Oct. 25, 1938. N. P. HARSHBERGER 2,133,988

ROOFING AND SIDING ELEMENTS

Filed July 23, 1935

Fig. 1.

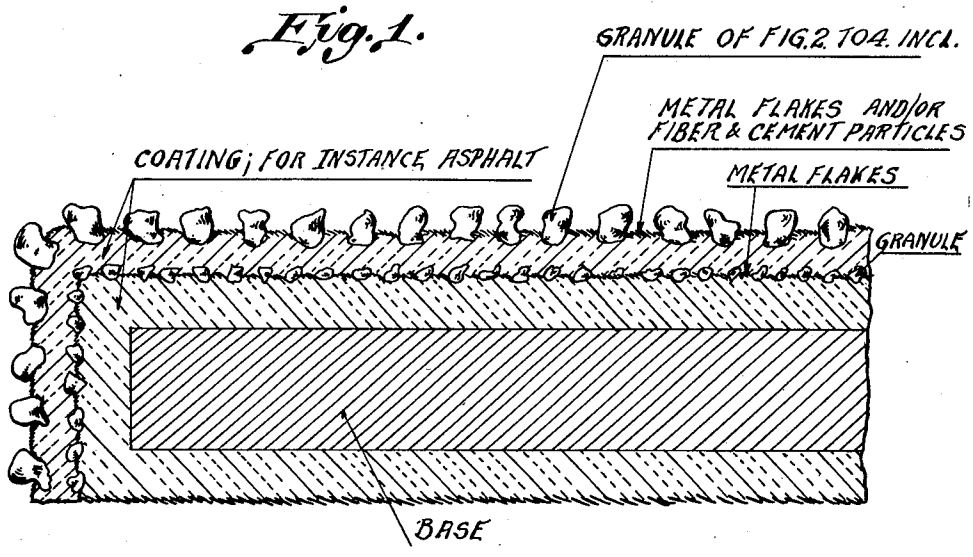



Fig. 2.

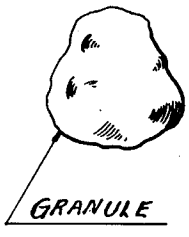



Fig. 3.

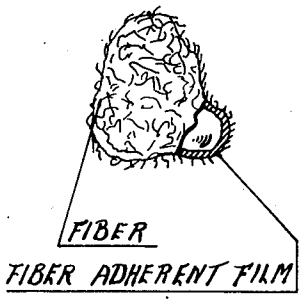
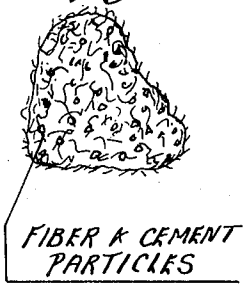



Fig. 4.




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# UNITED STATES PATENT OFFICE

2,133,988

## ROOFING AND SIDING ELEMENTS

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Application July 23, 1935, Serial No. 32,723

12 Claims. (Cl. 91—68)

This invention relates to materials for roofs and to the production of roofing and siding elements generally of the character of shingles, slabs, shingle strips, clapboards or the like, in which when the material is laid upon a surface in overlapping courses or to form a composite structure, there are exposed portions that are subject to deterioration caused by the sunlight and the elements.

Ordinarily, in the manufacture of modern roofing such as employed for these purposes it is the custom to form a sheet of fibrous material, saturate or impregnate it with a bituminous compound such as pitch, asphalt or the like and thereafter to coat one or both sides with a layer of bituminous adhesive into which, while it is still soft and plastic, is firmly anchored a surfacing of granular particles, for instance, slate or tile. The sheet thus formed is ordinarily cut to take the form of individual shingles or strip shingles, slabs of various designs, long narrow strips or roll roofing, which may then be laid according to the well known manner.

Obviously in materials of this character the bituminous layers at the surface and at the cut edges are exposed to the elements and to the sunlight and are susceptible to rapid deterioration, for it is known that the action of sunlight or the ultra-violet rays is such as to cause a condensation or polymerization of the bitumen, resulting in the hardening thereof with a consequent checking or breaking down of the bitumen, particularly when the bitumen is exposed in relatively thin films or layers. Constant exposure to the elements and light cause these layers to shrink and crumble, and this, together with the absorption of moisture, cause deterioration and curling of the material. Moreover, when exposed in warm climates the bitumen may also soften and the surface is in this manner susceptible to further physical damage.

Furthermore, materials of the character described are subject to blistering when exposed to the weather because of the presence of moisture or of volatile materials which expand and are driven off at the elevated temperatures produced by the absorption of heat from the sun's rays.

It is an object of the present invention to provide roofing and siding material in which the aforesaid undesirable effects are reduced to a minimum and in which the structure is a novel one having improved characteristics.

