Oct. 4, 1966 C. F. LAMB 3,276,193

ELIMINATOR PLATE ASSEMBLY FOR AIR WASHERS

Filed Jan. 6, 1964 4 Sheets-Sheet 1

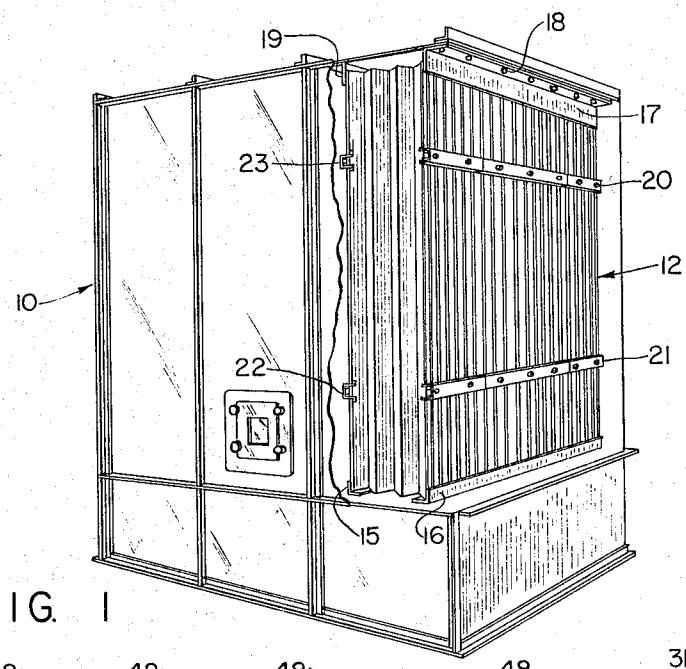


FIG. 1

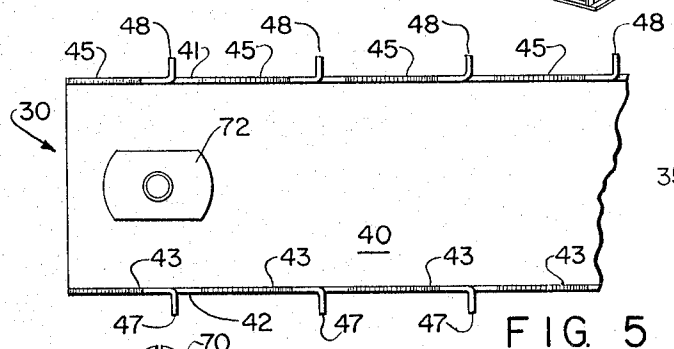


FIG. 5

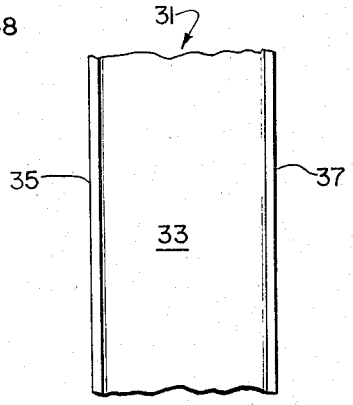


FIG. 8

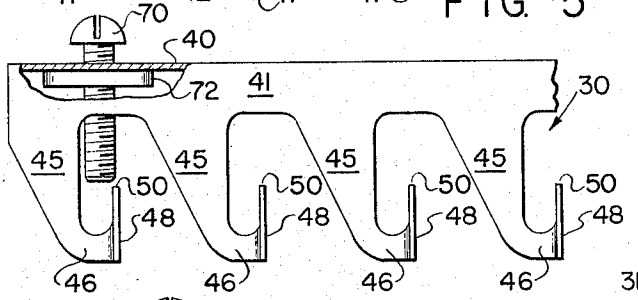


