

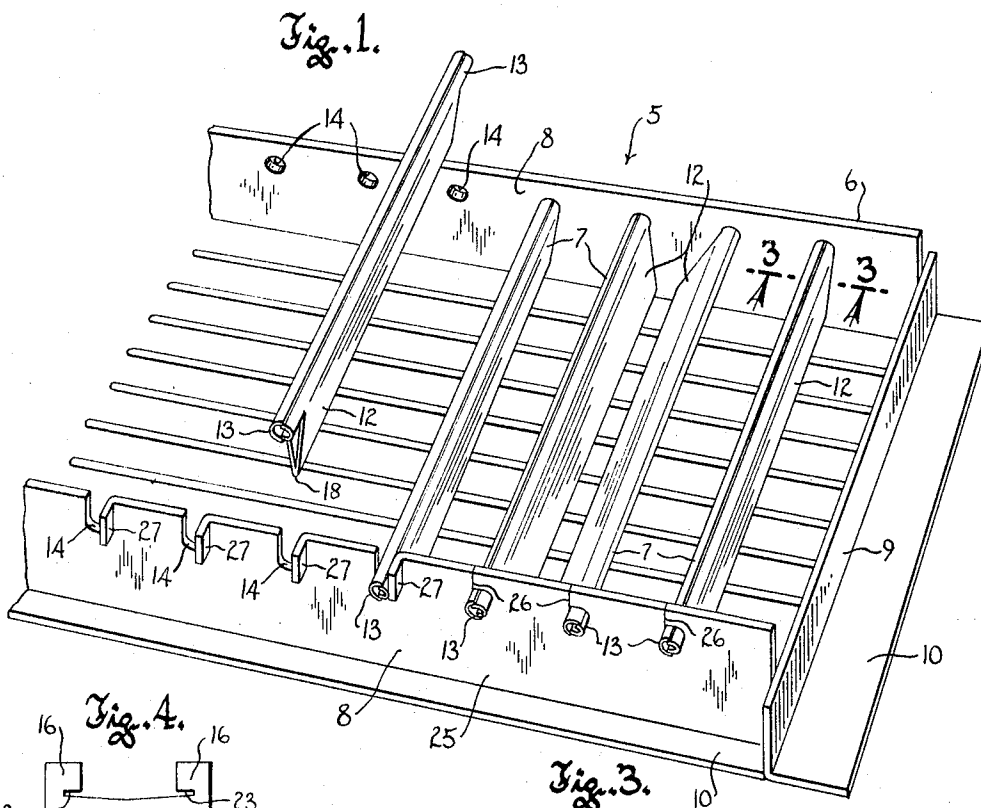
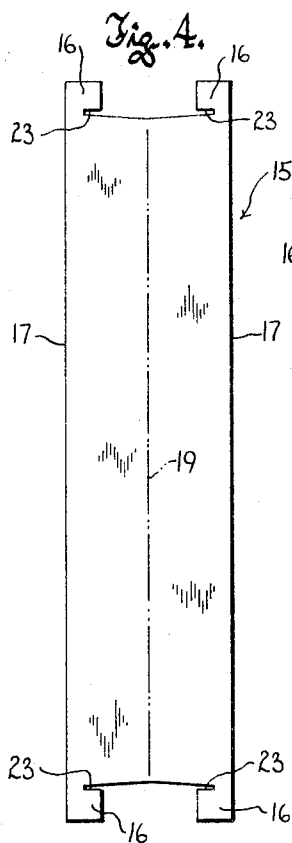
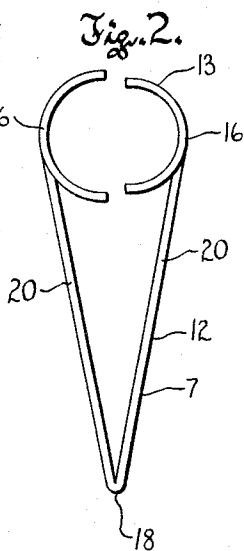
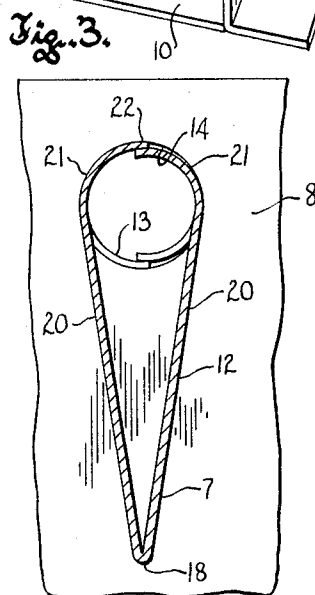
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AIR OUTLET HAVING ANGULARLY ADJUSTABLE LOUVERS

