

April 13, 1965

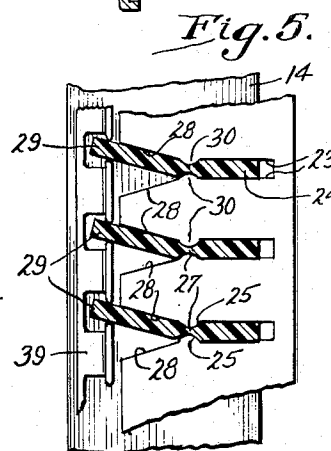
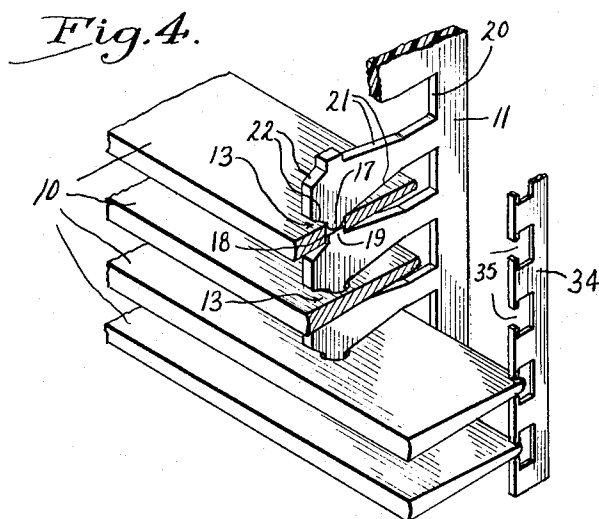
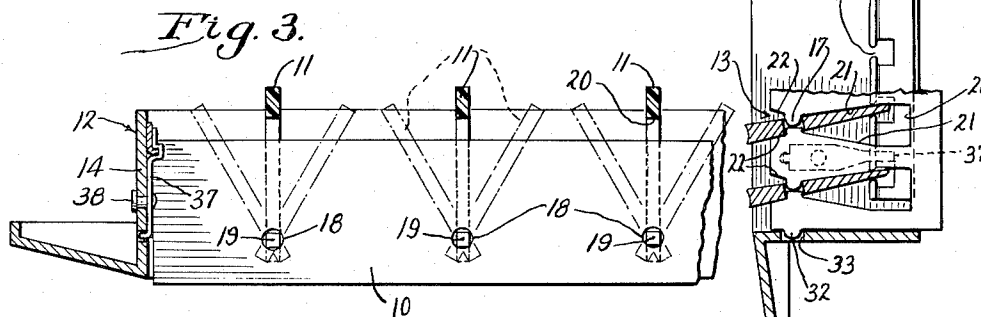
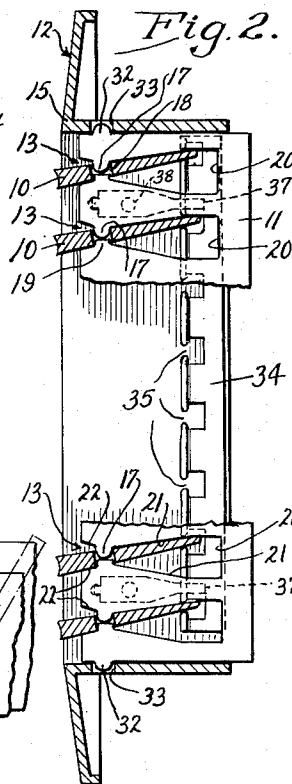
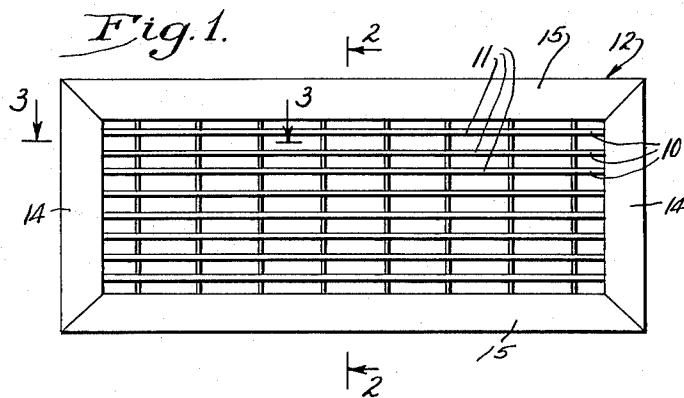
W. W. KENNEDY

3,177,797

ADJUSTABLE GRILLE

Filed Jan. 21, 1963

2 Sheets-Sheet 1



INVENTOR
Walter W. Kennedy
BY Wolfe, Hubbard,
Vait & Osann
ATTORNEYS

April 13, 1965

W. W. KENNEDY
ADJUSTABLE GRILLE

3,177,797

Filed Jan. 21, 1963

2 Sheets-Sheet 2

Fig. 6.

