Feb. 21, 1933. H. W. COLLINS 1,898,424

FRAMEWORK FOR AIR FILTERS

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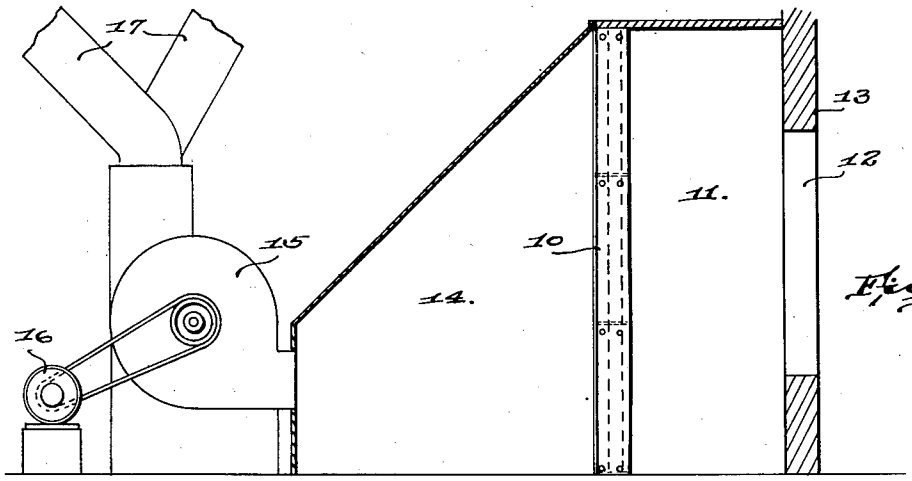


Fig. 1.

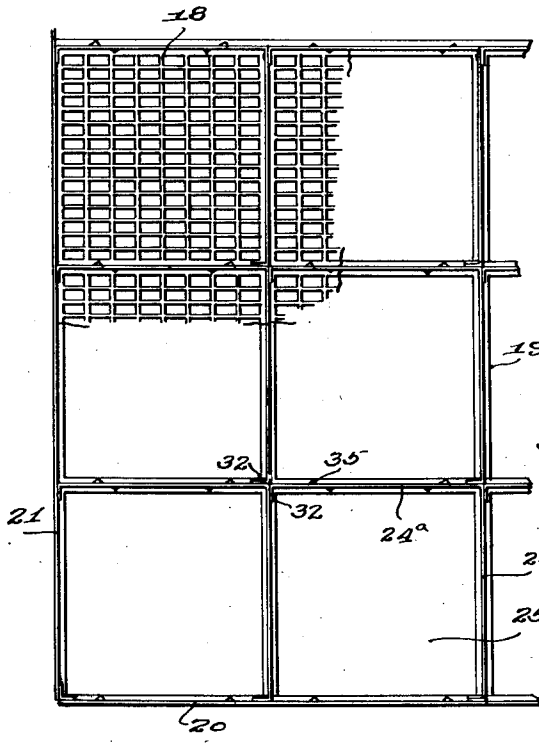


Fig. 2.

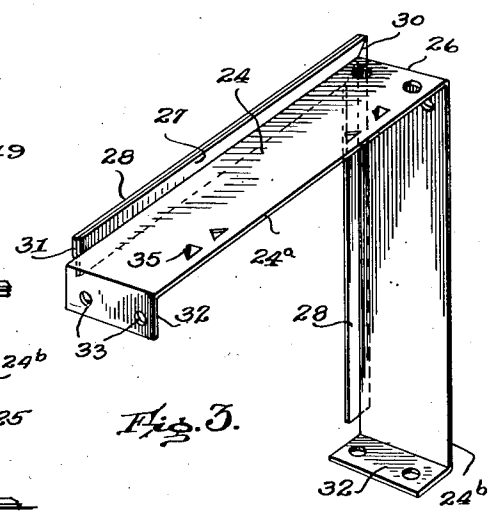


Fig. 3.

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Fig. 4.

