April 20, 1965 M. S. FAIN 3,179,034

AIR DUCT OUTLET GRILLE AND METHOD OF ASSEMBLING THE SAME

Filed Feb. 8, 1963 4 Sheets-Sheet 1

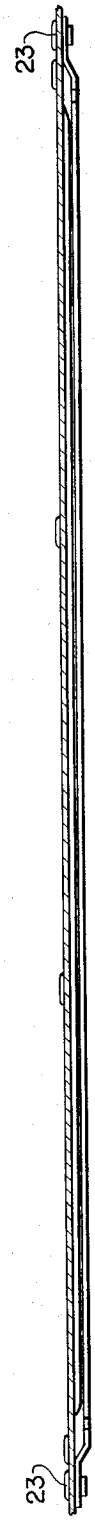


FIG. 9

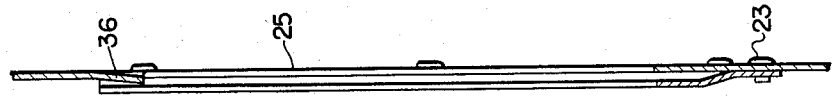


FIG. 10

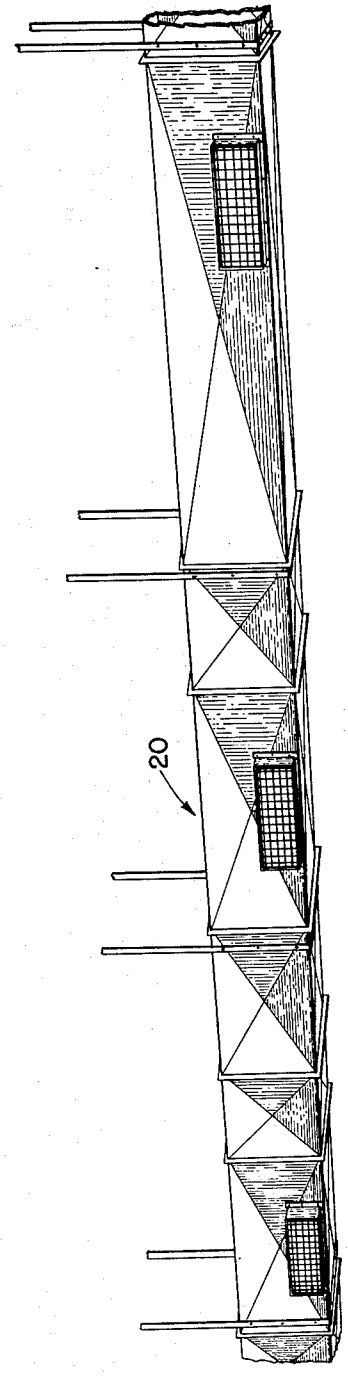


FIG. 1

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AIR DUCT OUTLET GRILLE AND METHOD OF ASSEMBLING THE SAME

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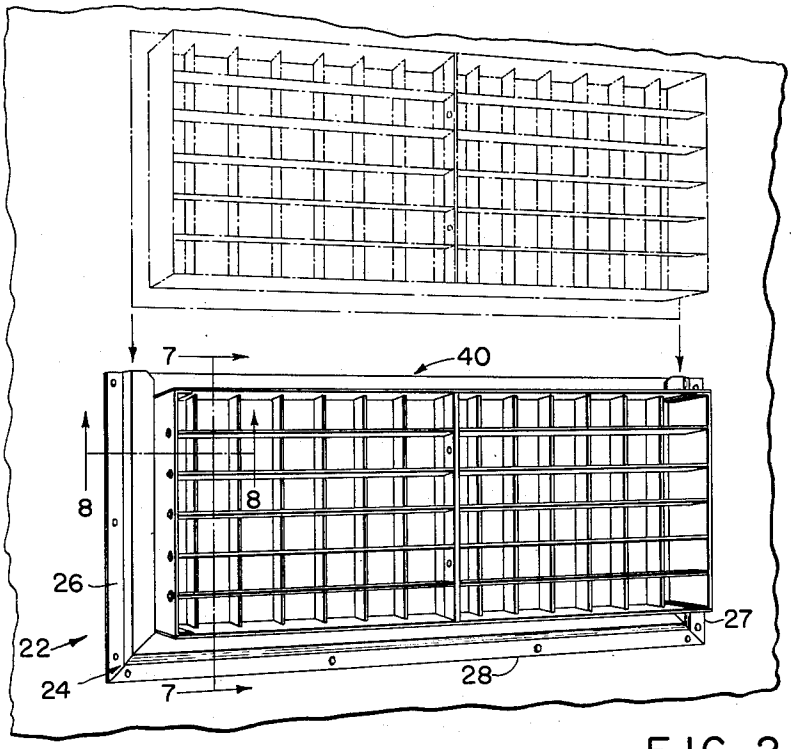


