

June 2, 1964

W. H. W. SCHULLER ETAL

3,135,069

ROOFING

Filed Dec. 31, 1958

4 Sheets-Sheet 1

Fig. 1

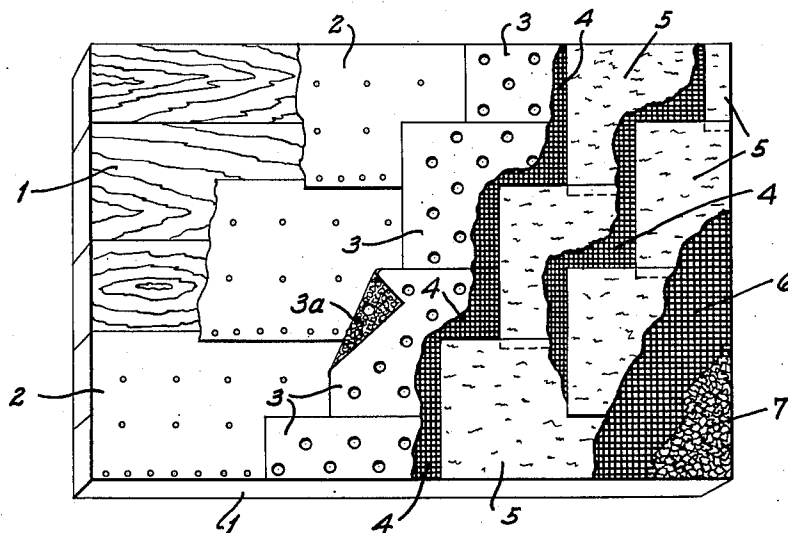
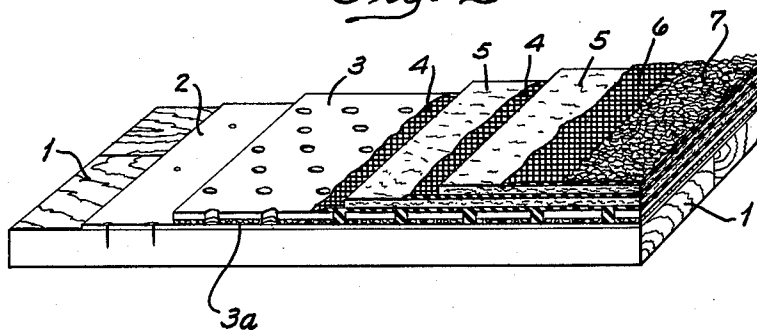


Fig. 2



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Fig. 3

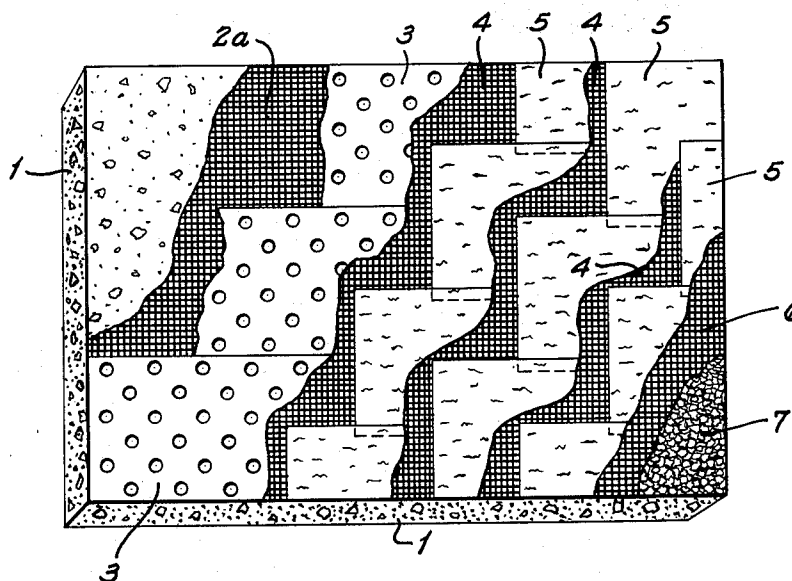
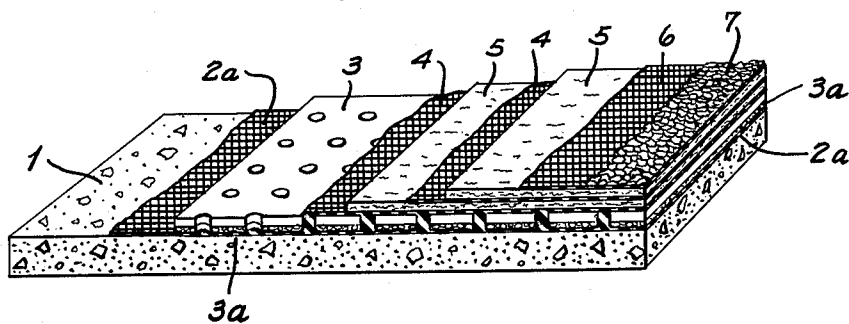


