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3,351,995

METHOD OF MAKING EXPANDED METAL

Filed Oct. 5, 1966

FIG. 1

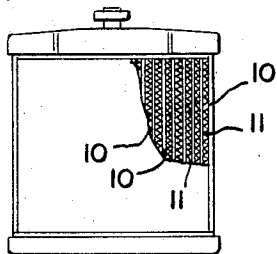


FIG. 6

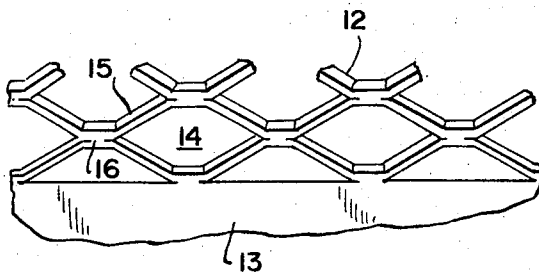


FIG. 2

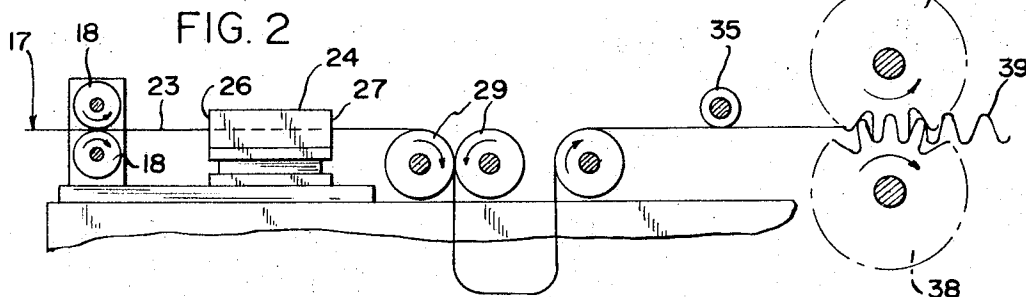


FIG. 3

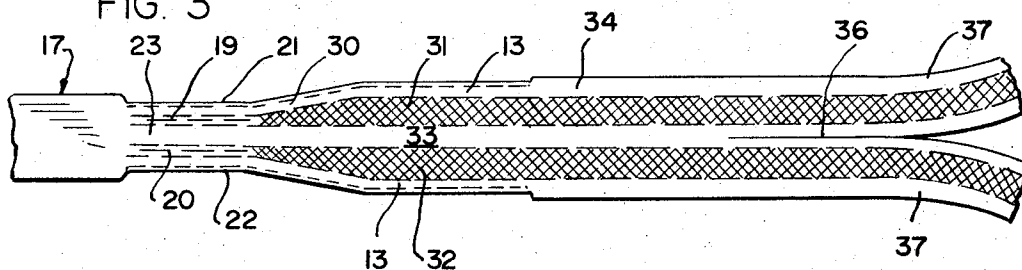


FIG. 4

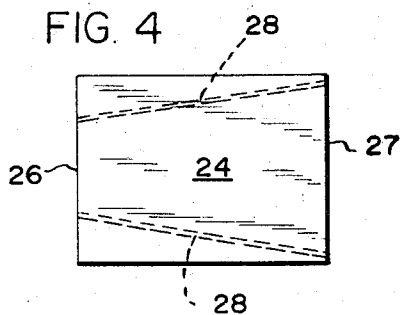
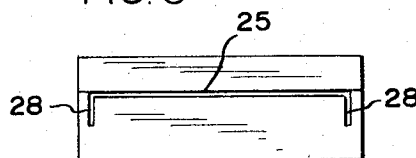


FIG. 5



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METHOD OF MAKING EXPANDED METAL
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4 Claims. (Cl. 29—6.1)

This invention relates to a method of making expanded metal.

Expanded metal is a term used to designate a sheet of deformable metal that has been provided with a plurality of spaced slits dividing the sheet into a plurality of strands and connecting bridges followed by laterally stretching the metal to provide openings at the slits with these openings being defined by the strands which are thereby distorted. Such expanded metal has been found useful in various environments one of which is to make heat conducting fins for use in fin and tube heat exchangers.

One of the features of this invention is to provide an improved method of making expanded metal that includes slitting a sheet of deformable metal with a plurality of spaced slits dividing the sheet into a plurality of strands and connecting bridges, deforming portions of the sheet on opposite sides of this plurality of slits to provide integral projections, grasping the sheet at the projections and moving the projections relatively apart to expand and stretch laterally the sheet at the slits to provide the openings bounded by these strands while moving the sheet longitudinally in a path simultaneously with the grasping and moving apart in the expanding step.

Other features and advantages of the invention will be apparent from the following description of one embodiment thereof taken in conjunction with the accompanying drawings which illustrate the method and an apparatus for practicing the method. Of the drawings:

FIGURE 1 is a front elevational view of a radiator using cooling fins between parallel liquid coolant tubes with the fins being made of metal expanded by the method of this invention.