FIG. 6

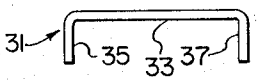


FIG. 9

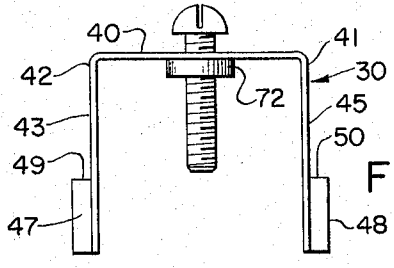


FIG. 7

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ELIMINATOR PLATE ASSEMBLY FOR AIR WASHERS

Filed Jan. 6, 1964 4 Sheets-Sheet 2

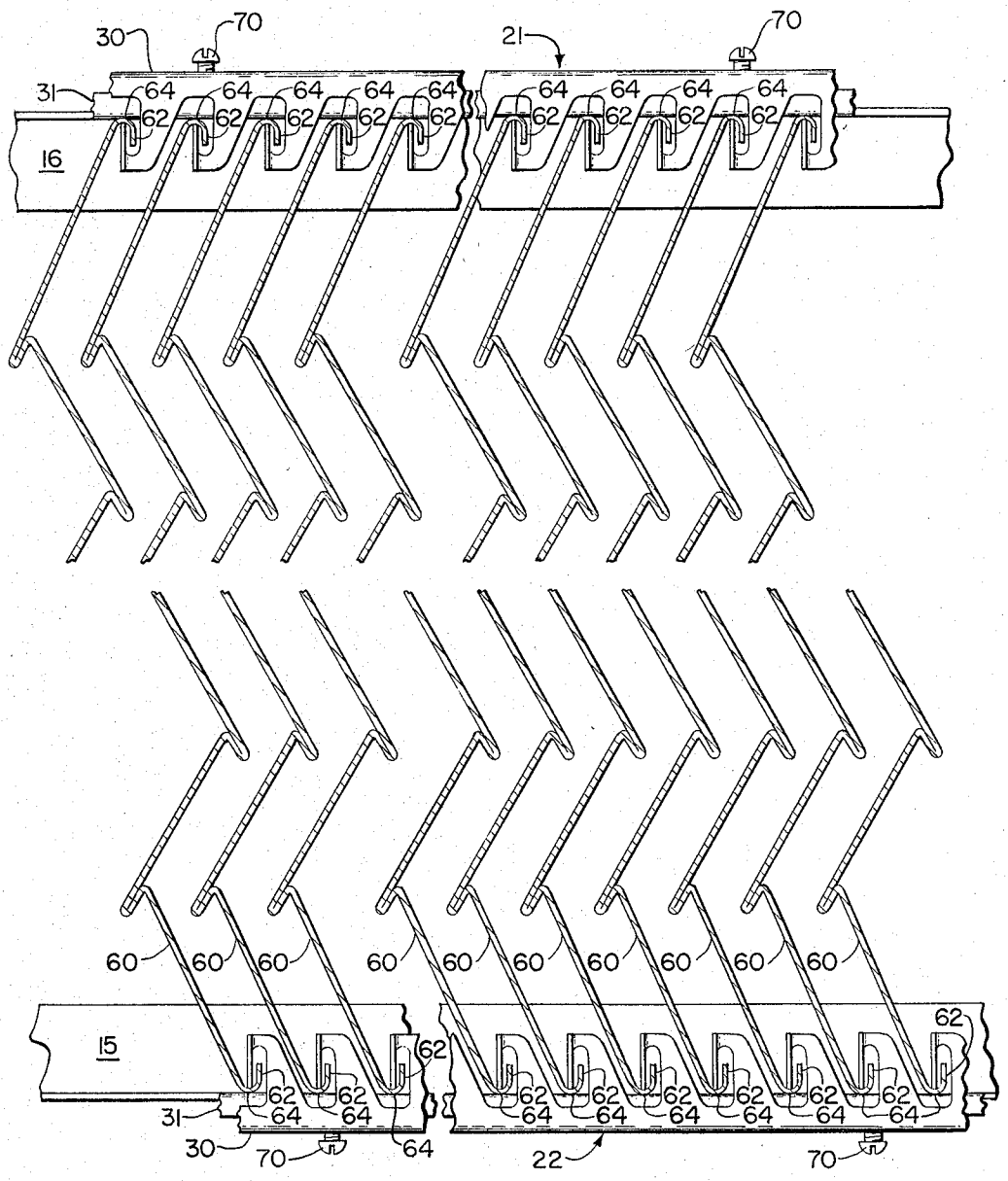


FIG. 2