Fig. 4



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Fig. 5

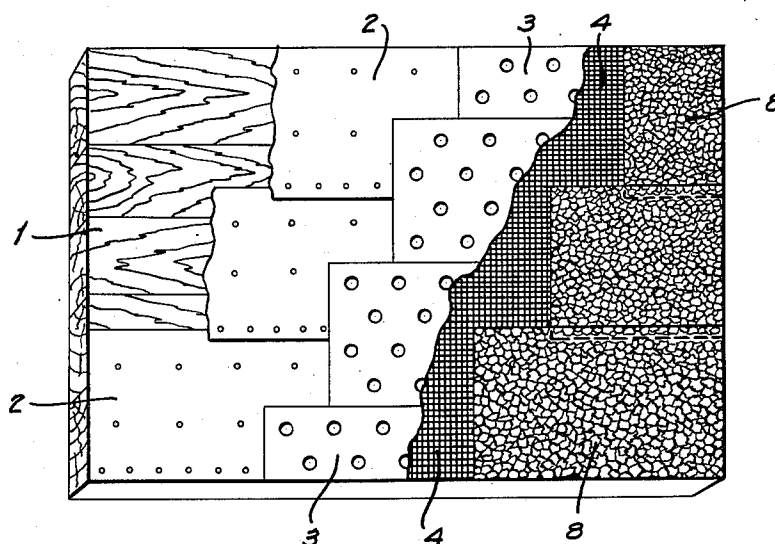
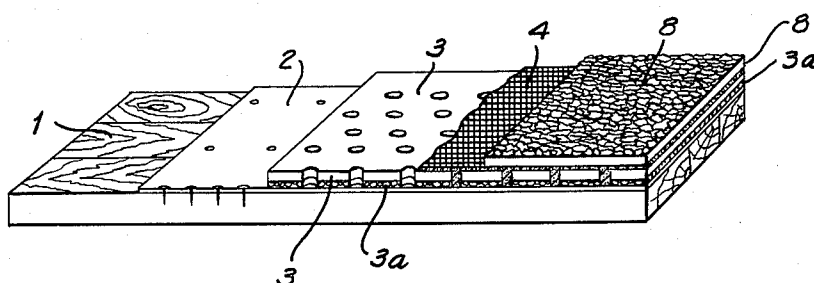


