

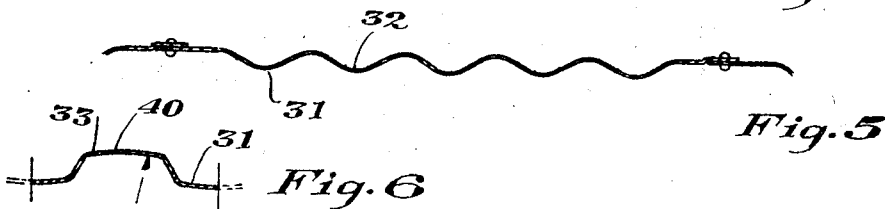
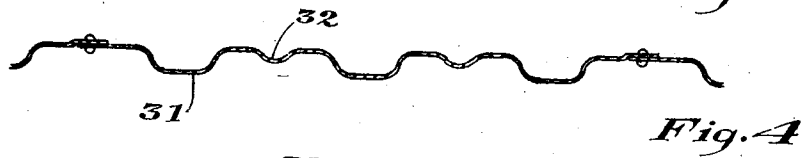
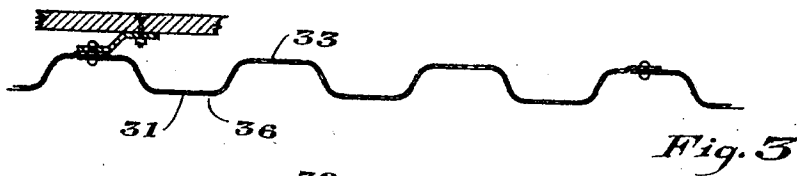
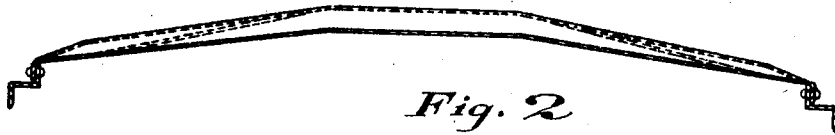
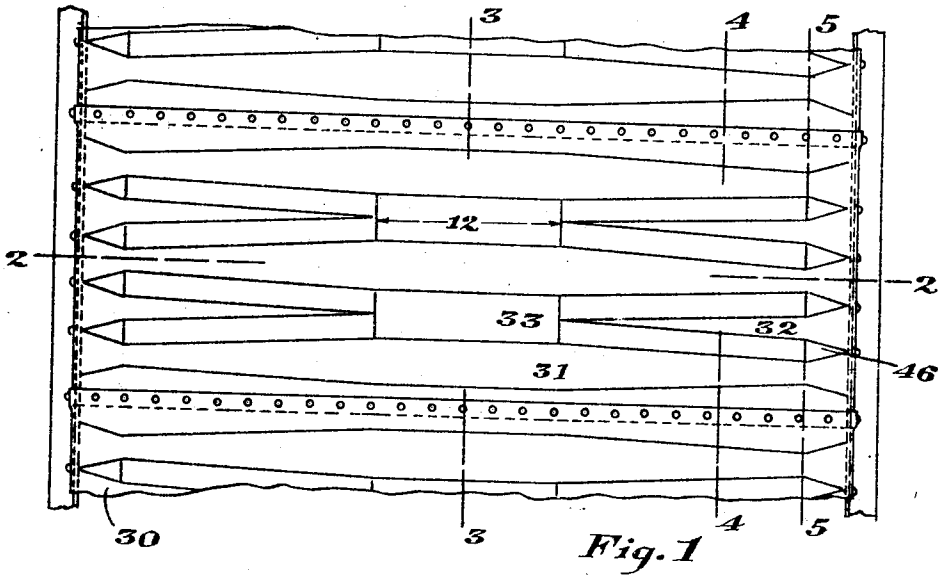
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A. E. SMALL

ROOF FOR RAILWAY CARS

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UNITED STATES PATENT OFFICE.

