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SUPPORT FOR MAIN FILTER AND PREFILTER

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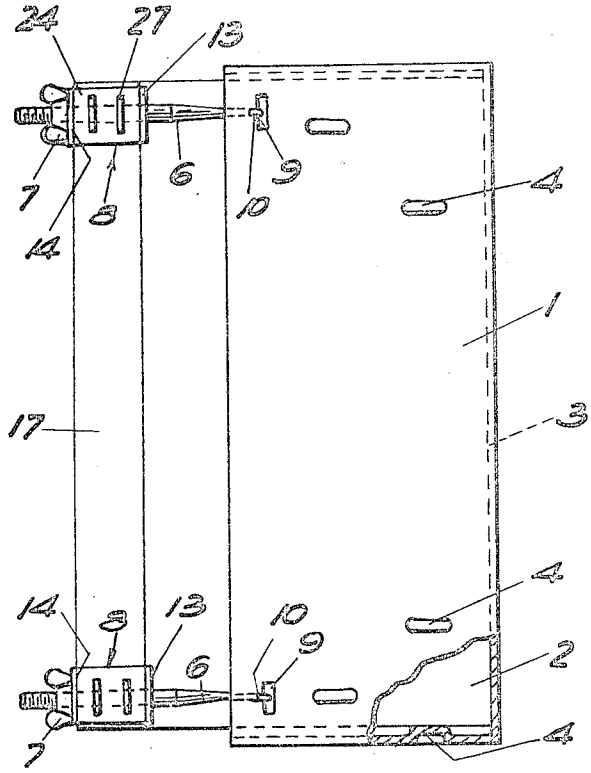


Fig. 1.

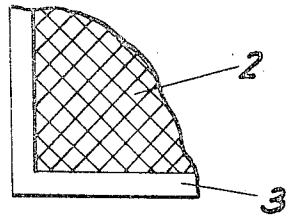


Fig. 2.

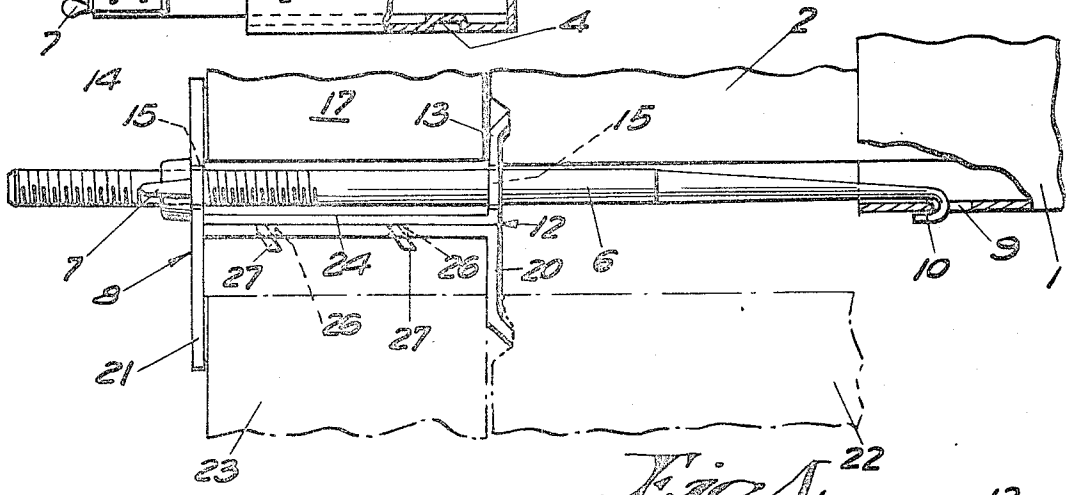


Fig. 4.

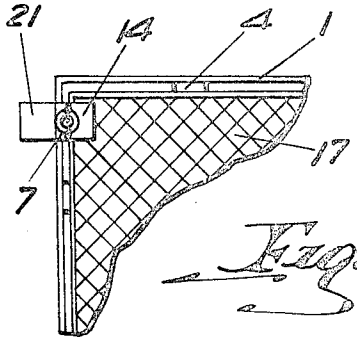


Fig. 3.

