

Sept. 30, 1952

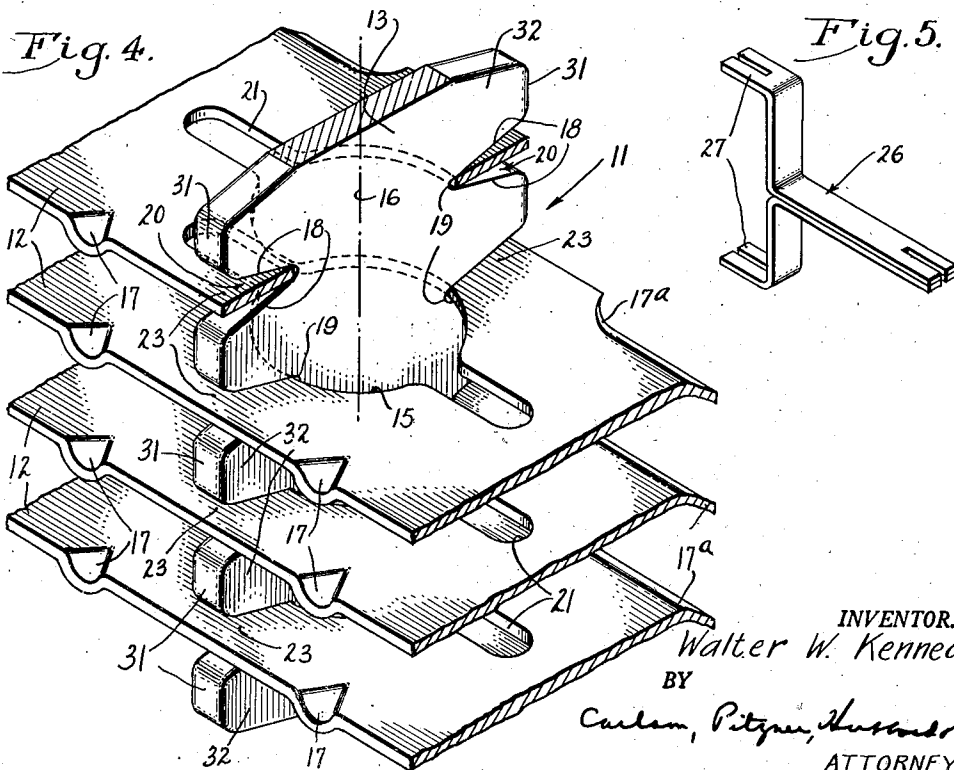
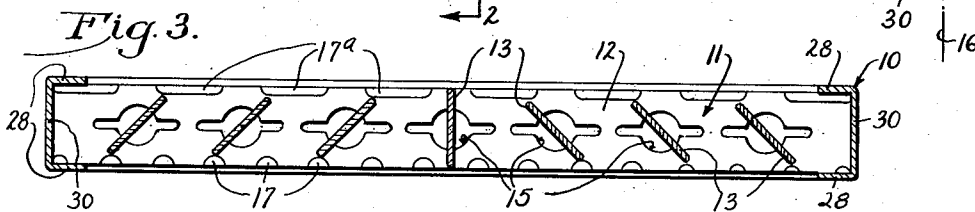
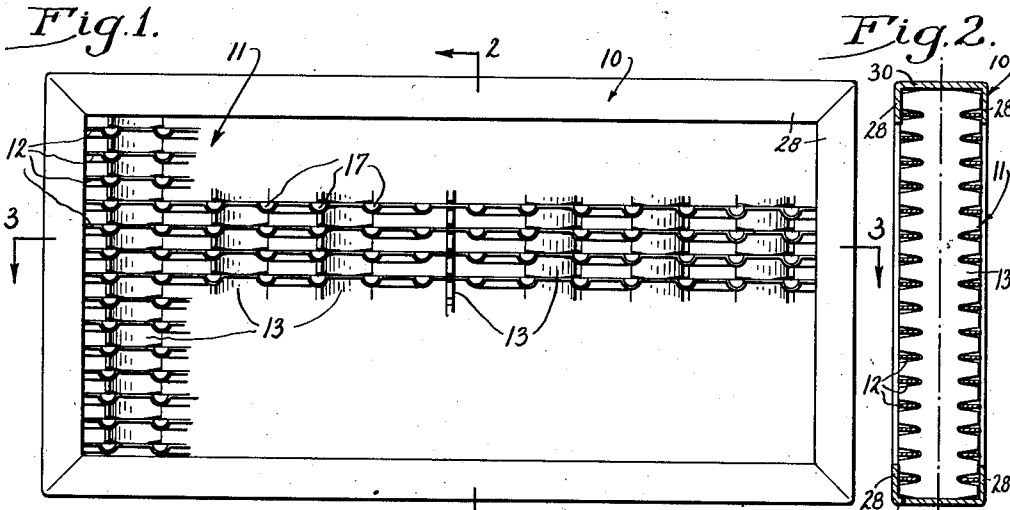
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2,612,095

