

May 3, 1960

H. V. FIRST

2,935,157

SUPPORT FOR AIR FILTER UNITS AND THE LIKE

Filed July 18, 1958

2 Sheets-Sheet 1

FIG. 1

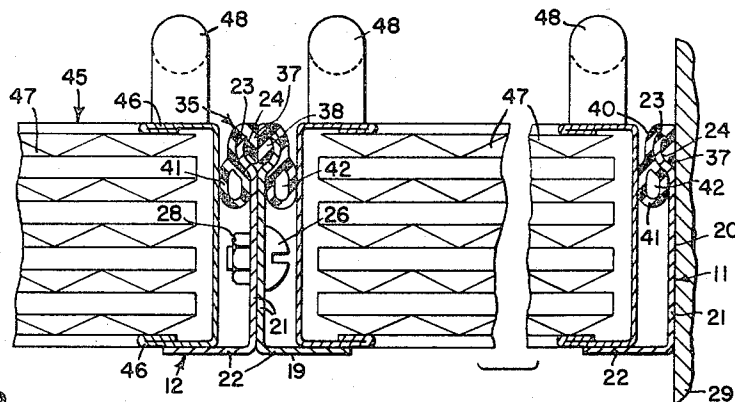
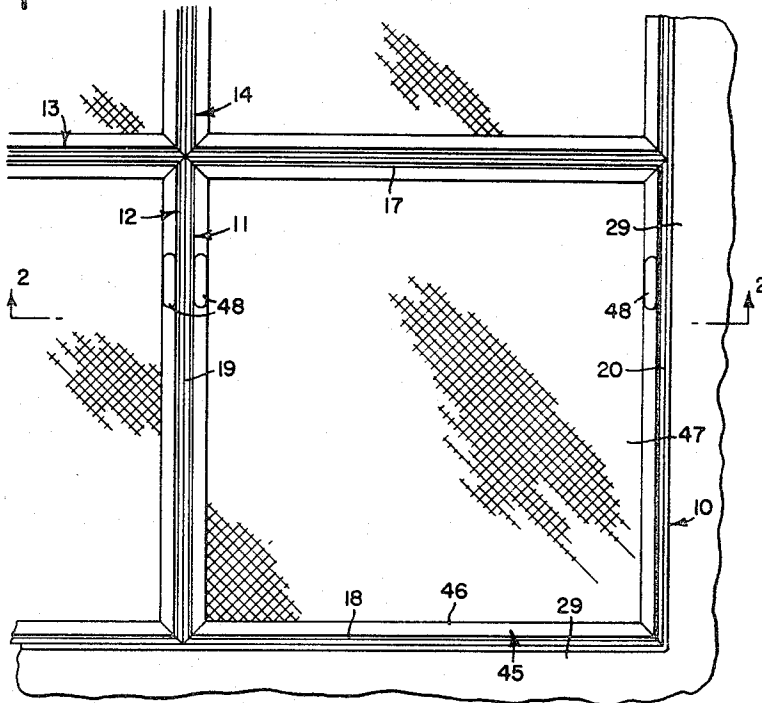


FIG. 2

INVENTOR.