FIGURE 2 is a semi-diagrammatic, fragmentary, side elevational view of an apparatus for practicing the method of this invention.

FIGURE 3 is a semi-diagrammatic plan view of a strip of metal illustrating its appearance at various stages of the method.

FIGURE 4 is a diagrammatic plan view of a die used in laterally stretching the metal to provide the expanded sections illustrated in FIGURE 3.

FIGURE 5 is an end elevational view taken from the right-hand end of FIGURE 4 with the thickness of the metal guide portion of the die enlarged for clarity of illustration.

FIGURE 6 is an enlarged, fragmentary plan view of an expanded metal section of each conducting fin of the heat exchanger of FIGURE 1.

FIGURE 1 illustrates a radiator for an internal combustion engine with the radiator being of the fin and tube type in which parallel spaced tubes 10 have heat conducting fins 11 in heat exchange relationship therewith.

Each fin 11 has a central expanded metal section 12, as illustrated in enlarged plan view in FIGURE 6. As is disclosed here an edge section 13 of the fin is flat and continuous while the expanded metal section 12 contains openings 14 bounded by strands 15 interconnected by bridges 16. As is well known to those skilled in the expanded metal art, the openings 14 before lateral expansion were slits.

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FIGURES 2-5 illustrate one embodiment of practicing the method of this invention with illustrative apparatus being shown diagrammatically. In this method an elongated strip 17 of deformable metal such as copper, aluminum or the like is moved longitudinally by a pair of driven rolls 18 between which the metal is pressed and moved from left to right as shown in FIGURE 2. These rolls serve the dual function of providing two spaced sections 19 and 20 that are parallel to each other and that each contain a plurality of slits that are later expanded into the openings 14 and that divide each section into the strands 15 and connecting bridges 16 and at the same time turn down edge flanges 21 and 22 at the side edges of the strip 17.

After leaving the rolls 18 the metal strip section 23 containing the spaced parallel longitudinal sections 19 and 20 with the slits and turned down side flanges 21 and 22 is directed through a die 24. This die 24 as illustrated in FIGURES 4 and 5 has a horizontal flat opening 25 extending from front 26 to rear 27 with the opening 25 at the edges joining with vertical edge openings 28 corresponding to the right angle flanges 21 and 22 on the strip 17. As can be seen in FIGURE 4, these edge openings 28 diverge from each other from the front 26 to the rear 27 of the die. With this arrangement as the section 23 of the strip 17 is pulled through the die 24 by the forward driven rollers 29 the portion 30 as it passes through the die is laterally stretched to the shape shown in FIGURE 3 by the engagement of the side flanges 22 with the diverging edge openings 28 in the die. This forms two parallel sections 31 and 32 of expanded metal as shown in FIGURE 6 bounded on the outside by the unexpanded metal 13 and separated by a center strip 33 of unexpanded metal.

The driven rollers 29 not only serve to pull the metal strip through the die 24 but also flatten the edge flanges 21 and 22 back into the plane of the strip 17, as illustrated by the portion 34 of the metal strip 17.

After being so flattened, the strip is drawn past a rotating circular cutter blade 35 which severs the strip 17 substantially at the center along a line 36 to divide the strip 17 into two side-by-side sections 37 each containing an expanded metal section 31 or 32.

After being so divided at the line 36, each section 37 is passed between cooperating corrugating rollers 38 to provide a corrugated strip 39 of the expanded metal. These corrugated strips 37 are cut into suitable lengths to provide the corrugated expanded fins 11 shown in FIGURE 1.

Having described my invention as related to the embodiment shown in the accompanying drawings, it is my intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. The method of making expanded metal, comprising: slitting a sheet of deformable metal with a plurality of spaced slits dividing the sheet into a plurality of strands and connecting bridges; deforming portions of said sheet on opposite sides of said plurality of slits to provide projections; grasping said sheet at said projections and moving said projections relatively apart to expand said sheet laterally at said slits; and moving said sheet longitudinally in a path simultaneously with said grasping and moving apart.

2. The method of claim 1 wherein said projections comprise edge flanges, and said flanges are flattened to

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substantially their original positions subsequent to said expanding.

3. The method of claim 1 wherein said sheet is provided with a plurality of side-by-side sections each containing a said plurality of spaced slits, and said sheet is severed between said sections subsequent to said expanding.

4. The method of claim 1 wherein said sheet is provided with a plurality of side-by-side sections each containing a said plurality of spaced slits, said projections

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comprise edge flanges, said flanges are flattened to substantially their original positions subsequent to said expanding, and said sheet is severed between said sections subsequent to said expanding and subsequent to said flattening.

References Cited

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10 RICHARD H. EANES, JR., *Primary Examiner*.