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LOUVRE PLATE FOR USE IN A FORCED AIR HEATING SYSTEM

Filed Nov. 18, 1966

2 Sheets-Sheet 1

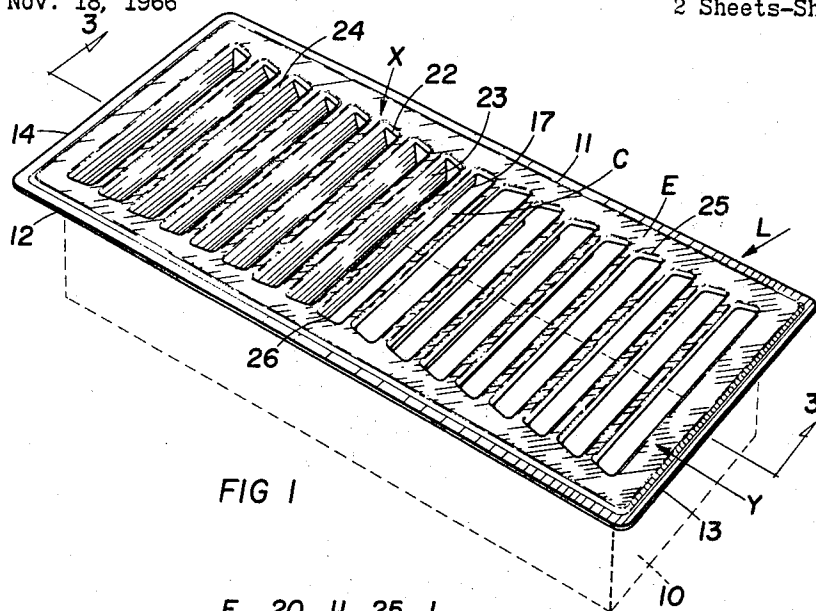


FIG 1

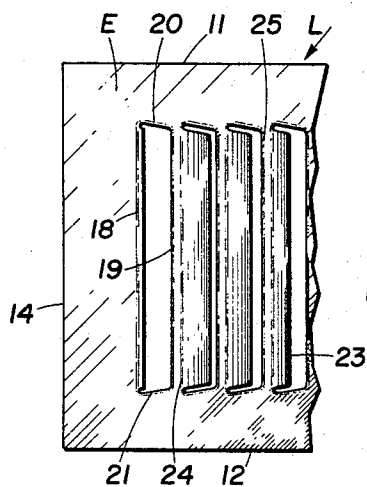


FIG 2

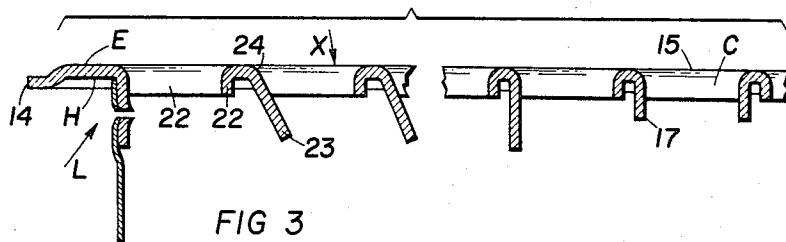


FIG 3

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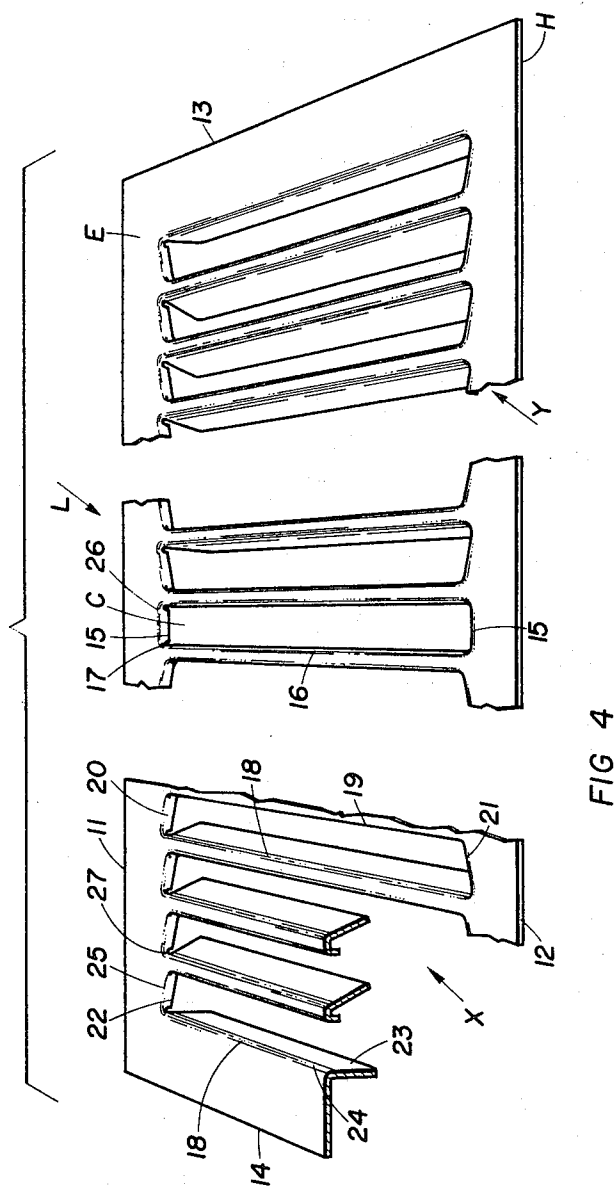


