UNITED STATES PATENT OFFICE.

GUILFORD CRESSE GLYNN, OF KANSAS CITY, KANSAS, ASSIGNOR TO THE WILBERITE ROOFING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

WATERPROOF MATERIAL.

1,330,443. Specification of Letters Patent. Patented Feb. 10, 1920.

No Drawing. Application filed April 4, 1918. Serial No. 226,742.

To all whom it may concern:

Be it known that I, GUILFORD CRESSE GLYNN, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Waterproof Materials; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to water-proof material and more particularly to roofing or the like of a character like that consisting of a felt or fabric body filled or coated with asphalt or other bituminous material.

Roof coverings of the bituminous type are ordinarily produced, in sheet and shingle form, by immersing fabric or felt in hot bitumen, the consistency of which may be varied by introducing higher or lower penetration materials to control the viscosity of the finished product. Coating material of a consistency different from that used for saturation is usually flowed on the saturated felt or fabric to complete the product.

The bitumens used are viscous in their nature, deforming under stresses, movement of the asphaltic molecules on each other being only resisted by the internal molecular friction or viscosity of the fluid, which is entirely independent of the pressure; the rate of movement or flowage being conditioned by the temperature, softening and stickiness occuring in hot weather and hardness and brittleness in cold weather. Such defects are sought to be controlled by predetermination of the viscosity of the bituminous material.

In utilizing bitumens for roofing purposes, other considerations must be recognized, such as the effectiveness of the covering, durability, resistance to both chemical and physical changes, weathering, wind vibration, warping of the supporting structure, settling, snow-loading, fire resistance, slow transmission of heat, etc.

A most practical material for such roofing should not be dependent alone on the efficient use of bitumen, but, for economy, should require a minimum of bitumen and substitution of a less expensive material to an extent not prejudicial to its advantages.

It is the object, therefore, to produce roofing or like material having the advantages of the ordinary asphalt or bituminous filled and coated sheet or shingle, but wherein other material is substituted for a part of the bitumen, to effect economy and other advantages hereinafter described.

To this end I employ soils which exist in such condition that colloidality can be readily induced, are highly silicious and have such peculiar characteristics as to size of grain, pore space and specific gravity as to require a minimum amount of bitumen for the production of a commercially workable mixture for roofing purposes.

By the term soil I mean the aggregate formed from rock weathering, particularly when chemical decomposition has contributed largely to the product thus formed.

In carrying out this process, the selected soil is broken up with an excess of water, so that separation by elutriation, sedimentation or other convenient means of classification is possible and the material brought to such condition that oversize content, such as gravel, and sand, may be removed, it being desirable to retain silt and finer particles down to and including collodial suspensoids and true colloids. Separation of the soil particles in heated water and with the aid of suitable deflocculants, as outlined in my Letters-Patent No. 1,227,903, is particularly effective.

This soil-water suspension of proper consistency, such as that approximately not over 40 per cent. water by weight and at a temperature of 200° F., may be combined readily with heated bitumens, and such combination is preferably effected by placing the suspension in an agitator wherein both translatory and rotative motion is effected and the bitumen added during the agitation.

The bitumen adheres by selection to the more finely divided suspensoids, due to the soluble phase at the inner-face of the smaller particles, so that the adherent, aqueous film thereon forms an inter-soluble zone or phase which is more miscible both to bitumen and water than the inter-face that separates such phases upon the larger particles.

For this reason I prefer to first feed to the agitator a bitumen for coating the smaller particles, then the asphalt and finally a solvent such as dead oils, which

often contain naphthalenes, phenols, cresols and analogous substances, having the property of miscibility or slight solubility in both water and bitumen and of acting as a solvent for the bitumen previously added. Such a solvent acts to partially dissolve the suspensoid particles of bitumen and causes the coarser silicious particles of the soil to become coated with the intersoluble mixture. Solvents derived from coal tar, such as benzols, napthalenes, phenols and cresols are desirable and effective for lowering viscosity and securing proper consistency in the product.

The bituminous-soil mixture thus formed is then combined with a roofing felt, preferably by drying the suspensoid product and then refluxing or melting the product with such changes in consistency as the exigencies of the case require, whether it is to be used for saturation or for coating of the felt fabric.

The bitumen-soil mixture when properly prepared is readily taken up by the felt without precipitation or filtration and then forms an impermeable product, that is not only highly efficient for roofing or like purposes but has the advantage of greatly reduced cost due to the displacement of a material proportion of the bitumen with the much cheaper soil ingredient.

In this way I take advantage of the peculiar availability, desirable characteristics and practical economy of felt, soil and bitumen as desirable and durable materials for roofing and more particularly for the production of shingles, wherein the requisite form, stability, adaptability and economy of use predominates.

Having thus described my invention, what I claim as new therein and desire to secure by Letters-Patent, is:

1. Water proof material consisting of a felt saturated with a mixture of bitumen and soil.

2. Water proof material consisting of a felt saturated with a fluxed mixture of bitumen and soil.

In testimony whereof I affix my signature.

GUILFORD CRESSE GLYNN.