Sept. 3, 1940. H. A. FABER 2,213,519

ROOFING STRUCTURE

Filed June 16, 1939 2 Sheets-Sheet 1

Fig. 1.

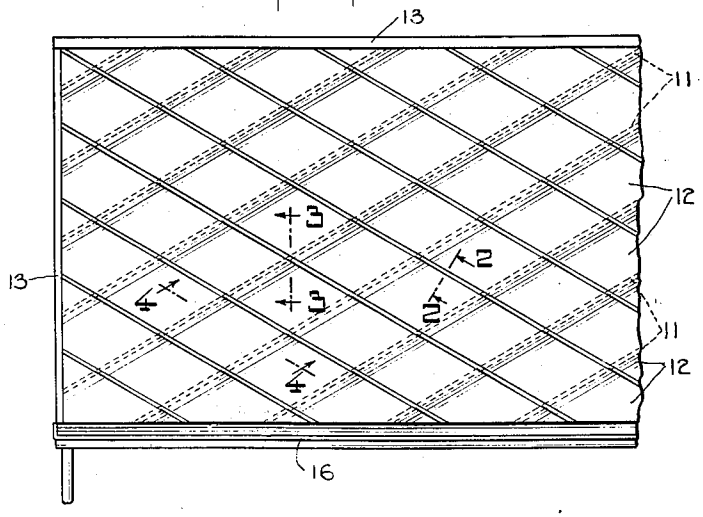


Fig. 2.

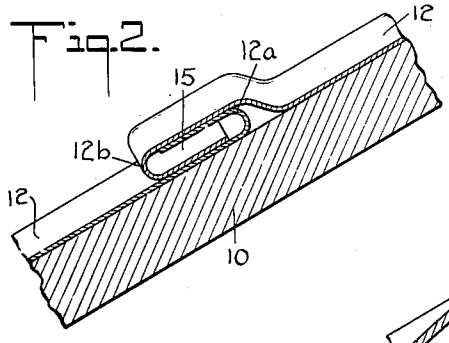


Fig. 3.

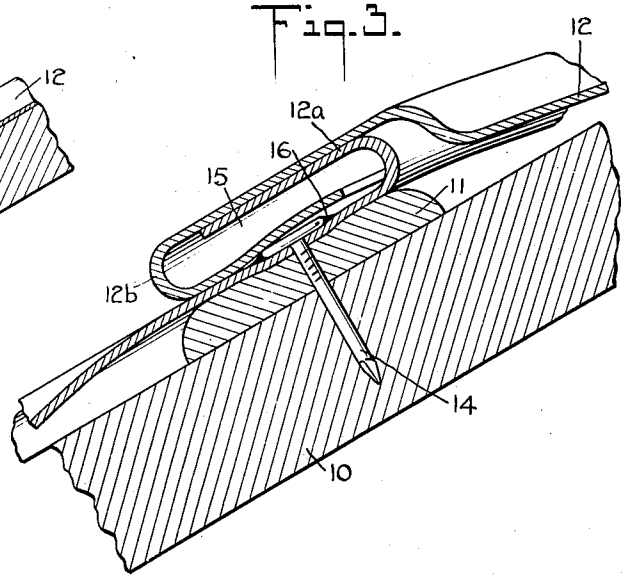
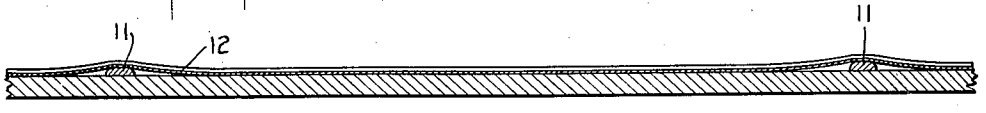


Fig. 4.



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Fig. 5.

