

March 21, 1933.

H. C. AVERY ET AL

1,902,298

ROOFING AND BUILDING MATERIAL

Original Filed March 9, 1925

Fig. 1

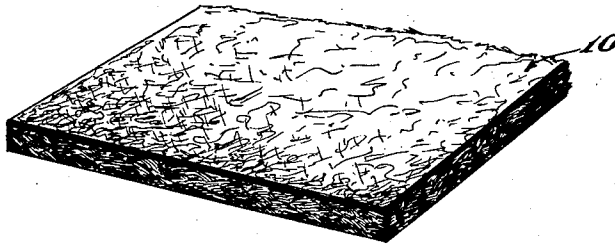


Fig. 2

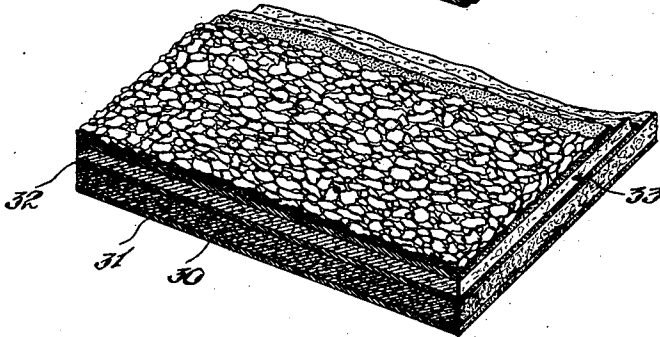
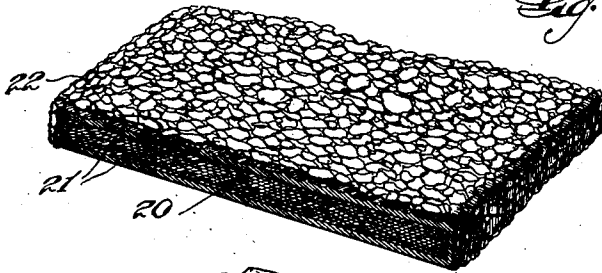


Fig. 3

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ROOFING AND BUILDING MATERIAL

Continuation of application Serial No. 14,122, filed March 9, 1925. This application filed March 2, 1931.
Serial No. 519,656.

This application is a continuation of our previously filed application, Serial Number 14,122, filed March 9, 1925.

This invention has relation to a rigid fibrous material, such as may be employed for a variety of purposes wherein heat-nonconductivity and a water-repellent quality are desirable.

The object of the invention is to produce a material which is rigid, light in weight, nonconductive to sound or heat, water and weather resistant, and useful in the manufacture of roofing or siding elements, partitions, wall board, or the like.

The foundation or base comprises a thick, highly porous or cellular sheet produced by matting or felting together coarse, unrefined fibers of cellulosic material, such as are produced from sugar cane, rice stocks, cocoanut, hemp fiber and the like. These fibers, with or without sizing additional to that inherent to the coarse decorticated raw material, are formed into suitable sheets of any desired length, breadth and thickness, but usually for the purposes to which the sheet is to be devoted, the sheets are approximately three-eighths of an inch in thickness. The sheets are flattened, if necessary, and are dried to remove free moisture, and are then rigid and relatively inflexible. A characteristic of this material is that it is light in weight and possesses a great multiplicity of large void cells or interstitial spaces between the fibers, differing in this respect from such material as flexible felt or paper produced from cotton rag and other short refined fibers.

The base or foundation so produced is now treated in such manner as to coat the individual fibers of the sheet with films of water-repellent material, without filling the characteristic void cells and interstitial spaces, as a result of which the light weight of the foundation is not materially increased, and its desirable qualities, flowing from the presence of the void cells and spaces, are unimpaired. The material employed for the purpose forms a film upon and may penetrate the individual fibers, and preserves them from deterioration and decay. Any suitable material for the purpose may be employed, such as one which