Fig. 6



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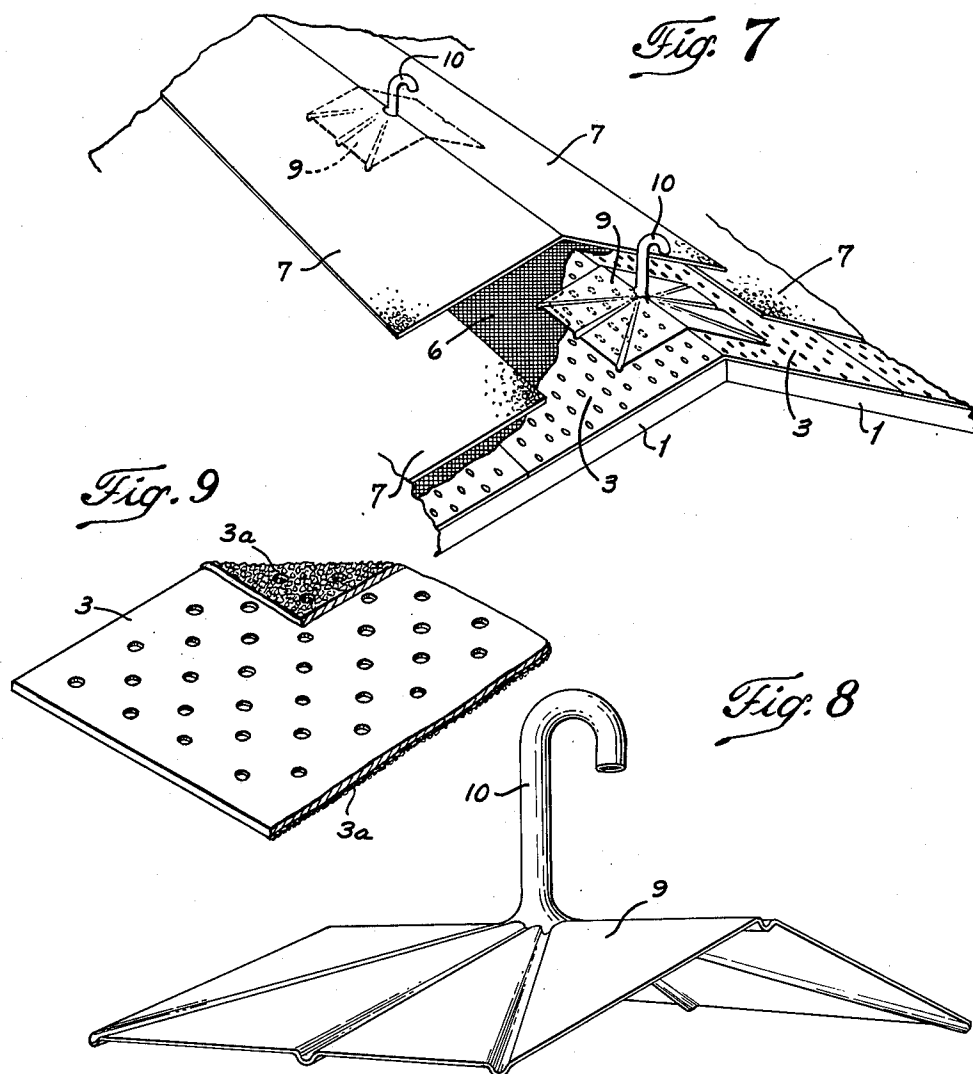
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4 Sheets-Sheet 4



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3,135,069
ROOFING

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4 Claims. (Cl. 50—196)

The present invention relates to a novel roof and a method for making same. More particularly, the present invention relates to a novel roofing element and the roofs in which it is used.

The conventional manner of rendering a roof or deck impervious to the elements is to secure on its surface impermeable or semi-impermeable sheets such as tarred paper or felt and the like, which are usually coated with an asphaltic or bituminous material to impart resistance to moisture and also to act as a bonding agent for such subsequent components as might be laid on top thereof. Recent changes in the established practices of the building trades have resulted in that industry becoming one which is carried on all year round and under every sort of weather condition. The building of a roof using the conventional methods and materials has not been rapidly adapted for the range of weather conditions outside those of a clear sunny day.

Where moisture has been introduced or accumulated under or between the layers of material which make up a conventional roof, distressing results may be expected. This type of moisture may remain dormant for some time until, being exposed to sufficient heat, it vaporizes. When such vaporization takes place, blisters, wrinkles and air pockets are formed between the deck and the roofing materials, which eventually leads to complete impairment of the integrity of the roof.

The present invention is directed particularly overcoming the problems arising from carrying on the building of the roof during ordinarily inclement weather. The invention consists essentially in a new method for roofing, one element of which is a new basic sheet which is fibrous or pulpy, being made preferably of glass fibers. This sheet is supplied with spaced perforations sufficient in size and number to assure the bonding of such an element to a base sheet or felt, the latter being secured to the board or concrete deck which forms the base for the entire roof. A binding material such as asphalt or tar may be poured on top of this perforated layer, and this results in spot fastening of such perforated layer to the subjacent element of the roof. A particularly noteworthy feature of this fibrous perforated element is that adhering to its ultimate underside are relatively large granules of cork or mineral material such as gravel or pebbles. These are usually adhered as a result of the fibrous material having been impregnated with asphalt or tar binder.

It is an object of the present invention to provide a roof, one element of which is of such construction that it allows for the breathing out of any moisture which might ordinarily be trapped beneath such component.

Another object of the present invention is the formation of a roof which contains means for the elimination of otherwise entrapped moisture.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

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The accompanying drawings, referred to herein and constituting a part hereof, illustrate an embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Referring now to the figures:

FIGURE 1 is a top plan view of a two-layer roof application from the bare roof deck to the finished pebbled surface.