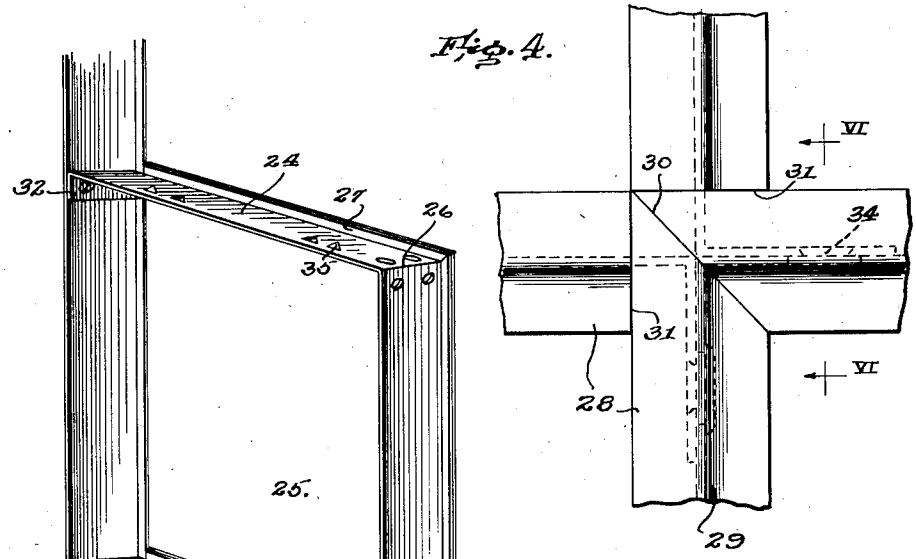
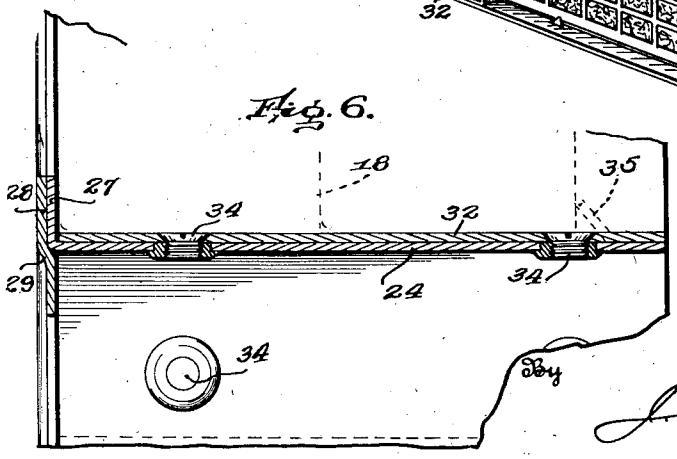


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE

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FRAMEWORK FOR AIR FILTERS

Application filed April 6, 1932. Serial No. 603,544.

My invention relates to air filter systems and particularly to a framework or structure for supporting a multiplicity of interchangeable air filter units, such framework also being adaptable for other purposes. The framework comprises individual frame sections which may be assembled to provide a framework comprising rectangular cells or compartments arranged in horizontal and vertical rows, each cell being adapted to receive one or more filter units.

Heretofore it has been proposed to build a framework for supporting filter units, comprising a main frame and a plurality of auxiliary interchangeable frames, each adapted to hold a filter unit or units, each of said auxiliary frames being complete in itself and supported within the main frame which entirely surrounds the assembly of auxiliary frames.

Such a construction is open to various objections. The individual frames are bulky and occupy an excessive amount of room when packed for shipping or in storage. When such individual frames are assembled for use there are two adjoining frame walls between each two adjacent cells. This construction requires much more material than a single wall structure and also permits leakage of air between the adjoining frames unless cement or packing material is used to prevent such leakage.

An object of the present invention is to provide a construction in which the above objections are overcome and various advantages obtained. To this end, the invention comprises a framework built up of frame members or sections, each of which when added to the framework completes a cell for receiving a filter unit, but which frame member does not in itself form a complete frame or completely surround a cell, but extends along two sides only of the filter unit. Said frame member at the same time provides one side of each two adjoining sections or frame openings. Each frame member is preferably substantially L-shaped, comprising two sheet metal plates extending at right angles and having their adjoining ends welded together. The frame members may thus be nested in packing for shipment and take up comparatively little room.

