

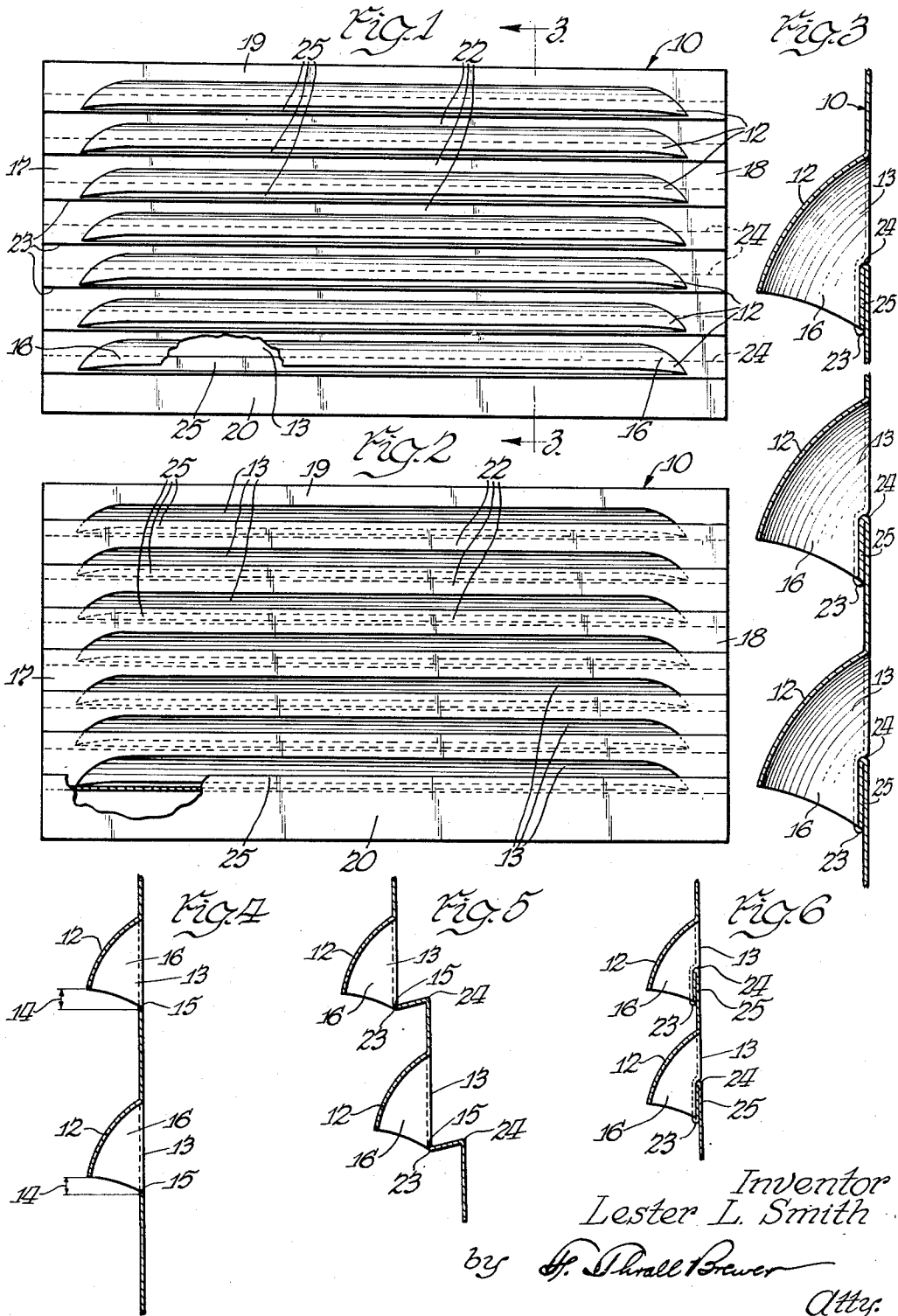
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LOUVERED PANEL STRUCTURE

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**LOUVERED PANEL STRUCTURE**

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This invention relates to louvered panels, and more particularly to the structure and arrangement of louvered panels made from sheet metal or the like, whereby the panels are reinforced and the louver openings are shielded to afford weather protection.

Material disclosed but not claimed herein constitutes the subject matter of my co-pending application, Serial No. 412,553, filed February 25, 1954, and entitled Method of Making Louvered Panels.

One of the objects of my invention is to provide a structure for louvered panels made integrally from single sheets of metal and which provide overlapping surfaces at the louver openings affording protection against the passage through such openings of driving rain, snow, sleet and the like.

As another object my invention comprehends the provision of louvered panel structures embodying integral reinforcing ribs which add strength and rigidity to the panels.

