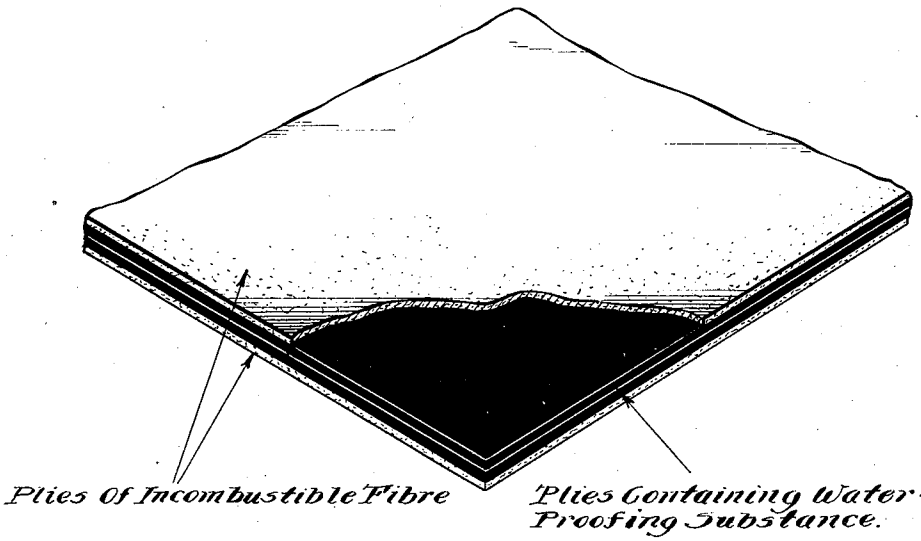
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WATERPROOF COMPOSITION AND PROCESS IN MAKING SAME

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WATERPROOF COMPOSITION AND PROCESS IN MAKING SAME.

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This invention relates to improvements in waterproof compositions and process in making same, and refers more particularly to the formation of a multiply felted sheet which is or may be formed on a multicylinder paper machine.

Among the objects of the invention are to provide a novel multiply sheet in which the inner ply or plies are waterproofed with a pitchy or bituminous waterproof medium, and in which the outer ply or plies are formed of an incombustible fibre, thereby producing a sheet which is both waterproof and fire resistant; to produce a multiply sheet in which the inner plies serve not merely as a waterproofing ply, but also to substantially reinforce the strength of the outer plies and the sheet as a whole; to produce a product in which the waterproofing of the inner plies takes place simultaneously with the sheet or felt forming operation; to produce a product which can be made on the standard form of multicylinder paper machines without any substantial modification or change thereof; to provide a process in which the waterproofing agent is wholly in the form of a non-adhesive emulsion as it passes from the wet end of the paper forming machine, thus preventing any gumming up of the wires or blankets or other interference with the operation of the machine; to provide a process in which the outer ply or plies formed of the incombustible fibre may itself be covered with a bituminous or pitchy coating and to which, if desired, a granular or gritty surface of any desired character may be applied; to provide a process in which one of the outer plies may be formed of asbestos and the other of felted paper stock which may be impregnated or saturated with bitumen or asphalt during the felting operation; to provide a process which permits of the use of a wide variety of fibres as well as a wide variety of pitches or bitumens; and in general, to provide an improved product and process of the character referred to. The single figure in the drawing is a diagrammatic perspective view of a sheet produced by our invention in which the character of the different plies has been designated.

In carrying out our process on the multicylinder machine, the inner plies may be formed of rag stock or other suitable paper stock, while either or both outer plies may be formed of incombustible fibre, as for example, asbestos or mineral wool. While substantially incombustible, the fibres of the outer plies do not in themselves inherently possess much strength, it being well known in the art that asbestos fibre felts imperfectly, and thus a sheet having relatively little strengths is produced. On the other hand, inner plies formed of paper stock impregnated or saturated with a continuous pitchy or bituminous medium have inherent strength and felt without difficulty. Moreover, the present process permits of wide ranges of strength due to the ability to select many different kinds of fibres and different forms of pitchy or bituminous binders. By a non-adhesive emulsion of normally adhesive asphaltic binder we refer to solid and semi-solid asphalts converted into dispersed form by means of an emulsifying agent substantially as described of such a character and in such a manner that the dispersed binder may, when mixed with fibrous stock, be run over a paper machine and thereby subjected to the pressure and contact with wires, blankets, press and couch rolls without adhering thereto or gumming them up or preventing the proper functioning of the parts. The adhesive or asphaltic binder in such non-adhesive form is distinguished from its normal adhesive condition in that when otherwise treated or otherwise attempted to be mixed with fibrous stock its adhesive nature would in a short time prevent its use in the paper forming operation through the adhesive action on the parts thereof.