Another object is the provision of asphalt or other bituminous roofing material in which blistering is substantially retarded.

A further object is to substantially prevent the evaporation of volatile oils from the bituminous layer of prepared roofing by the provision of a shielding layer.

An additional object is the provision of improved building material having a crystalline metallic heat and cold conducting layer to assist in the thermal insulation of a surface.

Another object is the provision of a granular surfaced roofing and siding material in which the adhesive layer in the interstices between particles is protected from the weather and in which the granular particles retain their texture and are aided in improving the appearance of the material upon exposure.

A further object is to provide an efficient and commercially practical process for making material of the aforesaid character.

A still further object relates to a novel coated particle and to the securing of a plurality thereof to a base sheet.

Various other objects of the invention will appear in the following description and in the claims taken in conjunction with the accompanying drawing, wherein—

Fig. 1 shows a cross sectional view of base material made in accordance with my invention;

Fig. 2 is an enlarged view of a roofing granule useful in the structure of Fig. 1;

Fig. 3 is an enlarged view partially in section of a roofing granule which may also be used in the structure of Fig. 1 and which is provided with a surfacing of fibrous material; and

Fig. 4 is an enlarged view of a further modification of a roofing granule which may be used, for instance, in the structure of Fig. 1 and which is provided with a surfacing of fibrous material and cement particles.

A feature of the invention consists in surfacing the asphalt or other adhesive material with a layer of a crystalline material capable of reflecting or conducting heat. The material is preferably hard and wear resistant.

In one embodiment the asphalt is covered with a layer of preferably finely divided aluminum flakes which are applied while the asphalt is hot and are firmly bonded thereto. Granular material such as mineral granules of slate or the like are then caused to penetrate the aluminum layer and to be embedded in the asphalt.

The aluminum layer shields the asphalt and prevents the evaporation of volatile oils therefrom. It also reflects or conducts away heat received from the sun, thus retarding any tendencies toward blistering and preventing flow of


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the asphalt. Moreover, it improves the appearance of the material as it prevents the black asphalt from showing between the granular surfacing particles, and blends attractively with certain colored granules.

Various other features consist in the details of construction and combinations of steps hereinafter more fully set forth.

In the following description and in the claims certain specific terms are used for convenience in referring to the various details. It is to be understood, however, that these terms are to be interpreted as broadly as the art will permit.

In accordance with the present invention a web may be saturated with a material comprising bitumen and a layer of adhesive for instance, a bitumen may be applied thereto in any desired manner which is known in the art. For example, a web made of vegetable, and/or animal and/or mineral fibrous material, for instance, asbestos fibre, cellulose fibre, rag fibre, commonly called a felt web, may be continuously passed from a roll through a container having a saturant such as a low melting point bituminous material, for instance, asphalt, under conditions such that the web becomes saturated and/or impregnated therewith. A layer of a higher melting point bituminous material, for instance, asphalt, may then be applied while hot as an even coating of the desired thickness. The coating may include extending material such as natural or synthetic resins or where desired may be primarily a resin coating which may also be a cold one. The coated web thus formed is similar to that commonly used as a base for composition roofing materials. A method of making the same is more fully described in my Patent No. 1,913,667, granted June 13, 1933.

Metal particles which may be in the form of flakes or powders, for instance, preferably aluminum flakes, may be applied to the coated web while the asphalt or other adhesive is still hot or the web may be reheated to soften the asphalt before the metal particles are applied thereto. Obviously where the nature of the adhesive coating permits, the metal particles may be applied without said coating being in a heated condition, a firm anchorage for the metal being the primary consideration. In any case the metal particles are preferably dispersed uniformly over the surface of the adhesive coating to which they adhere as a metallic layer. They are preferably impelled against the asphalt with sufficient force to cause them to make the intimate contact required for a firm bond. Obviously, the surface may be rolled to embed the particles in the asphalt, provided precautions are taken to prevent the particles from sticking to the roller.

The metal particles where desired make a firm, continuous surface which greatly reduces the absorption of heat by the asphalt by reason of its conductive and reflective properties and shields the adhesive from destructive light rays. Moreover, the metal particles also increase the wear resistance of the material. Flakes are preferred because of their suitability for application and the character of coverage and anchorage they provide.

A further surfacing of granular particles such as crushed slag, pebbles, crushed slate, crushed brick or tile, coke, crushed glass, sand, shale or the like may also be embedded in the material. For this purpose the granules are applied with sufficient force to slightly displace the metal particles so as to penetrate the layer of such particles and to become embedded in the asphalt. The granules may be applied with a blast or may be mechanically impelled against the material.