FIG. 2

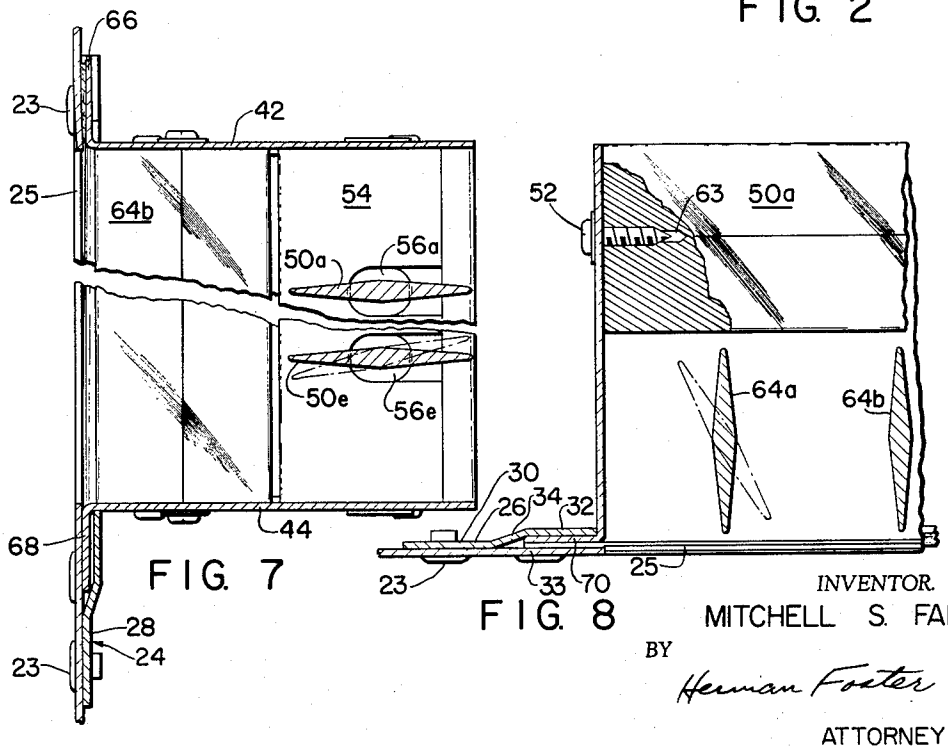


FIG. 7

FIG. 8

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AIR DUCT OUTLET GRILLE AND METHOD OF ASSEMBLING THE SAME

Filed Feb. 8, 1963 4 Sheets-Sheet 3

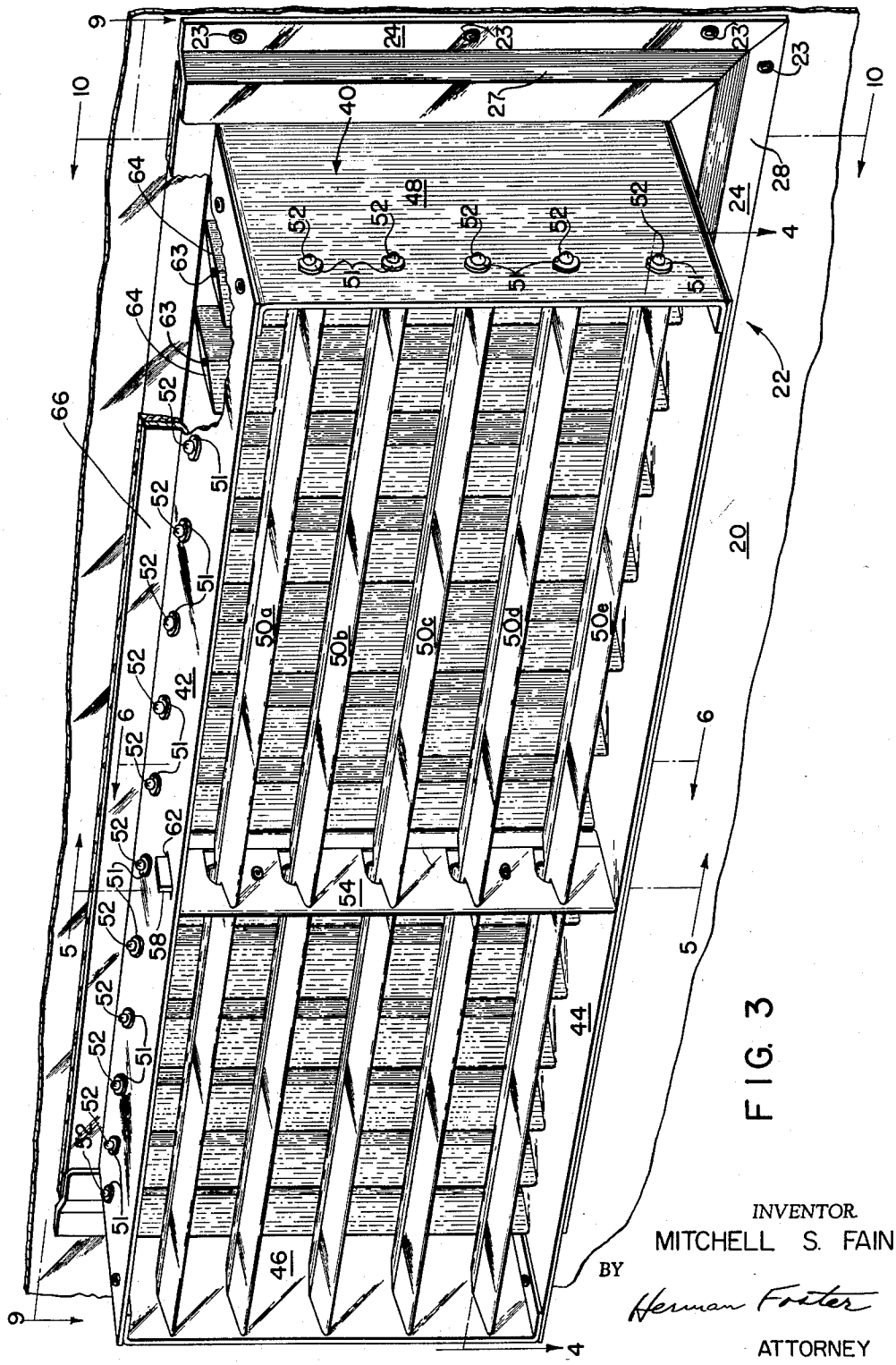


FIG. 3

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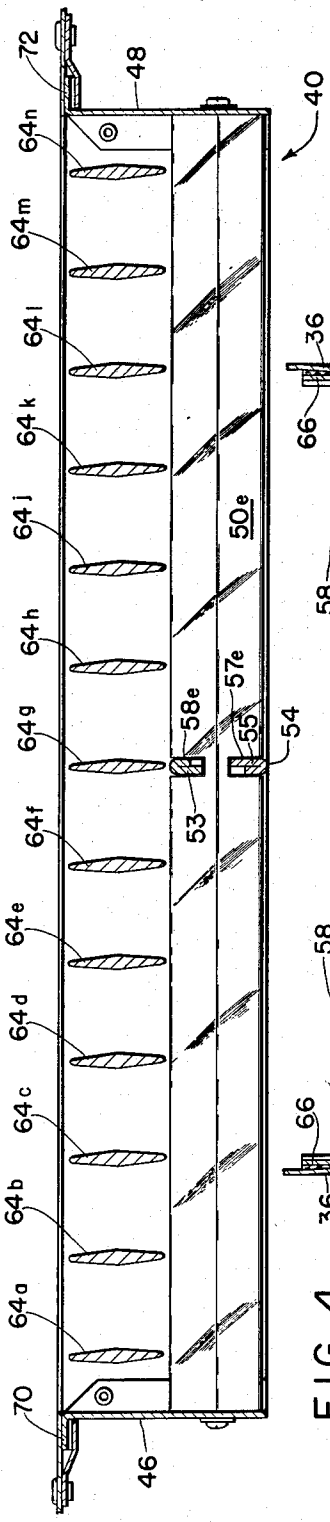


FIG. 4

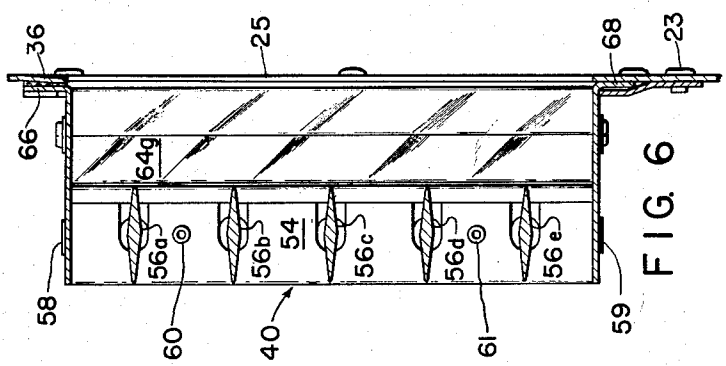


FIG. 6

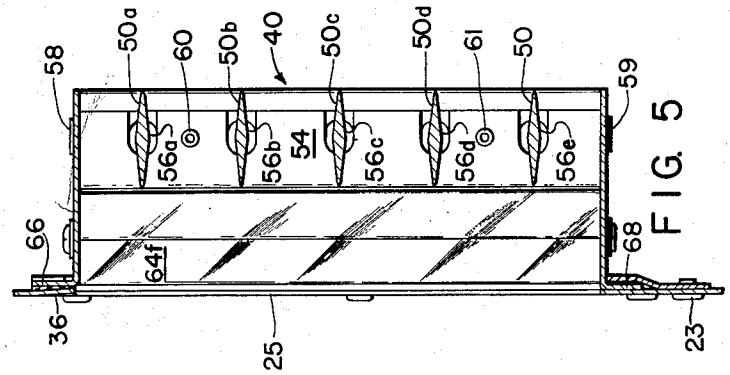


FIG. 5

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United States Patent Office 3,179,034 Patented Apr. 20, 1965

3,179,034

AIR DUCT OUTLET GRILLE AND METHOD OF ASSEMBLING THE SAME

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Filed Feb. 8, 1963, Ser. No. 257,138
1 Claim. (Cl. 98—40)

This invention relates to outlet grilles utilized in distributing air issuing from a duct into a room, and a method of assembling the same.