is initially liquid, or which is liquefiable by the application of heat or the employment of an organic solvent, or which is dispersed in an aqueous medium. Thus there may be used to advantage various thermoplastic compounds or compositions, such as gums, waxes, tars, bitumens, or other water-repellent materials. Thus, for example, such materials may be dispersed in an aqueous medium in colloidal particles of such small size as to penetrate the canals and voids of the foundation sheet and be deposited on the fibers. The aqueous emulsion or dispersion may be placed in a suitable receptacle and the sheet immersed therein, pressure or vacuum, or alternating pressure and vacuum, being employed to assist the penetration of the sheet, and the excess material being removed by similar means. The water is removed and the sheet heated and dried,—leaving the sheet in such condition that it possesses multitudinous large void interstitial cells or spaces, and with the fibers coated with fused films of the water-repellent material. Or if desired, the sheet may be impregnated with a "cut back" asphalt, i. e., asphalt dissolved in a suitable solvent. In such case, the impregnation may be accomplished in the manner previously described, following which the solvent is eliminated by heat, leaving the fibers coated with films of the thermoplastic water-proofing material. In certain instances the base or sheet is impregnated with a water-proofing material consisting of an asphaltic oil, either crude or refined to a consistency of heavy residuum. In such case the base or sheet is impregnated either at the normal atmospheric temperature or at a somewhat elevated temperature, is then heated to remove excess impregnating material, and then subjected to heat, steam and air treatment so as effectively to oxidize the asphaltic material contained in the saturant, thereby producing in situ airblown asphalt films about the fibers. As the effect of oxidizing asphalt is to elevate its melting point and to change it into a product which is not easily formed into thin films by reason of its thickness and viscosity at temperatures at which unoxidized asphalt is a thin liquid, the oxidization of the asphalt after it has

been applied to coat the individual fibers may be advantageous since the unoxidized asphalt is more readily introduced into the sheet and at lower temperatures than is oxidized asphalt, and is better adapted for forming thin films on the fibers without clogging the spaces between the fibers. By regulating the character and consistency of the initial saturant in relation to its asphaltic content and the subsequent condition of oxidation, a sheet or base product is produced having the desired relation between the thickness of the coating films, the void spaces, and the hardness of the asphaltic conversion product. By following any of the procedures hereinbefore briefly described, a sheet material is produced which is light in weight, rigid, strong and weatherproof, which can be sawed or cut into smaller pieces like a board, which is relatively non-conductive to sound and heat, and which may be used for a large number of purposes.

Advantageously, the base material so prepared may be subsequently coated on one or both faces and on edges to be exposed to the weather with a relatively high melting point air-blown asphalt of high viscosity. In the application of the coating, in a molten or plastic state, care is exercised to prevent the asphalt from being heated to such an elevated temperature that its fluidity or limpidity will cause it to penetrate into the sheet and fill the interior voids and interstitial spaces. In other words, the temperature should be so regulated as to ensure a viscosity such that an adherent external continuous layer of asphalt will remain interlocked on the surface of the base material without destroying its cellular character. While the coating is plastic, in some cases it is showered with crushed slate or other suitable mineral material, which is partially embedded therein, to form the surface layer on the board, this layer constituting a substantially continuous protective cover for the asphalt masking it from light rays and shielding it from these and other deteriorating elements of the weather.

In other cases, there is applied to the cellular base, a sheet of the customary or commercial mineral surfaced roofing material comprising the usual felted fibrous foundation impregnated with a waterproofing material and coated on the face to be exposed, with a layer of weatherproof material, such as high melting point asphalt in which may be blown or oxidized asphalt, so-called, having partially embedded therein a layer of surfacing grit such as crushed slate, slag, talc and the like. The sheet of mineral surfaced roofing material may be united to the cellular base by interposing a film or layer of high melting point asphalt, or other weatherproof adhesive, between one of the faces of the cellular base and the face of the sheet of roofing material that is free of the mineral grits, and

subjecting the laminated structure to suitable temperature and pressure conditions to cause a proper setting of the adhesive and a firm union between the cellular base and the roofing sheet.

Instead of an external layer of asphaltic roofing material, there may be applied to the treated and coated base, a facing sheet of waterproof paper-board, veneer wood, or the like, capable of receiving an ornamentation of paint, or of being otherwise decorated.

In the drawing,—

Figure 1 shows the initial starting material, consisting of a cellular sheet of more or less felted unrefined fibers;

Figure 2 shows one form of the finished product;

Figure 3 shows another form of finished product.

