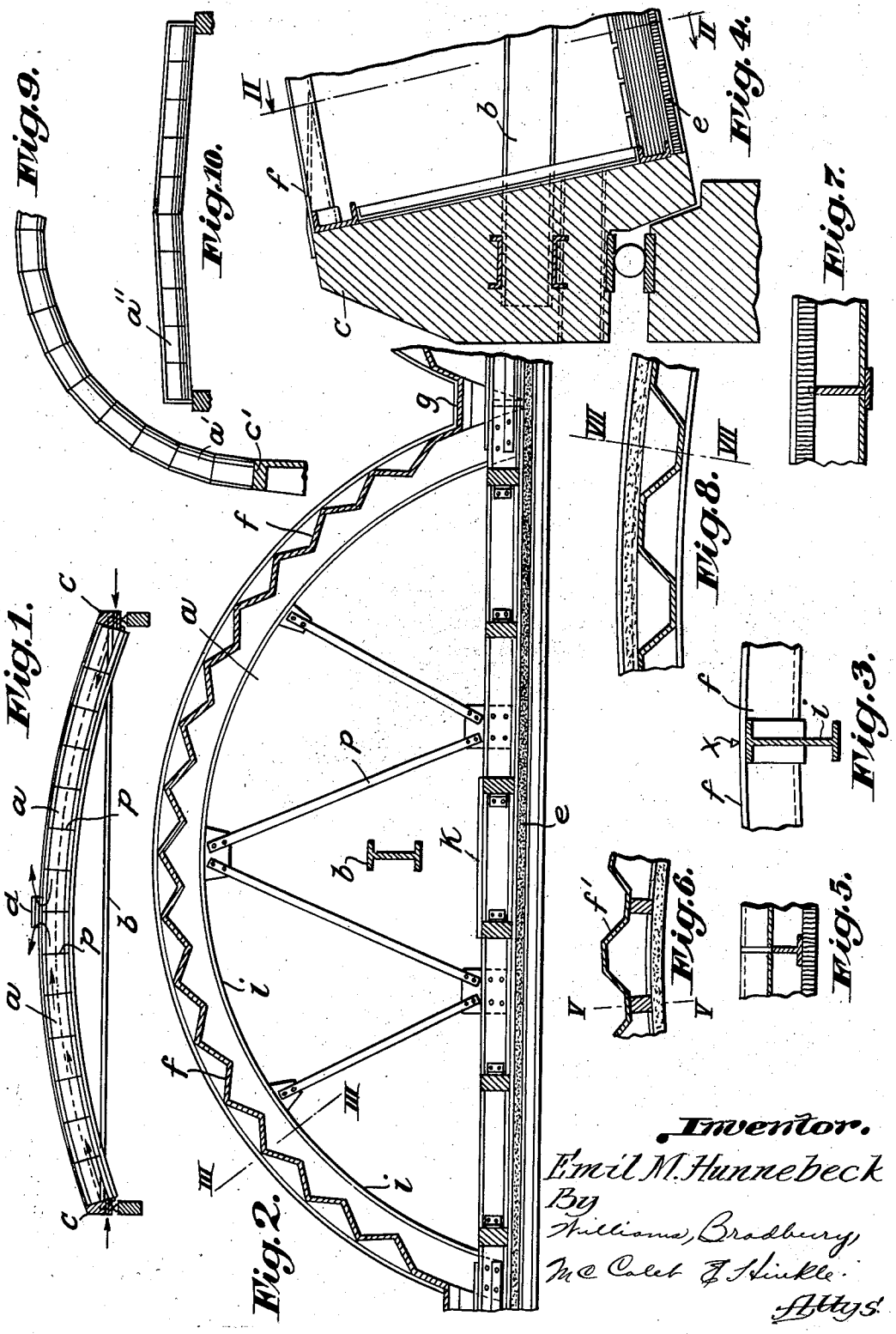
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SPACE-CLOSING SUPPORTING STRUCTURE

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SPACE-CLOSING SUPPORTING STRUCTURE

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The present invention relates to space-closing supporting structures for sheds or the like and more particularly refers to structures consisting of hollow bodies of sheet metal arranged side by side.

Heretofore various proposals have been made which involved the use of the space-closing elements of the roof in the dual capacity as space-closing elements and supporting members. These proposals were all based on the idea that with the above construction, struts, supports and the like could be done away with, thus reducing the weight.

However, with all of the known forms of construction, none of them provided for the particular requirements which accompany the use of sheet metal, in particular iron sheets. The reasons for this may be that up to the present time it was believed that metal sheets alone are not adapted to bridge great spans.

