(No Model.)

# C. M. WARREN.

## ROOFING FABRIC AND METHOD OF APPLYING THE SAME.

No. 291,440. Patented Jan. 1, 1884.

*Fig. 1.*

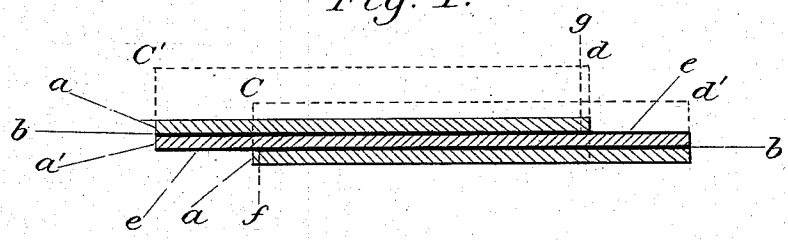



*Fig. 2.*

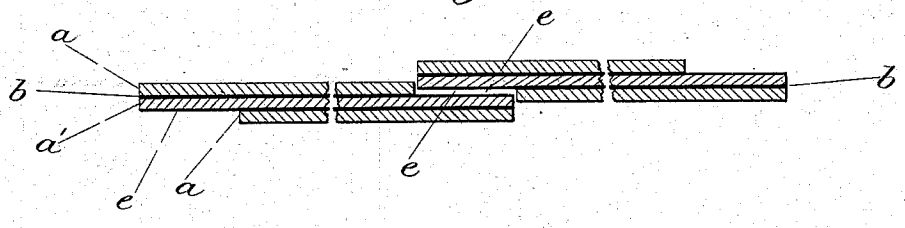



*Fig. 3.*

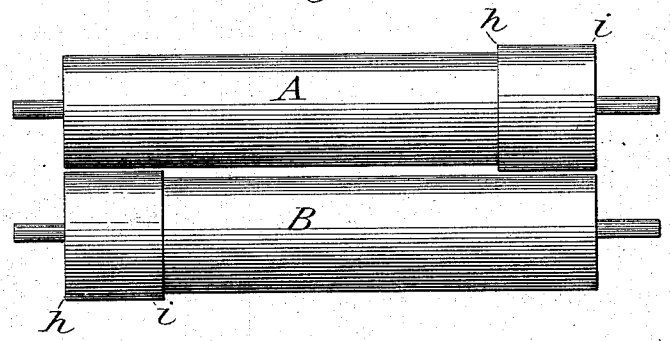
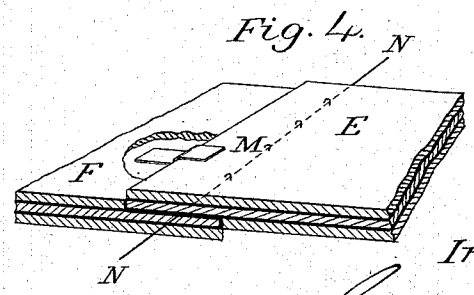



*Fig. 5.*



*Fig. 4.*




Witnesses:
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# UNITED STATES PATENT OFFICE.

CYRUS M. WARREN, OF BROOKLINE, MASSACHUSETTS.

## ROOFING FABRIC AND METHOD OF APPLYING THE SAME.

SPECIFICATION forming part of Letters Patent No. 291,440, dated January 1, 1884.

Application filed March 20, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, CYRUS M. WARREN, a citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Roofing Fabrics and in the Method of Applying the Same, of which the following is a specification.

My invention relates to improvements in the so-called "ready roofing," composed of either two or more layers of saturated paper or felt or of paper or felt and cloth cemented together, in a machine, with an adhesive water-proof cement; and the objects of my improvements are, first, to provide a reliable joining of the sheets upon the roof that will admit of expansion and contraction without damage; second, to provide safer means of fastening the fabric to the roof-boards, whereby its liability to suffer injury by shrinkage, either of itself or the boards, will be overcome or greatly diminished; and, third, to lessen its cost and the expense of application. I attain these objects by constructing the fabric as illustrated in the accompanying drawings.

In Figure 1 I have shown a cross-section of a single sheet of the fabric composed of three layers of felt, *a a' a*, and two layers of adhesive cement, *b b*, between the points *c d*, and two thicknesses of felt and two layers of the cement between the points *d d'* and the points *c c'*, and a layer of thin Manila or other strong paper, *e e*, or its equivalent, between the points *c' f* and the points *d' g*. It will be observed that by this construction or arrangement of the different layers of felt—the one on the other—I produce an article having both edges two-ply or of two thicknesses of felt, while the main portion or body of the article is three-ply or of three thicknesses of felt, so that when placed on the roof there will be four thicknesses of felt at the points where the felts overlap, and the reduced or rabbeted edge of the felt will serve as a guide in laying the adjacent strip of felt. The felt employed in the manufacture of the fabric may be saturated with any of the materials now in use for this purpose—as coal-tar or a fluid or semi-fluid compound of asphaltum and petroleum residuum, &c.—and for a cement to unite the layers of felt the ordinary coal-tar pitch, or a compound of similar consistency made of asphaltum and petroleum residuum, or other suitable adhesive water-proof material may be employed.

Fig. 1 is a cross-sectional view of a single sheet of the fabric, showing the offsets or rabbets in the edges which constitute the lap. Fig. 2 is a cross-sectional view of two sheets, showing their relative arrangement as applied to the roof. Fig. 3 is a view in elevation of the rolls between which the felts are coated with the cement and formed into a single sheet. Fig. 4 is a view, partly in perspective and partly in section, of two layers of the completed fabric as applied to the roof, with the fastening devices for holding the same thereon. Fig. 5 is a view in perspective of a metallic clip for holding the edges of two adjoining sheets together.

In Fig. 2 I have shown a cross-section of two sheets of the fabric united—as upon a roof—by overlapping and interposing a layer of adhesive cement. The edge of the lap is still further secured by metallic fasteners, Fig. 5, inserted, as at M in Fig. 4, over the edge of the top sheet and under the upper layer of the bottom one, the whole being secured to the roof-boards by means of a wire stretched along under the lap and fastened by staples, as shown at N, Fig. 4.

Instead of staples, strong nails may be employed, in which case the stretched wire is wound once around each of the nails, already partly driven, along the line intended for the wire, and the driving of the nails then completed.

Instead of applying the wire fastening under the lap, as shown in the drawings, it may be placed on the top, if preferred. Its object is to protect the roofing against wind.

Instead of using saturated paper or felt for the middle layer, *a'*, dry Manila or other strong paper or cloth may be substituted, and the strips of Manila paper dispensed with. The advantages gained will be a stronger fabric, thinner edges, and a smoother roof-surface.

In carrying out my invention, in respect to the manufacture of the fabric, I employ a machine in which the layers of cement are

formed between the layers of felt by passing the latter downward between two adjustable rollers revolving toward each other, and which, by being provided with plates fitting closely against the ends, form a hopper, which contains the melted cement. The thickness of the layers of cement retained between the layers of felt is controlled by increasing the space between the rollers.

My improvement of this machine, to adapt it for making my fabric, consists in enlarging the diameters of the rollers at opposite ends, as shown in Fig. 3, for a space between *h i* equal in width to the desired width of the lap, and in enlarged diameter equal to the difference between the thickness of the lap and that of the main body of the fabric.

The advantages gained by making the lap thinner than the main body of the fabric are the following, viz: It is more pliable, and therefore easily held down by the metallic fastener M while the cement is hardening, thereby and in connection with the wire fastening overcoming the objectionable necessity and extra cost of thickly nailing the outer edge of the lap one and one-half to two inches apart, as hitherto practiced, and forming a joint the parts of which are movable upon each other, and thus admitting of expansion and contraction without danger of loosening the joint or rupture of the fabric.

The use of wire to secure the fabric against wind is not only cheaper, but has also the great advantage over the close nailing that the fastenings of the wire (nails or staples) may be few and far between, admitting of comparatively free expansion and contraction of the boards, and lessening greatly the liability to injury of the fabric from this cause.

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

1. A roofing fabric composed of three webs or layers of felt or other suitable material cemented together with layers of water-proof cement, the outer layers of which are so arranged or disposed as to make the fabric of two thicknesses of felt at the edges, as set forth.

2. A roofing fabric composed of a series of layers of felt or other material cemented together in the manner described, so as to leave a ledge or rabbeted portion at both edges, the rabbeted portions having cemented thereto a strip of Manila paper or other thin material.

3. A roof the covering of which is composed of roofing-felt, the layers of felt being overlapped at the edges and secured to the roof-boards by means of a wire or wires and staples or hooks, as set forth.

4. A fastening for the overlapping edges of a felt or fabric roofing, consisting of a thin strip of metal bent at its center, so that the lower end can be placed on or within the underlapping edge of the felt and the upper end placed over the overlapping edge of the felt, as set forth.

5. A roof-covering composed of overlapping layers of felt, substantially such as described, the overlapping edges of which are secured by metallic straps and wires, substantially as described.

6. In a machine for making roofing-felt, in which the edges are made thinner than the main portion, the rollers A B, the opposite ends of which are made larger or of a greater diameter than the other portions of the rolls, and mounted so as to leave a space between the enlarged portions and the opposite roll to admit of the passage of the thin edges of the felt therethrough, as set forth.

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