In operation the emulsified binder has been incorporated into the stock in a non-adhesive form but it has been found advantageous to employ a fixing agent such as alum or a combination of silicate of soda and alum which causes the dispersed binder to be carried more effectively onto the sheet.

The process may be carried out in the following manner on a multicylinder paper machine.

We may first make a paste of water and clay. To this is added solid or semi-solid asphalt or analogous binder or other pitchy binder in a heated liquid condition and in such a way as to form a non-adhesive emulsion in which the particles of asphalt are

finely dispersed through the aqueous vehicle, the pitchy or bituminous binder forming the internal phase, and the water carrying the clay, the external phase of the emulsion.

This non-adhesive emulsion is then mixed with a fibrous stock either in the beater engine of by introducing it with the stock at the screens prior to reaching the cylinder machine. The fibrous stock may be of a character adapted to the particular purpose for which the sheet is to be used, as for example, if the sheet is to be used for roofing purposes, rag stock might be advantageously employed or mixtures of rag stock with old papers and sulphite screenings. In such case, the amount of asphalt introduced into the stock will approximate 100 to 150 parts of asphalt by weight to the dry fibrous stock. This constitutes the furnish for the inner plies of the sheet, and is fed to the inner cylinders of the machine. For the outer plies the asbestos stock is put into the beaters and beaten up in the usual manner, after which it is fed to one or both of the outer cylinders of the paper machine where it is formed into a web simultaneously with the formation of the inner plies. This web is carried along by the blanket, making up with the webs formed on the inner cylinders, producing a multiply sheet which is carried through the press rolls and over the driers in the usual manner. As the sheet passes over the machine the water is removed by the various press rolls until the web is of sufficient strength to transfer to the driers where sufficient heat is applied to completely remove the water and to cause the bitumen in the inner plies to coalesce and form a continuous pitchy medium or coating about the fibrous stock. The effect of the presence of asphalt or other pitchy binder in the plies is to firmly cement or unite the asbestos outer ply or plies with the inner plies in such a manner as to produce a unitary thoroughly bonded sheet, the plies of which may not be readily separated.

If desired, a bituminous or other coating may be applied to one or both of the outer plies as heretofore stated, and in addition a granular or grit facing may be applied to such coating.

A characteristic feature of this product is that if the outer plies are wet and subject to abrasion, the unsaturated portions can be rubbed away until the inner plies are exposed whereupon the waterproof character of the inner plies precludes further removal by attrition.

The product produced by the process above described may be used as waterproof and heat-resisting coverings in various arts, as, for example, roofing elements, packing, insulating, or the like, and in fact wherever it is desirable to use a sheet having incombustible fibre and waterproof qualities.

We claim as our invention:

1. A waterproof, fire resistant multiply sheet consisting of a plurality of felted plies, one or both of the outer plies being formed of substantially incombustible fibre, the inner ply or plies being formed of fibre of a different character, and a continuous pitchy medium extending through and saturating the inner ply or plies, said sheet possessing the characteristics of having been united while simultaneously formed from wet pulp.

2. A waterproof, fire resistant multiply sheet consisting of a plurality of felted plies, one or both of the outer plies being formed of substantially incombustible fibre, the inner ply or plies being formed of fibre of a different character, and a continuous bituminous binder extending through and saturating the inner ply or plies, said sheet possessing the characteristics of having been united while simultaneously formed from wet pulp.

3. A waterproof felted composition, consisting of a multiply sheet having an outer ply formed substantially of felted asbestos fibre, having an inner ply formed of a strength giving fibre of different character than the fibres of the outer ply, and a pitchy binder containing a bitumen and a colloidal agent extending through and saturating said inner ply and adhesively uniting the said inner and outer plies together.

4. A waterproof felted composition, consisting of a multiply sheet having one or both of the outer plies formed substantially of felted asbestos fibre, having an inner ply or plies formed of a strength-giving fibre of different character than the fibres constituting the outer ply or plies, said inner ply or plies constituting a body portion, and a bituminous binder extending through the body portion in the form of continuous films coating the fibres and saturating said body portion, said plies possessing the characteristics of having been united while simultaneously formed from the wet pulp.

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