Sept. 24, 1946. W. E. MACK 2,408,082

EXPANDED METAL LOAD BEARING STRUCTURE

Filed June 1, 1944

Fig. 1.

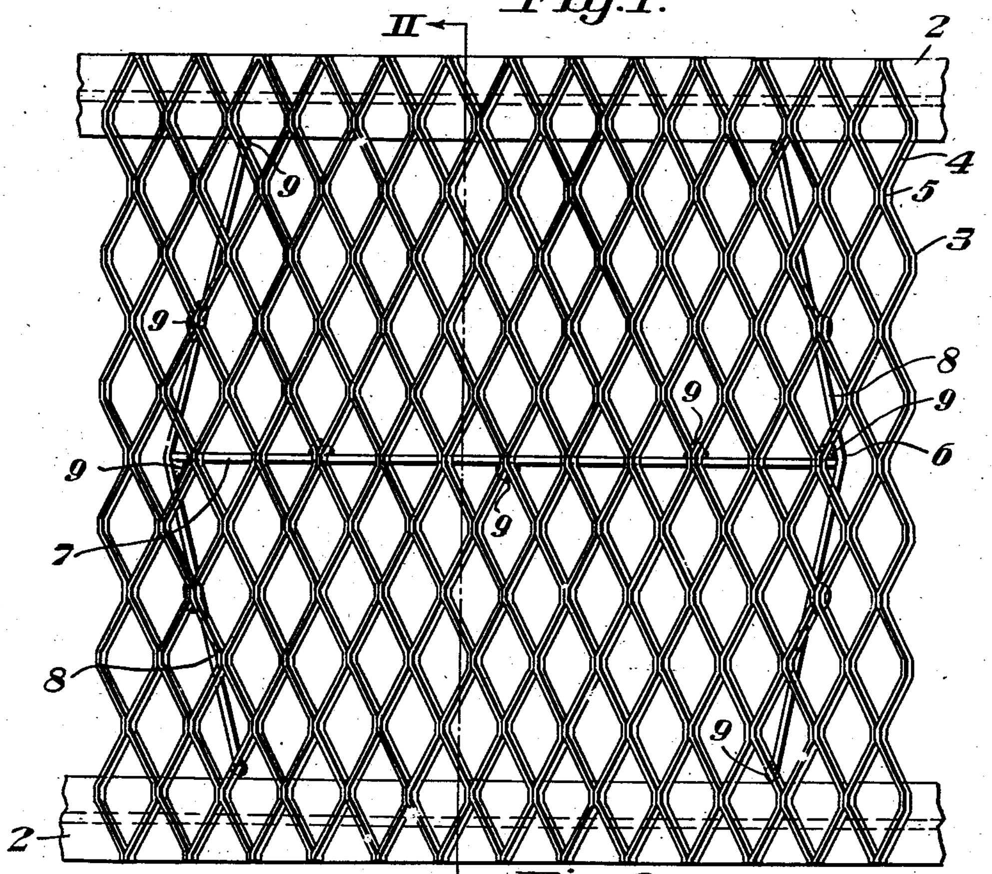


Fig. 2.

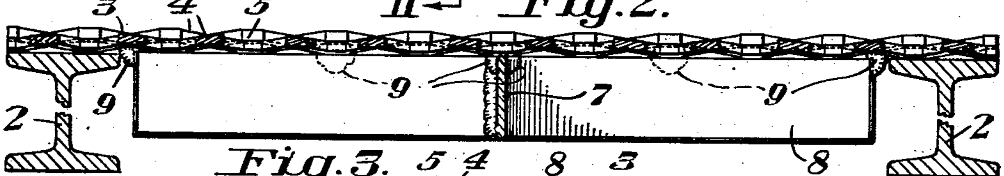


Fig. 3.

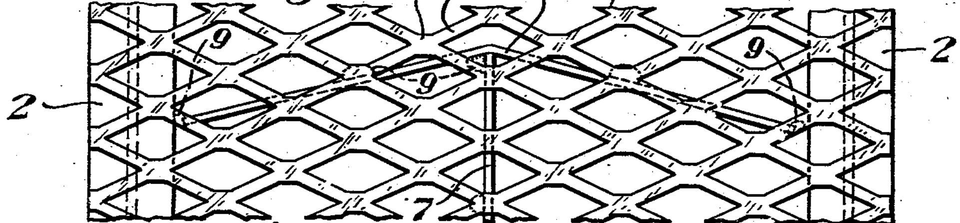
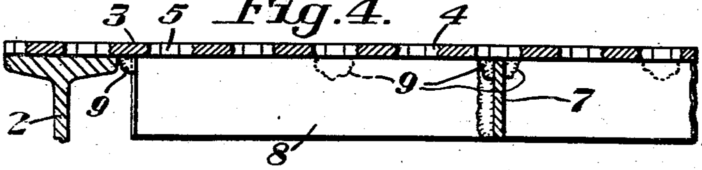


Fig. 4.



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EXPANDED METAL LOAD BEARING STRUCTURE

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12 Claims. (Cl. 189—82)

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This invention relates to expanded metal load bearing structures of the type employed as walkways and material supports comprising a sheet of expanded metal supported at two opposed edges with reinforcing means applied to the expanded metal between said edges. The invention has to do with the reinforcing which is applied to the expanded metal.

It has been proposed to provide a structure of the type above mentioned in which the expanded metal is reinforced between the supports by a series of parallel bars welded to the expanded metal and extending at right angles to the supports. In that structure no reinforcing is provided parallel to the supports. The transverse reinforcing bars have of necessity had to be positioned close together, which necessitates the employment of a considerable weight of material, resulting in a structure which is undesirably heavy for its load bearing characteristics and which requires a great amount of time and labor for its fabrication. Moreover, the closely spaced parallel transverse bars interfere with the passage of light through the structure, creating solid shadow from overhead light passing at an angle therethrough.

I have overcome the disadvantages of the prior structure by the provision of an expanded metal load bearing structure having superior load bearing characteristics for its weight, which effects an important saving in material, which can be fabricated at relatively low cost and with a substantial saving in time and labor and which has superior light transmitting characteristics.

I provide an expanded metal load bearing structure which comprises a sheet of expanded metal supported at two opposed edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising a portion extending generally parallel to said edges and a portion extending generally transversely of said edges. The generally transversely extending portion of the reinforcing means preferably is disposed so that its trace in the plane of the sheet extends non-parallel to a transverse row of bonds of the expanded metal. Preferably I employ generally transversely extending portions of the reinforcing means which are spaced along the structure and connected with the portion which extends generally parallel to the supported edges.

I preferably employ reinforcing means comprising a bar extending generally parallel to the supported edges of the expanded metal approximately equidistant therefrom and bars extending generally transversely of said edges and respectively connected with the ends of the first mentioned bar. The second mentioned bars are desirably non-parallel to a transverse row of bonds of the expanded metal.

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Due to the diamond pattern of expanded metal a concentrated load is distributed in fanlike manner along all strands entering the area of loading. A load applied to a sheet of expanded metal adjacent an unsupported edge causes relatively great deflection as compared with the deflection caused by a load applied at a point removed from the unsupported edge because many of the strands in the area of loading terminate at the unsupported edge of the sheet instead of over a support. Due to this peculiar characteristic of expanded metal I preferably arrange the generally transversely extending reinforcing portions or bars so that they cross at least one transverse row of bonds of the expanded metal. By providing transverse reinforcing bars which cross one or more transverse rows of bonds of the expanded metal I distribute the load with an increased portion on strands which terminate over the supports and thereby reduce deflection.

Other details, objects and advantages of the invention will become apparent as the following description of certain present preferred embodiments thereof proceeds.

In the accompanying drawing I have shown certain present preferred embodiments of the invention, in which

Figure 1 is a fragmentary plan view of an expanded metal load bearing structure;

Figure 2 is a vertical transverse cross-sectional view taken on the line II—II of Figure 1 but to enlarged scale;

Figure 3 is a fragmentary plan view of an expanded metal load bearing structure similar to that shown in Figure 1 but employing flattened expanded metal; and

Figure 4 is a fragmentary vertical transverse cross-sectional view similar to Figure 2 but of the form of structure shown in Figure 3.

Referring now more particularly to the drawing, the expanded metal load bearing structure shown therein is of the type which may be used as an overhead walkway in industrial plants or as a catwalk atop railway freight cars. The supporting structure consists of opposed parallel I-beams 2 upon which the expanded metal is supported at its edges. The expanded metal as shown in Figures 1 and 2 is designated generally by reference numeral 3 and is of conventional form consisting of strands 4 connected by bonds

5 to form the typical diamond pattern. The expanded metal is preferably laid upon the I-beams 2 with the long dimensions of the diamonds of the expanded metal extending transversely or approximately at right angles to vertical planes containing the axes of the I-beams. The expanded metal may be welded to the I-beams. A walkway is made up of a series of sheets of expanded metal laid substantially edge-to-edge along the I-beams.

Welded to the expanded metal 3 is reinforcing means designated generally by reference numeral 6. The reinforcing means is preferably welded to the under side of the expanded metal so as to leave the upper surface unobstructed. In the form of structure shown in Figures 1 and 2 the reinforcing means 6 comprises a bar 7 extending parallel to the I-beams 2 and equidistant therefrom and a pair of transverse bars 8 at opposite ends of the bar 7. The bars 7 and 8 are applied to the expanded metal by being welded to the under side thereof by suitable welds 9.

Each of the transverse bars 8 is of generally wide open V shape in plan as shown in Figure 1 and each of the ends of the bar 7 enters the V of one of the bars 8. Preferably the bars 7 and 8 are welded together so as to form in effect a unitary reinforcing structure. Each of the transverse bars 8 has each of its legs non-parallel to a transverse row of bonds of the expanded metal. Each of the legs crosses at least one transverse row of bonds and preferably more than one. In Figure 1 each of the legs of each transverse bar 8 crosses two transverse rows of bonds of the expanded metal.

The reinforcing structure just described may be applied to each of a series of sheets of expanded metal laid substantially edge-to-edge along the I-beams. In such case the longitudinal bar 7 of each such reinforcing structure is preferably made somewhat shorter than the dimension of the sheet of expanded metal to which it is applied in the direction parallel to the I-beams so that the transverse bars 8 are disposed in the vicinity of the unsupported edges of the sheet. When a load is imposed on a sheet adjacent an unsupported edge the reinforcing structure effectively distributes that load so as to minimize deflection. The transverse bar 8 adjacent the edge at which the load is applied distributes the load to strands of the expanded metal which terminate over the I-beams and to which the load would not as effectively be distributed if the bars 8 were not provided or if they extended parallel to the transverse rows of bonds of the expanded metal.

The structure shown in Figures 3 and 4 is identical with that of Figures 1 and 2 except that in Figures 3 and 4 the expanded metal is shown as having been flattened, that is, reduced to a truly planar sheet with the faces of the strands and bonds parallel to the plane of the sheet. In this structure the expanded metal lies flat against the I-beams and reinforcing bars and is in contact with the beams and bars over a considerably greater area of the expanded metal than when unflattened expanded metal is used as in Figures 1 and 2. Aside from this difference the structures are the same. Parts of the structure shown in Figures 3 and 4 corresponding to parts of the structure shown in Figures 1 and 2 are designated by the same reference numerals each with a prime affixed.

Thus I provide a superior expanded metal load bearing structure in that it has greater strength for the weight of metal employed than similar structures heretofore proposed, is relatively light in weight, effecting a substantial saving in metal, can be fabricated at relatively low cost and with a substantial time and labor saving and has superior light transmitting properties.

While I have shown and described certain present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges only and adapted to bear a load between said edges and unitary reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising a portion located substantially midway between said edges and extending generally parallel to said edges and portions extending generally transversely of said edges, each transverse portion being about one-half the length of the first-mentioned portion.

2. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges and adapted to bear a load between said edges and unitary reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising a portion located substantially midway between the edges and extending generally parallel to said edges and portions extending generally transversely of said edges but whose trace in the plane of the sheet is non-parallel to a transverse row of bonds of the expanded metal, each transverse portion being about one-half the length of the first-mentioned portion.

3. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges only and adapted to bear a load between said edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising a portion located substantially midway between said edges and extending generally parallel to said edges and portions spaced along the structure extending generally transversely of said edges and connected with the first mentioned portion, each transverse portion being about one-half the length of the first-mentioned portion.

4. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges only and adapted to bear a load between said edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising a bar extending generally parallel to said edges approximately equidistant therefrom and bars extending generally transversely of said edges and respectively connected with the ends of the first mentioned bar, the transverse bar, from its connection with the first-mentioned bar to the edge of the sheet being about one-half the length of the first-mentioned bar.

5. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges and adapted to bear a load between said edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising a bar extending generally parallel to said edges approximately equidistant therefrom and bars extending generally transversely of said edges and respectively

connected with the ends of the first mentioned bar, the second mentioned bars being disposed so that their traces in the plane of the sheet are non-parallel to transverse rows of bonds of the expanded metal, and from their connection with the first-mentioned bar to the edge of the sheet are about one-half the length of the first-mentioned bar.

6. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges only and disposed with the long dimensions of the diamonds transverse to said edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising bar means located substantially midway between said edges and extending generally parallel to said edges and bar means connected with the first mentioned bar means and extending generally transversely of said edges, the second-mentioned bar means from its connection with the first bar means to the edge of the sheet being about one-half the length of the first-mentioned bar means.

7. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges and disposed with the long dimensions of the diamonds transverse to said edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising bar means located substantially midway between the said edges and extending generally parallel to said edges and bar means connected with the first mentioned bar means and extending generally transversely of said edges, the second mentioned bar means crossing at least one transverse row of bonds of the expanded metal, and from its connection with the first-mentioned bar means to the edge of the sheet being about one-half the length of the first mentioned bar means.

8. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising bar means extending generally parallel to said edges and bar means extending generally transversely of said edges at an end of the first mentioned bar means, the second mentioned bar means extending from said end of the first mentioned bar means in the direction of the opposite end of the first mentioned bar means.

9. An expanded metal load bearing structure comprising a sheet of expanded metal supported

at two opposed edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means located substantially midway between said edges and comprising bar means extending generally parallel to said edges and bar means having portions extending at an angle to each other extending transversely of said edges at an end of the and connected to the first mentioned bar means, at least one of the portions of the second mentioned bar means crossing at least one transverse row of bonds of the expanded metal, and being about one-half the length of the first-mentioned bar means.

10. An expanded metal load bearing structure comprising a sheet of expanded metal supported at two opposed edges, disposed with the long dimensions of the diamonds transverse to said edges and adapted to bear a load between said edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising a bar extending generally parallel to said edges approximately equidistant therefrom and generally V-shaped bars at the ends of the first mentioned bar, each of the ends of the first mentioned bar entering the V of one of the second mentioned bars.

11. An expanded metal load-bearing structure comprising a sheet of expanded metal supported at two opposed edges and disposed with the long dimensions of the diamonds transverse to said edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising bar means extending generally parallel to said edges and terminating closely adjacent the ends of the expanded metal sheet and bar means connected with the first-mentioned bar means and extending generally transversely of said edges, the second-mentioned bar means crossing at least one transverse row of bonds of the expanded metal.

12. An expanded metal load-bearing structure comprising a sheet of expanded metal supported at two opposed edges and reinforcing means applied to the expanded metal between said edges, the reinforcing means comprising bar means extending generally parallel to said edges and terminating closely adjacent the ends of the expanded metal sheet and bar means connected with the first-mentioned bar means and extending generally transversely of said edges, the second-mentioned bar means crossing at least one transverse row of bonds of the expanded metal.

WAYNE E. MACK.