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BUILDING CONSTRUCTION PANEL

Richard F. Herr, Warren, Ohio

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6 Claims. (Cl. 189—34)

This invention relates to building construction panels of a hollow insulating metallic type particularly adapted for use in the formation of sheet metal walls, floors, doors and similar structures.

The principal object of the invention is to provide a light weight structure of considerable strength and relatively high insulating value particularly as to direct conductivity.

A further object of the invention is to provide a structure of pleasing appearance which is capable of formation by simplified production methods which results in economies in production costs.

A further object of the invention is to provide a sheet metal wall construction adapted to retain a loosely formed insulating filler in a manner that will prevent the filler from becoming packed in any localized area of the particular construction.

In the formation of sheet metal doors, partitions, walls, floors, and roof panels it has been common practice to provide a pair of parallel sheet metal surface pieces of desired size and shape, and various shaped metallic members positioned between these surface pieces at various intervals and welded thereto through various methods so as to form a panel unit. The present invention relates to an improved form of such structures.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a perspective view of a building construction panel formed in accordance with the invention.

Figure 2 is a view partially in section and partially schematic illustrating a method of welding a portion of the panel.

Figure 3 is a view partly in section and partly schematic showing the method of welding the assembled parts of the panel.

Figure 4 is a cross sectional elevation of a panel showing the use of insulating material positioned in the hollow spaces therein.

By referring to the drawing and Figure 1 in particular it will be seen that a skin stressed

building construction panel formed of a few simple elements has been disclosed which panel is light in weight, possesses great strength, and affords a high degree of insulating value due to extremely limited direct metal to metal contact and the resulting inability of the panel to conduct heat. As shown in Figure 1, a wall, floor, or roof panel is disclosed comprising surface pieces 10 and 11, respectively, having a plurality of sheet metal members 12 and 13, respectively, positioned therebetween in a manner so that the sheet metal members 12 cross the sheet metal members 13 at approximately right angles to one another, thus forming a strong and rigid supporting structure for the surface pieces 10 and 11 which are shown in Figure 1 as being of rectangular shape. The structure resulting comprises a panel of more or less conventional size which would be four feet wide, eight feet long, and four inches thick. In forming the panel illustrated in Figure 1 it is necessary to affix the sheet metal members 12 and 13, respectively, to the respective surface pieces 10 and 11 prior to assembling the surface pieces and the sheet metal members in opposite relation to one another to form the structure disclosed. In order to do this each of the surface pieces 10 and 11 has affixed to one side thereof the longitudinal or transversely positioned sheet metal members 12 or 13 which are located and positioned by means of mandrels or other suitable structures and so held during a subsequent welding operation which securely affixes the sheet metal members 12 and 13 to the surface pieces 10 and 11.

By referring to Figure 2 of the drawing the method of assembling the transverse or longitudinal sheet metal members to the surface pieces is illustrated wherein the parts are secured together through the use of a plurality of electrodes 14 and 15 positioned above and below the assembled parts and connected by suitable leads 16 and 17 to the secondary 18 of a welding transformer 19. The primary circuit 20 of the transformer 19 may obviously be controlled by devices known to the art which will provide the equipment with rapid, controllable, effective welding impulses of large current and short duration. Thus it is possible to effect a plurality of welds at one and the same time.

By referring to Figure 2 of the drawing it will be seen that each of the sheet metal members 12 and 13 is provided at various points along an edge thereof with a plurality of projections 21 which are preferably formed thereon by devices adapted to exert pressure in a localized area

along the edge so as to distort the metal and cause a projection to be formed on the edge thereof. It will be understood by those skilled in the art that in order that the individual sheet metal members 12 or 13 may not become bowed it will be necessary to distort the metal at intervals along the opposite edge of each member as indicated by the numeral 22 so as to provide for a uniform expansion due to the distortion of the edges of the member. In forming a panel according to this invention the sheet metal members 12 or 13 are welded through the projections 21 heretofore described to the surface pieces 10 and 11 with the result that prior to assembly the panel comprises two surface pieces; one provided with a plurality of longitudinally positioned sheet metal members and the other provided with a plurality of transversely positioned sheet metal members. These two portions of the completed structure are subsequently brought together in assembled relation as shown in Figures 1 and 3 wherein the transversely positioned sheet metal members 13 cross the longitudinally positioned sheet metal members 12 at right angles to one another. By referring now to Figure 3 of the drawing it will be observed that these two portions of the completed structure are secured together by the use of a plurality of electrodes 23 and 24 positioned above and below the assembled parts and connected by suitable leads 25 and 26 to the secondary 27 of a welding transformer 28. The primary circuit 29 of the transformer 28 may obviously be controlled by devices known to the art which will provide the equipment with rapid, controllable, effective welding impulses of large current and short duration. Thus it is possible to effect a plurality of welds at one and the same time. In this assembled position suitable welding currents are directed by suitable means through the assembled panel so that welding occurs at the junction of each of the crossing sheet metal members 12 and 13 thus firmly uniting the opposite surface pieces 10 and 11 to one another through the said sheet metal members 12 and 13.

