

Jan. 20, 1953

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2,625,873

GRILLE

Filed Aug. 5, 1950

2 SHEETS—SHEET 1

Fig. 1.

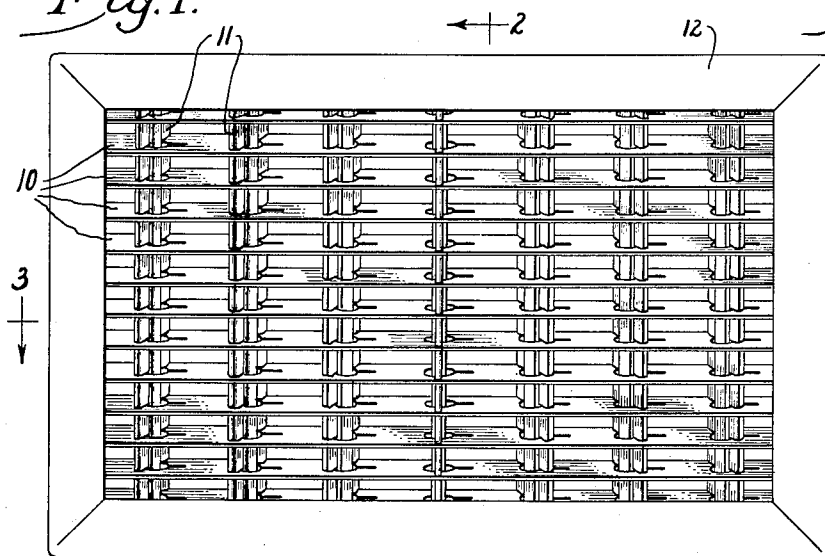


Fig. 2.

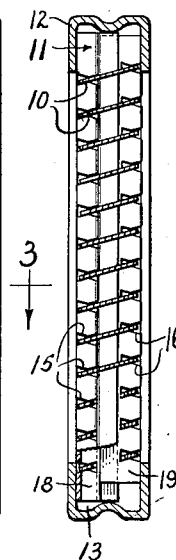


Fig. 3.

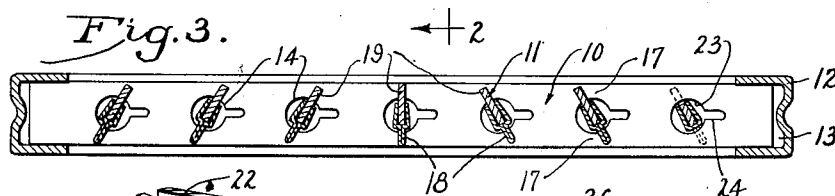
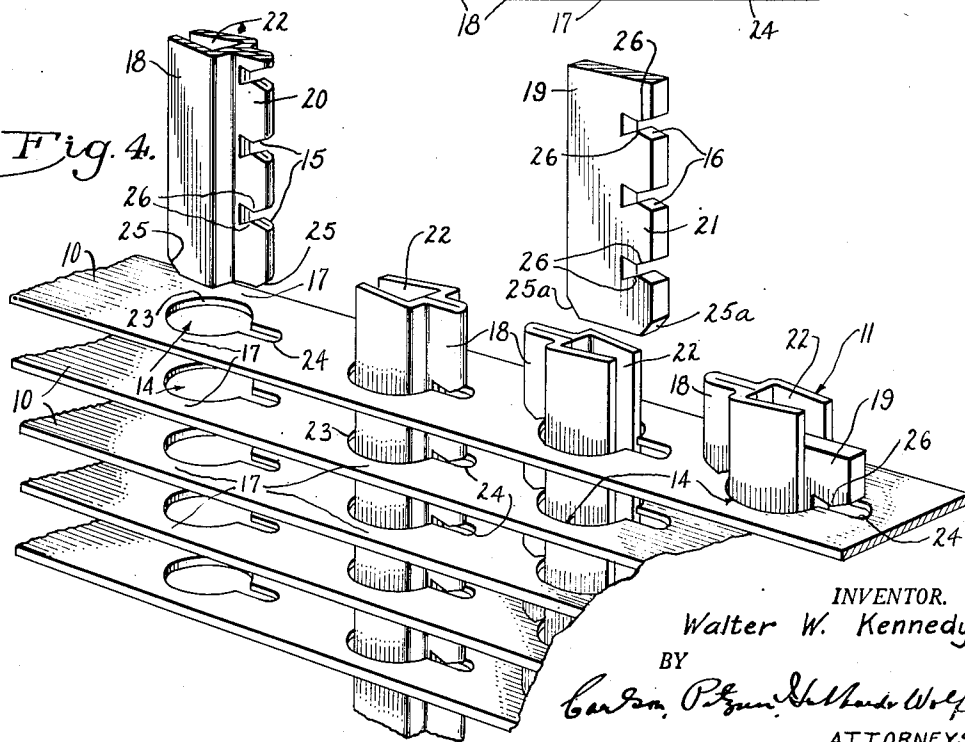