According to my invention it is possible to employ juxtapositioned hollow bodies consisting of a very light weight sheet metal as space-closing supporting structures for bridging the greatest spans.

An object of my invention is to provide a space-closing supporting structure adapted to bridge large or small spans, by making the supporting structure take the form of vaulted arches curved transversely to the direction of the support. These arches consisting of corrugated sheets forming a self-supporting armouring. The sheets are provided with bracings in a direction transverse to the main supporting structure.

A further feature of my invention is that the hollow bodies, consisting of corrugated sheet metal, are closed at the lower side by fire-checking and heat-isolating surfaces. The hollow bodies may also be polygonally constructed and bridge the span in substantially a straight direction instead of in the form of an arch, thus acting as beams or girders.

Another feature of my invention is to be found in the fact that between the individual juxtapositioned hollow bodies, cross channels are provided which consist of sheet metal of such a thickness, as to assist in determining the rigidity of the form of supporting structure employed, and in particular to prevent lateral displacement of the hollow bodies.

Another feature of my invention lies in the fact that the arch-shaped hollow bodies are mounted on the rods, connected to the center of gravity of the bearings or abutments.

Another feature of the invention lies in the fact that the space between the fire-checking and heat-isolating surfaces supported from the hollow bodies are, according to my invention, provided with openings so that this space may be ventilated and controlled.

Other objects and advantages of my invention will appear from the following description, reference being made to the accompanying drawing.

Referring now to the drawing:

Fig. 1 shows diagrammatically the supporting structure according to my invention;

Fig. 2 shows a detail section taken on the line 2—2 of Fig. 4;

Fig. 3 is a cross sectional detail view taken on the line 3—3 of Fig. 2;

Fig. 4 shows in detail the left hand side of the supporting structure shown in Fig. 1;

Figs. 5 to 8 are longitudinal and cross sectional views respectively showing modifications of the supporting metal sheathing;

Fig. 9 shows a modification of Fig. 1;

Fig. 10 shows an additional modification of the structure shown in Figs. 1 and 9.

Referring to Fig. 1, the supporting structure according to this form of my invention takes the shape of a shallow vaulted arch, consisting of individual vaulted hollow bodies *a*, one of which is shown in cross section in Fig. 2. At the ends, the arch-shaped hollow bodies are provided with disc-like bearings *c*. In the center of the end portion *c* a tie rod *b* is secured, which takes up the tensile force. This is shown on a smaller scale in Fig. 1.

Referring to Fig. 2, the space-closing sheets *f*, which form a self-supporting armouring, are, according to this modification of the invention, in the form of zigzag-like, corrugations. The purpose of the corrugations is to save the supporting metal sheets from bending or minor bumps.

To maintain the shape of the hollow bodies *a*, bracings *p* are provided at predetermined distances from each other. As may be seen from Fig. 2 these bracings consist of latticework, but may, of course, be constructed in any other manner, for instance, a framework or even a disc. These bracings, however, are not to be confused with ordinary girders, forming the supporting structure proper, because in the construction according to the invention the bracings *b* do not at all serve as supporting structures, but as already indicated, only serve to warrant the shape of the hollow bodies.

Fig. 3 shows the manner in which the metal

sheets *f*, the abutting edges *x* which extend transversally to the direction of the span, are connected to each other. These sheets are mounted upon the upper flanges of a bent I-beam *i* and preferably welded thereto. This I-beam *i* simultaneously serves to connect the bracings *p*. A ceiling or covering *e*, consisting of fire-checking and heat-isolating material is suspended from the bracings. Above the ceiling *e*, a gangway *k* is provided, allowing one to inspect the interior of the hollow bodies and thereby control the condition of the sheets.

As is well-known, a serious drawback is encountered by employing the construction disclosed in the prior art, namely, that moisture may condense at the metal parts closing a space, which very soon leads to a corrosion of the metal. The heat isolating ceiling *e* of my invention, prevents the difference of temperature existing between the atmosphere and the interior of the space, covered by the supporting structure, leads to a condensation of moisture at the inner surface of the sheets *f*. As a further safeguard against condensation of moisture, openings (not shown) may be provided in the side walls of the hollow bodies, so that air may flow through these hollow bodies. In Fig. 1 the path of the air is indicated by arrows. The vertex of the hollow bodies carries a hood *d* through which air may escape.

The hollow body *a'*, shown in Fig. 9, has the shape of a steeper arch resting upon the support *c'*. Of course, with this modification tie rods *b* are not required.

Figure 10 shows a hollow body *a''* bridging the span in substantially a straight line and not in the form of an arch as disclosed in Figure 1. This hollow body *a''* acts as a girder and does not require a tie rod *b*.

