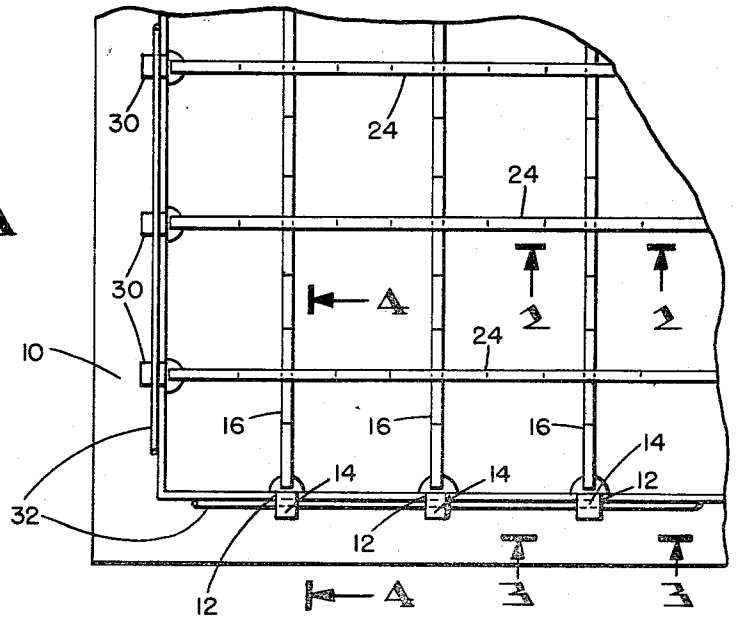
June 7, 1960 A. D. GOETTL 2,939,376

AIR DIRECTING LOUVER DEVICE

Filed Oct. 8, 1956 2 Sheets-Sheet 1

Fig. 1



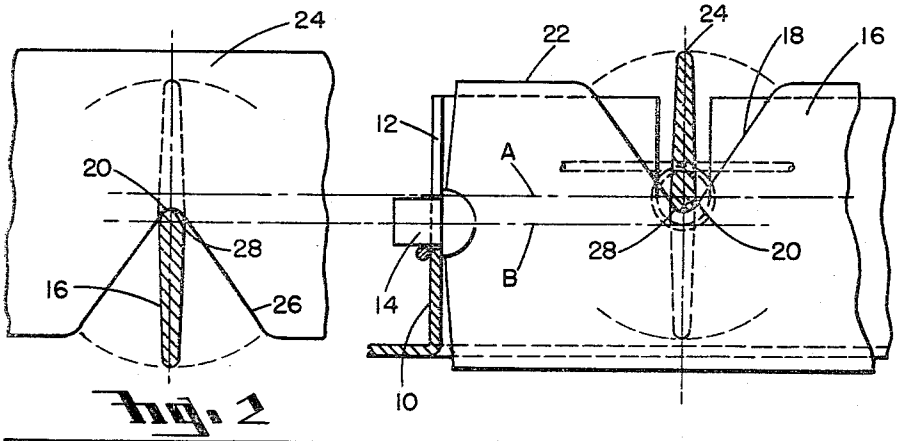


Fig. 2

Fig. 4

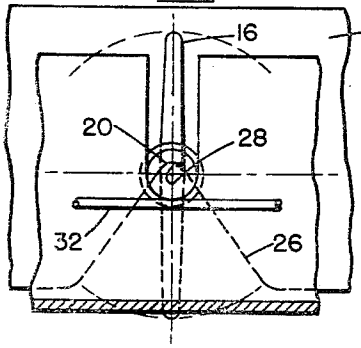


Fig. 3

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Filed Oct. 8, 1956 2 Sheets-Sheet 2

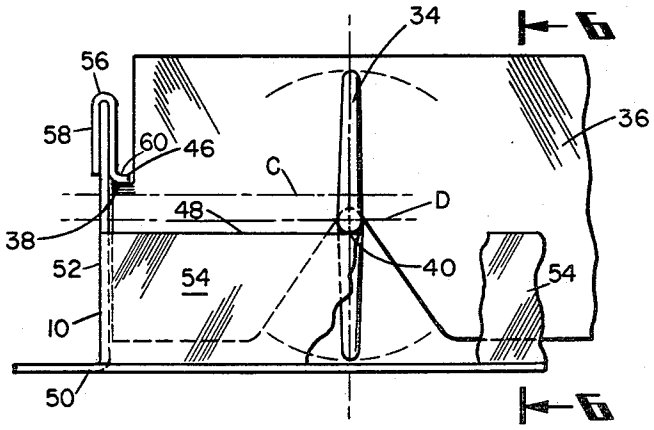

Fig. 5

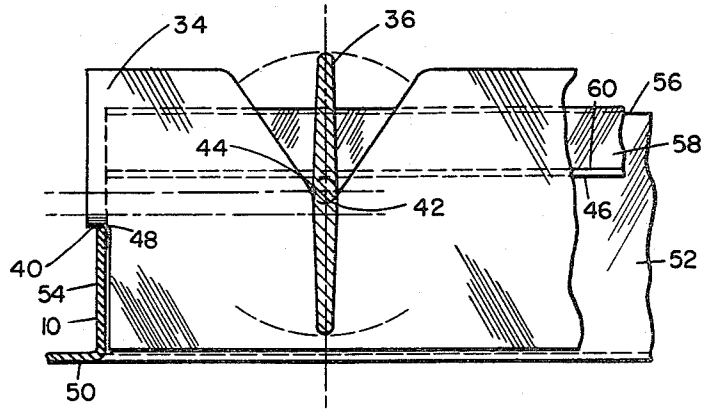

Fig. 6

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AIR DIRECTING LOUVER DEVICE

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Filed Oct. 8, 1956, Ser. No. 614,662

6 Claims. (Cl. 98—40)

This invention relates to an air directing louver device and more particularly to an improvement over the air directing louver device disclosed in my co-pending patent application, Serial No. 583,016, filed May 7, 1956, now abandoned.

In the fabrication of air directing louver devices, such as the one shown in said co-pending patent application, the use of plastic materials is desirable. In the construction of louver slats, according to the present invention, plastic or other material of similar strength and characteristics may be used. In order to employ plastics or such materials, it has been found necessary to make the louver slats sufficiently thick to be structurally adequate. These slats, as shown in the drawings of the present application, are substantially thicker than those disclosed in the above co-pending application. The louver slats, as disclosed in said co-pending application, were of proportions compatible with metal construction and therefore quite thin.

When louver slats are made of plastic and consequently are thicker, it has been found that the opposed engaging notch apex portions of the slats require that the pivotal axes of the slats be slightly offset to compensate for the thickness of the slats and provide smooth fully engaged bearing surfaces of the notch apex portions when the louver slats are pivoted to various angular positions.

Accordingly, it is an object of the invention to provide an improved construction for air directing louver devices which permits the utilization of various materials for constructing the slats and permits precise engagement of bearing surfaces at the interengaging notch apex portions of louver slats substantially of the configuration shown in said co-pending patent application.

Another object of the invention is to provide an air directing louver device having novel means for supporting air directing slats in a frame wherein all of the slats disposed at right angles to each other may be pivoted at various angular positions yet bear against each other in precise relationship.

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.

Another object of the invention is to provide an air directing louver device which is readily adaptable for use in connection with various air conditioning equipment for directing air and which may be readily and easily adjusted to various fixed positions for directing air at various angles or combinations of angles.

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 in accordance with the present invention;

Fig. 2 is an enlarged fragmentary sectional view thereof, taken from the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary edge elevational view taken from the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary sectional view taken from the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary side elevational view of a modified form of the invention disclosing a corner of the slat frame and illustrating the relative spacing of straight edge portions on the frame which engage bearing portions of slats which intersect each other at right angles near the corner of the frame; and

Fig. 6 is a fragmentary elevational view taken from the line 6—6 of Fig. 5.

As shown in Fig. 1 of the drawings, a rectangular frame 10 which is shaped in cross section, as shown in Fig. 4 of the drawings, supports a plurality of louver slats which are pivotally mounted therein. The frame 10 is provided with slots 12 in which bearing elements 14 of slats 16 are pivotally mounted. These slats 16 are provided with notch portions 18 which are each provided with a notch apex portion 20 from which a notch diverges outwardly from a location near the middle of the slat to one outer edge 22 thereof. The notches 18 are spaced equal to the spacing of said slats 24 which are disposed at substantially right angles to the slats 16. The slats 24 are provided with notches 26 which have notch apex portions 28 engaging the notch apex portions 20 of the notches 18 in the slats 16.

The slats 24 are mounted on pivot pins 30 which pivot on axes in a plane as indicated by a broken line A in Fig. 4 of the drawings. The slats 16 are pivotally mounted on the bearing pins 14 having their axes in a plane indicated by broken line B in Fig. 4 of the drawings. It will be noted that the axes of the slats 16 are at right angles to the axes of the slats 24 and that the axes of the slats 16 are spaced laterally from the axes of the slats 24 equal to the thickness of the slats 16 and 24 at their notch apex portions 20 and 28, respectively.

Each notch apex portion 20 and 28 is provided with a bearing radius equal to half of the thickness of each of the slats 16 and 24. The notch apex portions of the slats 16 and 24 intimately engage each other and are pivotal relative to each other at any angle within the diverging limits of these notch portions 18 and 26.

Pivotal movement of any of the slats relative to each other does not cause a varying frictional engagement of the slats relative to each other. When the slats are made of plastic material it is necessary to make them thicker than comparable slats made of metal in order to provide sufficient structural strength of the plastic slats.

Thus, the thickness of the slats dictates the disposition of their axes relative to the other slats which are normal thereto.

It will be noted that each notch apex portion of each of the slats is provided with a bearing having a radius concentric with the pivotal axis in which the notch apex portion is disposed. Thus, mating notch apex portions of the slats, normal to each other, 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. 1 to 4 of the drawings, a wire 32 engages the bearing pins 14 and 30 of the slats 16 and 24 and this wire 32 extends around the frame 10 tending to force the bearing pins 14 toward the axes of the bearing pins 30 and tending to force the bearing pins 30 toward the axes of the bearing pins 14 whereby the notch apex portions 20 and 28 of the slats 16 and 24 are maintained intimately and frictionally engaged with each other.

In operation, pivotal action of the slats 16 or 24, rela-

tive 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 pivot freely but are fractionally 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 16 and 24 are disposed, provides for constant engagement of the notch apex portions 20 and 28 without displacement thereof or binding of the slats relative to each other when they are pivoted at various angles within the diverging notches 18 and 26 of these slats 16 and 24, respectively.

The modification of the present invention, as shown in Fig. 5 of the drawings, includes slats 34 and 36 having notches and notch apex portions similar to those of the air directing louver device disclosed in Figs. 1 to 4, inclusive, of the drawings. These slats 34 and 36 at their opposite ends are provided with extending bearing portions 38 and 40 having a radius substantially equal to half the thickness of the slats 34 and 36 at their notch apex portions 42 and 44, respectively. The bearing portions 38 and 40 are disposed on axes located in planes as indicated by arrows C and D in Fig. 5 of the drawings. Thus, it will be noted that the axes of the slats 34 and 36 are laterally offset relative to each other in a similar manner to the axes of the slats 16 and 24 as disclosed in Fig. 4 of the drawings. The bearing portions 38 and 40 are engaged by edge portions 46 and 48 of a rectangular frame whereby these edges 46 and 48 tend to hold the notch apex portions of the slats 34 and 36 fully engaged with each other. The frame 10 is provided with a front rectangular flange 50 having integral frame side walls 52 and 54 which extend rearwardly at right angles to the flange 50. Since the frame 10 is rectangular there are two short side walls 54 at opposite sides of the frame and disposed at 90 degrees to these sides 54 are the sides 52 which are opposed to each other and these sides 52 are wider than the sides 54 as shown best in Fig. 5 of the drawings. Clipped over the rearmost edge 56 of the sides 52 are U-shaped clip portions 58 which are preferably friction tight on the side wall 52 but may be secured thereon by any other suitable means such as screws or the like. This U-shaped clip 58 has an inwardly extending flange 60 forming the straight edge bearing portion 46 which retains the slats 36 in the frame by engagement of the bearing portions 38 thereof.

The inner edge of the side walls 54 form the straight edge bearing portions 48 and from an inspection of the Fig. 5 it will be seen that the straight edge bearing portions 46 and 48 are spaced apart a distance equal to double the thickness of the slats at their notch apex portions.

The bearing portions 40 of the slat 34 engage the straight edge portions 48 at the inner edges of the sides 54 while the straight edge portion 46 formed by the flange 60 of the U-shaped clip 58 engages the bearing portions 38 of the slats 36 and inasmuch as the straight edge portions 46 and 48 are opposed to each other laterally of the width of the slats these straight edge portions tend to form bearings which retain the slats in edge to edge engagement with each other at their intersecting notches.

When installing the slats in the frame they are arranged in intersecting relationship to each other whereby the notches of the slats intersect when the slats are placed in the frame between the side walls thereover whereupon the clips 58 are subsequently frictionally engaged over the rear edges of the side walls 52 so that the slats 36 when forced against the slats 34 at their notch apex portions cause the bearings 40 of the slats 34 to bear against the straight edge portions 48 of the frame 10 due to engagement of the straight edge portion 46 of the clips 58 against the bearing portions 38. It will be noted that the bearing portions 38 and 40 of the slats 36 and 34, respectively, are formed at offset ledge portions at opposite ends of these slats which permits the slats neatly to be installed in a rectangular frame having spaced supports such as the straight edge portions 46 and 48 which engage these bearing portions 38 and 40. This provides for very simple construction and for economical installation of the slats in a rectangular frame. It will be noted that the bearing portions 38 and 40 have axes concentric with the radii of the notch apex portions of the slats 36 and 34, respectively.

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 the combination of: 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 is closely adjacent another closed apex at a predetermined 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 apex portions of that slat, each slat of said first and second plurality having bearing means projecting at the ends thereof; said means pivotally mounting said slats comprising a frame having; a first pair of opposed side walls provided with first straight edges at their extremities, said bearing means at the opposite ends of said first plurality of slats projecting at an angle over said first straight edges; a second pair of opposed walls of said frame having straight edge members secured thereon; said straight edge members engaging said bearing means projecting from the ends of said second plurality of slats and holding said second plurality in engagement with said first plurality; said straight edge members being disposed in opposed spaced relation to said straight edges of said first pair of side walls, said straight edges of said first side walls being spaced from the straight edge members on said second side walls, between the front and rear of said frame.

2. In an air flow louver the combination of: 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 is closely adjacent another closed apex at a predetermined 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 apex portions of that slat, each slat of said first and second plurality having bearing means projecting at the ends thereof; said means pivotally mounting said

slats comprising a frame having a first pair of opposed side walls provided with first straight edges at their extremities, said bearing means at the opposite ends of said first plurality of slats projecting at an angle over said first straight edges; a second pair of opposed walls of said frame having straight edge members secured thereon; said straight edge members engaging said bearing means projecting from the ends of said second plurality of slats and holding said second plurality in engagement with said first plurality; said straight edge members being disposed in opposed spaced relation to said straight edges of said first pair of side walls, said straight edges of said first side walls being spaced from the straight edge members on said second side walls, between the front and rear of said frame, said apex portions and said bearing means of each slat having arcuate bearing portions disposed about a common axis.

3. In an air flow louver the combination of: 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 whereby each closed apex is closely adjacent another closed apex at a predetermined 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 apex portions of that slat, each slat of said first and second plurality having bearing means projecting at the ends thereof; said means pivotally mounting said slats comprising a frame having a first pair of opposed side walls provided with first straight edges at their extremities, said bearing means at the opposite ends of said first plurality of slats projecting at an angle over said first straight edges; a second pair of opposed walls of said frame having straight edge members secured thereon; said straight edge members engaging said bearing means projecting from the ends of said second plurality of slats and holding said second plurality in engagement with said first plurality; said straight edge members being disposed in opposed spaced relation to said straight edges of said first pair of side walls, said straight edges of said first side walls being spaced from the straight edge members on said second side walls, between the front and rear of said frame, said apex portions and said bearing means of each slat having arcuate bearing portions disposed about a common axis, the axes of the arcuate bearing portions of the first plurality of slats being spaced from the axes of the arcuate bearing portions of the second plurality of slats a distance which substantially equals the thickness of the slats at said apex portions.

4. In an air flow louver the combination of: a first plurality of spaced slats; means pivotally mounting said slats; each of said slats having a plurality of spaces 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 whereby each closed apex is closely adjacent another closed apex at a predetermined 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 apex portions of that slat, each slat of said first and second plurality having bearing means projecting at the ends thereof; said means pivotally mounting said slats comprising a frame having; a first pair of opposed side walls provided with first straight edges at their extremities, said bearing means at the opposite ends of said first plurality of slats projecting at an angle over said first straight edges; a second pair of opposed walls of said frame having straight edge members secured thereon; said straight edge members engaging said bearing means projecting from the ends of said second plurality of slats and holding said second plurality in engagement with said first plurality; said straight edge members being disposed in opposed spaced relation to said straight edges of said first pair of side walls, said straight edges of said first side walls being spaced from the straight edge members on said second side walls, between the front and rear of said frame, said apex portions and said bearing means of each slat having arcuate bearing portions disposed about a common axis, the axes of the arcuate bearing portions of the first plurality of slats being spaced from the axes of the arcuate bearing portions of the second plurality of slats a distance which substantially equals the thickness of the slats at said apex portions, said opposed elements of said frame at their engagement with said bearing means being spaced a distance substantially equal to twice the thickness of said slats at said apex portions.

5. In an air flow louver the combination of: a first plurality of spaced slats; means pivotally mounting said slats; each of said slats having a plurality of spaces 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 whereby each closed apex is closely adjacent another closed apex at a predetermined 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 area of the apex portions of that slat, each slat of said first and second plurality having bearing means projecting at the ends thereof; said means pivotally mounting said slats comprising a frame having; a first pair of opposed side walls provided with first straight edges at their extremities, said bearing means at the opposite ends of said first plurality of slats projecting at an angle over said first straight edges; a second pair of opposed walls of said frame having straight edge members secured thereon; said straight edge members engaging said bearing means projecting from the ends of said second plurality of slats and holding said second plurality in engagement with said first plurality; said straight edge members being disposed in opposed spaced relation to said straight edges of said first pair of side walls, said straight edges of said first side walls being spaced from the straight edge members on said second side walls, between the front and rear of said frame, said apex portions and said bearing means of each slat having arcuate bearing portions disposed about a common axis, the axes of the arcuate bearing portions of the first plurality of slats being spaced from the axes of the arcuate bearing portions of the second plurality of slats a distance which substantially equals the thickness of the slats at said apex portions, said opposed elements of said frame at their engagement with

said bearing means being spaced a distance substantially equal to twice the thickness of said slats at said apex portions, said opposed elements of said frame being disposed on sides of said frame substantially 90 degrees apart with respect to each other.

6. In an air flow louver the combination of: a first plurality of spaced slats; a second plurality of spaced slats angularly disposed relative to and intersecting said first plurality of slats; first means disposed at the intersections of said slats to form a bearing relationship between said respective edges of the first and second slats and to prevent lateral displacement of said slats relative to each other; each slat of said first and second plurality having bearing means projecting at the ends thereof; means mounting said first and second pluralities of slats to pivot on approximately a common plane comprising a frame having a first pair of opposed side members provided with first straight edges, said bearing means at opposite ends of said first plurality of slats projecting at an angle across said first straight edges; a second pair

of opposed side members of said frame having second straight edge portions thereon; said second straight edge portions engaging said bearing means projecting from the ends of said second plurality of slats and holding said second plurality in engagement with said first plurality; said second straight edge portions being disposed to extend across said bearing means of said second plurality of slats, said straight edges of said first side members being spaced from and opposed to said second straight edge portions on said second side members between the front and rear of said frame.

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