ADJUSTABLE AIR DISTRIBUTION GRILLE

Filed Oct. 5, 1948

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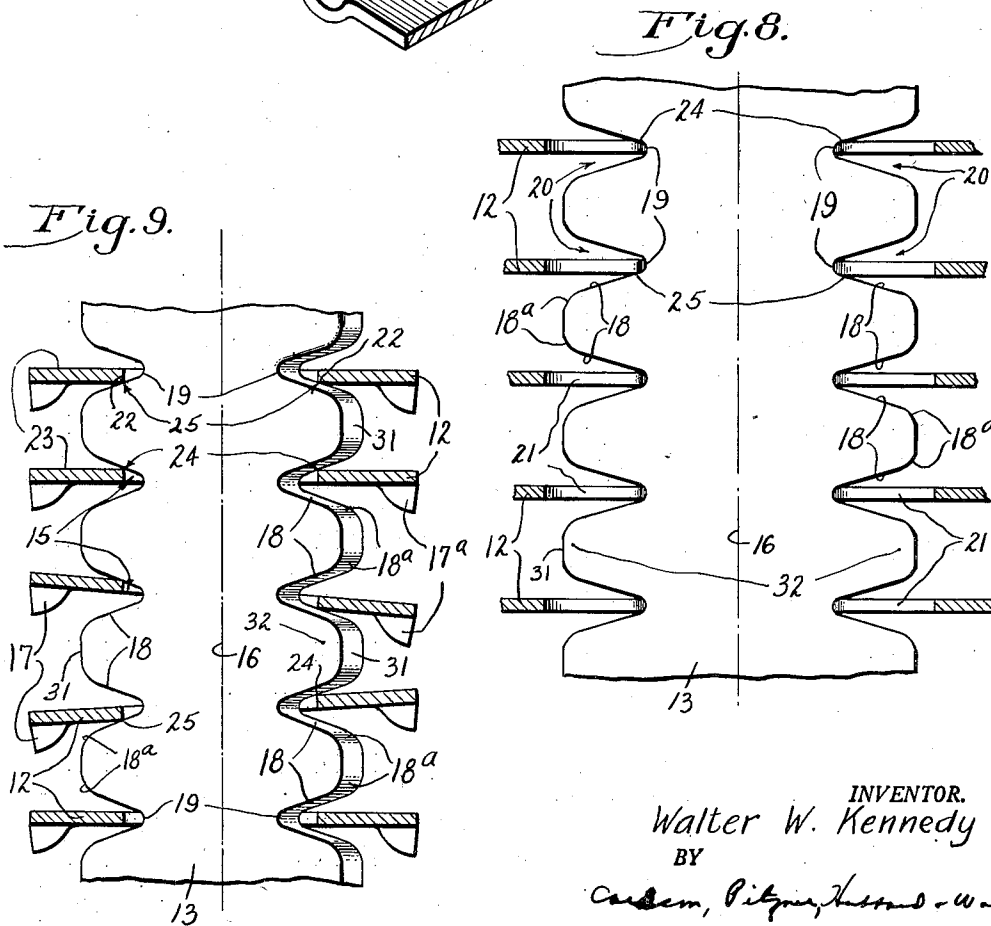
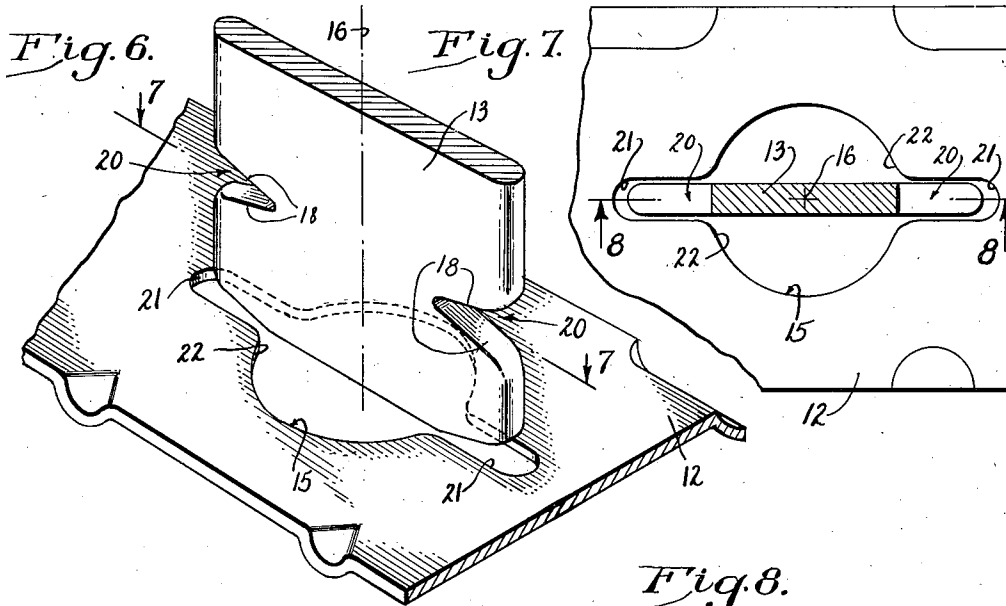
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2,612,095