HARRY V. FIRST

BY

C. F. Parker

ATTORNEY

May 3, 1960

H. V. FIRST

2,935,157

SUPPORT FOR AIR FILTER UNITS AND THE LIKE

Filed July 18, 1958

2 Sheets-Sheet 2

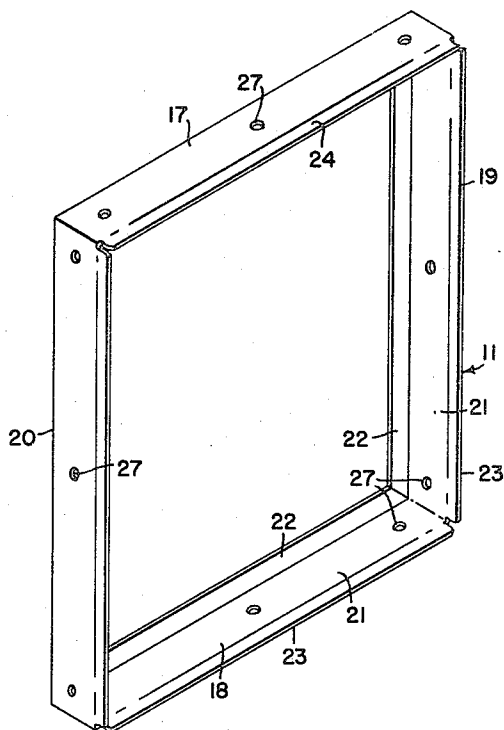


FIG. 3

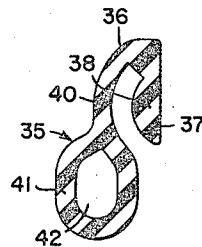


FIG. 5

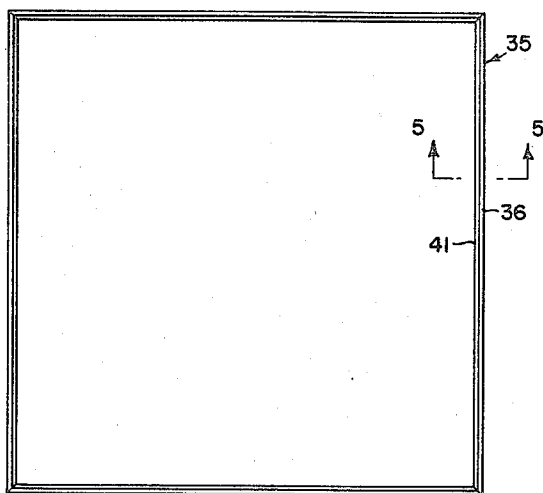


FIG. 4

INVENTOR.

HARRY V. FIRST

BY

C. Parker

ATTORNEY

1

2,935,157

SUPPORT FOR AIR FILTER UNITS AND THE LIKE

Harry V. First, Moline, Ill., assignor to The George Evans Corporation, Moline, Ill., a corporation of Illinois

Application July 18, 1958, Serial No. 749,382

8 Claims. (Cl. 183—49)

The present invention relates generally to air filters and more particularly to that class of filters used to filter air for ventilating purposes, and is in the nature of an improvement in the filter disclosed in Patent No. 2,792,906 granted May 21, 1957, to Reid Evans.

The filter shown in that patent comprises an assembly of rectangular supporting frames into which the filter units are slidably fitted and are held in the frames and sealed by a rubberlike peripheral sealing element which effectively prevents leakage of air between the units and their frames.

The principal object of the present invention relates to the provision of a novel and improved combination of frame and sealing element, which is less expensive, simpler to manufacture and easier to assemble and install.

These and other objects and advantages of my invention will be apparent to those skilled in the art after a consideration of the following description in which reference is had to the drawings appended thereto, in which—

Figure 1 is a front elevational view of an air filter comprising multiple filter units, embodying the present invention.

Figure 2 is an enlarged sectional view taken along a line 2—2 in Figure 1, portions of which are broken away to conserve space.

Figure 3 is an isometric view of one of the supporting frames.

Figure 4 is an elevational front view of one of the sealing elements, and

Figure 5 is an enlarged sectional view of the sealing element taken along a line 5—5 in Figure 4.

Referring now to the drawings the supporting frame of the air filter is indicated in its entirety by reference numeral 10 and comprises an assembly of frame sections 11, 12, 13, 14, etc. rigidly secured together to form a rigid framework.

Each of the frame sections is an outer peripheral supporting frame formed of sheet metal, such as aluminum, comprising top and bottom portions 17, 18 and two side portions 19, 20. Each of the portions 17, 18, 19, 20 is generally L-shaped in cross section with a main web portion 21, an inwardly projecting flange portions 22 along the rear edge thereof and an inwardly offset front edge portion 23 defining an outwardly facing concave recess 24. The front edge portion 23 is curved to produce a recess that increases in depth rearwardly from the front edge and then converges rearwardly with the outer plane of the web portion 21.