My invention further has within its purview the provision of louvered panels which afford conservatism in both manufacturing cost and the use of metal without material detriment to either the rigidity of the panels or the weather protection provided at the louver openings.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the single sheet of drawings:

Fig. 1 is a front elevational view of a louvered panel structure embodying a preferred form of my invention;

Fig. 2 is a rear elevational view of the louvered panel shown in Fig. 1;

Fig. 3 is a fragmentary end sectional view taken substantially on a line 3—3 of Fig. 1, in the direction of the arrows, and drawn to a larger scale than Figs. 1 and 2 in order to illustrate details of the louvered panel structure; and

Figs. 4, 5 and 6 are end sectional views illustrating successive steps of the manufacture of the disclosed louvered panel structure in accordance with my preferred method.

The accompanying drawings depict a preferred embodiment of my invention for illustrative purposes and show my preferred method for the production of louvered panels in accordance with this invention. Figs. 1 and 2 show a louvered panel 10 of substantially rectangular shape, in which louvered panel a series of louvers 12 project from the front face of the panel sheet and are integrally formed from the metal, such as aluminum, of the sheet. The louvers 12 extend horizontally and are disposed in substantially parallel and vertically spaced relationship to one another. Each louver extends downwardly over an elongated louver opening 13. Since the metal which is forced from the panel sheet to provide a louver opening is forced outwardly from the front face of the sheet and curved downwardly, the vertical extent of the louver, particularly along the major portion of its

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length and between the ends, does not quite cover the lower portion of its louver opening. This normally leaves gaps between the lower edges of the louvers and the lower edges of the louver openings, as depicted at 14 in Fig. 4.

In my disclosed louver structure, the louver openings have substantially straight lower edges 15 and the louvers are substantially straight between their end portions, with those end portions 16 smoothly curved in both horizontal and vertical planes to their juncture with the coplanar intervening portions of the louver sheet. In the disclosed louvered panels, side margins 17 and 18, as well as top and bottom margins 19 and 20 respectively, provide substantially flat areas surrounding the louvers and in coplanar relationship to spacing portions 22 of the louver sheet which separate the louver openings.

In order to provide more adequate and effective weather protection than is afforded by the louvers alone at their respective louver openings, and because of the gap, such as 14, which is normally present between the lower edge of each louver and the lower edge of its louver opening in an integrally formed louver structure, it is desirable to cover the lower portion of the louver opening without unduly restricting that opening to an extent that the cover for the opening is in overlapping and spaced relationship to the lower portion of each louver. For this purpose, and to provide stiffening ribs for rigidifying the louvered panel without departing from the advantages of the integral formation of my louvered panel from a single metal sheet, I have provided horizontal folds 23 and 24 in spaced relationship and adjacent the lower edge of the louver opening, which folds extend across the louvered sheet and are in the nature of return bends and effect the provision of a stiffening rib 25 of triple thickness metal extending across the lower portion of each louver opening and overlapping the lower edge of the louver at that opening in spaced relationship thereto. In the disclosed structure, the louver fold 23 for each louver opening is substantially coincident with the lower edge 15 of the louver opening, although it could be spaced somewhat therefrom. The other fold or return bend 24 for each louver opening is spaced sufficiently from the first mentioned fold 23 that the stiffening rib 25 of plural thickness metal which is provided for by the folds extends to a position somewhat above the lower edge of the adjacent louver. The upper extent of the folded stiffening rib 25 is limited to afford ample space above that rib for the passage of air through the louver opening. In order to provide a substantially flat face on the rear of the louver panel for mounting purposes, the metal of the louver sheet is formed at the fold so that the folds extend somewhat forwardly from the back surface of the sheet.

In the production of my disclosed louvered panels, my preferred method includes the piercing and formation of a substantially flat metal sheet to provide the formed louvers, as shown in Fig. 4, with greater space intervening between the louver openings 13 than is desired in the finished louvered panel. The number of louvers and the sizes of the louver openings is, of course, selected along with the size of the desired louvered panel. Furthermore, the initial spacing between the louvers is selected to provide for the double fold of the rib 25 which extends to a position above the lower edge of the adjacent louver, and also to provide for the desired spacing between the louvered openings of the finished panel.

After the formation of the louvers, as depicted in Fig. 4, the sheet is bent along the lines of the folds, as shown in Fig. 5, to establish the positions of the folds. Then the folds are completed to the extent that the adjacent layers of metal are juxtaposed, and the metal of the sheet is formed to the extent that the back surface is substan-

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tially flat and the folded portions extend forwardly therefrom. If desired to afford added stiffness, the folded ribs may be spot-welded at spaced positions so that the layers of the rib are bonded together.