ADJUSTABLE AIR DISTRIBUTION GRILLE

Filed Oct. 5, 1948

3 Sheets-Sheet 2



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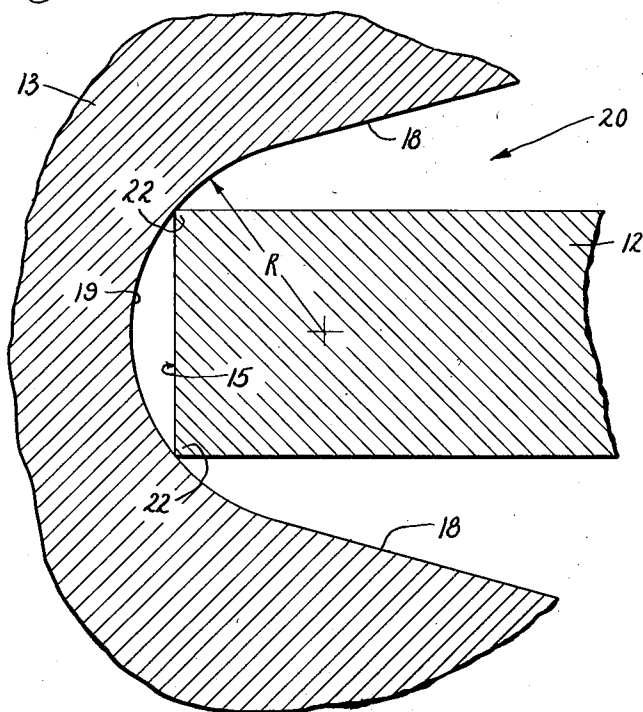
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ADJUSTABLE AIR DISTRIBUTION GRILLE

Filed Oct. 5, 1948

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Fig. 10.



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2,612,095

ADJUSTABLE AIR DISTRIBUTION GRILLE

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Application October 5, 1948, Serial No. 52,916

13 Claims. (Cl. 98—40)

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This invention relates to air distribution grilles having one set of spaced vanes or fins crossing another set of vanes or crossbars in relatively perpendicular relationship with each crossbar adapted for individual adjustment about a longitudinal axis so that, by selective adjustment of the crossbars, the direction of all or part of the air stream discharged through the grille may be varied as desired.

The general object of the invention is to interfit the two sets of vanes together in a novel manner which permits the vanes to be made of relatively thin sheet metal so as to obtain an optimum free air area through the grille, which facilitates assembly at low cost, and which insures firm retention of the vane adjustments in spite of manufacturing variations and wear in service use.

Another object is to provide a framed grille of the above character in which the crossbars are supported entirely by the grille fins and disconnected from the frame enclosing the ends of the fins and crossbars whereby to permit freedom of angular adjustment of the crossbars relative to the frame.

A further object is to connect the crossbars and fins in a novel manner so as to utilize the inherent unevenness and inaccuracies resulting from construction of the fins from thin sheet metal to insure firm frictional holding of the crossbars in all of their positions of adjustment and to take up automatically any wear occurring in service use.

In one of its aspects, the invention relates to a grille of the type in which each crossbar is inserted endwise through longitudinally elongated holes in the fins and notched along its side margins to permit turning of the bar to interlock the latter with the fins. Still another object is to so shape the notches in the crossbars that the defining ends may be used as cams for guiding the fin and bar notches into proper interfitting relation in spite of manufacturing inaccuracies.

A still further object is to so shape and dimension the crossbar notches that they may be punched readily from sheet metal while at the same time obtaining the frictional binding required for holding the adjustments of the crossbars.

Another object is to limit the frictional binding engagement between the fins and crossbars to small areas spaced remotely from the outer fin margins so as to permit decorative coating of the unit after assembly of the fins and crossbars and to avoid marring of the finish on the fin surfaces as an incident to adjustment of the crossbars.