The peripheral frame sections assemble together with the flat outer surfaces of the web sections 21 fitting tightly together in juxtaposed assembled relation and are rigidly secured together into a unitary frame by bolts 26 extending through aligned holes 27 in the juxtaposed web portions 21 and nuts 28 threaded on the bolts. The outer surfaces of the outside members of the supporting frame lie in juxtaposed relation to the wall surface 29 which defines the wall opening in which the air filter is installed.

In this assembled relation, the opposed recesses 24 in

2

the front edge portions of adjacent frame members define a forwardly opening groove between the front edge portions 23, which is narrower at the front of the groove than it is at the center of the groove, as best illustrated in Figure 2.

Each frame section is provided with a peripherally extending rectangular rubberlike sealing element, indicated generally by reference numeral 35, which comprises a middle supporting portion 36, U-shaped in cross section straddling the front edge 23 of the frame with an outer flange 37 formed with a bead 38 lying in the outwardly facing recess 24, filling the latter. The outer surface of the flange 37 lies flush or coplanar with the outer surface of the web portion 21 of the frame. Hence the outer surfaces of the flanges 37 on adjacent frame units lie in juxtaposition and cooperate to secure both flanges against withdrawal from the recesses 24 when in assembled relation.

The inner flange 40 of the rubberlike element 35 embraces the inner curved side of the offset edge portion 23 of the frame and is formed with an enlarged resilient compressible bead 41 within the frame behind the front edge portion 23. Preferably, the bead portion has a hollow center 42 which facilitates compressing the bead. The bead 41, which can be manufactured by extrusion in a process known to those skilled in the art, defines a rectangular opening smaller than the inside of the frame section 10.

The filter unit 45 is a conventional rectangular member comprising a metal peripheral frame 46 of channel section with a porous filter element 47 of conventional laminations of expanded aluminum sheet, a mass of steel wool, glass wool or any suitable known material. Each filter unit frame 46 has a pair of laterally spaced handles 48, by which the unit can be lifted and pressed into the opening defined by the inner bead 41. The filter unit frame 46 is slightly larger in dimensions than the compressible bead 41, but smaller than the supporting frame 10, so that pressing the frame 46 into the opening defined by the bead 41 compressing the latter between the frames 46, 10 and the filter unit is pushed rearwardly into contact with the inwardly turned flange portion 22 of the supporting frame 10, the flange 22 thus serving as an abutment which stops the filter unit from being pushed through the frame 10. The filter unit is thus entirely supported by its contacts with the compressible bead 41 and the rear abutment 22.

Conversely, the filter unit can be removed from the frame by grasping the two handles 48 and sliding it out of the opening defined by the inner compressible bead portion 41. The rubberlike element 35 is retained in the frame 10 by the beads 38 clamped between the recesses 24 of the front edges of the frames.

It will be evident from Figure 2 that the outer flange of the rubberlike element in the outer frame section lies flush against the side of the wall 29, which cooperates with the recess 24 to clamp the bead 37 in place and also seal against air leakage.

It will now be evident to those skilled in the art that the filter construction disclosed herein is simple and inexpensive to manufacture, but efficient in operation. The frame sections are formed of sheet metal in a simple angular shape and the resilient sealing member is a simple extruded form that is installed by slipping it over the front edge 23, but is securely retained within the recesses when the frames are assembled and bolted together. After assembly the sealing elements support the filter units in place without any additional bolts, latches or other retainers and prevent air leakage between the filters and the frames or between the adjacent frames and also prevent leakage between the outer frames and the wall.

I do not intend my invention to be limited to the par-

ticular details shown and described herein except as set forth in the following claims.

I claim:

1. In an air filter, the combination of an outer peripheral supporting frame having an inwardly projecting rear abutment portion and a front edge portion having an outwardly facing peripherally extending recess, a peripherally extending rubber-like element comprising a supporting portion generally U-shaped in cross-section straddling said front edge portion of said frame with an outer flange lying in said outwardly facing recess and substantially flush with the outer surface of said frame, the inner flange of said U-shaped portion being formed with an enlarged resilient compressible bead within said frame behind said front edge portion and defining an opening, and a filter unit having an outer peripheral surface slightly larger than said opening and slidably insertable into the latter into engagement with said rear abutment portion of the frame, said resilient bead serving both as a peripheral seal between said unit and said frame and as the sole support of said unit on said frame.