Fig. 4.



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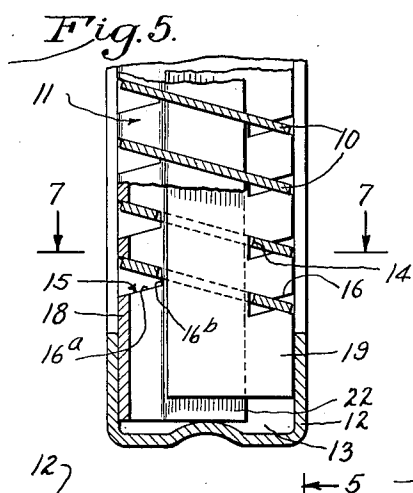
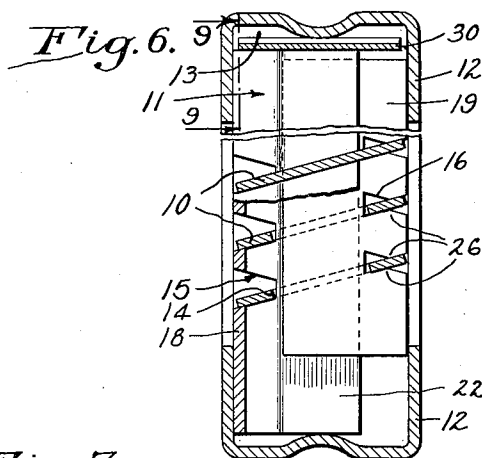
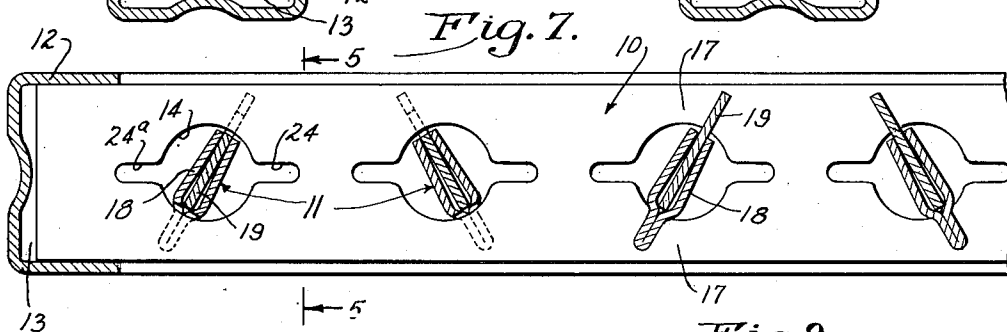
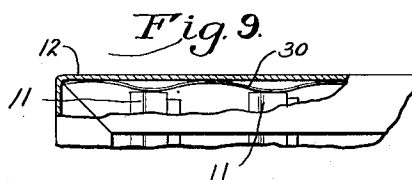
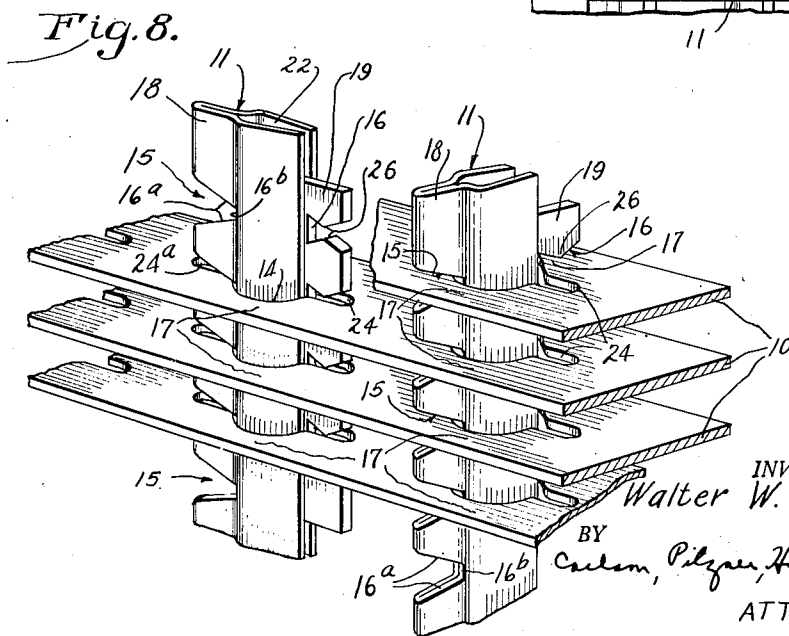
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2 SHEETS—SHEET 2



