

Feb. 4, 1958

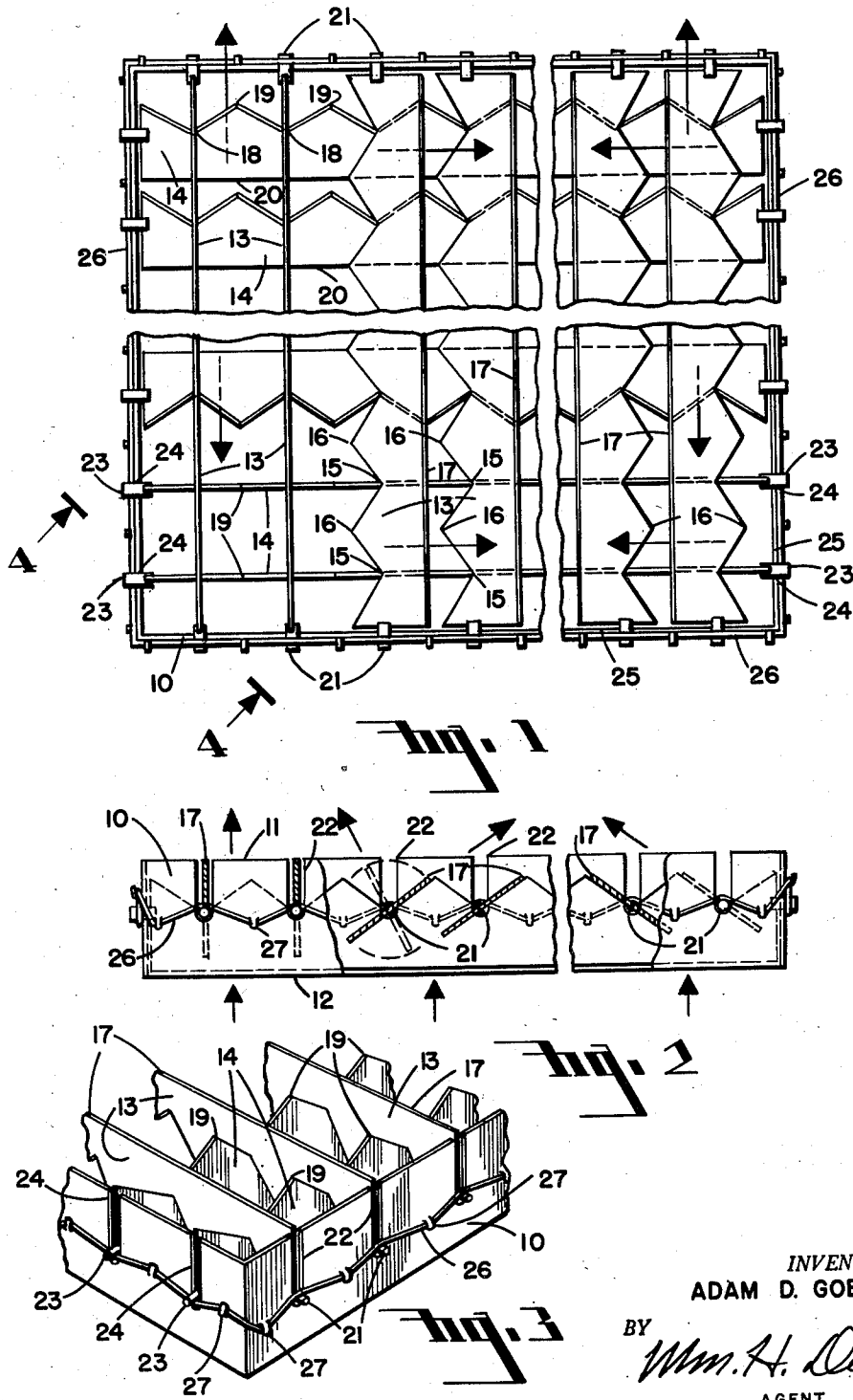
A. D. GOETTL

2,821,899

AIR DIRECTING LOUVER DEVICES

Filed Sept. 17, 1957

3 Sheets-Sheet 1



INVENTOR.
ADAM D. GOETTL