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## AIR OUTLET HAVING ANGULARLY ADJUSTABLE LOUVERS

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5 Claims. (Cl. 98-110)

This invention relates to louvered air outlets and refers more particularly to improvements in angularly adjustable vanes or louvers for air outlets, registers and the like.

Air outlets and registers of the type here under consideration are ordinarily provided with a number of elongated parallel vanes or louvers that extend transversely across the space between a pair of opposite frame members and which are angularly adjustable to provide for deflection in any desired direction of air issuing from the outlet. Each vane has endwise projecting coaxial trunnions at its opposite ends that are received in apertures in the frame members to mount the vane for manual swinging adjustment.

Heretofore the vanes for air outlets and registers have commonly been molded or extruded, with the trunnion portions of the vane formed integrally with the blade portion thereof. One common type of vane, for example, has been made of extruded stock that had a keyhole shaped cross section, with a rounded bead along one edge thereof. The stock was cut to the overall lengths of the required vanes, and end portions of the blade part of each length were cut away, leaving the bead portion projecting beyond each end of the blade to provide the trunnions.

To facilitate manufacture and assembly, the trunnion portions of such vanes had to be received in apertures in the frame that were big enough to provide a substantially loose fit, and therefore some friction means had to be provided for inhibiting free rotation of the vanes in the frame so that the vanes would remain in any position of angular adjustment to which they might be set. The friction means usually took the form of stiff, springy piano wire that was woven over and under the projecting end portions of the trunnions and which lay along the outer surface of the frame members. The piano wire thus biased the trunnions into snug frictional engagement with edge portions of the apertures in which they were received, and since alternate apertures along the length of each frame member were formed as slots, to facilitate installation of the vanes in the preassembled frame, the piano wire also served to confine the trunnion portions in the bottoms of the slots. Installation of this piano wire friction element was awkward and tedious, requiring a substantial degree of manual strength and dexterity.

By contrast it is a general object of the present invention to provide an angularly adjustable vane for a louvered air outlet of the character described, which vane can be stamped and formed from a unitary blank of light gage sheet metal and has integral trunnion portions which can be radially contracted, against the resilient bias of the metal, to facilitate insertion of the trunnions into apertures in the frame, and which then dilate to provide a snug fit in the apertures that prevents undesired rotation of the vane.

Another general object of this invention is to provide angularly adjustable vane for a louvered air outlet or register which can be fabricated from light gage sheet metal at substantially lower cost than prior molded or extruded vanes and which can be assembled into a frame much more quickly and easily than vanes of prior types.

Another object of this invention is to provide a louvered air outlet, register or the like that can be manufactured at substantially lower cost and assembled with greater speed and facility than prior devices of this type, and

which features angularly adjustable vanes fabricated of light gage sheet metal that are attractive in appearance and highly efficient in operation because they have a well streamlined cross section that minimizes air turbulence and affords good directional guidance to air issuing from the louvered device.

With the above and other objects in view which will appear as the description proceeds, this invention resides in a novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates one complete example of a physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

FIGURE 1 is a partially disassembled fragmentary perspective view, with portions broken away, of a louvered register or air outlet embodying the principles of this invention;

FIGURE 2 is an end view of a deflector blade or louver of this invention;

FIGURE 3 is a fragmentary sectional view taken on the plane of the line 3-3 in FIGURE 1; and

FIGURE 4 is a plan view of a blank from which the louver or blade of this invention is formed, shown prior to being bent.

Referring now to the accompanying drawing, the numeral 5 designates generally a louvered air outlet or register embodying the principles of this invention and which comprises a rectangular frame 6 and a plurality of louvers or vanes 7. The frame comprises a pair of elongated side members 8 held in spaced apart parallel relation by end members 9, all of the frame members being preferably of L-section stock and having their flange portions 10 at the front of the frame and projecting laterally outwardly.

