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FASTENING TOGETHER SHEETS OF EXPANDED METAL

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2 Sheets—Sheet 2

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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This invention relates to fastening together sheets of expanded metal, and particularly fastening together sheets of expanded metal to hold them against substantial relative movement in predetermined direction or directions.

While the invention is of broad application it is especially well adapted for use in the making of road expedients, landing mats and the like which require the assembly of sheets of expanded metal so that when they are laid on the ground they will be held against substantial relative movement normal to their plane or, if desired, against substantial relative movement both normal to their plane and generally in their plane.

I provide means for fastening together sheets of expanded metal comprising abutment means connected with one sheet of expanded metal and having a portion spaced from the expanded metal to provide for reception of an edge of another sheet of expanded metal between the expanded metal of the first mentioned sheet and said abutment means to hold the sheets against substantial relative movement normal to their plane. The abutment means preferably extends generally parallel to the plane of the sheet with which it is connected so as to provide a cavity bounded on two sides by the expanded metal of the sheet and on the third side by the abutment means, the cavity serving to receive an edge of another sheet of expanded metal so that the expanded metal meshwork of the sheets interfits. The abutment means preferably has a surface facing toward the expanded metal, disposed generally parallel to the opposite face of a strand of the expanded metal and spaced therefrom. The abutment means preferably comprises a metal bar welded to one of the sheets of expanded metal.

I preferably employ in combination with the abutment means other means for holding the sheets against substantial relative movement generally in their plane. While the means for holding the sheets against substantial relative movement generally in their plane may be formed as an integral part of the abutment means, such, for example, as hook means thereon, as specifically described and claimed in my copending application Serial No. 535,450, I may provide means separate from or applied to the abutment means extending generally normal to the sheets holding them against substantial relative movement generally in their plane, as, for example, means passing through the abutment means or through portions of the sheets or entering the meshwork of the sheets.

I further provide a composite structure comprising two sheets of expanded metal disposed in overlapping relation with the expanded metal meshwork thereof interfitting and means connected with one of the sheets engaging a portion of the other sheet to hold the overlapping portions of the sheets against substantial relative movement normal to their plane. I preferably further provide in such a composite structure means extending generally normal to the plane of the sheets holding the sheets against substantial relative movement generally in their plane.

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 drawings I have shown certain present preferred embodiments of the invention, in which

Figure 1 is a fragmentary plan view of the overlapped edges of two sheets of expanded metal fastened together in accordance with my invention;

Figure 2 is a view similar to Figure 1 showing a somewhat modified form of structure;

Figure 3 is an enlarged cross-sectional view taken on the line III—III of Figure 1;

Figure 4 is a view similar to Figure 3 showing how the sheets of expanded metal are assembled;

Figure 5 is an enlarged cross-sectional view taken on the line V—V of Figure 2;

Figure 6 is a view similar to Figures 3 and 4 but of a modified form of structure; and

Figure 7 is a view similar to Figure 3 of a further modified form of structure.

Referring now more particularly to the drawings, there are shown portions of two overlapping and interfitting sheets of expanded metal together with means for fastening them together against substantial relative movement normal to their plane and also in certain forms against substantial relative movement generally in their plane.

In Figures 1, 3 and 4 there are shown portions of two sheets of expanded metal designated, respectively, by reference numerals 2 and 3. The expanded metal may be of conventional form, such, for example, as is made on a guillotine type expanded metal making machine, and for most purposes will be what is known as heavy mesh weighing in the neighborhood of three to four pounds per square foot and having a thickness of the order of one-third of an inch. In a preferred form of structure the width of the strands may be about one-half inch, the width of the diamonds may be about three inches on centers and the length of the diamonds may be about five inches on centers. The sheets may be of any desired size, as, for example, four feet wide by twelve feet long.

The expanded metal has the usual strands 4 connected by bonds 5. As is well known, the entire sheet of expanded metal is an integral piece
of metal made from a sheet or plate, the strands being severed from one another for limited distances along the plate and then stretched to form the conventional diamonds.

Connected with the sheet 2, as, for example, by welding 6, is a bar 7 which serves as an abutment member to hold the sheet 3, when the sheets 2 and 3 are assembled as shown, against substantial movement relatively to the sheet 2 generally normal to the plane of the sheets. The bar 7 is welded to the sheet 2 with its inner edge 8 disposed against a row of aligned bonds 5. In the structure shown in the drawings the bar 7 is welded to one strand of the expanded metal at each bond 5 at each of two adjacent parallel rows of bonds of the expanded metal of the sheet 2.