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ROOF FOR RAILWAY CARS.

Application filed September 10, 1927. Serial No. 218,733.

This invention relates to railway freight car roofs, and more particularly to the all metal type of roof wherein a plurality of relatively thick roof sheets span the distance between the opposite side walls of the car and are so formed and arranged as to not only act as a roof in protecting the lading from the weather but also to perform the functions of the usual carlines, ridge pole and purlins which, in the ordinary car, constitute the roof framing.

A railway car in motion weaves and rocks and the rectangular frame composed of the side plates and end plates becomes distorted into a parallelogram; the cars also twist on their longitudinal axis setting up torsional strains and the roof sheets tend to slide past each other at their adjoining edges. Therefore, the seams between the adjoining edges of adjacent roof sheets must be well secured to each other or made flexible so that they will not tear and cause a leaky roof.

The object of my device is to provide integral depressions or corrugations in a metallic plate when used as a roof for a railway car which transmit any stresses imposed thereon to the opposite side plates of the car, which side plates, with the end plates, form a rectangular frame for the roof. And a further object is to so form and shape such embossments or corrugations as to impart rigidity to the plate adjacent the center line of the car and to impart resiliency and flexibility to the plate adjacent the side plates of the car. Such corrugations also restrict the buckling of the plates when acting as gussets to prevent the roof framing (side and end plates) from getting out of square.

The roof sheets are made higher adjacent the center line of the car so as to form a watershed and also to form an arch or cambered beam to transmit any load imposed upon them to the opposite side plates of the car. It is immaterial to my invention whether this watershed or arch is given to the sheets by forming them on a curve (arcuate) or a series of flat planes (apexed), I have used the term "arch" herein to define either structure or any similar structure thereto. Besides the weaving and racking stresses to which a car roof is subjected, it must also sustain the vertical loads of snow, slush and rain as well as the weight of men on the running boards.

In the drawings:

Fig. 1 is a fragmentary plan view of a car with my improved roof applied thereon.

Fig. 2 shows a section on line 2—2 of Fig. 1.

Figs. 3, 4 and 5 are enlarged sections on lines 3—3; 4—4 and 5—5, respectively of Fig. 1.

Figs. 6, 7 and 8 are modifications of Figs. 3, 4 and 5 respectively.

Figs. 1 to 6 inclusive show the preferred form of roof wherein the roof plate 30 is provided with a plurality of major corrugations 31 with flat apices 36 which are spaced apart distances substantially equal to their respective widths and the portions 33 of the plate between the major corrugations are also flat so that the configuration (see Fig. 3) is symmetrical in cross section about a line midway between the outermost portions of these major corrugations, which line is the neutral axis of the section. Such a section is very strong on account of the amount of metal positioned away from the neutral axis and is also relatively rigid. These major corrugations 31 are preferably widest and deepest adjacent their middle portion and decrease in width toward their opposite ends, and the apices change from a flat to an arcuate configuration. The metallic plate is also provided with a plurality of pairs of aligned minor corrugations 32 which lie between adjacent major corrugations 31 with their inner ends preferably terminating into the plate adjacent each other and with their outer ends terminating into the plate in line with the outer ends of the major corrugations.

The outer ends of the minor corrugations 32 have arcuate apices and the portions of the plate between these outer ends of the minor corrugations and the outer ends of the major corrugations are also arcuate so that they form a cross section of sinuous configuration, and, furthermore, the outer ends of the minor and major corrugations are of the same width and spaced apart distances equal to their respective widths so that they form a contiguous sinuous configuration (see Fig. 5) symmetrical in cross section about a line midway between the outermost portions of the corrugations, which line is the neutral axis of the section. Such a section is very resilient and has a spring like action under load, and, furthermore, produces a very strong section for the amount of metal used. The

minor and major corrugations merge into the plane of the plate by means of terminal portions 46 of any desired formation. By such an arrangement a car roof is provided which is relatively rigid adjacent the center line of the car and relatively resilient adjacent the side plates of the car.