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GRILLE

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14 Claims. (Cl. 98—40)

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The invention pertains to grilles of the type used in air conditioning systems for controlling the flow of air discharged from heating or cooling ducts, and has more especial reference to having air directing vanes adjustable to vary the direction of discharge of the air.

More specifically stated, the invention has for its primary object the provision of a grille composed of two relatively perpendicular sets of vanes advantageously arranged in interfitting relation so that both sets of vanes are capable of adjustment on their longitudinal axes for the purpose of controlling the direction and discharge of the air in two relatively perpendicular directions usually vertically and horizontally.

Another object is to construct the vanes of one set in two parts relatively shiftable longitudinally of each other to change the angular position of the vanes of the other set.

A further object is to construct the two part vanes in a novel manner such as to provide frictional holding of the vane adjustment and minimize obstruction to the flow of air through the grille.

The invention also resides in the novel construction of the vane parts which enables the same to be produced from sheet metal and assembled easily.

The objects of the invention thus generally set forth, together with other and ancillary advantages, are attained by the construction and arrangement shown by way of illustration in the accompanying drawings, in which

Figure 1 is a front elevational view of a grille embodying my invention and representing a preferred embodiment in which both sets of vanes are adjustable.

Fig. 2 is a fragmentary transverse sectional view taken approximately in the plane of line 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view taken approximately in the plane of line 3—3 of Fig. 1.

Fig. 4 is a fragmentary perspective view showing details of construction and the manner in which the parts are assembled.

Figs. 5 and 6 are fragmentary sectional views taken along the line 5—5 of Fig. 7 and partially broken away.

Figs. 7 and 8 are fragmentary views similar to Figs. 3 and 4 showing a modified form of the invention, Fig. 7 being a section taken along the line 7—7 of Fig. 5.

Fig. 9 is a fragmentary section taken along the line 9—9 of Fig. 6.

The double adjustable grille constituting the

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embodiment shown in Figs. 1 to 4 of the drawings comprises in general two relatively perpendicular sets of vanes 10 and 11, the vanes 10 being in the present instance horizontally disposed and the vanes 11 arranged vertically. The ends of the vanes of both sets are mounted within a frame 12 preferably of U-shaped cross section so as to form an inwardly opening channel 13. The grille herein shown by way of illustration is rectangular in form but it will be understood that it may be of any preferred shape. In accordance with common practice, the frame in the present instance is made from an elongated channel bar notched so as to be capable of being bent in rectangular form and the ends welded together in a mitered joint 12^a.