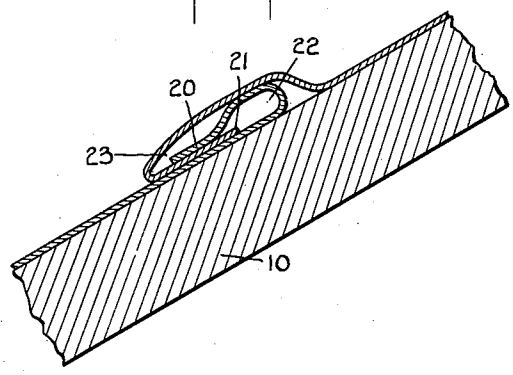


Fig. 6.

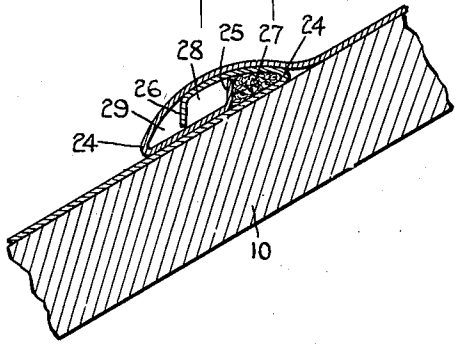


Fig. 7.

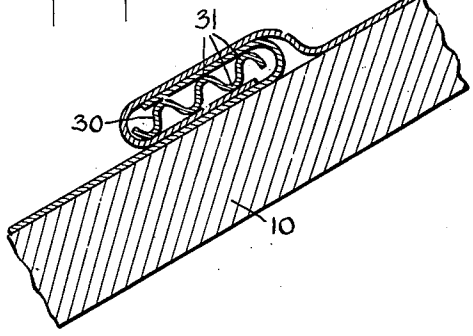


Fig. 8.

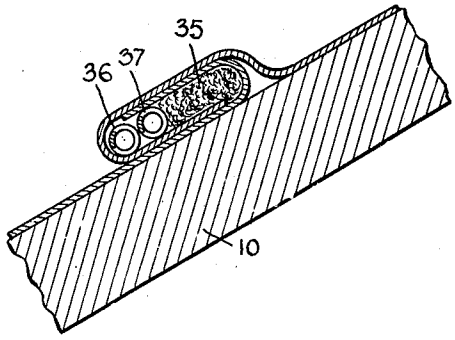
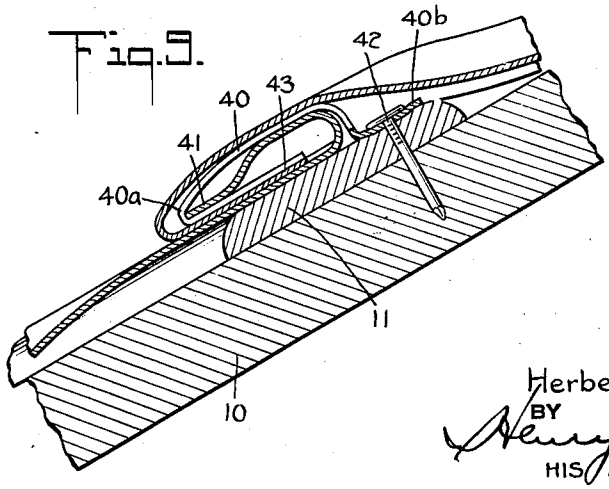


Fig. 9.



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UNITED STATES PATENT OFFICE

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ROOFING STRUCTURE

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Application June 16, 1939, Serial No. 279,408

4 Claims. (Cl. 108—13)

This invention relates to roof construction, and particularly to the external weatherproof roofing thereof.

The use of sheet roofing of a type having a relatively great coefficient of expansion, as for instance sheet copper, makes necessary special provision for affording free expansion and contraction of the sheet roofing, while in place, without disturbing the integrity of the roofing structure. Various methods of laying sheet roofing, together with special appurtenant devices, have heretofore been employed for attaining this desired functional characteristic. The present invention provides a particularly advantageous roofing arrangement for the purpose.

