GAS FILTER HOLDING DEVICE
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ABSTRACT OF THE DISCLOSURE
A unitary gas filter assembly including an encompassing
open-ended side wall frame and at least two grid-like re-
taining panels fastenable parallel to one another on the
frame to retain a filter medium means disposed in the
frame in position transverse the gas stream to be treated,
at least one of the retaining panels being secured by
means of racks mounted on the frame to permit multiple
adjustment of one of the retaining panels relative the
other.

Background of the invention
The present invention pertains to an improved appa-
ratus for gas separation, and more particularly, to a new,
useful, and unobvious unitary filter frame assembly.
One of the features of the present invention is to pro-
vide a filter medium retaining device in which gas filter
media of various thickness can be held in a simple
manner and easily exchanged for other filter media.
The apparatus of the present invention includes a
unique feature wherein multit-ended racks are mounted on
opposed inner faces of an encompassing side wall for
selective settings of grid-like retaining panels at different
parallel spacings. Through the multit-ended construc-
tion of the racks, swingable retaining panels can easily
be brought into various parallel positions with respect to
each other so that gas filter mediums of various thick-
nesses can be installed into the frame. Advantageously,
the racks mounted at various places on the frame can
be of similar construction so that the swingable retaining
panels can be articulated at will at two opposite ends of
the encompassing side wall frame.
So that the gas filter medium to be placed in the frame
will be held securely in the frame, one end of the frame
presents expeditiously a flat contact surface. The grid-like
panel fixed to the frame at such end can advantageously
be inserted in slots at the base leg of the frame end, such
end being provided with a U-shaped bent-off cross sec-
tion.
It is to be understood that various other features of the
present invention will become obvious to one skilled in
the art upon reading the disclosure set forth hereinafter.

Summary of the Invention
More particularly, the present invention provides a
unitary gas filter assembly for filtering contaminant par-
ticles from a gaseous stream comprising: an encompass-
ing, open-ended side wall frame member having an up-
stream dirty gas inlet end and a downstream clean gas out-
let end to define a flow-through passage therebetween for
the gaseous stream to be treated; filter means disposed in
the open-ended side wall frame member to extend trans-
verse the gaseous stream to be treated, a pair of spaced
parallel grid-like retaining panels, each comprising of sets
of spaced curved crossed rod members, the panels being
disposed along opposite faces of the filter means to retain
the filter means in gas treating position in the open-ended
side wall frame member; and fastening means for the
grid-like retaining panels to fasten the retaining panels to
the open-ended side wall frame member, the fastening
means including a pair of oppositely disposed indented
rack means mounted in facing aligned relation on opposed
wall portions of the encompassing side wall frame mem-
ber with the indentations thereof extending transverse the
direction of gas flow in the flow passage so as to be in
parallel spaced relationship successively between the dirty
gas inlet and the clean gas outlet of the frame means such
to receive the opposed edges of at least one of the pair
of grid-like retaining panels for removably securing such
panel to the frame in one of several selected spaced paral-
lel positions relative to the other panel.
It is to be understood that various changes can be
made in the arrangement, form, and construction of the
apparatus disclosed herein without departing from the
scope or spirit of the present invention.
Referring to the drawing which discloses one advan-
tageous embodiment of the present invention:
FIGURE 1 discloses in perspective view a portion of
the gas filter holding device;
FIGURE 2 discloses a section along line 2—2 of FIG-
URE 1;
FIGURE 3 shows a plan view of the retaining panel
swingably articulated in an enclosed side wall frame;
FIGURE 4 shows an enlarged section in a plane
through a sheet metal plate providing a rack on the en-
closed frame wall; and
FIGURE 5 shows a section in a plane through line
5—5 of FIGURE 4.
As disclosed in the drawing, encompassing open-ended
side wall frame member 2 is rectangular, advantageously
square, and the width of side wall frame wall member 2
corresponds substantially to the greatest thickness of gas
filter medium 1 to be used. Extending from side wall
frame member 2 is an inwardly projecting contact sur-
face 3 for gas filter medium 1. Surface 3 comprises part
of bent-off portion 4 which is U-shaped in cross section to
include a first leg extending inwardly toward the flow
passage of encompassing side wall frame 2, a base leg
extending along the flow passage, and a second leg ex-
tending outwardly parallel the first leg and away from the
flow passage.
On two opposed portions of side wall frame 2, there
are secured to the inner faces thereof the opposed and
aligned shaped metal plates 6 by some suitable means such
as spot welding. It is to be noted in FIGURE 4 of the
drawing that such plates 6 are of W-shaped cross section,
the W-shaped cross section form of each of the plates 6
serving a specific purpose as hereinafter described. Each
of plates 6 includes a multiplicity of spaced parallel in-
dentations and the plates are so mounted along the inner
faces of wall 2 that the indentations in the plates ex-
and transverse the direction of gas flow in the gas flow
passage through frame 2. These indentations serve to
receive the edges of grid-like retaining panel 7. In the
embodiment of the drawing, four plates are disclosed, all four plates being constructed alike and having in the example five indentations 8 between six straps 9. Plates 6 are shaped from a flat sheet metal plate by punching longitudinal slots therein. The straps 9 with the gripping slots are pressed out of the plate of the plate with the slots being so arranged that the indentations formed between straps 9 are slightly narrower at their entrances or openings than the diameter of the rods forming grid-like retaining panel member 7 which engages with the indentations and slightly larger at their bases so as to receive the rods of panels 7 in snap-clamp engagement therewith. As can be seen in FIGURE 4, each plate 6 lies with two surfaces standing apart against frame 2. Between straps 9 in each case there is formed accordingly the undercut indentation 8 for the rod part 10 of retaining panel 7 as aforesaid and described hereinafter.