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

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Figure 1 is a front elevational view of an air distribution grille embodying the novel features of the present invention.

Figs. 2 and 3 are vertical and horizontal sectional views taken respectively in the planes of lines 2—2 and 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary perspective view of a part of the grille core.

Fig. 5 is a perspective view of the tool used for adjusting the grille.

Fig. 6 is a fragmentary perspective view illustrating the relationship of the parts of the grille core during assembly thereof.

Fig. 7 is an enlarged fragmentary sectional view taken along the plane of line 7—7 in Fig. 6.

Fig. 8 is an enlarged fragmentary sectional view taken along the line 8—8 of Fig. 7.

Fig. 9 is a view similar to Fig. 8 but with the crossbars in a different position of adjustment.

Fig. 10 is a fragmentary and greatly magnified view of a portion of Fig. 8.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment. It is to be understood, however, that I do not intend to limit the invention by such disclosure but aim to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

The adjustable air distribution grille shown in the drawings for purposes of illustration comprises generally a frame 10 supporting and enclosing the periphery of a grille core 11 which is composed of a multiplicity of closely spaced vanes or fins 12 crossing a plurality of vanes or crossbars 13 in perpendicular relationship, the bars and fins interfitting with each other in a novel manner such that each set of vanes is supported and maintained in spaced parallel relation entirely by the vanes of the other set, while at the same time permitting each crossbar to be adjusted about its longitudinal axis 16 disposed about midway between the margins of the fins. For these two purposes, each fin is cut away between its side margins to form holes 15 for receiving the crossbars and also for forming arcuate bearing surfaces 22 which interengage with complementary surfaces on the crossbar and coact with the latter, not only to hold the vanes of each set in spaced parallel relation, but also to permit turning of each crossbar to any desired angular position within an arc substantially greater than a right angle.

To provide optimum free air area through the grille, the fins are made of thin sheet metal, preferably soft steel, about .018 to .020 of an inch thick, and are of sufficient width and close lateral spacing to gain control over the air forced through the grille frame. Preferably, the side margins of each fin are deformed at longitu-

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dinally spaced points to form deflecting and diffusing elements 17 along one margin and similar but substantially longer elements 17^a along the other margin. The elements 17 and 17^a are staggered relative to the holes 15 in the fins and are differently shaped to cause deflection of the air passing through the grille at different angles depending on the direction of the flow.

The crossbars 13 are made substantially stiffer and much thicker than the fins 12 in order that they may be held in tight frictional engagement with the fins to retain their adjusted positions and yet may be turned to different positions without becoming twisted or bent. Preferably, the bars comprise flat strips of sheet metal about $\frac{1}{8}$ of an inch thick and only slightly narrower than the fins 12 so that they will act effectually in deflecting each increment of the air stream discharged through the space between a pair of adjacent fins and a pair of adjacent crossbars. In view of the wide range of angular adjustment of the crossbars, the latter may be spaced somewhat farther apart than the fins 12 while permitting the desired degree of lateral deflection of the air stream to be obtained. Herein, the bar axes 16 are spaced apart approximately one and one half times the width of the bars.

The fins and crossbars are assembled to form the core 11 by first inserting each bar through a set of the aligned fin holes 15 while the bar is disposed as shown in Figs. 6 and 7 in a plane parallel to the fin edges and then turning the bar about its axis 16 to interengage the surfaces by which the vanes of each set are held in spaced relation and the crossbar is journaled on the fins. In one of its aspects, the invention contemplates a novel shaping and location of these coating surfaces to facilitate assembly of the fins and crossbars; to enable the fins to be made of thin and readily deformable sheet metal, to compensate for inaccuracies inherent in the formation of the fins as sheet metal stampings, and to utilize the resiliency of the fin material in producing firm binding engagement for maintaining the adjusted positions of the crossbars in spite of normal wearing off of these surfaces in service use.

To achieve these important functions and advantages, one of the coating surfaces above referred to is formed by the edge of a fin hole 15 while the other is the wall of an outwardly opening notch 20 in the margin of the crossbar 13, at least one of the surfaces being inclined relative to the plane of the fin so as to act as a cam in guiding the surfaces into full interengagement in the turning of the crossbar during assembly. Preferably, as in the present instance, the inclined interengaging surface is formed on the crossbar by making the notches 20 V-shaped with the walls 18 converging inwardly toward each other at an included angle of about 25 degrees. If desired, the outer end portions 18^a of the notch walls may, as shown, be flared at a still greater angle.

