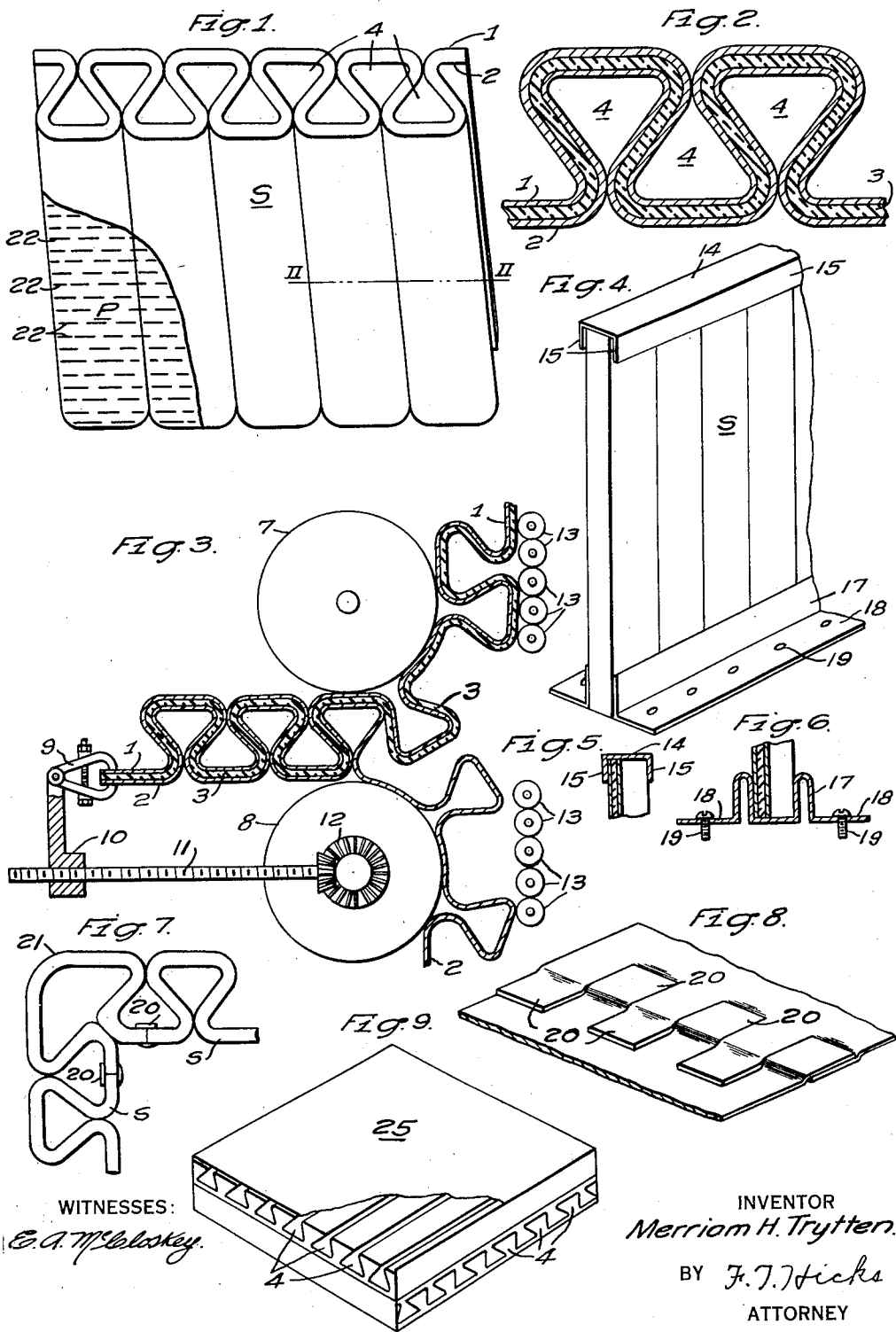


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FOLDED METAL SECTION

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5 Claims. (Cl. 189—34)

My invention pertains to folded sheet metal sections for construction and building purposes and methods of assembling and mounting the same. The method of and apparatus for fabricating my sheet metal sections are claimed in my copending patent application Serial No. 27,392, filed June 19, 1935.