Figs. 3, 4 and 5 show a construction wherein the apices of the major corrugations and also the portion of the sheet between these major corrugations are both flat, and Figs. 6, 7 and 8 show a modified form wherein the apices of the major corrugations and also the portion of the sheet between major corrugations are both arcuate in reverse directions.

By thus forming a metallic plate I provide a plurality of corrugations or beams which cooperate to form a very rigid structure adjacent the middle of the plate capable of absorbing considerable stress without much deflection and which also form a resilient structure adjacent the sides of the corrugations so that when the plate deflects under extreme load it rebounds or returns to its normal position without appreciable permanent distortion.

In my application Serial No. 595,634, filed October 19, 1922, I have disclosed and claimed broadly the particular formation of the metallic plate and specifically the use of such a structure as a wall for a railway car.

The accompanying drawings illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof within the scope of the claims will occur to persons skilled in the art.

I claim:

1. A roof sheet for a railway car, comprising one of a plurality of members to form the roof consisting of substantially an arch between the opposite side plates of the car, said sheet provided with a plurality of major corrugations which decrease in width toward their opposite ends, said sheet also provided with a plurality of minor corrugations lying between said major corrugations which increase in width toward their outer ends until the major and minor corrugations terminate into the sheet adjacent the opposite side plates of the car.
2. A roof sheet for a railway car, comprising one of a plurality of members to form the roof consisting of substantially an arch between the opposite side plates of the car, said sheet provided with a plurality of major corrugations which decrease in width and in depth toward their opposite ends, said sheet also provided with a plurality of minor corrugations lying between said major corrugations which increase in width and in depth toward their outer ends until the major and minor corrugations terminate into the sheet

adjacent the opposite side plates of the car.

3. A roof sheet for a railway car, comprising one of a plurality of members to form the roof consisting of substantially an arch between the opposite side plates of the car, said sheet provided with a plurality of major corrugations spaced apart distances substantially equal to their width which decrease in width toward their opposite ends, said sheet also provided with a plurality of minor corrugations lying between said major corrugations which increase in width toward their outer ends until the major and minor corrugations are also spaced apart distances equal to their width adjacent the opposite side plates of the car.

4. A roof sheet for a railway car, comprising one of a plurality of members to form the roof consisting of substantially an arch between the opposite side plates of the car, said sheet provided with a plurality of major corrugations which decrease in depth toward their opposite ends, said sheet also provided with a plurality of minor corrugations lying between said major corrugations which increase in depth toward their outer ends adjacent the opposite side plates of the car, the length of the center line of the metal of a cross section of the major corrugations adjacent the middle of the sheet being the same as the length of the center line of the metal of a cross section of the major and minor corrugations adjacent the side plates of the car.

5. A roof sheet for a railway car, comprising one of a plurality of members to form the roof consisting of substantially an arch between the opposite side plates of the car, said sheet provided with a plurality of major corrugations which decrease in depth toward their opposite ends, said sheet also provided with a plurality of minor corrugations lying between said major corrugations which increase in depth toward their outer ends, the lengths of the center lines of each cross section of the corrugated portion of the sheet being equal to each other.

6. A roof sheet for a railway car, comprising one of a plurality of members to form the roof consisting of substantially an arch between the opposite side plates of the car, said sheet provided with a plurality of major corrugations which are relatively deep adjacent their middle portions which decrease in depth toward their opposite ends, said sheet also provided with a plurality of minor corrugations lying between said major corrugations which increase in depth toward their outer ends until the major and minor corrugations form a plurality of relatively shallow corrugations adjacent the opposite side plates of the car so as to provide a relatively rigid structure adjacent the center of the car and a relatively resilient structure adjacent the opposite side plates of the car.

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