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ELIMINATOR PLATE ASSEMBLY FOR AIR WASHERS

Filed Jan. 6, 1964 4 Sheets-Sheet 3

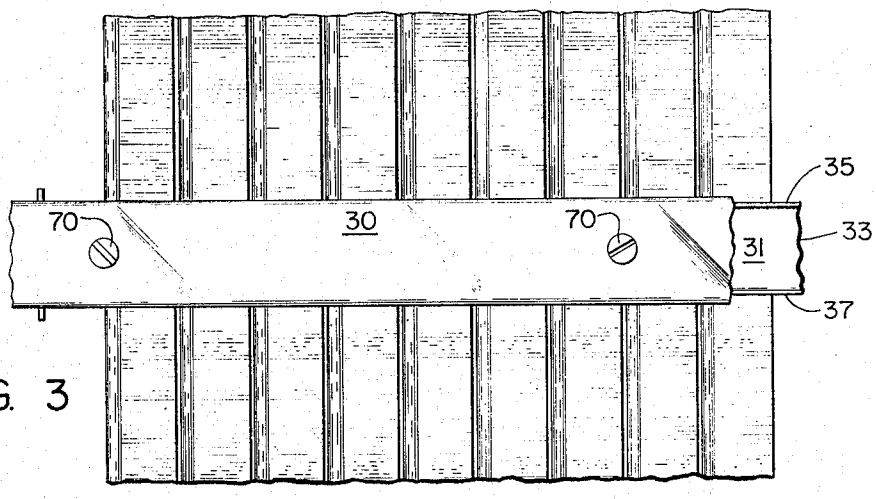


FIG. 3

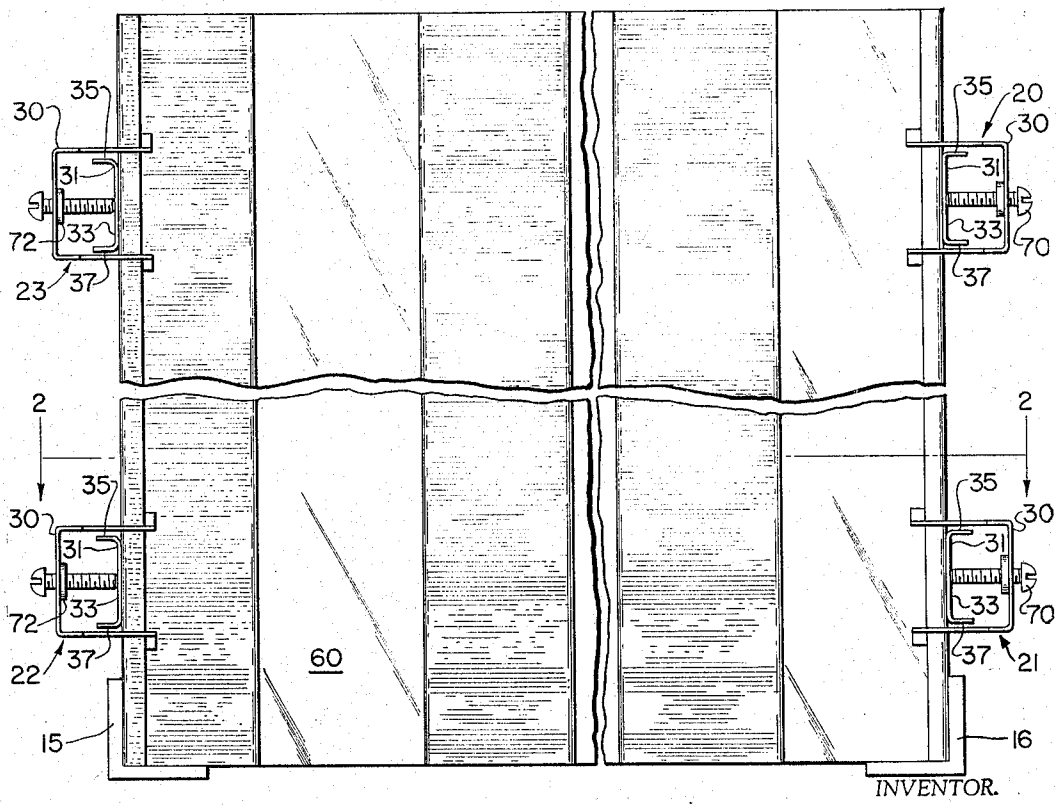


FIG. 4

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Oct. 4, 1966 C. F. LAMB 3,276,193