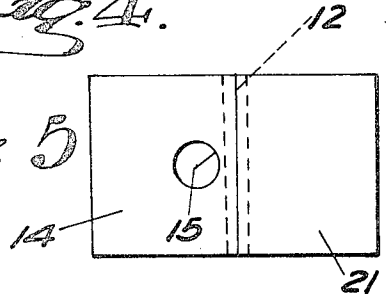


Fig. 5

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SUPPORT FOR MAIN FILTER AND PREFILTER

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U.S. Cl. 55—484 7 Claims

ABSTRACT OF THE DISCLOSURE

A rectangular frame for holding a main filter has a plurality of rods detachably connected to its sidewalls and extending out of one end of it. Close to one side of each rod outside of the frame is the body of a bracket, which has a pair of spaced flanges projecting laterally from one side and provided with aligned holes slidingly receiving the rod. Each pair of bracket flanges is positioned to receive an edge of a prefilter between them while the inner flange engages the adjoining end of a main filter in the frame. Nuts screwed onto the outer ends of the rods engage the outer bracket flanges.

Filtering apparatus often includes a frame, in which a filter is removably mounted. In many cases several frames may be joined side by side, or a single large frame may be provided with compartments, to provide for a bank of filters. In order to hold the filters in the frames and also to hold prefilters against the inlet ends of the main filters, various means have been proposed and used. One scheme is shown in Pat. No. 3,250,063, in which spring strips are used for that purpose.

It is among the objects of this invention to provide apparatus for supporting a rectangular main filter and a prefilter, which is simple in construction, which is adjustable, which can be quickly applied, and which can be used with single filters or with banks of filters.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which

FIG. 1 is a side view of a complete unit;

FIG. 2 is a fragmentary front view;

FIG. 3 is a fragmentary rear view;

FIG. 4 is an enlarged fragmentary plan view; and

FIG. 5 is a rear view of one of the brackets alone.

Referring to the drawings, a sheet metal rectangular frame **1** has a length or depth that is less than the depth of a main filter **2** that it houses. The filter is inserted from the inlet end of the frame and pushed forward until it seats against an integral flange **3** (FIG. 2) projecting inwardly from the front or outlet end of the frame. A seal is formed between the flange and the adjoining filter so that air cannot bypass the filter. The filter projects from the back of the frame. The filter is spaced a short distance from the sides of the frame by indentations **4** in the side walls of the frame.

In order to hold the filter in the frame and tightly against the front flange, a plurality of retaining members are provided. Each of these members is formed from a rod **6**, a nut **7** and a bracket **8**. In some cases only two retaining members may be used, one on each of two opposite sides of the frame. In other cases there may be a retaining member at each side of the frame, or two or all four sides of the frame may be provided with two retaining members each. Each rod has an inner end that extends only a short distance into the frame adjacent a side wall thereof, to which the rod is detachably connected. A very convenient way of connecting the rods to the sides of the frame is to provide the sides with openings **9** near their rear edges as shown in FIGS. 1 and 4, and to form the inner ends of the rods into the

shape of hooks **10** that hook into those openings. The space between the filter and the sides of the frame makes it easy to insert the rods after the filter has been placed in the frame. With the filter in place, the rods extend backward behind it several inches and have screw-threaded rear end portions.