From the foregoing description and reference to the accompanying drawings, it may be readily appreciated that I have developed an integrally formed louvered panel which not only provides for good ventilation, but also affords effective weather protection. In addition, this integrally formed louvered panel embodies stiffening ribs of plural thickness metal which rigidify the structure to the extent that metal may be conserved in the panel overall because it can be made from metal considerably thinner than that which would afford the same rigidity without the stiffening ribs. Furthermore, my invention comprehends the provision of a feasible and efficient method for producing louvered panels of the disclosed type in a series of steps which can be accomplished by machine operations and in large quantities.

Although my invention has been described in connection with specific details of the embodiments thereof, it must be understood that it is not intended to be limited thereto except insofar as set forth in the accompanying claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A louvered panel comprising, in combination, a metal sheet having a louver integrally formed therein and projecting from one surface of the sheet at the upper edge of a louver opening to provide a cover for the opening, said opening in the sheet also having a lower edge, and said sheet having reversely bent substantially 180 degree folds therein adjacent the lower edge of the opening and one of which extends across the sheet in substantially parallel relationship to said lower edge, said folds being spaced from one another in a direction perpendicular to said lower edge and said one of the reverse folds being spaced from said lower edge more than the other and less than the height of the opening, and the spaces between the folds, the directions of the folds and the spacing of said one fold from said lower edge providing folds at and above said lower edge of the opening, so that a strip of plural thickness metal narrower than the louver opening extends upwardly of the opening and longitudinally across the lower portion thereof in overlapping and spaced relationship to the louver.

2. A louvered panel as defined in claim 1, and wherein one of said folds is substantially coincident with the lower edge of the louver opening.

3. A louvered panel as defined in claim 1, and wherein said strip of plural thickness metal is in the general plane of the metal sheet.

4. A louvered panel as defined in claim 1, and wherein said louver covers over half of the upper part of said opening and said strip of plural thickness metal extends upwardly to cover less than the lower half of said opening.

5. A louvered panel comprising, in combination, a metal sheet with an elongated louver opening therein having elongated upper and lower edges in opposed relationship and with an integral louver projecting from one face of the sheet and extending over a major portion of the opening from the upper elongated edge of the opening, and said sheet having a plurality of opposed return bent folds therein, one of which is adjacent the lower edge of the opening and the other of which extends across the sheet in parallel relationship to said lower edge and is spaced therefrom less than the height of the louver opening in a direction lateral to the elongation of the

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opening, said folds having directions and being spaced to provide an integrally formed metal strip extending upwardly from said lower edge and partially across the lower portion of said opening to an extent such that said louver and said strip overlap in spaced relationship to one another.

6. A louvered panel as defined in claim 5, and wherein the metal of the sheet is doubled upon itself between said folds so that said strip is of plural thickness metal and provides a reinforcement for the sheet at the louver opening.

7. A louvered panel as defined in claim 5, and wherein the metal of said sheet is doubled upon itself between said folds and overlaps the metal at opposite ends of the elongated opening so that said strip is constituted of double thickness metal at the lower portion of the louver opening and triple thickness metal at the ends of the opening.

8. A louvered panel comprising, in combination, a relatively thin sheet of material with an elongated opening therein which has elongated upper and lower edges in opposed relationship, a louver projecting from one face of the sheet at the upper edge of the opening and extending downwardly over a major portion of the opening, and a strip of folded metal which is an integral part of said sheet extending upwardly partially across the opening from the lower elongated edge, and said louver and strip overlapping in spaced relationship.

9. A louvered panel comprising, in combination, a metal sheet having a plurality of elongated louver openings therein in spaced and substantially parallel relationship, louvers projecting from one face of the sheet and covering the major upper portions of the openings from one elongated edge of each opening, and means comprising a plurality of substantially parallel folds integrally formed in the sheet and substantially parallel to one elongated edge of each opening for covering the lower portions of the louver openings along the other elongated edges to an extent to overlap the louvers in spaced relationship thereto.

10. A louvered panel as defined in claim 9, and wherein said means provides double thickness metal reinforcing strips extending across the sheet in the direction of elongation of the louver openings and adjacent the said other edges of the louver openings.

11. A louvered panel comprising, in combination, a relatively thin sheet of material with an elongated opening therein which has elongated upper and lower edges in opposed relationship, a louver projecting from one face of the sheet at the upper edge of the opening and extending downwardly over a major portion of the opening, and a strip of folded metal which is an integral part of said sheet extending partially across the opening from the lower elongated edge, said louver and strip overlapping in spaced relationship and said strip extending upwardly across less than half of the opening.

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