May 30, 1944. C. D. BONSALL 2,350,213

CAR ROOF

Filed May 9, 1942

Fig. 1.

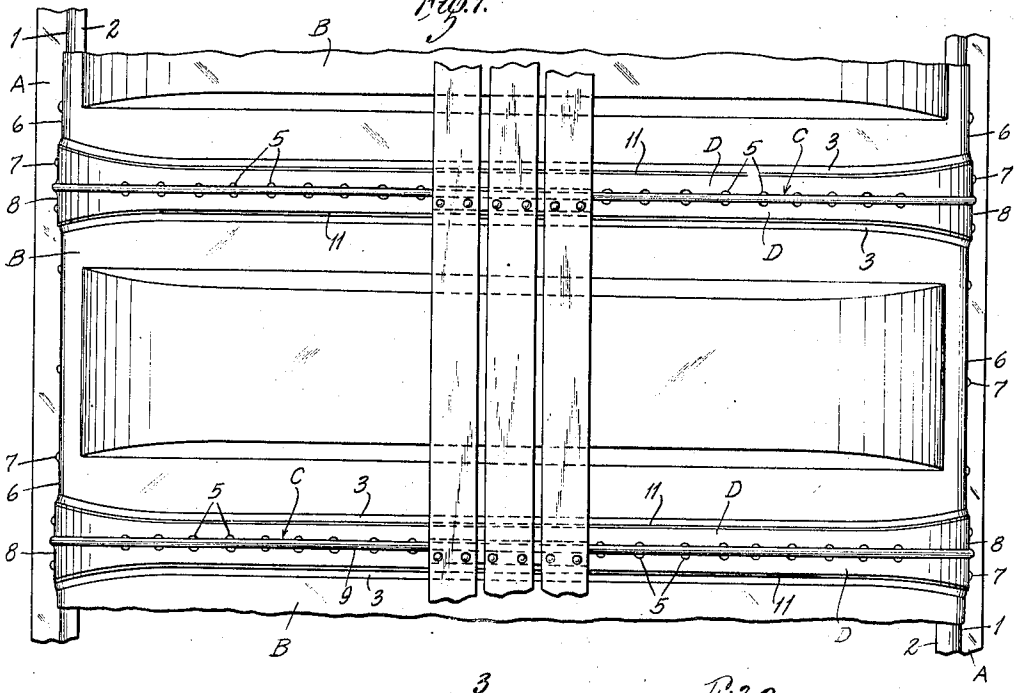


Fig. 3.

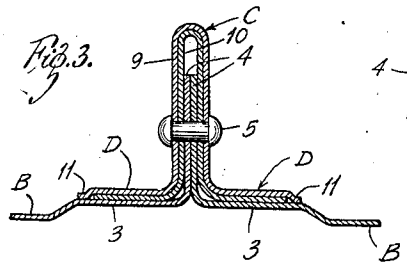


Fig. 2.

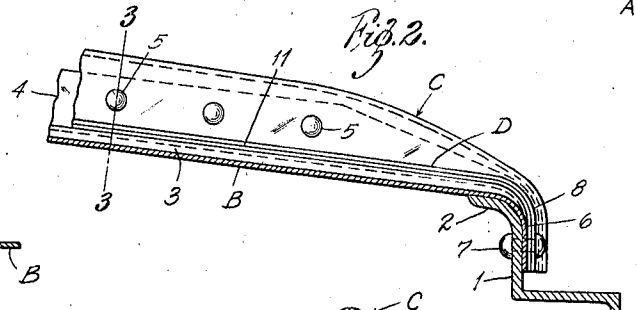


Fig. 5.

