

Oct. 12, 1937.

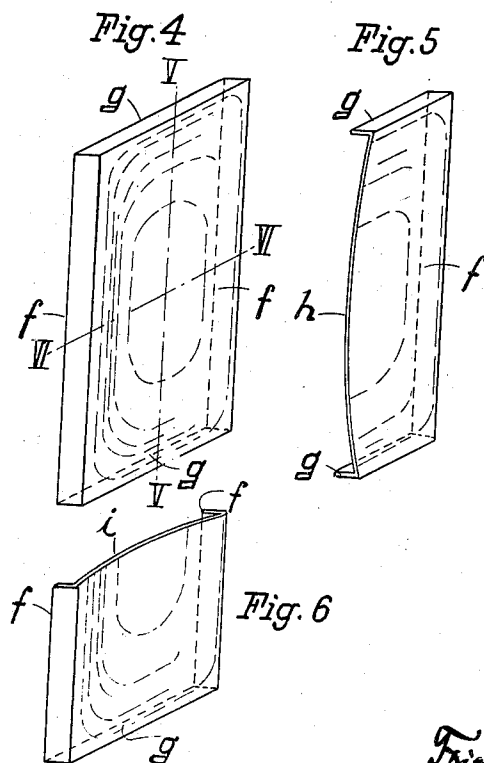
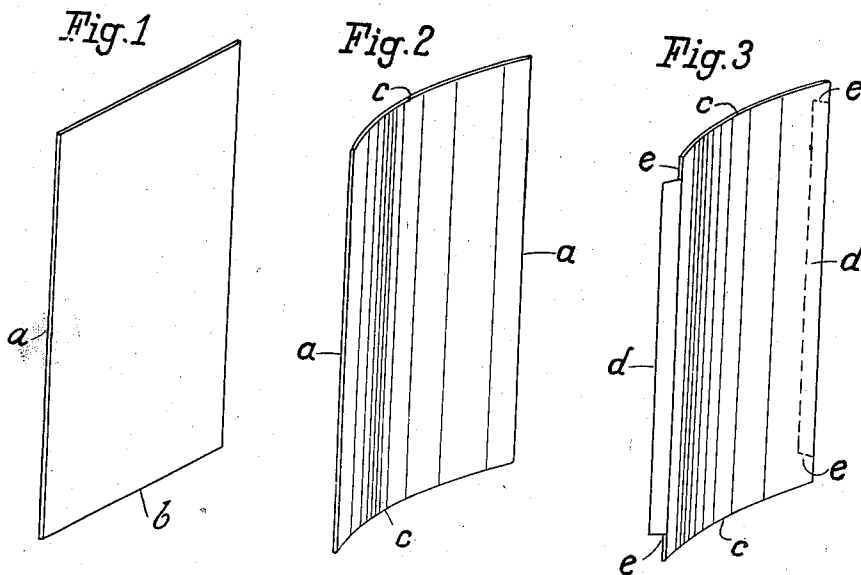
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2,095,533

METHOD OF PRODUCING ARCHED METAL PANELS

Filed Aug. 1, 1936

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

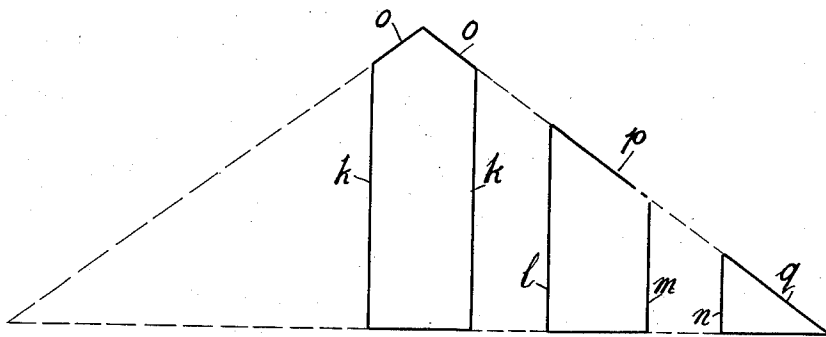


Fig.7

Fig.8

Fig.9

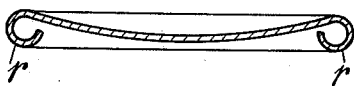


Fig.10

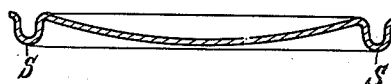


Fig.11

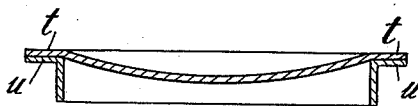


Fig.12

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UNITED STATES PATENT OFFICE

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METHOD OF PRODUCING ARCHED METAL PANELS

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Application August 1, 1936, Serial No. 93,838
In Germany August 7, 1935

1 Claim. (Cl. 153—3)

This invention relates to curved structural members, and more particularly to a method of producing trough-shaped thin plate panels such as are used, for example, as the wall forming elements of metallic wall structures.

It is an object of the present invention to provide for a considerable reduction in the costs of production of trough-shaped metal panels, in particular, by producing trough-shaped metal panels of any desired size and configuration by means of one and the same apparatus or set of apparatus.

Other objects, and the manner in which the same are attained, will appear from the following description.

As is well known to those skilled in the art, trough-shaped metal panels and more especially thin plate panels, are used as wall forming elements in buildings and other structures, such elements being usually provided in the form of angular panels having edges situated in one plane, the surface enclosed by the edges being slightly arched. Hitherto panels of the kind aforesaid were shaped on huge hydraulic presses by means of suitable stamping tools. This, however, involves the drawback that such machinery is very expensive, particularly so where panels of various dimensions are to be produced, since in this case each shape or size requires a particular tool to be inserted in the press; likewise, the use of hydraulic presses and the like in the production of such metal panels is rendered uneconomical, where the expensive press is not utilized continuously in the production of such panels.