Many of the characteristics of sheet metal are very desirable for various kinds of construction work and particularly for building since it is fire-proof, rigid, and capable of being worked into suitable elements by automatic machinery at the factory for rapid erection at the site of construction. Furthermore, sheet metal may be assembled into sections which are relatively light and thin.

By contrast the usual building materials must be laboriously assembled by hand at the site of building. Furthermore, the conventional building materials are so heavy and bulky that the walls and partitions of buildings are usually very thick thereby wasting a large portion of the space within the building limits, and adding greatly to the weight of the building. This necessitates still thicker walls and supports in the lower floors to support the great weight of the upper floors.

It is accordingly an object of my invention to provide unitary, light, rigid, insulating sheet metal sections suitable for construction and building.

A further object of my invention is to provide folded sheet metal wall or partition units having improved heat and acoustic insulating properties.

It is also an object of my invention to provide sheet metal sections which are rigid and light and which may be conveniently assembled and mounted as unitary elements for quick erection to form the walls, partitions, ceilings and floor portions of buildings.

Another object of my invention is to provide construction or building units and sections which may be fabricated mechanically at a factory and conveniently erected and united at the building site.

In accordance with my invention I join a pair of resilient metal sheets in interlocking relation spaced apart by insulating material interposed therebetween whereby there is no direct metallic contact from one side of the panel to the other. The interlocking portions on the metallic sheets or plates comprise parallel dovetailed folds which provide closed air cells for insulation and which also serve as internal braces contributing to the stiffness and rigidity of the section in one direction. Suitable end plates and flanges are applied along the open edges of the panel to close the insulating air cells, also to hold the adjacent

metallic folds in alignment and stiffen the panel at right angles to the folds, and also to provide for convenient mounting.

The invention itself, however, both as to its organization and its method of construction, together with additional objects and advantages thereof, will best be understood from the following description of specific embodiments when read in conjunction with the accompanying drawing, in which:

Figure 1 is a perspective view showing a folded sheet metal section constructed in accordance with my invention;

Fig. 2 is a sectional view taken on line II—II;

Fig. 3 is a diagrammatic view illustrating the mechanical fabrication of a panel section;

Fig. 4 is a perspective view showing a completed metal section assembled with a top cap and a bottom flange for mounting;

Figs. 5 and 6 are detail views thereof;

Fig. 7 is a plan view showing how a pair of metal sections are joined at right angles as in the corner of a room;

Fig. 8 is a perspective view showing the union of sheets in adjacent sections; and

Fig. 9 is a perspective view showing how a very rigid panel or floor member may be created by uniting two of my metal sections with their grooves disposed at right angles.

Referring more specifically to Figs. 1 and 2 of the drawing, it will be seen that a folded sheet metal section constructed in accordance with my invention comprises a pair of metallic plates or sheets 1 and 2 with an insulating material 3 between them. To hold them in mutually interlocking relation, the plates, which are preferably of steel or some other metal having appreciable resilience, are reversely bent to provide parallel folds 4 alternately closing toward opposite sides, as shown. The folds are of substantially triangular cross-section with their side walls inclining together. When inter-folded, the resilience of the metal provides sufficient engagement, the triangular grooves dovetailing together and the resilience of the metal plates holding them in firm position.

The use of bolts, rivets, or other metallic fastening members, between the plates is thus avoided, and the plates constituting the opposite sides of the section may be effectively insulated from each other in accordance with the characteristics of the interposed insulating material. The plates or sheets used in assembling the section are first corrugated by reversely folding or bending, in any well known manner. An insulating material having the desired property of insulating thermally or acoustically or both, as the particular application may require, is applied, by adhesive material or simply folded in, to one surface of each plate either before or after corrugation. If

a sufficient thickness of the insulating material can be caused to adhere to one surface, it is only necessary to apply it to one of the plates of each pair. The assembled structure also provides

5 closed elongated air cells in the folds 4, as shown.

The heat insulating characteristics of a panel constructed in accordance with my invention depend very much upon the particular insulating material used, its thickness, and the porosity of

10 the material. For any arbitrary set of conditions, the superior thermal insulating characteristics of this structure may be readily demonstrated. The absence of direct metallic conductive connection between opposite sides of the panel also provides

15 a very favorable acoustic insulating property which is also desirable in a building structure. The coordination of a pair of folded plates into interlocking relation is best accomplished by bending the plates in opposite directions to open

20 the abutting edges of the corrugations, disposing the opened corrugations in juxtaposed relation and releasing the bending force to permit the associated portions to spring together in interlocking relation, as shown in Fig. 3.