Referring to the drawing, Figure 1 illustrates somewhat conventionally at 10, the initial or starting material which may be termed the foundation or base, and which, as previously stated, consists of a rigid mat or sheet of interfelted coarse unrefined fibers having between them large void spaces and interstices. Figure 2 illustrates the same at 20 after it has been treated with the waterproofing material and after there have been applied thereto the external blown-asphalt coating 21 and the surface layer 22 of crushed slate.

Figure 3 illustrates a product adapted to be used among other purposes, as a roofing unit to be laid in overlapping courses. This product comprises a base 30 such as that hereinbefore referred to, as the foundation or base 10, having on its bottom surface a layer or film 31 of suitable weatherproof material, such as a high melting point asphalt, which includes oxidized or blown asphalt, so-called, and having on its top surface a layer or film 32 of weatherproof material such as high melting point asphalt, uniting to the cellular base a sheet of roofing material 33, with the surfaced face of the roofing material being exposed.

From the foregoing description it will be observed that the material may be employed as a wall board and exposed to the weather without deterioration, since it is water and weatherproof. It may be made in the form of clapboards or of roofing shingles or tiles of various shapes, which by reason of their thickness and rigidity not only present a pleasing appearance, but also do not curl and are not blown up by the wind. Being strong and rigid, they may be walked on without injury. While in most cases it is desirable that the coarse fibers should be individually protected by films of water-repellent or waterproof material, yet for some purposes the impregnation may be omitted, and the coating of high melting point blown asphalt be applied to the initial sheet after it has been

formed and dried. This seals the outer surfaces of the sheet without affecting its cellular structure or filling the voids therein.

In the form of the product illustrated in Figure 3, the mineral surfaced weather-resistant sheet united to the base, adds greatly to the structural strength and other properties thereof so that a much thinner base of cellular material, as heretofore disclosed, may be used for the production of units having high heat and sound insulating properties and capable of withstanding the action of the elements. Where the product in this form is used as a covering for a roof or side wall and laid in successive overlapping courses, in a manner customary with roofing shingles, the completed structure will possess heating insulating values greatly in excess of that attributable to the base or foundation of the individual units that may be employed. Furthermore, the fabrication of the units in the composite form illustrated and described, avoids the necessity of separately applying the heat insulating element and the weather resisting sheet or covering, and hence brings about a large saving in the labor cost for building up the combined structure on the job.

We claim as our invention:

1. A constructional unit comprising a rigid base consisting of a layer of coarse interfelted fibers with a plurality of relatively large interstitial voids, said base having a weather-resistant coating on one face thereof and a sheet of asphalt impregnated, asphalt coated and mineral surfaced roofing material secured to the opposite face thereof by means of a film of a weatherproof adhesive.
2. As an article of manufacture, a constructional unit comprising a substantially rigid base consisting of a layer of coarse interfelted fibers having large interstitial voids, the fibers of said base having a film of a weatherproof medium thereon which does not fill the voids, said base having a layer of felt base asphaltic roofing material firmly united to one face thereof by means of a film of an adhesive asphaltic composition.
3. As an article of manufacture, a constructional unit comprising a substantially rigid base consisting of a layer of coarse interfelted fibers with relatively large interstitial voids, said base having a weather-resistant asphaltic coating on one face thereof and a layer of felt base asphaltic roofing material firmly united to the opposite face thereof by means of an asphaltic weatherproof adhesive.
4. As an article of manufacture, a constructional unit adapted to be laid in overlapping courses, said unit comprising a substantially rigid base consisting of a layer of coarse interfelted fibers with a plurality of relatively large interstitial voids, said base

having firmly secured thereto by means of an asphaltic adhesive, a layer of asphalt impregnated felted fabric coated on one side with an adhesive asphalt composition having surfacing grits partially embedded therein. 70

5. As an article of manufacture, a constructional unit adapted to be laid as an exterior covering material, said unit comprising a substantially rigid base consisting of a layer of coarse interfelted fibers with a plurality of relatively large interstitial voids, said base having firmly secured thereto by means of a bituminous adhesive, a layer of bitumen impregnated felted fabric coated on one side with an adhesive bituminous composition having surfacing grits partially embedded therein. 75 80

Signed at Rutherford in the county of Bergen and State of New Jersey this 27th day of February A. D. 1931. 85

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