The two sets of vanes 10 and 11 are associated in interfitting relation and in a manner such as to permit of individual turning movement of each vane on its longitudinal axis. At the same time, the interfitting relationship is such that the vanes of each set are maintained in spaced parallel relation by coaction with the vanes of the other set. This is accomplished in general through the provision of aligned holes 14 in one set of vanes, wherein the horizontal vanes 10 through which the other set of vanes 11 are inserted, the latter set of vanes being provided with spaced notches 15 and 16 respectively adapted to receive lands 17 at the edges of the vanes on opposite sides of the holes. The vertical vanes are capable of turning in the aligned holes 14 so as to permit of individual adjustment about the centers of the aligned holes.

To enable the horizontal vanes 10 to be turned and adjusted about their longitudinal center lines, the opposite edges of the vertical vanes are notched and shaped to permit such adjustment and one or more of these vanes is made in two sections or parts 18 and 19 slidable endwise to effect the adjustment. Notches 15 and 16 are thus formed in the respective parts and spaced along the latter to receive the lands 17 of the vanes 10.

In the present instance, the vanes 10 are made from thin flat strips of metal, preferably soft steel about .020 of an inch thick, to form narrow fins of a length substantially corresponding to the horizontal dimension of the frame 12, the opposite ends of the strips being received within the vertical channel 13 at opposite sides of the frame as shown clearly in Fig. 3. The end portions slidably engage with the walls of the channel so as to permit of rotative adjustment of the fins about their longitudinal horizontal axes.

The vanes 11 on the other hand are preferably constructed to provide the two relatively slidable sections or members 18 and 19 interfitting in partially telescoping relation and respectively providing edge portions 20 and 21 carrying the notches 15 and 16. The section 18 is made from a flat sheet of metal of heavier gauge than the fins 10 and folded upon itself to form a bar having a rib constituting the edge portion 20 and a channel 22 for receiving one edge portion of the section 19. The latter is in the form of a flat bar and the depth of the channel 22 is dimensioned to receive the bar with a sliding fit, with the edge portion 21 in which the notches 16 are formed projecting beyond the channel. The walls of the channel 22 preferably converge slightly toward the open end of the channel so as to reduce the area of contact of the channel section with the bar section in assembling these parts and in the adjustment thereof after assembly.

The holes 14 in the vanes 10 are specially formed to permit of the assembly of the vertical vanes 11 with the horizontal vanes. Thus each hole comprises a main or circular portion 23 located substantially centrally of the vane and a longitudinal slot 24 opening at one side of the portion 23 of the hole, thereby forming in effect an aperture of keyhole shape. In assembling the parts, the vanes 10 are suitably supported in a jig or fixture with the vanes in spaced parallel relation and the holes 14 in alinement. Thereupon the channel sections 18 of the vertical vanes are inserted through the holes in the manner illustrated at the left in Fig. 4, the edge portions 20 entering the slots 24. It will be observed that the channel portions are of a width substantially corresponding to the diameter of the circular hole portions 23.

After insertion of the sections 18 they are rotated through 180 degrees and the bar sections 19 then inserted into their channels 22 with the edge portions 21 of the bars 19 passing through the slots 24. With the parts of this vane shown in position at the right of Fig. 4, the vanes are turned (reversely in the present instance) so that the notched edge portions 20 and 21 are disposed opposite the lands 17 for coaction therewith.

It will be observed that by this construction and arrangement the sections 18 and 19 of the vertical vanes are held by the vanes 10 in assembled relation. At the same time, relative endwise movement between the sections is permitted when the vanes 10 are turned on their horizontal axes. To facilitate insertion of the sections 18 through the holes 14, the lower ends of the channel portions of these sections may be beveled as at 25 (Fig. 4). Similarly, to facilitate insertion of the bar sections into the channels 22 and slots 24, the lower ends of the bar sections may be beveled as shown at 25a.

In the form of the grille shown in Figs. 1 to 4, the notches 15 and 16 along opposite edge portions of the vanes 11 are of the same general shape, the inner extreme end or bottom of the notch being relatively wide and converging to a narrow central portion providing opposed bearing and fulcrum points 26 from which the edges diverge outwardly to the open end of the notch. The holes 14 in the fins 10 are as shown slightly larger than the spacing of the bottom of the notches 15 so as to provide the clearance necessary for permitting tilting of the fins. Such shaping of the notches is advantageous in that it permits rocking motion of the horizontal vanes while holding the vanes relatively snugly. Also, the point bearing contact between the horizontal

vanes and the vertical points determined by the opposed bearing points 26 minimizes the area on the vanes 10 subjected to wear, thereby preventing any undue removal of any finishing coating applied to the vanes. By spacing these points outwardly from the holes, the adjusting force resulting from relative sliding of the parts is utilized at greater mechanical advantage.