It will be observed that the resulting panel possesses unusual rigidity and strength, at the same time being light in weight, and further that the construction results in a minimum number of direct metal to metal contacts between the surface pieces 10 and 11, respectively, and that such metal to metal contacts are of such limited area that there is little if any heat conduction possible through the panel.

By referring to Figure 4 of the drawing it will be seen that the spacing of these members provides uniform hollow sections throughout the structure in either or both of which suitable insulating material such as rock wool may be readily positioned and retained as, for example, at such time as the panel is used as a vertically positioned wall panel an insulation filler 30 is preferably positioned so as to rest upon the transversely positioned metallic members 13 which will prevent the insulation from shifting to the bottom of the panel and becoming packed therein which would obviously interfere with the insulating qualities of the complete panel.

Modifications in assembling the panel are obviously possible. For example, the sheet metal members 12 and 13 may be assembled in crossed relation to one another between the surface pieces 10 and 11 and retained in that position by suitable mandrels or other structures while electrodes are brought to bear against the surface pieces 10 and 11 and welding currents passed through the

complete structure thus welding the sheet metal members 12 and 13 to one another at their points of crossing and along their opposite edges to the surface pieces 10 and 11 in a single assembling operation. A further modification could obviously comprise the assembling of the sheet metal members 12 and 13 in crossed relation to each other and welding them in that position at their points of contact and subsequently positioning the assembly of welded sheet metal members 12 and 13 between the surface pieces 10 and 11 and welding the same thereto as hereinbefore described.

Modifications in the structural details of the building construction panel herein disclosed are obviously possible. Such modifications would comprise, for example, the positioning of the transverse and longitudinal sheet metal members at angles other than as shown as, for example, the panel might be constructed with these members running diagonally in relation to the surface pieces rather than transversely and longitudinally as illustrated.

A further modification might be made in forming the building construction panel with interposed sheet metal members of undulating form which panel could be more easily formed as the sheet metal members in undulating form would not require the use of mandrels positioned between the same during the assembling and welding operations. Sheet metal members of undulating form would insure their proper positioning during the assembling operation as they would be self-supporting.

What I claim is:

1. As an article of manufacture a metallic panel comprising exterior sheets of metal forming faces of the panel spaced apart and secured together through a dual assembly of spacing strips, each of said assemblies comprising a plurality of vertically disposed spacing strips affixed to one of the exterior sheets of metal and positioned on a different plane and at an angle to the axis of the spacing strips of the other assembly so that the spacing strips affixed to one exterior sheet cross the spacing strips affixed to the other exterior sheet, the said spacing strips affixed to each other at the points where the said strips touch so that metallic contact between the assemblies of spacing strips exists only at the points between the edges of the strips.

2. As an article of manufacture a metallic panel comprising exterior sheets of metal forming faces of the panel spaced apart and secured together through a dual assembly of spacing strips, each of said assemblies comprising a plurality of vertically disposed spacing strips positioned at right angles to the axis of and out of plane with respect to the said spacing strips of the other assembly so that the spacing strips affixed to one exterior sheet cross the spacing strips affixed to the other exterior sheet, the spacing strips of each assembly being secured at one of their edges to an exterior sheet and secured to each other at the points where the said strips touch one another so that metallic contact between the assemblies of spacing strips exists only at the points between the edges of the strips.

3. As an article of manufacture a metallic panel comprising exterior sheets of metal forming faces of the panel spaced apart and secured together through an assembly of vertically disposed spacing strips, each of said assemblies comprising a plurality of spacing strips of undulating form affixed to one of the exterior sheets

of metal and positioned at an angle to the axis of and out of plane with respect to the spacing strips of the other assembly so that the spacing strips affixed to one exterior sheet cross the spacing strips affixed to the other exterior sheet, the said spacing strips secured together at the points where they touch one another so that metallic contact between the assemblies of spacing strips exists only at the points between the edges of the strips.

4. As an article of manufacture a metallic panel comprising an assembly of two parts each of which comprises a sub-assembly of a surface sheet and a plurality of similarly aligned, vertically positioned spacing strips secured at their edges thereto, the spacing strips of one sub-assembly being positioned at an angle to the axis of and out of plane with respect to the spacing strips of the other sub-assembly so that the spacing strips of one sub-assembly cross the spacing strips of the other sub-assembly, the said spacing strips being secured to each other at the points where the said strips cross one another so that metallic contact between the spacing

strips of the sub-assemblies exists only at the points between the edges of the strips.

5. A metallic floor structure comprising two series of vertically disposed strip sections, the sections of one series being disposed above and at an angle to the sections of the other series and affixed to each other at the points where the said sections cross, surface sheets affixed to the upper and lower surfaces of said assembled sections so as to form a floor structure having metallic contact between the strip sections thereof only at the points between the edges of the strips.

6. A metallic wall structure comprising two series of vertically disposed strip sections, the sections of one series being disposed beside, out of plane with and at an angle to the sections of the other series and affixed to each other at the points where the said sections cross, surface sheets affixed to the exterior surfaces of the said assembled sections so as to form a wall structure having metallic contact between the strip sections thereof only at the points between the edges of the strips.

RICHARD F. HERR.