The bar extends generally parallel to the plane of the sheet 2, although it is tilted somewhat to the plane of the sheet and is substantially parallel to the opposed face 9 (Figure 4) of the adjacent strand of the expanded metal of the sheet and is also spaced from that strand in a direction normal to the upper surface of the strand and to the under surface of the bar by a distance approximating or slightly greater than the thickness of a strand of expanded metal. While in Figure 4 the bar 7 is shown as spaced from the opposed face 9 of the adjacent strand in a direction normal to the upper surface of the strand and to the under surface of the bar by a distance approximating the thickness of a strand of the expanded metal the bar 7 may be spaced from such face 9 by a slightly greater distance. The bar 7 cooperates with the expanded metal of the sheet 2 to provide a series of cavities along the bar each bounded on two sides (the bottom and left-hand sides) by the expanded metal at 17 and 18 respectively and on the third side (the top viewing Figure 3) by the bar itself, which cavities are adapted to receive portions of an edge of the sheet 3 so that the expanded metal meshwork of the sheets interferes and to hold the overlapping portions of the sheets against substantial relative movement normal to their plane as will now be described. The slight space between the under surface of the bar of one sheet and the upper surfaces of the strands of the other sheet shown in the drawings may be due to slight distortion of the strands.

The sheets 2 and 3 are assembled by initially holding the sheet 3 in a position inclined to the plane of the sheet 2, as shown in Figure 4, and then introducing the edge diamonds of the sheet 3 into the diamonds bounded by the strands having the upper surfaces 9 as shown in that figure. The sheet 3 is then lowered or dropped into the plane of the sheet 2. This results in the diamonds of the sheets interfitting with the edge strands of the sheet 3 lying beneath the bar 6, as shown in Figure 3. This effectively holds the overlapping edges of the sheets against relative movement normal to their plane so long as they are not relatively moved substantially in their plane.

In the form of structure shown in Figures 1, 3 and 4 the bar 7 is disposed on the opposite edge of the sheet 2 of the bar 7. The bar may, however, be removed from the edge diamonds of the sheet 2. In Figures 2 and 3 sheets 2a and 3a which are joined to the sheet 2a and further removed from the nearest edge of the sheet 2 to provide for a wider zone of overlapping between the sheets. The width of the zone of overlapping between the sheets may be controlled as desired by appropriately positioning the bar 7 relatively to the edge of the sheet which is to be overlapped by an adjacent sheet.

Figure 6 shows a structure which is the same as that shown in Figures 1, 3 and 4 except that the pins 10 pass through the bar 7b which is welded to the pins 10 are preferably disposed at the minor axes of the diamonds of the sheet 2b and there may be one of those pins lying generally within each diamond or the pins may be disposed only at certain diamonds, as, for example, every second diamond, every third diamond, etc. Each pin in the form shown has a rivet-like head 11, a neck portion 12 of reduced diameter where the pin passes through the bar 7b and an enlarged body portion 13 below the bar. The body portion 13 of each of the pins is spaced from the adjacent outward strand of the expanded metal of the sheet 2b sufficiently to permit an edge strand of a cooperating sheet 3b to pass between such strand of the sheet 2b and the pin as shown in dotted lines in Figure 6.

In the form of structure shown in Figure 6 the sheets 2 and 3 overlap the outer face 8 in exactly the same way as above described and as illustrated in Figure 4, but when the sheet 2b is turned down to coplanar position relatively to the sheet 2 the edge strands 14 of the sheet 2b lie behind or to the left of the pins 10, as shown in Figure 6 so that while the sheets 2b and 3b remain in coplanar position they cannot be substantially relatively moved either in their plane or normal to their plane. Downward movement of the sheet 2b relatively to the sheet 2 is prevented because the edge of the sheet 2b lies on top of the edge of the sheet 2b. Upward movement of the sheet 3b relatively to the sheet 2b is prevented by the bar 7b. Movement of the sheet 3b toward the left relatively to the sheet 2b is prevented because the strands of the diamonds of the sheet 3b which overlap diamonds of the sheet 2b abut laterally against the corresponding strands of the sheet 2b. Movement of the sheet 3b toward the right relatively to the sheet 2b is prevented because the edge strands 14 of the sheet 3b lie behind the pins 10 and if the sheet 3b is pulled toward the right those strands will engage the pins 10 which will hold the sheets in substantially fixed relative position. The bar 7b and each pin 10 constitute in effect hook means extending about a portion of the meshwork of the sheet 3b.

While the pins 10 are shown as being applied to the bar 7b in permanent fashion, the bar 7b may be provided with holes for reception of pins and the pins may be inserted after the sheets of expanded metal have been assembled.

Figure 7 shows a modified form of structure which is exactly the same as the structure shown in Figure 6 but with stakes or spikes 15 passing through the diamonds of the respectively sheets 2c and 3c at positions offset from the bars 7c. The stakes or spikes 15 may be of metal, wood or any other suitable material and are provided with heads 16. They are preferably driven into the ground when the overlapped sheets of expanded metal are used for purposes which require their being laid on the ground, or they may be driven into any backing material when the sheets are otherwise disposed, and the stakes or spikes may pass through any overlapping diamonds of the two sheets. Thus the stakes or spikes 15 hold the sheets against substantial relative movement in their plane, the sheets being
held against substantial relative movement normal to their plane just as are the sheets of the other forms of structure shown.

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 to the details of embodiment but may be otherwise variously embodied within the scope of the following claims.

I claim:

1. Means for fastening together sheets of expanded metal comprising abutment means connected with one sheet of expanded metal extending generally parallel to the plane of the sheet so as to provide a cavity, bounded on two sides by the expanded metal and on the third side by the abutment means, to receive an edge of another sheet of expanded metal so that the expanded metal meshwork of the sheets interfits and hold the overlapping portions of the sheets against substantial relative movement normal to their plane.

2. A sheet of expanded metal having connected therewith an abutment member having a surface facing toward the expanded metal, disposed generally parallel to the opposed face of a strand of the expanded metal and spaced therefrom to provide for reception of an edge of another sheet of expanded metal between said abutment member and said strand.

3. A composite structure comprising two sheets of expanded metal disposed with the expanded metal meshwork in overlapped relation with corresponding parts interfitting and rigid means disposed generally parallel to the opposed face of a strand and connected with one of the sheets and disposed entirely at one side thereof engaging a portion of the other sheet to hold the overlapping portions of the sheets against substantial relative movement normal to their plane.

4. Means for fastening together sheets of expanded metal comprising a metal bar welded to one sheet of expanded metal extending generally parallel to the plane of the sheet and having a free edge spaced from the expanded metal to provide for reception of an edge of another sheet of expanded metal between the expanded metal of the first mentioned sheet and said bar.

5. Means for fastening together sheets of expanded metal comprising abutment means connected with one sheet of expanded metal and disposed entirely at one side of sheet and extending generally parallel to the opposed face of a strand of the sheet and having projecting edge portion spaced from the expanded metal to provide for reception of an edge of another sheet of expanded metal between the expanded metal of the first mentioned sheet and said projecting edge portion of the abutment means and means for holding the sheets against substantial relative movement generally in their plane.

6. Means for fastening together sheets of expanded metal comprising abutment means connected with one sheet of expanded metal and having a projecting edge portion spaced from the expanded metal and lying generally parallel to the face of an opposed strand to provide for reception of an edge of another sheet of expanded metal between the expanded metal of the first mentioned sheet and said projecting edge portion of the abutment means with the expanded metal meshwork of said sheets interfitting whereby to hold the sheets against substantial relative movement normal to their plane and means separate from the abutment means passing through portions of the sheets to hold them against substantial relative movement generally in their plane.

8. Means for fastening together sheets of expanded metal comprising abutment means connected with one sheet of expanded metal extending generally parallel to the plane of the sheet and having a projecting edge portion spaced from the expanded metal and lying entirely to one side of said sheet to provide for reception of an edge of another sheet of expanded metal between the expanded metal of the first mentioned sheet and said projecting edge portion of the abutment means with the expanded metal meshwork of said sheets interfitting whereby to hold the sheets against substantial relative movement normal to their plane and means connected with said abutment means and engaging the meshwork of the second mentioned sheet of expanded metal to hold the sheets against substantial relative movement generally in their plane.

9. A composite structure comprising two sheets of expanded metal disposed in overlapping relation with the expanded metal meshwork thereof interfitting, means lying generally parallel to the face of an opposed strand and connected with one of the sheets and disposed entirely at one side thereof engaging a portion of the other to hold the overlapping portions of the sheets against substantial relative movement normal to their plane and means extending generally normal to the plane of the sheets holding the sheets against substantial relative movement generally in their plane.

10. A composite structure comprising two sheets of expanded metal disposed in overlapping relation and having the expanded metal meshwork thereof nested at their edges and a rigid metal projection welded to one of the sheets and disposed entirely at one side thereof and lying generally parallel to the face of an opposed strand and engaging the other when the sheets are in said position to prevent separation of the sheets by relative movement in the plane of the sheets.

11. A composite structure comprising two sheets of expanded metal disposed with edges overlapping and hook means connected with one of the sheets and engaging the expanded metal meshwork of the other to prevent separation of the sheets by relative movement in the plane of the sheets.

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