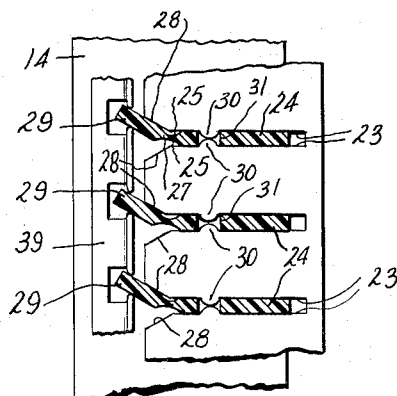
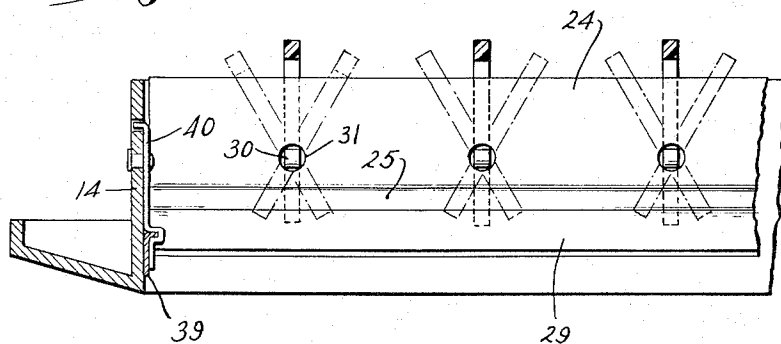


Fig. 7.



INVENTOR
Walter W. Kennedy
BY *Wolfe, Hubbard,
Jest & Osann*
ATTORNEYS

1

3,177,797

ADJUSTABLE GRILLE

Walter W. Kennedy, Rockford, Ill., assignor to Barber-Colman Company, Rockford, Ill., a corporation of Illinois

Filed Jan. 21, 1963, Ser. No. 252,741

8 Claims. (Cl. 98-40)

This invention relates to adjustable grilles of the type used to cover wall openings in air distribution systems and having two sets of vanes that are relatively adjustable about perpendicular axes to control the direction of flow of air discharged through the opening.

The primary object of the invention is to interlock and hinge the two sets of vanes together in the grille frame in a novel manner such that the resulting grille work is economical to manufacture, sturdy in construction, and attractive in appearance.

A related object is to construct and mount the vanes in a novel manner such that one or both of the sets may be composed of relatively flexible plastic without sacrificing overall rigidity of structure.

A more specific object is to mount one set of vanes in notches in the other set with the notch walls spaced to hold the vanes of the first set in properly spaced relation, and to form lugs on the notch walls interlocking the vanes in a novel manner such that the lugs hold the first set of vanes in the notches while hinging the second set on the first set and, at the same time, pivotally supporting the first set on the second.

Another object is to eliminate the need for mounting pins and the like for supporting the vanes in the frame.

The invention also resides in the manner of hinging one set of vanes for swinging relative to the other without interfering with the swinging action of the others.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

FIGURE 1 is a front elevational view of a grille embodying the novel features of the present invention.

FIG. 2 is an enlarged fragmentary sectional view taken along the line 2-2 of FIG. 1 with the parts in different positions.

FIG. 3 is a fragmentary sectional view taken along the line 3-3 of FIG. 1.

FIG. 4 is an enlarged fragmentary perspective view of a portion of the grille work shown in FIG. 1.

FIG. 5 is a view similar to a portion of FIG. 2 but showing an alternate form of the invention.

FIG. 6 is a view similar to FIG. 5 showing still another form of the invention.

FIG. 7 is a view similar to FIG. 3 but showing the form of the invention illustrated in FIG. 6.

As shown in the drawings for purposes of illustration, the invention is embodied in a grille of the type commonly used to cover a wall opening in an air distribution system and having two sets of relatively adjustable vanes 10 and 11 for controlling the direction of flow of air discharge through the opening into a room or other space. In such grilles, the vanes of each set are supported in a frame 12 for angular adjustment about parallel longitudinal axes, the axes of the vanes 10 being horizontal while the axes of the other vanes 11, hereinafter called fins for clarity of reference, are upright and preferably perpendicular to the axes of the vanes 10. To support the vanes in vertically spaced relation and generally in the plane of the fins, a plurality of notches 13 are formed along one edge of each fin to receive and hold one edge portion of each vane.

