(No Model.)

W. H. STEWART.

ROOFING.

No. 332,570. Patented Dec. 15, 1885.

Fig. 1.

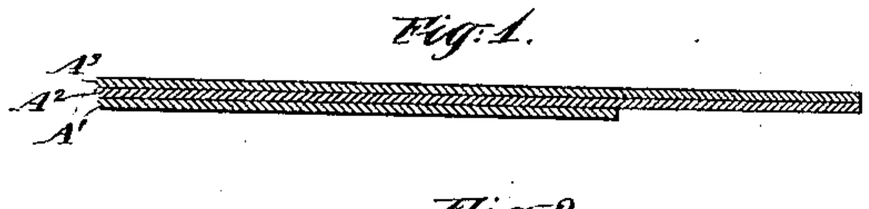


Fig. 2.

Fig. 3.

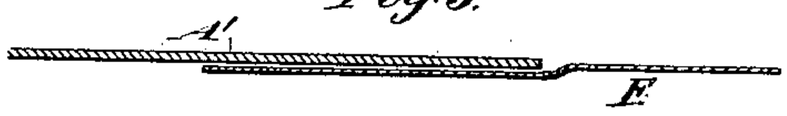


Fig. 4.

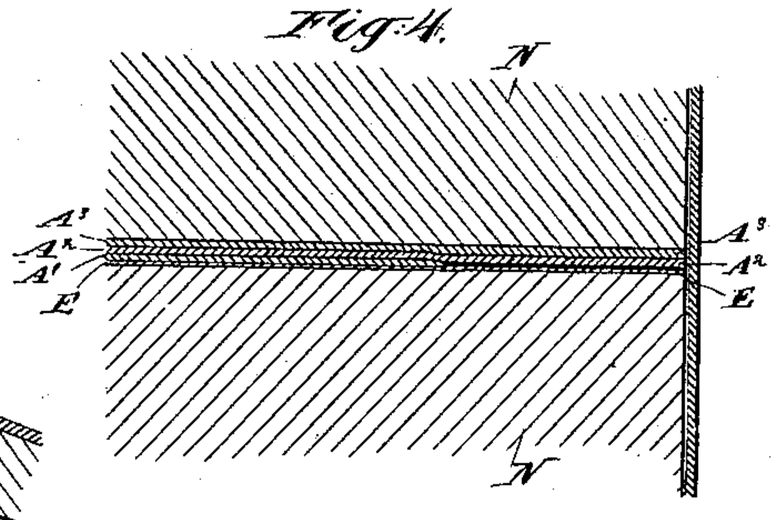


Fig. 7.

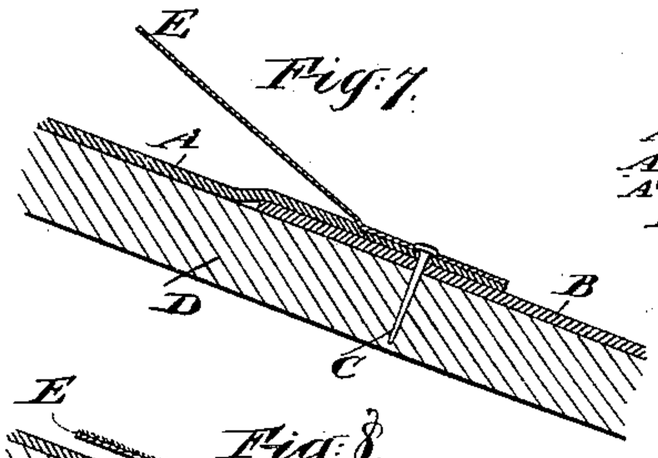


Fig. 8.

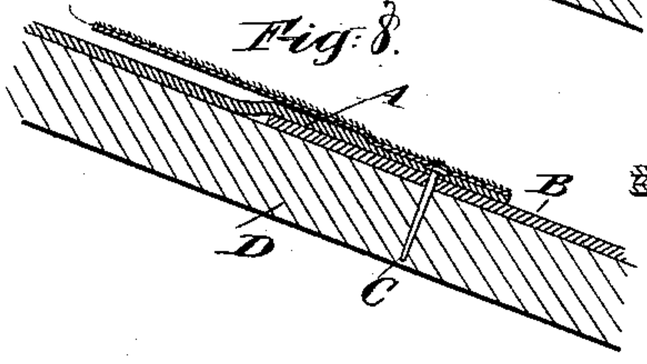


Fig. 5.

