Sept. 19, 1939. W. D. THOMPSON ET AL 2,173,402

CAR ROOF

Original Filed Sept. 27, 1935 2 Sheets-Sheet 1

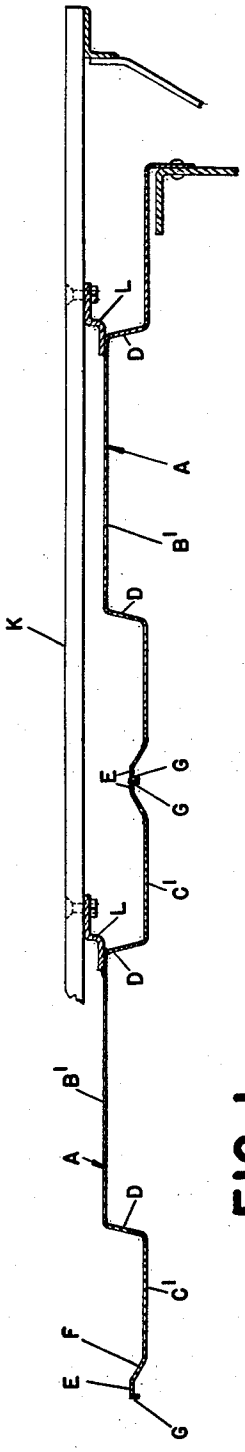


FIG. 1.

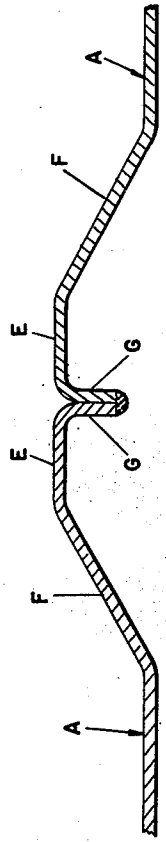


FIG. 5.

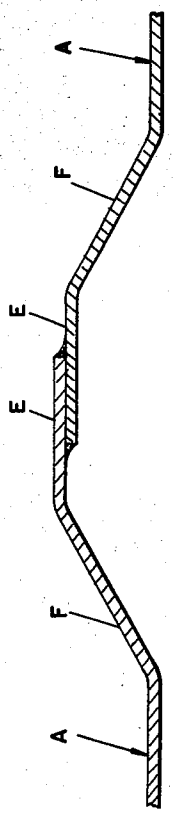


FIG. 6.

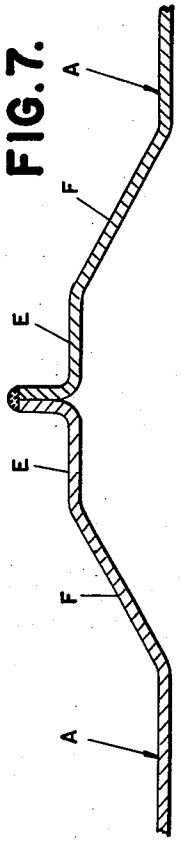


FIG. 7.

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FIG. 2.