The frame 12 is formed by two upright end bars 14

2

15, each bar being of generally L-shaped cross-section. The four bars are mitered together at the corners of the rectangular frame to surround the grille work formed by the vanes 10 and fins 11 with the opposite ends of the vanes and fins disposed closely adjacent the opposed flat sides of the bars 14 and 15 respectively. To adjust the direction of air flow through the grille, the fins are swung to one side or the other about their longitudinal axes to deflect the air laterally, and the vanes are swung up or down about their axes to deflect the air flow upwardly or downwardly as desired.

In accordance with the present invention, the fins 11 and vanes 10 are interlocked and hinged together in the frame 12 in a novel manner such that the resulting grille work is economical to manufacture while at the same time being sturdy in construction and attractive in appearance. For these purposes, each notch 13 in the fins is formed with a lug 17 which projects into an alined recess 18 formed in the portion of the vane disposed in the plane of the fin thereby to hold the vanes against shifting edgewise out of the notches, and the vane recesses are shaped to permit turning of the lugs as the fins are swung back and forth. Thus, the lugs and the recesses serve the additional purpose of defining the pivotal axes of the fins and hinging the fins on the vanes and in the frame.

Further, the walls of the notches 13 are spaced to abut against the vanes 10 and hold the latter in properly spaced relation in the frame, and also are shaped to permit angular adjustment of at least one longitudinal edge portion of each vane in all the angular positions of the fins 11. Thus, the fins and the vanes pivotally support each other and brace each other in the frame. As a result, one or both sets may be composed of relatively flexible material such as plastic which is durable, inexpensive, easy to shape and assemble, and is not susceptible to corrosion.

In the form shown in FIGS. 1 through 4, the vanes 10 comprise thin strips of metal such as aluminum with a series of circular holes spaced along their length and offset slightly to one side of center to form the recesses 18. The fins 11 are strips of plastic such as polypropylene with the notches 13 extending across most of their width and generally perpendicular to the longitudinal edges of the fins.

Formed integrally with the plastic strips and preferably spaced somewhat inwardly from the open end of each notch 13 are two lugs 17, 19 which project into the alined vane hole 18 from the upper and lower notch walls and are loosely received in the holes. The adjacent ends of the lugs are more closely spaced than the thickness of the vanes to lock the vanes securely against edgewise shifting out of the notches, and the spacing of the notch walls adjacent the lugs is approximately the same as the vane thickness to maintain each vane in properly spaced relation with the rest of the vanes.

Mounted in this manner, the fins 11 are hinged on the vanes 10 to swing back and forth about the axes defined by the lugs 17, 19 which turn freely in the holes 18. To accommodate such swinging, the inner end walls 20 of the notches 13 are spaced well inwardly from the inner edges of the fins when the fins are disposed at an angle of ninety degrees with the vanes as shown in FIG. 4. Thus, the fins may be swung through a substantial arc in either direction from this position before the end walls abut against the vane edges. The two extreme positions of the fins are shown in FIG. 3, each position being approximately thirty degrees from the intermediate position.

To permit angular adjustment of the vanes 10 as well

as the fins 11, the diameter of the vane holes 18 is made somewhat greater than the cross-sectional length of the lugs 17, 19 as shown in FIG. 2, and the notch walls diverge inwardly at 21 and outwardly at 22 on the inner and outer sides of the lugs respectively. Thus, the opposite edge portions of the vanes may be rocked up and down about the fulcrums formed by the lugs as permitted by the clearance in the holes 18 around the lugs and in the enlarged ends of the notches on both sides of the lugs.

With the fins composed of relatively flexible plastic, the vanes may be inserted freely into the notches 13 after the fins are bent edgewise away from the notched edges to open the notches and spread the lug ends to a spacing greater than the vane thickness. Then, with the holes 18 aligned with the lugs 17, 19, the fins are straightened to bring the lugs into the holes and thereby lock the vanes in the notches.