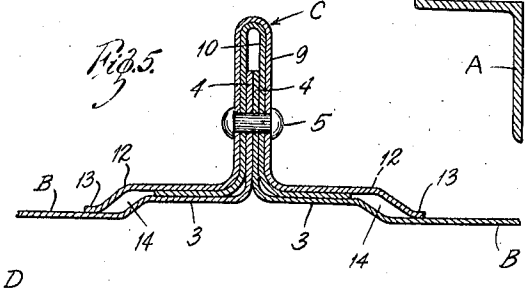
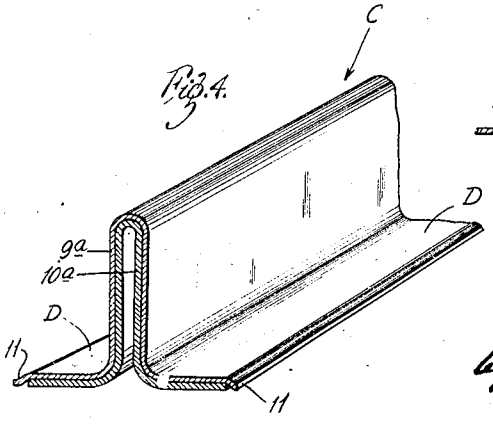


Fig. 4.



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HIS ATTORNEYS.

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# UNITED STATES PATENT OFFICE

2,350,213

## CAR ROOF

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Application May 9, 1942, Serial No. 442,349

4 Claims. (Cl. 108—5.4)

This invention relates to metal car roof constructions of the type wherein the roof sheets extend from side plate to side plate of the car and have upstanding flanges along their adjacent margins that are rigidly connected by a seam cap so as together to form standing weatherproof seams which function as load carrying members of the roof structure after the manner of outside carlines.

Since the seam caps and roofs sheets are exposed to the weather, it is desirable to galvanize them to protect them against the action of moisture, atmospheric acids, cinders and other products of combustion; and, for the effective performance of the seam cap as the load carrying member or outside carline of the roof structure, it is desirable to make the seam cap approximately twice as thick as the roof sheets. While it is practicable to press a galvanized sheet of one-sixteenth of an inch into a suitable shape for a seam cap without causing the zinc to flake from the base metal, it is not practicable to do the same with a thicker sheet because of the great probability of the zinc flaking therefrom during the pressing operation.

The principal object of the present invention is to devise a car roof construction of the above type wherein the seam cap has a sound galvanized coating and is of greater thickness than has heretofore been practicable to make of galvanized sheets. Another object is to increase the weatherproofing qualities and load carrying capacity of the roof. The invention consists in a car roof wherein the seam cap element or member of the standing seam is composed of a galvanized metal outside sheet and an ungalvanized or black inside metal sheet that are snugly die pressed together and riveted or otherwise permanently secured together and to the upstanding seam flanges of the roof sheets, the galvanized outside sheet being thin enough to deform without flaking and the two sheets providing a cross-sectional area greater than the cross-sectional area heretofore obtainable with a single galvanized sheet without danger of flaking. The invention also consists in continuing the base flanges of the galvanized outer ply of the carline cap of the roof outwardly beyond the base flanges of the ungalvanized inner ply of said cap and thence offsetting the marginal portions of the base flanges of said galvanized outer ply downwardly to seat on the roof sheets. The invention also consists in providing longitudinal passageways between the roof sheets and base flanges of the inner ply of the two-ply seam cap, which passageways serve as drain panels for any water that leaks beneath the outer edges of said base flanges and also serve to break the line of contact between said base flanges and sheets and thus prevent flow of water through the seam by capillary attraction. The invention also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed. This application is a continuation-in-part of my copending application Serial Number 384,866 filed March 24, 1941, entitled: "Seam cap and process of manufacturing same."

In the accompanying drawing, which forms part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a plan view of a portion of a car roof construction embodying my invention,

Fig. 2 is an enlarged vertical transverse section through the eaves portion of the roof, the section being taken adjacent to one of the roof seams on the line 2—2 in Fig. 1,

Fig. 3 is an enlarged fragmentary vertical longitudinal section through the roof on the line 3—3 in Fig. 2,

Fig. 4 is a perspective view of a portion of a unitary two-ply seam cap of modified construction; and

Fig. 5 is a sectional view similar to Fig. 3 showing a further modification of the invention.

In the accompanying drawing, my invention is shown embodied in a car roof comprising metal side plates A of substantially Z-shaped cross section with their inner legs 1 upstanding and having inwardly extending top flanges 2 disposed at an angle conforming to the pitch of the roof. Galvanized metal roof sheets B span the car from side plate to side plate and rest on the inwardly extending top flanges 2 thereof.

As shown in the drawing, the roof sheets B have raised flat topped panels 3 along their adjacent side margins and upstanding flanges 4 along the adjacent edges of said panels that are covered by inverted U-shaped metal seam caps C that are rigidly secured by horizontal rivets 5 to said flanges and have outstanding base flanges D that seat on said panels, whereby said panels, flanges and seam caps cooperate so as together to form rigid upstanding seams which function as the load carrying members or outside carlines of the roof structure.

As shown in the drawing, the roof sheets B are turned down at the eaves to form depending eaves flanges 6 that overhang the upstanding inner legs 1 of the side plates A and are rigidly

secured to the outer face of said legs by horizontal rivets 7. The seam caps C and seam flanges 4 preferably decrease in depth from points inwardly of the side plates A to the eaves where they are turned down, as at 8, over the depending eaves flanges 6 of adjacent roof sheets B and are secured thereto and to the inner legs 1 of said side plates by the rivets 7. As the depth of the seam flanges 4 and seam caps C decreases, there is a corresponding increase in the width of the raised side marginal panels 3 of the roof sheets B and the base flanges of the seam caps C towards the eaves, said panels preferably continuing downwardly along the depending eaves portions 8 of said caps to the lower ends thereof.

According to the present invention, each of the seam caps C is composed of an outer sheet or ply 9 and an inner sheet or ply 10 that are preferably snugly die pressed together in superposed relation for application to the seam flanges 4 as a complete preassembled unit. The outer ply 9 of the unitary two-ply seam cap assembly C is a galvanized metal sheet that is thin enough to permit the sheet to be pressed into the desired shape of the seam cap without causing the zinc to flake from the base metal, while the inner ply 10 of said assembly is made of ungalvanized or black iron for sake of economy and is made thick enough to provide the desired load carrying capacity when acting in combination with the other elements of the combination seam and carline construction. By providing the seam cap C with a galvanized outer ply that is no thicker than one-sixteenth of an inch, the danger of the zinc flaking off is substantially eliminated; and, by die pressing together the inner and outer plies of said cap and then rigidly securing this unitary two ply seam cap to the seam flanges, a seam construction is formed of much greater strength than could be formed out of a single thicker galvanized sheet without injury to its zinc coating. The outer galvanized ply 9 of the seam cap covers and protects the outer surface of the inner ungalvanized ply 10 thereof, while the galvanized roof sheets B cover and protect the inner surface of said ungalvanized inner ply of said cap.

As shown in the drawing, the outer side margins of the galvanized outside ply 9 of the two-ply seam cap C extend beyond the outer side margins of the ungalvanized inside ply thereof and are disposed in the plane of said last mentioned margins, so as, in the finished seam cap, to form depressed side marginal panels 11 that overhang and cover the side edges of said ungalvanized inner ply and seat on the raised side marginal panels 3 of the galvanized roof sheets B.

As shown in Fig. 5, the galvanized outer ply 9 of the two-ply seam cap has the outerside marginal portions 12 thereof extended beyond the raised side marginal panels 3 of the roof sheets B and inclined downwardly to the lower plane or body portions of said sheets where they terminate in depressed side marginal panels 13 that seat or bear against said lower plane or body portions of said sheets. By this arrangement, longitudinal spaces 14 are formed between the roof sheets B and the extended outside marginal portions 12 of the galvanized outside ply 9 of the seam cap C along the raised side marginal panels 3 of said sheets, and these spaces serve as drain channels or passageways for carrying away any water that may leak beneath the depressed outer margins 13 of the extended portions of said galvanized outside ply; they also serve as ventilating panels to keep said spaces or passageways dry; and they also serve to break the line of contact between the roof sheets and said extended portions and thus prevent further flow of water into the seam by capillary attraction. The outwardly extended portions of the galvanized outside section of the seam cap also serve to increase the strength and rigidity of the standing seam construction as well as increasing the weatherproofing qualities thereof; and there is sufficient spring in said outwardly extended portions of the outside ply of said cap to keep the depressed margins 13 thereof in close contact with the roof sheets.

As the seam cap C is made of two plies, the relative thickness of each ply can be varied in accordance with practical and economical considerations, the most important consideration being that the outer galvanized ply 9 shall be thin enough to undergo the necessary shaping operation without impairing its galvanized coat. Thus, as black iron sheets are cheaper than galvanized sheets, it is more economical to use a heavier gage sheet 10*a* for the inner ply than for the outer ply 9*a*, as shown in Fig. 4.

While this invention is especially adapted for the utilization of galvanized sheet metal for the outer ply, said outer ply may be made of other metal sheets that are adapted to resist corrosion, such for instance, as a corrosion resistant alloy steel or a sheet that is especially treated to resist corrosion.

What I claim is:

1. A car roof comprising galvanized metal roof sheets extending from side to side of the car and having upstanding flanges along their adjacent edges and a two-ply seam cap extending from side to side of the car and covering and rigidly secured to said flanges, whereby said flanges and their associated cap together function as an outside carline, said seam cap having base flanges seating on said roof sheets on opposite sides of said upstanding flanges, the outside ply of said seam cap being made of galvanized sheet metal thin enough to permit said ply to be pressed into shape without causing the galvanizing to flake, and the inside ply of said seam cap being made of ungalvanized metal, the base flange portions of said galvanized outside ply extending outwardly beyond the base flange portions of the ungalvanized inside ply and thence downwardly into contact with said roof sheets, the outwardly extended portion of the base flange portions of said galvanized outside ply cooperating with said roof sheets to form longitudinal passageways between said extended base flange portions and said roof sheets.

2. A car roof comprising metal roof sheets extending from side to side of the car and having raised panels along their adjacent margins and upstanding flanges along the adjacent edges of said panels, and a two ply seam cap extending from side to side of the car and covering and rigidly secured to said flanges, whereby said flanges and their associated cap together function as an outside carline, said caps having outstanding base flanges seating on said panels, the outside ply of said cap being made of galvanized metal thin enough to permit said ply to be pressed into shape without causing the galvanizing to flake, and the inner ply of said cap being made of ungalvanized metal, the base flange portions of said galvanized outside ply extending outwardly beyond said panels and the base flange portions of the ungalvanized inner ply and thence downwardly, thereby providing spaces between

said roof sheets and said extended base flange portions of said galvanized outside ply.

3. A car roof comprising galvanized metal roof sheets extending from side to side of the car and having raised panels along their adjacent margins and upstanding flanges along the adjacent edges of said panels, and a two-ply sheet metal seam cap extending from side to side of the car and covering and rigidly secured to said flanges, said cap having base flanges seating on said panels, the outside ply of said cap being galvanized and thin enough to permit said ply to be pressed into shape without causing the galvanizing to flake, and the inside ply of said cap being ungalvanized, the base flange portions of said galvanized outside ply extending outwardly beyond said panels and the base flange portions of the ungalvanized inside ply and having depressed marginal panels that seat on said roof sheets outwardly of said panels, thereby providing passageways alongside said panels between said roof sheets and said extended base flange portions of said galvanized outside ply.

4. A roof for a railway car having spaced side walls, said roof including a pair of galvanized metal roof sheets extending between and supported by said walls and formed with upstanding marginal flanges in contact with each other, and a carline extending between and supported by said walls, said carline comprising an upstanding hollow rib snugly straddling and rigidly secured to said roof sheet flanges and base flanges extending outwardly from said rib, said carline being composed of an ungalvanized metal inner sheet and a galvanized metal outer sheet fitting each other snugly, both carline sheets being thick enough to be load supporting but the galvanized outer sheet being thin enough to permit said sheet to be pressed into shape without causing the galvanizing to flake, the base flange portions of said ungalvanized inner carline sheet seating on said roof sheets on opposite sides of the upstanding flanges thereof, and the base flange portions of said galvanized outer carline sheet extending outwardly beyond the base flange portions of said ungalvanized inner carline sheet and being bent downwardly into contact with said roof sheets entirely beyond the base flange portions of said ungalvanized inner carline sheet, whereby said ungalvanized inner carline sheet is protected from the corrosive action of the elements on all sides by said galvanized roof sheets and said galvanized outer carline sheet.

CHARLES DAVID BONSALL.