Fig. 10.

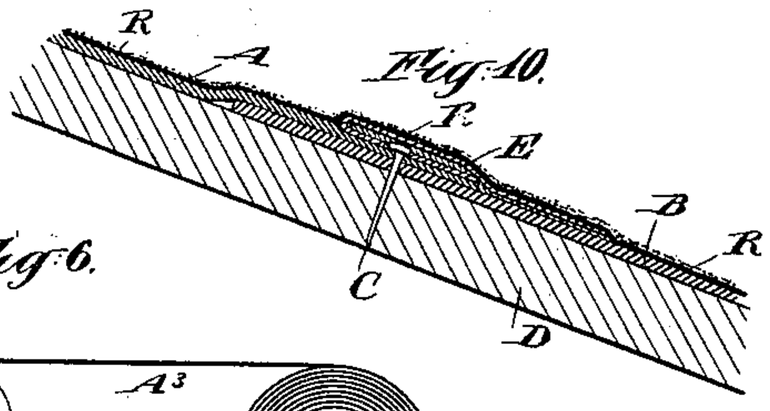
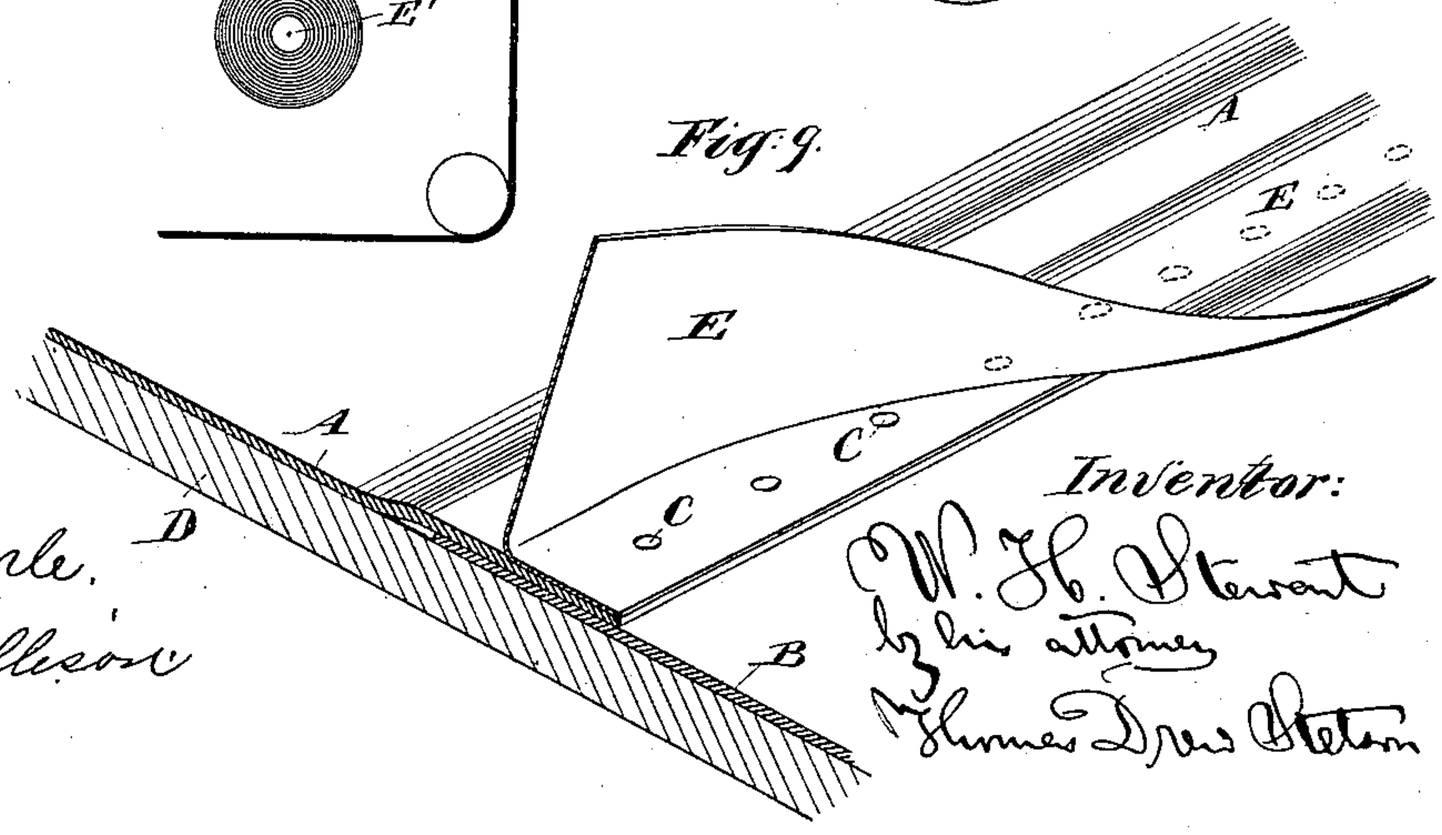


Fig. 6.