ELIMINATOR PLATE ASSEMBLY FOR AIR WASHERS

Filed Jan. 6, 1964 4 Sheets-Sheet 4

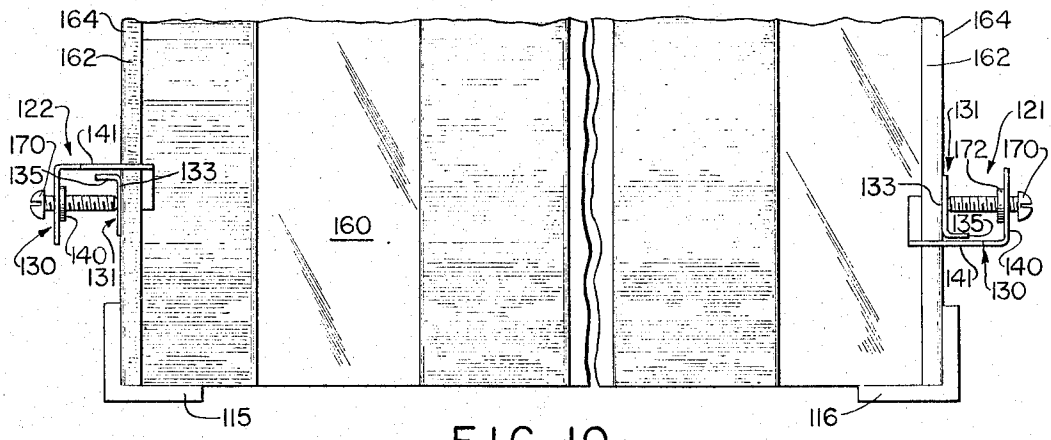


FIG. 10

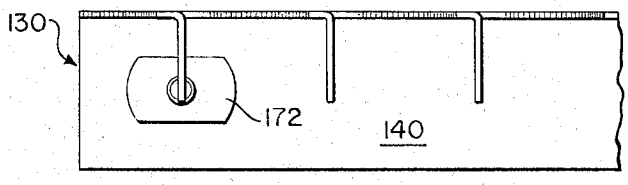


FIG. 11

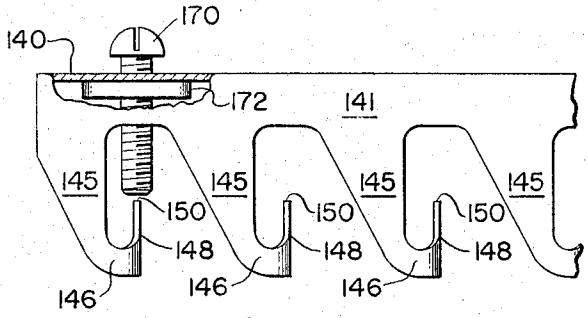


FIG. 12

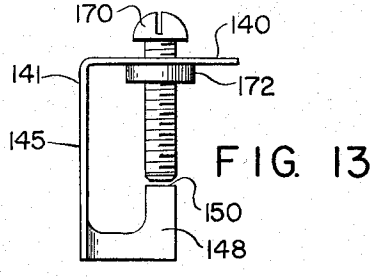


FIG. 13

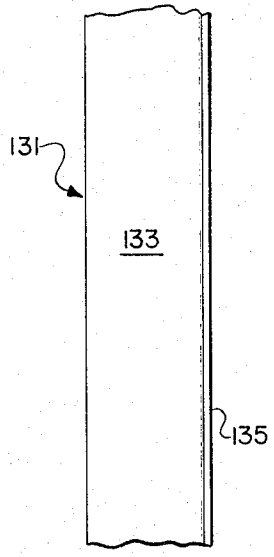


FIG. 14

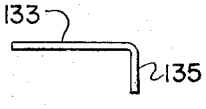


FIG. 15

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United States Patent Office

3,276,193
Patented Oct. 4, 1966

3,276,193

ELIMINATOR PLATE ASSEMBLY FOR AIR WASHERS

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Filed Jan. 6, 1964, Ser. No. 335,870
5 Claims. (Cl. 55—436)

This invention relates to eliminator plate assemblies for air washers and the like. More particularly it deals with structure for retaining the zig-zag eliminator plates of an air washer in place.