FIGURE 2 is a tri-dimensional view of FIGURE 1.

FIGURE 3 is a top plan view of a three-layer roof application from the bare concrete deck to the finished pebbled surface.

FIGURE 4 is a tri-dimensional view of a section of FIGURE 3.

FIGURE 5 is a plan view of a preferred two-layer roof application from the wooden deck to the finished pebbled surface.

FIGURE 6 is a tri-dimensional view of a section of FIGURE 5.

FIGURE 7 is a tri-dimensional view showing the application of the vent pipes.

FIGURE 8 is a tri-dimensional view of the vent pipe embodiment.

FIGURE 9 is a tri-dimensional view of the perforated sheet or felt.

Referring now to the above recited figures in greater detail:

FIGURES 1 and 2 show a deck portion 1 of a wooden deck covered by a vapor permeable lamina, such as, a layer of asphalt impregnated building paper 2 which is in turn covered by the fibrous perforated sheet or felt 3 which had adhering to its lower surface a profusion of relatively large granular particles 3a and which has brushed or coated over its surface and worked down through the perforations an asphaltic or tar composition 4 which acts to attach the sheet or felt 3 to the asphalt impregnated building paper 2 by spot binding. It also acts as an adhesive surface on which saturated ply sheets 5 can be attached. A final coating of asphalt or tar material 6 is applied over the topmost ply sheet 5, and in the surface of the asphaltic or tar material 6 are then embedded heavy granules 7 of gravel or other coarse grain materials of a size to pass through a standard 5-10 sieve.

FIGURES 3 and 4 represent a construction similar to that of FIGURES 1 and 2 but wherein 1 is a concrete deck and 2a is a cold applied asphaltic composition. After 2a has been allowed to dry, the perforated sheet or felt is laid in edge to edge relation (no overlap) loosely onto (2a) with the coarse gravel surface (3a) pointing towards the deck. A number of saturated ply sheets 5 which may be laid above element 3 is determined by the degree of severity of the weather conditions to which the finished roof may be subjected. These layers are topped by a final asphaltic or coal tar coating 6 which is used both to seal the subjacent layers and to act as a binding material for the outer granular layer 7.

FIGURES 5 and 6 show a preferred embodiment of the present invention in which a wooden deck 1 has fastened to it an asphalt impregnated paper by conventional means such as tarred or galvanized nails, said layer being lapped along one edge and being in turn covered with the fibrous perforated sheet or felt 3 bearing on its lower surface relatively large granules of mineral material 3a and being impregnated with an asphaltic material. The perforated fibrous sheet bearing said granules is coated on its upper surface with a layer of an asphaltic or coal tar composition 4 which passes through the perforations and secures said sheet 3 at points beneath said perforations to the asphalt impregnated paper 2 below it. Disposed upon asphaltic composition 4 is a heavy-type (45

to 60 pounds) saturated glass felt 8 with a mineral surface.

FIGURE 7 shows the vent pipes with a sheet metal attachment 9 which serves to collect and guide moisture or vapor into the actual tube 10. As well as it has been shown for a sloped roof the vent pipes can be installed on a flat roof.

FIGURE 8 shows a detailed picture of the vent tube embodiment for a sloped roof.

The relatively large granular particles 3a which are included in each of the roofs described in the foregoing, are an integral part of the asphalt impregnated fibrous perforated building element. These granules provide a pathway along which entrapped vapors may travel beneath the roof connecting to this pathway. At spaced intervals are vent pipes which may be made according to any conventional design such as a copper tube curved at one end and bearing a flange at the other, which flange lies directly within the pathway formed by the granules. This allows the escape of any vaporized moisture while preventing reintroduction of same into the air space beneath the roof because of the curved neck of this breathing means. The arrangement just described does not merely allow moisture initially trapped beneath the roofing material to escape, but moisture which collects beneath the roof proper in the building below is capable of passing through the wooden and concrete deck and the elements 2 which are relatively thin layers of asphalt, of asphalt impregnated sheet, or felt. The roof made in accordance with this invention therefore aid in preventing the accumulation of undue amounts of moisture in the buildings.