Slidably mounted on each rod behind the frame is a bracket **8**, each of which has a flat body **12** disposed close to the side of the rod and extending lengthwise of it. Projecting laterally from the opposite ends of this body are two generally parallel flanges **13** and **14**, provided with aligned holes **15**, through which the rod extends. Threaded on the outer end of the rod is wing nut **7** that engages the outer flange **14**. By tightening this nut, the bracket can be slid inwardly along the rod. The distance between the bracket flanges is such as to snugly receive an edge of a prefilter **17** between them. This prefilter is positioned against the inlet end of the main filter and removes large foreign particles from the gas flowing through it before they can reach the main filter. By turning the wing nuts inwardly on the rods around the frame, the brackets will hold the prefilter securely against the main filter while the inner bracket flanges **13**, which overlap the rear edge of the main filter, press that filter forward against the front flange **3** of the metal frame. Preferably, the free ends of the inner flanges of the brackets are turned toward the main filter as shown in FIG. 4, so that they hook over its edge and thereby help to prevent the brackets from accidentally swinging laterally away from the filters.

When the banks of filters are used, some of the rods can support brackets that hold two adjoining pairs of main filters and prefilters. To do this, another pair of spaced flanges **20** and **21** project from the side of a bracket body opposite the rod on which it is mounted. The second pair of flanges serve the same purpose as the first pair, but with an adjoining main filter **22** and prefilter **23** such as indicated in broken lines in FIG. 4. The body of the bracket can be made in one piece or from two flat webs **24** that are held face to face, such as by welding or riveting, each web being integral with the flange at its opposite ends. However, since the filters are not always arranged in banks so that two sets of flanges are not always needed, it may be desirable to detachably connect the two webs to permit one web and its flanges to be omitted. This can be done conveniently by providing one of the webs with openings, such as parallel slots **26**, and providing the other with struck-out tongues **27** that extend through the slots. It is best to provide the web that is next to the rod with the tongues so that they extend away from the rod and do not interfere with it. By inclining the tongues from that web toward the inner flanges of the bracket the tongues will hold the two webs together because the pressure of flange **20** against filter **22** will prevent the slotted web from moving inwardly relative to the other web and sliding off the tongues.

The retaining members disclosed herein are simple and inexpensive in construction and permit a prefilter to be clamped tightly against a main filter and to hold both firmly in a frame. If a prefilter is not used, the brackets still press the main filter tightly against the front flange of the frame. When only one filter unit is used, then only single brackets with flanges **13** and **14** are necessary, but when two units are placed side by side, double brackets are employed so that flanges **20** and **21** will be available. The conversion from single to double brackets requires only a moment.

I claim:

1. Apparatus for supporting a rectangular main filter and holding a rectangular prefilter against its inlet end, said apparatus comprising a rectangular frame adapted to

receive the main filter and provided at one end with an inwardly projecting flange for overlapping the marginal area of the outlet end of the main filter, a plurality of rods having inner ends inside the frame and detachably connected to different side walls thereof, the rods projecting from the end of the frame opposite the flanged end and having screw threaded outer end portions, brackets with bodies close to the sides of the rods and extending lengthwise thereof, each bracket also having a pair of spaced flanges projecting laterally from the rod side of its body and provided with aligned holes slidingly receiving a rod, each pair of bracket flanges receiving an edge of the prefilter between them, and nuts screwed onto the outer ends of the rods and engaging the outer bracket flanges, whereby the inner bracket flanges can be pressed against the inlet end of the main filter to hold that filter in the frame.

2. Apparatus according to claim 1, in which the side walls of said frame are provided with openings, and the inner ends of said rods are hook shape and hooked into said openings.

3. Apparatus according to claim 1, in which another pair of spaced flanges project from the side of each bracket body opposite the first-mentioned pair for receiving the edge of another prefilter.

4. Apparatus according to claim 1, in which the free ends of said inner bracket flanges are bent away from the outer bracket flanges.

5. Apparatus according to claim 3, in which said body is formed from two flat webs and means holding them face to face, and each pair of said flanges project from a different one of said webs.

6. Apparatus according to claim 3, in which each of said bracket bodies is formed from two flat webs in face to face engagement with each other, one of said webs being provided with an opening through it, and the other web having a struck-out tongue extending through said opening, each pair of said flanges projecting from a different one of said webs.

7. Apparatus according to claim 6, in which said tongue projects from said first-mentioned web and is inclined toward the inner end of that web.

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