Fig. 9.



Witnesses:
Charles R. Searle.
Maurice Ellison

Inventor:
W. H. Stewart
by his attorney
Thomas Drew Stetson

UNITED STATES PATENT OFFICE.

WILLIAM H. STEWART, OF BROOKLYN, NEW YORK.

ROOFING.

SPECIFICATION forming part of Letters Patent No. 332,570, dated December 15, 1885.

Application filed September 7, 1885. Serial No. 176,367. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. STEWART, of Brooklyn, Kings county, in the State of New York, have invented a certain new and useful Improvement in Roofing, of which the following is a specification.

The invention applies to all that class of roofing in which felt or analogous flexible material, which I will include in the term "felt," is employed in separate rolls or sheets, and relates to the joints usually formed by slightly overlapping and nailing. I overlap and nail and may use the same arrangement and proportions and the same nails, and also the same sheet-metal washers under the nail-heads, but I prefer to dispense with the latter.

The ordinary mode of protecting the joints from leaking is not sufficient. Driving storms, or a holding back of water on a roof by snow, followed by rain, induces leakage. The water enters through slight elevations of the lapped edges. Cementing them together seems to be ineffective. I attach a strip of thin tough material. I have used in my experiments cheap muslin, attaching it by cementing about one-third of its breadth to the felt and leaving the remainder free. The cemented edge being on the edge of the felt and the free portion farther inward toward the center, I apply this piece so that it lies with its edge overlapping upon the adjacent sheet, nail it by common nails without washers, and then, as a final step in completing the joint, apply a coat of cement over the whole exposed face of the strip and fold it outward and press it down. It adheres, fitting closely over the nail-heads, the offset formed by the joint, and a portion of the adjacent piece. It defends against the entrance of water by the joint. It defends against the entrance of water around the nails. It allows a slight movement of the felt without opening the cemented junction. It strengthens the felt, so that it is less likely to tear or stretch and allow such movement.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is an edge view of a portion of the felt. Fig. 2 is an edge view of the strip of muslin before it is tarred, and Fig. 3 a corresponding view of the narrow exterior layer of felt with the muslin lying against it, ready to receive the cementing material. Fig. 4 shows the same in the act of receiving the cementing material between itself and two other thicknesses of felt and being subjected to the pressure of rollers. Fig. 5 shows the completed material. In this condition the material is stored and sold. Fig. 6 is a diagram showing the machinery by which the several layers of which a single piece of felt is composed and the strip of muslin are applied together and the complete felt produced with the muslin properly attached all at a single operation. The remaining figures show the mode of use. Fig. 7 is a section showing the two pieces of felt lapped and nailed. Fig. 8 shows the same after a coating of cement is applied over the whole exposed face of the muslin. Fig. 9 is a perspective view showing the muslin in the act of being folded over. Fig. 10 is a section showing the completed work.

Similar letters of reference indicate like parts in all the figures where they occur.

A is one piece of felt, certain portions being distinguished, when necessary, by additional marks, as A′. The adjacent piece of felt is marked B. The nails are marked C, and the boards of the structure on which this roofing material is nailed are marked D. A strip of muslin, E, is provided, extending along the edge of A in the position shown. It is attached by cementing along a portion of its breadth and pressing it strongly down upon the felt in the process of manufacture. It goes with the felt when the latter is rolled up or otherwise stored for transportation and use. After the felts A and B are properly placed in position on the building, and secured by nails C, driven through the tarred or otherwise cemented edge of E, and also through A and B and firmly set in D, a coat of tar or other adhesive material adapted to serve as a cement to permanently unite the parts is applied upon the whole exterior of E, and also upon the nail-heads, and the free part of E is nicely folded over and pressed down. It is in a position to completely cover the joint and a little breadth of both of the felts adjacent thereto. It strengthens and tightens.