To permit the notches 20 to be punched in the crossbars, those in opposite margins are spaced apart at their roots 19 a distance somewhat greater than the diameter of the fin hole 15 (see Figs. 8 and 10), and the roots are rounded at a radius R (see Fig. 10) nearly equal to the fin thickness. This radius is correlated with the size of the fin holes 15 so that the width of each notch at the radius of the fin hole is substantially equal to the average thickness of the fin. Thus, if the parts are perfectly sized as shown in Fig. 10, the

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walls defining opposite sides of the fin hole 15 will fit closely in the curved parts of the notch roots 19, the engagement being confined to the corners 22 of the hole wall 15 as shown in Fig. 10. Tolerance variations in the sizes of the holes and notches and the thickness of the fins will, of course, vary the looseness or tightness of this fit; but without detrimental effect as will appear later. Notches of the shape and dimensions described may be punched from the crossbars without danger of breakage or rapid deterioration of the tools.

The notches 20 are spaced along the crossbars to correspond to the desired spacing of the fins 12 in the final grille assembly. In this instance, both margins of the bars 13 are similarly notched which is advantageous in enabling the bar to be made of a width only slightly narrower than the fins 12. If narrower crossbars are employed, only one margin need be notched, or the notches in margins of such a narrower crossbar may be staggered relative to each other.

The holes 15 are elongated longitudinally of the fins in order that each crossbar may be inserted endwise through a set of aligned holes in the fins when the bar is disposed parallel to the fin edges (see Fig. 6). This is accomplished by forming the ends of the fin holes 15 as parallel sided slots 21 extending along the center line of the fin, the over-all length of the hole including the extensions being somewhat greater than the width of the crossbars.

Intermediate its ends, the fin hole is enlarged to form the arcuate bearing surfaces or edges 22 which are concentric with respect to the axis 16 of the inserted crossbar and of a radius slightly greater than the spacing of the root 19 of each crossbar notch from the center line 16. Thus, after the crossbar has been inserted through the aligned holes 15 of a group of fins to bring the notches 20 into the planes of the respective fins as shown in Fig. 6, the bar may be turned about its axis 16 during which the bar surfaces 18 pass out of the slotted ends 21 of the fin holes so as to straddle the fin and then move around the bearing surfaces 22. The bar surfaces 18 thus become disposed as shown in Fig. 4 on opposite sides of the marginal portions or lands 23 of the fins which portions are disposed between the defining edges 22 of the fin holes 15 and the opposite marginal edges of the fin.

When punched out of thin sheet metal as above described, the fins are deformed to some extent and not perfectly flat. Also, there will be some small dimensional variations in the size of the holes 15, the depth and width of the notches 20, the thickness of the fins, or the formation of burrs around the fin holes in the punching operation. Such variations do not interfere with turning of the crossbars in assembling the parts as above described, or with proper interengagement of the lands 23 and the notch walls 18. For example, even if the deformation of the fins is substantial so the fins as initially assembled are as irregularly spaced as shown in Fig. 9, the outer ends 18^a of the notch walls will nevertheless always straddle the associated fins in the initial turning of the crossbars. Then, as the turning continues, the inclined bar surfaces 18 engage the defining sides of the slots 21 and act as cams on the latter to bend the fins and guide the fin lands 23 into the roots of the notches 20 as illustrated in Fig. 4 after turning of the bar through a quarter revolution.

The V-shape of the crossbar notches, in addi-

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tion to facilitating interlocking of the crossbars and fins in the manner described above, insures substantially uniform spacing of the fins in the final assembly. That is to say, the fin lands 23 are cammed by the action of the bar surfaces 18 into a common plane which becomes spaced equidistantly from the adjacent fins as shown in Fig. 8. Such automatic straightening of the fins in the assembly operation is made possible by virtue of the thinness of the fins and the powerful cam action produced by the bar inclines 18.

If the dimensional inaccuracies are such as to produce a closer fit between the notch walls 18 and the hole edges 22 than is shown in Fig. 10, the bar walls may in the camming action above described actually shear off a very small amount of metal around the hole edges. Such action is made possible by confining the engagement of the fin and crossbar surfaces to an edge 22 on the thinner part or fin and by making the crossbar rigid enough to withstand the applied torsional strain.

On the other hand, if the dimensional variations accumulate in a direction to fit the notch walls loosely in one fin hole, there is little likelihood of the bar or the fin as a whole remaining loose in the final assembly considering the substantial number of points of interengagement between each bar and the different fins or between each fin and the different bars.