BY

Wm. H. Dean

AGENT

Feb. 4, 1958

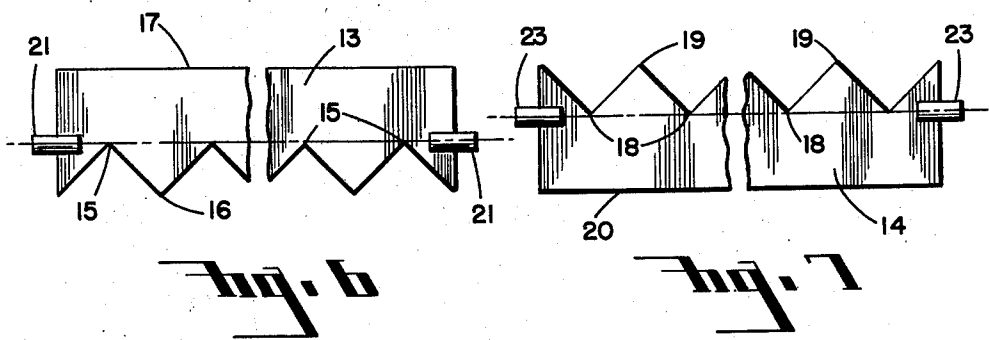
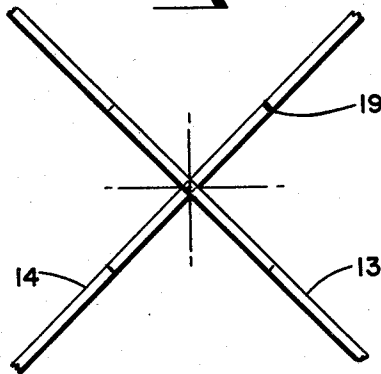
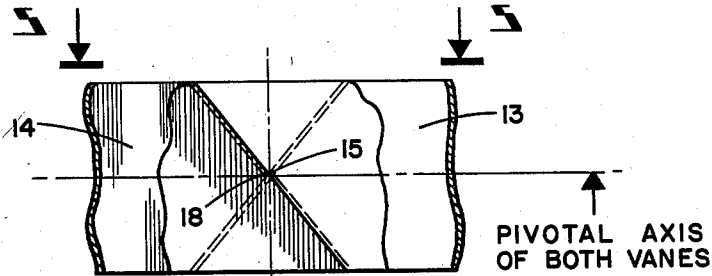
A. D. GOETTL

