2 Sheets—Sheet 1.

J. M. AYER.

CAR-ROOF.

No. 180,088. Patented July 18. 1876.

Fig. 1.

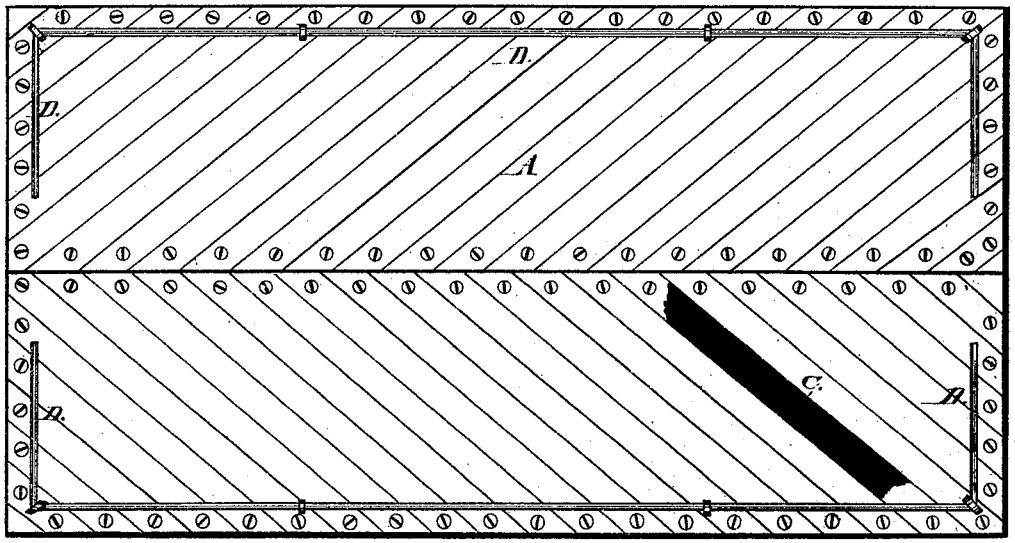
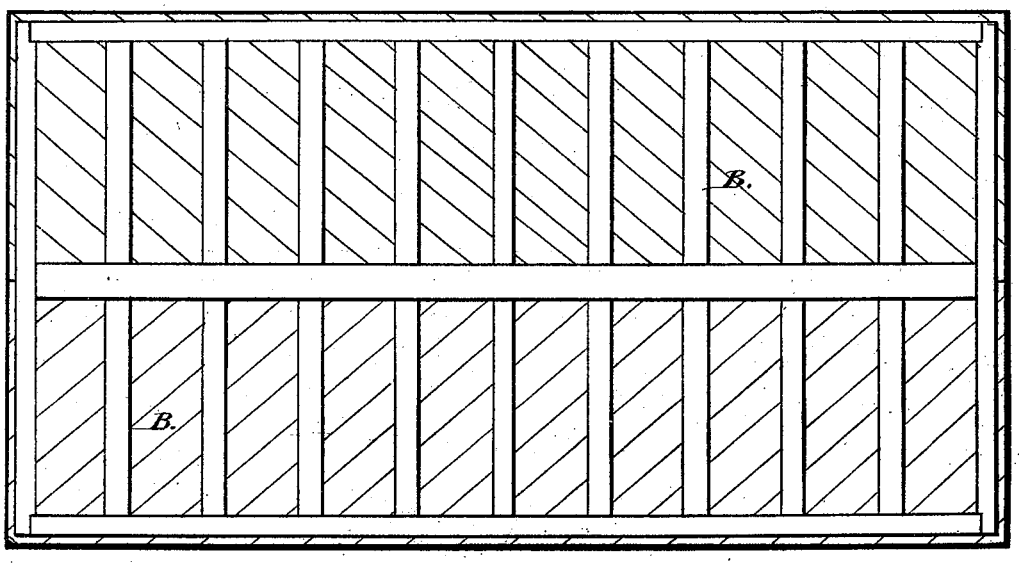


Fig. 2.



WITNESSES:

Casper P. Search

J M Ayer

INVENTOR:

John M. Ayer

2 Sheets—Sheet 2.

J. M. AYER.

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No. 180,088. Patented July 18, 1876.

Fig. 3.

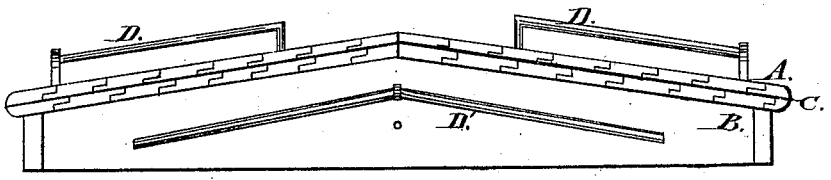
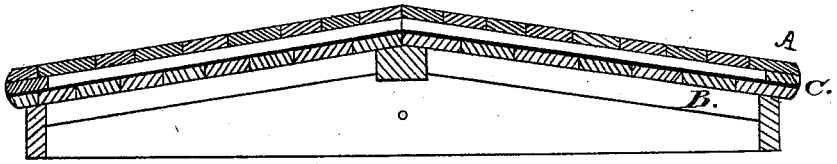


Fig. 4



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UNITED STATES PATENT OFFICE.

JOHN M. AYER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN CAR-ROOFS.

Specification forming part of Letters Patent No. **180,088**, dated July 18, 1876; application filed April 6, 1876.

To all whom it may concern:

Be it known that I, JOHN M. AYER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Roofs for Railway-Cars; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of my invention is to provide cars and other structures with a much lighter roof than is commonly used, which roof shall, at the same time, act as a non-conductor of heat, and be absolutely impervious to moisture under all circumstances, no leakage arising in consequence of expansion or contraction from heat, cold, or other causes, no matter how suddenly or with what degree of violence such expansion or contraction may take place; and it consists in providing such roof with a lining of india-rubber or the material known as "rubber packing," to be placed between the internal lining and external covering of the roof, as hereinafter more fully described.

The accompanying drawings show the application of my invention to railway-cars only; but I do not confine myself to this, as it is equally applicable to the roofs of houses, carriages, &c., and the decks of vessels.

For decks of vessels, or cabin-roofs, india-rubber or the rubber packing is laid on boards, metal, or other suitable material, and is fastened in any suitable way by cement, tacks, or otherwise. The rubber or packing may have cloth or duck on one or both sides. The upper layer may then be painted with mineral paint, sanded, or coated with any other suitable material, the object being to preserve the duck or decking, and make a good walking-surface.

I prefer, in laying the rubber, that it be about one-thirty-second or one-twenty-fourth of an inch in thickness, the duck about the same, or a little heavier; but I do not limit myself to any thickness in either. I also prefer that the duck be made with the rubber, as it is then a part of it, and thus obviate the necessity of first laying one separately and covering it with the other.

Boards may be laid over the rubber and duck, if desired.

Neither do I wish to limit myself to its application to roofs and decks only, for I apply my invention likewise to refrigerator-cars and other refrigerators, which shall be wholly inclosed in this manner, with or without the external board covering.

Hitherto it has been customary to cover cars with double boards, or boards and metal in combination; but this method is by no means as satisfactory in its results as mine of employing india-rubber or rubber packing as a lining, the rubber or packing being much lighter, a non-conductor of heat, and non-oxidizable when exposed to the action of the air or weather. Moreover, when subjected to sudden and violent concussions, or the perpetual pounding and jarring which are inseparable from the moving of cars, it is far preferable to metal, inasmuch as there are no seams to open, and hence no joints to loosen or rivets to displace. It is superior, also, to wood, as the latter, like metal, conducts heat, though in a less degree, and cannot be so constructed as to remain water-tight for any considerable length of time.

Under my roof, in consequence of the valuable properties of india-rubber as a non-conductor of heat, together with my peculiar method (hereinafter described) of constructing said roof, fruit, fish, grain, flour, &c., may be transported long distances without suffering injury from changes of temperature, thus obviating much loss to shippers and others. Hence my intention to construct refrigerator-cars in which my principle shall be applied to the sides, ends, and floors, as well as to the roofs.

Referring to the accompanying drawings, Figure 1 is a plan view of the upper surface of the car-roof without the walking-plank, and with a small portion broken away to show the rubber coating below. Fig. 2 is a plan view of the interior surface. Fig. 3 is an end view. Fig. 4 is a vertical transverse section.

A represents the exterior covering, while B represents the interior layer of boards, and C represents the intermediate water-proof non-

conducting material, or lining of india-rubber, or rubber packing, as it is termed, which may be fastened to the internal layer B by a coating of shellac or other cement, to which it will adhere, or by means of tacks, nails, or the like.

The rubber coating for each car consists of two strips or sheets, each about as long as the car and somewhat more than half the width thereof, the two parts lapping each other along the center. Thus there are no transverse joints or seams.

Of course, if convenient, the rubber may be in one piece or sheet. If in two pieces, but not broad enough to lap, a separate strip of the same material may be laid over the seam along the center of the car.

The internal layer B may be made of such strength as to render it capable of sustaining sufficient weight to enable me to dispense with the external covering A, said layer B having upon its upper surface the rubber coating C, as before described, which, in that case, would form the outermost surface of the roof. Moreover, it would not in the least be departing from the spirit of my invention if the interior lining B were dispensed with wholly, and the non-conducting, impervious material fastened to the under surface of the external covering A. In general, however, I prefer to employ all three layers; and I find that some advantage might be secured, especially in the way of excluding heat, by having a space or air-chamber between the outer covering A and the impervious coating C. This air-chamber should be provided with suitable openings at the sides, to secure free ventilation. It might be desirable, in some cases, to have openings in the air-chamber at the ends as well as the sides, or at the ends only, and also into the interior of the car. Where no air-chamber is employed, it may be found advantageous, in certain cases, to fasten the rubber lining to both the upper and lower layer, by means of cement or otherwise.

By referring to the drawings it will be seen that the boards of the roof lie in diagonal directions. In the external covering the boards extend diagonally from the edges to the center of the roof, where they form acute angles; and the internal layer is formed in the same way as the external covering, the boards, however, lying in the opposite direction, and forming nearly, or quite, right angles with those of the external covering; but I do not confine myself to this form of construction. The boards of either or both divisions of the roof may be laid as shown, or longitudinally, or laterally; and they may be straight, as in the drawings, or bent to conform to a curved roof, such as cars often have, without departing in any degree from the spirit of my invention, so long as they are employed in combination with a layer of india-rubber or the material termed "rubber packing." The lower boards B, in particular, since they are covered by the rubber or packing, may be of common lumber, and may extend lengthwise with the car. In this manner the cost of construction is lessened, and fewer cross-supports are needed.

D represents safeguards on top of the car, which may consist of a metallic or wooden bar or railing, arranged in the manner shown, or else of a plank, or an equivalent of any material, secured upon its edge, and having slots or openings at proper intervals along the bottom, through which water may run off. This safeguard is intended principally as a protection, to prevent people from falling off the car.

D′ represents safeguards under the edge of the roof, at the ends of the car, which safeguards are for the purpose of affording a security against a person's reaching the track in the event of his falling while passing from one car to another.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of an external covering, internal lining, and intermediate coating of india-rubber or the material termed "rubber packing," substantially as and for the purpose described.

2. The combination of the internal lining B and india-rubber or the material termed "rubber packing" C, substantially as described.

3. The combination of the india-rubber or rubber packing C and the outer covering A, substantially as described.

4. The combination of an outer covering, internal lining, water-proof non-conducting material, and an air-chamber, such air-chamber lying between the outer covering and water-proof material, and having openings, the whole being constructed in the manner and for the purpose described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN M. AYER.

Witnesses:
CASPER F. SEARCH,
G. M. AYER.