In many textile mills there has been a trend toward the use of what is called a "split-system" air conditioning system to properly treat the air within the mill and maintain the proper humidity. This system consists primarily of an air conditioning system which circulates conditioned air through ducts into the room at the proper temperature and cleanliness. Supplementing this duct system is a water atomizing system which brings the room air to the proper humidity level. In most mills, particularly cotton mills, the atmosphere within the mill contains much lint and fly which, in the course of circulating throughout the room, eventually settles on many of the appurtenances of the building within the mill. This includes portions of the atomizing system and the duct system for the air conditioning. One component which apparently is particularly prone to being heavily deposited with this lint and fly are the air duct and outlet grilles. It has therefore become necessary that these grilles be removable to facilitate their cleaning. Prior grilles in this art have been built so as to be removable either by having the grille fastened to the duct by screws or by having a grille with a removable core which is retained in place by a heavy spring. Both of these types of removable cores or grilles require a worker who may be standing on a high ladder and attempting to remove these grilles for cleaning purposes, to perform awkward maneuvers in removing these grilles or cores thereby seriously endangering his well-being. In addition, the prior grille devices have utilized a fin configuration which apparently had a great propensity for collecting lint and fly and was not easily adjustable, or if so adjustable, would not readily lend itself to being fixed in its desired orientation. The present invention overcomes these problems in a manner which will become more apparent from the following detailed description of a preferred embodiment thereof and the accompanying drawings in which:

FIG. 1 is a perspective view of a section of typical duct work showing the placement of the improved outlet grille;

FIG. 2 is a larger detailed perspective of an improved grille, showing its removable construction;

FIG. 3 is an enlarged perspective of an improved grille with portions cut away showing the details of construction;

FIG. 4 is a horizontal section taken on line 4—4 of FIG. 3;

FIG. 5 is a vertical section taken on line 5—5 of FIG. 3;

FIG. 6 is a vertical section taken on line 6—6 of FIG. 3;

FIG. 7 is a vertical section with portions removed for ease of illustration, taken on line 7—7 of FIG. 2;

FIG. 8 is a partial horizontal section taken on line 8—8 of FIG. 2 with a portion removed to show a fastening detail;

FIG. 9 is a horizontal section of the duct work, with the grille removed, taken on line 9—9 of FIG. 3;

FIG. 10 is a vertical section of the duct with the grille removed taken on line 10—10 of FIG. 3.

Referring in greater particularity to the drawings, a duct work **20** is shown having several outlet constructions thereon. Each outlet construction **22** has a U-shaped frame assembly **24** fastened by rivets **23** to the duct approximately coterminous on two sides and the bottom with an opening **25** in the duct. Each assembly is made up of two side strips **26** and **27** and a bottom strip **28** which may or may not be joined at the corners when placed over the opening **25**. These strips are of a misshapen Z cross-section having two displaced substantially parallel flanges such as **30** and **32** on strip **26** (see FIG. 8), connected by a web **34**. The spaced flange **32** and the wall of the duct **33** form a guiding channel for the reception of flange **70** which will be described hereafter. At the top of the opening **25** the duct is bent outwardly to form a lip **36** (see FIG. 10).

The insertable register **40** is rectangular in shape and has a top **42**, a bottom **44** and two sides **46** and **48** forming the basic frame. Joined to the side frame members **46** and **48** are horizontal fin members **50***a*, **50***b*, **50***c*, **50***d* and **50***e* which have, in cross-section, the shape of an elongated diamond and which are substantially of the same length. Generally the fins are solid and receive, in a properly sized hole (one at each end) such as **63**, at approximately the axis of each fin, the threaded portions of screws **52**. These screws are self tapping screws placed through predrilled holes in the frame (not shown) and are preferably driven into holes, such as **63** in FIG. 3, by a controlled torque screwdriver so that their heads firmly engage the flat washers **51** to a preselected value.

At the middle of the top **42** and bottom **44** is a vertical support web **54** with holes **56***a*, **56***b*, **56***c*, **56***d* and **56***e* through it for supporting and guiding the centers of the horizontal fins. These holes have circular or elliptical configurations (see FIGS. 5 and 6) so as not to obstruct the rotation of the fins by hand when it is determined that the air is to be directed toward a different direction. The web **54** is formed of two similar slotted plates **53** and **55**, interfitted as shown in FIG. 4 about a notched-out portion **57***e* and **58***e*. The two plates are joined by rivets **60** and **61** (see FIGS. 5 and 6). Each plate has a turned edge which when abutted to the adjacent plate determines the proper spacing so that the slots will form holes **56***a–e*. At each end of the web is a tongue **58** and **59** which fit a slot in each of top **42** and bottom **44**. Such a slot is seen at **62** in FIG. 3.

