UNITED STATES PATENT OFFICE.

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ROOFING-FELT.

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No Drawing. Application filed February 7, 1918. Serial No. 215,891.

To all whom it may concern:

Be it known that I, ALBERT L. CLAPP, a citizen of the United States, residing at Marblehead, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Roofing-Felts, of which the following is a specification.

This invention has relation to the art of felt-making and also relates to the manufacture of prepared weatherproof roofing material.

In the manufacture of artificial or prepared shingles or sheet roofing there are used certain weatherproof pitchy asphaltic bituminous or hydrocarbon compounds of such character that they will withstand solar heat and the action of the elements, when exposed on the roof or side of a building. Various materials of this general character are used for impregnating and for coating the roofing material. It is preferable for the saturating compound, however, to employ those materials which have a relatively low melting point, and to use for the coating or facing materials having a relatively higher melting point and which are relatively tough and hard. These various materials cannot be used alone, *i. e.* formed in thin slabs, and consequently it is necessary to use some sort of porous foundation or support therefor. Heretofore it has been customary to utilize for this purpose what is known as felt, which consists largely of rag fibers, sometimes with a small amount of wool fiber incorporated therein. Such felt of the desired thickness is first impregnated with the saturating compound, which may consist of a low-melting-point tar asphalt or a mixture of soft asphalts, rosins, oils, wax tailings, etc. The saturating compound is rendered molten by heat and the sheet of felt is carried therethrough. Then there is applied to one or both faces of the impregnated sheet a coating of a relatively harder compound, such as higher-melting-point asphalt or a mixture of pitches and asphalts. Sometimes there is incorporated in the coating pigments of an inert nature which impart their color thereto. For this purpose red iron oxid is frequently used.

According to modern practice, however, it is customary, while the exterior coating is soft and plastic, to apply thereto a thick facing or layer of crushed slate, grit, or other granular comminuted or crushed material, the granules of which are partially embedded in the soft and plastic coating. Ornamental effects are secured by using mineral materials of different colors and applying them in designs in spaced areas on the surface of the sheet.

The support or foundation, which serves as the medium for holding in place the saturating waterproofing compound and the exterior coatings or facings, must be of such character that the molten saturating compound may easily penetrate it within a short space of time. In order that the roofing material may be produced at low cost, it is necessary that the sheet of felt or the sheet forming the support should be fed through the molten bath of saturating compound at a relatively high speed, and it will be understood by those skilled in the art that the greater the degree to which the support is saturated, the greater will be the durability thereof. According to the requirements of the National Board of Underwriters, prepared roofing used for shingles or the like must have at least a certain minimum weight per square foot. Hence, if the foundation or support is characterized by slow penetrability, the saturating compound must be so soft that it is impracticable and will, when the roofing is laid, ooze from the roofing, or else the compound must be heated, to such a degree of temperature as to injure the foundation or support as it is passing therethrough.

After long experimentation, I have succeeded in producing, for use as a foundation or support for roofing material, what may be termed a felt which is characterized by three optimum characteristics: first, it is of sufficient strength to withstand the strains to which it is exposed during the impregnation and coating operations; second, it has a high degree of penetrability so that it may be saturated to a maximum extent more rapidly than heretofore found practicable; and, third, it is of such flexibility that, after being saturated and coated, it does not readily break when bent at a relatively sharp angle.

By the present invention I have succeeded in producing a felt having the optimum characteristics, by incorporating in the felt in the manufacture thereof a quantity of sawdust, by which interstices are formed in the fabric without weakening the same and

thereby increasing the porosity and penetrability of the felt. The sawdust is preferably relatively fine so that lumps are not formed on the surface of the felt, and in fact I frequently find it desirable to employ sawdust of two grades, to wit that of soft wood, and fine sawdust of hard wood such as produced in sawing veneers, etc. Both kinds of sawdust are fibrous in character, and are more or less permeated by the saturating compounds. If ordinary sawdust is employed it should be screened, and that portion used which will pass through a 25 to 50 mesh sieve, to secure the best results.