The supporting structure according to the invention has many advantages. Spans of 150 meters and more may be bridged and the weight of the supporting structure is substantially smaller than that of any known construction. The metal sheets *f* not only have a great stability or rigidity, but also form good protection against incendiary bombs, consequently the supporting structure according to the invention is particularly well adapted for sheds or halls accommodating aeroplanes.

A further advantage of the invention consists in the fact, that the cover or ceiling *e* suspended from the supporting structure, protects the supporting structure against fire coming out from the interior of the roofed shed or hall.

The modified forms of my invention shown in Figs. 9 and 10 have the advantage that damage to the local parts of the supporting structure do not cause a collapse of the entire supporting structure.

What I claim is:

1. A space-closing supporting structure for buildings, comprising hollow bodies of sheet metal adapted to be supported on and extend between abutments, said bodies consisting of shallow arches curved transversely to the direction of support, said arches being constructed of corrugated metal sheets forming a self supporting armouring and being provided with bracings extending transversely to the direction of support, said metal sheets being corrugated in a transverse direction to the direction of support.

2. A space-closing supporting structure for buildings, comprising hollow bodies of corrugated sheet metal adapted to be supported on and extend between abutments, said bodies being curved transversely to the main supporting direction forming a self supporting armouring, said bodies being provided with bracings extending transversely to the direction of support and bridge the span in a substantially straight direction, said metal sheets being corrugated in a transverse direction to the direction of support.

3. A space-closing supporting structure for buildings, comprising hollow bodies of sheet metal adapted to be supported on and extend between abutments, said bodies consisting of shallow arches curved transversely to the direction of support, said arches being constructed of corrugated metal sheets provided with bracings extending transversely to the direction of support and covered at the lower side by fire checking and heat isolating surfaces, said metal sheets being corrugated in a transverse direction to the direction of support.

4. A space-closing supporting structure for buildings, comprising hollow bodies of corrugated sheet metal adapted to be supported on and extend between abutments, said bodies being curved transversely to the main supporting direction forming a self supporting armouring, said metal sheets being corrugated in a transverse direction to the direction of support, said bodies being provided with bracings extending transversely to the direction of support and bridge the span in a substantially straight direction, said hollow bodies being covered at the bottom by fire checking and heat isolating surfaces.

5. A space-closing supporting structure for buildings, comprising juxapositioned hollow bodies connected by cross channels formed of sheet metal, said hollow bodies being provided with bracings extending transversely to the direction of support and said hollow bodies being adapted to be supported on and extend between abutments, said bodies being corrugated in a transverse direction to the direction of support, said channel forming sheets being of such thickness that said sheets contribute in maintaining the shape of the supporting structure and prevent lateral displacement of said hollow bodies.

6. A space-closing supporting structure for buildings, comprising hollow bodies of sheet metal adapted to be supported on and extend between abutments, said bodies being provided with bracings extending transversely to the direction of support and consisting of shallow arches curved transversely to the direction of support, said arches being constructed of corrugated metal sheets closed at the lower side by fire checking and heat isolating surfaces, said metal sheets being corrugated in a transverse direction to the direction of support, the side walls of said bodies being provided with openings for connecting the space of the hollow bodies with the atmosphere.

7. A space-closing supporting structure for buildings, comprising hollow bodies of corrugated sheet metal adapted to be supported on and extend between abutments, said bodies being curved transversely to the main supporting direction forming a self supporting armouring, said bodies being provided with bracings extending transversely to the direction of support and bridge the span in a substantially straight direction, said metal sheets being corrugated in a transverse direction to the direction of support, the side walls of said bodies being provided with openings for connecting the space of the hollow bodies with the atmosphere.

8. A space-closing supporting structure for

buildings, comprising hollow bodies of sheet metal adapted to be supported on and extend between abutments, tie rods mounted at the ends of said hollow bodies above the bearings mounted at the top of said abutments and formed as rigid discs, said bodies consisting of shallow arches curved transversely to the direction of support, said arches being constructed of corrugated metal sheets forming a self supporting armouring, and being provided with bracings extending transversely to the direction of support, said metal sheets being corrugated in a transverse direction to the direction of support.

9. A space-closing supporting structure for buildings, comprising juxtapositioned hollow bodies of corrugated sheet metal connected by cross channels formed of sheet metal, said hollow bodies being provided with bracings extending transversely to the direction of support and said hollow bodies being adapted to be supported on and extend between abutments, said channel forming sheets being of such thickness that said sheets contribute in maintaining the shape of the supporting structure and prevent lateral displacement of said hollow bodies, said metal sheets being corrugated in a transverse direction to the direction of support.

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