E. B. WARREN.
Gravel-Roof.

No. 202,493. Patented April 16, 1878.

FIG. 1

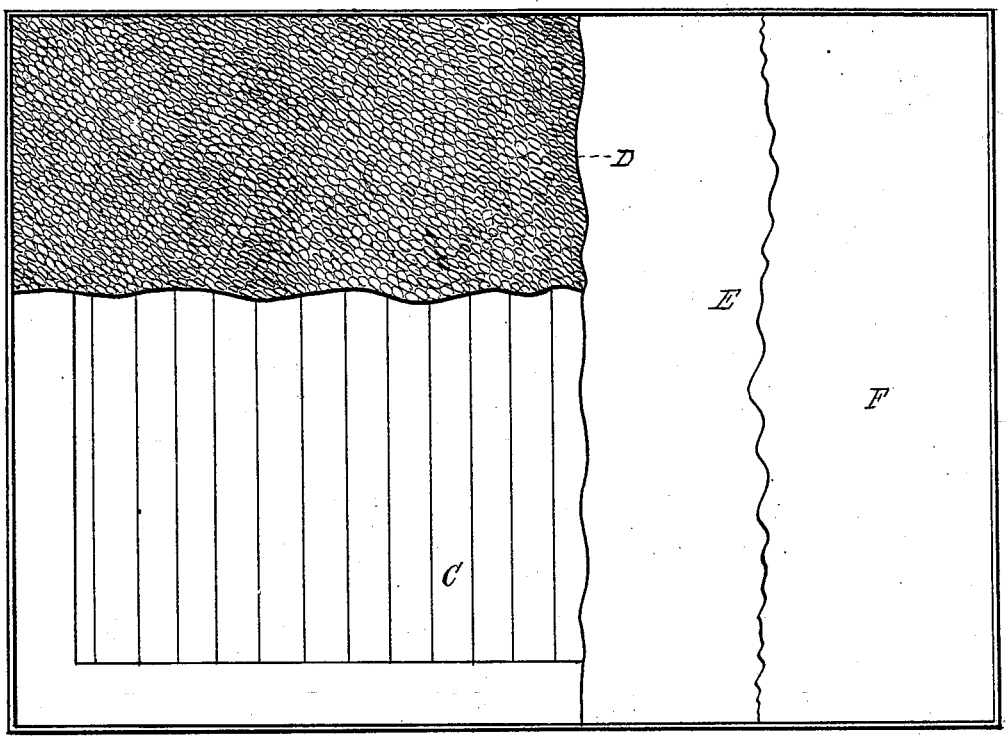
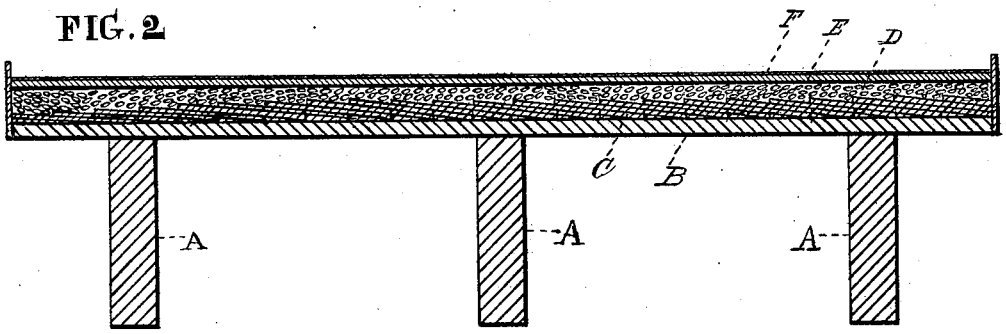


FIG. 2



Witnesses.

Thomas J. Bawley

S. H. Millett

Inventor

Ebenezer Burgess Warren

per Stephen Ustick Attorney

UNITED STATES PATENT OFFICE.

EBENEZER B. WARREN, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN GRAVEL ROOFS.

Specification forming part of Letters Patent No. **202,493**, dated April 16, 1878; application filed January 28, 1878.

To all whom it may concern:

Be it known that I, EBENEZER BURGESS WARREN, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in what are commonly known as "Gravel Roofs," which invention is fully set forth in the following specification and the accompanying drawings, in which—

Figure 1 is a top view of a portion of a gravel roof with my improvement. Fig. 2 is a cross-section of the same.

Like letters of reference in both figures indicate the same parts.

The object of my invention is to remedy the serious objections to gravel roofing and similar roofing on account of the washing of the gravel or other substance into the gutters, and also on account of the too direct action of the sun upon the composition which is held by the gravel, causing it to run, and, in many cases, to fill the gutters.

The object is, also, to prevent the usual rapid wearing away by rain of the composition, which is held by the capillary attraction of the gravel; and the invention consists of a surface-coating composed of asphaltum softened with from four to forty per cent. of petroleum-tar, mixed with fine sand, in sufficient quantity to enable the person applying it to tamp it, when hot, with heated tamping-iron, thus packing the sand and asphaltic cement together, and embedding them in the surface of gravel or other similar substance below the coating. The use of sand is to hold the asphaltic composition by capillary attraction, without forming such a solid or hard mass as would be occasioned by the use of pulverized stone or similar substance, which would cause it to become so hard and solid as to cause it to crack from contraction when exposed to extreme cold weather. This surface-coating is then washed with a solution of hydraulic cement or lime, red lead, brown ocher, or other suitable wash.

I do not confine myself to any particular proportion of asphaltic cement, but usually mix from twelve to twenty-five per cent. with sand.

When the material which forms the coating is applied in the manner above described, the surface becomes perfectly smooth and quite hard when chilled; but the elasticity of the asphaltic cement prevents cracking, even by extreme cold weather.

The reasons for using asphaltum are, its well-known durability, and, even when mixed with petroleum-tar, not being volatile, but remaining for years as elastic as when first applied.

In the preparation of the composition a small quantity of sulphur may be used advantageously.

One of the most important objects obtained by my invention is a great increase in the durability of a cheap mode of roofing.

The wash may be dispensed with, if desired.

In the drawings, A A A represent the rafters of a portion of a roof; B, the sheathing; and C, the felting or paper, saturated with asphaltic cement, coal-tar, or other bituminous substance, composed of sheets, which are cemented together with asphaltic cement. D is a layer of asphaltic, coal-tar, or other bituminous cement, and gravel, which covers the felting C, broken stone, slag, or other similar substance. E is the surface-coating, which adheres to the layer of gravel and cement below it. F is the wash on the surface-coating.

Instead of tamping the layer of asphaltic cement and gravel, it may be solidified by rolling.

I do not claim the softening of asphaltum with petroleum-tar or other similar substance, as that is not new.

I claim as my invention—

1. The surfacing of old gravel roofing with a composition of native asphaltum, softened with petroleum-tar, and mixed with a sufficient quantity of fine sand, so that the asphaltum and the sand will pack solidly together by tamping or rolling when hot, and thus be prevented from becoming soft by the action of summer heat, the surface to be washed, or not, with a solution of hydraulic cement or other wash, substantially as set forth.

2. A roofing composed of a layer or layers of felting or paper saturated with any preparation of asphaltum, petroleum-tar, or coal-tar, upon which is spread asphaltic pitch, coal-tar pitch, pine-pitch, or rosin, softened by mixing it with other substances, into which is embedded clean-washed gravel, free from sand, or, in place of gravel, broken stone, slag, or other material of

a similar nature, then, after removing the gravel which has failed to become embedded, applying a surface-coating of my above-described composition of asphaltum, softened with petroleum-tar, mixed with fine sand, and making this surface compact and smooth by tamping or rolling while hot, which may be washed with hydraulic cement or other wash, substantially as set forth.

EBENEZER BURGESS WARREN.

Witnesses:
STEPHEN USTICK,
THOMAS J. BEWLEY.