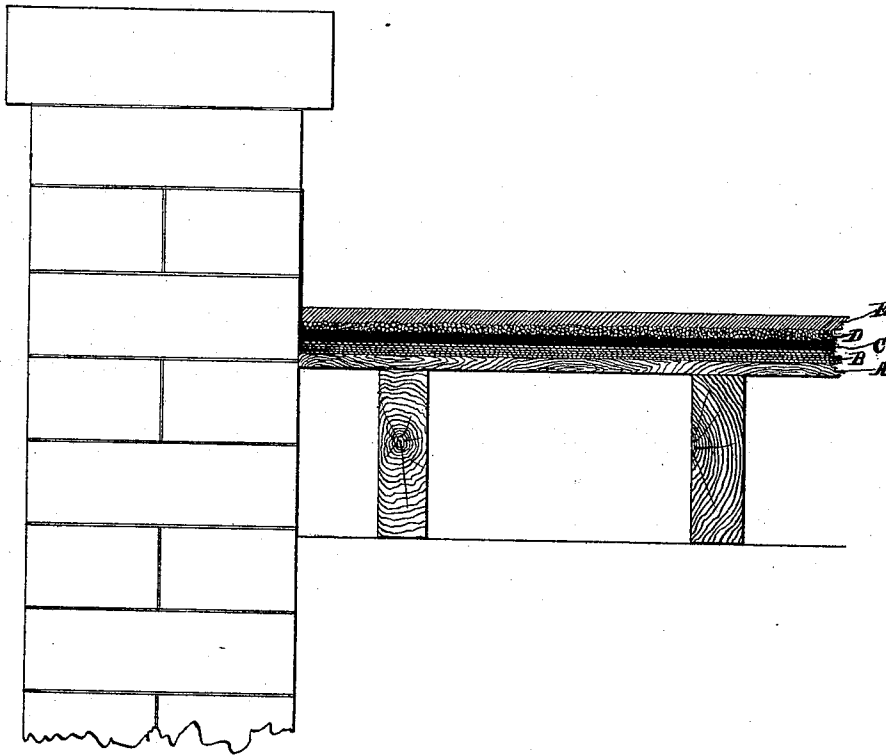


C. M. WARREN.

ROOF.

No. 175,531.

Patented March 28, 1876.



Witnesses

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UNITED STATES PATENT OFFICE.

CYRUS M. WARREN, OF BROOKLINE, MASSACHUSETTS.

IMPROVEMENT IN ROOFS.

Specification forming part of Letters Patent No. **175,531**, dated March 28, 1876; application filed September 16, 1875.

To all whom it may concern:

Be it known that I, CYRUS M. WARREN, of Brookline, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Fire and Water Proof Roofs, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing.

The object of my invention is an improvement whereby the objectionable features of the roofs now made of felt covered with pitch and gravel, or other material, are removed, and their fire-proof quality and durability increased; and it consists in the application to the properly-prepared surface of such roofs of a layer of hydraulic-cement mortar of suitable quantity, consistency, and thickness, maintaining the same in a moist condition by application of water during the period required for setting or hardening.

The improved roof is illustrated by the accompanying drawing, in which A represents the boards or sheathing on which the roof is laid. B represents a layer of three or more thicknesses of felt or paper laid loosely on the sheathing, but cemented together under the edges of the laps by means of a composition of pitch of suitable quality, prepared from the residuum of the distillation of coal-tar. C represents a layer of the same pitch applied hot, and immediately filled with a coating, D, of clean-washed gravel or pebbles of medium size and free from sand; or, in place of gravel, broken stone, or slate, or any other material of a similar nature, may be substituted. E represents the finishing-layer of hydraulic cement.

That the nature of my invention may be more clearly defined I would state, first, that the fire-proof quality claimed for the roofs composed exclusively of felt, pitch, and gravel, depends, to a large extent, on a layer of loose gravel which it has been found essential to leave in larger quantity on the surface of that embedded in the pitch, and without which more or less of the pitch oozing from among the pebbles would run down the roof, and, lying exposed on the surface of the roof and in the gutters, would be liable to ignite from the burning of an adjacent building. The necessary presence of this loose gravel is a constant source of annoyance in various ways. During

heavy rains the gutters frequently become filled with it, causing the water to overflow in torrents, and run down the wall underneath; and during the prevalence of high winds the gravel is frequently blown off in considerable quantities, resulting in the breakage of glass or other damage. This defect is obviated by my invention. Second, the layer of pitch in which the gravel is embedded has been found to deteriorate gradually, and finally become friable and worthless, by exposure to the action of the sun and other atmospheric influences; while, on the contrary, that protected between the layers of felt has been found to undergo scarcely a perceptible change after many years' exposure. The durability of the roof is therefore prolonged indefinitely by my invention, which completely protects the surface pitch from atmospheric agencies. Third, roofs whose exterior surface is composed of pitch and gravel are ill adapted for use as a footway for any purpose—such as the drying of clothes, for example—for which roofs are frequently brought into requisition in densely-populated localities, and are peculiarly liable to injury by such use. This is obviated by my invention, which gives to such roofs a hard, smooth, and firm surface, and may be applied to new or old roofs of this description.

To enable others skilled in the art to use my invention, I will proceed to describe the process of construction.

The roof is laid on tongued-and-grooved or matched sheathing, presenting an even surface. On this are laid, in successive overlapping courses, commencing at the gutter, (into which the first two or three courses, well cemented together, should slightly extend,) not less than three thicknesses of felt, weighing not less than forty-five pounds per hundred square feet of roof. Each course should overlap the preceding one not less than two-thirds of its width, and be well cemented under the lower edge of the lap with the preparation of hot pitch. Over the surface of the whole, commencing at the upper edge of the roof, is then spread a sufficient layer of the preparation of hot pitch, requiring not less than nine or ten gallons per hundred square feet of roof, following immediately with the application of clean and warm dry pebbles of medium size,

or other material of a similar nature. After allowing the pebbles to become well settled and embedded in the pitch, occupying one or more warm, sunny days, the excess of loose gravel may be carefully swept up in the cooler part of the day and removed, and the surface of the roof afterward thoroughly washed. The roof is now ready to receive the finishing layer of hydraulic-cement mortar, which may be prepared in the ordinary manner of fresh hydraulic cement of good quality, used either alone, or mixed with sharp and clean fine quartz sand, preferably in equal parts. The consistency of the mortar should be that of a moderately-thin paste, which may be spread upon the previously-moistened surface of the roof by means of a broad, stiff broom of rattan, moving the mortar back and forth to insure the filling of all interstices among the pebbles, and leaving it, preferably, of a thickness just sufficient to cover the pebbles. Either immediately, or within twenty-four hours after the spreading of the cement mortar, the surface of the roof may be divided, if necessary, into squares of one foot each by means of a sharp-pointed steel instrument, scratching through the layer of hydraulic-cement mortar, and thus preventing the possibility of the occurrence of large cracks from shrinkage, which, uncontrolled, (if too thick a layer of cement has been used,) might tend to strain and injure the roof beneath; but which will prove harmless in its effects if distributed equally

along the weakened lines of division produced by the scratching. These lines themselves will in no wise injure the roof, since the hydraulic cement is not relied on or needed to add to its excellent water-proof character.

It only remains, now, to provide a constant supply of water to maintain the layer of cement mortar in a moist condition during the period required for thoroughly setting or hardening. This is conveniently accomplished by laying a perforated pipe along the upper edge of the roof, and connecting with a water-main, tank, or other source of supply.

I do not claim the application of hydraulic-cement mortar in the manufacture of roofs, as I am aware that it has been variously employed for this purpose. The distinctive character of my invention consists in the application of hydraulic-cement mortar as an exterior and finishing-layer of an already water-tight roof composed of felt, pitch, and gravel, or other similar material.

What I claim as my invention is—

The combination of a coating of hydraulic-cement mortar, as an exterior and finishing layer, with a roof composed of felt or paper, pitch and gravel, sand, broken stone, or other similar material, substantially as described, and for the purpose set forth.

C. M. WARREN.

Witnesses:

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