Accordingly, a primary object of the invention is the arrangement of roofing structure, which includes sheet roofing having a relatively high coefficient of expansion, in such manner as to allow for free expansion and contraction of the sheet roofing without interfering with its protective function.

An object is to provide roofing structure, as above, which is inexpensive and simple in construction.

An outstanding feature of the invention resides in the employment of individual strip lengths of suitable sheet roofing material and in the positioning of such individual strip lengths in substantially parallel side-by-side relationship with edges joined loosely in a water-shedding arrangement which allows expansion and contraction for the strip lengths laterally, and, further, in the supporting of the strip lengths at intervals along their lengths so that intermediate portions thereof droop between the locations of support, thus providing for longitudinal expansion and contraction of the strip lengths even though they be rigidly secured at their ends.

In certain preferred embodiments, a feature resides in the sloping arrangement of the strip lengths relative to a pitched sub-surface roof, together with a particular overlapping joinder of the mutually contiguous edges of the strip lengths, whereby the ability to shed water and the ability to resist wind is provided in a very simple manner, and whereby expansion and contraction is adequately provided for.

Further objects and features of the invention will be apparent from the following detailed description.

In the drawings:

Fig. 1 represents a top plan view of a fragment of a roof embodying a preferred construction pursuant to the invention.

Fig. 2 represents a vertical section taken on the line 2—2, Fig. 1.

Fig. 3 represents a vertical section taken on the line 3—3, Fig. 1.

Fig. 4 represents a vertical section taken on line 4—4, Fig. 1.

Figs. 5, 6, 7 and 8 are views corresponding, respectively, to that of Fig. 2, but each illustrating a slightly different embodiment of overlapping, seam joinder.

Fig. 9 is a view corresponding to that of Fig. 3, but illustrating a slightly different construction.

The invention is concerned primarily with sheet roofing of the type having a relatively great coefficient of expansion, and contemplates in its preferred forms, the use of sheet copper in strip lengths. Other sheet material, metal or otherwise, which requires special attention because of a relatively high coefficient of expansion, may be utilized to advantage, however.

The roofing structure of the invention is most advantageously applied in connection with sloping sub-surface roofs, although, in its broader aspects, it is not restricted thereto in its application.

The roofing arrangement illustrated in Figs. 1 through 4 is a preferred form of the invention, it being possible in this arrangement, to obtain desired functional characteristics with a high safety factor, so far as leakage is concerned, and at low cost.

To the sub-surface roof 10, which may be of practically any desired construction, usually comprising wood sheathing superimposed on rafters, are secured, in spaced side-by-side parallel relationship, slats 11, advantageously of wood. The slats 11 extend diagonally across the upper surface of the sub-surface roof, as indicated in Fig. 1.

Extending transversely across the slats 11 in parallel side-by-side relationship and diagonally with respect to the sub-surface roof construction are strip lengths 12 of suitable sheet roofing material, preferably sheet copper. The strip lengths 12 overlap at mutually contiguous edges and inter-lock to form waterproof joinder seams, hereinafter described in detail, and are firmly secured at their ends to the edges of the sub-surface roof structure. Suitable flashing strips, see those indicated at 13, 13, Fig. 1, may be applied along the margins of the roofing structure. The strip lengths 12 are of sufficient length to droop between the spaced slats 11, preferably

against the top surface of the sub-surface roof structure. Thus the slats 11 are interposed between the sheet roofing and the sub-surface roof structure, and provide upstanding means which serve to support the sheet roofing at spaced intervals along its length.

The overlapping mutually contiguous edges of adjacent sheet strips are advantageously joined by seam type joinders which are water-shedding and substantially water-tight, and which afford free lateral expansion and contraction for the sheet strips.