FIG 4

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LOUVRE PLATE FOR USE IN A FORCED AIR HEATING SYSTEM

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5 Claims. (Cl. 98—101)

ABSTRACT OF THE DISCLOSURE

A louvre plate for forced air heating systems having louvre openings and vanes which are designed to provide a rigid structure capable of withstanding service usage and susceptible of manufacture by the action of a progressive die to leave the exposed face of the plate smooth and free of sharp or jagged edges without any grinding or finishing operations. This shape of the openings and vanes may be generally characterized as trapezoidal, with the vane being integrally joined to the longer base edge, and a narrow continuous flange depending inwardly from the shorter base edge and side edges.

The present invention relates to forced air heating systems and is concerned primarily with the louvre plate which is mounted in a wall vent. Such a louvre plate has an exposed outer surface and an inner surface that is inaccessible to a user of the premises where the plate is installed.

A prime requirement of such louvre plates is that the exposed surface be smooth to prevent injury to a person coming into contact therewith. It is also important that the louvre plates be susceptible of manufacture by a simple operation to hold down the cost thereof. It is equally important that the louvre plate have all of the structural characteristics required by its service usage.

With the foregoing conditions in mind the present invention has in view as its foremost objective the provision of a louvre plate designed for use in air heating systems which is shaped and designed so that the louvre openings and vanes may be formed by the action of a progressive die leaving the exposed surface smooth without requiring any grinding or finishing of cut edges.

Another somewhat more detailed object of the invention is to provide, in a louvre plate of the type noted, a plurality of louvre openings, trapezoidal in shape, with a vane integrally joined to the longer base edge of each opening, and a continuous narrow flange integrally joined to and extending inwardly from the shorter base edge and side edges of each opening.

Still another object is to provide, in a louvre plate of the character aforesaid, louvre openings each having a vane and flange structure integrally joined to the edges of said openings by rounded or bend portions, leaving the exposed surface of the plate smooth and free of sharp or jagged edges.

Particular objects and advantages of the invention are intimately associated with the shape of the louvre openings and the structure integrally attached to the edges thereof. These will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

For a more complete understanding of the invention reference may be had to the following description and accompanying drawings, wherein:

FIGURE 1 is a perspective of a louvre plate constructed in accordance with the precepts of this invention;

FIGURE 2 is a plan view of a fragment of a blank after it has been subjected to the action of a progressive die;

FIGURE 3 is a longitudinal section through portions of

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a formed plate being taken about on the plane represented by the line 3—3 of FIGURE 1, and

FIGURE 4 is a perspective showing portions of several sections of the plate in exploded relation.

Referring now to the drawings, and first more particularly to FIGURE 1, the duct of an air heating system is shown in phantom at 10. In accordance with conventional practice such ducts are ordinarily of rectangular shape. Where the duct enters a room or similar premises a vent is provided which is closed by the louvre plate referred to in its entirety by the reference character L and which plate is mounted on the end of the duct 10. The plate L is ordinarily made of appropriate sheet steel which is susceptible of deforming operations. The plate L has side edges 11 and 12 and end edges 13 and 14.

Referring now more particularly to FIGURE 4, the louvre plate L is shown as having an exposed outer face E and an inner or hidden surface H. Formed in the plate L are three sets or groups of louvres. Thus, there is a centre set comprising one or more louvre openings such as shown at C and end groups X and Y.