2. The combination set forth in claim 1, further characterized in that said recess increases in depth toward the rear and said outer flange of said rubberlike element is formed with a bead filling said recess and serving to secure the outer flange against withdrawal when said flush outer surface of said frame is positioned against a flat surface.

3. The combination set forth in claim 2, further characterized in that said peripheral supporting frame is in the form of a sheet metal structural member generally L-shaped in cross-section, the front edge portion being offset inwardly to define said outwardly facing recess and the rear leg of the L-shaped member is turned inwardly to form the abutment.

4. In an air filter, the combination of a plurality of rectangular filter units and a plurality of outer peripheral supporting frames for said units adapted to fit tightly together in juxtaposed assembled relation, means securing said frames to each other in assembled position, each of said frames having a front edge portion offset inwardly from the juxtaposed outer surfaces to provide an outer peripheral recess in opposed relation to the corresponding outer recess in adjacent frames, a peripherally extending rubberlike element for each frame comprising a supporting portion generally U-shaped in cross-section straddling said front edge portion with an outer flange lying in said outwardly facing recess and substantially flush with the outer surface of the frame and in face-to-face contact with the outer flange portion of the outer flanges of the corresponding elements on the adjacent frames, the inner flange of said U-shaped portion being formed with an enlarged resilient compressible bead within said frame behind said front edge portion and defining an opening, said filter unit having an outer peripheral surface slightly larger than said opening and slidably insertable into the latter.

5. The combination set forth in claim 4, further characterized in that said recesses increase in depth toward the rear and said outer flanges of said rubber-like ele-

ments are formed with beads filling said recesses and operable with the corresponding juxtaposed flange to secure both flanges against withdrawal when in assembled relation.

6. The combination set forth in claim 5, further characterized in that said supporting frames are in the form of sheet metal structural members, the front edge portions being turned inwardly and flaring outwardly toward the front edge, thereby defining a forwardly opening groove between the front edges of adjacent frames which retain the outer flanges of two adjacent rubberlike elements.

7. In an air filter, the combination of an outer peripheral supporting frame having an inwardly projecting rear abutment portion and a front edge portion having an outwardly facing peripherally extending recess, a peripherally extending rubberlike element comprising a supporting portion straddling said front edge portion of said frame with an outer flange lying in said outwardly facing recess and substantially flush with the outer surface of said frame and an enlarged resilient compressible bead formed on the opposite side of said frame and defining an opening, and a filter unit having an outer peripheral surface slightly larger than said opening and slidably insertable into the latter into engagement with said rear abutment portion of the frame, said resilient bead serving both as a peripheral seal between said unit and said frame and as the sole support of said unit on said frame.

8. In an air filter, the combination of a plurality of rectangular filter units and a plurality of outer peripheral supporting frames for said units adapted to fit tightly together in juxtaposed assembled relation, means securing said frames to each other in assembled position, each of said frames having a front edge portion offset inwardly from the juxtaposed outer surfaces to provide an outer peripheral recess in opposed relation to the corresponding outer recesses in adjacent frames, a peripherally extending rubberlike element for each frame comprising a supporting portion straddling said front edge portion with an outer flange lying in said outwardly facing recess and substantially flush with the outer surface of the frame and in face-to-face contact with the outer flange portion of the outer flanges of the corresponding elements on the adjacent frames, and an enlarged resilient compressible bead formed on the opposite side of said element inside the periphery of said frame and defining an opening, said filter unit having an outer peripheral surface slightly larger than said opening and slidably insertable into the latter.

References Cited in the file of this patent

UNITED STATES PATENTS

2,158,717	Brock	May 16, 1939
2,582,219	Ardito et al.	Jan. 15, 1952
2,792,906	Evans	May 21, 1957
2,793,405	Focht	May 28, 1957

FOREIGN PATENTS

1,065,980	France	Jan. 13, 1954
523,897	Canada	Apr. 17, 1956
797,100	Great Britain	June 25, 1958