Other objects of the invention will appear hereinafter.

In the accompanying drawings:

Fig. 1 is a part sectional elevation of a filter system, embodying the present invention.

Fig. 2 is a fragmentary elevation view of the filter framework and filter units mounted therein.

Fig. 3 is a perspective view of a frame member.

Fig. 4 is a fragmentary rear elevation showing portions of adjoining frame members in their assembled relation.

Fig. 5 is a fragmentary perspective view of the framework and also shows filter units installed in one of the cells.

Fig. 6 is a sectional view taken at the line VI—VI on Fig. 4.

Referring to Fig. 1, the air filter system may comprise a bank 10 of air filters installed in a room of a building to which the filtered air is to be supplied. The bank of filters separates the room into an outer compartment 11 containing unfiltered air admitted through an opening 12 in the wall 13, and a compartment 14 containing filtered air. A suction fan 15 driven by a motor 16 draws the air from the compartment 14 and discharges it through pipes 17 which convey the filtered air to any desired rooms or parts of the building.

The bank 10 of filters includes a multiplicity of filter units 18 removably and interchangeably installed in a framework 19. The framework comprises an outer supporting structure including a bottom frame piece 20 and a vertical frame piece 21 which may have their adjoining ends secured together as by means of an angle plate 22 secured to the frame members by screws 23. The framework is built up on this exterior structure 20, 21 by assembling therewith individual frame members or sections 24, all of which may be alike, and each of which when added to the framework completes a rectangular cell or compartment 25 for receiving one or more of the filter units 18. Each of the

frame members 24 comprises a horizontal plate or frame piece 24^a and a vertical plate or frame piece 24^b which may be made integral, as, for example, by stamping the frame member from sheet metal and bending at the edge 26. However, the frame pieces 24^a and 24^b are preferably stamped as separate pieces and united by welding them together at their adjoining edges 26. Each frame piece is provided with a flange portion 27 extending along the rear edge thereof, which may be formed by bending up a marginal portion of the frame piece. Secured to the rear face of the flange portion 27, by welding or otherwise, is a sheet metal strip 28. The strip 28 is of greater width than the flange 27 and provides a flange projecting on the opposite side of the frame piece. The strip 28 is offset inwardly at 29 (Fig. 6) so that the inner faces of both flanges lie in the same plane. The adjoining ends of the flanges 27 and also of the strips 28 extend beyond the corner 26 of the frame member, with their diagonal edges 30 meeting to form a square corner for the flange. The opposite ends 31 of the flanges terminate short of the frame pieces 24^a, 24^b to accommodate the flange portions of the adjoining frame members when the framework is assembled. The outer end portions 32 of each frame member are bent inwardly at right angles to the body portions to provide attaching means by which the frame member is secured to the framework. The end flanges 32 are provided with holes 33 to receive stud screws 34 for securing the frame parts together.

The length of the frame pieces 20 and 21 forming the outer supporting structure is determined by the number of cells comprised in the bank of filters, the length of the bottom frame piece 20 being proportional to and determined by the number of cells in each horizontal row, and the length of the vertical frame piece 21 being proportional to the number of such horizontal rows.

After the framework has been built up in the manner before pointed out, it is ready to receive the filter units 18. One or more filter units, preferably two, are placed in each cell. The first unit is slipped into position in its cell and bears against the flanges 27, 28. A second filter unit is then inserted in the cell and held in position in close contact with the first cell by means of lugs 35 stamped from the frame members. These lugs hold the filter units securely in position while permitting them to be readily removed for replacement by new filter units.

The filter units 18 may comprise filter pads made of glass wool coated with a heavy oil. The filter pad is enclosed in a carton or container made of paper or other combustible material, said container comprising openwork permitting the passage of air through the filter. The particular construction of the filter does not in itself form a part of the present invention.