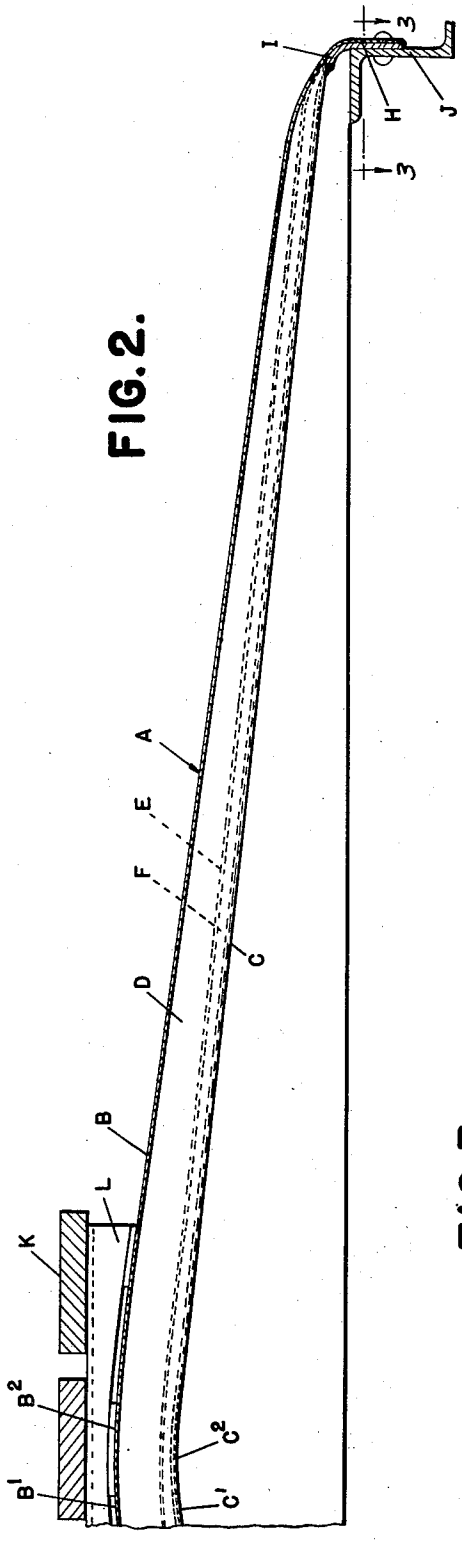


FIG. 3.

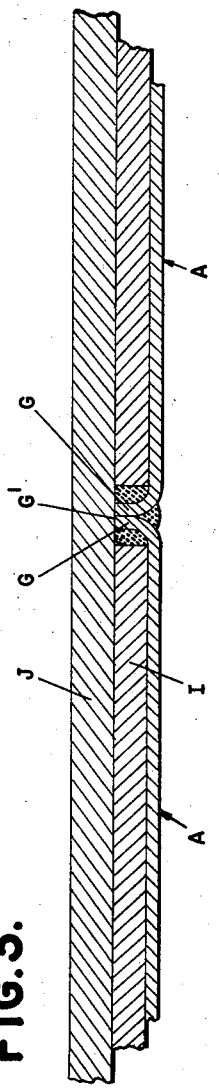
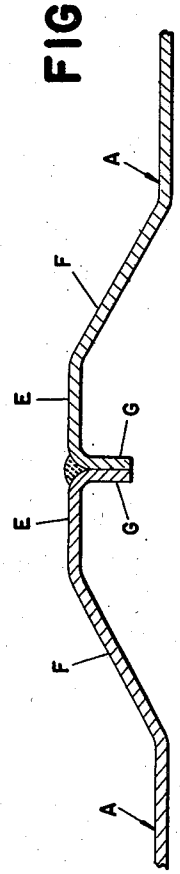


FIG. 4.



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2,173,402

CAR ROOF

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Application September 27, 1935, Serial No. 42,526
Renewed December 3, 1938

9 Claims. (Cl. 108—5.4)

The invention relates to car roofs of that type comprising a series of fashioned sheet metal units extending from eaves to eaves and welded to each other. Each of the units is pitched from a central ridge portion towards the eaves and the metal in the portions on each side of the ridge is disposed in upper and lower planes connected to each other by substantially vertical portions, thereby forming a truss or beam and dispensing with separate carlines. The units are also welded to each other along their adjacent edges which lie in the same plane and form complementary portions of one panel. However, difficulty has been experienced in the fashioning of the units to hold these marginal portions in a true plane free from any waves or distortions.

It is the object of the present invention to obtain a construction which avoids this difficulty, and also secures additional advantages, particularly in facilitating the welding operation and the forming of the depending flanges which overlap the side plates at the eaves. To this end the invention consists in the construction as hereinafter set forth.

In the drawings:

Fig. 1 is a longitudinal section in the plane of the ridge;

Fig. 2 is a cross section;

Fig. 3 is a horizontal section on line 3—3, Fig. 2;

Fig. 4 is an enlarged section through the welded marginal portions of adjacent units;

Figs. 5, 6 and 7 are similar views showing modified constructions.

Each unit A is fashioned from a flat sheet metal blank to form upper plane portions B, B', sloping oppositely from a central ridge portion B^2 and lower plane portions C, C', correspondingly sloping from a ridge portion C^2. These upper and lower plane portions are connected to each other by substantially vertical portions D which taper in height from ridge towards eaves and at the eaves both upper and lower plane portions merge into a common vertical plane overlapping the side plate of the car frame. Preferably the upper plane portion is at the center of the unit and the lower plane portions are arranged upon opposite sides thereof, the latter being restricted in width so that when joined with an adjacent unit, a panel of the desired width is obtained.

However, as above stated, it is difficult to maintain marginal lower plane portions of the desired contour, free from waves or distortions. Also, in the fashioning of the blank the metal near the ridge is contracted in width to a considerably greater extent than that near the eaves on account of the greater distance between upper and lower planes at this point. Thus to secure a straight edge, it is either necessary to trim the margins, or the original blank may be made with a greater width at its center which forms the ridge portion, than at its opposite ends, thereby compensating for the greater contraction. Even with this construction, the edge of the fashioned blank will not be perfectly straight. We have therefore modified the construction by off-setting the marginal portions of each unit to stiffen and hold the same to form. As shown in Figs. 1 and 4, E is a portion which is raised above the plane of the portion C, being connected therewith by an oblique portion F, and G is a flange at the end of the portion E which is turned downward. The length of the flange G is not as great as the off-setting of the portion E so that said flange does not extend below the plane of the portion C. At the eaves the portions B, C, E and F are all turned downward and merge into a common plane H, but the flange G continues around the bend and extends inward. The eaves portion is reinforced by a member I secured on the inner side of the portion H and curved to extend around the bend. This portion I is preferably secured to the portion H by welding thereto along its upper and lower edges. Both portions H and I are then secured to the side plate J of the car frame, preferably by riveting and the abutting flanges G of adjacent units are joined by welding.

With the construction just described, it is not necessary that the edges of the blank should be exactly straight, for these are turned downward in the flanges G and it is the sides of these flanges which abut against each other. As these are formed in dies, all portions thereof will lie in the same plane. The welding is preferably along the top edge, as this is more conveniently accessible to the welding machine. However, if desired, the flanges G may be welded to each other along their lower edges, as indicated in the modified construction, Fig. 5. Still another modification is to dispense with the flanges G and to overlap the edges of the portions E and weld them to each other as indicated in Fig. 6. However, we prefer the construction shown in Fig. 4.

The offsetting of the marginal portion E not only stiffens the unit and holds the same to form, but also facilitates welding and has the further advantage that it increases the effectiveness of the metal in the lower panel, so that this panel may be increased in width. The width of the

panels in the upper and lower planes is determined by various considerations. Obviously the wider the panels the fewer units that will be required to make the complete roof, but on the other hand, if these panels are too wide, the trussing effect is diminished, as not all of the metal will be in work. We have found that where the marginal portion of the unit is offset as above described, this has the effect of rendering the metal in the adjacent plane more effective, so that the panel formed by complementary portions on opposite sides of the weld may be of greater width than the panel in the other plane. As a specific example, if the upper plane has a width of 17½ inches, the lower plane may be extended to 20 inches, or 10 inches on each side of the weld.

Another advantage of the offset marginal portion of the blank is that the flange G may be turned down without projecting below the lower plane of the roof. At the eaves where the portions B, C, E and F merge in a common plane, the flange G projects inward, but the reinforcing plates I are of sufficient thickness to provide a space therebetween for the inturned flanges, as indicated at G', Fig. 3. Still another advantage of this construction is that the flanges G being on the inside of the portions E will be compressed and upset in passing around the bend, whereas flanges extending outward would be placed under high tension stress that might rupture the same.

One other advantage of the off-set marginal edge portions of the blank is that it places the welded joint in a plane above that of the lower panel, so that water will readily drain off from this portion and will not stand on the welded joint, with possible injury to the same.

The car roof is provided with the usual running boards K which are supported upon saddles L mounted on the upper panels at the ridge portion B^2. These saddles in addition to their function of supporting the running board form in connection therewith a tie member between adjacent upper panels which assist in holding the same from lateral deflection, thereby increasing the strength of the structure.

One important feature of the construction is that it eliminates drumming. By this is meant movement alternately above or below a median plane occasioned either by walking over the roof or by vibrations incident to the travel of the car. The offsetting of the marginal portions into the third plane and the securing of these marginal portions to each other forms a stiffening means which prevents drumming.

The welding of the units to each other is preferably performed before the placing of the structure on the frame of the car. This is possible by reason of the fact that the structure is one which has sufficient strength and rigidity to be self-sustaining during transportation. If, however, it is more convenient to ship the roof in sections, this may be done and the sections welded to each other after placing in position on the car frame.

What we claim as our invention is:

1. In a car roof, a fashioned sheet metal unit comprising portions arranged in spaced planes connected by substantially vertical portions and forming the cooperating chord members of a truss and extending from eaves to eaves, the marginal edges of the portions in one plane being slightly off-set into an adjacent intermediate plane and terminating in flanges which extend towards the original plane thereof.

2. In a car roof, a fashioned sheet metal unit comprising portions extending from eaves to eaves in spaced planes, connected by substantially vertical portions and forming the cooperating chord members of a truss, the portions in the lower of said spaced planes being somewhat more than half the width of the portion in the upper plane having their marginal edges slightly upwardly off-set into an intermediate plane and terminating in downturned flange portions which abut against each other in adjacent units.

3. In a car roof, a fashioned sheet metal unit comprising portions extending from eaves to eaves in spaced planes, connected by substantially vertical portions and forming the cooperating chord members of a truss, the portions in the lower plane being somewhat more than half the width of the portion in the upper plane and having marginal edge portions slightly upwardly off-set into an intermediate plane and provided with downturned flanges, all of the portions in the several planes being bent at the eaves to merge in a single downturned plane, and the edge flanges extending around the bend and said downturned flanges.

4. A car roof formed of a series of like pressed sheet metal units marginally welded to each other, each unit having parallel edges extending from eaves to eaves and comprising non-parallel portions arranged in spaced planes which converge from ridge towards eaves and are connected by transversely extending portions, all of said portions merging at the eaves in a downturned portion terminating in a single plane there being a single central portion in one of said spaced planes and two portions of somewhat more than half the width in the other spaced plane on opposite sides of said central portion and provided at their marginal edges with portions slightly offset in a direction towards the other of said planes the said offset portions being welded to each other; the whole series forming alternate upper and lower plane panels of slightly different width but substantially equal stiffness, said panels being connected by transverse beams which are symmetrical throughout the series and of equal trussing effect.

5. A car roof formed of a series of like pressed sheet metal units marginally welded to each other, each unit having parallel edges extending from eaves to eaves and comprising non-parallel portions arranged in spaced planes which converge from ridge towards eaves and are connected by transversely extending portions, all of said portions merging at the eaves in a down-turned portion terminating in a single plane there being a single central portion in one of said spaced planes and two portions of somewhat more than half the width in the other spaced plane on opposite sides of said central portion and provided at their marginal edges with portions slightly offset in a direction towards the other of said planes the said offset portions being welded to each other; the whole series forming alternate upper and lower plane panels connected by transverse beams which are symmetrical throughout the series and of equal trussing effect, the panels of greater width having the offset marginal welded portions being trussed by the latter to be equal in strength and rigidity to the narrower panels in the other plane.

6. A car roof formed of like pressed sheet metal units marginally welded to each other, each unit having parallel edges extending from eaves to

eaves and comprising non-parallel portions arranged in spaced planes which converge from ridge toward eaves and are connected by transversely extending portions, all of said portions merging at the eaves in a downturned portion there being a single central portion in one of said spaced planes and two portions in the other plane on opposite sides of said central portion terminating in marginal portions slightly offset into a third plane and welded to corresponding portions of adjacent units, said offset portions functioning to prevent warping of the portions in the adjacent plane during the welding operation, the whole series of units forming alternate upper and lower plane panels connected by transverse beams which are symmetrical throughout the series and of substantially equal trussing effect.

7. A car roof formed of like pressed sheet metal units marginally welded to each other, each unit having parallel edges extending from eaves to eaves and comprising non-parallel portions arranged in spaced planes which converge from ridge toward eaves and are connected by transversely extending portions, all of said portions merging at the eaves in a single plane there being portions in one plane respectively on opposite sides of said unit terminating in marginal portions slightly offset into a third substantially parallel plane and welded to corresponding portions of adjacent units, said offset portions functioning to prevent warping of the portions in the adjacent plane during the welding operation, the whole series of units forming alternate upper and lower plane panels connected by transverse beams which are symmetrical throughout the series and of substantially equal trussing effect.

8. A car roof formed of like pressed sheet metal units marginally welded to each other, each unit comprising portions arranged in spaced planes merging at the eaves and connected by substantially vertical portions and forming the cooperating chord members of a truss extending from eaves to eaves, the marginal portions of each unit being offset into an adjacent intermediate substantially parallel plane with the meeting marginal portions thereof welded to each other adjacent to said intermediate plane, said offset marginal portions functioning to prevent warping of the portions in the adjacent planes during the welding operations.

9. A car roof formed of like pressed sheet metal units marginally welded to each other, each unit comprising portions arranged in spaced planes merging at the eaves and connected by substantially vertical portions and forming the cooperating chord members of a truss extending from eaves to eaves, the marginal portions of each unit being offset into an adjacent substantially parallel intermediate plane terminating in vertically extending flanges which are welded to each other adjacent to said intermediate plane, said offset marginal portions functioning to prevent warping of the portions in the adjacent planes during the welding operation.

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