The inherent inaccuracies or deformities in the fins above referred to are actually utilized to advantage in producing firm frictional binding engagement with the crossbars to hold the latter in all positions of adjustment, and this, in spite of the fact that the fit between the notch surfaces 18 and fin hole walls may be very loose. As illustrated in Fig. 9, deformities in or lack of straightness of the fins will result in uneven spacing of the lands 23 of the different fins in the final assembly. Such uneven spacing, although slight and unnoticeable to the human eye, necessitates springing of the fins as the crossbars are turned in assembling the parts. As a result, the upper edges of some of the fin lands 23 will engage the upper notch surface 18 as indicated at 24 in Fig. 8 while the edges of other of the lands will engage the lower notch surfaces as indicated at 25. Still other of the land edges will be centered in the notches, and, therefore, out of effective engagement with either surface 18 of the notch in which it is disposed. Nevertheless, each crossbar will always be in binding engagement with several of the fins in all of its positions of adjustment, and, therefore, will be held against turning so firmly as to necessitate the application of a substantial torque in order to adjust the bars readily. Any possibility of the crossbars or fins vibrating or rattling in service use or of the adjustment of the crossbars changing by impingement of the air stream against them is effectually avoided.

Actually, the fins and crossbars, when interlocked as described above, fit together so tightly that the bars cannot be turned readily without the aid of a special tool 26 such as is shown in Fig. 5 thereby making it difficult for unauthorized persons to change the adjustment of the grille. The tool 26 has a fork 27 at one end adapted to enter between adjacent fins and straddle one of the crossbars. Then, by gripping the outer end of the lever, the crossbar may be turned readily.

The firmness of the binding engagement does not change appreciably even after repeated adjustment of the crossbars in service use. This is because of the relatively large number of the

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points 24 and 25 of engagement between the fins, coupled with the fact that the fins, even when made of relatively soft steel, possess sufficient resiliency to take up any wear occurring at the engaging surfaces.

The use of V-shaped notches in the crossbars 16 is also advantageous in confining the engagement between the bars and the fins to very small areas of the fins, preferably at the very edges 22 of the lands 23 and around the holes 15. There is no rubbing whatever on the fin surfaces proper; consequently, the grille core 11 comprising the assembled fins and bars may be painted a desired color after assembly, and such finish will not be destroyed by repeated adjustment of the crossbars in service.

It will be observed that the assembly of the fins and crossbars to form the unitary and self-contained grille core 11 simply involves insertion of the crossbars 13 endwise through the aligned slots 21 in a group of the fins 12 followed by turning of each bar through a quarter revolution. No edgewise or lateral shifting of the crossbars is necessary because the circular bearings formed by the hole edges 22 are disposed intermediate the ends of the holes 15 each of which has a slot 21 projecting from opposite ends.

Interlocking of the fins and crossbars in the manner above described is especially advantageous from a manufacturing standpoint. Thus, the assembly of fins and crossbars may be made in large sizes and then cut into cores 11 according to the varying sizes of the grilles to be produced. Manufacture may thus be standardized and simplified, and both labor and material costs are minimized.

To form a complete grille, a core 11 of the desired size is cut from the fin and crossbar assembly above described and mounted in the frame 10 to conceal the ends of the crossbars and fins and facilitate mounting of the grille in a room wall. In the form shown in Fig. 1, the frame comprises end and side members of channel cross section connected at the corners and having flanges 28 which overlap the margins of the core 11 on both faces of the latter. The intermediate portions 30 of the channels extend across the ends of both the fins and the crossbars and are disconnected from the latter so as to permit free turning of the bars in the manner previously described.

In the grille core described above, it will be observed that axes 16 of the crossbars 13 are disposed midway between the edges of the grille fins 12. Also, the adjacent deflecting elements 17 or 17^a on the fins are spaced along the fin equidistant from the intervening crossbar axis 16. This arrangement permits the use of crossbars of maximum width, preferably equal to the width of the fins, while at the same time allowing a wide range of angular adjustment of the crossbars without interference by the elements 17 and 17^a which, in order to be effective to produce the desired deflecting and diffusing action, must be of a height greater than half the width of the notches 20 at the outer ends of the latter. Stated otherwise, the centering of the crossbars with respect to the fin and the deflecting elements enables the latter to be spaced closer together along the fins and act more effectually in producing the desired diffusing and deflecting action.

The grille constructed in the manner described is neat and attractive because the fins, being rigidly connected, are equally spaced at all times and thus impart a uniform frontal appearance

to the grille face. The crossbars, which are slightly narrower than the fins, have edges defined by the ends 31 of projections 32 between the adjacent notches 20. These ends are shorter than the spacing of the fins so that any unevenness in the spacing of the fins does not detract from the uniformity of appearance of the grille face. These ends remain visible in all positions of adjustment of the crossbars, and the variation in their spacing from the grille face or relative to each other in different positions of adjustment is hardly noticeable. This is due to the intentionally produced lack of continuity of the edges of both the fins and the crossbars.

In addition, the grille is extremely versatile in enabling the discharged air stream to be deflected in any pattern in the planes of the fins while permitting at least four different degrees of deflection to be obtained in perpendicular planes. If, for example, it is desired to spread the air stream laterally, the crossbars may be adjusted to the positions shown in Fig. 3 with one or more of the center bars disposed perpendicular to the grille face and the bars on opposite sides inclined in opposite directions. If the air stream is to be deflected in one direction only, all of the crossbars would be inclined in the same direction. With the crossbars disposed perpendicular to the grille face no deflection will result.

The amount of deflection of the discharged air stream in a plane perpendicular to the fins will depend on which of the elements 17 or 17a are disposed at the discharge edges of the fins or at the front face of the grille. If the elements 17 are active as shown in Fig. 1, a deflection of about five degrees will result. The elements 17a produce a greater deflection—about fifteen degrees. The direction of such deflection will depend on whether the grille is positioned with the active elements projecting downwardly or upwardly. Thus, in the case of the grille shown in Fig. 1, the air stream would be bent downwardly five degrees by the elements 17. By reversing the grille, an upward deflection may be obtained.

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

I claim as my invention:

1. A grille having two relatively perpendicular sets of fins and angularly adjustable crossbars with the parts of each set spaced apart longitudinally of the parts of the other set, said fins being composed of relatively thin sheet metal and having rows of spaced holes therein elongated in one direction to receive the crossbars in assembly and disposed intermediate the edges of the fins to provide lands on opposite sides of the holes, and said crossbars being of greater rigidity than the fins and having outwardly opening notches longitudinally spaced along the crossbar margins and flaring outwardly for coaction of their walls with the edges of said holes to guide said lands into the notches during turning of the crossbars in said holes.

2. A grille having two relatively perpendicular sets of fins and angularly adjustable crossbars with the parts of each set spaced apart longitudinally of the parts of the other set, said fins being composed of relatively thin sheet metal and having rows of spaced holes therein elongated in one direction to receive the crossbars in assembly and disposed intermediate the edges of the fins to provide lands on opposite sides of the holes, and said crossbars being of greater

rigidity than the fins and having outwardly opening notches longitudinally spaced along the margins of the crossbars, the walls of said notches being inclined relative to the planes of the fins and interlocking with the defining edges of the fins during turning of the crossbars in the fin holes whereby to cam said lands into said notches in spite of deformities in the fins.

3. A grille comprising a series of parallel fins having holes spaced apart longitudinally of the fins, said fins being composed of sheet metal approximately .020 of an inch thick, a plurality of rigid sheet metal crossbars approximately $\frac{1}{16}$ of an inch thick, each extending through one set of the aligned holes of the fins and having marginal notches spaced according to the desired spacing of the fins, said holes being elongated in one direction to permit endwise insertion of the crossbars through the holes and turning of the bars to initially interlock the fins and the notches of the bars and permit subsequent angular adjustment of the crossbars, and the walls of said bar notches being spaced apart at their outer ends sufficiently to straddle the defining edges of said fin holes during said turning but more closely spaced adjacent their inner ends so as to be engageable with the edges of said fin holes to hold the bars frictionally in different angular positions of adjustment.

4. A grille comprising a series of parallel fins having holes spaced apart longitudinally of the fins, said fins being composed of sheet metal approximately .020 of an inch thick, a plurality of rigid sheet metal crossbars substantially thicker than said fins, each extending through one set of the aligned holes of the fins and having marginal notches spaced according to the desired spacing of the fins, said holes being elongated in a direction longitudinally of the fins to permit endwise insertion of the crossbars through the holes and turning of the bars to initially interlock the fins and bars and permit subsequent angular adjustment of the bars, and the walls of said bar notches being spaced apart sufficiently at their outer ends to straddle the defining edges of said fin holes during said turning but more closely spaced at inwardly spaced points so as to be engageable with fins to hold the bars frictionally in different angular positions of adjustment.

5. A grille core comprising a plurality of flat relatively thick rigid bars having outwardly opening notches uniformly spaced along their margins, and a plurality of fins substantially thinner than said bars and apertured intermediate their edges to provide aligned sets of holes elongated in one direction to permit insertion of the bars into the holes and turning of the bars to interlock the fins and bars, the defining walls of said notches being inclined relative to each other and to the planes of the fins and coacting during initial turning of the bars to deform the fins and guide the latter into predetermined positions relative to each of said notches while leaving said bar and fin margins in firm frictional engagement.

6. A grille core comprising spaced parallel fins apertured intermediate their edges and at longitudinally spaced points to provide aligned sets of holes elongated in one dimension, and crossbars adapted to be received in said sets of holes when disposed in the plane of said elongated dimension and journaled in the fins to turn about their longitudinal axes, said bars having marginal V-shaped notches opening outwardly to receive the defining edges of said fin holes with at

least one wall of each notch inclined relative to the adjacent fin and frictionally engaging the fin at a point spaced inwardly from the outer end of the notch.

7. A grille comprising a series of parallel fins having holes spaced apart longitudinally of the fins and alined with corresponding holes of adjacent fins, a plurality of crossbars each extending through one set of the alined holes and having marginal notches spaced according to the desired spacing of the fins, said holes being elongated in one direction to permit insertion of the crossbars into the holes and turning of the bars to interlock the fins and bars, and the walls of said bar notches diverging outwardly sufficiently to straddle the defining edges of said fin holes in spite of non-uniformity in the spacing of the latter and acting on such edges during said turning of the bars to cam said hole edges into centered positions in the notches.

8. A grille core comprising a series of substantially parallel fins having holes spaced apart longitudinally thereof and elongated in one dimension, said fins being composed of thin readily deformable material, and a plurality of flat relatively rigid crossbars each extending through one set of the alined fin holes and adapted to be inserted therein when disposed in the plane of said elongated dimension, said bars having notches spaced along their margins and of greater width than the thickness of said fins, the walls of said notches and the defining edges of said fin holes being shaped to interlock automatically during turning of the inserted bars and coacting during such turning to cam the defining edges of the fin holes laterally of the fins and guide these edges into the bar notches whereby to utilize deformities of said fins to maintain firm frictional engagement between the fins and bars during subsequent angular adjustment of the bars.

9. A grille comprising a series of parallel fins having holes spaced apart longitudinally of the fins and alined with corresponding holes of adjacent fins, said fins being thin sheet metal stampings with said holes elongated in one dimension, and a plurality of relatively rigid crossbars each extending through one set of the alined fin holes and having marginal notches spaced according to the desired spacing of the fins, said bars, when disposed in the plane of said elongated dimension, being insertable in said holes and rotatable after such insertion to interlock the fins and bars, and said notches being substantially wider at their outer ends than the thickness of said fins whereby to straddle the fins during said turning and being sufficiently narrower near their root ends to engage the fins around said holes and frictionally hold the bars in different positions of angular adjustment.

10. A grille having two relatively perpendicular sets of vanes with the vanes of each set spaced apart longitudinally of the vanes of the other set, one set having rows of spaced holes longitudinally elongated to receive the vanes of the other set in assembly and disposed centrally of the first vanes to provide lands between the vane edges and opposite sides of the holes, and the vanes of the other set being formed with outwardly opening notches spaced along the vane margins with the walls of the notches flaring outwardly so as to straddle said lands and engage said first vanes only at the edges of intersection between the fin surfaces and the walls of said holes whereby to prevent rubbing contact

between said notch walls and the vane surfaces.

11. A grille for controlling the direction of flow of air into a room or space, comprising two relatively perpendicular sets of vanes with the vanes of each set spaced apart longitudinally of the vanes of the other set, one set of vanes being composed of thin relatively flexible material and having rows of holes disposed intermediate the margins thereof and providing lands adjacent said margins on opposite sides of the holes, said holes being elongated in one direction to receive the vanes of the other set and the vanes of said other set comprising thicker bars each having outwardly opening notches along opposite edges to receive said lands and to adapt the bars for individual rotational adjustment whereby to vary the discharge pattern of air passing through the grille, said notches being several times as wide at their outer ends as the thickness of said fins and narrowed intermediate their ends to frictionally engage the notch walls with said lands.

12. A grille comprising a series of closely spaced parallel fins having holes spaced apart longitudinally of the fins, said fins being composed of thin and flexible strips and a plurality of rigid crossbars substantially thicker than said fins, each extending through one set of the alined holes of the fins and having marginal notches spaced according to the desired spacing of the fins, said holes being elongated to receive the crossbars by endwise insertion thereof through the holes and to permit turning of the bars to initially interlock the fins and bars and thereafter to adjust the bars angularly, and the walls of said bar notches being shaped and spaced apart for engagement with said fins frictionally over an area which is only a small fractional part of the total overlapped width of the walls and fin surfaces whereby to utilize the flexibility of said fins in maintaining all of the different adjustments of the bars.

13. An adjustable grille for controlling the direction of flow of air into a room or space comprising two relatively perpendicular sets of vanes with the vanes of each set spaced apart longitudinally of the vanes of the other set, one set being in the form of thin strips having rows of holes elongated in one dimension to receive the vanes of the other set and disposed centrally of the strips to provide lands at the edges of the vanes on opposite sides of the holes, and the vanes of said other set comprising flat bars having V-shaped notches along opposite edges for receiving said lands and permitting rotational adjustment of the bars whereby to vary the discharge pattern of air passing through the grille.

WALTER W. KENNEDY.

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