In forming the seam type joinders, each strip length of sheet roofing is secured adjacent its upper marginal edge, as by nailing, see the nail 14, Fig. 3, to the respective slats 11 which it traverses, and the upper marginal edge portion thereof is looped back upon itself, as indicated at 12*a*, Figs. 2 and 3. Thereupon, the lower marginal edge portion of the next upper sheet strip of roofing material is looped downwardly and inwardly as indicated at 12*b*, Figs. 2 and 3, and is passed into and over the looped upper marginal edge portion 12*a* of the lower sheet strip, resulting in a seam type of joinder. It should be noted, however, that the looped marginal edge portions 12*a* and 12*b* are purposely not flattened down. Thus, an unobstructed channel 15 is formed within the joinder, and, since the channel is directed downwardly along the slope of the roof, any moisture that might possibly seep through the joinder from the exterior thereof, will flow downwardly to the eaves of the roof where a rain gutter 16 may be provided for its disposal. For preventing leakage, the heads of the nails 14 may be embedded in a water-proof mastic, see 16, Fig. 3, or may be soldered in place.

When the individual strip sheets of roofing expand or contract under changing temperature conditions, the looped marginal edge portion 12*b* of each sheet strip moves relative to the associated secured looped marginal edge portion 12*a* of a next adjacent sheet strip, thus compensating for lateral expansion and contraction. In addition those portions of each sheet strip which droop between adjacent supporting slats 11, rise and fall with contraction and expansion, respectively, and, thus, compensate for longitudinal expansion and contraction of the sheet strips.

The interlocking joinder may be made in a variety of forms, several of which are illustrated in Figs. 5 to 9, inclusive. The illustrated embodiments by no means exhaust the possibilities of advantageous joinders inherent in the structural characteristics of the invention.

In Fig. 5, the looped upper marginal edge portion of the lower sheet has its mouth substantially closed by the lip formation 20. The lip member 21 of the sloped lower marginal edge portion of the next upper sheet strip is slid under the lip member 20, thus forming two flow channels within and along the length of the joinder. The two lips hug each other to substantially preclude seepage of moisture from the first flow channel 22 to the second flow channel 23.

In the embodiment of Fig. 6, the looped and interlocking upper and lower marginal edge portions of adjacent sheet strips of roofing have their closed loop ends bent at a relatively sharp acute angle, as indicated at 24, 24, and have lip members 25 and 26, respectively, inturned, thus providing three parallel lengthwise channels within the body of the joinder. The first channel is desirably filled with a suitable water-resistant packing material, such as oakum, indicated 27, and the other two channels, indicated 28 and 29, are preferably left open to provide for the downflow of any moisture that might possibly seep thereinto.

The embodiment of Fig. 7 is similar, so far as the interlocking joinder of upper and lower looped marginal edge portions of adjacent sheet strips are concerned, to that joinder illustrated in Figs. 2 and 3. There is, however, a corrugated insert strip of rigid material disposed within and extending along the length of the channel of the joinder, see the strip 30. Thus, the interlocking marginal edge portions of the sheet strips are firmly supported against collapse, and a plurality of downflow channels and a plurality of moisture seals—see the moisture seals indicated by the numerals 31—are provided.

The embodiment of Fig. 8 is substantially similar to the embodiment of Figs. 2 and 3, so far as the loop formation of the interlocking upper and lower marginal edge portions of adjacent sheet strips is concerned. As in the case of the embodiment of Fig. 7, however, the channel formed interiorly of the joinder has supporting means therein. In the present instance, the supporting means comprises a pair of coil springs, 36 and 37, respectively, disposed forwardly in and extending lengthwise of the channel. Suitable packing material 35, such as oakum, is advantageously placed alongside the supporting means to aid in maintaining the joinder weather-tight.