Alternative forms of the invention are shown in FIGS. 5 through 7 in which both the vanes and the fins are composed of plastic. In this instance, the inner end portions 23 of the notch walls are parallel and are spaced to lie closely adjacent the inner edge portions 24 of the vanes. Hinging of the latter for swinging relative to the fins is accomplished by weakening the vanes along lines spaced inwardly from and paralleling their outer edges. While the vanes may be weakened in various ways, herein they are formed with aligned, longitudinal grooves 25 on their opposite sides which reduce the thickness of a section 27 (FIGS. 5 and 6) of each vane sufficiently to permit free flexing of the vane at the weakened section. The notch walls diverge outwardly at 28 adjacent the open ends of the notches to accommodate swinging of the outer edge portions 29 of the vanes.

In these forms also, the vanes are held in the notches by lugs 30 on the notch walls which are spaced inwardly from the open ends of the notches and project into recesses in the vanes spaced from the free edges thereof, the lug ends being more closely spaced than the thickness of the vanes. In the form shown in FIGS. 6 and 7, the lugs project loosely into circular holes 31 spaced inwardly from the grooves 25, while in FIG. 5 the portions of one of the grooves 25 lying in the plane of the fins are utilized as the recesses for receiving the lugs. In each case, the lugs are free to turn in the respective recesses as the fins swing back and forth.

To assemble the grilles of FIGS. 5 through 7, the fins are bent edgewise as before to open the notches to receive the vanes and then are straightened to bring the lugs 30 into the vane recesses. If desired, the inner portions 24 of the notch walls may be spaced to press against and frictionally engage the vanes when the fins are straight so that the fins are held frictionally in selected angular positions.

In order to mount the grille work of FIGS. 1 through 4 securely in the frame, two lugs 32 are formed on the opposite ends of each fin 11 to project upwardly and downwardly therefrom and are loosely received in holes 33 in the horizontal frame bars 15, these lugs being aligned with the lugs 17, 19 along the pivotal axes of the fins. With these lugs seated in the frame holes 33, the fins are held straight and the lugs 17, 19 are held in locking engagement with the vane holes 18. It will be seen that no additional support is required for the vanes since the notch walls maintain the proper vane spacing and the lugs 17, 19 provide all the pivotal support that is necessary. Thus, the need for mounting pins or the like has been eliminated.

Usually, however, suitable means will be provided to adjust the vanes in unison and hold them in selected parallel planes in service use. Herein, this means takes the form of adjusting bars 34 (FIGS. 2, 3 and 4) disposed against the inner sides of the end bars 14 and formed with notches 35 spaced along one side of each bar, the walls of each notch lying closely adjacent the opposite sides of a vane in position to abut against the vane at

points spaced from its pivotal axis when the bar is shifted endwise in either direction.

During such shifting, one or the other of the notch walls engages the adjacent side of one edge portion of each vane to swing the vanes in unison in the direction of movement of the adjusting bar. The adjusting bars are held releasably in place relative to the frame bars 14 by suitable means such as spring clips 37 riveted at 38 to the frame bars with one end of each clip overlying the associated adjusting bar 34 and pressing the latter against the frame. Thus, the adjusting bars normally are held frictionally in place but are slidable back and forth to make any adjustment desired.

The fins shown in FIGS. 5 through 7 also may include lugs (not shown) journaled in the frame in the manner shown in FIG. 2, and similar adjusting bars 39 are provided to engage the upper and lower surfaces of the adjustable edge portion 29 of the vanes to swing these edges back and forth and hold them in different selected positions. These bars also may be held frictionally in place by spring clips 40 (FIG. 7) similar to those shown in FIGS. 2 and 3.

From the foregoing, it will be evident that a grille work comprising two sets of adjustable fins and vanes hinged on each other and interlocked in one of the manners described herein is sturdy in construction and attractive in appearance and may be manufactured at reasonable cost. The use of plastic as the material for one or both sets is made possible without loss of rigidity because of the co-action of the fins and vanes in bracing each other in the frame.

I claim as my invention:

1. In an adjustable grille, the combination of, a frame, a set of parallel vanes mounted in said frame for angular adjustment about axes extending longitudinally of the vanes, a set of parallel fins spaced apart longitudinally of said vanes and mounted in said frame for angular adjustment about longitudinal axes perpendicular to said vane axes, each of said fins having a series of notches spaced along one edge and each defined by side walls spaced apart longitudinally of the fin and straddling one edge portion of one of said vanes, and each of said vanes having a plurality of equally spaced circular holes therein intermediate the edges of the vane and lying in the planes of the respective fins along the axes of the fins, and a lug on one side wall of each notch extending along the axis of the fin and projecting into the aligned hole in the vane disposed in the notch thereby to retain the vane against edgewise displacement out of the notch, said lugs being of shorter cross-sectional length than the diameter of the holes whereby the vanes are free to rock relative to the lugs, and said side walls diverging both outwardly from the lugs toward the open end of the notch and inwardly from the lugs toward the closed end of the notch from a spacing approximately the same as the vane thickness to a substantially greater spacing to permit pivoting of the vanes within the notches.