It will be observed that when the framework is assembled the number of individual cells 25 is equal to the number of the frame members or sections 24. It will also be noted that there is only a single metal strip or plate between each two adjoining cells, instead of two separate plates or strips of metal, as necessitated by structures in which the framework is built up of separate or interchangeable frames, each of which in itself forms a complete cell or entirely surrounds the filter unit installed therein. Thus, with the present construction, there can be no air leakage between adjoining cell frames, and the need of gaskets, cement or other fillers is avoided.

Modifications may be resorted to within the spirit and scope of my invention.

What I claim is:

1. A framework for air filters providing rectangular cells arranged in horizontal and vertical rows, said framework comprising individual frame members, each forming two adjoining sides of a cell.

2. A framework for air filters providing rectangular cells arranged in horizontal and vertical rows, said framework comprising individual L-shaped frame members, each forming two adjoining sides of a cell, said frame members being interchangeable.

3. A framework for air filters providing rectangular cells arranged in horizontal and vertical rows, said framework comprising individual frame members, each forming two adjoining sides of a cell, and certain of said frame members additionally forming sides of adjoining cells.

4. A framework for air filters providing rectangular cells arranged in horizontal and vertical rows, said framework comprising individual frame members, each forming two adjoining sides of a cell, and each additionally forming a side each of two adjoining cells.

5. A bank of air filters comprising a framework providing rectangular cells arranged in horizontal and vertical rows, said framework including an outer supporting structure consisting of a bottom frame piece and an upright frame piece, and a plurality of interchangeable frame members built up on said supporting structure, each of said frame members forming two adjoining sides of a cell.

6. A framework for air filters providing rectangular cells arranged in horizontal and vertical rows, said framework comprising individual frame members, each forming two adjoining sides of a cell, filter units installed in said cells, said frame members comprising flanges extending along their marginal edges and providing stops for the filter units, and means for holding the filter units against said stops.

7. A framework for air filters providing rectangular cells arranged in horizontal and vertical rows, said framework comprising individual frame members, each forming two adjoining sides of a cell, each of said frame members being substantially L-shaped and having the end portions thereof bent at right angles to the body portions to provide means for attaching the frame member to adjoining portions of the framework.

8. A framework for filter units comprising interchangeable frame members, each said member being made of sheet metal and including a body portion substantially L-shaped, and a flange extending along the marginal edge of the body portion.

9. A framework for filter units comprising interchangeable frame members, each said member being made of sheet metal and including a body portion substantially L-shaped, and a flange extending along the marginal edge of the body portion, said flange terminating short of the end of the body portion to accommodate the flange of an adjoining frame member.

10. A framework for filter units comprising interchangeable frame members, each said member being made of sheet metal and including a body portion substantially L-shaped, the free ends of said body portions being extended at right angles to provide means for attaching the frame members to adjoining parts of the framework.

11. In a framework for filter units, a frame member made of sheet metal comprising two strips extending at right angles to each other and having adjoining ends integrally united to form a substantially L-shaped member, each of said strips having a marginal portion bent at right angles to the body thereof to form a flange, and additional strips secured to said flanges and extending to the opposite side of the adjoining body portion to provide a flange along said opposite side.

12. In a framework for filter units, a frame member made of sheet metal comprising two strips extending at right angles to each other and having adjoining ends integrally united to form a substantially L-shaped member, and strips secured to said frame member and extending along the margins thereof, each said strip projecting laterally on opposite sides of the body portion of the frame member to provide flanges along the inner and outer faces of the frame member.

13. A framework providing a multiplicity of rectangular cells arranged in horizontal and vertical rows, said framework comprising an outer supporting structure consisting of a horizontal bottom frame piece and a vertical frame piece, said bottom frame piece forming the lower sides of the cells in the bottom row and said vertical frame piece forming the outer sides of the adjoining cells in a vertical row, and individual L-shaped frame members built up on said supporting structure, each of said frame members forming two sides of a cell.

Signed at Toledo, Ohio, this 4th day of April, 1932.

HOWARD W. COLLINS.