It will be clear from the foregoing that both sets of vanes are capable of being adjusted for the purpose of varying the direction of flow of the air both horizontally and laterally. The vanes 11, herein disposed vertically, are capable of individual or independent adjustment so that they may be set as illustrated in Figs. 1 and 3 to control the air discharge in any preferred pattern in one direction, e. g., horizontally of the grille. The center vane is shown in perpendicular relation to the face of the grille and the two sets of vanes on opposite sides of the center vane are oppositely adjusted so as to effect a spreading of the air. The vanes 10 on the other hand are adjusted in unison due to the fact that these vanes are interconnected by the vertical vanes. It will be understood that to permit of relative endwise movement of the vanes 11, one of the sections, herein the bar section 19, is made somewhat shorter than the other or channel section as shown in Figs. 2 and 4, the bar being shown in its uppermost position in Fig. 2 and in Fig. 4 being shown as shifted downwardly from such uppermost position. The section 18 is fixed rigidly between the sides of the frame 12 as shown in Fig. 2.

The end portions of the vanes 11 fit slidably within the channels 13 along the upper and lower edges of the grille so as to permit rotative adjustment of these vanes, and preferably the ends of the channel section bear against the outer wall of the frame channel 13 so as to be held thereby against endwise movement. Thus rotative adjustment of the vanes 10 occurs solely as an incident to the endwise movement of the bar sections 19 and such adjustment is retained by virtue of the friction between the bar and channel sections.

It will be seen that through the use of a novel interfitting relationship between two sets of relatively perpendicularly disposed vanes I have provided for the control of air passing through the grille so as to determine the discharge pattern as may be desired. Of primary importance is the control of air flow in two directions through the rotative adjustment of both sets of vanes as in the construction shown in Figs. 1 to 4, and more especially through the provision of one set of rotatively adjustable vanes supporting the other set for similar adjustment. It is to be observed in this connection that one of the vertical vane sections, herein the channel sections, constitute in their broader aspect connecting members providing pivotal supports for the edges of the vanes 10 at one side of the grille, while the bar sections serve to connect the opposite edges of the vanes 10 for movement in unison.

In the modification shown in Figs. 5 to 8, the parts common to the form above described are indicated by corresponding reference numerals. In this construction, the channels 22 of the parts 18 of the vertical vanes are somewhat flatter and the notches 15 in the folded outer edge thereof are shaped differently than the notches 16. The notches 15 are V-shaped with sides 16^a diverging outwardly from a generally flat bottom 16^b at a sufficiently large angle to allow for tilt-

ing of the fins 10 between the desired limit positions shown in Figs. 5 and 6. In any of its various positions each vane is supported on one side by one of the points 26 on the vanes 11 and on the other side by engagement of the edge of the corresponding land 17 with one of the notch walls 16^a. As before, the adjusted positions of all of the vanes 10 are retained by virtue of the friction between the sliding parts of the vanes 11 to which the vanes 10 are always connected rigidly at the points 26 of the notches 16. By this same connection, the positions of angular adjustment of the vertical vanes 11 is also retained frictionally. This is because the vanes 10 when punched from thin sheet metal are deformed somewhat along their lengths so that some of the lands 17 on each fin bear against the point 26 on one side of the notch 16 while the other lands bear against the other side. The frictional binding thus produced holds the vanes 11 firmly in place.

If desired, additional slots 24^a may be punched in the fins 10 on the sides of the holes 14 opposite the slots 24. This permits the two parts of each vane 11 to be interfitted before insertion through the alined holes 14 during which the edge portions of the two parts 18 and 19 pass through the slots 24 and 24^a respectively.