Another advantage which is more apparent where the roof deck covered is of somewhat green lumber is that the roof of the present invention will not be unduly distorted by shifts in the deck itself. The major portions of the roof in the present invention lay as if they were a mantle draped over said deck, securely attached thereto through spot-binding by means of the asphaltic rivets passing through the perforations of element 3 but which may be loosened should the deck warp beneath them without distorting the roof itself. The preferred embodiment uses glass fiber mats having perforations of approximately $\frac{5}{8}$ inch in diameter spaced about 3 inches apart at their centers. This perforated fibrous material is then impregnated with asphalt or coal tar which gives it a weight of 60 to 80 pounds per square, that is, 10 feet by 10 feet of roofing. The granules may be almost of any mineral of coarse grain such as small pieces of cork or washed gravel, pyrites, quartz, and the like, preferably of 5 to 10 mesh per inch, which adheres to one surface or the roof element while the other surface is dusted in a conventional manner to prevent this element from sticking to itself upon being rolled. Using a glass fiber mat provides an added advantage in that even in cold weather where the temperature may be in the vicinity of 12° F., such material does not lose its flexibility.

An effective though less preferred embodiment of this invention consists in substituting an imperforate building element which has been impregnated with asphaltic material to serve as the layer next above the layer of coarse granules the interstices of which provide the paths which provide a means of escape for otherwise entrapped moisture. This imperforate element must be fastened to the underlying structure by conventional means such as by nailing. The removal of moisture is accomplished in the same manner as in the preferred embodiment of the roof. The defect inherent in the structure discussed above is its lack of flexibility in situations where the deck tends to shift. The nails anchored in a shifting, warping deck either distort the lay of the elements through which the nails pass or tear through those layers. The preferred embodiment is adaptable to all situations

but the variation described above would be feasible in situations in which the possibility of a shift of the deck is minimized.

Roofs of the type described may be built in almost any weather in which a workman could be outdoors, because of their provision for the elimination of moisture initially entrapped. This advantage continues throughout the life of the roof since it allows for breathing or elimination of vapors from the rooms below it.

The invention in its broader aspects is not limited to the specific steps, methods, compositions and improvements shown and described herein, but departures may be made within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What is claimed is:

1. A multi-ply roof structure comprising a roof deck, a vapor permeable lamina disposed over said deck, a fibrous mat disposed over said vapor permeable lamina, said fibrous mat being impregnated with a bituminous binder material and having the surface thereof adjacent to said vapor permeable lamina provided with a layer of coarse, granular material for draining said moisture collected beneath said fibrous mat, and vent means communicating with said granular layer for effecting removal of said moisture therefrom to atmosphere, said fibrous mat being formed of glass fiber material with spaced perforations therethrough and through said granular layer, and including a coating of bituminous material applied to the surface of said glass fiber mat remote from said granular material with portions of said coating disposed in said perforations and spot-binding said glass fiber mat to said vapor-permeable lamina.

2. The invention as defined in claim 1 including further lamination of alternate ply sheets and asphaltic binders, the uppermost such lamina including an asphalt layer having embedded therein protective mineral particles.

3. A roof structure comprising a vapor penetrable roof surface, a fibrous, foraminous mat provided with spaced perforations disposed over said surface, said mat impregnated with a bituminous binder material and having the surface thereof adjacent to said surface provided with a layer of coarse, granular material for draining moisture collected beneath said mat, with sections of said layer communicating with atmosphere for effecting removal of said moisture, and means for securing said mat to said surface at spaced intervals, said means including a coating of bituminous material applied to the surface of said mat remote from said layer of granular material with portions of said coating disposed in the perforations in said mat and passing through said granular layer spot-binding said mat to said surface.

4. The roof structure comprising a vapor penetrable roof surface, a glass fiber mat disposed over said surface, said mat impregnated with a bituminous binder material and having the surface thereof adjacent to said surface provided with a layer of coarse, granular material for draining moisture collected beneath said mat, with sections of said layer communicating with atmosphere for effecting removal of said moisture, said glass fiber mat being provided with spaced perforations passing through said mat and said granular layer, and including a coating of bituminous material applied to the surface of said glass fiber mat remote from said layer of granular material with portions of said coating disposed in said perforations and spot-binding said glass fiber mat to said surface.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,135,069

June 2, 1964

Werner H. W. Schuller et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 25, for "rapidly" read -- readily --;
column 3, line 52, for "or the roof" read -- of the roofing
--; column 5, line 10, for MacNut" read -- MacNutt --;
column 6, line 1, for "Linguist" read -- Lindquist --.

Signed and sealed this 6th day of October 1964.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents