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2,664,172

AIR FILTER CONSTRUCTION

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FIG. 1.

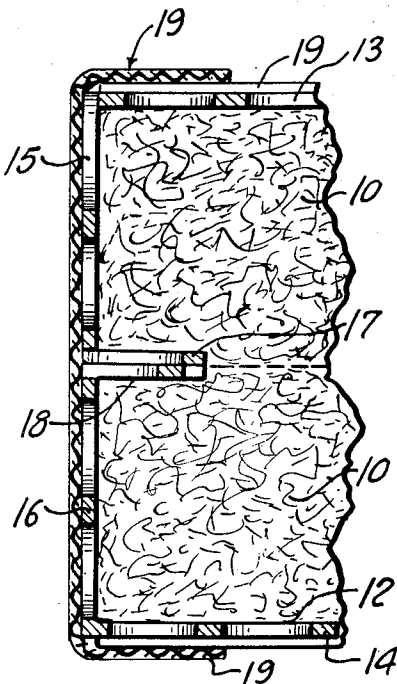
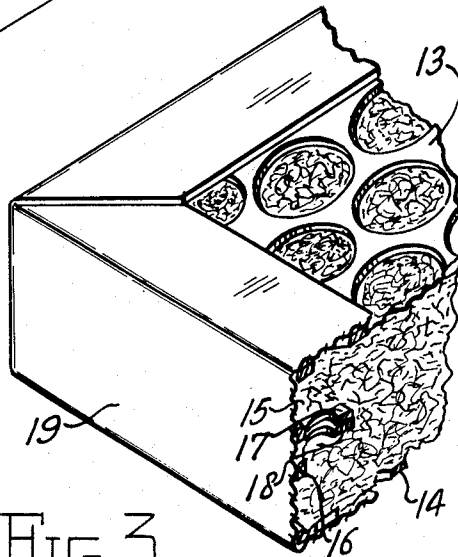
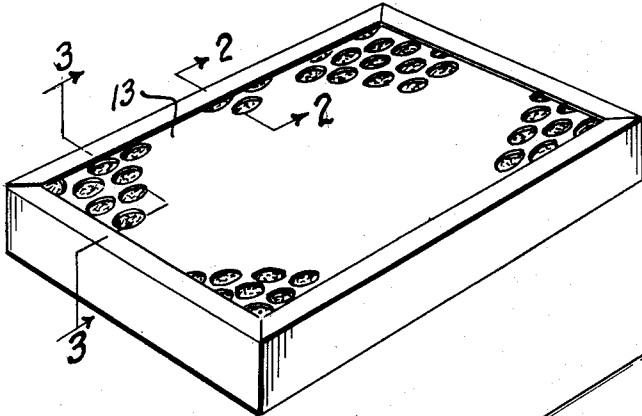


FIG. 3.

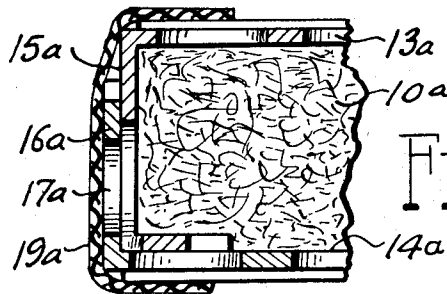


FIG. 4.

FIG. 2.

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AIR FILTER CONSTRUCTION

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3 Claims. (Cl. 183-45)

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This invention relates to improvements in air filter constructions and, more particularly, to improvements in the design and assembly of the means for retaining the filtering medium in place.

Dust filters for use in heating and circulating systems usually consist in masses of heterogeneously arranged fibers, for example, rock wool or glass fibers, assembled in a relatively thin, loosely packed, mass, usually of rectangular shape, which are inserted in the air passageways of heating or air conditioning systems for the purpose of filtering out dust which otherwise would be carried back into the space being heated or conditioned. Because the masses of fibers have to be quite loose, it is necessary that they be bound in some kind of frame or package to hold them together, protect them during manufacture, packaging, shipping, storage and handling and to support them in the passageways.

It is the principal object of this invention to provide a simplified, easily assembled fiber retaining means for an air filter which has sufficient strength not only to hold the fibers in place during use but to form a package during shipment and storage of the filter.

The package constituting the invention comprises two generally flat perforated grills, one to be located on each of the major faces of a mass of loosely packed fibers and each of the grills having flanges bent over around the edges of the mass inwardly toward the flanges of the other grill; the whole being made unitary and retained in assembled construction by a single web, preferably formed of a textile tape, which is folded and adhered around the edges of the grill flanges.

An air filter embodying the invention is shown in the attached drawings, in which:

Fig. 1 is a view in perspective of an assembled air filter constructed according to the invention.

Fig. 2 is a greatly enlarged fragmentary, vertical, sectional view taken substantially on the line 2-2 of Fig. 1.

Fig. 3 is a fragmentary perspective view, partly in section, taken substantially along the line 3-3 of Fig. 1.

Fig. 4 is a fragmentary vertical sectional view of a filter construction illustrating a modification of the invention.

An air filter consists in one or more masses of loosely compacted fibers 10 which usually are formed in layers either one or two inches thick and have generally rectilinear shapes. Each of the masses of fibers has major, flat, parallel

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faces 11 and 12 over each of which there is laid a perforated metal grill 13 or 14, respectively. In the embodiment of the invention shown, the perforated metal grills have a plurality of circular openings through which air passes, leaving a web between the openings which furnishes the structural support for the filter.

In an air filter package or construction according to the invention, each of the grills 13 and 14 is formed with inwardly extending flat flanges 15 or 16 which are bent on all four sides to form a shallow pan-like structure. In the embodiment of the invention shown in the drawings, a filter comprising two thin wafers of fibers 10 is shown in assembled condition. In making each of these semi-filters the mass of fibers 10 is laid in the shallow pan-like structure formed by a grill 14 and its bent flanges 15 or 16 and then the ends of the flanges are bent over to form lips 17 or 18 generally parallel to the major planes of the grills 13 or 14.

The two pan-like structures comprising the grills 13 and 14 and the masses of fibers 10 are then placed together with the open faces adjacent, the two being assembled particularly as shown in section in Fig. 2. In order to retain the structures in assembled condition and to give the assembled filters unity, a wide fiber reinforced adhesive tape 19 is wrapped around the edges of the two flanges 15 and 16 and its wings are folded over the top and bottom forming a frame around the grills 13 and 14 and retaining the two in assembled condition. The tape 19 may be mitered or lapped at the corners as shown in Fig. 3 and the whole pressed tightly against the material of which the grills 13 and 14 are formed.

Although the grills 13 and 14 are indicated as being made from perforated metal, other materials such as thin fiber board or cardboard or other relatively stiff, tough perforated sheet material, may also satisfactorily be employed.

The embodiment of the invention illustrated in Figs. 1, 2 and 3 consists of two masses of fibers 10 and their associated grills 13 and 14 so that the final finished filter is double thickness. In some applications, single thickness filters may be employed, in which case one of the shallow pan-like structures made up of a grill 13a having flanges 15a is filled with a mass of fibers 10a and a second grill 14a may then either be laid over the open side of the pan shaped structure or it may be formed slightly larger and telescoped over the open side of the pan. Such a construction is illustrated in Fig. 4 where a grill 14a is shown as

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having a flange 16a which slides over the exterior of the flange 15a of the grill 13a, the major face of the grill 14a lying against the exterior of a lip 17a formed on the flange of the grill 13a. As in the embodiment of the invention illustrated in Figs. 1, 2 and 3, an adhesive tape 19a which preferably is fiber reinforced, is pressed around the edges of the flanges 15a and 16a to retain the two grills 13a and 14a around the mass of fibers 10a.

An air filter construction embodying the invention eliminates the necessity for stapling or otherwise mechanically securing the facing grills 13 and 14 or similar elements to each other and the use of flanges formed directly from the same material as that forming the grill faces themselves eliminates the use of expensive framing materials such as are presently employed in most commercial air filters as well as greatly strengthening the assembled structure.

The particular materials employed for fabricating any of the elements of a grill constructed according to the invention are not critical, it being only necessary that they have sufficient strength and, preferably, light weight, to retain the fiber masses in place during handling and shipping and to hold them generally across the passageway of the air circulating system in which they are employed without greatly interfering with the flow of air or unnecessarily weighting or bulking the completed air filter.

I claim:

1. A filter construction unit consisting of a generally fiat mat of fibers, said mat having generally parallel and planar major faces and edges

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generally perpendicular to such major faces and a retainer for such mat consisting in a thin perforated grill having a fiat body overlying one major face of said mat, marginal flanges extending generally perpendicularly to said body and embracing all of the edges of said mat and return lips extending inwardly over the margins of the other major face of said mat generally parallel to said fiat body.

2. An air filter comprising a filter construction unit according to claim 1, a closing cover consisting in a fiat, perforated main face and edge flanges perpendicular to said face and arranged in telescoping overlying relation to the flanges of said unit and means for attaching said cover to said unit.

3. An air filter comprising a pair of filter construction units according to claim 1 arranged in back to back relationship with the return lips of each unit in contact and means for securing said units in assembled relationship.

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