In some instances it may be preferable to apply the granules as required and to roll or press them into the material. In any event they are caused to penetrate the metal layer and to become embedded in and bonded to the adhesive provided. Where asphalt or the like is the adhesive, the granules are preferably applied while said material is still hot and as a continuous process. The asphalt may, however, be reheated if it has been allowed to cool prior to application of the granules. Furthermore, in certain instances it may be desirable that the granules receive the fullest contact with the adhesive. It should therefore be understood that the granules may be applied to the adhesive material simultaneously with or before the metal particles. The granules may then be partially embedded by any well known means. Obviously they may be impelled if desired.

While not preferred the metal particles may also be applied to a previously made granular surfaced sheet, the sheet being treated if necessary to obtain the proper adhesive conditions for application of the metal particles. The metal particles may be somewhat finer in this instance as the particles must pass between the granules without undue interference.

The material thus produced may constitute an adhesive coated base having a layer of metallic particles which is practically continuous except for the occupancy or penetration of granules. The entire surface thus presents a heat conducting or reflecting material which presents a pleasing appearance as well as improving the characteristics of the roofing material as above mentioned. Both the metallic particles and the granules are bonded to the adhesive. Hence the material is particularly resistant to wear.

It is obvious that the metal particles may be applied to both faces of the material, if desired, in which case any of the above treatments may be repeated on the opposite side of the material. Obviously it is preferred that an adhesive coating be provided, although it is also contemplated to use the adhesive properties of the saturant or impregnant if there be one for this purpose, especially where as may be the case if desired, the further granular surfacing is omitted. The second layer of metal particles gives additional insulating property to the material whether used for shingles or roll roofing since the second layer serves when the material is laid, to keep out summer heat and also prevents heat losses from within during cold weather. Moreover, in certain instances the metal particles may make an excellent separator.

It has previously been pointed out that the cut edges of roofing materials are especially vulnerable when exposed to the weather and it is a feature of the invention to aid in the protection of such edges by the described treatment. For this purpose the material after the cut edges to be exposed are formed is treated with any of the aforesaid adhesives in a manner to coat said edges. If in the form of a web the adhesive may be applied as by spraying the cut edges or it may be spread as a coating and be permitted to run thereover, after which the metal particles are applied by any of the heretofore mentioned means. Obviously individual shingles may be

similarly treated or may be dipped into the adhesive, and thereafter in metal particles. In either case the metal particles adhere to the edges and form a protective coating thereover. It should also be understood that granules of any character may be applied to the treated edges before or after the application of metal particles as previously mentioned.

The invention is also admirably suited to the formation of a laminated structure, comprising alternate layers of adhesive coating material such as asphalt or the like and metal particles. This may be produced from the coated material above described by coating the metallic layer with adhesive and repeating the treatment with metal particles. This successive treatment with adhesive and metal particles may be repeated as many times as required to build up a laminated material or element of the desired structure. Moreover, surfacing granules may be embedded in each adhesive coating if desired, such aiding in anchoring the successive adhesive coats firmly together. In this type of structure the metal particles serve to extend the life of the under adhesive layers since they serve to separate the adjacent layers and substantially prevent bleeding between them, during manufacture or thereafter. This obviously prevents the transmission of stresses, as of cracking, from one layer to the next.

The invention also provides a further structure wherein an additional coating is provided over the metal particles which coating may also be applied with surfacing granules. For this purpose the web is prepared as above described with a layer of asphalt or other adhesive and the metal particles are embedded therein as a substantially continuous layer.

A mixture of fibrous material such as asbestos fibre, surfacing granules of the character mentioned above and a binder that will cause the fibrous material to unite with the surfacing granules is then made, using proportions of each suitable for the effect desired. The binder may comprise a dry hydraulic cement or any other suitable material that will provide binding characteristics with the addition of liquid. This mixture is applied to the coated web in any of the ways described above for the application of surfacing granules to the coated web. It may, for example, be impelled against the surface or rolled thereon with sufficient force to cause the granules to penetrate the metal layer and to become embedded in the asphalt.

Liquid, for instance, water, is then applied to the surface of the material in quantities such that the cement is caused to react and set. When the cement has set it makes a strong bond to reinforce and secure the surfacing granules in place.

The fibrous material assists in securing the desired bond between the asphalt and granules. It also imparts a body to the cement and increases the strength of the material. The granules being mingled with the fibres supply the necessary weight to facilitate the application of the fibres to the surface of the web, otherwise the light fibres would be difficult to handle and properly apply. Obviously the fibrous coating may be applied in the form of a design or may have coloring matter such as mineral oxides or dyes incorporated therewith. In some instances the metal particle coating may be omitted and the fibrous coating applied directly to the asphalt or other adhesive base or to a base with granules embedded therein according to the surface desired.

In certain cases it may be desired to form fibre coated granules before mixing them with hydraulic cement or other surfacing material and applying them to a base. The granules may then be moistened or given a thin coating of adhesive, for instance, sodium silicate, shellac, glue material or synthetic resin or bitumen and then be rolled, mixed or otherwise brought in contact with the fibrous material to obtain such as a surface layer. Obviously the hydraulic cement or other surfacing may be omitted if desired and the fibre coated particles directly applied to the base.

The material may be used as roll roofing or covering material or it may be cut into shingle shapes such as individual shingles, strip shingles having tab-formed edges or the like, and applied as such. Obviously the web may be cut into desired shapes at any stage in the process, for example, before the aluminum flakes are applied or before the granules are applied. It may also be treated in any manner commonly used to improve properties of such material.

While a preferred embodiment of the invention has been described for purposes of illustration, it is obvious that the invention is not limited thereto. Various changes and substitutions may be made by persons skilled in the art without departing from the features hereinbefore set forth.

Aluminum flakes have been specifically referred to because of their physical and chemical properties. They are light, substantially chemically inert in air and in bitumen, resistant to water and wear, and retain their surface appearance indefinitely. Also their low cost makes them desirable for roofing purposes. Other metals, for instance bronze, while not so desirable, which have similar characteristics, may be employed if desired without departing from the scope of this invention. Any type of granule useful in the building art may be employed in connection therewith.

It is also obvious that coloring matter may be incorporated with the granules or with the cement or fibres or colored granules may be used, if desired. The aluminum flakes and granules may also be applied in the form of designs to produce a permanent design effect. Moreover, the invention may be utilized in connection with a rigid cement-asbestos base which includes bitumen binders or which includes a bituminous or other adhesive surface layer with or without the addition of granules.

The invention is only to be limited in accordance with the following claims when interpreted in view of the prior art.

I claim:

1. The method of applying asbestos fibres to a surface which comprises adhering individual roofing granules to said fibres and applying the mixture to said surface, the granular material being of sufficient mass whereby to act as a carrier for the asbestos fibres to assist in the distribution and application thereof.

2. The method of making a bituminous roofing material which comprises applying fine metallic particles to a material having a bituminous surface, under conditions such that the particles become bonded to the bitumen to form a substantially continuous coating, and applying a mixture of cement, fibrous material and granules to said coating under conditions such that the granules penetrate the coating and become em-


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bedded in the asphalt and the cement mixture acts as a binding and reinforcing means to assist in holding the fibrous material in place.

3. A composition roofing material or the like comprising a base coated with adhesive, and having a surfacing of individual granules coated with a mixture of fibres in cement partially embedded in the adhesive.

4. An individual coated granule for roofing and the like comprising a granule and a substantially continuous surfacing of asbestos fiber thereon.

5. Roofing material or the like comprising a base, bitumen on said base, surfacing granules embedded in the bitumen, and a weather, and heat and light reflecting facing, consisting of aluminum flakes masking the bitumen between the granules and anchored to said bitumen.

6. Composition roofing comprising a base having its upper side faced with bitumen and having a continuous layer of metal flakes bonded to said bitumen, said roofing having an additional bitumen facing extending over the portion to be exposed when the roofing is laid and said additional bitumen facing having a continuous layer of metal flakes bonded thereto, the under metal flakes serving to separate the bitumen strata and the exposed metal flakes serving to produce a heat and light reflecting surface for the roofing.

7. An individual coated granule for roofing material comprising a granular core and a surfacing of mineral fibrous material surrounding said core.

8. Roofing material or the like comprising a base, bitumen on said base, surfacing granules embedded in the bitumen, and a weather, and heat, and light reflecting facing consisting of metallic flakes masking the bitumen between the granules and anchored to said bitumen.

9. Composition roofing as claimed in claim 6, wherein the metal flakes are aluminum flakes.

10. The method of making roofing and siding comprising forming a base with a bonding facing, wetting individual roofing granules with a liquid coating, adhering the wetted granules to mineral fibrous material under conditions that the individual granules become surrounded with a surfacing of fibrous material, and applying the fiber surfaced granules to said base facing in a manner such that the granules and fibrous coating become bonded thereto.

11. A method of making roofing material and the like comprising adhering mineral fibrous material to individual roofing granules to form a surrounding fiber coating thereon, mixing the fiber coated granules with a composition comprising cement and applying the mixture to base material having an adhesive surface under conditions such that the coated granules become bonded to the adhesive, and hardening the cement composition.

12. The method of making roofing material and the like comprising applying metallic flakes to a material having an adhesive surface, under conditions such that the flakes become bonded to the adhesive to form a substantially continuous layer, adhering mineral fibrous material to a multiplicity of individual granules to form fiber coated granules, mixing the fiber coated granules with a composition comprising hydraulic cement, and applying the mixture to the adhesive base under conditions such that the coated granules penetrate the metallic layer and become bonded to the adhesive, and hardening the cement composition.

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