Air washers are devices which are used to remove the free particles of liquid, such as water, from air or other gases. To satisfactorily perform this function zig-zag shaped eliminator plates upon which the moisture laden air can deposite the water are grouped in the path of the moving air. Because these eliminator blades are prone to having solids deposited on their surfaces as well as liquids, it is necessary to periodically clean these blades after the solids have begun to accumulate. This is particularly true iln textile mills where lint, fly and starches are carried in the air stream and readily joint with the water in the air stream to cover the blades with a coating which is virtually a glue. To remove this coating it is necessary to periodically scrub the blades. This establishes the requirement that all of the surfaces of the blades be readily accessible.

Prior art air washers have been built with some awareness of this problem. However, in an effort to maintain structural strength and rigidity these washers have generally been built with the eliminator blades joined to the frame members of the air washer. The result of using such a construction is unwieldliness in separating the blades so that a brush or the like may be passed between them to accomplish the cleaning.

Some prior constructions have utilized long rods or bolts to fasten the plates together and retain them in slots formed in the frame members of the washer. This has imposed the requirement of unfastening the rods or bolts before the plates could be moved apart. Generally, such a construction has lent itself to cleaning the blades from only one side. Other prior construction utilizing clips of various sorts have also been limited with respect to the access to the interior surfaces of the blades in that separation has also best been accomplished from only one side. Further, the clips have often been used to fasten the frame members and the blades together, making removal of the blades as well as their separation difficult.

It is therefore apparent that each air washer has normally been assembled almost in the status of a custom job. This is so because the frame members of the washer were either slotted as required or had the clips fastened to them as required, for any particular job. This is how the spacing of the eliminator blades for each frame assembly is established. Therefore, it has been impractical to precut the frame members until the spacing of the blades for a particular installation has been determined.

The present invention overcomes the above-described inadequacies and permits easy cleaning of the eliminator blades from either the front or back of the blades as they are pivotable from either the front or the back. In addition, the blades are held in a self-contained core which merely rests on the frame of the air washer so that the frame members can be precut at will since the washer can now accept any core of eliminator blades having overall outside dimensions to fit the washer frame. The spacing of eliminator blades in the core will have no effect on the frame structure and further the core can be installed and removed without excessive manipulation of fastening means.

The following describes a preferred embodiment of the present invention and is illustrated by the accompanying drawings in which:

FIG. 1 is a perspective view of an air washer with a portion of the casing at the exit end broken away to expose the eliminator plate assembly.

FIG. 2 is an enlarged detail section of a portion of the eliminator plate core resting in support channels of the air washer of FIG. 1, as taken along line 2—2 of FIG. 4.

FIG. 3 is an enlarged detail front elevation view of a portion of the eliminator plate core of FIG. 1.

FIG. 4 is an enlarged detail side elevation view of a portion of the eliminator plate core of FIG. 1 viewed from the near side of the core of FIG. 1.

FIG. 5 is an enlarged detail elevation of one embodiment of a fulcrum retainer member alone.

FIG. 6 is a top plan view of the member of FIG. 5.

FIG. 7 is an end view of the member of FIG. 5.

FIG. 8 is an enlarged detail front elevation of one embodiment of a secondary retainer member.

FIG. 9 is an end view of the member of FIG. 8.

FIG. 10 is an enlarged detail side view, similar to FIG. 4, of a portion of an eliminator plate core retained by another embodiment of retainer assembly.

FIG. 11 is an enlarged detail elevation of another embodiment of a fulcrum retainer member alone.

FIG. 12 is a top plan view of the member of FIG. 11.

FIG. 13 is an end view of the member of FIG. 11.

FIG. 14 is an enlarged detail front elevation of another embodiment of a secondary retainer member.

FIG. 15 is an end view of the member of FIG. 14.

Viewing the drawing in greater particularity, FIG. 1 shows an air washer generally indicated by the numeral **10**. Within the washer **10** are various deflectors and nozzles and other equipment necessary to remove lint carried by the air. As a result of the "washing" the air prior to being inserted into the building is relatively clean but saturated with moisture. It is the function of the eliminator blades to remove this moisture by having the air at high velocity change direction through the paths formed by the deflectors or eliminator blades and thus impinge its moisture on the blades. The moisture thereafter runs down the blades to a collection tank at the bottom of the washer. None of these features are shown in the drawings as they do not form a part of the invention. The invention is concerned with the retainers for the eliminator blades which are generally shown as a core **12** in FIG. 1. Therefore, the particular configuration of the blades is not part of the invention except insofar as the blades contain features to cooperate with the retainers.