When the vanes of both sets 10 and 11 are swung out of planes perpendicular to the face of the grille, some small clearance is produced between the side edges of the vanes and the walls of the frame channel. Most of this is normally taken up by the slight but unnoticeable unevenness of the grille face in the final assembly of the grille core. However, if desired, means such as a spring 30 (Figs. 6 and 9) may be provided to take up all of such clearance. The spring shown comprises a thin strip of resilient metal bent into a serpentine shape as shown in Fig. 9 and extended along one side of the frame 12 within the channel thereof with the bends on one side bearing downwardly against the ends of the channel bars 18 and urging the latter endwise against the bottom of the frame 12.

It will be apparent from the foregoing that the grilles above described are very versatile in service use in that either or both sets of the vanes 10 and 11 may be adjusted simultaneously to vary the direction of the air stream discharged through the grille in either or both of two transverse planes that is, horizontally or vertically. Such double adjustability is achieved by virtue of the novel manner of interfitting the crossed vanes with each other to permit swinging of either set in one plane perpendicular to the grille face irrespective of the positions in which the other vanes are located. This is achieved by extending the vanes 11 through holes in the vanes 10 and supporting the latter vanes on the vanes 11 at two points 26 and 26^a spaced transversely of the vanes 10 and relatively adjustable along the vanes 11 to tilt the vanes 10 while leaving the vanes 11 free to swing independently around their own axes.

This application is a continuation-in-part of my copending application Serial No. 596,882 filed May 31, 1945, now abandoned.

I claim as my invention:

1. A grille comprising a plurality of parallel strips having alined holes forming lands at opposite edges of the strips, and vanes inserted through the alined holes and each vane comprising two sections, means for connecting said sections so as to be relatively shiftable longitudinally

and having notches spaced along each edge portion and receiving the lands when the vanes are disposed in perpendicular relation to the face of the grille, said notches on at least one edge portion of each vane having a relatively narrow central portion providing opposed bearing surfaces, and the edges of the notches diverging from said central bearing portion in opposite directions transversely of the grille.

2. A grille comprising a set of parallel fins having alined holes forming lands at opposite edges of the fins, and a set of vanes inserted through the alined holes, at least one of the vanes comprising two interfitting sections one in the form of a channel section and the other a bar section received in the channel section, both of said sections of each vane providing projecting edge portions having notches therein spaced to receive the lands when the vanes are disposed in perpendicular relation to the face of the grille, certain of said notches having a relatively narrow central portion providing opposed bearing surfaces with the edges of the notches diverging from said bearing surfaces in opposite directions transversely of the grille.

3. A grille having, in combination, a frame, a plurality of fins mounted in said frame for rotational adjustment, said fins having alined holes centrally thereof providing lands at opposite edges of the fins, an elongated member mounted in said frame in perpendicular relation to said fins and edge notches spaced to receive the lands at one side of the grille, the walls of each notch converging outwardly to engage the associated fin land only at a point spaced outwardly from the adjacent fin holes, and a second elongated member extending longitudinally of said first member through said fin holes and having edge notches spaced to receive the fin lands on the other side of the holes, and means connecting said two members for relative endwise sliding movement, said holes being elongated along one dimension to permit endwise insertion of said members.

4. A grille comprising a series of parallel vanes having alined holes disposed centrally thereof with lands at opposite edges of the vanes, and members inserted through said holes in perpendicular relation to said vanes, each of said members comprising a channel section and a bar section interfitting in the channel section for relative endwise sliding movement, each section having an edge portion with notches therein spaced to receive the lands at opposite sides of the vanes respectively, and said holes having communicating slots disposed for the passage of the edge portions therethrough during insertion of such sections through the holes when assembling the parts of the grille.

5. A grille comprising a series of parallel vanes having alined elongated holes forming lands at opposite edges of the vanes, and a second set of vanes inserted through said alined holes in the first set and rotatively adjustable, certain of the vanes of said second set being composed of two sections including a channel section and a bar section fitting into the channel section in telescoping relation thereto, said channel section having an edge portion with spaced notches for receiving the lands at one side of the grille, and said bar section having an edge portion with spaced notches to receive the lands at the opposite side of the grille, said notches being formed with outwardly diverging side walls permitting rotative adjustment of the first set of vanes incident to a relative shifting of the two sections.

6. A grille having, in combination, a frame, a plurality of parallel fins mounted in said frame for rotational adjustment and having alined holes therein disposed between lands at opposite edges of the fin, an elongated member projecting loosely through the holes in said fins and having notches spaced to receive the lands of the fins at one side of the grille and provide a fulcrum therefor, and a second elongated member extending through said fin holes and mounted for relative movement in a direction parallel to the first member, said second member being notched to receive the lands of the fins at the opposite side of the grille, said holes being elongated along one dimension to receive said members by endwise insertion.

7. A grille comprising a series of parallel vanes having alined holes forming lands at opposite edges of the vanes, and a second set of vanes inserted through alined holes in the first set, certain of the vanes of said second set being composed of two sections interfitting in telescoping relation and relatively slidable longitudinally, the edge portions of said sections having surfaces thereon respectively engaging said lands at opposite edges of the vanes of the first set to adjust the vanes about their longitudinal axes when the two sections are relatively shifted.

8. A grille having a series of parallel vanes with alined holes forming lands at opposite edges of the vanes, and a second set of vanes inserted through alined holes in the first set, certain of the vanes of said second set being composed of two sections interfitting in telescoping relation and relatively slidable longitudinally, said sections providing edge portions respectively notched to receive lands along opposite edges of said first set of vanes.

9. A grille comprising a series of parallel vanes each having holes spaced therealong and alined with the corresponding holes of the adjacent vanes, and a second set of vanes each extending through alined holes in the vanes of the first set and having notches spaced along opposite edges and receiving edge portions of said first vanes, each of said second vanes being composed of two parts slidably interfitting with each other and relatively movable endwise to tilt the vanes of said first set.

10. A grille comprising a series of fins each having a hole therein alined with holes of the other fins and disposed between lands at opposite edges of the fin, and a vane extending through said alined holes and comprising two bars overlapping each other at their adjacent edges and slidably connected for relative endwise adjustment, the outer edges of said bars having notches spaced therealong and receiving the corresponding lands of said fins, the notches in one of said bars having a narrow portion intermediate its ends and sides diverging outwardly and inwardly therefrom.

11. A grille comprising a series of fins each

having a hole therein alined with holes of the other fins and disposed between lands at opposite edges of the fin, and a vane extending through said alined holes and comprising two bars overlapping each other at their adjacent edges and slidably connected for relative endwise adjustment, the outer edges of said bars having notches spaced therealong and receiving the corresponding lands of said fins, the side walls of each of said notches diverging outwardly to permit tilting of each of said fins about its longitudinal axis.

12. A grille comprising a series of fins each having a hole therein alined with holes of the other fins and disposed between lands at opposite edges of the fin, and a vane extending through said alined holes and comprising two bars overlapping each other at their adjacent edges, means for slidably connecting the bars for relative endwise adjustment, the outer edges of said bars having notches spaced therealong and receiving the corresponding lands of said fins whereby to permit turning of the vane about the axis of said holes.

13. A grille comprising a series of fins each having a hole therein alined with holes of the other fins, and a vane extending through said alined holes and comprising two members slidably interconnected for relative endwise adjustment, and means interconnecting said members and said fins for tilting of the latter simultaneously in response to relative endwise movement between said members, said holes being elongated along one dimension to permit endwise insertion of said members.

14. A grille comprising a series of fins each having a hole therethrough alined with the holes of the other fins, and a vane extending through the alined holes and notched along opposite edges to receive opposite edge portions of each fin on opposite sides of the hole therein, the walls of said notches and the opposite sides of each fin engaging each other to provide two points of support disposed on opposite sides of the center of each fin hole while permitting independent turning of said vane and each of said fins about their longitudinal axes, and said vane comprising two parts carrying the respective support points and relatively movable endwise to adjust the points relative to each other and longitudinally of the vane.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,007,716	Green	July 9, 1935
2,008,907	Green	July 23, 1935
2,034,231	Fox	Mar. 17, 1936
2,140,993	Germonprez	Dec. 20, 1938