25 Means suitable for conveniently carrying out the method of assembly is diagrammatically represented in Fig. 3, and comprises a pair of rollers 7 and 8 for simultaneously bending two plates 1 and 2 while drawing them in and forcing the corrugations 4 together. Roller guides 13 cause the

30 folded plates to approach the rolls angularly whereby they are caused to bend around the rolls as they approach. The rollers are driven by any suitable motive means (not shown). A tensioning force applied to draw out the joined edges of the plates facilitates the process of bending them and drawing them through the rollers to force

35 them together. Such a force may be applied by means of a clamp 9 connected to a threaded sleeve 10 which is driven by a threaded shaft 11 rotated simultaneously with the roller 8 through suitable

40 gearing 12 or other transmission means. As the plates are thus interlocked in firm gripping relation, by the resilient corrugations springing together, the insulating material on the surface of one or both plates is bound between them thereby holding them spaced and insulated.

The completed section S is provided with a cap plate 14 extending along one of the open edges

50 with depending flanges 15 adjacent the side plates 1 and 2 of the section to which they may be secured in any suitable manner, as by welding. The other open edge of the section is also closed by a base plate 17 which may be provided with laterally extending portions 18 for attachment to

55 the floor by lag screws 19, or in any suitable manner for mounting the section as a wall or partition. The end plates stiffen the assembled structure and completely close the elongated air cells in the folds 4.

When two sections are to be jointed, the edges of the sheets are cut at regular intervals and bent alternately in and out to provide tongues 20

60 which interlock, as shown in Fig. 8. The outer sheets would likewise interlock and may be further secured as by welding.

When a pair of metal sections S are to be joined at right angles, as in the corner of a room, a special corner section 21 is joined to the panels in the manner described.

70 To support plaster on the partitions, the metal plates or sheets 1 and 2 may be provided with

perforations 22 similar to metal lath, as shown on the portion P of Fig. 1. In some cases, it is desirable to provide additional metallic sheets of metal lath outside of the folded plates 1 and 2 to provide a more rigid assembly and these may be spot welded in place in the well known manner.

The depth and proportions of the corrugations 4 are selected in accordance with the characteristics desired. The corrugations may be made quite shallow to make a thin partition, providing they are of sufficient depth to lock two plates together, or they may be made deep to increase the rigidity of the section.

When a very rigid member or floor element is required, this may be fabricated by uniting or spot welding two of the sections S together with their grooves 4 turned at right angles, as shown in Fig. 9. The various building elements and sections are preferably made in standard sizes and shapes which may be combined to accommodate the requirements of builders.

Although I have shown and described certain specific embodiments of my invention, I am fully aware that many modifications thereof are possible. My invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim as my invention:

1. A unitary metal building section comprising a pair of plates having resilient self-closing folds disposed in parallel interlocking relation to form closed air cells and hold the plates together as a rigid self-supporting element with the side walls of said folds also serving as internal braces to stiffen the sections and insulating material disposed between said plates.

2. The combination in a building of unitary sheet metal sections comprising pairs of steel plates having resilient self-closing folds disposed in parallel interlocking relation to hold the plates together as rigid supporting elements, and insulating material disposed between said plates.

3. A sheet metal building unit comprising a pair of resilient sheet metal plates bent in parallel self-closing folds to resiliently interlock the plates together in a rigid self supporting structure enclosing air cells, a layer of insulating material between said interlocking plates, and end closure members secured across the open ends of said folds, to close said air cells and stiffen the unit, and facilitate mounting.

4. A sheet metal building unit comprising a plate of resilient sheet metal bent in parallel self-closing folds to provide closed dead air cells having side walls which serve as braces to stiffen the section in planes parallel to said folds, a layer of insulating material on a surface of said plate, and end closure members secured across the open ends of said folds to close said air cells and stiffen the section in planes perpendicular to said folds, and facilitate mounting.

5. A rigid metal building unit comprising a pair of plates having resilient self closing folds disposed in parallel interlocking relation to form elongated closed air cells having outwardly exposed adjacent side wall portions in substantially aligned relation for defining wall surfaces, material supporting means on said outwardly exposed portions, and insulating material between said plates.

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