used for air conditioning or heating systems. The filter preferably comprises a fibrous web in which a plurality of fibers are adhesively bonded to each other and to a flexible open cloth backing to retain its shape. Examples of the fibrous web are fully disclosed in the prior copending patent applications of Joseph J. Klein, Serial Nos. 676,278 and 676,657 filed August 5, 1957, and August 6, 1957, respectively, now Patents No. 3,005,516 and No. 2,988,169, respectively.

Although it is preferred to use a filter media of the type described in the above mentioned patent applications, it will be understood that the frame hereinafter described may be used with any suitable filter media, and the invention is not restricted to any specific material insofar as the filter media is concerned.

The frame may be fabricated of thermoplastic or thermosetting material, or, if desired, metal or other similar material may be used. The frame comprises a base member which preferably is made in one piece to provide stability for the frame. The top member is preferably made of a plurality of parts for convenience of manufacture. The top member may be made in any desirable length and then cut into parts of a length to fit any size of base member, thereby avoiding the necessity of stocking a large inventory of top members of different sizes. The top parts abut each other at their ends, and are secured together at said ends in any suitable manner. If the frame is fabricated of thermoplastic material, it is preferred to heat seal the adjoining ends of the top parts. If the frame is made of thermosetting material or of metal the ends are preferably stapled together, or they may be adhered by any suitable adhesive.

The structure by means of which the above noted and other advantages of the invention are attained will be specifically described in the following specification, taken in conjunction with the accompanying drawing, showing a preferred illustrative embodiment of the invention, in which:

FIG. 1 is a perspective view of a filter embodying the invention;

FIG. 2 is a perspective view of the fibrous web which forms the filter media;

FIG. 3 is a perspective view of the top parts of the frame in position to be secured at the abutting ends to form a top member;

FIG. 4 is a perspective view of the unitary base member of the frame;

FIG. 5 is a fragmentary perspective view, showing the base and top frame members associated with one edge of the filter media, before the frame members are secured together; and

FIG. 6 is a fragmentary cross sectional view showing the frame members in assembled position with one edge of the filter media secured in place between the frame members.

Referring to the drawings, the reference numeral 2 indicates the base frame member which comprises a wall 3 having an inner flange 4 and an outer flange 5 extending perpendicularly thereto. The flange 5 is at the outer

2

end of the wall 3 and is of considerably greater height than flange 4 which is spaced inwardly therefrom. The surface of flange 4 facing flange 5 is provided with a longitudinally extending recess 6 intermediate its height.

Inwardly of the flange 4, wall 3 is provided with a plurality of longitudinally extending ribs 7.

The top frame member 8 comprises a plurality of parts 9 arranged in end to end relationship. The abutting ends of parts 9 are preferably shaped so that the top frame member fits within the perimeter of the base member. In the drawings, the frame members are rectangular, but it will be understood that the frame may be any desired configuration.

Each top part 9 comprises a wall section 10 approximately parallel to wall 3 inwardly of flange 4, and having longitudinally extending ribs 11 similar to ribs 7 of wall 3. Ribs 7 and 11 are offset laterally, relative to each other, to provide maximum security for clamping the edges of the filter media between the base and top frame members. Wall section 10 is extended upwardly, as indicated at 12, outwardly, as indicated at 13, and downwardly, as indicated at 14. Wall 14 is of a width substantially equal to the distance between flanges 4 and 5, so that it will fit snugly therebetween. The lower edge portion of wall 14 is provided with a longitudinally extending projection 15, adapted to fit into recess 6.

The edge of flange 4 continuous to the upper edge of recess 6 projects slightly beyond the projection, so that projection 15 will snap into recess 6 when upper member 9 is pressed down to force wall 14 between flanges 4 and 5. Flange 4 has a slight resilience so as to facilitate the snapping engagement of the top and base members of the frame. The ends of each top frame member 9 are preferably cut at an angle, as indicated at 16, to form neat joints with each other. These joints may be heat sealed when the frame is made of thermoplastic material, or may be stapled or adhered in any suitable manner if the frame is made of metal or thermosetting material.

The filter 17 preferably comprises a plurality of fibers 18 bonded to each other and to an open cloth backing 19. In assembling the filter, the filter media is positioned with its edges overlying ribs 7 of wall 3. The upper frame is then positioned with the outer surface of wall 14 abutting the inner surface of flange 5, as shown in FIG. 6. The top frame member is then pressed downwardly until projection 15 snaps into recess 6. This position is shown in FIG. 5, wherein the edge of the filter media is substantially compressed between wall 3 and wall section 10. Ribs 7 and 11 are offset relative to each other, and preferably are of such length as to form a vertical overlap therebetween when the base and top frame members are snapped together with projection 15 fitting within recess 6. The vertical overlap between ribs 7 and 11 makes it substantially impossible to pull the edge of the filter media out of engagement with the frame members. Preferably the filter media is stretched tautly between the walls of the frame before the upper frame member is clamped into position.

Although I have described a preferred embodiment of my invention in considerable detail, it will be understood that the description thereof is intended to be illustrative, rather than restricted, as many details of the invention may be modified or changed without departing from the spirit or scope of the invention. Accordingly, I do not desire to be restricted to the exact structure described.

I claim:

1. A filter frame comprising an integral base member having one wall in the form of a closed figure and spaced inner and outer flanges perpendicular to said wall extending around the perimeter of said wall, a top member

3

comprising a plurality of parts adapted to fit within the perimeter of said outer flange with the ends thereof in abutting relationship, each of said parts having an outer wall with its lower edge fitting snugly between said flanges and having a surface to surface engagement with both of said flanges, and interengageable means on said outer wall and one of said flanges to hold said frame members against accidental separation, each of said parts having a wall section parallel to the wall of said base member inwardly of said inner flange, and longitudinally extending ribs on the wall of said base member and said wall section projecting toward each other, the ribs on the wall of said base member and the ribs on said wall section being offset relative to each other and overlapping vertically when said base and top members are assembled, whereby the ribbed portions of the wall of said base member and said wall section are adapted to cooperate with each other to hold an edge of a filter media between said first mentioned wall and said wall section.

2. A filter comprising a filter media, and a filter frame comprising a base member and a top member, said base member having a wall and a pair of parallel flanges extending at right angles to said wall, said top member having wall sections parallel to the wall of said base member, the wall of said base member and said wall sections each having integral projections spaced from said flanges and cooperating with each other to hold the outer edge of a filter media therebetween, a second wall integral with one of said wall sections, said second wall being spaced outwardly of said one wall section and extending perpendicularly thereto, said parallel flanges being spaced apart and having a surface to surface engagement with opposite faces of said second wall, and interengageable means on said second wall and one of said flanges to secure said base member and top member together to clamp the outer edge of said filter media between said base and top members.

3. A filter comprising a filter media, and a filter frame comprising a base member and a top member, said base member having a wall and a pair of parallel flanges extending at right angles to said wall, said top member having wall sections parallel to the wall of said base member, the wall of said base member and said wall sections having integral vertically overlapping projections spaced from said flanges and cooperating with each other to hold the outer edge of a filter media therebetween, a second wall integral with one of said wall sections, said second wall being spaced outwardly of said one wall section and extending perpendicularly thereto, said parallel flanges being spaced apart and having a surface to surface engagement with opposite faces of said second wall, a longitudinally extending recess in one of said flanges, and a projection on said second wall, said last mentioned projection being engageable with said recess to secure said base member and top member together to clamp the outer edge of said filter media between said base and top members.

4. A filter frame comprising a base member and a top member, said base member having a wall, an outer flange, and an inner flange spaced from said outer flange, said flanges extending approximately perpendicularly to said wall, said top member having an outer wall and an inner wall extending approximately parallel to said outer wall in spaced relationship thereto, one edge portion of said outer wall fitting between said flanges and having a surface to surface engagement with both of said flanges, and interengageable means of said outer wall and one of said flanges to retain said base member and said top member against accidental separation, and to hold said inner wall in position to cooperate with the wall of said base member, in an area spaced from said flanges, to thereby hold against accidental displacement one edge of a filter media positioned between said inner wall and the wall of said base member.