In the form of the invention illustrated there is but a single central louvre opening C. This opening is of substantially rectangular formation defined by parallel end edges 15 and parallel elongated side edges 16. Extending inwardly from the edges 15 and 16 and projecting beyond the inner face H is a continuous peripheral flange 17. This flange 17 has a depth or extent substantially equal to twice the thickness of the plate L.

Where the end edges 15 join in with the side edges 16, the corners formed by the meeting are rounded and this same rounded structure obtains at the corners of the flange 17.

End louvre sets X and Y are substantially identical with the exception of the direction in which the openings and vanes are arranged with respect to the centre. Thus each of the sets X and Y comprises louvre openings with converging sides with the convergence being toward the centre and inclined vanes with the angles of inclination being toward the centre.

Each louvre opening of the sets X and Y is of trapezoidal shape being defined by a long base edge 18, a short base edge 19 and side edges 20 and 21 which connect the base edges 18 and 19 and which converge toward the centre section C. It should be noted that in each opening the shorter base edge 19 is disposed closer to the centre section than is the longer base edge 18. The side edges 20 and 21 are disposed at an angle out of the normal with respect to the shorter base edge 19 and which angle ranges from 95° to 115°.

It will be noted that the longer base edge 18 of one louvre opening is spaced from the shorter base edge 19 of the next adjacent opening edge, the spacing being such as to leave a sufficient amount of metal between the two to provide required rigidity in the structure. It will be further noted that the staggered relation of the ends of the longer base edges with respect to the shorter base edges affords increased extent of metal between adjacent corners. This is important to the same end of providing rigidity.

Depending inwardly from the inner face H and from the side edges 20 and 21 and shorter base edge 19 of each louvre opening is a continuous flange 22 having a depth or extent of the same order as the flange 17, that is substantially twice the thickness of the plate L. All of the flanges 17 and 22 are substantially normal to inner face H of the plate L.

Where the side edges 20 and 21 of the louvre openings meet the base edges 20 and 21 corners are formed, and these corners are rounded. Moreover, this same roundness is carried over into the corresponding parts of the flanges 22.

Also extending inwardly of the inner face H and from the longer base edge 18 of each louvre opening is a vane 23. Each vane 23 has an extent substantially the same as that of the adjacent louvre opening less the extent or depth of the flange 22 of that opening.

It is notable that where the vane 23 joins the plate L there is a rounded edge or bend portion 24. Likewise there are rounded edges or bend portions 25 where the flanges 22 are joined to the plate L. Similarly where the flange 17 joins the plate L there are rounded edges or bend portions 26.

It is evident that the formation of the flanges 22 at the side edges 20 and 21 take metal from the plates. This means that the edge of the vane which is integrally joined to the longer base edge 18 is not co-extensive therewith but is shorter. From the point where the joining edge of the vane terminates to the adjacent rounded corner there is a small lip 27. The presence of these lips 27 not only lends to the creation of the smooth face E but also adds to the rigidity of the finished plate.

It is important to note that the angle of the vanes 23 of the respective sets X and Y progressively varies away from the centre section C. Thus the vane 23 which is closer the centre set is substantially perpendicular to the plate L with the angle with respect to the inner plate face progressively decreasing with each vane away from the centre.

The louvre plate above described presents an outer exposed surface that is smooth with all edges defining the openings being rounded. Thus, after the openings, flanges and vanes have been formed by the action of a progressive die there is no need to carry out any finishing operations such as grinding, sanding or polishing. There simply are no sharp or jagged edges to be finished.

It is evident that each vane 23 has the shape and substantially the extent of the trapezoidal opening which is generated at it is formed. The extent of this vane will be slightly less than that of the opening due to the formation of the flange 22.

While a preferred, specific embodiment of the invention is hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions, dimensions and designs illustrated and described, because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. A louvre plate for use in a forced air heating system, said plate having an inner face and a smooth exposed outer face: said plate being formed with three sets of openings, namely a central set and two end sets; said central set comprising at least one elongated substantially rectangular opening having a continuous peripheral flange extending inwardly from the edges thereof at said inner face and of a depth substantially equal to twice the thickness of said plate; each of said end sets comprising a plurality of spaced apart elongated openings of trapezoidal shape, each of said openings being defined by a long base edge, a short base edge and side edges converging toward said central set, there being rounded corners where said side edges join said base edges; a continuous flange extending inwardly from said inner face at the side edges and short base edge of each of said openings, said flange having a depth substantially equal to twice the thickness of said plate; a vane of trapezoidal shape integrally joined to and projecting inwardly from said inner face at the longer base edge of each louvre opening, said vane having an extent substantially the same as that of the adjacent louvre opening less the extent of the flanges depending from the end edges and short base edge of that opening; the vanes of each end set being disposed at an angle with respect to said inner face with said angle becoming less with each vane away from the centre; and bend portions where each of said vanes and flanges is joined to said plate.

