

UNITED STATES PATENT OFFICE.

CYRUS M. WARREN, OF BROOKLINE, MASSACHUSETTS.

IMPROVEMENT IN ROOFING MATERIAL.

Specification forming part of Letters Patent No. **179,828**, dated July 11, 1873; application filed January 11, 1876.

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 Improved Roofing Material, which invention is fully set forth in the following specification.

This invention consists in a roofing material composed of native bitumen or asphaltum, and the residuum of petroleum or "candle-tar;" also, in a roofing material composed of paper or felt saturated or coated (or both) with a compound made of native bitumen or asphaltum and the heavy oil or residuum of petroleum or candle-tar, or saturated with either of these last-named non-volatile oils or tar.

In preparing a roofing material, great care must be taken to select non-volatile materials which will not melt and run by the action of the sun's rays, but which can be readily melted by artificial heat and spread on the roof, or used for saturating or coating paper or felt.

The roofing materials most commonly used, such as coal-tar pitch or coal-tar, are largely composed of volatile matters, and if the same are spread on a roof and exposed for a certain time to the influence of the atmosphere, the volatile matters evaporate, the roofing material becomes brittle and full of cracks, and the roof is spoiled; or, if such roofing materials are applied to paper or felt, this paper or felt, when spread on a roof, becomes brittle as soon as the volatile matters have evaporated, and the consequence is a leaky roof.

In order to overcome these difficulties I have selected for my roofing material ingredients which contain no volatile matters, such as native bitumen or asphaltum, and the residuum of petroleum or candle-tar. The native bitumens, when used without the addition of other materials, are too hard and liable to crack when spread on a roof and exposed to the influence of the atmosphere, and I have, therefore, added to such native bitumens a quantity of the residuum of petroleum or candle-tar, sufficient to render the mixture tenacious and durable during all seasons of the year.

Candle-tar is a residual product obtained by distilling candle-stock, and the residuum of petroleum is obtained, in the same manner, by distilling petroleum; and since it requires a very high temperature to accomplish these

objects, the residuums obtained are of such a nature that they can stand the various influences of the atmosphere without undergoing any change.

The proportion in which I mix the native bitumen and candle-tar or residuum of petroleum together depends, chiefly, upon the nature of the bitumen, and the place where the material is to be used. My roofing material may also be employed in combination with paper or felt, either by saturating such paper or felt, or by coating it with the compound.

The apparatus employed in saturating the paper or felt is the same as that in common use for saturating with coal-tar, and the process differs only in substituting for the latter the tarry residuum of petroleum or candle-tar thickened with native bitumen or asphaltum. Paper or felt saturated with this material will remain permanently soft and flexible, and the pitch-like compound soft and elastic.

When it is desired to make the roofing paper or felt compact and clean to handle, and adapt it to other uses, such as sheathing or laying under slates or shingles, I coat the surfaces of the saturated or unsaturated felt or paper by passing it through the melted pitch-like compound, (made hard enough, in this case, to prevent its running on a steep surface when exposed to the sun,) and thence between hot press-cylinders. If one surface only is to be coated, I pass the paper or felt over and in contact with a revolving cylinder, partly immersed in the melted pitch-like material, and thence between the hot press-cylinders, as before. In addition to this, the surface may be dusted, as the felt leaves the press-cylinders, with a suitable pulverized material, and by any convenient method.

In preparing my compound a portion of resin may be substituted for an equivalent portion of the native bitumen or asphaltum.

A good roofing material is obtained, also, by saturating paper or felt with either of the non-volatile oils above stated, such as the heavy oil or the residuum of petroleum or candle-tar.

What I claim as new, and desire to secure by Letters Patent, is—

1. A roofing material composed of native bitumen or asphaltum and the heavy oil or

residuum of petroleum or candle-tar mixed together, substantially as specified.

2. A roofing material made of paper or felt coated or saturated (or both) with a compound of native bitumen or asphaltum, and the heavy oil or residuum of petroleum or candle-tar, substantially as set forth.

3. A roofing material made of paper or felt saturated with a non-volatile oil, such as the heavy oil or the residuum of petroleum or

candle-tar, or any mixture of the same, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand and seal this 7th day of January, 1876.

CYRUS M. WARREN. [L. s.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.