In order to eliminate these drawbacks, the invention contemplates the production of thin, slightly trough-shaped panels of any desired shape and size by means of simple apparatus, which can be made and operated at greatly reduced costs in comparison with a hydraulic press. More particularly the invention eliminates the separate tools hitherto required for each shape and size, by providing for the production of panels having any desired size or configuration on one and the same kind or set of apparatus.

According to the present invention, the plane sheet metal panels, on having been cut to size, are first arched cylindrically or conically on a bending machine in a manner such that a considerably greater curvature is obtained than the finished workpiece is intended to ultimately possess. The sheet metal thus arched is now first turned down as broadly as desired on the sides

extending in parallel to the axis of the curvature.

Thereafter the other side edges of the sheet metal plate, while being still arched, are transformed into a straight form and are then turned down in such a manner that the bending edges are situated in the plane of the bending edges of the first turned-down edges. Thus the surface located intermediate the turned-down edges is formed with a trough-shaped arch, the depth of which is less than that of the trough first obtained, and which is curved, in all sections parallel to the edges. Thus even with rectangular panels, where the length is a multiple of the width, the sectional lines parallel to the longitudinal sides also display a pure arch shape, i. e. the trough-shape constitutes a surface, which is curved in space toward all sides.

In the drawings affixed to this specification and forming part thereof several embodiments of the invention are shown diagrammatically by way of example.

In the drawings,

Fig. 1 is a perspective view of a plane rectangular sheet metal panel;

Fig. 2 is a similar view of a cylindrically arched sheet metal panel;

Fig. 3 is a perspective view of a curved panel provided with bent longitudinal edges;

Fig. 4 is a similar view of a finished arched panel having turned-down edges on both the longitudinal and the transverse sides;

Fig. 5 is a perspective view of the right half of Fig. 4, while

Fig. 6 is a similar view of the lower half of Fig. 4;

Figs. 7, 8, and 9 are front elevations showing several forms of sheet metal panels obtained according to the invention as used in the slating of a house gable;

Figs. 10, 11, and 12 are cross-sectional views of panels obtained according to the invention, which are formed with differently modified side edges.

Referring to the drawings, Fig. 1 shows the plane sheet metal panel cut to size as used in the subsequent bending and edging operations, having a longitudinal edge *a* and a transverse edge *b*. This panel is treated on a bending machine or the like, where it is cylindrically arched as shown in Fig. 2. In the bending operation the longitudinal boundaries *a* of the panel are kept straight, while the transverse boundaries *c* are curved, the degree of curvature being considerably greater than that which the finished workpiece is intended to possess.

In the further development of the method according to the invention, as illustrated in Fig. 3, rectangular edges d are turned down on the longitudinal sides of the arched panel, while the transverse sides c still possess their curved shape. The ends of the bent edges d are formed with recesses e , the length of which in the direction of the axis of curvature is chosen corresponding to the height of those edges, which shall be turned down on the transverse sides. Thereafter, as shown in Fig. 4, the transverse side edges are transformed from the curved into a straight shape and are then turned down in a manner such that the finished panel is provided with the bent edges f and g .

In order to demonstrate the flat curvature of the finished panel, Fig. 4 is first sectioned along the lines V—V, the right half thus obtained being shown in Fig. 5, where h illustrates the flat longitudinal curvature. A further section is taken along lines VI—VI in Fig. 4, Fig. 6 illustrating the lower half of Fig. 4 thus obtained, the transverse sectional line i likewise displaying a flat curvature.

In order to demonstrate the manifold shapes of the panels obtained according to the present invention with one and the same set of machinery, Figs. 7, 8, and 9 show sheet metal panels employed in the slating of a house gable, where they extend longitudinally at various lengths k , l , m , n , having upper side edges o , p , q , of various configurations.

Instead of simply turning down the panel edges, I may provide also other types of reinforcing edges. Fig. 10 illustrates a panel according to the invention, in which the side edges r are flanged to spiral section in the manner shown in Fig. 10. Fig. 11 shows another embodiment of the invention, wherein the edges are formed to V-section, e. g. by beading, as indicated at s , while Fig. 12 illustrates the connection, of the pressed edges t , to the rigid frame u , which may be formed of T-iron.

A trough-shaped sheet metal panel obtained according to the present invention can subsequently be formed with indentations wherever desired, e. g. for the purpose of attaching to the panel all kinds of accessories, such as pipe passages, plugs, switches, lamp arms, basin supports, radiators and the like, or with doors for attaching the door hinges, locks, fittings and the like, while the basic form of a trough uniformly arched toward the center of the sheet metal panel is always maintained.

With the method according to the present invention numerous advantages are obtained. The use of large hydraulic presses for stamping the trough-shaped panels is eliminated. The exchange of separate tools for every size or shape of the panels is dispensed with. Instead, the trough-shaped metal panels can be produced in a simple sequence of steps and the first costs are far inferior to those arising in the old process.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

I claim:—

The method of producing trough-shaped slightly arched thin sheet metal panels, which are particularly adapted for use as wall forming elements in building structures, comprising the steps of bending a plane panel into a curved shape, the curvature of which is substantially greater than that which the finished workpiece is intended to possess, stiffening the edge portions of the panel extending parallel to the axis of said curvature, straightening out the other side edges of the trough-shaped body thus obtained, and reinforcing the same in a similar manner, so that the boundaries of the finished trough-shaped panel are situated in one plane.

FRIEDRICH SCHMIDT.