2,821,899

AIR DIRECTING LOUVER DEVICES

Filed Sept. 17, 1957

3 Sheets-Sheet 2



INVENTOR.
ADAM D. GOETTL

BY
Wm. H. Dean

AGENT

Feb. 4, 1958

A. D. GOETTL

2,821,899

AIR DIRECTING LOUVER DEVICES

Filed Sept. 17, 1957

3 Sheets-Sheet 3

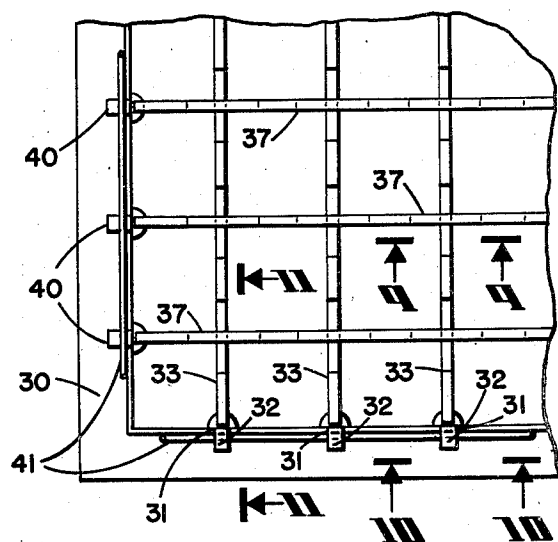


Fig. 8

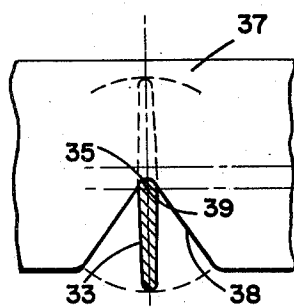


Fig. 9

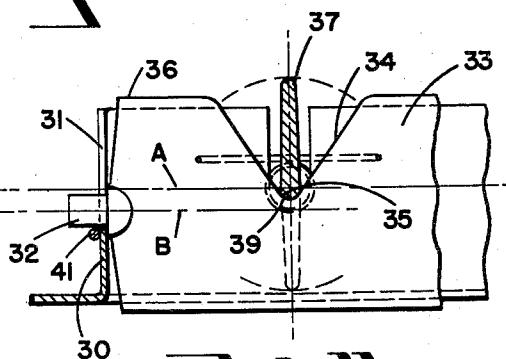


Fig. 11

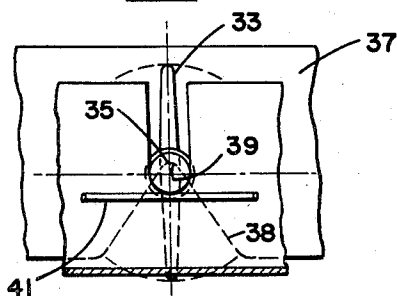


Fig. 10

INVENTOR.
ADAM D. GOETTL

BY
Wm. H. Dean

AGENT

1

2,821,899

AIR DIRECTING LOUVER DEVICES

Adam D. Goettl, Phoenix, Ariz.

Application September 17, 1957, Serial No. 684,492

9 Claims. (Cl. 98—40)

This invention relates to air directing louver devices and more particularly to a louver device for use in directing air from various equipment such as heaters, coolers and fans. The present application is a continuation in part of my co-pending application, Serial No. 583,016, filed May 7, 1956, now abandoned.

The art of louver devices contains many configurations of mechanism for directing air at various angles and at various combinations of angles. While the art contains numerous louver devices having intersecting adjustable slats most of them are either noisy and flutter when air passes therethrough or will not remain in a desired adjusted position.

In addition, many of the prior art louver devices are complicated and expensive to manufacture. Also, some louver devices are provided with slat structures which are very difficult to replace if damaged.

In the fabrication of air directing louver devices the use of plastic materials is desirable. In the construction of louver slats of plastic or other material of similar strength and characteristics it has been found necessary to make the louver slats sufficiently thick to be structurally adequate.

According to the present invention, intersecting louver slats having meshing V shaped notches may be made of plastic material. The pivotal axes of such slats must be slightly offset to compensate for the thickness of the slats and to provide smooth fully engaged bearing surfaces at meshing notch apex portions of the slats when they are pivoted into various angular positions relative to each other.

Accordingly, it is an object of the invention to provide an air directing louver device having slat structures which may be adjusted at various angles relative to each other.

Accordingly, it is an object of the invention to provide an air directing louver device having slat structures which may be adjusted at various angles relative to each other and which will maintain such adjustments during a vigorous flow of air between the slats.

Another object of the invention is to provide an air directing louver device having intersecting slats which are at all times maintained in secure contact with each other which thereby prevents rattling of the slats during a vigorous flow of air therebetween.

Another object of the invention is to provide an air directing louver device which is very simple to assemble whereby slats thereof may be readily replaced in the event they become damaged.

Another object of the invention is to provide an air directing louver device having intersecting slats which are substantially identical in construction and therefore very simple and economical to manufacture.

A further object of the invention is to provide an air

2

directing louver device in which intersecting slats thereof are provided with novel pivotal supports and means for resiliently holding the louver slats in secure engagement with each other throughout various angularly adjusted positions thereof.

Another object of the invention is to provide an air directing louver device having intersecting slats, all pivotally mounted on axes passing through a substantially common plane.

Another object of the invention is to provide an air directing louver device which is particularly adapted for the use of plastic or other similar materials in the construction of the louver slats thereof.