5. A filter frame comprising a base member and a

4

top member, said base member having a wall, an outer flange, and an inner flange spaced from said outer flange, said flanges extending approximately perpendicularly to said wall, said top member having an outer wall and an inner wall extending approximately parallel to said outer wall in spaced relationship thereto, one edge portion of said outer wall fitting between said flanges and having a surface to surface engagement with both of said flanges, a longitudinal recess in one of said flanges and a projection on said outer wall engageable with said recess to retain said base member and said top member against accidental separation, and to hold said inner wall in position to cooperate with the wall of said base member, in an area spaced from said flanges, to thereby hold against accidental displacement one edge of a filter media positioned between said inner wall and the wall of said base member.

6. A filter frame comprising a base member and a top member, said base member having a wall, an outer flange, and an inner flange spaced from said outer flange, said flanges extending approximately perpendicularly to said wall, said top member having a downwardly extending outer wall and a downwardly extending inner wall spaced from said outer wall and extending approximately parallel thereto, the lower edge portion of said outer wall fitting between said flanges and having a surface to surface engagement with both of said flanges, and an interengageable projection and recess on said outer wall and one of said flanges to retain said base member and said top member against accidental separation, and to hold said inner wall in position to cooperate with the wall of said base member in an area spaced from said flanges, to thereby hold against accidental displacement one edge of a filter media positioned between said inner wall and the wall of said base member.

7. A filter frame comprising an integral base member having a wall in the form of a closed figure, an outer flange and an inner flange spaced from said outer flange, said flanges extending approximately perpendicularly to said wall and extending around the perimeter of said wall, a top member comprising a plurality of parts adapted to fit within the perimeter of said outer flange with the ends thereof in abutting relationship, each of said parts having an outer wall and an inner wall, the lower edge portion of said outer wall fitting between said flanges and having a surface to surface engagement with both of said flanges, and interengageable means on said outer wall and one of said flanges to retain said base member and said top member against accidental separation, and to hold said inner wall in position to cooperate with the wall of the base member in an area spaced from said flanges to thereby hold against accidental displacement one edge of a filter media positioned between said inner wall and the wall of said base member.

8. A filter frame comprising an integral base member having a wall in the form of a closed figure, an outer flange and an inner flange spaced from said outer flange, said flanges extending approximately perpendicularly to said wall and extending around the perimeter of said wall, a top member comprising a plurality of parts adapted to fit within the perimeter of said outer flange with the ends thereof in abutting relationship, each of said parts having an outer wall and an inner wall, the lower edge portion of said outer wall fitting between said flanges and having a surface to surface engagement with both of said flanges, and interengageable means on said outer wall and one of said flanges to retain said base member and said top member against accidental separation, and to hold said inner wall in position to cooperate with the wall of the base member in an area spaced from said flanges, each of said parts having a wall section parallel to the wall of said base member, to thereby hold against accidental displacement one edge of a filter media positioned between said wall section and the wall of said member.

9. A filter frame comprising an integral base member having a wall in the form of a closed figure, an outer flange, and an inner flange spaced from said outer flange,

5

said flanges extending approximately perpendicularly to said wall and extending around the perimeter of said wall, a top member comprising a plurality of parts adapted to fit within the perimeter of said outer flange with the ends thereof in abutting relationship, each of said parts having an outer wall and an inner wall, the lower edge portion of said outer wall fitting between said flanges and having a surface to surface engagement with both of said flanges, a longitudinal recess in said inner flange, a projection on said outer wall engageable with said recess to retain said base member and said top member against accidental separation, and to hold said inner wall in position to cooperate with the wall of the base member in an area spaced from said flanges, each of said parts having a wall section parallel to the wall of said base member, to thereby hold against accidental displacement one edge of a filter media

5

10

15

6

positioned between said wall section and the wall of said base member.

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