2. A louvre plate for use in a forced air heating system, said plate having an inner face and a smooth exposed outer face and formed with a series of louvre openings, each of said openings being trapezoidal in shape defined by a long base edge, a short base edge and converging side edges; a rounded corner at the jointure of each side edge with a base; a continuous flange extending inwardly from said inner face at said side edges and short base edge said flange having a depth substantially equal to twice the thickness of said plate, there being bend portions where said flange joins said plate; said side edges being disposed at an angle with respect to said short base edge, said angle ranging from 95° to 115°; and a vane integrally joined to said plate at the long base edge of each opening, there being a bend portion at the jointure of each vane to said plate, said vanes being disposed at an angle with respect to the inner face of said plate and which angle progressively decreases with each vane towards one end of said plate.

3. A louvre plate for use in a forced air heating system, said plate having an inner face and a smooth exposed outer face: said plate being formed with three sets of openings, namely a central set and two end sets; said central set comprising at least one elongated substantially rectangular opening having a continuous peripheral flange extending inwardly from the edges thereof at said inner face and of a depth substantially equal to twice the thickness of said plate; each of said end sets comprising a plurality of spaced apart elongated openings of trapezoidal shape, each of said openings being defined by a long base edge, a short base edge, and side edges converging toward said central set, there being rounded corners where said side edges join said base edges; said side edges meeting said shorter base edges at an angle ranging from 95° to 115°; a continuous flange extending inwardly from said inner face at the side edges and short base edge of each of said openings, said flange having a depth substantially equal to twice the thickness of said plate; a vane of trapezoidal shape integrally joined to and projecting inwardly from said inner face at the longer base edge of each louvre opening, said vane having an extent substantially the same as that of the adjacent louvre opening less the extent of the flanges depending from the end edges and short base edge of that opening; the vanes of each end set being disposed at an angle with respect to said inner face with said angle becoming less with each vane away from the centre; and bend portions where each of said vanes and flanges is joined to said plate.

4. A louvre plate for use in a forced air heating system, said plate having an inner face and a smooth exposed outer face: said plate being formed with three sets of openings, namely a central set and two end sets; said central set comprising at least one elongated substantially rectangular opening having a continuous peripheral flange extending inwardly from the edges thereof at said inner face and of a depth substantially equal to twice the thickness of said plate; each of said end sets comprising a plurality of spaced apart elongated openings of trapezoidal shape, each of said openings being defined by a long base edge, a short base edge and side edges converging toward said central set, there being rounded corners where said side edges join said base edges; a continuous flange extending inwardly from said inner face at the side edges and short base edge of each of said openings, said flange having a depth substantially equal to twice the thickness of said plate; a vane of trapezoidal shape integrally joined to and projecting inwardly from said inner face at the longer base edge of each louvre opening, said vane having an extent substantially the same as that of the adjacent louvre opening less the extent of the flanges depending from the end edges and short base edge of that opening; the joining edge of each vane being shorter than the longer base edge to which it is connected, and small lips between the vane ends and the adjacent rounded corners; the vanes of each

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end set being disposed at an angle with respect to said inner face with said angle becoming less with each vane away from the centre; and bend portions where each of said vanes and flanges is joined to said plate.

5. A louvre plate for use in a forced air heating system, said plate having inner and outer faces and a series of parallel louvre openings, each said opening being formed with an elongated trapezoidal opening, said opening being defined by a long base edge, a short base edge and converging side edges, said edges meeting at rounded corners; a continuous flange extending inwardly from said inner face at said side edges and short base edge, there being bend portions at the joindure of said flange to said plate; and a vane extending inwardly from said inner face at said long base edge and integrally joined to said plate by a bend portion, said vane having an extent substantially the same as that of said opening less the extent of said flange, with the joining edge of said vane being shorter than the long base edge to which it is connected

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and a lip on the inner face of said plate between each end of said vane and the adjacent rounded corner, said vane of each said opening being disposed at an angle with respect to the inner face of said plate and which angle progressively decreases with each vane towards each end of said plate.

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