I attach importance to the means I adopt for attaching the strip E without adding materially to the expense of the manufacture. I make the felt in three separate thicknesses,

A′ A² A³, joined together by a coating of tar, which I will continue to term "cement," applied in the act of passing the several thicknesses or layers simultaneously through a pair of rollers, N N. This has long been practiced, making the three all of equal width. I make two, A² A³, of the full width of the piece, and a third, A′, a little narrower. The difference in the width is the extent to which I wish the strip E to be cemented in the act of manufacturing the felt.

Referring to Fig. 6, the circles marked, respectively, 1, 2, and 3, indicate rollers or reels delivering the three thin sheets of felt A′, A², and A³, which are to be joined together to constitute the single complete felt A. The joining is effected by means of cement M, which is applied in nearly the same manner, as has been long practiced, by supplying a quantity of the cement M in a hot condition and causing it to be well diffused over the surfaces which are presented and caused to adhere together. The only novelty in this part of the operation is in making one sheet, A′, a little narrower than the other two sheets, A² and A³, and introducing the muslin E from the roller E′ in such position as to receive the cement on a portion of its breadth, while another portion will be protected and will not receive any. Thus conditioned, the three sheets or breadths or layers of thin felt and the strip of muslin are all applied together and cemented in the required condition at one operation.

The operation outlined in Fig. 6 is shown in its several stages in Figs. 3, 4, and 5. Fig. 3 shows the narrow sheet with the muslin in place in the act of being drawn along to the meeting-place. Fig. 4 shows all three of the sheets or thin layers of felt and the muslin with the tar being squeezed between the rollers; and Fig. 5 shows the complete felt with the muslin attached in the condition in which it emerges from the rolls, and after being carried a sufficient distance, exposed to cooling influences—air or water, or both—is ready to be rolled up.

Fig. 7 shows the felts nailed in place. While in this position a coating of fresh cement, *m*, is applied on the whole outer or exposed surface of the strip E. Fig. 8 shows the parts in the condition which obtains after this coating *m* is applied and before it is folded over.

Fig. 9 shows the strip E in the act of being folded over. This may be done by hand or by any suitable appliances. The conditions are not favorable to the employment of any elaborate machinery. I know no means better than hand-work, aided by a brush or the like to apply the cement, and simple means—as a wooden or other tool—to aid in lifting and folding over the free edge and main body of the muslin.

Fig. 10 shows the muslin completely folded over and pressed down. It is important to secure a good union between the muslin E and the face of the felt B. A dry stiff brush or a roller or a rubbing appliance of proper shape may aid in pressing down the muslin to insure such union. However the muslin may be pressed down, I esteem it expedient usually to coat the whole top surface of the roofing with fresh cement and to sift sand thereon, thus giving a top surface, R, having durable and every way desirable qualities.

Modifications may be made in the forms and proportions without departing from the principle or sacrificing the advantages of the invention. The width of the strip E may be varied. Its thickness and character may vary considerably. Artificial leather, parchment-paper, common paper, any flexible material, even some kinds of metal, may serve; but I esteem metal generally objectionable, by reason of its expansion and contraction with changes of temperature. Staples may be used in place of the nails C.

Parts of the invention may be used without the whole. I can use all the layers of the felt of equal width and attach the strip E by another operation. Such will make a good felt with the muslin properly attached, but will cost a little more to make.

I can use more than three thicknesses in my felt. Two only may serve successfully; but in order to attain the economy of manufacture due to my method above described it is important that the outer one be a little narrower than the other or others.

What I term "felt" may be all of woven fabric; or it may be partly of felted and partly woven.

A good felt is made three-ply, with the upper and lower felted and the intermediate woven.

The strip E, in addition to its other functions, serves an important end in strengthening the edge of the felt, to enable it to resist gales of wind and other disturbing forces.

I claim as my invention—

1. Roofing-felt made in separate sheets A, having attached in the process of manufacture a flexible strip, E, arranged to extend beyond the edge of A and cover the joint between this sheet and the next, substantially as herein specified.

2. A strip of roofing-felt, A, having a strip of flexible material, E, connected along one edge, and adapted to serve as herein specified.

3. The board D, nails C, and felts A B, in combination with each other and with the muslin or analogous tough flexible strip E and cement M, arranged to serve as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, New York, this 2d day of September, 1885, in the presence of two subscribing witnesses.

WILLIAM H. STEWART.

Witnesses:
M. F. BOYLE,
MANIERRE ELLISON.