Further objects and advantages of the invention will be apparent from the following specification, appended claims and accompanying drawings in which:

Fig. 1 is a fragmentary, side elevational view of an air directing louver device constructed in accordance with the present invention and showing the slats thereof in various angularly adjusted positions.

Fig. 2 is a fragmentary, end view of the air directing louver device, as shown in Fig. 1 of the drawings and showing portions broken away and in section to amplify the illustration.

Fig. 3 is a fragmentary, perspective view of a corner of an air directing louver device constructed in accordance with the present invention.

Fig. 4 is a fragmentary, sectional view taken from the line 4—4 of Fig. 1.

Fig. 5 is a fragmentary view taken from the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary, side elevational view of one slat of the present invention.

Fig. 7 is a side elevational view of another slat adapted to intersect the slat as shown in Fig. 6 of the drawings.

Fig. 8 is a fragmentary, side elevational view of a modified form of an air directing louver device in accordance with the present invention.

Fig. 9 is an enlarged, fragmentary, sectional view thereof taken from the line 9—9 of Fig. 8.

Fig. 10 is an enlarged fragmentary edge elevational view taken from the line 10—10 of Fig. 8; and,

Fig. 11 is an enlarged fragmentary sectional view taken from the line 11—11 of Fig. 8.

The air directing louver device according to the present invention is provided with a rectangular frame 10 which is open at both of its sides 11 and 12. The frame 10 is arranged to permit the flow of air therethrough and supports intersecting slats therein as shown best in Fig. 1 of the drawing.

The construction of each of the slats 13 is substantially identical to that of each of the slats 14. These slats 13 and 14 preferably intersect at right angles to each other and are all pivoted so that they may be adjusted to various angular positions as desired for changing the flow direction of air passing through the frame 10.

Each of the slats 13 is provided with substantially V shaped notches having inwardly directed closed apex portions 15 from which the notches diverge toward common edges of the slats and from outwardly directed apex portions 16 which are disposed between the inwardly directed notch apex portions 15. The slats 13 are provided with straight edge portions 17 opposite to said common edges at which the apex portions 16 are located.

The slats 14 are spaced equal to the spacing of the inwardly directed notch apex portions of the slats 13 and the slats 13 are spaced equal to the spacing of inwardly

3

directed closed apex notch portions 18 of the slats 14. The slats 14 intermediate the inwardly directed notch apex portions 18 are provided with outwardly directed apex portions 19. The notches in the slats 14 are substantially V shaped and diverge outwardly from the inwardly directed closed apex portions 18 toward the outer common edges of the respective slats 14. These slats 14 are provided with straight edge portions 20 which are opposed to the notched edges having the inwardly and outwardly directed apex portions 18 and 19, respectively.

It will be noted that the inwardly directed notch apex portions 15 of the slats 13 engage and mesh with the inwardly directed notch apex portions 18 of the slats 14 whereby all of the slats pivot substantially on a common plane which extends through the inwardly directed notch apex portions of all of the slats 13 and 14.

Connected to opposite ends of the slats 13 are pivot pins 21 which are loosely fitted in notches 22 of the frame 10. Fixed to opposite ends of the slats 14 are pivot pins 23 which are retained in notches 24 of the frame 10. It will be seen that the pivot pins 21 and 23 are provided with end portions extending outwardly from the outer side walls 25 of the frame 10. These pivot pins 21 and 23 are engaged by a wire 26 which is secured to the frame 10 by outwardly directed tabs 27 which are integral with the frame 10.

The wire 26 surrounds the frame 10 and is hooked under all of the tabs 27 and engages all of the pivot pins 21 and 23 for holding the inwardly directed notch apex portions 15 and 18 of the slats 13 and 14, respectively, secured in engagement with each other.

It will be understood that the slats 13 and 14 are thin resilient members and that the wire 26, when securely engaged with the tabs 27 and the pins 21 and 23, maintain a slight resilient loading of the slats 13 and 14 at their interengaging inwardly directed closed notch apex portions. This resilient engagement of the slats 13 and 14 at their inwardly directed notch apex portions prevents them from rattling when there is a vigorous flow of air intermediate the slats and the resilient loading of the slats together also tends to maintain them in certain adjusted position, even though the flow of air between the slats is quite forceful.

Attention is called to Fig. 4 of the drawing which illustrates the pivotal axes of both of the slats 13 and 14 on a common plane. This common plane which substantially passes through the pivotal axes of the slats 13 and 14 may substantially align with the axes of the pivot pins 21 and 23 while these pins 21 and 23 are resiliently supported near the inner ends of the slots 22 and 24 by the wire 26 engaging the tabs 27 of the frame 10.

It will be understood that the pivotal axes of the thin slats 13 and 14 may be disposed on substantially a common plane with each other depending upon reasonable manufacturing tolerances and upon the thickness of the slats 13 and 14. It will be further noted that the notch apex portions 15 and 18 of the slats 13 and 14 are disposed at locations between opposite edges of the slats 13 and 14 as shown in Fig. 4 of the drawing.

In operation, the air directing louver device in accordance with the present invention may be used to direct hot air from heaters, cool air from cooling or refrigerating devices, or this louver device may be used to direct any other flow of air or fluid, as desired. The slats 13 and 14 may be adjusted at various angles to provide for a compound directional flow of air leaving the louver device and the hereinbefore described resilient loading of the intersecting slats 13 and 14 prevents them from being rattled by air which is buffeted around between the slats. In addition, the resilient loading of the slats together and their engagement with each other at their inwardly directed intersecting notch apex portions prevents them from being moved out of adjustment.

The contiguous relation of the closed apex portions of the V shaped notches in the intersecting slats of the

4

present louver device provides for aerodynamic efficiency of the device by minimizing turbulence of air passing through the louver device. It will be seen that the slats at their notch apex portions may be angularly adjusted relative to each other and that the closely fitted condition of the intersecting apex portions prevents undue turbulence and leakage between the slat intersections as the air passes between the slats.

As shown in the modifications disclosed in Fig. 8 of the drawings, the slats are somewhat thicker than the metal disclosed in Fig. 1 of the drawing. When these slats are made of plastic material it is necessary to make them sufficiently thick to provide adequate structural strength thereof.

As shown in Fig. 8 of the drawings, a rectangular frame 30 supports a plurality of louver slats which are pivotally mounted therein. The frame 30 is provided with slots 31 in which extending bearing elements 32 of the slats 33 are pivotally mounted. These slats 33 are provided with substantially V shaped notch portions 34 which are each provided with a closed notch apex portion 35 from which the notch diverges outwardly to one outer edge 36 thereof. The notches 34 are spaced equal to the spacing of said slats 37 which are disposed at substantially right angles to the slats 33. The slats 37 are provided with substantially V shaped notches 38 which have closed notch apex portions 39 engaging the notch apex portions 38 of the notches 34 in the slats 33.

The slats 37 are mounted on pivot pins 40 which pivot on axes in a plane as indicated by a broken line A in Fig. 11 of the drawings. The slats 33 are pivotally mounted on the bearing pins 32 having their axes in a plane indicated by broken line B in Fig. 11 of the drawings. It will be noted that the axes of the slats 33 are at right angles to the axes of the slats 37 and that the axes of the slats 33 are spaced laterally from the axes of the slats 37 equal to the thickness of the slats 33 and 37 at their notch apex portions 35 and 39 respectively.

Each notch apex portion 35 and 39 is provided with a bearing radius equal to half of the thickness of each of the slats 33 and 37. The notch apex portions of the slats 33 and 37 intimately engage each other and are pivotal relative to each other at any angle within the diverging limits of the notch portions 34 and 38.

The thickness of the slats as shown in Fig. 8 of the drawings, dictates the disposition of the axes of the slats relative to those which intersect them. It will be noted that each notch apex portion of each of the slats is provided with a bearing having an arcuate surface concentric with the pivotal axes of the slat in which the notch apex portion is disposed. Thus, meshing notch apex portions of the slats are normal to each other and follow the radius of each other when the slats are pivoted at varying angles with respect to each other and within the limits of the diverging notch portions extending from the notch apex portions of the slats.

As shown in Figs. 8 to 11 of the drawings, a wire 41 engages the bearing pins 32 and 40 of the slats 33 and 37 and this wire 41 extends around the frame 30 tending to force the bearing pins 32 toward the axes of the bearing pins 40 and tending to force the bearing pins 40 toward the axes of the bearing pins 32 whereby the notch apex portions 35 and 39 of the slats 33 and 37 are maintained intimately and frictionally engaged with each other.

In operation, pivotal action of the slats 33 or 37, relative to each other, causes the bearing portions at the notch apex portions of these slats to intimately engage and to follow the radii of each other whereby they may be pivoted freely but are frictionally engaged so that they will remain in adjusted position as desired during the flow of air therebetween. The lateral spacing of the planes indicated at A and B, in which the axes of the slats 37 and 33 are disposed, provides for constant engagement of the notch apex portions 35 and 39 without displacement thereof or binding of the slats relative to each other when

they are pivoted at various angles within the diverging notches 34 and 38 of these slats 16 and 24, respectively.

What I have herein set forth is a specific example of my invention where the slats are all of equal thickness of each modification, it is perfectly possible that the louver could be constructed with slats of varying thickness, particularly varying with respect to thickness of the horizontal and vertical louver, and in this case the axes of the louvers would be displaced not a distance equal to the thickness of the slats but would be displaced a distance determined by the thickness of one of the slats and which I prefer to refer to as a distance of the order of the thickness of a slat to take care of this paried situation where the slats are of unequal thickness and where the spacing of the axes is in accordance with the variation thus made in the thickness of the slats.

Various modifications of the present invention may be resorted to in a manner limited only by a just interpretation of the following claims.

I claim:

1. In an air flow louver, a first plurality of spaced slats, means pivotally mounting said slats, each of said slats having a plurality of spaced substantially V shaped notches, each notch terminating in a closed apex and extending to a common edge of a respective slat; a second plurality of spaced slats each having a plurality of substantially V shaped notches, each notch terminating in a closed apex and extending to a common edge of a respective slat; said second plurality of slats being pivotally mounted and being disposed in angular relation to said first plurality of slats so as to mesh therewith, the notches of said first plurality straddling respective notches of said second plurality, the axes of said first plurality being displaced relative to the axes of the second plurality as determined by the thickness of the material of said slats whereby each closed apex is closely adjacent another closed apex at any pivoted position of any slat to minimize air leakage and turbulence in the region therebetween within the pivotal limits defined by the angle of convergence of the notches, the pivotal axis of each slat passing in close proximity to the areas of the apices of the slats.

2. In an air flow louver, a first plurality of spaced slats, means pivotally mounting said slats, each of said slats having a plurality of spaced substantially V shaped notches, each notch terminating in a closed apex and extending to a common edge of a respective slat; a second plurality of spaced slats each having a plurality of substantially V shaped notches, each notch terminating in a closed apex and extending to a common edge of a respective slat; said second plurality of slats being pivotally mounted and being disposed in angular relation to said first plurality of slats so as to mesh therewith, the notches of said first plurality straddling respective notches of said second plurality, the axes of said first plurality being disposed relative to the axes of the second plurality whereby each closed apex of the first plurality is closely adjacent to a respective closed apex of the second plurality at any pivoted position of any slat to minimize air leakage and turbulence in the region therebetween within the pivotal limits defined by the angle of convergence of the notches, the pivotal axis of each slat passing in close proximity to the areas of the apices of that slat.

3. An air flow louver according to claim 2 wherein; each of said slats is provided with projections extending along the pivotal axis thereof, and means engaging said projections and tending to hold said slats in position relative to each other.

4. In an air flow louver, a first plurality of spaced slats, means pivotally mounting said slats, each of said slats having a plurality of spaced substantially V shaped notches, each notch terminating in a closed apex and extending to a common edge of a respective slat; a second plurality of spaced slats each having a plurality of substantially V shaped notches each notch terminating in

a closed apex and extending to a common edge of a respective slat; said second plurality of slats being pivotally mounted and being disposed in angular relation to said first plurality of slats so as to mesh therewith, the notches of said first plurality straddling respective notches of said second plurality, the axes of said first plurality being substantially co-planar with the axes of the second plurality whereby each closed apex is closely adjacent another closed apex at any pivoted position of any slat to minimize air leakage and turbulence in the region therebetween within the pivotal limits defined by the angle of convergence of the notches, the pivotal axis of each slat passing in close proximity to the areas of the slat.

5. In a louver grill the combination of: a frame; a plurality of first slats individually pivoted in said frame in spaced parallel relation to each other; a plurality of second slats individually pivoted in said frame in spaced parallel relation to each other, said second slats angularly disposed relative to said first slats, each of said first and second slats provided with spaced notches having inwardly directed notch apex portions, said notches diverging from said inwardly directed notch apex portions toward the edges of said slats, said inwardly directed notch apex portions of said first slats being spaced equal to the spacing of said second slats, the spacing of the inwardly directed notch apex portions of said second slats equal to the spacing of said first slats, the inwardly directed notch apex portions of said first slats engaging the inwardly directed notch apex portions of said second slats; and means supporting said first and second slats for pivotal action on axes intersecting said inwardly directed notch apex portions of both said first and second slats, said means comprising slots in said frame and pivot pins located in said slots and fixed to the ends of said first and second slats, each of said slots being open at one end, the open ends of said slots supporting said pivot pins of said first slats, being disposed in the same direction as the open ends of said slots supporting said pivot pins of said second slats, said pivot pins having end portions projecting outwardly of said frame and a wire member engaging said pivot pins and resiliently holding the same in said slots.

6. In a louver grill the combination of: a frame; a plurality of first slats individually pivoted in said frame in spaced parallel relation to each other; a plurality of second slats individually pivoted in said frame in spaced parallel relation to each other, said second slats angularly disposed relative to said first slats, each of said first and second slats provided with spaced notches having inwardly directed notch apex portions, said notches diverging from said inwardly directed notch apex portions toward the edges of said slats, said inwardly directed notch apex portions of said first slats being spaced equal to the spacing of said second slats, the spacing of the inwardly directed notch apex portions of said second slats equal to the spacing of said first slats, the inwardly directed notch apex portions of said first slats engaging the inwardly directed notch apex portions of said second slats; and means supporting said first and second slats for pivotal action on axes intersecting said inwardly directed notch apex portions of both said first and second slats, said means comprising slots in said frame and pivot pins located in said slots and fixed to the ends of said first and second slats, each of said slots being open at one end, the open ends of said slots, supporting said pivot pins of said first slats, being disposed in the same direction as the open ends of said slots supporting said pivot pins of said second slats, said pivot pins having end portions projecting outwardly of said frame and a wire member engaging said pivot pins and holding the same in said slots, tab means on said frame for retaining said wire member thereon, and in engagement with said pivot pins.

7. An air flow louver according to claim 2 wherein; the axes of said first plurality are displaced relative to

7

the axes of said second plurality a distance equal to the thickness of said slats at the meshing apices thereof.

8. An air flow louver according to claim 2 wherein; the axes of said first plurality are spaced relative to the axes of the second plurality a distance equal to the thickness of the slats at the apex portions of said notches, said slats at said apex portions of said notches being arcuate concentrically of the pivotal axes of respective slats whereby said notch apex portions pivot smoothly about the arcuate surfaces of like notch apex portions of intersecting slats.

9. An air flow louver according to claim 2 wherein; the axes of said first plurality are displaced relative to the

8

axes of said second plurality a distance of the order of the thickness of a slat at the meshing apices thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

1,850,822	Young	Mar. 22, 1932
2,626,556	Davies	Jan. 27, 1953
2,630,053	Kennedy	Mar. 3, 1953
2,642,792	Reichelderfer	June 23, 1953
2,685,246	Saunders	Aug. 3, 1954
2,759,410	Hurt	Aug. 21, 1956