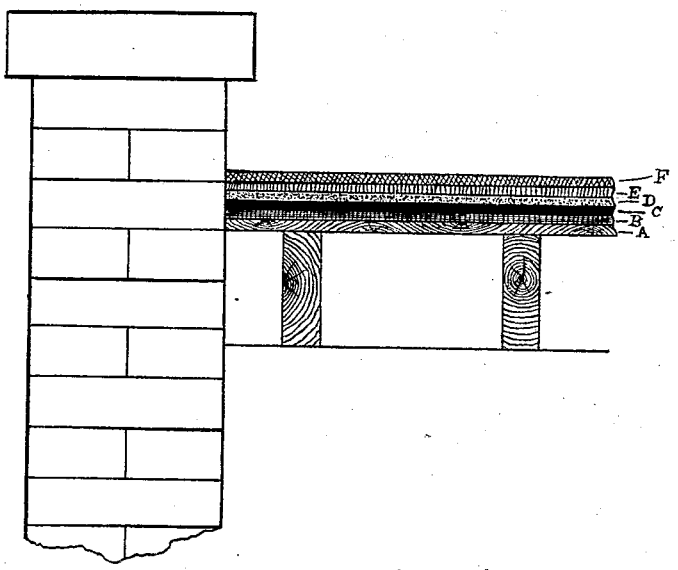
C. M. WARREN.

Composite Roof.

No. 217,917. Patented July 29, 1879.



Witnesses.

Geo. E. Corey

Fred L. Kane

Inventor.

Cyrus M. Warren

UNITED STATES PATENT OFFICE.

CYRUS M. WARREN, OF BROOKLINE, MASSACHUSETTS.

IMPROVEMENT IN COMPOSITE ROOFS.

Specification forming part of Letters Patent No. **217,917**, dated July 29, 1879; application filed November 22, 1878.

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 Composite Roofs, which invention is fully described in the following specification, reference being had to the accompanying drawing.

This invention is intended as an improvement upon the roof for which Letters Patent were granted to me March 28, 1876, numbered 175,531; and it consists in substituting slate, tile, or equivalent rigid material, embedded in bituminous, resinous, or coal-tar cement, or equivalent material, for the layer of hydraulic cement therein described.

In carrying out my invention the roof is first constructed in the ordinary manner of laying a gravel roof, or in any other suitable manner, usually of three or more thicknesses or overlapping courses of saturated paper or felt upon the sheathing-boards A, with intermediate layers of hot bituminous or coal-tar cement, preferably the former, or equivalent material, and the surface of the felt foundation B thus formed spread over with a layer, C, of the hot bituminous cement, or equivalent material, and this, while still hot, immediately covered and filled with warm or dry gravel D, or equivalent material. A finer mineral material may be substituted for the gravel; but the latter is far preferable.

To the gravel roof thus constructed, or in any other suitable manner, and after the bituminous cement has well set by cooling, the loose gravel is swept off, and the firm gravel surface D remaining is covered with a layer, E, of the hot bituminous cement sufficient to fill the voids between and thinly coat the surface of the projecting pebbles, but avoiding an excess. The surface of the cemented pebbles is now sprinkled over with dry sand, or equivalent material, to admit of its being walked upon without sticking to the feet, and to partially fill the cement to prevent any possibility of its running if too much has been applied, and then covered with a layer, F, of warm slates, tile, or equivalent rigid material, which, by the aid of their contained heat, may be readily imbedded in the bituminous cement and brought to a firm bearing upon the projecting pebbles; or this may be done with a hot roller, or other appliance, after the slates or tile are laid.

If no excess of bituminous cement has been applied immediately under the slates or tile, the pebbles and slates will suffice to prevent any running out of the cement, which should not be too easily fusible; and the slates or tile themselves, resting directly on the pebbles, will not be liable to slide or be otherwise displaced.

I am aware of the patent issued to Luke S. Mills and C. Hart Smith, No. 40,542, dated November 3, 1863, and also of the two patents issued to Tobias New, numbered and dated as follows, viz: No. 147,962, dated February 24, 1874, Reissue No. 8,414, dated September 10, 1878, and No. 209,131, dated October 22, 1878; and I disclaim any invention contained in either of these patents.

In the construction of a paved roof, the pavement of which is laid or embedded in bituminous or any kind of soft or fusible cementing material, or in a composition of which such a fusible material is one of the chief ingredients, it is important that such material should be intermixed with some firm rigid supporting substance, on which the slates or other paving may rest, in order to protect the underlying soft material from the pressure, to which it would otherwise be subjected, of the superimposed paving material, and, more important still, from the greater pressure incident to its use for the various purposes for which such a paved roof is intended.

With no other support under the slate or tile than a material which is soft and plastic in warm weather, such as that made of bituminous cement and sand, continued pressure on one end or corner of a slate or tile, as in tilting back in chairs, or even standing for some time on one end or corner of a slate or tile, would press it downward by displacing the bituminous composition underneath and raise the other end or corner, making the surface of the roof uneven, and placing the slates or tile in position to be easily broken.

In my improved roof these objections are entirely obviated.

The slates or tile have a firm bearing upon the pebbles under their entire surface, (the

pebbles themselves resting on the felt,) to which they are securely fastened with the bituminous cement, so that no part of the roof will suffer injury, either by the heat of the sun or from any severe usage to which such a roof is likely to be subjected.

I claim as my invention—

The combination of slate, or other equivalent rigid material, laid in bituminous cement, or other equivalent material, on a foundation of gravel, or other equivalent supporting material, embedded in bituminous cement, or other equivalent material, in the construction of a roof, substantially as set forth.

CYRUS M. WARREN.

Witnesses:

ALLEN LINCOLN,

HERBERT M. WARREN.