2. A grille as defined in claim 1 in which two lugs are formed on the walls of each notch to project toward each other and into the aligned hole along the axis of the fin.

3. In an adjustable grille, the combination of, a frame, a set of parallel vanes mounted in said frame for angular adjustment about axes extending longitudinally of the vanes, a set of parallel fins spaced apart longitudinally of said vanes and mounted in said frame for angular adjustment about longitudinal axes perpendicular to said vane axes, each of said fins having a series of notches spaced along one edge and each defined by side walls spaced apart longitudinally of the fin and straddling one edge portion of one of said vanes, and each of said vanes having a plurality of equally spaced holes therein intermediate the edges of the vane and lying in the planes of the respective fins along the axes of the fins, and a lug on one side wall of each notch extending along the axis of the fin and projecting into the aligned hole in the vane

5

disposed in the notch thereby to retain the vane against edgewise displacement out of the notch, said holes being sized to receive the lugs with sufficient clearance to permit rotation of the lugs therein and back and forth rocking of said vanes relative to the lugs, and the portions of said side walls overlying the edge portions of said vanes being spaced to accommodate such rocking.

4. In an adjustable grille, the combination of, a frame, a set of parallel vanes, a set of parallel fins spaced apart longitudinally of said vanes and mounted in said frame for angular adjustment about longitudinal axes perpendicular to said vanes, each of said fins having a series of notches spaced along one edge and defined by side walls spaced apart longitudinally of the fin and straddling one of said vanes, and each of said vanes having a plurality of longitudinally spaced recesses therein lying in the planes of the respective fins along the axes of the fins, a lug on one side wall of each notch extending along the axis of the fin and projecting into the alined recess in the vane disposed in the notch thereby to retain the vane in the notch, and means defining a hinge extending longitudinally of each vane intermediate the edges thereof and pivotally connecting the edge portions of said vane on opposite sides of said hinge, said recesses being shaped to permit turning of said lugs relative to the vanes during angular adjustment of said fins, and the walls of each notch being spaced to permit angular adjustment of one side edge portion of each vane within the notch.

5. A grille as defined in claim 4 in which said vanes are composed of resiliently flexible material and said hinges are formed by reducing the thickness of a narrow intermediate section extending the full length of each vane.

6. A grille as defined in claim 5 in which said recesses comprise portions of two alined longitudinal grooves in opposite sides of the vane reducing the thickness of the vane between said grooves, and two lugs are formed on the side walls of each notch to project toward each other along the axis of the fin and into said grooves, the portions of the notch side walls straddling the inner edge

6

portions of said vanes being spaced to clamp said inner edge portions between them and the portions of the side walls overlying the outer edge portions of said vanes being spaced to accommodate pivoting of said outer edge portions about the axes defined by said hinges.

7. In an adjustable grille, the combination of, a frame, a set of parallel vanes mounted in said frame for angular adjustment of at least one edge portion of each vane about an axis extending longitudinally of the vane, a set of parallel fins spaced apart longitudinally of said vanes and mounted in said frame for angular adjustment about longitudinal axes perpendicular to said vane axes, each of said fins having a series of notches spaced along one edge and defined by side walls spaced apart longitudinally of the fin and straddling one of said vanes, and each of said vanes having a plurality of longitudinally spaced recesses therein lying in the planes of the respective fins along the axes of the fins, and a lug on one side wall of each notch extending along the axis of the fin and projecting into the alined recess in the vane disposed in the notch thereby to retain the vane in the notch, said recesses being shaped to permit rotation of said lugs relative to the vanes during angular adjustment of said fins and said notches being shaped to permit angular adjustment of said vane edge portions relative to the fins.

8. A grille as defined in claim 7 including two additional lugs projecting from opposite ends of each of said fins along the axis of the fin and journaled in the frame to mount the fins therein.

References Cited by the Examiner

UNITED STATES PATENTS

2,626,556	1/53	Davies	98—40
2,735,351	2/56	Abrahamsen	98—40
2,887,943	5/59	Goehl	98—40
2,959,117	11/60	Wright	98—40
3,093,060	6/63	Emery	98—40

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