It may be desirable to secure the individual sheet strips to the sub-surface roof by means other than nailing through a portion of the roofing per se. Accordingly, in Fig. 9, is illustrated a practical procedure. A separate cleat, which interlocks with the interlocking upper and lower marginal edge portions of adjacent sheet strips, is employed. The joinder, so far as the configuration of the looped marginal edge portions of the sheet strips are concerned, may be, as illustrated, substantially similar to that embodiment which is illustrated in Fig. 5. The interlocking cleat strip 40 has a looped end 40*a* which is slid over the lip member 41 of the looped marginal upper edge portion of a lower sheet strip, and has a portion 40*b* which may be nailed or otherwise secured directly to a slat 11, see 42. Thereupon, the lip 43 of the looped lower marginal edge portion of the next upper sheet strip is slid beneath the cleat 40*a*, thus entirely enclosing the loop portion of the cleat within the joinder and covering the secured portion 40*b* of the cleat. In this embodiment, it will be noted that the nail, or other securing device, need not be surrounded by a waterproof mastic material; nor need there be taken any other precautions for waterproofing the location of securement, for it is disposed outside the confines of the joinder and under the protective covering of the main body of the roofing.

In the preferred arrangement of sheet roofing illustrated in Fig. 1, it will be noted that, due to the diagonally placed slats 11 and to the diagonally placed lines of joinder between the individual sheet strips 12, an ornamental pattern is formed. The portion of sheet roofing bounded by two adjacent lines of joinder and by two adjacent slats, which traverse those lines of joinder, is substantially diamond shaped, either rectangularly so, or otherwise, depending upon the angularity of the lines of joinder and of the slats with respect to the sub-surface roof structure.

While this invention has been described with respect to preferred embodiments thereof, it

should be clearly understood that changes may be made without departing from the spirit and generic scope of the invention as set forth herein and in the claims that follow.

I claim:

1. Roof construction comprising a sloping sub-surface roof; sheet roofing in the form of strips laid edge-on-edge in water-shedding seam type joinders which extend downwardly along the slope of the roof, said seam type joinders being loose, providing for lateral expansion and contraction of said strips and forming enclosed flow channel means along their lengths; lengthwise corrugated rigid strip means disposed along the lengths of said seam type joinders within and lengthwise of said flow channel means, said corrugated rigid strip means bearing against the inner walls of said seam type joinders, serving to support the same against collapse and providing a plurality of flow channels and a plurality of lines of seal along the length of said flow channel means; and supporting means upstanding from said sub-surface roof and spaced at intervals along the lengths of said strips, said strips being secured at their ends and having lengths sufficient to provide slack which droops between said upstanding means.

2. Roof construction comprising a sloping sub-surface roof having supporting means spaced apart thereon in spaced substantially parallel rows which run diagonally thereacross; sheet roofing covering said sub-surface roof and superimposed on said supporting means, said sheet roofing comprising individual sheet strips laid lengthwise in substantially parallel overlapping moisture-shedding relation, which allows for lateral expansion and contraction, said sheet strips running diagonally of said roof transversely across said rows of supporting means, said sheet strips being secured at their ends and having lengthwise slack which droops between said rows of supporting means.

3. Roof construction comprising a sloping sub-surface roof having supporting means spaced apart thereon in spaced substantially parallel rows which run diagonally thereacross; sheet roofing covering said sub-surface roof and superimposed on said supporting means, said sheet roofing comprising individual sheet strips laid lengthwise in substantially parallel relation and overlapping in water-shedding seam type joinders which run diagonally of said roof transversely across said rows of supporting means and are loose, allowing for lateral expansion and contraction, and providing, interiorly thereof, enclosed flow channel means, said sheet strips being secured at their ends and having lengthwise slack which droops between said rows of supporting means.

4. Roof construction comprising a sloping sub-surface roof having slats spaced apart thereon in spaced substantially parallel rows which run diagonally thereacross; sheet roofing covering said sub-surface roof and superimposed on said slats, said sheet roofing comprising individual sheet strips laid lengthwise in substantially parallel relation and overlapping in water-shedding seam type joinders which run diagonally of said roof transversely across said rows of slats and are loose, allowing for lateral expansion and contraction, and providing, interiorly thereof, enclosed flow channel means, said sheet strips being secured, along their upper marginal edges, to the said slats, and being secured at their ends, and having lengthwise slack which droops between said rows of supporting means.

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