To the rear of the horizontal fins are vertical fins **64***a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, *j*, *k*, *l*, *m*, and *n* which are substantially of equal length and which have the same shape as the horizontal fins and like the horizontal fins are fastened by screws **52** driven into holes such as **63** in the ends of the fins. The screws **52** being located in the center of each fin (both horizontal and vertical) at each end make it possible, when necessary, to adjust the alignment of the fins so that the air stream issuing from the outlet may be directed in a desired direction. Moreover, being located in the center, at the longitudinal axis of each fin, the retention force for holding the fin in position need not be as great as that for a fin having its fastener near an edge. The screws **52** also make it possible to easily vary the retentive torque maintaining the fins in position, so that initially, the fins may be easily adjusted, when the air-conditioning system is installed, to direct the air as desired, and then fixed in position to a desired degree by tightening the screws to a preselected torque value. In normal practice, while the screws are tightened sufficiently to hold the fins in position, they still permit some rotation of the fins when minor adjustments are found to be necessary.

Each of the top **42**, bottom **44** and sides **46** and **48** have a flange, **66**, **68**, **70** and **72** respectively which extends

outwardly of the register **40** at right angles to each of the top, bottom and sides. The top flange **66** has a sealing strip **74** joined to it. Preferably, this strip is shown as being composed of felt. However, foam rubber or foam plastic are considered suitable substitutes. Each of the flanges **70** and **72** are slidably receivable in the channels formed by the frame members **26** and **27** and the duct wall as shown in FIG. 8 by the flange **70** and the frame flange **32** and duct wall **33**. The bottom flange **68** is received by the bottom frame member **28** and the duct wall as the register **40** is slid downwardly into place. Each of the frame members **26**, **27**, and **28**, by being properly spaced, provide sufficient sealing engagement. The top of the register is sealed because of the pressure of the lip **36** on the sealing strip **74**.

Whenever the grille register **40** requires cleaning it is a simple operation for a man to climb a ladder, slip the register out of the frame assembly **24** and bring it down for cleaning and adjustment, if necessary.

It will be understood that various changes in the details, materials, steps and arrangement 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 claim.

I claim:

In a duct construction for the transmission of air and the like, an outlet grille construction comprising:

(A) a substantially U-shaped frame mounted about a rectangular opening in a vertical side of said duct, said frame including:

(1) a horizontal elongated first frame member fastened to said duct adjacent the bottom edge of said opening,

(2) two vertical elongated frame members, one at each end of said horizontal member, extending vertically adjacent each side edge of said opening,

(3) all of said members each having:

(*a*) a first flange poined to said duct adjacent said opening,

(*b*) an elongated second flange parallel to said first flange and spaced outwardly therefrom and from said duct,

(*c*) a web member joining said first and second flanges,

(B) a rectangular outlet register slidingly engaged by said frame at the bottom and two sides thereof and

retained thereby over said opening, said register including:

(1) a rectangular frame extending outwardly of said duct, said frame having:

(*a*) a top member,

(*b*) a bottom member, and

(*c*) two side members extending in parallelism between the top and bottom members,

(2) each of said bottom and side members having outwardly extending flanges at their edges adjacent the duct slidingly engaged between the duct and the second flanges of said frame members,

(3) a plurality of vertical elongated fin members each having the cross-sectional configuration of an elongated diamond,

(4) a plurality of horizontal elongated fin members each having the cross-sectional configuration of an elongated diamond located outwardly of the vertical fin members,

(5) means for pivotally connecting each of the said fin members at their ends to the register, said means comprising:

(*a*) a screw passing through an abutting frame member and into each end of each of said fins aproximately in line with the axis of the fin,

(C) means at the top of said register for sealing the space between the register and said duct, said means comprising:

(1) an outwardly extending lip on the top margin of said opening,

(2) an outwardly extending flange on the top frame member at the edge adjacent the duct,

(3) an elongated sealing member joined to said last mentioned flange and compressed between said flange and said lip.

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ROBERT A. O'LEARY, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,179,034 April 20, 1965

Mitchell S. Fain

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 40, for "poined" read -- joined --.

Signed and sealed this 2nd day of November 1965.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents