

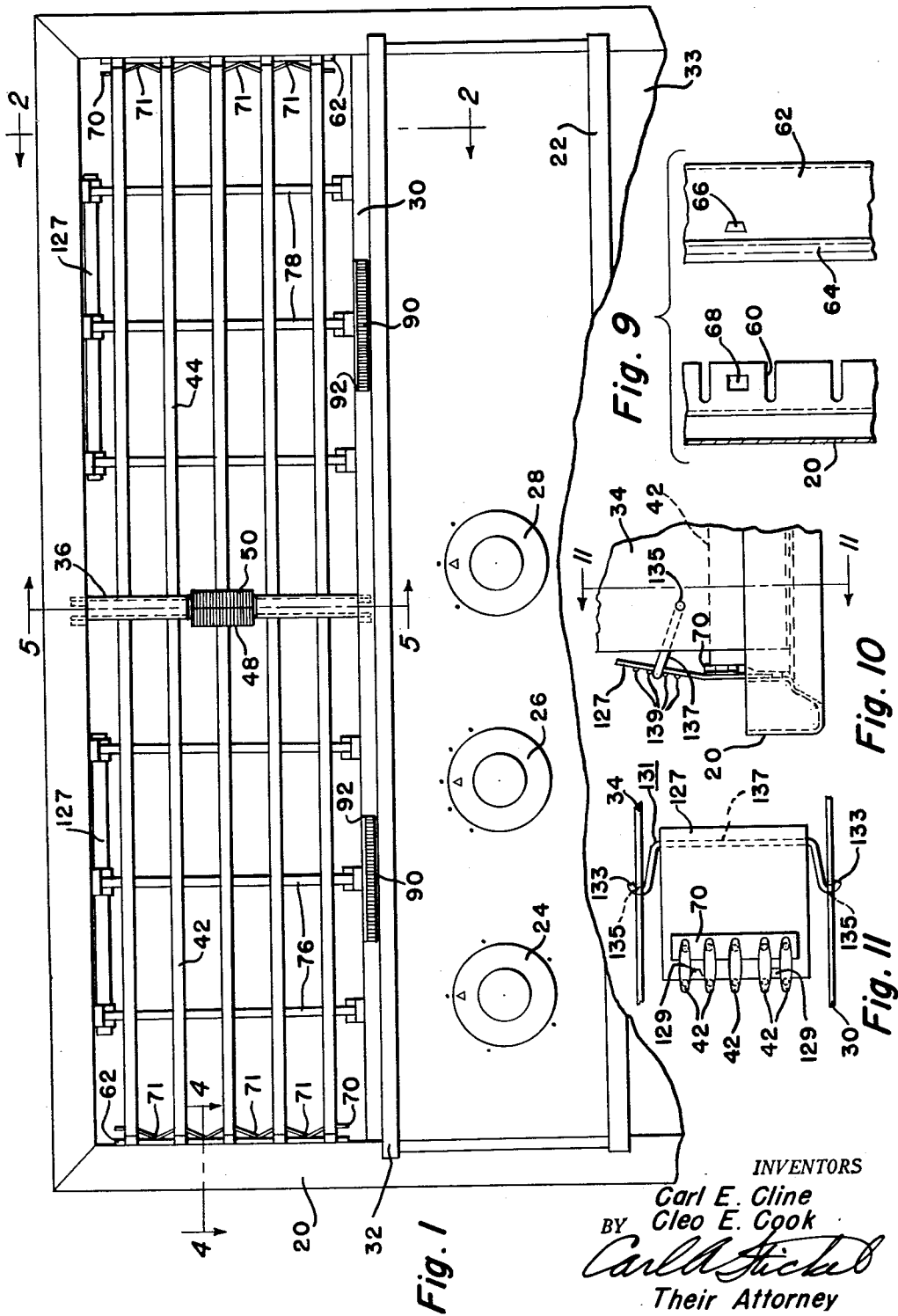
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C. E. CLINE ETAL
REFRIGERATING APPARATUS

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3 Sheets-Sheet 1



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3 Sheets-Sheet 2

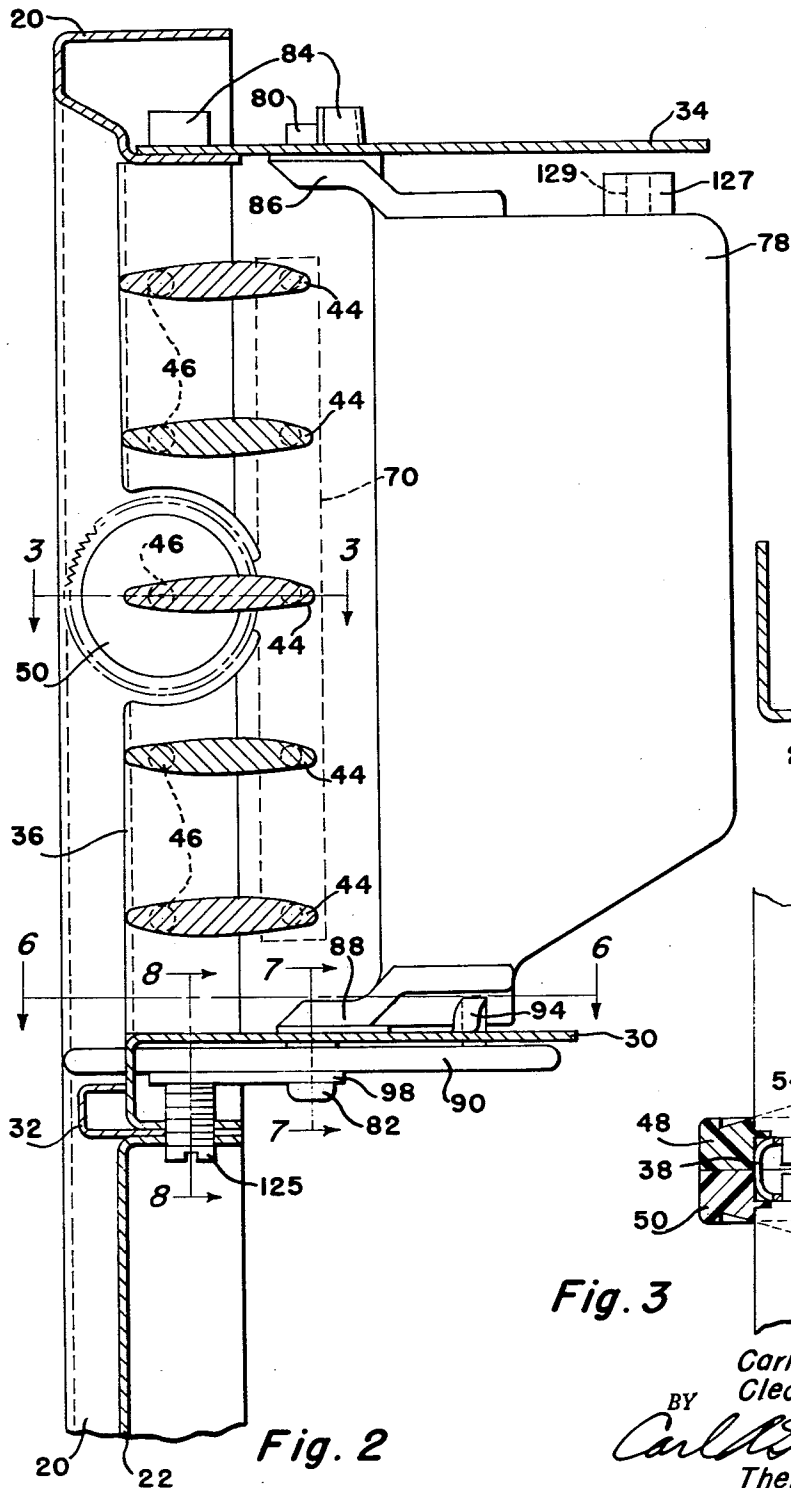


Fig. 2

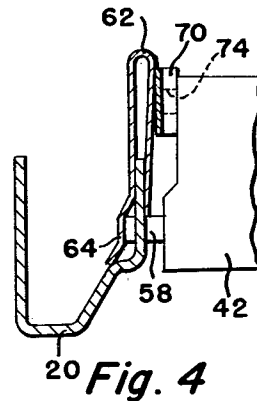


Fig. 4

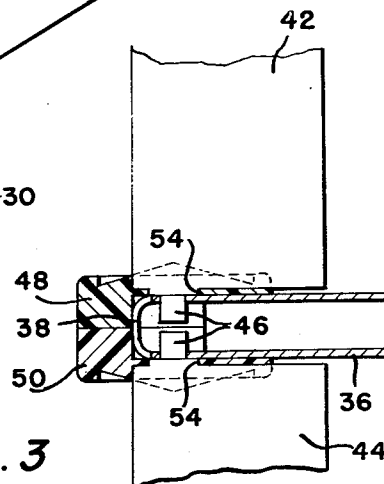


Fig. 3

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3 Sheets-Sheet 3

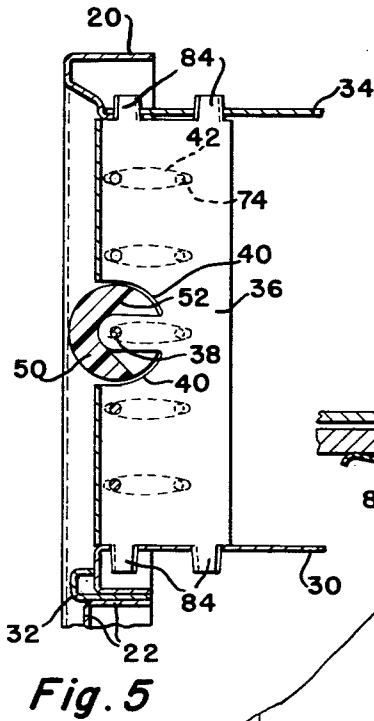


Fig. 5

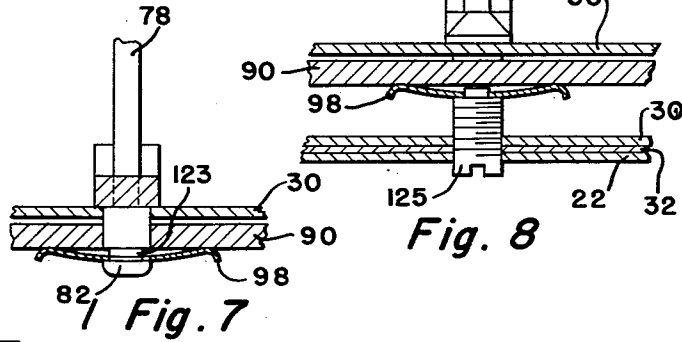


Fig. 7

Fig. 8

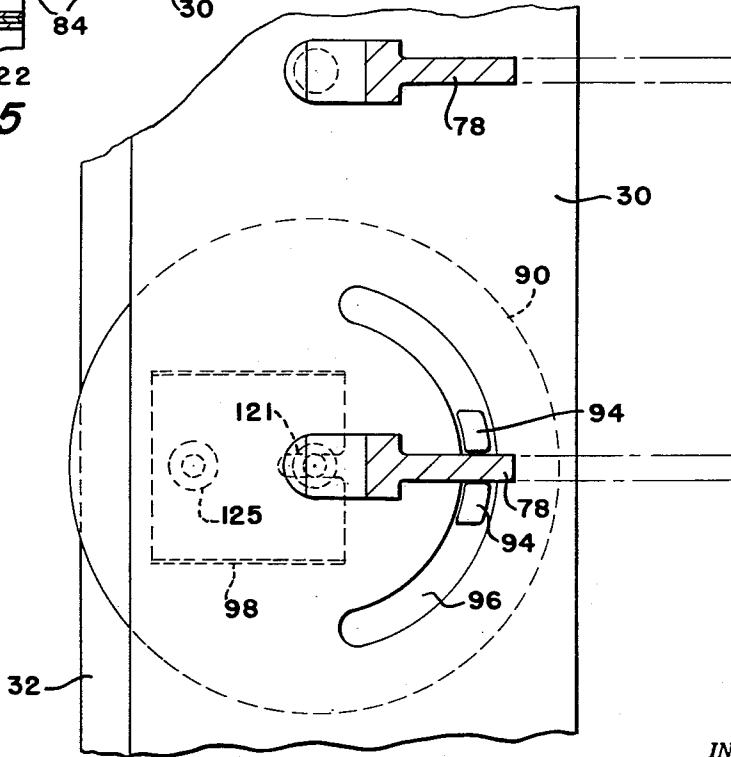


Fig. 6

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REFRIGERATING APPARATUS

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5 Claims. (Cl. 98—40)

This invention pertains to refrigerating apparatus and especially to air discharge deflectors, such as may be used on air conditioners.

Air deflectors are an important part of air conditioners because of the different likes and dislikes and particularly to the difference in sensitivity of people to the movement of cool air. It is therefore important to provide an air deflector which is adjustable to the widest variety of sensitivity and desires. Because of price competition, it is necessary that the maximum amount of adjustment be obtained at the lowest manufacturing cost.

It is an object of this invention to provide a simple, low cost, easily manufactured and assembled air deflector which is easily and simply adjusted in all directions and which can deflect streams of air simultaneously in two different individually selective directions at the same time.

It is another object of this invention to provide simple, easily assembled connection between the manipulator and the adjustable vanes.

It is another object of this invention to provide a simple, low cost, easily manufactured and assembled deflectors made up of horizontally and vertically pivoted vanes arranged with one set behind the other, all of which are readily manipulatable from the front of the cabinet or deflector.

These and other objects are attained in the form shown in the drawings in which the common ends of two sets of horizontal vanes are pivotally mounted in a center support. The central vane of each set has a manipulating knob fixed to it adjacent to the center support. The pivot projections at the outer ends of the vanes are held within the closed ends of slots in the frame by a snap-clip provided with barbs to lock it to the frame. The vanes are pivotally connected off center by connecting bars at their outer ends to make them move in unison. The vertical vanes are pivotally mounted in vane retainers which are sprung apart to receive the pivoting projections thereon. These vertical vanes are likewise pivotally connected by a connecting bar to move in unison. The vertical vanes are located behind the horizontal vanes. Each set of vertical vanes is provided with a knurled manipulating knob directly connected to the middle vane and rotatable therewith and upon the axis thereof. This knob for the vertical vanes is sufficiently large and the pivoting axes of the vertical vanes are far enough forward to extend the front of the knob beneath the horizontal vanes and forwardly beyond them for easy manipulation from the front of the cabinet.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein preferred embodiments of the invention are clearly shown.

In the drawings:

FIGURE 1 is a front view of an air conditioning cabinet having an air deflector embodying one form of our invention;

FIGURE 2 is a fragmentary vertical section taken along the line 2—2 of FIGURE 1;

FIGURE 3 is a fragmentary horizontal section taken along the line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary horizontal section taken along the line 4—4 of FIGURE 1;

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FIGURE 5 is a fragmentary vertical section taken along the line 5—5 of FIGURE 1;

FIGURE 6 is a fragmentary horizontal section taken along the line 6—6 of FIGURE 2;

FIGURE 7 is a fragmentary vertical section taken along the line 7—7 of FIGURE 2;

FIGURE 8 is a fragmentary vertical section taken along the line 8—8 of FIGURE 2;

FIGURE 9 is a fragmentary exploded view of a part of the side of the frame and the horizontal vane retainer;

FIGURE 10 is a fragmentary top view of a modified form of the invention showing an adjustable resilient device for applying an adjustable frictional load to the horizontal vanes;

FIGURE 11 is a fragmentary vertical section taken substantially along the line 11—11 of FIGURE 10.

Referring now to the drawings and more particularly to FIGURE 1, there is shown a rectangular frame 20 substantially U-shaped in cross section. Extending transversely between the sides of the frame 20 is a control panel 22 which may have knobs 24, 26 and 28 thereon. The ends of the panel 22 are preferably connected to the sides of the frame 20 by projecting tabs extending into and through apertures in the inner portions of the frame and being twisted or turned over the projecting ends thereof. Extending across the frame above the control panel 22 and similarly fastened to the sides of the frame is the center bar 30. Fastened in between the center bar 30 and the control panel 22 is a trim strip 32. Beneath control panel 22 is an air inlet grille 33. The center bar 30 also serves as a lower vane retainer. The upper vane retainer 34 is in the form of a rectangular strip welded at the front to the inner top portion of the frame 20. Extending between the lower and upper vane supports 30 and 34 is a center vane support 36 which is substantially U-shaped in cross section and at the front has the projecting arms 38 and slots 40 on opposite sides of the arms around the center pivot of the vanes.

The center vane support 36 has five apertures receiving the pivoting projections or pins 46 at the inner ends of the five horizontal vanes 42 located on the left side of the central support 36 and the five horizontal vanes 44 located on the right side of the central support 36. The pivoting projections at the inner ends of both sets of vanes are designated by the reference character 46. The horizontal vane manipulating knobs 48 and 50 are formed of a suitable plastic resin, such as polystyrene. These knobs each include a V-shaped notch 52 which extends around the arms 38. This V-notch limits the movement of the knobs 48 and 50 by engaging the arms 38 at the opposite ends of the permissive amount of rotation of the vanes 42 and 44. The knobs each have an aperture 54 which receives a boss on the inner end of each of the vanes to center the knobs 48 and 50 on the inner ends of the vanes 42 and 44. The inner ends of the vanes 42 and 44 extend into notches in the adjacent faces of the knobs 48 and 50. These ends also hold the knobs 48 and 50 between them and the center support bar 36. The knobs and the inner ends of the vanes 42 and 44 are held in place by the pivoting projections 46 extending through the pivoting apertures in the vertical center bar 36.

As shown in FIGURES 4 and 9, the pivoting projections or pins 58 at the outer ends of the vanes 42 and 44 are held within the slots 60 formed in the sides of the frame 20. At each outer end these pivoting projections 58 are held in the closed ends of the slots 60 by the horizontal vane retainer 62 which is in the form of a long U-shaped spring-type clip extending over the inner portion of the frame 20 and has its inner front edge bearing against the pivoting projections 58 on the inside of frame 20. An outer offset portion 64 bears against the outer

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end of the pivoting projection 53 to urge the vane 42 against the center bar support 36. The horizontal vane retainer 62 has two barbs 66 thereon which are struck outwardly so as to engage retaining apertures 68 in the frame 20 so as to retain the pivoting projection 58 in the slots 60 to form a fixed pivot at the outer end of the horizontal vanes 42 and 44. The knobs 48 and 50 project in front of the horizontal vanes 42 and 44 and the center bar support 36 to make a convenient means for turning the center horizontal vane of the left and right sets. The remaining vanes are turned by the horizontal vane connector bars 70 located at the outer ends of the horizontal vanes 42 and 44 pivotally connected to pivoting projections 74 at the rear corners of the horizontal vanes 42 and 44. These connector bars 70 are in the form of zig-zag spring metal strips with the hump portions 71 acting as semi-elliptic springs bearing against the vane retainer 62 to provide sufficient friction to hold the horizontal vanes 42 and 44 to any adjusted position. The horizontal vanes 42 and 44 may be of metal, such as aluminum, or plastic, such as polystyrene.

Behind the horizontal vanes 42 and 44 are the vertical vanes 76 and 78. These all have pivoting projections 80 and 82 extending upwardly and downwardly with the upper pivoting projection 80 extending into the upper vane retainer 34 while the lower projections 82 extend into apertures in the center bar or lower vane retainer 30. These vane retainers 34 and 30 are sprung apart during the insertion of the projections 80 and 82 into their pivoting apertures. After these have been inserted, the holding projections or tangs 84 at the top and bottom of the center support 36 are twisted so as to hold the upper and lower retainers 34 and 30 in position so as to prevent the pivoting projections 80 and 82 from coming out of the apertures, in the upper and lower retainers 34 and 30.

The pivoting projections 80 and 82 extend from forwardly projecting arms 86 and 88 so that the pivoting axes are located forwardly of the front edges of the vertical vanes 76 and 78 adjacent the rear edges of the horizontal vanes 44. This makes it possible for the adjusting knob or wheel 90 which is mounted upon the lower pivot pin 82 beneath the center bar 30 to project forwardly beneath the horizontal vanes and through the slots 92 in the center bar 30 as shown in FIGURES 1 and 2. This keeps the knob or wheel 90 of a reasonable size and makes possible the adjustment of the rear vanes 76 and 78 from the front. The knobs 90 and 92 have a pair of projections 94 extending through an arcuate slot 96 in the center bar which fit on opposite sides of the center vanes 76 and 78. These projections 94 provide the rotating connection between the knob 90 and the center vanes 78 and 76. Also, their presence in the arcuate slot 96 serves to limit the rotation of the knob 90 as well as the vanes 76 and 78 when they engage the ends of the slots 96. The vertical vanes 76 and 78 are connected to operate each of their sections in unison by separate connector bars 127 pivotally connecting to the projections 129 provided at the top of the vertical vanes 76 and 78 as shown. The knob 90 is retained by a bowed spring-clip 98 having a notch 121 which fits into the annular groove 123 provided on the lower end of the pivoting projection 82 as shown in FIGURE 7.

The spring clip 98 is held by a set screw 125 having a projection extending into an aperture therein. The shoulders of the set screw 125 adjust the spring pressure of the clip against the knob 90 to adjust its freedom of movement.

The two sides, of course, are individually adjustable since they have individual knobs 48 and 50 for the left and right horizontal vanes 42 and 44 and individual knobs for the vanes 76 and 78 on the left and right sides of the center bar support 36. Thus, the vanes on the left side may be turned to direct the air diagonally upwardly to the left while the vanes on the right side may be directed to direct the air downwardly to the right.

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In FIGURES 10 and 11, there is provided an adjustable resilient friction type holding means and retainer for the horizontal vanes 42. The same device is applicable to the horizontal vanes 44 and could also be applied to the vertical vanes 76 and 78 if desired.

In this form, a thin rectangular sheet metal member 127 replaces the horizontal vane retainers 62. It is similarly held in place by the barbs 129 which fit into the openings 68 in the frame 20 in the same manner as the barbs 66 of the horizontal vane retainer 62. This rectangular sheet metal member 127 also acts as a vane retainer like the vane retainer 62. This sheet metal member is resiliently held in engagement with the outer end portions of the horizontal vanes 42 and the connecting bar 70 by the U-shaped spring wire member 131 in the form of a bail having its upper and lower ends provided with hooks 133 which hook through apertures 135 in the members 30 and 34 so that the member 131 can swing about the apertures 135 which form the pivots for it. The vertical portion 137 loops around the free end of the rectangular sheet metal member 127 and is held in at least four different adjustable positions by small projections 139 provided on the outer face of the sheet metal member 127. As the vertical portion 137 is swung further to the rear about the apertures 135 to other positions provided by the projections 139, increasing tension is applied to the member 127 to increase the resilient frictional force upon the outer ends of the vanes 42 to hold the vanes in any desired adjusted position. Thus, in this form, the member 127 not only retains the pivoting projections of the vanes 42 in the slots 60, but it also provides a simple means for varying the friction force upon the vanes so that the holding action may be adjusted as desired.

While the embodiments of the invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. An air discharge deflector including a vane having pivoting projections extending therefrom, supporting means having means forming a bearing for each of said projections, one of said projections extending through said bearing and supporting means and beyond, a manipulating means mounted on said portion of said one projection extending beyond said bearing, said supporting means having an arcuate aperture extending as a part of a circle centered on said bearing, said manipulating means having means extending through said arcuate aperture connecting with said vane to turn said vane and to keep the turning of the vane within the limits of said arcuate aperture, said one projection having a groove beneath said manipulating means, and a spring member bearing against said manipulating means and having a notched portion fitting into said groove.

2. An air discharge deflector including a vane having pivoting projections extending therefrom, means for pivotally supporting said projections including an arm having a bearing means for one of said projections, a manipulating wheel provided on one side with a notch receiving a portion of the end of said vane and having an aperture through which said one pivoting projection extends into said bearing means, said wheel having on the other side an additional V-shaped notch receiving said arm and limiting the rotation of said wheel and vane.

3. An air discharge deflector including a frame, a set of deflector vanes having pivoting means extending from the ends thereof, bearing means in the frame for said pivoting means, a connector bar of spring metal pivotally connected to said deflector vanes, said deflector vanes being also provided with pivotal connections eccentrically located relative to the pivoting means at one end of the vanes, said connector bar having bearing means receiving said pivotal connections for pivotally connecting said vanes and said connector bar, said connector bar having projecting semi-elliptic spring portions between said pivotal connections, said frame having means contacted by

said projecting portions for frictionally holding said vanes in any desired position said spring portions having sufficient amplitude of spring powered movement and sufficient spring force to press against said frame.

4. An air discharge deflector including a frame, a set of deflector vanes pivotally mounted in the frame and having pivoting axes, connector means connecting said vanes for rotation in unison, a thin sheet member of spring metal mounted upon the frame adjacent one end of the vanes and extending transversely over said end of the vanes, and an adjustable bail pivoted to said frame upon an axis substantially parallel to said sheet member and having a yoke portion contacting in various angular positions said sheet member in an area remote from its mounting upon the frame for contacting and holding said sheet member in resilient contact with a portion of said connector means for resiliently holding said vanes in any desired position of adjustment.

5. An air discharge deflector including a frame having a face, a first set of deflector vanes mounted in the frame adjacent said face of the frame, a second set of deflector vanes behind the first set of vanes and extending across the frame in a direction transverse to said one direction, one of the vanes of said second set having projections extending forwardly and provided with pivotal

connections with said frame forwardly of the remaining portions of said one vane to locate said pivotal connections closer to said face, said frame having a slot, a manipulating wheel rotatable coaxially with said one of the vanes of said second set and having means for rotating said one vane, said wheel having a sufficiently large diameter to extend a portion through said slot forwardly and transversely of said first set of vanes and said frame beyond the first set of vanes for ease of manipulation from the front of the deflector.

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