As shown in FIGS. 1 and 2, the eliminator blade core **12** preferably rests on channel members **15** and **16** and is retained in place by removable channel members at the top, such as **17**. The upper channel member **17** is

fastened to the washer cabinet by bolts such as indicated at **18**. A similar retainer channel such as **19** is normally used at the top of the other side of the eliminator blades and may be fastened in a manner similar to that of retainer channel **17**. As will be explained in greater detail hereinafter, the core is held together as a unit by retainer subassemblies **20**, **21**, **22**, and **23**. These subassemblies are best seen in FIGS. 1–9 which illustrate one embodiment of a desirable subassembly.

Since each of the subassemblies **20–23** are constructed in the same manner, the components for each are indicated as typical units in FIGS. 5–9. Generally speaking the subassemblies are composed of two channel members **30** and **31**, contained one within the other with the open channels of each facing the other. The channel **31** is of simple construction, having a web **33** and two relatively short flanges **35** and **37** which provide structural rigidity. This channel **31** fits within the channel **30** and acts as an abutting and aligning member for the eliminator blade core.

The channel **30** is a more complex construction, containing an elongate web **40** and two short flanges **41** and **42** extending at right angles from the longitudinal edges of the web. The two flanges thereby being in parallel aligned orientation. Extending from the flange **41** is a plurality of parallel flat closely spaced legs **45**. Flange **42** has similar legs **43**. Each leg has a laterally displaced fulcrum member joined to it; member **48** to the end of the leg **45**, and member **47** joined to the leg **43**. Each fulcrum member is substantially perpendicular to the plane of the web **40**. The fulcrum member is joined to the leg **45** by means of a connecting web **46**. Leg **45** has a similar connecting web. In the pictured embodiment the fulcrum member **48** is rectangular in shape and has an end or edge **50** which is directed inwardly toward the channel web **40** and which is the actual fulcrum about which the retained eliminator plate can pivot. Similarly fulcrum member **47** has a fulcrum end or edge **49**.

Each blade **60** has an inwardly directed fringe member **62** extending along each longitudinal edge **64** in spaced relation to the main body portion of the blade **60**.

FIGS. 10–15 inclusive illustrate another embodiment of a retainer sub-assembly. Those shown in FIG. 10 are numbered **121** and **122**. Since each of the sub-assemblies **121** and **122** are constructed in the same manner, the components making up each are shown as typical units in FIGS. 11–15. Generally speaking, sub-assemblies of this particular embodiment are composed of two angle iron members **130** and **131**, contained one within the other. Each angle iron has two flanges at right angles to each other. The angle iron **131** is of quite simple construction, having a wide flange **133** and a narrow flange **135** which combine to provide structural rigidity to the angle iron.

The angle **130** is of a more complex construction, having a wide flange or web **140** and a narrow flange **141** extending at right angles to the former. Extending from the narrow flange **141** is a plurality of parallel flat closely spaced legs **145**. Each leg has a laterally displaced fulcrum member **148** joined to the end of the leg by means of a connecting web **146**. Each fulcrum member **148** is directed substantially perpendicularly inwardly toward the flange **140** and is generally rectangular in shape with an end or edge **150** at the innermost end of the member **148**. It is this end or edge **150** which is the actual fulcrum about which the retained eliminator can pivot.

To assemble the eliminator blade core of the embodiment of FIGS. 1–9, the fringe member **62** of each blade is inserted in the space between one leg **45** and the fulcrum member **48** joined thereto and an opposing leg **43** and the fulcrum member **47** joined thereto, on one channel **30** (see FIGS. 2, 3, and 4). Assuming that two retainer sub-assemblies are required on each side of the eliminator plate core, e.g., **20** and **21** on one side and **22** and **23** on the other side, these will be located approximately at one quarter of the height of the blades from the bottoms and the tops of the blades.

With the fringe member **62** located as described above, the fulcrum edges **49** and **50** are capable of engaging the interior surface of longitudinal edge **64** between the fringe member **62** and the main body of the blade. The channel member **31** is then inserted between web **40** and the longitudinal edges **64**, preferably with the short flanges **35** and **37** facing toward the web **40**. If this is inconvenient, the channel member **31** may be placed within the channel member **30** prior to the engagement of fulcrum edges **49** and **50** with the interior surface of longitudinal edge **64**. A plurality of screws **70** or similar type of fastener is then threaded through spaced weld nuts **72** fastened to the interior of web **40**, and then tightened to urge channel **31** into firm engagement with the outsides of the longitudinal edges **64** while simultaneously drawing the fulcrum edges **49** and **50** into firm engagement with the interior surfaces of the longitudinal edges **64**.

By utilizing the blades themselves as part of the retaining means, e.g., the fringe portions **62** and edges **64**, sufficient structural strength and rigidity is achieved in combination with the channel members **30** and **31** so that additional lateral support is not required from the frame members of the air washer itself.

When it is necessary to clean the blades, retainer subassemblies **20** and **21** or **22** and **23** may be removed (depending on the side from which the cleaning is to occur). Removal is easily accomplished by retracting screws **70** and disengaging the fulcrum members **47** and **48** from between the fringe members **62** and the main bodies of the eliminator blades. If sub-assemblies **20** and **21** are removed the eliminator blades may be easily separated from that side by slightly loosening the screws **70** of subassemblies **22** and **23** and then merely pushing the desired blades apart from the side formerly retained by subassemblies **20** and **21**. When this is done the blades will pivot easily about the fulcrum edges **49** and **50** of the sub-assemblies **22** and **23**.

Should cleaning be necessary from the side retained by sub-assemblies **22** and **23**, these sub-assemblies may be removed and the plates pivoted about the fulcrum edges **49** and **50** of sub-assemblies **20** and **21** in the same manner set out in the previous paragraph.

Similar results are obtained from the embodiment shown in FIGS. 10–15 inclusive. In this embodiment the retainer sub-assemblies are each composed of two members **130** and **131** each having a shape substantially of an elongated angle iron. The principles of use of these retainer subassemblies are similar to the principles contained in the sub-assemblies utilizing channel members **30** and **31**, described above. For example, the fulcrum edge **150** of each fulcrum member **148** is engaged with the interior surface of each longitudinal edge **164** between the fringe member **162** and the main body of blade **160**. The channel member **131** is then inserted between the web **140** and the longitudinal edges **164**.

As shown in FIG. 10 the fringe members **162** of each eliminator plate may be constructed to lie on the same side of the plate. In such a case the retainer sub-assemblies at opposite edges of the plate such as shown here at **121** and **122** would engage the edges with the flanges **141** and **135** of the angle iron members **130** and **131**, downwardly and upwardly respectively. This orientation may vary with various orientations of the fringe members **162**. The advantage of the particular orientation shown in FIG. 10 is that in sub-assembly **121**, flange **141** of angle iron member **130** will prevent the angle iron member **131** from falling downwardly. Whereas, in sub-assembly **122**, the screws **170** and the flange **135** will prevent angle iron member **130** from falling downwardly.

A plurality of screws **170** or similar type of fastener is then threaded through spaced weld nuts **172**, fastened to the web **140**, and then tightened to urge channel **131** into firm engagement with the outsides of longitudinal edges

164 while simultaneously drawing the fulcrum edges 150 into firm engagement with the interior surfaces of the longitudinal edges 164.

The retainer sub-assemblies composed of angle iron type members such as 130 and 131 when engaged with the eliminator blades will when properly utilized give the same satisfactory structural rigidity as will the sub-assemblies formed from the channel members such as 30 and 31. As with these latter channel member sub-assembly constructions the eliminator blades utilizing the angle iron type of sub-assemblies can be separated for cleaning from either the front or the back by following the same procedures set out above with respect to sub-assemblies 20, 21, 22, and 23.

It will be understood that in the embodiment of FIGS. 1–9 the entire eliminator core may easily be removed by removing one upper retainer channel such as 17 and lifting the core out of the supporting channels 15 and 16. The embodiment of FIGS. 10–15 may be just as simply removed from supporting channels 115 and 116 by following similar procedures.

It will be understood that various changes in the details, materials, steps and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. In an air washer and similar apparatus having a plurality of similar zig-zag eliminator blades each with front and rear turned edge portions having fringe members spaced from the main body of the blade, means for retaining said blades as an integral removable unit with the front and rear edges lying in parallel planes in closely spaced parallel relation to form tortuous air passages therebetween, said means comprising a sole retaining means fixedly secured to said blades and including:

(A) a plurality of elongate members; at least one of each being at the front of said blades and at least one of each being at the rear of said blades,

(B) each elongate member having a web portion extending substantially at right angles to each outer edge of each blade,

(C) a plurality of inwardly directed closely spaced fulcrum means joined to each web portion,

(1) a fulcrum means engaging the interior portion of a turned edge portion of each blade between the fringe member and the main body of the blade,

(D) means for releasably retaining each of said fulcrum means in firm engagement with said interior portion,

whereby said fulcrum means at either front or rear edges maybe removed to permit pivoting of said blades about the remaining fulcrum means.

2. Apparatus as called for in claim 1 wherein said means for retaining each of said fulcrum means is:

(A) a second elongate member interposed between said web portion and said outer edges of said blades parallel to said web portion and in engagement with said outer edges, and

(B) variable means in engagement with said web portion for forcing said second elongate member against said outer edges and simultaneously forcing said fulcrum members against said interior portions of said turned edge portions.

3. In an air washer and similar apparatus having a plurality of similar zig-zag eliminator blades each with front and rear turned edge portions having fringe members spaced from the main body of the blade, means for retaining said blades as an integral removable unit with the front and rear edges lying in parallel planes, in closely spaced parallel relation to form tortuous air passages therebetween, said means comprising a sole retaining means fixedly secured to said blades and including:

(A) a plurality of elongate members; at least two parallel spaced elongate members being at the front of said blades and at least two parallel spaced elongate members being at the rear of said blades,

(B) each elongate member comprising a planar web portion substantially parallel to the plane of the adjacent outer edges of said blades and at right angles to the adjacent outer edge of each blade,

(C) a plurality of closely spaced parallel members, joined to each of said web portions and extending toward said blades, each of said parallel members having:

(1) a laterally displaced fulcrum member with a fulcrum end directed toward the plane of said web portion,

(a) a fulcrum end engaging the interior portion of a turned edge portion of each blade between the fringe member and the main body of the blade,

(D) means for releasably retaining each of said fulcrum ends in firm engagement with said interior portion,

whereby all of said fulcrum members at either one of the front or the rear of said blades may be removed to permit pivoting of said blades about the remaining fulcrum members.

4. Apparatus as called for in claim 3 wherein said means for retaining each of said fulcrum ends is:

(A) a second elongate member interposed between each said web portion and said outer edges of said blades parallel to said web portion and in engagement with said outer edges, and

(B) a plurality of screws threadedly engaged through each web portion to abut the respective second elongate member interposed between said web portion and said outer edges, whereby advancing said screw forces said respective second elongate member against said outer edges of said blades and simultaneously forces said fulcrum ends against the interior portions of said turned edge portions.

5. In an air washer and similar apparatus having a plurality of similar zig-zag eliminator blades each with front and rear turned edge portions having fringe members spaced from the main body of the blade, means for retaining said blades as an integral removable unit with the front and rear edges lying in parallel planes, in closely spaced parallel relation to form tortuous air passages therebetween, said means comprising a sole retaining means fixedly secured to said blades and including:

(A) a plurality of elongate members at the front and rear of said blades extending substantially at right angles to each outer edge of each blade, each elongate member comprising:

(1) a web portion with two parallel edges lying in a plane substantially parallel to the plane of the adjacent edges of said blades,

(2) at least one elongate flange member joined to and extending along at least one of said web portion edges at substantially right angles to said web portion,

(3) a plurality of closely spaced members extending from said flange member toward said blades in a plane substantially perpendicular to said web portion,

(4) a fulcrum member joined to each of said closely spaced members, each fulcrum member:

(a) being laterally displaced from its spaced member, and

(b) having a fulcrum end directed inwardly toward a plane containing the said parallel edges of said web portion,

(c) one each of said fulcrum ends:

(A') engaging the interior portion of a turned edge portion of a corresponding one of each blade,

(B) a second elongate member interposed between each said web portion and said outer edges of said blades parallel to said web portion and in engagement with said outer edges, and

(C) a plurality of screws threadedly engaged through each web portion to abut the respective second elongate member interposed between said web portion and said outer edges, whereby advancing said screws forces said respective second elongate member against said outer edges of said blades and simul-

taneously forces said fulcrum ends against the interior portions of said turned edge portions to hold said blades firmly, and withdrawing said screws at either front or rear edges of said blades permits the removal of all of the fulcrum members at said edge to permit pivoting of said blades about the remaining fulcrum means.

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ROBERT F. BURNETT, *Primary Examiner.*