As can be seen in FIGURE 1 of the drawing, bent-over part 10 of grid-like retaining panel 7 is clamped in one of the openings of an indentation 8 for swingable articulation of panel 7 in such indentation.

It is to be understood that panel 7 hinged on frame 2 and panel 7 hereinafter described as having protrusions 13 which project into slots 11 of U-shaped bent-over part 4 are both comprised of sets of spaced and crossed individual rods welded to one another or soldered at the points of crossing. The rods of panels 7 (not shown) are disposed as right angles; however, it is to be understood that they can also be of other angles other than right angles. The panels 7 and 5 are detachably inserted into frame 2. To attach panel 5, there are arranged in the base of U-shaped bent-over part 4 at the end of frame 2 two openings 12 in each of a pair of opposite base wall portions of frame 2. The other pair of opposite base wall portions of frame 2 can be provided only with an opening 11 in the middle of the base side in question (not shown in detail). Several rod protrusions 12 of panel 5 lie against the outside of frame 2. Altogether, six rod protrusions 13 of panel 5 are inserted through openings 11 into the U-shaped bent-over portion 4. The rods of panel 5 are thereby bent somewhat out of the plane of the panel and the rod protrusions of the panel are tensed elastically against another one. The panel 5 is thus elastically spring held onto frame wall 2 and can, through a spring bending, be released from the wall and taken therefrom.

The rods of panel 7 are connected with one another in a manner similar to the rods of panel 5; however, panel 7, unlike panel 5, is provided at each side thereof with a bow 14 (FIGURE 5) which is jointed by welding or soldering exclusively at the points 15, 16, and 17 with the other rods. Bow 14 can therefore be elastically resiliently deformed somewhat so that two points 19 extend beyond the rod 18 of the panel. By application of force at these two points, the bow 14 can be displaced elastically to the rod 18 of panel 7. Points 19 of panel 7 can in the process snap into place in one of indentations 8 of plate 6. Panel 7 is then unswissingly secured to the side wall frame 2.

Depending on the thickness of the gas filter medium to be used, the fastening of panel 7 onto side wall frame 2 is accomplished by judicial selection of indentations 8 of the four plates 6. After the setting of the gas filter medium 1 in frame 2 with the gas filter edges extending against the four flat walls of the frame, the swingable panel 7 is inserted in those indentations 8 of sheets 6 so that the unswissingly secured to the frame causes panel 7 to lie against gas filter medium 1. It is to be understood that the installation of the bent-off places 10 of panel 7 into the proper indentations 8 of two plates 6 and also the insertion of points 19 of bows 14 into the corresponding indentations 8 of the other two plates 6, as well as installation of panel 5 in frame 2, can be simply carried out without any tools.

If, for example, two different gas filter layers are to be held with an interplying panel (not disclosed) in frame 2, then two swingable panels 7 can be attached to side wall frame 2. When the three panels then are unswissingly fastened to the frame 2, they lie parallel to one another, and for example, at various distances.

If several side wall frames 2 are to be arranged adjacent to one another in one plane, then these side wall frames 2 can be set by means of their U-shaped bent-off parts 4 on a common carrier bar or be thrust into two oppositely situated carrier bars.

Several side wall frames 2 lying in one plane may also be held in one plane by plates lying in the U-shaped bent-off parts 4 in the manner of interlock walls, all the side wall frames 2 then being additionally surrounded by a mounting frame which likewise engages in U-shaped bent-off parts 4. The whole unit, consisting of several side wall frames 2, can then be installed as one piece, for example, as a filter wall, into a masonry wall opening.

By each plate 6 secured to side wall frame 2, two grooves 21 are formed (FIGURE 4). In these grooves there can be secured clamps (not shown) for additional filter layers, or, for example, a supporting bracket for filter bags (not shown). A fastening of these additional means to the frame can also be carried out by installing of cross pieces (straps) in the interstices 22 of the plates 6 if the bent-off parts 10 and the points 19 of the rods of grating 27 and (FIGURE 4). The invention claimed is:

1. A unitary gas filter assembly for filtering contaminant particles from a gaseous stream comprising: an encompassing open-ended side wall frame member having an upstream dirty gas inlet and a downstream clean gas outlet end to define a flow-through passage therebetween for the gaseous stream to be treated; filter means disposed in said open-ended side wall frame member to extend transverse the gaseous stream to be treated; a pair of spaced parallel grid-like retaining panels each comprised of sets of spaced crossed rod members disposed along opposite faces of said filter means to retain said filter means in gas treating position in said open-ended side wall frame member; and fastening means for said grid-like retaining panels to fasten said retaining panels to said open-ended side wall frame member, said fastening means including a pair of oppositely disposed indent-
said encompassing side wall frame member being bent along at least a portion of one end thereof to form an end of U-shaped cross section including a first leg extending inwardly toward said flow passage, a base leg extending along said flow passage, and a second leg extending outwardly away from said flow passage, said base leg having slot means therein to receive said protrusions of said other grid-like retaining panel to hold said panel in position.

6. The apparatus of claim 5, said encompassing side wall frame member being bent around the entire peripheral end thereof.