The sawdust and the rag fiber are placed in a beater engine and subjected to the operation thereof until the pulp is of the proper consistency after which it is formed into a felt web or sheet according to the known methods followed in making felt.

Instead of employing only rags, I preferably use a mixture of rags and paper, such as waste newspapers. The proportion of these two components may be varied within relatively wide limits, but for all general purposes I find that a mixture of 60 parts by weight of rags to 25 parts of paper, produces the best results. This amount of paper imparts a certain degree of stiffness and strength to the resultant felt without detracting from the requisite flexibility thereof.

In practice, I place 60 parts by weight of rags, and 25 parts by weight of newsprint in the beating engine together with the proper quantity of water, and they are subjected to a beating operation for about an hour. Then about 15 parts of sawdust (half soft wood sawdust and half very fine hard wood sawdust) are added to the beater, and the mixture beaten for about an hour and a half, the beating operation serving to reduce the larger particles of wood, and to form a practically homogeneous pulp, *i. e.* with the sawdust fully distributed therethrough. The pulp is then formed into felted sheets according to the usual methods which need not be described.

While, as I have stated, any relatively fine sawdust of any suitable kind may be employed, I preferably use and recommend a portion, at least, of fairly minute hard wood sawdust, but in any event the sawdust should not be of such large grains as to form lumps on the surface of the sheet, as these lumps are subsequently rendered more prominent after the saturating and coating processes to which the sheet is subjected in the manufacture of prepared roofing.

Felt formed as herein described is soft and pliable. It possesses the desired tensile strength, and because of the presence of the particles of sawdust, the felt is full of voids and interstices into which the saturating compound may penetrate rapidly, so that the sheet may be fed at relatively high speed through the saturating vat.

I find that such felt is capable of absorbing and retaining a greater weight of saturating compound per square foot, than ordinary felt of the same thickness manufactured of rag fiber, or of a mixture of rag fiber and paper stock.

After the felt is formed as herein described, it is saturated with a relatively low melting point molten tar or asphaltic compound, and then, if desired, coated on one or both faces with a higher melting point pitch or asphalt, into which, while the coating is soft and plastic, grit is embedded therein to give to the felt a greater fire-resistant quality and to present an ornamental appearance.

What I claim is:

1. As a new article of manufacture, a flexible sheet composed of a mixture of rag fiber and sawdust intimately commingled in such proportions as to result in a product of high penetrability and tensile strength so as to adapt it as a foundation for prepared roofing.

2. As a new article of manufacture, a flexible sheet composed of a mixture of rag fiber, paper stock and sawdust intimately commingled and beaten together in such proportions as to result in a product having high penetrability and tensile strength so as to adapt it for a foundation for prepared roofing.

3. As a new article of manufacture, a flexible sheet of high penetrability, adapted for a foundation for prepared roofing, comprising a mixture of approximately 60 parts by weight of rag fiber, 25 parts by weight of paper stock and 15 parts by weight of sawdust, all intimately commingled.

4. As a new article of manufacture, a flexible sheet of high penetrability, adapted for a foundation for prepared roofing, composed of a mixture of rag fiber and the sawdust of soft wood and hard wood all intimately commingled.

5. As a new article of manufacture, a flexible sheet of high penetrability, adapted for a foundation for prepared roofing, composed of a mixture of rag fiber and sawdust, such sawdust consisting of relatively coarse particles of soft wood and relatively fine particles of hard wood, all intimately mixed and beaten together.

6. As a new article of manufacture, a roofing sheet composed of a foundation of felt having sawdust incorporated therein and forming voids or interstices, and containing in the pores and interstices of the sheet and the fibers thereof, an asphaltic compound substantially as herein described.

In testimony whereof I have affixed my signature.

ALBERT L. CLAPP.