The several louvers or vanes 7 extend across the space between the side frame members 8, transversely to them and parallel to the end members 9, and each vane comprises a blade portion 12 and a pair of opposite endwise projecting coaxial trunnion portions 13. The trunnion portions of the vanes are received in lengthwise spaced apart apertures 14 in the side frame members.

Each of the vanes is formed from an elongated rectangular blank 15 (see FIG. 4) of light gage sheet metal having a pair of endwise projecting rectangular protuberances 16 at each end thereof, one near each of the longitudinal edges 17 of the blank, the outer edge of each protuberance preferably being continuous with its adjacent longitudinal edge of the body portion of the blank. The two protuberances at each end of the blank cooperate to define a trunnion portion 13 of the finished vane.

In forming the vane, the blank is sharply bent, as at 18 along its longitudinal centerline 19, to dispose its opposite longitudinal edge portions 17 in close parallel proximity to one another, so that the body portion of the blank defines flatwise adjacent walls 20 of a hollow but substantially thin blade portion of the vane. The sharp bend 18 defines the front edge of the blade, and, as shown, the walls 20 diverge rearwardly at a small acute angle therefrom.

The longitudinal marginal edge portions of the blank are given complementary arcuate curvatures in transverse section, as at 21 (see FIGURE 3) so that they define a bluntly rounded rear edge portion of the blade. Attention is directed to the fact that in the finished vane

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the outermost longitudinal edge portions of the blank are in slightly overlapping relation, as at 22, rather than being in edgewise abutting relationship, so that said edges do not interfere with convergence of the walls of the blade against the resilience of the metal. It will be observed that the blade portion 12 of the vane, by reason of being bent in transverse section as just described, forms a well streamlined section which promotes smooth flow of air over the vane from the rear to the front edge thereof and thus causes the blade to produce an efficient deflecting action upon an airstream passing it.

As best seen in FIGURE 2, the two protuberances 16 at each end of the vane are arcuately bent in transverse section so as to complement one another in defining a trunnion portion 13 which has a substantially circular cross section but which is split along its length. In part the arcuate curvature of each protuberance is a lengthwise continuation of the curvature of the blunt rear edge portion of its endwise adjacent blade wall, but the laterally inner portion of each protuberance curves laterally inwardly from the plane of the adjacent blade wall, as viewed from the end of the vane. To permit the protuberances to have such inward curvature, the blank has short lateral slits 23 extending from the inner edge of each protuberance partway to the longitudinal edge 17 of the blank.

It will be noted that the edges of opposing protuberances 16 in the formed vane are in slightly overlapping relation, rather than being in edge-to-edge abutting relationship. Hence each trunnion can be radially contracted to a substantial extent by manually converging its adjacent blade wall portions, but the trunnion will again dilate, in response to the resilient bias of the metal, as soon as released. By making the apertures 14 in the side frame members somewhat smaller than the normal relaxed diameter of the trunnion portions on the vanes, assurance is had that the trunnions will engage in the apertures with a snug friction producing fit, but it is nevertheless easy to insert the trunnions into the apertures by converging the side wall portions of the blade during assembly.

Preferably each of the apertures 14 in one of the side frame members 8 is formed, as shown, with a circular hole in the web portion 25 of the frame member, spaced a small distance inwardly from the rear marginal edge thereof, and with a slit 26 that extends from that hole to said edge to cooperate with the hole in defining a tab 27 that can be bent out of the plane of the frame member web. When the tab thus formed is bent substantially perpendicular to the web portion of the frame member, it leaves a slot that opens to the rear edge of the frame member, the bottom of said slot being defined by the edge portion of the hole proper. It is of course a very simple matter to insert one of the trunnion portions of a vane laterally into this slot and then bend the tab 27 back into coplanar relationship with the web of the frame member to confine the trunnion portion in the hole.

The apertures in the opposite side frame member can all be formed as ordinary holes into which the trunnion portions of vanes are axially inserted. Alternatively, of course, every other aperture in each frame member can be made with a slit 26 so that adjacent vanes are inserted into the frame from opposite sides thereof.

From the foregoing description taken together with the accompanying drawing it will be apparent that this invention provides a louvered air outlet having angularly adjustable vanes or louvers of light gage sheet metal which can be made at substantially lower cost than molded or extruded vanes and which can be assembled into a frame with much greater speed and facility than was possible with prior louvers.

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What is claimed as my invention is:

1. In a louvered air outlet or the like:

(A) a pair of opposite elongated frame members, each having a plurality of lengthwise spaced apart apertures;

(B) means fixing said frame members in laterally spaced apart substantially parallel relationship, with the apertures in one frame member in substantially coaxial alignment with the apertures in the other;

(C) a plurality of vanes spanning the space between said frame members, each of said vanes being bent from a unitary sheet metal blank and comprising

(1) a pair of flatwise adjacent wall portions connected with one another around a substantially sharp bend that defines one longitudinal edge of the vane and having free marginal edge portions remote from and extending substantially parallel to said bend that are substantially arcuately bent toward one another in transverse section to cooperate in defining a substantially blunt opposite longitudinal edge of the vane, and

(2) an integral trunnion portion projecting endwise from each end of each wall portion near said opposite longitudinal edge of the vane, each trunnion portion being bent to an arcuate transverse section, the opposing trunnion portions at each end of the vane being of complementary transverse curvature and cooperating to define a trunnion that is receivable in one of the apertures in a frame member when the complementary trunnion portions are converged against the resilient bias of the metal, divergence of the trunnion portions in the aperture, under resilient bias, providing a snug fit of the trunnion in the aperture by which the vane is frictionally held in any position of angular adjustment to which it may be swung.

2. The air outlet of claim 1 further characterized by the fact that certain of the apertures in one frame member are defined by a hole in the frame member spaced from one longitudinal edge thereof and a slit which extends from the hole to said longitudinal edge and which cooperates with the hole and said edge in defining a tab means than can be bent out of the plane of the frame member to provide a slot into which the trunnion of a vane can be laterally inserted and which can be bent back into coplanar relationship with the frame member to confine the trunnion in the hole.

3. A one-piece vane for a louvered air outlet or the like, of the type having an elongated blade portion and coaxial trunnions projecting lengthwise from the ends of the blade portion and receivable in apertures in a pair of opposite frame members to mount the vane for angular adjustment, said vane being characterized by:

(A) the blade portion of the vane being hollow and comprising a pair of flatwise adjacent sheet metal wall elements integrally connected with one another around a substantially sharp bend which extends along one longitudinal edge of the blade, said wall elements having free marginal edge portions at the opposite longitudinal edge of the blade that are resiliently flexible toward and from one another; and

(B) each of said trunnions comprising an endwise projecting integral protuberance on each of said wall elements laterally spaced from the first designated longitudinal edge of the blade, the two protuberances at each end of the blade being opposite one another and having complementary substantially arcuate curvatures in transverse section, the resilience of the wall elements permitting the opposite protuberances to be converged so that the trunnion that they cooperate to provide can be inserted into an aperture and can dilate under resilient bias into a snug

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fit in the aperture whereby the vane is frictionally held in any position of angular adjustment.

4. As an article of manufacture, a vane for a louvered air outlet or the like comprising: an elongated substantially rectangular sheet metal blank having integral protuberances projecting endwise from both ends thereof, one near each of its opposite longitudinal edges, said blank

- (1) having a substantially sharp bend along its longitudinal centerline which disposes the portions of the blank at opposite sides of said centerline in flatwise adjacent relationship so that they cooperate to provide a hollow blade portion, said bend thus defining one longitudinal edge of the blade portion,
- (2) the longitudinal marginal edge portions of the blank being bent toward one another, transversely to the blade portion, to define a substantially blunt opposite longitudinal edge of the blade portion, and
- (3) said protuberances being substantially arcuately curved in transverse section, with the two protuberances at each end of the blade complementing one another in curvature and cooperating to provide a lengthwise split trunnion, the diameter of which can be reduced for engagement of the trunnion in an aperture by converging said two protuberances, and

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which dilates upon release, under the resilient bias of the metal, so as to have a snug fit in the aperture whereby the vane is frictionally retained in any angular position to which it may be adjusted.

5. The vane of claim 4, further characterized by the fact that: each of said protuberances is bent to a substantially semi-circular transverse section, the portion of each protuberance remote from the longitudinal edge of the blank being separated from the blade portion by a transverse slit which extends partway to said edge of the blank.

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